Appendix F

Alternative and Environmental Considerations Report
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DISCLAIMER STATEMENT  
April 2014

The Alternatives and Environmental Considerations Report (AECR) is a summary document that outlines the alternatives considered and environmental analyses conducted to date for the proposed DART Cotton Belt Corridor Regional Rail project. The report contains the results of data collection and an impact analysis conducted by DART between July 2010 and September 2013 and is not a complete or thorough review of the issues found in the corridor. It is based on preliminary 5% design plans and is intended to provide the reader with information about the range of alternatives and design considerations analyzed during this period. It is contemplated that additional work will be required to complete or update this document when direction is provided to advance the project through the capital development process either as a DART project or in conjunction with a private developer. The report includes a status of design or environmental issues so that when work is resumed, there is an understanding of the necessary effort.

While the original scope of the Cotton Belt Project included achieving environmental clearance under the National Environmental Policy Act (NEPA) for the Federal Transit Administration, Federal Aviation Administration and DART’s Policy for Local Environmental Review changes to the project occurred that necessitated changing the anticipated deliverable to the AECR in order to preserve the work that was undertaken under the contract. The AECR identifies the environmental resources and existing conditions associated with the project and includes potential social, economic and environmental impacts of the various alternatives being considered. Suggested mitigation for the identified potential impacts are also included.
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1 PURPOSE OF REPORT

1.1 Introduction
This Alternatives and Environmental Considerations Report (AECR) is a summary document that outlines the alternatives considered and environmental analyses conducted to date for the proposed Cotton Belt Corridor Regional Rail project. This document identifies the environmental resources and existing conditions surrounding the Cotton Belt corridor from the Dallas/Fort Worth International Airport (DFW Airport) to Shiloh Road in Plano, Texas; provides background data for consideration of the proposed project alternatives to be evaluated during the future National Environmental Policy Act (NEPA) phase of the project once funding for project construction has been identified; and identifies potential social, economic and environmental impacts of the proposed project. Options for potential mitigation measures are also presented.

The Cotton Belt Corridor Regional Rail Project (Cotton Belt Project) is in the pre-NEPA stage of the project development process. The AECR is not intended nor required to fulfill federal (e.g., NEPA or Section 106), state or local regulations or requirements. The AECR is supported by a series of technical memoranda and reports prepared as part of the environmental evaluation of design alternatives. These supporting documents are summarized and/or referenced throughout the AECR, where applicable, and are appended. For a complete list of these technical memoranda, refer to the list of documents at the front of each Appendix. Appendix A includes each of the environmental technical memoranda. Appendix B contains supporting reports and technical memoranda. Appendix C is a compilation of agency coordination correspondence and Appendix D contains the Final 5% Design Plans, design report, and engineering supporting documentation.

It should be noted that the NEPA process was initiated with a Notice of Intent published in the Federal Register on July 8, 2010. This announced the Federal Transit Administration (FTA) and Dallas Area Rapid Transit’s (DART) decision to prepare an Environmental Impact Statement (EIS) for the Cotton Belt Project. The Federal Aviation Administration (FAA), having jurisdiction over airports, was identified as a cooperating agency. Uncertainty associated with funding and implementation schedule prompted suspension of the NEPA process.

Construction of the future regional rail project may involve the use of future federal funds and may require project approval by the FTA, FAA or other federal agencies. As such, future environmental studies and project reviews will be required as part of the NEPA review process to provide for the determination of a preferred alternative. Studies completed to date as part of the current Cotton Belt Project are designed to document the vision for the corridor, with specific emphasis on identifying the future rail alignment and identifying environmental concerns.

This Cotton Belt Project is a collaborative effort led by DART and included an early public and agency involvement process that is summarized in Appendix C.
**Project Location**

The proposed Cotton Belt Project is located between DFW Airport and the DART Red Line in the Plano/Richardson area of Texas. The Cotton Belt Project is part of a longer corridor extending between Fort Worth and Wylie, Texas, known as the Cotton Belt Corridor, 52 miles of which is owned by DART.

As reflected in Figure 1-1, the 26-mile DART Cotton Belt Corridor would lie within right-of-way purchased by DART in 1990 and designated as a preserved corridor for future passenger rail service. The right-of-way width varies throughout the corridor, but is generally 100 feet. The alignment traverses through three counties: Tarrant, Dallas, and Collin; and seven cities: Grapevine, Coppell, Dallas, Carrollton, Addison, Richardson and Plano. Land use varies along the corridor and includes residential, commercial, government/institutional, transportation and industrial, as well as underdeveloped areas.

Three freight companies operate within the corridor through agreements on tracks owned by DART: The Fort Worth and Western Railroad (FWWR), the Kansas City Southern (KCS) Railroad, and the Dallas Garland Northeastern (DGNO) short-line freight rail service. The Union Pacific (UP) Railroad has trackage rights but does not currently operate within the corridor. The Surface Transportation Board (STB) approved the abandonment of freight on the Cotton Belt from Knoll Trail in Dallas to Renner Junction in Richardson effective on January 27, 2010. The STB’s action was based on a DART Board resolution on January 22, 2010 in anticipation of implementing passenger service in the corridor.

**Figure 1-1: Project Location Map**

![Project Location Map](image-url)

*Source: GPC 5, 2010*
1.2 Project Background

The Cotton Belt Corridor has been included in both regional and local transportation plans since 1983, when a passenger rail corridor concept from the DART Red Line in the Richardson/Plano area to the Green Line in Carrollton was included in the original DART Service Plan. In 1989, the DART Transit System Plan recommended the purchase and preservation of the Cotton Belt Corridor right-of-way from north Fort Worth to Wylie; the 52-mile corridor purchase was completed in 1990. During the development of the 1995 DART Transit System Plan, this corridor was combined with others as an alternative for further study to serve an expanded North Crosstown Corridor.

DART conducted a high level alternatives analysis and completed an existing conditions report on the North Crosstown Corridor as part of its 2030 Transit System Plan (TSP), adopted in 2006. The 2030 TSP identified the Cotton Belt Corridor as a focus area and concluded that by 2030, the North Crosstown Corridor area would experience notable insufficient roadway capacity equivalent of more than 10 freeway lanes. The report indicated that rail service on the Cotton Belt Corridor (from DFW Airport to the DART Red Line), using 20 minute peak and 60 minute off-peak service, was the most cost-effective and direct route to serve this east-west crosstown corridor.

On May 11, 2010, the DART Board of Directors authorized the President/Executive Director to execute the Memorandum of Understanding (MOU) between DART and the Regional Transportation Council (RTC) concerning the identification of funding sources to implement rail service on the Cotton Belt Corridor. The MOU established DART’s role to advance the preliminary engineering and conduct an EIS for the project and the North Central Texas Council of Governments (NCTCOG) was to develop a financial plan sufficient to design, build, and implement regional rail service on the Cotton Belt Corridor. DART initiated NEPA Scoping in July 2010.

The RTC/NCTCOG efforts to identify funding did not result in any financial proposals and the state legislature did not take any action on a proposed bill to finance the project. The MOU expired on September 30, 2012 without a substantive financial plan. DART’s project development resulted in a number of changes in the scope/design of the project, especially as DART navigated the public and agency coordination. Because of these changes and uncertain funding, DART suspended the NEPA process in late 2012 and decided to prepare the AECR documentation contained herein and develop a modified Final Preliminary Engineering 5% Design Plan Set, which is located in Appendix D.

On a regional level, the Cotton Belt Corridor has been included in the NCTCOG regional transportation plan since 1986. The western portion of the 52-mile Cotton Belt Corridor, between Fort Worth and DFW Airport is being evaluated by the Fort Worth Transportation Authority (the T). In October 2008, The T completed a Draft EIS for the western section of the Cotton Belt from DFW Airport to Fort Worth as part of their TEX Rail project (formerly known as the Southwest-to-Northeast (SW2NE) project). On August 12th, 2013, the T’s Board of Directors determined that a phased approach would most quickly advance the implementation of the TEX
Rail commuter rail service. The project was redefined due to cost and other considerations as the minimum operable segment which was included in the DEIS as an optional alignment.

The proposed TEX Rail project length was reduced from 37.6 miles to 27.2 miles. FTA requested an Environmental Assessment (EA) be prepared to document the changes to the project since the completion of the DEIS. Following the completion of the EA, the T has begun preparing the documentation required for the Final Environmental Impact Statement (FEIS) currently scheduled to be completed in 2014. To complete the environmental review process, it is anticipated that the FTA and FAA would issue a Record of Decision (ROD). The ROD would commit the T to the proposed mitigation and would allow the agency to move into the implementation phase of the project once funding is secured. The T is seeking federal funding for the TEX Rail project. The proposed Cotton Belt Project would utilize the portion of the TEX Rail’s project that extends northwest, on new right-of-way, from the DFW Terminal B Station to the DFW North Station located just south of the Cotton Belt Corridor. This portion of the alignment and the DFW Terminal B Station are included in the T’s FEIS.

Relevant System Planning Activities
The Cotton Belt Corridor has been studied and included in numerous transportation improvement plans since 1983. The following plans have included the Cotton Belt Corridor:

- **DART Final Service Plan, 1983** – DART Service Plan included an at-grade passenger rail service from downtown Carrollton to North Central Corridor (the current Red Line).

- **Mobility 2000 – The Regional Transportation Plan for North Central Texas, May 1986** – This plan recommended the right-of-way preservation for the Cotton Belt Corridor from downtown Fort Worth to Plano.

- **DART Transit System Plan, June 1989** – The plan recommended the Cotton Belt Corridor right-of-way preservation and purchase. The purchase of 52 miles of right-of-way from Wylie, Texas to north Fort Worth was completed in 1990.

- **2010 DART Transit System Plan, November 1995** – This plan identified the North Crosstown Corridor which included the Cotton Belt, Kansas City Southern (KCS), and Burlington Northern Santa Fe (BNSF) railroad corridor alignments.

- **Mobility 2020 – The Metropolitan Transportation Plan, December 1996** – This plan included commuter rail on the Cotton Belt Corridor from Parker Road or Addison Transit Center to DFW Airport and light rail from Addison Transit Center to Interstate Highway (IH) 635/ United States Highway (US) 75.

- **Mobility 2025 – The Metropolitan Transportation Plan, January 2000** – This plan identified several options for the North Crosstown Study area including passenger rail along Santa Fe and Burlington Northern lines, passenger rail on the Cotton Belt Corridor from Parker Road to DFW Airport, passenger rail on the Cotton Belt Corridor from the Addison Transit Center to DFW Airport, and light rail from the Addison Transit Center to IH 635/US 75.

- **Mobility 2025 Update – The Metropolitan Transportation Plan, May 2001** – The regional transportation plan was updated in 2001. The options for the North Crosstown Study area remained the same and included, passenger rail along Santa Fe and Burlington Northern lines, passenger rail on the Cotton Belt Corridor from Parker Road to DFW
Airport, passenger rail on the Cotton Belt Corridor from the Addison Transit Center to DFW Airport, and light rail from the Addison Transit Center to IH 635/US 75.

- **Mobility 2025 – The Metropolitan Transportation Plan – 2004 Update, January 2004** – The updated regional transportation plan included options for the North Crosstown Study area. The options included, passenger rail along Santa Fe and Burlington Northern lines, passenger rail on the Cotton Belt Corridor from Parker Road to DFW Airport, passenger rail on the Cotton Belt Corridor from the Addison Transit Center to DFW Airport, and light rail from the Addison Transit Center to Forest Lane Station on the DART Red Line.

- **Mobility 2025 – The Metropolitan Transportation Plan – April 2005 Amendment, April 2005** – The updated regional transportation plan included modified options for the North Crosstown Study area. The options included passenger rail on the Cotton Belt Corridor from Parker Road to DFW Airport, passenger rail service along BNSF and KCS Corridors from Carrollton to Richardson and light rail from the Addison Transit Center to Forest Lane Station on the DART Red Line.

- **DART 2030 Transit System Plan, October 2006** – The DART system plan included express rail on the Cotton Belt Corridor from the DART Red Line to DFW Airport. As part of this plan, a high-level alternatives analysis and existing conditions report was completed. This report concluded that express passenger rail service from DFW Airport to the DART Red Line along the Cotton Belt Corridor was the most direct and cost-efficient route.

- **Mobility 2030 – The Metropolitan Transportation Plan, June 2007** – The regional transportation plan included light rail/new technology for the Cotton Belt Corridor with the alignment from DFW Airport to downtown Plano or Bush Turnpike Station.

- **Mobility 2030 – The Metropolitan Transportation Plan – 2009 Amendment, April 2009** – The amended plan included an option for the Cotton Belt Corridor with light rail/new technology and the alignment from DFW Airport to downtown Plano or Bush Turnpike Station.

- **Cotton Belt Corridor Conceptual Engineering and Funding Study – April 2010** – This study completed by the NCTCOG provided background information on the existing environment, and compared various combinations of interlining with the western portion of the Corridor, Red Line termini, minor alignment deviations, and station locations on the Cotton Belt Corridor.

1.3 **Purpose and Need**

The Cotton Belt Corridor currently has a number of employment centers, major corporate headquarters and jobs. As a result, traffic within the project study area has been increasing. Congestion and travel delays on the existing roadway network are at moderate to severe levels. Current land use patterns exhibit low-density, auto-oriented development and lack connectivity to existing transit systems. However, some areas, such as Addison, have significant medium to high density developments focused on the Transit Center and future rail station. Over the next 20 years, the project study area is projected to attract new employment and population, continuing to impact and strain the transportation network. The accessibility of the corridor will decline as congestion and travel delay increases. Even with the planned transportation improvements for the corridor, congestion and travel delays are expected to worsen. In order
to meet the growing demands of the corridor, transportation improvements are needed to improve accessibility, connectivity and reduce congestion levels.

The following transportation needs have been identified for the Cotton Belt Corridor.

- Reduce congestion and travel delays along major roadway networks.
- Provide reliable connections between the existing and proposed local and regional transit systems.
- Improve accessibility to employment, activity centers and residential areas in the corridor.
- Promote sustainable development patterns in the study area.

The Cotton Belt Project’s primary purpose is to provide passenger rail connections and service that will improve mobility, accessibility and system linkages to major employment, population and activity centers in the northern part of the DART Service Area. Travel patterns within the Cotton Belt Project study area are largely east to west, suburb to suburb and longer distance than the traditional suburb to central business district trip. The proposed Cotton Belt Project would be designed to provide high-speed, reliable transit options for long-distance commuters in the corridor with connections to the existing and planned transit systems. The vehicles are anticipated to be compliant with FRA safety regulations but have the look and feel of light-rail vehicles. The transit service will be unique to corridor and region.

The implementation of passenger rail within the Cotton Belt Corridor would provide an alternative mode of transportation to help alleviate traffic congestion within the project study area. The connection of three LRT lines and two planned regional rail lines (DCTA A-Train and the T’s TEX Rail Project) makes regional connectivity a key component of the Cotton Belt Project. The Cotton Belt Project also offers opportunities to connect with the proposed BNSF regional rail corridor between Frisco and Irving, with a connection in downtown Carrollton.

Regional demand for travel in the project study area is projected to increase along with congestion. Implementation would improve transit performance in the project study area by offering a new, more reliable service. By implementing a new transportation option, peak period congestion would be reduced, improving regional air quality.

More detailed information supporting the purpose and need is contained in Appendix B.
2 ALTERNATIVES CONSIDERED

2.1 Local Planning Process

This section briefly explains how the local planning process yielded the alternatives that were considered for fulfilling the “purpose and need” of the transit investment.

2.2 Alternatives Description

The Cotton Belt Project implements passenger transit service within a 26-mile section of the Cotton Belt Corridor from DFW Airport to the Richardson/Plano area of Texas. The alignment extends eastward from DFW Airport, through three counties: Tarrant, Dallas, and Collin; and seven cities: Grapevine, Coppell, Carrollton, Addison, Dallas, Richardson and Plano. The primary purpose of the project is to provide regional rail service that will improve mobility, accessibility and system linkages to major employment, population and activity centers in the northern part of the DART Service Area. Service would be provided every 20 minutes during the peak periods and every 60 minutes during the off-peak periods. Proposed project elements include station areas with rail passenger platforms, bus transfer areas, passenger shelters, parking, kiss-and-ride, associated site amenities, hard-surface pedestrian paths, landscaping and fencing.

The proposed project would be placed primarily within Cotton Belt Corridor (right-of-way purchased by DART in 1990) and designated as a preserved corridor for future transit rail service. The corridor has been included in various DART and NCTCOG planning documents since 1983 as an alignment alternative for passenger rail. During the development of the DART 2030 TSP, the Dallas City Council passed a resolution with their recommendations for the plan. This included conditions specific to the Cotton Belt Project, one of which was that the rail line be below grade from at least 2,000 feet west of Preston Road to 1,500 feet east of Meandering Way in North Dallas. In their resolution adopting the DART 2030 TSP in October 2006, the DART Board of Directors acknowledged without endorsing the City’s preference for a below grade option. Instead, DART will consider mitigation alternatives in working with the cities on environmental concerns. Two below grade options and an at-grade option are presented below in the alternatives discussion.

The majority of the Cotton Belt Project alignment is designed as a double track within the existing single freight track corridor. The Cotton Belt Project would operate in conjunction with continued freight rail service, except through the area where freight has been abandoned (Knoll Trail Drive in Dallas and Renner Village in Richardson.

The proposed regional rail vehicle would comply with the requirements of the Federal Railroad Administration (FRA) safety standards (FRA-compliant) because there are no plans to remove freight service from other sections of the corridor. The rail vehicle that would operate in the corridor would be similar to the rail vehicles currently operating on the Denton County Transportation Authority (DCTA) A-Train system with future generation low or no emission propulsion based on resolutions passed by both the Dallas City Council and the DART Board.
The regional rail line would be an expansion of the region’s rail transit system and would connect with DART’s Orange, Green and Red LRT lines and DCTA’s A-Train and the T’s proposed (TEX Rail) project.

### 2.2.1 Build Alternatives

The alternatives being considered are located primarily within the Cotton Belt Corridor. Areas where the track alignment deviates from the Cotton Belt Corridor are referred to as Design Alternatives. Additionally, areas where various grade elevations are being considered are referred to as Profile Options.

There are two areas where Design Alternatives being considered deviate from the Cotton Belt Corridor. First is in the Coppell/Dallas area near North Lake and the planned Cypress Waters development. The second is near the President George Bush Turnpike (PGBT) in Richardson. In North Dallas three profile options are being considered that would retain the alignment at grade or place the alignment below grade within a trench or tunnel.

To describe the alternatives, which include the various design alternatives and profile options, the Cotton Belt Corridor has been divided into three separate contiguous sections as described below and as shown in Figure 2-1. The alternatives are described from west to east starting on DFW Airport property to the end of line at Shiloh Road in Plano.

#### Figure 2-1: Cotton Belt Corridor Section Limits

![Figure 2-1: Cotton Belt Corridor Section Limits](Source: GPC 5)

**Section 1 - DFW Airport to the Coppell/Carrollton City Limits**

The Cotton Belt Project assumes that the T’s proposed TEX Rail Project extending from southwest Fort Worth to Terminal B at DFW Airport will be in place and environmentally cleared by the TEX Rail FEIS. The DART project would utilize the portion of the T’s project that extends northwest, on new right-of-way, from the DFW Terminal B Station to the DFW North Station.
located just south of the Cotton Belt Corridor. At this station the TEX Rail Project turns to west on the Cotton Belt Corridor right-of-way, while the DART project turns to the east. Section 1 of the Cotton Belt Project begins at the DFW North Station. It proceeds northeast and connects to the existing Cotton Belt Corridor freight track. It then heads east and crosses the Cottonwood Branch and its floodplain on an aerial structure and continues under International Parkway, under IH 635 and crosses Royal Lane and Freeport Parkway at grade. It continues east and crosses South Coppell Road at grade and is on an aerial structure over Grapevine Creek. It is on retained fill until it crosses South Denton Tap Road, where it is a grade-separated aerial structure. The alignment then runs parallel to Belt Line Road and crosses Moore Road, Mockingbird Lane, MacArthur Boulevard and Fairway Drive at grade. The profile gradually ascends on retained fill to an aerial structure over two floodplain areas just west of the Elm Fork Branch of the Trinity River. The Section 1 alignment ends just before the Elm Fork Branch of the Trinity River. This section is included as part of the Base Alternative.

This section includes the DFW Terminal B Station (to be constructed by the T) and DFW North Station (portions of which would be constructed by both transit agencies).

**Cypress Waters Alternatives (Section 1-2B)**

Section 1 has two alternatives that deviate from the existing alignment in the vicinity of North Lake and the planned Cypress Waters mixed-use development. Figure 2-2 shows the base alignment and the two design alternatives.

- **Cypress Waters Southwestern Boulevard Alternative:** This alternative begins at South Coppell Road as a single track alignment on new location and veers to the southeast, generally following Southwestern Boulevard and relocated Belt Line Road. It is on an aerial structure over Grapevine Creek and is grade separated at South Denton Tap Road with an aerial structure. The alignment then descends to at grade and turns northeast to rejoin the existing Cotton Belt Corridor alignment at Moore Road.

- **Cypress Waters South Alternative:** This alternative begins at South Coppell Road as a single track alignment on new location and veers to the southeast, similar to the Southwestern Boulevard Alternative; however, this alternative is located south of Southwestern Boulevard and Belt Line Road. It is on an aerial structure over Grapevine Creek and is grade separated at South Denton Tap Road with an aerial structure. The alignment then descends to at grade and turns northeast to rejoin the existing Cotton Belt Corridor alignment at Moore Road.

Both Cypress Waters alternatives include the North Lake Station and require a rerouting of Belt Line Road. Belt Line Rerouting Plans are shown in Supplemental Plans and Graphics in Appendix D. Development of the Cypress Waters South Alternative was initiated in 2013 to address roadway and school access impacts. The two alternatives are proximate to each other and would have similar profiles. There is only a slight variation in the western portion of the alignment. The station location and layout would be identical in the two alternatives. Except where noted in the AECR, the costs, ridership and environmental impacts of the Cypress Waters South Alternative are assumed to be identical to the Cypress Waters Southwestern Boulevard Alternative. Where no differences are noted, the alignment that serves the North Lake Station is generally referred to as the Cypress Waters Alternative.
Section 2 - Coppell/Carrollton City Limits to Dallas North Tollway

Section 2 begins on a structure over the Elm Fork Branch of the Trinity River, it then continues just north of Belt Line Road and under PGBT and Luna Road at-grade. The alignment continues east, crosses the Hutton Branch of the Trinity River, then travels under IH-35E aerial bridges as well as under the DART Green Line aerial bridges. The station in downtown Carrollton will serve as the interface with the DART Green Line. East of the station, the alignment is on aerial structure over the BNSF freight tracks (Madill Sub). In downtown Carrollton, portions of the existing Cotton Belt Corridor and the existing Madill Sub would be realigned to facilitate grade separation of the two rail corridors. TxDOT is currently finalizing plans to rebuild and change the profile of IH-35E, its frontage roads and Belt Line Road in downtown Carrollton. The Cotton Belt Project design has been coordinated with the TxDOT project.

The alignment continues east toward Addison crossing the intersecting streets at grade. In Addison, the alignment is on aerial structure over Midway Road but the freight track would remain at grade. The Section 2 alignment ends at the southbound frontage road of the Dallas North Tollway.

This section includes the Downtown Carrollton Station and the Addison Transit Center Station.
Section 3 - Dallas North Tollway to Shiloh Road

Section 3 begins just west of the Dallas North Tollway and remains grade separated over the main lanes and continues as double track. The alignment crosses Knoll Trail Drive at-grade, crosses over White Rock Creek and then traverses slightly to the northeast so the alignment does not impact the existing Preston Road bridge columns. At this point, three profile options will be considered through a 2.6 mile section between Preston Road and Meandering Way in the North Dallas area. These are discussed below in more detail. After passing through the North Dallas area where the three options described above are being considered, the alignment would pass under grade-separated Coit Road. The alignment continues east and would cross Waterview Parkway, KCS Railway, Synergy Park Boulevard, Renner Road, and Custer Parkway at-grade. The track centers vary between 16 and 33 feet to allow the placement of the center platform station that is located between Waterview Parkway and KCS Railway.

The section includes the Knoll Trail Station, Preston Road Station, Renner Village Station (two location options are being considered—either Dickerson Street or Coit Road) and University of Texas at Dallas (UTD)/Synergy Station.

North Dallas Profile Options

A substantial portion of the agency coordination and public involvement for the Cotton Belt Project related directly to the profile options in North Dallas. While three profile options have been addressed within the AECR effort and are described in the following sections, a fourth profile was also considered. Referred to as the “deep trench” concept, this profile alternative fully complies with City and DART Board resolutions without requiring a tunnel. However, the trackbed elevations created serious conflicts with four creek crossings that required pump stations to transition creek water under the trackbed. More detail on this profile option and its potential impacts is included in Section 2.7.5 of the AECR and in the Final 5% Design Report in Appendix D. A detailed Pump Station Study is also included in Appendix B.

Although there is significant differences in costs and impacts, the operating plan and ridership for the three North Dallas Profile Options is assumed to be identical.

At-Grade Profile (Section 3-2A)

This option would operate at grade through North Dallas and would use bridges at the three creek crossings locally known as McKamy Branch, Osage Branch Crossing #1 and Osage Branch Crossing #2. The alignment would cross the roadways of Davenport Road (twice), Campbell Road, Hillcrest Road, McCallum Boulevard and Meandering Way at grade. This section is included as part of the Base Alternative.

Trench Profile (Section 3-2B)

This option combines a maximum trench depth with walls and berms to maintain a top of wall 15 feet over the rail with the use of culverts instead of bridges at the creek crossings of McKamy Branch, Osage Branch Crossing #1 and Osage Branch Crossing #2. The roadways of Davenport Road (twice), Campbell Road, Hillcrest Road, McCallum Boulevard and Meandering Way would be elevated over the rail alignment. This
alternative profile met the spirit of the City resolution without the creek impacts of the deep trench option.

**Tunnel Profile (Section 3-2C)**

This option proposes a 2.6-mile tunnel section that starts west of Preston Road and ends west of Coit Road. It includes a 0.7-mile west portal, a 0.3-mile east portal and a 1.6-mile tunnel. The tunnel would be located entirely within the limestone rock formation. Generally, the tunnel runs parallel to and below an unnamed tributary to White Rock Creek, which splits into the McKamy Branch and the Osage Branch. The tunnel crosses under the creek three times at McKamy Branch, Osage Branch Crossing #1 and Osage Branch Crossing #2. The depth of overburden above the tunnel crown is between 20 and 40 feet. The shallow cover areas are near the portal structures and below the creek crossings.

**Red Line Interface Alternatives**

The final length of the Section 3 alignment begins at Alma Road and includes the two alternatives.

**North Alternative (Section 3-4A)**

The Red Line Interface North Design Alternative follows the Cotton Belt Corridor, crosses Alma Road at grade, travels under the existing PGBT Bridge, crosses over both US 75 and Plano Parkway on new structure, interfaces with the DART Red Line at the proposed at-grade 12th Street Station. The at-grade 12th Street Station would include a pedestrian connection to a new aerial Red Line LRT station. The line continues east terminating near Shiloh Road. This section is included as part of the Base Alternative.

This alternative includes an at-grade 12th Street Station and Shiloh Road Station. Since both would be constructed as part of this project, the new 12th Street LRT Station combined with the new Cotton Belt Station is referred to collectively as the 12th Street Station Complex.

**South Alternative with Aerial Station and Depressed Freight (Section 3-4B)**

The Red Line Interface South Design Alternative deviates from the Cotton Belt Corridor and veers southerly away from the PGBT, crosses the floodplain of Spring Creek and US 75 on an aerial structure, then turns north and descends to the Bush Turnpike Station and adjacent existing Red Line LRT station. From this station, the alignment travels north and parallel to the DART Red Line. Near 12th Street, the alignment then takes a sharp right turn and ascends on aerial structure to an aerial 12th Street Station. The aerial 12th Street Station would include a pedestrian connection to a new future Red Line LRT station. In this area, the existing freight track would be depressed between 10th Street and N Avenue. K Avenue and Municipal Avenue would be reconstructed to cross the depressed freight track at grade. The remainder of this section travels east on the Cotton Belt Corridor terminating near Shiloh Road.
This alternative includes the Bush Turnpike Station, an aerial 12th Street Station Complex and the Shiloh Road Station. However, the South Alternative could be constructed with or without the 12th Street Station Complex.

2.3 Corridor Sub-sections Descriptions

To facilitate the evaluation and comparison of alternatives provided in subsequent chapters of this report, the three main corridor sections described above are further divided into the following 15 subsections, as shown on Figure 2-2. Potential station locations within each section are listed as well.

2.3.1 Section 1 DFW Airport to Coppell/Carrollton City Limits

Subsection 1-1: DFW Airport to Coppell Road, which includes the DFW North Station.

Subsection 1-2A: Coppell Road to Moore Road.

Subsection 1-2B (Cypress Waters Alternatives): Coppell Road to Moore Road, which includes the North Lake Station.

Subsection 1-3: Moore Road to the Coppell/Carrollton City Limits.

2.3.2 Section 2 Coppell/Carrollton City Limits to Dallas North Tollway

Subsection 2-1: Coppell/Carrollton City Limits to Hutton Drive.

Subsection 2-2 (Downtown Carrollton): Hutton Drive to Erie Street, which includes the Downtown Carrollton Station.

Subsection 2-3: Erie Street to Dallas North Tollway, which includes the Addison Transit Center Station.

2.3.3 Section 3 Dallas North Tollway to Shiloh Road in Plano

Subsection 3-1: Dallas North Tollway to White Rock Creek, which includes the Knoll Trail Station.

Subsection 3-2A: (At-grade Profile) White Rock Creek to Coit Road, which includes the Preston Road Station and the Renner Village Station (two location options)

Subsection 3-2B (Trench Profile): White Rock Creek to Coit Road, which includes the Preston Road Station and the Renner Village Station (two location options).

Subsection 3-2C (Tunnel Profile): White Rock Creek to Coit Road, which includes the Preston Road Station and the Renner Village Station (two location options).

Subsection 3-3: Coit Road to Alma Road, which includes the UTD/ Synergy Station.

Subsection 3-4A (North Alignment Alternative): Alma Road to N Avenue, which includes the 12th Street Station Complex (at-grade).
Subsection 3-4B (South Alignment Alternative): Alma Road to N Avenue (at-grade and elevated), which includes the Bush Turnpike Station and the 12th Street Station Complex (elevated).

Subsection 3-5: N Avenue to Shiloh Road, which includes the Shiloh Station.

Figure 2-2 Corridor Subsection Limits

Source: GPC 5

2.4 Potential Station Locations

Eleven new potential stations locations have been identified for study purposes within the Cotton Belt Project and are reflected in Figure 2-3. A twelfth station (DFW Airport Station) would be constructed by the T at Terminal B at DFW Airport and would be shared with the TEX Rail project. This station serves as the connection between the Cotton Belt Project and DFW Airport, via the DFW Airport’s Skylink people-mover system in the Terminal A/B area. It also provides a pedestrian connection to DART’s Orange Line DFW Station at Terminal A. A station layout is provided in Supplemental Plans and Graphics in Appendix D.
Figure 2-3 Cotton Belt Project Proposed Stations

Source: URS, 2013.

Brief descriptions of each of the eleven new station locations are provided below. Planning-level station layouts for each of the stations are provided in the Final 5% Design Plans in Appendix D.

DFW North Station – This station is currently being planned as part of the T’s portion of the rail line. The DFW North Station would include side platforms for each of the two rail lines serving the station, a parking area, bus bays and a new access road from the station to State Highway 26 (Texan Trail), located west of the station.

North Lake Station (Cypress Waters Alternatives) – The North Lake Station would be located on the south side of Belt Line Road between Denton Tap Road and Moore Road, just north of North Lake. This station would include side platforms for the Cotton Belt Project, a parking area and bus bays. Access to the parking area would be provided by a single full-access driveway onto relocated Belt Line Road. The bus bay area would be accessed by a separate driveway and a one-way circulating drive, with full movement access (left and right turn-outs) at the exit.

Downtown Carrollton Station – This station would be located north of Belt Line Road between Broadway Street and Denton Drive in downtown Carrollton, immediately adjacent to the existing DART Green Line station. The station would be located on realigned section of the Cotton Belt Corridor, as discussed in Section 2.2.1 of the AECR. This station includes side
platforms for the Cotton Belt Project and a pedestrian connection via stairs and elevator to the Green Line station at the end of the Cotton Belt Project platforms. Two additional parking areas will be added with two full-access driveways onto Denton Drive.

**Addison Station** – This station would be placed on the north side of the existing Addison Transit Center, currently located on the north side of Arapaho Road between Addison Road and Quorum Drive in Addison. The station would include side platforms for the Cotton Belt Project and a pedestrian connection to the Addison Transit Center facilities at the west end of the platforms. No new parking or site circulation driveways would be constructed as part of the Cotton Belt Project, as new traffic and rail users would be accommodated by the existing facilities at the Addison Transit Center. The station would eventually be incorporated into a station area plan that would include a shared garage with the City of Addison.

**Knoll Trail Station** – This station would be located approximately one-quarter mile north of Addison Road just east of Knoll Trail Drive in Dallas. The station would include side platforms for the Cotton Belt Project, but dedicated parking or drop-off areas are not currently planned. Riders would access this station on foot, by bicycle, kiss and ride area, or from existing transit services in the area.

**Preston Road Station** – This station would be located south of Keller Springs Road just east of the Preston Road grade separation in Dallas. The station would include a center platform for the Cotton Belt Project, but would not have any dedicated parking or drop-off areas as currently planned. Riders would access this station on foot, by bicycle, or from existing transit services in the area.

**Renner Village Station** – Two options are being considered for this station. The Coit Road option would be located just west of Coit Road approximately one-half mile north of McCallum Boulevard in Dallas. The station would include side platforms, a new parking area and bus bays with single full-access driveway onto Coit Road. The second option located near Dickerson Street would include side platforms, a new parking area and bus bays. Station access would be facilitated with a single full-access driveway onto Dickerson Street.

**UTD/Synergy Station** – This station would be located south of Waterview Parkway between the Frankford Road and Renner Road intersections, on the north side of the UTD campus in Richardson. The station would include a center platform, a new parking area and bus bays. Access to the parking area and the bus bays will be provided by a single full-access driveway onto Waterview Parkway. The proposed parking would be temporary as the station would eventually be incorporated into a UTD campus plan that would accommodate station parking and access.

**Bush Turnpike Station (Red Line Interface Southern Alternative)** – This station would be located immediately adjacent to the existing DART Bush Turnpike LRT station, which is south of the PGBT and east of US 75 in Richardson. This station would include side platforms for the Cotton Belt Project, and would require reconfiguration of the PGBT circulation area, but will not add any additional parking for the Bush Turnpike Station. This station would provide a connection between the Cotton Belt Project and the DART Red Line.
12th Street Station At-Grade Complex (Red Line Interface Northern Alternative) - This station is planned along 12th Street in Plano, between the Red Line and K Avenue. This at-grade station would include a center platform for the Cotton Belt Project, a new parking area and bus bays. Access to the parking area and the bus bays would be provided by two driveways on a new segment of 12th Place between J Avenue and K Avenue, one driveway on 12th Place between K Avenue and Municipal Avenue, and two driveways on K Avenue located north of the Cotton Belt Project. As compared to the Bush Turnpike Station, this station would provide an alternative connection to the DART Red Line, which would require construction of a new aerial LRT station on the Red Line at this location.

12th Street Station Aerial Complex (Red Line Interface Southern Alternative) – This station is planned along 12th Street in Plano, between the existing K Avenue and Municipal Avenue. The aerial station would include side platforms for the Cotton Belt Project, a new parking area and bus bays. Access to the parking area and the bus bays would be provided by two driveways on a new segment of 12th Place between J Avenue and K Avenue, and two driveways on K Avenue located north of the Cotton Belt Project. Additionally, a fire lane is also proposed along the south side of the new station between K Avenue and Municipal Avenue. The existing freight track would be depressed between 10th Street and N Avenue to allow sufficient clearance for the elevated Cotton Belt Project guideway. K Avenue and Municipal Avenue would be reconstructed so as to cross the freight track at grade. This station would provide an alternative connection to the DART Red Line, a new aerial LRT station on the Red Line at this location.

Shiloh Road Station – This station would be located on the west side of Shiloh Road between Plano Parkway and 14th Street in Plano. This station would include a center platform for the Cotton Belt Project, one new parking area and bus bays. Primary access to the main and secondary parking areas as well as access to the bus bays would be provided by a full-access driveway and a right-in/right-out driveway onto Shiloh Road.

A summary of these station characteristics, including platform types and available parking, is provided in Table 2-1.
Table 2-1: Summary of Station Characteristics

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<tr>
<th>Station</th>
<th>City</th>
<th>Platform Type</th>
<th>Bus Bays</th>
<th>Parking Facility</th>
<th>Estimated Parking Spaces</th>
<th>Major Transit Connections</th>
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<td>DFW Terminal B</td>
<td>Grapevine</td>
<td>Side</td>
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<td>No</td>
<td>n/a</td>
<td>TEX Rail Orange Line</td>
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Source: GPC 5, 2012.

2.5 New Technology Rail Vehicle

Dallas City Council and DART Board Resolutions dictate that the vehicle to be used for the Cotton Belt Project must meet 2015 emission requirements and look similar to light rail vehicles. In addition, the vehicles operated in Cotton Belt Corridor must be compliant with FRA requirements if it is to share the corridor with freight service. DART has developed vehicle specifications to be used within the design criteria for the Cotton belt Project. For the purposes of the AECR, a vehicle similar to the DCTA A-Train was assumed.

2.6 Vehicle Storage and Maintenance Facility

For the purposes of this document, it was assumed that vehicle storage and maintenance would be accommodated at the DCTA Yard located on the UP corridor seven miles north of the Cotton Belt Corridor. Trains on the Cotton Belt Corridor would switch to the UP in downtown Carrollton. Ultimately a Vehicle Storage and Maintenance Facility would be constructed as part of the Cotton Belt Project. The size and location of this facility is dependent on many variables including, vehicle manufacturer and project phasing. The location of this facility would be determined as the project is advanced. A Regional Rail Vehicle Storage and Maintenance Facility Site Inventory, included in Appendix B, contains a list of the potential sites.

2.7 Alternative Development

The proposed Cotton Belt Project extends approximately 26 miles from DFW Airport to the Shiloh Road Station in Plano. Within this corridor there are two areas where the existing rail line could be modified as design alternatives and one area where three profile options are being
considered. The following presents the rationale for developing these design alternatives and discusses how these options are combined and presented throughout the remainder of the document.

### 2.7.1 Design Alternatives

#### Cypress Waters Alternatives

As the Cotton Belt Project passes through City of Coppell, the Cypress Waters Alternatives deviate from the existing alignment to provide the North Lake Station in the City of Dallas. This allows the placement of a station in a 7.25-mile portion of the Base Alternative without a station.

The Cypress Waters Alternatives were envisioned to provide rail service, via the North Lake Station, to the Cypress Waters mixed use development that is currently under construction. When completed, Cypress Waters will contain 4.5 million square feet of retail and commercial space and 10,000 residential units. The Cypress Waters South Alternative is an avoidance alignment that eliminates certain impacts associated with the Southwestern Boulevard Alternative as described in Section 3.3 and Section 4.3.

#### Red Line Interface Alternatives

The two Red Line Interface Alternatives were developed to help meet the development objectives of the cities of Plano and Richardson. The North Alternative would remain on the Cotton Belt Corridor and would provide a 12th Street Station in Plano. The South Alternative swings south off of the Cotton Belt Corridor to serve the Bush Turnpike Station in Richardson. The North Alternative was envisioned to extend the development that has occurred as result of the Red Line, south to 12th Street. The South Alternative was envisioned to provide multimodal connections to the growing mixed use development occurring at the Bush Turnpike LRT Station. This development includes the new State Farm Insurance, 1.5-million square foot facility that will house over 6,000 employees.

Both Red Line Interface Alternatives would provide a critical Red Line Interface with the Cotton Belt Corridor. The Red Line Interface North Alternative stays within the Cotton Belt Corridor but requires retrofitting a new LRT station to form the multi-modal 12th Street Station Complex. The Red Line Interface South Alternative deviates from the Cotton Belt Corridor, but connects to the existing Bush Turnpike LRT Station. The South Alternative could be constructed with or without the 12th Street Station Complex. With the 12th Street Station Complex, the South Alternative could help meet the development objective of both cities.

### 2.7.2 Profile Options

#### North Dallas Profile Options

In North Dallas the three profile options are being considered. The At-grade Option would provide rail service without significantly altering the existing corridor. The Trench and options were developed as design alternatives to achieve the City of Dallas desire to place the alignment below grade as discussed in Section 2.7.5. This desire was based on public perception that an at-grade alignment would have significant environmental and quality of life impacts.
2.7.3 Full Length Alternatives

Full length alternatives are those alternatives that extend from DFW Airport to Shiloh Road. From the operating perspective alignment sections that have been defined for the Cotton Belt Project have been combined to form two basic full length alternatives: a Red Line Interface North Alternative that follows the Cotton Belt Corridor right-of-way in Plano, and a Red Line Interface South Alternative that deviates from the right-of-way southward to serve the Bush Turnpike Station. For each of these basic alignments, there is a variation on the western portion of the Cotton Belt Project which either stays on the Cotton Belt Corridor right-of-way or deviates from the right-of-way and provides a North Lake Station. From an operating perspective, the three North Dallas Profile Options (At-grade, Shallow Trench, Tunnel) are identical.

Base Alternative
The Base Alternative represents the most basic, at-grade, full length alternative that does not deviate from the existing Cotton Belt Corridor alignment. The North Alignment operating at-grade through North Dallas without the Cypress Waters or Red Line Interface design alternatives is the Base Alternative. Through this document the various design and profile options are discussed as they compare to the Base Alternative.

All Station Alternative
The All Station Alternative represents the most comprehensive, full length alternative that includes all deviations and all stations. The All Station Alternative could operate at any grade profile through north Dallas. The Red Line Interface South Alternative with the Cypress Waters Design Option is the All Station Alternative. This Alternative includes the North Lake Station, the Bush Turnpike Station and the 12th Street Station Complex. This alignment would have the greatest potential volume of passengers.

2.7.4 Potential Minimum Operable Segments

Given the length of the Cotton Belt and sheer size of the project, consideration is being given to implementing smaller portions of the corridor that may be more affordable or present fewer environmental impacts. The federal definition of a minimum operable segment (MOS) is a segment of a larger project that has independent utility. This means the MOS has reasonable patronage and cost effectiveness. Two MOS alternatives are discussed in this document and are reflected in Figure 2-4: MOS 1, Carrollton to Addison and; MOS 2, DFW Airport to Addison. MOS 1 would have stations at downtown Carrollton and Addison Transit Center. MOS 2 would have stations at DFW Terminal B, DFW North, North Lake, downtown Carrollton and Addison Transit Center. DART has begun examining other options for an MOS. A white paper, Cotton Belt Corridor Early Implementation of Regional Rail Service between Addison to Carrollton in Appendix B, describes these options and provides additional detail on costs and operating requirements.
2.7.5 Previously Considered Alternatives: North Dallas Deep Trench Profile Option

During the development of the DART 2030 TSP, the Dallas City Council passed a resolution with their recommendations for the plan. In the resolution the City recommended the proposed Cotton Belt Corridor Project be below grade from at least 1,500 feet east of Meandering Way to 2,000 feet west of Preston Road. In adopting the DART 2030 TSP in October 2006, the DART Board of Directors acknowledged of the City’s preference for a trench. As such, both at-grade and below grade profile options were examined in North Dallas.

A deep trench concept that would depress the rail alignment at least 15 feet below grade was originally suggested as a below grade profile option. The primary challenge of the Deep Trench Profile Option was that the 100-year floodplain water surface elevations must be conserved in order to avoid adding new inundation areas or structures to the existing floodplain. Stormwater velocities within the creek must also be controlled to avoid erosion and compromising the integrity of the creek banks. Because of these environmental constraints, implementation of the Deep Trench Option would require that water in three creeks be pumped past the trench. The three creek crossings between Hillcrest Road on the east and Preston Road on the west that would be affected are as follows:
• Osage Branch Crossing 1, located just east of Davenport Court
• Osage Branch Crossing 2, located just south of Duffield Drive
• McKamy Branch Crossing, approximately 300 feet north of Davenport Drive

The drainage concept developed for the Deep Trench Profile Option consisted of capturing the water upstream of the alignment and pumping it under the tracks, to the downstream side of the tracks. The assessment of the Deep Trench Profile Option included options for pumping stations, types of pumps, and use of submersible electric motors. It also included an analysis of each creek crossing, including design considerations, power needs, probable annual operating costs, and a summary of estimated capital costs.

It was estimated that three pump stations for the Deep Trench Profile Option would cost over $280M in capital costs and over $2.5M in annual operating costs. These estimates did not include construction of the alignment in the trench or annual operating costs of the rail service. In addition to the substantial costs associated with the pump stations, adverse impacts to several resources would occur. Potential impacts would include loss of vegetation and wildlife habitat, displacement of residents, the use of public parkland, increased noise levels, and impacts to water resources.

Of primary concern was the liability associated with the three pump stations. Pumps could fail to function due to power outages, which typically occur during major storm events. Failure of the pumps could result in flooding of upstream properties and DART infrastructure. Public safety and life protection could be undermined. DART cannot assume the liability associated with a catastrophic failure of the pump stations.

DART determined that the Deep Trench Profile Option was cost-prohibitive, would result in significant adverse environmental impacts and could be a threat to public safety. The Shallow Trench Profile Option was developed as an alternative to the Deep Trench Profile Option that would not require the use of pumping stations. Additional information on the Deep Trench issues can be found in the Pump Station Study for Deep Trench Technical Memorandum, in Appendix B.

2.8 Operating Plan Summary

This section of the report summarizes the proposed operating plan for the Build Alternatives. Additional detail can be found in the Transit Operating Plans Technical Memorandum in Appendix B.

Full Length Alternatives

As described in Section 2.7, the alignment sections have been combined to form two basic full length alternatives: a Red Line Interface North Alternative and a South Alternative. These can be implemented with or without the Cypress Waters deviation.

It should be noted that the operating plan for the three North Dallas Profile Options (At-grade, Shallow Trench, Tunnel) are identical. In addition, this operating plan assumes that the Cotton Belt Project would run independent of the T’s TEX Rail Project allowing DART to assess the
eastern portion of the larger combined project. In the future consideration may be given to developing an operating plan that merges the two projects.

**Red Line Interface North Alternative**

The Red Line Interface North Alternative generally follows the existing Cotton Belt Corridor for the length of the alignment. The Alternative may include a variation in the Cypress Waters area, where the route deviates from the right-of-way to provide the North Lake Station. Generally, both alternative variations have similar characteristics for the operating plan analysis. The Red Line Interface North Alternative without the Cypress Waters deviation is referred to as the Base Alternative.

North Alternative would have stations at the following locations:

- DFW Terminal B
- DFW North
- North Lake (Optional)
- Downtown Carrollton
- Addison Transit Center
- Knoll Trail Drive
- Preston Road
- Renner Village
- UTD/Synergy
- 12th Street Complex
- Shiloh Road

Service for the Cotton Belt Project is assumed from approximately 5:30 a.m. until 12:00 midnight on Mondays through Saturdays, and from 6:00 a.m. until 10:00 p.m. on Sundays. Proposed service frequencies by time period are as follows:

**Weekdays**
- Peak Periods – 20-minute frequencies
- Midday period – 60-minute frequencies
- Evening period – 60-minute frequencies

**Weekends**
- All time periods – 60-minute frequencies

The estimated one-direction travel time for the North Alternative is 48:09 minutes with the North Lake Station and is 44:36 minutes without the North Lake Station. Six trains are needed to provide 20-minute service frequencies in the peak period. Two trains are required when operating at 60-minute service frequencies in the midday, evening and weekend time periods. A review of Horizon Year 2035 ridership forecasts indicate that three-car trains are needed. Thus, a total of 18 peak/22 fleet rail cars are required.

Several bus route modifications are proposed in conjunction with new Cotton Belt Project, primarily in and around the cities of Plano and Addison and also DFW Airport. Modifications
include improving peak period frequencies, extending or modifying, and adding new circulator routes.

**Red Line Interface South Alternative**

The Red Line Interface South Alternative diverts from the Cotton Belt Corridor in the vicinity of US 75 in Plano, in order to serve the Bush Turnpike Station while retaining the 12th Street Station Complex. The Alternative also includes a variation in the Cypress Waters area where the route deviates from the Cotton Belt Corridor to provide the North Lake Station. Generally, both alignment variations for Cypress Waters have similar characteristics for the operating plan analysis. The Red Line Interface South Alternative with the Cypress Waters Variation and the 12th Street Station Complex is referred to as the **All Station Alternative**.

The alignment between DFW Airport and Shiloh Road would have a 12th station between UTD/Synergy and 12th Street Plano at the Bush Turnpike Station.

The Red Line Interface South Alternative assumes the same span of service and frequencies as previously identified for the Red Line Interface North Alternative. The estimated one-direction travel time for the South Alternative is 49:08 minutes with the North Lake Station and is 46:35 minutes without the North Lake Station. Six trains are needed to provide 20-minute service frequencies in the peak period. Two trains are required when operating at 60-minute service frequencies in the midday, evening and weekend time periods. A review of Horizon Year 2035 ridership forecasts indicate that three-car trains are needed. Thus, a total of 18 peak/22 fleet rail cars are required.

Several bus route modifications are proposed in conjunction with new Cotton Belt Project, primarily in and around the cities of Plano and Addison and also DFW Airport. Modifications include improving peak period frequencies, extending or modifying routes, and adding new circulator routes.

The Red Line Interface South Alternative could also be implemented without the 12th Street Station Complex. In this scenario, buses serving the 12th Street Station would be routed to the Bush Turnpike Station. Since the two stations are in proximity to each other, the operating plan is assumed to be the same, although there would be a slight improvement in the estimated one-direction travel time.

**MOS Alternatives**

For the purposes of the operating plan, the MOS Alternative is assumed to be shorter versions of the build alternative with the same operating characteristics. Several bus route modifications are proposed in conjunction with new Cotton Belt Project, primarily in and around the cities of Addison and Carrollton and also DFW Airport (for MOS 2). Modifications include improving peak period frequencies, extending or modifying routes, and adding new circulator routes. The estimated one-direction travel time is 7:42 minutes for MOS 1 and 27:06 minutes for MOS 2. A total of 4 peak/5 fleet rail cars are required for MOS 1 and 8 peak/10 fleet cars for MOS 2. Additional MOS options have been assessed as part of the development of Cotton Belt Corridor Early Implementation of Regional Rail Service between Addison and Carrollton, in Appendix B.
MOS 1 would have stations at the following locations:
- Downtown Carrollton
- Addison Transit Center

MOS 2 would have stations at the following locations:
- DFW Terminal B
- DFW North
- North Lake (if the Cypress Waters option is included)
- Downtown Carrollton
- Addison Transit Center

2.9 Ridership
This section of the report summarizes the travel forecasts prepared for the Cotton Belt Corridor Project. Ridership is used to estimate parking needs, analyze station area impacts and evaluate capacity and level of rail service.

2.9.1 Methodology
The regional travel demand model developed and supported by the NCTCOG was used by DART for the preparation of transit forecasts. The transit network includes bus and fixed guideway rail modes. All forecasts used the regionally approved 2035 demographics, with the following rail investments included in the background network.
- The T’s TEX Rail – from southwest Fort Worth to DFW Terminal A/B
- DCTA’s A-Train – from downtown Denton to downtown Carrollton
- DART South Oak Cliff extension to University of North Texas at Dallas
- DART Red, Orange, Blue and Green lines
- Trinity Railway Express

As detailed in Cotton Belt Corridor Travel Forecasts Technical Memorandum in Appendix B, several ridership scenarios were developed for the project. The forecasts presented here were based on the Operating Plan detailed in the Transit Operating Plans Technical Memorandum in Appendix B and summarized previously in Section 2.8.

2.9.2 Results
Analysis of the travel forecasts indicates that there is very little variation in total ridership between the full length build alternatives. Therefore only forecasts for the All Station Alternative and the two MOS Alternatives are detailed in this section. Table 2-2 shows the ridership for the Cotton Belt Corridor.
2.9.3 All Station Alternative

The All Station Alternative depicts rail running the full length of the project corridor, beginning at the DFW Airport Terminal B Station and continuing to Shiloh Road in Plano. The All Station Alternative includes the Cypress Waters Design Alternative and the Red Line Interface South Design Alternative. A review the detailed information contained in the Cotton Belt Corridor Travel Forecasts Technical Memorandum, in Appendix B, reveals the following observations about the performance of the Build Alternative:

- Drive access represents the highest boarding mode (32% of all boardings) and is highest at the Bush Turnpike Station (nearly 24% of all drives board here).
- Transfers from the regional commuter rail lines (TEX Rail and the DCTA A-Train) provide the next highest boarding mode (18% of all boardings) and occur at the DFW North and Downtown Carrollton stations.
- The Downtown Carrollton Station shows the highest overall station ridership, due in great measure to the transferring rail riders from the DART Green Line and the DCTA A-Train at this location.
- Transfers to the Cotton Belt Project from DART Light Rail occur as expected at the 12th Street Station Complex and Bush Turnpike Station (from the Red Line), the Downtown Carrollton Station (from the Green Line) and the DFW Airport Terminal B Station (from the Orange Line). Transfer from LRT represents nearly 14% of all boardings and 18% of all alightings for the Cotton Belt Corridor.
- The second highest station ridership overall occurs at the DFW Airport Terminal B Station. The airport is a major activity center and the high rail ridership at this station reflects that – both for employees and passengers. It is primarily a destination station.

### Table 2-2: Total Station Ridership – 2035 Average Weekday Riders

<table>
<thead>
<tr>
<th>STATION/Alternative</th>
<th>All Station Alt.</th>
<th>MOS 1</th>
<th>MOS 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFW Airport Terminal B Station</td>
<td>2,590</td>
<td>N/A</td>
<td>1,552</td>
</tr>
<tr>
<td>DFW North</td>
<td>1,567</td>
<td>N/A</td>
<td>1,244</td>
</tr>
<tr>
<td>North Lake Station</td>
<td>608</td>
<td>N/A</td>
<td>407</td>
</tr>
<tr>
<td>Downtown Carrollton</td>
<td>2,719</td>
<td>1,010</td>
<td>1,810</td>
</tr>
<tr>
<td>Addison Transit Center Station</td>
<td>1,837</td>
<td>1,010</td>
<td>2,123</td>
</tr>
<tr>
<td>Knoll Trail Station</td>
<td>998</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Preston Station</td>
<td>544</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Renner Village Station</td>
<td>1,012</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>UTD/Synergy Station</td>
<td>1,341</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Bush Turnpike Station</td>
<td>1,736</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>12th Street Station</td>
<td>600</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Shiloh Station</td>
<td>831</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Cotton Belt Trips</td>
<td>16,382</td>
<td>2,021</td>
<td>7,136</td>
</tr>
</tbody>
</table>

*Source: GPC 5, 2013.*
(231 boardings versus 4981 alightings) with Walk and the Automated People Mover (APM) providing the majority of access.

• The UTD/Synergy Station shows the impact of the feeder bus system that was included for this Alternative. Over 68% of the boardings at this station come from DART bus – this represents the highest bus access of any Cotton Belt Project stations.
• The Addison Transit Center Station is the third highest in overall ridership and includes a strong walk egress component.
• The stations at North Lake, Preston and 12th Street are the lowest ridership stations along the Corridor.
  o Elimination of the North Lake Station would result in about 600 fewer riders.
  o Elimination of the Preston Road Station would likely result in the re-distribution of riders to nearby stations.
  o The multi-modal 12th Street Station is clearly impacted by the proximity of the Bush Turnpike Station which also interfaces with the Red Line.
• Implementing the Red Line Interface South Alternative (All Station Alternative) with the addition of the Bush Turnpike Station would only result in 15 more rail riders (16,382 versus 16,367) than the Red Line Interface North Alternative.
  o Without the Bush Turnpike, riders would be redistributed to the 12th Street and Shiloh Stations
  o With both stations, Ridership at the Bush Turnpike Station is significantly higher than the 12th Street Station.
• The ridership forecast did show some degradation of ridership on existing DART rail lines as a result of Cotton Belt Project. There is a net increase in overall system ridership.
  o Orange Line – 13,050 No-Build versus 9,990 All Station Alternative
  o Green Line – 12,500 No-Build versus 12,090 All Station Alternative
  o Red Line – 14,640 No-Build versus 14,730 All Station Alternative
  o Blue Line – 7,000 No-Build versus 6,680 All Station Alternative

2.9.4 Alternative MOS 1 – Carrollton to Addison

Alternative MOS 1 depicts rail running from downtown Carrollton to the Town of Addison. Headways, park-and-ride locations, and feeder bus routes are identical for the stations included in this segment as those shown for the All Station Alternative. A review of MOS 1 ridership projections reveals the following observations about the performance of MOS 1.

• The ridership on MOS 1 was estimated at 2,021 riders per day or about 12.3% of overall ridership on the All Station Alternative previously stated.
• With only two stations, ridership at each is identical.
• Transfers between the Cotton Belt Project and DART LRT or the DCTA A-Train in downtown Carrollton represent 85% of the MOS 1 ridership.

2.9.5 Alternative MOS 2 – DFW Airport to Addison

Alternative MOS 2 depicts rail running from DFW Airport to the Town of Addison. Headways, park-and-ride locations, and feeder bus routes are identical for the stations included in this segment as those shown for the All Station Alternative. A review of the detailed information contained in the Cotton Belt Corridor Travel Forecasts Technical Memorandum in Appendix B, reveals the following observations about the performance of MOS 2.
- MOS 2 attracts about 44.3% of the overall corridor ridership from the All Station Alternative shown above.
- Addison Transit Center Station is the highest overall ridership station, with 30% of the overall ridership.
- Drive and Commuter Rail access are the highest modes for boardings along the corridor, each representing 30% of the overall boardings.
- As with the All Station Alternative, transfers to DART LRT at downtown Carrollton and DFW Airport, along with the DFW Airport APM are important – representing 30% of the total alightings for this alternative.
- Ridership at the North Lake Station is the lowest along the MOS, representing less than 6% of the overall corridor riders.
- Removing the North Lake Station results in a slight drop in ridership, a loss of 14 daily riders.

2.10 Cost Estimate Summary

Capital Cost Estimates

Capital costs for the project were estimated and documented in a separate report titled Final Preliminary Engineering 5% Design Cost Estimate contained in Appendix D. The cost estimate was provided in two formats; one format typical for DART projects and another using FTA Standard Cost Categories (SCC). The capital cost analysis identifies estimated direct costs, soft costs, and corresponding allocated and unallocated contingencies associated with the current status of design. It incorporates the major components of the project including civil and track construction, stations, utilities, special conditions, system elements, vehicles, right-of-way, professional services and contingencies.

The capital cost analysis summarizes total project costs for different scenarios corresponding to various alignment and profile options. The scenarios include two different alignment options for Section 1 of the project; one generally following the existing railroad right-of-way and the other going through the Cypress Waters development. (The costs of the two Cypress Waters Alternatives are assumed to be identical.) The scenarios include three different profile options through the North Dallas area in Section 3: the at-grade option, the shallow trench option and the tunnel option. Also in Section 3, the scenarios include either a north or south Red Line Interface option. The South Alternative can be implanted with or without the 12th Street Station Complex. Finally, capital costs for the two MOS Alternatives are included.

Capital costs for the two MOS Alternatives and the South Alternative without the 12th Street Station assume that the All Station Alternative will eventually be constructed. As such the costs for the All Station Alternative build out designs are included. The total project costs for the various options are shown in Table 2-3.
### Table 2-3: DART Cotton Belt Regional Rail Capital Cost Summary

<table>
<thead>
<tr>
<th>DART Cotton Belt Section</th>
<th>At Grade</th>
<th>Shallow Trench</th>
<th>Tunnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
<td>$275,728,498.62</td>
<td>$275,728,498.62</td>
<td>$275,728,498.62</td>
</tr>
<tr>
<td>Section 1 Additional Cost for Cypress Waters (CW)</td>
<td>$59,096,609.21</td>
<td>$59,096,609.21</td>
<td>$59,096,609.21</td>
</tr>
<tr>
<td>Section 2</td>
<td>$350,492,561.21</td>
<td>$350,492,561.21</td>
<td>$350,492,561.21</td>
</tr>
<tr>
<td>Section 3 At Grade Profile</td>
<td>$307,348,434.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Section 3 Shallow Trench Profile</td>
<td></td>
<td>$430,489,247.33</td>
<td></td>
</tr>
<tr>
<td>Section 3 Tunnel Profile</td>
<td></td>
<td></td>
<td>$817,998,600.76</td>
</tr>
<tr>
<td>Section 3 North Alternative</td>
<td>$207,955,989.23</td>
<td>$207,955,989.23</td>
<td>$207,955,989.23</td>
</tr>
<tr>
<td>Section 3 Additional Cost for South Alternative</td>
<td>$52,208,788.40</td>
<td>$52,208,788.40</td>
<td>$52,208,788.40</td>
</tr>
<tr>
<td>Section 3 Additional Cost for South Alternative w/o 12th Street Station Complex</td>
<td>$40,708,788.40</td>
<td>40,708,788.40</td>
<td>40,708,788.40</td>
</tr>
<tr>
<td>Total Project (w/o CW) - North Alternative (Base Alternative)</td>
<td>$1,141,525,483.34</td>
<td>$1,264,666,296.40</td>
<td>$1,652,175,649.82</td>
</tr>
<tr>
<td>Total Project (w/CW) - North Alternative</td>
<td>$1,200,622,092.55</td>
<td>$1,323,762,905.60</td>
<td>$1,711,272,259.03</td>
</tr>
<tr>
<td>Total Project (w/o CW) - South Alternative</td>
<td>$1,193,734,271.74</td>
<td>$1,316,875,084.80</td>
<td>$1,704,384,438.22</td>
</tr>
<tr>
<td>Total Project (w/CW) - South Alternative w/o 12th Street Station Complex</td>
<td>$1,189,122,092.55</td>
<td>1,312,262,905.60</td>
<td>$1,751,981,047.43</td>
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<tr>
<td>Total Project (w/CW - South Alternative (All Station)</td>
<td>$1,252,830,880.95</td>
<td>$1,375,971,694.00</td>
<td>$1,763,481,047.43</td>
</tr>
<tr>
<td>MOS 1</td>
<td>$262,588,066.27</td>
<td>$563,078,588.94</td>
<td>$622,175,198.15</td>
</tr>
<tr>
<td>MOS 2 (w/o CW)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOS (w/CW)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: GPC 5, 2013.

**O&M Cost Estimates**

As detailed in *Operations and Maintenance Cost Methodology and Results Technical Memorandum*, in Appendix B, annual operating and maintenance (O&M) costs were estimated by following methodology established by the FTA. Fully-allocated spreadsheet cost models were developed for each affected mode impacted by the project alternatives. This includes costs associated with implementing Regional Rail on the Cotton Belt Corridor, adding a new Red Line Station and proposed bus service changes. Note that the selection of a final vehicle maintenance facility location could alter these O&M costs. No O&M cost differences were assumed for the three North Dallas Alternatives.
The incremental annual O&M cost for the various Full Length Alternatives, when compared to No-Build are in the vicinity of $26.8 to $28.3 million, with approximately $21.5 Million as the cost of Cotton Belt Project, $635,000 for maintaining a new Red Line station adjacent to the 12th Street Station, and the remainder being the cost of improved bus service (2012 dollars).

O&M costs for the MOS options depend on the level of service that would be provided if they were to be implemented. It remains to be seen if they would require the same level of service assumed on the full length alternatives. To maintain level of service of 30-minute headways during peak and a 60 minute headways during off peaking O&M cost would range from $5.4 to $11.4 Million. For continuous 60-minute headways the O&M cost could range from $4.4 to $10.0 Million. The table below provides operating costs and service statistical information for the Full Build (at the full service level assumed) and MOS (at multiple levels of service) alternatives. Ridership forecasts are based on the highest level of service for each alternative. More information is provided in the Cotton Belt Corridor Early Implementation of Regional Rail Service between Addison and Carrollton White Paper included in Appendix B.
3 AFFECTED ENVIRONMENT, EFFECTS AND POTENTIAL MITIGATION

3.1 Introduction and Study Area
This section presents the existing natural and built conditions that would be affected by the Cotton Belt project. Potential environmental consequences and possible mitigations are also presented. Generally the project study area is described as the area within one-quarter mile of the Cotton Belt Project alignment and within one-half mile from a potential station location. However, in some instances, there is a separate project study area for a resource.

3.2 Land Use
Introduction and Regulatory Setting
An assessment of the existing and future land use along the DART–owned Cotton Belt Corridor provides insight into development trends in the study area. Possible land use types include, but are not limited to, residential, office, light industrial, industrial, commercial/retail, transportation, and institutional. Examining existing land use provides a sense of the general character of the areas through which the alignment passes.

Zoning ordinances of local municipal jurisdictions form the framework for regulating land uses within its city limits. The basis for this regulatory power at the local level comes from Chapter 211, Municipal Zoning Authority, of the Texas Local Government Code.

The Land Use Existing Conditions Technical Memorandum and the Land Use Impact Assessment in Appendix A provides a more detailed assessment of existing conditions and impacts for the Cotton Belt Project.

Methodology
For the purposes of the environmental review, the project study area for land use includes one-quarter mile on either side of the Cotton Belt Project alignment and one-half mile radius around each proposed station location. The most recent land use data from NCTCOG (2005) was used for the existing land use. Municipalities were utilized as primary sources for future land use plans and zoning.

Existing Conditions
The majority of the proposed Cotton Belt Project would follow the existing Cotton Belt Corridor. Since most development along the corridor occurred after the existing rail was constructed, several industrial and warehouse areas developed along the corridor to have direct access to the rail for the transportation of goods. This history is apparent in the many rail spurs extending from the main line to connect nearby businesses to the rail and in the many existing industrial/warehouse uses adjacent to the alignment. Other primary existing land uses adjacent to the Cotton Belt Corridor include residential, town centers, and undeveloped/park/open space. Figures 4-2A and 4-2B of the Land Use Existing Conditions Technical Memorandum in Appendix A graphically depict the land use types within the corridor. Table 4-1 of the Land Use
Existing Conditions Tech Memorandum in Appendix A reflects the amount of each type of land use present in the corridor by acreage and percent of the corridor.

Additional details regarding land use, development trends, future land use plans, and zoning are available in the Land Use Existing Conditions Technical Memorandum in Appendix A.

Impact Assessment
A combination of the 2005 NCTCOG land use maps, recent aerial photography, and desktop research formed the inventory of existing land uses on which this impact assessment is based. This assessment is preliminary and will be updated as necessary once the right-of-way requirements for the proposed project have been determined.

Base Alternative

Alignment: The proposed project would be located within Cotton Belt Corridor existing rail right-of-way and therefore would not significantly impact existing land uses along the Base Alternative.

DFW North Station and Alignment: The proposed station would be located on currently vacant property. The TEX Rail Regional Rail Station and alignment is assumed to be in place prior to the Cotton Belt. DART would share the alignment station and access with the TEX Rail project. Therefore the proposed project would not impact the transportation land use that would exist at the time of implementation.

Downtown Carrollton Station: The proposed station would impact approximately six acres of vacant land to construct a new station and two parking facilities. Adding a new station to the existing station could result in the existing residential, commercial, and industrial land uses being rezoned to accommodate increased levels of transit activity.

Addison Station: The proposed station would not impact the existing land use due to the proposed modifications being constructed adjacent to the existing transit center along the alignment.

Knoll Trail Station: The proposed station would impact the existing land uses because the platforms would only be added to the alignment within the Cotton Belt Corridor right-of-way. The existing office and retail land uses could be indirectly impacted by the increased activity, resulting in the land uses becoming more transit-oriented over time.

Preston Road Station: The station project would not impact the existing land uses due to only adding platforms within the Cotton Belt Corridor right-of-way.

Renner Village Station (Dickerson St. Option): The proposed station would impact the existing office land use at Dickerson Street due to the proposed station infrastructure and parking lot. Land that is now occupied by a large radio tower, a large metal barn, and fenced areas storing trailers, trucks, and scrap would also be impacted. This land, which is immediately east of the office use, is identified in the NCTCOG land use file as vacant.
Renner Village Station (Coit Rd. Option): The proposed station would impact Adventure Landing, the existing commercial land use at Coit Road. The entire theme park would be removed to construct the station infrastructure and parking lot.

UTD/Synergy Park Station: The proposed station would impact vacant land use for the station infrastructure and parking lot. The parking lot would be just east of existing office land use, but would not likely impact the office building or parking lot.

12th Street Station Complex: The proposed station would impact existing retail, industrial, and vacant land uses in order to construct the 12th Street Station Complex.

Shiloh Road Station: The proposed station would impact an existing vacant land use that is surrounded by industrial land uses. The vacant land use would be converted into a parking lot. An industrial land use that contains an Oncor Electric substation separates the station platforms from the parking lot. Over time, the existing industrial land uses could be rezoned to facilitate transit-oriented development.

**Cypress Waters Alternatives**

Alignment: Either of the Cypress Waters Alternatives would impact existing land uses. Both alternative alignments would occupy commercial and vacant land uses. A small area of single-family residential land uses may also be impacted from the alignments. The eastern portion of the alignment would cut through utility land use, similar to the station area. The Cypress Waters South Alternative would utilize more currently vacant land than the Southwestern Boulevard Alternative which would occupy existing street right-of-way.

North Lake Station: The proposed station for either Cypress Waters Alternative would be located on land that is identified in the NCTCOG land use file as Utilities; however, the Cypress Waters mixed-use development is currently under construction. Across Belt Line Road from the future station is a 38-acre vacant land use that has since been developed into a warehouse facility.

**North Dallas Profile Options**

At-Grade Profile (Section 3-2A)

The At-Grade profile is included in the Base Alternative; therefore, all station areas and alignment impacts would be the same as those described in the Base Alternative.

Trench Profile (Section 3-2B)

Alignment: With the Trench Profile, roadway crossings would be reconstructed as overpasses to cross the rail trench. The overpasses would require additional right-of-way, which would primarily impact residential land uses but could also impact flood control land uses.

Stations: All station area impacts would be the same as described in the Base Alternative.

Tunnel Profile (Section 3-2C)

Alignment: The Tunnel Profile could require additional right-of-way at the portals on either end of the tunnel, which could impact office, parkland, and/or transportation land uses.
Stations: All station area impacts would be the same as described in the Base Alternative.

**Red Line Interface Alternatives**

**North Alternative (Section 3-4A)**

The Red Line Interface North Alternative is included in the Base Alternative, therefore, all station area and alignment impacts would be the same as those described in the Base Alternative.

**South Alternative with Aerial Station and Depressed Freight (Section 3-4B)**

**Alignment:** In order to connect to the existing PGBT Station, the alignment would deviate from the existing Cotton Belt Corridor and impact vacant, park/trail, and utilities land uses. Although the multi-family residential land use is shown on Figure 4-2B in the *Land Use Existing Conditions Technical Memorandum* in Appendix A to extend east of the nearby apartment complex, there is no development outside the existing complex.

**Bush Turnpike Station:** The proposed project with the Red Line Interface South Alternative would impact existing vacant land use by adding two new platforms immediately west of the existing DART Red Line Bush Turnpike Station platforms.

**12th Street Station Complex:** The proposed project with the Red Line Interface South Alternative would impact existing retail, industrial and vacant land uses. The impacts result from the construction of the station parking lots. The aerial station option may impact existing infrastructure and transportation land uses in order to accommodate the station platforms.

**Future Plans**

In anticipation of implementation of rail service, communities along the Cotton Belt Corridor have developed plans associated with station area development. Stations for which plans have been developed include DFW North, North Lake, Downtown Carrollton, Addison, Renner Village (East), UTD/Synergy, Bush Turnpike, and 12th Street.

**Mitigation Options**

As described above, many communities are developing station area plans along the Cotton Belt Corridor, which encourages transitions to more conducive land uses for transit. DART would continue working with these communities to encourage appropriate development. Unwelcomed change could be mitigated through various methods. The specific type of mitigation that could be applied is dependent on the characteristics of the particular neighborhood or community that is affected by the transit project. A variety of mitigation strategies are available. A few examples are provided as follows:

- Link stations with redevelopment sites
- Route any additional vehicular, pedestrian, and/or bicycle traffic generated by the project away from the local neighborhoods
- Provide fencing as needed to keep passengers and others away from potentially dangerous areas such as LRT track
- Place construction staging areas and haul routes away from sensitive land uses such as neighborhoods, schools, or churches to the extent possible. When this is not possible,
submit plans for the staging areas as well as construction schedules for review by DART representatives. Store only necessary materials or equipment at the construction site. Restore staging areas to their original condition as soon as possible once the construction is completed

- Notify businesses and residences in advance of short-term utility disruptions in service due to transit construction activity
- Initiate policies at the city level to encourage a mixture of land uses to coexist with one another and complement each other.
- Provide opportunities for stakeholders to discuss concerns about land use and explore potential solutions.
- The selection of an MOS alternative would reduce the number of land uses changes, both unwelcomed and welcomed.

3.3 Socioeconomic Characteristics and Cohesion

This section assesses the existing socioeconomic characteristics and identifies potential impacts associated with the proposed Cotton Belt Project. For clarity, the discussion of existing conditions and potential impacts will been discussed according to the following topical areas:

- Community Facilities
- Neighborhood Integrity and Community Cohesion
- Schools
- Demographics
- Employment
- Economic Development

Introduction and Regulatory Setting

Although the Cotton Belt Project is not a federally funded project at this time, data collection and analysis efforts were nonetheless guided by NEPA standards. These require that adverse effects on environmental resources from a proposed federally funded project be identified and avoided or minimized, including potential impacts to the human environment and social interactions. Executive Order (EO) 13045, Protection of Children from Environmental Health and Safety Risks mandates that federal agencies identify and assess environmental safety risks that may disproportionately affect children as a result of implementation of federal policies, programs, activities and standards.

DART policies also require that the potential impacts of any proposed project (whether federally or locally funded) be assessed, and if adverse effects are found, that these impacts be avoided, or minimized and mitigated. As described in DART’s Environmental Impact Assessment and Mitigation Guidelines for Transit Projects, DART’s three main objectives regarding a proposed transit project’s impact on the human environment, particularly on community character and cohesion, are as follows:
• Contribute to community cohesion,
• Contribute to the local economy, where possible, and avoid negative economic impacts, and
• Provide for an equitable distribution of costs and benefits and ensure that the project does not have a disproportionately high and adverse impact on low-income or minority populations.

**Methodology**
The most recent community data for each city and independent school district (ISD) were used as a basis for the existing socioeconomic characteristics, and supplemented with data acquired during field reconnaissance and anecdotal information gathered throughout the planning processes.

In order to determine impacts to socioeconomic resources, all community facilities and major employers immediately adjacent to the existing alignment or affected by proposed alternative alignments or station areas were evaluated for potential impacts. In addition, school zones, neighborhoods, and homeowners associations which span the alignment were also evaluated for possible impacts.

An adverse impact was identified if any potential disruption in activity is anticipated. This includes the displacement of a community facility or employer, disruption to the cohesion of a neighborhood, or increased difficulty in accessing a particular facility.

**Existing Conditions**
This section identifies existing socioeconomic characteristics along the Cotton Belt Project Corridor, including neighborhoods, schools and other community facilities, demographics, employment and economics. The facilities discussed in this section are located within the project study area.

**Community Facilities**
Currently 71 community resources were inventoried, including day care centers, medical facilities, and places of worship, public offices and parks, police and fire stations, schools, universities and colleges, as well as additional places of interest. Table 3-1 provides a list of these community facilities. The Map ID in this table can be used to reference the facilities on Figure 4-2 in the Socioeconomics Characteristics Existing Conditions Technical Memorandum located in Appendix A.
<table>
<thead>
<tr>
<th>Map Key</th>
<th>Facility Name</th>
<th>Address</th>
<th>City</th>
<th>In proximity to station or alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fire Station No. 121</td>
<td>520 Southwestern Blvd.</td>
<td>Coppell</td>
<td>Alignment</td>
</tr>
<tr>
<td>2</td>
<td>Coppell Fire Department Office of Administrative Services and Fire Inspection</td>
<td>500 Southwestern Blvd</td>
<td>Coppell</td>
<td>Alignment</td>
</tr>
<tr>
<td>3</td>
<td>Animal Services and Adoption Center</td>
<td>821 S. Coppell Rd.</td>
<td>Coppell</td>
<td>Alignment</td>
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<td>4</td>
<td>Coppell Road Service Center</td>
<td>816 S. Coppell Rd.</td>
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<td>5</td>
<td>W.W. Pinkerton Elementary</td>
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<td>Coppell</td>
<td>Alignment</td>
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<tr>
<td>6</td>
<td>Riverside Church of Christ</td>
<td>150 E. Belt Line Rd.</td>
<td>Coppell</td>
<td>Station and Alignment</td>
</tr>
<tr>
<td>7</td>
<td>Valley Ranch Baptist Church</td>
<td>1501 E. Belt Line Rd.</td>
<td>Irving</td>
<td>Alignment</td>
</tr>
<tr>
<td>8</td>
<td>Barbara Bush Elementary School</td>
<td>515 Cowboys Parkway</td>
<td>Irving</td>
<td>Alignment</td>
</tr>
<tr>
<td>9</td>
<td>The North Church</td>
<td>1615 Belt Line Rd.</td>
<td>Carrollton</td>
<td>Alignment</td>
</tr>
<tr>
<td>10</td>
<td>City Square and Gazebo</td>
<td>Main St. and Broadway</td>
<td>Carrollton</td>
<td>Station</td>
</tr>
<tr>
<td>11</td>
<td>Miracle Tabernacle Pentecostal Church of God</td>
<td>1107 Jackson St.</td>
<td>Carrollton</td>
<td>Station and Alignment</td>
</tr>
<tr>
<td>12</td>
<td>Wellness Plus Chiropractic Center</td>
<td>1311 E. Belt Line Rd.</td>
<td>Carrollton</td>
<td>Station and Alignment</td>
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<tr>
<td>13</td>
<td>Korean Disciple Baptist Church</td>
<td>1017 Erie St.</td>
<td>Carrollton</td>
<td>Station and Alignment</td>
</tr>
<tr>
<td>14</td>
<td>Primera Iglesia Bautista Hispana</td>
<td>1407 Walnut St.</td>
<td>Carrollton</td>
<td>Station and Alignment</td>
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<td>15</td>
<td>First Korean Presbyterian Church</td>
<td>1109 Clint St.</td>
<td>Carrollton</td>
<td>Station and Alignment</td>
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<tr>
<td>16</td>
<td>The Hope Presbyterian Church</td>
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<td>Carrollton</td>
<td>Alignment</td>
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<td>Hilltop Memorial park</td>
<td>1810 N. Perry Rd.</td>
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<td>Metrocrest Funeral Home</td>
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<td>20</td>
<td>Perry Cemetery</td>
<td>Perry Rd and Sherwood Dr.</td>
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<tr>
<td>22</td>
<td>Carrollton-Farmers Branch ISD Administration Building</td>
<td>1445 N. Perry Rd.</td>
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<td>Ted Polk Middle School</td>
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<td>Alignment</td>
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<td>Map Key</td>
<td>Facility Name</td>
<td>Address</td>
<td>City</td>
<td>In proximity to station or alignment</td>
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<td>Kelly Athletic Fields</td>
<td>2000 Kelly Blvd.</td>
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<td>Alignment</td>
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<td>Islamic Association of Carrollton</td>
<td>1901 Kelly Blvd.</td>
<td>Carrollton</td>
<td>Alignment</td>
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<tr>
<td>26</td>
<td>Fire Station #7</td>
<td>4798 Airport Pkwy</td>
<td>Addison</td>
<td>Station</td>
</tr>
<tr>
<td>27</td>
<td>Police Headquarters</td>
<td>4799 Airport Parkway</td>
<td>Addison</td>
<td>Station</td>
</tr>
<tr>
<td>28</td>
<td>Fire Station #7</td>
<td>6010 Davenport Rd.</td>
<td>Dallas</td>
<td>Station and Alignment</td>
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<tr>
<td>29</td>
<td>Fairhill School and Diagnostic Center</td>
<td>15150 Preston Rd.</td>
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<td>Alignment</td>
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<tr>
<td>30</td>
<td>Congregation Ohev Shalom/Far North Dallas Eruv</td>
<td>6821 McCallum Blvd.</td>
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<td>31</td>
<td>Montessori School at Hillcrest (6 weeks-Kindergarten)</td>
<td>6950 McCallum Blvd.</td>
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<td>Frankford Middle School</td>
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<td>Texas AgriLife Research &amp; Extension Center at Dallas</td>
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<td>Richardson</td>
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<td>University of Texas at Dallas (UTD)</td>
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<td>Station</td>
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<td>Open Door Christian Life Center</td>
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<td>Station and Alignment</td>
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<td>Avenue F Church of Christ</td>
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<td>Alignment</td>
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<td>Alignment</td>
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<td>41</td>
<td>Plano Day Care Inc. (Douglass Community Center)</td>
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<td>Holy Communion Outreach Temple</td>
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<td>Greater New Birth Baptist Church</td>
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<td>Shiloh Missionary Baptist</td>
<td>920 14th St.</td>
<td>Plano</td>
<td>Station and Alignment</td>
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<td>Plano Police Department Headquarters</td>
<td>909 E. 14th St.</td>
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<td>Station</td>
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<tr>
<td>46</td>
<td>First Christian Church of Plano</td>
<td>813 E. 15th St.</td>
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<td>Station</td>
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<tr>
<td>47</td>
<td>Cox Building</td>
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<td>Station</td>
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<tr>
<td>Map Key</td>
<td>Facility Name</td>
<td>Address</td>
<td>City</td>
<td>In proximity to station or alignment</td>
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<td>Plano Municipal Court East Side Location</td>
<td>900 E. 15th St.</td>
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<td>Station</td>
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<td>Location - Raymond Robinson Justice Center</td>
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<td></td>
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<td>God's Work Ministries</td>
<td>1617 K Ave, Ste. B</td>
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<td>Station</td>
</tr>
<tr>
<td>50</td>
<td>Plano Municipal Center</td>
<td>1520 Avenue K</td>
<td>Plano</td>
<td>Station</td>
</tr>
<tr>
<td>51</td>
<td>Shiloh Baptist</td>
<td>1310 I Ave.</td>
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<td>Station and Alignment</td>
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<td>52</td>
<td>Hills Chapel CEM Church</td>
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<tr>
<td>53</td>
<td>First Baptist Church of Plano</td>
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<td>Alignment</td>
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<td>54</td>
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<td>Station and Alignment</td>
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<td>1407 14th St.</td>
<td>Plano</td>
<td>Station and Alignment</td>
</tr>
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<td>56</td>
<td>Children's Workshop</td>
<td>1409 E. 14th St.</td>
<td>Plano</td>
<td>Station and Alignment</td>
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<td>57</td>
<td>For God's Little Angles Day Care</td>
<td>1408 O Ave.</td>
<td>Plano</td>
<td>Station and Alignment</td>
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<td>58</td>
<td>Templo de Altisimo</td>
<td>1519 E. 15th St.</td>
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<td>Alignment</td>
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<td>59</td>
<td>Plano First Assembly of God</td>
<td>1609 14th St.</td>
<td>Plano</td>
<td>Alignment</td>
</tr>
<tr>
<td>60</td>
<td>Workforce Solutions North Central Texas</td>
<td>1101 Resources Dr.</td>
<td>Plano</td>
<td>Alignment</td>
</tr>
<tr>
<td>61</td>
<td>US Post Office</td>
<td>1200 Jupiter Rd.</td>
<td>Plano</td>
<td>Alignment</td>
</tr>
<tr>
<td>62</td>
<td>Small Miracles Day Care</td>
<td>2700 S. Rigsbee Dr.</td>
<td>Plano</td>
<td>Alignment</td>
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<td>63</td>
<td>Collinwood Nursing and Rehabilitation</td>
<td>3100 S. Rigsbee Dr.</td>
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<td>Alignment</td>
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<td>64</td>
<td>All Nations United Methodist</td>
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<td>Plano</td>
<td>Station and Alignment</td>
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<td>65</td>
<td>God's Food Pantry</td>
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<td>Plano</td>
<td>Station and Alignment</td>
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<td>66</td>
<td>Salvation Army - Plano Corps</td>
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<td>Plano</td>
<td>Station and Alignment</td>
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<tr>
<td>67</td>
<td>Shiloh Center (PISD Facility)</td>
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<td>Alignment</td>
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<td>Islamic Academy</td>
<td>1251 Shiloh Rd.</td>
<td>Plano</td>
<td>Station and Alignment</td>
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<td>69</td>
<td>Forman Elementary</td>
<td>3600 Timberline Dr.</td>
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<td>70</td>
<td>Sehion Mar Thoma Church</td>
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<td>Plano</td>
<td>Station and Alignment</td>
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<td>71</td>
<td>DFW Fire – EMS Station # 6</td>
<td>711 Regent Boulevard</td>
<td>Grapevine</td>
<td>Alignment</td>
</tr>
</tbody>
</table>

Source: URS, city and organization websites, 2013.
**Neighborhoods and Community Cohesion**

Some portions of the existing Cotton Belt Corridor pass through or near residential areas. DART has identified several registered or formally-organized homeowners’ and neighborhood associations along the corridor. Several of these groups have provided important feedback on the project. Neighborhoods and associations known to date within a half-mile of the proposed station locations or within a quarter-mile of the Cotton Belt Project alignment are identified in the *Socioeconomic Characteristics Existing Conditions Technical Memorandum* in Appendix A.

Community cohesion refers to the level of social interaction experienced within and across neighborhoods. Neighborhood and homeowners’ associations and similar organizations serve to bind neighbors to one another under a common identity or set of ideals, and create more meaningful social interactions.

The vast majority of neighborhoods surrounding the Cotton Belt Corridor developed around the railroad, since the corridor pre-dates modern residential developments. As a result, the corridor serves as a logical physical boundary line for many neighborhoods. Potentially impacted neighborhoods which are bisected by the Cotton Belt Project are discussed in greater detail in the next section.

Select neighborhoods within the City of Plano have neighborhood action plans that were developed by the city with close participation of interested members from affected neighborhoods. Within each neighborhood, residents were given the opportunity, via surveys and community meetings, to provide input on issues, concerns and desires for their neighborhood. After compiling information from the community as a whole, the Neighborhood Planning Team (comprised of residents of the neighborhood) developed goals and objectives that address the needs of the neighborhood and aim to foster community cohesion.

In the Plano portion of the project study area, the neighborhoods with action plans in place include Douglass Community, Haggard, Old Towne, Meadows Addition, Ridgewood and Foreman. The Meadows Addition neighborhood is represented by the Meadows Neighborhood Association and Old Towne is part of the Southwood Estates Association.

The North Dallas area is home to a vibrant and growing Jewish population, centered around McCallum Boulevard and Hillcrest Road and within an approximate two mile radius, with several synagogues and day schools. What makes this area so attractive to this population is the presence of an Eruv. An Eruv is a symbolic boundary that some Jewish communities erect in their neighborhoods as a way to permit Jewish residents or visitors to carry certain objects (e.g., house keys, prayer books, canes or walkers, and children who cannot walk on their own) from a private space to a public domain during Sabbath. These examples are types of activities that they do not perform unless they create a communal area by erecting a symbolic boundary around the neighborhood. An Eruv accomplishes this by integrating a number of private and public properties into one larger private domain. The Sabbath is observed from sundown every Friday evening to nightfall the next Saturday.
**Schools**

To identify and assess the potential safety risks to children imposed by the Cotton Belt Project, a first step is to inventory areas within the corridor where high concentrations of children are likely, such as schools.

When a new transportation corridor is under consideration, whether along an existing corridor or in a new location, it is important to not only inventory the locations of schools along the alignment, but also their respective attendance zones. By examining the relationship of the location of the schools to the residential areas within each attendance zone, it can be determined whether school children would have to cross the proposed corridor in order to reach their school on foot or by bicycle. There are 30 schools with attendance zones within the project study area. The schools are described in more detail and identified on Figure 4-3 in the *Socioeconomic Characteristics Existing Conditions Technical Memorandum* in Appendix A.

**Demographics**

This section provides a demographic profile of the population within the project study area, and also gives the same information for those counties and cities, which the Cotton Belt Project traverses. General race, ethnicity, median household income, poverty level and vehicle availability data are included in this section. More detailed project-area information regarding race, ethnicity, income and English proficiency can be found in the *Environmental Justice Existing Conditions Technical Memorandum* in Appendix A. *Table 3-2* below provides county and city population data from the 2000 and 2010 Decennial Censuses.

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Collin County</td>
<td>491,675</td>
<td>782,341</td>
<td>290,666</td>
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<tr>
<td>Dallas County</td>
<td>2,218,899</td>
<td>2,368,139</td>
<td>149,240</td>
<td>6.7%</td>
</tr>
<tr>
<td>Tarrant County</td>
<td>1,446,219</td>
<td>1,809,034</td>
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<td>Town of Addison</td>
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<td>13,056</td>
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<tr>
<td>City of Carrollton</td>
<td>109,576</td>
<td>119,097</td>
<td>9,521</td>
<td>8.7%</td>
</tr>
<tr>
<td>City of Coppell</td>
<td>35,958</td>
<td>38,659</td>
<td>2,701</td>
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<tr>
<td>City of Dallas</td>
<td>1,188,580</td>
<td>1,197,816</td>
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<tr>
<td>City of Grapevine</td>
<td>42,059</td>
<td>46,334</td>
<td>4,275</td>
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<tr>
<td>City of Plano</td>
<td>222,030</td>
<td>259,841</td>
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</tr>
<tr>
<td>City of Richardson</td>
<td>91,802</td>
<td>99,223</td>
<td>7,421</td>
<td>8.1%</td>
</tr>
</tbody>
</table>

*Source: USCB, NCTCOG, URS, 2013.*

As shown in *Table 3-2* above, most cities through which the proposed Cotton Belt Project passes, have experienced an increase in population from 2000 to 2010. Addison is the only city that decreased in population, and the City of Dallas had a negligible growth rate of less than one percent. The remaining cities increased in population by between eight and 17%.
Socioeconomic Characteristics Existing Conditions Technical Memorandum, in Appendix A, provides the racial and ethnic breakdown of the counties, cities and census units included in the project study area. Project-area race and ethnicity statistics are from the 2010 Decennial Census and the American Community Survey (ACS). Also provided in the tech memo are the median household income, individual poverty rates, and proportion of household without vehicles for the counties, cities and census tracts (CT) included in the project study area.

Employment
There are 40 major employers within the project study area. The NCTCOG defines “major employer” as a single location of a business, which employs 250 or more individuals. This data is provided and periodically updated by NCTCOG on its website. Thirty-one major employers were identified within one-half mile of a proposed station location. Additionally, State Farm Insurance is currently constructing a new 1.5-million square foot facility that could house 6,500 employees adjacent to the Bush Turnpike Station on the Red Line Interface South Alternative. Major employers near station locations likely generate considerable activity in those areas, and thus, it is important to identify major employment centers in addition to residential populations. It is also important to identify other large employers with facilities near the project corridor in order to determine whether those businesses may be impacted by the proposed rail service. Table 4-5 of the Socioeconomic Characteristics Existing Conditions Technical Memorandum in Appendix A lists the major employers within a half-mile of the proposed Cotton Belt Project stations or within a quarter mile of the Cotton Belt Project alignment.

Economic Development
Most cities within the project study area have economic development corporations (EDCs) to support business development within their jurisdiction. EDCs actively pursue potential business relocations on behalf of their cities. Tax increment financing (TIF) districts and tax rebates are examples of other tools used by cities within the study area to attract new business. More information regarding economic development is available in the Socioeconomic Characteristics Existing Conditions Technical Memorandum in Appendix A.

Impact Assessment
This section identifies potential impacts to socioeconomic characteristics as a result of the proposed Cotton Belt Project. Impacts include those to neighborhoods, schools and other community facilities, demographics, employment and economics.

Community Facilities
A total of 71 community facilities were identified within the project study area, and of those, only 20 are adjacent to the proposed base alignment or station areas warranting further study. These 20 facilities, described in the Socioeconomic Impact Assessment Technical Memorandum in Appendix A, were all already adjacent to the existing Cotton Belt freight corridor and are not considered to be further impacted by the project.

The only adverse impacts to community facilities that could result from the Base Alternative are those due to an increase in noise, as described in Section 3.13 of AECR and the Noise and Vibration Impact Assessment Technical Memorandum in Appendix A. Table 3-3 identifies community facilities impacted by noise as a result of the Base Alternative.
Table 3-3: Base Alternative Noise Impacts to Community Facilities

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Address</th>
<th>City</th>
<th>Description of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valley Ranch Baptist Church</td>
<td>1501 E. Belt Line Rd.</td>
<td>Irving</td>
<td>Moderate Noise Impact</td>
</tr>
<tr>
<td>The North Church</td>
<td>1615 Belt Line Rd.</td>
<td>Carrollton</td>
<td>Moderate Noise Impact</td>
</tr>
<tr>
<td>Miracle Tabernacle Pentecostal Church of God</td>
<td>1107 Jackson Street</td>
<td>Carrollton</td>
<td>Severe Noise Impact</td>
</tr>
<tr>
<td>Hilltop Memorial Park</td>
<td>1810 Perry Rd.</td>
<td>Carrollton</td>
<td>Severe Noise Impact</td>
</tr>
<tr>
<td>Ted Polk Middle School</td>
<td>2001 Kelly Blvd.</td>
<td>Carrollton</td>
<td>Moderate Noise Impact</td>
</tr>
<tr>
<td>Islamic Association of Carrollton</td>
<td>1901 Kelly Blvd.</td>
<td>Carrollton</td>
<td>Severe Noise Impact</td>
</tr>
<tr>
<td>Congregation Ohev Shalom/ Far North Dallas Eruv</td>
<td>6821 McCallum Blvd.</td>
<td>Dallas</td>
<td>Severe Noise Impact</td>
</tr>
<tr>
<td>Montessori School at Hillcrest</td>
<td>6950 McCallum Blvd.</td>
<td>Dallas</td>
<td>Severe Noise Impact</td>
</tr>
<tr>
<td>Frankford Middle School</td>
<td>7706 Osage Plaza Parkway</td>
<td>Dallas</td>
<td>Severe Noise Impact</td>
</tr>
</tbody>
</table>


Additionally, the W.W. Pinkerton Elementary School has been identified as a potential severe noise impact in both Cypress Waters Alternatives Noise impacts are described in more detail in Section 3.13 of AECR and the Noise and Vibration Impact Assessment Technical Memorandum in Appendix A.

The City of Coppell has also raised a concern regarding traffic in the Cypress Waters Southwestern Boulevard Alternative. In this scenario the rail would occupy a portion a Southwestern Boulevard right-of-way directly adjacent to W.W. Pinkerton Elementary School. This could exasperate an existing congestion and access problem immediately before and after school resulting in increased difficulty in accessing the school. More detail is provided in Section 4.1 of AECR and the Traffic Analysis Technical Memorandum in Appendix B.

No additional impacts to community facilities are anticipated as a result of the Cypress Waters South Alternative or any of the North Dallas or Red Line Interface Alternatives.

**Neighborhoods and Community Cohesion**

The vast majority of neighborhoods surrounding the Cotton Belt Corridor developed around the railroad, since the corridor pre-dates modern residential developments. As a result, the corridor serves as a logical physical boundary line for many neighborhoods. In North Dallas there are several neighborhoods located along the Cotton Belt Corridor. Although each of these neighborhoods has a unique identify they share many common concerns and interest. Social interaction occurs within and across these neighborhood boundaries. Therefore North Dallas is discussed here as whole. In addition to North Dallas only one other neighbor, Old Downtown Carrollton, is bisected by the existing corridor alignment.

The Old Downtown Carrollton Association is located in a historic railroad community that is a well-developed area whose downtown neighborhood character is fitting with rail operations. The area currently includes three intersecting tracks and a railroad switching yard. The design of
the Cotton Belt Project includes grade separating passenger rail over the most heavily trafficked freight lines. Additionally, the TxDOT IH-35 E reconstruction project will eliminate some of the at-grade rail and roadway crossings in downtown Carrollton. Although there would be increased frequency of traffic along the Cotton Belt Corridor, the design of the Cotton Belt Project and TxDOT project would reduce at-grade crossings and thus minimize the impacts to community cohesion.

In North Dallas, community interaction is currently limited by the existing rail corridor and several creeks and riparian areas that roughly parallel the Cotton Belt Corridor. The only community interaction across the rail corridor occurs at roadways crossings including Preston Road, Davenport Road, Campbell Road, Hillcrest Road, McCallum Boulevard, Meandering Way, Dickerson Street and Coit Road. Of these, Preston Road is currently grade separated over the rail and Coit Road is planned to cross over the rail.

In the North Dallas with the At-grade Profile, the primary impedance to community cohesion would be travel delays as result of crossing events. Freight traffic has been removed from this portion of the Cotton Belt Corridor and under the proposed passenger rail operating plan, crossing delays would be insignificant. Trains would cross North Dallas roadways up to six times an hour for approximately 45 seconds for each crossing event.

These minor impacts to community cohesion would be avoided in either the Trench or Tunnel Profile since all at-grade crossings would be eliminated. With its combination of walls and trenches the Trench Profile may be perceived as a barrier to community cohesion.

The proposed project has the potential to affect the North Dallas Jewish community if the project causes breaks in the Eruv boundary. The existing rail line crosses Davenport, Hillcrest, McCallum, Meandering Way, Dickerson and Coit, and the proposed changes with project implementation may necessitate changes in the configuration of utility poles, which the Jewish community uses for the Eruv. These potential changes, as well as the potential construction of walls, fences or other structures or removal of vegetation associated with the proposed Cotton Belt Project may impact the Eruv either positively or negatively. Temporary impacts could occur during construction if markers are down causing a break in what is to be a continuous boundary. The Eruv must remain in good repair to be effective and with no breaks.

No additional impacts to neighborhoods are anticipated as a result of any of the Cypress Waters or Red Line Interface Alternatives.

**Schools**
The Cotton Belt Corridor predates the development of most schools in this area. As a result, many of school attendance zones along the Cotton Belt Corridor use the corridor as a logical boundary. However, some school attendance zones are intersected by the Cotton Belt Corridor, resulting in a potential impact. The full list of schools evaluated for potential impact is included in the *Socioeconomic Impact Assessment Technical Memorandum* in Appendix A. Table 3-4 below lists only those schools which have are likely to be impacted. Likelihood for impact was determined by the proportion of a school’s residential area located across the alignment and the overall walkability from those neighborhoods.
Table 3-4: Schools Attendance Zones Crossing the Cotton Belt Alignment

<table>
<thead>
<tr>
<th>School</th>
<th>District</th>
<th>Residential Area Across Tracks</th>
<th>Description of Walk/Bike Access from Across Tracks</th>
<th>Potential for Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.W. Pinkerton Elementary</td>
<td>Coppell ISD</td>
<td>75-100%</td>
<td>Nearby neighborhoods, no major barriers to walking</td>
<td>Yes</td>
</tr>
<tr>
<td>Riverchase Elementary</td>
<td>Carrollton/Farmers Branch ISD</td>
<td>25-50%</td>
<td>1.0-1.5 miles to nearest affected neighborhood</td>
<td>Yes</td>
</tr>
<tr>
<td>Carrollton Elementary</td>
<td>Carrollton/Farmers Branch ISD</td>
<td>1-25%</td>
<td>Nearby neighborhoods, no major barriers to walking</td>
<td>Yes</td>
</tr>
<tr>
<td>Bush Middle School</td>
<td>Carrollton/Farmers Branch ISD</td>
<td>1-25%</td>
<td>0.5-1.0 miles to nearby apartment complexes</td>
<td>Yes</td>
</tr>
<tr>
<td>Perry Middle School</td>
<td>Carrollton/Farmers Branch ISD</td>
<td>25-50%</td>
<td>Nearby neighborhoods, no major barriers to walking</td>
<td>Yes</td>
</tr>
<tr>
<td>Polk Middle School</td>
<td>Carrollton/Farmers Branch ISD</td>
<td>1-25%</td>
<td>0.5-1.0 miles to nearby apartment complexes</td>
<td>Yes</td>
</tr>
<tr>
<td>Brentfield Elementary</td>
<td>Richardson ISD</td>
<td>25-50%</td>
<td>Nearby neighborhoods, no major barriers to walking</td>
<td>Yes</td>
</tr>
<tr>
<td>Parkhill Junior High</td>
<td>Richardson ISD</td>
<td>1-25%</td>
<td>Nearby neighborhoods, no major barriers to walking</td>
<td>Yes</td>
</tr>
<tr>
<td>Frankford Middle School</td>
<td>Plano ISD</td>
<td>1-25%</td>
<td>0.5-1.0 miles to nearby apartment complexes</td>
<td>Yes</td>
</tr>
<tr>
<td>Mendenhall Elementary</td>
<td>Plano ISD</td>
<td>1-25%</td>
<td>Nearby neighborhoods, no major barriers to walking</td>
<td>Yes</td>
</tr>
<tr>
<td>Williams High School</td>
<td>Plano ISD</td>
<td>1-25%</td>
<td>Nearby neighborhoods, no major barriers to walking</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: URS, 2013.

In Coppell ISD, W. W. Pinkerton Elementary is located south of the Cotton Belt Corridor. The neighborhoods north of the corridor are close enough to the elementary school that walking or biking to school is likely to occur, especially because no major roadways create barriers to non-motorized travel. Students can cross the existing Cotton Belt Corridor in two locations: east of the school along Coppell Road or west of the school on Denton Tap Road. The increase in rail traffic along the corridor could impede walking access to the school along Coppell Road. However, students and parents are already accustomed to freight rail traffic along the corridor and the crossing is already equipped with flashing light signals and gates, so the potential impacts would be minimal. Passenger rail would be placed on aerial structure over Denton Tap Road so walking access to the school would not be impeded. Freight would continue to operate at-grade, which is the existing condition.

The two proposed Cypress Waters Alternatives, which would reroute the rail alignment South around the school, would significantly reduce residential area in the school’s attendance zone separated by the Cotton Belt Corridor. Students would still pass under the grade separation at Denton Tap. Students walking along Coppell Road would however be required to cross the twice.

Riverchase Elementary and Barbara Bush Middle School are located in Carrollton/Farmers Branch ISD west of IH-35E. Several neighborhoods and apartment complexes are located within
walking distance of the schools, making pedestrian and bike access important. The primary access for both schools is along MacArthur Boulevard. The Base Alternative would increase rail traffic along the alignment, which could impact students who chose to walk or bike. The rail crossing at MacArthur Road has flashing light signals, gates and a traffic control signal regulating vehicle and pedestrian movements across Belt Line Road, which should help to minimize most of the impact.

Also in Carrollton/Farmers Branch ISD, to the east of IH-35E, Carrollton Elementary and Perry Middle School are located off of Perry Road south of the Cotton Belt Corridor. Residential area just north of the corridor is within walking distance of both schools and likely to generate some pedestrian and bike travel. The only direct access to these neighborhoods occurs along Perry Road. Perry Road currently has a flashing signal and gate at the existing rail crossing; however, there is no designated pedestrian path across the Cotton Belt Corridor. Increased rail traffic resulting from the Base Alternative could create an adverse impact related to school access in this area; however, the lack of sidewalks acts as a deterrent to pedestrian activity.

Polk Middle school in Carrollton/Farmers Branch ISD is located north of the Cotton Belt Corridor on Kelly Lane. The majority of property south of the Cotton Belt Corridor is commercial; however, one block, located south of Country Club Drive between Josey Lane and Metrocrest Drive, is residential. Although this is not a pedestrian friendly environment, students in this area are close enough to walk or bike to school and could be adversely impacted by the increased rail traffic. Access to the school would require crossing the Cotton Belt Corridor on Kelly Boulevard. This crossing is currently equipped with flashing signals, gates, and a designated pedestrian crossing. Any potential adverse impacts are expected to affect only a small number of students, as the affected residential area is quite small.

Brentfield Elementary and Parkhill Junior High in the Richardson ISD are located adjacent to each other, southeast of the existing Cotton Belt Corridor. Both schools’ attendance zones include the nearby neighborhoods on the northeast side of the existing tracks. Students from these neighborhoods could access school from the southern Davenport Road crossing, along Campbell Road, or via the northern Davenport Road crossing. Freight has been abandoned along this portion of the Cotton Belt Corridor. In the At-grade Profile Option, all three crossings would be appointed with flashing signals, gates, and a pedestrian crossing, which would minimize the potential impact due to rail traffic along this corridor. Impacts to both schools would be mitigated as a result of the North Dallas Trench Option or Tunnel Option, due elimination of grade crossings.

In the Plano ISD, Frankford Middle School is located north of the Base Alternative in Osage Plaza. A small portion of this school’s attendance zone is south of the Cotton Belt Corridor, between Coit Road and the apartments on McCallum Road. Freight has been abandoned along this portion of the Cotton Belt Corridor. The most direct access across the tracks is along Dickerson Road; however, some students may also cross at Meandering Way or Coit Road. DART would elevate Coit Road over the Cotton Belt Corridor as part of the project. There is currently no designated pedestrian path across the corridor at Dickerson Street; however, the City of Dallas is in the process of rebuilding Dickerson Street which will result in a more pedestrian friendly environment. Both at-grade crossings would be appointed with flashing signals, gates, and a pedestrian crossing, which would minimize the potential impact due to rail traffic along Cotton Belt Corridor. The North Dallas Trench Profile or Tunnel Profile options would eliminate the at-
grade crossing of Meandering Way. The Dickerson Street and Coit Road configuration is the same in all three North Dallas Alternatives.

Also in the Plano ISD, Mendenhall Elementary School and Williams High are located north of north of the Cotton Belt Corridor and east of US 75. The attendance zone for these schools extends across the Cotton Belt Corridor which is an active freight corridor in this area. Most residential neighborhoods south of the alignment are also separated by the PGBT and more than two miles distance across a predominately commercial/industrial area. Because of these conditions, pedestrian, or bicycle trips to school are unlikely.

There is one residential neighborhood located within walking distance of some of these Plano ISD schools. This small enclave of residential home, which is surrounded by commercial and industrial uses, is located south of the Cotton Belt Corridor L Avenue. Access to the schools would require crossing the alignment on Municipal Avenue which has existing flashing signals, gates, and pedestrian crossings. In the Red Line Interface North Alternative, the Cotton Belt Project would operate at-grade at Municipal Avenue. Any potential adverse impacts are expected to affect only a small number of students, as the affected residential area is quite small.

In the Red Line Interface South Alternative, Cotton Belt Project would be placed on aerial structure over Municipal Avenue, thus walking access to the school would not be impeded. Freight would continue to operate at-grade, which is the existing condition.

**Demographics**

It is possible that the addition of regional rail service could result in a slight change to the existing demographics in this area. However no negative impacts are anticipated as a result of the Base Alternative or any of the Alternative Alignment options. A discussion of potential adverse impacts to protected demographic groups is provided in detail in the *Socioeconomic Characteristics Impacts Assessment Technical Memorandum* in Appendix A and summarized in Section 3.7 of this document.

**Employment**

Major employers, or business with 250 or more employees, are identified by the NCTCOG. A total of 40 major employers were identified as part of the *Socioeconomic Characteristics Existing Conditions Technical Memorandum* in Appendix A. Of these, almost half would be within walking distance of a proposed station. The *Socioeconomic Impact Assessment Technical Memorandum* in Appendix A analyzes the 13 major employers which are adjacent to the proposed Cotton Belt Project. However, none of these were found to be adversely impacted as they are already adjacent to the existing Cotton Belt Corridor. No improvements or proposed station areas outside the existing right-of-way would infringe on any major employers. Additionally, State Farm Insurance is currently constructing a new 1.5-million square foot facility that could house 6,500 employees adjacent to the Bush Turnpike Station on the Red Line Interface South Alternative. The existing Bush LRT Station is situated between the new development and the proposed Cotton Belt Station. No adverse impact to the State Farm development would result from the Cotton Belt Project.
**Economic Development**

The addition of service from the Cotton Belt Project could result in an impact to economic development along the corridor. Some existing DART station areas have spawned an increase in transit oriented development. Many of the communities located along the Cotton Belt Corridor are anticipating an economic development benefit as a result of the Cotton Belt Project. No adverse economic development impacts are anticipated as a result of the Base Alternative or any of the alternative alignments.

**Mitigation Options**

**Community Facilities**

The only long-term direct adverse impacts to community facilities that could result from the base alternative are those due to an increase in noise. Noise impacts to community facilities would also result from both Cypress Waters Alternatives. As described in Section 3.13, these noise impacts would be mitigated through the implementation of quiet zones.

A traffic/access impact to W. W. Pinkerton Elementary School would result from the Cypress Waters Southwestern Boulevard Alternative. Should this alternative be selected, mitigation could include intersection improvements, turning lanes, capacity improvement or modifying the school’s on-site roadway infrastructure. However, the Cypress Waters South Alternative was developed specifically as an alternative to avoid the traffic/access impact to the school. Selection of the Base Alternative or MOS 1 would avoid the impact to the school.

**Neighborhoods and Community Cohesion**

Two areas (Old Downtown Carrollton and North Dallas) may experience a slight impact to community cohesion as a result of the Base Alternative. These impacts are not considered to be significant and would not require mitigation. Although not specifically a mitigation measure, DART has taken additional action that would further limit impacts to community cohesion in North Dallas. In anticipation of implementing passenger rail in the Cotton Belt Corridor, DART facilitated the official abandonment of freight traffic in part of the corridor in 2010. This action permanently removed freight traffic from North Dallas, thus reducing the possibility of increased train traffic and eliminating crossing events of longer durations.

The North Dallas Eruv could experience adverse impacts as a result of the Cotton Belt Project. To avoid and minimize potential adverse impacts, the affected community should be engaged during future phases of project planning, design, and construction to assist with proposed solutions. During construction, attempts should be made to make repairs before the Sabbath.

**Schools**

The following Schools have been identified as potentially being impacted by the various alternatives:

- W.W. Pinkerton Elementary
- Riverchase Elementary
- Barbara Bush Middle School
• Carrollton Elementary
• Perry Middle School
• Polk Middle School
• Brentfield Elementary
• Parkhill Junior High
• Frankford Middle School
• Mendenhall Elementary
• Williams High School

No adverse impacts are anticipated as a result of any of the alternative alignments or profile options. DART would ensure that all at-grade crossings would be appointed with safe crossing measures such as flashing signals, gates, and a designated pedestrian crossing. Two current at-grade crossings (Denton Tap Road and Coit Road) traversed by students would be future grade separations. The selection of the North Dallas Trench or Tunnel Profile Options would eliminate at-grade crossing near North Dallas schools. The Red Line Interface South Alternative would eliminate the at-grade crossing of Metropolitan Avenue in Plano.

In general cities are responsible for providing an appropriate pedestrian environment. DART would coordinate the development of the Cotton Belt Corridor with these cities to help ensure appropriate signage and pedestrian ways. DART's Hike & Bike Policy provides that unused portions of rail corridor could be made available for trail purposes. This could improve access to some schools.

DART’s has a Transit Education Program that is a community outreach program to educate the public on transit and transit safety. This program is used to promote safety in schools before and after implementation of rail transit. More information on DART Transit Education program can be found at: http://www.dart.org/transiteducation.asp. No additional mitigation is anticipated.

Other Socioeconomic Characteristics

No adverse impacts to demographics, employment, or economic development are anticipated. Therefore no additional mitigation is required.

3.4 Parks and Recreational Facilities

Introduction and Regulatory Setting
This section inventories the parks and recreational facilities within the Cotton Belt Project study area. Identifying these important community resources will help ensure that adverse impacts are avoided or minimized and efforts are made to create a meaningful relationship between the Cotton Belt Project and the surrounding environment whenever possible.

Several regulations pertain to the use of parks and recreational facilities. Section 4(f) of the United States Department of Transportation (USDOT) Act of 1966, as amended (49 USC 303), declares it a national policy to make a special effort to preserve the national beauty of the countryside, including parks, recreation land, wildlife and waterfowl refuges, and historic sites. Use of Section 4(f) protected resources should be avoided when planning transportation projects, unless no other feasible or prudent alternatives exist. Section 6(f) of the Land and
Water Conservation Fund (LWCF) Act states that parks developed or improved using LWCF grant monies cannot be acquired unless no other reasonable and feasible alternative exists and without coordination with the National Park Service (NPS). Chapter 26 of the Texas Parks and Wildlife Department (TPWD) Code states that a state agency, county, or municipality cannot approve a project that would require the use or taking of a public park or recreational land unless it is determined that no feasible or prudent alternative exists, adverse impacts have been minimized through the planning process, and a public hearing is held regarding the proposed use.

**Methodology**
For the purpose of the environmental review, the project study area for park and recreational facilities includes one-quarter mile on either side of the proposed Cotton Belt Corridor Project alignment and one-half mile radius around each proposed station location. Park and recreational trails data were gathered through coordination with affected municipalities in conjunction with a review of city maps, parks and trails master plans, and GIS shapefiles from NCTCOG. Any park or trail within one-quarter mile alignment buffer and a half-mile station area buffer was included in the analysis.

The following three regulations previously outlined apply to the use of parks and recreational facilities for transportation projects:

- Section 4(f) of the Department of Transportation (DOT) Act of 1966;
- Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965; and
- Chapter 26 of the Texas Park and Wildlife Code.

The analysis of impacts to public parks and recreational facilities is consistent in all of these regulations; the funding source and initiating agency are defining criteria for the determination of what type of documentation is required for public park and recreational facility impact analysis.

**Existing Conditions**
Many parks and recreational facilities exist within the project study area. This section inventories 57 resources and identifies 6(f) facilities as well as any historic sites known to date that would be protected under Section 4(f) of the USDOT Act of 1966, as amended. Table 3-5 lists publicly owned parks and recreational facilities that may be subject to Section 4(f) regulations. Table 3-6 lists privately owned recreational facilities within the project study area. Figure 4-2 (A and B) in the Parks and Recreational Facilities Existing Conditions Technical Memorandum in Appendix A, shows the location of each inventoried facility along the Cotton Belt Corridor. The figure also shows a green-shaded overlay of the North Central Texas Council of Governments (NCTCOG) 2005 Land Use category “Dedicated, Parks.” As defined by the NCTCOG, land use examples in this category could include public and private parks, golf courses, cemeteries, public and private tennis courts and swimming pools, and amusement parks.

For the purpose of the environmental review, all publicly owned and privately owned parks and recreational areas have been identified. Dependent on the significance of public use, not all publicly owned parks and recreational facilities qualify as Section 4(f) protected resources. Publicly owned properties that may not qualify include school properties and floodways.
Conversely, some privately owned parks and recreational facilities are protected by Section 4(f). The applicability of Section 4(f) would be assessed on a case-by-case basis and a final determination will be made during the planning phase of the project. A Section 4(f) Evaluation that assesses all impacted Section 4(f) resources would be prepared.

<table>
<thead>
<tr>
<th>Table 3-5: Publicly Owned Parks and Recreational Facilities Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facility Name</strong></td>
</tr>
<tr>
<td><strong>Section 1</strong></td>
</tr>
<tr>
<td>Grapevine Springs Park Preserve</td>
</tr>
<tr>
<td>Grapevine Creek Park</td>
</tr>
<tr>
<td><strong>Section 2</strong></td>
</tr>
<tr>
<td>McInnish Park Sports Complex</td>
</tr>
<tr>
<td>R.E. Good Sports Complex</td>
</tr>
<tr>
<td>Dimension Tract</td>
</tr>
<tr>
<td>Elm Fork Nature Preserve</td>
</tr>
<tr>
<td>Elm Fork Nature Preserve Trail</td>
</tr>
<tr>
<td>Future bike and pedestrian trail (Elm Fork Trail)</td>
</tr>
<tr>
<td>Future bike and pedestrian trail (Crosby Trail)</td>
</tr>
<tr>
<td>Funded bike and pedestrian trail (Hutton Branch Trail)</td>
</tr>
<tr>
<td>Pioneer Park</td>
</tr>
</tbody>
</table>
## Table 3-5: Publicly Owned Parks and Recreational Facilities Inventory

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Address</th>
<th>City</th>
<th>In proximity to station or alignment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Square and Gazebo</td>
<td>1103 W. 3rd St. (at Main St. and Broadway)</td>
<td>Carrollton</td>
<td>Station, Alignment</td>
<td>City park</td>
</tr>
<tr>
<td>Francis Perry Park</td>
<td>1400 Francis St. (at Ross)</td>
<td>Carrollton</td>
<td>Station</td>
<td>City park</td>
</tr>
<tr>
<td>Gravley Park</td>
<td>1508 N. Perry Rd.</td>
<td>Carrollton</td>
<td>Alignment</td>
<td>City park</td>
</tr>
<tr>
<td>Gravley Park Loop</td>
<td>1508 N. Perry Rd.</td>
<td>Carrollton</td>
<td>Alignment</td>
<td>City trail</td>
</tr>
<tr>
<td>A.W. Perry Homestead Museum</td>
<td>1509 N. Perry Rd.</td>
<td>Carrollton</td>
<td>Alignment</td>
<td>City trail</td>
</tr>
<tr>
<td>Josey Ranch Lake Park (Hutton Branch Purple Trail and disc golf course only)</td>
<td>Kelly Blvd. and LeMans Dr. (at or near 2131 Kelly Blvd.) to Josey Ln.</td>
<td>Carrollton</td>
<td>Alignment</td>
<td>City park, trail, disc golf course</td>
</tr>
<tr>
<td>Hutton Branch Purple Trail</td>
<td>Steenson Park to Kelly Blvd.</td>
<td>Carrollton</td>
<td>Alignment</td>
<td>City trail</td>
</tr>
<tr>
<td>Kelly Athletic Facilities</td>
<td>2000 Kelly Boulevard</td>
<td>Carrollton</td>
<td>Alignment</td>
<td>Carrollton-Farmers Branch ISD</td>
</tr>
<tr>
<td>Arapaho Pedestrian Trail</td>
<td>Along Arapaho Rd. from just east of Addison Rd. to just west of Midway Rd. Extends to railroad right-of-way and includes viewing mounds in right-of-way.</td>
<td>Addison</td>
<td>Station, Alignment</td>
<td>City trail</td>
</tr>
<tr>
<td>Addison Circle Park</td>
<td>4970 Addison Circle Dr.</td>
<td>Addison</td>
<td>Station, Alignment</td>
<td>City Park</td>
</tr>
<tr>
<td>Bosque Park</td>
<td>15675 Quorum Dr.</td>
<td>Addison</td>
<td>Station, Alignment</td>
<td>City park</td>
</tr>
<tr>
<td>Parkview Park</td>
<td>5032 Parkview</td>
<td>Addison</td>
<td>Station, Alignment</td>
<td>City park</td>
</tr>
<tr>
<td>Beckert Park</td>
<td>5044 Addison Circle Dr.</td>
<td>Addison</td>
<td>Station, Alignment</td>
<td>City park</td>
</tr>
</tbody>
</table>

**Section 3**
<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Address</th>
<th>City</th>
<th>In proximity to station or alignment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wagging Tail Dog Park</td>
<td>5841 Keller Springs Rd.</td>
<td>Dallas</td>
<td>Station, Alignment</td>
<td>City park</td>
</tr>
<tr>
<td>Keller Springs Park</td>
<td>5710 Keller Springs Rd.</td>
<td>Dallas</td>
<td>Station, Alignment</td>
<td>City park</td>
</tr>
<tr>
<td>City of Dallas Floodway Management Area</td>
<td>16110 Preston Rd.</td>
<td>Dallas</td>
<td>Station, Alignment</td>
<td>Floodway Management Area</td>
</tr>
<tr>
<td>Preston Ridge Trail</td>
<td>Meandering Way from south of Belt Line Rd. to McCallum Blvd.; also on Brentfield Dr. from Meandering Way to Davenport Rd.; future extension from McCallum north to PGBT</td>
<td>Dallas</td>
<td>Alignment (two separate points of proximity along corridor)</td>
<td>City/County trail</td>
</tr>
<tr>
<td>City of Dallas Floodway Management Areas</td>
<td>6210 Davenport Rd., 6001 and 6101 Campbell Rd., 7000 and 7004 Spanky Branch Ct.</td>
<td>Dallas</td>
<td>Alignment</td>
<td>Floodway Management Areas</td>
</tr>
<tr>
<td>City of Dallas Public Use Area</td>
<td>16900 Davenport Rd.</td>
<td>Dallas</td>
<td>Alignment</td>
<td>Public Use Area</td>
</tr>
<tr>
<td>Preston Green Park</td>
<td>6900 Duffield Ct.</td>
<td>Dallas</td>
<td>Alignment</td>
<td>City of Dallas park</td>
</tr>
<tr>
<td>University Trail</td>
<td>Follows the property boundary of UTD and connects with Renner Trail on Renner Road</td>
<td>Richardson</td>
<td>Station, Alignment</td>
<td>City/County trail</td>
</tr>
<tr>
<td>Point North Park</td>
<td>3222 N. Floyd Rd.</td>
<td>Richardson</td>
<td>Station, Alignment</td>
<td>City of Richardson park</td>
</tr>
<tr>
<td>Renner Trail</td>
<td>Renner Rd. from Renner Rd. at Point North Pkwy. to US 75</td>
<td>Richardson</td>
<td>Station, Alignment</td>
<td>City of Richardson trail system</td>
</tr>
<tr>
<td>Custer Park and Trail</td>
<td>SW corner of Custer Rd. and Renner Rd.</td>
<td>Richardson</td>
<td>Alignment</td>
<td>City of Richardson park</td>
</tr>
</tbody>
</table>
### Table 3-5: Publicly Owned Parks and Recreational Facilities Inventory

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Address</th>
<th>City</th>
<th>In proximity to station or alignment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring Creek Trail</td>
<td>PGBT and Alma Rd. Bikeway intersection through Spring Creek Nature Area</td>
<td>Richardson</td>
<td>Station, Alignment</td>
<td>City of Richardson trail system</td>
</tr>
<tr>
<td>Spring Creek Nature Area</td>
<td>Trail head at SE corner of Renner Rd. and US 75</td>
<td>Richardson</td>
<td>Station</td>
<td>City of Richardson park</td>
</tr>
<tr>
<td>Central Trail</td>
<td>Arapaho Station to PGBT paralleling Red Line LRT corridor</td>
<td>Richardson</td>
<td>Station, Alignment</td>
<td>City of Richardson trail system</td>
</tr>
<tr>
<td>Haggard Park</td>
<td>901 E. 15th St.</td>
<td>Plano</td>
<td>Station</td>
<td>City of Plano park</td>
</tr>
<tr>
<td>Shoshoni Park</td>
<td>3450 Hillridge Dr.</td>
<td>Plano</td>
<td>Station, Alignment</td>
<td>City of Plano park</td>
</tr>
</tbody>
</table>

Source: URS Corporation, city websites, 2013.

### Table 3-6: Privately Owned Recreational Facilities

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Address</th>
<th>City</th>
<th>In proximity to station or alignment</th>
<th>Open to Public or Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Future Carter Phase III Addition common area</td>
<td>1 Legacy Ct.</td>
<td>Coppell</td>
<td>Alignment, Station</td>
<td>HOA common area</td>
</tr>
<tr>
<td>Riverchase Golf Club</td>
<td>700 Riverchase Dr.</td>
<td>Coppell</td>
<td>Alignment</td>
<td>Open to public</td>
</tr>
<tr>
<td>Yucatan Beach Club</td>
<td>1850 E. Belt Line Rd.</td>
<td>Coppell</td>
<td>Alignment</td>
<td>Open to public</td>
</tr>
<tr>
<td>Bahama Beach Club</td>
<td>1849 E. Belt Line Rd.</td>
<td>Coppell</td>
<td>Alignment</td>
<td>Open to public</td>
</tr>
<tr>
<td>Section 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dallas Pistol Club</td>
<td>1830 W. Belt Line Rd.</td>
<td>Carrollton</td>
<td>Alignment</td>
<td>Members only</td>
</tr>
<tr>
<td>Honors Golf Club Dallas</td>
<td>2525 Country Club Dr.</td>
<td>Carrollton</td>
<td>Alignment</td>
<td>Members only</td>
</tr>
<tr>
<td>The Country Place</td>
<td>2727 Country Place, 2999 Carriage Ln., 1731 Marsh Ln.</td>
<td>Carrollton</td>
<td>Alignment</td>
<td>Members only</td>
</tr>
<tr>
<td>Section 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prestonwood Country Club</td>
<td>15909 Preston Rd.</td>
<td>Dallas</td>
<td>Station, Alignment</td>
<td>Open to public</td>
</tr>
</tbody>
</table>
### Table 3-6: Privately Owned Recreational Facilities

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Address</th>
<th>City</th>
<th>In proximity to station or alignment</th>
<th>Open to Public or Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preston Trails Homeowners Association</td>
<td>5950 and 5955 Westgrove Cir., 9009 and 16700 Preston Trail Dr., 16421 Ashbourne Dr.</td>
<td>Dallas</td>
<td>Station, Alignment</td>
<td>Residential common areas</td>
</tr>
<tr>
<td>Fairhill School</td>
<td>16100 Preston Rd.</td>
<td>Dallas</td>
<td>Station, Alignment</td>
<td>Green space associated with private school</td>
</tr>
<tr>
<td>Adventure Landing</td>
<td>17717 Coit Rd.</td>
<td>Dallas</td>
<td>Station, Alignment</td>
<td>Open to public</td>
</tr>
<tr>
<td>Somerset Amenity Center</td>
<td>Maribeth Dr.</td>
<td>Dallas</td>
<td>Station, Alignment</td>
<td>HOA common area</td>
</tr>
<tr>
<td>The Practice Tee Golf Center</td>
<td>3570 Waterview Pkwy.</td>
<td>Richardson</td>
<td>Station, Alignment</td>
<td>Open to public</td>
</tr>
<tr>
<td>Canyon Creek Country Club</td>
<td>625 W. Lookout Dr.</td>
<td>Richardson</td>
<td>Alignment</td>
<td>Open to public</td>
</tr>
</tbody>
</table>

*Source: URS, 2013.*

### Section 4(f) and Section 6(f) Facilities

Properties typically protected under Section 4(f) include the following:

- Publicly-owned parks that are open to the public;
- Historic resources, whether privately owned or publicly owned;
- School playgrounds, if there is a significant public use; and
- Trails, unless funded through transportation funding.

To date, known historic resources identified in this document within the project area include Hilltop Memorial Park (Cemetery), Perry Cemetery, Pioneer Park, A.W. Perry Homestead Museum, and City Square and Gazebo. Additional historic resources within a defined area of potential effect (APE) are discussed in the *Cultural Resources Existing Conditions Technical Memorandum* and the *Historic Resources Reconnaissance Survey Report* in Appendix A. The reconnaissance survey recorded 68 historic-age architectural resources within the project APE. Of these, none are currently listed in the National Register of Historic Places (NRHP) and one (Addison State Bank) is listed as a Registered Texas Historic Landmark. In total, three resources are recommended individually eligible for inclusion in the NRHP: Addison State Bank (Resource 44); Carrollton Depot (Resource 21); and White Rock Creek Bridge (Resource 45). Section 4(f) would also apply to the “use” of White Rock Creek Bridge and may require additional evaluation pursuant to Section 4(f).

At present, no archaeological resources occur within the proposed Cotton Belt Corridor. Therefore, no known archaeological resources would be impacted by the proposed actions. It should be noted, however, that an intensive archaeological survey within a defined APE for archaeological resources has not yet been completed.
Four Section 6(f) resources were identified in the study area. Four LWCF grants were found in the NPS LWCF grant database for the project study area. All four entries are located in Dallas County. One recreational facility, McInnish Park in Carrollton, has had three grants awarded since the 1970s for some portion of its complex. The other park receiving LWCF funding is also located in Carrollton: Thomas Park.

**Impact Assessment**

This section summarizes the land acquisition, access impacts, noise and vibration impacts, and visual impacts as they relate to the parks and recreational trails within the study area. More detailed information regarding the nature of the potential impacts is available in the *Parks and Recreational Facilities Impact Assessment* in Appendix A.

Table 3.7 summarizes potential impacts to publicly owned parks and recreational facilities. Potential impacts are categorized by type of impact: land acquisition, access, noise and vibration, and visual. Unless otherwise noted the impact applies to the base alternative.

Land acquisition of Section 4(f) resources would be considered a “direct use.” Public properties with potential impacts related to access, noise and vibration, and visual effects may also be subject to Section 4(f) as a “constructive use.” A constructive use is when a project does not incorporate any Section 4(f) land, but proximity impacts of the project substantially impairs activities, features, or attributes of the resource.

**Acquisition**

For the Base Alternative, Kelly Athletic facilities represent the only direct use of publicly owned parks and recreational facilities. The *Final Preliminary Engineering 5% Design Plan Set (Appendix D)* indicates that a sliver of this facility would be required for the project. This property may be covered under Section 4(f) if it is found to have a significant public use. However, the area that would be acquired is not generally open to public use.

For the Trench Profile in North Dallas, a Floodway Management Area and a City of Dallas Public Use Area would represent a direct use of publicly owned parks and recreational facilities. Use of this property is related to additional right-of-way required to reconstruction roadways over the trench. If it is found to have a significant public uses these properties may be covered under Section 4(f).

The project would not require use of properties that were developed using Section 6(f) Land and Water Conservation Funds.

**Access**

There are no access impacts associated with the Base Alternative. With the Trench Profile, the depressed alignment would prevent Preston Ridge Trail from crossing the Cotton Belt Corridor at-grade. Also the South Red Line Interface Alternative may require some modification of the Spring Creek Trail.

**Noise**

For the Base Alternative, five public parks were found to have severe noise impacts. Each of these impacts is due to the sounding of train horns at nearby at-grade crossings. In all cases the
sounding of horns at the crossings predates the dedication of the park; however, the implementation the project would significantly increase the frequency of train horns. A constructive use resulting from increased noise applies only when the protected resource is noise sensitive and derives some of its value from its quiet setting.

The impact to Gravely Park and Gravely Park Loop occur at the northern portion of the park. The only potential noise sensitive receptors in the park are several hundred feet from the tracks and the source of the noise. Preston Green Park is a neighborhood Park with a playground. Both Preston Green Park and Beckert Park host concerts and therefore derive value from the quiet setting.

**Visual**

For the Base Alternative, the project may result in visual impact to the Arapaho Pedestrian Trail due to the distinct nature of the adjacent Arapaho Bridge at Midway Road. The elevated rail alignment in this area would alter area views of the bridge but, the western third of the trail would be situated between the two structures. This would alter the characteristics of the trail but would not obstruct views of the bridge from the trail.

For the Trench Profile, the project may result in visual impact to the Preston Ridge Trail due to the visibility of the walls around the trench and the grade separated intersection at Meandering Way.

For the Red Line Interface South Alternative the modified alignment could result in a potential visual impact to Spring Creek Trail. The elevated structure could alter the trail and some landscaping but, trails users are already accustomed to elevated infrastructure.

| Table 3-7: Cotton Belt Alignment Potential Impacts to Public Parks and Recreational Facilities |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Name                             | Land Acquisition | Access | Noise and Vibration | Visual |
| Section 1                        |                    |        |                    |        |
| NONE                             |                    |        |                    |        |
| Section 2                        |                    |        |                    |        |
| Gravely Park                     | No                  | No     | Yes                | No     |
| Gravely Park Loop                | No                  | No     | Yes                | No     |
| Kelly Athletic Facilities        | Yes                 | No     | No                 | No     |
| Arapaho Pedestrian Trail         | No                  | No     | No                 | Yes    |
| Addison Circle Park              | No                  | No     | Yes                | No     |
| Beckert Park                     | No                  | No     | Yes                | No     |
| Section 3                        |                    |        |                    |        |
| Preston Ridge Trail              | No                  | Yes*   | No                 | Yes*   |
| City of Dallas Floodway Management Area 2 | Yes* | No | No | No |
Table 3-7: Cotton Belt Alignment Potential Impacts to Public Parks and Recreational Facilities

<table>
<thead>
<tr>
<th>Name</th>
<th>Land Acquisition</th>
<th>Access</th>
<th>Noise and Vibration</th>
<th>Visual</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Dallas Public Use Area</td>
<td>Yes*</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Preston Green Park</td>
<td>No</td>
<td>No</td>
<td>Yes**</td>
<td>No</td>
</tr>
<tr>
<td>Spring Creek Trail</td>
<td>No</td>
<td>Yes***</td>
<td>No</td>
<td>Yes***</td>
</tr>
</tbody>
</table>

Source: URS, 2013.

*The potential for impacts exists only with the Trench Profile.
**Trench or Tunnel Profile would eliminate potential impact.
***The potential for impacts exists under the South Alignment Alternative.

Note: All land acquisition impacts are preliminary and based on a visual assessment of right-of-way requirements using the 5% Design.

Table 3.8 summarizes potential impacts to privately owned parks and recreational facilities. The only identified impacts involve acquisitions. All impacts apply to the Base Alternative. These private recreational facilities are not protected by Section 4(f) regulations.

The Final Preliminary Engineering 5% Design Plan Set, in Appendix D, indicates that a sliver of the Honors Golf Club would be required for the project. The Coit Road Option for the Renner Village Station would displace the privately owned Adventure Village Theme Park.

Table 3-8: Cotton Belt Alignment Potential Impacts to Private Parks and Recreational Facilities (Base Alternative)

<table>
<thead>
<tr>
<th>Name</th>
<th>Land Acquisition</th>
<th>Access</th>
<th>Noise and Vibration</th>
<th>Visual</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NONE</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Section 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honors Golf Club</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Section 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adventure Landing</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Source: URS, 2013.

Note: All land acquisition impacts are preliminary and based on a visual assessment of ROW requirements using the Final 5% Design.

Historic Resources

Of the three resources individually eligible for inclusion in the NRHP, two are in or directly adjacent to the Cotton Belt Project. Carrollton Depot (Resource 21) would be directly adjacent to the Downtown Carrollton Station but not impacted by the project. The use of White Rock Creek Bridge will require additional evaluation pursuant to Section 4(f).
Mitigation Options

Section 4(f)
A final Section 4(f) Evaluation will be prepared for all determined Section 4(f) resources. This evaluation must demonstrate that no feasible or prudent alternative to the use of the Section 4(f) resource exists and will ensure that all possible planning has been done to minimize harm. Avoidance alternatives will be considered and engineering design will attempt to reduce impacts.

The Kelly Athletic Facilities property impact is common to all alternatives including the two MOS alternatives. Selection of any profile but the Trench would avoid potential impacts to Floodway Management Area 2 and City of Dallas Public Use Area.

As discussed in Section 3.9, DART will consult with the Texas Historical Commission (THC) to identify measures to minimize and mitigate the effects to historic resources. For resources that are not able to be avoided, DART will follow the procedures outlined by the THC for documenting the resource.

In order to determine impacts to archeological resources, THC will be consulted to identify an APE. DART proposes to conduct an intensive archeological survey within the defined APE. Upon consultation with THC, this survey will be augmented by shovel testing and possibly geoarcheologial evaluations of backhoe trenches.

Land Acquisition
As detailed in Section 3.5, property owners will be paid fair market value for property acquired. Relocation benefits are provided for all businesses and residents (owner occupants and tenants) that are displaced by acquisition.

Access
Potential access impacts to trails can be mitigated by reconfiguring the trail or constructing a bridge over the Trench Profile.

Noise and Vibration
Since each noise impact to parks and recreational facilities is due to the sounding of train horns at nearby at-grade crossings, these impacts could be mitigated through the implementation of quiet zones. Other potential mitigation measures are described in Section 3.13.

Visual and Aesthetics
The visual impacts at Arapaho Pedestrian Trail due to the grade separation at Midway Road could be mitigated by minimizing the elevated structure to preserve the view or providing a complementary structure. Providing a vegetative buffer between the trail and the elevated guideway would also lessen the visual impact of the structure on trail users.

With the Trench Profile, the visual impact to Preston Ridge Trail could be mitigated through vegetative buffers that preserve the existing character of the area. Similarly the visual impact at Spring Creek Trail under the Red Line Interface South Alternative could be mitigated through vegetative buffers that preserve the existing character of the area. Mitigation strategies are
discussed further in Section 3.8 and in the *Visual and Aesthetic Resources Impact Assessment Technical Memorandum* in Appendix A.

### 3.5 Acquisitions and Displacements

This section describes the potential acquisitions and displacements associated Cotton Belt Project. As design progresses on the alignment and station areas, there will be refinements and additions or deletions to the proposed right-of-way and parcel acquisitions.

### Introduction and Regulatory Setting

DART policies require that the potential impacts of any proposed project (whether federally or locally funded) be assessed, and if adverse effects are found, that these impacts be avoided, or minimized and mitigated. As described in DART’s *Environmental Impact Assessment and Mitigation Guidelines for Transit Projects*, project design and operating procedures must comply with all federal, state, county, and municipal statutory requirements.

### Methodology

For the purpose of the environmental review this assessment is based primarily on a review of the *Final Preliminary Engineering 5% Design Plan Set* in Appendix D. A review of the *Cypress Waters South Alternative Exhibits* contained *Supplemental Plans and Graphics* in Appendix D also contributed to this assessment.

### Existing Conditions

The approximate 26-mile Cotton Belt Project is generally located within DART owned right-of-way. The right-of-way width varies throughout the corridor, but is generally 100 feet. Currently the Cotton Belt Corridor consists of single track rail.

### Impact Assessment

To accommodate regional rail, the Cotton Belt Project would upgrade and replace the single freight track rail with double track. Several new grade separations are proposed that may require additional right-of-way. Most of the proposed stations would require the purchase of land to accommodate, access, parking and bus activity. In Table 3-9 the properties potentially impacted by the Cotton Belt Project are reflected.

<table>
<thead>
<tr>
<th>Property Address</th>
<th>City</th>
<th>State</th>
<th>Zip</th>
</tr>
</thead>
<tbody>
<tr>
<td>1601 E. Dallas Rd.</td>
<td>Dallas</td>
<td>TX</td>
<td>75201-6390</td>
</tr>
<tr>
<td>1 DFW Airport</td>
<td>Dallas</td>
<td>TX</td>
<td>75201-6390</td>
</tr>
<tr>
<td>1 DFW Airport</td>
<td>Dallas</td>
<td>TX</td>
<td>75201-6390</td>
</tr>
<tr>
<td>1000 Cotton Rd.</td>
<td>Dallas</td>
<td>TX</td>
<td>75201-6390</td>
</tr>
<tr>
<td>1210 Denton Dr.</td>
<td>Dallas</td>
<td>TX</td>
<td>75201-6390</td>
</tr>
<tr>
<td>1205 Denton Dr.</td>
<td>Carrollton</td>
<td>TX</td>
<td>75011-0328</td>
</tr>
<tr>
<td>1115 N. Denton Dr.</td>
<td>Carrollton</td>
<td>TX</td>
<td>75011-0229</td>
</tr>
<tr>
<td>1200 N. Denton Dr.</td>
<td>Carrollton</td>
<td>TX</td>
<td>75011-0229</td>
</tr>
<tr>
<td>2001 Kelly Blvd.</td>
<td>Carrollton</td>
<td>TX</td>
<td>75011-0611</td>
</tr>
<tr>
<td>2000 Kelly Blvd.</td>
<td>Carrollton</td>
<td>TX</td>
<td>75011-0611</td>
</tr>
</tbody>
</table>
Table 3-9: Potential Property Impacts

<table>
<thead>
<tr>
<th>Property Address</th>
<th>City</th>
<th>State</th>
<th>Zip</th>
</tr>
</thead>
<tbody>
<tr>
<td>2525 Country Club Rd.</td>
<td>Carrollton</td>
<td>TX</td>
<td>75006-5501</td>
</tr>
<tr>
<td>4200 Lindbergh Dr.</td>
<td>Lewisville</td>
<td>TX</td>
<td>75067-8007</td>
</tr>
<tr>
<td>4204 Lindbergh Dr.</td>
<td>Addison</td>
<td>TX</td>
<td>75001-4537</td>
</tr>
<tr>
<td>4300 Lindbergh Dr.</td>
<td>Addison</td>
<td>TX</td>
<td>75001-4538</td>
</tr>
<tr>
<td>4650 Airport Pkwy.</td>
<td>Addison</td>
<td>TX</td>
<td>75001-3252</td>
</tr>
<tr>
<td>15375 Addison Rd.</td>
<td>Richardson</td>
<td>TX</td>
<td>75080-3502</td>
</tr>
<tr>
<td>17404 Hillcrest Rd.</td>
<td>Dallas</td>
<td>TX</td>
<td>75252-5995</td>
</tr>
<tr>
<td>6950 McCallum Blvd.</td>
<td>Dallas</td>
<td>TX</td>
<td>75252-5935</td>
</tr>
<tr>
<td>6969 McCallum Blvd.</td>
<td>Dallas</td>
<td>TX</td>
<td>75201-5935</td>
</tr>
<tr>
<td>6810 Rocky Top Cir.</td>
<td>Dallas</td>
<td>TX</td>
<td>75252-6110</td>
</tr>
<tr>
<td>6806 Rocky Top Cir.</td>
<td>Dallas</td>
<td>TX</td>
<td>75252-6110</td>
</tr>
<tr>
<td>17804 Dickerson St.</td>
<td>Plano</td>
<td>TX</td>
<td>75023-6202</td>
</tr>
<tr>
<td>17800 Dickerson St.</td>
<td>Dallas</td>
<td>TX</td>
<td>75203-2632</td>
</tr>
<tr>
<td>17804 Dickerson St.</td>
<td>Dallas</td>
<td>TX</td>
<td>75252-6306</td>
</tr>
<tr>
<td>17804 Dickerson St.</td>
<td>Plano</td>
<td>TX</td>
<td>75023-6202</td>
</tr>
<tr>
<td>17713 Coit Rd.</td>
<td>Dallas</td>
<td>TX</td>
<td>75252</td>
</tr>
<tr>
<td>17717 Coit Rd.</td>
<td>Dallas</td>
<td>TX</td>
<td>75252-6407</td>
</tr>
<tr>
<td>Waterview Pkwy.</td>
<td>Austin</td>
<td>TX</td>
<td>78701-2902</td>
</tr>
<tr>
<td>3560 Alma Rd.</td>
<td>Plano</td>
<td>TX</td>
<td>75024-2686</td>
</tr>
<tr>
<td>I Ave.</td>
<td>Plano</td>
<td>TX</td>
<td>75086-0358</td>
</tr>
<tr>
<td>1201 K Ave.</td>
<td>Austin</td>
<td>TX</td>
<td>78703-1121</td>
</tr>
<tr>
<td>1202 K Ave.</td>
<td>Campbell</td>
<td>TX</td>
<td>75422-1267</td>
</tr>
<tr>
<td>1304 13th St.</td>
<td>Richardson</td>
<td>TX</td>
<td>75080-3762</td>
</tr>
<tr>
<td>1100 Klein Rd.</td>
<td>Plano</td>
<td>TX</td>
<td>75074-3782</td>
</tr>
<tr>
<td>Shiloh Rd.</td>
<td>Dallas</td>
<td>TX</td>
<td>75221-9071</td>
</tr>
<tr>
<td>Shiloh Rd.</td>
<td>Plano</td>
<td>TX</td>
<td>75086-0358</td>
</tr>
</tbody>
</table>

Source: AZB, URS 2013.

**Base Alternative**

With a few exceptions the Base, at-grade alignment would be located entirely within the existing Cotton Belt Corridor right-of-way.

- The western portion of the project would be located on vacant DFW Airport property where it would interface with the T’s TEX Rail project at the DFW North Station. DART would require approximately 0.65 miles of new, varying width right-of-way as the project transitions from the station to the existing Cotton Belt Corridor.
- Downtown Carrollton is crisscrossed by several rail rights-of-way, roadways and a major freeway. There is also the existing DART LRT Station and a railroad switching yard. Most of the property to be used by project is owned by DART. Other property is privately owned or controlled by the City of Carrollton, the City of Dallas, TxDOT and the BNSF Railroad. Currently, at least one commercial business could potentially be displaced.
The reconfiguration of Cotton Belt Corridor alignment and the Madill Subdivision would significantly alter the existing right-of-way configuration. TxDOT’s IH-35E project will also alter the existing conditions. The ultimate use of property would be determined as the design of both the TxDOT and DART projects are advanced further.

- Near Kelly Boulevard in Carrollton, the Cotton Belt Project as currently designed would require an approximately 3,200-foot section of new right-of-way on the north side of the Cotton Belt Corridor. This property is owned by the Carrollton-Farmers Branch ISD and Honors Golf Club. No businesses or structures would be displaced.

- South of Addison Airport, the Cotton Belt Project as currently designed would require an approximately 2,000-foot section of new right-of-way on the north side of the corridor. A portion of the property is owned by Addison Airport while the rest is in private ownership. No businesses or structures would be displaced.

- At PGBT in Richardson, the Cotton Belt Project as currently designed would require an approximately 1,400-foot section of new right-of-way on the south side of the Cotton Belt Corridor. Some of the property is existing PGBT right-of-way. The rest is owned by an apartment complex. No businesses or structures would be displaced.

- Near the proposed 12th Street Station Complex in Plano, the Cotton Belt Project as currently designed would require an approximately 2,000-foot section of new right-of-way on the north side of the corridor. A portion of this would be incorporated into the 12th Street Station Complex. Most of this property is private ownership. Potentially, some structures and businesses would be displaced.

**Base Stations**

**DFW North Station and Alignment:** The proposed station would occupy currently vacant DFW Airport land. DART would share the alignment, station and access with the TEX Rail project.

**Downtown Carrollton Station:** The proposed station with two parking lots would occupy approximately six acres of currently vacant private property.

**Addison Station:** The proposed station platform, which is adjacent to the existing Addison Transit Center, would be located entirely within existing Cotton Belt Corridor right-of-way. No additional property would be required.

**Knoll Trail Station:** The proposed station would only add platforms to the alignment within the Cotton Belt Corridor right-of-way. Bus activity would take place on existing streets.

**Preston Road Station:** The proposed station would only add platforms to the alignment within the existing Cotton Belt Corridor right-of-way. There is no bus activity or parking associated with the station.

**Renner Village Station (Dickerson St. Option):** The proposed station would impact the existing commercial/office land use at Dickerson Street in order to build the station and parking lot. Existing businesses would be displaced.

**Renner Village Station (Coit Rd. Option):** The proposed station would displace a small amusement park, Adventure Landing. The entire theme park would be removed to construct the station and parking lot.
UTD/Synergy Park Station: – The proposed station would impact vacant land use for the station and parking lot. The station would eventually be incorporated into UTD Campus.

12th Street Station Complex: – The proposed station would potentially impact existing commercial retail and industrial businesses to construct the station.

Shiloh Road Station: – The proposed station would be located on City of Plano owned land adjacent to an Oncor Electric substation. No businesses or structures would be displaced.

**Cypress Waters Alternatives**

In the Coppell area, the alignment would divert from the existing Cotton Belt Corridor for approximately 9,800 feet. In the eastern portion of this diversion, both Cypress Waters alternatives would extend through currently vacant land in the northern portion of the Cypress Waters development. Additionally, Belt Line Road would be rerouted between Moore Road and Denton Tap Road extending west to ultimately connect with Wrangle Drive. This land for the road and the rail alignments is controlled by the City of Coppell, the Coppell ISD, the Cypress Waters Development and Luminent Electric Distribution. Access to businesses along existing Belt Line Road would be maintained.

In the western portion of the diversion, both alternatives would potentially displace a few commercial businesses along Southwestern Boulevard.

In the central portion of the diversion there are a few differences between the two alternatives. The Southwestern Boulevard Alternative would occupy part of the existing Belt Line Road and Southwestern Boulevard rights-of-way. It would also require a sliver of right-of-way from W. W. Pinkerton Elementary School and from the vacant property south of Southwestern Boulevard. No additional structures or businesses would be displaced. The South Alternative would be removed from the street right-of-way and from the school, but would utilize more of the vacant commercial property south of Southwestern Boulevard. East of Denton Tap Road the alignment would displace a vacant commercial strip development along Belt Line Road. The alignment would also displace 500-foot radio tower. This tower is located on Coppell ISD property and is on lease through 2019.

**Cypress Waters Station (North Lake Station)**

North Lake Station: In either Cypress Waters Alternative the North Lake Station would be located on currently vacant land. No businesses or structures would be displaced.

**North Dallas Profile Options**

In general the three North Dallas Profile Options would be located within the existing Cotton Belt Corridor. With the Trench Profile, the construction of roadway grade separations over the trench would require the purchase of additional right-of-way including some publicly owned parcels. It would also require modifying the access to several single family and multi-family residential units. At least one single family home would potentially be displaced. The impacts associated with the Preston Road Station and the Renner Village Station (described above) would be the same for all three alternatives.
Red Line Interface South Alternative
The proposed project with the Red Line Interface South Alternative would divert from the existing Cotton Belt Corridor for approximately 9,600 feet. This diversion begins near Alma Road and dips south before returning north to the Bush Turnpike LRT Station. The alignment continues north in DART owned Red Line right-of-way before returning to the Cotton Belt Corridor. The eastern portion of this diversion would require approximately 7,300 feet of new right-of-way through Plano Parkway. The proposed right-of-way is largely vacant land owned by an apartment complex, a developer, TxDOT and DART. North of Plano Parkway, the alternative would require an approximately 900-foot sliver of new right-of-way on the west side of the Red Line. This property is occupied by commercial businesses, but no structures would be directly impacted. No businesses would be displaced by the South Alternative, but access to one commercial structure may be impacted. This option would also potentially impact a few parking spaces and bus bays at the Bush Turnpike LRT Station.

Red Line Interface South Alternative Stations
The South Alternative would add a new Cotton Belt Station adjacent the existing Bush Turnpike LRT Station and would add the 12th Street Station Complex.

Bush Turnpike Station: The PGBT Cotton Belt Station would be located directly adjacent to the LRT Station on currently vacant land. No businesses or structures would be displaced.

12th Street Station Complex: The 12th Street Station Complex includes adding aerial platform to the Red Line and placing an aerial Station on the Cotton Belt. Similar to the base alternative, this concept would potentially impact existing commercial retail and industrial businesses to construct the station complex.

Mitigation Options
Property owners will be paid fair market value for property acquired. All acquisition of property must adhere to the DART Board of Directors’ Real Estate Policy and Procedures, adopted August 25, 1987 and modified in October 2000. These policies and procedures adhere to all Federal guidelines regarding acquisition and relocation assistance including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42USC 4601). For all real property acquired, DART compensates the property owner for the fair market value of their property and for damages to any remaining parcel(s).

Relocation benefits are provided for all businesses and residents (owner occupants and tenants) that are displaced by acquisition. Prior to the relocation of businesses, DART staff will prepare a relocation analysis that determines the availability of suitable locations or facilities for displaced businesses. The relocation benefits and services provided to those displaced are determined by eligibility guidelines based on Federal policies. For businesses, these generally include reimbursement of moving expenses and advisory assistance in locating a replacement site.

Selection of the Base Alternative would avoid new property acquisitions associated with the Cypress Waters Alternative, the North Lake Station or the Red Line Interface South Alternative. Selection of the At-grade or Tunnel Profile in North Dallas would avoid the new property acquisitions and driveway modification associated with the Trench Option. Selection of either
MOS Alternative would significantly reduce the acquisition of right-of-way and property for stations.

### 3.6 Safety, Security and Emergency Services

Existing safety and security practices were identified and documented in the *Safety and Security Existing Conditions Technical Memorandum* and *Safety and Security Impact Assessment Technical Memorandum* in Appendix A. This section will address three key areas related to safety and security:

- Police and Public Safety
- Fire and Emergency Medical
- Pedestrian Safety

#### Introduction and Regulatory Setting

DART policies require that the potential impacts of any proposed project (whether federally or locally funded) be assessed, and if adverse effects are found, that these impacts be avoided, or minimized and mitigated. As described in DART’s *Environmental Impact Assessment and Mitigation Guidelines for Transit Projects*, project design and operating procedures must comply with all federal, state, county, and municipal statutory requirements and take into account advisory group safety recommendations. Security designs are also addressed in *DART LRT Project Design Criteria Manual, Volume No. 1 (Facilities Design)*.

Pursuant to *EO 13045, Protection of Children from Environmental Health Risks and Safety Risks*, federal agencies are directed, as appropriate and consistent with the agency’s mission, to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children.

#### Methodology

The assessment of safety impacts includes the following items:

- An identification of specific community characteristics
- An identification of the planned system operating characteristics such as transit vehicle frequency by time of day and transit vehicle speed
- An evaluation of crossing control requirements, the need for other safety-related design features, and needed operation plan changes to be determined based on the previous identification and evaluation steps, government regulatory requirements, and industry practice in similar situations

The assessment of security impacts includes the following items:

- Potential threats to security at stations, in parking lots, for equipment, within the transit vehicle, and along the passenger rail lines will be identified
- Proposed system operating characteristics that could influence security requirements would be identified, including hours of operation, system access policy, fare collection system, and train frequency
• The level and characteristics of community activity adjacent to stations, other structures, equipment, and the right-of-way would be identified

• Operating policy, equipment, materials, and design alternatives that address potential threats which are applied system-wide, as well as in unique situations

Existing Conditions

Emergency Services
Each of the seven cities along the corridor has their own police and fire departments. In all seven cities the fire departments provide both fire and emergency medical services. In addition to local police departments, DFW Airport has a police department responsible for maintaining security at the airport in conjunction with the Transportation Security Administration (TSA). Additionally, the UTD has an internal police department.

The DART police department is an independent police department with responsibilities for ensuring security and safety on DART property and vehicles. “DART police officers are vested with all the rights, privileges, obligations, and duties of peace officers in the state of Texas....”¹ DART police work in coordination with local law enforcement agencies in investigations and ensuring a safe transit system.

There are a total of 13 fire stations with jurisdiction inside the study area. Only the stations in Coppell (520 Southwestern Boulevard), Carrollton, Addison (4798 Airport Parkway), Dallas (6010 Davenport Road) and DFW Airport (711 Regent Boulevard, Grapevine) are physically located in the project study area. There are also three major hospitals close to the project study area. The listed hospitals represent the locations where emergency medical services could be provided to residents or workers in the project study area and vehicles could deliver patients. None of the hospitals are within the project study area, thus these facilities are not mapped and do not contain a Map ID.

Vehicular and Pedestrian Rail Crossing Activity
The addition of passenger rail operations would introduce new conflicts for vehicles and pedestrians where the Cotton Belt Project crosses streets at-grade, and in areas where Cotton Belt Corridor residents use informal crossings as short-cuts to access neighborhood facilities. The potential for conflict at these informal crossings requires special attention to identify possible hazards.

Six trails in the project study area intersect the Cotton Belt Corridor. These trails are briefly described and also shown in Table 3-10.

Table 3-10: Trails Intersecting the Cotton Belt Rail Alignment

<table>
<thead>
<tr>
<th>Trail</th>
<th>City</th>
<th>At-Grade Crossing Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton Belt Trail (Future)</td>
<td>All study area cities</td>
<td>All but one public at-grade crossings have lights, bells, and gates</td>
</tr>
<tr>
<td>Elm Fork Trail (Future)</td>
<td>Carrollton</td>
<td>No existing crossing Bridge at future crossing</td>
</tr>
<tr>
<td>Crosby Trail (Future)</td>
<td>Carrollton</td>
<td>No existing crossing</td>
</tr>
<tr>
<td>Renner Trail</td>
<td>Richardson</td>
<td>Lights, bells, gates</td>
</tr>
<tr>
<td>Bike Trail (B)</td>
<td>Richardson</td>
<td>Lights, bells, gates</td>
</tr>
<tr>
<td>Preston Ridge Trail</td>
<td>Dallas</td>
<td>Lights, bells, gates</td>
</tr>
<tr>
<td>Spring Creek Trail</td>
<td>Richardson</td>
<td>No existing crossing</td>
</tr>
</tbody>
</table>

Source: URS, 2013.

Impact Assessment

The proposed Cotton Belt Project would not be expected to cause any impact to demand for municipal police protection of the community. Additional police protection beyond what is currently provided would be required for project security during both the construction and operation of the proposed project, but DART would provide the needed uniformed and undercover transit police on its vehicles and at station areas. Should it become necessary, DART Police would work with local police to apprehend criminals.

There are three police stations located within the project study area, Addison Police headquarters, Dallas North Central Police Station, and Plano Police Department headquarters. There would be no long-term impacts to these police stations due to the Cotton Belt Project.

The Cotton Belt Project may require fire protection services for control of fires in the vehicles and at the substations. However, it is unlikely that a fire would occur in a regional rail vehicle due to all vehicles constructed of flame-and shatter-resistant materials, containing two fire extinguishers per car, and having an exterior constructed with fire-resistant materials. Because the potential for fire is low, it is not anticipated that the proposed project would necessitate the hiring of additional fire protection personnel.

Five fire stations are located within the project study area, Fire Station No. 121 in Coppell, Fire Station #1 in Carrollton, Fire Station #7 in Addison, Fire Station #7 in Dallas, and DFW Airport Fire – EMS Station #6. There would be no long-term impacts to these fire stations due to the proposed project.

The potential exists for increased demands for emergency medical services due to the concentration of passengers at the rail stations. Although there are no major hospitals in the project study area, emergency vehicles could be slightly delayed if they have to cross the alignment at an at-grade crossing during a response to an emergency. However, emergency vehicle response time is not likely to be impacted by any of the alternatives since the gate down-time is expected to be around 30 to 60 seconds.
Pedestrian safety impacts concern safe walking environments to schools, parks, and other key community centers. Potential impacts to schools and community facilities are discussed in Section 3.3 of this AECR. Potential impacts to parks and recreation facilities are discussed in Section 3.4. As active freight rail exists for most of the corridor, the addition of frequent rail service along the alignment would not likely present safety and security concerns for adjacent residents and businesses.

In north Dallas, freight operations have been prohibited since 2010, additionally, the Cypress Waters Alternatives and the Red Line Interface South Alternative would introduce new rail crossings. Although the addition of regional rail service raises safety concerns at new or reactivated crossings, they would be designed in accordance to DART safety measures and negative safety impact to crossings are not anticipated.

There would be a potential impact to vehicular and pedestrian safety at points where the Cotton Belt Project would cross streets at-grade. Traffic impacts are described in detail in Section 4 of AECR and the Traffic Analysis Technical Memorandum in Appendix B. Based on assumed operational parameters for the Cotton Belt Project, 46 of 50 current at-grade crossings would have no long-term impacts. Four current at-grade crossings would be impacted enough to warrant a grade separation. As a result of the grade separations, pedestrians and vehicles would no longer interact with trains, which would eliminate the potential adverse impact at these locations. Grade-separated rail crossings are recommended at the following locations:

- Denton Tap Road
- Midway Road
- Coit Road
- E Plano Parkway and US 75 NB/SB Frontage Roads

Although the addition of regional rail service increases the potential for impacts in and around station areas, stations would be designed in accordance to DART safety measures such that no negative safety impact to a station area is anticipated. Additionally, the presence of DART Police and other personnel would serve to deter crime at stations.

Mitigation Options
From a safety perspective there is little difference between impacts of an LRT rail corridor and the proposed regional rail project. DART transit projects must be designed to ensure a high level of patron safety, as well as allow safe movement of motor vehicles, bicycles and pedestrians. Examples of best practices, industry standard safety features, and potential mitigation strategies for safety and security concerns are listed below. Additional best practices and industry standard safety features are available in the Safety and Security Impact Assessment Technical Memorandum in Appendix A. Mitigations for impacts to community facilities and school are discussed in Section 3.3 of this AECR. Mitigations for impacts to parks and recreational facilities are discussed in Section 3.4. Traffic mitigation is discussed in Section 4.4.

Safety
- Provide crossing controls at all at-grade crossings
- Provide warning signage at rail crossing approaches to alert drivers and pedestrians of rail crossing; audible warnings may be implemented as warranted
- Provide underpasses or overpasses for pedestrians at high volume pedestrian locations
• Design the system with Positive Train Control (PTC) which will automates the enforcement of operating rules and reduces conflicts between train movements and at crossings. PTC becomes an FRA requirement in 2015. Provisions for PTC have been incorporated into the capital cost estimate
• Use fencing at locations where train operation speed exceeds 45 mph if a high likelihood exists for frequent crossing of the passenger rail ROW between designated crossings
• Close streets that do not have a demonstrated need for an at-grade crossing
• Use zigzag fencing (Z-crossing) at exclusive pedestrian/bicycle crossings to force cyclists to slow and pedestrians to look
• Conduct information sessions with local police and fire departments regarding safety and security issues, as well as agency responsibilities
• Prepare an emergency plan with municipal police and fire departments, emergency medical services, and other appropriate civil agencies
• Provide Emergency Vehicle Preemption Equipment (EVPE) and other similar technologies, where appropriate, to ensure priority status for emergency vehicles. EVPE sensors detect rapidly flashing emergency signals to allow preemption, giving priority to traffic in the direction from which the emergency vehicle is approaching
• Locate alternate routing for emergency vehicles operating out of facilities near at-grade crossings, taking into consideration whether the alternate route will create longer response time than the crossing gate down time
• Selection of the Trench or Tunnel Profile would avoid six at-grade crossings
• Selection of either MOS would avoid several at-grade street crossings as discussed in Section 4

Security
• Design station layouts and landscaping plans that minimize nooks, corners, and other low-visibility spaces that could be used as a hiding place
• Incorporate design elements that maximize safety to prevent criminal activity in the parking areas and within the transit stations themselves; utilize Crime Prevention through Environmental Design (CPTED) principles
• Provide right-of-way fencing in areas with high rates of vandalism
• Design and light parking lots for high visibility from other locations in station areas.
• Provide visibility of public areas from control facilities and offices
• Provide “Blue Light” Police Phones or Public Pay Phones for emergency communication purposes
• As of March 2012, DART completed installation of closed circuit cameras at all LRT stations; a pilot program for video surveillance on trains was implemented in 2012

3.7 Environmental Justice
Environmental justice (EJ) refers to identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects caused by the proposed project on minority populations and/or low-income populations (collectively “EJ populations”). Environmental justice is a key element of the NEPA process and requires a holistic approach to its assessment. The two terms “minority” and “low-income” should not be presumptively combined. In an EJ assessment, impacts across all resource areas are examined to determine how those impacts would affect EJ populations relative to non-EJ populations. While a true “existing condition” does not exist for environmental justice, the existing demographics of
the study area are the basis for a determination of whether EJ populations exist within the study area boundaries. This section provides an overview of the meaning and purpose of environmental justice, the legal framework that guides an EJ analysis and the existing demographics of the project study area that will be used in the EJ assessment for the Cotton Belt Project. An important consideration in this EJ analysis is the existing and future interaction of the neighborhoods with the rail traffic along the existing Cotton Belt Corridor.

Introduction and Regulatory Setting

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was signed in February 1994. The general principles of EO 12898 are as follows:

- To avoid, minimize or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority and low-income populations
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- To prevent the denial of, reduction in or significant delay in the receipt of benefits by minority and low-income populations

In 1997 the US Department of Transportation (US DOT) issued the US DOT Order 5610.2, *Order to Address Environmental Justice in Minority Populations and Low-Income Populations*, which describes the process for incorporating environmental justice principles into all existing DOT programs, policies and activities. The US DOT order defines “minority” as a person who is Black; American Indian and Alaskan Native; Asian; Native Hawaiian and other Pacific Islander; or of Hispanic origin. An individual is considered to be “Low income” by the US DOT if the individual’s median household income is at or below the Department of Health and Human Services (HHS) poverty guidelines.

The US DOT is also committed to Title VI of the Civil Rights Act of 1964, which provides that “no person in the United States shall, on the ground of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.” In addition, DART’s *Environmental Assessment and Mitigation Guidelines for Transit Projects* states that mitigation is warranted if a particular group suffers an inequitable distribution of project costs.

In August 2012, the FTA issued *Environmental Justice Policy Guidance* (Circular 4703.1) in order to incorporate EJ principles into plans, projects and activities that receive funding from FTA. The Circular is designed to provide a framework to integrate principles of EJ into the transit decision-making process.

Methodology

The primary source of data for EJ analyses is the US Census Bureau. For the proposed Cotton Belt Project, the 2006-2010 ACS was utilized as the main source of data. The ACS is a data set developed by the US Census Bureau in one-year, three-year and five-year increments. It involves an annual survey of randomly-selected individuals on subjects that are not included in the short
form of the decennial census, such as household income. The Census Bureau then develops estimates for one-year, three-year and five-year periods.

For this study, the threshold for establishing EJ populations was set at twice the county percentage for each indicator. A minority or low-income population is also present if the numeric measure is over 50% of the affected area. A disproportionate impact to a minority or low-income population would be characterized as significant and adverse to the population if those impacts were higher than the impacts to non-EJ populations and/or significant when combined with other environmental impacts (cumulative effects).

**Existing Conditions**

The *Environmental Justice Existing Conditions Technical Memorandum*, in Appendix A, provides detail on the presence of low income and minority population in the corridor. Figures 4-1A through 4-1E in the tech memo illustrate concentrations of minority, Hispanic, and low-income populations.

The tables and figures developed for the tech memo identify three general areas of EJ communities, one in Carrollton, one in North Dallas/Richardson, and one in Plano. The Downtown Carrollton Station area and along the alignment to the east includes several Hispanic census blocks, a few minority blocks, and one low-income block group.

The Renner Village Station Option areas and UTD/Synergy Park Station area (including the alignment between the two station areas and the alignment east of the UTD/Synergy Park Station area) is largely covered by block groups of low-income individuals with a few minority blocks. The largest low-income area between Renner Village and UTD/Synergy Park proposed station locations is characterized by UTD student populations and expanses of land used for agricultural research, office, and commercial use. The smaller low-income area in the Renner Village Station area falls in a large development of older apartment complexes.

The Plano portion of the project is identified as almost entirely low income. This is due in large part to the industrial and commercial nature of much of the area near downtown Plano. The Douglass neighborhood is one of the few minority EJ areas in the Plano portion of the study area.

**Impact Assessment**

Impacts and mitigation were not fully assessed since a Locally Preferred Alternative (LPA) has not been selected in the corridor. However as summarized in Section 6.10, there are very few immitigable impacts associated with the Cotton Belt Project. This being the case, there should not be a disproportionately high and adverse human health or environmental effects caused by the proposed project on minority populations and/or low-income populations. The three EJ communities are all in the vicinity of potential stations; therefore these communities would share the benefits as well as the impacts of the project.

Benefits to environmental justice populations include access to jobs, schools and transportation. The project would provide transit access to several major employment centers including DFW Airport, the Town of Addison, and the new State Farm Complex in Richardson. The UTD/Synergy Station would be located on the UTD campus. The project provides connections to three LRT
lines and two planned regional rail lines (DCTA A-Train and The T’s TEX Rail Project). The west terminus station is located in the central terminal area of DFW Airport providing access to major airlines.

The two MOSs would avoid two of the three EJ communities. Selection of an MOS would eliminate any impact to these communities but, would also eliminate any benefits of the proposed project.

As the project progresses, DART staff will ensure full and fair participation by all potentially affected communities in the transportation decision making process. No disproportionately high impacts to environmental justice communities are anticipated.

### 3.8 Visual and Aesthetic Conditions

#### Introduction and Regulatory Setting

Visual resources were inventoried during site visits and field observations of the corridor, project area photographs, and online aerial imagery. Visual resources are considered to be components of the natural and built environment that are capable of being seen. Viewers are considered to be neighbors who can see the proposed project and travelers who would use the proposed transit facility. Neighbors are defined as civic neighbors and adjacent land uses including: residential, retail, commercial, industrial, agricultural, and recreational. Travelers are defined as transit system users, commuters, haulers, tourists, pedestrians, and the recreating public.

#### Methodology

The assessment methodology is based upon the Federal Highway Administration’s (FHWA) Visual Impact Assessment for Highway Projects (Publication Number: FHWA-HI-88-054) and DART’s Environmental Impact Assessment and Mitigation Guidelines for Transit Projects, dated May 2012.

#### Existing Conditions

Today’s landscape along the corridor is largely manmade. The foremost visual element is the existing freight rail corridor itself with many of the features associated with freight rail operations, such as railroad crossings and signals (almost all major road crossing within the corridor are at-grade crossings, with exceptions noted elsewhere in the text). The Southern Pacific Railroad owned the corridor well before DART purchased the right-of-way in 1990 for future transit use. Conspicuous also are the electrical power stations (notably the proposed station at North Lake) and the electrical utility towers that parallel and pass over the tracks intermittently along the corridor; as well as the various freeways, with their elevated ramps, overpasses, and interchanges; and the DART Light Rail Transit (LRT) Red Line and Green Line elevated guideways and station platforms.

Views of new and older developments along the corridor range from parks and recreational facilities, such as golf courses, to low-density single-family residences and small commercial/retail malls to high-density, multi-storied, housing, commercial, and institutional buildings, many in urban park-like settings, to airports. Pockets of light and heavy industry, as well as vacant and underutilized parcels can be seen. Proposed developments include most
notably an expanded university campus master plan (UTD) near the proposed UUTD/Synergy Station area; a mixed use project, including office and corporate research facilities and entertainment/retail facilities surrounding the proposed Airport North Station area; the Cypress Waters Master Plan, including low and medium-density neighborhoods, community center, commercial/retail areas, and office “campuses” surrounding North Lake and near the North Lake Station area; and the joint, public-private Texas A&M University Urban Living Laboratory development, a proposed 1.1 million-square-foot “research and urban lifestyle community,” to be located south of the tracks between Coit Road and Waterview Parkway, featuring office buildings, multi-family residences, sustainability research facilities, retail and commercial facilities, a water treatment plant, and generous green space, including parks, trails, and community gardens. The State Farm mixed use development is currently under construction at the Bush Turnpike Station. The development will feature a 1.5-million square foot facility that could house over 6,000 employees.

In Addison, the Arapaho Bridge over Midway Road is located directly adjacent to the Cotton Belt Corridor. This award-winning bridge is a signature icon of the Town of Addison.

More detailed information regarding the existing conditions of each section is available in the Visual & Aesthetic Resources Existing Conditions Technical Memorandum in Appendix A.

Impact Assessment

Table 3-11 provides a summary of the visual impact analysis for the proposed project. Since the Cotton Belt Project would be implementing rail in an existing rail corridor, the Base Alternative would generally have an overall low visual impact. Exceptions to this would be locations where new aerial structure would be constructed. Most significantly the Cotton Belt Bridge over Midway Road would be constructed directly adjacent to Addison’s Arapaho Bridge. The addition of the elevated guideway would obstruct some views of the signature bridge.

Implementation of some of design alternatives or profile options may also have some visual impacts. The Cypress Waters Alternatives and the Red Line Interface South Alternative would place tracks and aerial structures in new locations, thus altering the visual character of the areas. With the Trench Profile, although the track and trains would be less visible, the overall change in visual impact would be greater due to the change in existing conditions and the resultant visibility and spatial impact of the new construction, which would include elevated roadway crossings. Depending on method of excavation, the Tunnel Profile has the potential to significantly alter the existing corridor at to be determined locations. In these cases the visual impact to the existing track bed could be significant.

Additional details are available in the Visual & Aesthetic Resources Impacts Technical Memorandum in Appendix A.

Mitigation Options

Mitigation is discussed by section in the Visual & Aesthetic Impacts Technical Memorandum in Appendix A. Examples of mitigation for visual impacts associated with the proposed project include:
• Preserving existing vegetation to serve as a natural buffer between primary viewers and the proposed project
• Re-vegetating disturbed areas and/or installing new vegetative buffers to screen the project from primary viewers
• Minimizing the heights of roadway and rail overpasses associated with certain alternatives of the proposed project
• Designing aerial structures to complement existing surroundings
• Selecting the Base Alternative would avoid the visual impact of the placing rail in a new location associated with the Cypress Waters or South Alternatives (it would also avoid the visual impact associate with the Trench Profile)
### Table 3-11: Visual Impact Analysis Matrix

<table>
<thead>
<tr>
<th>Section</th>
<th>Section Name</th>
<th>Visual Resources</th>
<th>Primary Viewers*</th>
<th>Station Area (At-grade)</th>
<th>Station Area (Elevated)</th>
<th>Track (At-grade)</th>
<th>Track (Elevated)</th>
<th>Track on new Alignment</th>
<th>Regional Rail Vehicle</th>
<th>Trench Wall</th>
<th>Parking (At-grade)</th>
<th>Parking (Structure)</th>
<th>Road Modifications</th>
<th>Overall Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>DFW Airport to Coppell Rd.</td>
<td>Grazing Land/ Open Spaces SH 121; IH 635 Industrial Chesapeake compressor station</td>
<td>A, E, H</td>
<td>Low</td>
<td>NA</td>
<td>Low</td>
<td>NA</td>
<td>Low</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Low</td>
</tr>
<tr>
<td>1-2A</td>
<td>Coppell Rd. to Moore Rd.</td>
<td>North Lake Power Lines</td>
<td>A, D, F</td>
<td>NA</td>
<td>NA</td>
<td>Low</td>
<td>High</td>
<td>NA</td>
<td>Low</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Medium</td>
</tr>
<tr>
<td>1-2B</td>
<td>Coppell Rd. to Moore Rd.</td>
<td>North Lake Power Lines Radio towers</td>
<td>A, B, E, F, G</td>
<td>Low</td>
<td>NA</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Low</td>
</tr>
<tr>
<td>1-3</td>
<td>Moore Rd. to Coppell/ Carrolton City Limits</td>
<td>Electrical Substation Power Lines Riverchase Golf Course McInnish Park Elm Fork</td>
<td>A, B, C, D, E, G</td>
<td>NA</td>
<td>NA</td>
<td>Low</td>
<td>NA</td>
<td>NA</td>
<td>Low</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Low</td>
</tr>
<tr>
<td>2-1</td>
<td>Coppell/ Carrolton City Limits to Hutton Dr.</td>
<td>PGBT IH-35E; frontage roads; future Belt Line Rd. DART Green Line</td>
<td>A, B, C, D, E, G</td>
<td>NA</td>
<td>NA</td>
<td>Low</td>
<td>NA</td>
<td>NA</td>
<td>Low</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Low</td>
</tr>
<tr>
<td>2-2</td>
<td>Hutton Dr. to Erie St.</td>
<td>IH-35E; frontage roads; future Belt line Rd. DART Green Line Carrollton Heights District</td>
<td>A, C, E, F, G, H (DART Green Line)</td>
<td>Low</td>
<td>NA</td>
<td>Low</td>
<td>High</td>
<td>NA</td>
<td>Low</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Low to Medium</td>
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<th>Road Modifications</th>
<th>Overall Rating</th>
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</table>
| 2-3     | Erie St. to Dallas North Tollway | Carrollton Heights District  
Honors Golf Club  
Addison Airport  
Addison Transit Center  
Addison Circle  
Addison Circle Park  
Arapahoe Bridge  
Addison Pedestrian Trail | A, B, C, D, E, F, G | Low | NA | Low | High | NA | Low | NA | Low | NA | NA | NA | Medium |
| 3-1     | Dallas North Tollway to White Rock Creek | Electrical Substation  
Power Lines  
White Rock Creek  
Prestonwood Country Club | A, C, E, G | Low | NA | Low | NA | NA | Low | NA | NA | NA | NA | NA | Low |
| 3-2A (At-grade) | White Rock Creek to Coit Rd. | White Rock Creek  
Prestonwood Country Club  
Keller Springs Park  
Preston Road  
Fairhill School  
McKamy Branch  
Woodlands Power Lines | A, B, C, D, E, F, G (Institutional) | Low | NA | Low | NA | NA | Low | NA | Low | NA | NA | Med. | Low to Medium |
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<td></td>
<td></td>
</tr>
<tr>
<td>3-5</td>
<td>N. Ave. to Shiloh Rd.</td>
<td>Electrical Substation Power Lines</td>
<td>A, C, E, F, H (Institutional)</td>
<td>Low</td>
<td>NA</td>
<td>Low</td>
<td>NA</td>
<td>NA</td>
<td>Low</td>
<td>NA</td>
<td>Low</td>
<td>NA</td>
<td>NA</td>
<td>Low</td>
</tr>
</tbody>
</table>

*Primary Viewers:*

- A = Motorist
- B = Single-Family Resident
- C = Multi-Family Resident
- D = Recreational Users
- E = Commercial/Office Tenant
- F = Industrial Tenants
- G = Pedestrians
- H = Others

**Depending on method of excavation, the Tunnel Profile has the potential to significantly alter the existing corridor at to be determined locations. In these cases the track bed modification impact could be high.**

*Source: URS, 2013.*
3.9 Cultural Resources

The purpose of this section is to describe the existing cultural resources within the project study area, and describes potential impacts that may result from the implementation of the Cotton Belt Project. Cultural resources are documented in more detail in the Cultural Resources Existing Conditions Technical Memorandum and a Historical Resources Reconnaissance Survey Report, both in Appendix A.

Introduction and Regulatory Setting

The cultural resource effort assisted in the coordination effort in anticipation of fulfilling any regulatory requirements under Section 106 of the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. 470 et seq., as amended) and the Antiquities Code of Texas.

Methodology

An archaeological project study area was established by creating a 1-kilometer (3,621-feet) buffer around the construction footprint of the proposed rail corridor. An examination of the Texas Archeological Sites Atlas (TASA) database was undertaken to locate known archaeological sites, identify previous archaeological investigations, and develop a cultural context for archaeological resources in anticipation of a formal pedestrian survey within a defined project APE.

An APE for historic-age resources for the Cotton Belt Project was established in coordination with the THC. The APE was defined as 175 feet (53 meters) from the centerline for existing right-of-way. For areas requiring new right-of-way, the APE was adjusted to 250 feet (76 meters) from the centerline. Archival research was then conducted to identify resources requiring initial or further investigation, as well as to locate previously recorded and evaluated historic resources, districts, markers, cemeteries, bridges and culverts. Listings of Registered Texas Historic Landmarks (RTHLs), and State Archaeological Landmarks (SALs), in addition to reports, records, maps and aerial photographs, were examined and were made available through the following institutions:

- The Texas Historic Sites Atlas (THSA)
- Reports housed at various agencies including URS
- Online maps of the Texas State Library & Archives Commission
- The Handbook of Texas Online
- The online records of the Tarrant, Dallas and Collin appraisal districts

Existing Conditions

Archaeological Resources

The search yielded the presence of 28 previously recorded archaeological sites and four cemeteries. In addition, 31 archaeological investigations have been conducted previously within the proposed archaeological project study area. These include 11 area surveys, 19 linear surveys, and one site testing. No NRHP-listed or NRHP-eligible archaeological resources are present within the project study area. Fifteen archaeological resources have been determined ineligible for listing in the NRHP. Ten archaeological resources have an undetermined NRHP-eligibility status while the remaining three archaeological resources have an unknown NRHP-
eligibility status. Overall, the results of the TASA database search indicate that while no known archaeological resources are present within the construction footprint of the proposed Cotton Belt Project; numerous previously recorded archaeological resources are present within the expanded project study area. Prehistoric sites have typically been found in buried contexts, while historic sites have been recorded as surface manifestations.

**Architectural Resources**

A search of the THSA resulted in the identification of 28 known historic-age resources potentially within or near the Cotton Belt Project APE. Following the database search, a historic resources reconnaissance survey of the APE was completed resulting in the documentation of 68 historic-age resources. All of the identified resources are enumerated in Table 6-5 of the Cultural Resources Existing Conditions Technical Memorandum in Appendix A, with their respective locations in regard to the APE. A comprehensive technical report from the historic resources reconnaissance survey is located in Appendix A.

**Impact Assessment**

**Archaeological Resources**

At present, no archaeological resources occur within the proposed Cotton Belt Corridor right-of-way. Therefore, no known archaeological resources would be impacted by the proposed actions. It should be noted, however, that an intensive archaeological survey within a defined APE for archaeological resources has not been completed. Given the distribution and context of previously recorded archaeological sites within the archaeological project study area, our present understanding of the occupational history of the region, and the occurrence of soils suitable for the preservation of archaeological deposits, the Cotton Belt Corridor right-of-way has the potential to contain previously unrecorded archaeological resources.

**Architectural Resources**

Of the 68 historic-age architectural resources within the project APE, none are currently listed in the NRHP and one (Addison State Bank - Resource 44) is listed as a RTHL. In total, three resources are recommended individually eligible for inclusion in the NRHP: Addison State Bank (Resource 44); Carrollton Depot (Resource 21); and White Rock Creek Bridge (Resource 45). Section 4(f) of the U. S. Department of Transportation Act of 1966, would also apply to the “use” of White Rock Creek Bridge and may require additional evaluation pursuant to Section 4(f). Carrollton Depot would be directly adjacent to the Downtown Carrollton Station, but would not be impacted by the project.

**Mitigation Options**

Currently, no known archaeological resources would be impacted by the proposed actions. THC will be consulted to identify an APE For archeological resources. DART proposes to conduct an intensive archeological archaeological survey within the defined APE. Upon THC consultation, this survey would be augmented by shovel testing and possibly geoarchaeological evaluations of backhoe trenches. Should any archaeological resources be identified, DART would follow the procedures outlined by the THC for documenting the resource.

For the resources where an adverse effect to historic-age resources is expected, consultation with the THC will occur to identify additional measures to minimize and mitigate the effects. For
resources that are not able to be avoided, DART would follow the procedures outlined by the THC for documenting the resource. The two MOS Alternatives would avoid any impact to White Rock Creek Bridge.

3.10 Soils and Geology

The purpose of this section is to describe the existing geologic and soil conditions within the project study area, and the potential impacts that may result from the implementation of the Cotton Belt Project. This section will be organized according to two topical areas: geology and soils.

Introduction and Regulatory Setting

The Farmland Protection Policy Act (FPPA), as detailed in Subtitle I of Title XV of the Agricultural and Food Act of 1981, provides protection to the following: 1) prime farmland; 2) unique farmland; and 3) farmland of local or statewide importance. FPPA defines prime farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management (irrigation), according to acceptable farming methods. Unique farmland is farmland that is used for production of specific high value food, feed, and fiber crops. Farmland of local or statewide importance is determined by the appropriate state or local government agency or agencies.

Methodology

The project study area used for the assessment of potential impacts includes a one-quarter mile corridor centered on the project centerline. Existing literature and mapping were reviewed for the project area to assess geology and soils. Maps examined include Aerials Express Dallas 2010 Aerial Imagery, the Geologic Atlas of Texas Dallas Sheet (UT-BEG, 1987), and U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) Soil Surveys for Dallas County (NRCS, 1980), Collin County (NRCS, 1969) and Tarrant County (NRCS, 1981).

Existing Conditions

Geology

Four geologic types underlie the project area – the Eagle Ford Formation, alluvium, fluviatile terrace deposits, and Austin Chalk. These are discussed in more detail in the Geology and Soils Existing Conditions Technical Memorandum in Appendix A.

Soils

Seven soil associations are found within the project area. These include (from west to east):

- Houston Black-Navo-Heiden association – gently sloping, deep, clayey and loamy soils of uplands
- Houston Black-Heiden association – deep, nearly level to strongly sloping, clayey soils of uplands
- Wilson-Rader-Axtell association – deep, nearly level to gently sloping, loamy soils of uplands
• Trinity-Frio association – deep, nearly level, clayey soils of floodplains
• Eddy-Stephen-Austin association – very shallow, shallow, and moderately deep, gently sloping to moderately steep, loamy and clayey soils of uplands
• Austin-Houston Black association – moderately deep and deep, nearly level to sloping, clayey soils of uplands Houston Black-Austin associations – gently sloping to sloping, clayey soils of uplands that are over deep marl and chalk

Detailed descriptions and locations of each of these are available in the Geology and Soils Existing Conditions Technical Memorandum in Appendix A. Fourteen prime farmland soil series, comprising approximately 1,550 acres were identified the project study area. No unique farmland or farmland of local or statewide importance is found within the project study area.

**Impact Assessment**

**Geology**
The Tunnel Profile Option would include a tunnel which would pass through the Austin Chalk formation. Austin Chalk is known for producing small-scale faulting. The formation is also susceptible to weathering due to erosion. The occurrence of fossils in this formation is not common. Because Austin Chalk is a hard formation with soft layers and faulting/weathered sections, some impact may occur if the Tunnel Profile Option is selected.

**Soils**
No unique farmland or farmland of local or statewide importance is found within the project study area; therefore, no impact to either of these resources is anticipated. Although 14 prime farmland soil series were identified, the project study area is primarily committed to urban use. The FPPA exempts from consideration those lands “committed to urban use” (within city limits or zoning boundaries). Thus, NRCS, FPPA coordination would not be required for project development activities within the study area.

**Mitigation Options**
If the Tunnel Profile Option is selected, impacts to the Austin Chalk due to construction of the tunnel should be mitigated through special structural design measures that may strengthen tunnel walls in the vicinity of faults or layers.

Potential soil erosion and sedimentation during construction will be addressed in a Stormwater Pollution Prevention Plan (SWPPP), to be prepared prior to beginning construction activities. The SWPPP will detail best management practices (BMPs) to be incorporated into the project design related to erosion control, sedimentation control, and post-construction total suspended solids (TSS) removal. Detailed geotechnical borings would be completed prior to the final design stage in order to identify and avoid through design any potential structural stability issues.

**3.11 Water Resources**
This section provides an introduction and regulatory setting for water resources, including surface water quality, Waters of the US (including wetlands), groundwater, and floodplains within and adjacent to the project study area. The section also provides a summary of the methodology used to form the existing conditions, impacts and mitigation measures as a result of the proposed project.
Introduction and Regulatory Setting

The Environmental Protection Agency’s (EPA) National Pollutant Discharge Elimination System (NPDES) permit program, authorized by the Clean Water Act, controls water pollution by regulating point sources that discharge pollutants into Waters of the US in Texas, the NPDES program is administered by the Texas Commission on Environmental Quality (TCEQ), as part of the Texas Pollutant Discharge Elimination System (TPDES). Stormwater runoff resulting from the proposed project would be addressed through compliance with the TPDES Construction General Permit.

Impacts to Waters of the US resulting from the discharge of dredged or fill material are regulated by the United States Army Corp of Engineers (USACE) under Section 404 of the Clean Water Act. If a linear transportation project places less than 0.5 acre of fill into Waters of the U.S., it would typically be authorized under Nationwide Permit (NWP) 14; impacts of more than 0.5 acre require an Individual Permit. Impacts authorized under a NWP- Linear Transportation Projects which equal or exceed 0.1 acre require Pre-Construction Notification (PCN) to the USACE; impacts to wetlands (of any amount) would also require PCN.

EO 11990 Protection of Wetlands (issued in 1977) requires federal agencies to minimize the destruction or modification of wetlands.

The Rivers and Harbors Act of 1899 sets forth regulations related to navigable Waters of the US, which are defined as “waters subject to the ebb and flow of the tide and/or are presently being used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce” (33 CFR 329.4).

EO 11988, Floodplain Management, requires federal agencies to avoid actions, to the extent practicable, which will result in the location of facilities in floodplains and/or affect floodplain values.

A Trinity River Corridor Development Certificate (CDC) is required for projects located within the Trinity River Regulatory Zone and is intended to minimize flood risk by regulating development within the Trinity River Corridor in North Central Texas. The Trinity River Regulatory Zone is consistent with the 100-year floodplain for the Trinity River, of which the Elm Fork of the Trinity River is crossed by the proposed project. As part of the CDC process, Section A of the CDC application is submitted and the cities (Carrollton and Coppell) will determine the applicability of the project, which will proceed to the Fort Worth District USACE and then to Federal Emergency Management Agency (FEMA), the Texas Water Commission (TWC) and to the North Central Texas Council of Governments. Finally, a formal approval, approval with conditions, or disapproval by the city is required with/without a FEMA conditional map revision or a TWC plan of reclamation. If no development activities occur by the end of five years from the date of issuance, the applicant may submit a written request within 30 days for up to a three-year extension. Summary project status reports are to be submitted to the CDC/Floodplain Administrator annually.

Section 408 of the Clean Water Act requires that projects which would take possession of, use, or cause injury to harbor or river improvements be reviewed and approved by the USACE.
Methodology
The project study area for water resources used for the assessment of potential impacts includes a one-quarter mile corridor centered on the project centerline. Existing literature and mapping were reviewed for the project area to assess groundwater, surface waters, floodplains, soils, and potential wetland areas. Maps examined include Aerials Express Dallas 2010 Aerial Imagery, United States Geological Survey (USGS) topographic maps (USGS, 1981), FEMA floodplain maps (FEMA, 2001), Texas Water Development Board (TWDB) Groundwater Database (TWDB, 2009), Rail Road Commission (RRC) Public Map Viewer for Oil, Gas, and Pipeline Data (RRC, 2011) United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps (USGS, 1989), USGS National Hydrography Dataset (NHD) (USGS, 2009), and U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) Soil Survey for Dallas County (NRCS, 1980), Collin County (NRCS, 1969) and Tarrant County (NRCS, 1981).

Existing Conditions
This section describes the existing conditions with respect to surface water and groundwater resources in the project study area.

Surface Water Quality
The project study area is located within the Trinity River basin, which drains approximately 17,969 square miles (TCEQ, 2004). For the purposes of monitoring water quality, the TCEQ has divided the Trinity River basin into 41 discrete segments. The Cotton Belt Project is located within Segment 0822 – Elm Fork Trinity River below Lewisville Lake, Segment 0822B – Grapevine Creek, and Segment 0827A – White Rock Creek. Defined uses of Segments 0822 and 0822B include aquatic life use, contact recreation use, general use, and public water supply. Defined uses of Segment 0827A include aquatic life use and contact recreation use. According to the 2012 Section 303(d) list, none of the segments are listed as impaired.

Waters of the US, Including Wetlands
Data obtained from the NHD and NWI reflects the project study area crossing the Cottonwood Branch, Grapevine Creek, Elm Fork Trinity River, and Hutton Branch, two unnamed tributaries to Hutton Branch, Perry Branch, White Rock Creek and one unnamed tributary to White Rock Creek, Pittman Creek, and Spring Creek. In addition, North Lake is approximately one-quarter mile south of the Cotton Belt Project centerline and immediately adjacent to the Cypress Waters Alternative. These are described in in Section 2.2 and Figure 2-1 of the Water Resources Existing Conditions Technical Memorandum in Appendix A. Additional detail can be found in the separate Preliminary Draft Jurisdictional Determination Report in Appendix A.

Field Delineation
Wetlands are defined by USACE as areas which, due to a combination of hydrologic and soil conditions, are capable of supporting hydrophytic vegetation. Potential wetlands and Waters of the US were identified using NHD mapping, USGS maps, NWI maps, and soil survey information.

Delineated jurisdictional limits were overlaid on detailed design information in order to quantify the area of disturbance associated with the design alternatives and determine any permitting and mitigation requirements. Table 1 of the Water Resources Existing Conditions Technical
Memorandum in Appendix A lists descriptions and potential impacts to each Water of the US feature.

**Groundwater**
The project area is located over the downdip, or subsurface, portion of the Trinity Aquifer (TWDB, 2006; Ashworth and Hopkins, 1995). The downdip portion of the aquifer is involved in subsurface water storage (as opposed to surface water recharge). The Trinity Aquifer extends across 55 counties in Texas, from the Red River to the south-central portion of the state. Extensive development over the aquifer in the DFW metropolitan area has resulted in substantial declines in the water level within the aquifer (Ashworth and Hopkins, 1995). The source aquifer for the project area is the downdip portion of the Woodbine Aquifer. The main use of groundwater in the project area is municipal use (TWDB, 2007). Water pressure within the aquifer shows declines around major cities as a result of heavy use. During the 20th century, a decline of approximately 1,000 feet has occurred in the DFW area due to heavy pumping, and annual fluctuations of up to 60 feet have been recorded in the vicinity of the City of Dallas (TWDB, 2004). According to TWDB’s water well database, there are no wells that are intersected by the project (TWDB, 2009).

**Floodplains**
FEMA floodplain maps were consulted for the project area (Map ID 48439C0115K, 48439C0110K, 48113C0135J and 48113C0345J, 48113C0155J, 48113C0160J, 48113C0180J, 48113C0185J, 48085C0485J, 48085C0505J, 48113C0065J, 48085C0390J, and 48085C0395J). According to the maps, there are four 100-year floodplains within the project study area. They are associated with Cottonwood Branch, Grapevine Creek, Elm Fork of the Trinity River and White Rock Creek. See Figure 2-1 of the Water Resources Existing Conditions Technical Memorandum in Appendix A.

**Impact Assessment**
This section addresses impacts to water resources, including surface water, groundwater, and floodplains.

**Surface Water Quality**
More than five acres of earth disturbance would occur as a result of the project; therefore, a SWPPP, construction site notice, and Notice of Intent (NOI) would be required.

**Waters of the US, Including Wetlands**
Table 1 of the Water Resources Existing Conditions Technical Memorandum in Appendix A lists descriptions and potential impacts to each Water of the US feature. Twenty-three potential Waters of the US, including three wetlands, lie within the proposed right of way of the Base Alternative (Crossings #1 through #23 in Table 1). The base project has the potential to affect approximately 4.27 acres of Waters of the US within the proposed Cotton Belt Project right-of-way.

Only one crossing (#24), potentially affecting 0.08 acres of Water, lies within the Cypress Waters Alternative right-of-way. This alternative would avoid two base crossings (#3 and #4) affecting about 0.16 acres. Three crossings (#25 through #27), potentially affecting about 1.08 acres of Water, lie within the Red Line Interface South Alternative right-of-way. This alternative would
avoid two base crossings (#21 and #22) affecting about 0.27 acres. The Tunnel Profile Option would avoid three potential crossings (#17 through #19) affecting about 0.34 acres.

Three potential crossings (#12 through #14) affecting about 0.3 acres of Water lie within the MOS 1 right-of-way. Fourteen potential crossings (#1 through #14) affecting about 3.37 acres of Water lie within the MOS 2 right-of-way.

Also see the separate Preliminary Draft Jurisdictional Determination Report in Appendix A for additional details.

No navigable Waters of the US are located in the project area.

None of the streams/rivers in the project area are designated as a Wild and Scenic River; therefore, coordination with the National Park Service will not be required.

**Groundwater**
The proposed project has the potential to contribute to the current trend of declining water levels within the Trinity Aquifer.

**Floodplains**
As shown on Figure 2-1 of the Water Resources Existing Conditions Technical Memorandum in Appendix A, the western crossing is a 100-year floodplain associated with Cottonwood Branch; approximately 1,313 linear feet of this floodplain is crossed by the Cotton Belt Project. The next crossing is the 100-year floodplain associated with Grapevine Creek; approximately 3,350 linear feet of this floodplain is crossed by the Cotton Belt Project. The largest crossing is the 100-year floodplain associated with Elm Fork Trinity River; approximately 9,488 feet of this floodplain is crossed. A crossing in the eastern half of the project study area is the 100-year floodplain associated with White Rock Creek; approximately 1,112 linear feet of this floodplain is crossed. The tributary of White Rock Creek has a 100-year floodplain associated with it; approximately 1,739 linear feet of this floodplain is crossed.

The North Dallas Trench Profile Option consists of a combination of open cut trench that is four to 12 feet below grade with six to 15 feet above-grade screen walls. This option would cross three tributary floodplains associated with White Rock Creek (McKamy Branch and two crossings of Osage Branch) and maintain a one foot freeboard above the 100-year elevation. The Tunnel Profile Option would be located below these creeks and floodplains. Potential floodplain and water resource impacts associated with the Trench Profile Option could include de-watering of adjacent wetlands and riparian areas, modifications to shallow alluvial aquifers, the need for pumping and possibly detention facilities, and modifications to the flow regime of creeks that intersect the depressed/excavated section.

No facilities subject to Section 408 of the Clean Water Act have been identified within the Cotton Belt Corridor.

**Mitigation Options**
As outlined in Federal regulations, water impacts must be avoided, minimized, or mitigated. Project planning and development would seek to utilize every available feasible design
technique to minimize or eliminate impacts to Waters of the US. Following the guidelines of NWP 14 for Linear Transportation Projects, if more than a 0.10 acre of Waters of the US are going to be impacted, or there is a discharge in a special aquatic site, including wetlands, a PCN must be submitted to the USACE prior to commencement of construction activities within Waters of the US.

The USACE requirements indicate that if a proposed activity would result in the loss of greater than 0.10 of an acre of wetlands, then mitigation for the impacts must be addressed. Compensatory mitigation is determined on a case-by-case scenario and could require wetland/stream restoration as mitigation. DART’s preferred method of wetland replacement is wetland banking, should compensatory mitigation be required. DART will comply with all the terms and conditions of NWP 14.

Implementation of Best Management Practices (BMPs) during construction, including erosion controls, sediment controls, and/or post-construction total suspended solids controls, would reduce impacts to water quality. Examples of BMPs that could be used for the proposed project include mulch logs, rock filter dams, and fabric silt fences, which function to trap sediment before it enters a watercourse.

BMPs utilized to avoid water quality degradation will also serve to protect groundwater quality. However, according to the Draft 5% Preliminary Engineering Design Report (2011), several of the existing water utility lines and culverts would require modifications for the shallow trench option. Channels would also have to be evaluated due to an increase in erosive velocities from additional bridge piers.

As described previously the MOS alternative would avoid many of the river crossings. Additionally, MOS 1 would avoid the four identified floodplain crossings. MOS 2 would avoid the White Rock Creek floodplain crossing. The At-grade Base Alternative and the Tunnel Profile Option would avoid potential floodplain and water resource impacts associated with the Trench Profile previously described.

### 3.12 Biological Resources

This section describes the biological resources within and adjacent to the Cotton Belt Rail project area and discusses impacts which would result from construction of the project.

**Introduction and Regulatory Setting**

The proposed project corridor crosses the communities of Grapevine, Coppell, Dallas, Carrollton, Addison, Plano, and Richardson. All of these municipalities have tree protection ordinances in place. The ordinances provide protection against unnecessary removal of trees and may require replacement. Existing DART owned rights-of-way are exempt from the City of Dallas tree ordinance; however, the ordinance would apply to new right-of-way and station areas. Any tree removals would be done in accordance with city ordinances, and permits would be obtained if necessary.

1918 prohibits harm to all migratory birds, their nests, eggs, and nestlings. The Bald and Golden Eagle Protection Act further provides protection for Bald Eagles and Golden Eagles.

State law prohibits direct harm for state-listed species, but does not currently provide for habitat protection. If any individuals of state-listed species are encountered within the project area during construction, care should be taken to avoid harming them.

Methodology
The biological resource project study area used for the assessment of impacts generally includes the Cotton Belt Corridor, although a much larger search radius (10 miles) was used in the examination of threatened or endangered species occurrence data. Existing literature and mapping were reviewed for the project area to identify soils, potential vegetative communities, potential wildlife assemblages, potential wetland areas, and threatened or endangered species of potential occurrence. Maps examined include Aerial Imagery for Dallas (Aerials Express, 2010), United States Geological Survey (USGS) topographic maps for the Garland, Grapevine, Carrolton, Plano, and Addison, Texas quadrangles (USGS, 1973; USGS, 1981), The Vegetation Types of Texas Including Cropland (McMahan et al., 1984), and the Natural Resource Conservation Service (NRCS) soil survey maps for Dallas County (NRCS, 1982).

Field investigations were conducted by project biologists in November 2011 and March 2013 to identify and evaluate vegetative communities, wildlife habitat, migratory bird use, and potential habitat for rare, threatened and endangered species within the project study area. The findings of this natural resource field assessment are discussed below.

Existing Conditions
This section describes the existing natural communities found within and in the vicinity of the project study area and provides information regarding rare, threatened, or endangered species of potential occurrence in Tarrant, Dallas, and Collin Counties.

Vegetation
The project study area is located within two natural regions. The western portion of the project area is located within the Cross Timbers Natural Region, and the eastern portion is within the Blackland Prairies Natural Region (Gould et al., 1960). According to The Vegetation Types of Texas, three vegetation types exist within the project area: “Urban”, “Crops”, and “Other Native and/or Introduced Grasses” (McMahan et al., 1984). Maps and a detailed description of these natural regions and vegetation types are available in the Biological Resources Existing Conditions Technical Memorandum in Appendix A.

During field investigation, no crops were found within the project area. Urban vegetation generally consisted of turf grasses, such as Bermuda grass or St. Augustine grass, and ornamental plantings which can include a variety of types of trees, shrubs, or herbaceous plants. Other native and/or introduced grasses can be found on undeveloped land, including parks and stream corridors.

Wildlife
According to Blair (1950), the study area is located within the Texan Biotic. Approximately 49 species of mammals, 57 species of reptiles, and 23 species of amphibians occur in the province.
(Blair, 1950). Approximately 471 avian species, including both residents and migrants, have been reported in the Oaks and Prairies and Osage Plains of Texas (Freeman, 2003), an area that is roughly analogous to the Texan Biotic Province.

The project area is mostly urban and suburban. The majority of wildlife species inhabiting the project study area would be expected to be those which are generally associated with urban and suburban areas. Several parks are located adjacent to the proposed Cotton Belt Project, including Gravley, Keller Springs, and Preston Green, RE Good Sports Complex, Grapevine Creek Park, and Grapevine Springs Park. Numerous creek crossings occur in the Cotton Belt Corridor right-of-way. The creeks and undeveloped portions of the parks could provide habitat for various species of wildlife.

According to data obtained from TPWD’s TXNDD, one rookery utilized by Snowy Egrets, Little Blue Herons, and Cattle Egrets has been reported to occur within the central portion of the project area (TPWD, 2011d). Two other rookeries, both of which are utilized by various heron and egret species, were noted to occur within 10 miles of the project study area. One of these is located approximately 5.4 miles southeast of the project study area, and the other is located at a wildlife refuge approximately 9.4 miles south of the project study area (TPWD, 2011d).

During field investigations several Red-tailed Hawks, other raptors, several heron species, Mallards, soft-shelled turtles, raccoon tracks, bobcats, and several fish and other turtles were observed along the project corridor. No rookeries were noted within or adjacent to the project corridor. Swallow nests were noted under the PGBT along the Richardson Alignment.

**Impact Assessment**

The majority of the Cotton Belt Project would be developed within existing Cotton Belt Corridor right-of-way. Therefore, it anticipated that impacts to vegetation and wildlife described above would be minimal, occurring primarily in the areas where new trackwork would need to occur.

Thirty–two federal and state protected and monitored (two plant and 30 animal) species were identified and documented in the *Biological Resources Existing Conditions Technical Memorandum* in Appendix A.

Federally-listed species and their habitats are protected under the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended. No potential habitat for federally-listed species was identified within the project area; therefore, the proposed project would have no effect on federally-listed species for Tarrant, Dallas and Collin Counties.

Impacts to wildlife could also occur as a result of habitat destruction. Of the 32 protected and monitored species, 13 state listed species were described as potentially impacted by the project.

Eight state-listed threatened species could occur in the project study area including the alligator snapping turtle, canebrake rattlesnake, Bald Eagle, White-faced Ibis, Wood Stork, Louisiana pigtoe, Texas pigtoe, and the Texas heelsplitter. The latter three species all have element of occurrences within 0.7 – 8 miles from the project area. The project may impact these eight state-listed species if they are present within the project study area. The proposed Cotton Belt Project would have no impact on any other state-listed threatened species.
Five state-listed species of concern could occur in the project study area including fawnsfoot, little spectaclecase, Wabash pigtoe, Texas garter snake, and plains spotted skunk. The Texas garter snake has two element of occurrences (ID 432) 9.3 miles south of project study area and (ID 434) 7.1 miles north of the project study area.

**Species** identified as state species of concern are tracked by TPWD for monitoring purposes, but do not currently receive regulatory protection. Texas state law includes provisions which prohibit direct harm to threatened and endangered species.

**Mitigation Options**
State law prohibits direct harm for state-listed species, but does not currently provide for habitat protection. If any individuals of state-listed species are encountered within the project area during construction, care should be taken to avoid harming them. In addition, several swallow nests were identified under the PGBT along the Richardson Alignment. Although these species are not listed as threatened or endangered, they would fall under the protection of the MBTA, and any work done in this area would need to be avoided during nesting season.

Most bridges over rivers would need to be replaced, which could impact water species. However, use of Best Management Practices would avoid or minimize water quality impacts to the river, thus avoiding impacts to the species. The Tunnel Profile Option would include a tunnel which would pass under three creeks (McKamy Branch, Osage Branch, and White Rock Creek) in the project study area. Providing that the tunnel is designed to cross under the creek bottom, there would be no impacts to any listed species with this alternative.

Most of the animals present within the project study area are already subject to an environment that is regularly disturbed. Due to the animals’ mobile nature, they would relocate in the event of habitat disturbance. Construction activities would temporarily disturb these animals’ habitat; however, long-term impacts would be mitigated through re-vegetation.

Site planning and construction techniques would be designed to avoid and preserve existing mature native trees and shrubs. The amount of vegetation removed, trampled or disturbed would be minimized to the greatest extent possible. Existing vegetation or habitat would be replanted along the disturbed project area. Replacement vegetation would utilize native species that are generally useful to wildlife. The replacement vegetation can provide habitat for numerous wildlife species. On DFW Airport property, use of vegetation that is attractive to birds is discouraged since birds represent a safety risk to aircraft. In riparian areas, bridge spans would allow usable vertical and horizontal space for local terrestrial wildlife to cross under. These measures are included in DART’s construction specifications and would be applied during and after construction of the project.

### 3.13 Noise
This section presents the noise impact assessment for the Cotton Belt Project. The objective of the analysis was to assess the potential noise impacts of the planned regional rail at sensitive locations along the Cotton Belt Corridor.
Introduction and Regulatory Setting
Noise impacts for this project are based on the criteria as defined in the US FTA guidance manual “Transit Noise and Vibration Impact Assessment” (FTA-VA-90-1003-06, May 2006). These criteria are consistent with DART policy as described in Environmental Impact Assessment and Mitigation Guidelines for Transit Projects, May 2012.

Methodology
The primary components of wayside noise from the train operations are engine/exhaust and cooling fan noise from vehicle power units and wheel/rail noise from the steel wheels rolling on steel rails. Horns and warning bells sounded at street crossing also factor in noise impact assessment.

The noise assessment for the Cotton Belt Project is based on results of a noise and vibration test program for the Stadler diesel-electric GTW 2/6 articulated diesel multiple unit (DMU) rail vehicles currently operating on the DCTA A-Train system. These measurements are summarized in Noise and Vibration Test Program for the DCTA Stadler DMU in Appendix A. This report concludes that noise emissions from the DCTA Stadler DMU vehicles are relatively low compared to existing standards. Additionally, the noise levels emitted from the DCTA DMU and the DART light rail are very similar.

The FTA noise impact criteria place noise sensitive land uses into three categories as indicated in Table 3-12. The Day-Night Sound Level (Ldn) is used to characterize noise exposure for residential areas (Category 2). For other noise sensitive land uses, such as, outdoor amphitheaters and school buildings (Categories 1 and 3), the maximum 1-hour “equivalent” sound level (Leq) during the facility’s operating period is used.

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Noise Metric (dBA)</th>
<th>Description of Land Use Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Outdoor L_{eq}(h)^1</td>
<td>Tracts of land where quiet is an essential element in their intended purpose. This category includes land set aside for serenity and quiet, and such land use as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.</td>
</tr>
<tr>
<td>2</td>
<td>Outdoor L_{dn}</td>
<td>Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.</td>
</tr>
<tr>
<td>3</td>
<td>Outdoor L_{eq}(h)^1</td>
<td>Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.</td>
</tr>
</tbody>
</table>

\(^{(1)}\text{L}_{eq}\text{ for the noisiest hour of transit-related activity during hours of noise sensitivity.}

Source: FTA, May 2006
Impacts are divided into two categories, severe and moderate, as summarized below:

- **Severe Impact**: Project-generated noise in the severe impact range can be expected to cause a significant percentage of people to be highly annoyed by the new noise and represents the most compelling need for mitigation. Noise mitigation will normally be specified for severe impact areas unless there are truly extenuating circumstances which prevent it.

- **Moderate Impact**: In this range of noise impact, the change in the cumulative noise level is noticeable to most people but may not be sufficient to cause strong, adverse reactions from the community. In this transitional area, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These factors include the existing level, the predicted level of increase over existing noise levels, the types and numbers of noise-sensitive land uses affected, the noise sensitivity of the properties, the effectiveness of the mitigation measures, community views, and the cost of mitigating noise to more acceptable levels.

The future noise exposure would be the combination of the existing noise exposure and the additional noise exposure caused by the proposed rail project. **Figure 3-1** illustrates the increase in total or cumulative noise that can occur in the overall noise environment before an impact occurs.

**Figure 3-1: Increase in Cumulative Noise Exposure Allowed by FTA Criteria**

Existing Conditions
Twenty-four representative sites were chosen in accordance with FTA guidelines to characterize the existing baseline noise conditions at sensitive receptors along the corridor. Noise measurements were conducted at these representative sites during the period from December 6 through December 10, 2010. Nineteen sites, designated as LT-1 through LT-19, were selected throughout the corridor for long-term monitoring. Five sites, designated as ST-1 through ST-5, were selected for short-term monitoring in a few areas where needed to supplement the long-term measurements. More detail regarding the measurement sites, including location,
photographs, and detailed noise descriptions are included in the *Noise and Vibration Existing Conditions Technical Memorandum* in Appendix A.

**Impact Assessment**

The results of the noise impact assessment identify noise impacts at a total of 3,880 receptors without mitigation, including 2,652 severe impacts and 1,228 moderate impacts for the Base Alternative with the At-Grade Profile Option (Section 3-2A) and the Red Line Interface North Alternative (Section 3-4A). For the Base Alternative with the Trench Profile Option (Section 3-2B) and the Red Line Interface North Alternative (Section 3-4A) there are a total of 1,944 noise impacts without mitigation (1,203 severe impacts and 741 moderate impacts). For the Base Alternative with the Tunnel Profile Option (Section 3-2C) and the Red Line Interface North Alternative (Section 3-4A) there are a total of 1,937 noise impacts without mitigation (1,203 severe impacts and 734 moderate impacts). Twelve moderate noise impacts are predicted along the Cypress Waters Alternative. Impacts for the Cypress Waters South Alternative are assumed to be identical to the Cypress Waters Southwestern Boulevard Alternative; however, this option would place the line further away from noise sensitive receptors, likely resulting in fewer impacts. There are no noise impacts predicted for the Red Line Interface South Alternative with Aerial Station and Depressed Freight (Section 3-4B).

**Mitigation Options**

Without mitigation, the primary cause of potential noise impact for the Cotton Belt Project is noise from train horns that would be sounded at the numerous at-grade crossings along the Cotton Belt Corridor. Thus, the primary recommended mitigation measure is the implementation of quiet zones throughout the corridor. As documented in Table 3-13 below, over 95% of all noise impacts would be eliminated with the implementation of quiet zones throughout the Cotton Belt Corridor. All of the remaining potential noise impacts fall within the moderate impact range. Some may not require mitigation. Additional mitigation beyond quiet zones would be implemented on a case by case basis as described in the *Noise and Vibration Impact Assessment Technical Memorandum* in Appendix A. Additional mitigation measures that may be considered include: noise barriers, building sound insulation, wheel/rail lubrication, special trackwork, or property acquisitions/easements.
### Table 3-13: Summary of Noise Impacts With and Without Quiet Zones

<table>
<thead>
<tr>
<th>Section</th>
<th>Alternative</th>
<th>Number of Impacts With Horn Noise</th>
<th>Number of Impacts With Quiet Zones</th>
<th>Moderate Impacts</th>
<th>Severe Impacts</th>
<th>Moderate Impacts With Less Than 3 dB Increase</th>
<th>Moderate Impacts With 3 dB or More Increase</th>
<th>Severe Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>Base</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-2A</td>
<td>Base</td>
<td>8</td>
<td>9</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-2B</td>
<td>Cypress Waters</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-3</td>
<td>Base</td>
<td>332</td>
<td>352</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2-1</td>
<td>Base</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2-2</td>
<td>Base</td>
<td>61</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2-3</td>
<td>Base</td>
<td>296</td>
<td>642</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>3-1</td>
<td>Base</td>
<td>36</td>
<td>174</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3-2A</td>
<td>Base (At-Grade)</td>
<td>494</td>
<td>1449</td>
<td>0</td>
<td>46</td>
<td>46</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3-2B</td>
<td>Base (Trench)</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3-2C</td>
<td>Base (Tunnel)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3-3</td>
<td>Base</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3-4A</td>
<td>Base (North Alt.)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3-4B</td>
<td>South Alt.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3-5</td>
<td>Base</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Base Noise Impact Summary (with At-Grade Profile)</strong></td>
<td></td>
<td>1228</td>
<td>2652</td>
<td>4</td>
<td>90</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Base Noise Impact Summary (with Trench Profile)</strong></td>
<td></td>
<td>741</td>
<td>1203</td>
<td>4</td>
<td>51</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Base Noise Impact Summary (with Tunnel Profile)</strong></td>
<td></td>
<td>734</td>
<td>1203</td>
<td>4</td>
<td>44</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cypress Waters Alternative Summary</strong></td>
<td></td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>South Alternative Summary</strong></td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MOS 1 Summary</strong></td>
<td></td>
<td>357</td>
<td>668</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MOS 2 w/o Cypress Water Summary</strong></td>
<td></td>
<td>697</td>
<td>1029</td>
<td>4</td>
<td>8</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. The number of impacts includes both Category 2 (residential) and Category 3 (institutional) receptors.
2. Noise levels are measured in dBA.
3. There are no noise-sensitive receptors of this type in this section.

Source: HMMH, 2013.

### Avoidance Alternatives

- MOS 1 avoids 91% of base with quite zone noise impacts
- MOS 2 avoids 77% of base with quite zone noise impacts
- The Trench Profile avoids 43% of base with quite zone noise impacts
- The Tunnel Profile avoids 49% of base with quite zone noise impacts
3.14 Vibration
This section presents the vibration impact assessment for the Cotton Belt Project. The objective of the analysis was to assess the potential vibration impacts of the planned regional rail at sensitive locations along the Cotton Belt Corridor.

Introduction and Regulatory Setting
Ground-borne vibration from transit systems is usually characterized in terms of the "smoothed" root mean square (RMS) vibration velocity level, in vibration decibels (VdB). The range of interest is approximately 50 to 100 VdB, from imperceptible background vibration to the threshold of damage. Although the approximate threshold of human perception to vibration is 65 VdB, annoyance is usually not significant unless the vibration exceeds 70 VdB. The “rumble” that radiates from the motion of surfaces in buildings due to ground-borne vibration is defined as ground-borne noise. Although expressed in dBA, which emphasizes more audible middle and high frequencies, the criteria are set lower than airborne noise to account for low-frequency character of ground-borne noise.

Vibration impacts for this project is based on the criteria as defined in the US FTA guidance manual Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06, May 2006). These criteria are consistent with DART policy as described in Environmental Impact Assessment and Mitigation Guidelines for Transit Projects, May 2012. The Noise and Vibration Existing Conditions Technical Memorandum in Appendix A provides more depth regarding these criteria.

Methodology
The FTA groups vibration-sensitive land uses into three categories, as shown in Table 3-14 below. Category 1 includes vibration-sensitive research and manufacturing facilities, hospitals with sensitive equipment, and university research operations. Category 2 includes places where people sleep, such as homes, hospitals, and hotels. Category 3 includes schools, libraries and churches.
Table 3-14: FTA Ground-Borne Vibration and Ground-Borne Noise Impact Criteria

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch/sec)</th>
<th>Ground-Borne Noise Impact Levels (dB re 20 micro-Pascals)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequent Events(^1)</td>
<td>Occasional Events(^2)</td>
</tr>
<tr>
<td>Category 1: Buildings where vibrations would interfere with interior operations.</td>
<td>65 VdB(^4)</td>
<td>65 VdB(^4)</td>
</tr>
<tr>
<td>Category 2: Residences and buildings where people normally sleep.</td>
<td>72 VdB</td>
<td>75 VdB</td>
</tr>
<tr>
<td>Category 3: Institutional land uses with primarily daytime use.</td>
<td>75 VdB</td>
<td>78 VdB</td>
</tr>
</tbody>
</table>

\(^1\) “Frequent Events” is defined as more than 70 vibration events of the same source per day.
\(^2\) “Occasional Events” is defined as between 30 and 70 vibration events of the same source per day.
\(^3\) “Infrequent Events” is defined as fewer than 30 vibration events of the same kind per day.
\(^4\) This criterion limit is based on levels that are acceptable for most moderately sensitive equipment.
\(^5\) Vibration-sensitive equipment is generally not sensitive to ground-borne noise.

Source: FTA, May 2006

There are some buildings, such as concert halls, recording studios and theaters that can be very sensitive to vibration, but do not fit into any of the three categories. None of these special buildings are located along the Cotton Belt Corridor.

More detailed criteria for determining vibration impacts are provided in the Noise and Vibration Existing Conditions Technical Memorandum in Appendix A.

Existing Conditions

The operation of freight trains in the Cotton Belt Corridor occurs infrequently. Other than these infrequent freight trains operating in some segments of the Cotton Belt Corridor there are no other significant sources of existing vibration. Vibration measurements for this project therefore focused on characterizing the ground-borne vibration propagation properties of the soil at representative locations along the corridor.

Field measurements were conducted during the period from December 6 through December 10, 2010. Ground-borne vibration propagation measurements were conducted at ten sites, numbered V-1 through V-10, along the Cotton Belt Corridor. The vibration testing sites were selected to represent the existing vibration propagation characteristics. At each of the sites the ground-borne vibration propagations tests were conducted by impacting the ground and measuring the input force and corresponding ground vibration response at various distances. Depending on the site location, vibrations from the proposed operations may vary over a range...
20 to 35 VdB. Detailed vibration propagation test data are included in the *Noise and Vibration Existing Conditions Technical Memorandum* in Appendix A.

### Impact Assessment

The results of the vibration impact assessment identify potential ground-borne vibration impact at a total of five receptors without mitigation for the Base Alternative and at two receptors with the Cypress Waters Alternative. Although no ground-born vibration impacts were identified for the Tunnel Profile Option, a total of 32 potential ground-borne noise impacts are identified. There are no vibration impacts predicted for the Red Line Interface South Alternative with Aerial Station and Depressed Freight. Table 3-15 summarizes the projected ground-borne noise and vibration impacts at residential receptors.

<table>
<thead>
<tr>
<th>Section</th>
<th>Alternative</th>
<th>Distance to Track (ft)</th>
<th>Train Speed, (mph)</th>
<th>Project Vibration Level</th>
<th>Vibration Impact Criterion</th>
<th>Number of Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2A</td>
<td>Base</td>
<td>60-70</td>
<td>50-55</td>
<td>73-76</td>
<td>72</td>
<td>5</td>
</tr>
<tr>
<td>1-2B</td>
<td>Cypress Waters</td>
<td>40</td>
<td>40</td>
<td>74</td>
<td>72</td>
<td>2</td>
</tr>
<tr>
<td>3-2C</td>
<td>Base w/Tunnel</td>
<td>40-70</td>
<td>32-50</td>
<td>38-44</td>
<td>38</td>
<td>32</td>
</tr>
</tbody>
</table>

### Mitigation Options

Vibration impacts that exceed FTA criteria are considered to be significant and to warrant mitigation, if reasonable and feasible. Therefore, the predicted ground-borne vibration and ground-borne noise impacts that have been identified above would need to be considered for mitigation. The vibration assessment assumes that the rail vehicle wheels and track are maintained in good condition with regular wheel truing and rail grinding. Beyond this, there are several approaches to reduce ground-borne vibration and ground-borne noise from train operation, including Ballast Mats, Tire Derived Aggregate, Floating Slabs, Resiliently Supported
Concrete Ties (Under-Tie Pads), Resilient Rail Fasteners, and Special Trackwork. More detail regarding these mitigation techniques can be found in the *Noise and Vibration Impact Assessment Technical Memorandum* in Appendix A.

Ground-borne noise can be a concern in underground transit operations. If the Tunnel Profile is selected, it is recommended that further analysis be conducted based on the depth of the tunnel and an advanced design of the rail line.

Selection of the At-grade or Trench Profile Option would avoid the 32 ground-borne noise impacts attributed to the Tunnel Option. The Cypress Waters Alternative would avoid three base alternative ground-borne noise impacts.

### 3.15 Air Quality

The following sections discuss the regulatory guidance, methodology and existing conditions related to air quality.

**Introduction and Regulatory Setting**

The EPA regulates air quality and delegates this authority to the governor, who has delegated authority to the TCEQ for monitoring and enforcing air quality regulations in Texas. NCTCOG conducts air quality modeling for the region.

The federal Clean Air Act (CAA) of 1970 and the Clean Air Act Amendments (CAAA) of 1977 and 1990 require that states adopt ambient air quality standards. The standards have been established to protect the public from potentially harmful amounts of pollutants. The EPA has set national ambient air quality standards (NAAQS) for the following six criteria pollutants: ozone (O\(_3\)), particulate matter (PM\(_{10}\), PM\(_{2.5}\)), nitrogen dioxide (NO\(_2\)), carbon monoxide (CO), sulfur dioxide (SO\(_2\)) and lead (Pb). Table 2-1 of the *Air Quality Existing Conditions Technical Memorandum* in Appendix A lists the NAAQS for these six pollutants. The CAA established two types of standards for these major air pollutants: primary and secondary. Primary standards set limits to protect public health, including the health of “sensitive” populations such as asthmatics, children and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation and buildings.

The CAAA requires all states to submit a list identifying those air quality regions, or portions thereof, which meet or exceed the NAAQS or cannot be classified because of insufficient data. Portions of air quality control regions that are shown by monitored data or air quality modeling to exceed the NAAQS for any criteria pollutant are designated “nonattainment” areas for that pollutant. The CAAA also establishes time schedules for the states to attain the NAAQS.

According to the EPA, the Dallas-Fort Worth region does not meet NAAQS for O\(_3\) and is classified as a “moderate” nonattainment area for that pollutant effective July 20, 2012 (TCEQ, 2012a). For O\(_3\), the federal CAA establishes nonattainment area classifications ranked according to the severity of the area’s air pollution problem. These classifications—*marginal, moderate, serious, severe* and *extreme*—translate to varying requirements with which Texas and nonattainment areas must comply. The “serious” classification requires that certain emission control programs be implemented under federal law (NCTOG, 2011).
State regulations that apply to emissions from the DART vehicle fleet include SB 681 (Section 382.133 of the *Health and Safety Code*) and Chapters 451-53 of the *Texas Transportation Code*.

Additionally, since a portion of the proposed project is located on DFW Airport Property, compliance with CAA legislation requires FAA Form 7460-1, Notice of Proposed Construction or Alternation, and an accompanying Airport Construction Emissions Inventory.

**Conformity**
FTA cannot approve funding for project activities beyond preliminary engineering unless the proposed project meets EPA transportation conformity regulations at the project level. The project is included in the NCTCOG Transportation Conformity. In addition, NCTCOG has demonstrated that Mobility 2035: The Metropolitan Transportation Plan for North Central Texas and 2011-2014 Transportation Improvement Program for North Central Texas – 2011 Amendment meet all transportation air quality conformity requirements of the CAAA, the air quality plan, the transportation conformity rule and transportation conformity related provisions contained in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (NCTCOG, 2011).

For a more detailed discussion of conformity and the regulating laws, see Section 2.1 of the *Air Quality Existing Conditions Technical Memorandum* in Appendix A.

**Pollutants of Concern**
Air quality is affected by pollutants that are generated by both natural and man-made sources. In general, the largest man-made contributors to air emissions are transportation vehicles and power-generating equipment, both of which typically burn fossil fuels. The main criteria pollutants of interest for transportation projects are CO, particulate matter, O₃ and the O₃ precursors, volatile organic compounds (VOCs) and oxides of nitrogen (NOx). Both federal and state standards regulate these pollutants, along with two other criteria pollutants, SO₂ and Pb.

The largest contributors of pollution related to transportation projects are motor vehicles. The main pollutants emitted from motor vehicles are CO, particulates, O₃, greenhouse gases and air toxic pollutants. Motor vehicles also emit pollutants that contribute to the formation of ground-level O₃. This section discusses the main pollutants of concern and their effect on public health and the environment.

For a more detailed discussion of the pollutants of concern, see Section 2.2.1 through Section 2.2.5 of the *Air Quality Existing Conditions Technical Memorandum* in Appendix A.

**Methodology**
Air monitoring station locations were identified using the NCTCOG GIS database and determining the nearest active federal air monitoring stations. Specific monitor readings were obtained through the TCEQ air monitoring data web site. The NCTCOG web site for air quality identified specific programs implemented by the region to improve air quality.
Existing Conditions
Air quality is a regional concern, not a localized condition. The study area is located in Tarrant, Dallas and Collin counties, which has been designated as a moderate nonattainment area for eight-hour $O_3$ and Pb in Frisco, TX—Collin County by the EPA. The NCTCOG eight-hour $O_3$ nonattainment region includes Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall and Tarrant counties. The formation of $O_3$ is directly related to emissions from motor vehicles and point sources. The primary pollutants from motor vehicles are VOCs, CO, and NOx. VOCs and NOx can combine under the right conditions to form $O_3$. The Dallas-Fort Worth region is in attainment for CO, sulfur dioxide, nitrogen dioxide and PM.

The modeling procedures for $O_3$ require long-term meteorological data, detailed area-wide emission rates and activity levels for all emission sources (on-road, non-road, point and area). Accordingly, concentrations of $O_3$ are modeled by the regional air quality planning agency for the SIP. The TCEQ monitors airborne pollutants in the Dallas-Fort Worth region on a continuous basis. $O_3$ is monitored every hour of the day, every day. Table 4-1 Air Quality Existing Conditions Technical Memorandum in Appendix A lists the four highest daily maximum eight-hour $O_3$ concentrations recorded annually from 2000 to 2012.

In addition to controls included in the next SIP and in the MTP, several efforts have been initiated at the local level through the NCTCOG to improve air quality. See Section 4.0 of the Air Quality Existing Conditions Technical Memorandum in Appendix A.

Impact Assessment
The rail vehicle that would operate in the corridor would be similar to the rail vehicles currently operating on the DCTA A-Train system with future generation low or no emission propulsion based on resolutions passed by both the Dallas City Council and the DART Board.

Air quality impacts from transportation projects generally focus on changes in motor vehicle related pollution. The introduction of transit into a corridor can reduce automobile trips, in turn, reducing mobile emissions.

Traffic impacts resulting from the fixed guideway transit projects could have the potential to result in some air quality impacts. These impacts are likely to occur at crossings of the transit corridor and near stations. Traffic impacts are detailed in Section 4 of this AECR.

With mitigation, most of the roadways crossing the Cotton Belt Project would operate at acceptable levels of service; therefore impacts to traffic are expected to be negligible. Estimated wait time for each rail crossing would only be 30 to 60 seconds, the minimal traffic delays would result in a minimal impact to air quality. DART would work with the City of Carrollton to develop mitigation to the potential traffic impact to the Luna Road crossing. Proposed grade separations in the various alternatives could serve to further reduce air quality impacts.

It is anticipated that the proposed Cotton Belt Project would only slightly impact transportation conditions and traffic operations in the vicinity of the 11 potential station locations. The additional traffic volumes generated by each station during the AM and PM peak hours are not expected to substantially impact traffic flow therefore would not impact air quality.
Mitigation Measures
No adverse impacts to air quality would be anticipated, no mitigation measures would be required.

3.16 Hazardous and Regulated Materials
The purpose of this section is to provide an understanding of key environmental hazard issues associated with the alternatives and profile options, and how they could be addressed in the corridor.

Introduction and Regulatory Setting
A search of the regulatory databases for sites that handle, generate, transport, store, or dispose of hazardous and/or regulated materials was conducted. Federal, state and other regulatory databases were searched for sites within the American Society for Testing Materials (ASTM)-specified search distances (ASTM E 1527-05, 2005) from the project centerline. A report was generated for potential hazardous sites within a one-half mile radius from the Cotton Belt Corridor (existing DART right-of-way) where construction activities would be expected.

Methodology
The Cotton Belt Corridor was evaluated by reviewing available regulatory agency databases, aerial photographs, topographic maps, and by site reconnaissance. These documents and site visits were intended to serve as an overall environmental screening for the Cotton Belt Corridor in order to begin to address potential hazardous material issues related to proposed Cotton Belt Project.

Potential hazardous sites within a one-half mile radius were evaluated and ranked based on the premise that the proposed Cotton Belt Project would generally be located within the Cotton Belt Corridor right-of-way. Construction activities would involve primarily surface disturbances related to track replacement and/or maintenance activities except in the areas where the track would be either below-grade or deviates from the existing alignment. With the below-grade or deviation from the existing alignment, the evaluation involved limited sub-surface evaluation of the potential impacts from hazardous material sites. Potential sites were ranked either high, medium, or low based on the distance to the project corridor, activities that were and are being conducted at the site, and the history of releases, spills, or violations.

Potential hazardous sites were further screened based on the future construction activities. The proposed construction activities could be at existing at-grade, below-grade or above-grade levels. For above- and below-grade level options, deeper subsurface soils would be disturbed for trench, tunnel, or pillar construction. For areas where construction would be at-grade level, potential hazardous sites within the 500 feet of the Cotton Belt Corridor were evaluated. For other areas (proposed below-grade or above-grade level construction area), all hazardous sites within a one-half mile radius were evaluated. The main difference between the two approaches is the depth of excavation. This is because the risk of encountering hazardous materials increases as the depth of excavation increases.

Finally, a site visit was conducted and aerial and topographic maps were reviewed in order to verify the presence and condition of hazardous material sites along the Cotton Belt Corridor.
Existing Conditions

A total of 320 potential risk sites within a one-half mile buffer of the Cotton Belt Corridor were identified. Using the aforementioned screening process, a total of 33 potential risk sites were identified within the defined criteria which might impact the construction activities. These potential risk sites are summarized in the Hazardous Materials Technical Memorandum in Appendix A.

Sites were further evaluated in detail for the potential impact during construction activities. Most of these sites have been remediated and are listed as low risk. However, out of 33 sites, two are rated as a high risk and nine as a medium risk. The remaining 22 sites were rated as a low potential to impact the Cotton Belt Project. This risk classification is based on the nature of the site contamination and proximity to the Cotton Belt Corridor. It is important to note that this risk ranking would be applicable to Cotton Belt Corridor only if the ground is disturbed during construction activities. Based on the current rail alignment, it appears that none of the identified high or medium risk sites are within the construction area where subsurface soil would be disturbed during the construction activities hence, do not pose any risk. However, if the current rail alignment changes, then further evaluation of the sites listed in Table 1 of the Hazardous Materials Technical Memorandum in Appendix A may be required. The approximate location and nature of contamination of the identified high and medium risk sites are discussed below.

Proposed Stations and Parking areas:

There are eleven potential stations for the Cotton Belt Project. Besides the existing Cotton Belt Corridor, proposed parking and station areas were also surveyed for potential hazardous materials. The findings of each station are discussed below.

DFW North Station: This proposed station is located north from the SH 114 and east from the Texan Trail road. At the time of the site reconnaissance, DFW Airport property was not accessed. However, based on the EDR regulatory database search, no hazardous material site with potential risk was found within one-half mile from this site. The Cotton Belt Project would share this site with the T’s TEX Rail. Subsurface soil disturbance by the T would likely precede Cotton Belt Project construction.

North Lake Station: This proposed station with parking lot is located north of North Lake and south from Belt Line Road and opposite the ADI warehouse located at 346 East Belt Line Road in Coppell. During the site visit, the proposed station was fenced and was therefore inaccessible. However, the proposed station area was observed from outside of the fence and it appeared that no environmental issue is present. Based on the EDR regulatory database search, no hazardous material site with potential risk was found within one-half mile from this site.

Downtown Carrollton Station: This proposed station with parking lot is located on north side of the existing DART Green Line parking area. The proposed station site was surveyed during site visit. No environmental impacts related to hazardous materials were found in the proposed parking areas. Based on the EDR regulatory database search, no hazardous material site with potential risk was found within one-half mile from this site. There was one hazardous material site was located just outside of the one-half mile radius.
Addison Transit Center Station: This proposed station without additional parking lot is located between Addison Road and Quorum Drive adjacent to the existing transit center. The proposed station would be built within the Cotton Belt Corridor (DART right-of-way property). No environmental issue was observed during site visit. Also, based on the EDR regulatory database search, no hazardous material site with potential risk was found within one-half mile from this site.

Knoll Trail Station: This proposed station without parking lot is located just east of Knoll Trail Drive. The proposed station would be built within the Cotton Belt Corridor. During site visit, dark stained rocks were found on the railroad track. Also, based on the EDR regulatory database search, one hazardous material site and one orphan site (ORC-1 St John’s Cleaners) were found within one-half mile from this station. However, these sites are expected to have a low potential to impact the Cotton Belt Project.

Preston Road Station: This proposed station without parking lot is located just east of Preston Road. The proposed station would be built within Cotton Belt Corridor. No environmental issue was observed during site visit. Also, based on the EDR regulatory database search, no hazardous material site with potential risk was found within one-half mile from this site.

Renner Village Station: Both potential station options with parking are located between Dickerson Street and Coit Road. Neither site was surveyed. The east option parking lot is occupied by Adventure Landing Theme Park, but it was not accessible. Based on the EDR regulatory database search, one hazardous material site was found on the proposed west Renner Village Station parking lot. Contaminated soil from a Leaking Petroleum Storage Tank (LPST) site was documented at the site. However, the final concurrence was issued and case has been closed. No other Hazmat site with potential risk was found within one-half mile from this proposed station area.

UTD/Synergy Park Station: This proposed station with parking is located on the northwest corner of the existing DART track and the KCS railroad track. The proposed station site was surveyed during site visit. No environmental impacts related to hazardous materials were found on proposed parking areas. Also, based on the EDR regulatory database search, no hazardous material site with potential risk was found within one-half mile from this site.

Bush Turnpike Station: This is an existing station for DART Red Line transit. This station would be constructed if the Red Line Interface South Alternate route is selected. This existing DART Red Line station site was surveyed during the site visit. No environmental impacts related to hazardous materials were found on the station area site. Also, based on the EDR regulatory database search, no hazardous material site with potential risk was found within one-half mile from this site.

12th Street Station Complex: This proposed station complex with parking is located on northeast corner of the Cotton Belt Corridor and DART LRT track. The 12th Street Station Complex has two Cotton Belt Project platform options: An at-grade platform option associated with the Red Line Interface North Alternative and an aerial platform option with depressed freight tracks associated with the Red Line Interface South Alternative. The parking for both options occupies the same general footprint. Both proposed station platforms were surveyed during site visit and no environmental impacts related to hazardous materials were found. However, currently, the
proposed parking lot is occupied by a pawn shop, Caliber Collision Center and Reed Fence and Deck Company and was not surveyed. Based on the EDR regulatory database search, one potential hazardous material site was found within one-half mile from this site which is located at the corner of 10th Street and Cotton Belt Corridor. This site soil is contaminated with VOCs, chlorinated solvents, and metals.

Shiloh Road Station: This proposed station with parking is located on the southwest corner of the existing DART LRT right-of-way and Shiloh Road. The proposed station and parking lot area was surveyed during site visit. No environmental impacts related to hazardous materials were found on the proposed parking areas. However, there is a power station north of the proposed station parking lot and south of the existing rail alignment. Based on the EDR regulatory database search, no hazardous material site with potential risk was found within one-half mile from this site.

Impact Assessment
Based on the current alignment, it appears that none of the identified high or medium risk sites are within the construction area where subsurface soil would be disturbed during the construction activities. However, if current alignment changes, then further evaluation of the sites may be required to determine the Hazmat risk.

In the Red Line Interface North Alternative, there may be a potential for a hazardous material risk area near the US 75 intersection if subsurface soil is disturbed during construction activities. There are two hazardous material sites on either side of the US 75 which are in medium risk category. Further detail is provided in Hazardous Materials Technical Memorandum (Map ID 42 and 48) in Appendix A. Map ID 42 site, located at 810 North Central Express Parkway, is a dry cleaning facility and the site soil is contaminated with chlorinated solvents. Map ID 48 is a LPST site located at 625 North Central Express Parkway and the site groundwater is contaminated. There is a potential for the hazardous material risk since the proposed new structure would involve subsurface soil disturbance for pier construction. It should be noted that TxDOT is planning on widening US 75. Subsurface soil disturbance by TxDOT would likely precede Cotton Belt construction.

From the site reconnaissance conducted on November 13, 21, 29, and December 3, 2012, no significant environmental impact related to hazardous materials was observed along the 26-mile Cotton Belt Corridor, or adjacent properties. However, a few spills and stains were observed on the track as well as household trash on properties adjacent to the Cotton Belt Corridor.

Mitigation Options
DART has established an on-going due diligence policy and program to assess the environmental condition of all properties contemplated for purchase as right-of-way or transit facilities. DART would conduct a separate Phase I Environmental Site Assessment (ESA) of each parcel or site under consideration for purchase in order to assess its specific probability for contamination. A Phase II ESA may also be undertaken to identify and quantify hazardous/regulated materials so the resulting need for cleanup or mitigation can be factored by Real Estate. All acquired property with structures will be surveyed for the presence of asbestos-contaminated materials (ACM). The results of these surveys will determine whether or not additional impacts exist due
to the presence of these hazardous/regulated materials. If the presence of these materials is confirmed during the survey, mitigation measures will be initiated as part of demolition and construction activities.

From database evaluation and site reconnaissance the following recommendations are proposed.

- Stained soil present on the Cotton Belt Corridor right-of-way should be tested for contamination and should be properly removed, if contaminants are identified
- If surface and sub-surface soils are disturbed during pillar construction, tunneling or during trenching at below the grade level track near the contaminated sites, the soil and groundwater should be tested for potential contamination
- Contractors should be prepared to encounter potentially hazardous conditions when working in proximity to high or medium risk sites and should have proper equipment available to protect their workers and the environment if hazardous materials are encountered

Selection of the Red Line Interface South Alternative or either MOS would avoid potential hazardous material risk near the US 75 intersection with the Cotton Belt Corridor.

**3.17 Utilities and Electric and Magnetic Fields**

This section discusses the existing utilities within the corridor and addresses potential utility relocations that would result from the proposed project. A more detailed discussion of existing utilities and proposed utility modifications is available in the *Final Preliminary Engineering 5% Design Report* in Appendix D. Due to the presence of transmission lines and substations along the corridor, and in particular the proximity of the Shiloh Station to an Oncor Electric substation, this section also describes electric and magnetic fields (EMF) and the potential health effects from EMFs.

**Methodology**

This section utilizes the utility modification information detailed in the *Final Preliminary Engineering 5% Design Report* in Appendix D, which relied on three main data sources:

- Existing utility composite drawings
  - The drawings were prepared for the 5% submittal using record drawings and GIS data obtained from the City of Coppell, City of Grapevine, DFW Airport, Explorer Pipeline Company, Atmos Energy, Chesapeake Energy, Verizon, Time Warner Cable, Oncor Electric, Sprint, Qwest Communications and other identified utility owners
- DART documentation of utility license agreements
  - These agreements have been executed with utility owners for the use of the Cotton Belt Corridor right-of-way for utility location and construction purposes. The consultant team has coordinated with DART personnel and has received a list of known license agreements associated with utilities that affect the project corridor.
- The Subsurface Utility Engineering (SUE) investigation performed as part of DART’s General Engineering Consultant (GEC)-III Contract No. C-1013219
  - The limits of the SUE investigation extend from downtown Fort Worth near Northeast 28th Street to IH 35E in the City of Carrollton. The SUE investigation
was documented on a set of drawings titled “Cotton Belt Composite Utilities, Mile Post 603.50 to 632.27, Contract No. C-1013219” created by Gorrono and Associates and dated December 27, 2010. The SUE investigation includes up to Quality Level B utility location services and determined approximate horizontal and vertical position of some of the underground utilities within the corridor.

Existing Conditions
A preliminary existing utility crossing list for Sections CB-1, CB-2, and CB-3 has been included in Appendix A of the Final Preliminary Engineering 5% Cotton Belt Design Report, contained in Appendix D.

Impact Assessment
Section CB-1
The most significant utility crossings and/or possible utility modifications that may be required for the design and construction of the Cotton Belt Project in Section CB-1 include:

- Oncor 138 KV overhead (OH) electric transmission lines running longitudinally along the southern half of the right-of-way between Stations 1163+81 and 1265+20
- An Explorer 12.75-inch petroleum line running longitudinally along the northern half of the Cotton Belt Corridor from Station 1130+38 to the end of line section CB-1 and crossing the existing tracks twice near Stations 1384+49 and 1385+20
- Sprint fiber optic and Qwest fiber optic lines running longitudinally along a meandering path for the entire length of section CB-1
- Chesapeake pipeline crossings, 12-inch gas line and 10-inch saltwater line, at approximately Station 1025+00
- Chesapeake gas valve station at approximately Station 1025+00

Section CB-2
The most noteworthy utility crossings and/or possible utility modifications that may be required for the design and construction of the Cotton Belt Project in Section CB-2 include:

- An Explorer 12.75-inch petroleum pipeline running longitudinally along the Cotton Belt Corridor throughout Section 2 and crossing the existing and proposed rail lines at various locations
- Qwest, Sprint and Verizon fiber optic lines running longitudinally along meandering paths throughout the Cotton Belt Corridor for the entire length of Section CB-2

Section CB-3
There are several noteworthy utility crossings and/or possible utility modifications that may be required for the design and construction of the Cotton Belt Regional Rail in Section CB-3 include:

- An Explorer 12.75-inch petroleum pipeline running longitudinally along the Cotton Belt Corridor throughout most of Section CB-3 and crossing the existing and proposed rail lines at various locations
- Qwest, Sprint and Verizon fiber optic lines running longitudinally along meandering paths throughout the Cotton Belt Corridor for the entire length of Section CB-3
- Most utilities located in the area of the proposed Trench Profile Option beginning west of Preston Road and terminate near Coit Road between Stations 3065+00 and 3216+00 in the Final Preliminary Engineering 5% Design Plan Set in Appendix D.
Under the Trench Profile Option, approximately 36 utility crossings were identified. Of those, approximately 20 would require adjustment as part of the Trench Profile Option. For additional information on the utilities previously referenced see Section 6 of the *Final Preliminary Engineering 5% Design Report* in Appendix D.

**Mitigation Options**

**Utility Modifications**

Efforts would be made during construction to minimize disruptions in utility service. Potential mitigation measures include:

- Plan and schedule construction activities to minimize any utility service interruptions
- Prior to construction, area utility companies would be contacted to provide line location and approval of any alteration of utility lines
- Businesses and residences would be notified prior to any planned utility service interruptions
- Down periods for businesses would occur during non-business hours and would not exceed 24 hours
- Businesses, such as restaurants, grocery stores, or food preparation/manufacturing facilities would be accommodated in order to protect food preparation and storage mechanisms
- If any previously unidentified utilities are discovered during construction, all work in the area around the utility would stop until the appropriate utility companies and agencies are notified

**Electric and Magnetic Fields**

EMF is invisible—just like radio and TV signals. They surround any wire that is conducting electricity. For example, the distribution power line serving a neighborhood produces EMF. So do household appliances such a toaster, hair dryer, lamps, and washing machine. In addition, business equipment, such as computers, copiers and fluorescent lights, produce EMF. The potential of health effects from EMF is a controversial scientific subject. After 30 years of research there is no conclusive evidence of harmful effects. Epidemiological and toxicological studies have shown no statistically significant association or weak associations between EMF exposure and health risks. The possible impact of EMF exposure to human health has also been investigated by public health professionals for the past several decades. While the general consensus is that electric fields pose no human risk, the question of whether exposure to magnetic fields can cause biological responses or health effects continues to be debated and research continues.

The term electromagnetic refers to electric and magnetic fields that are coupled together such as in high frequency radiating fields. For the lower frequencies associated with power lines, EMF should be separated into electric fields and magnetic fields, which arise from the flow of electricity and the voltage of a power line. Electric fields are measured in kilovolts per meter (kV/m) and magnetic fields are measured in milliGauss (mG). A milliGauss is one-thousandth of a Gauss. The intensity of the electric field is proportional to the voltage of the transmission line, while the intensity of the magnetic field is proportional to the current flow through the conductors. Transmission lines operate at a power frequency of 60 hertz (cycles per second).
There is no federal standard for transmission line electric fields. Considerable research has been conducted over the past three decades to determine if exposed to power-frequency (60 hertz) magnetic fields causes biological response and health effects. Most of the research conducted on the potential health effects of EMF from power facilities has focused on transmission and distribution lines rather than substations. According to the National Institutes of Environmental Health Sciences (NIEHS), a federal research institute, most of the EMF that comes from a substation is produced by these lines, rather than the equipment at the substation itself. Beyond the substation fence, the EMF produced by the transformers and other substation equipment is typically indistinguishable from the EMF levels that would be experienced if the equipment was not there.

**Electric Fields**

The vast majority of research conducted on the potential health effects of power facilities has focused on magnetic, rather than electric, fields that the facilities produce. There appears to be a consensus that the electric fields do not pose a health threat because buildings, vegetation and other objects block the fields.

**Magnetic Fields**

Magnetic fields are produced by the earth itself, household appliances, and residential wiring, as well as power facilities. Unlike electric fields, magnetics fields cannot easily be shielded, and therefore, will penetrate structures. The estimated average 24-hour exposure for a typical person in the US is less than about 2 mG; however, exposures vary widely (NIEHS 2002, pp. 30-31). Exposure to magnetic fields can vary dramatically by location. Fields produced by overhead transmissions and distribution lines fall off sharply with distance from the line. For example, if a utility worker is up near a distribution line, the magnetic field is about 50 mG, and worker below the line is in a magnetic field of about 4 mG; while a passerby at 80 feet away would be in a magnetic field of approximately 1 mG. **Table 3-16** lists examples of exposure for a typical person.

<table>
<thead>
<tr>
<th></th>
<th>Magnetic field 6 inches from appliance (mG)</th>
<th>Magnetic field 2 feet away (mG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum cleaner</td>
<td>300</td>
<td>10</td>
</tr>
<tr>
<td>Hair dryer</td>
<td>300</td>
<td>--</td>
</tr>
<tr>
<td>Microwave oven</td>
<td>200</td>
<td>10</td>
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<tr>
<td>Electric shaver</td>
<td>100</td>
<td>--</td>
</tr>
<tr>
<td>Copy machines</td>
<td>90</td>
<td>7</td>
</tr>
<tr>
<td>Garbage disposals</td>
<td>80</td>
<td>2</td>
</tr>
<tr>
<td>Fluorescent lights</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>Dishwasher</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>Computers</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Electric oven</td>
<td>9</td>
<td>--</td>
</tr>
</tbody>
</table>

*Source: National Institute of Environmental Services/National Institutes of Health: EMF Associated with the Use of Electric Power*
Potential Impacts of EMF on Implantable Medical Devices

Two such devices, pacemakers and implantable cardioverter defibrillators (ICDs), have been associated with problems arising from interference caused by EMF. This is called electromagnetic interference or EMI. Manufacturers’ recommended threshold for modulated magnetic fields is 1 Gauss which is 5 to 10 times greater than the magnetic field likely to be produced by a high-voltage transmission line. Research shows a wide range of responses for the threshold at which ICDs and pacemakers responded to an external EMI source. The results for each unit depended on the make and model of the device, the patient height, build, and physical orientation with respect to the electric field. Some of the devices that the American Heart Association reports may interfere with pacemakers are: anti-theft systems, metal detectors for security, cell phones, MP3 player headphones, magnetic resonance imagery and power-generating equipment. The American Heart Association recommends consulting with one’s physician about exposure to these devices (American Heart Association, 2011).

The FTA’s Guidance on the Prevention and Mitigation of Environmental, Health and Safety Impacts of Electromagnetic Fields and Radiation for Electric Transit Systems recommends that transit authorities, as a precaution, should post Caution or Warning signs in depots, maintenance yards, control centers, and near traction power substations.
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4 TRANSPORTATION EFFECTS

The Cotton Belt Project has the potential to have far reaching impacts on the transportation network. It is a corridor that parallels three primary east-west freeways (IH 635, SH 161 and SH 121), creates a new east-west transit corridor that connects with existing and planned transit lines. Several major activities centers are located along the corridor. This section describes what is currently understood about the impacts of the facility.

Existing Transportation Infrastructure

The proposed 26-mile Cotton Belt Project extends from DFW Airport to Shiloh Road in Plano. The existing Cotton Belt Corridor traverses the area in a generally at-grade configuration. Major Freeways crossing the alignment are grades separated. These included SH 121, IH 635, PGBT (Twice), IH 35E, Dallas North Tollway, and US 75. Additionally, the Cotton Belt Project is grade separated from DART’s Green Line and Red Line and the KCS Railway. As detailed in the Traffic Analysis Technical Memorandum in Appendix B, there are currently 50 at-grade roadway crossings for the Cotton Belt Project.

There are two at-grade railway crossings in downtown Carrollton and a grade separated rail crossing in Richardson. Mercer yard, in downtown Carrollton, is local hub for the rail freight that serves switching operations and train storage.

Transit facilities along the proposed project include the Downtown Carrollton Green Line Station, the Addison Transit Center, and The Bush Turnpike Red Line Station. The Orange Line DFW Station will open in December 2014 and the T’s TEX Rail Project is scheduled to open the DFW Station and the DFW North Station 2017.

Dedicated non-motorized (bicycle and pedestrian) facilities exist at several locations along the Cotton Belt Corridor.

4.1 Grade Crossing Analysis

A grade crossing analysis was conducted to determine the impact of implementing regional rail in the Cotton Belt Corridor. Both roadways and railway grade crossings were examined.

Roadways

Grade crossing analysis for roadways was based on future-year average daily traffic (ADT) volumes and the number of lanes that cross each at-grade crossing. The results of the roadway grade crossing analysis indicated the Cotton Belt Project would have a slight impact on traffic operations at all but seven of the 50 crossings. For further information please see Traffic Analysis Technical Memorandum included in Appendix B. Most locations can continue to operate as at-grade crossings with only minimal, short-term, localized impacts to roadway level of service (LOS) and queuing at crossings and adjacent intersections. Results show that implementing signal timing and railroad preemption would provide acceptable operations and reduced queuing at two of the seven roadways: Alma Road and Addison Road.
Based upon the grade crossing analysis and in accordance with DART’s Grade Separation Policy, a grade separation is recommended at four locations: Denton Tap Road, Midway Road, Coit Road, and East Plano Parkway/US 75 Northbound and Southbound Frontage Roads.

At the Luna Road crossing in Carrollton, the operational analysis suggests that a grade separation is needed; however, physical constraints related to the proximity of PGBT prevent construction of a grade separation at this location.

**Railways**

There are two at-grade railway crossings in downtown Carrollton. The UP tracks running north-south have limited traffic and can be maintained as an at-grade crossing. The Madill Subdivision (BNSF) has a significant amount of traffic with some trains as long as 8,000 feet. This at-grade crossing would impact transit operations and a grade separation is recommended.

### 4.2 Station Area Impacts

The primary impacts of the Cotton Belt Project would be locally generated at or near station locations. There are eleven potential stations for the Cotton Belt Project. The Renner Village Station has two location options. The DFW Terminal B Station is being cleared through a separate the TEX Rail environmental document. A summary of these station characteristics, including platform types, access characteristics and available parking, is provided in Table 4-1.

Stations that would require new parking facilities include DFW North (shared with TEX Rail) North Lake, Downtown Carrollton, Renner Village (East Option), Renner Village (West Option), UTD/Synergy, 12th Street Complex and Shiloh Road.

Based on the findings, it is anticipated that the proposed Cotton Belt Project would slightly impact transportation conditions and traffic operations in the vicinity of the potential station locations. However, the additional traffic volumes generated by each station during the AM and PM peak hours are not expected to substantially impact traffic flow or require additional capacity on the adjacent street network. Some ingress and egress impacts at two station sites (Renner Village Station East Option and UTD/Synergy Station) are anticipated.

Most of the stations would require infrastructure improvements to provide access. Station Site Plans are provide in the *Final Preliminary Engineering 5% Design Plan Set* in Appendix D. Major infrastructure improvements are detailed in Section 4.3 below. More information about the impacts on traffic is included in the *Traffic Analysis Technical Memorandum* included in Appendix B. Impacts are covered in Section 3.
Table 4-1: Summary of Station Characteristics

<table>
<thead>
<tr>
<th>Station</th>
<th>City</th>
<th>Bus Bays</th>
<th>Parking Facility</th>
<th>Number of New Parking Spaces</th>
<th>Vehicular Access Points</th>
<th>Major Transit Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFW Terminal B</td>
<td>Grapevine</td>
<td>No</td>
<td>No</td>
<td>n/a</td>
<td>1</td>
<td>TEX Rail, Orange Line</td>
</tr>
<tr>
<td>DFW North</td>
<td>Grapevine</td>
<td>4</td>
<td>Yes</td>
<td>Shared w/ TEX Rail</td>
<td>1</td>
<td>TEX Rail</td>
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<td>North Lake</td>
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<td>4</td>
<td>Yes</td>
<td>170</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Downtown Carrollton</td>
<td>Carrollton</td>
<td>Existing</td>
<td>Yes</td>
<td>231</td>
<td>2</td>
<td>Green Line, DCTA</td>
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<tr>
<td>Addison</td>
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<td>Existing</td>
<td>Existing</td>
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<td>Addison TC</td>
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<tr>
<td>Knoll Trail Drive</td>
<td>Dallas</td>
<td>No</td>
<td>No</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Preston Road</td>
<td>Dallas</td>
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<td>No</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Renner Village (East Option)</td>
<td>Dallas</td>
<td>5</td>
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<td>197</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Renner Village (West Option)</td>
<td>Dallas</td>
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</tr>
<tr>
<td>UTD/Synergy</td>
<td>Richardson</td>
<td>6</td>
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<td>1</td>
<td>Red Line</td>
</tr>
<tr>
<td>Bush Turnpike</td>
<td>Richardson</td>
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<td>Existing</td>
<td>Existing</td>
<td>Existing</td>
<td>Red Line</td>
</tr>
<tr>
<td>12th Street</td>
<td>Plano</td>
<td>3</td>
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<td>196</td>
<td>4</td>
<td>Red Line</td>
</tr>
<tr>
<td>Shiloh Road</td>
<td>Plano</td>
<td>2</td>
<td>Yes</td>
<td>702</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Source: URS, 2012

4.3 Proposed Roadway and Railway Modifications

As detailed in the Final Preliminary Engineering 5% Design Plan Set in Appendix D, several modifications to the existing conditions are proposed for the Cotton Belt Project. These changes are a result of the grade crossing analysis, the station design process, station area traffic analysis, freight railroad coordination and coordination with the various cities along the corridor.

Base Alternative

In the Base Alternative four new roadway grade separations are proposed to mitigate traffic impacts. The proposed project would be grade separated over Denton Tap Road, Midway Road, and East Plano Parkway/US 75 North and Southbound Frontage Roads. At Coit Road the proposed project would be slightly depressed and the roadway would be elevated over the rail line.

In downtown Carrollton, the TxDOT IH 35E reconstruction project will modify the existing conditions. Belt Line Road and the two freeway frontage roads will be elevated over the Cotton Belt Corridor and Madill Subdivision. As part of the Cotton Belt Project the at-grade crossing of the Cotton Belt Corridor and the Madill Subdivision would be eliminated. This rail intersection would be reconfigured to move the crossing approximately 1,800 feet to the east where the proposed project would be elevated over the Madill Subdivision.

In North Dallas there is currently no rail activity. New rail and crossing infrastructure would be installed as part of the base alternative.
In order to maintain through traffic and provide access to the 12th Street Station in Plano, several roadway modifications would be required. These changes include realignment and modifications to portions of 12th Street, K Avenue, 12th Place, J Place and J Avenue.

**Cypress Waters Alternatives**

In addition to diverting from the current Cotton Belt Corridor, the two Cypress Waters alternatives would grade separate the rail over Denton Tap Road and require a rerouting of Belt Line Road between Moore Road extending west to connect with Wrangle Drive at Denton Tap Road. This would require the construction of a new intersection of rerouted Belt Line Road and old Belt Line/Southwestern Boulevard. Belt Line Rerouting Plans are shown in *Supplemental Plans and Graphics* in Appendix D. The Cypress Waters Alternatives would add two new at-grade roadway crossings of the diverted rail line. The rail would cross old Belt Line/Southwestern near the North Lake Station and would also cross Southwestern Boulevard as the rail spurrs off of the original alignment near Coppell Road.

As shown in *Supplemental Plans and Graphics* in Appendix D, the Cypress Waters Southwestern Boulevard Alternative would occupy the median of old Belt Line Road and Southwestern Boulevard both east and west of Denton Tap Road. West of Denton Tap, this alternative would occupy the median in front of W. W. Pinkerton Elementary School. Under this concept driveways at W. W. Pinkerton Elementary School and for other properties along Southwestern Boulevard would be restricted to right turn-in and right turn-out. To facilitate travel in both directions, U-turn lanes would be placed near Denton Tap Road under the aerial structure and at-grade near Coppell Road. This concept created a concern for the City of Coppell. Preliminary traffic analysis, based on existing and projected traffic volumes, indicates that traffic along Southwestern Boulevard would flow freely most of the day. However, other factors help to create a traffic congestion problem at the school.

A large proportion of the traffic along Southwestern Boulevard is school generated traffic related to parents dropping off and picking up their children. The school facility does not have adequate onsite roadway infrastructure to accommodate the volume of traffic generate by this activity. This traffic is concentrated in a short period of time before and after school. The arrival and departure of school staff and buses add to the concentrated traffic volumes. Onsite congestion leads to on-street queueing and bottlenecks, inhibiting the free flow of traffic on Southwestern Boulevard. The concern is that the presence of the transit infrastructure and the aforementioned U-turn concept would further exasperate this problem, further limit access and create a safety issue for children and automobiles. Because of this concern, DART developed an avoidance alternative which moves the rail alignment further south, out off the street right-of-way. With the Cypress Waters South Alternative, the proposed project would no longer exasperate the school related congestion problem on Southwestern Boulevard.

The grade separation of Denton Tap Road in the Cypress Waters South Alternative would necessitate the closing of Sanders Loop intersection with old Belt Line Road. Sanders Loop would still be accessible from Denton Tap Road.
North Dallas Profile Options
In addition to the at-grade base alternative, there are two below grade profile options within the existing Cotton Belt Corridor in North Dallas. Although projected traffic volumes do not meet the warrants of providing grade separations, both the Trench and the Tunnel Profile Options would eliminate the at-grade crossing of six roadways: Davenport Road (twice), Campbell Road, Hillcrest Road, McCallum Boulevard and Meandering Way.

The Trench Profile Option would require rebuilding portions of each of these roadways to elevate them over the Cotton Belt Corridor. As depicted in the Final Preliminary Engineering 5% Design Plan Set in Appendix D, this would also require modifications to nearby street intersections, alleys and driveways.

With the Tunnel Profile, the existing rail and crossing infrastructure could be removed.

Red Line Interface North Alternative
In addition to diverting from the main Cotton Belt Corridor, the Red Line Interface South Alternative crosses the floodplain of Spring Creek and US 75 on an aerial structure, and provides regional rail station adjacent to the Bush Turnpike LRT Station. Upon returning to the Cotton Belt Corridor right-of-way, the proposed rail alignment ascends on aerial structure to an aerial 12th Street Station platform. In this area, the existing freight track would be depressed between 10th Street and N Avenue. K Avenue and Municipal Avenue would be reconstructed to cross the depressed freight track at grade. Modifications to portions of 12th Street, 12th Place, J Place and J Avenue would also be required.

4.4 Traffic Mitigation
The Cotton Belt Project would operate within exclusive right-of-way and the moving train would always take precedence over automobile traffic at grade crossings through the use of priority signals and warning devices. All at-grade crossings would have active warning devices, train signals and gates that are activated by approaching trains.

As described in DART’s Environmental Impact Assessment and Mitigation Guidelines for Transit Projects, there are several techniques that can be employed to mitigate traffic impacts. The following are common mitigation techniques:

- Improvements of traffic signing and pavement markings
- Modification of existing traffic signals
- Coordination of signal timing between intersections
- New traffic signals
- Turn lane improvements
- Intersection improvements
- Access relocations
- Grade Separations

Proposed Base Alternative Mitigation
- Grade separation is recommended at four locations: Denton Tap Road, Midway Road, Coit Road, and East Plano Parkway/US 75 Northbound and Southbound Frontage Roads
• Reconfigure rail crossing in downtown Carrollton to elevate the Cotton Belt Project over the Madill Subdivision
• Modify streets at 12th Street Station Complex to maintain through traffic and provide station access
• Limit access to right-in/right-out or three quarter access, right-in/right-out and left-in at the Renner Village Station (East Option)
• Limit access to right-in/right-out or three quarter access, right-in/right-out and left-in at the UTD/Synergy Station

As detailed above a grade separation of Luna Road is warranted, but physical constraints related to the proximity of the PGBT prevent construction of a grade separation at this location. DART would work with the City of Carrollton to develop alternative mitigation to this traffic impact.

Proposed Cypress Waters Alternative Mitigation
• Grade separation is recommended at Denton Tap Road
• Reroute Belt Line Road

Cypress Waters Southwestern Boulevard Alternative
• Limit access to right-in/right-out at properties along Southwestern Boulevard west of Denton Tap Road
• Provide U-turn lanes on Southwestern Boulevard to facilitate bi-directional travel
• Size U-turn lane to accommodate trucks and buses.

Cypress Waters South Alternative
• Shift alignment south out of Southwestern Boulevard to avoid traffic impacts to W.W. Pinkerton Elementary School
• Place cul-de-sac at Sanders Loop Street Closure

Proposed North Dallas Trench Profile Option Mitigation
• Rebuild Davenport Road (twice), Campbell Road, Hillcrest Road, McCallum Boulevard and Meandering Way plus nearby street intersections, alleys and driveways to facilitate local access. These six streets would be elevated over the trench.

Proposed South Alternative Mitigation
• Provide new aerial structure over US 75 and Spring Creek
• Elevate station over K Avenue and Municipal Avenue to avoid rerouting streets and related impacts
• Depress crossing of freight track with K Avenue and Municipal Avenue

Potential Avoidance Alternatives
• The Cypress Waters South Alternative has been advanced as an Avoidance Alternative to the Southwestern Boulevard Alternative (this would avoid traffic impacts to on Southwestern Boulevard at W. W. Pinkerton Elementary School)
• Selection of the Trench or Tunnel Profile Options would avoid six at-grade Street Crossings
• Selection of MOS 1 would avoid all but nine street crossings
• Selection of MOS 2 would avoid half of the street crossings

4.5 Public Transportation

The Cotton Belt Project would provide an important link within the transit network. It would facilitate east-west transit travel that is currently provided by bus on many congested roadways and creates reduced travel time between the DFW Airport and the Northeast Dallas/Richardson/Plano area. The proposed project would connect at the DART Red Line in Richardson and/or Plano at the Bush Turnpike Station and/or Downtown Plano. It would also connect with the DART Green Line in Downtown Carrollton and the Orange Line at DFW Airport. There are 17 DART Bus Routes that would connect along the Cotton Belt Corridor many of which may be re-aligned as a result of rail implementation.

The proposed would also improve regional connections. It would connect to the TEX Rail Regional Rail project being advance by the T and could potentially connect to the DCTA A-Train in Carrollton if that were extended south from its current terminus at the DART Green Line at the Trinity Mills Station.

Existing bus routes would be modified to improve efficiency, avoid duplication and expand coverage. Modifications include improving frequencies, extending routes, and changing circulation patterns. More detailed information about the transit network affected by the Cotton Belt Project is included in the Transit Operating Plans Technical Memorandum in Appendix B.

Impacts on the public transportation system as they relate to ridership, service changes and O&M costs are outlined in Section 2.8 and 2.9.

Non-motorized circulation includes pedestrian and bicycle facilities. These facilities include sidewalks, pedestrian crossing, pedestrian signal, trails, way finding, trails and bike routes. Dedicated non-motorized (bicycle and pedestrian) facilities exist at several locations along the Cotton Belt Corridor. Municipalities with existing or planned facilities include Addison, Carrollton, Coppell, Dallas, Grapevine, Plano, and Richardson. The following describes these facilities.

Regional Veloweb

The NCTCOG has plans for the development of a regional non-motorized facility known as the Regional Veloweb. The Regional Veloweb is a 644-mile designated off-street trail network planned to provide non-motorized connections throughout the Dallas-Fort Worth Region. Figure 4-1 displays the location of existing and planned Regional Veloweb facilities within proximity to the Cotton Belt Corridor.
Several segments of the planned Regional Veloweb will exist along active freight rail corridors, including the Cotton Belt Corridor. In fact, the planned off-street trail network follows almost the entire Cotton Belt rail alignment. The Veloweb alignment, originally develop as part of the Mobility 2010 Plan, was determined through the cooperative efforts of local governments and NCTCOG staff by:

- Identifying existing and funded trails
- Reviewing locally planned bicycle and pedestrian facilities
- Locating routes that would provide air quality benefits or access to transit stations
- Identifying an alignment that would offer the greatest potential for regional connectivity

Several municipalities within the study area also have planned expansions to their local bicycle and pedestrian trail systems. Plano has committed to approximately 15 miles of additional on-street bicycle lanes within the city limits. Dallas, Grapevine, Plano, and Richardson have identified 15 total additional miles of off-street non-motorized facilities. The following provides additional details regarding local non-motorized improvements and their proximity to the Cotton Belt Corridor.

In addition to the planned trail along the corridor, there are several existing trails along the corridor including:

- Grapevine Trails generally fall just beyond the immediate vicinity of the Cotton Belt Corridor. The proposed Cotton Belt Trail would end just east of Texan Trail and would eventually connect with the TEX Rail corridor project.
- The Green Trail, recommended in the City of Carrollton Trails Master Plan (2006), parallels the BNSF rail corridor heading northeast from the Green Line station and
proposed station area for Cotton Belt Project. A future connecting unnamed bike and pedestrian trail is planned to follow along Crosby Road from Josey Lane to the Green Line, then head north generally paralleling the Green Line alignment.

- The Preston Ridge Trail, a North Dallas Neighborhood trail, is a major north-south multi-use facility primarily along Meandering Way that extends from just south of Belt Line Road (near Coit Road) north to the PGBT. The trail intersects the Cotton Belt Corridor just north of MacCallum Boulevard.
- The Renner Trail is an existing multi-use trail that extends from the UUTD (University Trail) to US 75. A planned trail crossing at US 75 would allow Renner Road to connect to the existing Spring Creek Trail.
- The US 75/PGBT Hike and Bike Trail is a recently completed project that parallels the Cotton Belt Corridor near Alma Road.

The proposed project would connect and provide access to these trails. Design plans have been adjusted to minimize impacts to trail connectivity and to enhance access from the proposed station locations. More detailed information about these trails is provided in the Traffic Analysis Technical Memorandum in Appendix B.

DART has several policies and programs that promote and encourage non-motorized circulation as part of the total transit experience. Pedestrian access is a priority in the design of DART rail stations. DART works with the community to integrate the station into the surrounding neighborhood and its pedestrian environment. Based on DART’s Bike and Ride Policy, DART’s Station Access Program allows bikes to be brought on trains and buses. It also provides for bicycle racks and lids to be placed at rail stations. DART’s Hike and Bike Trail Use Policy allows DART-owned rights-of-way to be made available for hike and bike uses. DART’s upcoming Transit System Planning effort will incorporate each of these elements into a long range plan that focuses on station access.

### 4.6 Freight

Freight movements through and across the Cotton Belt Corridor are primarily accommodated by the existing roadway and railroad network. There are several freight-oriented facilities located along, or in proximity to, the Cotton Belt Corridor. This includes four industrial parks; 133 warehouses, 27 distribution centers, 31 manufacturing centers, and one terminal. These freight facilities are concentrated in three main areas of the corridor: near DFW Airport; south of downtown Carrollton; and east of the DART Red Line. Figure 4-2 displays the location of freight related activities in relation to the Cotton Belt Corridor.

**Existing Conditions: Trucking**

DFW Airport is the primary commercial service airport located within proximity to the Cotton Belt Corridor. DFW Airport is located just south, and at the western terminus, of the Cotton Belt Project. In addition to commercial airline service, DFW Airport handles a majority of air cargo service into the DFW region. Most of the Cargo areas around DFW Airport are accessed via major freeways. There is some truck traffic on two roads crossing the Cotton Belt Corridor: Royal Lane and Freeport Parkway.
Additional freight warehousing/trucking activity occurs in Carrollton in an area bound by the rail corridor to the north, Belt Line Road to the south, Josey Lane to the west, and Marsh Lane to the east. Belt Line Road provides direct east-west access to/from IH 35E which is located approximately three miles to the west in downtown Carrollton. As noted above, downtown Carrollton is crisscrossed by railroad tracks. All trucks serving this Carrollton area from IH 35E must currently cross some tracks. Southbound trucks exiting IH 35E at Belt Line Road must currently cross the Cotton Belt Corridor.

Warehousing/trucking facilities are also present in the Plano area. Just south of the Cotton Belt Corridor, along Plano Parkway, are several freight-related operations. Plano Parkway is a designated truck route that provides direct east-west access to/from US 75. US 75 is located approximately three miles west of the site. Plano Parkway currently crosses the Cotton Belt Corridor at US 75. Access to the PGBT is available approximately three miles to the south via Shiloh Road.
Existing Conditions: Rail
Local freight rail service is provided by short line and regional carriers. As passenger regional rail service is developed in the Cotton Belt Corridor, consideration of local freight service is essential.

Freight operates on the Cotton Belt Corridor except for the area between the Dallas North Tollway and the KCS Crossing (Renner Junction), where freight rail operations have been abandoned. There are approximately 18 freight-rail train trips per week within the Cotton Belt Corridor and additional activity on intersection rail lines. Four freight railroad companies operate within the corridor, through agreements, on DART-owned tracks. Various agreements control the freight service activities within the Cotton Belt Corridor. The UP Railroad has track usage rights on the entire corridor but operates no trains. The FWWR provides local freight service west of downtown Carrollton. The DGNO provides local freight service from UP in downtown Carrollton east to Addison. The KCS provides local freight service from Renner Junction east into Plano. The DGNO also operate Mercer Yard in downtown Carrollton. Mercer Yard is local hub for the DGNO that serves switching operations and train storage.

Two freight line cross the Cotton Belt Corridor in downtown Carrollton. The Burlington Northern Santa Fe (BNSF) Railway or Madill Subdivision intersects the Cotton Belt Corridor at-grade. This Corridor has significant freight service with train lengths as great as 8,000 feet. UP rail Corridor also crosses the Cotton Belt Corridor at-grade. This corridor has very limited freight service.

Freight Coordination
Meetings were held with the freight railroads between November 2010 and April 2012 to introduce each carrier’s representatives to the Cotton Belt Project. The meetings were arranged to obtain information regarding the freight operations on each line segment to be used as input to the continued preliminary engineering design work. The railroads were provided the opportunity to voice concerns relevant to their specific operating conditions. More detail about these coordination efforts are included in the Freight Railroad Coordination Proceedings Technical Memorandum contained in Appendix B. Highlights of the coordination include:

- The FWWR and the DGNO were primarily concerned with continued access to their customer base on the corridor. The possibility to remove certain unused customer sidings adjacent to or near the alignment was discussed in order to simplify the regional rail line engineering process.
- The BNSF Railway main track would require relocation to eliminate the at-grade crossing with the Cotton Belt Corridor in downtown Carrollton.
- The co-existence of freight and passenger operations is of primary concern to the KCS. KCS plans to increase traffic on the line in the future.
- The US 75 road widening project in Plano has direct bearing on the Red Line Interface North Alternative preliminary design and KCS operations.

Potential Freight Impacts
In general the impacts to trucking would be the same impacts to traffic previously discussed. In the Red Line Interface North Alternative passenger rail would be grade separated over Plano Parkway which is a designated truck route. In the Red Line Interface South Alternative the
realigned passenger rail would add an at-grade rail crossing at Plano Parkway. With the mitigation measures listed in Section 4.4 there would be no significant impacts to trucking.

The majority of the Cotton Belt Project is designed as a double track within the existing single freight track corridor. The proposed project would operate in conjunction with continued freight rail service, except through the North Dallas area where freight has been abandoned. Regional rail service and freight service operations would coexist within various Cotton Belt Corridor segments. It is assumed one track would be dedicated for regional rail service and a shared track would be maintained for both regional rail and freight service. However, some sections may have a single track to minimize impacts if service can be accommodated within the operating plan. The design of the proposed project includes the roadway and railway modifications previously detailed in Section 4.3. In addition, most railroad bridges would be replaced with new structure and tracks, crossings and signals would be upgraded.

The addition of passenger service would increase the frequency and duration of rail traffic, which could result in impacts freight movements through and across the Cotton Belt Corridor. However; proposed modifications and upgrades could significantly reduce or eliminate these impacts.

**Freight Mitigation**
In downtown Carrollton, roadway modifications by TxDOT combined with proposed railway modifications would eliminate most conflicts between freight traffic (truck and rail) and passenger rail. The reconfiguration of the Cotton Belt Corridor existing rail alignment and Madill Subdivision would enhance switching efficiency for the DGNO at Mercer Yard.

As part of the proposed project, freight was abandoned in North Dallas. This eliminated all potential rail freight conflicts in this area.

The design of the corridor from Renner Junction to the east that designates the southern track in the Cotton Belt Corridor for passenger rail eliminates most conflicts between KCS freight operation. This allows freight to flow freely on the northernmost track. The Red Line Interface South Alternative would further segregate freight from passenger rail. The aerial 12th Street station design would provide an aerial walkway from the parking lot over the freight tracks to the rail platform.

Each freight carrier has unique operational requirements on the corridor that have accounted for in design of the future commuter service and infrastructure. Ongoing coordination with freight providers will continue as the projects develops. Temporal separation of freight and passenger rail will be considered as an additional mitigation measure.
5 AIRPORTS AND AVIATION

5.1 Federal Aviation Administration (FAA)

The proposed Cotton Belt Corridor Project would traverse DFW Airport and a small southern portion of the Addison Airport, which would require the modification of both airport layout plan (ALP). The ALP identifies all existing and future runways, runway extensions, terminal buildings, and other airport facilities and development descriptions. Pursuant to 49 USC §47107(a) (16), the FAA Administrator (under authority delegated from the Secretary of Transportation) must approve any revision or modification to an ALP that may adversely affect the safety, efficiency, or utility of the airport before the revision or modification takes effect.

During future environmental reviews, the FAA will be invited to participate as a cooperating agency for review of the environmental documents. The FAA will focus on the technical and aeronautical issues that are associated with the effects to DFW Airport and Addison Airport and determine if the environmental documents meet the standards of adequacy under the NEPA. FAA guidance on federal actions as it relates to evaluating environmental impacts can be found in FAA Order 1050.1E, Environmental Impacts: Policy and Procedures and FAA Order 5050.4B, the National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions. FAA Order 1050.1E provides FAA's environmental protocol, while Order 5050.4B provides specific instructions to support airport development projects. Order 5050.4B follows the Council on Environmental Quality's (CEQ's) NEPA implementing regulations at 40 CFR 1500 - 1508. The following sections review the anticipated conditions with regard to airport operations and environmental effects of the proposed project.

5.1.1 FAA Policy and Interim Guidance

The FAA Office of Airports (ARP) issued interim guidance, dated September 7, 2012, on land uses within a Runway Protection Zone (RPZ). The intent of the interim guidance is to clarify its policy on land uses within the RPZ. This interim guidance addresses recurrent questions about what constitutes a compatible land use and how to evaluate proposed new or modified land uses that would reside in an RPZ. Coordination with the FAA National Airport Planning and Environmental Division is required when transportation facilities such as light, heavy, freight or passenger rail are proposed within the RPZ. The new comprehensive guidance, slated for publication in 2013, will outline a comprehensive review process for existing and proposed land use within an RPZ. Although the FAA recognizes that in certain situations the airport sponsor may not fully control land within the RPZ, the FAA expects the airport sponsor to take all possible measures to protect against and remove or mitigate incompatible land uses.

The Cotton Belt Corridor lies along the southern property line of Addison Airport and is within the RPZ. Under the new FAA Interim guidance, establishing DART rail service, even within existing right-of-way, may be considered a change of land use and require coordination. This guidance will also apply for the portion of project near and within the DFW Airport as the alignment lies within the RPZ. During the next phase of environmental review, coordination will be required with the National Airport Planning and Environmental Division of FAA to document the alternatives considered for areas impacting the RPZ and identify any mitigation measures to
protect people and property on the ground. It should be noted that rail operating with the existing Cotton Belt Corridor pre-dates both airports.

5.1.2 Aeronautical Assessment
As part of the future environmental phase, an aeronautical assessment will be required due to the location of the proposed project alignment within DFW Airport and near the Addison Airport property. This report will examine potential affects, resulting impacts and mitigations strategies. Areas needing to be addressed will include:

- Airport Design standards
- Objects Affecting Navigable Airspace
- Terminal Instrument Procedures
- Area Navigation
- Significant Airport Features
- Human Factors
- Safety Risk Management

As part of the aeronautical assessment, an airspace study will be required. Airspace studies are required by the FAA when a project changes the ALP or uses construction equipment. The FAA evaluates conformance with environmental regulations and determines if the project will have an impact on air operations, navigation aids or radio transmissions. This report along with aeronautical assessment will be included in the final document after coordination with FAA.

5.1.3 Texas Department of Transportation (TxDOT)
TxDOT Aviation is responsible for assisting with federal funding for reliever and general aviation airports included in the Texas Airport System Plan. TxDOT oversees the construction activities at these airports providing rules, standards and guidelines. When the project advances to the next phase, TxDOT will be engaged to facilitate coordination with the FAA and to assist with the planning, development and construction activities at or near DFW Airport and Addison Airport.

5.2 DFW Airport
DFW Airport opened in 1974 and is currently one of the busiest airports in the world in terms of aircraft operations and passengers served. In terms of land area, DFW Airport is the second largest airport in the US, covering approximately 27 square miles, behind Denver International Airport. The airport consists of domestic terminals A, B, C, and E and international/domestic terminal D.

DFW Airport has two major transit projects, one planned, the T’s TEX Rail Project on the DART-owned Cotton Belt Corridor in Tarrant County, and the extension of the Orange Line to DFW Airport Terminal A, projected to open in 2014.

The proposed Cotton Belt Project assumes that the proposed TEX Rail Project extending from southwest Fort Worth to Terminal B at DFW Airport will be in place. The T is completing the EIS and expects service to open in 2017. The Cotton Belt Project would utilize the portion of the T’s project that extends northwest, on new right-of-way, from the DFW Terminal B Station to the DFW North Station located just south of the Cotton Belt Corridor. At this station, the TEX Rail Project turns to the west on the Cotton Belt Corridor right-of-way, while the DART Cotton Belt Project turns to the east. Preliminary Engineering for the TEX Rail project from the Cotton Belt
Corridor at the north end of the airport into Terminal B assumes double tracking for the entire segment in order to accommodate a future second track for DART’s proposed rail service from the east. Initially the T would construct mostly single track for TEX Rail service.

The extension of the Orange Line to DFW Airport Terminal A is a 5-mile double track light rail extension from the existing Belt Line Station. A Finding of No Significant Impact (FONSI) was issued by FTA & FAA in October 2011 and the project is currently under construction with open in 2014. A design change moving the alignment south of Airfield Drive was made in early 2012.

The proposed Cotton Belt Project would traverse the northern portions of the DFW property traveling under IH 635 and International Parkway and joins with the proposed TEX Rail Project at a shared station, as shown in Figure 5-1.

**Figure 5-1: Rail Configuration at DFW Airport**
5.2.1 Impact Assessment

The proposed Cotton Belt Corridor Project assumes that the T’s proposed TEX Rail Project extending from southwest Fort Worth to Terminal B at DFW Airport will be in place. Section 1 of the proposed project begins at the DFW North Station. The following environmental resources would be evaluated in the next phase of the project in accordance with FAA Orders 1050.1E and 5050.40. Table 5-1 summarizes the resources that will likely require further evaluation and others that will not likely be impacted.

<table>
<thead>
<tr>
<th>Table 5-1: DFW Airport Environmental Impact Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air Quality</strong></td>
</tr>
<tr>
<td><strong>Biotic Resources</strong></td>
</tr>
<tr>
<td><strong>Coastal Barriers</strong></td>
</tr>
<tr>
<td><strong>Coastal Zone Management</strong></td>
</tr>
<tr>
<td><strong>Compatible Land Use</strong></td>
</tr>
<tr>
<td><strong>Construction</strong></td>
</tr>
<tr>
<td><strong>Section 4(f)</strong></td>
</tr>
<tr>
<td><strong>Federally-listed Endangered and Threatened Species</strong></td>
</tr>
<tr>
<td><strong>Energy Supplies, Natural Resources, and Sustainable Design</strong></td>
</tr>
<tr>
<td><strong>Environmental Justice</strong></td>
</tr>
<tr>
<td><strong>Farmlands</strong></td>
</tr>
<tr>
<td><strong>Floodplains</strong></td>
</tr>
</tbody>
</table>
Table 5-1: DFW Airport Environmental Impact Assessment

<table>
<thead>
<tr>
<th>Hazardous Materials</th>
<th>Further evaluation will be required to determine the presence of hazardous materials. If hazardous materials are present, an evaluation will determine if they exceed the thresholds established in FAA Order 5050.4B.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historic and Archeological Resources</td>
<td>It is not anticipated that proposed project would impact historical or archaeological resources. Further coordination with the THC will be required.</td>
</tr>
<tr>
<td>Induced Socioeconomic</td>
<td>The proposed project is primarily within existing DART owned property. As there are no residential communities adjacent to the alignment, no adverse effects are anticipated.</td>
</tr>
<tr>
<td>Light Emissions and Visual Effects</td>
<td>Coordination with DFW Airport staff to ensure compliance with development guidelines related to light emissions and visual effects will be required throughout the next environmental phase.</td>
</tr>
<tr>
<td>Noise</td>
<td>Further evaluation will be required to determine if noise levels will exceed thresholds stated in FAA Order 1050.1E, Environmental Impacts: Policy and Procedures and FAA Order 5050.4B, the NEPA Implementing Instructions for Airport Actions.</td>
</tr>
<tr>
<td>Water Quality</td>
<td>No adverse impacts are anticipated to water quality.</td>
</tr>
<tr>
<td>Wetlands</td>
<td>No adverse impacts to wetlands are anticipated.</td>
</tr>
<tr>
<td>Wild and Scenic Rivers</td>
<td>No wild and scenic rivers are located in the affected area. Therefore, there will be no adverse impacts.</td>
</tr>
</tbody>
</table>


5.2.2 Mitigation Options

Close coordination with National Airport Planning and Environmental Division of FAA will be required prior to the final environmental document. While no significant impacts are anticipated, there are several resources that will require further evaluation to determine impacts and appropriate mitigation: air quality, biotic resources, compatible land uses, construction, endangered and threatened species, flood plains, historic and archeological resources, light emissions, visual effects and noise.

As part of the TEX Rail FEIS process, the T has conducted an aeronautical assessment for the portion of the project on DFW Airport property. The proposed project was assessed and analyzed for various aeronautical aspects to understand potential affects, the resulting impacts and potential mitigation strategies. The analysis made several recommendations that would allow construction and operation of the Cotton Belt Project to avoid adversely affecting airport or aircraft operations.

5.3 Addison Airport

Addison Airport opened in 1957 and was purchased by the Town of Addison in 1976. Addison Airport is a general aviation airport located approximately 14 miles north of downtown Dallas in a highly developed, densely-populated urban area. At one point, Addison Airport was the third busiest general aviation airport in the country. Today, aircraft operations are down, but still approaching 100,000 operations per year.
In terms of land area, Addison Airport covers approximately 368 acres. The airport includes one runway and has three terminals, Atlantic Aviation, Landmark Aviation and Million Air Dallas. Addison Airport currently has approximately 70 businesses and 2,340 employees on-site.

The proposed rail station would be placed on the north side of the existing Addison Transit Center, located on the north side of Arapaho Road between Addison Road and Quorum Drive. The station would include side platforms for the rail service and a pedestrian connection to the Addison Transit Center facilities at the west end of the platforms.

The airport is currently working on a project that will result in the installation of an Engineered Materials Arresting System (EMAS) off the south end of the runway (between the runway end and the airport service road, just north of the rail line) as an alternative to a standard Runway Safety Area (RSA). Currently, the rail line is approximately 500 feet south of the runway while FAA standards call for a minimum of 1,000 feet. When the EMAS is constructed, this will enhance airport safety.

5.3.1 Impact Assessment

While the proposed rail alignment is within the existing Cotton Belt Corridor, additional right-of-way would potentially be acquired along the southern property line of Addison Airport to accommodate the dual track and maintain the existing storage track. In addition, the proposed rail alignment is within the RPZ of Runway 15/33. This will require evaluation and coordination with the National Airport Planning and Environmental Division of FAA as outlined in Section 5.1.

Due to the proposed rail alignment being mostly within the Cotton Belt Corridor, environmental impacts are anticipated to be minimal. The following environmental resources will be evaluated in the next phase of the project in accordance with FAA Orders 1050.1E and 5050.40. Table 5-2 summarizes the resources that will likely require further evaluation and others that will not likely be impacted.

<table>
<thead>
<tr>
<th>Table 5-2: Addison Airport Environmental Impact Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air Quality</strong></td>
</tr>
<tr>
<td><strong>Biotic Resources</strong></td>
</tr>
<tr>
<td><strong>Coastal Barriers</strong></td>
</tr>
<tr>
<td><strong>Coastal Zone Management</strong></td>
</tr>
<tr>
<td><strong>Compatible Land Use</strong></td>
</tr>
</tbody>
</table>
### Table 5-2: Addison Airport Environmental Impact Assessment

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Construction activities impacts would be temporary. All activities would conform to local, state and federal ordinances. No adverse impacts are anticipated.</td>
</tr>
<tr>
<td>Section 4(f)</td>
<td>Further evaluation will be required to determine any impacts to Section 4(f) resources.</td>
</tr>
<tr>
<td>Federally-listed Endangered and Threatened Species</td>
<td>Coordination with the TPWD and the USFWS will be required to determine impacts to federally-listed endangered and threatened species. No adverse impacts are anticipated.</td>
</tr>
<tr>
<td>Energy Supplies, Natural Resources, and Sustainable Design</td>
<td>It is not anticipated that the project will adversely impact the demands or exceed the availability of energy supplies, natural resources. It is anticipated that sustainable design will be implemented where appropriate.</td>
</tr>
<tr>
<td>Environmental Justice</td>
<td>Further evaluation will be required to determine any adverse impacts to environmental justice resources.</td>
</tr>
<tr>
<td>Farmlands</td>
<td>No adverse impacts are anticipated, as there are no farmlands within Addison Airport property.</td>
</tr>
<tr>
<td>Floodplains</td>
<td>Further evaluation will be required to determine if the proposed project impacts the 100-year or 500-year floodplain. No adverse impacts are anticipated.</td>
</tr>
<tr>
<td>Hazardous Materials</td>
<td>Further evaluation will be required to determine the presence of hazardous materials. If hazardous materials are present, an evaluation will determine if they exceed the thresholds established in FAA Order 5050.4B.</td>
</tr>
<tr>
<td>Historic and Archeological</td>
<td>It is not anticipated that proposed project would impact historical or archaeological resources. Further coordination with the THC will be required.</td>
</tr>
<tr>
<td>Induced Socioeconomic</td>
<td>Further evaluation will be required to determine any adverse impacts to induced socioeconomic resources.</td>
</tr>
<tr>
<td>Light Emissions and Visual Effects</td>
<td>Coordination with Addison Airport staff to ensure compliance with development guidelines related to light emissions and visual effects, including the impact of a parking garage, if one is warranted at the Addison Station.</td>
</tr>
<tr>
<td>Noise</td>
<td>Further evaluation will be required to determine if noise levels will exceed thresholds stated in FAA Order 1050.1E, Environmental Impacts: Policy and Procedures and FAA Order 5050.4B, the NEPA Implementing Instructions for Airport Actions.</td>
</tr>
<tr>
<td>Water Quality</td>
<td>The Cotton Belt Project does not cross any water bodies through Addison Airport property, no adverse impacts are anticipated to water quality.</td>
</tr>
<tr>
<td>Wetlands</td>
<td>No adverse impacts to wetlands are anticipated.</td>
</tr>
<tr>
<td>Wild and Scenic Rivers</td>
<td>No wild and scenic rivers are located in the affected area. Therefore, there will be no adverse impacts.</td>
</tr>
</tbody>
</table>

Source: URS, 2012
5.3.2 Summary of Ground-Borne Noise and Vibration Impacts Without Mitigation Options

As the proposed project is within the RPZ at Addison Airport, close coordination with National Airport Planning and Environmental Division of FAA will be required prior to the final environmental document. While no significant impacts are anticipated for most of the environmental resources as the Cotton Belt Project is primarily within Cotton Belt Corridor right-of-way, the following resources may require mitigation including: visual effects and light emissions.
6 OUTSTANDING ISSUES

6.1 Funding/Proposal
The Cotton Belt Corridor has been studied and included in numerous transportation improvement plans since 1983. DART purchased the Cotton Belt Corridor right-of-way in 1990 with the intent to provide passenger rail service sometime in the future. The Cotton Belt Project is currently an unfunded component of DART’s Transit System Plan.

The region has been exploring alternative financing for the project since 2009 when DART initiated the PPP effort with a Request for Information (RFI) to the private sector. More recently, the RTC with the NCTCOG have taken a lead role in developing innovative financial mechanisms and revenue streams to implement passenger rail service in the Cotton Belt Corridor. As of the fall of 2013, these efforts have not resulted in any financial proposals and the state legislature did not take any action on a proposed bill to finance the project.

The funding for the Cotton Belt Project will be considered DART’s next Transit System Plan and Financial Plan efforts. Additionally, DART is open to alternative financing. This AECR is a summary document that outlines the alternatives considered and environmental analyses conducted to date for the proposed Cotton Belt Project. This document will form the basis for future environmental efforts once funding for project construction has been identified.

6.2 Outstanding Environmental Issues
This AECR document identifies the existing environmental conditions and potential impacts of the proposed project that are known to date. This report can provide information for local decision makers to further define and develop the project. It can also provide the basis for documentation of the corridor when the project is ultimately implemented. It should be noted that depending when the project is implemented many of the environmental categories will need to be revisited. Existing conditions can change, data bases are updated, models are refined and some data has a limited shelf life. The following identifies some of known issues that need to be addressed prior to project implementation.

6.2.1 Environmental Review (Future NEPA Process)
The Cotton Belt Project is in the pre-NEPA stage of the project development process. Construction of the future project may involve the use of future federal funds, which would require approval by FTA and other federal agencies as applicable. Additionally a portion of the Cotton Belt Project would be located airport property requiring approval by FAA. As such, future studies and environmental review will be required under the NEPA process after project funding is identified.

6.2.2 Environmental Justice
Based on Census 2010 and 2008-2012 ACS Five-year Estimates, there are minority and low-income populations within and adjacent to the proposed project area. Therefore, the Cotton Belt Project will need to be evaluated for disproportionately high and adverse human health or
environmental effects to minority or low-income populations. A final EJ determination will be made as part of future environmental reviews under the NEPA process.

6.2.3 Water Resources/Waters of the U.S.
The Cotton Belt Project has the potential to impact Waters of the US future phases of environmental will require inter-agency coordination. If enough time elapses from the date the wetland were last field reviewed, the wetlands should be re-visited to insure that projected impact are still accurate or if the project scope changes. As outlined in Federal regulations, water impacts must be avoided, minimized, or mitigated. Project planning and development would seek to utilize every available feasible design technique to minimize or eliminate impacts to Waters of the US.

6.2.4 Geologic Resources
Should the proposed project advance with the Tunnel Profile Option through North Dallas, additional geotechnical investigations should be performed to identify potential issues.

6.2.5 Contaminated Properties and Hazardous Materials
As part of the future NEPA process and project design process, when additional information, such as right-of-way acquisition, the Cotton Belt Project should be re-evaluated for potential contamination issues. Additionally, depending on how much time has passed, a new search of regulatory databases should be conducted.

6.2.6 Cultural Resources
During this phase of the project, cultural resources were preliminarily addressed. One resource, White Rock Creek Bridge in North Dallas (Resource 45), located within the Cotton Belt Corridor right-of-way is recommended individually eligible for listing in the NRHP. Review of the proposed action has determined that there would be an adverse impact to this resource. DART will consult with the THC to identify measures to minimize and mitigate the effects to historic resources. For resources that are not able to be avoided, DART will follow the procedures outlined by the THC for documenting the resource.

At present, no archaeological resources occur within the proposed Cotton Belt Corridor. In order to determine impacts to archeological resources, THC will be consulted to identify an APE. DART proposes to conduct an intensive archeological survey within the defined APE. Upon THC consultation, this survey will be augmented by shovel testing and possibly geoarcheological evaluations of backhoe trenches.

6.2.7 Section 4(f) Evaluation
The project has been reviewed for potential Section 4(f) involvement. Publically owned parks or recreational facilities are potential Section 4(f) resources. The Base Alternative and the Trench Profile Option require the “use” of publically owned parks or recreational facilities. A final determination of the applicability of Section 4(f) will be required for these resources. In the Base Alternative there is also one historic resource that is considered to be a Section 4(f) resource. A Section 4(f) Evaluation will be required for all resources determined to be covered under Section 4(f). Future stages of project development should consider alternatives or methods to avoid use of Section 4(f) properties.
6.2.8 Vibration
If the Tunnel Profile Option is selected, it is recommended that further analysis be conducted based on the depth of the tunnel and an advanced design of the rail line.

6.2.9 Right-of-Way and Relocation
The proposed project would require additional right-of-way. Because the design process for the proposed project is still in the preliminary stage, the amount of permanent right-of-way to be acquired is approximate at this time. Specific right-of-way impacts and number of individual parcels affected by a roadway design will be identified with future NEPA studies. The acquisition of land and relocation of property owners due to the proposed project will be conducted in accordance with federal and state rules and regulations in place at the time of project implementation.

6.2.10 Indirect Effects and Cumulative Impacts
The CEQ regulations implementing the procedural provisions of NEPA (40 CFR Part 1500-1508) require federal agencies to consider the environmental consequences of their actions, including not only direct effects, but also indirect effects and cumulative impacts. During the preparation of the future NEPA document, separate analyses will be conducted to evaluate indirect effects of the proposed project and to evaluate project-related cumulative impacts.

6.3 Public Involvement and Agency Coordination
DART initiated the NEPA process for the Cotton Belt Project in July 2010. Uncertainty associated with funding and implementation schedule eventually prompted suspension of the NEPA process. As detailed in Public Involvement and Agency Coordination in Appendix C, an extensive program to include the public and relevant agencies in the decision making process was part of the NEPA process. Should the construction of the future regional rail project involve the use of future federal funds or require project approval by the FTA, FAA or other federal agencies the NEPA process would be reinitiated.

When a LPA is selected and the proposed project is reinitiated, a robust public involvement and agency coordination process will be implemented to ensure appropriate public and agency input is used in the decision-making process.

In compliance with the principles of EJ, DART will ensure full and fair participation by all potentially affected communities in the transportation decision making process.

6.4 Project Phasing
Given the length of the Cotton Belt Project and sheer size of the corridor, phasing options may present the opportunity to develop the project in smaller portions as DART financial capacity warrants.

Two potential MOS are described in this AECR. These segments represent project phases that could be implemented prior a full build. The federal definition of an MOS is a segment of a larger project that has independent utility. This means the MOS has reasonable patronage and cost effectiveness. Either MOS alternatives would provide rail service to the Town of Addison and could be implemented as the first phase of the project. A technical memorandum, entitled Early
Implementation of Regional Rail Service between Addison and Carrollton is provided in Appendix B. It outlines the issues and opportunities associated with an MOS serving Addison. The memo also discusses potential extension to DFW Airport or interlining with DCTA or service to Irving via the Madill Subdivision Corridor as a way to improve the independent utility of the Addison to Carrollton MOS (MOS 1).

A second option for phasing the project would be to implement rail service with fewer initial stations. Additional stations could be added as the project matures. This concept would require additional ridership modeling to determine the costs, benefits and overall impact of providing fewer stations.

6.5 FAA Issue/Resolution

The selection of an LPA and the eventual implementation of regional rail on the Cotton Belt Corridor will require extensive coordination with FAA for segments of the project located on or adjacent to DFW Airport and Addison Airport. FAA’s involvement will include:

- A comprehensive review process for existing and proposed land use within an RPZ
- An aeronautical assessment
- Airspace Studies
- Environmental impact assessment review
- Revision of the ALP

6.6 TEX Rail Project

In order to provide a connection to DFW Airport, the proposed Cotton Belt Project assumes that the final leg of the T’s TEX Rail Project extending from the Cotton Belt Corridor to Terminal B at DFW Airport will be in place. The FEIS for the TEX Rail Project currently scheduled to be completed in early 2014. It is anticipated that the FTA and FAA would issue a Record of Decision (ROD) that would allow the agency to move into the implementation phase of the project. Final Design is scheduled to begin in mid-year 2014 with construction activities scheduled to begin in 2015. The T is targeting an opening day for the TEX Rail project in 2017. The T is seeking federal funding for the TEX Rail project.

Should the TEX Rail project be significantly delayed due to funding or others issues; the Cotton Belt Project may require additional evaluation. Depending on the ultimate timing of the two projects, the portion of the T’s project that extends northwest, on new right-of-way, from the DFW Terminal B Station to the DFW North Station may need to be incorporated into the Cotton Belt Project design and environmental documentation. Additional infrastructure would include the two stations and a new bridge over SH 114. The T’s current design, environmental documentation and aeronautical analysis could be form the basis of this effort.

Evaluation of the Cotton Belt Project would need to consider the added costs of the additional infrastructure, as well as the potential reduction in ridership associated with delay or elimination of the TEX Rail project.
6.7 Anticipated Permits and Approval

Table 6-1 provides a preliminary list of anticipated permits and approvals required. This list would be updated with the future NEPA process based on approval and permitting requirements in place at that time.

<table>
<thead>
<tr>
<th>Permit/Approval</th>
<th>Agency</th>
<th>Action Required or Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Environmental Policy Act (NEPA) review and decision</td>
<td>FTA</td>
<td>Approval/Determination</td>
</tr>
<tr>
<td>Section 4(f) determination</td>
<td>FTA</td>
<td>Approval</td>
</tr>
<tr>
<td>Section 106 (Historic / Archeological)</td>
<td>FTA</td>
<td>Determination of Effect</td>
</tr>
<tr>
<td>Jurisdictional Determination</td>
<td>USACE</td>
<td>Determination</td>
</tr>
<tr>
<td>Section 404 Permit</td>
<td>USACE</td>
<td>Permit</td>
</tr>
<tr>
<td>State</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Pollutant Discharge Elimination System (Re-issue August 2013)</td>
<td>TCEQ</td>
<td>Permit</td>
</tr>
<tr>
<td>Section 106 (Historic / Archeological)</td>
<td>THC</td>
<td>Concurrence</td>
</tr>
<tr>
<td>Local</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trinity River Corridor Development Certificate (CDC)</td>
<td>City of Coppell City of Carrollton</td>
<td>Approval</td>
</tr>
</tbody>
</table>


6.8 DART Resolution Compliance

In their resolution adopting the DART 2030 TSP in October 2006 (Resolution No. 060177), the DART Board of Directors imposed conditions to developing the Cotton Belt Corridor. These conditions generally focused on the project traversing North Dallas, impact assessment, and vehicle characteristics. The following summarizes these conditions and the current status:

- Actively pursue discussions with current users and rights holders regarding removal of freight from corridor.

  Through DART’s efforts, STB approved the abandonment of freight on the Cotton Belt from Knoll Trail Drive in Dallas to Renner Junction in Richardson effective on January 27, 2010.

- DART will consider all mitigation alternatives in working with cities on environmental concerns. Evaluate potential impacts (noise, vibration, visual, traffic, safety, etc.) consistent with measures used in other DART projects. The City of Dallas preference is a trench.
DART policies require that the potential impacts of any proposed project (whether federally or locally funded) be assessed, and if adverse effects are found, that these impacts be avoided, or minimized and mitigated. This AECR and future environmental efforts will be consistent with DART’s *Environmental Impact Assessment and Mitigation Guidelines for Transit Projects*.

In North Dallas, an **At-grade** Profile and two below grade profile options (**Trench** and **Tunnel**) are evaluated in this document.

- **Noise/vibration impacts will be mitigated to a level consistent with DART light rail.**

  The *Noise and Vibration Test Program for the DCTA Stadler DMU Report* in Appendix A indicates that the noise levels emitted from the DCTA DMU and the DART SLRV are very similar.

  Since light rail vehicles are not subject to requirements to sound horns at roadway crossings, implementation of quiet zones along the Cotton Belt Corridor also assists to bring the project in compliance with the DART Board Resolution. The 94 identified noise impacts are typical of implementation of rail transit in an urban setting. The following compares the proposed project noise impacts to the noise impacts identified in the environmental documents prepared for two LRT Corridors in similar urban settings:
  
  - **Cotton Belt**: 26 miles; 94 moderate impacts, 0 severe impacts
  - **NW Corridor* (Green Line)**: 17.6 miles; 84 moderate impacts, 4 severe impacts
  - **SE Corridor** **(Green Line)**: 10.1 miles; 257 moderate impacts, 18 severe impacts
  
  *Northwest Corridor to Farmers Branch and Carrollton FEIS, October 2003
  **Southeast Corridor FEIS, October 2003

- **Vehicle Considerations:**
  
  - Locomotive-hauled passenger rail will not be considered.
  - The size (length, height and width) of a rail car would generally be the same as the current DART light rail vehicle
  - Emissions will meet or beat Environmental Protection Agency (EPA)

  The rail vehicle under consideration would have light rail characteristics. It would be similar to the DMU vehicles currently operating on the DCTA A-Train system with future generation low or no emission propulsion.

- **City of Dallas has a preference for stations at Knoll Trail Drive, Preston Road and west of Coit Road.**
  
  - The three North Dallas Stations are evaluated in the AECR.

- **City of Dallas preference is to minimize number of tracks.**
  
  - In order to meet the operating demands of the proposed project, maintain existing freight, and provide flexibility double tracking of most of the corridor is required.
6.9 Selection a Locally Preferred Alternative

The DART Board has not yet selected a LPA for the Cotton Belt Corridor. This summary document outlines the alternatives considered and environmental analyses conducted to date for the proposed project. The AECR can aid local decision makers in the ultimate selection of an LPA.

The following compares and contrasts the alternative alignments presented in the AECR.

**Ridership**

A review of the ridership information presented in Section 2.9 and in Appendix B indicates that there is little difference between the full length alternatives.

- Since the three North Dallas Profile Options operate at the same speed and distance without altering any stations, there is would no differences in ridership.
- Implementing the Red Line Interface South Alternative (All Station Alternative) with the addition of the Bush Turnpike Station would only result in 15 additional rail riders (16,382 versus 16,367) than the Red Line Interface North Alternative. Without the Bush Turnpike Station riders would be redistributed to the 12th Street and Shiloh Stations.
- Implementation of the North Lake Station in the Cypress Water Alternatives would result in about 600 additional riders.
- Both MOS options would represent a significant drop in projected corridor ridership from the full length alternatives.
  - MOS 1 only attracts 12% of the All Station Alternative ridership.
  - MOS 2 attract 44.3% of the All Station Alternative ridership.

**Costs**

A review of the cost information presented in Section 2.10 and in Appendix D indicates that the Base Alternative would cost about $1,652 Million to construct. The design alternatives would increase this amount.

- The Cypress Waters alternative would add $59 Million
- The Trench Profile would add $123 Million
- The Tunnel Profile would add $511 Million
- The Red Line Interface South Alternative would add $52 Million
- The Red Line Interface South Alternative without 12th Street Station Complex would add $41 Million

Since the lengths of the MOS Alternatives are significantly shorter than the Base Alternative, the cost the MOS Alternatives would be considerable less. The MOS costs are shown below:

- MOS 1: $262 Million
- MOS 2 without Cypress Waters: $563 Million
- MOS 2 with Cypress Waters: $622 Million

**Environmental Issues**

As described in more detail in Section 3, the following highlights some of the environmental issues associated with the Cotton Belt Project and its various alternatives:
Community Facilities: The traffic/access impact to W. W. Pinkerton Elementary School in the Cypress Waters Southwestern Boulevard Alternative is the most significant impact to a Community Facility. This impact is avoided by the Cypress Waters South or the Base alternatives.

Parks: All alternatives require the purchase of slivers of publicly owned recreational facility property although; no public areas are directly impacted and no dedicated Parkland is required.
  - Trench Profile Option involves the Use of 2 additional publicly owned parcels.

Land Acquisition: All alternatives require some Land Acquisition:
  - Most stations require land acquisition. Some require business displacements
  - Both Cypress Waters Alternatives require additional land for new right-of-way with some business displacements. Cypress Waters South requires more land and businesses than the Southwestern Boulevard Alternative.
  - The Red Line Interface South Alternative requires land for new right-of-way.
  - With the Trench Option, the construction of roadway grade separations would require the purchase of additional right-of-way. It would also require modifying the access to several single family and multi-family residential units. At least one single family home would be displaced.
  - Both MOS options significantly reduce property acquisition.

Visual Impact: Each alternative would have some Visual Impact:
  - All alternatives would have a visual impact on the Arapaho Signature Bridge
  - The Cypress Waters Alternatives and the Red Line Interface South Alternative require new right-of-way and would alter the visual character of their respective areas by placing tracks/structures in new locations.
  - The Trench Profile Option would change the overall visual character with a trench, 15-foot walls and elevated roadway crossings
  - Depending on method of excavation, the Tunnel Profile Option has the potential to significantly alter the existing corridor at to be determined locations.

Historic Resources: One Resource (White Rock Creek Bridge) would be impacted by all full length alternatives.
  - Both MOS Alternative would avoid this impact.

Water Resources: All alternatives would have an impact on Water Resources
  - Base with Red Line Interface South Alternative has the greatest potential impact with 24 water crossing potentially affecting about five acres of Waters of the US
  - Remaining full length alternatives have 20 to 23 water crossings potentially affecting approximately four acres of Water of the US
  - The Tunnel Profile Option avoids three water crossings (Only potentially affecting .34 acres)
  - MOS 1 avoids most impacts to Waters of the US
  - Trench Profile Option could have a negative effect on adjacent floodplains and water resources.

Noise Impacts: Implementation of quiet zones would mitigate over 95% of potential noise impacts. All of the remaining potential noise impacts fall within the moderate impact range.
Moderate noise impacts would be noticeable but may not be sufficient to cause annoyance. Consideration would be given to additional mitigation at these locations. With quiet zones, Noise Impacts are summarized as follows:

- Base (At-grade): 94 Total Moderate Impacts (46 in North Dallas).
- Base w/Trench: 54 Total Moderate Impacts (7 in North Dallas).
- Base w/Tunnel: 48 Total Moderate Impacts (0 in North Dallas).
- MOS 1: 8 Total Moderate Impacts.
- MOS 2: 12 Total Moderate Impacts.

**Vibration Impacts:** Vibration Impacts (Ground Bourne Noise) are summarized as follows:

- Base: 5 Vibration impacts in Coppell area.
- Cypress Waters Alternatives: Reduces Vibration Impacts to 2.
- Tunnel Profile Option: Adds 32 Vibration Impacts in North Dallas.

**Hazardous and Regulated Materials:** Based on the current designs, no identified high or medium risk sites are within the potential construction areas.

- Selection of the Red Line Interface South Alternative would avoid potential hazardous material risk near the US 75 along the base (North) Alternative.

**Traffic Impacts:**

- The only unmitigated traffic impact is common to all full length alternatives.
- The Cypress Waters South Alternative avoids the traffic impact associated with the Cypress Southwestern Boulevard Alternative.
- Both North Dallas below grade profile options provide six unwarranted grade separations.
- The Trench Profile Option requires the construction of six roadway bridges plus rebuilding nearby intersections, alleys and driveways to facilitate local access.

**Alternative Summary**

**Base Alternative**

Of the full length alternatives, the Base Alternative (At-grade, North without Cypress Waters) provides the most riders for the least cost. Due to the traditional transportation uses in the corridor there are few inmitigable environmental issues associated with the base project. As summarized above, the base alignment would have little impact on most of the resource categories described.

**Cypress Waters Alternatives**

The Cypress Waters Alternatives with the added North Lake Station increase the cost of the project by $59 Million while only adding 600 riders. The alternative does help to achieve the public and private sector development goals in the area. The costs, ridership and most environmental impacts of the two Cypress Waters Alternatives are the same. The Cypress Waters Southwestern Boulevard Alternative has a traffic impact at W. W. Pinkerton Elementary School. The Cypress Waters South Alternative avoids this impact but requires additional land acquisition.
North Dallas Profile Options
Below grade options were developed based on the perception that an at-grade alignment would have significant environmental and quality of life impacts. Concerns raised by the public included safety, visual, traffic and noise. Based on the analysis to date, there are no significant impacts associated with the at-grade alignment. Much of this is due to placing rail in a traditional rail corridor that predates residential development. There are no differences in ridership between the profile options.

- **At-grade Profile Option**: Regarding safety, DART transit projects are designed to ensure the safe movement of motor vehicles, bicycles and pedestrians. The visual character of the area would change as the deteriorating single track rail and bridges would be replaced with a new double track alignment. There would be some change in vegetation. Traffic analysis indicates that the proposed project would only slightly impact traffic at the six at-grade North Dallas Crossings. Implementation of quiet zones would mitigate over 97% of potential noise impacts in North Dallas.

- **Trench Profile Option**: This concept would eliminate the perceived safety or traffic concerns associated with at-grade roadway crossings. The Trench Profile Option would significantly change the overall visual character with a trench, 15-foot walls and elevated roadway crossings. There would only be seven moderate North Dallas noise impacts associated with this concept. The Trench Profile Option adds $123 Million to the cost of the project but, only represents a marginal improvement in traffic, safety and noise. Additional environmental concerns associated the Trench Profile Option include potential impacts to adjacent water/floodplains and increased property acquisitions including residential property and publicly owned recreational property.

- **Tunnel Profile Option**: This concept would also eliminate the perceived safety or traffic concerns associated with at-grade roadway crossings. Except where excavation is required the visual character of the area would remain as is. This concept would replace the 46 North Dallas, moderate noise impacts with 32 ground borne noise (vibration) impacts. The Trench Profile Option adds $511 M to the cost of the project but, only represents a marginal improvement in traffic and safety.

Red Line Interface Alternatives
The two Red Line Interface Alternatives were envisioned to help meet the development objectives of the cities of Plano and Richardson. The North Alternative was envisioned to extend the development that has occurred as result of the Red Line, south to 12th Street. The Red Line Interface South Alternative was envisioned to provide multimodal connections to the growing mixed use development occurring at the Bush Turnpike LRT Station. This development includes the new State Farm Insurance, 1.5-million square foot facility that would house over 6,000 employees. The Red Line Interface South Alternative could be constructed with or without the 12th Street Station Complex. With the 12th Street Station Complex, this alternative could help meet the development objective of both cities.

The total projected ridership of the two alternative is very similar; however, the when both stations are present the Ridership of the Bush Turnpike Station is significantly higher than the 12th Street Station. The cost of the Red Line Interface South Alternative is $52 Million more than the Red Line Interface North Alternative; however, this includes both the Bush Turnpike Station and 12th Street Station Complex. Without the 12th Street Station Complex the differential is only $41 Million.
The Red Line Interface South Alternative has a greater potential to impact Waters of the US than the Base Alternative:

- Base: 23 water crossings potentially affect 4.27 acres of Water
- South: 24 water crossings potentially affecting about five acres of Water

**MOS Alternatives**

The two MOS alternatives are smaller portions of the corridor. As such they are more affordable and have fewer environmental impacts. Most environmental impacts are avoided by the MOS alternatives but they have significantly less ridership and do not meet all of the stated goals for the corridor. MOS 1 represents an 88% drop in ridership and MOS 2 represents a 56% drop in ridership. Neither MOS would interface with the Red Line or serve the population and employment centers in Richardson and Plano. As discussed in Section 6.4 above, implementation of an MOS could be used as an early phase of the Cotton Belt Project.