Dallas/Fort Worth to Meridian Passenger Rail Study

TxDOT Rail Division
I-20 Corridor Council

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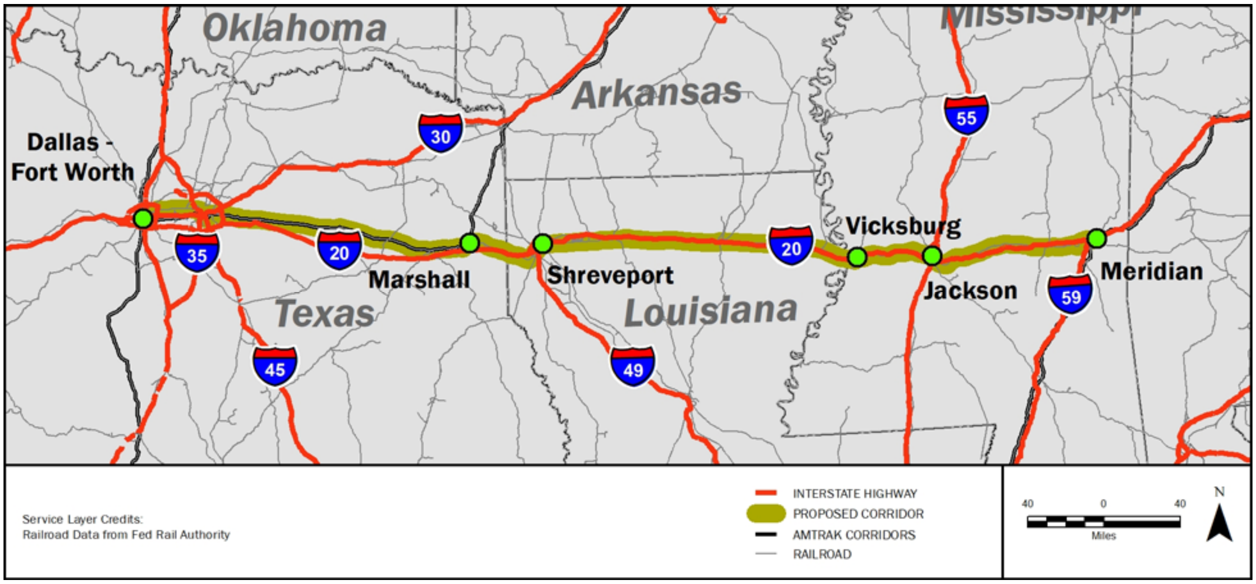
Section 1: Executive Summary

Purpose of the Study

The purpose of the Dallas/Fort Worth to Meridian Passenger Rail Study is to identify additional infrastructure needs and perform a benefit-cost analysis to implement a reliable passenger rail service from Fort Worth, Texas (TX) to Meridian, Mississippi (MS). The conceptual engineering, which is summarized in this report, is based on existing track and train count characteristics and the National Railroad Passenger Corporation's (Amtrak) anticipated station stops and schedule.

The feasibility of providing passenger rail service on the Meridian – Fort Worth corridor (see **Figure 1-1**) or along a portion of it has been previously studied. Several prior reports and state rail plans, summarized in this report, have identified the need to evaluate this feasibility.

Figure 1-1: Project Corridor between Fort Worth, Texas and Meridian, Mississippi



Methodology

For the purposes of this study, potential infrastructure improvements are limited to siding installations and extensions within the corridor. The methodology for identifying infrastructure improvements is dependent on the available data for each segment of existing track. The following methodology represents two separate approaches for identifying possible infrastructure improvements within the project corridor.

Fort Worth, TX to Dallas, TX:

1. *High-level review of passenger rail service within the* Trinity Railway Express *TRE corridor* –Review the current TRE commuter train schedules, current Amtrak Texas Eagle passenger train schedules, and the potential Amtrak passenger rail schedule to identify possible train meets within the corridor.

Dallas, TX to Meridian, MS:

2. *Compare existing Amtrak corridors and their characteristics* –A multi-stage approach to identify potential passing siding locations for this corridor segment includes:
    a. Determine project corridor characteristics between stations on the Amtrak route.
    b. Identify existing Amtrak corridors located within or near the project corridor.
    c. Review lengths and spacing of siding and double track locations, type of signalization and maximum allowable train speeds on the existing Amtrak corridors.
    d. Review existing freight and passenger train volumes on the existing Amtrak corridors.
    e. Review On-Time Performance (OTP) of selected existing Amtrak service.
    f. Identify and compare variables (indicators) on infrastructure, train volumes and OTP between the selected Amtrak corridors and the project corridor between station limits.
    g. Determine potential passing siding infrastructure improvements based on results from the comparison of indicators.

Improvements

To identify passing siding improvements within the corridor, the data was reviewed and compared between corridor segments and indicators. These indicators include the infrastructure, operations, and OTP data.

A spreadsheet-based model was created and run for the potential Amtrak schedule for the corridor length from Fort Worth, TX to Meridian, MS to validate Amtrak's schedule from the evaluation that Amtrak conducted (using Alternative 3).

The Fort Worth, TX to Dallas, TX segment was evaluated separately from the other potential passenger rail corridors since it is the only segment from the project corridor that currently has commuter service. Given the elevated number of commuter trains running in this segment, a high-level schedule review was conducted to evaluate the impacts of the anticipated passenger rail schedule provided by Amtrak.

To complete the evaluation, the Dallas, TX to Meridian, MS segment was divided into the following sub-segments:

- Dallas, TX to Marshall, TX;
- Marshall, TX to Shreveport, LA;
- Shreveport, LA to Vicksburg, MS; and
- Vicksburg, MS to Meridian, MS.

The indicators described within **Section 5** of this report were compared between the selected existing Amtrak routes and the Dallas, TX to Meridian, MS study segments. These indicators included:

- OTP,
- existing passing sidings,
- percentage of double track,
- freight and passenger train counts, and;
- corridor capacity.

The comparisons were conducted using simple regression analysis, with graphs to visualize the association between indicators and the calculation of the R^2 coefficient to understand the strength of the relationship between these indicators. The observed regression with the strongest association between indicators and the highest R^2 value was between the total number of daily trains and percentage of double track for those corridors with an OTP equal or greater than 80%, as seen in **Figure 1-2**.

Figure 1-2 Percentage of Double Track Compared with the Total Number of Trains by Corridor Segment with an OTP Equal or Higher than 80%

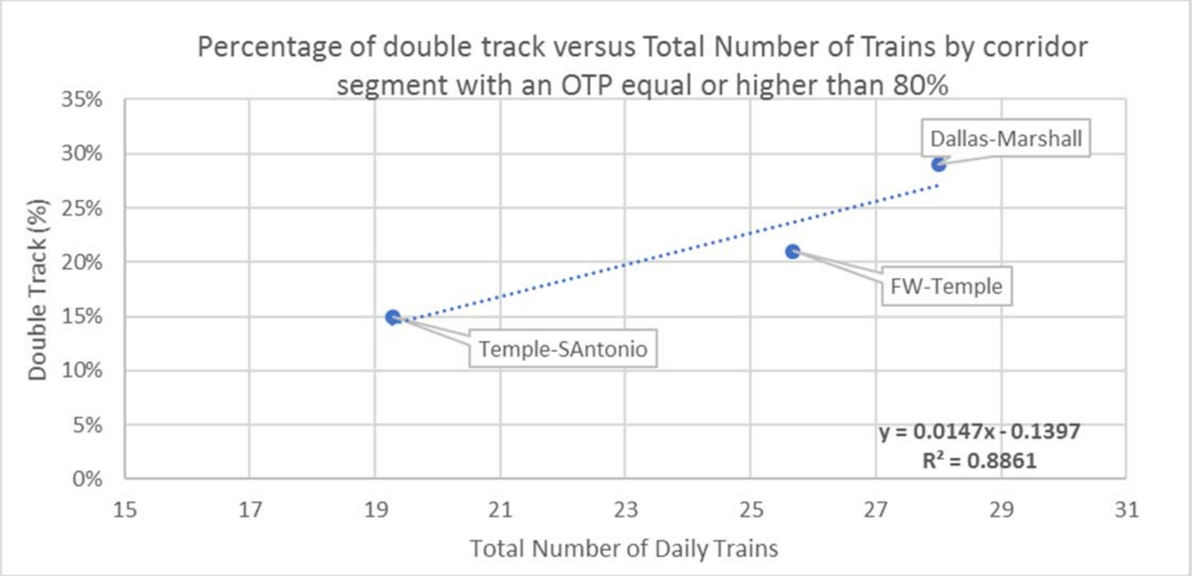


Figure 1-2 plots the correlation between the percentage of double track (vertical axis) versus the total number of trains (horizontal axis) by corridor segment, using only three segments of data, which are the ones where the OTP is equal or higher than 80%. This correlation was used to predict the additional length in the miles of passing sidings for all the segments within the project corridor excluding the Fort Worth, TX to Dallas, TX segment, which was evaluated separately given the elevated number of commuter trains running in that segment.

Results

The percentage of double track, the number of existing and potential daily trains, and the signalization type were used to determine potential passing siding improvements identified to provide reliable passenger service in the project corridor. OTP was also used indirectly to select the corridors that would be used for the analysis. **Table 1-1** summarizes the potential passing siding improvements by sub-segments of the project corridor with the proposed additional length of passing sidings in miles.

Table 1-1: Summary of Potential Passing Siding Improvements by sub-segment

Amtrak Station for potential passenger service		Proposed Additional Length of Passing Sidings (miles)
Westbound Station	Eastbound Station	
Fort Worth, TX	Dallas, TX	0
Dallas, TX	Marshall, TX	6
Marshall, TX	Shreveport, LA	0
Shreveport, LA	Vicksburg, MS	13
Vicksburg, MS	Meridian, MS	2
TOTAL (miles)		21

Section 6 also presents an order-of-magnitude construction cost estimate for the implementation of these potential improvements. Based on the results from **Table 1-1**, an additional 21 miles of passing sidings and/or double track improvements may be needed. A unit cost of $4 million for 1 mile of siding has been used to estimate the cost of the potential passing siding improvements; see **Appendix E** for details on this unit cost. It is also estimated that an additional $7.5 million would be needed for new station locations in Shreveport/ Bossier City, Ruston, and Monroe, LA and Vicksburg and Jackson, MI. **Table 6-10** summarizes the order-of-magnitude construction costs for the potential passing siding improvements by project corridor sub-segments and the new station locations.

Table 1-2 summarizes the order-of-magnitude construction costs for the potential passing siding improvements by state.

Table 1-2: Order of Magnitude Construction Costs for the potential passing sidings improvements by state

State	Item	Unit	Quantity	Unit Price	Total	Total by State
Texas	Siding	Mile	6	$4,000,000	$24,000,000	$24,000,000
Louisiana	Siding	Mile	13	$4,000,000	$52,000,000	$56,130,000
	Station – Shreveport/ Bossier City	Each	1	$1,180,000	$1,180,000	
	Station - Ruston	Each	1	$850,000	$850,000	
	Station - Monroe	Each	1	$2,100,000	$2,100,000	
Mississippi	Siding	Mile	2	$4,000,000	$8,000,000	$11,370,000
	Station Vicksburg	Each	1	$2,570,000	$2,570,000	
	Station - Jackson	Each	1	$800,000	$800,000	
TOTAL CONSTRUCTION COSTS						$91,500,000

Benefit-Cost Analysis

A preliminary Benefit-Cost Analysis (BCA) has been prepared to compare selected benefits and costs of the potential passenger rail service between Fort Worth, TX and Meridian, MS. This analysis was conducted with a spreadsheet-based benefit-cost model which incorporates historic and forecasted economic and transportation data with available project specific details.

Costs include capital construction costs for additional potential siding improvements and new or upgraded passenger rail station facilities, as well as operations and maintenance costs. Benefits were calculated based on a ridership forecast developed by Amtrak in 2015 of a potential restructuring of the Crescent service between Penn Station in New York City (NYP) and New Orleans, Louisiana (NOL). Four benefit classes were evaluated:

1. Net travel cost savings resulting from diversion from auto to Amtrak rail,
2. Passenger travel time savings resulting from diversion from auto to Amtrak rail,
3. Net emissions damage avoided resulting from diversion from auto to Amtrak rail, and
4. Net crash costs avoided resulting from diversion from auto to Amtrak rail.

The results of the BCA, as shown in **Table 1-3**, showed that the benefits quantified in this analysis exceed the costs of the project by 2.80 to 1 at a 7% discount rate. An evaluation of other classes of benefits, such as those that could accrue to shippers as a result of the rail capacity improvements, could increase the surplus of benefits over costs. **Section 7** and **Appendix G** document the overall benefit-cost ratio in detail.

Table 1-3: Benefit-Cost Analysis Results Summary

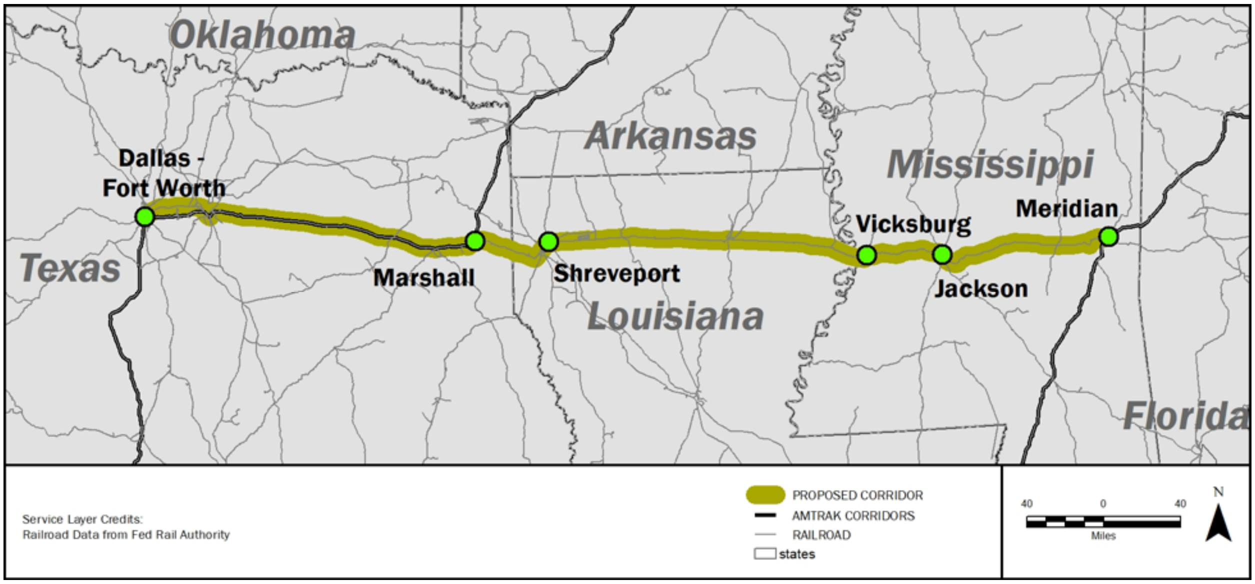
	7% Discount Rate
Life-Cycle Benefits (millions)	$181.1
Life-Cycle Costs (millions)	$81.3
Benefit-Cost ratio	**2.23**

Section 2: Introduction

The purpose of the Dallas/Fort Worth to Meridian Passenger Rail Study is to identify additional infrastructure needs and perform a BCA to implement a reliable passenger rail service from Fort Worth, Texas, TX to Meridian, Mississippi, MS. The conceptual engineering, which is summarized in this report, is based on existing track and train counts characteristics and the National Railroad Passenger Corporation's (Amtrak) anticipated station stops and schedule. The conceptual engineering identifies potential infrastructure improvements to provide the services based on the methodology developed within this document.

The project limits start at the Intermodal Transportation Center (ITC) in Fort Worth, Texas and end at Union Station in Meridian, Mississippi. The study area includes a potential passenger rail corridor through Texas, Louisiana, and Mississippi along the Trinity Railway Express (TRE); the Union Pacific Railroad (UPRR) Dallas, Mineola, Little Rock, and Reisor Subdivisions; and the Kansas City Southern Railway (KCS) Vicksburg and Meridian Subdivision mainlines. **Figure 2-1** shows the project corridor.

Figure 2-1: Project Corridor between Fort Worth, Texas and Meridian, Mississippi



Background

Operations of freight and passenger railroads have existed within the Texas, Louisiana, and Mississippi since the 1860s when the Vicksburg, Shreveport, and Texas Railroad constructed east-west lines across the study corridor. Much of the railroad mileage currently within the study area had been constructed by the turn of the century and, while the railroads have changed ownership over the years and expanded, the original mainline alignments are still in use.

Amtrak currently runs long distance passenger rail service on freight owned rail lines within a portion of the study area limits. These existing routes are identified below and at **Figure 2-2**, and allow for possible connections to other Amtrak routes throughout the United States.

- *Texas Eagle* – This passenger route provides service from Chicago to San Antonio, where it connects to the Sunset Limited route. The Texas Eagle includes major city stops in St. Louis, Little Rock, Dallas/Fort Worth, and Austin. The route overlaps a portion of this project corridor, including station stops within Texas at Marshall, Longview, Mineola, Dallas, and Fort Worth.
- *Crescent* – Traversing the East Coast, the Crescent's route extends from New York City to New Orleans and connects with major stops at Philadelphia, Baltimore, Washington D.C., Charlotte, Atlanta, and Birmingham. The route includes a station stop at Meridian, MI, which provides a connection to this project corridor.
- *Heartland Flyer* – This Amtrak route provides a passenger rail connection between the cities of Fort Worth and Oklahoma City and is a daily service. The route connects to the Study area at the Fort Worth terminus.

There is not currently Amtrak passenger rail service between Meridian, Mississippi and Marshall, Texas.

Figure 2-2: Amtrak long distance passenger rail service routes within the study area limits

Service Layer Credits: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Railroad Data from Fed Rail Authority

Overview of Previous Studies

The feasibility of providing passenger rail service on the Meridian – Fort Worth corridor or at a portion of it has been previously studied. Several reports and state rail plans have identified the need to evaluate this feasibility. The following reports incorporate this discussion with different approaches and level of detail analysis.

2011 Mississippi State Rail Plan: Meridian-Jackson-Shreveport-Fort Worth AND 2015 Louisiana Rail Plan: Meridian-Jackson-Shreveport-Dallas/Fort Worth

As future rail passenger service is improved and frequencies are added to the New Orleans-Meridian route, new potential route options can be considered for the Amtrak Crescent route. Both the 2011 Mississippi State Rail Plan and the 2015 Louisiana Rail Plan referenced one such option explored by Amtrak in late 1990s. It studied splitting the Crescent at Meridian and operating a leg of the route from Meridian to Fort Worth. This ridership and ticket revenue study, undertaken by Amtrak as part of its Network Growth Strategy, found the proposed service worthy of additional consideration.

Study Recommendation: The Amtrak study concluded the Meridian-Fort Worth service would add significant new markets to the Crescent, allow same day connections to Amtrak western routes, and provide direct service between the end-points of the Gulf Coast High-Speed Corridor (Atlanta/Birmingham) and the proposed Texas High-Speed Rail (HSR) Corridor (Dallas/Fort Worth). This route would also provide new east/west service at Jackson and Vicksburg, and Shreveport, LA. A Dallas/Fort Worth leg of the Crescent operating in conjunction with the Gulf Coast and Texas HSR Corridors would mirror European networks where overnight trains link the extreme endpoints of their high-speed systems.

2012 East Texas Report – Texas Eagle Infrastructure Assessment Study

The East Texas Infrastructure Assessment provided conceptual engineering for improvements to increase allowable speeds and decrease trip times for the Amtrak Texas Eagle route between Fort Worth and Texarkana. The study included a background review and infrastructure inventory of the route to identify existing conditions. The study also included the identification of improvements to increase allowable operating speeds for passenger trains to either 79 mph or to 110 mph (based on associated infrastructure improvements) as well as estimated costs and reductions in theoretical trip times associated with those potential improvements. This study did not include an analysis of capacity or operational impacts to train speeds and actual trip times along the route,

The East Texas Infrastructure Assessment concluded that the analysis of theoretical trip times as compared to the estimated costs of improvements associated with the trip time reductions indicated that the substantial increase in cost required for 110 mph passenger operations is not justified by the additional time savings of only 35 minutes. The significant increase in cost for 110 mph improvements is due to the requirement of UP for a fully separated rail line for passenger rail operations at speeds above 90 mph.

2015 Amtrak Crescent Fort-Worth Extension

At the request of Amtrak's Long Distance Business Line, Service Planning and Costing evaluated a proposal to modify the service structuring of the Crescent. Three schedule alternatives were evaluated for this proposal. Each of the three schedule alternatives will have the Crescent operate daily with its current consist from New York Penn Station, NY (NYP) to Meridian, MS (MEI). The proposed changes to existing service for the three alternatives would include:

- A section of the consist containing one locomotive, two coaches, one dining car, two sleeping cars and one baggage car continue along a potential new segment from Meridian, MS to Fort Worth, TX.
- A consist of one locomotive, two coaches, one café, two sleeping cars, and one baggage car would remain as part of the Crescent's current service to New Orleans, LA (NOL).

Service Planning and Costing recommended further consideration of schedule Alternative 3, which is forecasted to increase the number of passengers by 107,100 generating 110.662 million passenger miles and $22.997 million in incremental ticket revenue. In Alternative 3, the southbound Crescent would leave NYP at the same time as the 2015 schedule at 2:15 pm, and the northbound would depart thirty minutes earlier from NOL at 6:30 am.

2015 North Louisiana Passenger Rail Feasibility Study

The Northwest Louisiana Council of Governments (NLCOG) commissioned the North Louisiana Passenger Rail Feasibility Study to assess the potential of initiating a startup passenger rail service between Shreveport, LA., and Vicksburg, MS. (Shreveport-Vicksburg Corridor). Three primary factors were evaluated to assess the feasibility of the potential service:

1. Infrastructure improvements needed to accommodate passenger rail service without negatively impacting existing and future freight operations,
2. Attractiveness of the service and its ability to generate ridership and revenue, and
3. Financial resources needed to construct and operate the potential service.

In addition, the study considers the potential for connecting the Shreveport-Vicksburg Corridor with destinations beyond Louisiana including Dallas/Fort Worth, TX to the west and Meridian, MS to the east.

The Shreveport-Vicksburg Corridor currently does not have passenger rail service and would utilize an existing 170-mile long freight rail line known as the Kansas City Southern (KCS) Vicksburg Subdivision. The Vicksburg Subdivision provides the only existing rail infrastructure between Shreveport and Vicksburg that, with improvements, could potentially be used to support passenger rail service.

A key consideration was how to integrate the Shreveport-Vicksburg Corridor into a larger corridor analysis to make it more attractive for ridership and increase its feasibility for implementation. Connecting passenger rail service to major urban populations and economic centers east and west (Dallas/Fort Worth) of the Shreveport-Vicksburg Corridor should increase ridership and generate more revenue to offset the operating subsidy. Also, it would expand state funding partnerships. The Shreveport-Vicksburg Corridor is part of a large-scale plan supported by the Southern Rail Commission (SRC). It is embedded on the study objectives of the I-20 Corridor Dallas to Shreveport to Meridian route, one of the priority corridors identified by the SRC.

2016 Texas Rail Plan Update – Chapter 3: Potential Passenger Rail Improvements and Investments

As part of an effort to strengthen southwest and southern rail links to the Northeast and to begin to create a hub in the Dallas/Fort Worth Metroplex, Amtrak analyzed the potential of operating a leg of Amtrak's New York – New Orleans Crescent from Meridian to Fort Worth. This service would greatly improve passenger rail accessibility from Dallas/Fort Worth to other urban centers in the southeastern U.S. (such as Atlanta) and to East Coast destinations (such as Washington, D.C). TxDOT also coordinated with Amtrak to develop a portion of this route, which was being promoted by passenger rail advocates in East Texas, who wanted to see a route developed between Dallas and Shreveport, Louisiana (190 miles). While the ridership and ticket revenue of the proposed Meridian – Fort Worth leg of the Crescent was estimated to be very positive, the initiation of service would require substantial rail capacity expansion.

Section 3: Methodology

The purpose of the Dallas/Fort Worth to Meridian Passenger Rail Study is to identify the infrastructure requirements to allow for reliable passenger rail service on existing freight tracks between Fort Worth, TX and Meridian, MS. This section discusses the design standards and assumptions for the evaluation, the existing infrastructure within the existing TRE, UPRR, and KCS freight corridors, and the methodology used to determine potential improvements for passenger rail service within these corridors.

Some of the freight railroad owners within the study have a different approach than the one discussed here. They believe that the introduction of a possible passenger rail within the existing corridor should be done through the construction of a new railroad line for passenger trains only and separated entirely from the freight network. This new line would have to be separated a sufficient distance from the existing freight line for safety reasons. Separating both services would reduce risk, avoid operational interference and allow for incremental growth, A cost estimate of adding a new passenger line track all along the corridor of study is presented in **Section 6**: Improvements.

Design Standards and Assumptions

Maximum allowable train speeds for freight and passenger rail are prescribed according to track classification in 49 CFR 213 – Track Safety Standards.[1] Actual operating train speed would depend on line capacity, the acceleration/deceleration capabilities of the passenger trains, horizontal and vertical geometry, any other potential speed restrictions, and the distance between passenger stations in addition to the maximum allowable train speeds. **Table 3-1** summarizes the class of track associated with the maximum allowable passenger train speeds as related to freight speeds.

Table 3-1: Maximum Allowable Train Speeds per Class of Track

Track Class	Passenger Maximum Allowable Operating Speed (mph)	Freight Maximum Allowable Operating Speed (mph)
Class 1	15	10
Class 2	30	25
Class 3	60	40
Class 4	80	60
Class 5	90	80

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[1] Code of Federal Regulations, Title 49, Transportation, Part 213 (49 CFR 213), Subpart A – Classes of Track: Operating Speed Limits.

For the purposes of this study, the maximum allowable speed for freight corresponds to the class of track and the accompanying passenger allowable train speeds.

Line capacity is a measure of the maximum number of trains that can be operated over a rail line, or section of line, within a specified unit of time. Capacity is generally influenced by operations factors such as train speed restrictions, signal system design, and traffic at railroad junctions[2], as well as train characteristics, and non-track issues such as dwell times at passenger stations. In terms of passenger rail capacity on existing rail networks, capacity is further influenced by the volume of existing freight rail traffic and any agreements imposed through shared-use agreements with the track owners. Existing freight dispatching schedules for the corridors within the project limits were not provided, and there was not any modelling output (including stringlines) provided by Amtrak as part of its initial route analysis to determine possible freight and passenger train meets as part of an operating plan. This presents challenges in identifying improvements within the possible passenger rail corridor to accommodate those meets.

The most fundamental components of long-range transportation plans for passenger rail service are the selection of station locations and the development of train schedules.[3] Amtrak provided a Route and Service Financial Evaluation for the Crescent Meridian-Dallas-Fort Worth route summarizing potential schedules and station locations for that corridor. Anticipated passenger train speeds based on available data sources and typical dwell times have been included for further use in identifying potential meet/pass efficiency to correlate with that schedule.

This evaluation focuses on infrastructure needs to improve meet/pass efficiency such as sidings and does not review the potential for increases of allowable passenger train speeds through improvements to:

- Horizontal geometry,
- Possible slow order locations,
- Superelevation, and
- Other changes to existing track infrastructure.

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[2] *Transit Capacity and Quality of Service Manual*, 2nd ed., TCRP Report 100, Transit Cooperative Research Program, Federal Transit Administration, Washington, D.C. 2003.

[3] Railroad Corridor Transportation Plans: A Guidance Manual, Federal Railroad Administration, U.S. Department of Transportation, Washington, D.C., July 2005

Evaluation of Existing Infrastructure

The team used data available from multiple sources to gather existing conditions within the corridor from the Fort Worth ITC to the east to Meridian, MS. Where available, identification of existing track infrastructure through available sources includes:

- Number of mainline tracks, lengths, and location,
- Maximum allowable train speeds (freight and passenger),
- Signal system type, and
- Locations and lengths of sidings.

The team also compiled information regarding the railroad ownership and the daily train counts (freight and passenger trains), as well as the percentage of total trains running during the day or night.

The delays at departure and arrival by stations were compiled so that on-time performance could be calculated. This exercise was done only for the Fort Worth to Marshall segment, using current Texas Eagle corridor delay data.

Once the team gathered initial information, it performed an initial quality control check to verify that the inventory included the most-recent data available. The team also compared the inventory against current conditions using linear referencing tools and the latest available aerial imagery.

Appendix A provides a table with available existing infrastructure data collected.

Identification of Potential Improvements

While Amtrak's Route and Service Financial Evaluation for the project corridor included anticipated station locations and associated scheduled arrival/departure times, an independent operating plan and modeling effort to develop the schedule was not provided within its evaluation. In addition, existing freight movements from other stakeholders for modeling of meets were also not provided. Thus, stringlines from Amtrak identifying freight and passenger train meets are not available for use within this study's evaluation of the corridor.

For the purposes of this study, potential infrastructure improvements are limited to siding installations and extensions within the corridor; however, other improvements may also prove useful for reliable passenger service but are not included in this report since operations information was not available. The methodology for identifying infrastructure improvements is dependent on the available data for each segment of existing track. The following methodology represents two separate approaches for identifying possible infrastructure improvements within the project corridor.

Fort Worth, TX to Dallas, TX:

1. *High-level review of passenger rail service within the TRE corridor* –Review the current TRE commuter train schedules, current Amtrak Texas Eagle passenger train schedules, and the potential Amtrak passenger rail schedule to identify possible train meets within the corridor.

Dallas, TX to Meridian, MS:

2. *Compare existing Amtrak corridors and their characteristics* –A multi-stage approach to identify potential passing siding locations for this corridor segment includes:
    a. <u>Determine project corridor characteristics between stations on the Amtrak route.</u> Review the inventory for class of track and maximum allowable passenger track speeds, number of mainlines, passing siding locations and lengths, distances between sidings, and signalization type. Utilize the FRA grade crossing inventory database for freight and passenger train volumes and other characteristics within those potential station spacings.

    b. <u>Identify existing Amtrak corridors located within or near the project corridor.</u> Review Amtrak's existing routes within the region for schedules and station location spacing that is similar to the proposed passenger rail segments and find data sources for freight and passenger train volumes and siding locations within those existing station spacings.

    c. <u>Review lengths and spacing of siding and double track locations, type of signalization and maximum allowable train speeds on the existing Amtrak corridors.</u> Determine distances between each passing siding and associated length of siding and distance per mile between sidings for each similar existing Amtrak corridor. Calculate percentage of double track along each corridor and the track class based on maximum allowable freight speeds.

    d. <u>Review existing freight and passenger train volumes on the existing Amtrak corridors.</u> Determine the average number of trains per day (existing passenger trains, existing freight trains and potential passenger trains) and how are they dispatched throughout the day and night.

    e. <u>Review the OTP of selected existing Amtrak service.</u> Determine principal causes of delays and OTP based on relative delays between beginning and ending stations for each segment analyzed (delay at arrival – delay at departure to identify if certain segments have a lower-than-average OTP. Details included in **Appendix D**).

f. Identify and compare indicators on infrastructure, train volumes and OTP between the selected Amtrak corridors and the project corridor between station limits. Evaluate the route segment with the most-comparable existing Amtrak service and conduct comparisons between the following indicators: average passing siding distance, percentage of double track (double track mainlines and existing sidings), signalization type, average number of trains per day, percentage of trains running from 6 am to 6 pm, track class, and OTP.

g. Determine potential passing siding infrastructure improvements based on evaluation. Identify additional passing siding mileage in segments throughout the project corridor based on results from the comparison of indicators. Determine order-of-magnitude construction costs for potential implementation.

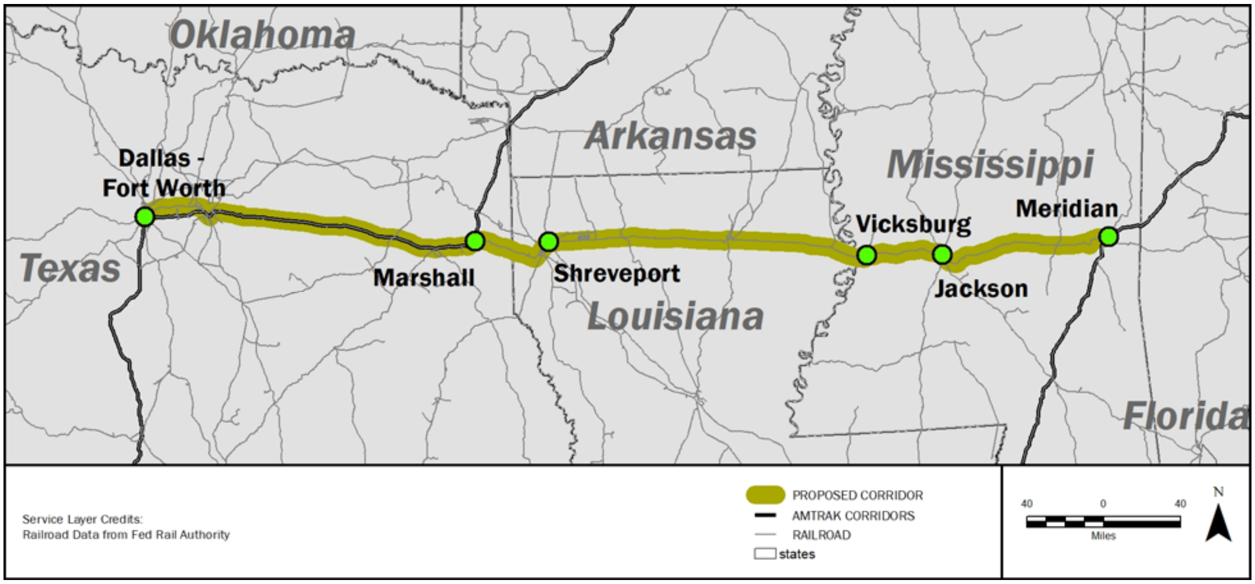
Prior to beginning the evaluation of the project corridor, a high-level review of the anticipated passenger rail schedule was provided by Amtrak using spreadsheet-based modeling software accounting for dwell times, train acceleration/deceleration, and maximum allowable train speeds on the potential route. This evaluation does not include freight operations and impacts by freight dispatching.

Sections 5 and **6** of this report detail the potential passing siding infrastructure improvements identified through this methodology as well as the order-of-magnitude construction costs for those improvements.

Section 4: Existing Rail System

Portions of the railroad mainlines that make up the connection between the Fort Worth, TX area and Meridian, MS have been in place since 1840 when the Clinton and Vicksburg Railroad constructed the track from those two cities. Through mergers, acquisitions, and consolidation of railroad ownership over the years, two Class 1 railroads own mainline track within the project corridor: Union Pacific Railroad (UPRR) and Kansas City Southern Railway (KCS). In addition, the TRE, hosting commuter and freight service operated by the Fort Worth Transportation Authority (The T) and Dallas Area Rapid Transit (DART), own track within the corridor. Other railroads, such as BNSF Railway Company (BNSF), Dallas, Garland, and Northeastern Railroad (DGNO), and the National Railroad Passenger Corporation (Amtrak) operate within the route as well. The project corridor traverses approximately 535 miles of these existing freight corridors with nearly 110 miles of siding tracks (not including double-track sections) within that overall mileage. A map of the project corridor is in **Figure 4-1**.

Figure 4-1: Project Corridor between Fort Worth, TX and Meridian, MS



Existing Rail Infrastructure

The existing rail system within the limits of the area of study includes the TRE; UPRR Dallas, Mineola, Little Rock, and Reisor Subdivisions; and KCS Vicksburg and Meridian Subdivisions. Some of these existing freight lines have Amtrak passenger rail service. See **Table 4-1** for additional details on limits for each railroad and subdivision within the project corridor.

Table 4-1: Railroad Ownership along the Project Corridor

West End of Segment	East End of Segment	Segment Name	Owner	Length (miles)
Fort Worth ITC, MP 611.4	JFK Jct, MP 644.3	TRE - DFW	TRE	32.9
JFK Jct, MP 214.5	SP Jct, MP 210.2	UPRR Dallas Subdivision	UPRR	4.3
SP Jct, MP 212.2	Longview, MP 89.6	UPRR Mineola Subdivision	UPRR	122.6
Longview, MP 89.6	Marshall Jct, MP 66	UPRR Little Rock Subdivision	UPRR	23.6
Marshall Jct, MP 351.4	Hollywood Jct, MP 315.6	UPRR Reisor Subdivision	UPRR	35.8
Hollywood Jct, MP 0.0	Shreveport, MP 5.2	Shreveport Industrial Lead	UPRR	5.2
Shreveport, MP 169.72	Vicksburg, MP 0.0	KCS Vicksburg Subdivision	KCS	169.7
Vicksburg, MP 140.6	Meridian, MP 0.0	KCS Meridian Subdivision	KCS	140.6

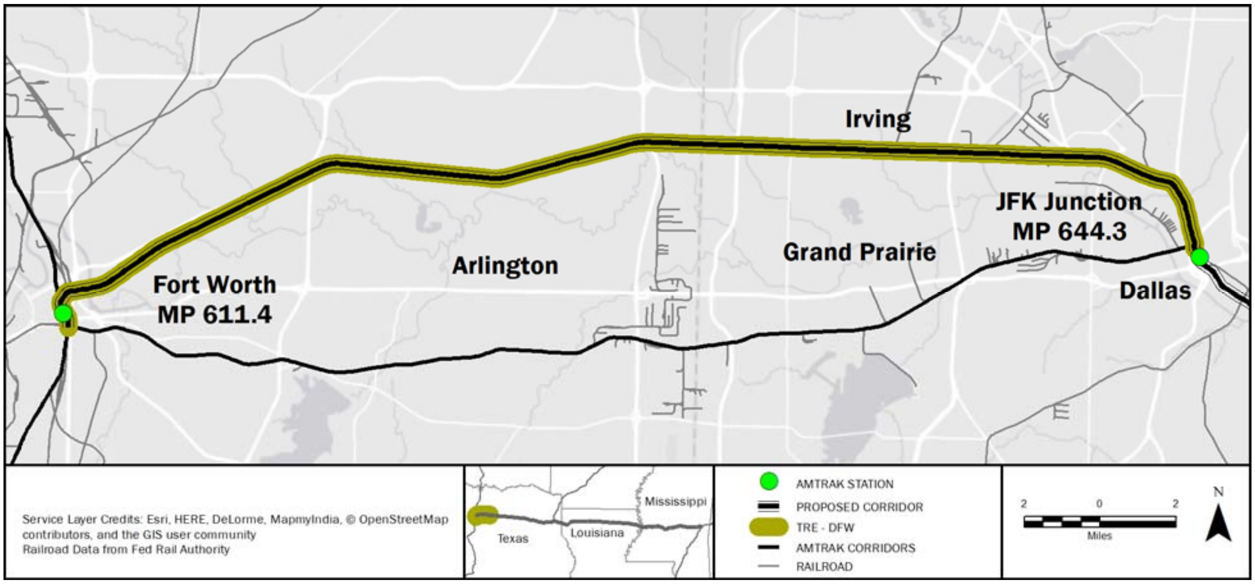
Class of track was not defined within any of the collected information; for this effort, the class of track will be generally identified by the maximum allowable train (freight and, if applicable, passenger) speeds. Existing passing sidings, for the purposes of this inventory, are defined as 8,000 feet or greater in length. See **Section 5**: Data Collection, Infrastructure Data Sub-section.

This existing rail system's infrastructure is discussed by segment in the following subsections. Additional details of existing mainline track, sidings, yards, stations, speed restrictions, and other data is within the existing rail infrastructure inventory located in **Appendix A** of this report. The data does not specifically state whether existing sidings are signalized; for the purposes of this study, it is assumed that sidings include signalization that match the mainline signal system.

Trinity Railway Express (TRE)

The TRE, a cooperative service provided by The T and DART, is generally a single-mainline railroad in Tarrant County and a double-tracked mainline in Dallas County. The service provided by TRE extends within the project corridor limits from the Fort Worth ITC in Fort Worth, Texas at MP 611.4 to JFK Junction in Dallas, Texas at MP 644.3. The track currently includes freight service, local commuter service between Fort Worth and Dallas, and Amtrak service as part of the Texas Eagle route. **Figure 4-2** details the location of the TRE mainline track.

Figure 4-2: TRE Limits Located within the Project Corridor



Service Layer Credits: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Railroad Data from Fed Rail Authority

Two segments of double-track mainline longer than 8,000 feet (3.1 and 2.1 miles) have been identified within the TRE limits, specifically in Dallas County.

The corridor utilizes Centralized Traffic Control (CTC) for railroad signaling. Maximum allowable freight and passenger speeds are 30 and 60 mph, respectively, between North Junction (MP 644.2) to W Perkins (MP 640.9) and 50 and 60 mph, respectively, between W Perkins (MP 640.9) and T&P (MP 610.7) with speed restrictions near the downtown areas of Fort Worth and Dallas, near Centreport, and at the Wye tracks in Irving. Based on maximum allowable train speeds within the corridor, the line operates as Class 3 track approaching the ITC in Fort Worth and as Class 4 track for the remainder of Tarrant County and Dallas County.

Based on existing passenger train schedules for TRE and Amtrak, an average of 58 commuter trains and two intercity passenger trains per day utilize the corridor. Available data shows freight volumes for the TRE between 22 and 31 trains per day. TRE commuter services generally operate from 4 am to 1 am, and freight trains operate during the same hours as the commuter trains. Current TRE commuter train schedules as well as the Amtrak Texas Eagle route schedule are included in **Appendices B and C**, respectively.

Existing TRE commuter and Amtrak passenger rail stations within the project limits include:

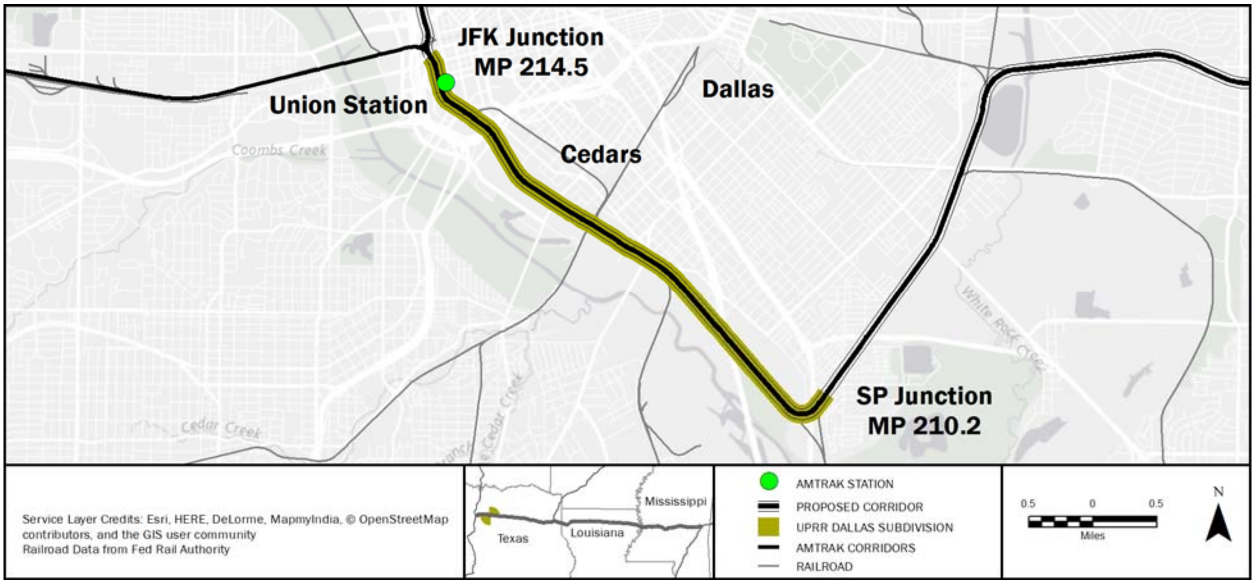
- Fort Worth ITC (MP 611.4),
- Richland Hills Station (MP 618.5),

- Bell Station (MP 622.6),
- CentrePort/DFW Airport Station (MP 628.5),
- West Irving Station (MP 631.4),
- Downtown Irving/Heritage Crossing Station (MP 634.7),
- Medical/Market Center Station (MP 641.1),
- Victory Station (MP 643.3), and
- Dallas Union Station (MP 644.3).

UPRR Dallas Subdivision

UPRR operates the Dallas Subdivision from SP Junction in Dallas to Centennial Yard in Fort Worth. A short segment of this line from JFK Junction, TX (MP 214.5) to SP Junction, TX (MP 210.2) is included as part of the possible passenger rail route. The track within the project corridor is a double-track mainline and includes existing freight service and Amtrak Texas Eagle service. Sidings are not present within this short segment, but there are two rail yards (Cadiz and C.J. Yards) within the four miles of track. **Figure 4-3** details the location of the UPRR Dallas Subdivision limits within the project corridor.

Figure 4-3: UPRR Dallas Subdivision Limits Located within Project Corridor



Based on available data from the Federal Railroad Administration (FRA) and Amtrak schedules, an average of 37 freight and 2 intercity passenger trains per day utilize the segment of track and are evenly split between day and night operations.

FRA compiles U.S. DOT Inventory forms for each highway-rail grade crossing in the U.S., and the updates on railroad data for these forms are coordinated between the reporting agency and the railroad responsible for the crossing. Associated data on these forms are updated or verified at least every three years. This study uses data from 2016 and 2017.

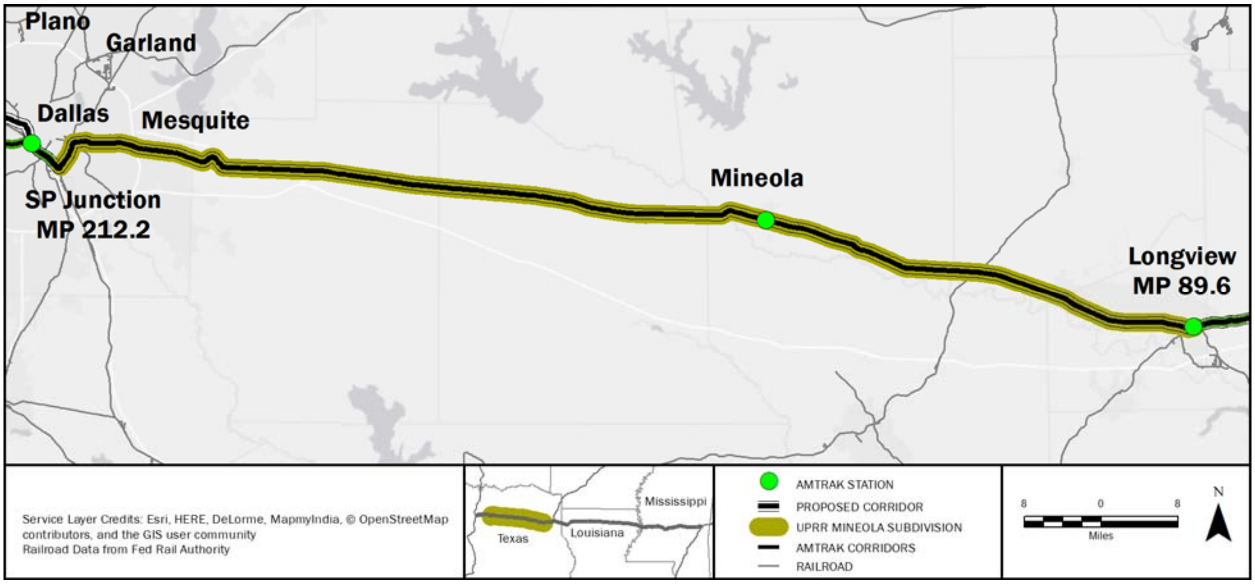
The corridor utilizes CTC for railroad signaling. Maximum allowable freight and passenger speeds are generally 60 and 79 mph, respectively, for the overall subdivision, but within the short Dallas Subdivision segment, the maximum speeds are regulated to between 20 and 40 mph for both passenger and freight trains. Based on maximum allowable train speeds within the corridor, it is assumed that the line operates as a Class 4 track.

An Amtrak passenger rail station resides within the UPRR Dallas Subdivision at Dallas Union Station.

UPRR Mineola Subdivision

The Mineola Subdivision is owned by UPRR from SP Junction in Dallas, TX (MP 212.2) to Longview, TX (MP 89.6), and the entire Mineola subdivision is part of the possible passenger rail route. It is generally a single-mainline track that hosts freight and Amtrak Texas Eagle service. Thirteen sidings greater than 8,000 feet long are present in this segment. **Figure 4-4** details the location of the UPRR Mineola Subdivision mainline track within the corridor limits.

Figure 4-4: UPRR Mineola Subdivision Limits Located within the Project Corridor



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Railroad Data from Fed Rail Authority

An average of 20 freight and 2 intercity passenger trains per day utilize the subdivision. Based on available data from the FRA, grade crossing inventory database and Amtrak schedules the train operations are split evenly between day and night.

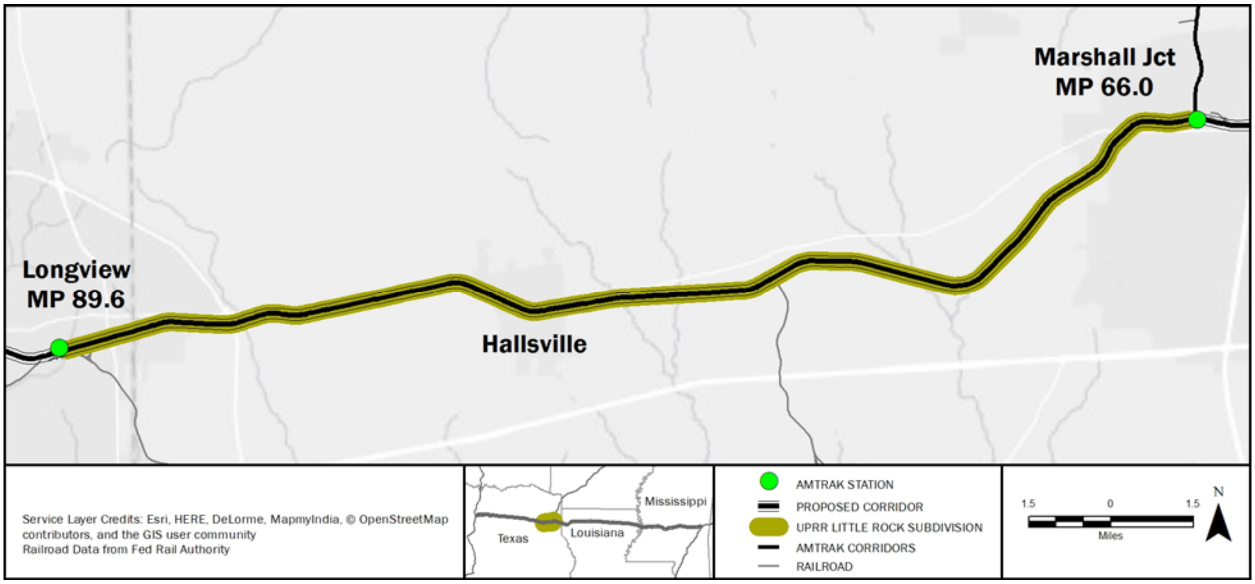
Centralized traffic control is used for railroad signalling in this segment of track. Maximum allowable freight and passenger speeds are generally 70 and 79 mph, respectively, for the subdivision; however, speed restrictions in some areas of the subdivision restrict maximum speeds to as low as 30 mph for both passenger and freight near the Dallas area. Based on maximum allowable passenger train speeds within the corridor, the line generally operates as a Class 4 track.

Existing Amtrak passenger rail stations within the UPRR Mineola Subdivision are in Mineola (MP 138) and Longview (MP 89.6).

UPRR Little Rock Subdivision

UPRR operates trains on the Little Rock Subdivision from Longview, Texas to Little Rock, Arkansas. The possible passenger rail route includes a 24-mile section of this line from Longview, TX (MP 89.6) to Marshall Junction, TX (MP 66.0). Most of the track within the route limits is a single-track mainline with double-track comprising a quarter of the track segment. This line hosts freight and Amtrak Texas Eagle service. Two sidings are present within this 24-mile segment, each approximately 8,000 feet long and separated by around 9 miles. There is also an 8.1-mile double track section within this track segment. **Figure 4-5** details the location of the UPRR Little Rock Subdivision limits within the project corridor.

Figure 4-5: UPRR Little Rock Subdivision Limits Located within the Project Corridor



Based on available data from the FRA grade crossing inventory and Amtrak schedules, within these route limits, an average of 40 freight and 2 intercity passenger trains per day utilize the corridor and are evenly split between day and night operations.

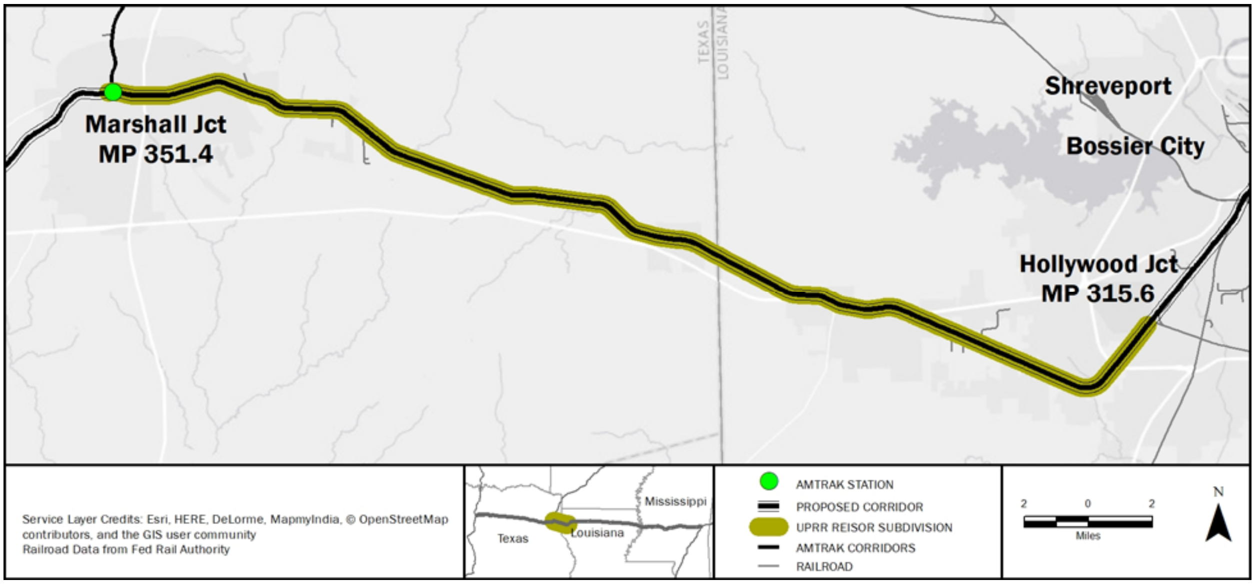
The corridor utilizes CTC for railroad signaling. Maximum allowable freight and passenger speeds are generally 70 and 79 mph, respectively for the overall subdivision, but speed restrictions near Marshall and Longview lower passenger rail speeds to 30 mph and 60 mph, respectively. Based on maximum allowable passenger train speeds within the corridor, it is assumed that the line operates as a Class 4 track.

Existing Amtrak passenger rail stations within the segment limits for the UPRR Little Rock Subdivision include Longview (MP 89.6) and Marshall (MP 66.6).

UPRR Reisor Subdivision

UPRR operates the Reisor Subdivision from Marshall Junction, TX (MP 351.4) to Texmo Junction, Louisiana (MP 195.7). A 36-mile segment of this subdivision from Marshall Junction, TX (MP 351.4) to Hollywood Junction, LA (MP 315.6) is included as part of the possible passenger rail route. The track within the route limits is a single-track mainline that includes freight service; there is not any existing passenger rail service on this segment of track. Three sidings 8,000 feet or longer are present and spread fairly evenly within this segment. **Figure 4-6** details the location of the UPRR Reisor Subdivision mainline track within the corridor limits.

Figure 4-6: UPRR Reisor Subdivision Limits Located within the Project Corridor



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Railroad Data from Fed Rail Authority

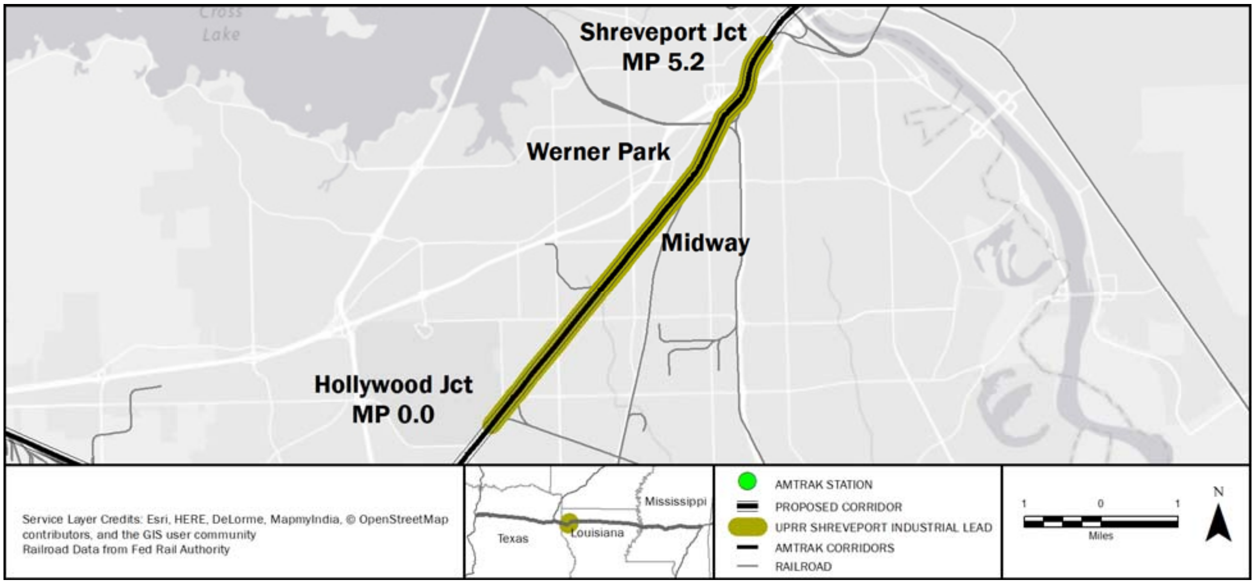
An average of 16 freight trains per day utilize the route segment of track based on available data from the FRA grade crossing inventory database, train operations are generally split between day and night hours.

Based on available data, the signaling for the corridor utilizes traffic warrant control (TWC) supplemented with automatic block signaling (ABS). Maximum allowable freight speeds are 60 mph for the overall subdivision, but within the route segment there are speed restrictions at Marshall, TX and Shreveport, LA that reduce freight speeds to a maximum of 40 and 25 mph, respectively. Based on maximum allowable train speeds within the corridor, it is assumed that the line operates as a Class 4 track.

UPRR Shreveport Industrial Lead

At Hollywood Junction, LA (MP 315.6), the project corridor intends to utilize the Shreveport Industrial Lead to connect with the KCS Vicksburg Subdivision. This is a short segment of 5.2 miles with Shreveport, Louisiana that extends from Hollywood Junction (MP 0.0) to Shreveport Junction (MP 5.2). **Figure 4-7** details the location of the UPRR Shreveport Industrial Lead limits within the project corridor.

Figure 4-7: UPRR Shreveport Industrial Lead Limits Located within Project Corridor



Service Layer Credits: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Railroad Data from Fed Rail Authority

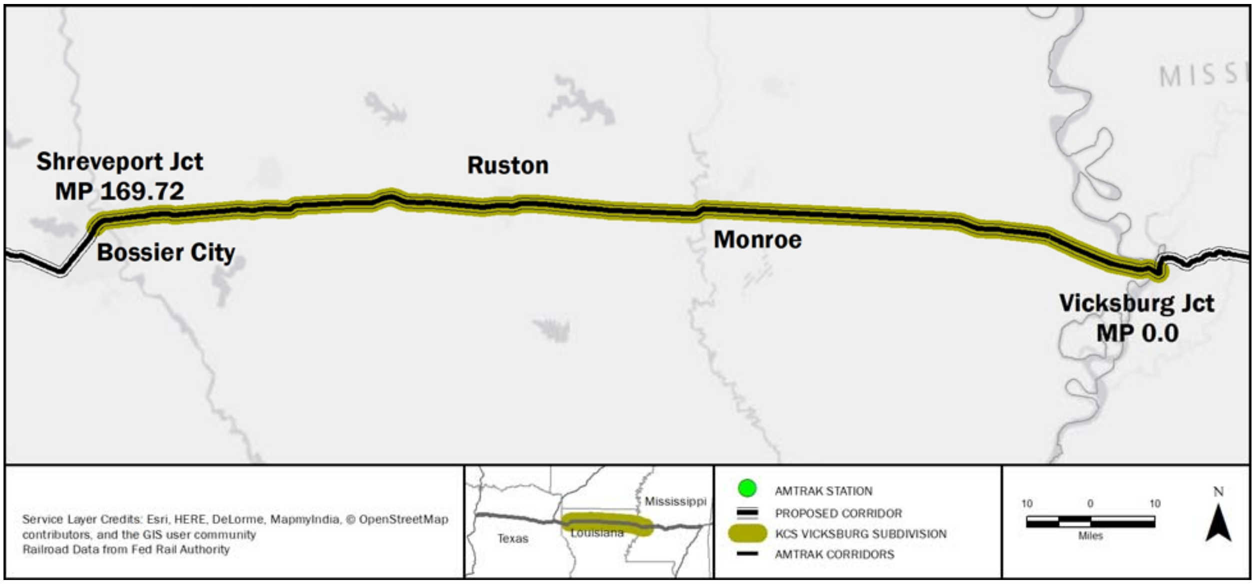
The track within these limits is a single-track mainline with a rail yard, but without sidings. There is not any existing passenger rail service on this segment of track.

Based on available data from the FRA grade-crossing inventory database, an average of 8 freight trains per day utilize this segment of track at a maximum allowable freight speed of 20 mph. Based on maximum allowable train speeds within the corridor, it is assumed that the line operates as a Class 2 track in this short segment.

KCS Vicksburg Subdivision

The Vicksburg Subdivision, owned and operated by KCS, runs from Shreveport, LA (MP 169.7) to Vicksburg, MS (MP 0.0). This subdivision is included as part of the possible passenger rail route and is a single-track mainline that includes freight service. Ten sidings 8,000 feet or longer are present within this 170-mile segment, most of which are on the eastern portion of the subdivision. **Figure 4-8** details the location of the KCS Vicksburg Subdivision mainline track within the project corridor limits.

Figure 4-8: KCS Vicksburg Subdivision Limits Located within the Project Corridor



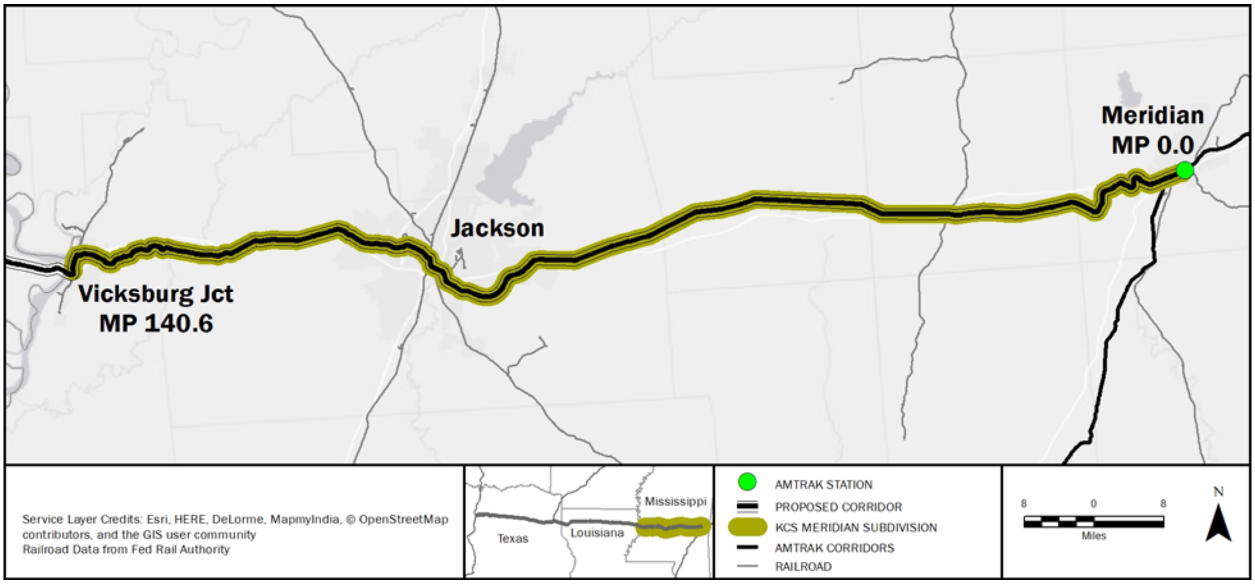
Based on available data from the FRA grade-crossing inventory database, within these project limits, an average of 20 freight trains per day utilize the corridor, half of them running between 6 am and 6 pm and the other half between 6 pm and 6 am. There is not any existing passenger rail service on this segment of track.

The corridor utilizes CTC for railroad signaling. Maximum allowable freight speeds are generally 55 mph for the subdivision, but speed restrictions within short segments of the corridor reduce speeds to between 20 and 50 mph. Based on maximum allowable train speeds within the corridor, it is assumed that the line operates as a Class 4 track.

KCS Meridian Subdivision

KCS runs trains on the Meridian Subdivision from Vicksburg, MS (MP 140.6) to Meridian, MS (MP 0.0). This subdivision is included as part of the project corridor and is a single-track mainline that includes freight service. Ten sidings 8,000 feet or longer and a 3.9-mile section of double track mainline are present within this 141-mile segment, a majority which are concentrated in the western portion of the subdivision. **Figure 4-9** details the location of the KCS Meridian Subdivision limits within the project corridor.

Figure 4-9: KCS Meridian Subdivision Limits Located within the Project Corridor



An average of 20 freight trains per day utilize the corridor based on available data from the FRA, half of them run during the day with the other half at night.

Centralized traffic control is used for railroad signaling within this corridor. Maximum allowable freight speeds are generally 55 mph for the subdivision, but the maximum speeds are limited in certain locations to between 10 and 50 mph. Based on maximum allowable train speeds within the corridor, the line operates as a Class 4 track.

Currently, two Amtrak long distance routes utilize the KCS Meridian Subdivision. Amtrak's City of New Orleans route from Chicago, Illinois to New Orleans, LA has a stop at Jackson, MS (MP 96.8). In addition, the Amtrak Crescent stops in Meridian, MS (MP 0.2) as it travels from New York City to New Orleans, LA. These Amtrak route schedules are detailed in **Appendix C** and connect to the project corridor.

Section 5: Data Collection

The goal of the Dallas/Fort Worth to Meridian Passenger Rail Study is to identify siding or track extension infrastructure improvements to implement a reliable passenger rail service from Fort Worth, TX to Meridian, MS through facilitating meet/pass moves through the corridor.

TxDOT requested data regarding existing and future train traffic and their operations, and from the host railroads for the development and analysis on this project, however the host railroads did not provide the requested data to model train meet locations between current and future freight traffic and the potential passenger service. Amtrak provided an anticipated schedule for the potential passenger service, but an operational plan to accomplish this schedule was not included.

As described in the methodology **Section 3**, given the lack of host railroad-provided data, TxDOT conducted an alternative approach based on analyzing the characteristics of other Amtrak routes and comparing those characteristics to the project corridor. The study assumptions and the rationale for those assumptions are documented and discussed in this section.

The reliability of service, measured in this report as OTP, is the probability that a train will arrive on-time or within an allowed delay timeframe (See **Appendix D** On-Time Performance Analysis for OTP definition); this reliability is affected by delays caused by multiple factors such as track and signals, maintenance challenges, train interference, equipment, weather, operations, or non-railroad third party activities (police activity, grade crossing accidents, etc.). The data sample collected and described in this section is used to identify if correlations may exist between track characteristics such as distance between sidings, presence of double track, type of signalization, and on-time performance. Identified linear regressions within these parameters are used for evaluation in subsequent sections of the report.

Section Overview

This section describes the steps to collect data used to evaluate siding improvements needs for a reliable passenger service between Fort Worth, TX to Meridian, MS. The steps include:

- Identify a select number of existing Amtrak routes within the project corridor,
- Collect information on the existing infrastructure in these selected Amtrak routes,
- Tabulate the existing information gathered for the project corridor (see **Section 4**) as well as for the selected Amtrak routes to compare parameters between all the routes,
- Collect information on the existing freight and passenger trains on the selected Amtrak routes and the study corridor,

- Compare information from the corridor to determine applicable parameters for analysis, and
- Review OTP along the study corridor and along the existing Amtrak corridors as well as the average OTP for all Amtrak long distance routes.
- Identify corridor infrastructure characteristics that appear to support a better OTP.

Identification of Existing Amtrak Corridors

Three existing Amtrak corridors were reviewed for the comparison analysis. The three corridors operate both freight and passenger trains and are located within or near the study corridor. **Table 5-1** and **Figure 5-1** show the locations of these corridors, the major cities served, and their overall lengths.

Table 5-1: Reviewed Existing Amtrak Corridors

Amtrak Route	Overall Route		Analyzed Segment		Host Railroad
	Major Cities Served	Length (miles)	Major Cities Served	Length (miles)	
Texas Eagle	Chicago, IL - St. Louis, MO - Dallas, TX - San Antonio, TX - (Los Angeles, CA)	1,267	Fort Worth, TX - Temple, TX - San Antonio, TX	281	BNSF / UP
Sunset Limited	New Orleans, LA - San Antonio, TX - Tucson, AZ - Phoenix, AZ - Los Angeles, CA	1,974	Sanderson, TX - San Antonio, TX - Lafayette, LA - New Orleans, LA	859	UP/ BNSF
Crescent	New York, NY - Atlanta, GA - New Orleans, LA	1,141	Slidell, LA - Meridian, MS - Atlanta, GA	485	Norfolk Southern (NS)

Figure 5-1: Reviewed Existing Amtrak Corridors

As previously stated, Amtrak conducted a study of the project corridor from Fort Worth, TX to Meridian, MS as an extension of the existing Crescent route. According to Amtrak's study, the Crescent would operate daily with its current consist from New York Penn Station, NY to Meridian, MS. The possible change in service would include a segment of the train consist traveling on study corridor between Meridian, MS and Fort Worth, TX. The existing Amtrak Texas Eagle route would share the same corridor as the study corridor from Fort Worth, TX to Marshall, TX (albeit on a different schedule).

Infrastructure Data

The first dataset used to compare the study corridor and the existing Amtrak routes includes number of sidings, number of mainline tracks, the type of signalization, and maximum allowable train speeds. This data, combined with train daily counts and OTP statistics, are intended to provide a comprehensive dataset to better understand the role that passing sidings play within the overall performance for passenger service within freight corridors.

Location and length of sidings and double track data were gathered from several sources, including the FRA crossing inventory and 2017 aerial photography.

The data was collected by grade crossing and then grouped by track segments delimited by existing and potential Amtrak stations; tables within this section detail this information. These data include:

- Number of mainline tracks,
- Location and lengths of existing passing sidings (a passing siding is defined as a siding being 8,000 feet or longer for the purposes of this study),
- Maximum freight and passenger speeds allowed at each crossing location, and
- Type of signalization.

Once collected, the data was reviewed to identify indicators that may provide insight into the infrastructure characteristics for each segment and allow a comparison between corridors. This process was similarly followed for the study corridor. These indicators include:

- Distance between passing sidings,
- Percentage of double track along corridor (double track mainlines and existing sidings),
- Track class, based on maximum allowable freight speeds, and
- Type of signalization – CTC or ABS

One indicator, the average distance between passing sidings, was obtained by dividing the length of each study segment (distance between beginning and end of segment stations) into the number of passing sidings (defined as 8,000 feet or greater in length). This study was unable to acquire data from host railroads on freight train consists, such as current and future train lengths. Due to increased efficiencies, a trend of increasingly longer freight train lengths is expected to continue on corridors that can accommodate them, and FRA standard practice advocates for 10,000 foot sidings for planning purposes for new sidings. Recommendations for additional passing sidings in Section 6 are programmed for 10,000 feet or more for this reason. For the purpose of evaluating the existing corridor for adequate siding lengths, this study assumes that existing sidings greater than 8,000 feet function sufficiently for typical freight train operations on the study corridor and will continue to provide efficient movements.

Double track segments (identified as lengths greater than 18,500 feet for study purposes) are also identified as an indicator for this study as they can allow passing opportunities for trains. The double track indicator includes data on passing sidings, but is a separate indicator developed for this study. To reflect passing opportunities for trains, the following criteria were used to reflect each double track segment:

- Double track segment less than 8,000 feet: Double track segments shorter than the minimum passing siding length were disregarded for the passing sidings index computation because some of the Amtrak corridor segments evaluated had long segments of double track at the beginning or end, and this is not the case for the project corridor.
- Double track segment between 8,000 feet and 18,500 feet: Included in analysis as an existing passing siding.
- Double track segment greater than 18,500 feet: Double track segments greater than 18,500 feet were considered one passing siding. In order to include a double track segment in the passing sidings count, the length of the double track was removed from the total sidings count so that the distribution of sidings per mile was not affected. These long segments are included in the double track percentage index computation.

A study of passing sidings as an indicator of viability of freight train operations must assess single track sections served by passing sidings; as stated above, double track sections are treated as one siding for this exercise. However, some of the evaluated segments had long sections of double track at their beginning or end. In order to better evaluate the passing sidings count on its own and better compare segments with each other, double track segments of any length located at the beginning or end of a segment were disregarded from the passing sidings count because the distance between passing sidings does not become a significant benefit until trains have cleared the double track sections.

A second indicator, the percent of existing double track, was calculated by totalling the length of all double track segments longer than 8,000 feet (including all assumed existing passing sidings) and dividing by the total track length.

A third indicator, the assumed track class, is based on maximum allowable train speeds. **Tables 5-2** and **5-3** summarize the sidings, double track, track class index, and signalization obtained by segment.

Table 5-2: Summary of Infrastructure Indicators for Selected Amtrak Corridors, By Segment

Amtrak Route	Host Railroad	Amtrak Westbound Station	Amtrak Eastbound Station	Segment Length (miles)	Average Distance between Passing Sidings (miles)	Double Track Percentage	Track Class	Type of Signalization
Texas Eagle (Fort Worth-San Antonio)	BNSF	Fort Worth, TX	Temple, TX	128	15.2	21%	4	CTC
	UP	Temple, TX	San Antonio, TX	153	23.3	15%	4	CTC/ ABS
Sunset Limited	UP	Sanderson, TX	San Antonio, TX	297	10.2	16%	5	CTC
	UP	San Antonio, TX	Lafayette, LA	428	14.2	27%	4	CTC
	BNSF	Lafayette, LA	New Orleans, LA	134	18.4	11%	4	ABS
Crescent	NS	Slidell, LA	Meridian, MS	167	23.2	13%	4	CTC
	NS	Meridian, MS	Atlanta, GA	318	13.2	24%	4	CTC

Table 5-3: Summary of Infrastructure Indicators for the Project Corridor

Amtrak Route	Host Railroad	Amtrak Westbound Station	Amtrak Eastbound Station	Segment Length (miles)	Average Distance between Passing Sidings (miles)	Double Track Percentage	Track Class	Type of Signalization
Texas Eagle (Fort Worth-Marshall)	TRE	Fort Worth, TX	Dallas, TX	33	16.5	16%	3/4	CTC
	UP	Dallas, TX	Marshall, TX	151	9.0	29%	4/5	CTC
Potential	UP	Marshall, TX	Shreveport, LA	41	13.7	16%	4	ABS
	KCS	Shreveport, LA	Vicksburg, MS	170	17.0	13%	4	CTC
	KCS	Vicksburg, LA	Meridian, MS	141	12.7	18%	4	CTC

Freight and Passengers Trains Data

Data on freight and passenger trains was also collected for the three selected Amtrak corridors and the study corridor. The collected data includes the number of trains operating on a railroad segment The data was initially gathered by grade crossing and then aggregated by segments delimited by Amtrak stations. These data include:

- Train counts (total, existing passenger trains, existing freight trains, potential passenger trains),
- Number of trains running during the day (6am to 6pm) and number of trains running during the night (6pm to 6am) based on FRA crossing data,
- Number of Amtrak passenger trains based on current Amtrak schedules (see Appendix C), and
- Number of TRE commuter trains based on TRE schedules (see Appendix B).

The freight train counts and the percentage of trains running during day and night were gathered from the FRA crossing inventory database. The average number of trains per day (total, existing passenger trains, existing freight trains, potential passenger trains) was used as an indicator in this study.

Data regarding the time of day for freight operations documented in the FRA crossing database has limited accuracy. Based on this information, which is the only information available for this study, there is a constant dispatching of trains during the day. Therefore, time of day data cannot be used to differentiate the study segments.

Tables 5-4 and **5-5** summarize the data related to freight and passenger train indicators by segment.

Table 5-4: Existing Train Counts for the Selected Amtrak Corridors

Amtrak Route	Host Railroad	Amtrak Westbound Station	Amtrak Eastbound Station	Train Counts (per day) (average)		
				Number of Freight Trains	Number of Passenger Trains	Total Number of Trains
Texas Eagle (Fort Worth-San Antonio)	BNSF	Fort Worth, TX	Temple, TX	26	2	28
	UP	Temple, TX	San Antonio, TX	17	2	19
Sunset Limited	UP	Sanderson, TX	San Antonio, TX	16	(6/week)*	18
	UP	San Antonio, TX	Lafayette, LA	20	(6/week)*	22
	BNSF	Lafayette, LA	New Orleans, LA	12	(6/week)*	14
Crescent	NS	Slidell, LA	Meridian, MS	12	2	14
	NS	Meridian, MS	Atlanta, GA	25	2	27

*Assumes a maximum of two passenger trains daily (one round trip) for the purposes of this study.

Table 5-5: Existing Train Counts for the Potential Passenger Rail Route

Amtrak Route	Host Railroad	Amtrak Westbound Station	Amtrak Eastbound Station	Train Counts (per day) (average)			
				Number of Freight Trains	Number of Passenger Trains	Number of Trains at Potential Passenger	Number of Total Proposed Trains
Texas Eagle (Fort Worth-Marshall)	TRE	Fort Worth, TX	Dallas, TX	28	60	2	90
	UP	Dallas, TX	Marshall, TX	26	2	2	30
Potential	UP	Marshall, TX	Shreveport, LA	15	0	2	17
	KCS	Shreveport, LA	Vicksburg, MS	20	0	2	22
	KCS	Vicksburg, LA	Meridian, MS	20	0	2	22

Note: Total TRE daily passenger train counts for Fort Worth to Dallas is 58 based on TRE's commuter schedule (see **Appendix B**). The two intercity trains from the Texas Eagle have been added to this number resulting in a total of 60 passenger trains that run daily. This data is not consistent with the data obtained from the FRA crossing inventory (48 passenger trains). The number of trains at potential passenger route is for two trains per day, one daily round trip.

On-Time Performance Data

Another data item collected and reviewed for use in evaluation of the project corridor is the OTP of existing Amtrak routes. For the context of this study, OTP is a measure of a specific train or route to remain on or within a defined threshold of the published schedule and is an attempt to measure the effectiveness of the routes and the reliability of their service.

The concept of relative delay has been introduced to measure the delay in minutes between first and last stations for each segment analyzed (delay at arrival – delay at departure). Raw data of delays in minutes by train, day, and endpoint station were gathered from the FRA website[4] and aggregated by track segments. This index identifies the degree to which segments vary from the OTP average for the corridor.

A detailed analysis was completed to determine the OTP for the study corridor as well as for the three selected Amtrak routes. This analysis can be found in **Appendix D**.

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[4] FRA "Historical Amtrak On-Time Performance Data" https://juckins.net/amtrak_status/archive/html/home.php

After analyzing existing OTP data, the findings were:

- The primary two causes of delay identified for the selected Amtrak routes are train interference and track and signals delays. See **Appendix D, Table D-3** (information obtained from FRA "Quarterly Report on the Performance and Service Quality of Intercity Passenger Train Operations"[5]
- OTP reported by the FRA at the Rail Service Metrics and Performance Reports[6] vary considerably from quarter to quarter and year to year due to seasonal fluctuations in freight traffic, construction, and maintenance work. Additionally, unexpected events occasionally skew OTP significantly because of the infrequent service of most of the long-distance routes.
- The data for the period analyzed (April 2016 to March 2017) show that the Texas Eagle and the Sunset Limited OTP are above the average OTP for Amtrak long distance routes (73% and 65%, respectively, versus an 56% average for the OTP of all Amtrak long distance routes).

Table 5-6 provides the end-of-segment OTP and delays at departure by selected Amtrak corridor segments.

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[5] FRA "Quarterly Report on the Performance and Service Quality of Intercity Passenger Train Operations" https://www.fra.dot.gov/Page/P0532;

[6] FRA Rail Service Metrics and Performance Reports https://www.fra.dot.gov/Page/P0532

Table 5-6: End-of-Segment OTP and Delay at Departure by the Selected Amtrak Corridor Segments, April 2016 to March 2017

Amtrak Route	Amtrak Westbound Station	Amtrak Eastbound Station	Segment Length (miles)	Average Delay at Departure (minutes)		OTP End of Segment* (relative delay)
				Average	Median	
Texas Eagle (Fort Worth-San Antonio)	Fort Worth, TX	Temple, TX	128	25	5	83%
	Temple, TX	San Antonio, TX	153	21	6	80%
Sunset Limited	Sanderson, TX	San Antonio, TX	297	23	0	74%
	San Antonio, TX	Lafayette, LA	428	38	15	73%
	Lafayette, LA	New Orleans, LA	134	37	23	74%
Crescent	Slidell, LA	Meridian, MS	167	29	20	65%
	Meridian, MS	Atlanta, GA	318	20	8	49%

*End of segment OTP delay criteria as described by the FRA (See **Appendix D, Table D-1**)
Source: Created using data from FRA "Historical Amtrak On-Time Performance Data" https://juckins.net/amtrak_status/archive/html/home.php

The same exercise was run for the Fort Worth, TX to Marshall, TX segment of the Texas Eagle and summarized in **Table 5-7**.

Table 5-7: End-of-Segment OTP and Delay at Departure by the Amtrak Texas Eagle Corridor (Fort Worth to Marshall), April 2016 - March 2017

Amtrak Route	Amtrak Westbound Station	Amtrak Eastbound Station	Segment Length (miles)	Average Delay at Departure (minutes)		OTP End of Segment* (relative delay)
				Average	Median	
Texas Eagle (Fort Worth-Marshall)	Fort Worth, TX	Dallas, TX	33	36	11	96%
	Dallas, TX	Mineola, TX	79	41	17	78%
	Mineola, TX	Longview, TX	48	46	24	84%
	Longview, TX	Marshall, TX	24	44	22	89%

*End of segment OTP delay criteria as described by the FRA (See **Appendix D, Table D-1**)
Source: Created using data from FRA "Historical Amtrak On-Time Performance Data"
https://juckins.net/amtrak_status/archive/html/home.php

Section 6: Improvements

This section details the steps used to identify the passing siding improvements to implement a reliable passenger rail service from Fort Worth, TX to Meridian, MS. The infrastructure improvements presented are limited to the quantity of passing sidings due to the limitations of this study. However, other improvements may also provide additional capacity and increase travel time for reliable passenger service.

Section Overview

To identify passing siding improvements within the corridor, the collected data was reviewed and compared between corridor segments and compiled indicators. These indicators include the infrastructure, operations, and OTP data.

A spreadsheet-based model (described in more detail below) was created and run for the potential Amtrak schedule for the corridor length from Fort Worth, TX to Meridian, MS to validate Amtrak's schedule from its evaluation.

The Fort Worth, TX to Dallas, TX segment was evaluated separately from the other potential passenger rail corridors since it is the only segment from the project corridor that has commuter service. Given the elevated number of commuter trains running in this segment, a high-level schedule review was conducted to evaluate the impacts of the anticipated passenger rail schedule provided by Amtrak.

To complete the evaluation, the Dallas, TX to Meridian, MS segment was divided into the following sub-segments:

- Dallas, TX to Marshall, TX;
- Marshall, TX to Shreveport, LA;
- Shreveport, LA to Vicksburg, MS; and
- Vicksburg, MS to Meridian, MS.

The indicators described within **Section 5** of this report were compared between the selected existing Amtrak routes and the Dallas, TX to Meridian, MS study segments. These comparisons included OTP, existing passing sidings, percentage of double track, freight and passenger train counts, and corridor capacity.

This section presents the potential improvements regarding the overall length of passing sidings by sub-segments of the project corridor. An order-of-magnitude construction cost estimate for the implementation of these potential improvements was also developed and has been included.

Anticipated Amtrak Schedule (unconstrained)

Amtrak prepared a Route and Service Financial Evaluation on July 2015 that included three possible schedules for the potential Fort Worth, TX to Meridian, MS passenger rail service with Alternative 3 from that evaluation being the recommended anticipated schedule. Operations data was not made available for this study. Therefore, a spreadsheet-based model was used to estimate travel time between stations to attempt to validate the Amtrak schedule. The model included inputs for acceleration/deceleration of the train, maximum allowable train speeds, station locations, and dwell times at stations; the model assumed that all train meets with the potential passenger rail service would provide priority to the passenger rail service. The following data was assumed for the model:

- Acceleration/deceleration of typical diesel locomotive for commuter and intercity,
- Maximum allowable passenger train speeds based on an assumed class as well as other speed restrictions identified from available data sources, and
- Typical dwell times (between 6 and 18 minutes) and station stops as identified within the Amtrak anticipated schedule. Dwell times were determined as a function of the population of the city where each potential station stop is located.

Results from the model and Amtrak's anticipated schedule are provided in **Table 6-1**. Based on the spreadsheet model and assumptions above, Amtrak's potential passenger rail schedule functions on the study corridor.

Table 6-1: Comparison of Amtrak's Alternative 3 Schedule and Spreadsheet Model Results

Potential Amtrak Station	Amtrak Alternative 3	Spreadsheet-based model	
	Travel time	Assumed dwell time (minutes)	Travel Time
Meridian		6	
Jackson	1h 43 min	18	1h 43 min
Vicksburg	54 min	6	1h 14 min
Shreveport	3h 27 min	18	3h 10 min
Marshall	1h 9 min	6	1h 10 min
Longview	27 min	6	27 min
Mineola	49 min	6	47 min
Dallas	1h 35 min	18	1h 35min
Fort Worth	1h 12 min		36 min
Total with Dwell Time	11h 16 min		10h 42 min

Fort Worth-to-Dallas Segment

The Fort Worth to Dallas segment of the study is owned by TRE and operates an average of 58 commuter trains daily within this segment (see **Appendix B** for additional schedule details) as well as freight operations within the corridor. Given that the number of passenger trains at this location is significantly higher than at the other segments of the corridor, this study suggests that the potential Amtrak schedule for the new route is compatible with the current TRE commuter train schedules and the Amtrak Texas-Eagle (see **Tables 6-2 through 6-5**). Freight data was not available to be incorporated into this evaluation.

Table 6-2: Weekday Westbound Dallas, TX to Fort Worth, TX Schedule Interference: TRE, Texas Eagle, and Amtrak Potential Route

RR owner / Route	Dallas Union Station	Fort Worth Intermodal Center
TRE	11:00 am	11:56 am
Texas Eagle	11:30 am arrival 11:50 am departure	1:25 pm arrival 2:10 pm departure
TRE	12:00 pm	12:56 pm
TRE	12:00 am	12:45 am
Amtrak potential	**1:22 am departure**	**2:34 am arrival**
TRE	5:00 am	6:01 am

Table 6-3: Saturday Westbound Dallas, TX to Fort Worth, TX Schedule Interference: TRE, Texas Eagle, Amtrak Potential Route

RR owner / Route	Dallas Union Station	Fort Worth Intermodal Center
TRE	11:30 am	12:31 pm
Texas Eagle	11:30 am arrival 11:50 am departure	1:25 pm arrival 2:10 pm departure
TRE	12:00 pm	12:56 pm
TRE	11:30 pm	12:31 am
TRE	12:10 pm	Stops at West Irving
Amtrak potential	**1:22 am departure**	**2:34 am arrival**
TRE	Starts at Centre Port at 5:01 am	5:31 am
TRE	6:30 am	7:31 am

Table 6-4: Weekday Eastbound Fort Worth, TX to Dallas, TX Schedule Interference: TRE, Texas Eagle, Amtrak Potential Route

RR owner / Route	Fort Worth Intermodal Center	Dallas Union Station
TRE	1:25 pm	2:22 pm
Texas Eagle	1:58 pm arrival 2:20 pm departure	3:20 pm arrival 3:40 pm departure
TRE	2:25 pm	3:22 pm
TRE	10:25 pm	11:22 pm
Amtrak potential	**11:00 pm departure**	**11:57 pm arrival**
TRE	11:55 pm	Stops at Centre Port at 12:20 am

Table 6-5: Saturday Eastbound Fort Worth, TX to Dallas, TX Schedule Interference: TRE, Texas Eagle, Amtrak Potential Route

RR owner / Route	Fort Worth Intermodal Center	Dallas Union Station
TRE	1:55 pm	2:52 pm
Texas Eagle	1:58 pm arrival 2:20 pm departure	3:20 pm arrival 3:40 pm departure
TRE	2:55 pm	3:52 pm
TRE	10:55 pm	11:52 pm
Amtrak potential	**11:00 pm departure**	**11:57 pm arrival**
TRE	11:55 pm	Stops at Centre Port at 12:20 am

The potential Amtrak service fits between current commuter operations as shown in **Tables 6-2** through **6-5**. While the possible impact of freight trains was not evaluated, it is assumed that they are not impacting current commuter operations given that the main cause of delays reported by the FRA for this segment is commuter train interference (71% of delays in 2016). Given this lack of interference between the Amtrak potential passenger rail and freight trains, as well as the extremely well-rated OTP (96% from April 2016 to March 2017, see Appendix D for more details on OTP), it is assumed that additional passing sidings for the potential Amtrak service are not needed within this segment. More detailed study is required to confirm this assumption.

Analysis - Indicators

This section provides a discussion on the interdependencies that may exist between the indicators identified at **Section 5**: Data Collection. **Table 6-6** provides a summary of the indicators and segments selected to include in the correlation discussion.

Table 6-6: Indicators by Segment to be Included in the Correlation Evaluation

Segment	Average Distance between Passing Siding (miles), 2017 More than 8,000 feet	Double Track Percentage More than 8,000 feet	Total Number of Trains, 2017	OTP (percentage)
Dallas - Marshall	9.0	29%	28	80%
Marshall - Shreveport	13.7	16%	15	N/A
Shreveport - Vicksburg	17.0	13%	20	N/A
Vicksburg - Meridian	12.7	18%	20	N/A
Fort Worth - Temple	15.2	21%	26	83%
Temple – San Antonio	23.3	15%	19	80%
Sanderson – San Antonio	10.2	16%	16	74%
San Antonio - Lafayette	14.2	27%	21	73%
Lafayette – New Orleans	18.4	11%	14	74%
Slidell - Meridian	23.2	13%	12	65%
Meridian - Atlanta	13.2	24%	26	49%

The indicators to be included in the correlation evaluation are described below:

OTP

Given the goal of a satisfactory performance for the project corridor, an evaluation and comparison of the OTP was conducted for selected existing Amtrak routes. The OTP data for the selected routes varies considerably from quarter to quarter and from year to year (see **Figure D-1** within **Appendix D**). Observing data from 2011 to 2016, the Sunset Limited has an overall better OTP than the other two selected routes and the average OTP of all Amtrak long distance routes. When evaluating the relative OTP by segments for each corridor (between stations), the Texas Eagle has an average OTP over 80%, while the Sunset Limited OTP average is 74% and the Crescent OTP average goes down to 57% (see **Table D-4** within **Appendix D**).

Another parameter directly linked to the OTP are the minutes of delay. The average and median delays at departure for the selected routes were evaluated, and the results showed that the average delay in all three corridors is much higher than the median value (see **Table D-4** within **Appendix D**). This correlates with the observance of some delays over 7 hours in all routes, and some delays that increased to more than 10 hours. Based on Amtrak's historical-OTP data[7], the main cause of delay of the Texas Eagle is train interference (32.9%). An increase in the number of passing sidings would provide additional opportunities for freight and commuter trains to allow for passing and possibly alleviate these delays.

Table D-4 within **Appendix D** shows how the average delay at departure for the Texas Eagle Fort Worth, TX to Marshall, TX segment is similar to the other corridors/segments studied. End-of-segment OTP using relative delays is 96% for the Fort Worth, TX to Dallas, TX segment (shown at **Table D-5** within **Appendix D**), which is the highest OTP within the evaluation. The other segments for this corridor also present high numbers of OTP (with relative delays) which range from 78% for the Dallas, TX to Mineola, TX segment to 89% for the Longview, TX to Marshall, TX segment.

Distance between Passing Sidings and Percentage of Double Track

The average distance between passing sidings for the selected routes range from 9 miles between siding from Dallas, TX to Marshall, TX (Texas Eagle) to 23.2 miles between siding from Slidell, LA to Meridian, MS (Crescent). See **Tables 5-2** and **5-3** for additional details on this data.

In this study, the "percent of double track" indicator counts all passing sidings over 8,000 feet as double track. In the data studied, this double track indicator increases as the indicator for the distance between passing sidings decreases. However, this correlation was not observed within the San Antonio, TX to Lafayette, LA (Sunset Limited) segment. This exception may be explained by the presence of three long segments of double track (19, 14, and 23 miles) within that route. This situation appeared to be an anomaly and did not occur at the other selected segments (the percentage of double track for a given segment is the total of double track and passing sidings areas equal or longer than 8,000 feet divided by the length of the segment).

When comparing these parameters with the project corridor, the existing infrastructure for the Dallas, TX to Marshall, TX segment has one of the shortest distances between passing sidings (average of 9 miles between siding) and the highest percentage of double track (average of 29%) within the selected corridors. See **Table 5-3** for details on the average distances between sidings.

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[7] https://www.amtrak.com/historical-on-time-performance

Total Number of Daily Trains

The total number of daily trains in the full project corridor differs from the Fort Worth, TX to Dallas, TX segment, where there are currently 90 trains running daily. From Dallas, TX to Meridian, MS, the total number of daily trains range from 15 to 30. The total number of daily trains running in the Amtrak corridors analyzed in this study range between 12 and 26.

Given that the Fort Worth, TX to Dallas, TX (Texas Eagle) segment has higher train volumes (90 trains/day including the 2 potential passenger rail trains) than the other selected routes (between 12 to 26 trains per day), this segment was not included in the comparison.

Other Indicators to be Used in the Evaluation: Corridor Capacity

There are many infrastructure and operational characteristics that can affect a railroad segment's train capacity. For instance, the type of signalization has the potential to impact the capacity of a corridor. Within the selected Amtrak corridors for review, the type of railroad signalization is usually CTC except for certain segments where ABS is present. As shown on **Table 6-7**, the capacity of a corridor measured as the practical maximum trains per day, appears to be correlated with the number of tracks, the signalization type, and whether trains other than freight are using the corridor.

Table 6-7: Corridor Capacity Based on Number of Tracks, Signalization, and Train Types within Corridor

Number of Tracks	Signal Type	Trains per Day - Practical Maximum If Freight and Passenger Trains Use Corridor	Trains per Day - Practical Maximum If Only Freight Trains Uses Corridor
1	ABS	18	25
1	CTC	30	48
2	ABS	53	80
2	CTC	75	100

Source: Association of American Railroads' (AAR) 2007 National Rail Freight Infrastructure Capacity and Investment Study

According to the AAR 2007 report, the "theoretical capacity" is the maximum number of trains that can operate within a corridor assuming unconstrained conditions. The "practical capacity" considers factors such as possible disruptions, maintenance, human decisions, weather, possible equipment failures, supply and demand imbalances, and seasonal demand. Per the AAR report, practical capacity is about 70 percent of theoretical capacity and is considered to be labelled as reliable service.

The data from the AAR 2007 report is not specific for the project corridor; however, its conclusions are used in this study as a criterion to obtain an accurate order of magnitude of corridor capacity and validate the results obtained for the segments analysed. This study compares the number of practical maximum trains per day that use a corridor given certain characteristics of that corridor as provided in **Table 6-7**, against the proposed total number of trains and tracks per segment analyzed, to verify if the segments analyzed within the project corridor still have capacity for additional passenger and freight trains after the improvements based on available current data have been identified.

The interdependence between the variables presented at **Table 6-7** as a summary of the AAR 2007 report, may contradict the interdependencies found in this study. This is discussed at the end of this section.

Analysis - Correlation Evaluation

Several comparisons between the indicators are conducted to find the most reasonable correlation between these indicators and the passing sidings infrastructure. All the trials conducted are summarized in this section.

OTP Compared with Other Evaluated Parameters

There are many factors that affect the OTP. This section presents the relationship identified between OTP (using relative delays) and percentage of double track, and OTP and the average distance between passing sidings. As **Figures 6-1** and **6-2** show, the logical relationship between these variables is not confirmed with the set of data used for this study; logically, OTP should increase with the percentage of double track (**Figure 6-1**), and OTP should decrease when the average distance between passing sidings decreases (**Figure 6-2**). But this is not the case with the data used for this study.

Figure 6-1 Percentage of Double Track Versus OTP by Corridor Segment

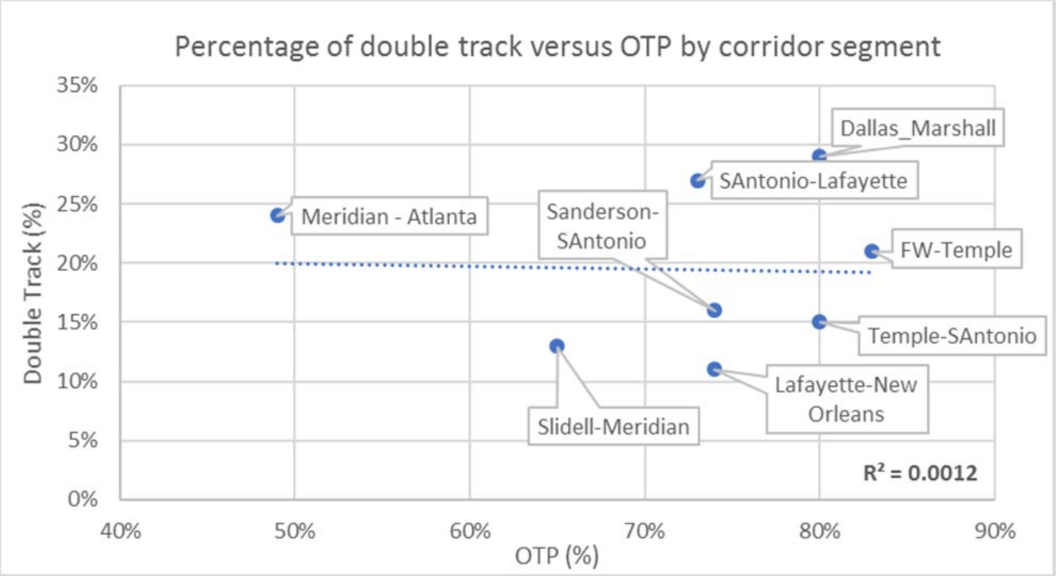


Figure 6-2 Distance between Passing Sidings and OTP by Corridor Segment

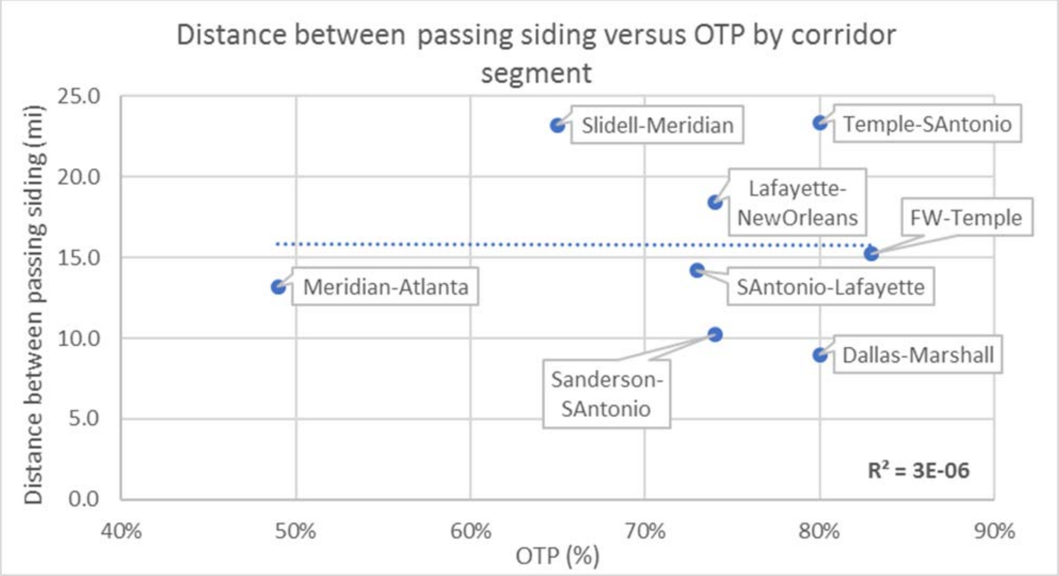


Figure 6-1 and **6-2** represent graphically how OTP (horizontal axis) varies with the percentage of double track (vertical axis **Figure 6-1**) and with the distance between passing sidings (vertical axis **Figure 6-2**). Both graphs show that the dots (data) are spread through the graphs randomly, meaning that an association between the two variables doesn't exist. The dotted line, which shows the linear regression between the two variables is flat. Also, R^2 (which ranges from 0 to 1) which expresses statistically the strength of a relationship, is extremely low in both cases (0.0012 and 3E-06 respectively). The closer R^2 is to 1, the stronger the relationship.

Given these results, OTP is not used directly as a variable to determine the improvements needed regarding the miles of passing sidings. However, OTP values will be used as a criterion when selecting the corridor segments that will be included in further correlations. By setting the minimum OTP to 80% to get a reliable service (Amtrak long distance routes OTP goal is 80%, see **Appendix D**), only three corridors will be used in the analysis, as discussed in the next paragraphs.

Daily Train Counts Compared with Length of Double Track versus Single Track

Based on the data available from the FRA crossings inventory (see **Appendix F**) and Amtrak and TRE schedules for the existing corridors (see **Appendices B and C**), the number of daily trains operating in a corridor correlates with the percentage of double track versus single track within that corridor (see **Figure 6-3**).

Figure 6-3: Total Trains Per Day Compared to Percentage of Double Track by Segment

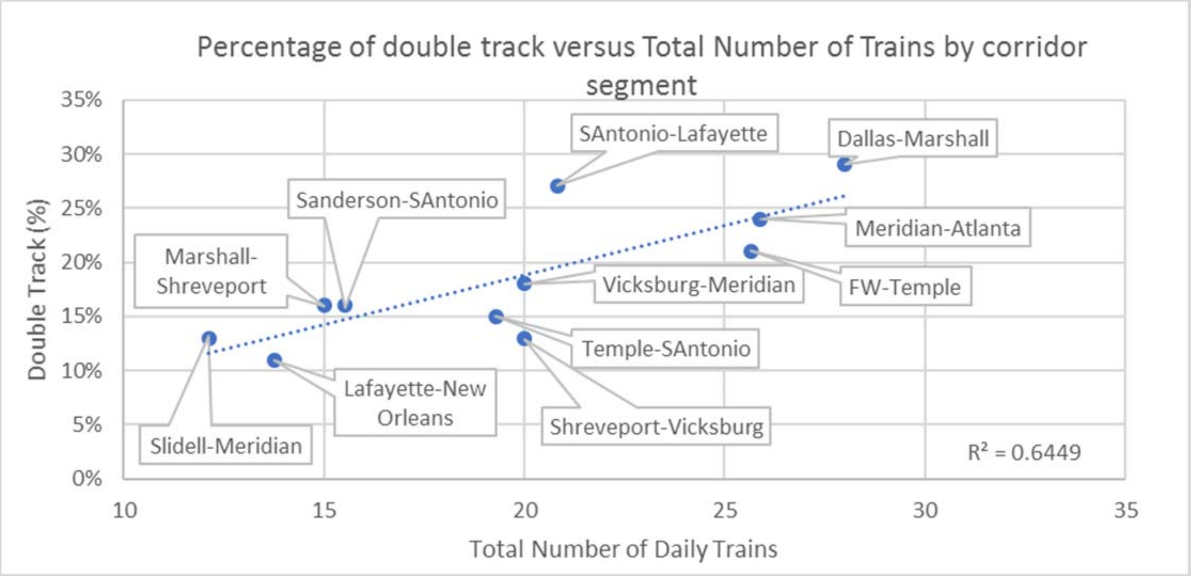
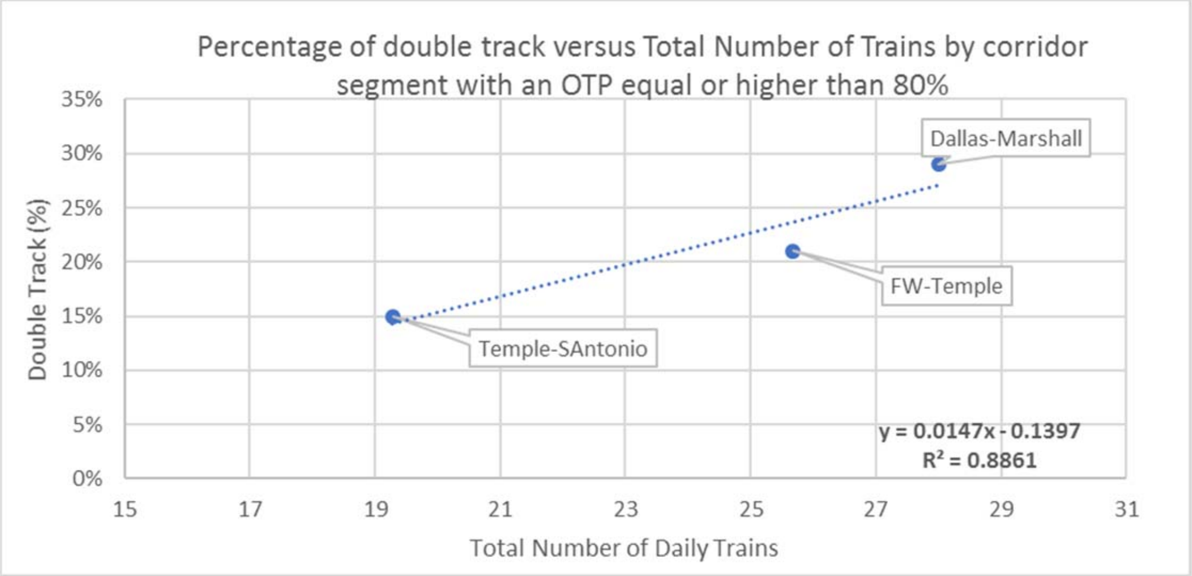


Figure 6-3 represents graphically how the percentage of double track (vertical axis) relates to the total number of daily trains (horizontal axis) by corridor segment. Data comes from **Table 6-7**. The graph demonstrates an association between both variables. When the number of daily trains increases in a corridor, the percentage of double track for that same corridor increases too. The linear regression, shown in **Figure 6-3** as a dotted line, helps to visualize this correlation. The slope of a regression line represents the rate of change of one value as the other changes; at **Figure 6-3** this can be translated into the change of the number of daily trains by segment, and the change on the percentage of double track by segment.

The strength of this relationship, when expressed statistically with R^2, shows an R^2 value of 0.65, confirming this relationship and the relative strength of it.

For prediction purposes, this study assumes that an R^2 value of 0.65 is too low. Given that a correlation exists between these two variables, to more accurately predict the extra miles of passing sidings needed, only those segments with an OTP equal or higher than 80% will be used in the set of data (Dallas, TX to Marshall, TX - 80% OTP, Fort Worth, TX to Temple, TX – 83% OTP, and Temple, TX to San Antonio, TX – 80%). **Figure 6-4** plots the correlation between the percentage of double track (vertical axis) versus the total number of trains (horizontal axis) by corridor segment, using only three segments with an OTP of 80% or greater.

Figure 6-4 Percentage of Double Track Compared with the Total Number of Trains by Corridor Segment with an OTP Equal or Higher than 80%

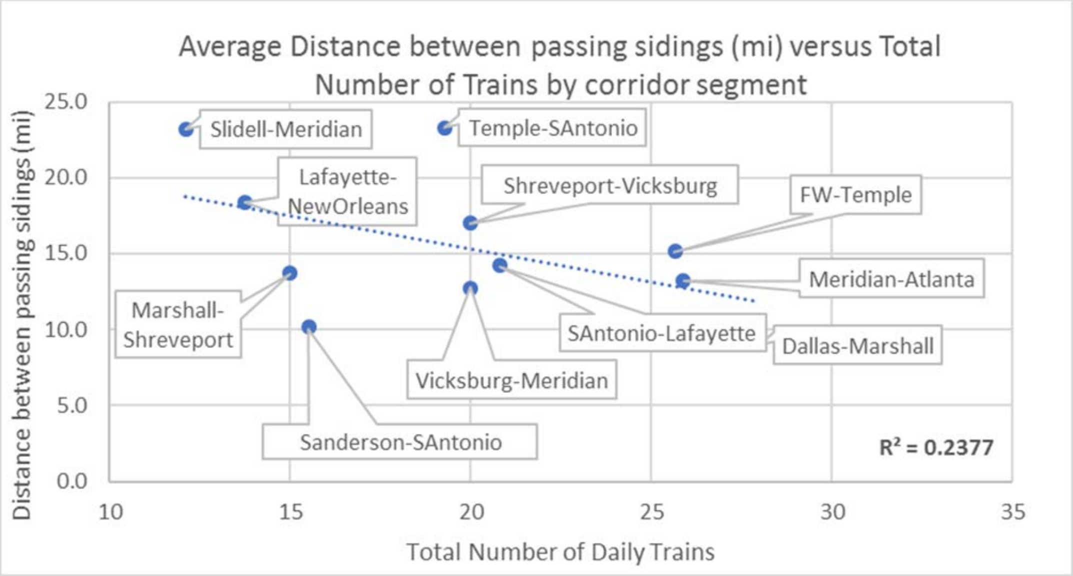


Using data only from segments where the OTP is equal or higher than 80%, the strength of this relationship increases considerably; R^2 value is now 0.89. With this R^2 value predictions of one variable (double track %) using the other variable (total number of daily trains) as a given value are considered feasible and reliable. The equation of the regression line shown in **Figure 6-4** is the one to be used to do these predictions ($y = 0.0147x - 0.1397$).

Daily Train Counts Compared with Distance Between Passing Sidings

The number of daily trains by corridor is also correlated with the number of miles between passing sidings. **Figure 6-5** shows how both variables are associated. As the regression line shows, the more trains that operate daily in a corridor, the less miles between passing sidings the corridor presents. But the strength of this relationship is low, as expressed with R^2 which has a value of 0.24. This value is much lower than the one obtained when comparing the total number of daily trains with the percentage of double track which has an R^2 value of 0.65 (see **Figure 6-3**).

Figure 6-5 Average Distance between Passing Sidings Compared with the Total Number of Trains



The percentage of double track variable is more comprehensive; it not only accounts for the length of the sidings but also for the length of the segments of double track that, with crossover in strategic locations, can have the same functionality as sidings.

With an R^2 value of 0.24, the correlation between total number of daily trains and distance between passing sidings will be disregarded to determine the siding improvements needed for this corridor for reliable passenger rail service.

Analysis – Prediction of Necessary Miles of Passing Sidings

Data resulting from the correlation observed between total number of daily trains and percentage of double track for those corridors with an OTP equal or greater than 80% (see **Figure 6-4**) is used to predict the increment in the miles of passing sidings for all the segments within the project corridor excluding the Fort Worth, TX to Dallas, TX segment, which has been evaluated separately, as discussed at the beginning of this section.

The variables to be used for this prediction are the double track percentage and the total daily trains including the two proposed daily passenger trains to run at the project corridor (see **Table 6-8**).

Table 6-8 Variables to be Used for the Prediction of Miles of Passing Sidings

Segment	Double Track Percentage More than 8,000 feet	Total Number of Potential Trains
Dallas - Marshall	29%	30
Marshall - Shreveport	16%	17
Shreveport - Vicksburg	13%	22
Vicksburg - Meridian	18%	22
Fort Worth - Temple	21%	26
Temple – San Antonio	15%	19

Using the equation from the regression line shown in **Figure 6-4**, the data suggests that the only segment where the percentage of double track needs to be adjusted is the Shreveport, LA to Vicksburg, MS. The other segments present a percentage of double track higher than the minimum needed according to this regression data to present a reliable service (OTP value of 80%). More detailed study is required to verify this finding.

The equation used to determine additional double track needed at the Shreveport, LA to Vicksburg, MS segment is from the regression line ($y = 0.0147x - 0.1397$), where y is the percentage of double track and x is the number of total passenger trains. For Shreveport, LA to Vicksburg, MS x= 22, and the y that resolves the linear regression equation is 18%, meaning that the percentage of double track at this segment will need to be increased from 13% to 18%.

Given the lack of data on future freight services, the following assumption has been applied to better determine the increase on the miles of sidings needed to provide a reliable service to provide a conservative estimate:

It is unknown when the potential passenger rail service at the project corridor will be implemented. To account for future freight train operations when this service is implemented, a 5% increase on the number of total daily freight trains is assumed. This assumption increases the Dallas, TX to Marshall, TX segment up to 32 daily trains, and according to the regression line in Figure 6-4, the percentage of needed double track increases to 33%. Both the Shreveport, LA to Vicksburg, MS and the Vicksburg, MS to Meridian, MS increase to 23 daily trains and 20% of double track. The Marshall, TX to Shreveport, LA daily trains go up to 18, and the percentage of double track remains the same as is (16%).

Table 6-9 summarizes the total percentages of double track proposed by segment from Dallas, TX to Meridian, MS, after incorporating the assumption discussed.

Table 6-9 Total Proposed Percentage of Double Track Percentages by Segment

Segment	Double Track Percentage More than 8,000 feet
Dallas - Marshall	33%
Marshall - Shreveport	16%
Shreveport - Vicksburg	20%
Vicksburg - Meridian	20%

As shown in **Table 6-7**, the capacity of a corridor, and therefore its service reliability, varies not only with the percentage of double track and the number of trains, but also with the signal type. Corridors with ABS typically have less potential capacity than corridors with CTC. The corridor capacity information presented by the AAR 2007 report and summarized in **Table 6-7** is used to verify that with the percentages of double track proposed, the segments within the project corridor have enough capacity to provide a reliable service:

- Dallas TX, to Marshall, TX - 33% double track, 32 daily trains, and signal type CTC: using the information shown at **Table 6-7**, and the existing ratio between one track and two tracks, this segment needs a minimum of 9% of double track, which is lower than the 33% of double track proposed.
- Marshall TX, to Shreveport, LA – 16% double track, 18 daily trains, and ABS: using the ratio between one track and two tracks shown at **Table 6-7**, this segment doesn't need any percentage of double track.
- Shreveport, LA to Vicksburg, MS – 20% double track, 23 trains daily, and CTC: using the ratio between one track and two tracks shown at **Table 6-7**, this segment doesn't need any percentage of double track.
- Vicksburg, MS, to Meridian, MS – 20% double track, 23 trains daily, and CTC: using the ratio between one track and two tracks shown at **Table 6-7**, this segment doesn't need any percentage of double track.

This verification concludes that the increase in the percentages of double track has the potential to provide enough capacity for the project corridor to provide a reliable passenger rail service.

Results

Based on the analysis above, the percentage of double track, the number of existing and potential daily trains, and the signalization type were used to determine potential passing siding improvements to provide reliable passenger service in the project corridor. OTP was also used indirectly to select the corridors that would be used for the analysis.

The analysis provided the increase in the percentage of double track needed. Using the length of each segment, the increase in the percentage of double track is converted into miles, and with these miles, the proposed average distance between passing sidings is calculated. **Table 6-10** summarizes the potential siding improvements regarding increasing the overall length of new passing sidings and/or double track for the corridor.

Table 6-10: Summary of Potential Passing Siding Improvements Compared to Existing Conditions

Amtrak Stations for potential passenger service			Existing Routes			Potential Passenger Rail Route			
Westbound Station	Eastbound Station	Segment Length (miles)	Average Distance between Passing Siding (miles)	Double Track Percentage	Daily Train Counts	Average Distance between Passing Siding (miles) **	Double Track Percentage	Daily Train Counts *	Proposed Additional Length of Passing Sidings (miles)
Fort Worth, TX	Dallas, TX	33	16.5	16%	88	16.5	16%	94	**0**
Dallas, TX	Marshall, TX	151	9.0	29%	28	7.6	33%	32	**6**
Marshall, TX	Shreveport, LA	41	13.7	16%	15	13.7	16%	18	**0**
Shreveport, LA	Vicksburg, MS	170	17.0	13%	20	10.2	20%	23	**13**
Vicksburg, MS	Meridian, MS	141	12.7	18%	20	11.7	20%	23	**2**

NOTES:
*Daily train counts include a 5% increase in total daily trains and two potential passenger trains.
**Potential distance between passing sidings was calculated assuming the new sidings are 10,000 feet long, per FRA recommendations for planning purposes.

It should be noted that the first segment of the project corridor, Fort Worth, TX to Dallas, TX, has an OTP higher than the other Amtrak segments included in the study (OTP = 96%). Thus, no potential improvements are included to provide the reliable passenger rail service.

Order of Magnitude Construction Costs

Based on the results from **Table 6-10**, an additional 21 miles of passing sidings and/or double track improvements may be needed to provide reliable passenger rail service from Fort Worth, TX to Meridian, MS. A unit cost of $4 million for 1 mile of siding[8] has been used to estimate the cost of the potential passing siding improvements; see **Appendix E** for details on this unit cost. It is assumed that all potential siding locations would be in at-grade locations and in areas without existing crossings. It is also assumed that sidings include signalization that match the mainline signal system; in case they were not signalized, signalizing them could be a first step as part of a Capital Improvement Plan, before double track construction is done.

It is also estimated that an additional $7.5 million would be needed for new station locations in Shreveport/Bossier City, Ruston, and Monroe, LA and Vicksburg and Jackson, MI. See **Figure 6-6** and **Appendix E** for details on costs by station.

Figure 6-6: Project Corridor between Fort Worth, Texas and Meridian, Mississippi with existing and potential Amtrak stations

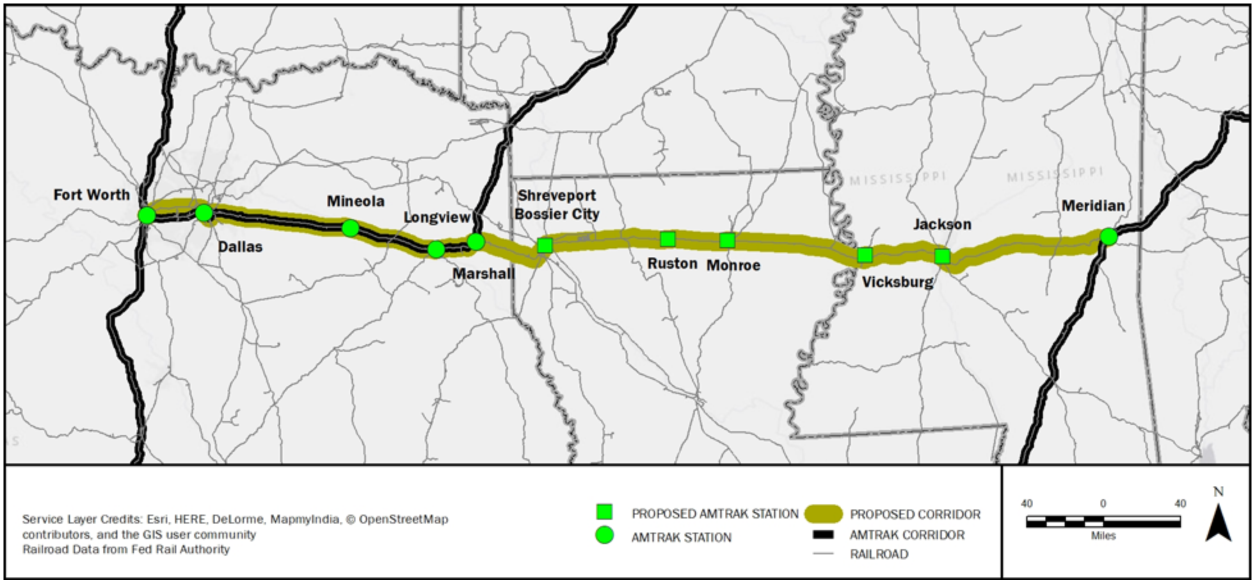


Table 6-11 summarizes the order of magnitude construction costs for the potential passing siding improvements by project corridor sub-segments and the new station locations. See **Appendix E** for details on this unit cost.

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[8] This cost per one mile of siding includes a 25% contingency.

Table 6-11: Order of Magnitude Construction Costs for the Potential Passing Siding Improvements and the new station locations

Amtrak Stations for potential passenger service		Item	Unit	Quantity	Unit Price	Total
Westbound Station	Eastbound Station					
Fort Worth, TX	Dallas, TX	siding	mile	0	$4,000,000	$0
Dallas, TX	Marshall, TX	siding	mile	6	$4,000,000	$24,000,000
Marshall, TX	Shreveport, LA	siding	mile	0	$4,000,000	$0
Shreveport, LA	Vicksburg, MS	siding	mile	13	$4,000,000	$52,000,000
Vicksburg, MS	Meridian, MS	siding	mile	2	$4,000,000	$8,000,000
Total Cost Estimate Potential Passing Sidings						$84,000,000
Total Cost Estimate New Station Locations						$7,500,000
Total Construction Costs						**$91,500,000**

Some of the freight railroads suggested adding a new railroad track exclusively for passenger rail along all the corridor. The estimate to construct a new track has been calculated assuming $4.6 million per mile of single track, and $4 million for 1 mile of siding, see **Table 6-12**. The locations where sidings would be needed have been estimated based on the proposed schedule presented by Amtrak[9], and the existing Texas Eagle schedule. Only one passenger train meet has been identified at the Dallas to Mineola section. The total to add a new track along the project corridor is $2.48 billion dollars.

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[9] 2015 Amtrak Crescent Fort-Worth extension – Schedule Alternative #3.

Table 6-12: Cost to add a new track along the project corridor by project corridor sub-segments

Amtrak Stations for potential passenger service		Quantity (in miles)		Unit Price (in Million Dollars)		Total Cost (in Million Dollars)		Total Cost (in Million Dollars)
Westbound Station	Eastbound Station	Single Track	Siding	Single Track	Siding	Single Track	Siding	
Fort Worth, TX	Dallas, TX	33	0	$4.6	$4.0	$152	$0	$152
Dallas, TX	Mineola, TX	79	1.5	$4.6	$4.0	$363	$6	$369
Mineola, TX	Longview, TX	48	0	$4.6	$4.0	$221	$0	$221
Longview, TX	Marshall, TX	24	0	$4.6	$4.0	$110	$0	$110
Marshall, TX	Shreveport, LA	41	0	$4.6	$4.0	$189	$0	$189
Shreveport, LA	Vicksburg, MS	170	0	$4.6	$4.0	$782	$0	$782
Vicksburg, MS	Meridian, MS	141	0	$4.6	$4.0	$649	$0	$649
Total Cost Estimate Potential Single Track Construction (in Million Dollars)								$2,472
Total Cost Estimate New Station Locations (in Million Dollars)								$7.5
Total Construction Costs (in Million Dollars)								**$2,480**

Section 7: Benefit-Cost Analysis

A preliminary BCA has been prepared to compare selected benefits and costs of the potential passenger rail service between Fort Worth, TX and Meridian, MS. This analysis was conducted with a spreadsheet-based benefit-cost model which incorporates historic and forecasted economic and transportation data with available project specific details. The Texas Transportation Institute (TTI) is currently conducting a parallel assessment of economic impacts of the potential service that could identify additional classes of benefits not evaluated herein. TTI's analysis assesses the potential passenger rail network planning and travel benefits of developing the project corridor; calculates the expected economic impacts at potential station locations along the project corridor and makes a preliminary multimodal assessment of roadway conditions/needs of the I-20 corridor and the potential for diversion of freight to rail. See **Appendix H** for the complete planning and economic impact analysis study.

The BCA calculations and documentation conform to U.S. Department of Transportation (USDOT) guidance supporting discretionary grant applications where data availability permitted. BCA results are presented over a 20-year time horizon at a discount rate of 7% for all benefits and costs. Monetary values are presented in 2016 dollars unless otherwise noted.

Benefits were calculated based on a high-level feasibility assessment developed by Amtrak in 2015 of a potential restructuring of the *Crescent* service between Penn Station in New York City (NYP) and New Orleans, Louisiana (NOL).[10] The service change would split the train at Meridian (MI) with one locomotive, two coaches, one dining car, two sleeping cars, and one baggage car proceeding to Fort Worth (FTW). A consist of one locomotive, two coaches, one café car, two sleeping cars, and one baggage car would continue to New Orleans. Three alternatives with different scheduled departure times were evaluated. This analysis is based on the option that was recommended for further study ("Alternative 3").

Costs include estimated construction expenditures associated with additional potential siding improvements and new passenger rail stations. The Amtrak study identified an expanded train consist with an additional sleeping car and an additional baggage car for the restructured service. This analysis assumes that the additional rolling stock can be reassigned from Amtrak's existing fleet. No capital costs for additional railcars were available or included in the analysis.

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[10] Amtrak. *Crescent* Meridian-Dallas-Fort Worth Section Route and Service Financial Evaluation, July 17, 2015. Partial draft provided to TxDOT by Amtrak.

Table 7-1 summarizes the results of the BCA, which are discussed in more detail in the sections that follow. The results show that the benefits quantified in this analysis exceed the costs of the project by 2.23 to 1 at a 7% discount rate. An evaluation of other classes of benefits, such as those that could accrue to shippers as a result of the rail capacity improvements, could increase the surplus of benefits over costs. Appendix G documents the overall benefit-cost ratio in more detail.

Table 7-1: Benefit-Cost Analysis Results Summary

	7% Discount Rate
Life-Cycle Benefits (millions)	$181.1
Life-Cycle Costs (millions)	$81.3
Benefit-Cost ratio	**2.23**

Costs

Cost 1: Capital Construction Cost

As documented in **Section 6**, construction costs for additional potential siding improvements and new or upgraded passenger rail station facilities are assumed to be $84 million and $7.5 million, respectively. Based on a three-year construction period, an annual expenditure of $31.0 million is assumed for the analysis. No cyclic capital costs or residual value for capital projects were included in this preliminary assessment.

Cost 2: Operations and Maintenance Cost

Amtrak's feasibility assessment estimated the incremental annual direct and shared operating costs of the potential service change to be $20,307,000. It also estimated that the operating costs would be fully recovered from fare revenues, with an operating surplus of $4,665,000. Because operating expenses reflect a transfer from the passenger to the operator, they do not reflect a cost to society and are excluded from both the cost and benefit components of the analysis.

Benefits

Four benefit classes were evaluated based on the ridership forecast developed by Amtrak. The feasibility study estimated that the restructuring would increase the annual number of passengers by 107,100, generating 110,662,000 passenger miles and $24.6 million of incremental ticket revenue. The benefits derive from savings associated with intercity travellers diverting from personal automobile to rail for travel in the corridor between Fort Worth, TX and Meridian, MS. Benefits include:

1. Net travel cost savings resulting from diversion from auto to Amtrak rail,
2. Passenger travel time savings resulting from diversion from auto to Amtrak rail,

3. Net emissions damage avoided resulting from diversion from auto to Amtrak rail, and
4. Net crash costs avoided resulting from diversion from auto to Amtrak rail.

Table 7-2 includes the net present value of the four benefits at a 7% discount rate. It summarizes the benefits by class.

Table 7-2: Benefit Summary

Benefit Class	NPV at 7% (Millions)
Net Travel Cost Savings	$77.3
Passenger Travel Time Savings	$-81.7
Net Emissions Damage Costs Avoided	$6.1
Net Crash Costs Avoided	$179.4
Life Cycle Benefits	**$181.1**

Benefit 1: Transportation System User Effects (Net Travel Cost Savings)

Intercity travelers who take Amtrak will experience a reduction in personal vehicle operating costs, offset by fare costs. Because operating expenses reflect a transfer from the passenger to the operator, they do not reflect a cost to society and are excluded from both the cost and benefit components of the analysis. To be conservative, this analysis excludes the full value of fare revenue from this benefit, including an operating surplus of $4,665,000 (2015 dollars) fare revenue over operating costs as estimated by Amtrak.

The amount of automobile travel diverted to rail is derived from Amtrak's estimate of incremental passenger-miles on the Crescent in the 2015 feasibility study, growing at 1.61 percent per year based on a composite of Amtrak ridership on the *Crescent* and *Texas Eagle* services from 2009 through 2015, as reported in Amtrak's annual fact sheets for each route.[11] To translate passenger-miles traveled (PMT) on trains into automobile vehicle-miles traveled (VMT), an average automobile occupancy of 1.39 people is used based on the USDOT guidance.[12] Personal vehicle operating costs are based on USDOT guidance.[13] **Table 7-3** details how the net travel cost savings benefit was calculated.

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[11] National Association of Rail Passengers. *Amtrak Fact Sheet.* Accessed at https://www.narprail.org/site/assets/files/1038/trains_2015.pdf

[12] U.S. Department of Transportation. Benefit Cost Analysis Guidance for TIGER and INFRA Applications, July 2017. Table 7: Average Vehicle Occupancy. Accessed at https://www.transportation.gov/sites/dot.gov/files/docs/mission/office-policy/transportation-policy/284031/benefit-cost-analysis-guidance-2017_0.pdf

Table 7-3: Net Travel Cost Savings Resulting from Diversion from Passenger Auto to Amtrak, 2021

	Input	Value	(2016$)
PRIVATE VEHICLE OPERATING COST			
(A)	Total **VEHICLE OPERATING COST**[1] =	**$0.40**	/VMT
VEHICLE-MILES DIVERTED			
(b)	Annual Amtrak Passenger Miles Travelled (PMT)[2] [3]	121,813,604	PMT/year
(c)	Average Private Vehicle Occupancy[4]	1.39	persons/car
(D)	Annual **VEHICLE-MILES DIVERTED** = *(b) x (c)*	**87,635,686**	VMT/year
VALUE OF TRAVEL COST SAVINGS BENEFIT			
(E)	Private Vehicle Operating Cost Savings = *(A) x (D)*	$39,813,363	/year
(F)	Amtrak Fare Revenue[2] [3]	$27,131,822	/year
	Total Value of Delay Savings = *(E) - (F)*	$12,681,541	/year

Sources/Notes:

1. U.S. Department of Transportation. Benefit Cost Analysis Guidance for TIGER and INFRA Applications, July 2017. Table 8: Vehicle Operating Costs. Accessed at https://www.transportation.gov/sites/dot.gov/files/docs/mission/office-policy/transportation-policy/284031/benefit-cost-analysis-guidance-2017_0.pdf
2. Amtrak. *Crescent* Meridian-Dallas-Fort Worth Section Route and Service Financial Evaluation, July 17, 2015. Partial draft provided to TxDOT by Amtrak.
3. 2015 estimated ridership and fare revenue grown to 2021 based on Amtrak Texas Eagle and Crescent historical ridership growth, 2009-2015. Source: National Association of Rail Passengers. Amtrak Fact Sheet. Accessed at https://www.narprail.org/site/assets/files/1038/trains_2015.pdf
4. United States Department of Transportation. Benefit Cost Analysis Guidance for TIGER and INFRA Applications, July 2017. Table 7: Average Vehicle Occupancy. Accessed at https://www.transportation.gov/sites/dot.gov/files/docs/mission/office-policy/transportation-policy/284031/benefit-cost-analysis-guidance-2017_0.pdf

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[13] U.S. Department of Transportation. Benefit Cost Analysis Guidance for TIGER and INFRA Applications, July 2017. Table 8: Vehicle Operating Costs. Accessed at https://www.transportation.gov/sites/dot.gov/files/docs/mission/office-policy/transportation-policy/284031/benefit-cost-analysis-guidance-2017_0.pdf

Benefit 2: Transportation System User Effects (Value of Time Impacts resulting from Diversion from Auto to Amtrak Rail)

Intercity travelers who take Amtrak instead of a personal vehicle will experience an increase in travel time. The value of this time results in a negative benefit. **Table 7-4** describes how the transportation system user effects benefit was calculated.

Table 7-4: Transportation System User Effects Resulting from Diversion from Auto to Amtrak, 2021

	Input		Value	(2016$)
VALUE OF TIME PARAMETERS				
(a)	Passenger-Miles[1]		110,662,000	miles/year
	Rail			
(b)	Distance[1]		1,706.0	miles
(c)	Running Time[1]		36.48	hours
(d)	Average Speed	(b) / (c)	46.76	miles/hour
	Auto			
(e)	Average Equivalent Driving Speed[3]		60.57	miles/hour
(f)	Incremental Passenger-hours	(a) / (d)	2,366,541	hours
(g)	Value of Time (private vehicle travel)[3]		$14.10	/person/hour
(h)	Amtrak Compound Annual Growth Rate[4]		1.61%	/year
VALUE OF TIME SAVINGS				
	Rail			
(i)	Passenger-hours of Travel by Train	(f) * ((1 + h) $^{(2021 - 2015)}$)	2,605,021	hours/year
(J)	Aggregate Value of Train Time	(g) x (i)	$36,730,800	/year
	Auto			
(k)	Passenger-hours of Travel by Auto	(a) * ((1 + (h) $^{(2021 - 2015)}$) / (e)	2,011,001	hours/year
(L)	Aggregate Value of Auto Time	(f) x (i)	$28,355,116	/year
	TOTAL VALUE OF TRAVEL TIME SAVINGS (L) - (J)		-$8,375,685	/year

Table 7-4: Transportation System User Effects Resulting from Diversion from Auto to Amtrak, 2021 (Continued)

Sources/Notes:

1. Amtrak. Crescent Meridian-Dallas-Fort Worth Section Route and Service Financial Evaluation, July 17, 2015. Partial draft provided to TxDOT by Amtrak. Alternative 3.
2. U.S. Department of Transportation. Benefit Cost Analysis Guidance for TIGER and INFRA Applications, July 2017. Table 6: Value of Travel Time Savings. Accessed at https://www.transportation.gov/sites/dot.gov/files/docs/mission/office-policy/transportation-policy/284031/benefit-cost-analysis-guidance-2017_0.pdf
3. Google Maps drive time, FTW station to MEI station, plus 1 hour stopped. Accessed at https://www.google.com/maps/
4. Historical compound annual growth rate calculated from National Association of Rail Passengers. Amtrak Fact Sheet. Accessed at https://www.narprail.org/site/assets/files/1038/trains_2015.pdf

Benefit 3: Safety and Environmental Benefits (Net Emissions Damage Costs Avoided)

Intercity travelers who take Amtrak will produce fewer emissions traveling by rail than by personal automobile because rail generally emits less pollution per passenger-mile transported. This benefit examines the net reduction of carbon dioxide, volatile organic compounds, nitrogen oxides, sulfur dioxide, and particulate matter associated with using rail instead of automobile. Using emission unit values based on federal guidance, the value of carbon dioxide and non-carbon dioxide emission reductions were calculated. **Table 7-5** details how the net emissions damage cost avoided benefit was calculated.

Table 7-5: Net Emissions Damage Avoided Resulting from Diversion from Passenger Car to Amtrak, 2021

Input	Value	
EMISSION RATES, BY MODE		
Rail (Line-Haul Locomotive)		
(a) Volatile Organic Compounds (VOCs)[1]	3.6	g/gal
(b) Nitrogen Oxides (NO_x)[1]	94	g/gal
(c) Particulate Matter ($PM_{2.5}$)[1]	2.1	g/gal
(d) Sulfur Dioxide (SO_x)[1]	0.09	g/gal
Auto		
(e) Volatile Organic Compounds (VOCs) [2]	0.89	g/mi
(f) Nitrogen Oxides (NO_x) [2]	1.30	g/mi
(g) Particulate Matter ($PM_{2.5}$) [3]	0.0090	g/mi
(h) Sulfur Dioxide (SO_x)	0	(No Data)
RAIL FUEL EFFICIENCY		
(i) Amtrak Rail Fuel Efficiency[4]	2.2	gal/train-mi
AUTO TRAFFIC DIVERTED TO RAIL		
(j) Increased Amtrak Traffic[5]	387,630	train-mi/year
(k) Reduced Auto VMT[6]	87,635,686	VMT/year
NET CHANGE IN EMISSIONS		
Grams		
(l) VOCs = *([(a) x (i) x (j)] – [(e) x (k)]) / 1,000,000*	-74.9	metric tons
(m) NO_x = *([(b) x (i) x (j)] – [(f) x (k)]) / 1,000,000*	-33.8	metric tons
(n) $PM_{2.5}$ = *([(c) x (i) x (j)] – [(g) x (k)]) / 1,000,000*	1.0	metric tons
(o) SO_x = *([(d) x (i) x (j)] – [(h) x (k)]) / 1,000,000*	0.1	metric tons

Table 7-5: Net Emissions Damage Avoided Resulting from Diversion from Passenger Car to Amtrak, 2021 (continued)

	Input		Value	(2016$)
UNIT VALUE OF EMISSIONS DAMAGE				
(p)	VOCs[7]	$1,844.00 (2015$)	$2,063.95	/ metric ton
(q)	NO_x[7]	$7,266.00 (2015$)	$8,133.41	/ metric ton
(r)	$PM_{2.5}$[7]	$332,405.00 (2015$)	$372,060.64	/ metric ton
(s)	SO_x[7]	$42,947.00 (2015$)	$48,070.56	/ metric ton
VALUE OF NET EMISSIONS AVOIDED BENEFIT, NON-CO_2				
(t)	VOCs =	(l) x (p)	$154,678	/year
(u)	NO_x =	(m) x (q)	$274,620	/year
(v)	$PM_{2.5}$ =	(n) x (r)	-$383,641	/year
(w)	SO_x =	(o) x (s)	-3,849	/year
	Total Non-CO_2 Benefits =	*(t) + (u) + (v) + (w)*	$41,809	/year

Sources/Notes:

1. U.S. Environmental Protection Agency. Emission Factors for Locomotives. Accessed at https://nepis.epa.gov/Exe/ZyNET.exe/P1001Z8C.txt?ZyActionD=ZyDocument&Client=EPA&Index=2011%20Thru%202015%7C1995%20Thru%201999%7C1981%20Thru%201985%7C2006%20Thru%202010%7C1991%20Thru%201994%7C1976%20Thru%201980%7C2000%20Thru%202005%7C1986%20Thru%201990%7CPrior%20to%201976%7CHardcopy%20Publications&Docs=&Query=Emissions%20factors%20locomotives&Time=&EndTime=&SearchMethod=2&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C95THRU99%5CTXT%5C00000022%5CP1001Z8C.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=15&FuzzyDegree=0&ImageQuality=r85g16/r85g16/x150y150g16/i500&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x(note: assumed 3,200 g/gal diesel fuel density, 44 grams of carbon dioxide is equivalent to 12 grams of sulfur dioxide, and 87% carbon content). Emission rates change over time (2021 values are shown).
2. U.S. Department of Transportation, Bureau of Transportation Statistics. Table 4-43: Estimated National Average Vehicle Emissions Rates per Vehicle by Vehicle Type using Gasoline and Diesel (grams per mile). Accessed at https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_04_43.html
3. Environmental Protection Agency. "Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks" (EPA-420-F-08-024, December 2011). Accessed at http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100EVXP.TXT

4. Amtrak Monthly Performance Report, November 2016. Accessed at https://www.amtrak.com/ccurl/1023/896/Amtrak-Monthly-Performance-Report-November-2016.pdf
5. Increased Amtrak train traffic = 531 miles x 2 trains x 365 days.
6. See Table 7-3, line (D).
7. U.S. Department of Transportation. Benefit Cost Analysis Guidance for TIGER and INFRA Applications, July 2017. Table 9: Damage Costs for Criteria Pollutant Emissions. Accessed at https://www.transportation.gov/sites/dot.gov/files/docs/mission/office-policy/transportation-policy/284031/benefit-cost-analysis-guidance-2017_0.pdf

Benefit 4: Safety and Environmental Benefits (Net Crash Costs Avoided)

Intercity travellers who take Amtrak could yield safety benefits to themselves and society in the form of reduced fatalities, injuries, and property damage because rail is generally safer per passenger-mile travelled. While increased rail traffic would also increase railroad crashes, this increase is outweighed by the decrease in automobile-involved crashes, thus resulting in a net benefit. **Table 7-6** details how the net crash costs avoided benefit was calculated.

Table 7-6: Net Crash Costs Avoided Resulting from Diversion from Passenger Car to Amtrak, 2021

	Input		Value	(2016$)
CRASH RATES BY MODE				
	Railroad Crash Rates (National)			
(a)	Total Fatalities[1]		768	persons
(b)	Total Injuries[1]		8,590	persons
(c)	Total Train Crashes[1]		10,376	crashes
(d)	Total Train-miles[1]		766	million train-mi
(e)	Total Value of Property Damage[1]$270M (2014$)		$263.67M	total
(F)	**FATALITY RATE =**	*(a) / [(d) / 100]*	**100.2611**	persons/ 100M train-mi
(G)	**INJURY RATE =**	*(b) / [(d) / 100]*	**1,121.41**	persons/ 100M train-mi
(H)	**CRASH RATE =**	*(c) / [(d) / 100]*	**1,354.57**	crashes/ 100M train-mi
	Highway Crash Rates (National)			
(i)	Total Fatalities[1]		32,675	persons
(j)	Total Injuries[1]		2,337,707	persons
(k)	Total Vehicles Involved in Crashes[1]		5,981,723	vehicles
(l)	Total VMT[1]		3,025,656	VMT
(m)	Total Passenger Vehicle VMT[1]		1,396,098	VMT
(N)	**FATALITY RATE =**	*(i) / [(l) / 100]*	**1.08**	persons/ 100M VMT
(O)	**INJURY RATE =**	*(j) / [(l) / 100]*	**77.26**	persons/ 100M VMT
(P)	**CRASH RATE =**	*(k) / [(l) / 100]*	**428.46**	vehicles/ 100M VMT

Table 7-6: Net Crash Costs Avoided Resulting from Diversion from Passenger Car to Amtrak, 2021 (continued)

	Input		Value	(2016$)
UNIT VALUE OF SAFETY BENEFITS				
(q)	**Fatality**[2]		$9,600,000	/ fatality
	Injury[2]			
(r)	AIS 0[3]	0.21538 Probability Rate	$0	/ person
(s)	AIS 1	0.62728 Probability Rate	$28,800	/ person
(t)	AIS 2	0.104 Probability Rate	$451,200	/ person
(u)	AIS 3	0.03858 Probability Rate	$1,008,000	/ person
(v)	AIS 4	0.00442 Probability Rate	$2,553,600	/ person
(w)	AIS 5	0.01034 Probability Rate	$5,692,800	/ person
(x)	**Injury** Weighted Average = *[(r) x Prob. Rt.] + [(s) x Prob. Rt.] + [(t) x Prob. Rt.] + [(u) x Prob. Rt.] + [(v) x Prob. Rt.] + [(w) x Prob. Rt.]*		$174,030	/ person
(y)	Property Damage (Auto Crashes)[2]		$4,252	/ crash
(z)	Property Damage (Rail Crashes) =	*(e) / (c)*	$26,646	/ crash
AUTO TRAFFIC DIVERTED TO RAIL				
(aa)	Increased Amtrak Traffic[4]		387,630	train-mi
(ab)	Reduced Auto VMT[5]		87,635,686	VMT
SAFETY BENEFITS OF TRUCK TO RAIL DIVERSION				
(ac)	Reduced Fatalities =	*[(F) x (aa) – (N) x (ab)] / 100,000,000*	-0.399	persons
(ad)	Reduced Injuries =	*[(G) x (aa) – (O) (ab)] / 100,000,000*	-52.919	persons
(ae)	Reduced Vehicles Involved in Highway Crashes =	*- [(P) x (ab)] / 100,000,000*	-317.570	vehicles
(af)	Increased **Railroad Crashes =**	*[**(H) x (aa)**] / **100,000,000***	**5.251**	**crashes**

Table 7-6: Net Crash Costs Avoided Resulting from Diversion from Passenger Car to Amtrak, 2021 (continued)

	Input		Value	(2016$)
VALUE OF SAFETY BENEFITS				
(ag)	Reduced Fatalities =	(q) x (ac)	$5,373,710	
(ah)	Reduced Injuries =	(x) x (ad)	$11,027,014	
(ai)	Reduced Vehicles Involved in Highway Crashes =	(y) x (ae)	$1,596,558	
(aj)	Increased Railroad Crashes =	(z) x (af)	-$139,911	
NET SAFETY BENEFITS				
	Total Net Safety Benefits =	(ag) + (ah) + (ai) + (aj)	**$17,857,371**	

Sources/Notes:

1. U.S. Department of Transportation, Bureau of Transportation Statistics. National Transportation Statistics, year 2014. Accessed January 2017 at https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/index.html#chapter_2
2. U.S. Department of Transportation. Benefit Cost Analysis Guidance for TIGER and INFRA Applications, July 2017. Table 4: Value of Injuries. Accessed at https://www.transportation.gov/sites/dot.gov/files/docs/mission/office-policy/transportation-policy/284031/benefit-cost-analysis-guidance-2017_0.pdf
3. Assume injury cost of zero.
4. Amtrak. Crescent Meridian-Dallas-Fort Worth Section Route and Service Financial Evaluation, July 17, 2015. Partial draft provided to TxDOT by Amtrak. Alternative 3. Train miles based on 531 route miles x 2 directions x 365 days/year.
5. See Table 7-3, line (D).

Dallas/Fort Worth to Meridian Passenger Rail Study

Appendix A: Rail Inventory

TxDOT Rail Division

I-20 Corridor Council

From Milepost	To Milepost	Mainline Tracks	Maximum Freight Speed	Maximum Freight Speed in Subdivision	Class	Class by Subdivision	Signal System	Subdivision	Location Notes	Length	From Milepost Alternative	To Milepost Alternative
643.9	642.6	1	30	30	2	2	CTC	TRE		1.3		
642.6	642	2	30	30	2	2	CTC	TRE		0.6		
642	640.9	1	30	30	2	2	CTC	TRE		1.1		
640.9	637.5	1	50	50	3	3	CTC	TRE		3.4		
637.5	634.8	2	50	50	3	3	CTC	TRE		2.7		
634.8	634.7	2	50	50	3	3	CTC	TRE		0.1		
634.7	634.4	2	20	50	2	3	CTC	TRE		0.3		
634.4	628.9	1	50	50	3	3	CTC	TRE		5.5		
628.9	628.7	1	30	50	2	3	CTC	TRE		0.2		
628.7	627.6	1	50	50	3	3	CTC	TRE		1.1		
627.6	625.5	2	50	50	3	3	CTC	TRE		2.1		
625.5	612.4	1	50	50	3	3	CTC	TRE		13.1		
612.4	611.9	1	10	50	1	3	CTC	TRE		0.5		
611.9	611.9	2	10	50	1	3	CTC	TRE		0		
611.9	610.7	1	10	50	1	3	CTC	TRE	T&P	1.2		
214.51	214	2	20	60	2	3	CTC	DALLAS	at JFK Junction	0.51		
214	213.4	2	30	60	2	3	CTC	DALLAS		0.6		
213.4	210.7	2	40	60	3	3	CTC	DALLAS		2.7		
210.7	210.2	1	30	60	2	3	CTC	DALLAS	Equation from Mienola Subdiv to Dallas Subdiv: 212.19=210.20	0.5	208.03	207.53
212.2	209.6	1	40	60	3	3	CTC	MINEOLA		2.6	209.53	206.93
209.6	205.5	1	50	60	3	3	CTC	MINEOLA		4.1	206.93	202.83
205.5	203	1	60	60	3	3	CTC	MINEOLA		2.5	202.83	200.33
203	201.3	1	45	70	3	4	CTC	MINEOLA		1.7	200.33	198.63
201.3	196.4	1	60	70	3	4	CTC	MINEOLA		4.9	198.63	193.73
196.4	193.3	1	50	70	3	4	CTC	MINEOLA		3.1	193.73	190.63
193.3	183	1	70	70	4	4	CTC	MINEOLA		10.3	190.63	180.33
183	182.2	1	40	70	3	4	CTC	MINEOLA		0.8	180.33	179.53
182.2	167.1	1	70	70	4	4	CTC	MINEOLA		15.1	179.53	164.43
167.1	166.3	1	50	70	3	4	CTC	MINEOLA		0.8	164.43	163.63
166.3	141.3	1	70	70	4	4	CTC	MINEOLA		25	163.63	138.63
141.3	139.7	1	60	70	3	4	CTC	MINEOLA		1.6	138.63	137.03
139.7	126.8	1	70	70	4	4	CTC	MINEOLA		12.9	137.03	124.13
126.8	125.8	1	60	70	3	4	CTC	MINEOLA		1	124.13	123.13
125.8	113	1	70	70	4	4	CTC	MINEOLA		12.8	123.13	110.33
113	113	1	40	70	3	4	CTC	MINEOLA		0	110.33	110.33
113	95.7	1	70	70	4	4	CTC	MINEOLA		17.3	110.33	93.03
95.7	89.8	1	40	70	3	4	CTC	MINEOLA		5.9	93.03	87.13
89.8	89.6	2	40	70	3	4	CTC	MINEOLA		0.2	87.13	86.93
89.6	86.3	2	60	70	3	4	CTC	LITTLE ROCK		3.3		
86.3	81.5	2	60	70	3	4	CTC	LITTLE ROCK		4.8		
81.5	80.2	1	60	70	3	4	CTC	LITTLE ROCK		1.3		
80.2	68.9	1	70	70	4	4	CTC	LITTLE ROCK		11.3		
68.9	67.2	1	60	70	3	4	CTC	LITTLE ROCK		1.7		
67.2	65.4	1	30	70	2	4	CTC	LITTLE ROCK		1.8		
65.4	65	1	60	70	3	4	CTC	LITTLE ROCK		0.4		
351.4	349.4	1	40	60	3	3	ABS	REISOR		2		
349.4	324.2	1	60	60	3	3	ABS	REISOR		25.2		
324.2	324	1	25	60	2	3	ABS	REISOR		0.2		
324	315.6	1	50	60	3	3	ABS	REISOR		8.4		
5.2	0	1	10	20	1	2		REISOR	shreveport Industrial Lead	5.2		
166.5	166.4	1	55	55	3	3	CTC	VICKSBURG		0.1		
166.45	166	1	30	55	2	3	CTC	VICKSBURG		0.45		
159.9	159.9	1	40	55	3	3	CTC	VICKSBURG		0		
159.9	127.2	1	55	55	3	3	CTC	VICKSBURG		32.7		
127.2	127.2	1	40	55	3	3	CTC	VICKSBURG		0		
127.2	72	1	55	55	3	3	CTC	VICKSBURG		55.2		
72	68.3	1	40	55	3	3	CTC	VICKSBURG		3.7		
68.3	2.5	1	55	55	3	3	CTC	VICKSBURG		65.8		
2.5	0.5	1	50	55	3	3	CTC	VICKSBURG		2		
0.5	0	1	20	55	2	3	CTC	VICKSBURG		0.5		
143.8	142.5	1	20	55	2	3	CTC	MERIDIAN		1.3		
142.5	142	1	20	55	2	3	CTC	MERIDIAN		0.5		
142	139.8	1	25	55	2	3	CTC	MERIDIAN		2.2		
139.8	139.2	1	20	55	2	3	CTC	MERIDIAN		0.6		
139.2	127.5	1	35	55	3	3	CTC	MERIDIAN		11.7		
127.5	107.5	1	55	55	3	3	CTC	MERIDIAN		20		
107.5	102.2	1	50	55	3	3	CTC	MERIDIAN		5.3		
102.2	99.3	1	55	55	3	3	CTC	MERIDIAN		2.9		
99.3	96.6	1	50	55	3	3	CTC	MERIDIAN		2.7		
96.6	95.8	1	10	55	1	3	CTC	MERIDIAN		0.8		
95.8	95.4	1	55	55	3	3	CTC	MERIDIAN		0.4		
95.4	94.6	1	30	55	2	3	CTC	MERIDIAN		0.8		
94.6	94.1	1	20	55	2	3	CTC	MERIDIAN		0.5		
94.1	90.2	2	30	55	2	3	CTC	MERIDIAN		3.9		
90.2	13.9	1	55	55	3	3	CTC	MERIDIAN		76.3		
13.9	13.8	1	45	55	3	3	CTC	MERIDIAN		0.1		
13.8	9	1	45	55	3	3	CTC	MERIDIAN		4.8		
9	3.1	1	40	55	3	3	CTC	MERIDIAN		5.9		
3.1	0	1	20	55	2	3	YL	MERIDIAN		3.1		

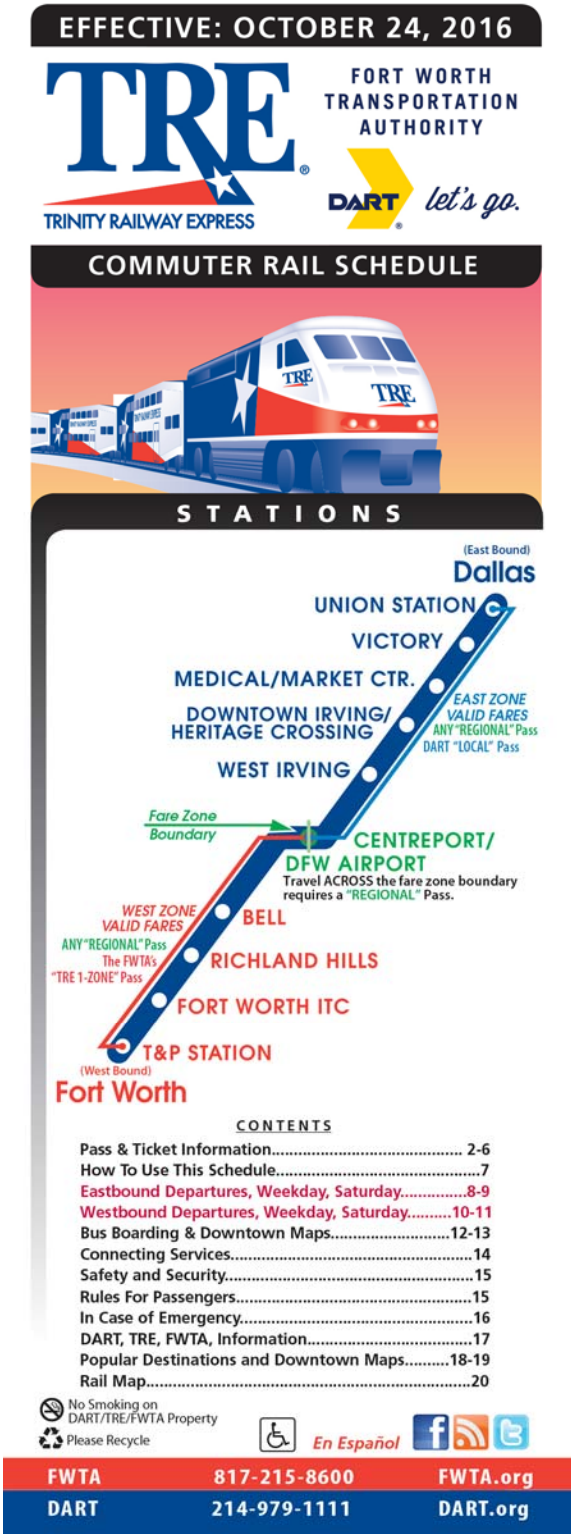
Turnout 1 Milepost	Turnout 1 Size	Turnout 1 Manual/Power	Turnout 2 Milepost	Turnout 2 Size	Turnout 2 Manual/Power	Length	Subdivision	Location Notes	Yard
613.7	NA	NA	614.6	NA	NA	0.9	TRE		
617.7	NA	NA	618.67	NA	NA	0.97	TRE		
625.5	NA	NA	627.6	NA	NA	2.1	TRE		
634.4	NA	NA	635.6	NA	NA	1.2	TRE		
214.38	NA	NA	213.73	NA	NA	0.65	DALLAS		Union Station
213.7	NA	NA	212.76	NA	NA	0.94	DALLAS		Cadiz Yard and CJ Yard
207.57	NA	NA	203.54	NA	NA	4.03	MINEOLA		
199.89	NA	NA	198.3	NA	NA	1.59	MINEOLA		
188.28	NA	NA	186.2	16	PS	2.08	MINEOLA	UPDATE TO1 - AFTER 2012	
182.4	16	PS	181.42	16	PS	0.98	MINEOLA		
176.66	16	PS	175.14	16	PS	1.52	MINEOLA		
169.46	NA	NA	166.68	16	PS	2.78	MINEOLA	UPDATE TO1 - AFTER 2012	
159.59	16	PS	158.05	16	PS	1.54	MINEOLA		
151.73	NA	NA	149.56	16	PS	2.17	MINEOLA	UPDATE TO1 - AFTER 2012	
138.92	16	PS	135.94	16	PS	2.98	MINEOLA		
124.93	16	PS	123.4	16	PS	1.53	MINEOLA	8/2015 Google Earth image indicates construction to extend track siding end location.	
114.46	16	PS	112.96	16	PS	1.5	MINEOLA		
105.48	16	PS	103.96	16	PS	1.52	MINEOLA		
95.73	16	PS	93.02	16	PS	2.71	MINEOLA	included as a siding	Greggton
94.58	10	PS	93.62			0.96	MINEOLA	included as a siding	Greggton
90.21	14	PS	87.84	14	PS	2.37	MINEOLA AND LITTLE ROCK		Longview Station
76.05	14	PS	74.53	14	PS	1.52	LITTLE ROCK		
67.16	14	PS	65.48	14	PS	1.68	LITTLE ROCK		
351.4	NA	NA	350.6	NA	NA	0.8	REISOR		Marshall
350.31	NA	NA	348.73	NA	PS	1.58	REISOR		
344.39	NA	NA	344.12	10	PS	0.27	REISOR		
343.49	10	PS	342.66	10	PS	0.83	REISOR		
337.55	NA	NA	335.38	NA	NA	2.17	REISOR	NEW SIDING	
332.98	10	PS	331.93	10	PS	1.05	REISOR		
323.86	NA	NA	321.16	10	PS	2.7	REISOR	will assume that this yard is also used as a siding	Reisor
166.4	NA	NA	167.71	NA	NA	1.31	VICKSBURG		Bossier City, LA
161.73	NA	NA	163.62	NA	NA	1.89	VICKSBURG		
153.29	NA	NA	153.96	NA	NA	0.67	VICKSBURG		
148.45	NA	NA	149.03	NA	NA	0.58	VICKSBURG		
147.5	NA	NA	148.27	NA	NA	0.77	VICKSBURG		
141.04	NA	NA	142.73	NA	NA	1.69	VICKSBURG		
130.73	NA	NA	131.39	NA	NA	0.66	VICKSBURG		
127.24	NA	NA	127.98	NA	NA	0.74	VICKSBURG		
127.19	NA	NA	129.1	NA	NA	1.91	VICKSBURG		
119.48	NA	NA	120.16	NA	NA	0.68	VICKSBURG		
111.01	NA	NA	113.18	NA	NA	2.17	VICKSBURG		
103.11	NA	NA	104.06	NA	NA	0.95	VICKSBURG	NEW SIDING	
94.96	NA	NA	95.9	NA	NA	0.94	VICKSBURG		
85.97	NA	NA	87.59	NA	NA	1.62	VICKSBURG		
74.52	NA	NA	76.34	NA	NA	1.82	VICKSBURG	NEW SIDING	
66.2	NA	NA	71.04	NA	NA	4.84	VICKSBURG	NEW SIDING	Monroe, LA
57.07	NA	NA	58.08	NA	NA	1.01	VICKSBURG		
38.42	NA	NA	40.3	NA	NA	1.88	VICKSBURG		
35.21	NA	NA	36.42	NA	NA	1.21	VICKSBURG		
15.05	NA	NA	16.88	NA	NA	1.83	VICKSBURG		
0.76	NA	NA	2.57	NA	NA	1.81	VICKSBURG		
140.13	NA	NA	141.68	NA	NA	1.55	MERIDIAN	NEW SIDING	
131.06	NA	NA	132.72	NA	NA	1.66	MERIDIAN	UPDATE TO1 - AFTER 2004	
124.09	NA	NA	125.89	NA	NA	1.8	MERIDIAN		
121.41	NA	NA	121.75	NA	NA	0.34	MERIDIAN		
110.95	NA	NA	112.8	NA	NA	1.85	MERIDIAN		
99.69	NA	NA	100.38	NA	NA	0.69	MERIDIAN		
95.97	NA	NA	98.17	NA	NA	2.2	MERIDIAN		
90.25	NA	NA	94.05	NA	NA	3.8	MERIDIAN	NEW SIDING	High Oak Yard
86.85	NA	NA	88.7	NA	NA	1.85	MERIDIAN	NEW SIDING	
84.72	NA	NA	85.24	NA	NA	0.52	MERIDIAN		
80.9	NA	NA	82.78	NA	NA	1.88	MERIDIAN		
75.26	NA	NA	75.82	NA	NA	0.56	MERIDIAN		
68.7	NA	NA	69.12	NA	NA	0.42	MERIDIAN	UPDATE TO1 - AFTER 2007	
61.06	NA	NA	62.8	NA	NA	1.74	MERIDIAN		
59.98	NA	NA	60.49	NA	NA	0.51	MERIDIAN		
49.05	NA	NA	50.25	NA	NA	1.2	MERIDIAN		
49.02	NA	NA	49.79	NA	NA	0.77	MERIDIAN		
38.79	NA	NA	40.73	NA	NA	1.94	MERIDIAN		
31.09	NA	NA	31.51	NA	NA	0.42	MERIDIAN		
20.71	NA	NA	22.48	NA	NA	1.77	MERIDIAN		
11.36	NA	NA	12.3	NA	NA	0.94	MERIDIAN		
0.95	NA	NA	1.7	NA	NA	0.75	MERIDIAN		Meridian, MS

Dallas/Fort Worth to Meridian Passenger Rail Study

Appendix B: TRE Schedules

TxDOT Rail Division

I-20 Corridor Council



EFFECTIVE: OCTOBER 24, 2016

TRE
TRINITY RAILWAY EXPRESS

FORT WORTH
TRANSPORTATION
AUTHORITY

DART let's go.

COMMUTER RAIL SCHEDULE

STATIONS

(East Bound)
Dallas

UNION STATION
VICTORY
MEDICAL/MARKET CTR.
DOWNTOWN IRVING/
HERITAGE CROSSING
WEST IRVING

EAST ZONE
VALID FARES
ANY "REGIONAL" Pass
DART "LOCAL" Pass

Fare Zone
Boundary

CENTREPORT/
DFW AIRPORT
Travel ACROSS the fare zone boundary requires a "REGIONAL" Pass.

WEST ZONE
VALID FARES
ANY "REGIONAL" Pass
The FWTA's
"TRE 1-ZONE" Pass

BELL
RICHLAND HILLS
FORT WORTH ITC
T&P STATION

(West Bound)
Fort Worth

CONTENTS

No Smoking on
DART/TRE/FWTA Property

Please Recycle

En Español

FWTA	817-215-8600	FWTA.org
DART	214-979-1111	DART.org

FWTA PASS & TICKET PRICES

ONE WAY FARES	(EFFECTIVE: 02/12/12)	
TRE - 1 Zone	$2.50	West Zone only
Regional	$5.00	All Zones
Regional - Reduced	$1.25	All Zones

TRANSIT PASSES	(EFFECTIVE: 02/12/12)		
	DAY	7 DAY	31 DAY
TRE - 1 Zone	$5.00	$25.00	$80.00
Regional	$10.00	$50.00	$160.00
Regional - Reduced	$2.50	NA	$40.00

- TRE 1 Zone includes **West Zone TRE** (between Fort Worth and CentrePort) service plus FWTA Local/Express bus and trolleys.

  Passengers boarding at CentrePort, going east, should purchase a DART Local fare if only traveling in the East Zone. Travel ACROSS the fare zone boundary requires a REGIONAL ticket.

- Regional and Reduced Regional includes all zones TRE service plus FWTA bus and trolley, all DART buses and trains and the DCTA A-Train & buses in Lewisville & Denton.

- FWTA does not offer a midday fare category. Regional midday ticketing issued by DART will be honored in FWTA service areas between 9:30 a.m. & 2:30 p.m., Mon-Fri.

To purchase a reduced fare: user must be ages 5-14 (traveling w/parent or guardian), high school student with valid photo ID issued by the transit agency or school, college/trade school student with valid photo ID issued by FWTA, DART or DCTA, age 65+ or disabled with valid photo ID issued by the transit agency or Medicare card.

2 Fare Zones: Fort Worth/CentrePort & Dallas/CentrePort

2 Zone travel - requires a REGIONAL fare.

PRECIOS DE PASES Y BOLETOS DE FWTA

TARIFAS SENCILLAS	(VIGENTES A PARTIR DEL 02/12/12)	
Zona 1 del TRE	$2.50	Solo zona oeste
Regional	$5.00	Todas las zonas
Regional reducida	$1.25	Todas las zonas

PASES DE TRANSPORTE	(VIGENTES A PARTIR DEL 02/12/12)		
	DÍA	7-DÍAS	31-DÍAS
Zona 1 del TRE	$5.00	$25.00	$80.00
Regional	$10.00	$50.00	$160.00
Regional reducida	$2.50	NA	$40.00

- La zona 1 del TRE incluye el servicio del **TRE de la zona oeste** (entre Fort Worth y CentrePort) y el servicio de los autobuses y los tranvías locales y exprés de FWTA.

  Los pasajeros que suban en CentrePort, y vayan hacia el este, deben adquirir la tarifa local de DART si solo viajan en la zona este. Si viajan MÁS ALLÁ del límite de zonas tarifarias, deberán obtener un boleto REGIONAL.

- Las tarifas regional y regional reducida incluyen todas las zonas del servicio del TRE, además de los autobuses y los tranvías de FWTA, todos los autobuses y trenes de DART y el A-Train y los autobuses de DCTA en Lewisville y Denton.

- FWTA no ofrece tarifa de mediodía.
  Los boletos regionales de mediodía emitidos por DART serán válidos en las áreas de servicio de FWTA de lunes a viernes, entre las 9:30 a. m. y las 2:30 p. m.

  Para comprar una tarifa reducida: el/la usuario(a) debe tener entre 5 a 14 años (viajando con padre o tutor), ser estudiante de secundaria con identificación valida con foto emitida por la agencia de tránsito o la escuela, ser estudiante de la universidad/instituto profesional con identificación valida con foto emitida por FWTA, DART o DCTA, tener más de 65 años o estar discapacitado/a con identificación válida con foto emitida por la agencia de tránsito o tarjeta de Medicare.

DART PASS & TICKET PRICES

FARES

EFFECTIVE DECEMBER 3, 2012

Local

• All DART buses and trains • Trinity Railway Express service between Union Station and CentrePort/DFW Airport Station • DART On-Call and FLEX services

Regional

• All DART buses and trains • All Trinity Railway Express service, FWTA buses, the A-train and DCTA buses in Lewisville and Denton

Fare Type	Adult		Senior/Disabled/ College/Children*		High School†	
2 Hour	$2.50	$5.00		$1.25		$1.25†
Mid-Day❖	$1.75	$3.50	$1.75	$3.50	$1.75	$3.50
Day	$5.00	$10.00		$2.50		$2.50†
7-Day	$25.00	$50.00	$25.00	$50.00	$25.00	$50.00
31-Day	$80.00	$160.00		$40.00		$40.00†
Annual	$800.00	$1600.00		$480.00•		

* These Reduced fares applicable under certain restrictions; see following page for details.

† These fares applicable weekdays only, adult fare required on weekends.

❖ Monday through Friday 9:30 a.m. – 2:30 p.m.

• Available to senior citizens only.

Download the GoPass™ app

GoPass

Available on the App Store

ANDROID APP ON Google play

Failure to produce a valid ticket or pass is punishable by an administrative penalty of up to $50 or a Class C misdemeanor violation with a fine not to exceed $500.

PRECIOS DE PASES Y BOLETOS

TARIFAS

VIGENTE A PARTIR DEL 3 DE DICIEMBRE DE 2012

Local

• Todos los autobuses y trenes de DART • El servicio del Trinity Railway Express entre Union Station y CentrePort/DFW Airport Station • DART On-Call y el servicio Flex

Regional

• Todos los autobuses y trenes de DART • Todo el servicio del Trinity Railway Express, autobuses en Fort Worth; y el A-train y los autobuses de DCTA en Lewisville y Denton.

Tipo de Tarifa	Adulto		Mayor/ Discapacitado/ Universitario/ Niños*		Escuela Secundaria†	
2 Horas	$2.50	$5.00		$1.25		$1.25†
Mediodía❖	$1.75	$3.50	$1.75	$3.50	$1.75	$3.50
Día	$5.00	$10.00		$2.50		$2.50†
7-Días	$25.00	$50.00	$25.00	$50.00	$25.00	$50.00
31-Días	$80.00	$160.00		$40.00		$40.00†
Anual	$800.00	$1600.00		$480.00•		

* Estas tarifas reducidas se aplican con determinadas restricciones. Consulte la página siguiente para obtener más información.

† Estas tarifas solo se aplican los días de semana. Los fines de semana se requiere la tarifa de adultos.

❖ De lunes a viernes, de 9:30 a.m. a 2:30 p.m.

• Solo disponible para ciudadanos mayores.

La falta de presentación de un boleto o pase válido se sanciona con una multa administrativa de hasta $50 o como un delito menor Clase C, con una multa que no deberá exceder los $500.

FARE STRUCTURE (CONTINUED)

Reduced Fare Structure

Reduced Fares are applicable on bus and rail for the following:

- Seniors 65+ showing valid DART issued photo ID or Medicare card.
- Non-paratransit persons with disabilities showing valid DART issued photo ID or Medicare card.
- Passengers of DART Route 702 NorthPark Shuttle.
- Children elementary through middle school; children under 5 are free (maximum of 2 per trip) when accompanied by an adult (18 or older) paying the appropriate Local, Regional or Reduced fare; any additional child under the age of five traveling with that adult, or any child accompanied only by person(s) younger than age 18, shall be charged the reduced fare.
- High school students with a valid DART issued photo ID or a high school student photo ID. High school fares are valid Monday through Friday only, adult fare required on weekends.
- Fulltime undergraduate College, University or Trade School students with valid DART issued Photo ID from schools in the DART service area not participating in the Higher Education Program.

NOTE: Lone Star cardholders with TANF benefits are eligible to purchase Monthly Passes at a 50% discount from listed fares (not applicable for Reduced or High School Monthly Pass purchases).

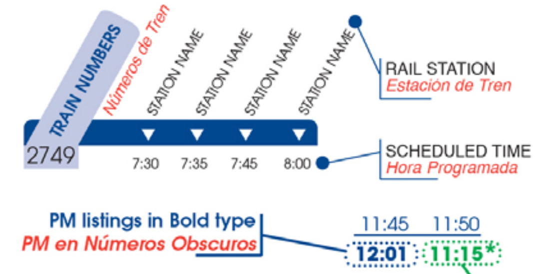
Estructura De Las Tarifas Reducidas

Las tarifas reducidas son aplicables en el autobús y tren para lo siguiente:

- Personas de 65 años de edad y mayores que muestran una tarjeta válida de Medicare o de identificación de DART con foto.
- Personas non-paratransit que muestran una tarjeta válida de Medicare o de identificación de DART con foto.
- Pasajeros del autobús shuttle DART en la ruta 702 de NorthPark.
- Los niños de primarias hasta la secundaria; los niños menores de 5 años no pagan (máximo de 2 por viaje) cuando están acompañados por un adulto (18 años de edad o mayor) pagando la tarifa Local, Regional o Reducida correspondiente. A cualquier niño adicional bajo la edad de cinco años viajando con el adulto, o cualquier niño acompañado solamente por personas menores de 18 años, se le cobrará la tarifa reducida.
- Los estudiantes de secundaria con una tarjeta de identificación válida de DART con foto o una tarjeta de identificación con foto emitida por una escuela secundaria. Las tarifas para estudiantes de secundaria son válidas solamente de lunes a viernes y las tarifas de adultos se requieren los fines de semana.
- Los estudiantes de un colegio, una universidad o un instituto profesional que asisten a clases de tiempo completo, tienen una tarjeta de identificación válida con foto emitida por DART y asisten a una de las escuelas en el área de servicio de DART que no participan en el Programa de educación superior.

NOTA: Los titulares de tarjetas Lone Star con beneficios de TANF son elegibles para comprar pases mensuales con un descuento del 50% de las tarifas listadas (no aplicables para compras reducidas o mensuales de estudiantes de la escuela secundaria).

HOW TO USE THIS SCHEDULE



* Trains labeled in green will use Track #4 (westernmost platform) at Victory Station, all other Westbound trains will use Track #3

* Los trenes marcados con verde usarán la pista #4. (La última plataforma hacia el oeste) en la Victory Station, todos los demás trenes en dirección oeste utilizarán la pista #3.

Weather, special events, and traffic conditions may alter service.

El clima, eventos especiales y congestión de tráfico afectará el servicio.

NO SUNDAY SERVICE
NO HAY SERVICIO LOS DOMINGOS

HOLIDAY SCHEDULE

No TRE service on Memorial Day, Independence Day or Labor Day, Thanksgiving, Christmas and New Year's Days.

HORARIO EN DÍAS FESTIVOS

No habrá servicio del TRE el Día Conmemorativo (Memorial Day), Día de la Independencia (Independence Day), Día del Trabajo (Labor Day), Día de Acción de Gracias (Thanksgiving), Navidad y Año Nuevo.

WEEKDAY/Entre Semana EASTBOUND TO-DALLAS TRAIN DEPARTURES/Salidas hacia el este

TRAIN NUMBERS	T&P	FORT WORTH ITC	RICHLAND HILLS	BELL	CENTREPORT/ DFW AIRPORT	WEST IRVING	DOWNTOWN IRVING/ HERITAGE CROSSING	MEDICAL/ MARKET CTR.	VICTORY	UNION
2500	These trains originate at West Irving Station					3:55	4:01	4:10	4:15	4:22
2502						4:25	4:31	4:40	4:45	4:52
2504						4:55	5:01	5:10	5:15	5:22
2906	4:51	4:55	5:06	5:12	5:19	5:25	5:31	5:40	5:45	5:52
2908	5:21	5:25	5:36	5:42	5:49	5:55	6:01	6:10	6:15	6:22
2910	5:51	5:55	6:06	6:12	6:19	6:25	6:31	6:40	6:45	6:52
2912	6:21	6:25	6:36	6:42	6:49	6:55	7:01	7:10	7:15	7:22
2914	6:51	6:55	7:06	7:12	7:19	7:25	7:31	7:40	7:45	7:52
2916	7:21	7:25	7:36	7:42	7:49	7:55	8:01	8:10	8:15	8:22
2918	7:51	7:55	8:06	8:12	8:19	8:25	8:31	8:40	8:45	8:52
2920	8:21	8:25	8:36	8:42	8:49	8:55	9:01	9:10	9:15	9:22
2122	8:51	8:55	9:06	9:12	9:20	This train terminates at CentrePort Station				
2924	9:21	9:25	9:36	9:42	9:49	9:55	10:01	10:10	10:15	10:22
2126	9:51	9:55	10:06	10:12	10:20	This train terminates at CentrePort Station				
2928	10:21	10:25	10:36	10:42	10:49	10:55	11:01	11:10	11:15	11:22
2930	11:21	11:25	11:36	11:42	11:49	11:55	**12:01**	**12:10**	**12:15**	**12:22**
2932	**12:21**	**12:25**	**12:36**	**12:42**	**12:49**	**12:55**	**1:01**	**1:10**	**1:15**	**1:22**
2934	**1:21**	**1:25**	**1:36**	**1:42**	**1:49**	**1:55**	**2:01**	**2:10**	**2:15**	**2:22**
2536	This train originates at West Irving Station					**2:25**	**2:31**	**2:40**	**2:45**	**2:52**
2938	**2:21**	**2:25**	**2:36**	**2:42**	**2:49**	**2:55**	**3:01**	**3:10**	**3:15**	**3:22**
2540	This train originates at West Irving Station					**3:25**	**3:31**	**3:40**	**3:45**	**3:52**
2942	**3:21**	**3:25**	**3:36**	**3:42**	**3:49**	**3:55**	**4:01**	**4:10**	**4:15**	**4:22**
2544	This train originates at West Irving Station					**4:25**	**4:31**	**4:40**	**4:45**	**4:52**
2946	**4:21**	**4:25**	**4:36**	**4:42**	**4:49**	**4:55**	**5:01**	**5:10**	**5:15**	**5:22**
2948	**4:51**	**4:55**	**5:06**	**5:12**	**5:19**	**5:25**	**5:31**	**5:40**	**5:45**	**5:52**
2950	**5:21**	**5:25**	**5:36**	**5:42**	**5:49**	**5:55**	**6:01**	**6:10**	**6:15**	**6:22**
2952	**5:51**	**5:55**	**6:06**	**6:12**	**6:19**	**6:25**	**6:31**	**6:40**	**6:45**	**6:52**
2954	**6:21**	**6:25**	**6:36**	**6:42**	**6:49**	**6:55**	**7:01**	**7:10**	**7:15**	**7:22**
2156	**6:51**	**6:55**	**7:06**	**7:12**	**7:20**	This train terminates at CentrePort Station				
2958	**7:21**	**7:25**	**7:36**	**7:42**	**7:49**	**7:55**	**8:01**	**8:10**	**8:15**	**8:22**
2160	**7:51**	**7:55**	**8:06**	**8:12**	**8:20**	This train terminates at CentrePort Station				
2962	**8:21**	**8:25**	**8:36**	**8:42**	**8:49**	**8:55**	**9:01**	**9:10**	**9:15**	**9:22**
2964	**9:21**	**9:25**	**9:36**	**9:42**	**9:49**	**9:55**	**10:01**	**10:10**	**10:15**	**10:22**
2966	**10:21**	**10:25**	**10:36**	**10:42**	**10:49**	**10:55**	**11:01**	**11:10**	**11:15**	**11:22**
2168	**11:51**	**11:55**	12:06	12:12	12:20	These trains terminate at CentrePort Station				
2170	12:21	12:25	12:36	12:42	12:50					
2172	1:21	1:25	1:36	1:42	1:50					

SATURDAY/Sábado EASTBOUND TO-DALLAS TRAIN DEPARTURES/Salidas hacia el este

TRAIN NUMBERS	T&P	FORT WORTH ITC	RICHLAND HILLS	BELL	CENTREPORT/ DFW AIRPORT	WEST IRVING	DOWNTOWN IRVING/ HERITAGE CROSSING	MEDICAL/ MARKET CTR.	VICTORY	UNION
3500	This train originates at West Irving Station					5:25	5:31	5:40	5:45	5:52
3902	5:51	5:55	6:06	6:12	6:19	6:25	6:31	6:40	6:45	6:52
3904	6:51	6:55	7:06	7:12	7:19	7:25	7:31	7:40	7:45	7:52
3906	7:51	7:55	8:06	8:12	8:19	8:25	8:31	8:40	8:45	8:52
3908	8:51	8:55	9:06	9:12	9:19	9:25	9:31	9:40	9:45	9:52
3910	9:51	9:55	10:06	10:12	10:19	10:25	10:31	10:40	10:45	10:52
3912	10:51	10:55	11:06	11:12	11:19	11:25	11:31	11:40	11:45	11:52
3914	11:51	11:55	**12:06**	**12:12**	**12:19**	**12:25**	**12:31**	**12:40**	**12:45**	**12:52**
3916	**12:51**	**12:55**	**1:06**	**1:12**	**1:19**	**1:25**	**1:31**	**1:40**	**1:45**	**1:52**
3918	**1:51**	**1:55**	**2:06**	**2:12**	**2:19**	**2:25**	**2:31**	**2:40**	**2:45**	**2:52**
3920	**2:51**	**2:55**	**3:06**	**3:12**	**3:19**	**3:25**	**3:31**	**3:40**	**3:45**	**3:52**
3922	**3:51**	**3:55**	**4:06**	**4:12**	**4:19**	**4:25**	**4:31**	**4:40**	**4:45**	**4:52**
3924	**4:51**	**4:55**	**5:06**	**5:12**	**5:19**	**5:25**	**5:31**	**5:40**	**5:45**	**5:52**
3926	**5:51**	**5:55**	**6:06**	**6:12**	**6:19**	**6:25**	**6:31**	**6:40**	**6:45**	**6:52**
3928	**6:51**	**6:55**	**7:06**	**7:12**	**7:19**	**7:25**	**7:31**	**7:40**	**7:45**	**7:52**
3930	**7:51**	**7:55**	**8:06**	**8:12**	**8:19**	**8:25**	**8:31**	**8:40**	**8:45**	**8:52**
3932	**8:51**	**8:55**	**9:06**	**9:12**	**9:19**	**9:25**	**9:31**	**9:40**	**9:45**	**9:52**
3934	**9:51**	**9:55**	**10:06**	**10:12**	**10:19**	**10:25**	**10:31**	**10:40**	**10:45**	**10:52**
3936	**10:51**	**10:55**	**11:06**	**11:12**	**11:19**	**11:25**	**11:31**	**11:40**	**11:45**	**11:52**
3138	**11:51**	**11:55**	12:06	12:12	12:20	These trains terminate at CentrePort Station				
3140	12:51	12:55	1:06	1:12	1:20					

WEEKDAY/Entre Semana WESTBOUND TO-FORT WORTH TRAIN DEPARTURES/Salidas hacia el este

TRAIN NUMBER	UNION	VICTORY	MEDICAL/ MARKET CTR.	DOWNTOWN IRVING/HERITAGE CROSSING	WEST IRVING	CENTREPORT/ DFW AIRPORT	BELL	RICHLAND HILLS	FORT WORTH ITC	T&P
2101	These trains originate at CentrePort Station					4:01	4:08	4:14	4:26	4:31
2103						4:31	4:38	4:44	4:56	5:01
2105						5:01	5:08	5:14	5:26	5:31
2907	5:00	5:05	5:10	5:19	5:25	5:31	5:38	5:44	5:56	6:01
2909	5:30 *	5:35	5:40	5:49	5:55	6:01	6:08	6:14	6:26	6:31
2911	6:00	6:05	6:10	6:19	6:25	6:31	6:38	6:44	6:56	7:01
2913	6:30 *	6:35	6:40	6:49	6:55	7:01	7:08	7:14	7:26	7:31
2915	7:00	7:05	7:10	7:19	7:25	7:31	7:38	7:44	7:56	8:01
2917	7:30 *	7:35	7:40	7:49	7:55	8:01	8:08	8:14	8:26	8:31
2919	8:00	8:05	8:10	8:19	8:25	8:31	8:38	8:44	8:56	9:01
2921	8:30 *	8:35	8:40	8:49	8:55	9:01	9:08	9:14	9:26	9:31
2923	9:00	9:05	9:10	9:19	9:25	9:31	9:38	9:44	9:56	10:01
2525	9:34	9:39	9:44	9:53	10:00	This train terminates at West Irving				
2927	10:00 *	10:05	10:10	10:19	10:25	10:31	10:38	10:44	10:56	11:01
2929	11:00	11:05	11:10	11:19	11:25	11:31	11:38	11:44	11:56	**12:01**
2931	**12:00**	**12:05**	**12:10**	**12:19**	**12:25**	**12:31**	**12:38**	**12:44**	**12:56**	**1:01**
2933	**1:00**	**1:05**	**1:10**	**1:19**	**1:25**	**1:31**	**1:38**	**1:44**	**1:56**	**2:01**
2935	**2:00**	**2:05**	**2:10**	**2:19**	**2:25**	**2:31**	**2:38**	**2:44**	**2:56**	**3:01**
2937	**3:00**	**3:05**	**3:10**	**3:19**	**3:25**	**3:31**	**3:38**	**3:44**	**3:56**	**4:01**
2939	**3:30** *	**3:35**	**3:40**	**3:49**	**3:55**	**4:01**	**4:08**	**4:14**	**4:26**	**4:31**
2941	**4:00**	**4:05**	**4:10**	**4:19**	**4:25**	**4:31**	**4:38**	**4:44**	**4:56**	**5:01**
2943	**4:30** *	**4:35**	**4:40**	**4:49**	**4:55**	**5:01**	**5:08**	**5:14**	**5:26**	**5:31**
2945	**5:00**	**5:05**	**5:10**	**5:19**	**5:25**	**5:31**	**5:38**	**5:44**	**5:56**	**6:01**
2947	**5:30** *	**5:35**	**5:40**	**5:49**	**5:55**	**6:01**	**6:08**	**6:14**	**6:26**	**6:31**
2949	**6:00**	**6:05**	**6:10**	**6:19**	**6:25**	**6:31**	**6:38**	**6:44**	**6:56**	**7:01**
2951	**6:30** *	**6:35**	**6:40**	**6:49**	**6:55**	**7:01**	**7:08**	**7:14**	**7:26**	**7:31**
2953	**7:00**	**7:05**	**7:10**	**7:19**	**7:25**	**7:31**	**7:38**	**7:44**	**7:56**	**8:01**
2555	**7:30** *	**7:35**	**7:40**	**7:49**	**7:55**	This train terminates at West Irving				
2957	**8:00**	**8:05**	**8:10**	**8:19**	**8:25**	**8:31**	**8:38**	**8:44**	**8:56**	**9:01**
2959	**9:00**	**9:05**	**9:10**	**9:19**	**9:25**	**9:31**	**9:38**	**9:44**	**9:56**	**10:01**
2961	**10:24**	**10:33**	**10:38**	**10:47**	**10:53**	**10:59**	**11:06**	**11:12**	**11:24**	**11:29**
2763	**11:00** *	**11:05**	**11:10**	**11:19**	**11:25**	**11:32**	This train terminates at CentrePort Station			
2963	**11:00** *	**11:05**	**11:10**	**11:19**	**11:25**	**11:31**	**11:38**	**11:44**	**11:56**	12:01
2565	**11:34**	**11:39**	**11:44**	**11:53**	12:00	This train terminates at West Irving				
2965	12:00	12:05	12:10	12:19	12:25	12:31	12:38	12:44	12:56	1:01

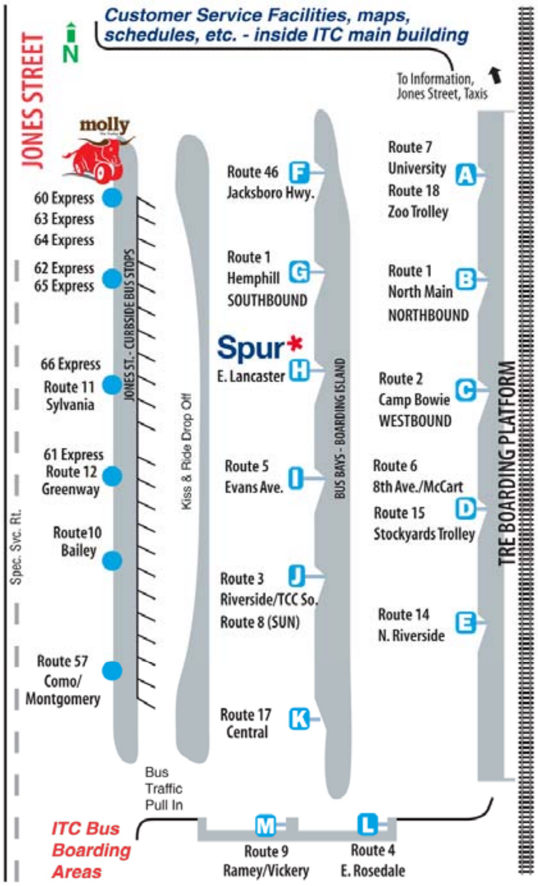
SATURDAY/Sábado WESTBOUND TO-FORT WORTH TRAIN DEPARTURES/Salidas hacia el este

TRAIN NUMBER	UNION	VICTORY	MEDICAL/ MARKET CTR.	DOWNTOWN IRVING/HERITAGE CROSSING	WEST IRVING	CENTREPORT/ DFW AIRPORT	BELL	RICHLAND HILLS	FORT WORTH ITC	T&P
3101	These trains originate at CentrePort Station					5:01	5:08	5:14	5:26	5:31
3103						6:01	6:08	6:14	6:26	6:31
3905	6:30	6:35	6:40	6:49	6:55	7:01	7:08	7:14	7:26	7:31
3907	7:30	7:35	7:40	7:49	7:55	8:01	8:08	8:14	8:26	8:31
3909	8:30	8:35	8:40	8:49	8:55	9:01	9:08	9:14	9:26	9:31
3911	9:30	9:35	9:40	9:49	9:55	10:01	10:08	10:14	10:26	10:31
3913	10:30	10:35	10:40	10:49	10:55	11:01	11:08	11:14	11:26	11:31
3915	11:30	11:35	11:40	11:49	11:55	**12:01**	**12:08**	**12:14**	**12:26**	**12:31**
3917	**12:30**	**12:35**	**12:40**	**12:49**	**12:55**	**1:01**	**1:08**	**1:14**	**1:26**	**1:31**
3919	**1:30**	**1:35**	**1:40**	**1:49**	**1:55**	**2:01**	**2:08**	**2:14**	**2:26**	**2:31**
3921	**2:30**	**2:35**	**2:40**	**2:49**	**2:55**	**3:01**	**3:08**	**3:14**	**3:26**	**3:31**
3923	**3:30**	**3:35**	**3:40**	**3:49**	**3:55**	**4:01**	**4:08**	**4:14**	**4:26**	**4:31**
3925	**4:30**	**4:35**	**4:40**	**4:49**	**4:55**	**5:01**	**5:08**	**5:14**	**5:26**	**5:31**
3927	**5:30**	**5:35**	**5:40**	**5:49**	**5:55**	**6:01**	**6:08**	**6:14**	**6:26**	**6:31**
3929	**6:30**	**6:35**	**6:40**	**6:49**	**6:55**	**7:01**	**7:08**	**7:14**	**7:26**	**7:31**
3931	**7:30**	**7:35**	**7:40**	**7:49**	**7:55**	**8:01**	**8:08**	**8:14**	**8:26**	**8:31**
3933	**8:30**	**8:35**	**8:40**	**8:49**	**8:55**	**9:01**	**9:08**	**9:14**	**9:26**	**9:31**
3935	**9:30**	**9:35**	**9:40**	**9:49**	**9:55**	**10:01**	**10:08**	**10:14**	**10:26**	**10:31**
3937	**10:30**	**10:35**	**10:40**	**10:49**	**10:55**	**11:01**	**11:08**	**11:14**	**11:26**	**11:31**
3939	**11:30**	**11:35**	**11:40**	**11:49**	**11:55**	12:01	12:08	12:14	12:26	12:31
3541	12:10	12:15	12:20	12:29	12:36	This train terminates at West Irving				

***Departing from track #4 from Union Station**

Fort Worth Intermodal Transfer Center (ITC)

(where to board connecting services)



TRE Riding Hints:

Bicycle location: Bicycles can be placed in areas reserved for disabled/senior wheel chair access. Disabled/Senior citizens have priority over bicycle placement.

Platforms: At the CentrePort station, Westbound (toward Ft. Worth) trains will use Platform 1, closest to the parking lot. Eastbound (toward Dallas) trains will use Platform 3, furthest from the parking lot. Passengers are requested to use caution when crossing the tracks and watch out for moving trains.

molly The Trolley

Climb Aboard Molly The Trolley!

Shuttle Service in Fort Worth

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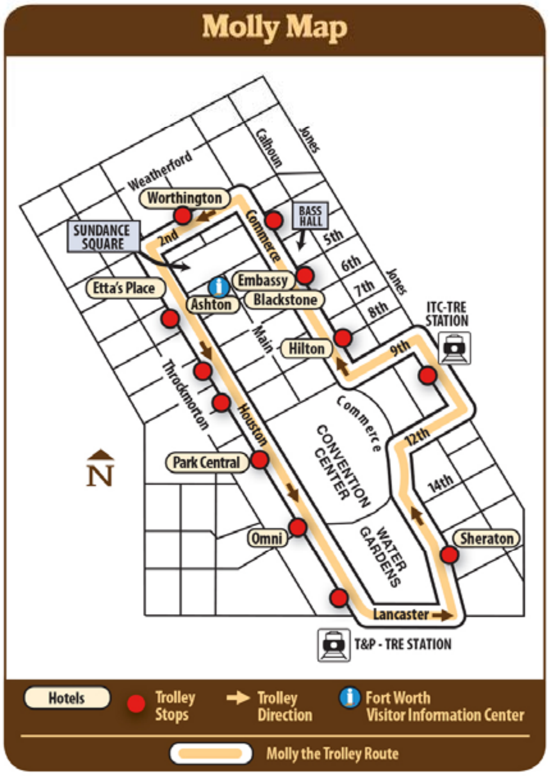
Daily --- 10 a.m. – 10 p.m.



For more information visit
www.mollythetrolley.com

CONNECTING SERVICES

INFORMACIÓN SOBRE CONEXIÓN DE RUTAS

UNION STATION 🚻
400 S. Houston St., Dallas
Dallas Streetcar, DART Rail Red & Blue Lines, DART Bus Routes 11, 19, 21, 60, 722 D-Link, Amtrak

VICTORY STATION
American Airlines Center 2525 Victory Ave., Dallas
DART Rail Green Line, Orange Line, DART Bus Routes 749, (Red Line - Blue Line Special Events Only)

MEDICAL/MARKET CENTER STATION
1419 Medical District Drive (formerly Motor Street) & Southwestern Medical Avenue (between Harry Hines Boulevard & Stemmons Freeway), Dallas
DART Bus Routes 705, 822/823-UT Southwestern Medical Center Shuttles (M-F)

DOWNTOWN IRVING/ HERITAGE CROSSING STATION 🚻 P
201 Rock Island Rd., Irving
63 (M-F), 401, 408, 501, 504 (M-S), 507 (M-S), 508 (M-S), 514 (M-F), 549, 840 (M-S)

WEST IRVING STATION P
4200 Jackson St., Irving
DART Bus Routes 505 (M-F), 514 (M-F)

CENTREPORT/DFW AIRPORT STATION P
14470 Statler Rd., Fort Worth
Terminal Shuttle to DFW Airport via
South Remote Park Lot, The T Bus Route 30 (M-F),
DART Bus Route 221 (M-F) MetroArlingtonXpress MAX»»

BELL STATION P
3232 Bell Helicopter Blvd.
(Bell Helicopter Blvd. at Trinity Blvd.)
The T Bus Routes 111 Bell Shuttle (M-F)

RICHLAND HILLS STATION P
7225 Burns St., Richland Hills
The T Bus Route 41 (M-S)

FORT WORTH ITC STATION 🚻
1001 Jones St., Fort Worth
The T Bus Routes 1, 2, 3 (M-S), 4, 5 (M-SAT), 6, 7, 9 (M-Sat), 10 (M-S), 11 (M-F), 12 (M-F), 14, 15 (Sat.), 17 (M-F), 46 (M-S), 57 (M-F), 61 (M-F), 62 (M-F), 63 (M-F), 64 (M-F), 65 (M-F), 66 (M-F), Molly The Trolley (10:00 a.m. - 10:00 p.m. Daily), Spur* (M-S), Amtrak and Greyhound

T&P STATION 🚻 P
221 W. Lancaster Ave., Fort Worth
(parking @ 200 W. Vickery)
The T Bus Routes 4 (M-S), 6 (M-S)

(All bus routes serve stations on days of TRE operation unless otherwise noted:
M-F = weekdays only; Sat. = Saturdays only)

We recommend passengers allow adequate time for connections.

🚻 Restrooms available at these stations

P Parking available at these stations

SAFETY & SECURITY

Safety and security begin with you.

Pay attention to your surroundings and take note of suspicious behavior. If you notice strange actions or behaviors, trust your instincts.

Reporting emergencies or incidents on a train or at a station:

In the event of an emergency or life-threatening situation, dial 911. If you see suspicious, disruptive or criminal behavior, notify any uniformed employee present or locate the emergency intercom to contact the train operator. You may also call DART Police at 214.928.6300 or text the keyword **DARTpolice** to 41411.

Be aware of people who loiter, stare, watch others and/or act excessively nervous. Also, pay attention to people who quickly enter and exit the train or station, or people who abandon packages. Take note of the person's physical appearance, such as their height, weight, gender, hair color and clothing. Keep in mind that suspicions should never be based on color, ethnicity, nationality or religion.

While most unattended packages are harmless, you should exercise caution. If you find a suspicious item or spilled substance, do not touch it. Instead, notify a uniformed employee or call DART Police at 214.928.6300 or dial 911.

A friendly reminder: Riders should always take their personal items – including trash – when disembarking.

In an emergency, always follow the instructions of uniformed personnel, police and fire officials.

RULES OF THE RAIL

Before You Board

Arrive in time to purchase your ticket and be prepared to board without delaying the train.

Remember, proof of payment is required – failure to produce a valid ticket may result in a fine.

Allow deboarding passengers to exit the train before attempting to board.

No smoking or alcohol consumption permitted on platforms or trains.

On The Train

Please wear proper attire. If you are not wearing shoes or a shirt, you will not be provided service.

Occupy one seat and reserve designated seats for elderly and mobility-impaired passengers.

Be considerate of your fellow passengers – keep music and phone conversations at a low volume.

Please gather your belongings and move toward the exit when your station is called – handy receptacles are provided for trash.

IN CASE OF EMERGENCY

EN CASO DE EMERGENCIA

1. Use the emergency button if available or alert the train crew member.
2. If there is danger, and no crew member is available, go to the next car.

   If it is not safe to do so, exit the train by the nearest available side door. When a side door can not be used, exit by an emergency window.
3. Before exiting the train, look around carefully for hazards on the ground such as electrical wires or debris.
4. Move away from the train while looking out for other trains or hazards.
5. Do not leave children unattended.

1. Apriete el botòn de emergencia donde disponible o llame a un empleado del tren.

2. Si existe peligro, o no hay ningún miembro del personal disponible, diríjase al siguiente vagón.

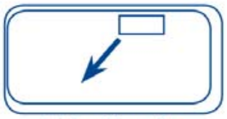
Si tal acción no es segura, salga del tren por la puerta lateral disponible más cercana. Cuando no pueda utilizarse una puerta lateral, salga por una ventana de emergencia.

3. Antes de salir del tren, mire a su alrededor detenidamente y cerciórese de que no haya peligros de cables eléctricos o escombros en el suelo.

4. Aléjese del tren y esté al pendiente de otros trenes o peligros.

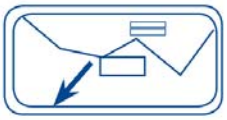
5. No deje a los niños sin vigilancia.

1.



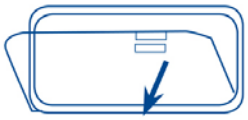
Pull red handle.
Apriete la manija roja

2.



Completely remove rubber strip
Despegue completamente la tira de goma

3.



Grip handle on glass and pull in
Asimiente la manija del vidrio
y hale para dentro

4. Place window out of way and exit train. Look both ways before exiting and step away from the tracks immediately.

Ponga la ventana a un lado y salga del tren. Mire a su alrededor detenidamente y quítese de las vias del tren rápidamente.

CONTACT INFORMATION

INFORMACÍON DE CONTACTO

DART SCHEDULE & ROUTE INFORMATION
Información sobre Rutas y Horarios
214.979.1111 (TTY) 214.979.0277

DART LOST & FOUND
Objetos Extraviados
214.749.3810
Monday - Friday 8:00 a.m. to 5:00 p.m.

DART SUGGESTIONS & INQUIRIES
Preguntas y Sugerencias
214.749.3333 (TTY) 214.749.3628

DART RIDESHARE 214.747.RIDE
Online "Trip Planner" available 24 hours
DART.ORG

FWTA INFORMATION

817-215-8600

CALL FOR TRIP ASSISTANCE, ROUTE AND SCHEDULE INFORMATION
Información sobre Rutas y Horarios
817-215-8600
FWTA.org

FWTA RIDESHARE 817-336-RIDE

DFW AIRPORT SHUTTLE SERVICE

972-574-6004

Passes available through
Pases y boletos se compran en
(Dallas County)

Albertson's,
Fiesta, Tom Thumb,
The DART Store @ Akard Station
DART.org

(Tarrant County)

Intermodal Transportation Center Station,
FWTA Customer Service Center,
FWTA.org

Download the GoPass™ app

GoPass
Available on the App Store
ANDROID APP ON Google play

DART TRE TRINITY RAILWAY EXPRESS FORT WORTH TRANSPORTATION AUTHORITY

TRINITY RAILWAY EXPRESS
TRE is a service provided by Dallas Area Rapid Transit and the Fort Worth Transportation Authority.

POPULAR DESTINATIONS

Fort Worth

- 7th Street District
- Amon Carter Museum of American Art
- Bass Performance Hall
- Fort Worth Botanic Garden
- Fort Worth Museum of Science and History
- Fort Worth Stockyards
- Fort Worth Zoo
- Kimbell Art Museum
- Modern Art Museum of Fort Worth
- National Cowgirl Museum and Hall of Fame
- Stockyards Museum
- Sundance Square
- TCU Amon G. Carter Stadium
- Texas Cowboy Hall of Fame
- Trinity Trails
- Will Rogers Arena & Complex

Orange Line Destinations in Irving

- Four Seasons Resort and Club Dallas at Las Colinas/AT&T Byron Nelson Championship
- Irving Convention Center at Las Colinas
- Las Colinas Urban Center
- Mandalay Canal
- North Lake College
- The University of Dallas

Dallas

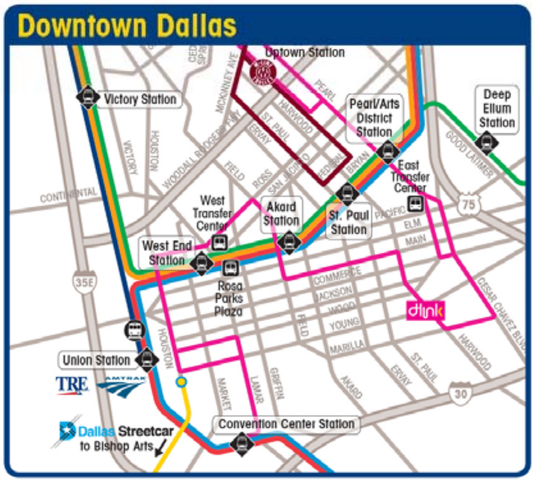
- All Major Downtown Hotels
- American Airlines Center
- Dallas World Aquarium
- Dallas Zoo
- Deep Ellum
- House of Blues
- NorthPark Center
- Perot Museum of Nature and Science
- Reunion Tower
- Sixth Floor Museum at Dealey Plaza
- Uptown
- Victory Park
- West End Historic District

Dallas Arts District:

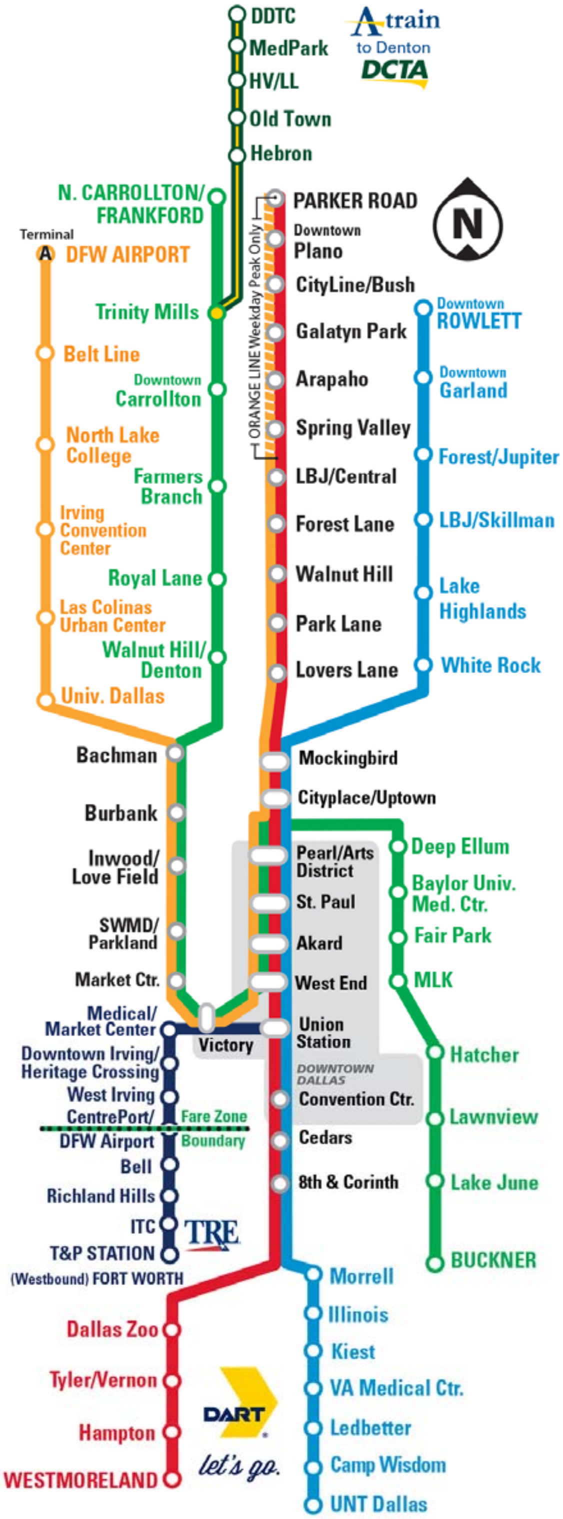
- Annette Strauss Square
- AT&T Performing Arts Center
- City Performance Hall
- Crow Collection of Asian Art
- Dallas Museum of Art
- Dee and Charles Wyly Theatre
- Elaine D. and Charles A. Sammons Park
- Margot and Bill Winspear Opera House
- Morton H. Meyerson Symphony Center
- Nasher Sculpture Center

Fair Park:

- Children's Aquarium at Fair Park
- Cotton Bowl Stadium
- Fair Park Band Shell
- Gexa Energy Pavilion
- Hall of State
- Magnolia Lounge
- Music Hall at Fair Park
- South Dallas Cultural Center
- State Fair of Texas
- Texas Discovery Gardens



RAIL MAP


DDTC
MedPark
HV/LL
Old Town
Hebron
A-train to Denton DCTA
N. CARROLLTON/ FRANKFORD
Terminal A DFW AIRPORT
Trinity Mills
Belt Line
Downtown Carrollton
North Lake College
Farmers Branch
Irving Convention Center
Royal Lane
Las Colinas Urban Center
Walnut Hill/ Denton
Univ. Dallas
PARKER ROAD
Downtown Plano
CityLine/Bush
Galatyn Park
Arapaho
Spring Valley
LBJ/Central
Forest Lane
Walnut Hill
Park Lane
Lovers Lane
ORANGE LINE Weekday Peak Only
N
Downtown ROWLETT
Downtown Garland
Forest/Jupiter
LBJ/Skillman
Lake Highlands
White Rock
Bachman
Burbank
Inwood/ Love Field
SWMD/ Parkland
Market Ctr.
Mockingbird
Cityplace/Uptown
Pearl/Arts District
St. Paul
Akard
West End
Union Station
Victory
DOWNTOWN DALLAS
Convention Ctr.
Cedars
8th & Corinth
Deep Ellum
Baylor Univ. Med. Ctr.
Fair Park
MLK
Hatcher
Lawnview
Lake June
BUCKNER
Medical/ Market Center
Downtown Irving/ Heritage Crossing
West Irving
CentrePort/ DFW Airport
Fare Zone Boundary
Bell
Richland Hills
ITC
T&P STATION
TRE
(Westbound) FORT WORTH
Dallas Zoo
Tyler/Vernon
Hampton
WESTMORELAND
DART let's go.
Morrell
Illinois
Kiest
VA Medical Ctr.
Ledbetter
Camp Wisdom
UNT Dallas

Dallas/Fort Worth to Meridian Passenger Rail Study

Appendix C: Amtrak Schedules

TxDOT Rail Division
I-20 Corridor Council

CITY OF NEW ORLEANS®
ILLINI® and SALUKI®

Effective April 1, 2017

CHICAGO

and

NEW ORLEANS

CHICAGO - CHAMPAIGN-URBANA
CENTRALIA - CARBONDALE
MEMPHIS - JACKSON
HAMMOND - NEW ORLEANS
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Washington, DC 20002.
NRPC Form P58–Internet only–4/1/17. Schedules subject to change without notice.

CITY OF NEW ORLEANS, ILLINI and SALUKI

Saluki	Illini	City of New Orleans	◂ Train Name ▸					City of New Orleans	Saluki	Illini
391	**393**	**59**	◂ Train Number ▸					**58**	**390**	**392**
Daily	**Daily**	**Daily**	◂ Normal Days of Operation ▸					**Daily**	**Daily**	**Daily**
R B ☕ 📶 🚲	R B ☕ 📶 🚲	R 🛏 🍴 ☕ 🧳 🚲	◂ On Board Service ▸					R 🛏 🍴 ☕ 🧳 🚲	R B ☕ 📶 🚲	R B ☕ 📶 🚲
Read Down			Mile	▼		Symbol	▲	**Read Up**		
8 15A	**4 05P**	🧳**8 05P**	0	Dp	**CHICAGO, IL** (CT) –Union Station 🚌 Madison—see back	●♿QT	Ar	🧳9 00A	**1 00P**	**9 45P**
⑲8 56A	⑲**4 46P**	⑲**8 54P**	24		**Homewood, IL** (METRA/IC Line)	●QT		⑲7 44A	⑲11 44A	**D8 27P**
9 22A	**5 12P**	⚑**9 23P**	57		**Kankakee, IL**	○⊠		⚑7 13A	11 15A	**8 00P**
9 44A	**5 34P**		82		**Gilman, IL**	○⊠			10 53A	**7 38P**
10 10A	**6 00P**		115		**Rantoul, IL**	○⊠			10 27A	**7 12P**
10 25A	**6 15P**	🧳**10 34P**	129		**CHAMPAIGN-URBANA, IL** 🚌 Davenport, Indianapolis—see back	●⊠QT		🧳6 10A	10 14A	**6 59P**
11 05A	**6 55P**	⚑**11 13P**	173		**Mattoon, IL** (Charleston)	○		⚑5 23A	9 31A	**6 16P**
11 29A	**7 19P**	⚑**11 37P**	200		**Effingham, IL**	○⊠		⚑4 57A	9 07A	**5 52P**
12 16P	**8 06P**	⚑12 25A	253		**Centralia, IL**	○⊠		⚑4 10A	8 23A	**5 08P**
12 49P	**8 39P**		289		**Du Quoin, IL**	○			7 51A	**4 36P**
1 45P	**9 35P**	🧳1 21A	309	Ar	**CARBONDALE, IL**	●♿QT	Dp	🧳3 16A	7 30A	**4 15P**
		🧳1 26A		Dp	🚌 St. Louis, Kansas City—see back		Ar	🧳3 11A		
		⚑3 14A	406		**Fulton, KY**	○♿		⚑1 04A		
		⚑3 56A	442		**Newbern-Dyersburg, TN**	○♿		⚑12 22A		
		🧳6 27A	528	Ar	**MEMPHIS, TN**	●♿QT	Dp	🧳**10 40P**		
		🧳6 50A		Dp			Ar	🧳**10 00P**		
		9 00A	654	Dp	**Greenwood, MS**	○♿	Dp	**7 37P**		
		⚑9 51A	706	Dp	**Yazoo City, MS**	○♿	Dp	⚑**6 42P**		
		🧳11 12A	751	Ar	**JACKSON, MS**	●♿QT	Dp	🧳**5 44P**		
		🧳11 20A		Dp	🚌 Mobile, Dallas—see back		Ar	🧳**5 28P**		
		⚑11 55A	784		**Hazlehurst, MS**	○♿		⚑**4 17P**		
		12 16P	805		**Brookhaven, MS**	○♿		**3 56P**		
		⚑**12 40P**	828		**McComb, MS**	○⊠		⚑**3 32P**		
		🧳**1 28P**	881		**Hammond, LA**	●⊠		🧳**2 45P**		
		🧳**3 32P**	934	Ar	**NEW ORLEANS, LA** (CT) –Union Passenger Terminal 🚌 Baton Rouge, Montgomery, Mobile—see back	●♿	Dp	🧳**1 45P**		

SCHEDULES EFFECTIVE 4/1/17

CITY OF NEW ORLEANS, ILLINI and SALUKI
ROUTE MAP and SYMBOLS

SYMBOLS KEY

D	Stops only to discharge passengers; train may leave before time shown.
CT	Central time
ET	Eastern time
🚌	Bus stop
⚑	Flag stop
QT	Quik-Trak self-serve ticketing kiosk
○	Unstaffed station
●	Staffed ticket office; may or may not be open for all train departures
♿	Station wheelchair accessible; no barriers between station and train
⊠	Station wheelchair accessible; not all station facilities accessible

SHADING KEY

▨	Overnight train
▨	Daytime train

Carry-On Pet Program

Amtrak.com Pets Animals A small cat or dog in a pet carrier may be carried on the *Illini* and *Saluki*, Trains 390-393, with reservations required. Reservations can be made at a staffed station or visit the website for complete information.

Service on the City of New Orleans®

- R **Coaches: Reservations required.**
- 🛏 **Sleeping cars:** Superliner sleeping accommodations.
  - Amtrak Metropolitan Lounge available in Chicago, and the Magnolia Room in New Orleans for Sleeping car passengers.
- 🍴 **Dining:** Full meal service.
- ☕ **Sightseer Lounge:** Sandwiches, snacks and beverages on select trains.
- 🧳 Checked baggage at select stations.
- 🚲 Trains 58 and 59: trainside checked bicycle service offered between staffed locations handling checked baggage. Customers will check in with the station agent, get a claim check/baggage tag for their bike, and hand up to a crew member inside the baggage car. Visit Amtrak.com/bikes for more information.
- ⑲ Passengers not carried locally between this station and Chicago except when connecting at Chicago to/from other Amtrak trains.

All Amtrak services and stations are non-smoking.

Service on the Illini® and Saluki®

- R **Coaches: Reservations required.**
- B **Business class:** Ticket price includes non-alcoholic beverage and newspaper, and access to the Amtrak Metropolitan Lounge in Chicago.
- ☕ **Café:** Sandwiches, snacks and beverages.
- 📶 Wi-Fi available.
- 🚲 **Unboxed Bicycles and Golf Bags:** A limited number of spaces are available on the *Illini* and *Saluki* to transport unboxed bicycles and golf bags to/from all stations served by those trains. Reservations are required; nominal charges apply; passenger assists with loading, stowing and unloading. Visit Amtrak.com/bikes for more information.
- ⑲ Passengers not carried locally between this station and Chicago except when connecting at Chicago to/from other Amtrak trains.

All Amtrak services and stations are non-smoking.

The *Illini* and *Saluki* are financed primarily through funds made available by the Illinois State Department of Transportation.

Trails and Rails Program: In cooperation with the National Park Service, volunteer rangers provide on board narratives between May and September on selected days on parts of the City of New Orleans route. Visit nps.gov/trailsandrails and amtraktoparks.com.

See back for Thruway Connections for these trains.

Airport Connections

Chicago Airports

Chicago Transit Authority (CTA) rapid transit trains provide service to O'Hare and Midway Airports. Blue Line trains to O'Hare leave from Clinton and Congress Streets, two blocks south of Union Station. Orange Line trains to Midway leave from the corner of Quincy and Wells streets, three blocks east of Union Station. Pay fare in CTA station. (312) 836-7000 or www.transitchicago.com.

Chicago • Rockford • Madison

(Van Galder–en route transfers may be necessary)

Thruway Number ▸				8961	8973	8979
Normal Days of Operation ▸	**Mile**	**Symbol**	▲	**Daily**	**Daily**	**Daily**
Chicago, IL–Union Station (CT)	0	●♿QT	Dp	10 30A	**1 30P**	**10 30P**
Rockford, IL	75	○	Ar	**12 10P**	**3 10P**	12 10A
South Beloit, IL	92	○		**12 35P**	**3 35P**	12 40A
Janesville, WI	105	○		**1 00P**	**4 00P**	1 00A
Madison, WI						
–Dutchmill Park & Ride	134	○		**1 35P**	**4 35P**	1 20A
–Memorial Union (CT)	140	○	Ar	**1 50P**	**4 50P**	1 35A

Madison • Rockford • Chicago *(Van Galder–en route transfers may be necessary)*

Thruway Number ▸				8956	8968	8974
Normal Days of Operation ▸	**Mile**	**Symbol**	▲	**Daily**	**Daily**	**Daily**
Madison, WI (CT)						
–Memorial Union	0	○	Dp	2 20A	11 30A	**4 00P**
–Dutchmill Park & Ride	6	○		2 35A	11 45A	**4 20P**
Janesville, WI	35	○		3 20A	12 30P	**5 00P**
South Beloit, IL	48	○		3 45A	12 55P	**5 25P**
Rockford, IL	65	○		4 10A	1 20P	**5 50P**
Chicago, IL–Union Station (CT)	140	●♿QT	Ar	5 50A	**3 30P**	**7 30P**

Davenport • Galesburg • Peoria • Bloomington • Champaign • Indianapolis *(Burlington Trailways)*

8890	8892	Thruway Number					8893	8895
Daily	**Daily**	**Mile**	▼	**Days of Operation**	**Symbol**	▲	**Daily**	**Daily**
	4 00P	0	Dp	Davenport, IA (CT)	○	Ar		**6 40P**
	4 10P	2		Rock Island, IL –Augustana College	○	Ar		**6 35P**
	4 20P	9		Moline, IL	○	Ar		**6 30P**
1 20P	**5 05P**	45		Galesburg, IL –Amtrak Station	●♿QT	Ar	11 35A	**5 30P**
2 25P	**6 15P**	94		Peoria, IL ✈	○[♿]	Dp	10 40A	**4 40P**
3 15P	**7 15P**	133		Bloomington-Normal, IL	●♿QT	Dp	9 45A	**3 40P**
4 15P	**8 15P**	187	Ar	Champaign-Urbana, IL	●[♿]QT	Dp	8 30A	**2 35P**
4 25P	**8 20P**		Dp			Ar	8 20A	**2 10P**
	9 05P	221	Dp	Danville, IL (CT)	○	Ar	7 35A	**1 25P**
7 35P	**11 25P**	314	Ar	Indianapolis, IN (ET)	●[♿]QT	Dp	7 15A	**12 50P**

The Thruway Services above connect with Amtrak trains at Champaign-Urbana.

Kansas City • St. Louis • Carbondale

Connecting Train Kansas City–St. Louis						
316	**Mile**	▼	**Thruway Number**	**Symbol**	▲	**311**
4 00P	0	Dp	Kansas City, MO (CT)	●♿QT	Ar	**2 55P**
7 03P	160	Dp	Jefferson City, MO	🄼○[♿]	Dp	11 36A
9 40P	282	Ar	St. Louis, MO (CT)	●♿QT	Dp	9 15A
Vandalia Bus Co. Thruway St. Louis–Carbondale						
8359	**Mile**	▼	**Thruway Number**	**Symbol**	▲	**8358**
11 00P	0	Dp	St. Louis, MO–Amtrak Sta. (CT)	●♿QT	Ar	6 00A
1 00A	84	Ar	Carbondale, IL–Amtrak Sta. (CT)	●♿QT	Dp	4 00A

SYMBOLS KEY

- **D** Stops only to discharge passengers; train may leave before time shown.
- **L** Stops to receive and discharge passengers; train may leave before time shown.
- **R** Stops only to receive passengers.
- 🚌 Thruway Bus stop
- ⚒ Flag stop
- ✈ Airport connection
- ⛴ Ferry connection
- 🛃 Customs & Immigration checkpoint
- QT Quik-Trak self-serve ticketing kiosk
- ○ Unstaffed station
- 🄼 Host station. See right.
- ● Staffed Station with ticket office; may or may not be open for all train departures.
- ♿ Station wheelchair accessible; no barriers between station and train.
- [♿] Station wheelchair accessible; not all station facilities accessible.

Meridian • Jackson • Dallas *(Greyhound Lines)*

8959	8219	Thruway Number					8220	8520
Daily	**Daily**	**Mile**	▼	**Days of Operation**	**Symbol**	▲	**Daily**	**Daily**
10 55A	**8 00P**	0	Dp	Meridian, MS (CT) –Union Station	●[♿]	Ar	6 40A	**2 25P**
12 25P	**9 30P**	94	Ar	Jackson, MS –Amtrak Station	●♿QT	Dp	5 10A	**12 55P**
1 35P	**10 25P**		Dp			Ar	4 10A	11 45A
2 40P	**11 30P**	138	Ar	Vicksburg, MS	○	Dp		10 45A
6 20P	2 20A	311	Ar	Shreveport, LA	○♿	Dp	12 40A	7 10A
6 55P	2 45A		Dp			Ar	12 05A	6 30A
9 25P	4 30A	408	Ar	Tyler, TX	○♿	Dp	**9 50P**	
		495	Ar	Mesquite, TX	○♿	Dp	**7 55P**	
11 10P	6 20A	507	Ar	Dallas, TX (CT) –Greyhound Station	○	Dp	**7 30P**	3 20A

Jackson • Mobile *(Greyhound Lines)*

8859	Thruway Number					8858
Daily	**Mile**	▼	**Days of Operation**	**Symbol**	▲	**Daily**
1 00P	0	Dp	Jackson, MS–Amtrak Station (CT)	●♿QT	Ar	11 55A
2 40P	91	Dp	Hattiesburg, MS	○	Dp	10 15A
4 30P	173	Dp	Biloxi, MS	○	Dp	8 20A
5 55P	232	Ar	Mobile, AL (CT)	○♿	Dp	7 00A

New Orleans • Baton Rouge *(Greyhound Lines)*

8059	Mile	▼	Thruway Number	Symbol	▲	8058
6 25P	0	Dp	New Orleans, LA (CT) –Union Passenger Terminal	●♿	Ar	7 00A
8 10P	80	Ar	Baton Rouge, LA–Greyhnd. Sta.(CT)	○	Dp	5 15A

New Orleans • Mobile • Montgomery *(Greyhound Lines)*

8659	Thruway Number					8658
Daily	**Mile**	▼	**Days of Operation**	**Symbol**	▲	**Daily**
9 25P	0	Dp	New Orleans, LA (CT) –Union Passenger Terminal	●♿	Ar	7 55A
11 45P	141	Dp	Mobile, AL	○♿	Ar	5 35A
3 20A	310	Ar	Montgomery, AL (CT)	○♿	Dp	1 45A

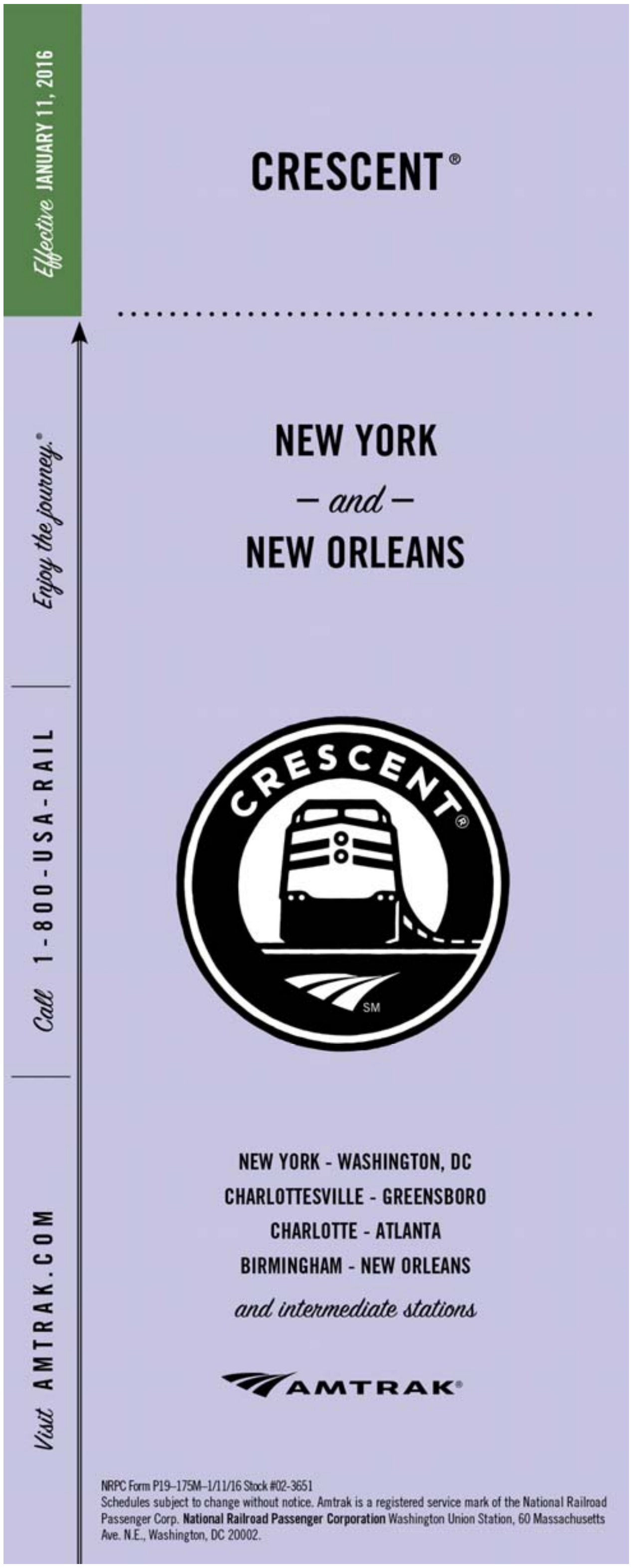
SHADING KEY

- ▨ Connecting train
- 🟩 Thruway and connecting services

See other side for Route Map.

🄼 Train Hosts and Station Hosts

Missouri Train Host program consists of on board volunteer train hosts that provide information and assistance. Volunteer station hosts assist passengers with schedules, boarding and general inquiries at Jefferson City, Washington and Kirkwood.



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CRESCENT

19	◂ Train Number ▸					20
Daily	◂ Normal Days of Operation ▸					Daily
R 🛏 ✕ ☕ 🧳 🚲	◂ On Board Service ▸					R 🛏 ✕ ☕ 🧳 🚲
Read Down	Mile	▼		Symbol	▲	Read Up
🧳2 15P	0	Dp	**NEW YORK, NY** (ET) –Penn Station	●♿QT	Ar	🧳1 46P
🧳R2 37P	10		Newark, NJ	●♿QT		🧳D1 25P
R3 18P	58		Trenton, NJ	●♿QT		D12 41P
🧳R3 55P	91		**PHILADELPHIA, PA** –30th Street Station	●♿QT		🧳D12 08P
🧳R4 19P	116		Wilmington, DE	●▣QT		🧳D11 44A
🧳R5 12P	185		Baltimore, MD-Penn Station	●♿QT		🧳D10 55A
🧳R6 30P	225		**WASHINGTON, DC** –Union Station	●♿QT	Ar	🧳D9 53A
🧳6 49P	233		Alexandria, VA	●▣QT		🧳D9 32A
7 22P	258		Manassas, VA	○		8 35A
7 55P	293		Culpeper, VA	○▣		8 01A
🧳8 52P	337		Charlottesville, VA 🚌 Richmond—see back	●♿QT		🧳7 09A
🧳10 00P	398	Ar	Lynchburg, VA (Roanoke)	●♿QT	Dp	🧳5 56A
🧳10 06P		Dp			Ar	🧳5 52A
11 14P	461	Ar	Danville, VA	○♿	Dp	4 43A
🧳12 15A	512	Ar	Greensboro, NC (Winston-Salem)	●♿QT	Dp	🧳3 44A
🧳12 22A		Dp			Ar	🧳3 37A
12 39A	524		High Point, NC	◐♿QT		3 16A
1 17A	559		Salisbury, NC	◐▣QT		2 32A
🧳2 20A	601	Ar	**CHARLOTTE, NC**	●▣QT	Dp	🧳1 46A
🧳2 45A		Dp			Ar	🧳1 21A
⚑3 12A	623		Gastonia, NC	○		⚑12 39A
4 14A	678		Spartanburg, SC	○♿		11 39P
🧳4 54A	709	Ar	Greenville, SC	●♿	Dp	🧳10 58P
🧳5 01A		Dp			Ar	🧳10 53P
5 39A	739		Clemson, SC	○		10 16P
⚑6 15A	773		Toccoa, GA	○		⚑9 40P
6 58A	810		Gainesville, GA	○♿		8 59P
🧳8 13A	859	Ar	**ATLANTA, GA** (ET)	●▣	Dp	🧳8 04P
🧳8 38A		Dp			Ar	🧳7 35P
10 00A	959	Dp	Anniston, AL (CT)	○▣	Dp	3 59P
🧳11 50A	1023	Ar	**BIRMINGHAM, AL**	●▣	Dp	🧳2 24P
🧳12 08P		Dp			Ar	🧳2 15P
🧳1 07P	1078	Dp	Tuscaloosa, AL 🚌 Mobile—see back	●▣	Dp	🧳12 44P
🧳2 58P	1175	Ar	Meridian, MS	●▣	Dp	🧳11 07A
🧳3 04P		Dp	🚌 Dallas—see back		Ar	🧳11 02A
⚑4 01P	1231		Laurel, MS	○▣		⚑10 05A
4 38P	1260		Hattiesburg, MS	○▣QT		9 30A
⚑5 42P	1324		Picayune, MS	○		⚑8 22A
⚑6 07P	1342		Slidell, LA	○		⚑7 57A
🧳7 32P	1377	Ar	**NEW ORLEANS, LA** (CT) –Union Passenger Terminal	●♿	Dp	🧳7 00A

Service on the Crescent®

- R **Coaches: Reservations required.**
- 🛏 **Sleeping cars:** Viewliner sleeping accommodations.
  - Amtrak ClubAcela First class Lounge available in New York, Philadelphia and Washington, DC, and the Magnolia Room in New Orleans for Sleeping car passengers.
- ✕ **Dining:** Full meal service.
- ☕ **Lounge:** Sandwiches, snacks and beverages.
- 🧳 Checked baggage at select stations.
- 🚲 **On Board Bicycle Racks:** Unboxed bicycles may be checked on the *Crescent* between all stations with checked baggage service, except for travel wholly between Greensboro and Charlotte; reservations are required and nominal fees apply. Passengers must lift the bicycle to shoulder height to put it into and pick it up from the baggage car.

All Amtrak services and stations are non-smoking.

Trails and Rails Program: In cooperation with the National Park Service, volunteer rangers provide on board narratives between May and September on selected days over parts of this route. Visit nps.gov/trailsandrails and amtraktoparks.com.

CRESCENT ROUTE MAP and SYMBOLS

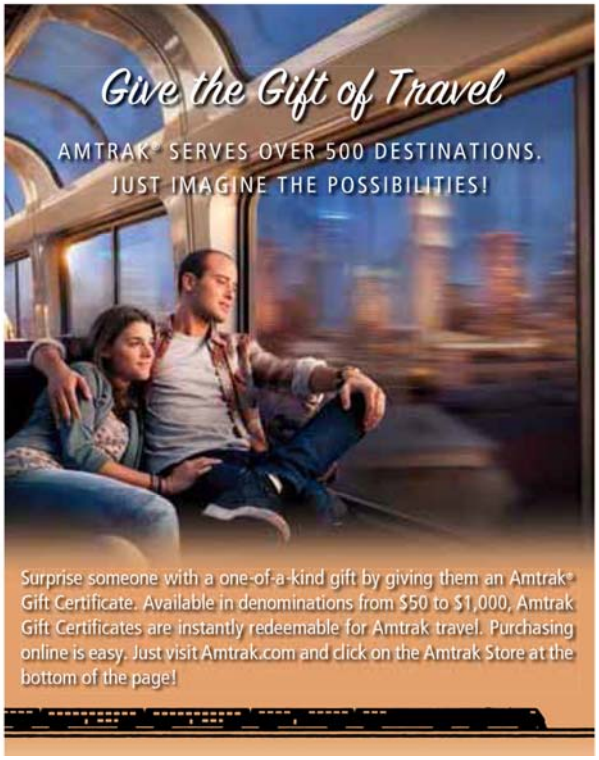
A	Time Symbol for A.M.
P	Time Symbol for P.M.
D	Stops only to discharge passengers; train may leave before time shown.
R	Stops only to receive passengers.
ET	Eastern time
CT	Central time
⚑	Flag stop
QT	Quik-Trak self-serve ticketing kiosk
○	Unstaffed station
●	Staffed ticket office; may or may not be open for all train departures
◐	Attended station
♿	Station wheelchair accessible; no barriers between station and train
▣	Station wheelchair accessible; not all station facilities accessible

Shading Key

Overnight train
Thruway and connecting services

Scenic Highlights

- Vibrant Northeast cityscapes
- Blue Ridge foothills
- Louisiana bayou country



Thruway Bus Connections

Tuscaloosa • Mobile *(Capital Trailways)*

19	Connecting Train Number					20
8019	Thruway Number					8020
Daily	Mile	▼	Days of Operation	Symbol	▲	Daily
4 40P	0	Dp	Tuscaloosa, AL–Amtrak Station (CT)	●♿	Ar	7 45A
5 55P	33	Ar	Brent, AL	○	Dp	6 35A
6 35P	57		Marion, AL	○		6 05A
7 20P	80		Selma, AL	○		5 20A
8 15P	123		Camden, AL	○		4 25A
8 55P	155		Thomasville, AL	○		3 45A
9 15P	170		Grove Hill, AL	○		3 25A
9 55P	187		Jackson, AL	○		2 45A
10 40P	224		Mt. Vernon, AL	○		2 00A
11 25P	255	Ar	Mobile, AL (CT)	○♿	Dp	1 15A

Richmond • Charlottesville *(James River Bus Lines)*

19	Connecting Train Number					20
6019	Thruway Number					6020
Daily	Mile	▼	Days of Operation	Symbol	▲	Daily
5 15P	0	Dp	Richmond, VA–Main Street Station (ET)	○♿QT	Ar	9 50A
🧳6 00P	8	Dp	Richmond, VA–Staples Mill Road	●♿QT	Ar	🧳9 15A
🧳7 30P	72	Ar	Charlottesville, VA–Amtrak Station (ET)	●♿QT	Dp	🧳7 55A

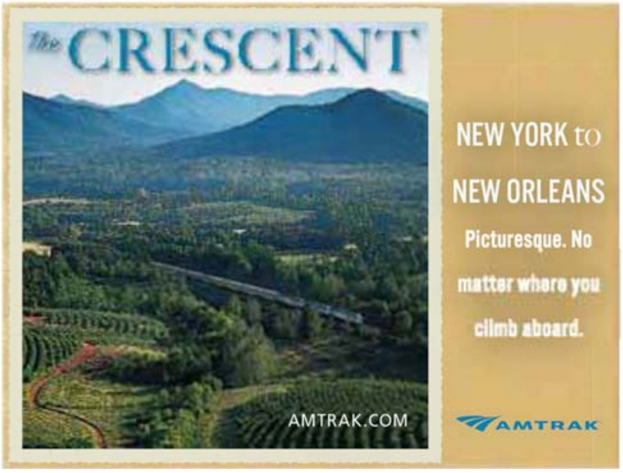
NOTE—Before traveling, confirm this schedule at Amtrak.com or 1-800-USA-RAIL.

Meridian • Dallas *(Greyhound Lines)*

19	Connecting Train Number					20
8519	Thruway Number					8220
Daily	Mile	▼	Days of Operation	Symbol	▲	Daily
5 00P	0	Dp	Meridian, MS–Union Station (CT)	●♿	Ar	9 20A
6 35P	94	Ar	Jackson, MS–Amtrak Station	●♿QT	Dp	7 50A
7 25P		Dp			Ar	7 00A
8 15P	138	Ar	Vicksburg, MS	○	Dp	
11 50P	311	Ar	Shreveport, LA	○♿	Dp	3 20A
12 30A		Dp			Ar	2 50A
*3 45A	408	Ar	Tyler, TX	○♿	Dp	1 10A
*5 15A	495	Ar	Mesquite, TX	○♿	Dp	**11 30P**
3 40A	507	Ar	Dallas, TX–Greyhound Station (CT)	○	Dp	**10 45P**

*** Arrive Mesquite and Tyler via Thruway Bus 8219, which departs Meridian at 7:35 p.m.**

See other side for Shading Key, Route Map and Symbols.



SUNSET LIMITED®

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SAN ANTONIO - TUCSON
MARICOPA - LOS ANGELES
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NRPC Form P1–Internet only–3/12/17. Schedules subject to change without notice.

SUNSET LIMITED

1 [20]			◂ Train Number ▸			2 [20]
As indicated in column			◂ Normal Days of Operation ▸			As indicated in column
[R] 🛏 ✕ ☕ 🧳 🚲			◂ On Board Service ▸			[R] 🛏 ✕ ☕ 🧳 🚲
Read Down	**Mile**	▼		**Symbol**	▲	**Read Up**
🧳9 00A MoWeSa	0	Dp	New Orleans, LA (CT) 🚌 Baton Rouge—see below 🚌 Montgomery—see below	●♿	Ar	🧳**9 40P** TuFrSu
10 30A MoWeSa	56		Schriever, LA (Houma/Thibodaux)	○[♿]		**7 03P** TuFrSu
11 56A MoWeSa	127		New Iberia, LA	○[♿]		**5 41P** TuFrSu
12 24P MoWeSa	145		Lafayette, LA	○[♿]		**5 15P** TuFrSu
1 55P MoWeSa	219		Lake Charles, LA	○[♿]		**3 29P** TuFrSu
3 48P MoWeSa	281		Beaumont, TX (Port Arthur)	○[♿]		**2 05P** TuFrSu
🧳**6 18P** MoWeSa	363	Ar	Houston, TX	●[♿]	Dp	🧳**12 10P** TuFrSu
🧳**6 55P** MoWeSa		Dp	🚌 Galveston—see below		Ar	🧳11 10A TuFrSu
🧳12 05A TuThSu	573	Ar	San Antonio, TX	●♿	Dp	🧳6 25A TuFrSu
🧳2 45A TuThSu		Dp			Ar	🧳4 50A TuFrSu
5 49A TuThSu	742		Del Rio, TX	○[♿]		1 02A TuFrSu
8 24A TuThSu	868		Sanderson, TX	○[♿]		**10 36P** MoThSa
10 38A TuThSu	959		Alpine, TX (Big Bend Nat'l. Park) (CT)	○[♿]		**8 45P** MoThSa
🧳**1 22P** TuThSu	1178	Ar	El Paso, TX 🚌 Las Cruces, Albuquerque—see below (MT)	●♿	Dp	🧳**3 35P** MoThSa
🧳**1 47P** TuThSu		Dp	(Ciudad Juarez, Mex.)		Ar	🧳**3 10P** MoThSa
3 18P TuThSu	1264		Deming, NM	○[♿]		**1 10P** MoThSa
4 13P TuThSu	1325		Lordsburg, NM (MT)	○[♿]		**12 15P** MoThSa
[69]**5 18P** TuThSu	1443		Benson, AZ (MST)	○[♿]		[69]9 15A MoThSa
[69]🧳**6 45P** TuThSu	1493	Ar	Tucson, AZ	●[♿]QT	Dp	[69]🧳8 15A MoThSa
[69]🧳**7 35P** TuThSu		Dp			Ar	[69]🧳7 28A MoThSa
[69]🧳**8 52P** TuThSu	1579	Ar	Maricopa, AZ	●[♿]	Dp	[69]🧳5 40A MoThSa
[69]🧳**9 02P** TuThSu		Dp	🚌 Phoenix—see below		Ar	[69]🧳5 30A MoThSa
[69]**11 49P** TuThSu	1744		Yuma, AZ (MST)	○♿		[69]2 47A MoThSa
2 02A WeFrMo	1890		Palm Springs, CA (PT)	○♿		12 36A MoThSa
D3 54A WeFrMo	1957		Ontario, CA	○♿		**10 54P** SuWeFr
D4 04A WeFrMo	1964		Pomona, CA	○[♿]		**10 41P** SuWeFr
🧳5 35A WeFrMo	1995	Ar	Los Angeles, CA ✈ (PT)	●♿QT	Dp	🧳**10 00P** SuWeFr

SCHEDULES EFFECTIVE 3/12/17

SUNSET LIMITED
ROUTE MAP and SYMBOLS

SYMBOLS KEY

D Stops only to discharge passengers; train may leave before time shown.
CT Central time
ET Eastern time
MT Mountain time
MST Mountain Standard time
PT Pacific time
🚌 Bus stop
✈ Airport connection

QT Quik-Trak self-serve ticketing kiosk
○ Unstaffed station
● Staffed ticket office; may or may not be open for all train departures
♿ Station wheelchair accessible; no barriers between station and train
[♿] Station wheelchair accessible; not all stations facilities accessible

SHADING KEY

Overnight train	Thruway and connecting services

Service on the Sunset Limited®

- [R] **Coaches: Reservations required.**
- 🛏 **Sleeping cars:** Superliner sleeping accommodations.
  - Magnolia Room is available in New Orleans and Amtrak Metropolitan Lounge in Los Angeles for Sleeping car passengers.
- ✕ **Dining:** Full meal service.
- ☕ **Sightseer Lounge:** Sandwiches, snacks and beverages.
- 🧳 Checked baggage at select stations.
- 🚲 Trains 1 and 2: trainside checked bicycle service offered between staffed locations handling checked baggage. Customers will check in with the station agent, get a claim check/baggage tag for their bike, and hand up to a crew member inside the baggage car. Visit Amtrak.com/bikes for more information.

[20] The *Sunset Limited* service between Orlando and New Orleans has been suspended. Future service has not been determined.

[69] This location does not observe Daylight Saving Time. Schedule times for it will be ONE HOUR LATER beginning with the fall time change on November 5, 2017.

All Amtrak services and stations are non-smoking.

Trails and Rails Program: In cooperation with the National Park Service, volunteer rangers provide on board narratives between May and September on selected days over parts of this route. Visit nps.gov/trailsandrails and amtraktoparks.com.

Thruway Bus Connections

New Orleans • Baton Rouge *(Greyhound Lines)*

8059			Thruway Number			8058
Daily	Mile	▼	Days of Operation	Symbol	▲	Daily
6 25P	0	Dp	New Orleans, LA (CT) –Union Passenger Terminal	●♿	Ar	7 00A
8 10P	80	Ar	Baton Rouge, LA (CT)	○	Dp	5 15A

Montgomery • Mobile • New Orleans *(Greyhound Lines)*

8658			Thruway Number			8659
Daily	Mile	▼	Days of Operation	Symbol	▲	Daily
1 45A	0	Dp	Montgomery, AL (CT)	○♿	Ar	3 20A
5 35A	169	Ar	Mobile, AL	○♿	Dp	**11 45P**
7 55A	310	Ar	New Orleans, LA–Amtrak Sta. (CT) –Union Passenger Terminal	●♿	Dp	**9 25P**

Galveston • Houston *(Lone Star Coach)*

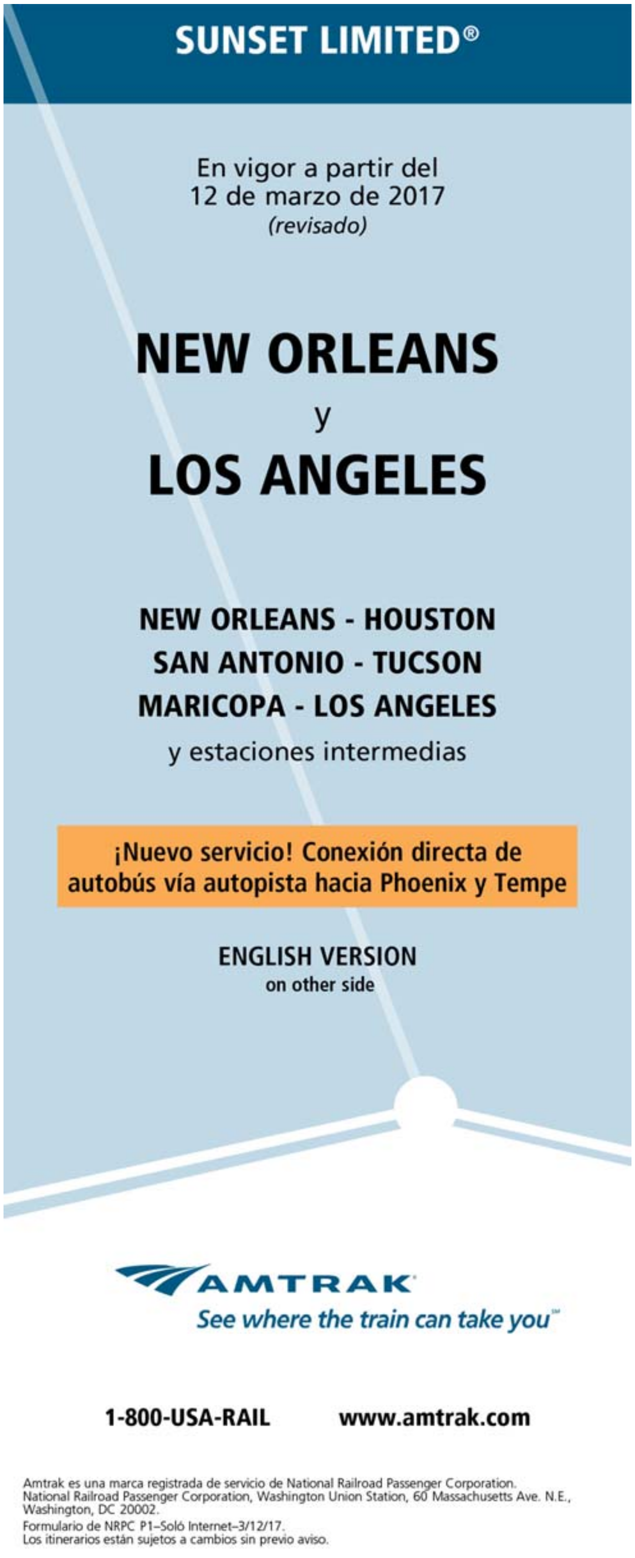
6022			Thruway Number			6021
Daily	Mile	▼	Days of Operation	Symbol	▲	Daily
11 30A	0	Dp	Galveston, TX–123 Rosenberg (CT)	○[♿]	Ar	**2 45P**
🧳**1 05P**	47	Ar	Houston, TX–Amtrak Station (CT)	●[♿]	Dp	**1 15P**

El Paso • Las Cruces • Albuquerque *(Greyhound Lines)*

1/2			Connecting Train Number			2/1
8101			Thruway Number			8102
Daily	Mile	▼	Days of Operation	Symbol	▲	Daily
8 55P	0	Dp	El Paso, TX–Greyhound Station (MT)	○	Ar	9 00A
9 55P	50	Ar	Las Cruces, NM–Chucky's Conv. Store	○	Dp	8 00A
1 25A	266	Ar	Albuquerque, NM–Amtrak Sta. (MT)	●[♿]	Dp	4 30A

NEW! Phoenix • Maricopa *(Stagecoach Express)*

8601			Thruway Bus Number			8902
SuTuTh	Mile	▼	Days of Operation	Symbol	▲	MoThSa
6 30P	0	Dp	Phoenix, AZ–Metro Center	○	Ar	7 15A
7 00P	18	Dp	–Sky Harbor Airport ✈	○♿	Ar	6 45A
7 15P	21	Dp	Tempe, AZ	○♿	Ar	6 30A
8 00P	47	Ar	Maricopa, AZ	●[♿]	Dp	5 45A
8901			Thruway Bus Number			8602
SuTuTh	Mile	▼	Days of Operation	Symbol	▲	MoThSa
9 15P	0	Dp	Maricopa, AZ	●[♿]	Ar	4 45A
10 00P	31	Ar	Tempe, AZ	○♿	Dp	4 00A
10 15P	34	Ar	Phoenix, AZ–Sky Harbor Airport ✈	○♿	Dp	3 45A
10 45P	47	Ar	–Metro Center	○	Dp	3 15A



SUNSET LIMITED®

En vigor a partir del
12 de marzo de 2017
(revisado)

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y
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Formulario de NRPC P1–Soló Internet–3/12/17.
Los itinerarios están sujetos a cambios sin previo aviso.

SUNSET LIMITED

1 [20]			◂ Número de tren ▸			2 [20]
Como se indica en la columna			◂ Días de operación ▸			Como se indica en la columna
Ⓡ 🛏 ✕ ☕ 🧳 🚲			◂ Servicio a bordo ▸			Ⓡ 🛏 ✕ ☕ 🧳 🚲
Leer hacia abajo	Milla	▼		Símbolo	▲	Leer hacia arriba
🧳9 00A LMiS	0	Dp	**New Orleans, LA** (CT) 🚌 Baton Rouge—ver debajo 🚌 Montgomery—ver debajo	●♿	Ar	🧳**9 40P** MVD
10 30A LMiS	56		**Schriever, LA** (Houma/Thibodaux)	○[♿]		**7 03P** MVD
11 56A LMiS	127		**New Iberia, LA**	○[♿]		**5 41P** MVD
12 24P LMiS	145		**Lafayette, LA**	○[♿]		**5 15P** MVD
1 55P LMiS	219		**Lake Charles, LA**	○[♿]		**3 29P** MVD
3 48P LMiS	281		**Beaumont, TX** (Port Arthur)	○[♿]		**2 05P** MVD
🧳**6 18P** LMiS	363	Ar	**Houston, TX**	●[♿]	Dp	🧳**12 10P** MVD
🧳**6 55P** LMiS		Dp	🚌 Galveston—ver debajo		Ar	🧳11 10A MVD
🧳12 05A MJD	573	Ar	**San Antonio, TX**	●♿	Dp	🧳6 25A MVD
🧳2 45A MJD		Dp			Ar	🧳4 50A MVD
5 49A MJD	742		**Del Rio, TX**	○[♿]		1 02A MVD
8 24A MJD	868		**Sanderson, TX**	○[♿]		**10 36P** LJS
10 38A MJD	959		**Alpine, TX** (Big Bend Nat'l Park) (CT)	○[♿]		**8 45P** LJS
🧳**1 22P** MJD	1178	Ar	**El Paso, TX** 🚌 Las Cruces, (MT) Albuquerque—ver debajo	●♿	Dp	🧳**3 35P** LJS
🧳**1 47P** MJD		Dp	(Ciudad Juarez, Mex.)		Ar	🧳**3 10P** LJS
3 18P MJD	1264		**Deming, NM**	○[♿]		**1 10P** LJS
4 13P MJD	1325		**Lordsburg, NM** (MT)	○[♿]		**12 15P** LJS
[69]**5 18P** MJD	1443		**Benson, AZ** (MST)	○[♿]		[69]9 15A LJS
[69]🧳**6 45P** MJD	1493	Ar	**Tucson, AZ**	●[♿]QT	Dp	[69]🧳8 15A LJS
[69]🧳**7 35P** MJD		Dp			Ar	[69]🧳7 28A LJS
[69]🧳**8 52P** MJD	1579	Ar	**Maricopa, AZ**	●[♿]	Dp	[69]🧳5 40A LJS
[69]🧳**9 02P** MJD		Dp	🚌 Phoenix—ver debajo		Ar	[69]🧳5 30A LJS
[69]**11 49P** MJD	1744		**Yuma, AZ** (MST)	○♿		[69]2 47A LJS
2 02A MiVL	1890		**Palm Springs, CA** (PT)	○♿		12 36A LJS
D3 54A MiVL	1957		**Ontario, CA**	○♿		**10 54P** DMiV
D4 04A MiVL	1964		**Pomona, CA**	○[♿]		**10 41P** DMiV
🧳5 35A MiVL	1995	Ar	**Los Angeles, CA** ✈ (PT)	●♿QT	Dp	🧳**10 00P** DMiV

LOS ITINERARIOS EFICAZ 3/12/17

SUNSET LIMITED
MAPA DE LA RUTA y SÍMBOLOS

CONVENCIONES DE SÍMBOLOS

D	Sólo se detiene para bajar pasajeros; el tren puede partir antes de la hora que se muestra.
CT	Hora del Centro
ET	Hora del Este
MT	Hora de la Montaña
MST	Hora estándar de la Montaña
PT	Símbolo de tiempo para P.M.
🚌	Parada de autobús
✈	Conexión al aeropuerto
QT	Quiosco Quik-Trak, venta de boletos autoservicio
○	Estación no provista de personal
●	Oficina de boletos provista de personal; puede no estar abierta en todos los horarios de salida
♿	Estación con acceso para silla de ruedas; no hay obstáculos entre la estación y el tren.
[♿]	Estación con acceso para silla de ruedas; no todas las instalaciones de la estación son accesibles

CONVENCIONES DEL SOMBREADO

Tren nocturno	Thruway y servicios de conexión

Servicio en el Sunset Limited®

- Ⓡ **Clase económica: se requiere reservación.**
- 🛏 **Cabinas dormitorio:** Dormitorios en Superliner. El Salón Magnolia está disponible en Nueva Orleans y el Salón Metropolitan en Los Ángeles para los pasajeros con servicio de coche-cama.
- ✕ **Comedor:** servicio de comida completo.
- ☕ **Lounge Sightseer:** sándwiches, refrigerios y bebidas.
- 🧳 Equipaje facturado en estaciones selectas.
- 🚲 Trenes 1 y 2: se ofrece servicio de documentación de bicicletas a un lado del tren entre ubicaciones dotadas de personal que aceptan equipaje documentado. Los clientes deberán presentarse ante el agente de la estación, obtener una etiqueta/comprobante de equipaje para su bicicleta y entregársela a un miembro del personal dentro del vagón para equipaje. Visite Amtrak.com/bikes para obtener más información.

[20] El servicio de *Sunset Limited* entre Orlando y New Orleans ha sido suspendido. No se ha determinado cuándo iniciará el servicio futuro.

[69] Esta ubicación no aplica el horario de verano. Los horarios para esta SE RETRASARÁN UNA HORA a partir del cambio de horario de otoño, el 5 de noviembre de 2017.

Está prohibido fumar en todos los servicios y estaciones de Amtrak.

Programa Recorridos (Trails and Rails): en cooperación con el Servicio de Parques Nacionales, en días seleccionados entre mayo y septiembre, los guardabosques voluntarios ofrecen narraciones a bordo del tren en partes de esta ruta. Visite nps.gov/trailsandrails y amtraktoparks.com.

Conexión de Thruway Bus

New Orleans • Baton Rouge *(Greyhound Lines)*

8059			Número de Thruway			8058
Diariamente	Milla	▼	Días de operación	Símbolo	▲	Diariamente
6 25P	0	Dp	**New Orleans, LA** (CT) –Union Passenger Terminal	●♿	Ar	7 00A
8 10P	80	Ar	**Baton Rouge, LA** (CT)	○	Dp	5 15A

Montgomery • Mobile • New Orleans *(Greyhound Lines)*

8658			Número de Thruway			8659
Diariamente	Milla	▼	Días de operación	Símbolo	▲	Diariamente
1 45A	0	Dp	**Montgomery, AL** (CT)	○♿	Ar	3 20A
5 35A	169	Ar	**Mobile, AL**	○♿	Dp	**11 45P**
7 55A	310	Ar	**New Orleans, LA** (CT) –Union Passenger Terminal	●♿	Dp	**9 25P**

Galveston • Houston *(Lone Star Coach)*

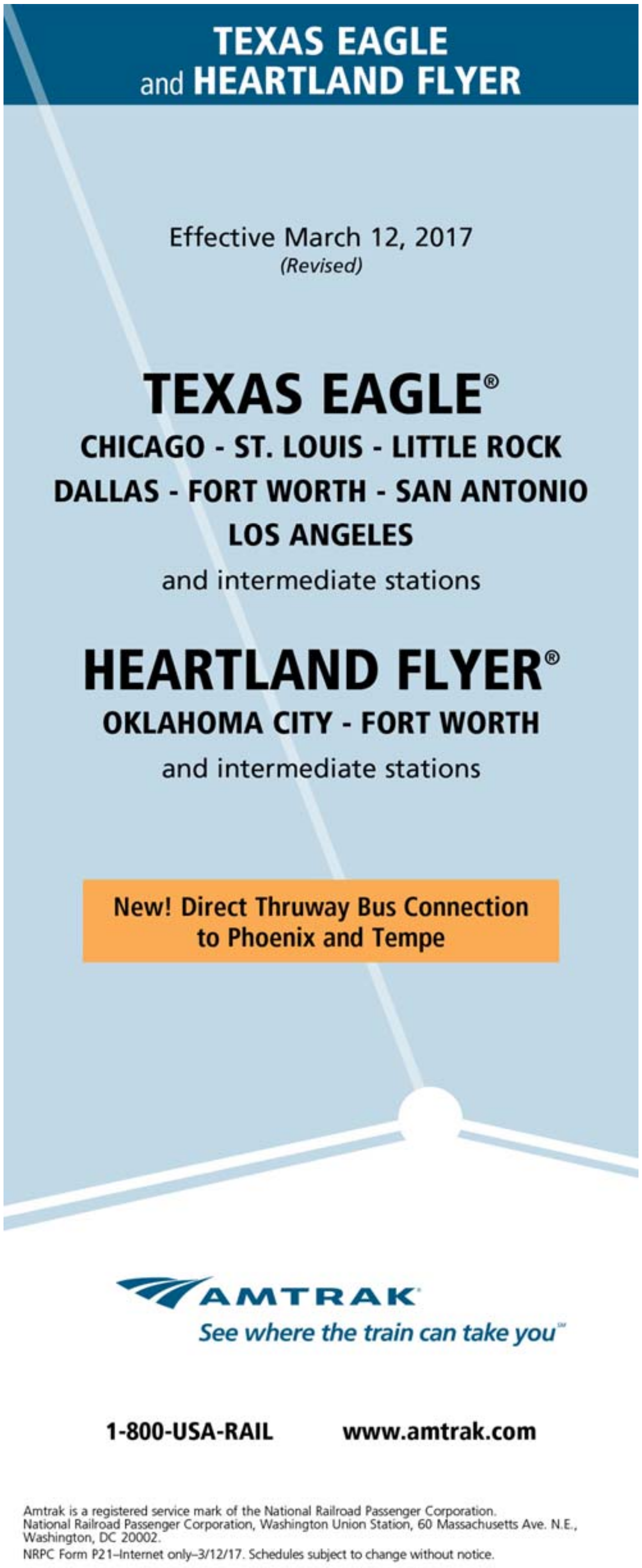
6022			Número de Thruway			6021
Diariamente	Milla	▼	Días de operación	Símbolo	▲	Diariamente
11 30A	0	Dp	**Galveston, TX**–123 Rosenberg (CT)	○[♿]	Ar	**2 45P**
🧳**1 05P**	47	Ar	**Houston, TX**–Estación de Amtrak (CT)	●[♿]	Dp	**1 15P**

El Paso • Las Cruces • Albuquerque *(Greyhound Lines)*

1/2			Número de tren en conexión			2/1
8101			Número de Thruway			8102
Diariamente	Milla	▼	Días de operación	Símbolo	▲	Diariamente
8 55P	0	Dp	**El Paso, TX**–Greyhound Station (MT)	○	Ar	9 00A
9 55P	50	Ar	**Las Cruces, NM**–Chucky's Conv. Store	○	Dp	8 00A
1 25A	266	Ar	**Albuquerque, NM** (MT) –Estación de Amtrak	●[♿]	Dp	4 30A

¡Nuevo servicio! Phoenix • Maricopa *(Stagecoach Express)*

8601			Número de Thruway			8902
DMJ	Milla	▼	Días de operación	Símbolo	▲	LJS
6 30P	0	Dp	**Phoenix, AZ**–Metro Center	○	Ar	7 15A
7 00P	18	Dp	–Sky Harbor Airport ✈	○♿	Ar	6 45A
7 15P	21	Dp	**Tempe, AZ**	○♿	Ar	6 30A
8 00P	47	Ar	**Maricopa, AZ**	●[♿]	Dp	5 45A
8901			Número de Thruway			8602
DMJ	Milla	▼	Días de operación	Símbolo	▲	LJS
9 15P	0	Dp	**Maricopa, AZ**	●[♿]	Ar	4 45A
10 00P	31	Ar	**Tempe, AZ**	○♿	Dp	4 00A
10 15P	34	Ar	**Phoenix, AZ**–Sky Harbor Airport ✈	○♿	Dp	3 45A
10 45P	47	Ar	–Metro Center	○	Dp	3 15A



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TEXAS EAGLE

21/421	‹ Train Number ›					22/422
As indicated in column	‹ Normal Days of Operation ›					As indicated in column
R 🛏 ✕ ☕ 🧳 🚲	‹ On Board Service ›					R 🛏 ✕ ☕ 🧳 🚲
Read Down	Mile	▼		Symbol	▲	Read Up
🧳1 45P Daily	0	Dp	Chicago, IL–Union Station (CT) 🚌 Madison—see back	●♿QT	Ar	🧳1 52P Daily
🧳R2 40P Daily	37		Joliet, IL	●▣		🧳D12 56P Daily
3 27P Daily	92		Pontiac, IL	○▣		11 39A Daily
🧳4 04P Daily	124		Bloomington-Normal, IL 🚌 Davenport, Indianapolis —see back	●♿QT		🧳11 08A Daily
4 37P Daily	156		Lincoln, IL	○▣		10 25A Daily
77🧳5 14P Daily	185		Springfield, IL	●♿		77🧳9 55A Daily
5 49P Daily	224		Carlinville, IL	○♿		9 15A Daily
6 22P Daily	257		Alton, IL	●▣		8 43A Daily
🧳7 21P Daily 🧳7 55P	284	Ar Dp	St. Louis, MO	●♿QT	Dp Ar	🧳7 55A Daily 🧳7 24A
10 02P Daily	376		Arcadia, MO–Arcadia Valley Station	○♿		4 19A Daily
11 42P Daily	453		Poplar Bluff, MO	○▣		2 44A Daily
12 37A Daily	513		Walnut Ridge, AR (Jonesboro)	○♿		1 41A Daily
🧳3 10A Daily	634		Little Rock, AR	●♿		🧳11 39P Daily
3 55A Daily	677		Malvern, AR (Hot Springs Natl. Park)	○♿		10 26P Daily
4 20A Daily	694		Arkadelphia, AR	○▣		10 02P Daily
5 09A Daily	741		Hope, AR	○♿		9 18P Daily
🧳5 58A Daily	774		Texarkana, AR/TX	●▣		🧳8 43P Daily
7 50A Daily	840		Marshall, TX	●♿		7 31P Daily
🧳8 28A Daily	864		Longview, TX (Tyler) 🚌 Shreveport, Houston—see back	●♿		🧳6 15P Daily
9 25A Daily	912	Dp	Mineola, TX (Canton)	○♿		5 15P Daily
🧳11 30A Daily 🧳11 50A	991	Ar Dp	Dallas, TX 🚌 Jackson, Meridian—see back	●♿QT	Dp Ar	🧳3 40P Daily 🧳3 20P
🧳1 25P Daily 🧳2 10P	1022	Ar Dp	Fort Worth, TX 🚌 Waco, Houston—see back	●♿QT	Dp Ar	🧳2 20P Daily 🧳1 58P
2 52P Daily	1050		Cleburne, TX	○▣		1 00P Daily
4 00P Daily	1125		McGregor, TX (Waco, Crawford)	○♿		11 51A Daily
4 43P Daily	1150		Temple, TX 🚌 Ft. Hood, Killeen—see back	●▣		11 25A Daily
5 36P Daily	1188		Taylor, TX	○▣		10 22A Daily
🧳6 30P Daily	1223		Austin, TX	●♿		🧳9 31A Daily
7 12P Daily	1253		San Marcos, TX	○♿		8 32A Daily
🧳9 55P Daily 🧳2 45A TuThSu	1305	Ar Dp	San Antonio, TX	●♿	Dp Ar	🧳7 00A Daily 🧳4 50A TuFrSu
5 49A TuThSu	1475		Del Rio, TX	○▣		1 02A TuFrSu
8 24A TuThSu	1600		Sanderson, TX	○▣		10 36P MoThSa
10 38A TuThSu	1692		Alpine, TX (Big Bend Nat'l. Park)(CT)	○▣		8 45P MoThSa
🧳1 22P TuThSu 🧳1 47P TuThSu	1910	Ar Dp	El Paso, TX 🚌 Las Cruces, Albuquerque—see back (Ciudad Juarez, Mex.) (MT)	●♿	Dp Ar	🧳3 35P MoThSa 🧳3 10P MoThSa
3 18P TuThSu	1998		Deming, NM	○▣		1 10P MoThSa
4 13P TuThSu	2058		Lordsburg, NM (MT)	○♿		12 15P MoThSa
69 5 18P TuThSu	2176		Benson, AZ (MST)	○▣		69 9 15A MoThSa
69🧳6 45P TuThSu 69🧳7 35P TuThSu	2226	Ar Dp	Tucson, AZ	●▣QT	Dp Ar	69🧳8 15A MoThSa 69🧳7 28A MoThSa
69🧳8 52P TuThSu 69🧳9 02P TuThSu	2312	Ar Dp	Maricopa, AZ 🚌 Phoenix—see back	●▣	Dp Ar	69🧳5 40A MoThSa 69🧳5 30A MoThSa
69 11 49P TuThSu	2477		Yuma, AZ (MST)	○♿		69 2 47A MoThSa
2 02A WeFrMo	2622		Palm Springs, CA (PT)	○♿		12 36A MoThSa
D3 54A WeFrMo	2690		Ontario, CA	○♿		10 54P SuWeFr
D4 04A WeFrMo	2696		Pomona, CA	○▣		10 41P SuWeFr
🧳5 35A WeFrMo	2728	Ar	Los Angeles, CA ✈ (PT)	●♿QT	Dp	🧳10 00P SuWeFr

SCHEDULES EFFECTIVE 3/12/17

SHADING KEY	Overnight train	Daytime train

Service between Chicago and San Antonio

The *Texas Eagle* serves all stations between Chicago and San Antonio daily. Through service west of San Antonio operates tri-weekly, departing Chicago, Poplar Bluff and intermediate stations on Sundays, Tuesdays and Fridays. Eastbound trains departing Los Angeles on Sunday, Wednesday and Friday arrive stations San Antonio-Little Rock on Tuesday, Friday and Sunday, and stations Walnut Ridge-Chicago on Wednesday, Saturday and Monday.

Service on the Texas Eagle®

R **Coaches: Reservations required.**

🛏 **Sleeping cars:** Superliner sleeping accommodations. Amtrak Metropolitan Lounge available in Chicago and Los Angeles, and a private waiting area available in St. Louis for Sleeping car passengers.

✕ **Dining:** Full meal service.

☕ **Sightseer Lounge:** Sandwiches, snacks and beverages.

🧳 Checked baggage at select stations.

🚲 Trains 21/421 and 22/422: trainside checked bicycle service offered between staffed locations handling checked baggage. Customers will check in with the station agent, get a claim check/baggage tag for their bike, and hand up to a crew member inside the baggage car. Visit Amtrak.com/bikes for more information.

69 This location does not observe Daylight Saving Time. Schedule times for it will be ONE HOUR LATER beginning with the fall time change on November 5, 2017.

77 Executive Transportation operates Thruway van service from Springfield, IL for connections from Train 22 to Trains 3 and 5 at Galesburg, IL and from Galesburg, IL for connections from Trains 4 and 6 to Train 21 at Springfield, IL. Passengers with disabilities must provide advance notification of needs. For additional information call (217) 523-5466.

All Amtrak services and stations are non-smoking.

Trails and Rails Program: In cooperation with the National Park Service, volunteer rangers provide on board narratives between May and September on selected days over parts of this route. Visit nps.gov/trailsandrails and amtraktoparks.com.

Possible Texas Eagle Schedule Change

The *Texas Eagle* schedule is subject to change between Chicago and San Antonio. Visit Amtrak.com or call 1-800-USA-RAIL to confirm schedules for your anticipated travel date.

Connecting Local Services

Dallas–Fort Worth Metroplex

Dallas Area Rapid Transit (DART) operates bus and light rail service in Dallas, with a light rail hub at Dallas Union Station. (214) 979-1111, www.dart.org.

Fort Worth Transportation Authority (the T) operates bus service from its hub at Fort Worth's Intermodal Transportation Center (Amtrak station). (817) 215-8600, the-t.com.

Trinity Railway Express is a cooperative effort of DART and the T, providing commuter rail service, Monday through Saturday, between Fort Worth and Dallas Amtrak stations. Intermediate stations include Richland Hills, Irving and a free shuttle bus from CentrePort station to Dallas – Ft. Worth International Airport.

Extend your trip on the *Heartland Flyer* to Dallas! Call DART or The T for more information or visit trinityrailwayexpress.org.

San Antonio–McAllen Harlingen-Brownsville

Connecting intercity bus service by Valley Transit is available from Greyhound Bus Station between San Antonio and McAllen, Harlingen and Brownsville.

St. Louis Metrolink

Metrolink operates light rail local service with branches serving St. Louis, East Saint Louis and Belleville, Illinois, and Lambert-St. Louis International Airport. Board at Civic Center Station, adjacent to Amtrak. For information call (314) 982-1400 or visit www.metrostlouis.org.

HEARTLAND FLYER

821			◀ Train Number ▶			822
Daily			◀ Normal Days of Operation ▶			Daily
R ☕			◀ On Board Service ▶			R ☕
Read Down	Mile	▼		Symbol	▲	Read Up
8903			🚌 Amtrak Thruway Connection—Newton, KS - Oklahoma City, OK			8904
🚌4 00A	0	Dp	**Newton, KS**–Amtrak Station (CT)	● ♿	Ar	🚌2 15A
🚌5 00A	28	Dp	**Wichita, KS**	○	Dp	🚌1 35A
🚌7 35A	189	Ar	**Oklahoma City, OK** –Amtrak Station (CT)	○♿QT	Dp	**🚌10 40P**
8 25A	0	Dp	**Oklahoma City, OK** (CT)	○♿QT	Ar	**9 27P**
8 51A	20		**Norman, OK**	○♿		**8 47P**
9 08A	35		**Purcell, OK**	○♿		**8 26P**
9 32A	57		**Pauls Valley, OK**	○♿		**8 01P**
10 24A	102		**Ardmore, OK**	○♿		**7 11P**
11 10A	141		**Gainesville, TX**	○♿		**6 30P**
12 27P	206	Ar	**Fort Worth, TX** (CT)	●♿QT	Dp	**5 25P**

SCHEDULES EFFECTIVE 8/22/16

Service on the Heartland Flyer®

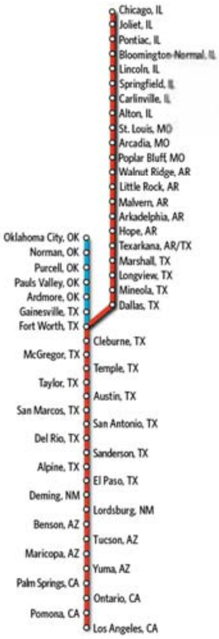
R **Coaches: Reservations required.**
☕ **Café:** Sandwiches, snacks and beverages.

All Amtrak services and stations are non-smoking.

Trails and Rails Program: In cooperation with the National Park Service, volunteer rangers provide on board narratives between May and September on selected days over parts of this route. Visit nps.gov/trailsandrails and amtraktoparks.com.

The *Heartland Flyer* is financed primarily through funds made available by the Oklahoma and Texas Departments of Transportation.

TEXAS EAGLE and HEARTLAND FLYER ROUTE MAP and SYMBOLS



SYMBOLS KEY

D	Stops only to discharge passengers; train may leave before time shown.
R	Stops only to receive passengers.
CT	Central time
ET	Eastern time
MT	Mountain time
MST	Mountain Standard time
PT	Pacific time
🚌	Bus stop
✈	Airport connection
QT	Quik-Trak self-serve ticketing kiosk
○	Unstaffed station
●	Staffed ticket office; may or may not be open for all train departures
♿	Station wheelchair accessible; no barriers between station and train
♿	Station wheelchair accessible; not all station facilities accessible

Madison • Rockford • Chicago

(Van Galder–en route transfers may be necessary)

8970	Mile	▼	Thruway Number	Symbol	▲	8965
			Madison, WI (CT)			
8 30A	0	Dp	–Univ. of Wisconsin/Chazen Museum	○	Ar	8 45P
8 45A	6		–Dutchmill Park & Ride	○		8 30P
9 30A	35		Janesville, WI	○		7 55P
9 55A	48		South Beloit, IL	○		7 35P
10 20A	65	Dp	Rockford, IL	○	Ar	7 15P
12 30P	140	Ar	Chicago, IL–Union Station (CT)	●♿QT	Dp	5 00P

Davenport • Galesburg • Peoria • Bloomington • Champaign • Indianapolis *(Burlington Trailways)*

8890	8892	Thruway Number					8893	8895
Daily	Daily	Mile	▼	Days of Operation	Symbol	▲	Daily	Daily
	4 00P	0	Dp	Davenport, IA (CT)	○	Ar		6 40P
	4 10P	2		Rock Island, IL –Augustana College	○	Ar		6 35P
	4 20P	9		Moline, IL	○	Ar		6 30P
1 20P	5 05P	45		Galesburg, IL –Amtrak Station	●♿QT	Ar	11 35A	5 30P
2 25P	6 15P	94		Peoria, IL ✈	○[♿]	Dp	10 40A	4 40P
3 15P	7 15P	133		Bloomington-Normal, IL	●♿QT	Dp	9 45A	3 40P
4 15P	8 15P	187	Ar	Champaign-Urbana, IL	●[♿]QT	Dp	8 30A	2 35P
4 25P	8 20P		Dp			Ar	8 20A	2 10P
	9 05P	221	Dp	Danville, IL (CT)	○	Ar	7 35A	1 25P
7 35P	11 25P	314	Ar	Indianapolis, IN (ET)	●[♿]QT	Dp	7 15A	12 50P

The Thruway Services above connect with Amtrak trains at Champaign-Urbana.

Galesburg • Springfield *(Executive Limo)*

5521	Mile	▼	Thruway Number	Symbol	▲	5522
2 15P	0	Dp	Galesburg, IL–Amtrak Station (CT)	●♿QT	Ar	1 30P
4 30P	119	Ar	Springfield, IL–Amtrak Station (CT)	●[♿]	Dp	11 15A

Longview • Houston • Galveston *(Lone Star Coach)*

6021	Mile	▼	Thruway Number	Symbol	▲	6022
🚌8 40A	0	Dp	Longview, TX–Amtrak Station (CT)	●♿	Ar	🚌5 40P
10 05A	70	Ar	Nacogdoches, TX	○	Dp	4 25P
🚌1 15P	214	Ar	Houston, TX–Amtrak Station	●[♿]	Dp	🚌1 05P
2 45P	266	Ar	Galveston, TX–123 Rosenberg (CT)	○[♿]	Dp	11 30A

NOTE—Reservations must be made at least 24 hours in advance departing Galveston.

Shreveport • Longview *(Lone Star Coach)*

6421	Mile	▼	Thruway Number	Symbol	▲	6422
6 30A	0	Dp	Shreveport, LA (CT)	○	Ar	7 45P
8 00A	62	Ar	Longview, TX–Amtrak Station	●♿	Dp	6 25P
6121	**Mile**	▼	**Thruway Number**	**Symbol**	▲	**6122**
8 40A	0	Dp	Longview, TX–Amtrak Station	●♿	Ar	5 45P
10 00A	62	Ar	Shreveport, LA (CT)	○	Dp	4 15P

Dallas • Jackson • Meridian *(Greyhound Lines)*

8520	8220	Thruway Number					8959	8219
Daily	Daily	Mile	▼	Days of Operation	Symbol	▲	Daily	Daily
3 20A	7 30P	0	Dp	Dallas, TX–Greyhound Station (CT)	○	Ar	11 10P	5 50A
	7 55P	12	Dp	Mesquite, TX	○♿	Ar	10 45P	
	9 50P	99	Dp	Tyler, TX	○♿	Ar	9 05P	4 05A
6 30A	11 59P	196	Ar	Shreveport, LA	○♿	Dp	6 55P	2 20A
7 10A	12 35A		Dp			Ar	6 20P	1 55A
10 45A		369	Dp	Vicksburg, MS	○	Ar	2 45P	11 05P
11 40A	4 05A	413	Ar	Jackson, MS–Amtrak Station	●♿QT	Dp	1 55P	10 15P
12 45P	5 05A		Dp			Ar	12 50P	9 20P
2 15P	6 35A	507	Ar	Meridian, MS–Union Station (CT)	●[♿]	Dp	11 15A	7 50P

Fort Hood • Killeen • Temple *(Southwestern Coaches)*

8821	Mile	▼	Thruway Number	Symbol	▲	8722
3 15P	0	Dp	Fort Hood, TX–Bldg. 108 (CT)	○	Ar	12 45P
3 45P	4	Dp	Killeen, TX	○	Ar	12 30P
4 15P	33	Ar	Temple, TX–Amtrak Station	●[♿]	Dp	11 45A
8721	**Mile**	▼	**Thruway Number**	**Symbol**	▲	**8822**
5 15P	0	Dp	Temple, TX–Amtrak Station	●[♿]	Ar	10 45A
6 00P	29	Ar	Killeen, TX	○	Dp	10 00A
6 15P	33	Ar	Fort Hood, TX–Bldg. 108 (CT)	○	Dp	9 45A

Fort Worth • Waco • Houston *(Greyhound Lines)*

8221	Thruway Number					8222
Daily	Mile	▼	Days of Operation	Symbol	▲	Daily
1 55P	0	Dp	Forth Worth, TX–Amtrak Sta. (CT)	●♿	Ar	1 40P
D3 45P	89	Ar	Waco, TX	○	Dp	R12 10P
D5 35P	172	Ar	Bryan, TX (College Station)	○	Dp	R10 15A
D6 50P	226	Ar	Prairie View, TX	○	Dp	R8 55A
7 50P	275	Ar	Houston, TX–Greyhound Sta. (CT)	○	Dp	7 45A

El Paso • Las Cruces • Albuquerque *(Greyhound Lines)*

8101	Thruway Number					8102
Daily	Mile	▼	Days of Operation	Symbol	▲	Daily
8 55P	0	Dp	El Paso, TX–Greyhound Station (MT)	○	Ar	9 00A
9 55P	50	Ar	Las Cruces, NM–Chucky's Conv. Store	○	Dp	8 00A
1 25A	266	Ar	Albuquerque, NM–Amtrak Sta. (MT)	●[♿]	Dp	4 30A

NEW! Phoenix • Maricopa *(Stagecoach Express)*

8601	Thruway Bus Number					8902
SuTuTh	Mile	▼	Days of Operation	Symbol	▲	MoThSa
6 30P	0	Dp	Phoenix, AR–Metro Center	○	Ar	7 15A
7 00P	18	Dp	–Sky Harbor Airport ✈	○♿	Ar	6 45A
7 15P	21	Dp	Tempe, AZ	○♿	Ar	6 30A
8 00P	47	Ar	Maricopa, AZ	●[♿]	Dp	5 45A
8901	**Thruway Bus Number**					**8602**
SuTuTh	**Mile**	▼	**Days of Operation**	**Symbol**	▲	**MoThSa**
9 15P	0	Dp	Maricopa, AZ	●[♿]	Ar	4 45A
10 00P	31	Ar	Tempe, AZ	○♿	Dp	4 00A
10 15P	34	Ar	Phoenix, AR–Sky Harbor Airport ✈	○♿	Dp	3 45A
10 45P	47	Ar	–Metro Center	○	Dp	3 15A

SYMBOLS KEY

D	Stops only to discharge passengers; train may leave before time shown.	○	Unstaffed station
R	Stops only to receive passengers.	●	Staffed Station with ticket office; may or may not be open for all train departures.
🚌	Thruway Bus stop	♿	Station wheelchair accessible; no barriers between station and train.
⚑	Flag stop	[♿]	Station wheelchair accessible; not all station facilities accessible.
✈	Airport connection		
QT	Quik-Trak self-serve ticketing kiosk		

SHADING KEY

▨ Thruway and connecting services

Dallas/Fort Worth to Meridian Passenger Rail Study

Appendix D: On-Time Performance Analysis

TxDOT Rail Division
I-20 Corridor Council

For the context of this study, OTP is a measure of success of a specific train or route to remain on or reasonably close to the published schedule and is considered a way to attempt to measure the effectiveness of the routes analyzed, and the reliability of their service.

OTP Definition

In 2008, Amtrak and the FRA jointly developed new metrics and standards to measure delays and OTP. “Under Section 213(a) of PRIIA, 49 U.S.C. § 24308(f)(1), if the OTP of any intercity passenger train averages less than 80% for any two consecutive calendar quarters, the Surface Transportation Board (STB) may initiate an investigation, or upon complaint by Amtrak or another eligible complaint, the Board “shall” do so”[14].

Therefore, the STB defines on-time and describes the calculation of OTP only for the purpose of determining whether the “less than 80 percent” threshold for bringing an OTP complaint has been met.

Until July 2016, Amtrak published OTP information on a quarterly basis in the Quarterly Reports on the Performance and Service Quality of Intercity Passenger Train Operations, as dictated by law under Section 207 of the Passenger Rail Investment and Improvement Act of 2008. In these Quarterly reports, Amtrak calculated OTP by taking the total number of trains arriving "on-time" at the end-point of the run divided by the total number of trains operated on the run. A train was considered "on-time" by Amtrak if it arrived at the final destination, or end-point, within an allowed number of minutes, or tolerance, of its scheduled arrival time. OTP was only provided for the end-of segment station, and each train was allowed a certain tolerance at the end-point based on the number of miles traveled[15]. Trains traveling over 550 miles (long distance corridors) were allowed a 30-minute tolerance at the end of segment. For shorter corridors, the tolerance was less. **Table D-1** details the allowable tolerance by distance of the measured segment.

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[14] Surface Transportation Board Decision Document_EP_726_0: https://www.stb.gov/Decisions/readingroom.nsf/WEBUNID/ECAAFD7AFF7C8F3A85257FFE0057BC68?OpenDocument

[15] Amtrak Route Performance Glossary of Terms: https://www.amtrak.com/servlet/Satellite?c=AM_Content_C&cid=1241245662251&pagename=am/Popup

Table D-1: Amtrak Criteria for Determining OTP at End-of-Segment (valid through July 2016)

Segment Length	Schedule Tolerance
< 251 miles	10 minutes
251 to 350 miles	15 minutes
351 to 450 miles	20 minutes
451 to 550 miles	25 minutes
>550 miles	30 minutes

Source: Created using data from FRA Rail Service Metrics and Performance Reports[16]

A new rule was effective on August 2016[17] to define "on-time" and to specify the formula for calculating OTP for purposes of Section 213 of the Passenger Rail Investment and Improvement Act of 2008, 49 U.S.C. § 24308(f). The new rule defines a train's arrival at, or departure from, a given station on-time, if it occurs no later than 15 minutes after its scheduled time; the rule also dictates the adoption of an "all-stations" calculation of OTP.

This study uses the OTP to measure the effectiveness of the routes and segments between stations. For this reason, given that the length of the segments analyzed varies a lot from segment to segment, this study uses the criteria that Amtrak had used until July 2016, which was directly related to the segment length. However, the OTP criteria in use as of August 2016 fixes the delay threshold the same for all corridors, therefore it hasn't been considered suitable to be used for this specific analysis.

When measuring OTP between short segments, the concept of relative delay data is introduced, which measures the delay in minutes between first and last stations for each segment analyzed (delay at arrival – delay at departure). This index allows to identify if certain segments of the corridors analyzed have a lower OTP than average.

OTP Analysis – Amtrak Long Distance Corridors

The first step for the review of OTP on Amtrak routes was to see overall how the OTP of the corridors correlate to the average Amtrak long distance routes. **Table D-2** summarizes those findings from April 2016 to March 2017, which is the most recent online data available for this measure. **Figure D-1** summarizes OTP at the end of segment for the 4th quarter from FY 2011 to FY 2016 (which is the range of data available on the FRA[18] website) and states that

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[16] FRA Rail Service Metrics and Performance Reports https://www.fra.dot.gov/Page/P0532

[17] Surface Transportation Board Decision Document_EP_726_0 https://www.stb.gov/Decisions/readingroom.nsf/WEBUNID/ECAAFD7AFF7C8F3A85257FFE0057BC68?OpenDocument

[18] FRA Rail Service Metrics and Performance Reports https://www.fra.dot.gov/Page/P0532

OTP values vary considerably from quarter to quarter and year to year. Note that not all the data gathered for the OTP evaluation was available for 2017; in these cases, as indicated, data for 2016 was used.

Another reviewed parameter is the primary cause of Amtrak passenger train delays. Amtrak records train delays in minutes; they are a measure of deviation from the schedule. The first two causes of delay identified for the study corridors were train interference, which refers to other train movements in the area (freight trains, commuter trains, and other Amtrak passenger trains) as well as delays due to switching to alternate tracks or routes to operate around other trains, and track and signals delays, referring to delays involving issues with or maintenance on the track or signal equipment.

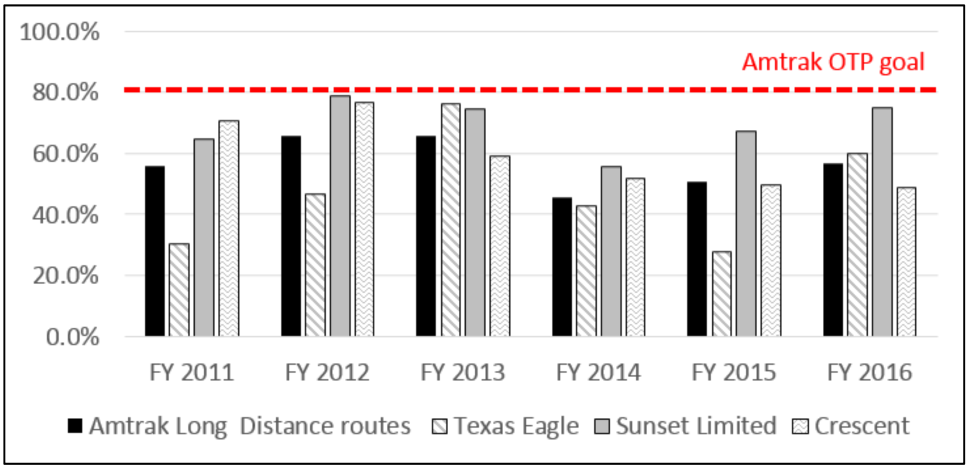
Table D-2 shows that the Texas Eagle and the Sunset Limited OTP are above the average OTP for Amtrak long distance routes (73% and 65%, respectively, versus 56% for the OTP of all Amtrak long distance routes in that time period), but all the percentages for the reviewed routes are below the Amtrak long distance routes OTP goal at 80%. When the data is expanded backwards from FY 2016 to FY 2011, however, **Figure D-1** shows that the OTP percentages vary significantly from one year to the next, and therefore the reliability of this data alone to be used as a measure of success of a specific train or route is questionable. This variability on the data may be explained through the two main causes of delay stated above. For example, **Table D-3** looks at data from January 2016 to September 2016 and shows the Texas Eagle and the Crescent endpoint OTP, both 52%, below the average OTP for all Amtrak long distance routes for that time period (62%).

Table D-2: Average OTP (April 2016 – March 2017) and Cause of Delay for Analyzed Amtrak Routes and Amtrak Long Distance Routes

	Average OTP April 2016 - March 2017	Primary Cause of Delay
		Train Interference
Amtrak Long Distance Routes	56%	43%
Amtrak Long Distance Routes without NE Routes	56%	40%
Texas Eagle	73%	31%
Sunset Limited	65%	47%
Crescent	56%	48%

Note: Table created with data from https://www.amtrak.com/historical-on-time-performance, page visited on May 2017

Figure D-1: Average OTP End-point Data (4th quarter FY 2011 to FY 2016) for Amtrak Long Distance Routes and Analyzed Amtrak Routes



Notes:
Source: created using data from FRA "FRA Rail Service Metrics and Performance Reports" https://www.fra.dot.gov/Page/P0532

Table D-3 splits the highest and second-highest causes of delay by host railroads. Except for the segments hosted by BNSF, all the host railroads main cause of delay is related to train interference, through freight trains (UP and CN), commuter trains (TRE), or passenger trains (TRE).

Table D-3: Average Endpoint OTP and Delay by Host Railroad and Amtrak Corridor, January 2016 – September 2016

Amtrak Long - Distance Route	January-September 2016 Endpoint OTP	Host Responsible for Delay by Service (Goal < 900 minutes per 10,000 train-miles)			
		Host Railroad	Minutes of Delay per 10,000 Train-Miles	First Cause of Delay*	Second Cause of Delay*
Texas Eagle	52%	BNSF	932	DSR: 74%	FTI: 13%
		UP	1,813	FTI: 39%	DSR: 23%
		TRE	1,223	CTI: 71%	PTI: 14%
Sunset Limited	71%	BNSF	1,266	DSR: 66%	DTR/DCS
		UP	1,336	FTI: 43%	DSR: 20%
Crescent	52%	NS	1,069	FTI: 47%	DSR: 24%
Amtrak Long Distance Route	62%				

Table D-3: Average Endpoint OTP and Delay by Host Railroad and Amtrak Corridor, January 2016 – September 2016 (Continued)

Source: created using data from FRA "Quarterly Report on the Performance and Service Quality of Intercity Passenger Train Operations" https://www.fra.dot.gov/Page/P0532;
*FTI: Freight Train Interference
*PTI: Passenger Train Interference; *CTI: Commuter Train Interference
*DTR: Route Detour; DSR: Slow Order Delays
*DCS: Signal Delays

OTP Analysis by Study Segment

After reviewing the OTP for the corridors as a group versus the average Amtrak long distance corridors OTP, the next step on the OTP review has been to check in detail each of the Amtrak routes studied by segments delimited by stations.

As described previously, the measure used to calculate the OTP has been the relative delay. Raw data of delays in minutes by train, day, and endpoint station were gathered from the FRA website[19] and aggregated by track segments. From this the minutes of delay were converted into OTP using the criteria previously detailed in **Table D-1**. At the end of this appendix, there is a comprehensive summary of the collected data. **Tables D-4** and **D-5** present the OTP by end of segment for each corridor and the average and median delays at departure by corridor.

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[19] FRA "Historical Amtrak On-Time Performance Data" https://juckins.net/amtrak_status/archive/html/home.php

Table D-4: End of Segment OTP and Delay at Departure by the Selected Amtrak Corridor Segments, April 2016 to March 2017.

Amtrak Route	Amtrak Westbound Station	Amtrak Eastbound Station	Segment Length (miles)	Average Delay at Departure (minutes)		OTP End of Segment* (relative delay)
				Average	Median	
Texas Eagle (Fort Worth-San Antonio)	Fort Worth, TX	Temple, TX	128	25	5	83%
	Temple, TX	San Antonio, TX	153	21	6	80%
Sunset Limited	Sanderson, TX	San Antonio, TX	297	23	0	74%
	San Antonio, TX	Lafayette, LA	428	38	15	73%
	Lafayette, LA	New Orleans, LA	134	37	23	74%
Crescent	Slidell, LA	Meridian, MS	167	29	20	65%
	Meridian, MS	Atlanta, GA	318	20	8	49%

Notes:
*End of segment OTP delay criteria as described by the FRA (see Table D-1)
Source: Created using data from FRA "Historical Amtrak On-Time Performance Data"
https://juckins.net/amtrak_status/archive/html/home.php

The same exercise was run for the Fort Worth, TX to Marshall, TX segment of the Texas Eagle. See **Table D-5**.

Table D-5: End of segment OTP, and Delay at Departure by the Texas Eagle Corridor Fort Worth, TX to Marshall, TX April 2016 - March 2017

Amtrak Route	Amtrak Westbound Station	Amtrak Eastbound Station	Segment Length (miles)	Average Delay at Departure (minutes)		OTP End of Segment* (relative delay)
				Average	Median	
Texas Eagle	Fort Worth, TX	Dallas, TX	33	36	11	96%
	Dallas, TX	Mineola, TX	79	41	17	78%
	Mineola, TX	Longview, TX	48	46	24	84%
	Longview, TX	Marshall, TX	24	44	22	89%

Notes:
*End of segment OTP delay criteria as described by the FRA (see Table D-1)
Source: Created using data from FRA "Historical Amtrak On-Time Performance Data" https://juckins.net/amtrak_status/archive/html/home.

Amtrak Train Routes – On-Time Performance

Amtrak Train Route On-Time Performance

- ⬜ Northeast Amtrak Routes
- 🟨 Routes analyzed for the DFW study
- 🟥 On-Time Performace below average

Performance Ranking for Primary Host Freight Railroads 04/2016 - 03/2017:

Host Railroad	Minutes of delay/ 10,000 train miles	
1 - Canadian Pacific	410	
2 - BNSF	880	
3 - Union Pacific	1077	for 541 miles (DFW corridor): 58.26 minutes of delay
4 - CSX	1282	
5 - Norfolk Southern	1320	
6 - Canadian National	1483	

			Primary Cause of Delays					
ROUTE	**MAJOR CITIES SERVED**	**ROUTE ON-TIME PERFORMANCE (03/2016-03 2017)**	**Train Interference**		**Track and Signals**		**Operational**	
Acela Express	Boston - New Haven - New York - Philadelphia - Baltimore - Washington, DC	83%	21%		44%		7%	
Adirondack	Montreal - Albany - New York	77%	33%		17%		20%	
Amtrak Cascades	Vancouver, BC - Seattle - Tacoma - Portland - Salem - Eugene	45%	48%	81.8% on BNSF Railway Company 18.2% on Union Pacific	29%	91.9% on BNSF Railway Company 8.1% on Union Pacific	8%	94.7% on BNSF Railway Company 5.3% on Union Pacific
Auto Train	Lorton, VA (Washington, DC) - Sanford, FL (Orlando)	48%	54%		28%		8%	
California Zephyr	Chicago - Denver - Glenwood Springs - Emeryville (San Francisco)	41%	37%	68.6% on Union Pacific 28.4% on BNSF Railway Company 3.0% on Amtrak	26%	57.7% on Union Pacific 42.3% on BNSF Railway Company	15%	57.3% on Union Pacific 40.9% on BNSF Railway Company 1.8% on Amtrak
Capitol Corridor	Auburn - Sacramento - Emeryville (San Francisco) - Oakland - San Jose	89%	29%	100.0% on Union Pacific	28%	100.0% on Union Pacific	14%	100.0% on Union Pacific
Capitol Limited	Washington, DC - Pittsburgh - Cleveland - Chicago	50%	64%	77.9% on Norfolk Southern 21.8% on CSX Corporation 0.3% on Amtrak	18%	50.6% on Norfolk Southern 49.1% on CSX Corporation 0.2% on Amtrak	7%	77.2% on Norfolk Southern 17.9% on CSX Corporation 4.9% on Amtrak
Cardinal	New York - Washington, DC - Cincinnati - Indianapolis - Chicago	71%	32%		28%		17%	
Carolinian / Piedmont	New York - Raleigh - Charlotte	58%	39%		39%		8%	
City of New Orleans	Chicago - Memphis - New Orleans	70%	54%		22%		8%	
Coast Starlight	Seattle - Portland - Los Angeles	47%	43%	81.5% on Union Pacific 11.9% on BNSF Railway Company 6.6% on S.C.R.R.A. (Moorpark to LAX)	15%	78.0% on Union Pacific 20.7% on BNSF Railway Company 1.3% on S.C.R.R.A. (Moorpark to LAX)	15%	95.2% on Union Pacific 2.6% on BNSF Railway Company 2.2% on S.C.R.R.A. (Moorpark to LAX)
Crescent	New York - Atlanta - New Orleans	56%	48%	96.9% on Norfolk Southern 1.9% on Amtrak 1.2% on CSX Corporation	21%	92.0% on Norfolk Southern 6.2% on Amtrak 1.8% on CSX Corporation	12%	88.0% on Norfolk Southern 11.6% on Amtrak 0.4% on CSX Corporation
Downeaster	Brunswick - Portland - Boston	79%	51%		32%		9%	
Empire Builder	Chicago - St. Paul/Minneapolis - Spokane - Portland/Seattle	30%	29%	96.0% on BNSF Railway Company 2.7% on CP Rail (Soo Line) 1.1% on Metra	14%	94.4% on BNSF Railway Company 4.8% on CP Rail (Soo Line) 0.8% on Metra	24%	85.9% on BNSF Railway Company 13.7% on CP Rail (Soo Line) 0.4% on Minnesota Commercial
Empire Service	New York - Albany - Syracuse - Rochester - Buffalo - Niagara Falls	88%	43%		23%		18%	
Ethan Allen Express	Rutland - Albany - New York	85%	39%		23%		15%	
Heartland Flyer	Oklahoma City - Fort Worth	87%	59%	100.0% on BNSF Railway Company	16%	100.0% on BNSF Railway Company	15%	100.0% on BNSF Railway Company
Hiawatha	Milwaukee - Chicago	97%	39%	80.4% on Metra 17.5% on CP Rail (Soo Line) 2.1% on Amtrak	18%	55.8% on Metra 42.6% on CP Rail (Soo Line) 1.6% on Amtrak	17%	55.5% on CP Rail (Soo Line) 43.4% on Metra 1.1% on Amtrak
Hoosier State	Indianapolis - Chicago	85%	48%	65.2% on CSX Corporation 23.7% on Union Pacific 4.9% on Amtrak	26%	88.1% on CSX Corporation 3.4% on Belt Railway of Chicago 3.4% on Metra	12%	98.5% on CSX Corporation 1.5% on Union Pacific
Illinois Service	Chicago - Quincy / St. Louis / Carbondale	74%	50%	50.6% on Union Pacific 36.6% on CN - IC (Former GTW and IC) 8.2% on BNSF Railway Company	26%	63.3% on CN - IC (Former GTW and IC) 25.8% on Union Pacific 7.2% on BNSF Railway Company	12%	54.4% on Union Pacific 27.9% on BNSF Railway Company 8.6% on Terminal Railroad Assn. Of St. Louis (TRRA)
Keystone	New York - Philadelphia - Harrisburg	91%	19%		27%		26%	
Lake Shore Limited	New York/Boston - Albany - Chicago	59%	47%		17%		15%	
Maple Leaf	Toronto - Niagara Falls - New York	83%	44%		16%		16%	
Michigan Services	Chicago - Grand Rapids/East Lansing - Port Huron/Detroit - Pontiac	72%	36%		26%		17%	
Missouri River Runner	St. Louis - Jefferson City - Kansas City, MO	90%	45%	94.5% on Union Pacific 5.0% on Kansas City Terminal 0.5% on Terminal Railroad Assn. Of St. Louis (TRRA)	22%	94.9% on Union Pacific 3.1% on Kansas City Terminal 2.0% on Terminal Railroad Assn. Of St. Louis (TRRA)	16%	93.0% on Union Pacific 7.0% on Kansas City Terminal
Northeast Regional	Boston - Providence / Springfield - Hartford - New York - Washington, DC - Lynchburg / Richmond - Petersburg - Norfolk / Newport News - Virginia Beach	82%	33%		30%		9%	
Pacific Surfliner	San Luis Obispo - Santa Barbara - Los Angeles - San Diego	71%	38%		19%		24%	
Pennsylvanian	New York - Pittsburgh	90%	49%		19%		10%	
San Joaquins	San Francisco Bay Area / Sacramento - Bakersfield / Southern California	66%	54%		22%		8%	
Silver Service / Palmetto	New York - Washington, DC - Charleston - Savannah - Jacksonville - Orlando - Tampa / Miami	51%	45%		30%		9%	
Southwest Chief	Chicago - Albuquerque - Los Angeles	67%	28%	81.8% on BNSF Railway Company 16.3% on New Mexico D.O.T. 1.6% on Kansas City Terminal	24%	71.4% on BNSF Railway Company 27.2% on New Mexico D.O.T. 1.0% on S.C.R.R.A. (Moorpark to LAX)	22%	64.8% on BNSF Railway Company 25.1% on Kansas City Terminal 9.9% on New Mexico D.O.T.
Sunset Limited	New Orleans - San Antonio - Los Angeles	65%	47%	97.8% on Union Pacific 0.8% on BNSF Railway Company 0.8% on S.C.R.R.A. (Moorpark to LAX)	23%	83.4% on Union Pacific 11.4% on BNSF Railway Company 3.4% on S.C.R.R.A. (Moorpark to LAX)	15%	96.6% on Union Pacific 2.2% on S.C.R.R.A. (Moorpark to LAX) 1.2% on BNSF Railway Company
Texas Eagle	Chicago - St. Louis - Dallas - San Antonio - (Los Angeles)	73%	31%	85.2% on Union Pacific 5.8% on Trinity Rail Express 3.9% on CN - IC (Former GTW and IC)	24%	83.2% on Union Pacific 11.9% on BNSF Railway Company 2.9% on CN - IC (Former GTW and IC)	24%	4.0% on Union Pacific 17.5% on Terminal Railroad Assn. Of St. Louis (TRRA) 9.4% on BNSF Railway Company
Vermonter	St. Albans - Burlington - Springfield - New York - Washington, DC	77%	10%		43%		19%	
Average		**70%**	**41%**		**25%**		**14%**	
Average without NorthEast Routes		**69%**	**42%**		**22%**		**15%**	
Average only for Long-distance routes		56%	43%		22%		15%	
Average only for Long-distance routes without NE routes		56%	40%		21%		17%	

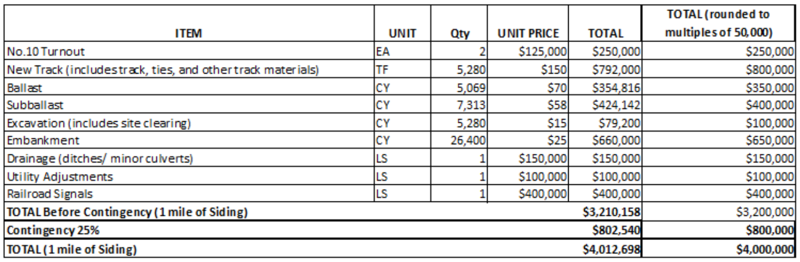
Note: Table created with data from https://www.amtrak.com/historical-on-time-performance, page visited on May 2017

Dallas/Fort Worth to Meridian Passenger Rail Study

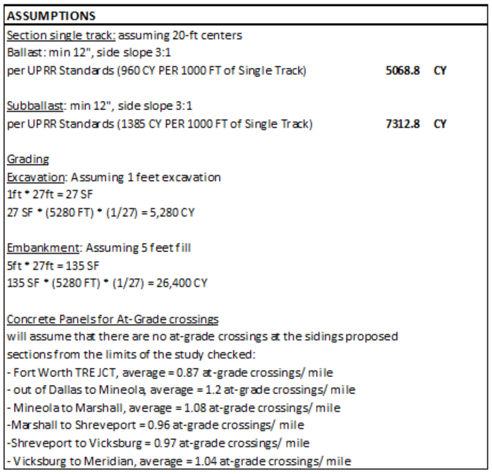
Appendix E: Order of Magnitude Construction Cost Estimates

TxDOT Rail Division
I-20 Corridor Council

Order of Magnitude Construction Costs for 1 mile of Siding



ITEM	UNIT	Qty	UNIT PRICE	TOTAL	TOTAL (rounded to multiples of 50,000)
No.10 Turnout	EA	2	$125,000	$250,000	$250,000
New Track (includes track, ties, and other track materials)	TF	5,280	$150	$792,000	$800,000
Ballast	CY	5,069	$70	$354,816	$350,000
Subballast	CY	7,313	$58	$424,142	$400,000
Excavation (includes site clearing)	CY	5,280	$15	$79,200	$100,000
Embankment	CY	26,400	$25	$660,000	$650,000
Drainage (ditches/ minor culverts)	LS	1	$150,000	$150,000	$150,000
Utility Adjustments	LS	1	$100,000	$100,000	$100,000
Railroad Signals	LS	1	$400,000	$400,000	$400,000
TOTAL Before Contingency (1 mile of Siding)				**$3,210,158**	$3,200,000
Contingency 25%				**$802,540**	**$800,000**
TOTAL (1 mile of Siding)				**$4,012,698**	**$4,000,000**



ASSUMPTIONS

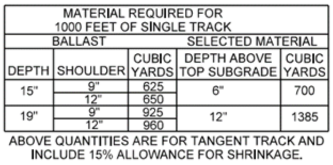
Section single track: assuming 20-ft centers
Ballast: min 12", side slope 3:1
per UPRR Standards (960 CY PER 1000 FT of Single Track) **5068.8 CY**

Subballast: min 12", side slope 3:1
per UPRR Standards (1385 CY PER 1000 FT of Single Track) **7312.8 CY**

Grading
Excavation: Assuming 1 feet excavation
1ft * 27ft = 27 SF
27 SF * (5280 FT) * (1/27) = 5,280 CY

Embankment: Assuming 5 feet fill
5ft * 27ft = 135 SF
135 SF * (5280 FT) * (1/27) = 26,400 CY

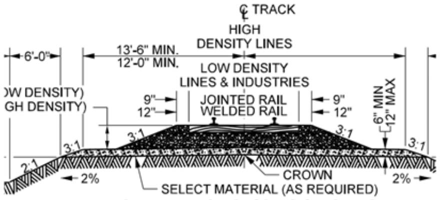
Concrete Panels for At-Grade crossings
will assume that there are no at-grade crossings at the sidings proposed
sections from the limits of the study checked:
- Fort Worth TRE JCT, average = 0.87 at-grade crossings/ mile
- out of Dallas to Mineola, average = 1.2 at-grade crossings/ mile
- Mineola to Marshall, average = 1.08 at-grade crossings/ mile
-Marshall to Shreveport = 0.96 at-grade crossings/ mile
-Shreveport to Vicksburg = 0.97 at-grade crossings/ mile
- Vicksburg to Meridian, average = 1.04 at-grade crossings/ mile



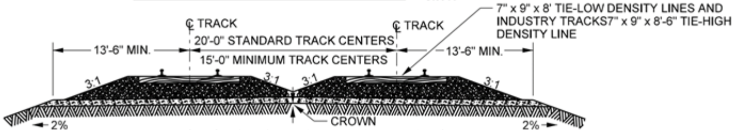
MATERIAL REQUIRED FOR 1000 FEET OF SINGLE TRACK				
BALLAST			SELECTED MATERIAL	
DEPTH	SHOULDER	CUBIC YARDS	DEPTH ABOVE TOP SUBGRADE	CUBIC YARDS
15"	9"	625	6"	700
	12"	650		
19"	9"	925	12"	1385
	12"	960		

ABOVE QUANTITIES ARE FOR TANGENT TRACK AND INCLUDE 15% ALLOWANCE FOR SHRINKAGE.

Roadbed Section for Wood Tie Track Construction - 0001C



ROADBED SECTIONS IN CUTS



BALLAST SECTION FOR TWO TRACKS

Order of Magnitude Construction Costs by station

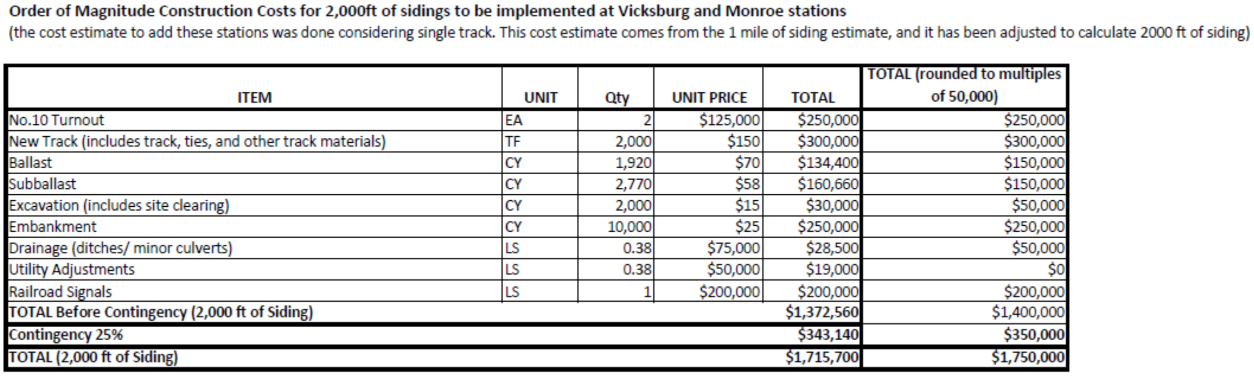
PROPOSED STATION	UNIT	Qty	UNIT PRICE	TOTAL
Shreveport/ Bossier City	EA	1	$1,180,000	$1,180,000
Ruston	EA	1	$850,000	$850,000
Monroe	EA	1	$2,100,000	$2,100,000
Vicksburg	EA	1	$2,570,000	$2,570,000
Jackson	EA	1	$800,000	$800,000
TOTAL				$7,500,000

Assumptions:

-2,000 ft of siding will be added at Vicksburg and Monroe Stations

-Order of magnitude construction costs and assumptions for the other stations have been gathered from the North Louisiana Passenger Rail Feasibility Study: Shreveport – Vicksburg, 2015. Northwest Lousiana Council of Governments.

Order of Magnitude Construction Costs for 2,000 ft sidings at Vicksburg and Monroe stations

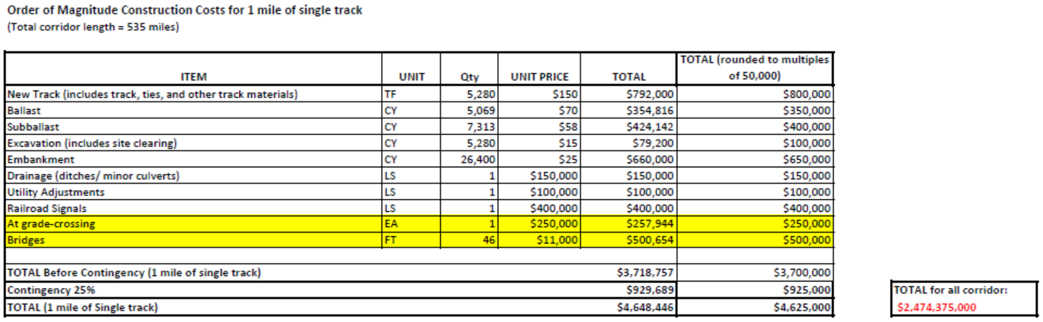


Order of Magnitude Construction Costs for 2,000ft of sidings to be implemented at Vicksburg and Monroe stations

(the cost estimate to add these stations was done considering single track. This cost estimate comes from the 1 mile of siding estimate, and it has been adjusted to calculate 2000 ft of siding)

ITEM	UNIT	Qty	UNIT PRICE	TOTAL	TOTAL (rounded to multiples of 50,000)
No.10 Turnout	EA	2	$125,000	$250,000	$250,000
New Track (includes track, ties, and other track materials)	TF	2,000	$150	$300,000	$300,000
Ballast	CY	1,920	$70	$134,400	$150,000
Subballast	CY	2,770	$58	$160,660	$150,000
Excavation (includes site clearing)	CY	2,000	$15	$30,000	$50,000
Embankment	CY	10,000	$25	$250,000	$250,000
Drainage (ditches/ minor culverts)	LS	0.38	$75,000	$28,500	$50,000
Utility Adjustments	LS	0.38	$50,000	$19,000	$0
Railroad Signals	LS	1	$200,000	$200,000	$200,000
TOTAL Before Contingency (2,000 ft of Siding)				**$1,372,560**	**$1,400,000**
Contingency 25%				**$343,140**	**$350,000**
TOTAL (2,000 ft of Siding)				**$1,715,700**	**$1,750,000**

Order of Magnitude Construction Costs for 1 mile of single track

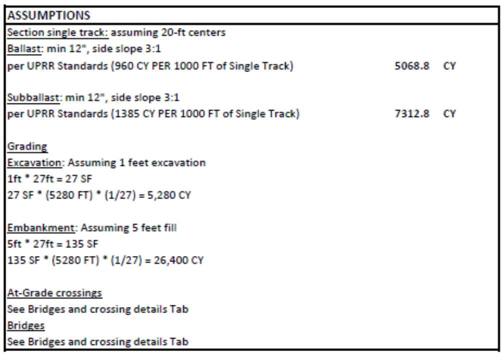


Order of Magnitude Construction Costs for 1 mile of single track

(Total corridor length = 535 miles)

ITEM	UNIT	Qty	UNIT PRICE	TOTAL	TOTAL (rounded to multiples of 50,000)
New Track (includes track, ties, and other track materials)	TF	5,280	$150	$792,000	$800,000
Ballast	CY	5,069	$70	$354,816	$350,000
Subballast	CY	7,313	$58	$424,142	$400,000
Excavation (includes site clearing)	CY	5,280	$15	$79,200	$100,000
Embankment	CY	26,400	$25	$660,000	$650,000
Drainage (ditches/ minor culverts)	LS	1	$150,000	$150,000	$150,000
Utility Adjustments	LS	1	$100,000	$100,000	$100,000
Railroad Signals	LS	1	$400,000	$400,000	$400,000
At grade-crossing	EA	1	$250,000	$257,944	$250,000
Bridges	FT	46	$11,000	$500,654	$500,000
TOTAL Before Contingency (1 mile of single track)				$3,718,757	$3,700,000
Contingency 25%				$929,689	$925,000
TOTAL (1 mile of Single track)				$4,648,446	$4,625,000

TOTAL for all corridor:
$2,474,375,000



ASSUMPTIONS

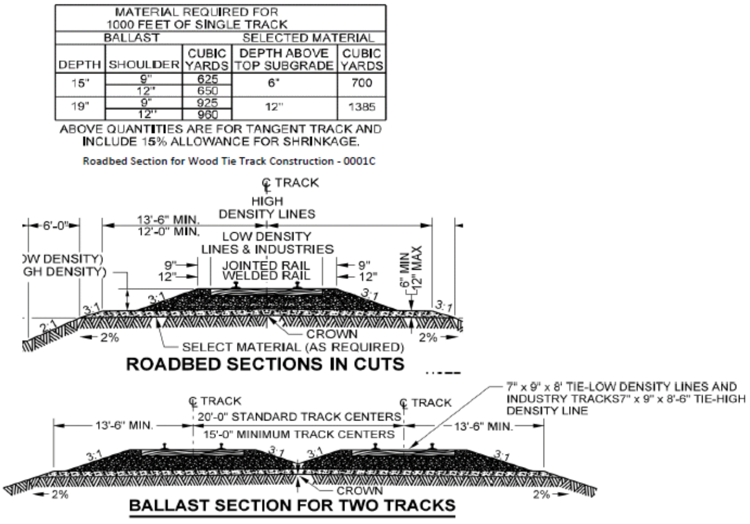
Section single track: assuming 20-ft centers
Ballast: min 12", side slope 3:1
per UPRR Standards (960 CY PER 1000 FT of Single Track) 5068.8 CY

Subballast: min 12", side slope 3:1
per UPRR Standards (1385 CY PER 1000 FT of Single Track) 7312.8 CY

Grading
Excavation: Assuming 1 feet excavation
1ft * 27ft = 27 SF
27 SF * (5280 FT) * (1/27) = 5,280 CY

Embankment: Assuming 5 feet fill
5ft * 27ft = 135 SF
135 SF * (5280 FT) * (1/27) = 26,400 CY

At-Grade crossings
See Bridges and crossing details Tab
Bridges
See Bridges and crossing details Tab



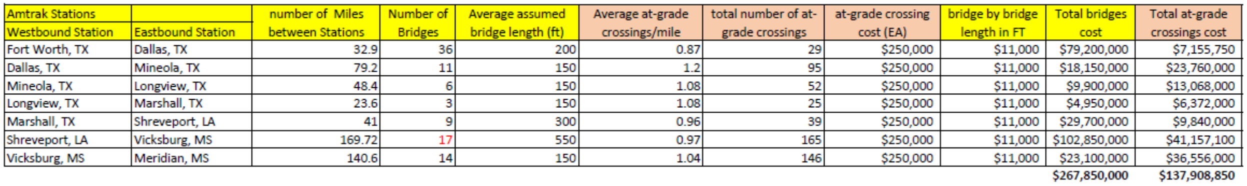
MATERIAL REQUIRED FOR 1000 FEET OF SINGLE TRACK

BALLAST			SELECTED MATERIAL	
DEPTH	SHOULDER	CUBIC YARDS	DEPTH ABOVE TOP SUBGRADE	CUBIC YARDS
15"	9"	625	6"	700
	12"	650		
19"	9"	925	12"	1385
	12"	960		

ABOVE QUANTITIES ARE FOR TANGENT TRACK AND INCLUDE 15% ALLOWANCE FOR SHRINKAGE.

Roadbed Section for Wood Tie Track Construction - 0001C

Order of Magnitude Construction Costs for 1 mile of single track (continuation)



Amtrak Stations Westbound Station	 Eastbound Station	number of Miles between Stations	Number of Bridges	Average assumed bridge length (ft)	Average at-grade crossings/mile	total number of at-grade crossings	at-grade crossing cost (EA)	bridge by bridge length in FT	Total bridges cost	Total at-grade crossings cost
Fort Worth, TX	Dallas, TX	32.9	36	200	0.87	29	$250,000	$11,000	$79,200,000	$7,155,750
Dallas, TX	Mineola, TX	79.2	11	150	1.2	95	$250,000	$11,000	$18,150,000	$23,760,000
Mineola, TX	Longview, TX	48.4	6	150	1.08	52	$250,000	$11,000	$9,900,000	$13,068,000
Longview, TX	Marshall, TX	23.6	3	150	1.08	25	$250,000	$11,000	$4,950,000	$6,372,000
Marshall, TX	Shreveport, LA	41	9	300	0.96	39	$250,000	$11,000	$29,700,000	$9,840,000
Shreveport, LA	Vicksburg, MS	169.72	17	550	0.97	165	$250,000	$11,000	$102,850,000	$41,157,100
Vicksburg, MS	Meridian, MS	140.6	14	150	1.04	146	$250,000	$11,000	$23,100,000	$36,556,000
									$267,850,000	**$137,908,850**

item #	Description	Unit	Unit cost (2017 dollars)

Dallas/Fort Worth to Meridian Passenger Rail Study

Appendix F: Data by Grade Crossing

TxDOT Rail Division
I-20 Corridor Council

Track Chart Data (Amtrak Routes)

Amtrak Stations		Train Counts (per day) (average)			Mainlines					
Westbound Station	Eastbound Station	Number of Freight trains	Number of Passenger Trains	Total Number of Trains	Total number of Main Lanes	Percentage of trains running from 6am to 6pm	segments with 2 mainlines - checked with google maps 2017 view	Treatment of double track for number of miles between passing siding calculation	number of Passing Sidings 2017 - checked with google maps 2017 view (>8,000 ft)	# Miles between Stations
Fort Worth, TX	Cleburne, TX	26	0	26	1.0	50%	2 ML MP 346 for 7,500 ft; 1.4 miles	Will ignore this DT segment and not include it in the segment limits. Segment limits for sidings distances: MP66 - MP81.5	1	28.5
Cleburne, TX	McGregor, TX	25	0	25	1.0	50%			6	74.7
McGregor, TX	Temple, TX	26	0	26	1.0	50%			4	24.7
Temple, TX	Taylor, TX	6	2	8	1.0	50%			2	38.1
Taylor, TX	Austin, TX	18	2	20	1.0	50%			2	35
Austin, TX	San Marcos, TX	18	2	20	1.0	50%			1	33
San Marcos, TX	San Antonio, TX	27	1.7	29	1.0	50%			2	47.1
San Antonio, TX	Del Rio, TX	21	0	21	1.0	50%			16	170.1
Del Rio, TX	Sanderson, TX	10	0	10	1.0	50%			13	126.8
Slidell, LA	Picayune, MS	11.3	0	11.3	1.0	39%			1	18.3
Picayune, MS	Hattiesburg, MS	12.6	0.08	12.6	1.0	44%			2	63.7
Hattiesburg, MS	Laurel, MS	12.0	0.3	12.3	1.0	40%			2	28.9
Laurel, MS	Meridian, MS	11.6	0.7	12.3	1.0	43%			2	56.4
Meridian, MS	Tuscaloosa, AL	21.3	0.5	21.8	1.1	52%	2 ML MP 295-292.7: 2.3 miles	will count it as a siding	5	96.6
Tuscaloosa, AL	Birmingham, AL	26.7	0.1	26.8	1.7	44%	2 ML MP 156-143: 13 miles	Will ignore this DT segment and not include it in the segment limits. Segment limits for sidings distances: MP66 - MP81.5	3	55.4
Birmingham, AL	Anniston, AL	26.8	0.0	26.8	1.1	48%	2 ML MP 787.6-791.7: 4.1 miles	will count it as a siding, but subtract 0.6 miles to the total	7	64.2
Anniston, AL	Atlanta, GA	26.9	1.3	28.2	1.1	51%			7	101.7
Atlanta, GA	Gainesville, GA	26.7	1.2	27.8	1.6	79%	2 ML MP 633.3-584.6	Will ignore this DT segment and not include it in the passings sidings segment limits	0	48.7
Gainesville, GA	Toccoa, GA	25.7	2.0	27.7	1.5	68%	2 ML MP 584.6-547.3	Will ignore this DT segment and not include it in the passings sidings segment limits	0	37.3
Toccoa, GA	Clemson, SC	25.6	2.0	27.6	1.8	64%	2 ML MP 547.3-514.2	Will ignore this DT segment and not include it in the passings sidings segment limits	0	33.1
Clemson, SC	Greenville, SC	23.5	2.0	25.5	1.6	55%	2 ML MP 514.2-484.1	Will ignore this DT segment and not include it in the passings sidings segment limits	0	30.1
San Antonio, TX	Houston, TX	24.2	0.0	24.2	1.2	50%	2ML MP 0.1-18.7: 18.6 miles & 2ML MP 210.8-197.14: 13.7 miles	Will ignore both segments and subtrat their length to the total segment of analysis	17	209.2
Houston, TX	Beaumont, TX	20.9	0.5	21.4	1.0	51%	2ML MP 375.6-353: 22.6 mi, & MP 351.1-346.5:4.6 mi & MP 280.1-282.2: 2.1 mi	will ignore first and last segments of DT (363-353 and 280.1-282.2) and subtract 10 miles and 2.1 miles to the total. The segment of 4.6 mi will count as a siding, but will subtract 1.1 miles to the total	5	82.9
Beaumont, TX	Lake Charles, LA	19.0	0.4	19.4	1.0	50%	MP 280.1 - 278.6: 1.5 mi	Will ignore this DT segment. It is less than 8,000 ft	5	61.5
Lake Charles, LA	Lafayette, LA	16.4	1.9	18.3	1.0	50%			3	74.1
Lafayette, LA	New Iberia, TX	12.0	2.0	13.9	1.0	50%			2	18
New Iberia, TX	Schriever, TX	12.0	2.0	14.0	1.0	50%			3	71.5
Schriever, TX	New Orleans, LA	11.6	1.8	13.4	1.1	50%			2	44.5

Track Chart Data (Amtrak Routes) - Continuation

			Milepost	Milepost	Railroad	Track Class	Track Class						
number of Miles between Passing Siding adjusted dedcucting 2 mainline segments	Amtrak route	number of passenger trains shown on Amtrak schedules	FROM	TO		using max passenger speed including slow speed	using max freight speed from timetables for all segment, not including slow speed restrictions	Operation type	total miles	sidings length	2 mainlines	Double Track percentage	
27.1	Texas Eagle	2	346	317.5	BNSF - Ft. Worth Subdivisio	4	4	CTC		5.7	0.00		19.8%
12.5	Texas Eagle	2	317.5	242.8	BNSF - Ft. Worth Subdivisio	4	4	CTC		13.7			18.4%
6.2	Texas Eagle	2	242.8	218.1	BNSF - Ft. Worth Subdivisio	4	4	CTC		7.7			31.0%
19.1	Texas Eagle	2	918.9	880.8	UP Waco Subdivision	4	4	ABS		4.6			12.1%
17.5	Texas Eagle	2	144	179	UP Austin Subdivision	4	4	CTC		6.5			18.6%
33.0	Texas Eagle	2	179	212	UP Austin Subdivision	3.5	4	CTC		5.4			16.4%
23.6	Texas Eagle	2	212	259.1	UP Austin Subdivision	3	4	CTC		6.4			13.6%
10.6	Sunset Limited	0 (6/week)	209.3	379.4	UP Del Rio subdivision	4	5	CTC		25.8			15.2%
9.8	Sunset Limited	0 (6/week)	379.4	506.2	UP Sanderson Subdivision	4	5	CTC	578	22.1		**16.9%**	17.4%
18.3	Crescent	2	167.3	149	NS - Norfolk Southern	3.5	4	CTC		2.7			14.9%
31.9	Crescent	2	149	85.3	NS - Norfolk Southern	4	4	CTC		8.4			13.2%
14.5	Crescent	2	85.3	56.4	NS - Norfolk Southern	3	4	CTC		4.2			14.6%
28.2	Crescent	2	56.4	0	NS - Norfolk Southern	4	4	CTC		5.6			9.9%
16.1	Crescent	2	295	198.4	NS - Norfolk Southern	4	4	CTC		16.4	2.3		19.4%
14.1	Crescent	2	198.4	143	NS - Norfolk Southern	4	4	CTC		6.9	13		35.9%
8.0	Crescent	2	143	735	NS - Norfolk Southern	4	4	CTC		13.8	4.1		3.0%
14.5	Crescent	2	735	633.3	NS - Norfolk Southern	4	4	CTC		18.5			18.2%
N/A	Crescent	2	633.3	584.6	NS - Norfolk Southern	4	4	CTC			48.7		100.0%
N/A	Crescent	2	584.6	547.3	NS - Norfolk Southern	3	4	CTC			37.3		100.0%
N/A	Crescent	2	547.3	514.2	NS - Norfolk Southern	3	4	CTC			33.1		100.0%
N/A	Crescent	2	514.2	484.1	NS - Norfolk Southern	3	4	CTC	1162.2		30.1	**21.1%**	100.0%
10.4	Sunset Limited	0 (6/week)	209.3	0.1	UP - Del Rio, Glidden & Terminal Subdivision	4	4	CTC		35.4	32.26004		32.4%
11.6	Sunset Limited	0 (6/week)	363	280.1	UP-Lafayette subdivision	4	4	CTC		13.3	16.7		36.2%
10.3	Sunset Limited	0 (6/week)	280.1	218.6	UP-Lafayette subdivision	4	5	CTC		11.8	0		19.2%
24.7	Sunset Limited	0 (6/week)	218.6	144.5	UP & BNSF - Lafayette Subd	4	4	ABS		5.6			7.6%
9.0	Sunset Limited	0 (6/week)	144.5	126.5	BNSF-Lafayette Subdivision	4	4	ABS		4.3			23.9%
23.8	Sunset Limited	0 (6/week)	126.5	55	BNSF-Lafayette Subdivision	4	4	ABS		7.1			9.9%
22.3	Sunset Limited	0 (6/week)	55	10.5	BNSF	4	4	ABS	561.7	3.9		**23.2%**	8.8%

Track Chart Data (Dallas to Meridian)

Amtrak Stations		Train Counts (per day) (avg)				Mainlines			
Westbound Station	Eastbound Station	Number of Freight Trains	Number of Passenger Trains	Total Number of Trains	Percentage of trains running from 6am to 6pm	Number of Mainlines	segments with 2 mainlines	Treatment of double track for number of miles between passing siding calculation	miles of double mainline (including only segments longer than 8,000 feet)
Fort Worth, TX	Dallas, TX	28	48	76	66%	1.0	2 ML MP 642-642.6: 0.6 miles	Will ignore it	5.2
							2 ML MP 634.4-637.5: 3.1 miles	Will count it as a siding	
							2 ML 627.6 - 625.5: 2.1 miles	Will count it as a siding	
Dallas, TX	Mineola, TX	22	2	24	50%	1.0	2 ML MP 210.7 - 214.51: 3.8 miles	Given that it is at the beginning of the segment, will ignore it and subtrat the length to the total segment limits. Segment limits for sidings distances: MP210.7 - MP138	3.8
Mineola, TX	Longview, TX	18	2	20	50%	1.0	2 ML MP 89.6-89.8: 0.2 miles	Will ignore it	0.0
Longview, TX	Marshall, TX	40	2	42	50%	1.0	2 ML MP 81.5-89.6: 8.1 miles	Will ignore this DT segment and not include it in the segment limits. Segment limits for sidings distances: MP66 - MP81.5	8.1
Marshall, TX	Shreveport, LA	15	0	15	50%	1.0			0.0
Shreveport, LA	Vicksburg, MS	20	0	20	50%	1.0			0.0
Vicksburg, MS	Meridian, MS	20	0	20	49%	1.0	2 ML MP 90.2-94.1: 3.9 miles	will count it as a siding but will subtract 0.4 miles to the total segment length	3.9

Track Chart Data (Dallas to Meridian) - Continuation

								Milepos	Milepost	Railroad
number of Passing Sidings	number of miles of passing sidings 8,000 feet or longer	number of Passing Sidings corrected with double track data	number of Miles between Stations	# Miles/ # Passing Siding (using corrections with Double track data for number of passing sidings and segment length)	double track percentage (including DT segments and passing sidings length)	Amtrak route	number of passenger trains shown on Amtrak schedules	FROM	TO	
0	0	2	32.9	**16.5**	**16%**	Texas Eagle	2	644.3	611.4	TRE - DFW Subdivision
8	18.69	8	79.2	**9.4**	**28%**	Texas Eagle	2	214.5	138	UPRR - Dallas/ Mineola Sub.
5	9.63	5	48.4	**9.7**	**20%**	Texas Eagle	2	138	89.6	UPRR - Mineola Subdivision
2	3.2	2	23.6	**7.8**	**48%**	Texas Eagle	2	89.6	66	UPRR - Little Rock Subdivision
3	6.45	3	41.0	**13.7**	**16%**	N/A	0	310.4	351.4	UPRR - Reisor Subdivision
10	21.46	10	169.7	**17.0**	**13%**	N/A	0	169.72	0	KCS Vicksburg Subdivision
10	22.04	11	140.6	**12.7**	**18%**	N/A	0	140.6	0	KCS Meridian Subdivision

Research in DOT Grade Crossing Inventory Forms (Freight Routes)

DOT number	Railroad	Potential Amtrak Station		Train Counts			Count Year	Maximum Freight Speed	Total Day Thru Trains	Total Night Thru Trains	Percentage of Trains Running from 6AM to 6PM	Comments	Milepost
		Westbound Station	Eastbound Station	Number of Freight Trains	Number of Passenger Trains	Total Number of Trains			6AM to 6PM	6PM to 6AM			
						TEXAS							
920989M	TRE	Fort Worth, TX	Dallas, TX	24	48	72	2016	20	46	26	64%	8th St	611.49
920988F	TRE	Fort Worth, TX	Dallas, TX	24	48	72	2016	20				7th St	611.55
598336A	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	60				Judkins St	612.9
598338N	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	60				Riverside Dr	613.17
598341W	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	60				Beach St	614.15
598342D	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79				Haltom Rd	615.17
598343K	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79				Elliot Reeder Rd	615.47
598344S	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79				Carson St	616.23
598345Y	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79	48	29	62%	Minnis Dr	617.03
598347M	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79				Hadley Ederville Rd	618.53
598350V	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79				Precinct Line Rd	620.67
598351C	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79				Norwood Dr	621.73
598353R	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79				Bell Spur	622.43
598359G	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79				Mosier Valley Rd	625.57
598361H	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79				Calloway Cemetary Rd	626.33
598363W	TRE	Fort Worth, TX	Dallas, TX	28	48	76	2016	79				Tarrant Main St	627.2
597730Y	TRE	Fort Worth, TX	Dallas, TX	43	48	91	2016	79	58	33	64%	Valley View Ln	629.87
597735H	TRE	Fort Worth, TX	Dallas, TX	31	48	79	2016	79				Gilbert Rd	631.53
597739K	TRE	Fort Worth, TX	Dallas, TX	25	48	73	2016	79				Irby Ln	633.53
597740E	TRE	Fort Worth, TX	Dallas, TX	25	48	73	2016	79				Rogers Rd	633.8
597743A	TRE	Fort Worth, TX	Dallas, TX	25	48	73	2016	79				MacArthur Blvd	633.98
597746V	TRE	Fort Worth, TX	Dallas, TX	22	48	70	2016	79	50	20	71%	Britain Rd	635.02
597747C	TRE	Fort Worth, TX	Dallas, TX	22	48	70	2016	79				Nursery Rd	635.47
597748J	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79	53	24	69%	Irving Heights Dr	636
597751S	TRE	Fort Worth, TX	Dallas, TX	29	48	77	2016	79				Wildwood Dr	636.5
597754M	TRE	Fort Worth, TX	Dallas, TX	26	48	74	2016	79				Norwood Rd	638.1
597759W	TRE	Fort Worth, TX	Dallas, TX	30	48	78	2016	79	53	25	68%	Market Center Blvd	641.66
763658S	UP	Dallas, TX	Mineola, TX	38	2	40	2017	40	20	20	50%	Forrest Ave, Dallas (Downtown)	212.34
763660T	UP	Dallas, TX	Mineola, TX	38	2	40	2017	40				Lenway St	
763662G	UP	Dallas, TX	Mineola, TX	38	2	40	2017	40				private crossing in Dallas	211.47
763657K	UP	Dallas, TX	Mineola, TX	32	0	32	2017	30				Lamar St (Wye Connection)	210.4
765866A	UP	Dallas, TX	Mineola, TX	28	0	28	2017	40				Sunday Street	212.76
765861R	UP	Dallas, TX	Mineola, TX	28	0	28	2017	40				Macon St (Residential)	212.02
794844D	UP	Dallas, TX	Mineola, TX	29	2	31	2017	70	15	14	52%	Jim Miller Rd	208.06
794833R	UP	Dallas, TX	Mineola, TX	29	2	31	2017	79				Prairie Creek Rd/Big Town Blvd	
794832J	UP	Dallas, TX	Mineola, TX	29	2	31	2017	79				Sam Houston Rd	205.72
794827M	UP	Dallas, TX	Mineola, TX	20	2	22	2017	45				Gross St, Mesquite	
794825Y	UP	Dallas, TX	Mineola, TX	20	2	22	2017	45				Ebrite ST	
794823K	UP	Dallas, TX	Mineola, TX	20	2	22	2017	45				Galloway Ave	
794822D	UP	Dallas, TX	Mineola, TX	20	2	22	2017	45				Florence St	
794821W	UP	Dallas, TX	Mineola, TX	20	2	22	2017	45				Municipal Service Center Rd	
794818N	UP	Dallas, TX	Mineola, TX	20	2	22	2017	70				Clay Rd	
794809P	UP	Dallas, TX	Mineola, TX	26	2	28	2017	70				Larkin Rd	
794806U	UP	Dallas, TX	Mineola, TX	20	2	22	2017	70				Lawson Rd	
794805M	UP	Dallas, TX	Mineola, TX	20	2	22	2017	50				FM 740/Bois Darc, Forney	
794804F	UP	Dallas, TX	Mineola, TX	20	2	22	2017	50				Elm St	
794803Y	UP	Dallas, TX	Mineola, TX	20	2	22	2017	50				Center St	
794802S	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Chestnut St	
794797X	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79	10	10	50%	CR 212	
794794C	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR211/Helms Trail, Terrell	
794793V	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 238	
748507P	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Metrocrest Way	
794788Y	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Metro Dr	
794785D	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				FM 148	
794784W	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Bradshaw St	
794783P	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Bowser St	
794782H	UP	Dallas, TX	Mineola, TX	20	2	22	2017	70				Ann St	
794780U	UP	Dallas, TX	Mineola, TX	20	2	22	2017	70				Rockwall St	
794779A	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Francis St	
794778T	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Catherine St	
794776E	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Adelaide St	
794775X	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Virginia St/SH 34	
794774R	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Delphine St	
794768M	UP	Dallas, TX	Mineola, TX	20	2	22	2017	10				Gardner St	
794767F	UP	Dallas, TX	Mineola, TX	20	2	22	2017	10				Burch St	
794765S	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				FM 429	
794762W	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 309	
794760H	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 352, Elmo	
794759N	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				FM 2728	
794758G	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 351	
794757A	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Estate Ln/CR 362	
794756T	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 350	
794753X	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 348, Wills Point	
794752R	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 3806	
794749H	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79	10	10	50%	CR 3805	
794748B	UP	Dallas, TX	Mineola, TX	20	2	22	2017	50				Mary St	
794747U	UP	Dallas, TX	Mineola, TX	20	2	22	2017	50				5th St	
794746M	UP	Dallas, TX	Mineola, TX	20	2	22	2017	50				FM 47/4th St	
794745F	UP	Dallas, TX	Mineola, TX	20	2	22	2017	50				Ash Ln	
794744Y	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 3523	
794740W	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CD 3525, Edgewood	
794739C	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 3504/CR 3505	
794738V	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				Main St	
794737N	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				FM 859/Houston St	
794731X	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 1129, Fruitvale	
794730R	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 1110/Lawrence, Grand Saline	
794728P	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 1128	
794727H	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 1816	
794726B	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79				CR 1818	

Research in DOT Grade Crossing Inventory Forms (Freight Routes) - Continuation

DOT number	Railroad	Potential Amtrak Station		Train Counts			Count Year	Maximum Freight Speed	Total Day Thru Trains	Total Night Thru Trains	Percentage of Trains Running from 6AM to 6PM	Comments	Milepost
		Westbound Station	Eastbound Station	Number of Freight Trains	Number of Passenger Trains	Total Number of Trains			6AM to 6PM	6PM to 6AM			
							TEXAS						
794721S	UP	Dallas, TX	Mineola, TX	20	2	22	2017	10				Houston St	
794720K	UP	Dallas, TX	Mineola, TX	20	2	22	2017	10				Main St/SH 110	
794719R	UP	Dallas, TX	Mineola, TX	20	2	22	2017	79	10	10	50%	FM 857	148.61
794716V	UP	Mineola, TX	Longview, TX	20	2	22	2017	79	10	10	50%	FM 1255, Mineola	142.54
794714G	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				FM 1253	141.52
794712T	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				CR 2880	136.65
794711L	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				Cheek St	136.36
794710E	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				Stone St	
794708D	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				US 69/Pacific St	136.01
794706P	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				CR 2740	
794705H	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				CR 2745	
794704B	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				FM 2422	
794703U	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				Woodville Rd	
794702M	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				FM 1804	
794700Y	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				CR 2794	
794695E	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				CR 3390, Hawkins	
794693R	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				CR 3375	
794688U	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				FM 14/Beulah St	
794687M	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				Jeffrey St/Burton Dr	
794686F	UP	Mineola, TX	Longview, TX	20	2	22	2017	79				CR 3750	
794685Y	UP	Mineola, TX	Longview, TX	20	2	22	2017	79	10	10	50%	CR 3780, Big Sandy	
794678N	UP	Mineola, TX	Longview, TX	16	2	18	2017	30	8	8		Tyler St	
794674L	UP	Mineola, TX	Longview, TX	16	2	18	2017	79				CR/Water Tower Rd	
794665M	UP	Mineola, TX	Longview, TX	16	2	18	2017	79				CR/Juniper Rd, Gladewater	
794663Y	UP	Mineola, TX	Longview, TX	16	2	18	2017	79				Mesquite Rd	
794662S	UP	Mineola, TX	Longview, TX	16	2	18	2017	79				Rodeo Rd	
794659J	UP	Mineola, TX	Longview, TX	16	2	18	2017	79				Dean St	
794658C	UP	Mineola, TX	Longview, TX	16	2	18	2017	79				US 271/Main St	
794657V	UP	Mineola, TX	Longview, TX	16	2	18	2017	79				Center St	
794656N	UP	Mineola, TX	Longview, TX	16	2	18	2017	79				Broadway Ave	
794654A	UP	Mineola, TX	Longview, TX	16	2	18	2017	79				Locker Plant Rd	
794653T	UP	Mineola, TX	Longview, TX	16	2	18	2017	79				Cherokee Trace	
794651E	UP	Mineola, TX	Longview, TX	16	2	18	2017	79	8	8	50%	Camp Switch Rd	
794647P	UP	Mineola, TX	Longview, TX	16	2	18	2016	40				Fisher Rd, Longview	
794642F	UP	Mineola, TX	Longview, TX	16	2	18	2016	40				Premier Rd	
794640S	UP	Mineola, TX	Longview, TX	16	2	18	2016	40				Enterprise St	
794639X	UP	Mineola, TX	Longview, TX	16	2	18	2016	40				Ward Dr	
794638R	UP	Mineola, TX	Longview, TX	16	2	18	2016	40				Lake Lamond Rd	
794636C	UP	Mineola, TX	Longview, TX	16	2	18	2016	40				Horaney St	
794634N	UP	Mineola, TX	Longview, TX	16	2	18	2016	40				Center St	
794633G	UP	Mineola, TX	Longview, TX	16	2	18	2016	40	8	8	50%	Fredonia St	90.24
794627D	UP	Longview, TX	Marshall, TX	40	2	42	2016	60	20	20	50%	Industrial Dr	87.06
794625P	UP	Longview, TX	Marshall, TX	40	2	42	2016	65				Mason Springs Church Road/CR 3422	
794624H	UP	Longview, TX	Marshall, TX	40	2	42	2016	65				Shady Brook Ln	
794623B	UP	Longview, TX	Marshall, TX	40	2	42	2016	65				Lansing Switch Rd	
794622U	UP	Longview, TX	Marshall, TX	40	2	42	2016	65				CR 3426	
794620F	UP	Longview, TX	Marshall, TX	40	2	42	2016	65	20	20	50%	Branch St	
794619L	UP	Longview, TX	Marshall, TX	40	2	42	2016	65				FM 450/Central St	
794628E	UP	Longview, TX	Marshall, TX	40	2	42	2016	75				Cypress St	
794617X	UP	Longview, TX	Marshall, TX	40	2	42	2016	75				Stephens Rd/CR 3113, Woodlawn	
794615J	UP	Longview, TX	Marshall, TX	40	2	42	2016	75				Muntz Cutoff	
794610A	UP	Longview, TX	Marshall, TX	40	2	42	2016	60				Houston St, Marshall	
794590R	UP	Longview, TX	Marshall, TX	40	2	42	2016	45	20	20	50%	Evans St	67.31
794383W	UP	Marshall, TX	hreveport, L	12	0	12	2016	60	6	6	50%	FM 2199, Scottsville	343.52
794379G	UP	Marshall, TX	hreveport, L	12	0	12	2016	60				Akin Rd/CR 2703	
794376L	UP	Marshall, TX	hreveport, L	12	0	12	2016	60				Bellview Rd/CR 2729, Waskom	
794374X	UP	Marshall, TX	hreveport, L	12	0	12	2016	60				Jonesville Cut Off/Jones Ville Rd	335.34
794371C	UP	Marshall, TX	hreveport, L	12	0	12	2016	10				Mary Elizabeth Dr	
794370V	UP	Marshall, TX	hreveport, L	12	0	12	2016	60	8	4		Noble St	
794369B	UP	Marshall, TX	hreveport, L	12	0	12	2016	10				FM 9/Powell St	
794368U	UP	Marshall, TX	hreveport, L	12	0	12	2016	60				N Lake St	
794366F	UP	Marshall, TX	hreveport, L	12	0	12	2016	60	6	6	50%	ateline Club Rd/Stateline Rd, Greenwoo	329.93
794364S	UP	Marshall, TX	hreveport, L	12	0	12	2017	60				LA 169/Greenwood Morningsport Rd	
794363K	UP	Marshall, TX	hreveport, L	12	0	12	2016	60				McGee Rd/Cemetary Rd	
794359V	UP	Marshall, TX	hreveport, L	24	0	24	2016	60				Jefferson Paige Rd	324.69
794357G	UP	Marshall, TX	hreveport, L	24	0	24	2017	25	12	12	50%	LA 511/W 70th St	324.13
794347B	UP	Marshall, TX	hreveport, L	12	0	12	2016	50				Buncomp Rd, Shreveport	320.37
794345M	UP	Marshall, TX	hreveport, L	12	0	12	2016	50	6	6	50%	Pines Rd	319.12
440164E	UP	Marshall, TX	hreveport, L	12	0	12	2016	50				Campus Dr/South Shrevepark	318.11
794339J	UP	Marshall, TX	hreveport, L	12	0	12	2016	50				Meriwether Rd	316.71
794389M	UP	Marshall, TX	hreveport, L	20	0	20	2017	10	10	10	50%	LA511/W 70th St	0.51
794395R	UP	Marshall, TX	hreveport, L	20	0	20	2016	10				Corbitt St	2.47
794396X	UP	Marshall, TX	hreveport, L	20	0	20	2016	10				Malcolm St	
794398L	UP	Marshall, TX	hreveport, L	20	0	20	2016	10				Midway St	3.125
794399T	UP	Marshall, TX	hreveport, L	20	0	20	2016	10				Manfield Rd	
794400K	UP	Marshall, TX	hreveport, L	20	0	20	2016	10				Claibourne St	3.78
794401S	UP	Marshall, TX	hreveport, L	20	0	20	2017	10	10	10	50%	Levy Street	4.565
302643F	KCS	Shreveport, LA	Vicksburg, M	20	0	20	2017	59	10	10	50%	Benton Rd, Bossier	166.23
302641S	KCS	Shreveport, LA	Vicksburg, M	20	0	20	2016	59				Airline Dr	
302640K	KCS	Shreveport, LA	Vicksburg, M	20	0	20	2017	59				Old Minden Rd	
302639R	KCS	Shreveport, LA	Vicksburg, M	20	0	20	2016	59				Industrial Dr	
302637C	KCS	Shreveport, LA	Vicksburg, M	20	0	20	2016	59				Miller Rd	
302635N	KCS	Shreveport, LA	Vicksburg, M	20	0	20	2016	59				Bodcau	
302633A	KCS	Shreveport, LA	Vicksburg, M	20	0	20	2017	59				Elm St, Haughton	
302631L	KCS	Shreveport, LA	Vicksburg, M	20	0	20	2016	59				Myrtle St	
302624B	KCS	Shreveport, LA	Vicksburg, M	20	0	20	2016	59				Fuller St/LA 163, Doyline	
302623U	KCS	Shreveport, LA	Vicksburg, M	20	0	20	2016	59				Main St	
302622M	KCS	Shreveport, LA	Vicksburg, M	20	0	20	2016	59				Amos Cutoff Rd	

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		Westbound Station	Eastbound Station	Number of Freight Trains	Number of Passenger Trains	Total Number of Trains			6AM to 6PM	6PM to 6AM			
302619E	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Rd 143D/Mathes Rd	
302618X	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Rd 143C/Harvill Rd	
302617R	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Horseshoe Loop, Sibley	
302616J	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Horseshoe Loop	
302613N	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Natchitoches St	
302611A	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Alexander Dr, Dubberly	
302610T	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				LA 531	
302607K	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				LA 532	
302605W	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Stuckey Rd	
302604P	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Peachtree Rd	
302603H	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Par Road 359/Black Lake Rd	
302599V	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Oscar Kilpatrick, Gibsland	
302598N	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Slay Woodard Rd	
302591R	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Main St	
302589P	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				US 80	
302585M	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				W Oakley Rd/Par Rd 260, Arcadia	
302584F	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				E Oakley Rd/Par Rd 260	
302583Y	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Beech St	
302582S	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Maple St	
302580D	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Hazel St	
302578C	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Madden St	
302576N	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59	10	10	50%	Felts Rd	
302571E	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Par Rd 3/Walnut Creek Rd, Simsboro	
302568W	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Traylor Rd	
302565B	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Woodland Dr	
302564U	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Martha St	
302563M	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Rose St	
302562F	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				LA 563	
302561Y	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				LA 150	
302559X	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Par Rd 32/Igoe Inn Rd, Grambling	
302557J	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Main St	
302556C	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Rodgers Rd	
302554N	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				LA 818, Ruston	
302553G	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Maple St	
914658L	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Homer St	
302550L	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Monroe St	
302549S	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Trenton St	
302548K	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Vienna St	
302544H	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Bernard St	
302543B	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Santiam Rd	
302541M	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Par Rd 405/Hogan Rd, Choudrant	
302540F	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Elm St	
302538E	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				W Walker Rd	
302537X	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				E Walker Rd	
302536R	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Pleasant Grove Rd	
302535J	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Par Rd 48/Crocker Rd	
302534C	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Hummingbird Lane	
302532N	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Owens Rd	
302531G	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Beulah Rd	
302529F	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Calhoun Rd, Calhoun	
302528Y	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				LA 151	
302527S	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Golson Rd	
302526K	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Britton Rd	
302523P	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				cheNIERE Station	
302522H	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				cheNIERE Baptist Church Rd, West Monroe	
302521B	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Vancil Rd	
302520U	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Well Rd	
302519A	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Thomas Rd	
302527L	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Jonesboro Rd	
302514R	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				5th St	
302511V	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Riverfront St	
302510N	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Grand St, Monroe	
302507F	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Fourth St	
302506Y	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Fifth St	
302505S	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Desiard St	
302503D	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2016	59				Oak St	
302500H	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59	10	10	50%	US 165 Service Rd	
302498J	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Powell Ave	
302497C	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Kansas Ln	
302496V	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Chennault Park Rd	
302495N	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Millhaven Rd	
302492T	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Leon Rd	
302490E	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Magnolia Dr, Rayville	
302487W	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Venable Rd	
302486P	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Old River Rd	
302484B	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Gin Rd	
914663H	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Hayes St	
302483U	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Julia St	
302482M	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Louisa St	
302480Y	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Louisiana St	
302479E	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Linda St	
302475C	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Sumlin Ranch Road	
302474V	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				LA 583	
302473N	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Luther Stowe Rd	

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		Westbound Station	Eastbound Station	Number of Freight Trains	Number of Passenger Trains	Total Number of Trains	Count Year		6AM to 6PM	6PM to 6AM			
302472G	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Mengel Rd	
302468S	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				LA 183	
302464P	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Sammy Davis Rd, Delhi	
302463H	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				LA 609	
919269X	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Charlie Kie Rd	
302455R	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59	10	10	50%	Section Rd	
302453C	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Sapa Dr	
302451N	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Denver St	
302450G	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Chicago St	
302447Y	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Broadway St	
302445K	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Golf Dr	
302439G	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Lee Cornist Dr	
302438A	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				LA 577	
302437T	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Charles Brown Rd	
302427M	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Dickinson St, Tallulah	
302425Y	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Elm St	
302423K	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Chestnut St	
302422D	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Cedar St	
302421W	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Mulberry St	
302419V	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Kimbrough Blvd, Richmond	
302417G	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				LA 602	
302416A	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Barnes Crossing Rd	
302414L	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Mound Rd, Mound	
302413E	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				LA 602	
302412X	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				Letourneau Rd, Delta	
302408H	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59				US 80	
302406U	KCS	Shreveport, LA	Vicksburg, MS	20	0	20	2017	59	10	10	50%	Old US 80	0.07
302397X	KCS	Vicksburg, MS	Meridian, MS	22	0	22	2016	59	11	11	50%	Oak St, Vicksburg	139.77
302393V	KCS	Vicksburg, MS	Meridian, MS	22	0	22	2016	59				Court St	
302385D	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Paxton Rd	
302380U	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Silver Creek Dr	
302374R	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Bovina Dr	
302367F	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Smith Station Rd, Edwards	
302364K	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				MS 467/Mt Moriah Rd	
302362W	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Main St	
302357A	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Buck Reed Road	
302354E	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Farr Road, Bolton	
302345F	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Raymond Bolton Rd	
919242N	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				St Thomas Pkwy/Norrel Rd, Clinton	
302332E	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Industrial Park Dr	
302330R	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Monroe St	
302329W	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Leake St	
302328P	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Main St	
302327H	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Oakwood Dr	
302326B	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Lakeview Dr	
302324M	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59	10	10	50%	Lindale Dr	
302323F	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Parker Dr	
302321S	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Wickstead Dr	
302318J	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Westhaven Blvd, Jackson	
302317C	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Dixon Rd	
302315N	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Boling St	
302314G	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Ford Ave	
302313A	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Columbia Ave	
302312T	KCS	Vicksburg, MS	Meridian, MS	22	0	22	2016	59				Parkside Place	
302311L	KCS	Vicksburg, MS	Meridian, MS	22	0	22	2016	59				Prentiss St	
302348B	KCS	Vicksburg, MS	Meridian, MS	24	0	24	2016	59				West St	
302347U	KCS	Vicksburg, MS	Meridian, MS	24	0	24	2016	59				State St	
305145G	KCS	Vicksburg, MS	Meridian, MS	24	0	24	2016	59				Pearson Rd, Pearl	
305144A	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Deeb St	
305141E	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Lee Drive	
305139D	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				MS 468/Whitfield Rd	
914661U	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				MS 18, Brandon	
970269F	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Marquette Rd	
914654J	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2017	59				E Mark Dr	
305132F	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				MS 471/College St	
305130S	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59	10	10	50%	North St	
305128R	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Trickham Bridge Rd	
305127J	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Andrew Chapel Rd	
305124N	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Collier Rd, Pelahatchie	
305122A	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Gulde Shiloh Rd	
919262A	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Johnson Quarters Rd	
305117D	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				MS 43	
305116W	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Brooks St	
305115P	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Warren Ave	
305112U	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Purvis Rd	
305110F	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Noblin Bridge Rd	
305107X	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Morton-Rankin County Line Rd, Morton	
305106R	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				MS 13	
305104C	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				MS 481/Old Hwy 481	
305102N	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Morris Tullos Dr	
309251D	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				State St	
305097U	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Herring Rd	
305096M	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Kalem Rd	
305094Y	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Raworth Rd	
305092K	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				County Barn Rd, Forest	
305089C	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Main St	
305087N	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				1st Ave/First Ave	
305085A	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Cedar St	

Research in DOT Grade Crossing Inventory Forms (Freight Routes) - Continuation

DOT number	Railroad	Potential Amtrak Station		Train Counts			Count Year	Maximum Freight Speed	Total Day Thru Trains	Total Night Thru Trains	Percentage of Trains Running from 6AM to 6PM	Comments	Milepost
		Westbound Station	Eastbound Station	Number of Freight Trains	Number of Passenger Trains	Total Number of Trains			6AM to 6PM	6PM to 6AM			
305083L	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				VFW Rd, Lake	
305081X	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Little Italy Rd	
305079W	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59	10	10	50%	Wilkins St	
305077H	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Ponderosa Rd	
305071S	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Whitehead Rd	
305068J	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				MS 505, Newton	
305062T	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Lawrence Bethel Rd	
305056P	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Oak St	
305054B	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				School St	
305053U	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Main St	
305051F	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				3rd Ave/Third Ave	
305049E	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Roy Mann Rd	
305047R	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Potterchitto Rd, Hickory	
305046J	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				MS 503/Jefferson St	
3050445C	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Smede St	
305043N	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Buckley Rd	
305040T	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Chestnut St, Chunky	
305039Y	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Popular St/Poplar St	
305038S	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Pine Forest Rd	
305037K	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Pt Wanita Lake Rd	
305035W	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59				Meehan Savoy Rd	
305022V	KCS	Vicksburg, MS	Meridian, MS	20	0	20	2016	59	10	10	50%	65th Ave, Meridian	
725478S	NS	Vicksburg, MS	Meridian, MS	17	0	17	2015	59	8	9	47%	49th Ave	
305017Y	NS	Vicksburg, MS	Meridian, MS	16	0	16	2016	59	8	8	50%	Martin Luther King Blvd	
725472B	NS	Vicksburg, MS	Meridian, MS	31	0	31	2016	25	15	16	48%	11th St	

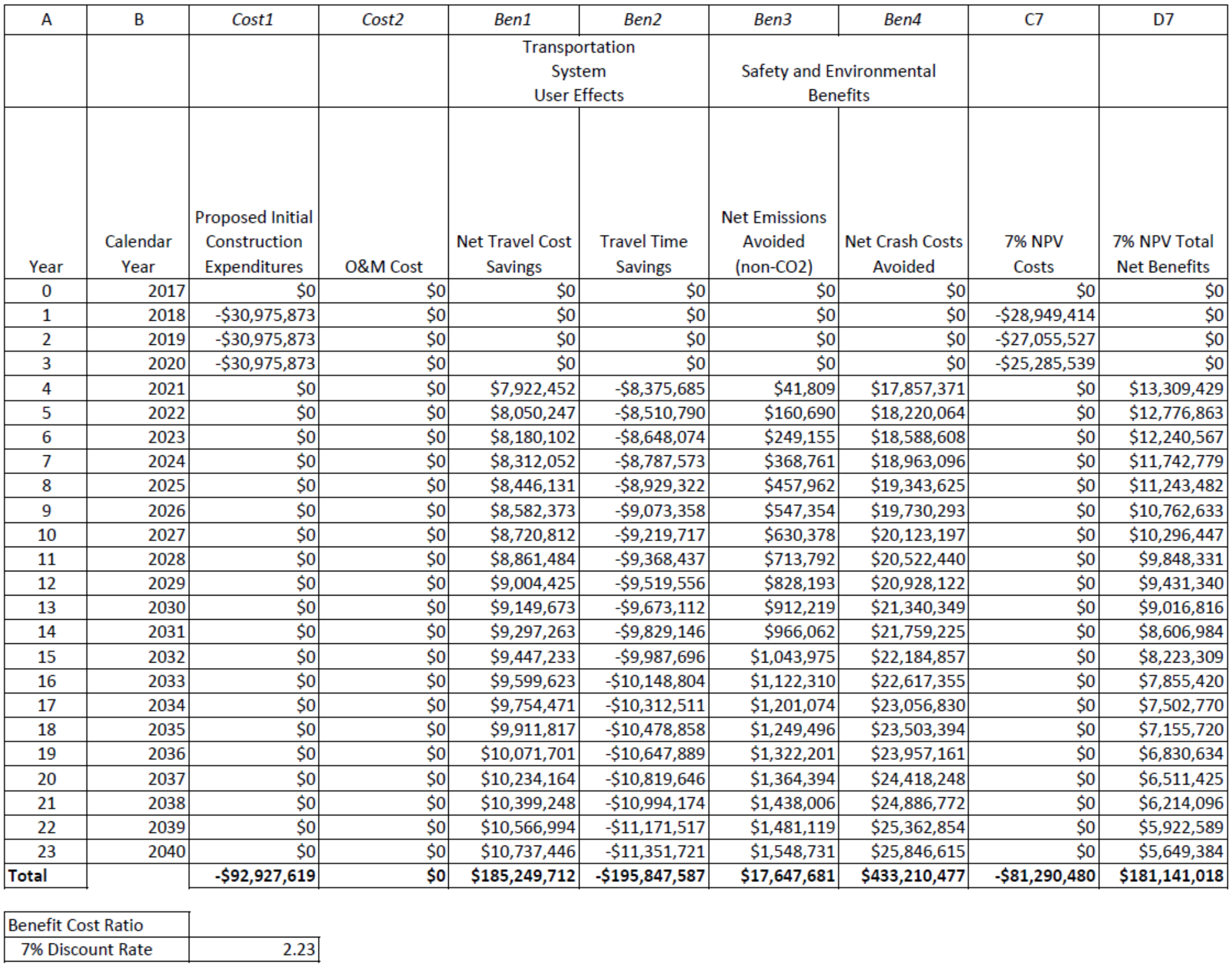
Dallas/Fort Worth to Meridian Passenger Rail Study

Appendix G: Benefit-Cost Analysis Results

TxDOT Rail Division

I-20 Corridor Council

Constant 2017 Dollars



A	B	*Cost1*	*Cost2*	*Ben1*	*Ben2*	*Ben3*	*Ben4*	C7	D7
				Transportation System User Effects		Safety and Environmental Benefits			
Year	Calendar Year	Proposed Initial Construction Expenditures	O&M Cost	Net Travel Cost Savings	Travel Time Savings	Net Emissions Avoided (non-CO2)	Net Crash Costs Avoided	7% NPV Costs	7% NPV Total Net Benefits
0	2017	$0	$0	$0	$0	$0	$0	$0	$0
1	2018	-$30,975,873	$0	$0	$0	$0	$0	-$28,949,414	$0
2	2019	-$30,975,873	$0	$0	$0	$0	$0	-$27,055,527	$0
3	2020	-$30,975,873	$0	$0	$0	$0	$0	-$25,285,539	$0
4	2021	$0	$0	$7,922,452	-$8,375,685	$41,809	$17,857,371	$0	$13,309,429
5	2022	$0	$0	$8,050,247	-$8,510,790	$160,690	$18,220,064	$0	$12,776,863
6	2023	$0	$0	$8,180,102	-$8,648,074	$249,155	$18,588,608	$0	$12,240,567
7	2024	$0	$0	$8,312,052	-$8,787,573	$368,761	$18,963,096	$0	$11,742,779
8	2025	$0	$0	$8,446,131	-$8,929,322	$457,962	$19,343,625	$0	$11,243,482
9	2026	$0	$0	$8,582,373	-$9,073,358	$547,354	$19,730,293	$0	$10,762,633
10	2027	$0	$0	$8,720,812	-$9,219,717	$630,378	$20,123,197	$0	$10,296,447
11	2028	$0	$0	$8,861,484	-$9,368,437	$713,792	$20,522,440	$0	$9,848,331
12	2029	$0	$0	$9,004,425	-$9,519,556	$828,193	$20,928,122	$0	$9,431,340
13	2030	$0	$0	$9,149,673	-$9,673,112	$912,219	$21,340,349	$0	$9,016,816
14	2031	$0	$0	$9,297,263	-$9,829,146	$966,062	$21,759,225	$0	$8,606,984
15	2032	$0	$0	$9,447,233	-$9,987,696	$1,043,975	$22,184,857	$0	$8,223,309
16	2033	$0	$0	$9,599,623	-$10,148,804	$1,122,310	$22,617,355	$0	$7,855,420
17	2034	$0	$0	$9,754,471	-$10,312,511	$1,201,074	$23,056,830	$0	$7,502,770
18	2035	$0	$0	$9,911,817	-$10,478,858	$1,249,496	$23,503,394	$0	$7,155,720
19	2036	$0	$0	$10,071,701	-$10,647,889	$1,322,201	$23,957,161	$0	$6,830,634
20	2037	$0	$0	$10,234,164	-$10,819,646	$1,364,394	$24,418,248	$0	$6,511,425
21	2038	$0	$0	$10,399,248	-$10,994,174	$1,438,006	$24,886,772	$0	$6,214,096
22	2039	$0	$0	$10,566,994	-$11,171,517	$1,481,119	$25,362,854	$0	$5,922,589
23	2040	$0	$0	$10,737,446	-$11,351,721	$1,548,731	$25,846,615	$0	$5,649,384
Total		**-$92,927,619**	**$0**	**$185,249,712**	**-$195,847,587**	**$17,647,681**	**$433,210,477**	**-$81,290,480**	**$181,141,018**

Benefit Cost Ratio	
7% Discount Rate	2.23

Dallas/Fort Worth to Meridian Passenger Rail Study

Appendix H: Planning and Economic Impact Study

TxDOT Rail Division
I-20 Corridor Council

Planning and Economic Impact Study: Proposed Intercity Passenger Rail Service from Fort Worth, TX, to Meridian, MS

Final Report

Texas A&M Transportation Institute

The Texas A&M Transportation Institute

The Texas A&M University System

College Station, Texas

October 2017

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EXECUTIVE SUMMARY

PURPOSES OF THE STUDY

This study is an initial planning and economic impact analysis of proposed intercity passenger rail (ICPR) service for the Fort Worth, Texas, to Meridian, Mississippi, rail corridor (study corridor). This rail route principally parallels Interstate Highway 20 (I-20) connecting the major population centers of north and central Texas with the southeastern United States. The purposes of this study are three-fold:

- To assess the potential passenger rail network planning and travel benefits of developing new east-west ICPR service along the study corridor as an extension of the existing National Railroad Passenger Corporation (Amtrak) Crescent long-distance service.
- To calculate the expected economic impacts at potential station locations along the study corridor route based upon elements of a confidential, business study of the route previously completed by Amtrak in 2015.
- To make a preliminary multimodal assessment of roadway conditions/needs of the I-20 corridor and the potential for diversion of freight to rail if infrastructure improvements (capacity, signaling, etc.) to the existing line occur as part of implementing ICPR service in the corridor.

This study was completed over a short period in mid-2017 with limited information at this early planning stage that restricted the scope of the analysis. Limitations and data used for analysis are described in the report. Primary data inputs for the economic impact modeling and planning analysis used information from three main sources:

- Amtrak's proprietary and confidential *Route and Service Financial Evaluation: Crescent Meridian-Dallas-Fort Worth Section* produced in July 2015 and updated in August 2015 (used in accordance with a non-disclosure agreement [NDA] between Texas A&M Transportation Institute (TTI) and Amtrak executed in August 2017).
- Supplementary ridership estimates for two additional, potential station locations in northern Louisiana not listed in the 2015 study that were provided by Amtrak in August 2017.
- The preliminary study corridor physical infrastructure assessment produced for the Texas Department of Transportation (TxDOT)/Federal Railroad Administration (FRA) submitted in June 2017.

Information on projected ridership numbers and station locations and cost estimates were taken from the Amtrak report and supplementary information on the two added stations, also provided by Amtrak. Physical infrastructure needs and track upgrade cost estimates were taken from the draft TxDOT physical infrastructure assessment report.

FINDINGS IN EACH PURPOSE AREA

TRAVEL AND NETWORK BENEFITS

The extension of the Crescent in the study corridor would have several important network benefits by adding an east-west route directly linking urban centers in Texas, Louisiana, and Mississippi more directly to major destinations in the southeast and eastern United States without requiring circuitous, multiday routing by train over the current route network or requiring difficult combination of train and bus routings. Extreme examples requiring travel from north and central Texas to Chicago to reach many of these destinations by train are not uncommon. Intercity bus and air options in the study corridor as alternatives are also examined.

ECONOMIC IMPACTS

To estimate the economic impacts of the proposed new passenger rail service in the study corridor, researchers from TTI's Infrastructure Investment Analysis Program examined two primary industry areas where impacts would occur: visitor spending and construction. The proposed service described in Amtrak's 2015 study included nine stops: five in Texas, one in Louisiana, and three in Mississippi. During the course of this study, it was determined that two additional station stops not considered in the 2015 Amtrak study, in Monroe and Ruston, LA, would also be included in the economic impact analysis. There are existing stations for identified stops along the study route with the exception of those in Shreveport, Ruston, and Monroe, Louisiana; and in Vicksburg, Mississippi.

Visitor spending will occur at each stop impacting the local economy on a continuous annual basis. Additionally, four new stations will need to be constructed along with miles of rail sidings for needed capacity between various stations. Impacts from these construction activities will have an economic effect on the region during the construction period. Unlike visitor spending, construction impacts are only realized for the construction period and are therefore reported separately.

Researchers used IMPLAN, an economic planning input-output model widely used and accepted in academia, government, and industry, which uses regional social accounting matrices to track the flow of goods and services within local economies. Inputs to the IMPLAN model for the study corridor were calculated for both visitor spending by scheduled stop and for construction by station or corridor location. Estimated cost inputs for the two new proposed stations and for construction costs for the estimated length of new sidings needed to support ICPR service were derived from the Amtrak 2015 study and the draft TxDOT/HNTB Corporation infrastructure needs analysis of the corridor completed earlier in 2017, respectively.

A series of approximately 70 tables showing economic impacts for both estimated visitor spending and construction benefits broken down by state and individual station location are presented in Chapter 2. Output represents total economic impacts using intermediate expenditures for materials and services and the value added. Table ES-1 summarizes the results of the economic impact analysis.

Table ES-1. Total Economic Impact Estimates of Visitor Spending and Construction

Impact Type	Employment	Labor Income	Value Added	Output
Visitor Spending	250.5	$8,056,475	$12,730,127	$21,750,108
Station Construction	61.0	$2,706,685	$3,678,397	$7,589,492
Rail Siding Construction	322.1*	$45,113,909	$62,220,021	$128,518,565
Total Impacts	633.6	$55,877,069	$78,628,545	$157,858,165

**Employment numbers for rail siding construction are per year while all other rail siding totals represent the total impact over the assumed three-year construction period.*

Visitor spending and station construction impacts are reported for a single year. Visitor spending is assumed to continue having an impact on an annual basis, while the impacts of station construction are only realized for the estimated single year of construction. Rail siding construction is estimated to occur over a 3-year time period. The labor income, value added, and output impacts for rail siding construction represent the total 3-year impact. However, the employment numbers represent a single year. Employment is reported as individual job-years, not full-time equivalent (FTE) job-years. A job-year is one year of one job and part-time positions are included in the count as a single job. Labor income includes both employee and proprietor income, while value added is comprised of labor income, property income, and indirect business taxes.

INFRASTRUCTURE NEEDS AND FREIGHT RAIL DIVERSION POTENTIAL

Chapter 3 describes the efforts to assess roadway demand and conditions in the study corridor that might impact truck freight movement over the coming decades, and to assess what freight commodities moving currently in the corridor might have the potential to shift from truck to rail transport. In some locations along the study corridor, these roadways are seeing up to 70 percent increases in the number of trucks along with increased personal automobile travel leading to delayed travel time and high construction/repair costs that might be avoided or postponed with improved rail capacity (both passenger and freight).

The purpose of the analyses carried out in this part of the study was to examine potential freight movement benefits that rail infrastructure investment to support ICPR service over the corridor might also bring by both reducing highway congestion and construction costs and by adding general capacity to the freight rail line. Official state highway and rail plans and specific studies undertaken by each of the three study corridor states were reviewed. An examination of the commodity flow analysis in the corridor using the U.S. Department of Transportation Freight Analysis Framework 4 data was performed as well as an analysis based upon recent Transportation Research Board guidance on identifying which commodities are potential truck to rail diversion candidates based upon characteristics of the commodity and current mode choice.

CHAPTER 1. NETWORK PLANNING AND PERSONAL TRAVEL BENEFITS OF INTERCITY PASSENGER RAIL SERVICE IN THE STUDY CORRIDOR

INTRODUCTION

Several passenger rail service studies have been recently completed or are soon to be undertaken by individual states along segments of the existing freight rail corridor between Fort Worth, Texas, and Meridian, Mississippi. Past proposals such as the Amtrak Network Growth Strategy proposed in 1999 and subsequent market-based analyses by Amtrak have suggested that an east-west passenger rail connection linking Texas and Louisiana markets more directly to other existing Amtrak routes in Mississippi and the southeastern United States would have promising results in ridership and associated economic activity at station locations along the route. Unfortunately, the studies of individual state segments have not fully assessed the market impacts that long-distance passenger rail service from the Dallas-Fort Worth (DFW) Metroplex to Meridian (and connecting potentially on to Atlanta, Georgia, and other East Coast Amtrak routes) might have for both improved passenger and freight rail service levels.

Connecting the Atlanta and DFW megaregions via the proposed extension of the Crescent service, as an Amtrak Long Distance corridor (defined by federal regulations as routes > 750 miles), instead of examining multiple, shorter distance state-supported corridor routes might also allow public funds to support physical, fixed infrastructure repair and capacity improvements instead of solely being spent to support routine operational costs. Rail network operational benefits to the freight railroads and enhanced connections to existing Amtrak routes serving the East Coast and Florida would also potentially be improved; however, it is important to remember that passenger rail service and increased freight rail movements often compete with one another for capacity. Increases in freight traffic in the study corridor might then impede passenger rail performance capability. The current study only envisions physical capacity improvements that would allow a single round trip each day. As a result, only limited freight rail improvements could be expected without further investments in rail infrastructure and capacity.

PURPOSES OF THIS STUDY

This study is an initial planning and economic impact analysis of proposed intercity passenger rail (ICPR) service for the Fort Worth, Texas, to Meridian, Mississippi, rail corridor (study corridor). This rail route principally parallels Interstate Highway 20 (I-20) connecting the major population centers of north and central Texas with the southeastern United States. The purposes of this study and the general outline of the chapters in this report are three-fold:

- To assess the potential passenger rail network planning and travel benefits of developing new east-west ICPR service along the study corridor as an extension of the existing Amtrak Crescent long-distance service.
- To calculate the economic impacts that can be expected at potential station locations along the study corridor route based upon elements of a confidential, business study of the route previously completed by the Amtrak in 2015.

- To make a preliminary multimodal assessment of roadway conditions/needs of the I-20 corridor and the potential for diversion of additional freight to rail if infrastructure improvements (capacity, signaling, etc.) to the existing line were to occur as part of implementing ICPR service in the corridor.

This study was completed over a short period in mid-2017 with limited information at this early planning stage, which restricted the scope of the analysis. Limitations and data used for analysis are described in the report. Primary data inputs for the economic impact modeling and planning analysis used information from three main sources:

- Amtrak's proprietary and confidential *Route and Service Financial Evaluation: Crescent Meridian-Dallas-Fort Worth Section* produced in July 2015 and updated in August 2015 (used in accordance with a non-disclosure agreement [NDA] between Texas A&M Transportation Institute [TTI] and Amtrak executed in August 2017).
- Supplementary ridership estimates for two additional, potential station locations in northern Louisiana not listed in the 2015 study, which were provided by Amtrak in August 2017.
- Preliminary study of corridor physical infrastructure assessment produced for the Texas Department of Transportation (TxDOT)/Federal Railroad Administration (FRA) and submitted in June 2017.

Information on projected ridership numbers and station locations and cost estimates were taken from the Amtrak report. Physical infrastructure needs and track upgrade cost estimates were taken from the draft TxDOT/HNTB Corporation physical infrastructure needs analysis. Cooperation of the Kansas City Southern Railway (KCS) and the Union Pacific Railroad (UP) were not obtained in this analysis due to its early planning phase and short-term nature. Research support and assistance from the University of New Orleans Transportation Institute (UNOTI) and the National Center for Intermodal Transportation for Economic Competitiveness (NCITEC) from the University of Mississippi was an integral part of the research plan. TTI led the study with advisory research support from UNOTI and NCITEC in gathering local information in Louisiana and Mississippi, respectively.

DEFINING THE FORT WORTH TO MERIDIAN STUDY CORRIDOR

This section gives an overview of the existing major transportation infrastructure of the region along the study corridor. The study corridor generally follows the same route as the highly traveled I-20 east-west highway corridor that also connects Fort Worth and Meridian. In Texas, east of Dallas, the rail corridor follows US Highway 80 (US 80) more closely and a few miles farther north before rejoining the I-20 corridor near Longview. US 80 preceded I-20 as a transcontinental highway travel route across the region as early as the 1920s. I-20's traffic and infrastructure challenges are described more fully in Chapter 3.

Figure 1 shows the entire rail study corridor and connecting major roadways and railroads. Current Amtrak routes are also highlighted and color-coded by host railroad over which the service operates at the current time. The proposed/study corridor route would follow the existing Amtrak Texas Eagle route over UP to Marshall, continue on the UP to Shreveport where the route would shift to the KCS for the remainder of the proposed route extension across Louisiana and Mississippi to Meridian. Fort Worth is a major hub for Amtrak in the South Central region while Meridian is an established stop on the Amtrak Crescent route between Atlanta and New Orleans. Amtrak's service and routing is described further in the *Current Amtrak Service in the Study Corridor Region* section below.

For purposes of this study, 11 proposed station locations were ultimately considered. These included the nine station locations identified in Amtrak's 2015 report and the two additional stations (in Monroe and Ruston, Louisiana) added during the course of the study. The station locations analyzed for this service include:

- *Fort Worth*: Fort Worth Intermodal Station (existing).
- *Dallas*: Dallas Union Station (existing).
- *Mineola*: Mineola Amtrak Station (existing).
- *Longview*: Longview Amtrak Station (existing).
- *Marshall*: Marshall Amtrak Station (existing).
- *Shreveport*: New station required.
- *Ruston*: New station required.
- *Monroe*: New station required.
- *Vicksburg*: New station required.
- *Jackson*: Jackson Union Station (existing).
- *Meridian*: Meridian Union Station/Meridian Multimodal Transportation Center (existing).

In the given Crescent extension scenario, Shreveport, Ruston, Monroe, and Vicksburg would require new station buildings and identification of station locations within each city. Amtrak's 2015 study estimated that stations in Shreveport and Vicksburg would cost a minimum of $2 million each, and this number was used to produce conservative estimates of economic impacts due to construction. In the smaller cities of Ruston and Monroe, lower station costs were used in the analysis with an estimate of $600,000 for a minimal station/trackside stop along a siding due to the lower projected ridership. Additional infrastructure/track work at some of the existing stations on the Amtrak Crescent (Meridian) or City of New Orleans (Jackson) routes to accommodate an east-west operating train would likely also be required.

HNTB Corporation's 2017 analysis for TxDOT, used as a basis for this study, and a previous report completed by HNTB examining potential ICPR service between Shreveport and Vicksburg in 2015 for the North Louisiana Council of Governments have more information on specific infrastructure upgrade needs within that segment. The proprietary/confidential 2015 Amtrak report estimated ridership for only nine of the stations listed above. During the report, ridership number ranges were provided by Amtrak for the two added stations and the midpoint of those ranges were used in the supplementary economic impact analysis. Amtrak's ridership estimates for each proposed station were primary inputs used by TTI to perform the economic impact analysis described in Chapter 2.

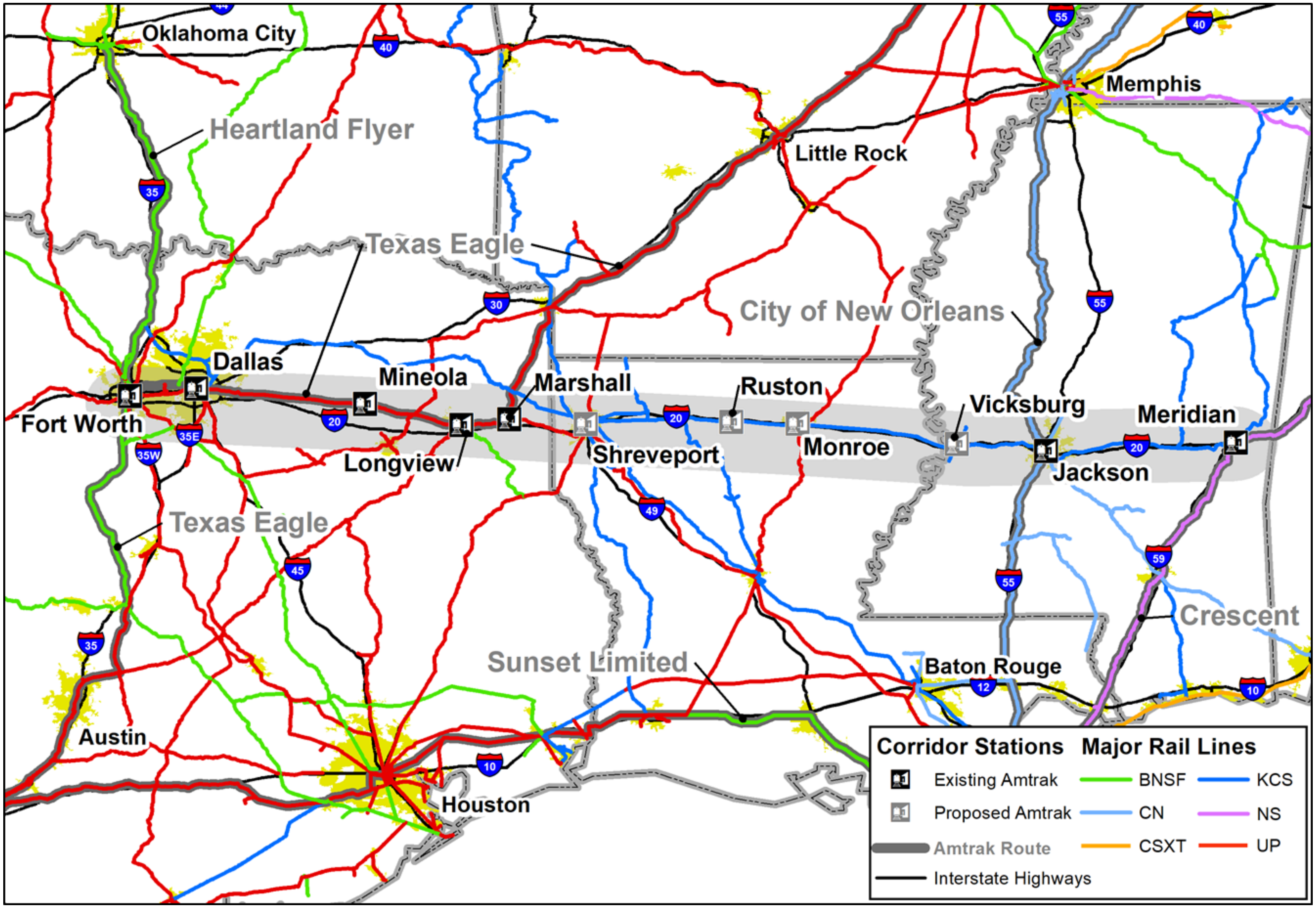


Figure 1. Map of the Fort Worth to Meridian Study Corridor (Source: TTI)

POPULATION DISTRIBUTION ALONG THE STUDY CORRIDOR

Figure 2 shows the relative size, distance between cities, and other parameters for the population centers located along the Fort Worth to Meridian study corridor. As stated in the legend for the figure, population estimates are for the U.S. Census Bureau Core-Based Statistical Area (CBSA) that surrounds each metropolitan or micropolitan area identified. As defined by the Census, CBSAs are a county or counties with at least one core urbanized area or cluster of at least 10,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties with the counties associated with the core (*1*). Note that the census bureau recognizes Dallas/Fort Worth as one CBSA due to economic ties throughout the region, so this figure shows the two stations as one population center even though there are two separate stations on the study route in each city.

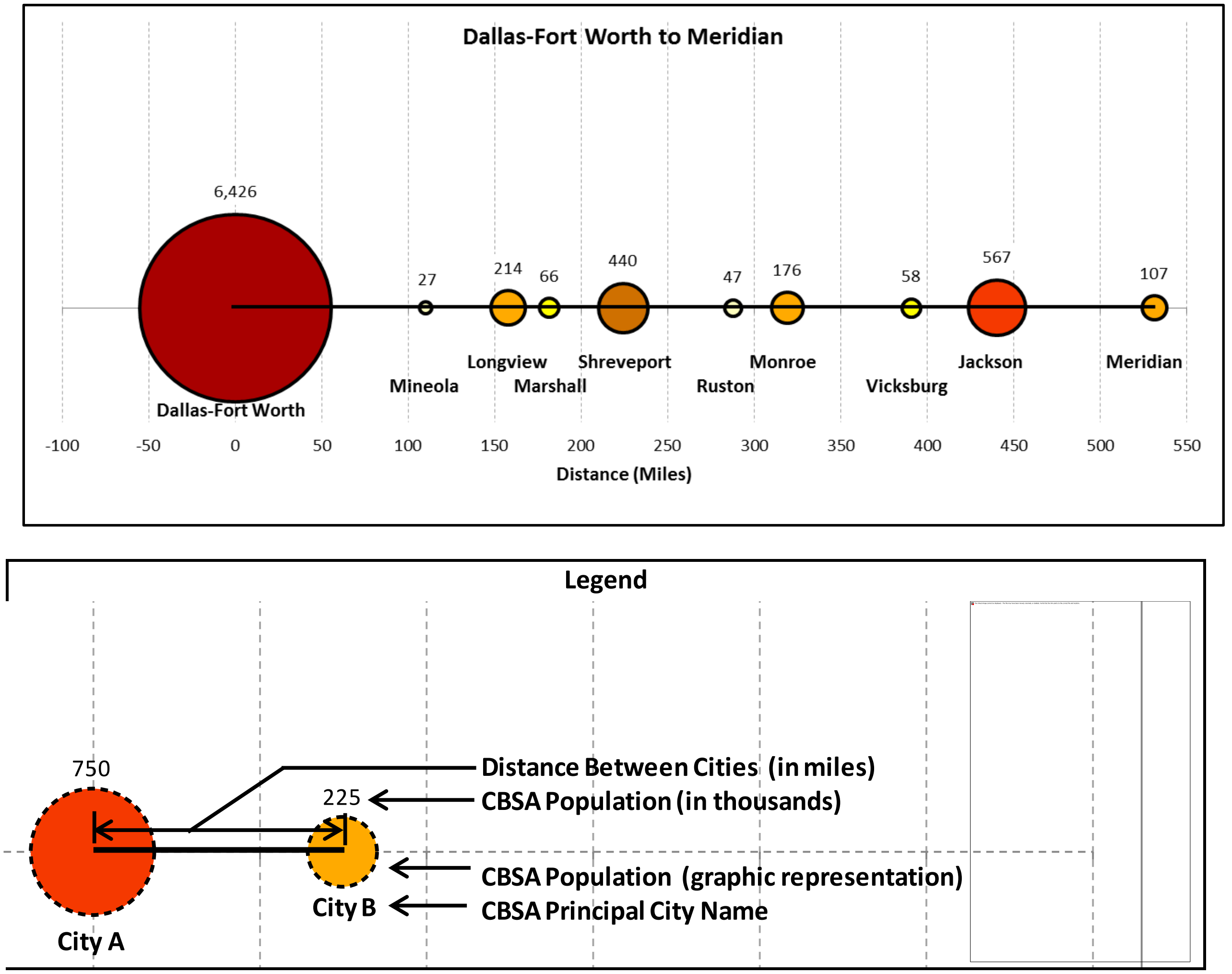


Figure 2. Study Corridor Population Centers and Characteristics

CURRENT AMTRAK SERVICE IN THE STUDY CORRIDOR REGION

Amtrak currently operates four long-distance routes and one corridor route within the south central and southeast planning regions, which the current Fort Worth to Meridian study corridor links. Figure 3 shows the existing Amtrak route structure and the Amtrak Thruway Bus connecting services. Of these existing Amtrak routes, all but one is generally oriented north-south leaving options for east-west travel within the corridor by train limited or non-existent. Currently, to get from a central Texas location to a destination such as Washington, D.C., or to Florida requires a multiday train trip through Chicago and back down the east coast. East-west travel between Dallas and southeastern U.S. metropolitan centers such as Atlanta are not directly possible by train, but some train-bus options have been recently introduced. Restoration of the Fort Worth to Meridian study corridor to the national passenger rail system would connect many existing service corridors providing network benefits beyond serving cities only in the study corridor.

Figure 3. 2017 Amtrak Routes in the South Central/South East Regions Impacting the Study Corridor (*2*)

The four existing Amtrak Long Distance routes impacting the study corridor are:

- The Texas Eagle; daily; San Antonio to Chicago via Fort Worth, Dallas, Marshall, Little Rock, and St. Louis.
- The City of New Orleans; daily; New Orleans to Chicago via Jackson and Memphis.
- The Crescent; daily; New Orleans to New York City via Atlanta, Washington, D.C., and Philadelphia.
- The Sunset Route; three times weekly; Los Angeles to New Orleans via San Antonio and Houston.

The Texas Eagle extends westward beyond San Antonio with the Sunset three times weekly from San Antonio to terminate in Los Angeles. The Sunset Route previously extended east of New Orleans to

Jacksonville, Florida, but has not operated in that corridor since 2005 following Hurricane Katrina. The Gulf Coast Working Group Report to Congress, released in July 2017 while this study was ongoing, examined and made recommendations for the restoration of Amtrak service east of New Orleans (*3*).

The single, state-supported corridor route in the study corridor region is the Amtrak Heartland Flyer, which operates daily round trip service between Fort Worth and Oklahoma City, Oklahoma. This corridor service is paid for by the states of Oklahoma and Texas through their respective departments of transportation (DOTs). Annual funding has historically been based upon special legislative appropriations in each state leaving the future funding status of the Heartland Flyer service at risk.

To augment and extend the reach of its rail services, Amtrak contracts with a variety of private bus operators for a system of Thruway intercity bus connecting services. Thruway bus tickets can only be purchased through Amtrak ticketing and only if at least one segment of the trip occurs by train. One of the Thruway routes currently in place and begun in early 2015 by Amtrak roughly parallels the study corridor route—operating between Dallas and Meridian via bus stops in Dallas, Mesquite, Tyler, Shreveport, and Vicksburg. Thruway bus stops in Longview, Jackson, and Meridian are co-located with the Amtrak stations in those cities while the other stops correspond with bus stations along the route. The Tyler and Mesquite Thruway bus stops are not in the same cities as existing Amtrak stops while the Dallas bus stop is near an Amtrak stop—within a ¼ mile walking distance—of Union Station.

PRESENT CHALLENGES OF AMTRAK TRAVEL BETWEEN TEXAS AND THE SOUTHEAST/EAST

CIRCUITOUS TRAVEL BETWEEN TEXAS AND EAST AND SOUTHEAST ALONG THE STUDY CORRIDOR

During the project, Amtrak's website, Amtrak.com, was accessed to plan a representative trip from Meridian to Fort Worth. As the study corridor route does not currently include a train travel segment, the most direct Thruway bus option did not result. Instead the Amtrak planning software produced a proposed trip on the Crescent from Meridian to Washington, D.C. (22 hours followed by a 6-hour layover), a transfer from Washington to Chicago on the Capitol Limited (18 hours and a 5-hour layover), followed by a transfer from Chicago to Fort Worth via the Texas Eagle (24 hours). In total, this example trip offer left Meridian on a Tuesday morning and arrived in Fort Worth three days later in the afternoon. Fares quoted for this trip were in the range between $419 for a seat only to $1628 for a low-end compartment (roomette).

Adjusting the trip parameters to leave from one end or the other and make only a short segment by rail to qualify for the Thruway bus option reduced time and costs dramatically. For example, a sample trip on the same day as the above example from Taylor, Texas (northeast of Austin), and including a segment on the Texas Eagle to Dallas Union Station via Fort Worth followed by a short walk over to the bus station and the overnight Thruway bus service resulted in a trip length of less than 18 hours and a quoted fare of only $145. Similar trip times and fares were also produced when adding a Fort Worth to Dallas rail travel segment and, alternatively, an Atlanta to Meridian rail travel segment that allowed access to the Thruway bus service between Dallas and Meridian.

These types of circuitous routings and extreme trips make current ICPR service difficult to use and market to consumers. Adding a regular and more direct, east-west rail service would open a much larger market possibility for rail travel between the population centers of Texas and the southeastern/eastern United States and Amtrak's analysis showed that this could be done at a net financial profit for the study corridor. The needed rail capacity to run such a train service and the costs to provide capacity improvements and operational agreements with host railroads would also have to be reached.

CONNECTION POTENTIALS OF ADDING RAIL SERVICE IN THE STUDY CORRIDOR

While the limits of this study are generally confined to the Fort Worth to Meridian corridor that is being considered as an extension of the Crescent, the possibility of connecting the corridor cities with other major metropolitan areas via the study corridor and existing connections are appealing in terms of potential ridership gains over those only within the study corridor. As an example, Figure 4 shows a similar plot with the next two large market stations on the Crescent, Birmingham, and Atlanta, and implies the expanded potential for ridership from additional major metropolitan areas that examining such connection possibilities beyond the study corridor would potentially add. Including the two large markets depicted would add over 6 million in population to the market potential for additional riders. The legend for this figure is included previously with Figure 2.

Access to East Coast destinations such as Washington, D.C., and New York City via once daily crescent service offer another opportunity for a better functioning ICPR network in the study corridor region. Other Amtrak network connections to major population centers would include DFW to Memphis and northward and/or DFW to New Orleans via Jackson on the City of New Orleans without requiring DFW residents to travel to San Antonio via the Texas Eagle and switch to the Sunset through Houston (which is only possible three times weekly with current Sunset service schedule).

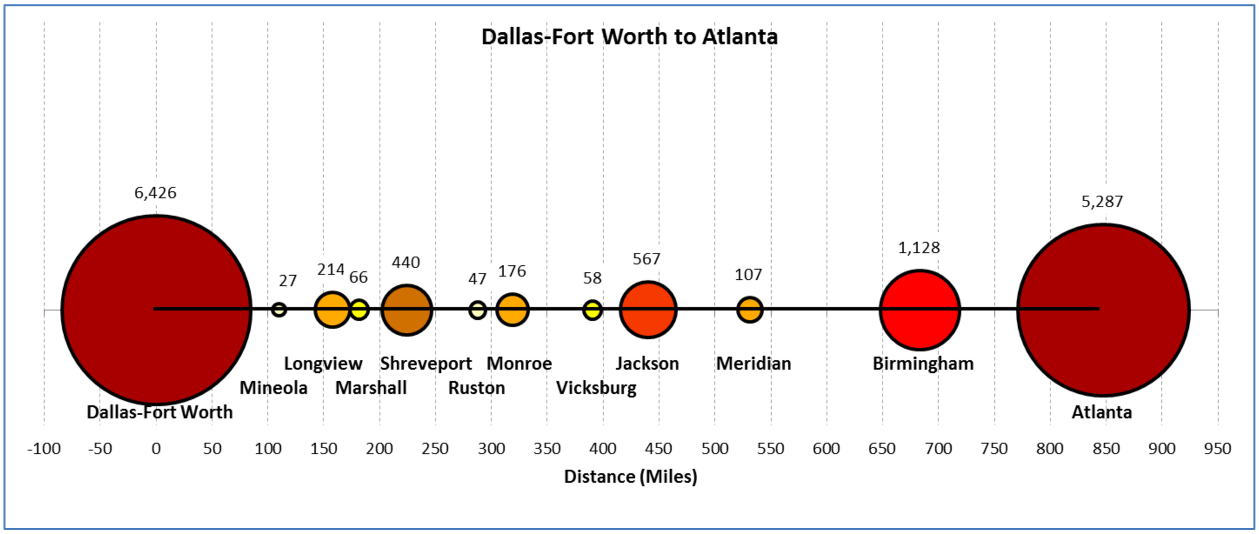


Figure 4. Example of Network Connection/Potential Ridership Access Benefits beyond Meridian to Atlanta

HISTORY/PAST STUDIES/PROPOSALS OF ICPR IN THE STUDY CORRIDOR

ABBREVIATED HISTORY OF RAIL SERVICE IN THE STUDY CORRIDOR

The concept of providing ICPR service that would serve both New Orleans and Shreveport via a hub in Meridian has a long history back to the late 19th century. Figure 5 shows the Queen and Crescent Route system that was operated by several rail owners in the corridor over time and remained on the Southern Railroad's system schedule from 1895 up until 1949. This route connected Cincinnati, known as the Queen City of the West, and New Orleans, known as the Crescent City. Connection with the Texas & Pacific Railway (T&P) in Shreveport allowed continued travel to Fort Worth along the study corridor and farther to the west. Southern Railway shifted the service route to the eastern part of its system under its ownership connecting New Orleans via Meridian to Birmingham, Atlanta, and ultimately the East Coast. Decades later in 1971, when Amtrak and its route system were originally formed, the Southern Railway retained service over the Crescent corridor to New Orleans for an additional four years until 1975 when Amtrak took over the passenger rail service on the line as its Crescent service, which has remained to this day.

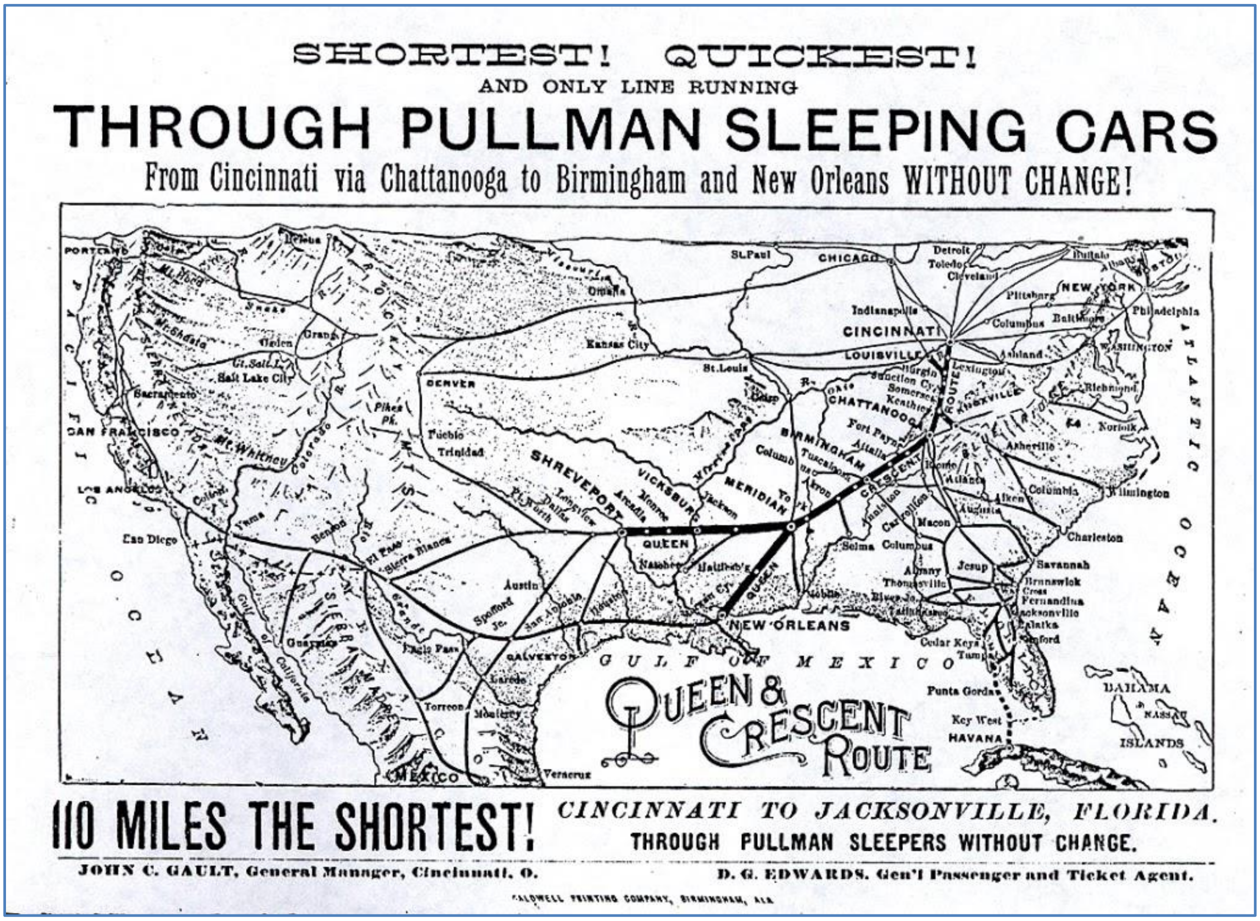


Figure 5. Early 20th Century Advertisement Showing the Queen and Crescent Route

Host railroad ownership of the system also changed hands over time. As noted above, the New Orleans-Meridian-Birmingham-Atlanta route was retained by the Southern Railway and absorbed into the current Norfolk Southern (NS) system; while the western Meridian-Shreveport corridor was first acquired by the Illinois Central Railroad through a subsidiary, then later sold to the MidSouth Rail Corporation, which was purchased by the KCS, its current owners, in 1993 (*4*). Since 2005, the freight route has been operated by a joint venture between KCS and NS as the Meridian Speedway, LLC (Meridian Speedway). KCS owns 70 percent of the venture while NS owns the remaining 30 percent. Together the two railroads have worked to upgrade rail infrastructure and capacity along the long-neglected route—investing millions of dollars each year and through specific improvement projects to expand freight rail service.

West of Shreveport, the proposed ICPR follows the route of the former T&P, which is now a part of the UP system. Only the UP segment between Shreveport and Marshall does not coincide with track currently being used by the current Amtrak Texas Eagle route and its 1970s predecessor the Amtrak Inter-American route.

PAST STUDIES/PROPOSALS FOR RESTORATION OF PASSENGER RAIL SERVICE

Over the past 20 years several studies or proposals have examined restoration of ICPR service over the study corridor route or segments of it. Primary among these are:

- **Amtrak Growth Strategy (1999–2002)—**Amtrak considered expansion in several areas of its national route structure during this period and examined a Crescent Star route similar in concept to the current study corridor, which would have split the Crescent train in Meridian; however, instead of following the UP route west from Shreveport, this concept route remained on the more northern, KCS-owned route through east Texas to Dallas. Financial challenges of Amtrak as a corporation and political pressure at the time kept Amtrak from executing any of the several expansion plans included in this strategy package and the concept was not advanced further.
- **Fort Worth to Shreveport (2012–2015)—**TxDOT and the East Texas Corridor Council used a portion of a federal earmark to have Amtrak examine costs and options for restored rail service in East Texas to Shreveport along the study corridor. Several more stations were a part of this corridor-type service in Centre Port/DFW, Mesquite, Forney, Terrell, and Wills Point in addition to the current Texas Eagle stations. TxDOT renewed and updated its analysis of rail service along this segment of the corridor during the 2014 completion of its I-20 East Texas Corridor Study but claimed it did not have available state funding to advance service beyond the study stage.
- **Shreveport to Vicksburg (2015)—**Northern Louisiana Council of Governments commissioned a study in 2015 that examined the Shreveport-Bossier City to Vicksburg segment of the current study corridor. Stations at Ruston and Monroe were included as intermediate stations in this corridor-type service study. The report examined in detail potential station locations and estimated infrastructure costs associated with restoring service where stations did not currently exist. The report also examined how extending their study route—including the DFW region—

would dramatically increase expected ridership along the corridor within Louisiana and points out that the longer corridor is supported by the regional Southern Rail Commission (a long-standing ICPR state compact made up of representatives of Louisiana, Mississippi, and Alabama).

RECENT CONNECTING/REGIONAL ICPR STUDIES

Several ongoing or recent ICPR studies have taken place in the region of the study corridor. These include:

- **Dallas to Houston High-Speed Rail/Texas Central**—This effort is under private development by the Texas Central Railway, and they are working with both FRA and TxDOT to complete required federal studies.
- **Texas-Oklahoma Passenger Rail System/Oklahoma City to South Texas**—A Service Level Draft Environmental Impact Statement/planning study was completed in June 2017 by TxDOT that outlined many options for improved north-south ICPR service connections in the south central region.
- **Baton Rouge to New Orleans ICPR**—The Southern Rail Commission completed a feasibility study in 2014 and a briefing book on options for the route for the Governor of Louisiana in September 2015.
- **Restoration of ICPR service east of New Orleans**—The FRA-chaired Gulf Coast Working Group submitted a report to Congress in July 2017 expressing their preferred option of additional once daily, round-trip long distance train service to Orlando and a daily round trip, state-supported train between New Orleans and Mobile in response to Section 11304 of the Fixing America’s Surface Transportation Act.
- **Southeast Regional Rail Planning Study**—This ongoing FRA-led, multistate study seeks to develop scenarios and plans for a multistate network in the southeastern United States including analysis of the Crescent and City of New Orleans routes) with a planned study completion date in late 2017.

OTHER INTERCITY TRAVEL ALTERNATIVES IN THE STUDY CORRIDOR

INTERCITY BUS

Figure 6 shows the Amtrak Thruway bus services alongside intercity bus carriers in the region. This map shows that at least two intercity carriers offer bus service along the study corridor. Fare information for these services was not readily available and varies greatly by the time tickets are purchased in relation to the trip date and demand for certain dates/times.

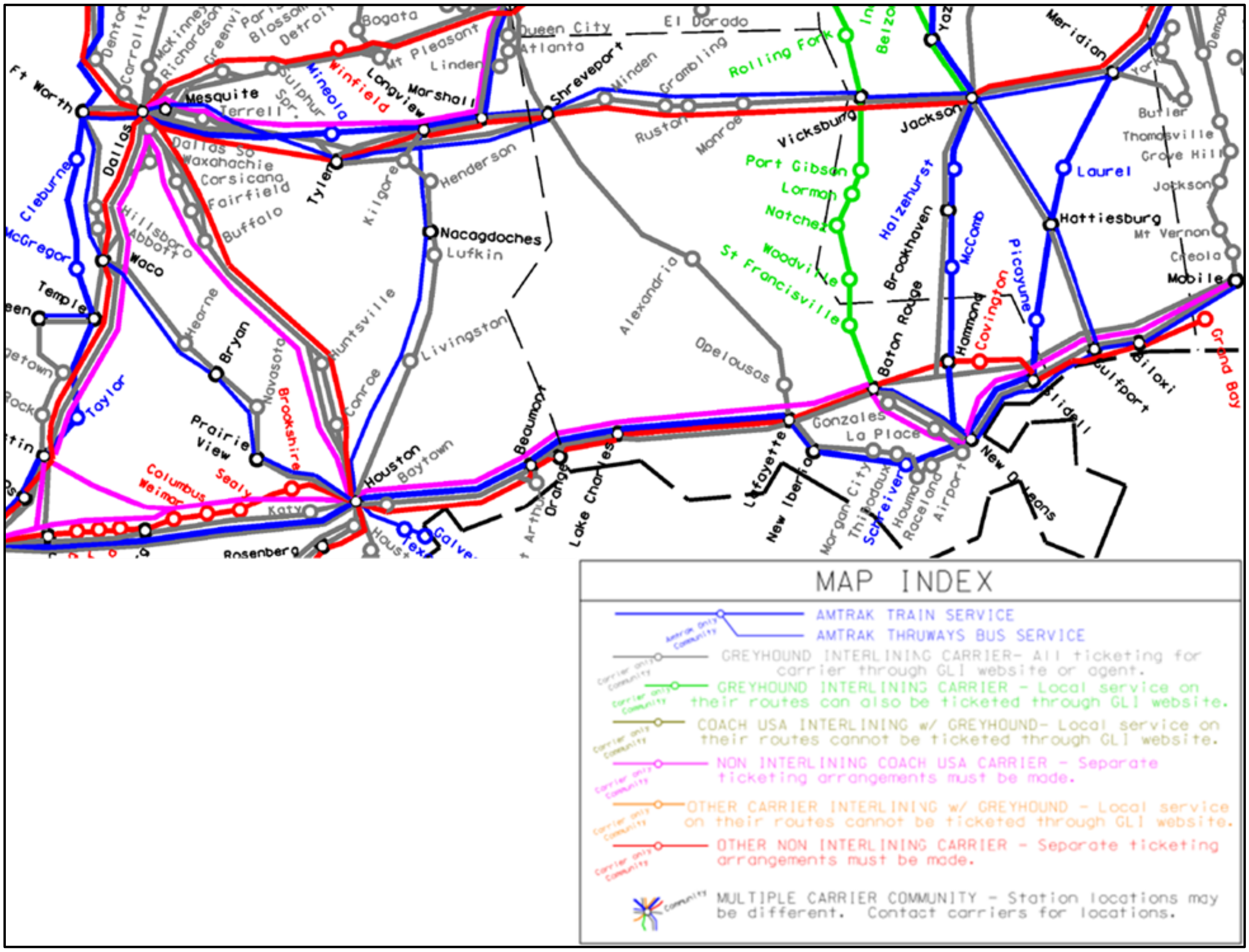


Figure 6. Intercity Bus Routes and Carriers in the Midwest South (5)

AIR SERVICE OPTIONS

Table 1 shows existing air service options between city-pairs within the study corridor and the flight duration, average fare, routing, and aircraft type for these options.

Table 1. DFW to Meridian Airline Service and Average Fare

Origin	Destination	Airline	Flight #	Time of Day	Duration	Aircraft	Average Fare
Meridian	DFW	Skywest	3125	9:36:00 AM	1h57m	CRJ-200	$123.28
DFW	Meridian	Skywest/ American*	3125/ 3128*	Various*	Various*	Various*	Various*
Jackson	DFW	Mesa	5874	6:10:00 AM	1h34m	CRJ-900	$199.00
		Mesa	5880	9:50:00 AM	1h33m	CRJ-900	$199.00
		Envoy Air	3572	12:18:00 PM	1h34m	E145	$199.00
		Mesa	5758	2:08:00 PM	1h35m	CRJ-700	$199.00
		Envoy Air	3675	4:16:00 PM	1h39m	E145	$199.00
		Mesa	5739	6:21:00 PM	1h33m	CRJ-700	$199.00
DFW	Jackson	Mesa	5880	8:00:00 AM	1h20m	CRJ-900	$211.00
		Envoy Air	3607	10:25:00 AM	1h25m	E145	$211.00
		Mesa	5758	12:15:00 PM	1h20m	CRJ-900	$211.00
		Envoy Air	3675	2:26:00 PM	1h25m	E145	$211.00
		Mesa	5739	4:30:00 PM	1h20m	CRJ-900	$211.00
		Mesa	5737	8:37:00 PM	1h22m	CRJ-700	$211.00
Shreveport	DFW	ExpressJet	2828	6:15:00 AM	1h3m	CRJ-700	$171.00
		ExpressJet	2817	10:35:00 AM	1h6m	CRJ-700	$171.00
		ExpressJet	2822	12:10:00 PM	1h9m	CRJ-700	$171.00
		Envoy Air	3590	2:24:00 PM	1h10m	E145	$171.00
		Envoy Air	3390	3:52:00 PM	1h9m	E145	$171.00
		ExpressJet	2818	6:25:00 PM	1h4m	CRJ-700	$171.00
DFW	Shreveport	ExpressJet	2817	8:45:00 AM	58m	CRJ-700	$190.50
		ExpressJet	2822	10:40:00 AM	58m	CRJ-700	$190.50
		Envoy Air	3590	12:50:00 PM	1h1m	E145	$190.50
		Envoy Air	3392	2:27:00 PM	1h	E145	$190.50
		ExpressJet	2818	4:55:00 PM	1h	CRJ-700	$190.50
		ExpressJet	2829	8:10:00 PM	55m	CRJ-700	$190.50
Longview	DFW	Envoy Air	3471	1:50:00 PM	1h3m	E145	$183.50
		Envoy Air	3273	6:32:00 PM	1h3m	E145	$183.50
DFW	Longview	Envoy Air	3265	12:35:00 PM	55m	E145	$238.00
		Envoy Air	3273	5:18:00 PM	49m	E145	$238.00

Source: Flight Aware/Airline Insight

Notes: Data sample is from July 25, 2017; Duration is gate to gate.

*Connecting flights only with multiple options available (Skywest/American). One-stop flights connect through Chicago (KORD) and Hattiesburg-Laurel (KPIB). No airfare data were readily available. There are two arrivals on flights from KDFW into KMEI @3:12 p.m. from KPIB and 8:15 p.m. from KORD.

CHAPTER 2. ECONOMIC IMPACT ANALYSIS

To estimate the economic impacts of the proposed new passenger rail service in the study corridor, researchers examined two primary industry areas where impacts would occur: visitor spending and construction. The proposed service described in Amtrak's 2015 study would include nine stops, five in Texas, one in Louisiana, and three in Mississippi. Stations for all of these stops currently exist with the exception of Shreveport, LA, and Vicksburg, MS. Visitor spending will occur at each stop impacting the local economy on a continuous annual basis. Additionally, two new stations will need to be constructed along with miles of rail sidings for needed capacity between various stations. Impacts from these construction activities will have an economic effect on the region during the construction period. Unlike visitor spending, construction impacts are only realized for the construction period and are therefore reported separately.

METHODOLOGY

Researchers used IMPLAN, an input-output economic impact analysis model widely used and accepted in academia, government, and industry, that uses regional social accounting matrices to track the flow of goods and services within an economy. Inputs to the IMPLAN model for the study corridor were calculated for both visitor spending by station stop and for construction by station or corridor location. Estimated cost inputs for the two new proposed stations and for construction costs for the estimated length of new sidings needed to support ICPR service were derived from the Amtrak 2015 study and the draft infrastructure needs study of the corridor completed earlier in 2017, respectively.

Visitor spending and station construction impacts are reported for a single year. Visitor spending is assumed to continue having an impact on an annual basis while the impacts of station construction are only realized for the estimated single year of construction. Rail siding construction is estimated to occur over a 3-year time period. The labor income, value added, and output impacts for rail siding construction represent the total three-year impact. However, the employment numbers represent a single year. Employment is reported as individual job-years, not full-time equivalent (FTE) job-years. A job-year is one year of one job, and part-time positions are included in the count as a single job. Labor income includes both employee and proprietor income, while value added is comprised of labor income, property income, and indirect business taxes. Output represents intermediate expenditures for materials and services and value added.

Direct impacts represent the initial change in expenditures that are driving the impact while indirect impacts are the effects derived from the direct industries' operations (*6*). Induced impacts result from the spending of direct and indirect wages.

VISITOR SPENDING IMPACTS

Ridership estimates for each of the nine proposed station stops were taken from the Amtrak 2015 study under the provisions of an NDA negotiated between Amtrak and TTI. Amtrak considers the ridership numbers and much of the other financial analysis in that study proprietary and confidential. The NDA allowed TTI to use the Amtrak study ridership numbers as inputs to the IMPLAN model, but did not allow for direct publication of those numbers in this report. Researchers began by applying the percent of tourists to the estimated ridership at each stop. Shown in Table 2, the tourist percentages are reported by state and are provided by Amtrak in their State Snapshots as the percentage of riders estimated to be tourists. Since the visitor spending is assumed to be done by the tourists, or visitors, this is the percentage of riders assumed to be visitors, and consequently, spending money in the community. However, the number of visitors was then further divided in half to represent round-trip travelers. Since visitors will be returning home on one end of their trip, they are not assumed to be spending at these levels on both ends of their trip.

Table 2. Tourist Riders

State	Percent of Total Riders that are Tourists
Texas	54%
Louisiana	62%
Mississippi	44%

Source: Amtrak State Snapshots

Visitor spending was allocated by trip into five standard categories within the IMPLAN model:

- Hotels and motels, including casino hotels.
- Full service restaurants.
- Transit and ground passenger transportation.
- Retail–miscellaneous store retailers.
- Other amusement and recreation industries.

The average daily spending for each of the five categories was multiplied by the average number of days per trip for each scheduled stop location. See Table 3 for spending by category. This average spending per trip was then multiplied by the number of annual round-trip visitors. The average length of stay and the average spending per day per person was determined for the five spending categories below by the respective state’s tourism department.

Table 3. Average Visitor Spending per Trip

Spending per Trip Category	Meridian (*7*)	Jackson	Vicksburg	Monroe	Ruston	Shreveport (*8*)	Marshall (*9*)	Longview	Mineola	Dallas (*10*)	Fort Worth
Average trip length in days	2.5	2.5	2.5	2.9	2.9	2.9	1.7	1.7	1.7	2.2	2.1
Hotels and motels, including casino hotels	$118	$118	$118	$36	$36	$53	$67	$74	$67	$135	$98
Full service restaurants	$60	$60	$60	$23	$23	$33	$35	$33	$35	$71	$62
Transit and ground passenger transportation	$96	$96	$96	$48	$48	$51	$48	$44	$48	$69	$58
Retail-Miscellaneous store retailers	$14	$14	$14	$9	$9	$10	$19	$24	$19	$41	$30
Other amusement and recreation industries	$19	$19	$19	$11	$11	$107	$5	$5	$5	$26	$16
Total Visitor Spending per Trip $	$306	$306	$306	$125	$125	$255	$174	$180	$174	$343	$264

Source: (*7*, *8*, *9*, *10*)

The spending totals developed through these calculations were then used as inputs into IMPLAN for each of the five categories of spending.

CONSTRUCTION IMPACTS

Proposed construction includes new stations at Shreveport, LA, and Vicksburg, MS. The construction cost of the new stations in Shreveport and Vicksburg was estimated to be $2,000,000 each based upon estimates in the Amtrak 2015 report and costs for minimal station facilities of $600,000 each were estimated for Ruston and Monroe. The station construction costs were used as inputs into IMPLAN under the construction of new commercial structures sector. Additionally, construction of new, additional rail siding was analyzed for three corridor segments based upon previous analysis completed and reported for the corridor. HNTB's analysis estimates were by segment and total mileage of required new siding capacity rather than specific siding location. Twenty miles of proposed additional siding was estimated to cost $4,000,000 per mile. The total cost of construction over a period of three years was estimated to be $80,000,000. See Table 4 for a summation of the siding construction impacts.

Table 4. Additional Sidings

From Station	To Station	Proposed Additional Length of Passing Sidings (mi)	Construction Cost
Marshall, TX	Shreveport, LA	2	$8,000,000
Shreveport, LA	Vicksburg, MS	14	$56,000,000
Vicksburg, MS	Meridian, MS	4	$16,000,000
Total		**20**	**$80,000,000**

Source: (11)

The construction costs were used as inputs into IMPLAN under the construction of other new nonresidential structures industry sector of the model.

A glossary explaining each of the terms and tax categories in the remainder of this chapter is included as the Appendix. Many of the economic impacts shown in the tables and described in the glossary are related to tax benefits that come back to counties from economic activity. For example, portions of the social security taxes paid by employees and employers associated with an activity to the federal government are accounted for as economic impacts since they ultimately flow back to local counties through state distributions. While these taxes are not direct state benefits, they do represent economic impacts of a given project. Similarly, county by county distributions of other federal and state taxes/fees (i.e., insurance, customs and severance taxes) that result from an activity are taken into account by the IMPLAN model and reported as outputs of economic impact in the tables of this section.

FINDINGS

VISITOR SPENDING IMPACTS

Economic impacts of visitor spending are reported by IMPLAN in terms of employment, labor income, value added, output, and tax impacts. Employment is reported as individual job-years, not FTE job-years. A job-year is one year of one job and part-time positions are included in the count as a single job. Labor income includes both employee and proprietor income, while value added is comprised of labor income, property income, and indirect business taxes. Output represents intermediate expenditures for materials and services and value added. Impacts of visitor spending are reported by state and then by proposed station location in this economic impacts study.

ESTIMATED ECONOMIC IMPACTS BY STATE

TEXAS

The state of Texas currently has passenger rail service through 19 stations and is served by three Amtrak routes: Texas Eagle, Sunset Limited, and Heartland Flyer. Amtrak carried 205,277 local riders in FY 2016, as well as directly employing 193 personnel within the state. Almost 70 percent of the state's population live within 30 miles of an Amtrak station, and the busiest station is Fort Worth followed by San Antonio and Dallas (*12*). The proposed Amtrak Fort Worth to Meridian service would include stops at five Texas stations: Fort Worth, Dallas, Mineola, Longview, and Marshall. Figure 7 shows the five stations that are currently included in the Texas Eagle route, with service turning north in Marshall toward Chicago rather than continuing on to Shreveport, which is served by a Thruway bus out of the Longview station. The study corridor impacts reported do not include economic impacts of the current Texas Eagle service, only those additional impacts of the proposed new service. Table 5 through Table 7 show the economic impacts in Texas and include a summary of the visitor spending impacts, the state and local tax impacts, and the federal tax impacts.

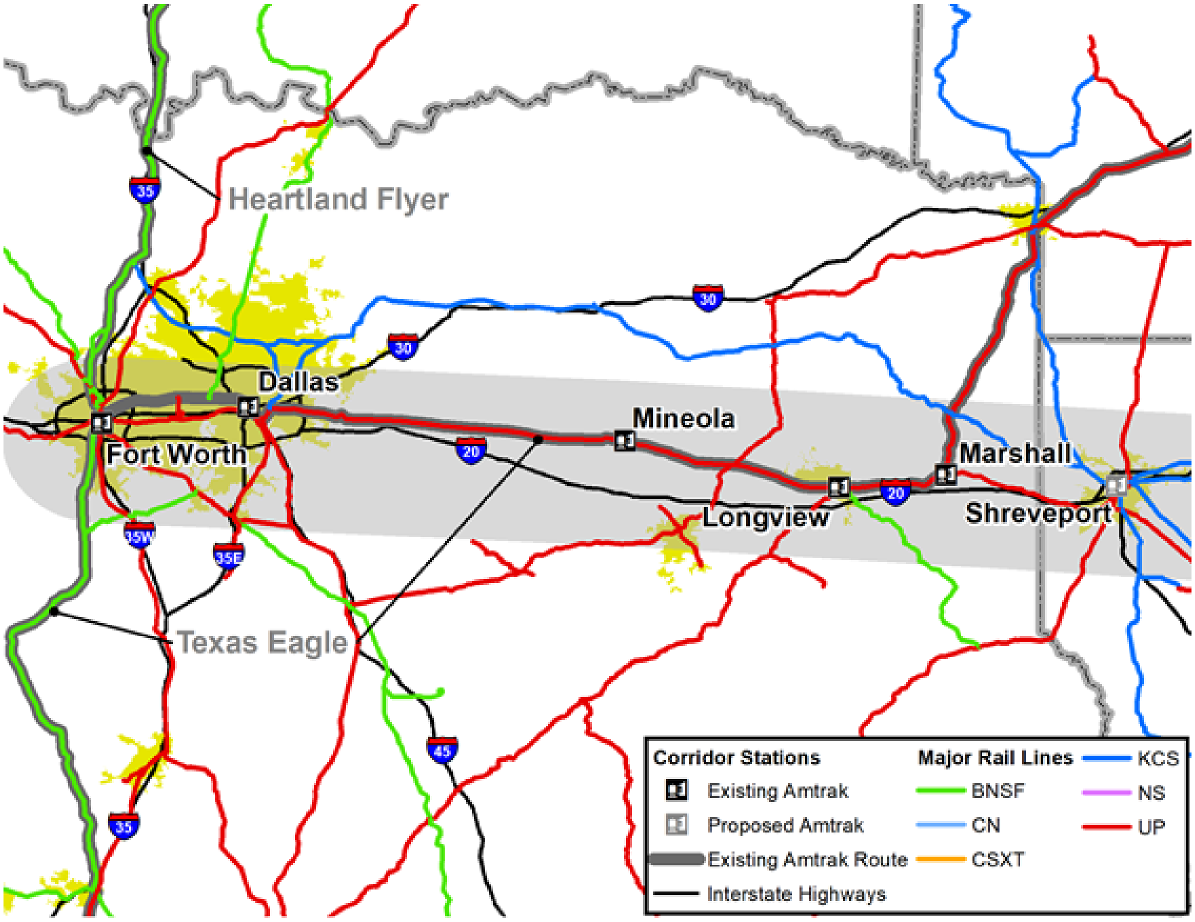


Figure 7. Texas Segment of the Study Corridor

Table 5. Texas Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	127.3	$3,849,057	$5,932,344	$9,511,325
Indirect Effect	18.1	$1,108,477	$1,755,264	$2,992,563
Induced Effect	20.5	$1,037,541	$1,753,746	$2,935,828
Total Effect	**165.8**	**$5,995,075**	**$9,441,354**	**$15,439,715**

Table 6. Texas State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$1,919
Social Insurance Tax- Employee Contribution	$2,083				
Social Insurance Tax- Employer Contribution	$4,211				
Tax on Production and Imports: Sales Tax			$545,949		
Tax on Production and Imports: Property Tax			$352,860		
Tax on Production and Imports: Motor Vehicle License			$7,964		
Tax on Production and Imports: Severance Tax			$37,444		
Tax on Production and Imports: Other Taxes			$19,930		
Tax on Production and Imports: S/L NonTaxes			$448		
Personal Tax: NonTaxes (Fines- Fees)				$29,539	
Personal Tax: Motor Vehicle License				$5,484	
Personal Tax: Property Taxes				$2,371	
Personal Tax: Other Tax (Fish/Hunt)				$1,781	
Total State and Local Tax	**$6,294**	**$0**	**$964,595**	**$39,176**	**$1,919**

Table 7. Texas Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations

Social Insurance Tax-Employee Contribution	$272,917	$44,950			
Social Insurance Tax-Employer Contribution	$266,414				
Tax on Production and Imports: Excise Taxes			$106,923		
Tax on Production and Imports: Custom Duty			$40,256		
Tax on Production and Imports: Fed NonTaxes			$6,537		
Corporate Profits Tax					$183,459
Personal Tax: Income Tax				$452,797	
Total Federal Tax	**$539,332**	**$44,950**	**$153,716**	**$452,797**	**$183,459**

LOUISIANA

Amtrak runs passenger rail service through seven stations and is served by three routes within Louisiana: the Sunset Limited, the Crescent, and the City of New Orleans. These routes carried 105,574 local riders in FY 2016 in the state of Louisiana. The New Orleans station is the busiest in the state and hosts a maintenance facility, which led to Amtrak employing approximately 230 Louisiana residents (*13*). The proposed Fort Worth to Meridian service as outlined in the 2015 Amtrak report along with the two additional added stations would add three additional stops in the state. Figure 8 shows the Louisiana segment of the study corridor. Table 8 through Table 10 show the economic impacts of the proposed route in Louisiana and include a summary of the visitor spending impacts, the state and local tax impacts, and the federal tax impacts.

Ridership data for use in this impact study were provided by Amtrak based on their own analysis of providing service from Meridian to Fort Worth. Their initial analysis described in the 2015 study did not include stops in Monroe and Ruston. After initial review, and at TxDOT request, Amtrak provided supplementary ridership numbers for Monroe and Ruston based off of additional analyses and adapted for use in the proposed Crescent service extension with the intent on being able to provide a high level economic impact analysis of such service. For these two cities, a range of ridership was provided and TxDOT directed that the midpoint of the provided ranges be used as inputs to the economic impact mode for the two added station locations.

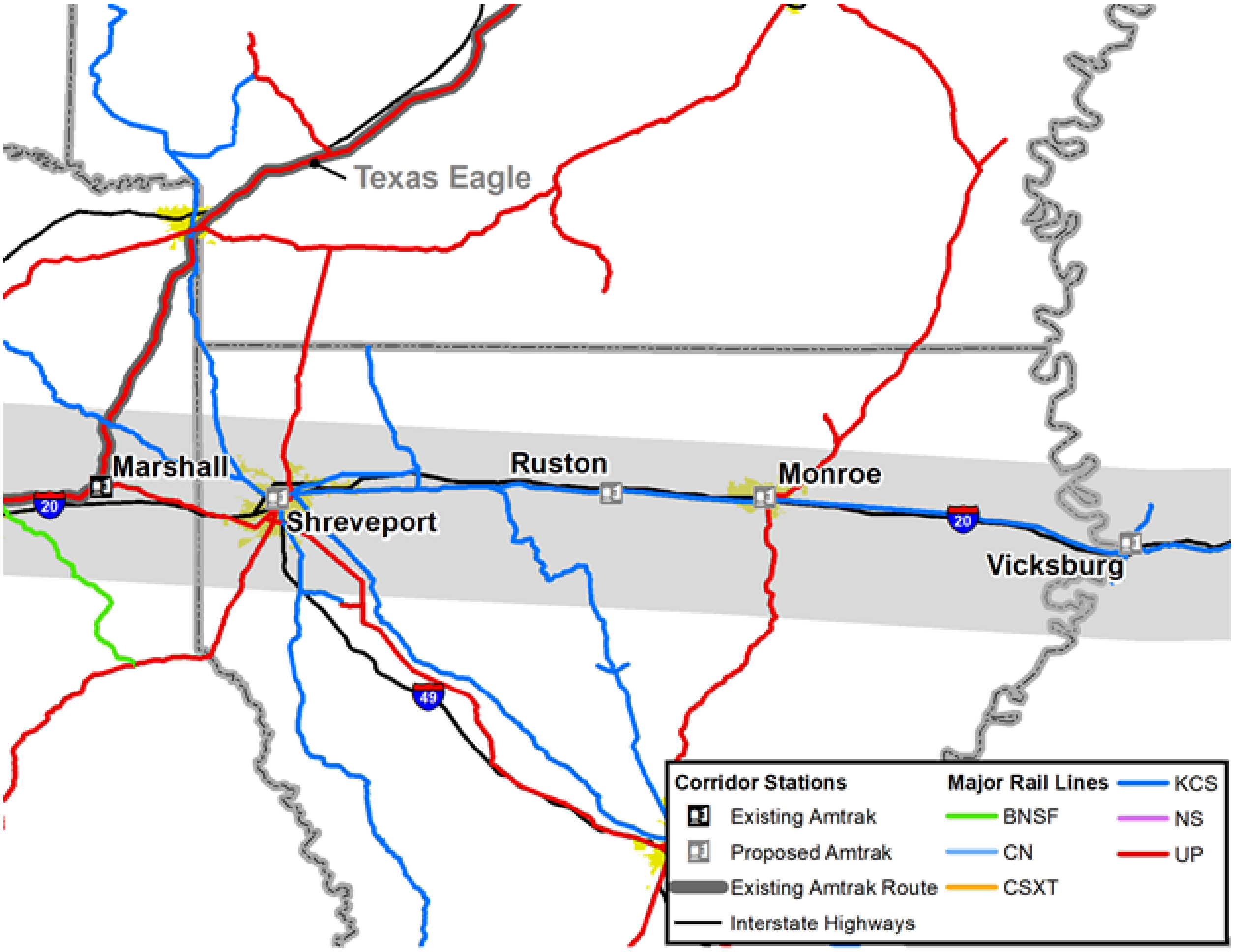


Figure 8. Louisiana Segment of the Study Corridor

Table 8. Louisiana Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	24	$448,365	$663,194	$1,338,145
Indirect Effect	3.5	$157,548	$287,290	$524,928
Induced Effect	3.1	$124,696	$227,677	$396,269
Total Effect	**30.7**	**$730,609**	**$1,178,161**	**$2,259,341**

Table 9. Louisiana State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$208
Social Insurance Tax- Employee Contribution	$555				
Social Insurance Tax- Employer Contribution	$1,120				
Tax on Production and Imports: Sales Tax			$81,676		
Tax on Production and Imports: Property Tax			$33,743		
Tax on Production and Imports: Motor Vehicle License			$241		
Tax on Production and Imports: Severance Tax			$6,073		
Tax on Production and Imports: Other Taxes			$3,777		
Tax on Production and Imports: S/L NonTaxes			$208		
Corporate Profits Tax					$909
Personal Tax: Income Tax				$8,416	
Personal Tax: NonTaxes (Fines- Fees)				$2,827	
Personal Tax: Motor Vehicle License				$156	
Personal Tax: Property Taxes				$211	
Personal Tax: Other Tax (Fish/Hunt)				$300	
Total State and Local Tax	**$1,675**	**$0**	**$125,718**	**$11,910**	**$1,118**

Table 10. Louisiana Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Tax-Employee Contribution	$34,763	$4,862			
Social Insurance Tax-Employer Contribution	$33,934				
Tax on Production and Imports: Excise Taxes			$12,478		
Tax on Production and Imports: Custom Duty			$4,698		
Tax on Production and Imports: Fed NonTaxes			$763		
Corporate Profits Tax					$23,952
Personal Tax: Income Tax				$46,391	
Total Federal Tax	**$68,696**	**$4,862**	**$17,940**	**$46,391**	**$23,952**

MISSISSIPPI

Within Mississippi, Amtrak serves 10 stations and has two routes: the Crescent and the City of New Orleans. (Prior to Hurricane Katrina, the Sunset Route also served the southern part of the state. Plans to restore or improve this route are ongoing.) Amtrak carried a local ridership of 54,090 and directly employed 75 residents in FY2016. Fifty-one percent of the population live within 30 miles of an Amtrak station with Jackson serving as the state's busiest station (*14*). The proposed Fort Worth to Meridian service would include three stops in Mississippi: Vicksburg, Jackson, and Meridian.

Figure 9 shows the Mississippi segment of the study corridor. Jackson and Meridian currently both support north-south services, the former along the City of New Orleans and the latter along the Crescent route. The impacts reported do not include impacts of the current services, only those of the proposed new service. Neither the City of New Orleans nor the Sunset Limited is included in this analysis. Table 11 through Table 13 show the economic impacts of the newly proposed service in Mississippi and include a summary of the visitor spending impacts, the state and local tax impacts, and the federal tax impacts.

Figure 9. Mississippi Segment of the Study Corridor

Table 11. Mississippi Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	42.2	$870,682	$1,285,597	$2,535,907
Indirect Effect	6.4	$262,300	$446,534	$855,459
Induced Effect	5.3	$197,810	$378,480	$659,686
Total Effect	**54.0**	**$1,330,790**	**$2,110,613**	**$4,051,052**

Table 12. Mississippi State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$367
Social Insurance Tax- Employee Contribution	$1,743				
Social Insurance Tax- Employer Contribution	$3,519				
Tax on Production and Imports: Sales Tax			$120,420		
Tax on Production and Imports: Property Tax			$63,308		
Tax on Production and Imports: Motor Vehicle License			$1,641		
Tax on Production and Imports: Severance Tax			$1,858		
Tax on Production and Imports: Other Taxes			$11,206		
Tax on Production and Imports: S/L NonTaxes			$33		
Corporate Profits Tax					$9,065
Personal Tax: Income Tax				$16,576	
Personal Tax: NonTaxes (Fines- Fees				$6,391	
Personal Tax: Motor Vehicle License				$1,217	
Personal Tax: Property Taxes				$469	
Personal Tax: Other Tax (Fish/Hunt)				$61	
Total State and Local Tax	**$5,262**	**$0**	**$198,462**	**$24,712**	**$9,432**

Table 13. Mississippi Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Tax-Employee Contribution	$70,602	$9,505			
Social Insurance Tax-Employer Contribution	$68,920				
Tax on Production and Imports: Excise Taxes			$18,017		
Tax on Production and Imports: Custom Duty			$6,783		
Tax on Production and Imports: Fed NonTaxes			$1,102		
Corporate Profits Tax					$43,777
Personal Tax: Income Tax				$61,193	
Total Federal Tax	**$139,521**	**$9,505**	**$25,901**	**$61,193**	**$43,777**

ECONOMIC IMPACTS BY STATION LOCATION

FORT WORTH, TX

Fort Worth is the fifth largest city in Texas and home to 854,113 residents (*15*). Fort Worth has a diverse economy today, but its historic and economic roots lie in the cattle drives and expansion of the railroads to the city in the late 1800s (*16*). Table 14 through Table 17 show the visitor spending impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the additional passenger rail service at the Fort Worth station.

Table 14. Fort Worth Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	53.7	$1,496,420	$2,337,744	$3,836,442
Indirect Effect	7.6	$396,249	$617,069	$1,100,880
Induced Effect	10.9	$509,396	$865,102	$1,485,673
Total Effect	**72.2**	**$2,402,066**	**$3,819,914**	**$6,422,995**

Table 15. Fort Worth Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
501	Full-service restaurants	19.9	$468,551	$545,630	$996,616
499	Hotels and motels, including casino hotels	14	$445,453	$955,341	$1,515,748
412	Transit and ground passenger transportation	11.4	$405,817	$572,542	$902,290
406	Retail–miscellaneous store retailers	5.9	$117,924	$144,956	$229,084
496	Other amusement and recreation industries	3.7	$86,512	$154,288	$253,428
440	Real estate	1.2	$27,867	$105,411	$169,491
464	Employment services	0.7	$23,482	$33,628	$45,258
468	Services to buildings	0.7	$19,235	$21,518	$31,634
502	Limited-service restaurants	0.7	$13,460	$33,041	$56,749
503	All other food and drinking places	0.6	$18,732	$14,542	$25,215

Table 16. Fort Worth State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$945
Social Insurance Taxes	$2,966				
Taxes on Production and Imports			$430,251		
Corporate Profits Tax					
Personal Taxes				$19,047	
Total State and Local Tax Impacts	**$2,966**	**$0**	**$430,251**	**$19,047**	**$945**

Table 17. Fort Worth Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$222,624	$15,815			
Taxes on Production and Imports			$63,252		
Corporate Profits Tax					$72,851
Personal Taxes				$215,399	
Total Federal Tax Impacts	**$222,624**	**$15,815**	**$63,252**	**$215,399**	**$72,851**

DALLAS, TX

Dallas, Texas, is the third largest city in the state and home to 1.3 million residents. Dallas serves as a transportation hub in North America, with an expanding light rail network, connections to rail, and a large international airport (*17*). Table 18 through Table 21 show the visitor spending impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the additional passenger rail service at the Dallas station.

Table 18. Dallas Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	57.6	$2,017,108	$3,051,894	$4,671,577
Indirect Effect	8.6	$627,764	$1,006,998	$1,627,379
Induced Effect	8	$470,683	$784,312	$1,258,226
Total Effect	**74.2**	**$3,115,555**	**$4,843,204**	**$7,557,182**

Table 19. Dallas Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
501	Full-service restaurants	19.2	$556,411	$627,823	$1,064,575
499	Hotels and motels, including casino hotels	14.9	$684,702	$1,374,220	$1,969,296
412	Transit and ground passenger transportation	13.4	$470,874	$620,939	$1,009,661
406	Retail–miscellaneous store retailers	6.2	$179,704	$204,011	$290,829
496	Other amusement and recreation industries	4.8	$149,999	$254,773	$385,252
440	Real estate	0.9	$51,919	$209,702	$259,035
468	Services to buildings	0.7	$19,315	$22,021	$32,420
464	Employment services	0.6	$26,759	$38,190	$47,305
503	All other food and drinking places	0.6	$22,066	$18,291	$27,832
502	Limited-service restaurants	0.5	$12,159	$27,426	$44,073

Table 20. Dallas State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$835
Social Insurance Taxes	$2,794				
Taxes on Production and Imports			$426,203		
Corporate Profits Tax					
Personal Taxes				$16,679	
Total State and Local Tax Impacts	**$2,794**	**$0**	**$426,203**	**$16,679**	**$835**

Table 21. Dallas Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$272,441	$24,907			
Taxes on Production and Imports			$71,431		
Corporate Profits Tax					$96,942
Personal Taxes				$199,327	
Total Federal Tax Impacts	**$272,441**	**$24,907**	**$71,431**	**$199,327**	**$96,942**

MINEOLA, TX

Mineola is a small city in Texas, home to 4,719 residents. The Mineola Train Depot is now a museum and an Amtrak stop, after being restored to its original appearance in 2005 (*18*). Table 22 through Table 25 show the visitor spending impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the additional passenger rail service at the Mineola station.

Table 22. Mineola Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	2.7	$72,142	$106,490	$184,269
Indirect Effect	0.2	$8,119	$12,796	$29,174
Induced Effect	0.3	$9,393	$19,491	$37,765
Total Effect	3.2	$89,653	$138,777	$251,208

Table 23. Mineola Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
501	Full-service restaurants	0.9	$15,790	$19,561	$39,934
499	Hotels and motels, including casino hotels	0.8	$19,871	$43,744	$75,267
412	Transit and ground passenger transportation	0.7	$29,847	$33,875	$54,080
406	Retail–miscellaneous store retailers	0.3	$5,356	$6,685	$10,453
496	Other amusement and recreation industries	0.1	$1,841	$3,365	$5,862
502	Limited-service restaurants	0	$430	$1,107	$2,041
440	Real estate	0	$108	$831	$2,142
438	Insurance agencies, brokerages, and related activities	0	$638	$906	$3,044
448	Accounting, tax preparation, bookkeeping, and payroll services	0	$751	$969	$1,396

482	Hospitals	0	$930	$942	$2,156

Table 24. Mineola State and Local Tax Impact

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					
Social Insurance Taxes	$131				
Taxes on Production and Imports			$19,715		
Corporate Profits Tax					
Personal Taxes				$541	
Total State and Local Tax Impacts	$131	$0	$19,715	$541	$0

Table 25. Mineola Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$7,284	$1,454			
Taxes on Production and Imports			$2,540		
Corporate Profits Tax					$2,101
Personal Taxes				$7,048	
Total Federal Tax Impacts	$7,284	$1,454	$2,540	$7,048	$2,101

LONGVIEW, TX

Longview, Texas, is home to 82,055 residents, and developed largely due to its proximity to the East Texas Oil Field. Its Amtrak station currently serves as a hub for Amtrak Thruway bus service to both Shreveport and to the Houston-Galveston region via Nacogdoches from the Texas Eagle. The station was recently upgraded into a multimodal station using a $2.2 million Transportation Enhancement grant matched by city funds (*19*). Table 26 through Table 29 show the visitor spending impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the additional passenger rail service at the Longview station.

Table 26. Longview Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	8.4	$155,833	$256,489	$499,937
Indirect Effect	1.3	$60,783	$92,871	$181,919
Induced Effect	0.9	$35,165	$59,441	$106,671
Total Effect	10.5	$251,781	$408,801	$788,526

Table 27. Longview Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
412	Transit and ground passenger transportation	2.8	$32,253	$51,767	$131,766
499	Hotels and motels, including casino hotels	2.5	$57,691	$123,081	$221,108
501	Full-service restaurants	2.2	$43,117	$52,105	$102,102
406	Retail–miscellaneous store retailers	0.8	$19,690	$23,394	$34,938
496	Other amusement and recreation industries	0.2	$5,436	$9,133	$15,541
440	Real estate	0.1	$1,543	$7,498	$14,616
468	Services to buildings	0.1	$1,633	$1,887	$3,324
503	All other food and drinking places	0.1	$1,965	$1,605	$2,989
62	Maintenance and repair construction of nonresidential structures	0.1	$4,226	$5,638	$12,538
464	Employment services	0.1	$2,295	$3,293	$4,383

Table 28. Longview State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$82
Social Insurance Taxes	$236				
Taxes on Production and Imports			$57,794		
Corporate Profits Tax					
Personal Taxes				$1,679	
Total State and Local Tax Impact	$236	$0	$57,794	$1,679	$82

Table 29. Longview Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$23,994	$2,007			
Taxes on Production and Imports			$9,798		
Corporate Profits Tax					$7,048
Personal Taxes				$18,786	

Total Federal Tax Impact	$23,994	$2,007	$9,798	$18,786	$7,048

MARSHALL, TX

Marshall, Texas, is home to 23,561 residents and is a major educational center in East Texas. Marshall is home to East Texas Baptist University, Texas State Technical College, Wiley College, and Panola College (*20*). Table 30 through Table 33 show the visitor spending impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the additional passenger rail service at the Marshall station.

Table 30. Marshall Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	4.9	$107,554	$179,727	$319,100
Indirect Effect	0.4	$15,562	$25,530	$53,211
Induced Effect	0.4	$12,904	$25,400	$47,493
Total Effect	**5.7**	**$136,020**	**$230,658**	**$419,804**

Table 31. Marshall Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
501	Full-service restaurants	1.6	$26,718	$33,354	$68,940
412	Transit and ground passenger transportation	1.3	$35,068	$54,606	$93,613
499	Hotels and motels, including casino hotels	1.3	$36,163	$77,463	$130,376
406	Retail–miscellaneous store retailers	0.5	$7,472	$10,163	$17,855
496	Other amusement and recreation industries	0.2	$2,716	$4,937	$9,845
464	Employment services	0	$943	$1,366	$2,031
440	Real estate	0	$214	$1,522	$3,736
468	Services to buildings	0	$670	$794	$1,321
502	Limited-service restaurants	0	$533	$1,376	$2,552
503	All other food and drinking places	0	$918	$685	$1,202

Table 32. Marshall State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$37
Social Insurance Taxes	$167				
Taxes on Production and Imports			$30,632		
Corporate Profits Tax					
Personal Taxes				$1,229	
Total State and Local Tax Impact	**$167**	**$0**	**$30,632**	**$1,229**	**$37**

Table 33. Marshall Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$12,988	$767			
Taxes on Production and Imports			$6,695		
Corporate Profits Tax					$4,517
Personal Taxes				$12,237	
Total Federal Tax Impact	**$12,988**	**$767**	**$6,695**	**$12,237**	**$4,517**

SHREVEPORT, LA

Shreveport is the third largest city in the state of Louisiana and home to 194,920 residents. The Port of Shreveport on the Red River is being developed once again to be a shipping center for the region. Shreveport currently does not have passenger rail service but has Amtrak Thruway bus service to the Longview Station and on the Meridian to Dallas Thruway bus service (*21*). Table 34 through Table 37 show the visitor spending impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the addition of new passenger rail service at a new Shreveport station. Currently, there is no Shreveport station and any potential location is unknown at this time.

Table 34. Shreveport Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	16	$293,585	$436,681	$883,611
Indirect Effect	2.3	$102,776	$199,711	$356,382
Induced Effect	1.9	$80,412	$147,246	$253,168
Total Effect	**20.3**	**$476,773**	**$783,638**	**$1,493,160**

Table 35. Shreveport Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
496	Other amusement and recreation industries	8.2	$123,166	$160,269	$381,172
412	Transit and ground passenger transportation	2.8	$67,056	$101,075	$182,189
501	Full-service restaurants	2.8	$57,211	$61,393	$123,940
499	Hotels and motels, including casino hotels	2	$40,796	$107,170	$188,384
406	Retail–miscellaneous store retailers	0.4	$10,130	$12,355	$18,516
440	Real estate	0.4	$13,229	$72,089	$91,810
468	Services to buildings	0.2	$3,353	$3,771	$7,020
464	Employment services	0.2	$4,784	$7,103	$9,714
502	Limited-service restaurants	0.1	$2,433	$5,961	$10,864
395	Wholesale trade	0.1	$10,219	$20,334	$32,646

Table 36. Shreveport State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$139
Social Insurance Taxes	$1,108				
Taxes on Production and Imports			$82,606		
Corporate Profits Tax					$633
Personal Taxes				$7,439	
Total State and Local Tax Impacts	**$1,108**	**$0**	**$82,606**	**$7,439**	**$772**

Table 37. Shreveport Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$48,392	$2,095			
Taxes on Production and Imports			$12,558		
Corporate Profits Tax					$16,685
Personal Taxes				$29,981	
Total Federal Tax Impacts	**$48,392**	**$2,095**	**$12,558**	**$29,981**	**$16,685**

RUSTON, LA

Ruston is the parish seat of Lincoln Parish and home to 22,370 residents (*15*). Beginning as a railroad town, Ruston is home to Louisiana Tech and Grambling State University (*22*). Table 38 through Table 41 show the visitor spending impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the addition of new passenger rail service at a new Ruston station. Currently, there is no Ruston station.

Table 38. Ruston Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	2.7	46,187.7	63,767.3	141,822.7
Indirect Effect	0.3	15,762.1	25,678.4	46,702.1
Induced Effect	0.3	11,255.7	21,670.8	37,645.8
Total Effect	**3.4**	**73,205.5**	**111,116.5**	**226,170.6**

Table 39. Ruston Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
412	Transit and ground passenger transportation	1.3	$16,198	$16,952	$55,629
501	Full-service restaurants	0.7	$10,735	$11,959	$27,555
499	Hotels and motels, including casino hotels	0.4	$10,225	$24,081	$41,688
496	Other amusement and recreation industries	0.2	$6,297	$7,668	$13,258
406	Retail–miscellaneous store retailers	0.1	$3,429	$3,910	$5,235
440	Real estate	0	$516	$7,117	$9,337
438	Insurance agencies, brokerages, and related activities	0	$1,360	$2,075	$4,851
503	All other food and drinking places	0	$526	$484	$960
464	Employment services	0	$914	$1,351	$1,781
502	Limited-service restaurants	0	$388	$963	$1,835

Table 40. Ruston State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$18
Social Insurance Taxes	$190				
Taxes on Production and Imports			$13,562		
Corporate Profits Tax					$68
Personal Taxes				$1,122	
Total State and Local Tax Impacts	**$190**	**$0**	**$13,562**	**$1,122**	**$86**

Table 41. Ruston Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$4,650	$1,184			

Taxes on Production and Imports			$1,669		
Corporate Profits Tax					$1,788
Personal Taxes				$4,461	
Total Federal Tax Impacts	**$4,650**	**$1,184**	**$1,669**	**$4,461**	**$1,788**

MONROE, LA

Monroe is the eighth largest city in Louisiana and home to 49,297 residents (*15*). Monroe is an educational hub hosting three universities and a community college within a 30-minute drive (*23*). Table 34 through Table 37 show the visitor spending impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the addition of new passenger rail service at a new Monroe station. Currently, there is no station at Monroe.

Table 42. Monroe Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	5.3	$108,592	$162,745	$312,712
Indirect Effect	0.8	$39,010	$61,901	$121,844
Induced Effect	0.9	$33,029	$58,760	$105,455
Total Effect	7.0	$180,631	$283,406	$540,010

Table 43. Monroe Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
412	Transit and ground passenger transportation	2.3	$38,535	$57,297	$122,753
501	Full-service restaurants	1.4	$27,086	$29,422	$61,503
499	Hotels and motels, including casino hotels	0.9	$28,106	$57,759	$91,952
496	Other amusement and recreation industries	0.6	$9,563	$12,049	$28,955
406	Retail–miscellaneous store retailers	0.2	$7,159	$8,339	$11,593
440	Real estate	0.1	$1,134	$10,668	$16,072
468	Services to buildings	0.1	$1,472	$1,642	$3,097
434	Non-depository credit intermediation and related activities	0.1	$2,663	$2,902	$7,992
502	Limited-service restaurants	0.1	$975	$2,359	$4,456
482	Hospitals	0.1	$3,466	$3,842	$7,496

Table 44. Monroe State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$51
Social Insurance Taxes	$377				
Taxes on Production and Imports			$29,550		
Corporate Profits Tax					$208
Personal Taxes				$3,349	
Total State and Local Tax Impacts	**$377**	**$0**	**$29,550**	**$3,349**	**$259**

Table 45. Monroe Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$15,655	$1,583			
Taxes on Production and Imports			$3,712		
Corporate Profits Tax					$5,479
Personal Taxes				$11,949	
Total Federal Tax Impacts	**$15,655**	**$1,583**	**$3,712**	**$11,949**	**$5,479**

VICKSBURG, MS

Vicksburg, Mississippi, is home to 22,925 residents and situated 40 miles west of the state capital, Jackson. Although originally a center for commerce due to river traffic, Vicksburg connected to the railroads early on in 1831 due to the increasing dangers in river travel (*24*). Table 46 through Table 49 show the visitor spending impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the addition of new passenger rail service at a new Vicksburg station. Currently, there is no Vicksburg station and a potential location is unknown at this time.

Table 46. Vicksburg Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	7.5	$273,275	$373,985	$595,503
Indirect Effect	0.8	$25,982	$43,220	$87,882
Induced Effect	1.3	$45,073	$88,351	$154,185
Total Effect	**9.6**	**$344,329**	**$505,557**	**$837,571**

Table 47. Vicksburg Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
501	Full-service restaurants	2.9	$52,462	$57,513	$123,403
499	Hotels and motels, including casino hotels	2.4	$74,525	$139,223	$235,738
412	Transit and ground passenger transportation	1.6	$117,183	$143,481	$191,265
496	Other amusement and recreation industries	0.4	$24,142	$28,092	$38,318
406	Retail–miscellaneous store retailers	0.3	$8,570	$10,070	$14,623
468	Services to buildings	0.1	$2,051	$2,317	$4,323
440	Real estate	0.1	$1,375	$11,562	$18,261
502	Limited-service restaurants	0.1	$1,970	$4,308	$8,308
464	Employment services	0.1	$2,951	$4,224	$5,910
482	Hospitals	0.1	$6,081	$7,417	$14,393

Table 48. Vicksburg State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$128
Social Insurance Taxes	$555				
Taxes on Production and Imports			$38,390		
Corporate Profits Tax					$1,933
Personal Taxes				$7,313	
Total State and Local Tax Impacts	**$555**		**$38,390**	**$7,313**	**$2,061**

Table 49. Vicksburg Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$30,613	$4,215			
Taxes on Production and Imports			$4,391		
Corporate Profits Tax					$9,335
Personal Taxes				$17,874	
Total Federal Tax Impacts	**$30,613**	**$4,215**	**$4,391**	**$17,874**	**$9,335**

JACKSON, MS

Jackson is the largest urban center in Mississippi, home to 169,148 residents, and serves as the state capital. The original station was built in 1927 after the railroad was elevated through downtown; however, in 2003, it was renovated into a multimodal transportation facility for the city (*25*). While the additional passenger service through Jackson brought by this proposed service extension would result in increased ridership at the station, it is unknown as to whether any station or track improvements related to capacity, access, or safety will be needed at the existing Jackson station. Therefore, no additional constructions impacts have been calculated or are considered in this analysis. Table 50 through Table 53 show the visitor spending impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the additional passenger rail service at the Jackson station.

Table 50. Jackson Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	17	$343,892	$518,795	$1,023,730
Indirect Effect	2.8	$129,399	$227,169	$416,042
Induced Effect	1.9	$78,427	$150,088	$253,082
Total Effect	**21.8**	**$551,718**	**$896,052**	**$1,692,853**

Table 51. Jackson Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
412	Transit and ground passenger transportation	6.1	$99,415	$151,697	$329,083
499	Hotels and motels, including casino hotels	4.7	$113,544	$217,473	$403,268
501	Full-service restaurants	4.6	$97,938	$105,046	$210,233
496	Other amusement and recreation industries	1.2	$23,109	$32,701	$65,657
406	Retail–miscellaneous store retailers	0.6	$14,111	$16,823	$24,701
468	Services to buildings	0.4	$4,263	$4,792	$10,134
440	Real estate	0.2	$6,540	$53,875	$66,122
464	Employment services	0.2	$5,867	$8,385	$11,290
503	All other food and drinking places	0.2	$5,171	$4,979	$7,939
438	Insurance agencies, brokerages, and related activities	0.2	$9,888	$15,574	$32,240

Table 52. Jackson State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$129
Social Insurance Taxes	$3,391				
Taxes on Production and Imports			$79,704		
Corporate Profits Tax					$4,128
Personal Taxes				$8,811	
Total State and Local Tax Impacts	**$3,391**	**$0**	**$79,704**	**$8,811**	**$4,257**

Table 53. Jackson Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$59,779	$3,107			
Taxes on Production and Imports			$11,681		
Corporate Profits Tax					$19,936
Personal Taxes				$22,171	
Total Federal Tax Impacts	**$59,779**	**$3,107**	**$11,681**	**$22,171**	**$19,936**

MERIDIAN, MS

Meridian is home to 39,113 residents and is the sixth largest city in the state of Mississippi. The city of Meridian was first connected to the railroads in 1855, leading to a rich rail heritage in the city. Station upgrades in the recent past and the involvement of its former mayor in intercity rail planning, while a member of Amtrak's board, have also led to increased emphasis on rail service in the region (*26*).

Table 54 through Table 57 show the visitor spending impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the additional passenger rail service at the Meridian station.

Table 54. Meridian Visitor Spending Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	17.7	$253,515	$392,817	$916,674
Indirect Effect	2.8	$106,919	$176,145	$351,535
Induced Effect	2.1	$74,310	$140,041	$252,419
Total Effect	**22.6**	**$434,743**	**$709,004**	**$1,520,628**

Table 55. Meridian Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
412	Transit and ground passenger transportation	6.8	$63,824	$98,183	$293,926
501	Full-service restaurants	4.6	$77,972	$86,200	$190,819
499	Hotels and motels, including casino hotels	4.6	$91,659	$178,295	$361,231
496	Other amusement and recreation industries	1.4	$10,903	$19,494	$58,410
406	Retail–miscellaneous store retailers	0.5	$13,665	$15,817	$22,545
468	Services to buildings	0.3	$5,143	$5,828	$10,926
464	Employment services	0.2	$7,207	$10,310	$13,985
503	All other food and drinking places	0.2	$4,745	$4,653	$8,130
438	Insurance agencies, brokerages, and related activities	0.2	$7,204	$11,673	$30,241
440	Real estate	0.2	$2,068	$26,124	$35,684

Table 56. Meridian State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$110
Social Insurance Taxes	$1,316				
Taxes on Production and Imports			$80,372		
Corporate Profits Tax					$3,004
Personal Taxes				$8,590	
Total State and Local Tax Impacts	**$1,316**	**$0**	**$80,372**	**$8,590**	**$3,114**

Table 57. Meridian Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$49,130	$2,183			
Taxes on Production and Imports			$9,830		
Corporate Profits Tax					$14,506
Personal Taxes				$21,148	
Total Federal Tax Impacts	**$49,130**	**$2,183**	**$9,830**	**$21,148**	**$14,506**

CONSTRUCTION ECONOMIC IMPACTS

Economic impacts of construction are reported as employment, labor income, value added, output, and tax impacts. Employment is reported as individual job-years, not FTE job-years. A job-year is one year of one job and part-time positions are included in the count as a single job. Labor income includes both employee and proprietor income, and value added is comprised of labor income, property income, and indirect business taxes. The economic impacts are also shown by industry sector. Additionally, the impacts calculated include the state and local tax impacts and the federal tax impacts associated with the construction. Output represents intermediate expenditures for materials and services and value added.

RAIL STATION CONSTRUCTION IMPACTS

The analysis included the construction of new stations at Shreveport, Ruston, and Monroe, Louisiana; and Vicksburg, Mississippi. The construction period for each rail station is assumed to be one year. Cost estimates for new stations in Shreveport and Vicksburg were set at $2 million per the 2015 Amtrak study. Because of the smaller market and smaller number of passengers expected to be served, the station costs in Ruston and Monroe were assumed to be $600,000, which is at the lower end of the range compared to the two other new stations in Vicksburg and Shreveport.

SHREVEPORT STATION

Table 58 through Table 61 show the economic impacts, top 10 impacted industries, the state and local tax impacts, and the federal tax impacts related to the construction of a new $2,000,000 passenger rail station in Shreveport, LA.

Table 58. Shreveport Station Construction Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	16.5	$819,634	$949,324	$2,000,000
Indirect Effect	2.4	$137,191	$249,026	$461,077
Induced Effect	4.7	$194,805	$356,883	$613,430
Total Effect	**23.5**	**$1,151,629**	**$1,555,233**	**$3,074,507**

Table 59. Shreveport Station Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
57	Construction of new commercial structures, including farm structures	16.5	$819,634	$949,324	$2,000,000
395	Wholesale trade	0.6	$48,494	$96,494	$154,923
482	Hospitals	0.3	$23,401	$26,013	$46,771
501	Full-service restaurants	0.3	$6,530	$7,007	$14,146
440	Real estate	0.3	$10,926	$59,535	$75,821
502	Limited-service restaurants	0.3	$4,985	$12,213	$22,261
411	Truck transportation	0.2	$13,496	$17,082	$40,921
449	Architectural, engineering, and related services	0.2	$18,132	$18,166	$36,879
405	Retail–general merchandise stores	0.2	$4,329	$8,245	$12,303
475	Offices of physicians	0.2	$16,264	$15,657	$22,576

Table 60. Shreveport Station State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$210
Social Insurance Taxes	$2,425				
Taxes on Production and Imports			$73,708		
Corporate Profits Tax					$953
Personal Taxes				$18,266	
Total State and Local Tax Impacts	**$2,425**	**$0**	**$73,708**	**$18,266**	**$1,163**

Table 61. Shreveport Station Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$105,895	$9,180			
Taxes on Production and Imports			$11,205		
Corporate Profits Tax					$25,117
Personal Taxes				$73,612	
Total Federal Tax Impacts	**$105,895**	**$9,180**	**$11,205**	**$73,612**	**$25,117**

RUSTON STATION

Table 62 through Table 65 show the economic impacts, top 10 impacted industries, the state and local tax impacts, and the federal tax impacts related to the construction of a new station passenger rail station facility in Ruston, LA. As stated previously, Ruston's initial costs for a station facility were estimated at $600,000 due to lower expected ridership in comparison to the new stations at Shreveport and Vicksburg.

Table 62. Ruston Station Construction Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	4.9	$251,356	$289,919	$600,000
Indirect Effect	0.7	$36,094	$56,897	$108,472
Induced Effect	1.4	$52,223	$100,436	$174,606
Total Effect	**6.9**	**$339,673**	**$447,252**	**$883,079**

Table 63. Ruston Station Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
57	Construction of new commercial structures, including farm structures	4.9	$251,356	$289,919	$600,000
395	Wholesale trade	0.1	$5,973	$13,380	$24,389
449	Architectural, engineering, and related services	0.1	$10,530	$10,502	$18,692
502	Limited-service restaurants	0.1	$1,611	$3,993	$7,614
440	Real estate	0.1	$1,278	$17,620	$23,115
501	Full-service restaurants	0.1	$1,545	$1,721	$3,966
482	Hospitals	0.1	$5,057	$5,606	$11,148
411	Truck transportation	0.1	$4,531	$5,818	$12,969
475	Offices of physicians	0.1	$3,472	$3,399	$6,293
503	All other food and drinking places	0.1	$1,065	$979	$1,944

Table 64. Ruston Station State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$68
Social Insurance Taxes	$1,115				
Taxes on Production and Imports			$19,835		
Corporate Profits Tax					$255
Personal Taxes				$5,095	
Total State and Local Tax Impacts	**$1,115**	**$0**	**$19,835**	**$5,095**	**$323**

Table 65. Ruston Station Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$27,320	$3,119			
Taxes on Production and Imports			$2,441		
Corporate Profits Tax					$6,723
Personal Taxes				$20,258	
Total Federal Tax Impacts	**$27,320**	**$3,119**	**$2,441**	**$20,258**	**$6,723**

MONROE STATION

Table 66 through Table 69 show the economic impacts, top 10 impacted industries, the state and local tax impacts, and the federal tax impacts related to the construction of a new station passenger rail station in Monroe, LA. As stated previously, Monroe's initial costs for a station facility were estimated at $600,000 due to lower expected ridership in comparison to the new stations at Shreveport and Vicksburg.

Table 66. Monroe Station Construction Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	5.2	$228,207	$266,994	$600,000
Indirect Effect	0.8	$46,260	$75,000	$147,317
Induced Effect	1.7	$61,446	$109,278	$196,170
Total Effect	**7.7**	**$335,912**	**$451,272**	**$943,487**

Table 67. Monroe Station Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
57	Construction of new commercial structures, including farm structures	5.2	$228,207	$266,994	$600,000
395	Wholesale trade	0.2	$12,911	$25,815	$42,220
449	Architectural, engineering, and related services	0.1	$10,788	$10,778	$20,067
501	Full-service restaurants	0.1	$2,195	$2,384	$4,983
440	Real estate	0.1	$1,253	$11,787	$17,757
482	Hospitals	0.1	$6,471	$7,172	$13,995
502	Limited-service restaurants	0.1	$1,668	$4,037	$7,624
411	Truck transportation	0.1	$2,664	$3,528	$9,824
475	Offices of physicians	0.1	$5,204	$5,008	$7,653
405	Retail–general merchandise stores	0.1	$1,407	$2,742	$4,157

Table 68. Monroe Station State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$65
Social Insurance Taxes	$747				
Taxes on Production and Imports			$23,280		
Corporate Profits Tax					$267
Personal Taxes				$6,187	
Total State and Local Tax Impacts	**$747**	**$0**	**$23,280**	**$6,187**	**$332**

Table 69. Monroe Station Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$31,042	$2,194			
Taxes on Production and Imports			$2,924		
Corporate Profits Tax					$7,027
Personal Taxes				$22,077	
Total Federal Tax Impacts	**$31,042**	**$2,194**	**$2,924**	**$22,077**	**$7,027**

VICKSBURG STATION

Table 70 through Table 73 show the economic impacts, top 10 impacted industries, the state and local tax impacts, and the federal tax impacts related to the construction of a new $2,000,000 passenger rail station in Vicksburg, MS.

Table 70. Vicksburg Station Construction Impact Summary

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	17.9	$680,139	$857,559	$2,000,000
Indirect Effect	1.6	$84,017	$141,387	$294,257
Induced Effect	3.3	$115,315	$225,695	$394,161
Total Effect	**22.9**	**$879,471**	**$1,224,640**	**$2,688,419**

Table 71. Vicksburg Station Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Labor Income	Value Added	Output
57	Construction of new commercial structures, including farm structures	17.9	$680,139	$857,559	$2,000,000
449	Architectural, engineering, and related services	0.3	$30,100	$30,043	$57,085
502	Limited-service restaurants	0.3	$4,824	$10,548	$20,344
482	Hospitals	0.3	$15,681	$19,127	$37,115
501	Full-service restaurants	0.3	$4,808	$5,271	$11,310
395	Wholesale trade	0.2	$16,358	$35,830	$58,795
440	Real estate	0.2	$2,556	$21,487	$33,937
464	Employment services	0.2	$4,433	$6,346	$8,878
405	Retail–general merchandise stores	0.2	$3,913	$7,437	$11,316
475	Offices of physicians	0.1	$13,523	$13,000	$18,864

Table 72. Vicksburg Station State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production	Households	Corporations

			and Imports		
Dividends					$285
Social Insurance Taxes	$1,707				
Taxes on Production and Imports			$73,251		
Corporate Profits Tax					$4,301
Personal Taxes				$18,407	
Total State and Local Tax Impacts	**$1,707**	**$0**	**$73,251**	**$18,407**	**$4,586**

Table 73. Vicksburg Station Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$94,145	$5,356			
Taxes on Production and Imports			$8,377		
Corporate Profits Tax					$20,771
Personal Taxes				$44,993	
Total Federal Tax Impacts	**$94,145**	**$5,356**	**$8,377**	**$44,993**	**$20,771**

RAIL SIDINGS CONSTRUCTION ECONOMIC IMPACTS

The analysis for the proposed passenger rail service additions includes the construction of new rail siding between Marshall and Shreveport, Shreveport and Vicksburg, and Vicksburg and Meridian. A three-year construction period is assumed. Impacts, other than employment, are reported as a three-year total. Employment is reported in total job-years and in annual job-years. The need for additional rail sidings was a determination from the draft physical infrastructure needs study undertaken earlier in 2017 by TxDOT and HNTB. The study helped identify the location, length, and cost of each of the needed sidings. This allowed the model to provide a more accurate result as the impact model is sensitive to state-specific factors that help determine economic impact.

MARSHALL TO SHREVEPORT

An additional two total miles of rail siding need was proposed between Marshall, TX, and Shreveport, LA, at a construction cost of $8,000,000 in the TxDOT/HNTB analysis. Table 74 through Table 77 show the economic impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the rail siding construction from Marshall to Shreveport.

Table 74. Marshall to Shreveport Construction Impact Summary

Impact Type	Employment	Employment/	Labor Income	Value Added	Output

		Year			
Direct Effect	57.9	19.3	$3,260,440	$3,867,247	$8,000,001
Indirect Effect	11.9	4.0	$610,208	$1,097,598	$1,980,371
Induced Effect	18.7	6.2	$759,160	$1,395,774	$2,452,181
Total Effect	**88.5**	**29.5**	**$4,629,808**	**$6,360,619**	**$12,432,553**

Table 75. Marshall to Shreveport Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Employment / Year	Labor Income	Value Added	Output
58	Construction of other new nonresidential structures	57.9	19.3	$3,260,440	$3,867,247	$8,000,001
395	Wholesale trade	2	0.7	$148,135	$300,816	$481,840
482	Hospitals	1.3	0.4	$94,683	$105,072	$190,016
440	Real estate	1.2	0.4	$39,268	$215,154	$279,978
502	Limited-service restaurants	1.1	0.4	$19,025	$46,943	$85,775
501	Full-service restaurants	1.1	0.4	$22,066	$24,019	$48,606
449	Architectural, engineering, and related services	0.8	0.3	$61,314	$61,743	$127,403
406	Retail–miscellaneous store retailers	0.8	0.3	$18,244	$22,499	$34,339
468	Services to buildings	0.8	0.3	$11,935	$13,526	$24,772
405	Retail–general merchandise stores	0.7	0.2	$20,187	$37,616	$55,955

Table 76. Marshall to Shreveport State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$922
Social Insurance Taxes	$7,975				
Taxes on Production and Imports			$280,810		
Corporate Profits Tax					$3,167
Personal Taxes				$68,972	
Total State and Local Tax Impacts	**$7,975**	**$0**	**$280,810**	**$68,972**	**$4,089**

Table 77. Marshall to Shreveport Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$380,356	$53,126			
Taxes on Production and Imports			$46,288		
Corporate Profits Tax					$110,632
Personal Taxes				$325,355	
Total Federal Tax Impacts	**$380,356**	**$53,126**	**$46,288**	**$325,355**	**$110,632**

SHREVEPORT TO VICKSBURG

An additional 14 miles of rail sidings are proposed between Shreveport, LA, and Vicksburg, MS, at a construction cost of $56,000,000 by the TxDOT/HNTB analysis to add needed capacity for the new service. Table 78 through Table 81 show the economic impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the rail siding construction from Shreveport to Vicksburg.

Table 78. Shreveport to Vicksburg Construction Impact Summary

Impact Type	Employment	Employment/ Year	Labor Income	Value Added	Output
Direct Effect	434.6	144.9	$21,501,282	$24,990,610	$56,000,003
Indirect Effect	97.6	32.5	$4,821,512	$8,101,629	$15,617,479
Induced Effect	145.6	48.5	$5,233,651	$9,667,859	$17,441,902
Total Effect	**677.8**	**225.9**	**$31,556,445**	**$42,760,098**	**$89,059,384**

Table 79. Shreveport to Vicksburg Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Employment / Year	Labor Income	Value Added	Output
58	Construction of other new nonresidential structures	434.6	144.9	$21,501,282	$24,990,610	$56,000,003
395	Wholesale trade	15.8	5.3	$1,074,132	$2,200,471	$3,655,258
440	Real estate	10.4	3.5	$95,838	$992,734	$1,541,078
502	Limited-service restaurants	9.8	3.3	$158,953	$388,052	$726,607
501	Full-service restaurants	9.2	3.1	$176,531	$191,326	$399,420
482	Hospitals	8.5	2.8	$540,120	$599,699	$1,154,754
411	Truck transportation	6.7	2.2	$319,697	$417,237	$1,079,528
449	Architectural, engineering, and related services	6.5	2.2	$543,407	$543,238	$1,048,735
468	Services to buildings	6.3	2.1	$93,214	$103,769	$196,283
403	Retail - Clothing and clothing accessories stores	6.1	2.0	$115,703	$290,535	$472,464

Table 80. Shreveport to Vicksburg State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$8,909
Social Insurance Taxes	$62,140				
Taxes on Production and Imports			$2,168,923		
Corporate Profits Tax					$26,229
Personal Taxes				$552,049	
Total State and Local Tax Impacts	**$62,140**	**$0**	**$2,168,923**	**$552,049**	**$35,138**

Table 81. Shreveport to Vicksburg Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$2,484,236	$380,349			
Taxes on Production and Imports			$265,720		
Corporate Profits Tax					$691,120
Personal Taxes				$2,158,135	
Total Federal Tax Impacts	**$2,484,236**	**$380,349**	**$265,720**	**$2,158,135**	**$691,120**

VICKSBURG TO MERIDIAN

An additional 4 miles of rail sidings are proposed between Vicksburg, MS, and Meridian, MS, in the TxDOT/HNTB physical infrastructure analysis at a construction cost estimate of $16,000,000. Table 82 through Table 85 show the economic impacts, the top 10 impacted industries, the state and local tax impacts, and the federal tax impacts associated with the rail siding construction from Vicksburg to Meridian.

Table 82. Vicksburg to Meridian Construction Impact Summary

Impact Type	Employment	Employment/ Year	Labor Income	Value Added	Output
Direct Effect	124.3	41.4	$5,640,669	$7,131,555	$16,000,001
Indirect Effect	32.8	10.9	$1,615,896	$2,777,673	$5,417,608
Induced Effect	43.0	14.3	$1,671,091	$3,190,076	$5,609,019
Total Effect	**200.2**	**66.7**	**$8,927,656**	**$13,099,304**	**$27,026,628**

Table 83. Vicksburg to Meridian Top 10 Industries Affected—Ranked by Employment

Sector	Description	Employment	Employment / Year	Labor Income	Value Added	Output
58	Construction of other new nonresidential structures	124.3	41.4	$5,640,669	$7,131,555	$16,000,001
395	Wholesale trade	5.1	1.7	$358,481	$764,190	$1,233,527
502	Limited-service restaurants	2.8	0.9	$45,539	$100,571	$196,797
440	Real estate	2.6	0.9	$56,319	$475,118	$614,052
449	Architectural, engineering, and related services	2.5	0.8	$181,158	$181,332	$378,004
482	Hospitals	2.4	0.8	$148,047	$180,288	$340,952
468	Services to buildings	2.4	0.8	$31,180	$35,165	$70,256
501	Full-service restaurants	2.3	0.8	$43,093	$46,832	$97,945
411	Truck transportation	2.1	0.7	$111,059	$135,678	$346,533
464	Employment services	2	0.7	$61,436	$87,854	$119,559

Table 84. Vicksburg to Meridian State and Local Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Dividends					$1,965
Social Insurance Taxes	$36,270				
Taxes on Production and Imports			$725,086		
Corporate Profits Tax					$54,607
Personal Taxes				$178,053	
Total State and Local Tax Impacts	**$36,270**	**$0**	**$725,086**	**$178,053**	**$56,572**

Table 85. Vicksburg to Meridian Federal Tax Impacts

Description	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Social Insurance Taxes	$876,829	$84,473			
Taxes on Production and Imports			$100,774		
Corporate Profits Tax					$263,695
Personal Taxes				$444,764	
Total Federal Tax Impacts	**$876,829**	**$84,473**	**$100,774**	**$444,764**	**$263,695**

ECONOMIC IMPACTS SUMMARY

This analysis calculated the economic impacts associated with the proposed passenger rail service from Fort Worth to Meridian. Passenger rail service currently exists at several stations on this proposed route that serve other Amtrak routes. For those stations where existing Amtrak service exist, only the additional passenger traffic created by the addition/extension of the Crescent from Meridian to Fort Worth are included. The proposed service route extension necessitates the construction of new stations in Vicksburg, Monroe, Ruston, and Shreveport under the current scenario. All forecasted, estimated traffic at these new stations from the 2015 Amtrak report and supplementary ridership data for the two additional stations is included in this analysis.

The economic analysis included both visitor spending impacts and construction impacts as data for those components were known and/or obtainable. It does not, however, include any impacts associated with any tenants at any of the stations as those data were not available. Tenants, for example, may include retail businesses and restaurants that have employees and operating budgets that generate additional economic activity. Nor does it include Amtrak operating and maintenance budgets associated with the station locations that likewise generate additional economic activity and impact. Those data were also not available for this analysis. The construction impacts included the construction of the two new stations in Vicksburg and Shreveport as well as the addition of rail sidings between Marshall and Meridian as outlined in the 2017 TxDOT/HNTB draft physical infrastructure needs analysis.

Economic impacts included direct, indirect, and induced impacts for employment, labor income, value added, and total output. The top 10 industries affected by the impacts were also noted, as were the local, state, and federal tax impacts. Table 86 provides a summary of the total economic impacts associated with the proposed passenger rail service between Meridian, MS, and Fort Worth, TX. Total economic impacts for each state are shown in earlier tables in this chapter.

Table 86. Total Economic Impact Estimates of Visitor Spending and Construction

Impact Type	Employment	Labor Income	Value Added	Output
Visitor Spending	250.5	$8,056,475	$12,730,127	$21,750,108
Station Construction	61.0	$2,706,685	$3,678,397	$7,589,492
Rail Siding Construction	322.1*	$45,113,909	$62,220,021	$128,518,565
Total Impacts	**633.6**	**$55,877,069**	**$78,628,545**	**$157,858,165**

**Employment numbers for rail siding construction are per year while all other rail siding totals represent the total impact over the assumed three-year construction period.*

As stated earlier in this section, visitor spending and station construction impacts are reported for a single year. Visitor spending is assumed to continue having an impact on an annual basis while the impacts of station construction are only realized for the estimated single year of construction. Rail siding construction is estimated to occur over a three-year time period. The labor income, value added, and output impacts for rail siding construction represent the total three-year impact. However, the employment numbers represent a single year. Employment is reported as individual job-years, not FTE job-years. A job-year is one year of one job and part-time positions are included in the count as a single job. Labor income includes both employee and proprietor income, while value added is comprised of labor income, property income, and indirect business taxes. Output represents intermediate expenditures for materials and services and value added. Direct impacts represent the initial change in expenditures that are driving the impact while indirect impacts are the effects derived from the direct industries operations (*6*). Induced impacts result from the spending of direct and indirect wages.

CHAPTER 3. CORRIDOR TRAFFIC AND FREIGHT ALTERNATIVES INVESTIGATION

This chapter investigates the operational characteristics of traffic and freight movement along the current I-20 corridor and explores the potential for diverting truck traffic to rail through rail infrastructure improvements. Infrastructure improvements to the rail corridor, made for ICPR purposes, may have some additional benefits of increasing freight rail capacity that would in-turn reduce demand on roadways in the corridor. The chapter looks at roadway constraints of I-20 and other parallel roadways, freight commodities currently moving in the corridor, and benefits of investment in rail infrastructure. Current truck percentage levels along segments of the study corridor and an analysis of the types of commodities that might be able to divert to rail are also presented.

ROADWAY CONSTRAINTS

This section identifies concerns expressed by the states along the corridor related to major roadways, especially in the I-20 corridor, and demonstrates existing conditions and future concerns along the I-20 corridor through which the proposed ICPR would operate.

REVIEW OF STATE HIGHWAY STUDIES ALONG STUDY CORRIDOR ROUTE

Texas' primary concerns along the I-20 East Texas corridor are the current traffic volume and the roadway capacity issue derived from anticipated traffic growth (both passenger and freight vehicles) in the coming years. An approximately 50 percent increase in average daily traffic along the corridor is expected by 2040, compared to 2012 traffic conditions. Of special concern are segments of the corridor where current level of service (LOS) ratings are LOS C-D—largely within urban boundaries and near the Texas-Louisiana border. These segments are expected to fall to LOS E-F by 2040 without major construction, according to a 2015 TxDOT study in the region (*27*). Hence, TxDOT has planned improvements along the corridor include lane expansion, construction of new interchanges and ramps, and bridge widening.

The Louisiana Department of Transportation and Development (LA DOTD) did not specifically discuss the needs of the I-20 corridor in the latest statewide transportation plan. However, according to the state's long-range transportation plan, LA DOTD has assigned approximately 20 percent of their $35.9 billion total budgeted amount to fulfill highway needs to improve highway mobility performance. LA DOTD found that two other major state's principal arterials, I-10 and I-12, along with the I-20 corridor, have very high traffic flows with truck through movements, and intercity and regional passenger movements (*28*).

In the latest Mississippi Statewide Freight Plan, the specific I-20 corridor between Jackson and Meridian is discussed as one of the busiest highway corridors in the state. The same report also states that not only between Jackson and Meridian, but the full length of I-20 corridor will likely be congested in the near future. Since further deterioration in serviceability of the corridor is expected, the state claimed that significant capacity investments will need to be made by 2040. The I-20 corridor along Vicksburg, Jackson, and Meridian is projected to have the highest growth in freight tonnage movement between

2011 and 2040. The report listed "Widen I-20 in Jackson and Meridian areas" as one of the state DOT's preliminary prioritization projects (*29*).

In addition to the individual state studies/plans discussed above, the recently updated *Cost of Congestion to the Trucking Industry* report published by the American Transportation Research Institute (ATRI) noted that Texas and Louisiana are listed among the top 10 states with the highest congestion cost increases with percent change of 24.6 and 82.8, respectively, between 2014 and 2015 (*30*). According to the report from ATRI and the Federal Highway Administration (FHWA), I-49 at I-20 in Shreveport, LA; I-55 at I-20 in Jackson, MS; and I-59 at I-20 in Meridian, MS; are all ranked as congested areas among 250 freight significant highway locations in the United States. The study is performed and updated annually as a part of the Freight Performance Measures (FPM) congestion monitoring initiative (*31*).

FREIGHT ANALYSIS FRAMEWORK VERSION 4 NETWORK DATABASE

The FHWA Freight Analysis Framework Version 4 (FAF4) Network Database maintains the FAF4 national roadway network and contains the results of assigning the FAF4 Origin-Destination Commodity Database to roadway network segments (*32*). This section of the report uses the FAF4 Network Database to demonstrate current and projected traffic levels and roadway conditions. The I-20 corridor between Fort Worth, TX, and Meridian, MS, is isolated to provide statistics associated with the project study corridor. The FAF4 Network Database presents roadway data for 2012 as a base year and projects freight traffic in 5-year increments to 2045.

The I-20 corridor between Fort Worth and Meridian captured from the FAF4 Network Database measures 519 miles in length. Of that 519 miles, 122 miles are designated as urban or small urban and the remaining 397 miles are designated as rural Interstate Highway (see Table 87). Figure 10 displays the 2012 annual average daily traffic (AADT) for the study corridor states. All of the major corridors in this region reflect the highest levels of traffic within the urban areas. The I-20 corridor depicts this same scene, with the highest AADT locations represented in the DFW, Shreveport, and Jackson urban areas.

Table 87. I-20 Corridor Urban-Rural Designations

State	Urban-Rural	Miles	Percent of Total
LA	Shreveport	19	4%
	LA Rural	171	33%
	LA Total	*190*	*37%*
MS	Jackson	29	6%
	MS Small Urban	5	1%
	MS Rural	97	19%
	MS Total	*131*	*25%*
TX	DFW	50	10%
	Longview	4	1%
	TX Small Urban	16	3%
	TX Rural	129	25%
	TX Total	*198*	*38%*
Grand Total		519	100%

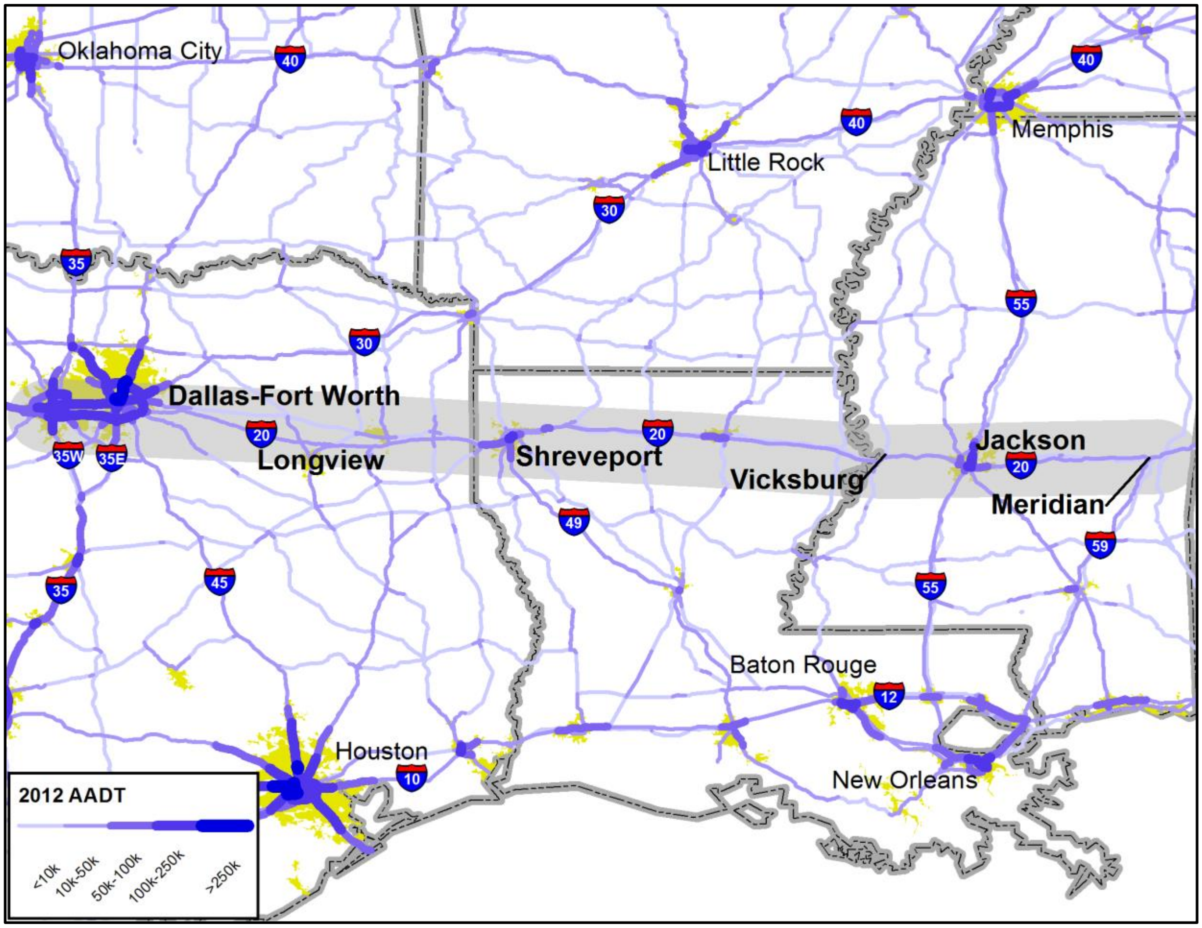


Figure 10. FAF4 Network Average Annual Daily Traffic—2012

In 2012, over 80 percent of the I-20 corridor between Fort Worth and Meridian experienced daily traffic levels under 50,000 per day (see Table 88). Only 8 percent exceeded 100,000 vehicles per day. The 2045 projected daily traffic volumes shown in Table 88 demonstrates that traffic levels are expected to grow significantly, with 19 percent of the I-20 corridor exceeding 100,000 vehicles per day. Additionally, there is a large forecasted shift of many roadway segments from reporting 10,000–50,000 vehicles per day in 2012 to projecting 50,000–100,000 vehicles per day in 2045.

Table 88. I-20 Corridor Average Annual Daily Traffic

Category	2012 AADT	2045 AADT
10k–50k	82%	44%
50k–100k	10%	36%
100k–250k	8%	12%
>250k	0%	7%
Grand Total	100%	100%

Similar to the traffic levels displayed in Figure 10, the volume-to-capacity (V/C) ratio along the I-20 corridor is generally elevated only within the urban areas along the route. This pattern expands when examining the 2045 projected data, as displayed in Table 89 and Figure 11. While only 1 percent of the total I-20 corridor experiences a volume-to-capacity ratio of 0.75 or higher in 2012, that number expands to 18 percent by 2045 according to the FAF4 projections. This shift to high V/C ratios is most acute in areas of northern Louisiana beyond the Shreveport metropolitan area, in and around Jackson, and east of Dallas.

Table 89. I-20 Corridor Volume-to-Capacity Ratio

Category	2012 V/C Ratio	2045 V/C Ratio
<0.25	47%	17%
0.25–0.50	47%	45%
0.50–0.75	5%	21%
0.75–1.0	1%	14%
> 1.0	0%	4%
Grand Total	100%	100%

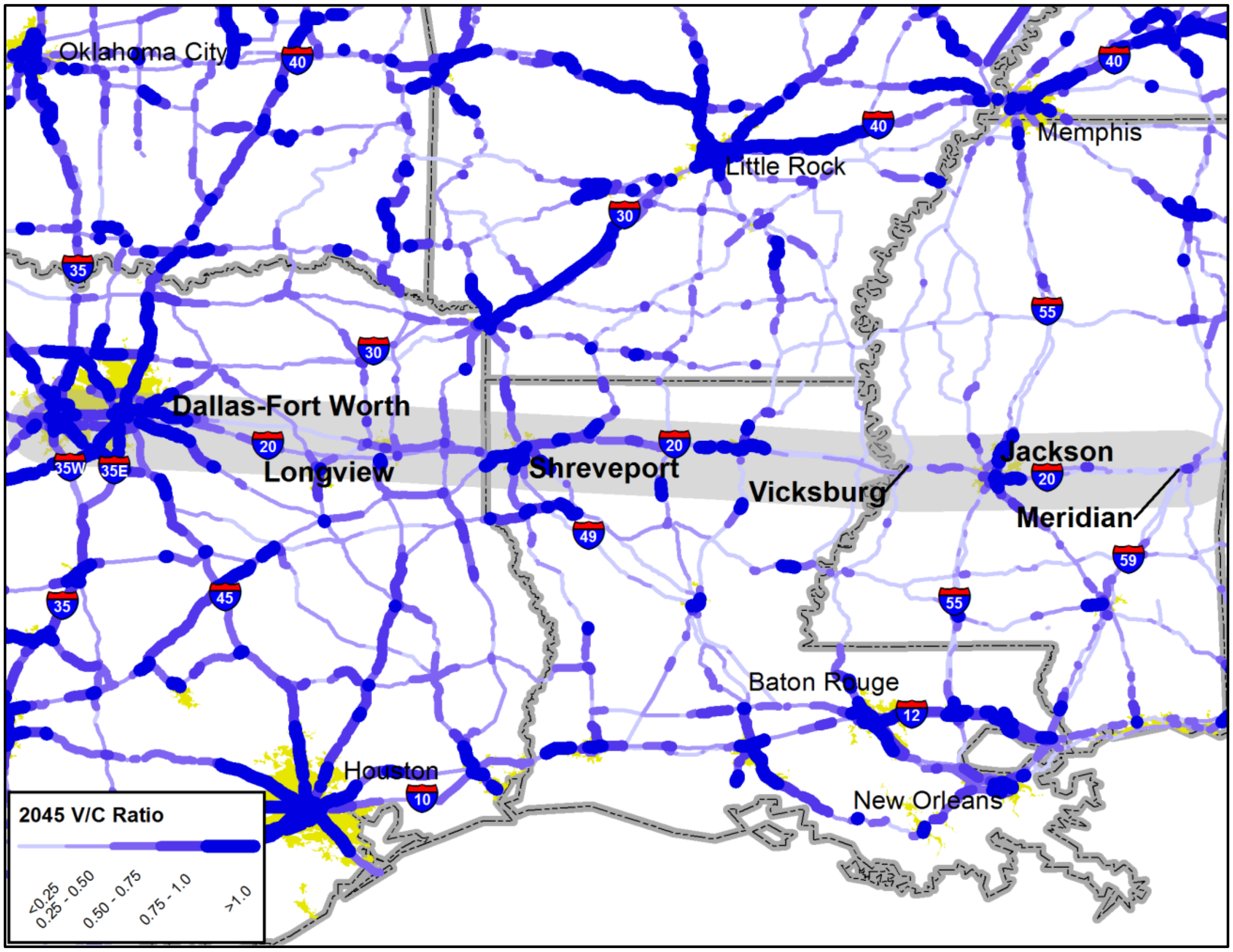


Figure 11. FAF4 Network Projected Volume-to-Capacity Ratio—2045

RAIL IMPROVEMENT IMPACTS

The following analysis provides a brief overview of the benefits of investing in rail infrastructure in the study corridor and describes the existing rail intermodal service areas along the I-20 corridor that might be impacted by a growth in freight rail or increased ICPR service capacity needs.

BENEFITS OF FREIGHT RAIL INFRASTRUCTURE INVESTMENT

Various reports noted benefits of moving freight by rail in different perspectives. Among them, the most notable benefit comes from reducing air pollution emissions. Freight moved by train typically has substantially lower air pollution impacts than truck on a ton-mile basis. A report published by the European Organisation for Economic Co-operation and Development (OECD) presents a comparison table of air pollution emissions between rail and truck by pollutants (see Table 90) (*33*). Recent reports published by the American Association of State Highway and Transportation Officials (AASHTO) and the Association of American Railroads (AAR) also note that railroads are four times more fuel efficient than trucks on average. Therefore, if 10 percent of the freight currently moved nationally by truck were diverted or shifted and moved by rail, it could save approximately 1.5 billion gallons of fuel per year and lower annual greenhouse gas emissions by 17 million tons (*34*, *35*).

Table 90. OECD Air Emission Factor Ranges for Truck and Rail, in grams/ton-km

Pollutant	Truck	Rail
CO	0.25–2.40	0.02–0.15
CO_2	127–451	41–102
HC	0.30–1.57	0.01–0.07
NO_X	1.85–5.65	0.20–1.01
SO_2	0.10–0.43	0.07–0.18
Particulates	0.04–0.90	0.01–0.08
VOC	1.10	0.08

A single railcar is known to move the same weight or volume as four to five trucks. According to the highway-needs costs estimation by FHWA's Highway Economic Requirements System model, combination truck vehicle miles traveled (VMT) are expected to increase by 38 percent by 2020, which means that, nationwide, the highway system would need to carry approximately 245 billion truck VMT. If all the projected 2020 rail tonnage were then moved by truck, approximately an additional 92 billion VMT would need to be added. The incremental cost to the highway system for this additional VMT would be $64 billion, and the value of the freight-rail system to the highway system needs would be $1,943 billion in total between 2000 and 2020 according to analysis in the AASHTO Freight Rail Bottom Line Report and AAR Economic Impact of America's Freight Railroads report (*35*, *36*). Looking at the issue from a different perspective, the Congressional Budget Office recently determined that each truck removed from the highway could save $0.01 per truck ton mile of highway maintenance costs (*37*).

Another impact of railroad investment is that it generates and supports jobs. A report from Towson University's Regional Economic Studies Institute found that railroads supported about 1.5 million U.S. jobs and $89 billion in total wages (*38*,*39*). Chicago Region Environmental and Transportation Efficiency Program also expects to create 2,700 jobs by 2030, and the Crescent Corridor project, a 2,500-mile rail infrastructure project from the Gulf Coast to the East Coast, also expects to create 47,00 jobs by the end of its completion (*40*).

EXISTING RAIL INTERMODAL SERVICES ALONG INTERSTATE 20 CORRIDOR

The south central U.S. rail system facilities incorporates several intermodal lanes, most of which interconnect the western Class I railroads with the eastern Class I railroads. Figure 12 displays the locations in the south central United States that have intermodal terminals. Some cities, like Dallas and Atlanta, have more than one terminal. Along the I-20 corridor, the DFW area, Shreveport, and Jackson all have major freight rail intermodal terminals. Figure 12 stretches east to Atlanta to demonstrate that the overall intermodal freight rail connection between Atlanta and DFW includes terminals in both Atlanta and Birmingham that are not specifically on the study corridor, but that feed freight rail traffic along the existing rail lines in the study corridor region. Additionally, freight rail traffic generated in

Houston, TX; Memphis, TN; and New Orleans, LA; as well as the other intermodal hubs pictured generate traffic that flows along or crosses the Fort Worth to Meridian route.

In addition to KCS intermodal operations, NS also has two intermodal rail services along the I-20 corridor. The NS service with UP operates on the UP line that closely follows I-20 between DFW and Shreveport. NS also operates an intermodal service with KCS along the KCS line between Dallas and Shreveport that roughly parallels I-20 to the north. Both services use the study rail line between Shreveport and Meridian over the tracks owned by the KCS-NS partnership, Meridian Speedway, LLC and on to other major intermodal yards in Birmingham and Atlanta via NS east of Meridian.

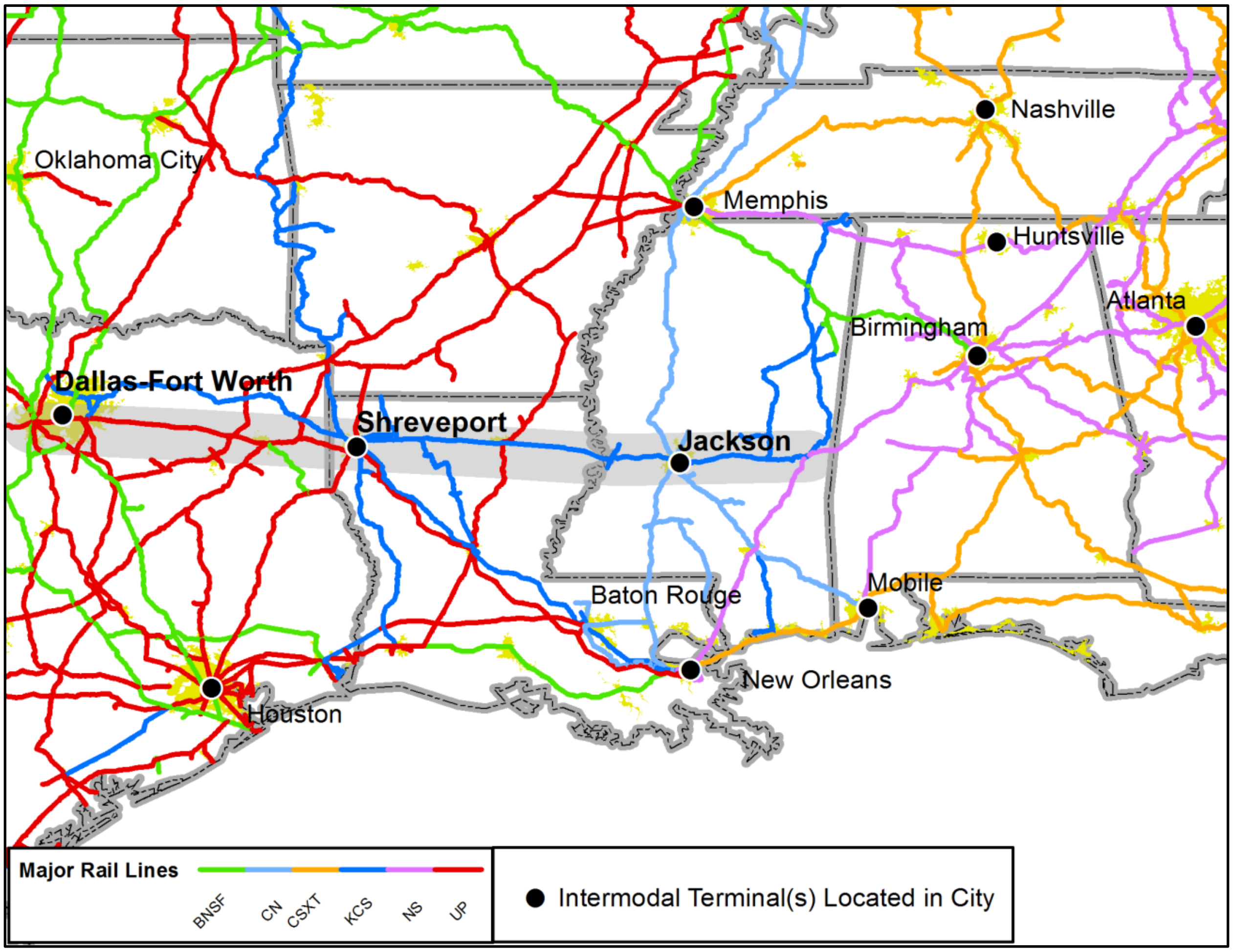


Figure 12. Cities with Railroad Intermodal Terminals

TRUCK DIVERSION ANALYSIS

The goal of the following analysis is to describe truck traffic levels and commodities moving by truck along the I-20 corridor and to estimate the potential likelihood of diversion of truck freight to rail freight in the I-20 corridor using the FHWA FAF4 databases and a methodology recently developed by the National Cooperative Highway Research Program (NCHRP).

CORRIDOR TRUCK LEVELS

The FAF4 Network Database includes the assignment of truck traffic onto the network roadway segments. Figure 13 displays the 2012 average annual daily truck traffic (AADTT) over the FAF4 network roadways for the south central U.S. region surrounding the study corridor. The east-west interstate corridors (I-10, I-20, I-30, and I-40) experience significant truck levels, generally between 10,000 and 25,000 trucks per day. The I-20 corridor maintains 46 percent of its length with trucks in the 10,000–25,000 daily trucks category, with none of the study corridor segments experiencing trucks levels exceeding 25,000 trucks per day in the 2012 FAF4 base year (see Table 91). In 2045, 87 percent of the I-20 study corridor segments have truck levels exceeding 10,000 trucks per day, compared to only 46 percent in 2012.

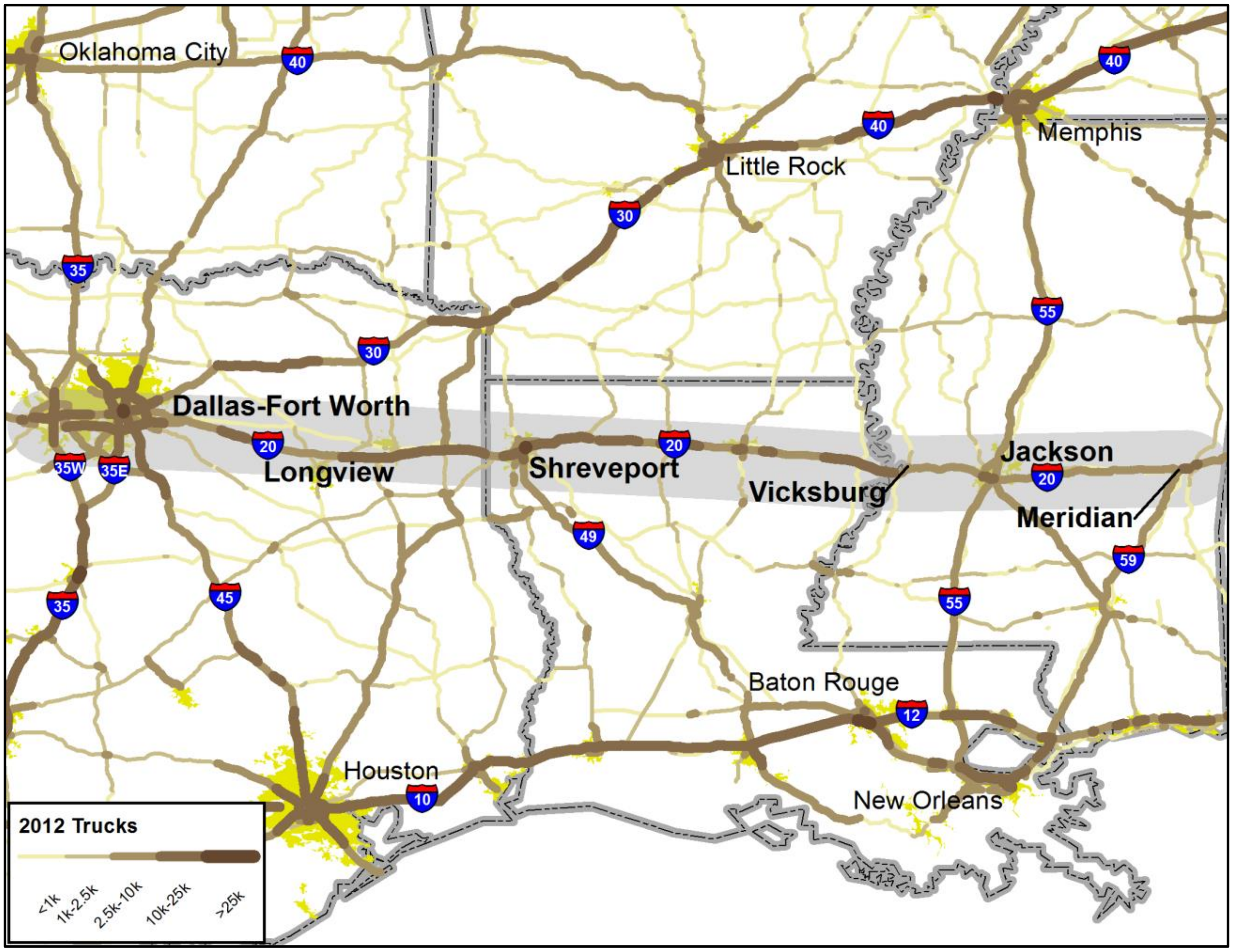


Figure 13. FAF4 Network Truck Volumes—2012 Base Year

Table 91. I-20 Corridor Average Annual Daily Truck Traffic

Category	2012 AADTT	2045 AADTT
1k–2.5k	1%	0%
2.5k–10k	52%	12%
10k–25k	46%	72%
>25k	0%	15%
Grand Total	100%	100%

The rural segments along many of the interstates in the south-central United States surrounding the study corridor experience large percentages of trucks compared to automobiles, as seen in Figure 14, especially the I-20 corridor and I-30/I-40 between Texarkana and Memphis. These represent major trade corridors between the east coast and Texas. With the high volumes of automobile traffic in the urban areas, these roadways have low percentages of trucks despite continuing to carry high truck volumes.

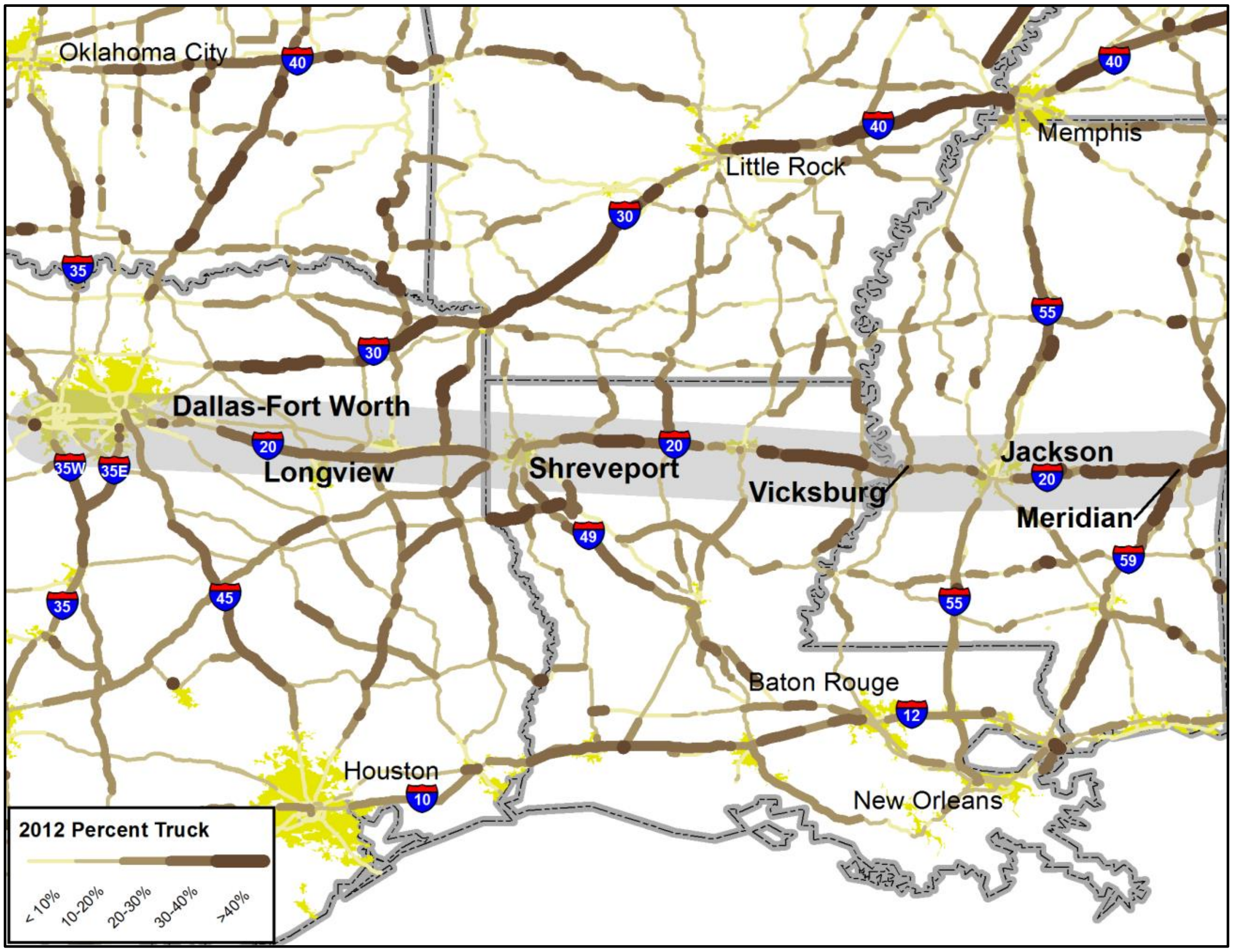


Figure 14. FAF4 Network Percent Trucks—2012

The FAF4 methodology does not change the percentage of modal split in forecast years, instead holding the ratio of trucks to cars constant to what it was in the 2012 base year, so the overall percent of trucks by segment does not change in the projected year numbers. Figure 15 displays the percent trucks in segments along the I-20 study corridor limits. The largest percentage of I-20 corridor segments lies within the 30–40 percent category, with over 17 percent of the segments along the I-20 corridor experiencing over 40 percent trucks.

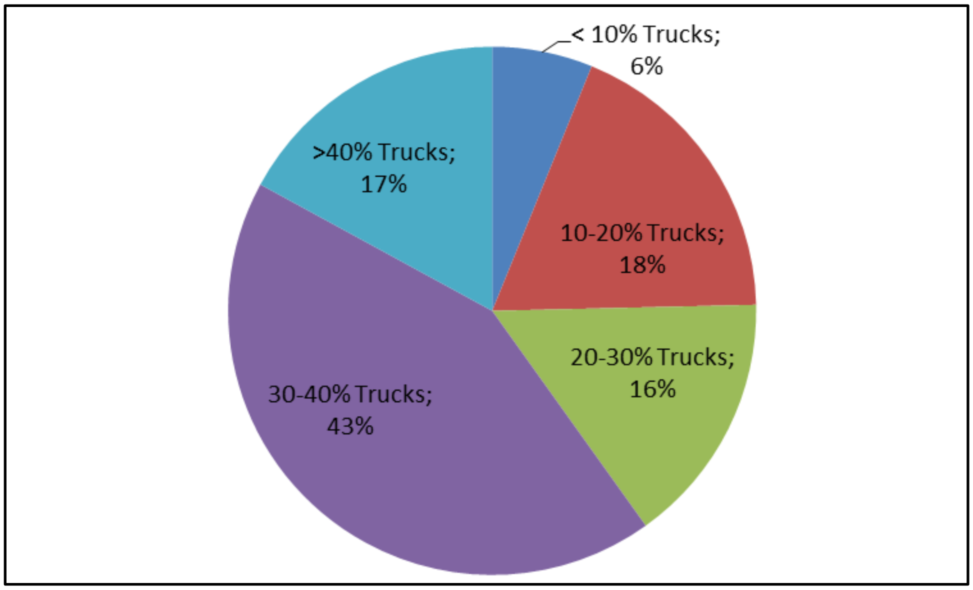


Figure 15. I-20 Corridor Segment Percent Trucks—2012 Base Year

FREIGHT MOVEMENT ALONG THE I-20 CORRIDOR

The FHWA FAF4 Origin-Destination Database estimates tonnage and value of goods by 132 domestic and 8 international FAF regions of origin and destination, type of commodity, and mode of transportation. The recently released FAF4 uses 2012 as a base year and provides forecasts from 2015 through 2045 in 5-year increments.

As noted above, the FAF4 database provides domestic origin and destinations for 132 regions, most of which represent large metropolitan regions. For those states with FAF regions comprised of large metropolitan regions, all remaining areas within a state outside those areas are often grouped together into a single FAF region. States without any major metropolitan regions as defined within FAF typically have a single FAF region, representing the entire state. The FAF regions in Texas include the major metropolitan FAF regions of DFW, Austin, San Antonio, Houston, Beaumont, Corpus Christi, El Paso, and Laredo. The rest of the state is defined as the “remainder of Texas.” The state of Louisiana FAF regions include Lake Charles, Baton Rouge, New Orleans, and a single zone for the “remainder of Louisiana.” The state of Mississippi has no major metropolitan area FAF regions so the entire state of Mississippi is defined as a single FAF region, making it more difficult to segregate freight moving in northern and southern parts of the state for this study. The Jackson, MS, region on the study corridor is, however, identified as the most freight intensive industrial area away from the Mississippi coast in the most recent Mississippi Statewide Freight Plan (*29*). Along the I-20/study corridor, for purposes of this analysis, the following FAF regions were considered in assessing freight movement: the DFW FAF4 region, the remainder of Louisiana FAF4 region, and the state of Mississippi FAF4 region. To capture additional freight activities that potentially feed freight into the I-20 corridor, researchers also extended the freight analysis area to also include the Birmingham and Atlanta FAF4 regions.

The FAF4 Origin-Destination Database designates freight movements into eight modes of transportation: Truck, Rail, Water, Air (includes truck-air), Multiple Modes and Mail, Pipeline, Other and Unknown, and No Domestic Mode. This analysis uses the Truck, Rail, and Multiple Modes and Mail modes of transportation to estimate potential for diversion of existing truck freight in the I-20 corridor to freight rail.

The tons of freight originating or terminating in the I-20 corridor FAF region were extracted from the FAF4 2012 database. The tons moved by truck, rail, and multiple modes were determined for each Standard Classification of Transported Goods (SCTG) commodity code. Based on these totals, the mode share from the total truck, rail, and multiple modes tons was determined for the three modes. Figure 16 shows modal split among truck, rail, and multiple modes along the I-20 corridor. Top 10 commodities shipped along the corridor are displayed in Figure 17 in tonnage. Following to that, tonnage of top 10 commodities by each mode is shown in Figure 18 through Figure 20.

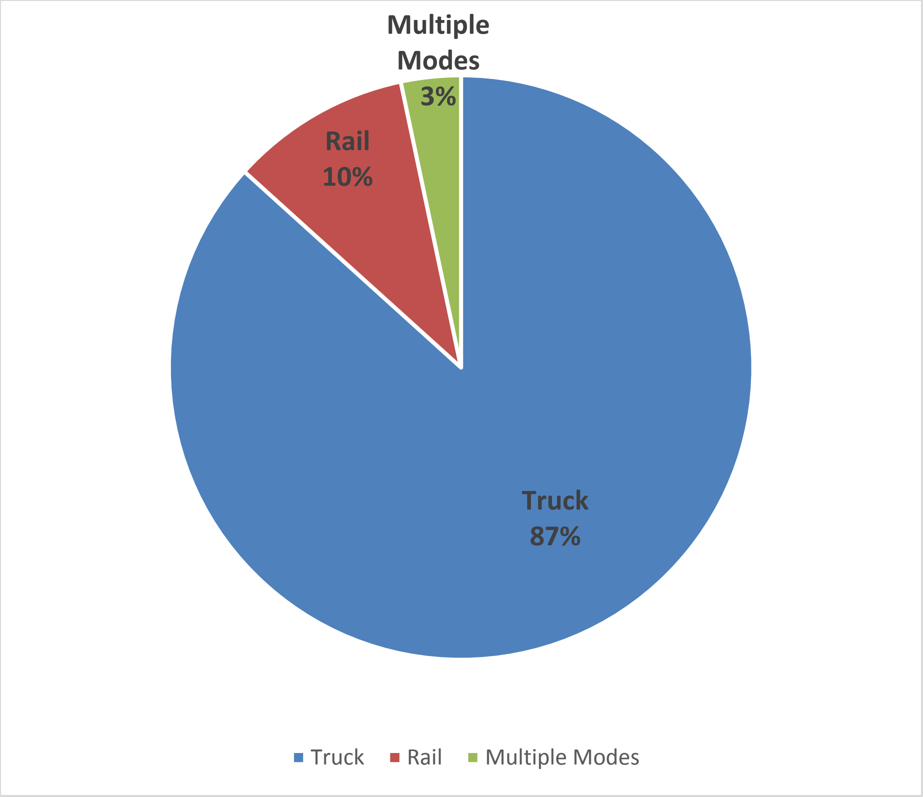
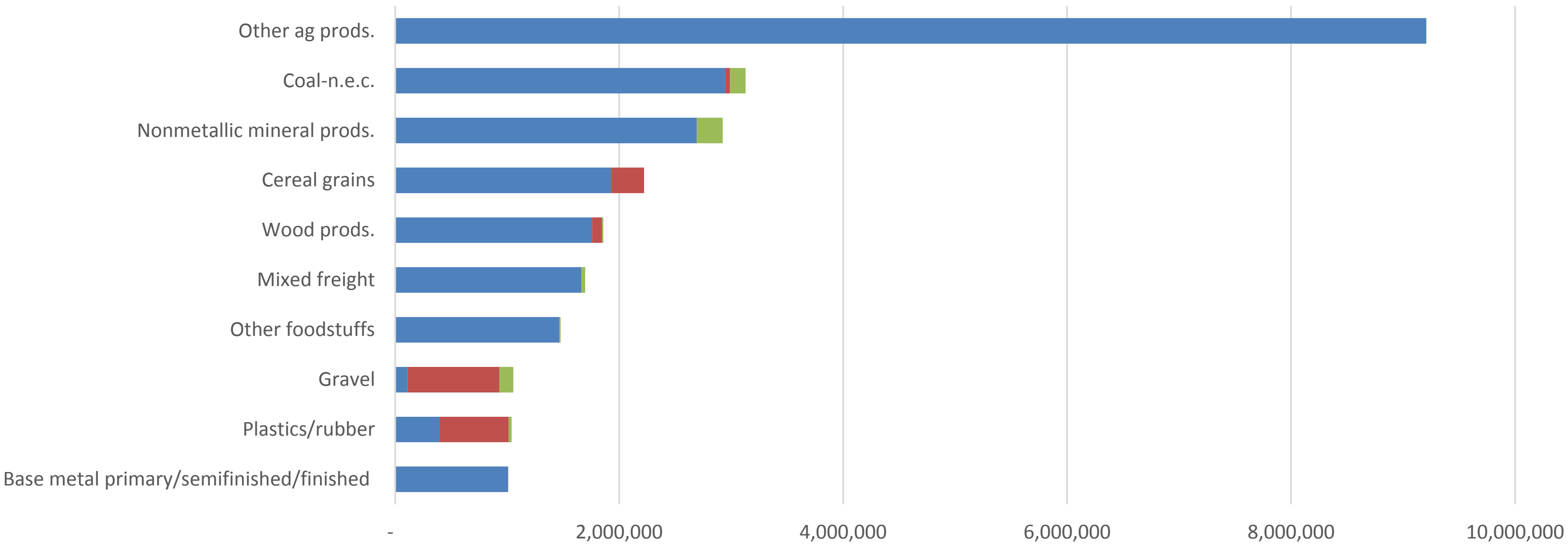


Figure 16. Modal Split along the I-20 Corridor



	Base metal primary/semifinished/finished	Plastics/rubber	Gravel	Other foodstuffs	Mixed freight	Wood prods.	Cereal grains	Nonmetallic mineral prods.	Coal-n.e.c.	Other ag prods.
🟦 Truck	1,007,439	393,776	110,745	1,466,871	1,662,822	1,759,008	1,926,622	2,692,796	2,947,790	9,207,608
🟥 Rail	5	620,207	819,697	-	35	87,142	297,036	-	43,083	-
🟩 Multiple Modes	1,554	26,445	124,886	10,718	34,243	12,889	-	232,139	138,384	111

Figure 17. Top 10 Commodities along the I-20 Corridor

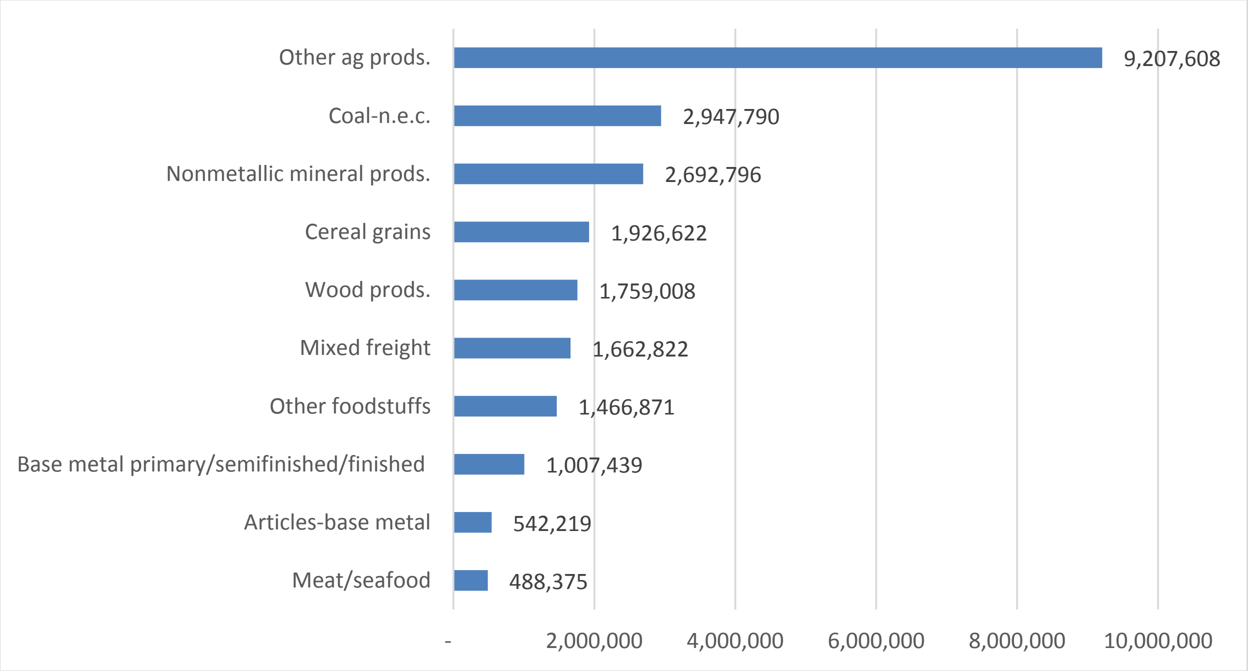


Figure 18. Tonnage of Top 10 Commodities by Truck

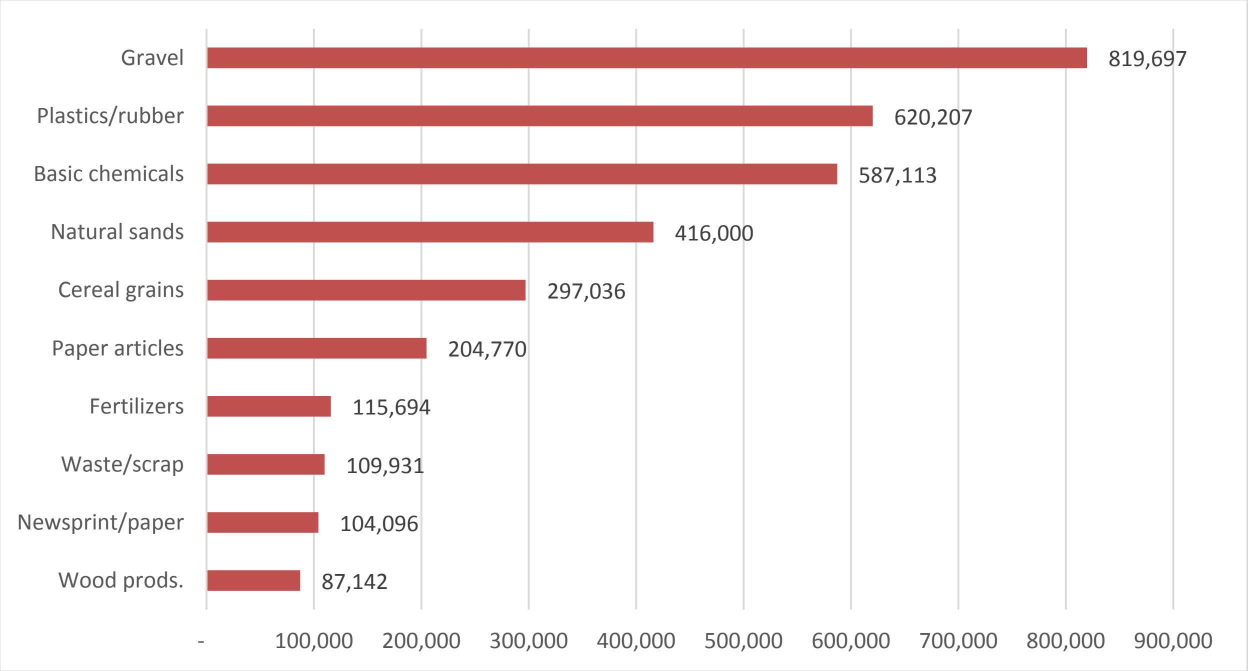


Figure 19. Tonnage of Top 10 Commodities by Rail

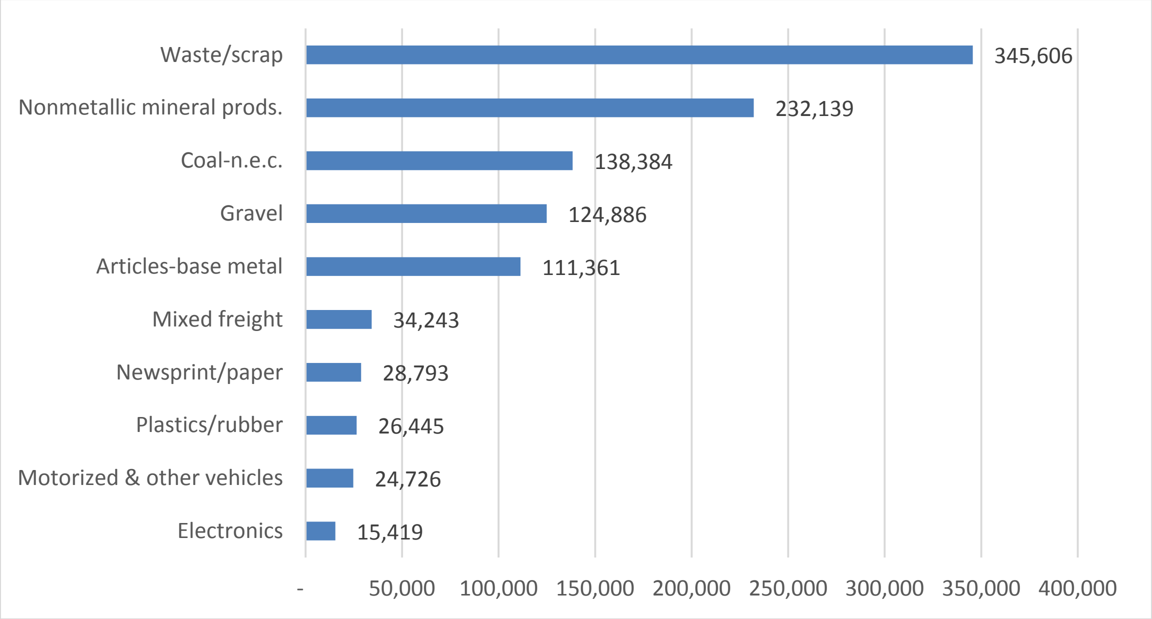


Figure 20. Tonnage of Top 10 Commodities by Multiple Modes

INDICATED TRUCK TO RAIL DIVERSION POTENTIAL

This section describes the results of the truck to rail diversion potential of freight currently moving in the study corridor. The diversion analysis used a model methodology outlined in NCHRP Report 586: *Rail Freight Solutions to Roadway Congestion – Final Report and Guidebook* published by the Transportation Research Board in 2007. The NCHRP 586 Guidebook truck to rail methodology estimates the diversion potential of freight commodities based on the quantity of goods moved by truck and rail and the mode share for each commodity. The diversion level is divided into four different categories: zero, small, significant, and large. If a certain commodity is exclusively moved by truck or rail, there is considered zero or negligible diversion potential. On the other hand, those commodities moved by both truck and rail in large quantities have large potential for diversion. Table 92 shows the definition of each potential diversion level.

Table 92. Definition of Potential Diversion Levels

Diversion Potential	Definition
Zero	Truck or Rail ~ 0%
Small	Truck or Rail < 20%
Significant	Truck or Rail < 40%
Large	Truck or Rail < 80%

However, there are several commodities that have negligible amount in rail shipments but moderately moved by multiple modes. As the NCHRP report only considered rail and truck, there is no published guideline when multiple modes is considered together with truck and rail. Commodities such as coal, pharmaceuticals, printed products, textiles/leather, non-metallic minerals, and electronics that have 0 percent share in rail but some in multiple modes are defined to have small diversion potential. Table

93 displays detailed information on mode share and diversion potential by commodity for the study corridor.

While the results presented in Table 93 indicate that several commodities currently moving by truck in the study corridor region have large or significant potential to shift to rail, it does not directly estimate the amount of these commodities moving in the study corridor currently. Additional analysis in more detail would be warranted to determine the true market opportunities for movement of these goods by rail.

RAILROAD INVESTMENT PROJECT DIVERSION EXAMPLES

Several truck to rail diversion examples are found by reviewing recent Transportation Investment Generating Economic Recovery (TIGER) applications. These examples are provided to demonstrate the magnitude of truck to rail diversion given specific types of rail investments:

- The Maine Regional Railways Project was funded $20 million under the U.S. DOT TIGER VII grant. In the first year of the project, the improved short lines are planned to move over 161 million tons of freight with 5,884 additional rail cars. Hence, it is expected to eliminate more than 5.26 million vehicle miles from the regional highway system. According to the benefit cost analysis performed for the project, the number is equivalent to 11,768 trucks being removed from the regional highway system, which will make space for 47,072 automobiles. The detailed information from the benefit cost analysis is not available to the public (*41*).
- “Improving Multi-Modal Operating Efficiencies to Move Central Texas” is one of the winning 2013 TIGER projects proposed by Capital Metropolitan (CapMetro) Transportation Authority in Austin, Texas. The CapMetro project is projected to convert more than 923,000 tons of commodities shipments from truck to rail by adding capacity to the rail facility along the rail corridor with 15 percent growth in the number of railcars. This is economically competitive since shipping via rail is cheaper than truck by 11 cents per ton mile, and rail capacity is four times the tonnage per car when compared to a single truck (*42*).
- The freight rail modernization project in the south Bronx, New York, was awarded $10 million under the U.S. DOT 2012 TIGER program. This rail improvement project was planned to construct 24,000 feet of new rail infrastructure and rehabilitate 8,500 feet of existing rail. At the end of the project, the improved rail infrastructure will reduce roadway trips by 1.1 billion VMT, which is equivalent to 58 million fewer large truck VMT each year (*43*).
- Oklahoma DOT proposed their freight rail improvements plan from Oklahoma City to Shawnee to 2009 TIGER program. The objective of the study is to repair and stabilize the railroad from the Shawnee area to Oklahoma City and from Shawnee to northern Pottawatomie County. In the No Build scenario, required truck trips would be 8,259 and over 4 million truck miles in 2012. The number of these trips is expected to nearly double by 2029 with 16,354 truck trips and approximately 9 million truck miles. By preserving and improving rail freight service, Oklahoma DOT expects that shippers would save $9.7 million in 2012 by shipping more commodities via rail than truck, and the amount will grow to $18.9 million annually by 2029 (*44*).

Table 93. I-20 Corridor FAF Regional Mode Share and Diversion Potential

SCTG2	Commodity	%Truck	%Rail	%Multiple Modes	Diversion Potential
1	Animals and Fish	100%	0%	0%	Zero
2	Cereal Grains	87%	13%	0%	Small
3	Agricultural Products	100%	0%	0%	Zero
4	Animal Feed	100%	0%	0%	Zero
5	Meat, Poultry, Fish, and Seafood	100%	0%	0%	Zero
6	Milled Grain Products and Preparations	100%	0%	0%	Zero
7	Other Prepared Foodstuffs, Fats and Oils	99%	0%	1%	Zero
8	Alcoholic Beverages and Denatured	100%	0%	0%	Zero
9	Tobacco Products	99%	0%	1%	Zero
10	Monumental or Building Stone	100%	0%	0%	Zero
11	Natural Sands	11%	89%	0%	Small
12	Gravel and Crushed Stone	10%	78%	12%	Significant
13	Other Non-Metallic Minerals	100%	0%	0%	Zero
14	Metallic Ores and Concentrates	100%	0%	0%	Zero
15	Coal	100%	0%	0%	Zero
16	Crude Petroleum	89%	11%	0%	Small
17	Gasoline, Aviation Turbine Fuel, and	100%	0%	0%	Zero
18	Fuel Oils	100%	0%	0%	Zero
19	Other Coal and Petroleum Products	94%	1%	4%	Small
20	Basic Chemicals	40%	60%	0%	Large
21	Pharmaceutical Products	95%	0%	5%	Small
22	Fertilizers	63%	37%	0%	Significant
23	Other Chemical Products and	92%	7%	1%	Small
24	Plastics and Rubber	38%	60%	3%	Significant
25	Logs and Other Wood in the Rough	100%	0%	0%	Zero
26	Wood Products	95%	5%	1%	Small
27	Pulp, Newsprint, Paper, and Paperboard	78%	17%	5%	Small
28	Paper or Paperboard Articles	57%	43%	0%	Large
29	Printed Products	86%	0%	14%	Small
30	Textiles, Leather, and Articles of Textiles	96%	0%	4%	Small
31	Non-Metallic Mineral Products	92%	0%	8%	Small
32	Base Metal in Primary	100%	0%	0%	Zero
33	Articles of Base Metal	80%	3%	16%	Small
34	Machinery	97%	1%	2%	Small
35	Electronic and Other Electrical	86%	0%	14%	Small
36	Motorized and Other Vehicles	94%	0%	6%	Small
37	Transportation Equipment	5%	91%	3%	Small
38	Precision Instruments and Apparatus	76%	1%	23%	Significant
39	Furniture	98%	0%	2%	Small
40	Miscellaneous Manufactured Products	95%	0%	5%	Small
41	Waste and Scrap	50%	12%	38%	Large
43	Mixed Freight	98%	0%	2%	Small
99	Commodity unknown	0%	0%	0%	Zero

APPENDIX: IMPLAN GLOSSARY

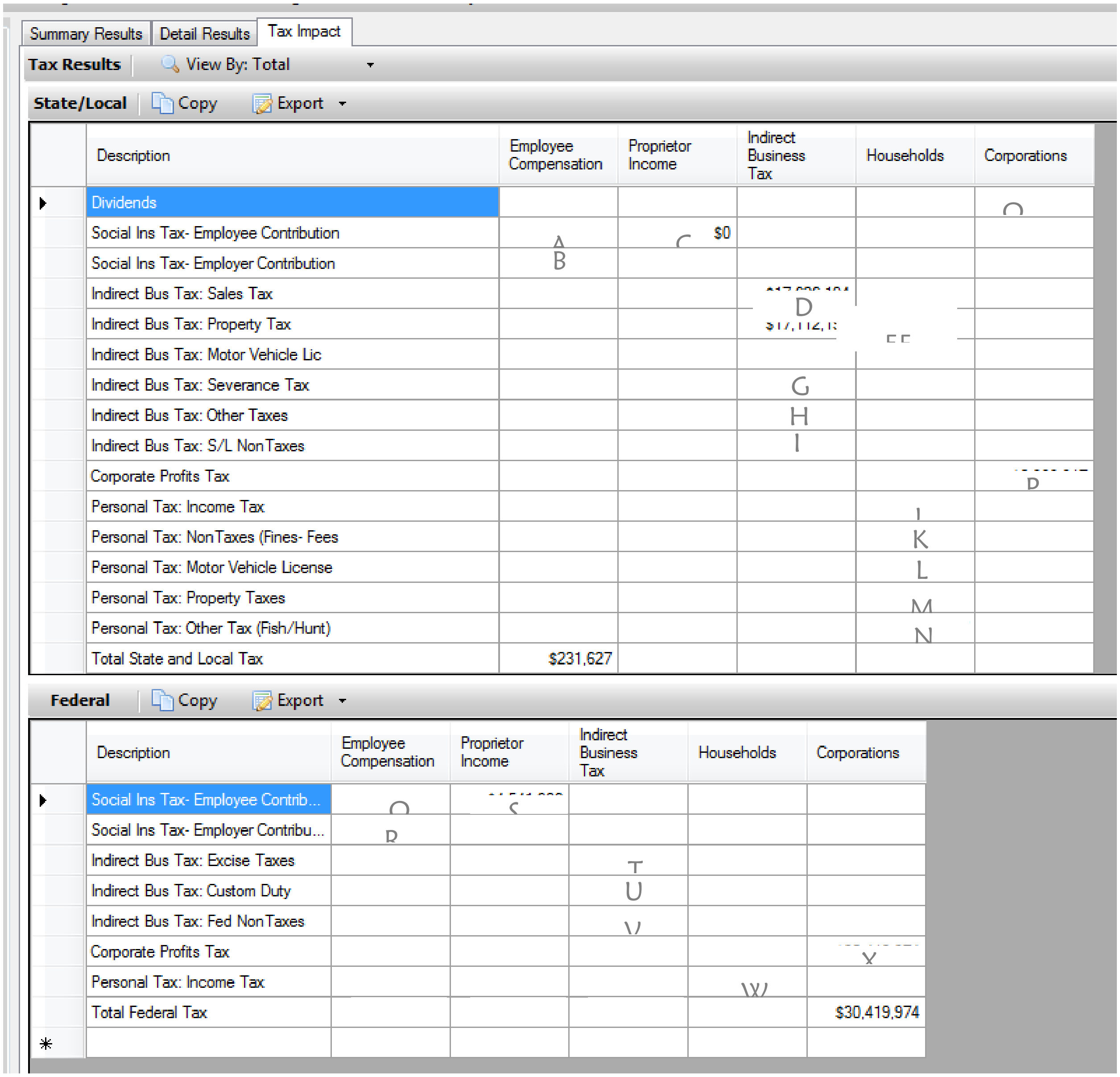
DEFINITIONS AND DATA SOURCES FOR VALUES IN THE TAX IMPACT REPORT

The tax impact report values are based on the existing relationships of the data found in the IMPLAN database (*6*). The sources for these data are listed below, followed by a detailed description of each data element in the tax impact report:

- **NIPA Tables**. All items in the IMPLAN data sets are ultimately controlled to the U.S.-level values from the Bureau of Economic Analysis' (BEA's) National Income and Product Accounts (NIPA). Section 3 of the NIPA tables covers Government Current Receipts and Expenditures.
- **Consumer Expenditure Survey (CES).** The U.S. Census Bureau annually conducts surveys and diary samplings of household expenditure patterns (the CES). The survey data are reported for nine different categories of household income, which we control to the NIPA's Personal Consumption Expenditure totals (which are not split out by income category). From these data, we can establish the tax-to-income relationships for the nine different household income categories. It is based on these relationships that we can distribute many of the national-level tax data to states and state-level tax data to counties, using the number of households in each of the nine household categories in the state or county.
- **Annual Survey of State and Local Government Finances (SLGF).** The U.S. Census Bureau also collects annual state/local government receipts and expenditures data. These data act as preliminary controls for state-level values (subject to controlling to the national NIPA values). They also give us the proportional split of the taxes on production and imports (TOPI) value among the various types (sales, property, etc.). The actual value of total TOPI (at the state level) comes from the BEA's REA series.

  - The annual survey also provides local government collections by tax type. We use these data to estimate, for the total state/local tax receipts, the share of each type of tax that belongs to local government. We then use data for each local government to apportion that local total (at the state level) to each county. Since we know the local total for each county, we can distinguish the state and local tax revenue in the tax impact report. The tax impact report includes four types of governments that compose state/local government:
    - State government.
    - County government.
    - Sub-county general government, which includes city and township governments, for example.
    - Sub-county special government, which includes fire and public school districts, for example.
  - We supplement gaps in the SLGF with 5-year Census of Governments data, and supplement the SLGF state tax revenue with current-year state tax collections data from Census.

- **Regional Economic Accounts (REA).** The BEA collects and reports income, wealth, tax, and employment data on a regional state and county basis also. The REA data from these two tables are used to distribute the U.S. NIPA values to states and counties:
    - Table CA05—Personal Income by Major Source and Earnings by Industry.
    - Table SA50—Personal Tax and Non-tax Payments.



Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Dividends					O
Social Ins Tax- Employee Contribution	A	C $0			
Social Ins Tax- Employer Contribution	B				
Indirect Bus Tax: Sales Tax			[illegible] D		
Indirect Bus Tax: Property Tax			$17,112,1		
Indirect Bus Tax: Motor Vehicle Lic				EF	
Indirect Bus Tax: Severance Tax			G		
Indirect Bus Tax: Other Taxes			H		
Indirect Bus Tax: S/L NonTaxes			I		
Corporate Profits Tax					[illegible] P
Personal Tax: Income Tax				J	
Personal Tax: NonTaxes (Fines- Fees				K	
Personal Tax: Motor Vehicle License				L	
Personal Tax: Property Taxes				M	
Personal Tax: Other Tax (Fish/Hunt)				N	
Total State and Local Tax	$231,627				

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Social Ins Tax- Employee Contrib...	Q	[illegible] S			
Social Ins Tax- Employer Contribu...	R				
Indirect Bus Tax: Excise Taxes			T		
Indirect Bus Tax: Custom Duty			U		
Indirect Bus Tax: Fed NonTaxes			V		
Corporate Profits Tax					[illegible] X
Personal Tax: Income Tax				W	
Total Federal Tax					$30,419,974

Figure 21. Tax Impact Report Key

The following definitions and sources provide a key to the tax impact report, with letters corresponding to the positions in Figure 21. For the local share of all state/local revenue listed below, the local government amounts are distributed according to data on local collections from SLGF:

- **Employee-paid portion for state/local social insurance.** This represents retirement plans and temporary disability insurance. The U.S. value comes from NIPA Table 3.6. This value is distributed to states based on each state's share of the following items from the SLGF: Employee Retirement – Local Employee Contribution; Employee Retirement – State Employee Contribution; and Workers Compensation – Other Contributions. This state value is then distributed to the counties based on each county's proportion of the state's State/Local Government Non-Education Employee Compensation. The county-level State/Local Employee Compensation figures come from BEA. These are then split into Education vs. Non-Education using various data from the U.S. Census Bureau and the U.S. Department of Education.
- **Employer-paid portion for state/local social insurance funds**. This represents workers' compensation and temporary disability insurance. The U.S. value comes from NIPA Table 3.6. This value is distributed to states and based on each state's share of the following items from the SLGF: Employee Retirement – From Local Government; Employee Retirement – From State Government; Unemployment Compensation – Contribution; and Workers Compensation – Own Contributions. County distribution is based on county portion of state and local government non-education employee compensation from IMPLAN.
- **State/local social insurance paid by self-employed**. Self-employed individuals do not make payments to state/local government, so this entry will always have a value of $0. TOPI sales taxes paid to state and local governments. The U.S. value comes from NIPA Table 3.5. The U.S. value is distributed to states based on each state's proportion of Total General Sales Tax from the SLGF. State government values are then distributed to counties based on total retail output.
- **TOPI property taxes paid to state and local governments.** The U.S. value comes from NIPA Table 3.5. The U.S. value is distributed to states based on each state's proportion of Total Property Tax from the SLGF. State government values are then distributed to counties based on total Personal Income from the BEA's CA05 table.
- **TOPI motor vehicle license taxes paid to state and local governments.** The U.S. value comes from NIPA Table 3.5. The U.S. value is distributed to states based on each state's proportion of Motor Vehicle Operator's License Tax and Motor Vehicle License Tax from the SLGF. State government values are then distributed to counties based on total Personal Income from the BEA's CA05 table.
- **TOPI severance taxes paid to state and local governments.** the U.S. value comes from NIPA Table 3.5. The U.S. value is distributed to states based on each state's proportion of Severance Tax from the SLGF. State government values are then distributed to counties based on total Personal Income from the BEA's CA05 table.
- **TOPI other taxes paid to state and local governments.** This item consists largely of business licenses and documentary and stamp taxes. The U.S. value comes from NIPA Table 3.5. The U.S. value is distributed to states based on each state's proportion of the following tax items from the SLGF: Corporation License; Amusement License; Other License; Documentary & Stock Transfer; Public Utility License; Alcoholic Beverage License; Occupation & Business License, NEC; and NEC.

State government values are then distributed to counties based on total Personal Income from the BEA's CA05 table.

- **TOPI non-taxes paid to state and local governments.** This item includes rents and royalties, special assessments, fines, settlements, and donations. The U.S. value comes from NIPA Table 3.5. The U.S. value is distributed to states based on each state's proportion of the following tax items from the SLGF: Miscellaneous – Rents; Miscellaneous – Special Assessments; Miscellaneous – Royalties; and Miscellaneous – Donations from Private Sources. State government values are then distributed to counties based on total Personal Income from the BEA's CA05 table.
- **Personal income tax payments to state and local governments**. The U.S. value comes from NIPA Table 3.3. The U.S. value is distributed to states based on Individual Income Tax from the SLGF. State government values are then distributed to counties based on total Personal Income from the BEA's CA05 table.
- **Personal non-tax payments to state and local governments.** This item includes payments for fines and donations. The U.S. value comes from NIPA Table 3.3. The U.S. value is distributed to states based on Motor Vehicle License Tax from the SLGF. State government values are then distributed to counties based on total Personal Income from the BEA's CA05 table.
- **Personal motor vehicle fee payments to state and local governments**. The U.S. value comes from NIPA Table 3.4. The U.S. value is distributed to states based on Miscellaneous – Fines & Forfeits from the SLGF. State government values are then distributed to counties based on total Personal Income from the BEA's CA05 table.
- **Personal property tax payments to state and local governments**. The U.S. value comes from NIPA Table 3.4. The U.S. value is distributed to states based on Property Tax from the SLGF. State government values are then distributed to counties based on total Personal Income from the BEA's CA05 table.
- **Personal other tax payments to state and local governments.** This item consists largely of hunting, fishing, and other personal licenses. The U.S. value comes from NIPA Table 3.4. The U.S. value is distributed to states based on Hunting and Fishing License Tax from the SLGF. State government values are then distributed to counties based on total Personal Income from the BEA's CA05 table.
- **State/local government dividends.** This item represents net dividend payments to government by corporations from investments. The U.S. value comes from NIPA Table 3.3. The U.S. value is distributed to states based on the following items from the SLGF: Employee Retirement – Securities – Mortgages; Employee Retirement – Securities – Corporate Stocks; Employee Retirement – Securities – Corporate Bonds; and Employee Retirement – Total Other Securities. State government values are distributed to counties is based on their proportion of state Other Property Income (from IMPLAN database).
- **State/local government corporate profits tax.** The U.S. value comes from NIPA Table 3.3. The U.S. value is distributed to states based on Corporate Net Income Tax from the SLGF. State government values are then distributed to counties is based on counties based on their proportion of the state's Other Property Income (from IMPLAN database).

- **Employee-paid portion for federal social insurance**. This item includes social security, survivors insurance, disability insurance, hospital insurance, supplemental medical insurance, unemployment insurance, veterans' life insurance, and railroad retirement plans. The U.S. value comes from NIPA Table 3.6. The U.S. value is distributed to states and counties based on Personal Contribution for Social Insurance from the BEA's CA05 table.
- **Employer-paid portion for federal social insurance**. This item includes social security, survivors insurance, disability insurance, hospital insurance, military medical insurance, unemployment insurance, pension benefit guaranty, veterans' life insurance, and railroad retirement plans. The U.S. value comes from NIPA Table 3.6. The U.S. value is distributed to states and counties based on Personal Contribution for Social Insurance from the BEA's CA05 table.
- **Self-Employed contribution to federal social insurance**. This item includes social security, survivors insurance, disability insurance, and hospital insurance. The U.S. value comes from NIPA Table 3.6. The U.S. value is distributed to states and counties based on Personal Contribution for Social Insurance from the BEA's CA05 table.
- **TOPI Federal Excise Taxes.** This item includes federally levied excise taxes on alcohol, tobacco, telephones, coal, fuels, air transportation, vehicles, etc. The U.S. value comes from NIPA Table 3.2. The U.S. value is distributed to states and counties based on IMPLAN estimates of total TOPI for all industries in relationship to U.S. total TOPI.
- **TOPI Federal Custom Duties.** These are gross collections less refunds. The U.S. value comes from NIPA Table 3.2. The U.S. value is distributed to states and counties based on IMPLAN estimates of total TOPI for all industries in relationship to U.S. total TOPI.
- **TOPI Federal Non-taxes.** This item includes rents and royalties.[1] The U.S. value comes from NIPA Table 3.2. The U.S. value is distributed to states and counties based on IMPLAN estimates of total TOPI for all industries in relationship to U.S. total TOPI.
- **Personal Income taxes paid to the federal government.** These are taxes paid through withholding, declarations, and final settlement less refunds. The U.S. value comes from NIPA Table 3.2. The same value can also be found in NIPA Table 3.4. The U.S. value is distributed to states based on each state's value of "Federal government: Individual Income taxes (net of refunds)" from the BEA's SA50 table. State values are then distributed to counties based on total Personal Income from the BEA's CA05 table.
- **Federal corporate profits tax**. The U.S. value comes from NIPA Table 3.2. The U.S. value is distributed to states and counties based on their proportion of U.S. Other Property Income (from IMPLAN database).

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[1] The source NIPA table does not specify that these are paid by businesses. We are assuming that royalties would only be paid as the result of some type of business activity; thus, we attribute it all to Indirect Business Taxes (IBT).

Note: The information in Appendix A is taken from the following source: IMPLAN, LLC. (2016, July 17). *Generation and Interpretation of IMPLAN's Tax Impact Report*. Retrieved from http://support.implan.com/index.php?view=download&alias=83-understanding-the-tax-impact-report&category_slug=internal-docs&option=com_docman&Itemid=1764.

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