Downtown Dallas Transit Study

Dallas CBD Alternatives Analysis/Draft Environmental Impact Statement

Dallas Area Rapid Transit
PO Box 660163
Dallas, TX 75266-0163

March 2010

DOWNTOWN DALLAS TRANSIT STUDY

IN DALLAS, DALLAS COUNTY, TEXAS

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Prepared by
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL TRANSIT ADMINISTRATION
DALLAS AREA RAPID TRANSIT

Pursuant to:

National Environmental Policy Act of 1969, Section 102(2)(c), 42 U.S.C. 4332 (2)(c); National Historic Preservation Act of 1966, Section 106, 16 U.S.C. 470 et seq; Executive Order 11990 (Protection of Wetlands); Executive Order 12898 (Environmental Justice for Low-Income and Minority Populations); Executive Order 13045 (Protection of Children from Environmental Health and Safety Risks); Executive Order 13166 (Improving Access to Services for Persons with Limited English Proficiency); Federal Transit Act, 49 U.S.C. Section 5323(b), Section 5309(e)(2)-(7), 5301(e), and 5324(b)(1)-(3); Title 49 U.S.C. Section 303, formerly Department of Transportation Act of 1966, Section 4(f), and Title 16 U.S.C. Section 4601-4, formerly Land and Water Conservation Fund Act, Section 6(f)(3); Section 404 of the Clean Water Act; the Clear Air Act Amendments (1990).

For FTA: _____ Date: 3/8/10

Robert C. Patrick
Regional Administrator
Federal Transit Administration
Region 6

For DART: _____ Date: March 5, 2010

Gary C. Thomas
President/Executive Director
Dallas Area Rapid Transit

D2 Downtown Dallas Transit Study
DALLAS, TEXAS
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Responsible Agencies

Lead Agencies: Federal Transit Administration (FTA), U.S. Department of Transportation, and Dallas Area Rapid Transit (DART).

Abstract

This Draft Environmental Impact Statement (DEIS) describes and summarizes the potential transportation impacts, environmental impacts, and costs of the transit and supporting facilities being considered for the Downtown Dallas (D2) Corridor in Dallas, Texas. DART intends to seek a federal transit grant to assist in the funding of this project. Alternatives assessed and compared in this document are a No Build Alternative and four build alternatives. The No Build Alternative consists of existing transportation facilities and services plus those improvements included in the 2030 Transit System Plan and the *Mobility 2030: The Metropolitan Transportation Plan for the Dallas-Ft. Worth Area*. The fixed-guideway build alternatives provide additional light rail transit (LRT) capacity required to maintain continued safe and reliable operations on the DART rail network without a deterioration of service, and to accommodate planned improvements and expansion. The alternatives are located within a 2.5-mile long corridor through downtown Dallas extending from Victory station on the Northwest line to Deep Ellum on the Southeast line. The alternatives include tunnel and surface sections as well as underground and surface stations. This DEIS defines the alternatives, identifies their associated operating and capital costs, and describes their potential transportation and environmental impacts. The information contained in the DEIS will be used by DART and FTA to make a decision on whether to implement the project and to select from among the build alternatives and alignment options a preferred alternative for implementation.

Comments on the DEIS

There is a minimum 45-day public review period for this DEIS that starts April 2, 2010 and concludes on May 17, 2010. Two public hearings will be held at the following location:

Thursday, May 6, 2010
Open House 11:30 a.m. – 12:00 p.m.
Public Hearing begins at 12:00 p.m.

Open House 6:00 p.m. – 6:30 p.m.
Public Hearing begins at 6:30 pm

DART Headquarters
Board Room
1401 Pacific Street
Dallas, TX 75266

Comments may be submitted at the Public Hearings in written or oral form. Those persons unable to attend the public hearings may submit written comments to Mr. Ernie Martinez, Project Manager. Comments must be received no later than May 17, 2010 for inclusion in the Final Environmental Impact Statement. Additional written comments and/or questions about the Public Hearings should be directed to:

FTA Regional Contact
Ms. Lynn Hayes
Community Planner
Federal Transit Administration, Region VI
819 Taylor Street
Room 8A36
Fort Worth, Texas 76102

Local Agency Contact
Mr. Ernie Martinez, Project Manager
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TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

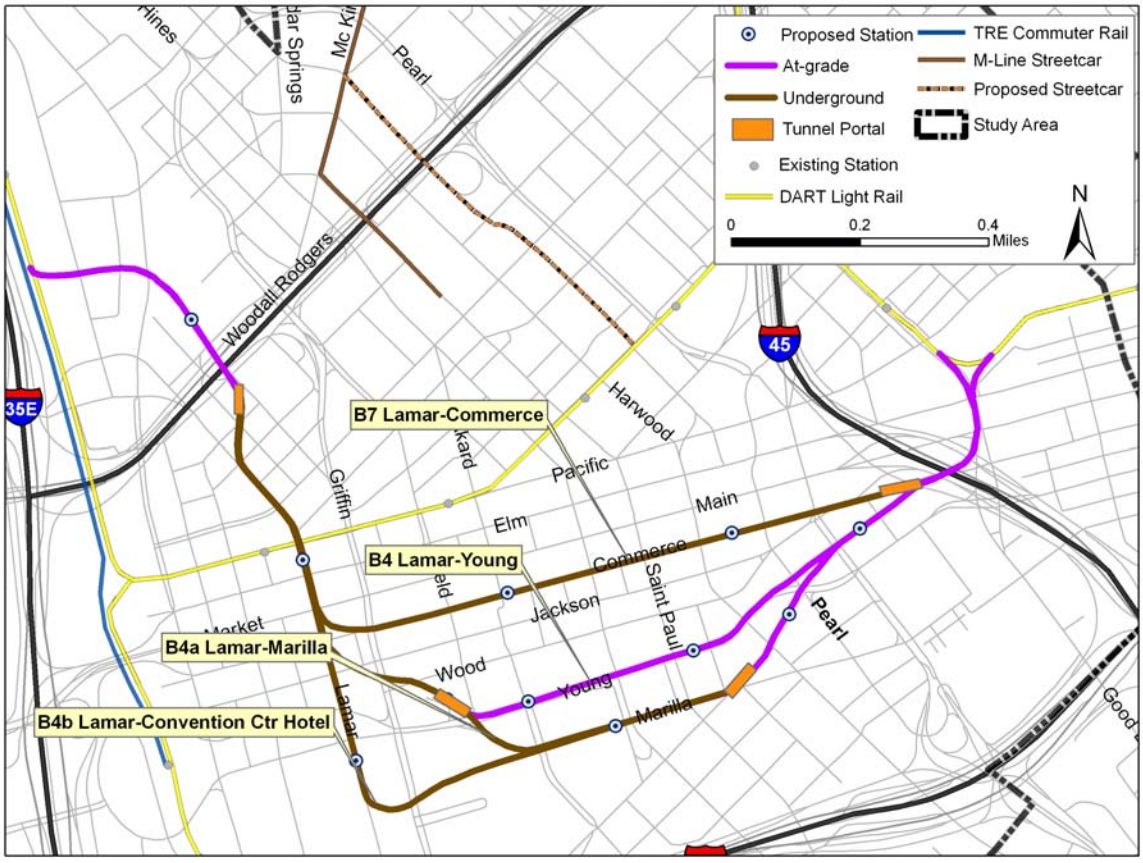
EXECUTIVE SUMMARY

S.0 EXECUTIVE SUMMARY

The subject of this Draft Environmental Impact Statement (DEIS) is a 2.5-mile light rail transit (LRT) project through downtown Dallas. The project corridor extends from the Victory Station on the Northwest corridor serving the Victory Park area, into the heart of the central business district (CBD) crossing under the existing LRT Pacific-Bryan transit mall near the West End, and then heads south and east serving the Convention Center, Government Center and Farmers Market Districts before re-connecting with the existing Southeast corridor in Deep Ellum.

The project, also known as the Downtown Dallas (D2) Project, represents a major capacity improvement to the existing and committed LRT system which is capacity constrained by only one LRT alignment through the CBD. This second CBD alignment is scheduled to open in 2016. The four D2 Build Alternatives that are the subject of this DEIS are illustrated in Figure ES-1.

Figure ES-1. Four Recommended LRT Build Alternatives



Source: PB/AZB Joint Venture

The National Environmental Policy Act (NEPA) of 1969 requires that federal agencies prepare an EIS for any major federal action that may have a significant impact on the environment. This DEIS was prepared by Dallas Area Rapid Transit (DART) under its responsibilities as the local lead agency to implement the LRT project. This document has been prepared in coordination with the Federal Transit

Administration (FTA), the lead Federal agency. The federal action for FTA would be partial funding of the project through a transit funding program.

The purpose of the EIS is to inform the public of potential environmental, social, and economic impacts associated with the proposed LRT project and the No Build Alternative. The No Build Alternative represents the base condition for identifying impacts associated with the proposed project. The EIS serves as the primary document to facilitate review of the proposed project by federal, state, and local agencies and the general public. The EIS documents the purpose and need for the project and describes the alternatives considered. It addresses the anticipated transportation and environmental impacts of the project, based on the current level of concept design (one to two percent), and identifies appropriate mitigation measures, in preliminary fashion, that may be required to minimize such impacts subject to additional design development to support the preparation of the Final EIS (FEIS).

The DEIS will be circulated for a required 45-day review and public comment period, beginning March 19, 2010, and concluding May 2, 2010. During this comment period, the DEIS will be made available to interested parties including private citizens, community groups, the business community, elected officials and public agencies. A public hearing will be held within the Study Area on April 15, 2010, to formally receive comments. Public comments can also be submitted in writing throughout the full comment period.

After circulation of the DEIS, additional concept engineering and environmental studies will be completed for a Locally Preferred Alternative (LPA). Mitigation commitments, where necessary, will be identified and responses to comments received during the DEIS comment period will prepared.

S.1 Purpose and Need

Current and projected travel patterns, levels of roadway congestion, growth in population and employment in the region and in the study area require that the proposed project be built in order to address the need for additional transportation capacity. To illustrate this trend, the Dallas/Fort Worth (DFW) region's population is expected to increase from 4.8 million (2000) to approximately 8.5 million, or 75 percent by the year 2030. Over the same time period, regional employment is expected to increase from 3.0 million to 5.2 million, or 75 percent. The number of people traveling on the regional roadway network will increase proportionally, creating significant burdens on today's already crowded roads. Transit demand is also increasing as DART has shown steady increases in ridership including a spike in demand when gas prices reached $4 per gallon. A major constraint to the growth of the DART LRT system is the lack of a second LRT alignment in the Dallas CBD.

The **purpose** of the proposed action is to allow DART to realize its vision for the 2030 Transit System Plan (TSP) by,

- Increasing transit capacity in Downtown Dallas to support increased demand and implementation of the 2030 TSP;
- Enhancing system operational flexibility and schedule reliability;
- Improving access and circulation to, through, and within the CBD;

- Promoting transit supportive land uses and sustaining the economic strength of the CBD; and,
- Accommodating travel demands associated with continued regional growth.

This vision depends on providing a new transit link through the Dallas Central CBD. Planning for the project has been ongoing since the 1990's by DART, the City of Dallas and other organizations, who have identified a wide range of transit options. The planning to date indicates that a reliable LRT system providing quality transit service is at risk without an additional transit connection through Downtown Dallas. The project is also part of a larger transportation and land use vision for the CBD, including improved CBD circulation and access to LRT stations with a proposed streetcar network.

The specific **needs** to be addressed by the D2 Project include:

- Relieve CBD LRT Capacity Constraint: With four LRT lines (Red, Blue, Green, and Orange) operating in the CBD by 2011, the existing transit mall will be at capacity. Capacity is also limited by an agreement with the City of Dallas that caps transit mall train frequencies at 2.5 minutes in each direction, and restricted movements through two CBD junctions. Other factors, such as DART's signalization system, high cross street traffic volumes at key signalized intersections, train and vehicle configuration, and station dwell times also limit capacity.
- Growing Travel Demand and Congestion: Ridership on DART is increasing and is projected to increase over time. Regional population, employment, and vehicle miles traveled (VMT) are projected to double. These growth and travel demands led DART to include additional LRT lines in the 2030 Transit System Plan. Connecting these lines in the CBD will create the opportunity improve connections and transfers for through-trip access to the regional transit system.
- Maintaining a Quality System and Service: Increasing dependence on the existing transit mall will force DART to cap peak period train schedules, thereby diminishing operating flexibility, efficiency and service. Any disruption along the transit mall will disrupt service throughout the entire system and reduce reliability. Frequent, reliable transit service attracts customers to DART and provides a competitive advantage over the automobile.
- Serve New CBD Transit Markets: Several key CBD markets and activity centers are not directly served by the LRT system, Government District (such as City Hall/Main Library), Farmers Market, Bryan Place, County Jail, Arts District, and the Design District. Other markets such as the growing downtown residential population, tourists, noontime lunch crowd, and special events patrons do not have an attractive and convenient way of linking their trip purpose with activity centers on transit.
- Enhance CBD Development Potential: The CBD has primarily been an employment center but is transitioning to a more mixed-use environment. Study area employment is expected to grow by 33 percent and population is expected to triple, according to North Central Texas Council of Governments (NCTCOG). Substantial new development and redevelopment is underway, planned and proposed. There is a desire by the City of Dallas and DART to accommodate this

growth near transit stations in coordination with developers and local areas to achieve both increased transit ridership and greater economic benefits.

S.2 Alternatives Considered

The development of alternatives and the screening process has been ongoing for almost 20 years involving DART, the City of Dallas, public agencies, stakeholders, and the public.

The D2 Study examined all previous information and conducted scoping in the spring of 2007, pursuant to FTA and NEPA requirements. The scoping process and results are detailed in the "D2 Scoping Summary Report" (October 2007). A long list of over 20 alternatives for transit improvements in Downtown Dallas was developed with D2 Study participants in the fall of 2007. A screening process was conducted that narrowed this list to 16 transit alignments, as described in the "Alternatives Development and Screening Report" (June 2008). The results were discussed at meetings and workshops with D2 Study Advisory Committees, the public, the DART Board of Directors, and the Dallas City Council. The screening report recommended a short list of two LRT Build Alternatives for more detailed definition and assessment. Subsequent refinement of these alternatives resulted in two additional LRT options. The completed process produced the four Build Alternatives described in Section 2.2.

Table ES-1 provides a summary of the five alternatives assessed in this document. These include the No Build Alternative, which includes planned and programmed transportation improvements in the Dallas region as presented in the Regional Transportation Plan and the DART 2030 Transit System Plan. The No Build Alternative long-term (year 2030) improvements will affect the capacity needs of the existing Pacific-Bryan Transit Mall.

Table ES-1. Characteristics of Alternatives

Alt. Id.	Mode	Alignment Route	Configuration	Station/Stops			Alignment Length (miles)		
				Total	Under-Ground	Surface	Total	Under-ground*	Surface
No Build	Multimodal	NA	NA	NA	NA	NA	NA	NA	NA
Build B7	LRT	Lamar-Commerce	Surface/ Underground/ Surface	4	3	1	2.1	1.3	.8
Build B4	LRT	Lamar-Young	Surface/ Underground/ Surface	5	1	4	2.2	.7	1.5
Build B4a	LRT	Lamar-Marilla	Surface/ Underground/ Surface	5	3	2	2.3	1.2	1.1
Build B4b	LRT	Lamar-Convention Center	Surface/ Underground/ Surface	5	3	2	2.5	1.4	1.1

*Includes length of tunnel portals
Source: PB/AZB Joint Venture

Two Build Alternatives were identified from the D2 screening. These include LRT Alternative B7 Lamar-Commerce on an alignment through the City Center business area, and LRT Alternative B4 Lamar-Young serving the Government Center and Harwood District/Farmers Market area. Both of these alternatives are similar in length (2+ miles) and have surface and tunnel sections.

Following the screening process, Alternative B4 Lamar-Young was refined and a range of options considered in order to provide service to the proposed Convention Center Hotel project being advanced by the City of Dallas at the southeast corner of Lamar and Young Streets. This effort resulted in two alternatives: B4a Lamar-Marilla, which included a tunnel station closer to the hotel at the old Santa Fe Railroad site, a longer tunnel section, and an underground station at City Hall; and B4b Lamar-Convention Center, which provides a tunnel station adjacent to the hotel site, an additional underground station at City Hall, and a longer tunnel section.

S.3 Affected Environment and Environmental Consequences

The existing natural and built environmental conditions in the D2 Study Area were established for the analysis of impacts on the social, cultural, and natural environment that would result from the construction and operation of the Build Alternatives in comparison to the No Build Alternative.

Table ES-2 summarizes the environmental impacts of the No Build and Build Alternatives along with the potential mitigation measures that have been identified for implementation. All environmental impacts and mitigation measures summarized in the table are discussed in detail under the appropriate headings in Chapter 3.0.

Table ES-2. Summary of Environmental Impacts and Mitigation Measures

Subject Area	No Build Alternative	Build Alternatives	Potential Mitigation Measures for Build Alternatives
Land Use	• Portions of the Study Area could experience difficulty attracting transit-supportive and pedestrian-oriented development	• May redistribute some of the expected regional growth as a result of improved quality of life, image, and overall mobility. • Could attract transit-supportive development to the corridor, including employment opportunities, higher-density residential development, and new services and amenities. • Supports continued development and redevelopment activity within the corridor which may become more intense and focused around stations. • Enhanced development / redevelopment potential in the immediate vicinity of stations.	• Generally no mitigation required, except in cases where local plans do not support new or redevelopment where plans need development control measures. • Design of station locations should be respectful of the primary land use in the surrounding area.

Table ES-2. Summary of Environmental Impacts and Mitigation Measures (continued)

Subject Area	No Build Alternative	Build Alternatives	Potential Mitigation Measures for Build Alternatives
Compatibility with Land Use Plans, Policies, and Controls	• Not fully supportive of the goals and objectives for the communities stated in planning documents.	• Compatible with the plans, policies, and regulations of the local jurisdictions and planning agencies.	• Design stations to be compatible with primary land use surrounding area. • Coordinate with local neighborhoods and community groups regarding stations.
Neighborhood and Community Facilities and Services	• Potential benefits of the proposed Build Alternatives, such as improved access and mobility, would not be realized.	*Community Facilities* • Increased accessibility to community facilities. • Build Alternatives could displace parking spaces in Victory Park, North tunnel portal, Harwood District and Farmers Market District. • Build Alternatives would have temporary, construction-related impacts to the Bark Park and Julius Schepps Park; however no permanent impacts are anticipated. • Alternative B4 would displace entrance to City Hall's underground parking facility, and widening for two eastbound travel lanes would cause encroachment along Young Street at the City Hall Plaza, as well as decrease sidewalk capacity. • Alternative B4 would impact First Presbyterian Church property. • Alternatives B4a and B4b would impact Scottish Rite Temple property. *Neighborhoods* • Greater access and mobility is anticipated to support the existing neighborhood functions without changing the overall neighborhoods. • Station areas could become centers of neighborhood activity and investment and; therefore, could serve to boost neighborhood social cohesion.	• The impacts on community facilities and neighborhood cohesion from the build alternatives are anticipated to be minimal. • DART will continue coordination with TxDOT and the City of Dallas to minimize potential effects to the Bark Park and Julius Schepps Park facilities. • Alternative B4 - Design provisions for City Hall garage entrance. • Refine design during PE and final design to minimize impacts to First Presbyterian Church and Scottish Rite Temple property • Educational awareness programs would alert residents to the presence of LRT service and vehicles.

Table ES-2. Summary of Environmental Impacts and Mitigation Measures (continued)

Subject Area	No Build Alternative	Build Alternatives	Potential Mitigation Measures for Build Alternatives
Demographic and Socioeconomic Factors	• No impact	• May redistribute some of the expected regional growth as a result of improved quality of life, image, and overall mobility within the CBD. • Could attract transit-supportive development to the corridor, including employment opportunities, higher-density residential development, and new services and amenities. • Supports continued development and redevelopment activity within the corridor which may become more intense and focused around stations. • Enhanced development / redevelopment potential in the immediate vicinity of stations.	• Generally no mitigation required, except in cases where local plans do not support new or redevelopment, or where plans need development control measures.
Displacement and Relocation	• No Impact	*Alternative B7 would result in:* • Acquisition of 14 property parcels consisting of 3 commercial buildings and 11 parking lots. *Alternative B4 would result in:* • Acquisition of 39 property parcels consisting of 2 residential buildings, 6 commercial buildings, 19 parking lots, 1 parking structure, and 2 open space lots. *Alternative B4a would result in:* • Acquisition of 22 property parcels consisting of 7 residential buildings, 2 commercial buildings, 9 parking lots, and 1 open space lot. *Alternative B4b would result in:* • Acquisition of 18 property parcels consisting of 7 residential, 6 parking lots, and 1 open space lot.	• The Uniform Relocation Assistance and Real Property Acquisition Act of 1970 requires that relocation and advisory assistance be provided to all eligible individuals and businesses displaced by a proposed project in accordance with the provisions of the act. • Property acquisition would occur after the Record of Decision. Property owners would be paid fair market value for property acquired. • Relocations could be accomplished either by providing compensation for moving residences and businesses back from the proposed right-of-way (where possible), or by providing assistance to locate and acquire available properties elsewhere.

Table ES-2. Summary of Environmental Impacts and Mitigation Measures (continued)

Subject Area	No Build Alternative	Build Alternatives	Potential Mitigation Measures for Build Alternatives
Economic	• Dallas' growth rate would occur at a lower rate than if the LRT were constructed.	• Contribute to the economic vitality and continued growth as part of a multimodal transportation strategy • Alternatives B4, B4a, and B4b would meet City's goal of providing light rail access to the convention center hotel and surrounding developable property. • Increased jobs for construction and operation	• No mitigation required. • Possible increases in property tax revenues as a result of increased development activity around rail stations or higher property values along the rail line is expected to more than offset the property value loss from the acquisition of properties for public use.
Air Quality	• No Impact	• No violation of National Ambient Air Quality Standards. • No increase in emissions.	• No mitigation required.
Noise and Vibration	• No Impact	• *All Build Alternatives* – moderate noise impacts for the W Hotel and an apartment building along Museum Way • *Alternative B4* – moderate noise impact at an apartment building • *All Build Alternatives* – vibration impact for the W Hotel and ground-borne noise impact at the lofts on Lamar Avenue • *Alternative B7* – vibration and ground-borne noise impact for the Manor House Hotel and Apartments and the Magnolia Hotel • *Alternative B4* – vibration impact at an apartment building • *Alternatives B4, B4a and B4b* - Ground-borne vibration Impacts at recording studio on Park Street • *Alternatives B4a and B4b* – vibration impact at Dallas Convention Center	• Mitigation would focus on relocation of crossovers and potential sound insulation of specific buildings. • Noise and vibration mitigation will be addressed in greater detail during preliminary engineering and final design.

Table ES-2. Summary of Environmental Impacts and Mitigation Measures (continued)

Subject Area	No Build Alternative	Build Alternatives	Potential Mitigation Measures for Build Alternatives
Historic, Architectural, and Archeological Resources	• No Impact	• Agency coordination initiated. Process of identification and determination of eligibility underway. • *Alternative B4, B4a and B4b* - may potentially cause an adverse effect to the Olive & Meyers Manufacturing Building, although it is pending eligibility for listing under NRHP Criteria A and C. • *Alternative B4* – would most likely impact the Chapel at First Presbyterian Church • *Alternatives B4a and B4b* – may adversely affect the Scottish Rite Temple, listed in the NRHP • *Alternative B4* – has other parcels located within the ROW that are more than forty years of age and would require evaluation for NRHP listing	• Mitigation measures to minimize harm and the determinations of eligibility of potential properties will be addressed in accordance with a Section 106 MOA that will be included in the Final EIS.
Parklands	• No Impact	• *Alternative B4* – Potential for direct impacts at Marilla, Akard, Young Triangle Park (Dallas Police Memorial) would not substantially impair or diminish use of the park.	• Correspondence between DART and the City of Dallas Park and Recreation Department is ongoing to ensure that none of the activities, attributes or features of the park would be adversely affected.

Table ES-2. Summary of Environmental Impacts and Mitigation Measures (continued)

Subject Area	No Build Alternative	Build Alternatives	Potential Mitigation Measures for Build Alternatives
Visual and Aesthetic Resources	• No Impact	• Introduction of structural elements that do not currently exist in the corridor, including portals. • Introduction of contact wires and support poles would have a minimal visual impact. • *All Build Alternatives* – portions of corridor are in Harwood Historic District and West End Historic District • *All Build Alternatives* – multi-family complex near Museum Way station • *Alternatives B4, B4a, and B4b* – row houses and multi-family complex located adjacent to proposed alignment • *Alternatives B4a and B4b* – station (Farmers Market Station) is planned at-grade in the parking lot of the Scottish Rite Temple • *Alternative B4* – alignment located adjacent to First Presbyterian Chapel	• Design stations to be compatible with surrounding area character and aesthetics • DART will apply context sensitive design to all portal areas, to make them compatible with local surroundings. • Compliance with West End Historic District Regulations • Compliance with Harwood Historic District Requirements • Screening near multi-family complexes and row houses • Screening/ Fencing around Farmers Market Station (B4a and B4b) due to proximity to Scottish Rite Cathedral • Incorporate design features to blend with the community and soften the visual impacts
Ecosystems	• No Impact	• Potential impact to landscaped median and areas of urban vegetation, such as landscape trees and shrubs in front of buildings and near sidewalks.	• Minimize clearing, cutting and pruning trees where possible along the proposed alignment. • Replacement of trees affected and relocated at other locations (to be determined in PE) along the alignment.
Water Resources	• No Impact.	• No Impact.	• Obtain Texas Pollutant Discharge Elimination System (TPDES) general permit for storm water discharges from construction activities. • Use best management practices to avoid seepage of contaminants into ground water. • See construction impacts.
Energy	• No Impact	• Energy Savings	• No mitigation required.

Table ES-2. Summary of Environmental Impacts and Mitigation Measures (continued)

Subject Area	No Build Alternative	Build Alternatives	Potential Mitigation Measures for Build Alternatives
Geology and Soils	• No Impact	• No Impact.	• During PE additional geotechnical investigations could be performed to develop site specific design criteria, selection of construction methods, and impacts to adjacent property.
Hazardous/ Regulated Materials	• No Impact	• *Alternative B7* – Total of 12 potential high risk sites of concern. • *Alternative B4* – Total of 2 potential high-risk sites of concern. • *Alternative B4a* – Total of 5 potential high-risk sites of concern. • *Alternative B4b* – Total of 6 potential high-risk sites of concern.	• See construction impacts.
Safety and Security	• No Impact	• Station area safety • Potential conflicts with vehicular or pedestrian traffic along Young Street with Alternative B4 • Passenger safety criteria	• B4 City Hall Station design that incorporates elements which maximize safety and security • Installation of traffic control measures • Enforcement of DART Safety and Security Program Plan

Table ES-2. Summary of Environmental Impacts and Mitigation Measures (continued)

Subject Area	No Build Alternative	Build Alternatives	Potential Mitigation Measures for Build Alternatives
Construction	• No Impact	• Increased traffic congestion and vehicular detours. • Temporary limits on parking and short term blockages of driveways. • Interrupted access to businesses. • Short-term disruption of utilities. • Airborne dust and possible mud on roadways. • Noise and vibration from construction equipment and vehicles. • Removal of or damage to vegetation (e.g., trees, shrubs, grass). • Short term use of vacant land for staging, and storage of equipment. • Sediment-laden runoff from construction sites can alter sensitive areas receiving these discharges. • Spillage of petrochemicals (fuels and lubricants) during operation, servicing, and maintenance of equipment. • Water quality degradation from storm water runoff is expected to be minimal. • Potential removal or disturbance of contaminated soils. • Removal and disposal of tunnel spoils	• Sequence contractor activities to minimize disruptions of traffic, parking, and access. • Implement maintenance of traffic plan. • Contain construction activities within as small an area as possible. • Coordination with the City of Dallas on related Noise Ordinances • Develop storm water management plans and sedimentation and erosion control plans. • Mitigation for construction vibration impacts will be provided during final stages of design • Coordination with utility companies on permanent station utilities • Use emission control devices and limit the unnecessary idling of construction vehicles • Develop project spoils disposal program
Cumulative Impacts	• No Impact.	• Benefits of induced development and economic activity. • Enhanced access to surrounding facilities and services. • Possible reduction in currently projected levels of air emissions.	• No mitigation required.
Environmental Justice	• No adverse, disproportionate impacts on minority, low-income, or other special populations. • No disproportionate benefits to these populations.	• No adverse, disproportionate impacts on minority, low-income, or other special populations. • Positive benefit of increased accessibility for disproportionately minority and low-income neighborhoods, or those with large numbers of elderly residents or youth.	• No mitigation measures necessary to protect minority, low-income, and other special populations beyond those to protect the general population.

S.4 Transportation Impacts

S.4.1 No Build

Under the No Build Alternative, transit service coverage would only expand to meet increases in population and employment through added bus service in the CBD. The No-Build alternative would not allow DART to implement its 2030 Transit Plan in its entirety because of the current constraint on the existing Pacific-Bryan LRT alignment. Without the second alignment, the Southport and West Dallas LRT lines would be truncated forcing transfers to other portions of the LRT system and reducing ridership overall. Effectively the DART LRT system serving the CBD would be capped and would not be able to expand to better serve the CBD and the region. In addition continued operation of the regional LRT system with a single CBD alignment may cause a steady degradation of service. Operation with tight headways, signalized at grade crossings involving major downtown streets and increased usage requiring longer boarding and alighting times would have a major negative impact on service in general and system reliability in particular. Transit user benefit calculations will be included in the Final EIS pending approval of the updated regional travel demand model by FTA.

Without a second D2 alignment, the opportunity to serve new markets such as the City Hall/Main Library, the new Convention Center hotel area and Farmers Market would be limited. Development potential of the south and southeast portions of the CBD would not be enhanced because there would not be a reliable transit alternative that could connect visitors and special event patrons in these areas to the rest of the LRT network. As rail transit can encourage more focused and less auto-dependent development, this economic opportunity would be much less likely to occur. DART completed several surveys specific to the CBD (parking, visitor, mid-day and special event) to supplement and strengthen travel forecast information in the CBD. Revised estimates will be reported prior to the completion of the FEIS that reflect the updated model.

Major highways (freeways and tollways) would experience continued increases in average daily traffic (ADT) volumes, and related decreases in Level of Service (LOS). Major arterial roadways would continue to have increasing ADT volumes and decreasing LOS.

S.4.2 Build Alternatives

The Build Alternatives would expand the geographic coverage of transit in the study area over a larger area compared to the No Build Alternative. Reliability would be increased with the LRT operating in a separate guideway and not subject to traffic congestion delays. The Build Alternatives would also provide travel time savings for transit riders during peak periods.

The LRT Alternatives would attract between 6,000 and 10,900 more transit riders to the DART system, compared to the No Build Alternative. Total LRT ridership would increase from 163,700 for the No Build Alternative to between 169,500 and 171,700 depending on the Build Alternative. The Build Alternatives would add between 5800 and 8000 new LRT riders compared to the No Build Alternative. Total system-wide passenger miles would increase between 1.4 percent and 1.6 percent compared to the No Build Alternative.

The Build Alternatives would reduce study area VMT only slightly compared to the No Build Alternative on a daily basis. Most arterial roadways would see only slight increases or no change in volumes and no change in level of service. There would be small amounts of localized added congestion or delay in the immediate vicinity of some LRT stations, and at some at-grade LRT crossings. Mitigation is proposed to address traffic impacts associated with the project, including signal and roadway intersection improvements in the vicinity of stations.

S.5 Cost and Financial Analysis

The capital and operating and maintenance (O&M) costs for the No Build and Build Alternatives are based on conceptual engineering and operations analysis developed during the D2 Transit Study consistent with FTA guidance.

The Project financial analysis considers costs, resources, and funding strategies associated with public transit services provided by DART. Unless otherwise stated in Chapter 5, the costs and revenues are presented in calendar year 2008 dollars and/or year-of-expenditure (YOE) dollars, which are based on a 2014 mid-point of construction estimate. The forecast period referred to is between 2008 and 2030.

S.5.1 Capital Costs

The capital cost estimate is the total cost of implementing the project. It is based on standard cost categories the FTA created to establish a consistent format for reporting, estimating, and managing capital costs for New Start Projects. This method allows for the summary of quantities to be tracked during the Project's follow-on design phases.

As described in Chapter 5, the cost estimates for specific items are based on typical construction practices and procedures on similar projects. Quantities are estimated based on conceptual engineering and service plans performed to date. Estimated costs for each standard cost category were increased in accordance with FTA guidance for estimates developed prior to preliminary engineering, to account for unknown but expected additional expenses.

The capital cost estimate of implementing each Build Alternative is presented in Table ES-3 Capital Cost Estimates, excluding finance charges, range from $377.56 million for the B4 Alternative to $612.56 million for the B4b Alternative in year 2008 dollars.

Table ES-3. Capital Cost Estimates for the Build Alternatives by Cost Category (millions of 2008 and 2014 YOE dollars)

Cost Categories	Build Alternatives							
	B7 Lamar-Commerce		B4 Lamar-Young		B4a Lamar-Marilla		B4b Lamar-Convent. Ctr. Hotel	
	2008	YOE	2008	YOE	2008	Y0E	2008	YOE
Project cost (construction, row, soft costs)	$527.21	$706.51	$343.24	$459.97	$507.43	$880.00	$556.87	$746.26
Contingency	$52.72	$70.65	$34.32	$46.00	$50.74	$68.00	$55.69	$74.63
Total Cost (Excluding Finance Charges)	$579.93	$777.16	$377.56	$505.97	$558.17	$748.00	$612.56	$820.89

Source: PB/AZB Joint Venture

S.5.2 Operating and Maintenance Costs

O&M costs were calculated for interim service options prior to 2030, as well as for 2030 No Build and Build Alternatives. For each operating scenario, operating statistics calculating peak vehicles, annual revenue train-hours and car-miles, revenue track miles, passenger stations by type, and number of maintenance yards were developed. Table ES-4 presents the resulting O&M costs for 2030 No Build and 2030 Build Alternatives.

Table ES-4. 2030 Operating and Maintenance Costs for 2030 Alternatives (in millions, 2008 dollars)

	Total LRT O&M Costs	Difference from No Build
No Build	$197.2	-
B7 Lamar-Commerce	$223.1	$25.9
B4 Lamar-Young	$224.2	$27.0
B4a Lamar-Marilla	$224.6	$27.4
B4b Lamar-Convention Ctr. Hotel	$224.8	$27.6

The 2030 No Build LRT system is estimated to cost $197.2 million annually to operate. All 2030 Build Alternatives add a minimum of nearly $26 million in O&M costs annually, largely because of the longer route patterns for the West Dallas and Southport Lines which are part of the 2030 TSP.

There are very minimal differences in operating costs between the Build Alternatives. The highest cost alternative (B4b Lamar-Convention Center Hotel) costs only $1.7 million more annually to operate than the lowest cost alternative (B7 Lamar-Commerce).

S.5.3 Funding Sources and Risk

A number of funding sources are assumed for implementation of the Project. These sources are described in Chapter 5 in detail; include DART and possible Federal and Local assistance. Only DART funds are available at this time as a request for Federal and other local funding is still pending. They are listed below:

- DART Funding – available budgeted capital funds ($511 million in YOE dollars) and fare revenues for O&M.
- Local Funds – requiring agreements with local entities and potential state legislation
- Federal Funds may include:
- FTA Section 5309 New Starts Program (49 USC 5309)
- Title 23 Projects of National and Regional Significance
- Surface Transportation Program (STP)/Congestion Mitigation and Air Quality (CMAQ) Funds (also known as “Flex Funds”)
- Potential New “Core Capacity” Program

- Potential New "Metropolitan Mobility" Program
- Potential New Funding from Climate Change/Energy Legislation

DART is exploring and evaluating an extensive range of possible federal funding sources to help fund the D2 project. At the time that this document was prepared, the federal surface transportation program that authorizes federal funding programs, the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) expires on September 30, 2009. It is not yet clear yet when Congress will enact new authorizing legislation, how existing funding programs might be modified (or perhaps eliminated) or whether potential new programs will be created.

S.6 Evaluation of Alternatives

The Build Alternatives would have both positive and negative aspects that must be balanced by decision-makers in selecting a LPA. In the trade-off analysis, only those differences that are discernable among the alternatives are considered. This helps focus on key differentiators, and permits decision-makers to apply their individual judgments with respect to what is being given up relative to what is being gained for each alternative. Table ES-5 summarizes the trade-offs:

Table ES-5. Trade-offs among Alternatives

Trade-Off Categories	Alternatives and Key Differentiators				
	2030 No Build Alternative	B7	B4	B4a	B4b
Transportation	• Gradual erosion of LRT service and reliability • No improved or new access to CBD transit markets • Lowest ridership	• Improved access to existing transit markets • Station areas overlap with Transit Mall • Higher ridership	• Access to new transit markets • No station area overlap with Transit Mall • Highest ridership	• Access to new transit markets • No station area overlap with Transit Mall • Higher ridership	• Access to new transit markets • No station area overlap with Transit Mall • Higher ridership
Environmental	• N/A	• Property acquisition (14 parcels)* • Potential impacts to adjacent buildings due to underground station access and tunnel ventilation facilities	• Property acquisition (39 parcels) • Property and parking Impacts at First Presbyterian Church • Relocation of Young St. access to City Hall Garage	• Property acquisition (22 parcels) • Property and parking Impacts at Scottish Rite Temple parking lot • Impacts to City Hall Garage	• Property acquisition (18 Parcels)* • Property and parking Impacts at Scottish Rite Temple parking lot • Impacts to City Hall Garage

Table ES-5. Trade-offs among Alternatives (continued)

Trade-Off Categories	Alternatives and Key Differentiators				
	2030 No Build Alternative	B7	B4	B4a	B4b
Land Use and Economic Development	• No change from NCTCOG forecast within the project corridor	• Potential redevelopment along Commerce St.	• Greatest TOD potential	• Good TOD potential	• Direct access to proposed Convention Center Hotel • Good economic development potential
Construction	• N/A	• Greatest construction impacts within Commerce Street • Higher spoils disposal	• Greatest construction impacts along Young Street • Least spoils disposal	• Moderate overall construction impacts • Higher spoils disposal	• Greatest construction impacts within Lamar Street • Higher spoils disposal
Capital Cost (Millions 2008 $)	• N/A	• $580 • Higher	• $378 • Low	• $558 • High	• $613 • Highest
Cost Effectiveness Capital Cost per Rider and TSUB	• N/A • N/A	• $50.22 • TBD	• $43.65 • TBD	• $50.10 • TBD	• $51.29 • TBD
Financial	• N/A	• Requires additional funds	• Feasible	• Requires additional funds	• Requires additional funds
Public and Agency Support	• N/A	• Transit rider and local resident support • Less stakeholder support than for other alternatives	• Local resident and stakeholder support	• Local resident and stakeholder support	• Preferred by City of Dallas • Local resident and stakeholder support

*Does not include private property required for access to underground stations along Commerce Street or at the Convention Center Hotel.
Source: PB/AZB Joint Venture

At $378 million, Alternative B4 would be the least expensive and most cost effective to construct due to the shortest tunnel with only one underground station and the highest ridership. It would serve new transit markets and would have the greatest potential for transit oriented development. It would also require the most property acquisition, including property impacts on First Presbyterian Church for the Harwood District Station. It would require the reconstruction of Young Street east of Field Street and the relocation of the Young Street access ramp to City Hall Garage. Alternative B4 has the support of some local residents and stakeholders, but is opposed by the First Presbyterian Church and the City of Dallas.

Alternative B4b would directly serve the proposed Convention Center Hotel and support the growth of the Dallas Convention Center, as well as development of

vacant property in the surrounding area. It would serve new transit markets throughout the corridor, including redevelopment areas east and south of City Hall and the Farmers Market area. It is the preferred alternative of the City of Dallas along with a number of stakeholders and some downtown residents. As currently defined, Alternative B4b would impact Scottish Rite Temple property for construction of the Farmers market Station, which is opposed by the property owners. It would be the most expensive alternative ($613 million) with the longest alignment, over a mile of tunnel and three underground stations, including a station within an existing cavern under City Hall. Alternative B4b would not be financially feasible without additional federal funding or other funding sources.

Alternative B4a is similar to Alternative B4b, but it would have an underground station approximately 1,200 feet east of the Convention Center Hotel. It would have a slightly lower cost ($558 million), and fewer construction impacts. Public support was minimal for this alternative.

Alternative B7 would have a high cost ($580 million) and would serve an existing transit market that is already served by the Pacific/Bryan Street Transit Mall and Commerce Street bus routes. Construction impacts would be severe along Commerce Street and public support was less than for other alternatives.

S.7 Public and Agency Consultation and Coordination

A Public Involvement and Agency Coordination Program was developed specific to the D2 Transit Study. It was implemented to receive public and agency input throughout the study, particularly in coordination with decision-making milestones including Public Scoping, Alternatives Screening, the DEIS evaluation of narrowed Alternatives, and the refinement of the Preferred Alternative(s).

The goals of the Public Involvement Program have been to:

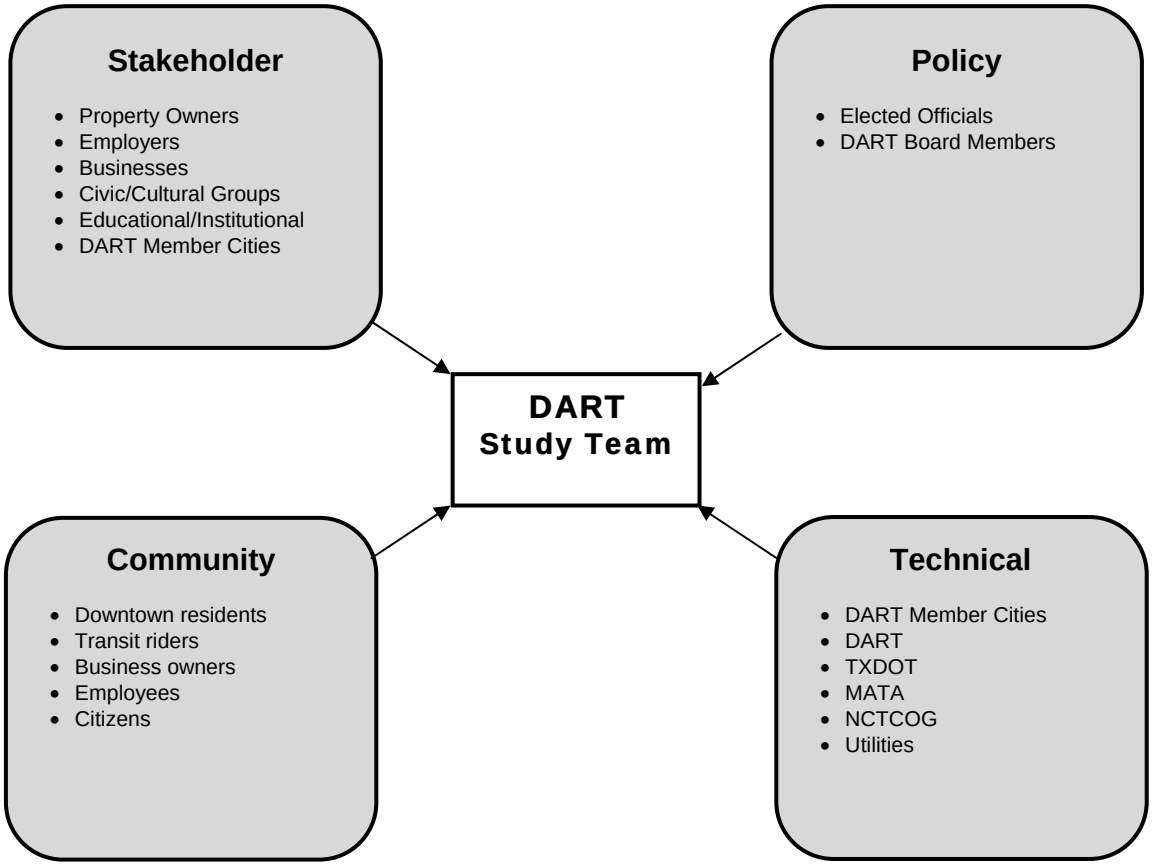
- Provide opportunities for early and continuous agency and public participation.
- Educate the public on the Federal planning process, the NEPA process and the project development process.
- Provide the public with presentations on the technical issues, focusing on analysis results, key factors, and the benefits and impacts of competing choices.
- Assure inclusion of traditionally under-represented groups in the process.
- Understand the competing community interests and address them, while striving for consent.
- Evaluate the effectiveness of outreach activities in order to refine the Public Involvement Plan and utilize the most cost effective techniques.

Public involvement on this project officially began in April 2007 when a Notice of Intent (NOI) was published on April 12, 2007 in the Federal Register. A mailing list was developed and 14,072 scoping meeting invitations were distributed by mail to interested parties.

Stakeholder, Community, Technical, and Policy Advisory Committees provided forums for dialogue, coordination, and consultation. Advisory committee members

participated in multiple meetings and workshops to allow these stakeholders to weigh information and communicate their diverse perspectives and interests in the selection of a Preferred Alignment. Stakeholder, Community, Technical, and Policy Advisory Committee members represented the interest groups identified in Figure ES-2.

Figure ES-2. Advisory Committees



Four rounds of public meetings were held prior to the publishing of the DEIS. Round one meetings were for Public Scoping. Round two and round three public meetings allowed the public to review progress on the screening of Alternatives. Each round of public meetings included at least two meetings and a 21-day comment period. Public and agency comments were documented and reviewed. New alignment options were developed to respond to comments where appropriate.

In addition to the public and agency involvement meetings, DART staff conferred with municipal agencies from Dallas, and with other regional agencies in order to ensure concurrence on potential environmental impacts, and to coordinate mitigation efforts with other guidance and current planning provisions. Copies of the agency coordination letters are reproduced in Appendix D of this document.

During the scoping and planning of the proposed project, DART actively engaged agencies and interested parties along the alignment in a proactive and iterative public involvement process. In addition to being especially informative to the design option alternatives that were developed in response to comments, this process was consistent with DART's commitment to its Public and Agency Involvement Plan. Well over 100 public and agency input meetings and venues have been conducted to date to gain input and receive comments.

In accordance with federal regulations, the DEIS will be available for public comment for 45 days after the publication of the Notice of Availability (NOA) in the *Federal Register*. Copies of the document will be sent to affected and interested local, regional, state, and federal agencies. Parties with a known interest in the project will be notified by direct mailing of the availability of the document and the public comment period. A final decision on the preferred alternative will not be made until after the close of the comment period and all comments have been reviewed and taken into consideration.

CHAPTER 1.0
PURPOSE AND NEED

1.0 PURPOSE AND NEED

Dallas Area Rapid Transit (DART), in cooperation with the Federal Transit Administration (FTA), has initiated the Environmental Impact Statement (EIS) process, concurrent with a planning Alternatives Analysis (AA), for transportation improvements in Downtown Dallas, Texas. The EIS phase of the Downtown Dallas Transit Study (D2 Study) includes preparation of a Draft Environmental Impact Statement (DEIS). A Final Environmental Impact Statement (FEIS) will be prepared in conjunction with Preliminary Engineering (PE) following selection of a Locally Preferred Alternative (LPA) and FTA approval to enter PE. The Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register* on March 26, 2007.

This chapter describes the purpose of the proposed project and presents the need for transportation improvements in Downtown Dallas. It contains an overview of the project study area in relation to the region, with a focus on land use, population and employment, travel demand, and existing transportation facilities and services. It also describes the specific transportation needs to be addressed and project goals and objectives. The chapter concludes with a discussion of the role of the EIS in the decision-making process.

1.1 Study Description

The purpose of the proposed action is to allow DART to realize its vision for the 2030 Transit System Plan (TSP) by:

- Increasing transit capacity in Downtown Dallas to support increased demand and implementation of the 2030 TSP;
- Enhancing system operational flexibility and schedule reliability;
- Improving access and circulation to, through, and within the central business district (CBD);
- Promoting transit supportive land uses and sustaining the economic strength of the CBD; and
- Accommodating travel demands associated with continued regional growth.

This vision depends on providing a new transit link through the Dallas Central CBD. Planning for the project has been ongoing since the 1990's by DART, the City of Dallas and other organizations, who have identified a wide range of transit options. The planning to date indicates that a reliable system providing quality transit service is at risk without an additional transit connection through Downtown Dallas. The project is also part of a larger transportation and land use vision for the CBD, the City of Dallas and the region.

The D2 Study continues and expands these efforts by conducting a formal AA/DEIS process. The process involves a wide range of agency and public participants developing alternatives for the draft environmental impact documentation and the selection of a LPA. A request will be made to FTA to advance the LPA to the next stage of project development, which is preliminary engineering and final NEPA documentation.

1.2 Description of Study Area

The D2 study area is located within the metropolitan area of Dallas, in Dallas County, Texas. Specifically, it contains the CBD and surrounding key activity districts, as shown in Figure 1-1. The study area includes the West End, Arts, City Center, Main Street, Farmers Market, Government, and Convention Center/Reunion Districts, situated within what has historically been considered the downtown CBD boundary, which is the freeway loop formed by US 75 and IH 45 to the east, IH 30 to the south, IH 35E to the west, and Woodall Rodgers Freeway to the north. It also includes the surrounding areas of: Deep Ellum, an entertainment district to the east; Uptown, a residential, commercial and employment district to the north; Victory Park, an entertainment, residential and office district to the north; the Trinity/Design District to the northwest; and Cedars, a residential, commercial and entertainment district to the south.

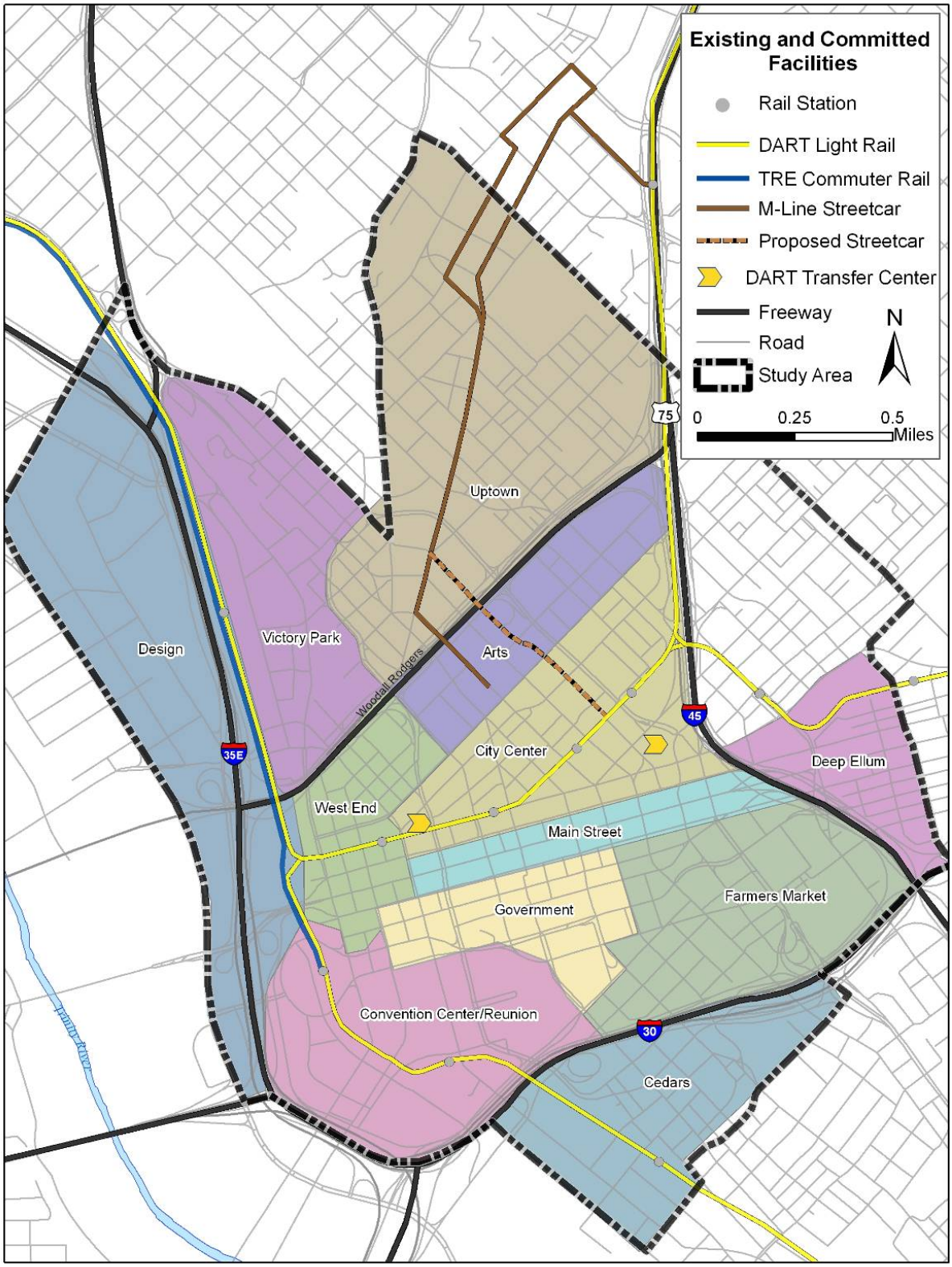
1.2.1 Study Area Setting

The study area encompasses a portion of Downtown Dallas, which acts as the commercial core of the Dallas metropolitan area and home to a growing residential population. Downtown Dallas has primarily been an employment center, but it is transitioning into a more mixed-use environment. There is an increasing number of new and converted high-density residential developments, including condominiums, apartments, and lofts. Downtown Dallas continues to experience growth in entertainment-related uses, with the construction, redevelopment, and enlargement of venues such as: completion of the American Airlines Center; recent additions to the Convention Center; planned improvements to the Farmers Market; construction of the “W” Hotel and Victory Park; expansion of the Arts District with new venues; and the establishment of the first grocery store during the modern era of Downtown Dallas.

Along with these new entertainment sites, Downtown Dallas contains many pre-existing attractions. The north section of the CBD, known as the Arts District, contains venues for the visual and performing arts and is in the process of adding several more, while the southern section of the CBD has several civic destinations, such as Dallas City Hall, J. Erik Jonsson Central Library, and the Dallas Convention Center. A number of historic places and properties also exist within the project study area, including the site of the assassination of President John F. Kennedy. Toward the western edge of the project study area, this site and the surrounding buildings are designated as the Dealy Plaza National Historic Landmark District. Also in the vicinity is the West End Historic District, a group of preserved late-nineteenth-century brick warehouses that have been adapted for use as restaurants and shops.

The primary land use of the CBD is a combination of commercial and government, with many parcels being utilized for downtown parking. Industrial, distribution, and warehouse-oriented uses are concentrated to the west and south of downtown. The convergence of railroad lines and the presence of roadway access made this a suitable location for manufacturing. However, a transformation is occurring in the area to the west, known as the Trinity/Design District, with mixed-use residential developments, the City of Dallas Trinity River Project, and recognition as an exclusive commercial hub for home furnishings. While high-density residential development is increasing within Downtown Dallas, most of the single and multi-family residential use is north to northeast or south, just beyond the CBD.

Figure 1-1. Study Area



Source: PB/AZB Joint Venture

1.2.2 Development and Growth

Table 1-1 identifies employment and population growth in the study area in relation to Dallas County and the Metropolitan Area (MA), previously the Metropolitan Planning Area. The MA is centered on the four urban counties: Collin, Dallas, Denton, and Tarrant. Also included in the MA are portions of the five bordering counties (Ellis, Johnson, Kaufman, Parker, and Rockwall). As identified in the table, population and employment in the study area are expected to continue to increase through 2030.

Table 1-1. Employment and Population Projections

Activity Center	Employment		Percent Growth 2000-2030	Population		Percent Growth 2000-2030
	2000	2030		2000	2030	
Study Area	311,121	413,165	32.8%	25,024	76,951	207.5%
Dallas County	1,745,109	2,540,076	45.6%	2,218,899	2,829,580	27.5%
Region (MPA)	3,072,791	5,256,667	71.1%	4,860,045	8,503,146	75.0%

Source: NCTCOG

Employment in the study area is expected to increase by approximately 33 percent. This is a lower growth rate than the anticipated growth rates for Dallas County or the region. Even though the Downtown Dallas share of total employment for the region has declined, it is still the largest employment center in North Texas (20 percent of all Dallas jobs). Noteworthy demographics about these employees includes: 56 percent of them live outside of the City of Dallas, the median commute distance is 20 miles and 50 percent of them drive their own vehicle to work.

The largest growth in residential population is expected to occur in and adjacent to Downtown Dallas, as new developments such as the Cedars and Victory Park promote downtown living. Population in the study area is expected to grow by 200 percent, from approximately 25,000 to over 75,000 by 2030. This is a substantially higher growth rate that the 28 percent rate for Dallas County and the 75 percent rate for the region.

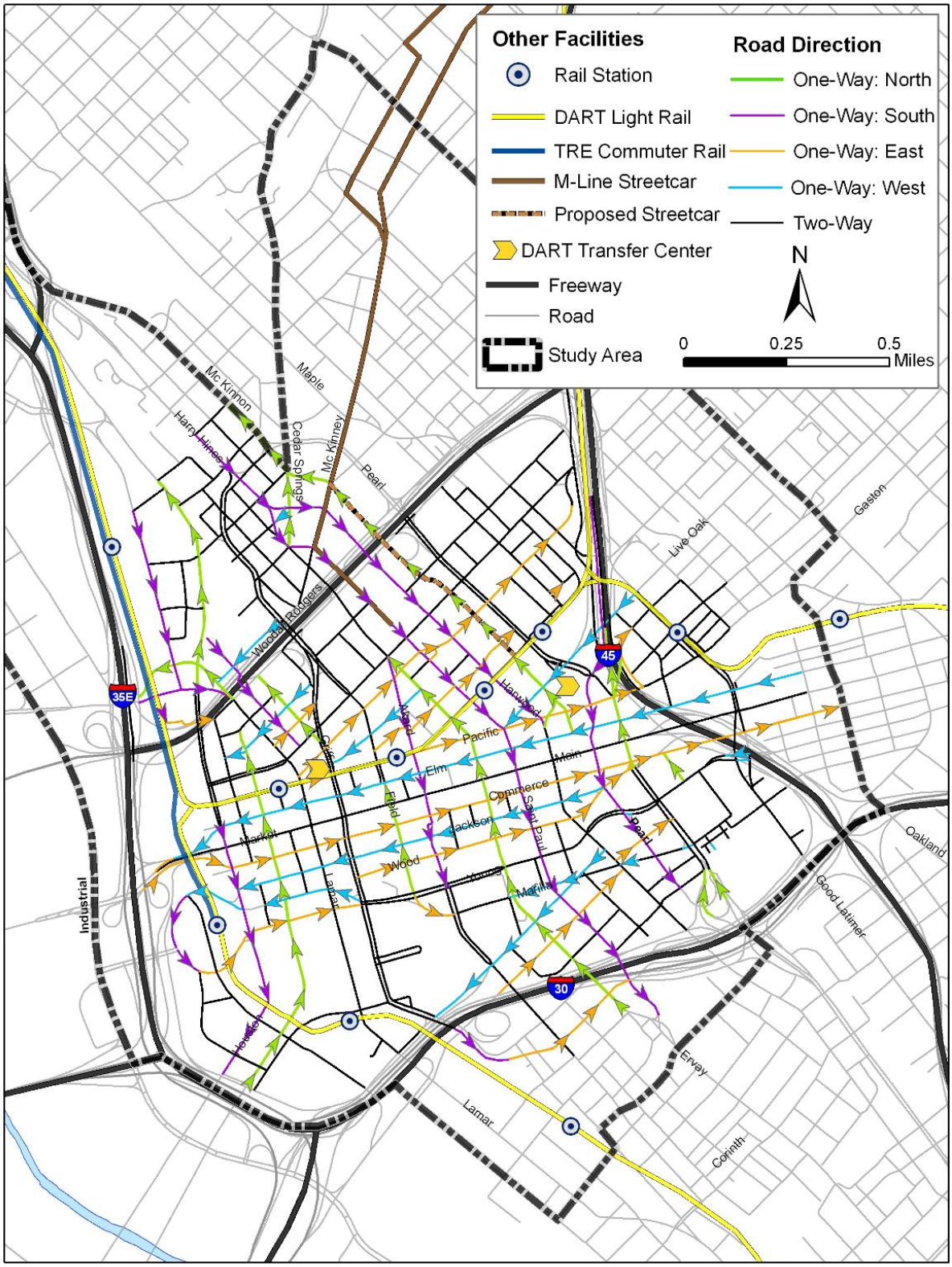
1.2.3 Transportation Facilities and Services

Transportation facilities and services within the study area include roadways and public transit.

1.2.3.1 Roadways

An extensive network of freeways, major arterials, collectors, and local streets serves the study area. Figure 1-2 shows the major roadways and the street network located within Downtown Dallas. The freeway loop formed by US 75 and IH 45 to the east, IH 30 to the south, IH 35E to the west, and Woodall Rodgers Freeway to the north provides access from the surrounding areas into the CBD. The study area contains a modified grid road network that shifts as it approaches the center of the CBD. Streets have a diagonal orientation in the northern section of the study area, become more rectilinear in the Main Street District, and then move back to the diagonal orientation to the south. While outside of the CBD most of the roads are two-way, the CBD is comprised of primarily one-way pairs. Griffin Street and Pearl Street/South Central

Figure 1-2. Study Area Roadways and Street Network



Source: PB/AZB Joint Venture

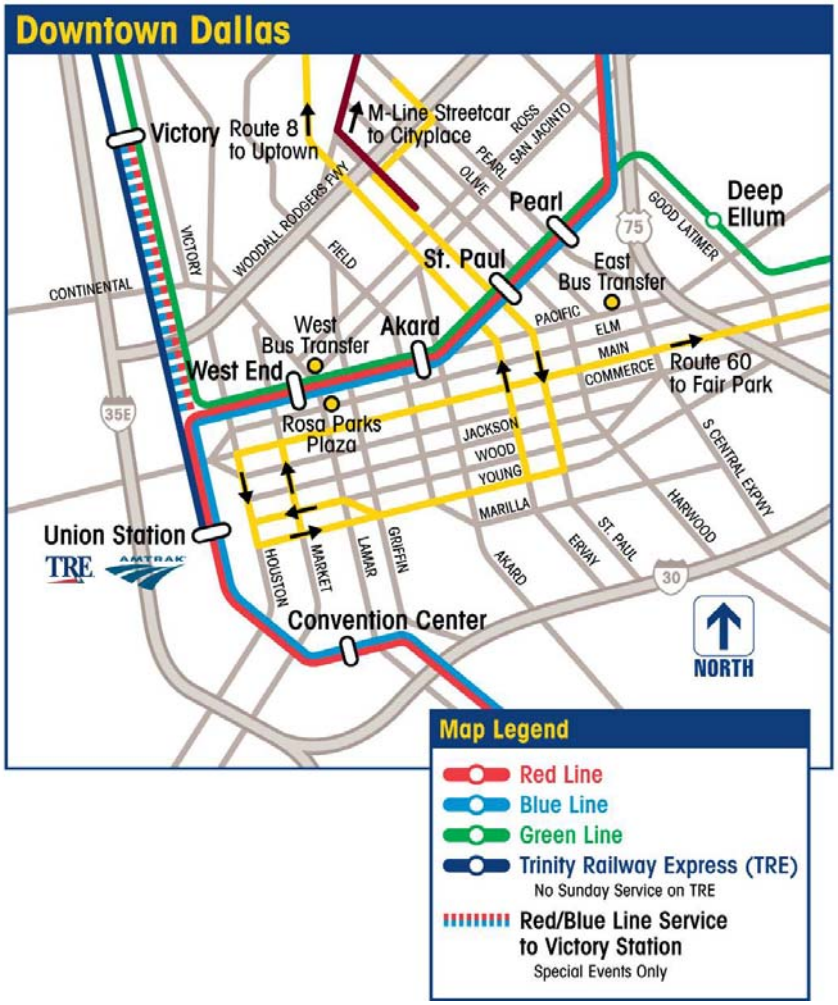
Expressway function as the two-way north-south arterials, with Ross Avenue and Young Street providing bi-directional movement east-west. All of the freeways and several of the downtown streets currently operate under congested conditions, especially during peak hours.

1.2.3.2 Public Transit

The DART transit system is comprised of various modes, facilities, services and programs. Currently, DART serves Dallas and 12 surrounding cities with approximately 130 bus routes, 48 miles of light rail transit, 84 freeway miles of high occupancy vehicle (HOV) lanes, and paratransit service.

DART's local and express buses have a stand alone function in many corridors, but also supplement the light rail by providing feeder service. Many local and express routes circulate through or terminate at downtown. A heavy amount of bus activity occurs at the two downtown transit centers, West Transfer Center and East Transfer Center. The East Transfer Center serves 17 bus routes, while the West Transfer Center serves 25 bus routes. Figure 1-3 shows the downtown transit facilities.

Figure 1-3. Downtown Dallas Transit Facilities



Source: DART

The light rail transit (LRT) system is designed in a hub-and-spoke fashion and serves a line haul function. Through 2018, the DART light rail system is planned to grow to 93 miles. When complete, the LRT system will run from the system focal point in the CBD along radial lines to the northeast, north central, northwest, southwest, south and southeast, as shown in Figure 1-4. The 2030 TSP recommends an additional 17 miles of LRT to the east, west and south for a system-wide total of 110 miles. By 2030, the LRT is projected to carry 160,000 riders a day. The three LRT stations with the highest passenger activity (Union Station, West End and Akard) are located in the CBD. The 2030 TSP also includes an east-west link along the Cotton Belt corridor to the north of Downtown Dallas that would connect several member cities and Dallas – Fort Worth International Airport (DFWIA).

DART and the Fort Worth Transportation Authority (the T) jointly operate 35 miles of commuter rail transit (the Trinity Railway Express or TRE), linking the downtowns of Dallas and Fort Worth with stops in the mid-cities and south end of DFW International Airport. DART also supports the McKinney Avenue Transit Authority, which manages a historic trolley line that links the Arts District within the CBD to Uptown and West Village. The McKinney Avenue Trolley serves the visual and performing arts venues, several hotels, and retail centers. It also provides a connection to the LRT system at the DART Cityplace station. A realignment and extension to the south end of the historic trolley line will provide a connection along Olive Street to the LRT at the St. Paul Station.

1.3 Need for the Proposed Action

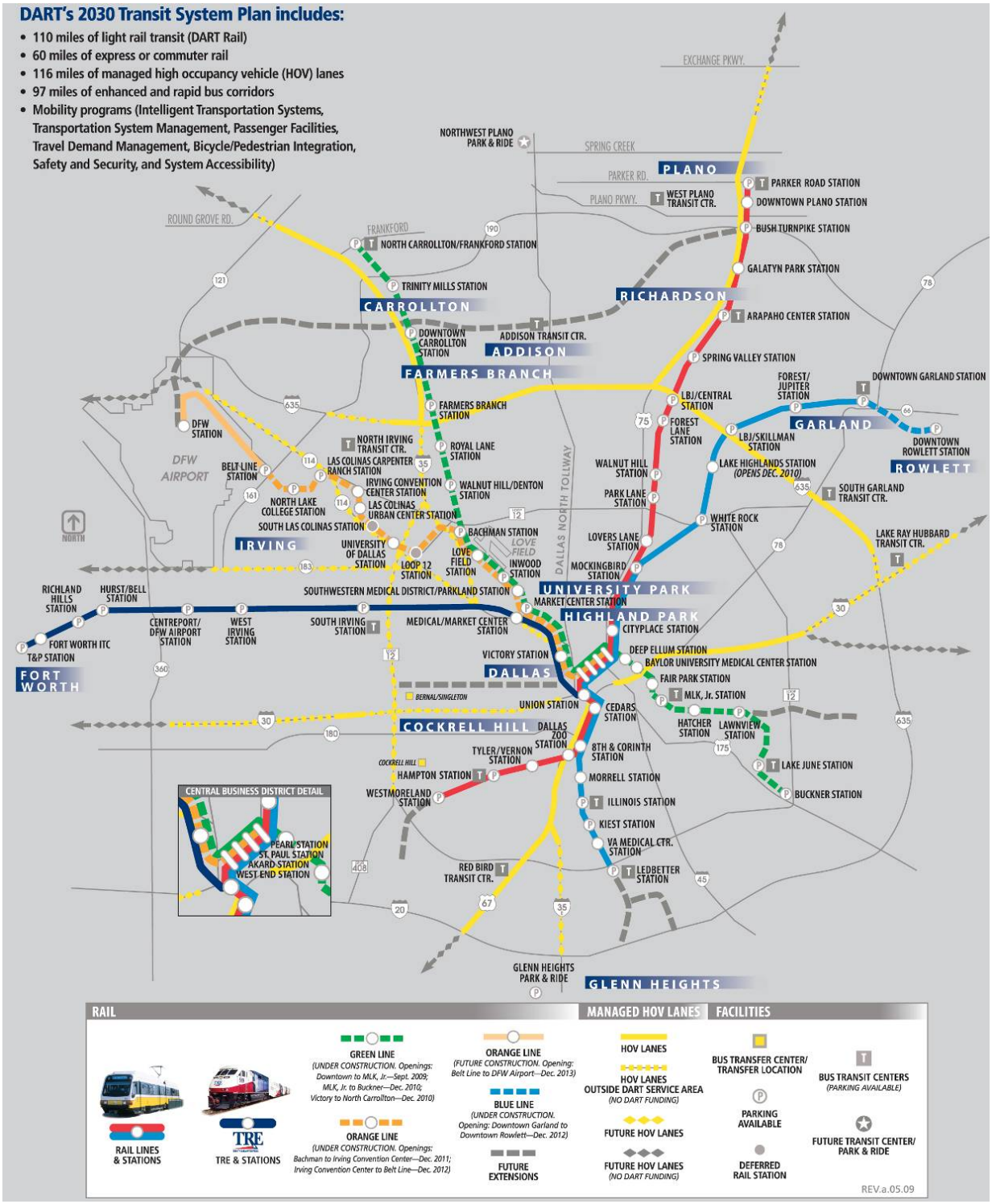
Transportation improvements are needed in Downtown Dallas to address capacity constraints of the light rail system. These future constraints are associated with increasing demands on the existing and committed light rail lines that will occur as a result of regional population and employment growth, changing land patterns, and proposed regional rail connections. New radially-oriented rail lines recently approved in the 2030 Transit System Plan will also influence the need for CBD improvements. Other concerns relate to rail system operational flexibility, given the heavy reliance of the existing and committed light rail routes on the single transit mall, and opportunities for ensuring service reliability. In addition, there is a need to address the growing demand for internal downtown trips with improvements to the downtown bus network, with LRT feeder, special event shuttle or circulator services.

1.3.1 Specific Transportation Needs

The specific needs to be addressed by the proposed action include:

- Relieve CBD LRT Capacity Constraint: With four LRT lines (Red, Blue, Green, and Orange) operating in the CBD by 2011, the existing transit mall will be at capacity. Capacity is also limited by an agreement with the City of Dallas that caps transit mall train frequencies at 2 ½ minutes in each direction, and restricted movements through two CBD junctions. Other factors, such as DART's signalization system, high cross street traffic volumes at key signalized intersections, train and vehicle configuration, and station dwell times also limit capacity.

Figure 1-4. Existing, Committed, and Planned Light Rail System



Source: DART

- Growing Travel Demand and Congestion: Ridership on DART is increasing and is projected to increase over time. Regional population, employment, and vehicle miles traveled (VMT) are projected to double. These growth and travel demands led DART to include additional LRT lines in the 2030 Transit System Plan. Connecting these lines in the CBD will create the opportunity improve connections and transfers for through-trip access to the regional transit system.
- Maintaining a Quality System and Service: Increasing dependence on the existing transit mall will force DART to cap peak period train schedules, thereby diminishing operating flexibility, efficiency and service. Any disruption along the transit mall will disrupt service throughout the entire system and reduce reliability. Frequent, reliable transit service attracts customers to DART and provides a competitive advantage over the automobile.
- Serve New CBD Transit Markets: Several key CBD markets and activity centers are not directly served by the LRT system, such as the Government District (including City Hall/Main Library), Farmers Market, Bryan Place, County Jail, Arts District, and the Design District. Other markets such as the growing downtown residential population, tourists, noontime lunch crowd, and special events patrons do not have an attractive and convenient way of linking their trip purpose with activity centers on transit.
- Enhance CBD Development Potential: The CBD has primarily been an employment center but is transitioning to a more mixed-use environment. Study area employment is expected to grow by 33 percent and population is expected to triple from 2000 to 2030 (Table 1-1), according to the North Central Texas Council of Governments (NCTCOG). Substantial new development and redevelopment is underway, planned and proposed. There is a desire by the City of Dallas and DART to accommodate this growth near transit stations in coordination with developers and local areas to achieve both increased transit ridership and greater economic benefits.

1.3.1.1 Transportation System Deficiencies

DART's LRT vehicles travel unimpeded except at stations inside of the CBD or comparable urbanized areas. Factors that prohibit the optimum service levels to be achieved include:

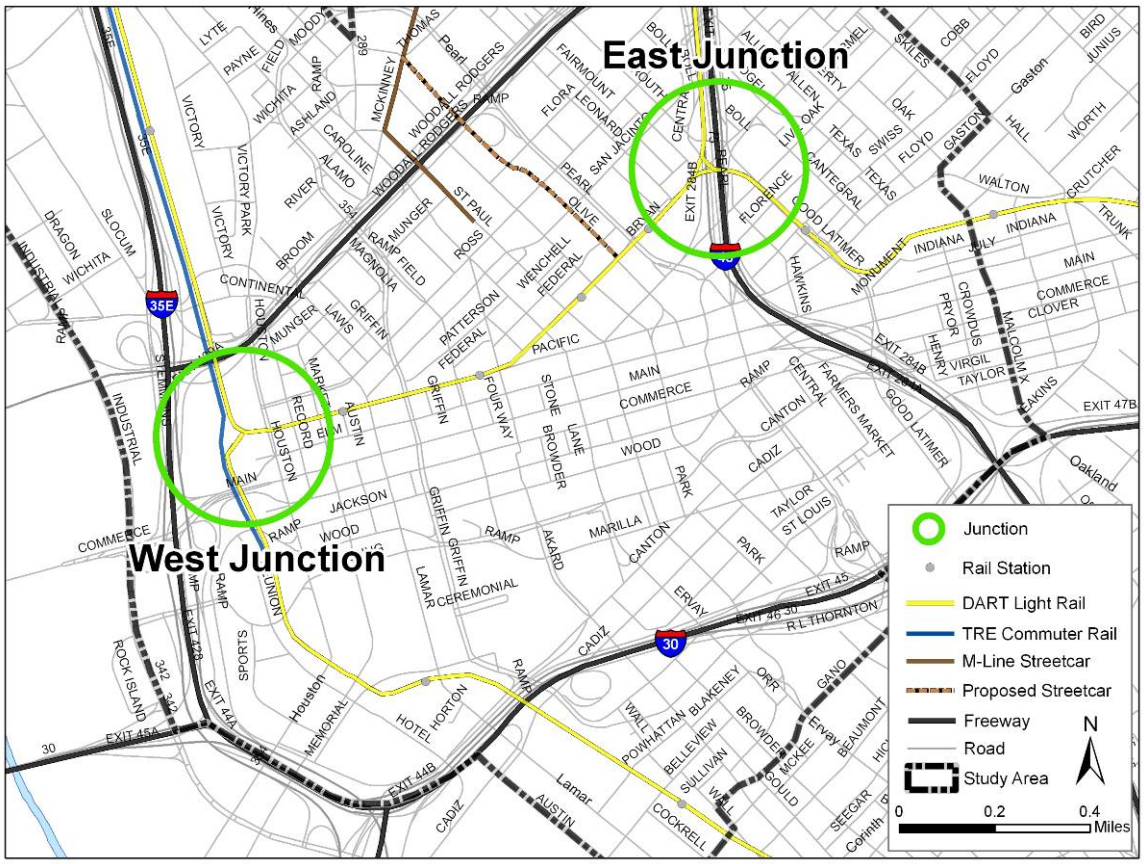
- The reliance of all LRT routes on at-grade junctions on each end (east and west) of downtown,
- DART's LRT vehicle and track signal/communication system (90 second between train trips),
- Traffic signal cycle length (75-second) and/or the use of partial priority at major city streets in the CBD and full priority only at minor streets,
- Inbound Green line relies on locking the junction route and having Pearl station free to clear the route, and
- Other issues, such as station dwell times, city street speed limits, shared auto/LRT corridor environment, pedestrian activity, and train arrival time variance.

Each of these deficiencies are described in further detail below:

Restrictive Junctions

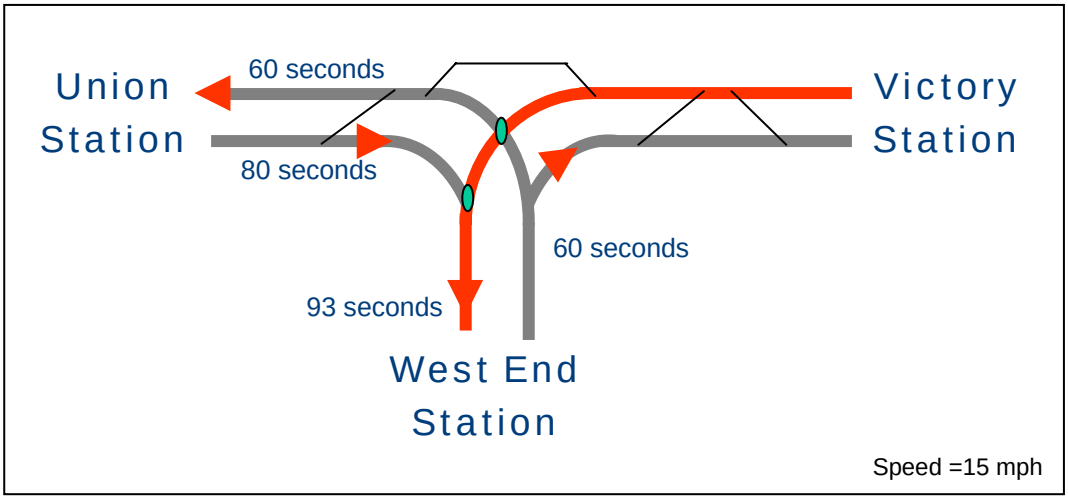
As shown in Figure 1-5, two junctions exist in Downtown Dallas—the east junction near Hawkins Street and the west junction near the West End Historic District. Junctions occur wherever two or more rail lines merge or cross, resulting in reduced service capacity. This is because one train must wait for the other's movement to be completed before entering the intersection. In addition to the actual crossing time, standard waiting periods occur prior to arrival and afterward to ensure safe clearance. DART's current LRT vehicle and track signal/communication system, which relies on visual observation in some instances, requires greater time buffers than a state-of-the-art communication "cab control" system. The current movements and actual crossing times for the West End junction are shown in Figure 1-6. Although some movements require only 60 seconds to clear, other movements require up to 93 seconds. This will place a large burden on both junctions in the CBD when the Green and Orange LRT lines become operational. It should be noted that DART recently constructed improvements at the east junction. However, these are primarily to straighten track curves (minimizing maintenance and improving travel time), and to facilitate the Green Line connection to the southeast.

Figure 1-5. Downtown LRT Junctions



Source: PB/AZB Joint Venture

Figure 1-6. West Junction Crossing Movements



Source: PB/AZB Joint Venture

Delays at Signalized Intersections

In addition to the junction movement requirements, LRT vehicles are restricted by fixed traffic signal timings (i.e., 75-second cycle lengths) at intersections on the transit mall that are not favorable for train operations. This decreases the number of LRT vehicles that can pass through the CBD from 60 trips per hour to 48 trips per hour. Reducing the cycle length would increase the train capacity of the transit mall, but would also increase auto delays at signalized intersections, especially during peak hours. An agreement with the City of Dallas will implement transit signal priority along the current transit mall when the Green Line opens.

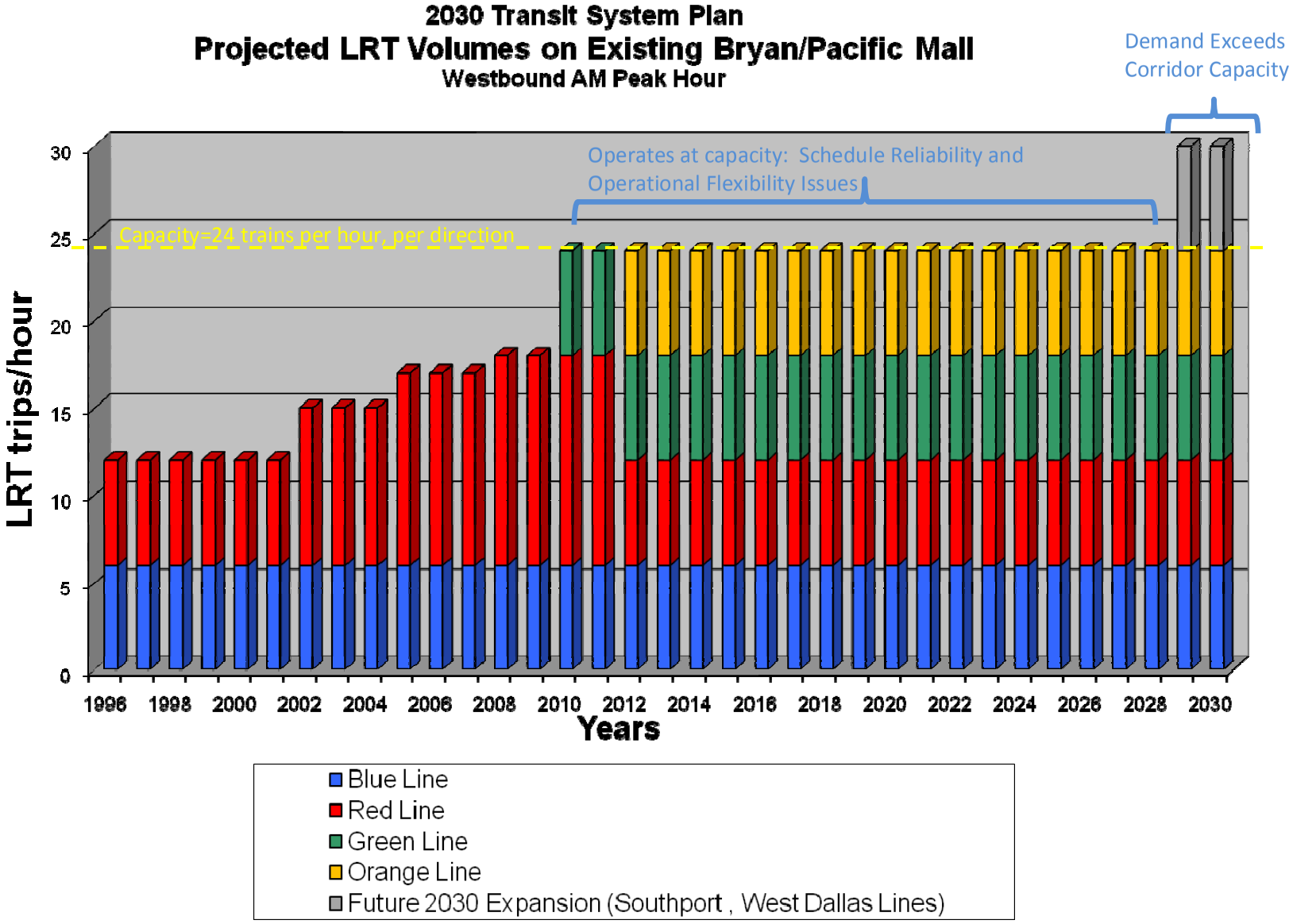
Mandated Capacity Constraint

To avoid severe congestion in the CBD, the City of Dallas and DART entered into an Interlocal Agreement (ILA). The ILA directs DART to begin setting aside money and to initiate the planning, design, and construction of a subway-running LRT within the CBD when service begins to operate within the transit mall at anything less than 2-1/2 minute frequencies in each direction. This effectively limits the corridor capacity to 24 trains per hour per direction. While the ILA specifies a LRT subway, DART will examine a variety of modes and configurations to address needs.

Operational Capacity Constraint

Regardless of the mandated ILA restriction, a recent DART analysis suggests that frequencies lower than 2-1/2 minutes may result in diminished train operations, such as on-time performance due to queuing. While DART currently operates at approximately 3-1/2 minute headways during the AM peak hour in the southbound direction, the 2-1/2 minute threshold will be met when the Green Line becomes operational in September 2009. Current and near term LRT service levels are shown in Figure 1-7.

Figure 1-7. Volume to Capacity Analysis



Source: DART

Longer Downtown Station Dwell Times

Other conditions are not exclusive to LRT service in the CBD, but affect service in the CBD to a greater degree than at other locations. These conditions include dwell times and the environment within which the LRT vehicles operate. Because many of the rail passengers are boarding and alighting at downtown stations, the time spent waiting for this activity to be completed is greater at stations inside the CBD, compared to stations outside of the CBD. Greater dwell times lower operating speeds and, in turn, reduce corridor capacity.

Slower Downtown Operating Speeds

The operating environment also affects travel speeds. The existing transit mall was constructed along existing street corridors within the CBD. While some sections were closed to auto traffic for safety reasons, there are other sections where it was infeasible because of the location of critical garage access and/or other circulation reasons. The proximity of the two parallel modes necessitates that travel speeds be regulated for safety reasons. Further, because the transit mall is at-grade, there is also the issue of the heavy cross-street traffic generated in a downtown area. Conflict points with pedestrians exist as well. The density of the CBD produces considerable pedestrian activity, some of which is LRT service-related. All these factors limit the operating speeds that can safely and practically be achieved through the CBD.

Train Length Constraint

An alternative that increases the person-carrying capacity of an LRT corridor without increasing frequency of service is to add light rail vehicles to a train.

While it does not completely address the capacity need, DART and the City of Dallas are addressing this issue three ways:

1. New light rail vehicle (LRV) low-floor sections are being inserted in existing trains for the entire rail fleet. These “Super LRVs” (SLRV) provide more seats and provide for platform-level boarding for customers with wheelchairs, strollers or bicycles, and mobility-impaired patrons with difficulties climbing up the steps into the regular LRVs. The current 115 vehicle fleet is being modified and all new vehicles purchased will include the low floor insert. To provide level boarding, the four CBD station platforms were raised by nearly 8 inches and all outlying stations will be modified to allow for an area of level boarding.
2. As part of the platform modifications, lanes on each side of the St. Paul Station were narrowed to allow for the 3-car SLRV train. While all of the CBD stations currently can accommodate a 3-car SLRV train, some outlying stations can only accommodate a 2-car SLRV as of September 2009.
3. When the Green Line becomes operational, LRT signal priority will be in place to minimize blocked intersections.

Non-Recurring Incidents/Special Events on Transit Mall

While the issues discussed above are the major reoccurring constraints associated with the existing and committed rail system, other factors influence the CBD capacity and/or the amount of traffic it will need to accommodate. On occasion, minor incidents or events within the CBD have resulted in temporary shutdown of the entire

system. When these events occur on any of the outlying line segments, they have a minimal impact. But when they occur on the transit mall, all LRT lines are affected, and the effect is exponential. Maintenance personnel, operating personnel and/or law enforcement are expected to expedite removal of the obstruction or other cause of delay.

1.3.2 Purpose of the Proposed Project

The purpose of the proposed project is to provide for the implementation of a transit connection through Downtown Dallas that:

- provides the necessary capacity to accommodate existing and future travel demands;
- improves the operational reliability of the transit network; and,
- maintains a quality service.

The project alternatives would provide bus facility and service improvements to improve bus-rail interface, access to rail transit stations, and circulation among major downtown activity centers. The project alternatives would meet the goals for building public support by improving mobility throughout the DART system; for encouraging sustainable economic growth and development; and for implementing improvements in a fiscally responsible and timely manner.

1.4 Project Goals and Objectives

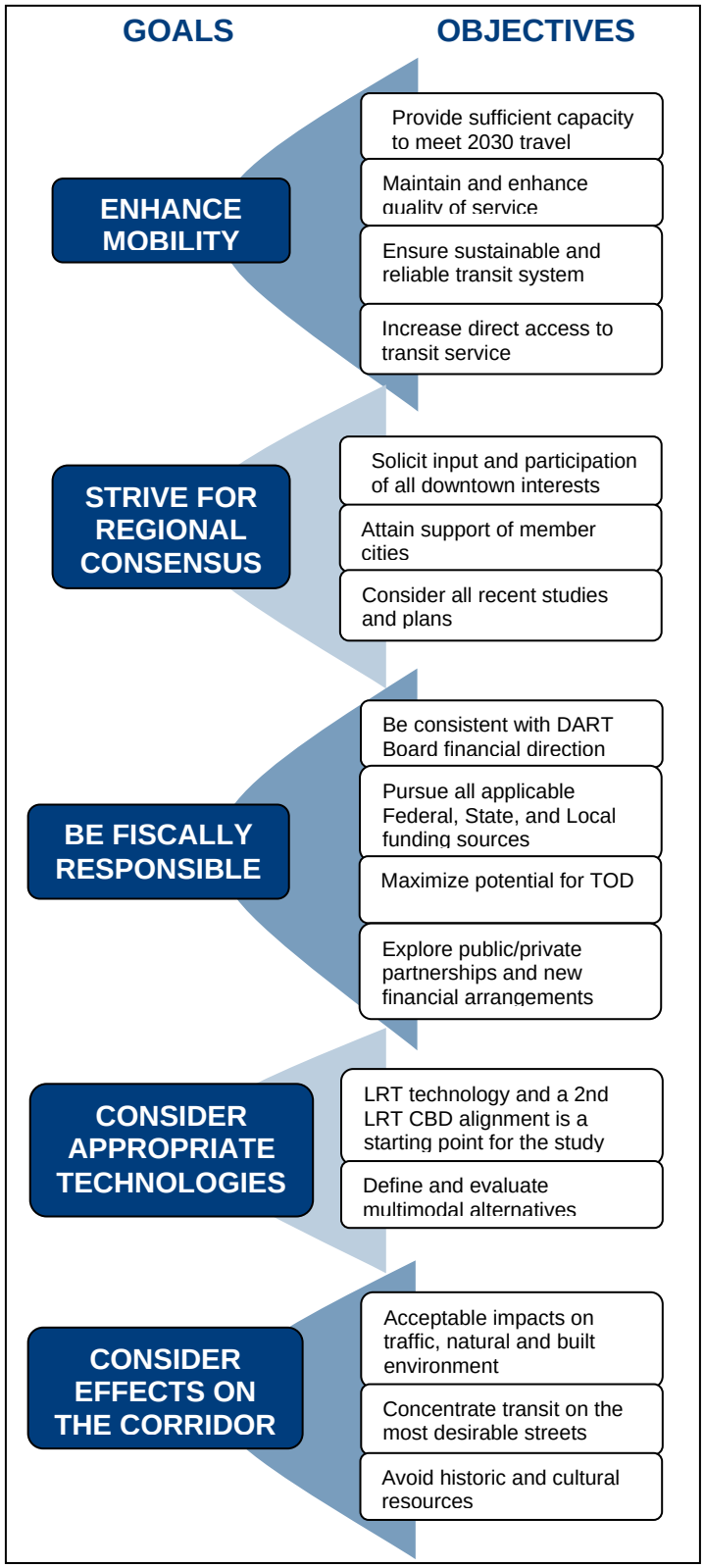
FTA requires that the evaluation of alternatives address environmental impacts, cost-effectiveness, mobility, economic development/land use, equity and financial feasibility. In addition, during the scoping process, D2 Study goals and objectives were developed based on the transportation needs identified for the project study area. Goals are general statements of what is to be accomplished. Objectives are statements that identify the extent to which the goals will be accomplished. Project goals and objectives are used in the development of reasonable alternatives for addressing the identified transportation needs. They also are used in the evaluation of alternatives to help determine how effectively the alternatives assist in meeting the needs of the study area.

Figure 1-8 identifies the goals and objectives established for the project. This DEIS reports on the evaluation of how effectively the alternatives help accomplish the goals and objectives in Chapter 7: Evaluation of Alternatives.

1.5 Planning Context

The planning context in which this DEIS for the D2 Study has been prepared is described herein in terms of: the parameters set by DART, the decisions from previous planning studies, the relationship to the FTA planning and project development process for major capital investments, the D2 Study's role in the project development process, and the decision at hand.

Figure 1-8. Project Goals and Objectives



Source: PB/AZB Joint Venture

1.5.1 DART Parameters

The study will be conducted within three broad parameters established by DART which complement the goals and objectives. These are:

- Fiscal Responsibility - Since the start of this project, DART has $300 million ($386 million in 2008 dollars) in local funding committed to the project and an available right-of way through Victory Park. It will pursue federal funding in order to leverage local funding and follow project planning guidelines, which require cost-effective solutions that maximize travel time savings and ridership while minimizing capital costs.
- Engineering and Operational Feasibility - The study must find solutions which accommodate long-term demand resulting from improvements in the 2030 Transit System Plan. DART must allow for rerouting of transit lines along the transit mall or 2nd alignment in emergency situations as well as accommodate transfers between existing and planned routes. It must meet or exceed design standards, including system integration requirements, while minimizing operating costs.
- Consider Previous Studies, Agreements and Planned Projects - These study agreements and plans include those summarized in Section 1.5.2 of this report.

1.5.2 Decision Framework

The decision to proceed with transportation improvements in the project study area is based on previous planning studies and agreements, including the City of Dallas/DART Master ILA, DART 2030 Transit System Plan, the Comprehensive Transportation Plan for the Dallas CBD, and the *Forward Dallas* City Comprehensive Plan. Implications associated with the regional transportation plan, Mobility 2030, will also be considered. The Downtown Dallas Transit Study AA/DEIS builds on these studies and agreements by providing the planning, conceptual engineering and analysis necessary to identify, compare and evaluate a reasonable range of alternatives in support of the selection of a LPA. The DEIS effort provides the analysis and study necessary to identify adverse social, economic, and environmental impacts and measures to avoid, minimize and mitigate impacts of the alternatives. This includes an evaluation of the benefits, costs, and environmental consequences of the alternatives against the stated goals and objectives of the project as set forth in the purpose and need of the project. The entire AA/DEIS process involves the implementation of a collaborative public involvement and agency coordination program necessary to guide development and implementation of the project. Key studies, agreements, and plans important to this effort are described below:

1.5.2.1 City of Dallas/DART Master Inter-Local Agreement

The City of Dallas/DART Master Interlocal Agreement (ILA), which was approved in February 27, 1990, reclassified the current CBD LRT line in the Service Plan from subway-running to a surface transit-way facility along Pacific/Bryan, but it did so with stipulations. The key stipulation was that DART amend its Financial Plan to include a line item for a 2nd CBD alignment that would be subway-running. It further stated that the funds should not be expended until:

1. Average ridership exceeds 8,000 passengers in one direction (peak hour, peak direction) and/or,
2. Headways decrease to 2.5 minutes.

While the ILA specifies a LRT subway, DART will perform a comprehensive review of a variety of modes and configurations to address needs.

1.5.2.2 Comprehensive Transportation Plan for the Dallas CBD

This study, completed in 2005, started with 13 LRT alignments identified during DART workshops in 2002. The City study qualitatively screened these down to three potential alignment corridors. The three options were analyzed using a traffic simulation model to determine the affect on the street and pedestrian networks, as well as transit effectiveness. After examining a fourth alignment option following a Lamar Street route, the study recommended a broad corridor for the location of a 2nd LRT alignment bounded by Woodall Rodgers, Field Street, Commerce Street, Young Street, and Lamar Street. The study also recommended that grade-separation be considered, at least between Ross Avenue and Commerce Street, to eliminate a surface crossing of the existing transit mall and to avoid the short blocks through this area. This corridor recommendation is the starting point for developing alternatives in the current Downtown Dallas Transit Study AA/DEIS.

1.5.2.3 Forward Dallas, City of Dallas Comprehensive Plan

The broad goal of Forward Dallas, completed in 2006, is to integrate land use, transportation and economic development so that they complement and reinforce one another. Recommendations include improving transportation connections throughout the City, increasing density around transit stations and along designated transit corridors, and assessing the modern streetcar technology. The plan includes a future growth and development scenario that is different than the regionally approved demographic and land use forecast. This alternative scenario increased rail ridership by about 20 percent based on a sensitivity test conducted as part of the DART 2030 TSP.

1.5.2.4 DART 2030 Transit System Plan

This plan, completed in 2006, identifies how rail is becoming the backbone of the DART system. It recommends five rail projects and identifies several additional promising corridors in the Vision Element. The Plan expands the LRT system from 45 miles carrying 60,000 people daily in 2006 to 110 miles and 160,000 people daily in 2030. It also discusses the potential for new vehicle technology in corridors that are not extensions of existing lines, streetcar opportunities and their role in supporting the transit system, stations and operating facilities, and expansion to potential new member cities beyond DART's 13-member city service area boundary. These plan elements, along with the potential for additional regional commuter rail corridors, establish the planning framework and need for additional transit capacity through the CBD.

1.5.2.5 NCTCOG Regional Transportation Plan: Mobility 2030

Approved January 2007 by the Regional Transportation Council (RTC), Mobility 2030 is the current Metropolitan Transportation Plan for the Dallas-Fort Worth area. It is

the defining vision for transportation systems and services in the Dallas-Fort Worth Metropolitan Area.

Mobility 2030 outlines the expenditure of nearly $71 billion of federal, state, and local funds expected to be available for transportation improvements through the year 2030. It includes $9.6 billion of rail recommendations, including $3 billion of Regional Transit Initiative (RTI) rail lines and includes $29.8 billion of roadway recommendations. It also recognizes the heightened awareness of the growing concerns for improved air quality, public acceptance of major transportation facilities, and the need for adequate financial resources. The findings of the sustainable development scenarios increase demands on the DART system.

1.5.3 Role of the EIS in the Project Development Process

The FTA planning and project development process within which federal, state, and local officials plan and make decisions regarding major transit capital investments contains five phases: (1) system planning; (2) alternatives analysis; (3) preliminary engineering; (4) final design; and (5) construction. As projects are conceived and advanced through these phases, their design, costs, benefits, and impacts are more clearly defined. The alternatives are evaluated and successively eliminated until only the most cost-effective alternative that provides the greatest benefit with the fewest adverse impacts remains. Final design and construction of the project then is initiated.

Preparation of the DEIS for the D2 Study, together with its required circulation and review, provides the assurance that an evaluation is conducted of all reasonable design alternatives, that transportation and environmental impacts are assessed, and that public participation and comments are solicited to help guide the decision-making process. The identification and analysis of impacts of reasonable alternatives are necessary to meet the requirements of the National Environmental Policy Act (NEPA). The analysis of environmental impacts identifies the type and severity of environmental impacts under each of the alternatives. Measures to avoid and mitigate adverse environmental impacts then can be developed for the build alternative in the FEIS, along with estimates of the costs and effectiveness of such measures.

1.5.4 Decision at Hand

The purpose of the DEIS is to help DART and other local decision-makers to select from among the alternatives under consideration a build alternative for implementation in the Downtown Dallas study area. Decisions to be made following the circulation of this document include location and configuration of the fixed-guideway alignment and station locations. Subsequent actions would include the adoption of the financing plan, and programming construction into a conforming long-range transportation plan and Transportation Improvement Program (TIP).

A FEIS will be prepared in the preliminary engineering phase of project development incorporating all the newly developed information as well as the comments and responses made regarding the DEIS during the public review and comment period. These comments will be addressed and commitments will be made for implementing mitigation measures.

Appropriate local, state, regional, and federal agencies will review the FEIS to determine if all comments reflecting community issues of concern have been addressed properly and to determine if interagency agreements and project mitigation measures have been incorporated into the document. The FTA may issue a Record of Decision (ROD) culminating the environmental review process. DART can then apply to the FTA for permission to enter final design and construction for the project.

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CHAPTER 2.0
ALTERNATIVES CONSIDERED

2.0 ALTERNATIVES CONSIDERED

This chapter presents the alternatives considered for the Downtown Dallas (D2) Transit Study and the process used to select them. It describes the results of the screening process which identified and narrowed the conceptual alternatives. Following public meetings, the remaining alternatives were refined, described in more detail and discussed at additional stakeholder and public meetings. This chapter focuses on the definition of the No Build Alternative and four Build Alternatives that are evaluated and compared in subsequent sections of this document.

2.1 Development and Screening of Alternatives

The development of alternatives and the screening process has been ongoing for almost 20 years involving the Dallas Area Rapid Transit (DART), the City of Dallas, public agencies, stakeholders, and the public.

The D2 Study examined all previous information and conducted scoping in the spring of 2007, pursuant to Federal Transit Administration (FTA) and National Environmental Policy Act (NEPA) requirements. The scoping process and results are detailed in the "D2 Scoping Summary Report" (October 2007). A long list of over 20 alternatives for transit improvements in Downtown Dallas was developed with D2 Study participants in the fall of 2007. A screening process was conducted that narrowed this list to 16 transit alignments, as described in the "Alternatives Development and Screening Report" (June 2008). The results were discussed at meetings and workshops with D2 Study Advisory Committees, the public, the DART Board of Directors, and the Dallas City Council. The screening report recommended a short list of two light rail transit (LRT) Build Alternatives for more detailed definition and assessment. Subsequent refinement of these alternatives resulted in two additional LRT options. These refinements and alternatives were designed to better serve proposed development along Young Street and the proposed Convention Center Hotel site, as described in Section 2.1.4 Screening. The completed process produced the four Build Alternatives described in Section 2.2.

2.1.1 Prior Studies

The evolution of transit alternatives through Downtown Dallas began in 1989 with the adoption of a Transit System Plan (TSP) which included the first Central Business District (CBD) LRT alignment, the current Pacific-Bryan Transit Mall. Ten studies were instrumental in this evolution, one conducted during the development of the 1989 Transit System Plan, two in the mid-late 1990s by DART and the Central Dallas Association, and seven in more recent years by North Central Texas Council of Governments (NCTCOG), DART, the Central Dallas Transportation Management Association (CDTMA), and the City of Dallas. These studies helped build consensus for a geographically broad, multimodal downtown transit strategy, including interim and long-term LRT, bus, streetcar, and pedestrian elements[1]. The result has been a growing understanding of CBD transit needs and identification of transit alignment

[1] Full descriptions of the 10 studies can be found in the *Alternatives Development and Alignment Screening Report*.

options. Table 2-1 shows each study and how each influenced the development of a wide range of potential D2 Study alternatives.

Table 2-1. Previous Studies of D2 Study Alternatives

	Previous Study	D2 Study Alternative
1	DART System Planning Study, 1989	Build
2	Downtown Dallas Circulator Systems Analysis, 1991	TSM
3	Dallas Center City Transportation Systems Management Study, 1997	TSM
4	Dallas CBD Transitway Mall Traffic Study, 2000	No Build, TSM
5	MATA Five Year Plan Directions Report, 2002	TSM, Build
6	DART–Dallas CBD Workshops Summary, 2002	Build
7	Comprehensive Transportation Plan for the Dallas CBD, 2005	Build
8	forwardDallas! Comprehensive Plan, 2006	No Build, TSM, Build
9	DART 2030 Transit System Plan, 2006	No Build
10	NCTCOG Mobility 2030: The Metropolitan Transportation Plan, 2007	No Build

Source: PB/AZB Joint Venture

2.1.2 Scoping

Scoping was initiated on April 12, 2007 and completed in July 2007. Scoping meetings were held with participating public agencies and the general public. The meetings included an overview presentation of the D2 Study, distribution of a scoping information booklet, and solicitation of ideas and issues through a "question and answer" period, comment forms, and through an internet website. The scoping process was documented in the D2 Scoping Summary Report (October 2007). Appendix D, Agency Correspondence, contains the April 20, 2007 scoping letter and list of agencies invited.

The CBD corridor recommended in the *Comprehensive Transportation Plan for the Dallas CBD* (June 2005*)* was presented as a starting point for the discussion of Build Alternatives, because it was the most recently completed City study that focused attention on the location of the second LRT Line through Downtown Dallas. It was completed two years before the D2 Study was kicked off. The study had a public involvement component, with a Steering Committee and a Technical Committee and was directed by the Mayor at the time. Extensive traffic analysis was also conducted under the guidance of Public Works and Transportation. This recommended corridor was a broad, partially grade separated corridor through the CBD encompassing several potential alignments and configurations. NCTCOG's Metropolitan Transportation Plan (MTP), *Mobility 2030 (Amended 2009),* includes a placeholder for a second downtown light rail alignment. The alignment in the MTP will be refined pending selection of a LPA.

Other alternatives were proposed and developed during the 2007 scoping process and through a series of workshops with the study Stakeholder Advisory Committee. These alternatives included:

- Elm-Pacific subway paralleling the existing transit mall and connecting the Northwest Corridor with the Southeast Corridor.

- An east-west corridor north of the existing transit mall to better serve the Uptown and Arts District areas.
- Extension of the MATA historic trolley line into the CBD with a modern streetcar.
- Reconfiguration of existing bus routes in the CBD in order to reduce buses on selected east-west streets, increase CBD circulation and improve access to neighborhoods surrounding the CBD.

Goals, objectives, project parameters, and the purpose of the project were discussed during scoping, at a series of study advisory committee meetings, and the public scoping meetings. Through these meetings, DART developed a set of project parameters (discussed in Sections 1.4 and 1.5) that describe what needed to be accomplished for the project to be successful. These helped guide development and evaluation of alternatives and contributed to development of the project Purpose and Need.

2.1.3 Concept Alternatives

A No Build Alternative was identified in compliance with federal requirements and provides a basis for comparison with other alternatives. The No Build Alternative includes the following features:

- Maintenance of existing facilities and services in the study corridor or region;
- Continuation of existing transportation policies; and
- All planned and committed improvements in the approved, fiscally constrained 2030 transportation plans for the region.

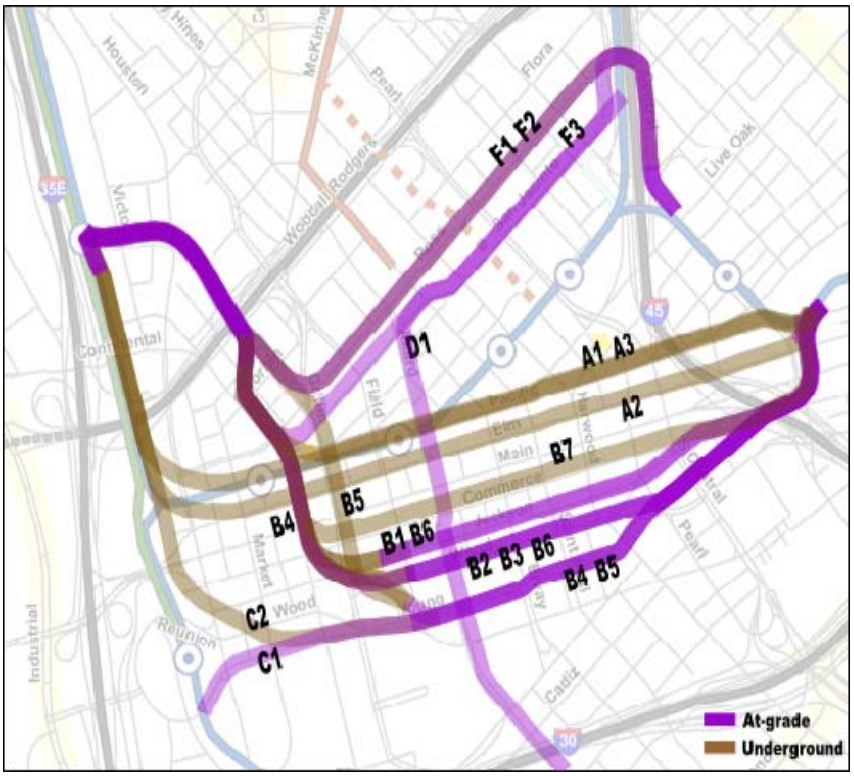
The Baseline/Transportation System Management (TSM) Alternative, described in the Detailed Definition of Alternatives report, represents relatively low cost approaches to addressing transportation problems. In short, the TSM Alternative represents the best that can be done to improve mobility without constructing a new, expensive fixed-guideway. Key characteristics of the TSM Alternative are:

- a realistic near-term package of improvements;
- an optimum mix of improvements in terms of number, type, location and effectiveness;

The TSM Alternative is not included in the DEIS as it is not a viable alternative to address the long term sustainability of both the DART transit system and the long term regional network since it does not provide a major core capacity investment. However, the TSM Alternative may be refined to serve as a baseline alternative for use in a New Starts evaluation, which is discussed in this DEIS (see Section 4.1.3.2). A long list of Build Alternatives was identified from previous studies, scoping, technical analysis and agency/public involvement, as shown in Figure 2-1.

The 16 transit alignments were developed at a sketch planning and conceptual engineering level of detail, including several optional alignment segments. A set of sketch plans, conceptual engineering drawings, and cross sections were prepared for each alignment, along with a brief narrative description. Of the 16 transit alignments there were five at-grade, two tunnel, and nine combination at-grade/tunnel concepts.

Figure 2-1. 16 Conceptual Transit Alignments



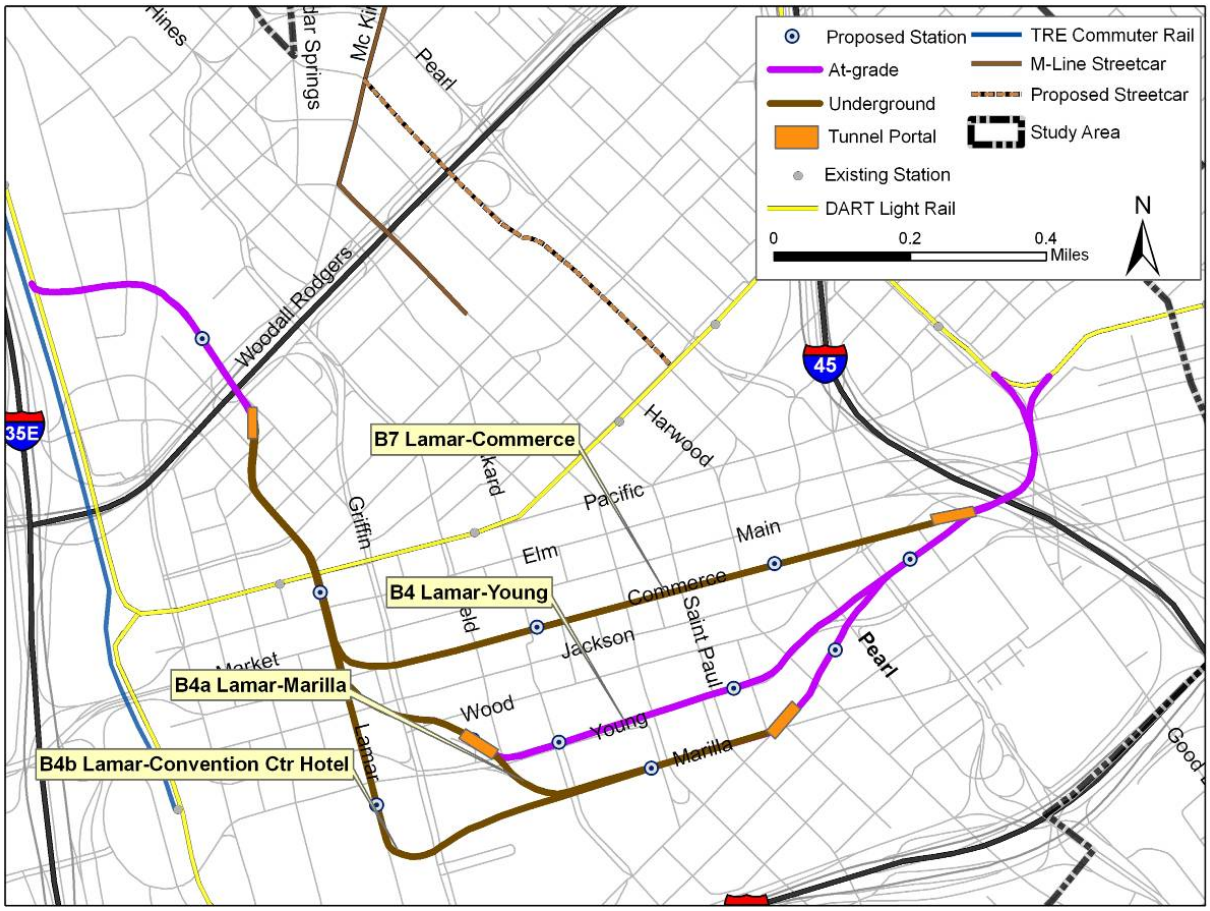
Source: PB/AZB Joint Venture

2.1.4 Screening

A screening evaluation of the 16 transit alignments was conducted based on seven categories of specific criteria. For each category/criteria, the results were presented in matrix format with the 16 transit alignments arrayed against measures of effectiveness. Both quantitative and qualitative measures were used to compare the alignments, based on the available data. The seven categories are engineering feasibility, environmental constraints, travel demand, operations flexibility and reliability, station area development, transportation effectiveness, and fiscal responsibility. Each category has one or more criteria and a number of measures of effectiveness. These categories of specific criteria can be found in the *Alternatives Development and Alignment Screening Report*.

In the spring of 2008, the D2 Study Team completed the initial screening and public review process. A summary of results were presented and arrayed against measures of effectiveness, and narrowed the 16 transit alignments to five for public review and stakeholder discussion. Based on the comments received, the D2 Study Team recommended that two of the five alignments should be carried forward as LRT Build Alternatives into detailed definition and evaluation: Alternative B7 Lamar-Commerce and Alternative B4 Lamar-Young (Figure 2-2). These alternatives had the greatest support from the advisory committees and the public, and they met the primary purpose of the project to provide future LRT capacity, operational flexibility and reliability to the DART rail network. They differed in terms of many other objectives,

Figure 2-2. Four Recommended LRT Build Alternatives



Source: PB/AZB Joint Venture

including improved access and circulation, transit supportive land use, economic development, and fiscal responsibility.

Following completion of the screening process, the City of Dallas and several stakeholders requested that DART identify additional alignment refinements and options to the B4 Lamar-Young alignment to better serve proposed development along Young Street and the proposed Convention Center Hotel site at the southwest corner of Lamar and Young Streets. An exercise was conducted during the summer of 2008 that identified a range of alignment and station options. These options were assessed further in terms of accessibility, development, environmental impact, ridership and cost, as well as other issues raised by the DART Board, the City of Dallas and the D2 Advisory Committees. In August 2008, two options were recommended and endorsed by the D2 Study Advisory Committee: B4a Lamar-Marilla and B4b Lamar Convention Center Hotel (Figure 2-2). These options, along with the two screening Alternatives B7 and B4, were subjected to another round of public, stakeholder and DART Board review meetings with the result that all four alignments were carried forward into detailed definition and evaluation. The *Convention Center Hotel Options, Draft Technical Memo* summarizes the strengths and weaknesses of the various Convention Center Hotel alignment options.

2.2 Definition of Alternatives

This section describes the alternatives evaluated and compared in this DEIS. It focuses on five transit alternatives—No Build and four LRT Build Alternatives—that have been developed to meet the goals of the D2 Study. The Detailed Definition of Alternatives Report (July 2009) described the key characteristics of each alternative, how it will be operated, as well as the specific route, configuration and location of transit stations. The detailed definition of each alternative served as the basis for impact assessment presented in Chapters 3, 4 and 5 of this document, and the comparison and evaluation of alternatives presented in Chapter 6.

2.2.1 Summary Alternatives

Table 2-2 provides a summary of the five alternatives. These include the No Build Alternative, which includes planned and programmed transportation improvements in the Dallas region as presented in the Regional Transportation Plan and the DART 2030 Transit System Plan. The No Build Alternative long-term (year 2030) improvements would result in demand exceeding capacity on the existing Pacific-Bryan Transit Mall.

Table 2-2. Characteristics of Alternatives

Alt. Id.	Mode	Alignment Route	Configuration	Station/Stops			Alignment Length (miles)		
				Total	Under-Ground	Surface	Total	Under-ground*	Surface
No Build	Multimodal	NA	NA	NA	NA	NA	NA	NA	NA
Build B7	LRT	Lamar-Commerce	Surface/ Underground/ Surface	4	3	1	2.1	1.3	.8
Build B4	LRT	Lamar-Young	Surface/ Underground/ Surface	5	1	4	2.2	.7	1.5
Build B4a	LRT	Lamar-Marilla	Surface/ Underground/ Surface	5	3	2	2.3	1.2	1.1
Build B4b	LRT	Lamar-Convention Center	Surface/ Underground/ Surface	5	3	2	2.5	1.4	1.1

Source: PB/AZB Joint Venture. *Includes length of tunnel portals.

Two Build Alternatives were identified from the D2 screening. These include LRT Alternative B7 Lamar-Commerce on an alignment through the City Center business area and LRT Alternative B4 Lamar-Young serving the Government Center and Farmers Market area. Both of these alternatives are similar in length (2+ miles) and have surface and tunnel sections.

Following the screening process, the B4 Lamar-Young Alternative was refined and a range of options were considered in order to provide service to the proposed Convention Center Hotel project being advanced by the City of Dallas at the southeast corner of Lamar and Young Streets. This effort resulted in two alternatives: B4a Lamar-Marilla, which included a tunnel station closer to the hotel at the old

Santa Fe Railroad site, a longer tunnel section, and an underground station at City Hall; and B4b Lamar-Convention Center, which provides a tunnel station adjacent to the hotel site, an additional underground station at City Hall, and a longer tunnel section.

2.2.2 No Build Alternative

The No Build Alternative serves as the baseline for comparison of all study alternatives and will provide the basis of comparison for the build alternative(s) in the Draft and Final Environmental Impact Statements. The No Build Alternative incorporates only those projects already approved and programmed by the year 2030. Thus, these projects are contained in the financially constrained DART 2030 Transit System Plan (TSP), and the NCTCOG Mobility 2030 Regional Transportation Plan (2009 Amendment). One exception from the Mobility 2030 Plan is the regional rail network. These projects are subject to new funding sources and thus are not included in the No Build Alternative network. However, given the potential impact of these projects on demand to and through downtown Dallas, the D2 Study includes a "sensitivity test" of the No Build Alternative to incorporate this regional rail system. This is discussed in more detailed in Section 2.2.2.2.

The following sections provide an overview of the service concept, planned transit improvements and programmed capital improvements through 2030.

2.2.2.1 Overview of Service Concept

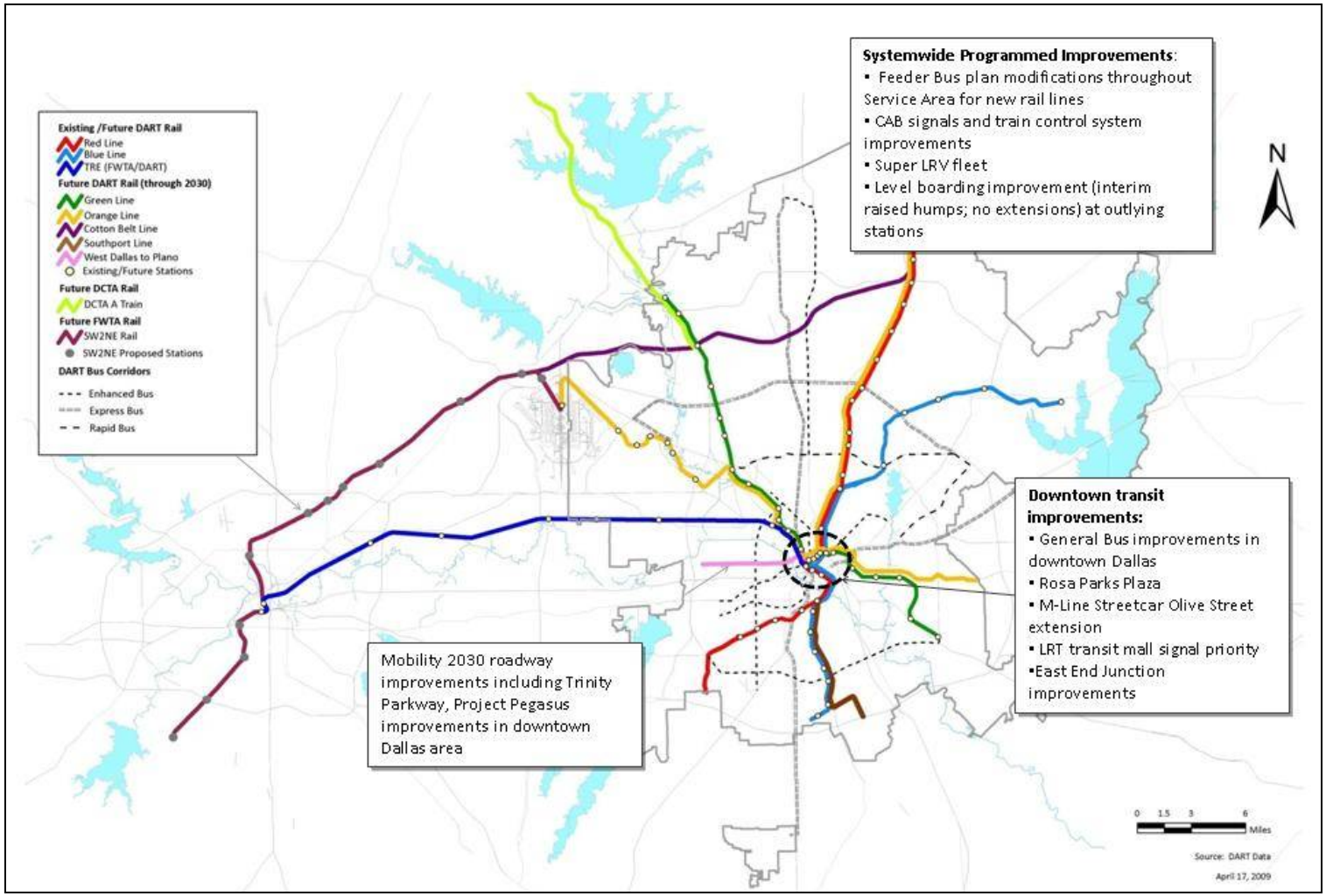
Figure 2-3 illustrates the improvements associated with the No Build Alternative. The No Build Alternative includes no major capital investments in transit within downtown Dallas. The No Build Alternative does include some changes to the bus network both in and out of downtown Dallas in order to keep pace with population and employment growth. A key element of the No Build Alternative bus service concept is to continue feeder bus plan changes as rail lines in the 2030 TSP are completed, and to implement enhanced, rapid, and express bus improvements contained in the 2030 TSP. In addition, highway and managed HOV lane improvements contained in Mobility 2030 are included.

The No Build Alternative assumes continued compliance with the DART/City of Dallas Interlocal Agreement, which does not allow headways to go below 2.5 minutes per direction in the peak hour. Because no major transit improvements in downtown Dallas are included in the No Build Alternative, additional LRT service through downtown along the existing transit mall is precluded. Thus, only the existing Red and Blue Lines, and future Green and Orange Lines will operate on the transit mall under the No Build Alternative scenario. The future West Dallas and Southport Lines contained in the DART 2030 TSP include a terminus outside of downtown Dallas and thus force transfers from those lines to one of the above four lines operating through downtown.

2.2.2.2 Planned Transit Service Improvements

The DART 2030 TSP, Fort Worth Transportation Authority (FWTA) Strategic Plan, and the Denton County Transportation Authority (DCTA) Service Plan identify planned transit improvements. These improvements are contained in the No Build Alternative. The regional rail network, included for purposes of sensitivity testing, is also discussed below.

Figure 2-3. No Build Alternative



Source: DART

DART Bus

The No Build Alternative bus network includes three primary types of bus changes:

- General service changes in downtown anticipated as part of the DART Five-Year Action Plan;
- Changes associated with implementation of feeder bus plans to new rail lines through year 2030, including Green Line, Orange Line, and five new 2030 LRT extensions or corridors, all of which may result in elimination of or changes to routes serving downtown Dallas; and,
- Incorporation of recommended improvements in the DART 2030 TSP related to express, enhanced, and rapid bus corridors.

The DART 2030 TSP includes specific recommendations relative to express, enhanced and rapid bus service. Express bus service includes radial and crosstown routes in key freeway, high occupancy vehicle (HOV) and managed lane corridors, such as the Dallas North Tollway, IH 30 east, LBJ and IH 35E. Enhanced bus service, which occurs through lower-cost capital improvements like Intelligent Transportation Systems (ITS), vehicles, and marketing, is focused in core transit corridors that have multiple routes serving the corridor. A majority of the 77 miles of enhanced bus corridors are within Loop 12. Rapid bus service is similar to enhanced bus service in that it is a limited stop, high frequency service, but it requires a higher level of capital investment in semi-exclusive or exclusive bus guideways. Recommended bus rapid transit corridors include Northwest Highway and Ferguson Road.

With the exception of two enhanced bus corridors, Singleton and Simpson Stuart/Bonnie View, all of these recommendations are included in the No Build Alternative. Enhanced bus service on Singleton and Simpson Stuart/Bonnie View are both intended to be interim service enhancements prior to implementation of the West Dallas and Southport rail lines. Since both of those rail corridors are included in the No Build Alternative, the enhanced bus service is not reflected in the network. Table 2-3 summarizes the 2030 TSP bus corridors included in the No Build Alternative.

DART Rail

By 2030, the DART rail network will include approximately 110 miles of light rail transit, plus the 26 mile Cotton Belt Corridor. In addition to the existing Red and Blue Lines, the Green and Orange Lines will open in phases through year 2013. The Blue Line extension from Garland to Rowlett is scheduled for the year 2012, and another Blue Line extension from Ledbetter to the University of North Texas south campus is scheduled for 2018. Once the Green and Orange Lines are in operation the current LRT transit mall will be operating at capacity. Beyond this expansion program all other lines are anticipated to open between year 2025 and 2030. The only exception may be the Cotton Belt Corridor which is being considered as a Public Private Partnership project to accelerate service, possibly sometime between 2013 and 2015.

The DART Irving-3 LRT line (DFW Extension) consists of two line segments to be constructed in two phases that would operate independently of one another. Phase I is the original section planned to provide LRT service to DFW Airport via the Orange

Table 2-3. 2030 Transit System Plan Bus Corridor Recommendations

	To	From	Miles
Express			
East RL Thornton (IH 30)	Downtown Dallas	Lake Ray Hubbard Transit Center	Strengthen Existing Service
Stemmons Freeway (IH 35E)	Downtown Dallas	Glenn Heights Park-and-Ride	Strengthen Existing Service
Dallas North Tollway	Downtown Dallas	Northwest Plano Park-and-Ride	Strengthen Existing Service
LBJ Freeway (IH 635)	South Garland Transit Center	Las Colinas	25
		Subtotal	25
Enhanced			
Ledbetter	Loop 12/Kiest	Buckner Station (Green Line)	14.4
Fort Worth/Commerce	Downtown Dallas	Cockrell Hill Transfer Location	5.6
Jefferson	Downtown Dallas	Cockrell Hill Transfer Location	8.2
Hampton	Red Bird Transit Center	Inwood Station (Green Line)	10.0
Cedar Springs	Downtown Dallas	Love Field	6.4
Gaston	Downtown Dallas	Grand Avenue	5.9
Preston	Northwest Highway	Northwest Plano Park-and-Ride	17.1
Rapid			
Northwest Highway	South Garland Transit Center	Bachman Station	13.8
Ferguson	South Garland Transit Center	Downtown via IH 30 HOV Lanes	6.3

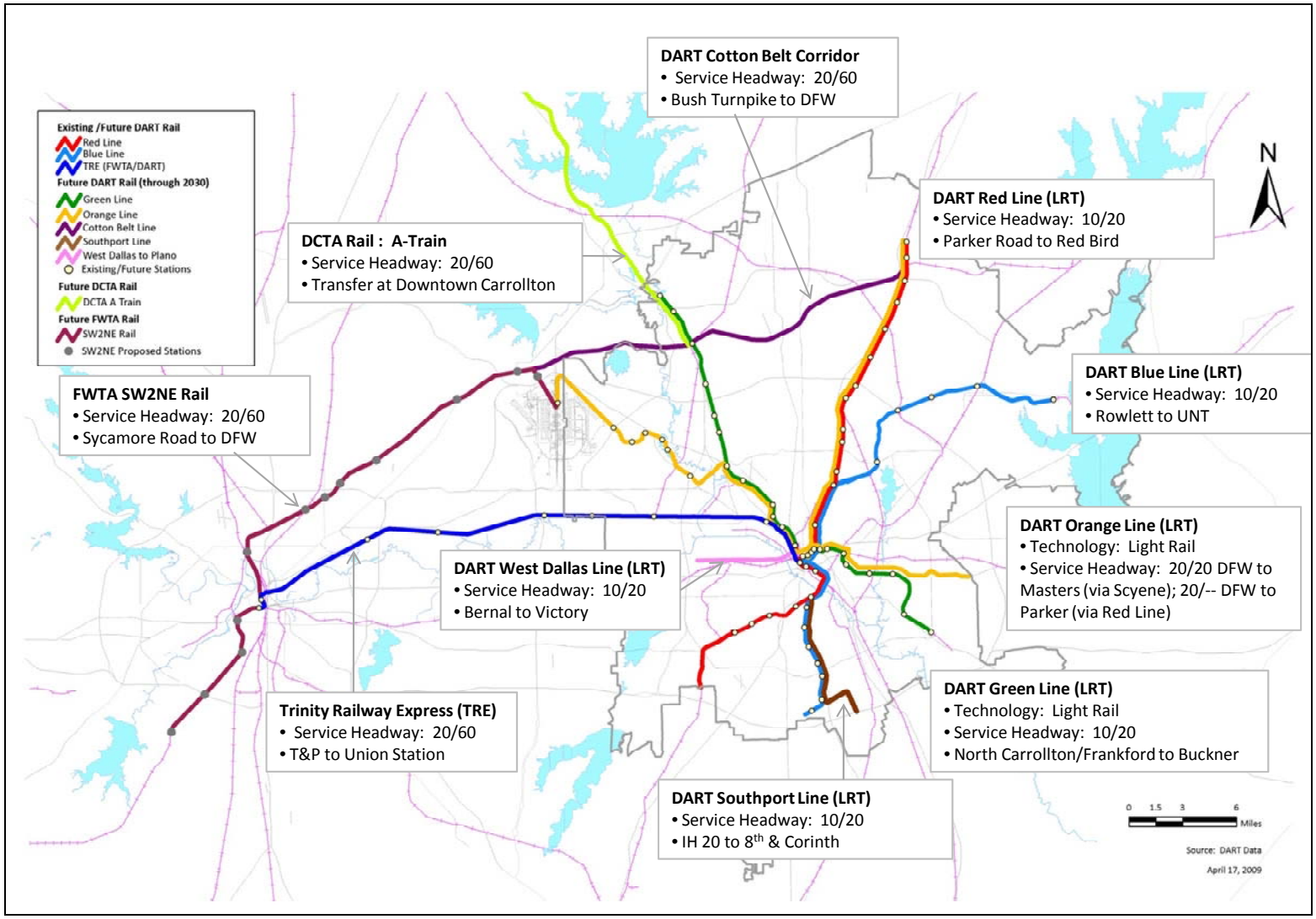
Source: DART 2030 Transit System Plan

Line. Phase II was adopted by the DART Board in July 2009 in order to provide an LRT link to the DART-owned Cotton Belt corridor, a future rail line that runs east-west north of the airport. Both phases are located entirely on DFW Airport property. It is envisioned that Phase II would be part of the expansion associated with service on the Cotton Belt corridor, which is under discussion as a potential public-private partnership (PPP) to accelerate service.

Figure 2-4 illustrates the rail network for the No Build Alternative. Without a second CBD alignment in place, the future West Dallas and Southport lines will terminate outside of downtown Dallas, requiring a transfer at Victory and 8th & Corinth, respectively.

The Cotton Belt Corridor does not directly affect CBD operations since it is an independent east-west corridor well north of Downtown Dallas. The West Oak Cliff Red Line extension also will not affect downtown operations since it is an extension of the Red Line. Similarly, the Scyene Corridor extension can be operated as an extension of the Orange Line. However, without a second alignment in place, the Orange Line will be operated as a split line – with every other peak train heading

Figure 2-4. No Build Rail Network



Source: DART

north to Parker Road to accommodate passenger demand in the North Central Corridor. This would result in the Scyene Branch only receiving a 20-minute peak headway, and the Red Line receiving a lower level of peak service than provided today. Service levels are summarized in Table 2-4 below.

Table 2-4. Summary of Service Headways for No Build Rail Network

Main Line LRT Services			Weekday Headways (in minutes)		Weekend Headways (in minutes)	
Line	**From**	**To**	**Peak**	**Base**	**Base**	**AM/PM**
Blue	Rowlett	UNT	10	20	20	30
Red	Parker Road	Red Bird	10	20	20	30
Green	Frankford	Buckner	10	20	20	30
Orange	DFW	Parker Road	20	0	20	30
Orange	DFW	Masters (via Scyene)	20	20	20	30
Combined peak headway for transit mall segment			*2.5*	*5*		
Transfers to Main Line LRT Services			**Weekday Headways (in minutes)**		**Weekend Headways (in minutes)**	
Line	**From**	**To**	**Peak**	**Base**	**Base**	**AM/PM**
TRE	Union Station, Dallas	T&P, Fort Worth	20	60	90 (Sat. only)	90 (Sat. only)
West Dallas	Bernal	Victory	10	20	20	30
Southport	8th & Corinth	IH 20	10	20	20	30
Cotton Belt	Red Line	DFW	20	60	90 (Sat. only)	90 (Sat. only)
DCTA A-Train	Denton	Downtown Carrollton	20	60	60 (Sat. only)	60 (Sat. only)
FWTA (SW2NE)	Sycamore Rd.	DFW	20	60	90 (Sat. only)	90 (Sat. only)

Source: DART, NCTCOG, DCTA, 2009; PB/AZB Joint Venture and Connetics

Regional Rail

In terms of regional rail the No Build Alternative includes a limited number of improvements to the existing Trinity Railway Express (TRE) service, which is jointly operated by DART and the FWTA. Outside of DART, both the FWTA and DCTA have planned rail service. These regional rail improvements and projects are:

- TRE Improvements – Under the No Build Alternative, the TRE is assumed to be upgraded to a full double-track corridor. This is underway via several projects on the DART side of the corridor and planned for on the T side of the corridor. This allows for 20-minute peak/60-minute off-peak service headways across the entire corridor. Quad gates or other safety measures at street crossings are also planned.
- FWTA SW2NE Rail Corridor – This is a 35-mile corridor from southwest Fort Worth, through downtown Fort Worth and then northeast to link with the DFW Terminal A-B area and provide transfers to the DART Cotton Belt Corridor (DFW to Red Line), and the future Orange Line.

- DCTA "A-Train" Corridor – The DCTA rail line will be 21-mile service linking downtown Denton with the Green Line at the Trinity Mills Station. A DCTA platform is being constructed to allow for cross platform transfers between the two services. A significant number of passengers transfer from DCTA to DART to take the Green Line into and through downtown Dallas. By 2030, it is expected that this transfer point will move to Downtown Carrollton to allow for interface with the east-west Cotton Belt corridor.

Mobility 2030 – Regional Rail

In addition to the two above committed regional rail projects, the Mobility 2030 Plan includes an extensive regional rail network that proposes several new rail lines, primarily outside of existing agency boundaries. DART is actively involved in discussions related to regional rail since the majority of service would connect to the DART rail network via a transfer to an LRT station, may be proposed to be interlined with the DART network, or may terminate in downtown Dallas. The Texas Legislature considered but did not approve the Texas Local Option Transportation Act (TLOTA) bill during their 2009 session, which would have allowed for local option elections to fund these and other regional transportation projects. Although no funding mechanism passed this session, regional leaders will continue to work towards a solution so that these projects can be implemented by 2030. As of January 2010, the NCTCOG Regional Transportation Council is developing a strategy to pursue local revenue options in the 2011 legislative session. In addition, NCTCOG staff is actively planning for key priority corridors that would be implemented in the near term should a funding plan be successful. Table 2-5 below summarizes the regional rail corridors subject to additional funding and the proposed interface with the DART network based on the current Mobility 2030 Plan.

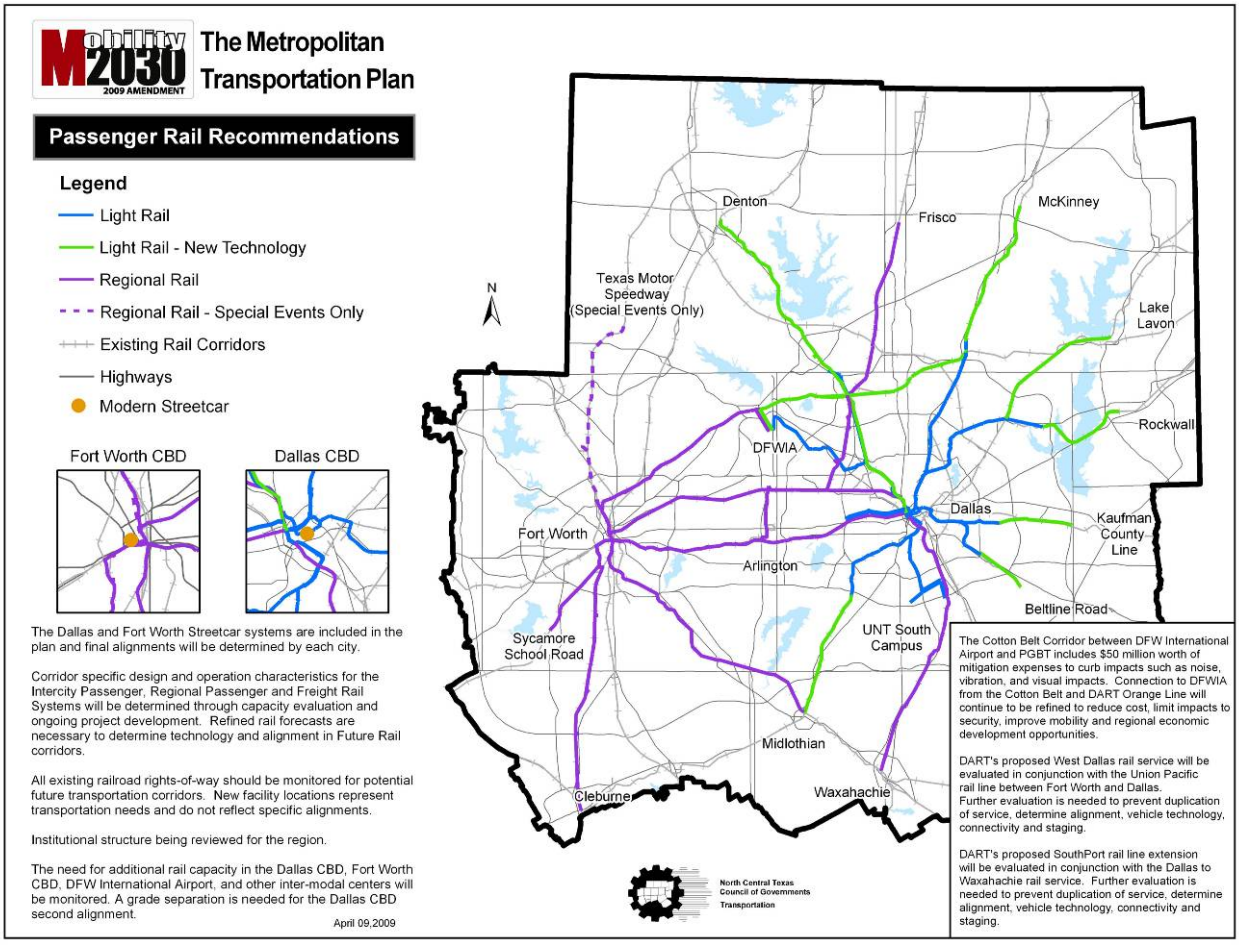
Table 2-5. Summary of Regional Rail Corridors and DART Interface Assumptions

Corridor	From-To and Interlining Concept	DART Interface
McKinney	McKinney to Westmoreland via Red Line	Interlined with DART
Rockwall	Rockwall to UNT Dallas via Blue Line	Interlined with DART
Lake Lavon	Lake Lavon to Downtown Garland	Transfer at Downtown Garland to Blue Line
Southeast/Kleburg	Frankford Station to Kleburg (South Belt Line Rd.) via Green Line	Interlined with DART
Mesquite-Forney	DFW Airport Station to Forney via Orange Line	Interlined with DART
Frisco	Frisco to Union Station via Madill & TRE	Union Station Transfer Point
Midlothian	Midlothian to Westmoreland	Transfer at Westmoreland to Red Line
Waxahachie	Waxahachie to Union Station	Union Station Transfer Point
UP RR	T&P Station to Union Station	Union Station Transfer Point
Dorothy Spur	Division St Station/UP RR to Downtown Carrollton via TRE & Madill	Transfer at Downtown Carrollton on Green Line
Cleburne	Cleburne to ITC Station	ITC Transfer Point (no direct DART interface)
Speedway	Speedway Race Track to T&P Station	Special Events only (no direct DART interface)
Mansfield	Mansfield Line	Added 2009 Amendment (no direct DART interface)

Source: DART; NCTCOG Mobility 2030 Plan

Figure 2-5 illustrates the regional rail network as contained in the NCTCOG Mobility 2030 Plan (2009 Amendment). A sensitivity test will be conducted with these additional regional rail lines in place to understand their potential implications on the DART network, including the downtown line and station capacity.

Figure 2-5. Proposed Regional Rail Corridors



Source: NCTCOG

2.2.2.3 Programmed Capital Improvements

The following sections describe programmed improvements in the D2 study area. Outside of downtown Dallas it should be noted that all existing light rail stations will be retrofitted to accommodate level boarding with the larger super light rail vehicle (SLRV). Some outlying stations cannot accommodate a 3-car SLRV train.

Transit Facility Improvements

Within downtown Dallas, there is a limited number of transit facility improvements related to both the transit system. These include:

- Rosa Parks Patron Plaza (Lamar/Elm) – This project opened to public use in July 2009 and thus would be part of the No Build Alternative. The plaza incorporates

four special-design passenger shelters, two bus bays to relieve DART's West Transfer Center, and a pedestrian way connecting to the West Transfer Center and the West End Station.

- An extension of the McKinney Avenue Transit Authority (MATA) streetcar system is under design and will extend this historic streetcar system south along Olive Street from McKinney Avenue to the LRT line on Bryan Street.
- Transit Signal Priority along the existing LRT transit mall has recently been put in place for Green Line operations, which began on September 14, 2009.
- Completion of the Bryan-Hawkins (East End) junction improvements associated with the new Green Line to the Southeast Corridor.
- Rail system and vehicle improvements to accommodate CAB signals and train control to assist with on-time performance have been completed.

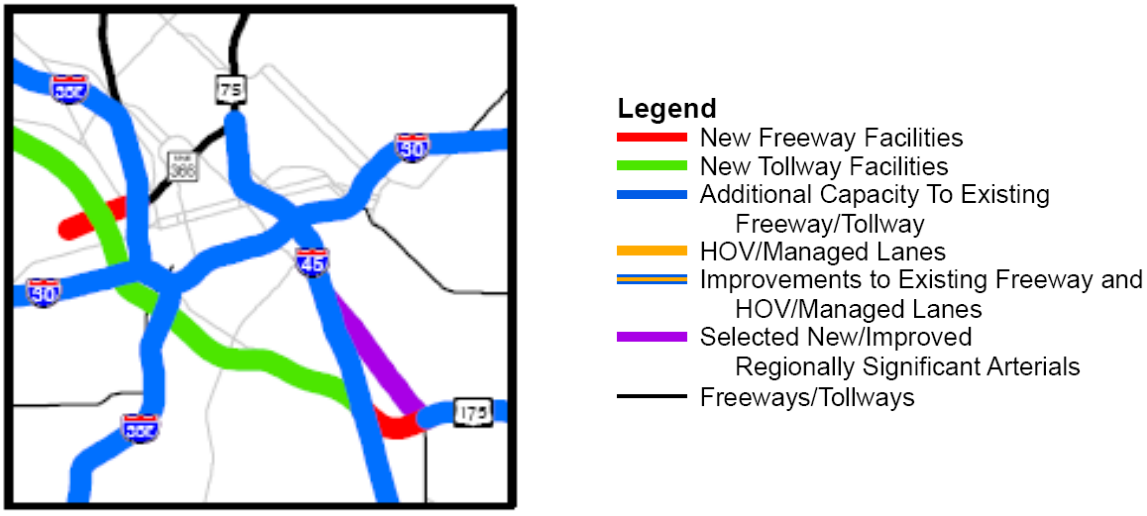
Even with the No Build Alternative improvements, maintaining a schedule through downtown Dallas on one transit mall will present issues. Minor delays at stations and/or incidents along the mall can affect on-time performance and affect travel time of patrons while the system recovers.

Street and Highway Improvements

There are number of street and highway improvements that may affect traffic volumes and movements in and around the Downtown Study area. These are reflected in the regional transportation travel forecasting model used to forecast vehicular traffic with the No Build Alternative.

The funded roadway recommendations for the Dallas Central Business District that are programmed for 2030 include the projects listed below and can be seen in Figure 2-6. Programmed roadway projects (2030) within the study area are listed in Table 2-6.

Figure 2-6. Roadway Recommendations for Dallas CBD



Source: NCTCOG 2009

Table 2-6. 2030 Programmed Projects within Study Area

Location	Limits	Lane Summary		Conformity Operational Year
		Existing	Proposed (2030)	
IH 30	IH 45 to US 80	8 + 1 (HOV-R)	10 + 4 (HOV-M/C*)	2030
IH 35E	8th Street to US 67	8 + (HOV-R)	10 + 2 (HOV-M/R*)	2025
IH 45	IH 30 to SM Wright Pkwy.	10	10 (Reconstruct)	2019
	SM Wright Pkwy. To Trinity Pkwy./US 175	6	8	2019
IH 45 (a segment of IH 45 between 45 and US 75)	US 75/Woodall Rodgers to IH 30/IH 45	8	10	2019
IH 30	IH 35E to Old Central Expressway	6 + 4 C-D	12 + 1 (HOV-M/R*)	2025
	Old Central Expressway to IH 45	6 + 4 C-D	12 + 4 (HOV-M/C*)	2025
Trinity Parkway	IH 35E to Woodall Rodgers Freeway	0	6 (TOLL)	2019
	Woodall Rodgers Freeway to IH 45/US 175 to	0	6 (TOLL)	2025
	IH 45/US 175 to US 175/SH 310	0	6 (TOLL)	2019
Woodall Rodgers Extension	IH 35E to Beckley Avenue	0	6	2019

*Note: HOV-M/C is ”Concurrent Managed Lanes”; HOV-M/R is “Reversible Managed Lanes” ; C-D is "Collector-Distributor Lanes"
Source: NCTCOG 2009

- Additional capacity to existing freeways/tollways along IH 35E, IH 45, and IH 30, including Project Pegasus
- A new/improved regionally significant arterial going north-south between IH 45 and US 175 going east
- New freeway/tollway facilities: Trinity Parkway, including US 175 connection, and Woodall Rodgers Freeway extension
- Conversion of two north-south oriented arterials in Downtown Dallas (Pearl and Central Streets) from one-way operation to two-way operation

2.2.3 Build Alternatives

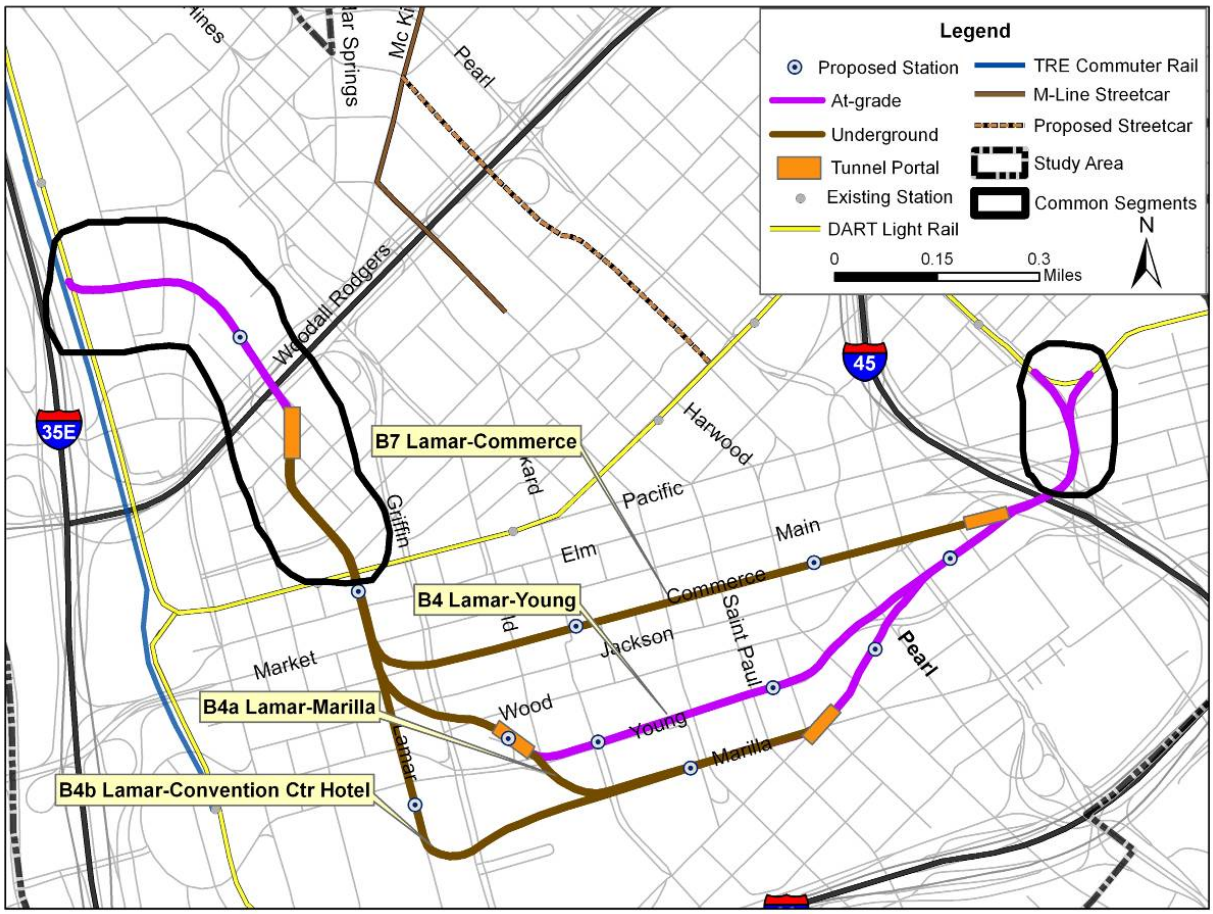
The four Build Alternatives under consideration provide for the implementation of new fixed-guideway transit service in Downtown Dallas. The Build Alternatives incorporate all of the elements of the No Build Alternative. In addition, the primary role of the Build Alternatives is to provide additional capacity, schedule reliability, and operations flexibility for the DART system. The Build Alternatives enhance service on a systemwide level by adding throughput capacity downtown to enable continued system expansion, and enhance access to and within downtown by serving new market areas. Providing an additional downtown LRT alignment allows for LRT lines in the No Build Alternative that would have been required to terminate outside of downtown to now operate through downtown.

The Build Alternatives have several common elements. They share common segments at either end where they connect to the Northwest and Southeast

corridors. All Build Alternatives begin immediately south of Victory Station, turning southeast within DART-owned right-of-way to Woodall Rodgers Freeway. Within this segment would be one station north of Woodall Rodgers to serve this growing area of downtown and the future Museum of Nature and Science. South of Woodall Rodgers Freeway all alternatives then descend into a tunnel portal and continue below Lamar Street, passing under the existing transit mall to a new underground Metro Center Station. The Metro Center Station would have vertical circulation to provide connections to the existing surface West End Station on the transit mall, the West Bus Transfer Center immediately north of the transit mall, and the Rosa Parks patron plaza on Lamar Street.

On the east end of downtown, all Build Alternatives end with the same surface alignment under IH 45 and along Good Latimer to a Y connection that allows for continued operations into either the North Central and/or Southeast Corridors. Figure 2-7 identifies the common segments amongst the Build Alternatives.

Figure 2-7. Common Segments amongst Build Alternatives



Source: PB/AZB Joint Venture

South of the Metro Center station, the Build Alternatives vary in both alignment configuration and station locations. The Build Alternatives have either four or five stations, and differ in the number and location of underground or surface stations.

All of the Build Alternatives are similar in length (approximately 2+ miles), but they vary significantly in the amount of tunnel section versus surface alignment.

Because the Build Alternatives interconnect existing radial corridors at the center of the transit network, they provide additional capacity and operational flexibility to meet transit demand without the need for additional vehicles and maintenance facilities. Table 2-7 below summarizes selected transportation improvements by Build Alternative. Several bus routes already have an existing bus stop at station nodes, and a small number of bus routes will be changed to feed stations. Alternative B4b has the longest alignment resulting in one additional track crossover, and Alternative B4 has the most surface alignment and will result in the most street reconstruction. A more detailed plan and profile for each Build Alternative is contained in Appendix C.

Table 2-7. Build Alternative Transit Stations and Other Improvements

Alternative	New Stations: S = Surface; U = Underground	Bus Routes Rerouted to New Stations	Facility Improvements	Street and Highway Improvements
Build B7	Museum Way-S	49, 52, 59	2 substations; 2 crossovers	Street reconstruction (Victory Station to north tunnel portal, and along Commerce and Good Latimer east of east tunnel portal)
	Metro Center-U	None		
	Pegasus Plaza-U	206		
	Main Street Garden-U	None		
Build B4	Museum Way-S	49, 52, 59	2 substations; 2 crossovers	Street reconstruction (Victory Station to north tunnel portal, and along Young Street between Field and Harwood Street, and realignment of St. Paul Street crossing Young Street)
	Metro Center-U	None		
	Govt. Center–S	206, 26		
	Harwood Dist.–S	None		
	Farmers Market-S	12, 60, 76, 110, 111, 164,		
Build B4a	Museum Way-S	49, 52, 59	2 substations; 2 crossovers	Street reconstruction (Victory Station to north tunnel portal, and along Marilla Street between Ervay and Harwood Street)
	Metro Center- U	None		
	Govt. Center–U	None		
	City Hall – U	2, 8		
	Farmers Market-S	existing		
Build B4b	Museum Way-S	49, 52, 59	2 substations; 2 crossovers	Street reconstruction (Victory Station to north tunnel portal, and along Marilla Street between Ervay and Harwood Street)
	Metro Center-U	None		
	Convention Center Hotel-U	26		
	City Hall – U	2, 8		
	Farmers Market-S	None		

Source: PB/AZB Joint Venture and DART

Operating Plan

The preliminary operating plan shifts the Orange and Green Line service onto the new downtown alignment, maintaining the Red and Blue Lines on the existing transit

mall. Shifting the Green and Orange lines to the second downtown alignment allows for new 2030 rail corridors to be brought on-line, allows for increased service on any of the four Build Alternative LRT lines, and provides enhanced operational flexibility should one of the downtown alignments be out of service due to an incident.

Relative to the long-term 2030 system plan, the addition of a second LRT alignment allows for the future West Dallas Corridor to operate through downtown on the existing transit mall rather than terminating near Victory Station and forcing a transfer to the LRT system. In addition, the Southport Corridor would be able to operate through downtown Dallas, rather than terminating near 8th and Corinth Station, and would be able to continue north within the North Central Corridor. Linking this corridor to the North Central line connects residents in the south Dallas area to employment in the North Central Corridor, while also providing the additional capacity needed in the North Central Corridor.

All LRT lines would consist of double-track guideway operating on a 10-minute peak and 20- or 30-minute off peak headway. This headway provides for a combined headway of 5-minutes in some of the most heavily utilized sections of the system. Service levels are summarized in Table 2-8 below.

Table 2-8. Summary of Service Headways for 2030 Build Rail Network

Line	From	To	Weekday Headways (in minutes)		Weekend Headways (in minutes)		Alignment
			Peak	Base	Base	AM/PM	
Blue	Rowlett	UNT	10	20	20	30	Transit mall
Southport	IH 20	Parker (Peak) LBJ (off Peak)	10	20	20	30	Transit mall
Red	Parker	Red Bird Lane	10	20	20	30	Transit mall
Green	Frankford	Buckner	10	20	20	30	D2
Orange	DFW	Masters (via Scyene)	10	20	20	30	D2
West Dallas	Bernal	Lawnview	10	20	20	30	Transit mall
Cotton Belt	DFW	Red Line	20	60	20	30	NA
DCTA- A-Train	Denton	Downtown Carrollton	20	60	60 (Sat only)	60 (Sat only)	NA
TRE	Union Station	T&P	20	60	90 (Sat. only)	90 (Sat. only)	NA
FWTA (SW2NE)	Sycamore Rd.	DFW	20	60	90 (Sat. only)	90 (Sat. only)	NA
Combined peak headway for transit mall segment			*2.5*	*5*			
Combined peak headway for D2 segment			*5*	*10*			

Source: PB/AZB Joint Venture and Connetics

Vehicle and Facility Assumptions

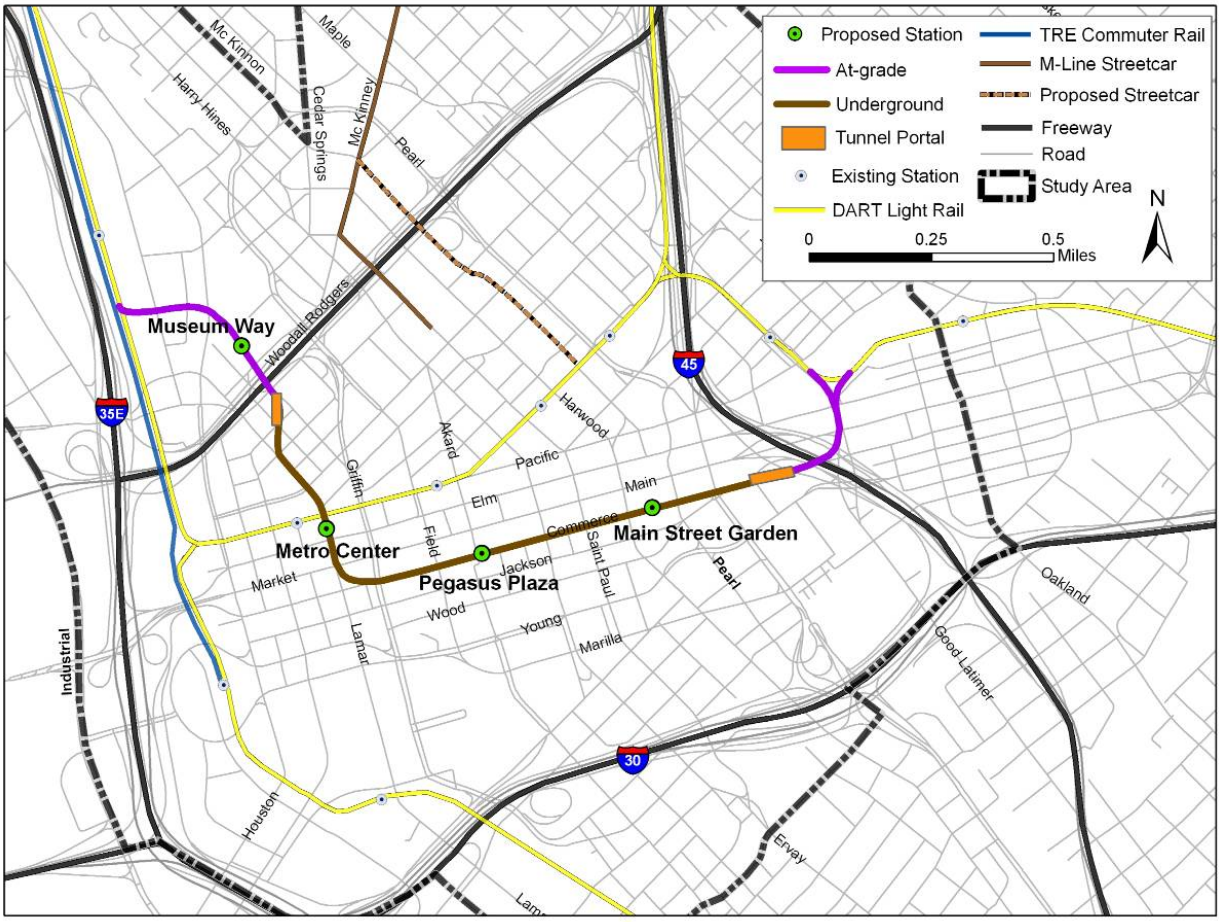
It is assumed that no new vehicles or maintenance facilities will be provided with the Build Alternatives.

2.2.3.1 Alternative B7 Lamar-Commerce

Alignment

Figure 2-8 illustrates Alternative B7 Lamar-Commerce. This route extends from Victory Station on the Northwest Corridor to Deep Ellum on the Southeast Corridor. The route would follow existing DART right-of-way at-grade through the Victory development to Woodall Rodgers, passing under the highway at-grade, and then turning southwest and descending into a tunnel portal between North Griffin and Lamar Streets. The route would continue south in Lamar Street under the existing Pacific-Bryan Transit Mall, then southeast between Lamar Street and Griffin Street to Commerce Street. The alignment would continue east under Commerce Street to a tunnel portal near the South Central Expressway. It would then continue at–grade and pass under I-45 to a "Y" connection with the North Central and Southeast Corridors.

Figure 2-8. Alternative B7 Lamar-Commerce



Source: PB/AZB Joint Venture

Station Locations

The common element includes the at-grade Museum Way Station north of Woodall Rodgers Freeway, and one below-grade station at Metro Center. Two additional below-grade stations would be located along Commerce Street. The Pegasus

Station is located near Akard Street and the Main Street Garden Station is between Pearl and Harwood Streets. These two underground stations would have access to both sides of Commerce Street. Additional connections to adjacent streets and buildings could be made by others and coordinated during more detailed design efforts.

Changes to No-Build Bus Routes

The Alternative B7 Lamar-Commerce bus route network is generally the same as under the No Build Alternative. Some bus routes are modified to better interface with new LRT stations.

Capital Improvements

Transit Facility Improvements

In order to accommodate operations along the new B7 LRT line and stations, two additional traction power substations (TPSS), and two track crossovers will be needed. The tunnel section will have operating and maintenance systems and facilities consistent with the Orange and Green line. Underground stations include required access and ventilation.

Street and Highway Improvements

Along surface sections of the alignment where in-street operation is proposed, roadway, street and walkway reconfiguration will be required. These improvements are anticipated between Victory Station and the North Tunnel portal located south of Woodall Rodgers and along Commerce and Good Latimer Expressway east of the East Tunnel portal.

DART and the City of Dallas have implemented transit signal priority for the existing downtown Pacific-Bryan transit mall and will be extended to at-grade crossing of all streets and intersections along this alternative. DART will actively pursue this same level of priority for at-grade sections of the D2 preferred alternative with the City of Dallas. While this has been discussed during Technical Work Group meetings, additional coordination and analysis will be undertaken after a LPA is selected and more detailed design is done.

2.2.3.2 Alternative B4 Lamar-Young

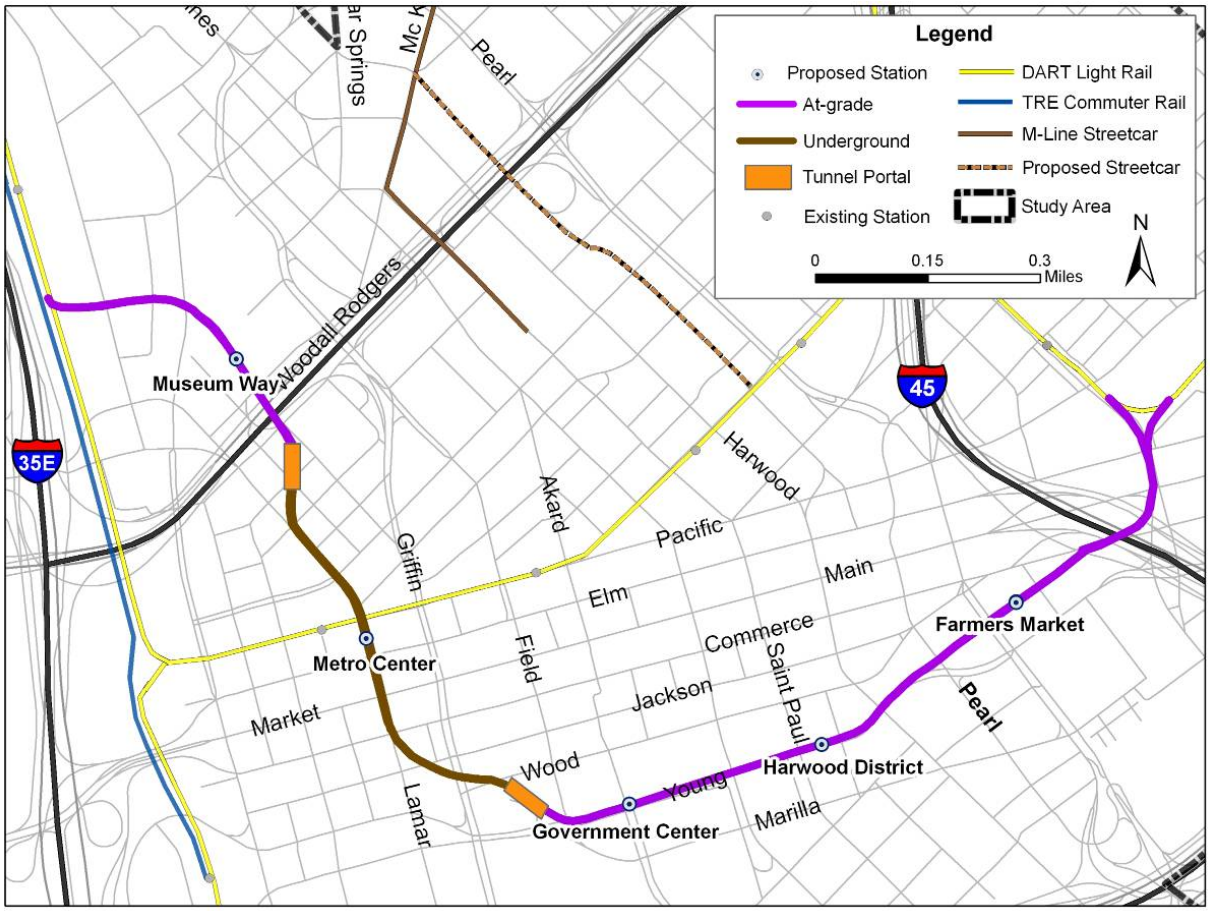
Alignment

The alignment for Alternative B4 Lamar-Young is displayed in Figure 2-9. This route follows the common alignment from Victory to Metro Center Station as described previously. After leaving Metro Center, the route would continue below grade, turning southeast between Lamar and Field Streets to a tunnel portal between Wood and Young Streets. It would then proceed east in the median of a reconstructed Young Street, continuing on abandoned Young Street, passing under IH 45 to a "Y" connection with the North Central and Southeast Corridors.

Station Locations

Five stations, four of which are at-grade stations, are proposed along the route. Two of these stations, the Museum Way Station north of Woodall Rodgers, and the below-grade Metro Center Station are located in the common segment. The three

Figure 2-9. Alternative B4 Lamar-Young



Source: PB/AZB Joint Venture

additional stations are located in the median of Young Street between Field and Akard Streets (Government Center Station), in the median of a reconstructed Young Street between St. Paul and Harwood Streets (Harwood District Station), and on abandoned Young Street east of Central Avenue (Farmers Market Station).

Changes to No-Build Bus Routes

The B4 Lamar-Young bus route network is generally the same as under the No Build Alternative. Some bus routes are modified to better interface with new LRT stations. Specific changes to bus routes are being documented in a separate report.

Capital Improvements

Transit Facility Improvements

In order to accommodate operations along the new Alternative B4 LRT line and stations, two additional traction power substations and two track crossovers will be needed. The tunnel section will have operating and maintenance systems and facilities consistent the Orange and Green line. Underground stations include required access and ventilation.

Street and Highway Improvements

Along surface sections of the alignment where in-street operation is proposed, roadway, street and walkway reconfiguration will be required. These improvements are anticipated between Victory Station and the North Tunnel portal located south of Woodall Rodgers and along Young Street east of the South Tunnel portal located at Field and Young Streets. Young Street would be largely reconstructed to accommodate the LRT line in the median between Field and Harwood Streets. St. Paul Street would be realigned at Young Street to accommodate the proposed surface station between St. Paul and Harwood Streets.

DART and the City of Dallas have implemented transit signal priority for the existing downtown Pacific-Bryan transit mall and will be extended to at-grade crossing of all streets and intersections along this alternative. DART will actively pursue this same level of priority for at-grade sections of the D2 preferred alternative with the City of Dallas. While this has been discussed during Technical Work Group meetings, additional coordination and analysis will be undertaken after a LPA is selected and more detailed design is done.

2.2.3.3 Alternative B4a Lamar-Marilla

Alignment

Figure 2-10 illustrates Alternative B4a Lamar – Marilla. This route follows the common alignment from Victory to Metro Center Station as described previously. After leaving Metro Center, the route would continue below grade, turning southeast between Lamar and Field Streets. However, instead of rising to a tunnel portal between Wood and Young Streets, this option would continue southeast in a tunnel under Griffin Street, Field, Young and Marilla Streets. It would proceed through the excavated cavern (Level 3) under City Hall between Akard and Ervay Streets and to a tunnel portal east of City Hall in Marilla Street between Park Avenue and Harwood Streets. It would then follow Marilla, Canton and abandoned Young Streets east at-grade, passing under IH 45 to a "Y" connection with the North Central and Southeast Corridors.

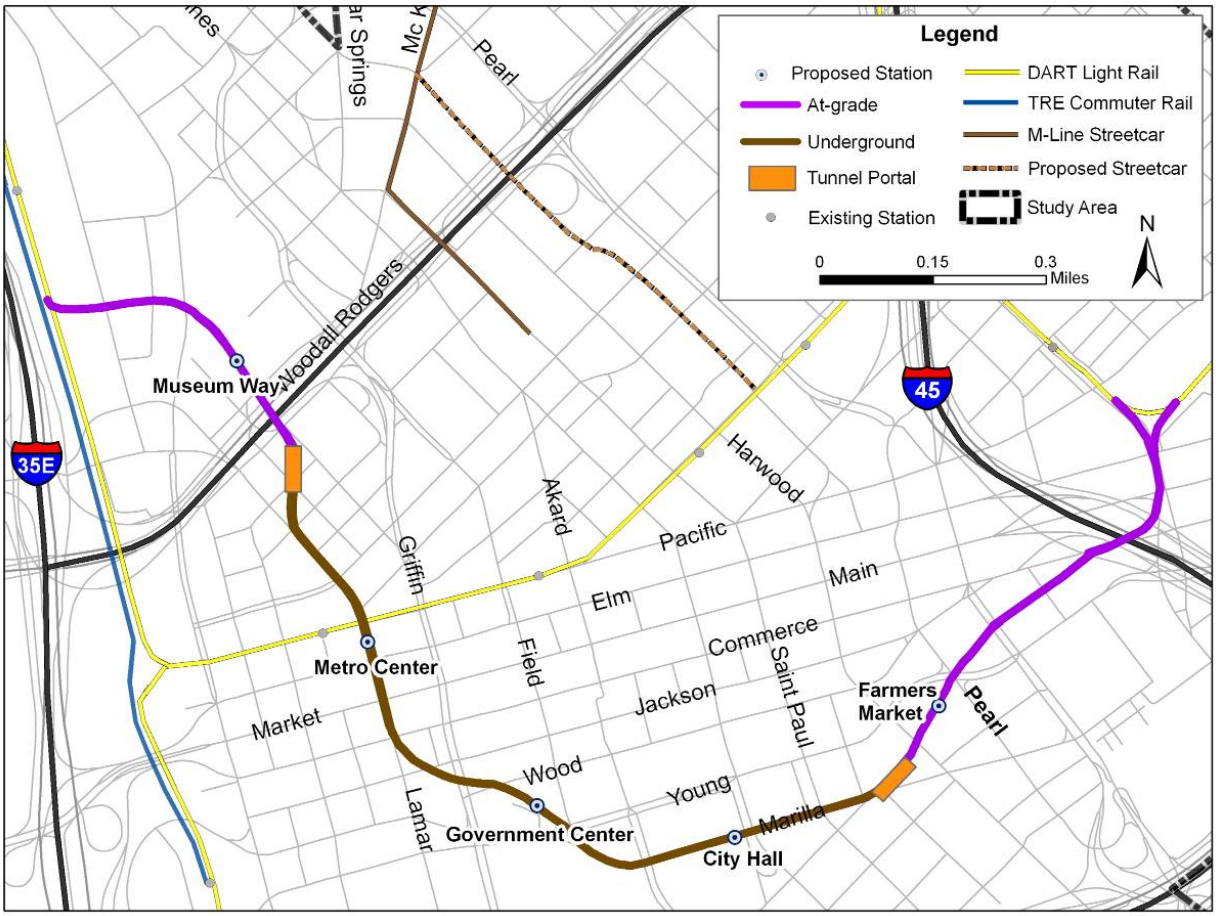
Station Locations

Five stations, two of which are at-grade stations, are proposed along the route. Two of these stations, the Museum Way Station north of Woodall Rodgers, and the below-grade Metro Center Station are located in the common segment. Continuing east from Metro Center, two additional below grade stations would be provided adjacent to the Santa Fe Building #4 between Wood and Young Streets (Government Center), and at City Hall near the eastern end of the underground cavern located beneath the parking garages (City Hall). Further east, one additional at-grade station would be provided adjacent to the south side of the Scottish Rite Temple between Harwood and Canton Streets (Farmers Market). The City Hall Station would have public access to Ervay Street and controlled access to City Hall for employees and visitors.

Changes to No-Build Bus Routes

The Alternative B4a Lamar-Marilla bus route network is generally the same as under the No Build Alternative. Some bus routes are modified to better interface with new LRT stations.

Figure 2-10. Alternative B4a Lamar-Marilla



Source: PB/AZB Joint Venture

Capital Improvements

Transit Facility Improvements

In order to accommodate operations along the new B4a LRT line and stations, two additional traction power substations and two track crossovers will be needed. The tunnel section will have operating and maintenance systems and facilities consistent the Orange and Green line. Underground stations include required access and ventilation.

Street and Highway Improvements

Along surface sections of the alignment where in-street operation is proposed, roadway, street and walkway reconfiguration will be required. These improvements are anticipated between Victory Station and the North Tunnel portal located south of Woodall Rodgers and along Marilla Street east of the South Tunnel portal located at Hayward Street.

DART and the City of Dallas have implemented transit signal priority for the existing downtown Pacific-Bryan transit mall and will be extended to at-grade crossing of all streets and intersections along this alternative. DART will actively pursue this same level of priority for at-grade sections of the D2 preferred alternative with the City of

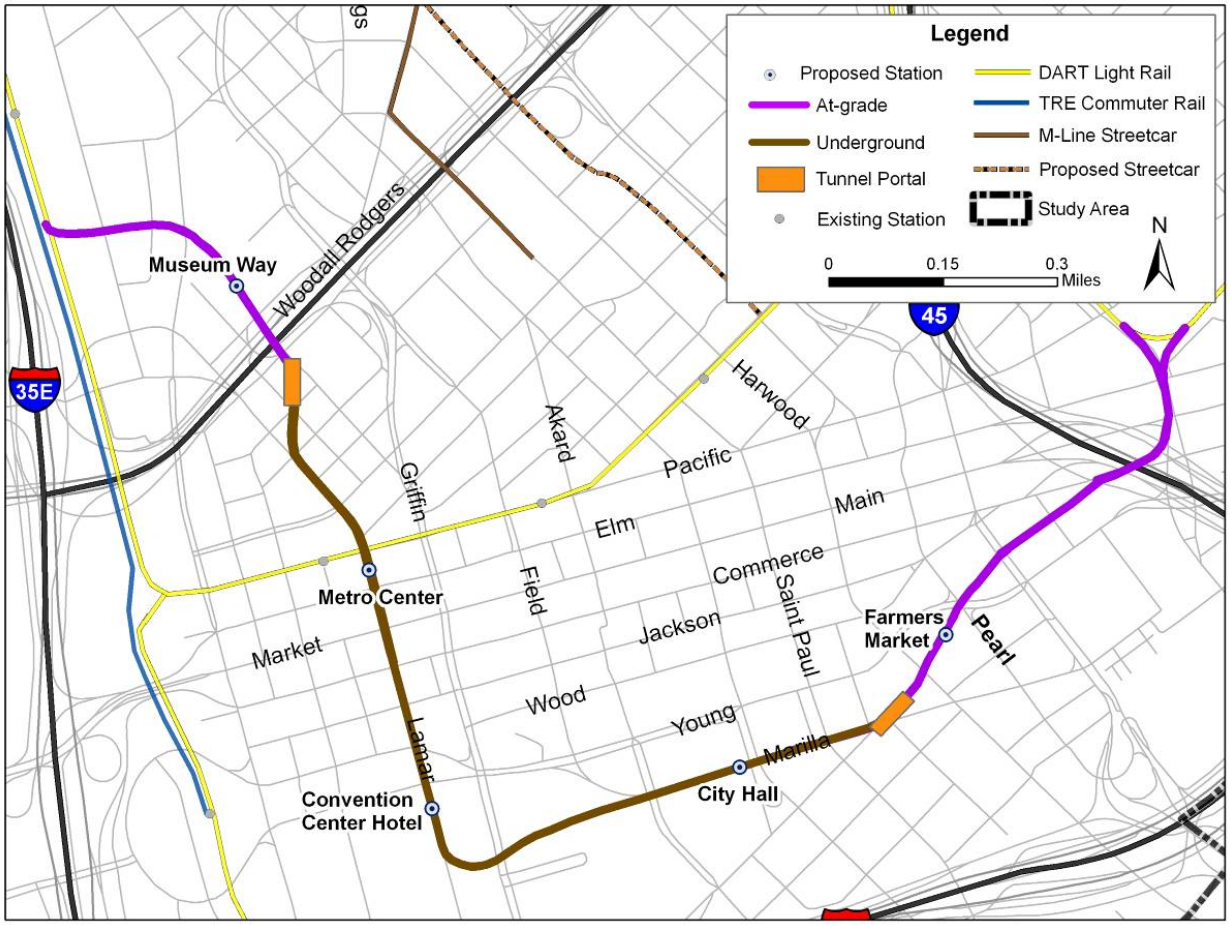
Dallas. While this has been discussed during Technical Work Group meetings, additional coordination and analysis will be undertaken after a LPA is selected and more detailed design is done.

2.2.3.4 Alternative B4b Lamar- Convention Center Hotel

Alignment

This route is similar to Alternative B4a Lamar-Marilla. From the underground Metro Center Station, Alternative B4b continues south in a tunnel under Lamar Street, as presented in Figure 2-11, to provide a direct connection to the proposed Convention Center Hotel site south of Young Street. After passing the new Convention Center hotel site south of Young Street, the route turns east in front of the Convention Center. Still in a tunnel, it passes underneath Pioneer Plaza and Cemetery to Marilla Street, through the excavated cavern (Level 3) under City Hall, and to a tunnel portal east of City Hall. It then follows the same alignment as Alternative B4a Lamar-Marilla east to the connection with the North Central and Southeast Corridors.

Figure 2-11. Alternative B4b Lamar-Convention Center Hotel



Source: PB/AZB Joint Venture

Station Locations

Four of the five stations under this alternative are the same as Alternative B4a. Two stations, the Museum Way Station north of Woodall Rodgers, and the below-grade Metro Center Station are located in the common segment. Continuing south from Metro Center, a below grade station would be provided under Lamar Street at Young Street to serve the Convention Center hotel site (Convention Center Hotel Station). As with Option B4a, a City Hall Station would be provided at the eastern end of the underground cavern beneath the parking garage. Further east, one additional at-grade station would be provided adjacent to the south side of the Scottish Rite Temple between Harwood and Canton Streets (Farmers Market). The City Hall Station would have public access to Ervay Street and controlled access to City Hall for employees and visitors.

Changes to No-Build Bus Routes

The Alternative B4b Lamar-Marilla bus route network is generally the same as under the No Build Alternative. Some bus routes are modified to better interface with new LRT stations. Specific changes to bus routes are being documented in a separate report.

Capital Improvements

Transit Facility Improvements

In order to accommodate operations along the new B4a LRT line and stations, two additional traction power substations and three track crossovers will be needed. The tunnel section will have operating and maintenance systems and facilities consistent the Orange and Green line. Underground stations include required access and ventilation.

Street and Highway Improvements

Along surface sections of the alignment where in-street operation is proposed, roadway, street and walkway reconfiguration will be required. These improvements are anticipated between Victory Station and the North Tunnel portal located south of Woodall Rodgers and along Marilla Street east of the South Tunnel portal located at Hayward Street.

DART and the City of Dallas have implemented transit signal priority for the existing downtown Pacific-Bryan transit mall and will be extended to at-grade crossing of all streets and intersections along this alternative. DART will actively pursue this same level of priority for at-grade sections of the D2 preferred alternative with the City of Dallas. While this has been discussed during Technical Work Group meetings, additional coordination and analysis will be undertaken after a LPA is selected and more detailed design is done.

2.2.3.5 Convention Center Hotel Connection Options

Direct access to the proposed Convention Center Hotel site is an important objective for the City of Dallas, particularly since the Orange and Green Lines provide a direct connection between the airports and Downtown Dallas. Alternative B4b is the only alternative that provides direct access to the proposed Convention Center Hotel site. Alternatives B4 Lamar-Young and B4a Lamar-Marilla are within a ¼ mile walking

distance to the hotel site. Alternative B7 Lamar-Commerce does not serve the Convention Center Hotel site.

In order to create a more seamless passenger connection between stations under Alternatives B4 and B4a and the Convention Center Hotel site, a range of at-grade, elevated and below grade connection options were examined. These options would extend along Young Street and include:

- At-grade street and sidewalk improvements designed to create a safe and secure walking environment, to provide visual recognition of a designated pedestrian pathway, and to facilitate the movement of small shuttle vehicles between the Convention Center Hotel and the station;
- An elevated, enclosed pedestrian bridge, with or without an automated moving walkway to increase walk speed; or
- An underground pedestrian tunnel, with or without an automated moving walkway to increase walk speed.

The connection could be a separate project completed by others, or could be incorporated into the project. For the purposes of the D2 study, it is assumed that this connection would be funded by non-DART sources and is not evaluated as part of this AA/DEIS.

2.3 Recommended Alternative

This section discusses the next steps for developing a second transit alignment through downtown Dallas. DART is currently advancing the alternatives analysis/Draft Environmental Impact Statement (AA/DEIS) evaluation process, having completed the Project Scoping, Alternatives Screening and Detailed Definition of Alternatives phases. During each of these phases, the DART Board has made interim decisions, supported by technical analysis and public discussion, which have narrowed the range of alternatives to those presented in this document. This process will ultimately result in the selection of a Locally Preferred Alternative (LPA) for advancement into detailed engineering, final design and construction.

2.3.1 Evaluation of Alternatives

The D2 Alternatives are being evaluated using the methods and criteria for an AA required for participation in the FTA New Starts Program. This DEIS is being conducted on the Alternatives, pursuant to NEPA. The alternatives analysis and environmental impact statement consider the extent to which the Alternatives meet the D2 Study's Purpose and Need and discuss the alternatives' potential effect on transportation and the environment. A financial evaluation compares capital and operating costs, in addition to project affordability given the available funding sources. Public and agency participation in the study is also considered.

2.3.2 Selection of Locally Preferred Alternative

The process for selecting a locally preferred alternative is as follows:

- Project advisory committee meetings, public meetings and presentations to the DART Board were held during May and June of 2009 to present the results of the Preliminary DEIS and gather comments and public input. The meetings and

presentations also served to gain greater understanding of the issues and preferences for the alternatives.

- The evaluation of alternatives based on FTA criteria is ongoing. When completed, these results will be presented to the DART Board. A final LPA will be selected by the DART Board based on a Public Hearing for the DEIS, the required DART Service Plan amendment, and discussions with FTA regarding project eligibility and priority for federal funding.
- The City of Dallas Transportation and Environment Committee (TEC) made a motion during the August 11, 2009 meeting to approve Alternative B4b as the City's preferred alignment option. Meeting minutes from this meeting are included in Appendix D, Agency Correspondence. This decision will be considered at the time a LPA is adopted by the DART Board.
- Upon the adoption of a LPA by the DART Board, an application for advancing the D2 project into the Preliminary Engineering/Final Environmental Impact Statement (PE/FEIS) phase will be prepared and submitted to FTA.

2.3.3 Recommended Alternative in this Document

In subsequent chapters of this document, all four Build Alternatives defined in Section 2.2 are presented and compared to the No Build Alternative; these alternatives are evaluated in Chapter 6 of this DEIS.

CHAPTER 3.0
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter discusses the existing physical environment that would be potentially affected by the alternatives proposed for the Downtown Dallas Transit Study (D2) project. The alternatives are described in Chapter 2.0. This chapter also presents the environmental consequences related to implementing each alternative. Initial mitigation measures are suggested; however, committed actions are not determined at this time in project development.

3.1 Land Use

This section describes the existing and planned land use for the study area and along the alternatives. It includes descriptions of local plans and policies, major districts, development activity and emerging trends. Existing and planned land use for the study area are discussed in the context of understanding the relationships between existing land use, policies and regulations, market conditions and the planned D2 project.

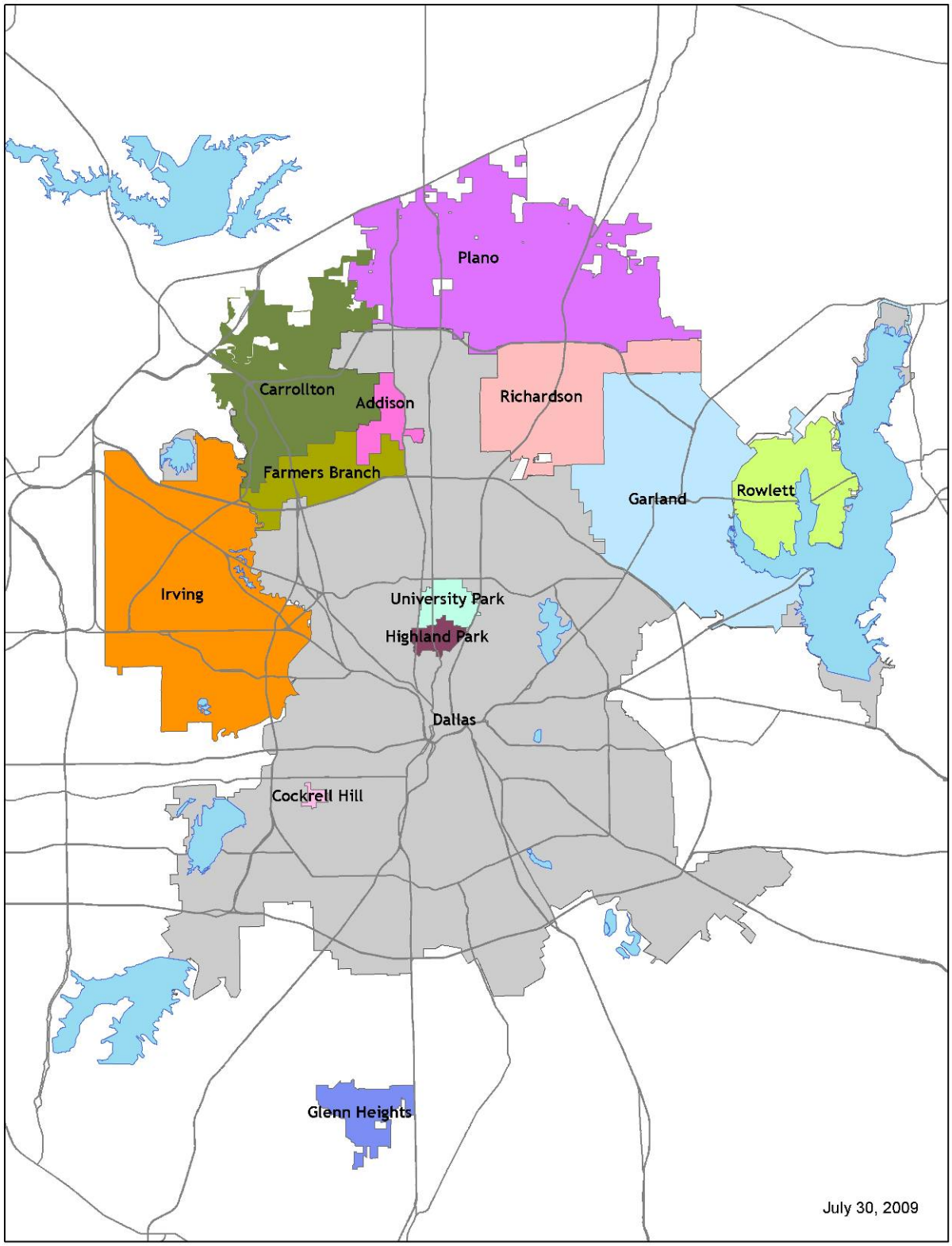
The D2 project would be located in the Dallas Central Business District (CBD), an area characterized by commercial buildings, arts and cultural centers, recreational facilities, City Hall and other governmental sites, parking and small parks. Residential housing is limited to multi-family housing units. Most of the CBD is already developed with only small amounts of vacant land available for future uses. The D2 project's impact on specific City districts is discussed in this section.

3.1.1 Regional Summary

The Dallas Area Rapid Transit (DART) service area covers an area of 700 square miles with 13 member cities (Figure 3-1). According to the 2009 population estimates prepared by the North Central Texas Council of Governments (NCTCOG), the City of Dallas had a population of 1,279,910. Dallas is the ninth largest city in the U.S. and the third largest city in Texas. The Dallas-Arlington-Fort Worth Metropolitan Statistical Area (Dallas MSA) consists of 12 counties: Wise, Denton, Collin, Hunt, Delta, Parker, Tarrant, Dallas, Rockwall, Kaufman, Johnson, and Ellis. The 2008 population for the Dallas MSA was 6,300,006, which ranks the Dallas MSA fourth among all MSAs in the country. The Dallas MSA covers 9,284 square miles (Real Estate Center at Texas A&M University; 2009 Texas Metro Market Overview; 2008). The City of Dallas has a total land area of 246,849 acres. As shown in Table 3-1 the leading land uses for the City of Dallas are single-family residential, infrastructure and vacant land. The study area's land use, by contrast, as shown in Table 3-1, is primarily commercial, office/retail, industrial, institutional, streets, and parking.

The study area encompasses approximately four square miles. In general, the study area includes the CBD, which is classified as predominantly commercial, multi-family residential, and government land uses.

Figure 3-1. DART Service Area



Source: DART

Table 3-1. City of Dallas Land Use

Land Use Type	Acres	Percent
Total	246,849	100%
Single-family Residential	62,383	25%
Multi-family Residential	10,011	4%
Other Residential	899	0%
Industrial	15,331	6%
Commercial	12,374	5%
Institutional	7,534	3%
Infrastructure	42,865	17%
Parks and Floodplain	15,727	6%
Water	29,703	12%
Under Construction	98	0%
Vacant	49,964	20%

Source: NCTCOG, 2000 Land Use by City

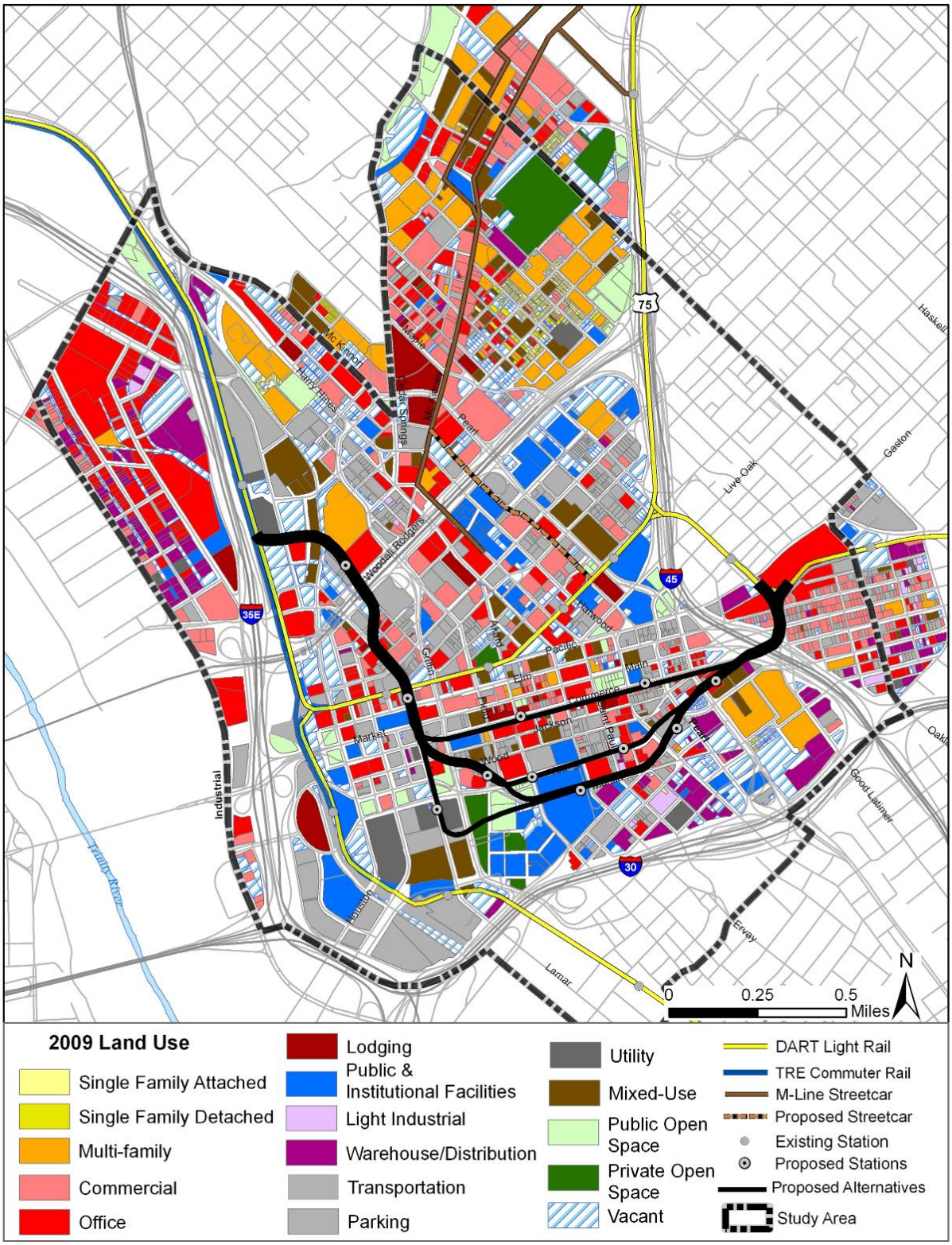
3.1.2 Existing Study Area Land Use

Land use across the study area is diverse and includes retail, office, institutional, and multi-family residential in and near the CBD. The outer CBD is characterized as industrial to the south; office space and multi-family housing to the southwest; recreational to the southeast; residential to the north and northeast; and the northwest is characterized as primarily multi-family and recreational areas.

The Dallas CBD is the core of the study area. Figure 3-2 illustrates land use for the study area. The predominant land use within the CBD is office buildings. Downtown Dallas is the location of over 2,500 businesses representing the region's major industries: accounting, advertising, architecture, communications, finance, government, law, hospitality, insurance, real estate, and trade, with approximately 29.4 million square feet of office space. The second largest land use in the CBD is institutional, such as government agency offices, educational facilities, and arts and cultural institutions. Within the last decade, the downtown area experienced a rapid increase in multi-family residential housing. The NCTCOG reports that as of 2007, 50 housing developments were either planned or under construction within one mile of downtown Dallas. According to the NCTCOG, approximately 170,000 people were employed in the downtown area in 2000. For the same area in 2009, approximately 190,000 are employed; by 2030 this will increase to 245,000.

Table 3-2 shows the number and percentage of acres by land use category for the study area. Office use is the most common land use, accounting for 22 percent of the study area. No single-family residential land use is located in the study area compared to 25 percent for the overall City of Dallas. The percentage area for each type of land use along each route is based on estimation of length of land use category along each side of track, the study area values are estimations based on total area. Figure 3-3 provides a more detailed illustration of land use adjacency along each alternative.

Figure 3-2. Existing Study Area Land Use



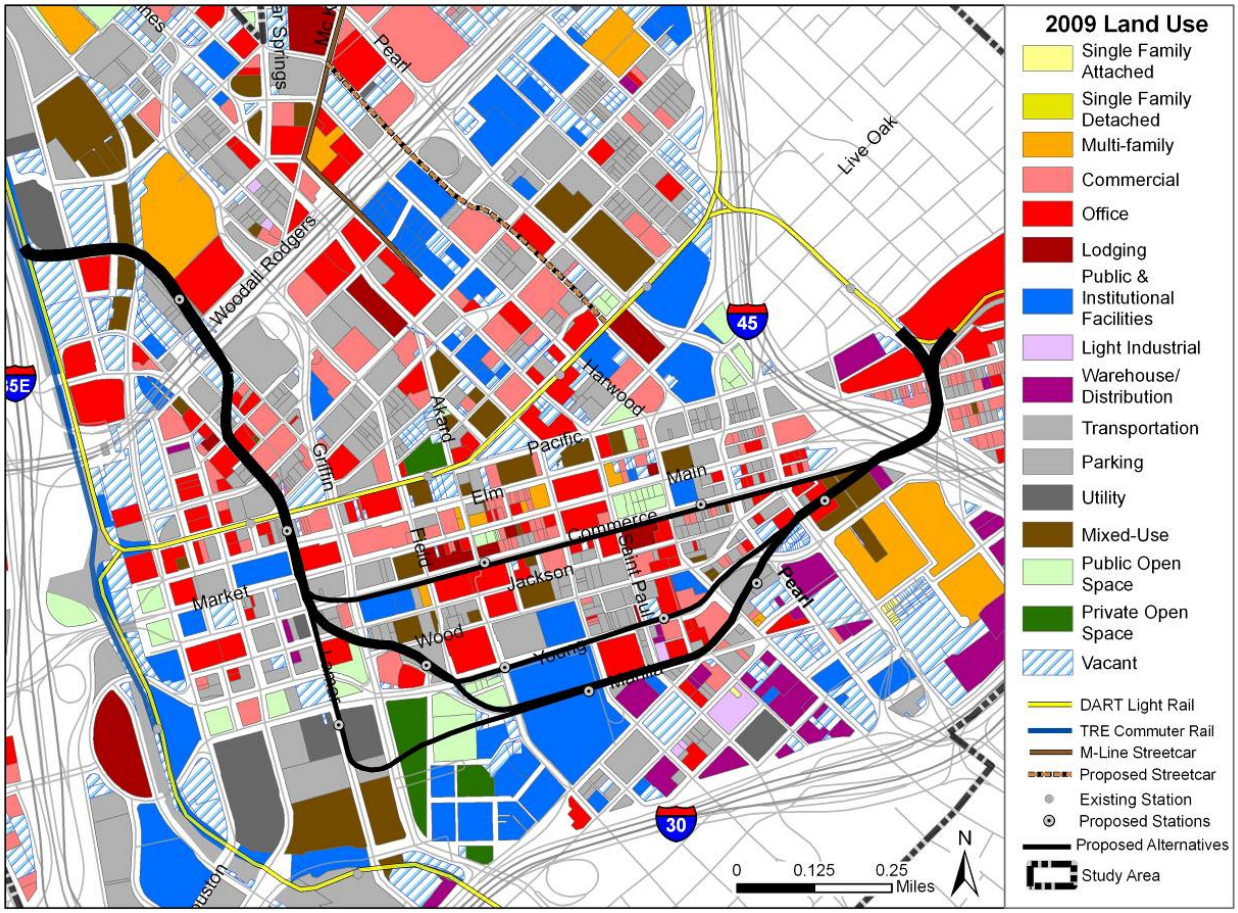
Source: City of Dallas, 2009

Table 3-2. Existing Study Area Land Use

Land Use	Alternative B7	Alternative B4	Alternative B4a	Alternative B4b	Alternative Area
Single Family	0%	0%	0%	0%	0%
Hotel	4%	0%	0%	0%	1%
Industrial	6%	11%	11%	11%	17%
Institutional	3%	7%	8%	5%	10%
Multifamily	4%	2%	2%	3%	6%
Office	42%	27%	17%	16%	22%
Parking	15%	28%	32%	36%	13%
Parks and Recreation	4%	5%	9%	9%	8%
Retail	23%	18%	18%	18%	19%
Vacant	0%	2%	2%	2%	4%

Source: NCTCOG

Figure 3-3. Land Use Adjacent to Build Alternatives



Source: City of Dallas, 2009

3.1.3 Study Area Districts

Districts in the Study Area include: the City Center and Main Street Districts, major centers of employment and business activity; the Government District, location of the Dallas City Hall and Public Library; the Deep Ellum and Farmers Market Districts, centers for shopping, social, and cultural activity; the Arts District, a major destination for cultural activities; the West End, a mix of cultural, educational, business and residential activity; the Convention Center District, where the existing Convention Center is located as well as the future Convention Center Hotel; Victory Park, a major new high-density, mixed-use development; the Design District, where several design stores and professional offices are located; and the Uptown District and The Cedars District, in the northern and southern reaches of the CBD, respectively. Descriptions of these districts are provided in the following sections. Figure 3-4 shows the location of these Districts.

3.1.3.1 Deep Ellum

Deep Ellum is a public improvement district located just inside the easternmost section of the study area. It is just east of the IH 45/US 75 Freeway, south of Gaston Avenue, and north of Canton Street. It is mainly a historical arts and entertainment district, although it does have many types of businesses, including some industrial, and a growing population of residents. The central artery of Deep Ellum is Main Street from Good Latimer Street to Hall Street, which is an extension from the western and more contemporary downtown Main Street District. Deep Ellum is an older area of downtown with turn-of-the-century, commercial style, low- rise buildings and converted warehouses abutting the streets. This improvement district has many restaurants, night clubs, and art studios and is frequented by patrons from Dallas and surrounding communities. It is host to the annual Deep Ellum Arts Festival, which includes live entertainment, various types of cuisines, and a number of artists exhibiting their arts and crafts.

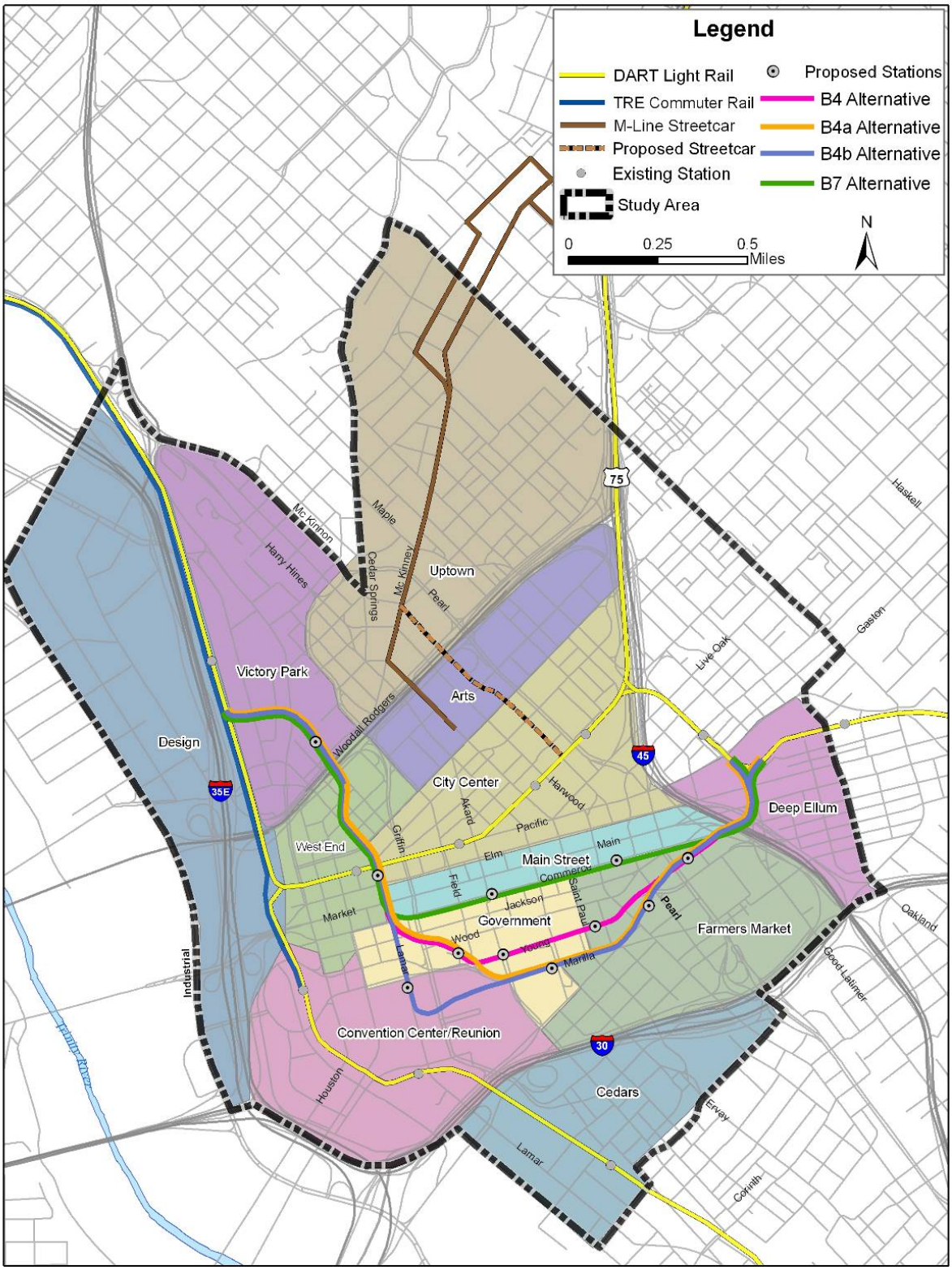
3.1.3.2 Main Street District

The Main Street District is home to many high-rise business buildings, hotels and condominiums, including: Bank of America Plaza, One Main Place, The Magnolia Hotel, Mercantile Tower, Bank One Center, SPG Building, Aristocrat Hotel, The Metropolitan, Davis Building, Kirby Building, Wilson Building, and Titche-Goettinger Department Store. It lies between Commerce Street and Elm Street, from Lamar Street to US 75/ IH 45. This district follows Main Street west of Deep Ellum and US 75 and is bound on the west by the West End District. Main Street is increasingly becoming the retail and dining destination in Downtown, with live entertainment at Pegasus Plaza and other special events geared to increase downtown activity.

3.1.3.3 City Center

The City Center is the historic financial core of Downtown, which has recently added more residential and retail uses. Major land uses within the City Center include office buildings and mixed-use developments, with most properties zoned for commercial use. Redevelopment is adding additional housing and population density to the area. The office towers and hotels that form the heart of this activity center extend from the Renaissance Tower on the southwest to the JP Morgan Chase Tower and Plaza of the Americas on the northeast.

Figure 3-4. Study Area Districts



Source: City of Dallas, 2009

3.1.3.4 Government District

This activity center is centered on the Dallas City Hall, and also includes the J. Erik Jonsson Central Library. Other features in the area include the City Hall Park Plaza, Dallas Police Memorial, Pioneer Plaza/Cemetery, and Founders Square.

3.1.3.5 Convention Center/ Reunion District

Named for its two most famous structures, this district is home to the Dallas Convention Center and Reunion Tower, as well as the Hyatt Regency Hotel, Dallas Morning News, WFAA-TV, Pioneer Plaza/Cemetery, and Founders Square. It is located inside Commerce Street, Jackson Street, Market Street, Young Street, Akard Street, IH 30, and IH 35E.

One of the major new developments planned for the Convention Center area is the city-sponsored Convention Center Hotel. The anticipated size of the project is six acres of land currently owned by the City of Dallas at the intersection of Young Street and Lamar Street. This hotel will provide up to 1,000 rooms with a variety of multi-purpose spaces (80,000 square feet) for meeting rooms and ballrooms. The hotel will provide climate controlled access to the Convention Center and have amenities such as restaurants, exercise facilities and other features that are associated with a 4-star hotel. There will be parking for up to 1,000 guests. The hotel will be designed to meet a LEED Silver certification. The Dallas Convention Center Hotel Development Corporation was created by the City as a local government corporation responsible for pursuing the development of the Convention Center Hotel, with authority to acquire land upon the City Manager and City Council's approval.

3.1.3.6 Design District

The Design District is located between Stemmons Freeway and the Trinity River at Oak Lawn. The Design District is distinguished as the location for a variety of retail outlets, featuring a wide variety of merchandise (antique malls), services and art, as well as office spaces. A growing market of mixed use and residential lofts and condominiums are being developed.

3.1.3.7 West End

The West End is a collection of restored warehouses that served Dallas' early railroad terminals. These buildings now house a collection of restaurants, offices and apartments. This district contains Dealey Plaza, the site of the Kennedy assassination, and the John F. Kennedy Memorial, El Centro College, and Dallas World Aquarium. New mixed-use developments have been built that mimic the West End's original red brick architecture. The area was initially revitalized in the 1990s as an entertainment district and to draw patrons into the downtown area of Dallas.

3.1.3.8 Uptown

Uptown, which includes the State Thomas neighborhood, is an urban mixed-use district. High-rise condos, townhouses, and office towers in this area are increasing the population density in the area. Several restaurants, shops, and services along McKinney Avenue, the spine road of the district, serve the community and employees of businesses in the area.

3.1.3.9 Victory Park

Victory Park, a $3-billion master planned development with modern office, residential and entertainment projects, is centered on the American Airlines Center, home to the Dallas Mavericks (National Basketball Association) and Dallas Stars (National Hockey League). The area features public plazas with outdoor art and special events. Since its inception, the Sports Arena Tax Increment Financing (TIF) District has seen more than $680 million in new private development started. All together, more than $1 billion worth of new private development is scheduled to be completed by the end of 2010. In addition, Two Victory Park is a planned 370,000 square foot office and retail building worth $70 million. As part of a prior agreement, DART owns a surface transit right-of-way through the area from Victory Station to Woodall Rodgers Freeway.

3.1.3.10 The Cedars

In the late 1800s, The Cedars was once an affluent community with Victorian houses. In subsequent years, after the turn of the century, light industry and a growing population caused many of the community's residents to move farther north. Eventually, most of the stately houses were demolished for warehouses, light industrial buildings, and highways. The area, a haven for artists and other creative types for over 20 years, has recently experienced an urban transformation with new townhomes and apartments and developments such as DART's Cedars Station, South Side on Lamar (a loft/retail development), Dallas Police Headquarters, The Beat Condominiums, and entertainment venues such as Gilley's Dallas and Poor David's Pub.

3.1.3.11 Farmers Market District

The Farmers Market District is bound by Interstate Highway 30 on the south and Julius Schepps Freeway to the east. It is also bound by five other districts: the Cedars, Convention Center/Reunion District, Government District, Main Street District, and Deep Ellum. The Farmers Market District includes 1,300 new apartments and townhomes near the historic Farmers Market. New low-rise residential projects continue to emerge in this area with generally more vacant property and lower land prices than other CBD neighborhoods.

3.1.3.12 Arts District

This district is bound by Ross Street to the south, Woodall Rogers Freeway to the north, Field Street to the west, and Julius Schepps Freeway to the east.

The Dallas Arts District is home to several facilities and institutions that attract visitors from throughout the city and region. These include cultural, educational and religious facilities, such as the Dallas Museum of Art, Nasher Sculpture Garden, Morton H. Meyerson Symphony Center, and the new Dallas Center for the Performing Arts. Activities include concerts, outdoor festivals, lectures, youth educational programs, and other cultural programs. Several significant residential developments are also being initiated in the Arts District, including One Arts Plaza and the Museum Tower.

3.1.4 Local Land Use Policies and Plans

3.1.4.1 forwardDallas! Comprehensive Plan

The forwardDallas! Comprehensive Plan was adopted by Ordinance No. 26371 by the Dallas City Council on June 14, 2006, following review by the Department of Development Services and the City Plan Commission. The purpose of this comprehensive plan is to promote sound development of the city and promote the public health, safety and welfare. This comprehensive plan sets forth policies to govern the future physical development of the city. The plan serves as a guide to all future city council action concerning land use and development regulations, urban conservation and rehabilitation programs and expenditures for capital improvements.

The forwardDallas! Plan is a comprehensive plan for the entire City, but does have several action plans that will impact the CBD. The plan states that the strength of the Central Business District is fundamental to the well being of not just Dallas, but North Central Texas. Strategies for the enhancement of transportation systems such as public transportation are viewed as critical to improving air quality and the development of transit oriented design is considered key to development strategies near future DART stations. On March 11, 2009, the City adopted form-based zoning districts to encourage walkable mixed-use areas consistent with the plan.

The forwardDallas! plan specifically recognizes the importance of DART's impact on the City's future development. The plan specifically looks to coordinate efforts with DART for future growth and to maximize mixed use, transit oriented design opportunities. This would specifically involve development of areas with different types of housing, retail, and office uses, professional service firms and cultural and artistic facilities.

Recommendations were made in the forwardDallas! Plan for future actions taken regarding land use and development, economic development, transportation, urban design, and the environment. Some of these policies pertain to the development of a light rail facility through the CBD. Relevant land use policies in the plan include:

- capitalizing on transit-oriented development opportunities;
- implementing the Trinity River Corridor Plan;
- developing a dynamic and expanded downtown area;
- strengthening existing neighborhoods, promoting neighborhoods' unique characteristics, and acknowledging the importance of neighborhoods to the city's long-term health and vitality;
- coordinating development and planning activities;
- establishing mixed-use zoning designations in strategic locations and invest in transit oriented development (TOD) pilot projects;
- developing a cross-town transportation linkage plan in collaboration with DART to provide an efficient local and regional transportation network;
- developing a commuter bike trail network throughout the city;

- investing in airport connections including access to the regional transportation system; and
- embracing environmental sustainability.

Relevant economic policies include:

- ensuring that zoning is flexible enough to respond to changing economic conditions;
- focusing economic development efforts on revitalization of the Trinity River Corridor;
- maximizing development opportunities around DART stations;
- restoring Dallas as the foremost retail location in the region;
- restoring Downtown Dallas as the economic and cultural heart of North Central Texas;
- partnering with key Downtown stakeholders to bring in retail; and
- working with property owners and stakeholders to preserve and enhance the image of Downtown Dallas.

Included in the forwardDallas Plan is a Street Car Action Plan which focuses on steps to encourage greater development of streetcars for public transportation in the City. The McKinney Avenue Trolley is identified as an example of how streetcars can effectively provide transportation and help in development along its route. Specific action plans related to the streetcar plan include:

- establishment of an advisory committee;
- conducting a comparative assessment of options;
- evaluating route options and costs;
- development or redevelopment assessment;
- estimate ridership and impact on downtown area; and
- review financing options

Implementation measures proposed in the plan include the following:

- Work with DART to develop mixed-use zoning districts to maximize transit-oriented development at the most appropriate locations within one-quarter to one-half mile of DART stations.
- Identify priority stations and develop Area Plans to spur transit oriented development.
- Embrace a holistic approach to mixed-use development that leverages the public investment in light rail and focuses on the needs of the surrounding community. This approach should encourage small business development and entrepreneurial activity within DART station areas and accommodate needs of transit ridership.

- Market DART station areas for mixed-use opportunities to fill gaps in communities poorly served by retail to keep those retail dollars in the neighborhood.
- Identify and implement "best practices" for transit oriented development. This information should be used to plan transit oriented developments (TODs) in collaboration with DART and to promote desirable development at stations along multi-modal corridors.
- Encourage development of urban amenities near DART stations, such as shopping, cultural and entertainment spots.
- Facilitate development of community-serving public facilities at appropriate locations within walking distance of DART stations
- Focus new investment and development in and around DART stations both in the Downtown area and in outer neighborhoods to increase ridership and convenience.
- Plan for and accommodate needs of transit ridership along multi-modal corridors.

3.1.4.2 CBD Comprehensive Transportation Plan (2005)

The CBD Comprehensive Transportation Plan was approved by the Dallas City Council in 2005. The Plan explored the following alternatives:

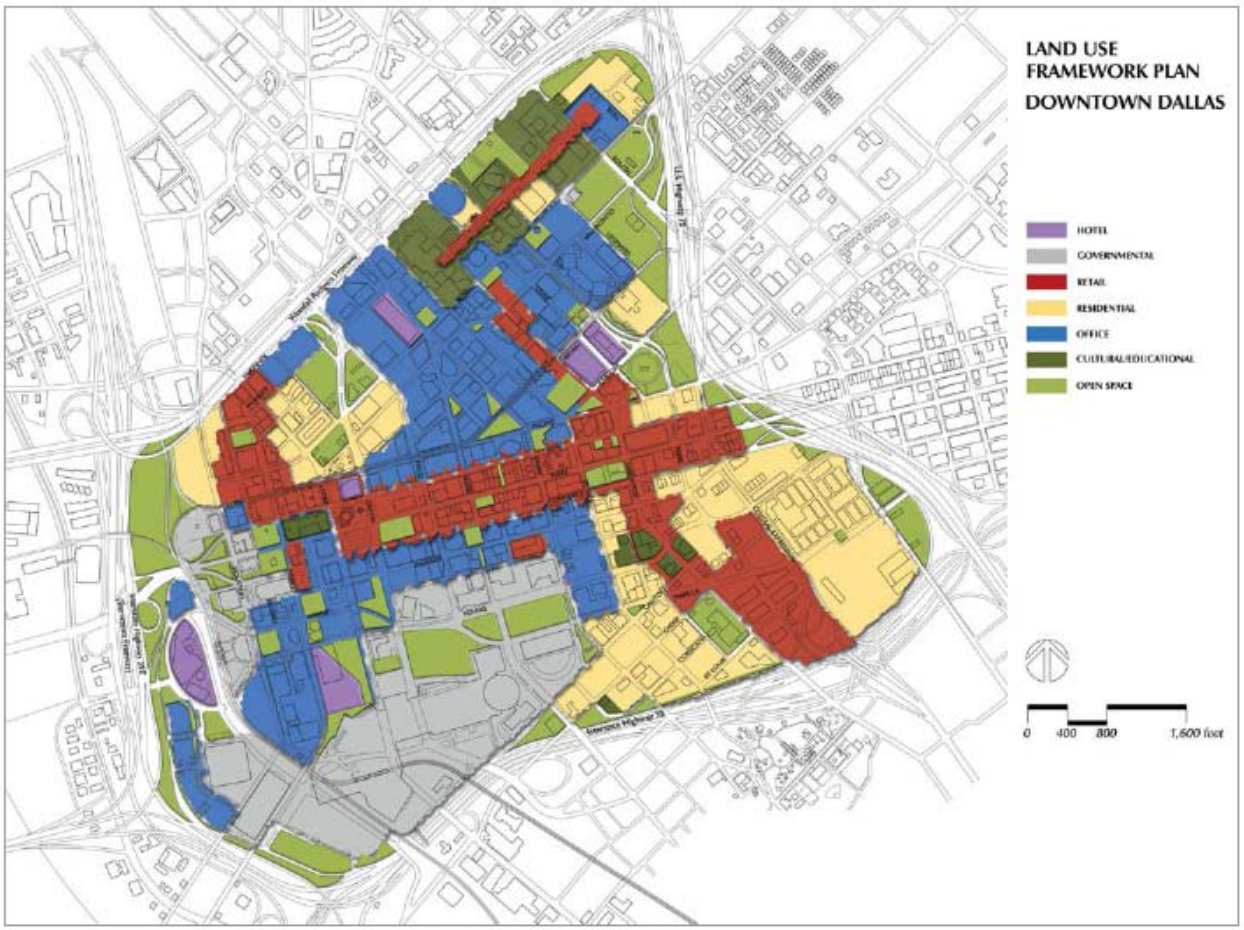
- 2nd light rail transit (LRT) corridor locations
- One-way to two-way street conversions
- Street closures
- Roadway systems
- Pedestrian enhancements
- Network enhancements

LRT corridor recommendations presented in the Plan included the adoption of the Lamar/Field (north-south) and Commerce/Young (east-west) Corridor as the preferred corridor for the second CBD LRT line. The Plan also recommended that DART proceed into alternatives analysis with this corridor to identify the specific alignment and adopt a below-grade alignment—at a minimum between Ross and Commerce. In addition, one component of the plan was a Land Use Framework Plan. This plan is illustrated in Figure 3-5 below, and page 29 of the CBD plan.

3.1.4.3 The Trinity River Comprehensive Land Use Plan (2005)

To spur revitalization in the Trinity River Corridor, the City of Dallas is collaborating with state and federal agencies to construct the Trinity River Corridor Project, a public works program involving the construction of new transportation, flood control and park facilities. The Trinity River Corridor Comprehensive Land Use Plan, which was adopted by the Dallas City Council in March 2005, serves as a framework for a coordinated approach to the Trinity Project infrastructure improvements, land use and economic development.

Figure 3-5. Land Use Framework Plan, Downtown Dallas (2005)



Source : CBD Comprehensive Transportation Plan, (2005)

The geographical area addressed by the Trinity River Corridor Comprehensive Land Use Plan is approximately 44,000 acres in size – about 20 percent of the land area in Dallas. The boundaries of the corridor span from Royal Lane in the north to I-20 in southern Dallas, and approximately 1.5 miles on either side of the Trinity River, including part of the Dallas CBD and D2 study area.

The plan will be used to guide development and investment decisions in the Trinity River Corridor. It describes the character that city residents desire for the corridor in the future and establishes general principles that direct preparation of detailed plans for smaller parts of the corridor. The plan also provides guidance about the appropriate land uses and development patterns for the corridor that can be used by citizens, property owners, and city officials as they review specific development proposals.

3.1.4.4 Strategic Engagement

This plan is intended to identify opportunities for raising the standard of living, promoting economic opportunities for residents and maintaining a stable revenue base for City services. Its focus is on downtown and southern Dallas. The plan

encourages the development of partnerships of both public and private sectors, to help retain and aggressively expand business development in these sectors.

Transit oriented design is an important part of the plan and directs economic development to work closely with DART officials to: identify a CBD station with TOD potential; provide incentives for TOD developers; and develop a marketing package to help in developing TOD (Strategic Engagement: Dallas Economic Development Plan – City of Dallas Office of Economic Development).

Transportation policies in the plan include:

- designing and improving thoroughfares to balance the need for traffic mobility;
- supporting expansion of Dallas' public transit system; and
- promoting a network of on-street and off-street walking and biking paths.

Relevant urban design policies include:

- defining urban character in Downtown and urban cores;
- ensuring attractive gateways into the city;
- encouraging a balance of land uses within walking distance of each other; and
- encouraging transit-oriented developments and transit centers.

The plan's environmental policies with implications for transit planning include:

- instituting transportation demand management; and
- limiting vehicle miles traveled.

3.1.4.5 Emerald Bracelet Report – October 2005

The Emerald Bracelet refers to the development of a greenbelt around the City central business district. Much of the land identified in the report is currently owned by the public sector. The plan's goals are to provide greenspaces for those who live and work in the central business district. The proposed greenbelt is located along the boundary of the study area.

3.1.4.6 The Trail Master Plan

The Master Plan for the Trinity Strand Trail was adopted in December 2004 by the Dallas Parks and Recreation Board. Through a public/private partnership, the nonprofit Friends of the Trinity Strand Trail are in the process of developing a fully accessible hike, bike and jogging trail system along the course of the Trinity River. The cost estimated for this project is $16 million. The project will connect Stemmons Freeway to the main stem of the Trinity River.

3.1.4.7 Downtown Initiatives Group

The purpose of the Downtown Initiatives Group is to achieve the critical mass goals set forth by a 2005 privately funded study on ensuring the future livelihood of Downtown Dallas. The Group also seeks to achieve general plan goals that would help to move the area into becoming the collection of self-sustaining

neighborhood/business districts the public has envisioned. The following is a list of such goals (City of Dallas Economic Development Department):

- Improve access between and within the Uptown and Downtown areas.
- Improve the image of the Downtown Connection Area.
- Support redevelopment of the existing building supply.
- Develop a more diverse mixture of land uses.
- Increase open space and recreational opportunities.
- Provide incentives to catalyst project(s) to accelerate reaching a critical mass of residential units, retail establishments, and public amenities.
- Facilitate private development for the public purpose of developing and diversifying the economy of the Districts.

3.1.4.8 Downtown Parks Master Plan

The June 2004 Downtown Parks Master Plan is designed to provide guidance and recommendations on increasing the number of parks and public spaces, and encourage the development of discrete and sufficient amounts of parking to support downtown activities and a comprehensive transportation plan that integrates vehicles, light rail, pedestrians and cyclists. The plan identifies potential areas for future park development in the downtown area.

3.1.4.9 Dallas Arts District Strategic Assessment and Action Plan

This report outlines a set of actions for the arts district in specific topic areas. Action items are meant to build on one another and are not separate. The primary purposes of this Strategic Assessment are to understand the stakeholders' vision and goals for the Arts District, to document its many assets, to identify key constraints and barriers keeping the district from realizing its full potential, and finally to recommend both short- and long- term actionable strategies that can be implemented to move the Arts District toward the goals shared by the stakeholders. Major issues that were identified in the plan included the Woodall Rogers Park and Harwood Street Closure; the McKinney Avenue Trolley and Parking. The Arts District does represent a major attraction to the CBD; access and parking have been identified as major issues to future use of these facilities. The plan does focus on working with DART to improve access to the area.

3.1.5 Central Business District Zoning

The City of Dallas manages land use and development within the City through zoning regulations. These regulations define specific land uses throughout the City, how property may be developed, and construction and other standards required for properties. Review policies and guidelines are also included in the zoning use regulations.

Zoning districts have uniform regulations including those on land use, height, setbacks, lot size, density, coverage, and floor area ratio (FAR). The City has established zoning regulations specifically related to the central area of the city and these are classified as CA-1 and CA-2. In general, the zoning regulations for these

areas allow for all but the heaviest of industrial uses and allow streetside development with minimal setback. Zoning for planned unit development (PD) is also common in the Downtown area.

Specific to the D2 project, the rail line, transit stations and transit passenger shelters must comply with city zoning for their use, which includes requirements for landscaping, screening, ingress and egress, and specific procedures and requirements for authorization by the City Council.

3.1.6 Tax Increment Financing Districts (TIF)

TIF Districts are used to finance new public improvements in designated areas. The goal is to stimulate new private investment and thereby increase real estate values. Any increase in tax revenues (caused by new development and higher property values) is paid into a special TIF fund to finance improvements. Potential improvements include new roads, utilities, sidewalks, and public landscaping/lighting. Bond funds support redevelopment of housing projects and improvements to low income housing. In special circumstances, TIF funds may also be used for environmental remediation, demolition, and historic façades.

The study area contains 6 TIF districts, as follows and as shown in Figure 3-6:

1. City Center
2. Downtown Connection
3. Farmers Market
4. Sports Arena
5. Deep Ellum
6. Design Center

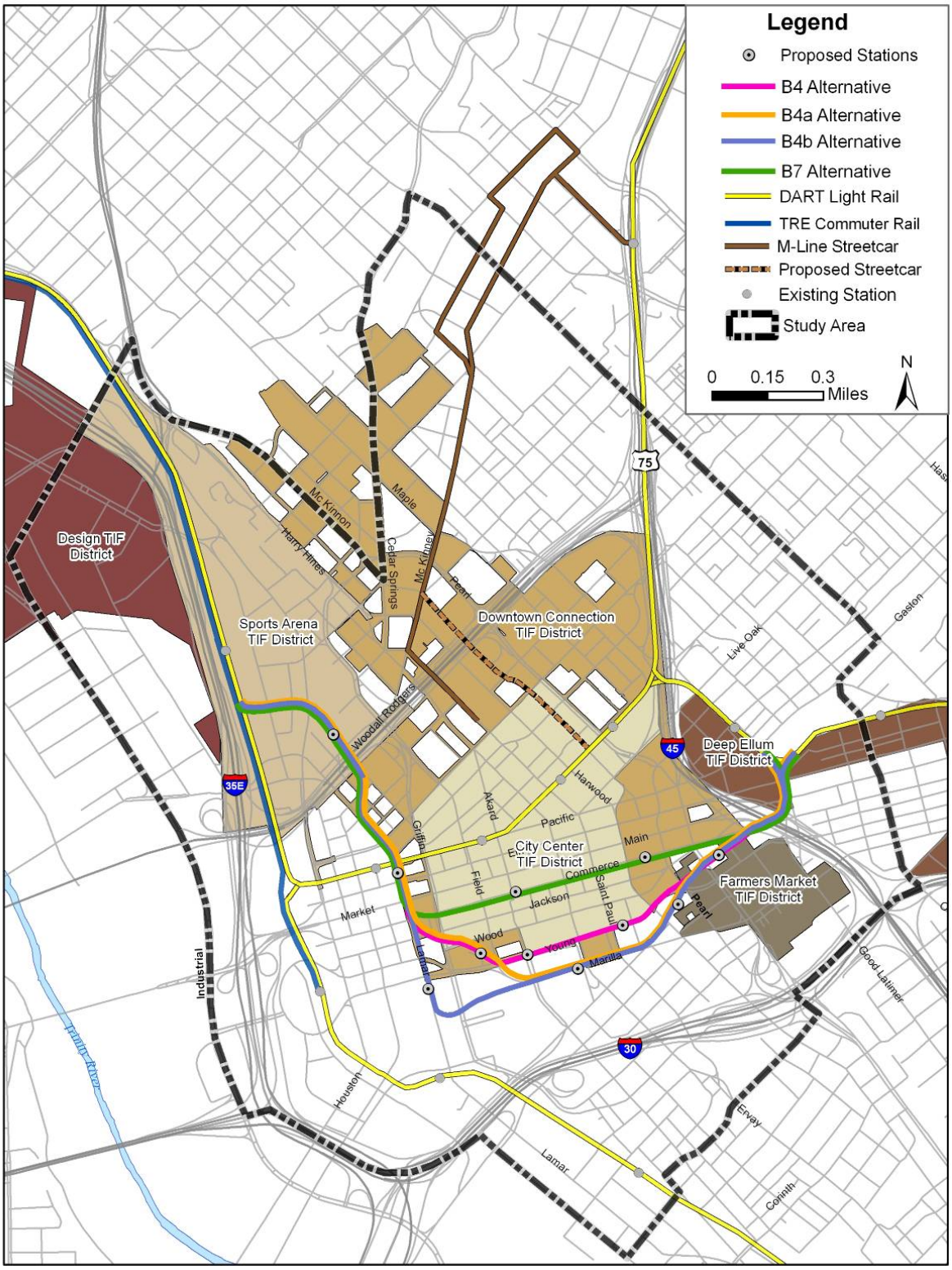
The State-Thomas TIF, located in the study area was the first TIF created, but closed in 2008. Each TIF has its own board of directors, which establishes specific goals and objectives for the district. The annual reports prepared by the TIFs provide information on major developments being undertaken in the district, any financial participation by the TIF, and future goals for development within the area.

TIF Districts have been a catalyst for improving the real estate market in areas that were lagging, drawing residents into the City's core, and creating new mixed use neighborhoods. As of Fiscal Year (FY) 2008, approximately 11,238 new residential units were completed in the City's 16 TIF Districts. During FY 2008, an estimated 4,015 dilapidated multi-family units were demolished in TIF Districts. Redevelopment of these sites is underway.

3.1.7 Emerging Trends

Emerging land use and development trends in the study area can be identified by analyzing recent development activity. Considerable development is now taking place within the study area. With the recent interest in redevelopment in the CBD, and the increasing appeal of multifamily residential development, the study area can be expected to continue transformation into a mixed land use area and capitalize on these trends over the coming years. Table 3-3 provides a summary of development planned or under construction within 0.25 mile of the Build Alternatives.

Figure 3-6. TIF Districts in the City of Dallas



Source: City of Dallas, Office of Economic Development

Table 3-3. Developments Planned or Under Construction in the Study Area

Type of Development	Alternative B7		Alternatives B4, B4a, & B4b	
	Under construction	Announced	Under construction	Announced
Cultural	1	1	1	1
Educational	0	0	0	0
Group Quarters	0	0	0	0
Hotels	3	2	3	2
Industrial	0	0	0	0
Institutional	0	0	0	0
Multi-family	2	11	2	6
Mixed Use	0	0	0	0
Office	2	2	2	1
Retail	0	1	0	1
Recreation	1	0	1	0
Service	0	0	0	0
Single Family	0	0	0	0
Total	9	17	9	11

Source: NCTCOG, Research and Information Services Department, 2009

The Research and Information Services Department of the North Central Texas Council of Governments (NCTCOG) tracks major developments for the 16-county region as part of the Development Monitoring Program. The second quarter summary is an overview of office, retail, and industrial projects over 80,000 square feet (sq ft) and hotels over 80 rooms that were announced, began construction, or were completed between April 1 and June 30, 2009. Also included is a summary of quarterly activity by type and location within the region. Development projects accounted for in Table 3-3 include: cultural facilities (museums and concert halls), educational facilities (primary or secondary public schools and colleges and universities), group quarters (dormitories with over 100 rooms), hotels (hotels and motels), institutional facilities (major hospitals), multi-family residences (apartments, townhouses and condos with at least 100 units), mixed use developments, office developments (with at least 100,000 square feet or 400 employees), retail commercial development (neighborhood centers and individual retail structures with at least 100,000 square feet), and single-family residences (subdivisions with at least 100 homes).

3.1.8 Station Area Land Use

3.1.8.1 Stations Common to All Build Alternatives

Two stations are common to all alternatives: Museum Way and Metro Center. The Museum Way Station would be located just north of the Woodall Rodgers Freeway. Land uses surrounding this station are primarily multi-family residential and retail. East and north of the station site are apartments, the site of the future Museum of Nature and Science (currently parking), and the W Hotel. West and south are retail, entertainment, and high-rise residential uses. South of Woodall Rodgers are the West End district and the Dallas World Aquarium.

Further south would be the Metro Center Station, an underground station planned along Lamar Street between Elm Street and Pacific Avenue. In the 0.25 mile surrounding the station, office use is predominant with about 25 percent of the area in retail use and some institutional land uses, including Rosa Parks Plaza, the West End Transfer Center, West End Historic District, and El Centro College.

3.1.8.2 Alternative B7: Lamar-Commerce

Two stations are exclusive to B7 and would be located below grade under Commerce Street. The Pegasus Plaza Station would be located below grade at Field Street, extending past Akard Street. One block north of the station is the Ritz Carlton and the Bank of America Plaza.

The Main Street Garden Station would be located between Harwood Street and Pearl Street, southeast of the Main Street Garden. This station and the Pegasus Plaza Station would be approximately 0.75 mile apart. The land uses surrounding each of the two stations are primarily in office use, including the Comerica Bank Tower. Since the stations are located along the borders of the Main Street District, they are also in proximity to retail uses and near multi-family residential areas.

3.1.8.3 Alternative B4: Lamar-Young

Three ground level stations are included in Alternative B4, in addition to the two stations common to all alternatives. The Government Center Station would be located near the Dallas Public Library on Young Street at Akard Street. The area surrounding the station consists mainly of office and institutional land uses with some parks. Further east on Young Street would be the Harwood District Station, located just east of St. Paul Street. The area is a mix of various land use types. About half of the area consists of office uses and the other half is a mix of industrial property, parking lots and facilities, institutional uses, and parks. South and west of the two stations is Founders Square, Pioneer Plaza, Pioneer Cemetery, and City Hall Park Plaza.

The last station proposed for Alternative B4 is the Farmers Market Station. It would be located southeast of Central Expressway and Commerce Street, within the Farmers Market District and just a few blocks away from the Dallas Farmers Market. Surrounding land use consists of almost equal parts office, industrial, and retail, with multi-family residential nearby.

3.1.8.4 Alternative B4a: Lamar-Marilla

Alternative B4a would have three stations, two of which would be located below ground in addition to the stations common to all alternatives. The first station beyond Metro Center would be the Government Center Station, which would be near the Aloft Hotel and redevelopment projects, but under Young Street, between Field Street and Griffin Street. The area surrounding the station is a mix of industrial properties, institutional uses, office buildings, parking lots and facilities, and parks, with the industrial and office use predominant. The next station, City Hall Station, would be located below City Hall and close to the library. The surrounding area consists of almost equal parts institutional, parking, office, and park uses, along with a small area of industrial use. The Farmers Market Station is proposed to be located in the Scottish Rite Temple parking lot. The surrounding 0.25-mile radial area is

about half office space and the rest is a mixture of industrial, retail, parking, and institutional uses.

3.1.8.5 Alternative B4b: Lamar-Convention Center Hotel

Alternative B4b would have the same station locations as Alternative B4a, but in place of the Government Center Station, it would have an underground station near the Convention Center. The surrounding area is mainly in institutional land use, but it also includes industrial use, parking facilities, office uses, and parks, such as Founders Square.

3.1.9 Methodology for Impact Assessment

Four Build Alternatives are proposed, all in relative proximity to each other. Evaluation of potential impacts is based on the likely effect that LRT stations would have on land use and development. This evaluation takes into consideration existing land use within 0.25 mile of stations, planned developments and development projects currently under construction in the study area, and city land use policies and plans. An assessment of the four build alternatives and existing local plans was also undertaken to confirm that the project is consistent with city planners' vision for Dallas and that there are not conflicts with future city land use and development plans.

3.1.10 Potential Impacts

The potential impacts described in this chapter are based on planning efforts to date and currently available information. These impacts are considered reasonably representative of future conditions for the purpose of comparing alternatives and selecting a preferred alternative.

3.1.10.1 General Land Use Impacts

No Build Alternative

The No Build Alternative would generally result in a continuation of current development patterns and trends. Land use patterns that exist today in several sections of the corridor, especially those land uses not in proximity to downtown or within a Tax Increment Reinvestment Zone (TIRZ), would be slow to change. The No Build Alternative would not impact regional land use and development as currently planned.

Build Alternatives

The Build Alternatives, when combined with supportive public policies, plans, and favorable real estate market conditions, would attract transit-supportive development or redevelopment to the corridor, including employment opportunities, higher-density residential development, and new services and amenities. The land use impacts would be strongest close to station locations. The Build Alternatives would redistribute growth within the study area that would likely have otherwise occurred within the region at a less dense scale. Experience in other cities with transit-associated investment suggests that developers are interested in creating transit- and pedestrian-oriented, mixed-use developments, and that these types of developments can be very successful. The Build Alternatives would enhance the potential for intensification of the land use pattern in the corridor by improving transit accessibility and by providing connections with other parts of the existing and

planned transit system, including such modes as bus and LRT. Access is an important consideration for development decisions for various types of land use, including residential, office/retail, health and community services, and recreation facilities. Improved access means that the study area would become more attractive to commercial and residential development opportunities, and that the corridor would experience enhanced connectivity to the CBD, Deep Ellum, Victory Park, and future connections to other activity centers.

3.1.10.2 Consistency with Local Plans

This section examines each of the alternatives for consistency with the plans and policies for the CBD, including the plans discussed earlier in this section relating to development, transportation and recreation.

No-Build Alternative

This alternative is not consistent with any of the land use plans and policies examined for Dallas. All of the local and regional plans reviewed for this project include some increased public transportation element within the boundaries of the CBD. Several of the plans are site specific and anticipate transit improvements as a catalyst for achieving desired land uses in those particular areas.

Build Alternatives

Except for the Emerald Greenbelt and the Trail Plan, which focus primarily on recreational issues in the CBD, the plans that were described earlier in this section all state the need for additional public transportation and the need for the City to work closely with DART with respect to future public transportation projects. None of the plans specifically recommended a particular route, however the Central Business District Transportation Plan did define a corridor which matches closely with the proposed Build Alternatives.

The proposed D2 project is consistent with the relevant plans developed by the City of Dallas. This includes the forwardDallas! Comprehensive Plan, which recommends developing a cross-town transportation linkage plan in collaboration with DART to provide an efficient local and regional transportation network. The forwardDallas! Comprehensive Plan also proposes maximizing development opportunities around DART stations, establishing mixed-use zoning designations in strategic locations, and investing in transit-oriented development pilot projects. The construction and operation of the D2 project would contribute to the attainment of those goals.

The project would provide a cross-town transportation linkage that would improve regional transportation efficiency by establishing a second downtown LRT facility. Without this second downtown facility, the existing system would be operating over capacity. An additional LRT line will allow for increased use of light rail by DART customers. The D2 project would also provide greater access to other regional transportations systems by providing links to DART's existing connection to the McKinney Avenue Trolley, Union Station and planned expansion to Love Field and DFW Airport.

The CBD Comprehensive Transportation Plan of 2005 specifically recommends a second LRT corridor in the CBD. The recommendations presented in this plan recommend a Lamar/Field (north-south) and Commerce/Young (east-west) corridor.

The Strategic Engagement Plan encourages the City to support an expansion of Dallas' public transit system. The development of the D2 project would provide the City with the second downtown LRT line as recommended by the plan, and the corridors identified in the 2005 CBD Comprehensive Transportation Plan generally follow the four D2 Build Alternatives.

The D2 project is consistent with the Downtown Initiative's Group Plan by improving access between and within the Uptown and Downtown areas. This is also a goal of the Dallas Arts District Strategic Assessment and Action Plan—to improve access to this District by working closer with DART and enhancing services associated with the McKinney Avenue Trolley. The development of the D2 project would provide greater access to these areas, especially if it is tied to the McKinney Avenue Trolley system and other public transit options. DART will continue to work with the City as the D2 project advances to improve access to these areas.

The Trinity River Comprehensive Land Use Plan is focused on development along the Trinity Corridor. The area associated with the Trinity River development includes portions of the Study Area. The D2 project is consistent with the goals of this plan.

The focus of the Emerald Bracelet Report, Trail Master Plan and the Downtown Parks Master Plan is to enhance greater access to and improved recreation in the Study Area. The D2 project will not interfere with the development of major recommendations presented in these plans, and by improving access to these areas, the project may be considered to be consistent with the plans.

3.1.10.3 Station Area Land Use Impacts and Transit Oriented Development

No Build Alternative

Because the No Build Alternative represents the status quo, there would be no station vicinity land use impacts. The No Build Alternative would not provide new opportunities for intensification, infill, or mixed-use development in portions of the corridor. Portions of the study area could experience difficulty attracting transit-supportive and pedestrian-oriented development and could remain primarily automobile-dependent.

Build Alternatives

The most substantial development pressure in the corridor would occur near the proposed stations. Generally, impacts from transit investment are seen within walking distance of stations, typically about 0.25 mile, with the most common impacts occurring immediately adjacent to stations and the likelihood of impacts diminishing with increasing distance. Impacts within the corridor could also occur to a lesser extent between stations, depending on market conditions. The proposed station locations and surrounding land use are described in Section 3.1.8. The potential impacts around the stations are described below, with indications in parentheses as to which alternatives include each station or if it is common to all four build alternatives:

Museum Way (common)

The area surrounding the Museum Way Station is mainly multifamily residential and retail uses that have recently been developed. This station's impacts would be to help sustain these existing uses and encourage further, similar redevelopment in the

area. This location would also assist in making a future planned museum in the area more accessible. DART will continue to work with planners and developers in the Victory Park and Arts Districts to enhance access to these important Districts and the proposed Museum of Science and History through alternative public transit options such as street cars.

Metro Center (common)

The Metro Center Station area consists of office, retail, and institutional land use. This station would provide the surrounding land uses, including El Cento College, with enhanced access and help to sustain those uses. It would also enhance access and increase mobility to the West End District and help to sustain existing activity and future redevelopment in that area. Intensification of land uses and redevelopment of vacant or under-utilized parcels would be likely, including parcels used to construct the Metro Center Station, and the West Bus transfer center site.

Pegasus Plaza and Main Street Garden (B7)

Both the Pegasus Plaza and Main Street Garden stations are proposed to be constructed under Commerce Street. The surrounding area is primarily office use. The stations would help to sustain land use of this type in the area and encourage high density uses in future redevelopment plans.

Government Center (B4)

The Government Center Station would enhance access to community facilities such as the Dallas Public Library and nearby parks and help to sustain those land uses. It would also provide better access to nearby federal and city offices, reducing demand for parking, and increasing the potential for redeveloping existing parking facilities.

Harwood District (B4)

The Harwood District station would be surrounded by a mix of land uses, and would improve access to nearby parks, industrial facilities and offices, supporting those uses. It would also potentially spark interest in transit-oriented redevelopment in this area.

Farmers Market (B4)

The Farmers Market Station under Alternative B4 would be located in an area of varied land uses with several parcels of vacant land available for development. The station would likely be a major catalyst for transit-associated, higher-density development in this area.

Government Center (B4a)

The Government Center Station for Route B4a would be under vacant, developable land formerly part of the Santa Fe Railroad terminal complex. The current owner has expressed possible interest in a TOD project, if this alternative is selected.

City Hall (B4a, B4b)

The City Hall Station would be underground in an existing excavated cavern beneath the Dallas City Hall garage. This area is a mix of land uses. A station here would increase access to City Hall and increase interest in redevelopment in nearby underutilized buildings and vacant property to the east and south.

Farmers Market (B4a, B4b)

The Farmers Market Station under Alternatives B4a and B4b would also be in an area of varied land uses with several parcels of vacant land available for development. The station would likely be a major catalyst for transit-associated, higher-density development. The Farmers Market Station would be located in the parking lot of the Scottish Rite Temple.

Convention Center Hotel (B4b)

The land use surrounding the proposed station is mainly office and vacant property. It is also the location of the Convention Center and the future Convention Center Hotel. Locating the station in this area would increase development in the southern and western parts of the study area.

In planning and constructing stations, DART would comply with local land use planning and zoning policies. Implementation of the LRT facility would contribute to the City of Dallas realizing many of its planning goals. Overall, the LRT facility would improve access into Downtown and support desired redevelopment.

3.1.11 Mitigation Measures

Some positive development and redevelopment may occur as a result of the proposed fixed-guideway transit. However, neighborhood impacts may also occur. Consideration of potential impacts on land use will continue throughout the study and design of the proposed fixed-guideway alignment, with a view to minimizing negative impacts. Mitigation measures could include the following:

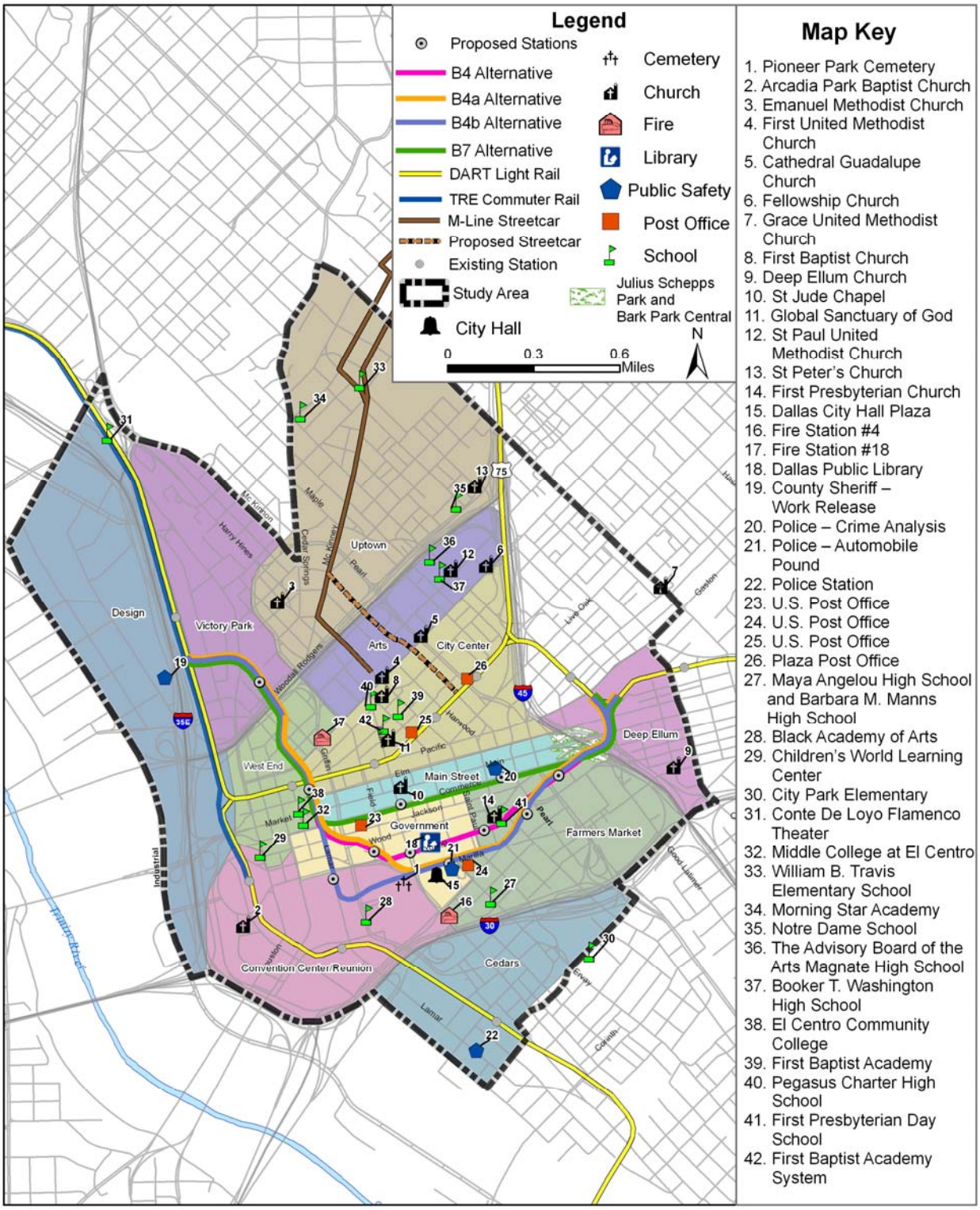
- Design station locations to be respectful of the primary land use in the surrounding area. For example, in primarily low-density residential areas, stations could be designed to be less obtrusive so that impacts on adjacent land uses are minimized. In areas that are best suited for redevelopment and intensification, stations could be appropriate in scale, and designed in conjunction with adjacent developments.
- Make safety a priority in design and operational planning, with special diligence where schools, churches, and senior housing are in proximity to the proposed alternative.
- Institute appropriate neighborhood traffic measures to help prevent conflict between cars and the fixed guideway.

Ongoing redevelopment plans for First Presbyterian Church property to the north of the station would be disrupted. A partnership arrangement to mitigate or enhance these plans would have to be put in place.

3.2 Community Facilities and Services

Community facilities and services include educational facilities, places of worship, hospitals, public safety facilities and services (police, fire, and rescue), government buildings, cultural facilities (libraries, museums, and theatres), parks and recreational areas, and existing transit services. All of these facilities and services contribute to the social welfare of the community. Community facilities and services are listed in by district and shown in Figure 3-7.

Figure 3-7. Study Area Community Facilities



Source: PB/AZB Joint Venture

3.2.1 Farmers Market and Deep Ellum Districts

Because of the proximity of the two districts, community facilities in the area can be considered to serve both areas and, therefore, are considered together in this section. Established in 1941, the Dallas Farmers Market encompasses over 26,000 square feet of fresh produce, flowers, houseplants and specialty items displayed under brightly colored sheds, where cooking classes and multi-cultural festivals are held throughout the year. The Farmers Market also holds community yard sales for residents to buy and sell used goods. Deep Ellum includes a significant entertainment sector.

Bark Park Central is the only community facility in the project area used for outdoor recreational activity. It is a fenced grassy area under IH 45 and provides facilities for dogs and dog owners. It has benches, water fountains, and waste disposal stations. It lies within Texas Department of Transportation (TxDOT) right-of-way and has as its primary purpose transportation use, thus it is not subject to the provisions of Section 4(f) of the Department of Transportation Act or Chapter 26 of the Texas Parks and Wildlife Code. However, DART will continue coordination with TxDOT and the City of Dallas to minimize potential effects on the facility.

Julius Schepps Park is an urban park and implied gateway into the Deep Ellum district. The parcel of land below IH 45 was enhanced with landscape development, pedestrian access, sculpture and art display, site lighting and parking. There is also a monumental bronze statue of Julius Schepps on a circular pedestal in the middle of the park. Since this park lies within TxDOT right-of-way and has as its primary purpose transportation use, its use is not subject to the provisions of Section 4(f) of the Department of Transportation Act or Chapter 26 of the Parks and Wildlife Code. However, DART will continue coordination with TxDOT and the City of Dallas to minimize potential effects on park resources.

Other area facilities are listed in Table 3-4.

Table 3-4. Farmers Market District and Deep Ellum Community Facilities

Facility	B7	B4	B4a	B4b
Julius Schepps Park	Y	Y	Y	Y
Bark Park Central	Y	Y	Y	Y
Farmer's Market/ Deep Ellum Banners	X	X	X	X
The Bridge		X	X	X
Latino Cultural Center	X	X	X	X
The Dallas Center for Contemporary Art	X	X	X	X
Dallas City Hall	X	X	Y	Y
First Presbyterian Soup Kitchen	X	X	X	X
First Presbyterian Church	X	Y	Y	Y
First Presbyterian Day School	X	Y	Y	Y
Barbara M. Manns High School			X	X
Fire Station #4			X	X

Note: "X" indicates facilities within 0.25 mile of the alternative. "Y" indicates facilities adjacent to the alternative.
Source: PB/AZB Joint Venture

3.2.2 The Cedars

Community facilities in The Cedars include DART's Cedars Station and the Dallas Police Headquarters.

3.2.3 Government District

The Government District is home to several public buildings, including city and federal facilities, as shown in Table 3-5. Among these are the City Hall and Plaza, United States District Court and the J. Erik Jonsson Central Library. Designed by renowned architect I. M. Pei, the City Hall and Plaza complex is two blocks long and two blocks wide (a seven-acre plaza) and is bounded by Young, Ervay, Canton, and Akard streets. The Plaza is cut diagonally into two triangular spaces. One side contains a minimalist, concrete slab with a 180-foot diameter reflecting pool which contains large floating sculptures, variable height fountain, benches, lights, and three distinctive 84-foot high flagpoles. The other side has a small amphitheater/gathering place, a lawn, and a dense grove of red oak, live oak and Chinese pistachio trees. The plaza contains some Henry Moore sculptures and is the site of numerous outdoor festivals and special events including parade VIP viewing and the start and finish of the White Rock Marathon. It is also used for public demonstrations.

Table 3-5. Government District Community Facilities

Facility	B7	B4	B4a	B4b
J. Erik Jonsson Central Library	X	Y	X	X
Mantra: Topsy Turvey, Textured Screen, and Square Forms with Circle (public art)	X	X	X	X
The Book Family, Glassworks, and Amoeba (public art)	X	X	X	X
Dallas Police Memorial	X	Y	Y	X
Floating Sculpture (public art)	X	Y	Y	Y
Dallas Piece (public art)	X	Y	Y	Y
Hands of Progress (public art)		X	X	Y
Symposium (public art)		X	X	X
Harrow Journey to Sirus (public art)	X	X	X	X
Stele Gateway (public art)	X	X	X	X
Dallas City Hall and Plaza	X	Y	Y	Y
Dallas Police Department Automobile Pound	X	X	Y	Y

Note: "X" indicates facilities within 0.25 mile of the alternative. "Y" indicates facilities adjacent to the alternative.
Source: PB/AZB Joint Venture

Activities in this area include government employees arriving and departing to and from their daily jobs, people arriving for jury duty, patrons visiting the central library, daily deliveries, and contractors who have meetings at City Hall. The Government District is bound by Commerce Street to the north, St. Paul Street and the Farmers Market District to the east, Young Street and the Convention Center District to the south, and Market Street to the west.

3.2.4 Main Street District

Community facilities in the Main Street District include federal government buildings and courthouses, a public plaza, and public art, as shown in Table 3-6.

Table 3-6. Main Street District Community Facilities

Facility	B7	B4	B4a	B4b
Lots Wife (public art)	X	X	X	
Pegasus Plaza	X	X	X	X
Earl Campbell Federal Building and Courthouse, U.S. Bankruptcy Court, U.S. District Court for the Northern District of Texas, U.S. Attorney's Office	Y	X	X	X

Note: "X" indicates facilities within 0.25 mile of the alternative. "Y" indicates facilities adjacent to the alternative.
Source: PB/AZB Joint Venture

3.2.5 City Center

Community facilities in this neighborhood are presented in Table 3-7. DART's Central Business District (CBD) line is located in this district along Pacific and Bryan Streets from Lamar Street, the east boundary of the West End District, to Julius Schepps Freeway to the east. It includes three existing DART rail stations: Akard Station, St. Paul Station and Pearl Station, which provide access to many of the high-rise buildings in this central area of downtown Dallas.

Table 3-7. City Center Community Facilities

Facility	B7	B4	B4a	B4b
John William Carpenter Portal Park Piece, Slice (public art)	X			
Astral Flower (public art)	X			
Four Chromatic Gates (public art)	X			
Glory Window (public art)	X			
Passageways and Habitats (public art)	X			
Thanks-giving Square	X			
The Majestic Theatre	X			
Akard Station	X			
St. Paul Station	X			
Pearl Station				
Rosa Parks Plaza	X	Y	Y	Y
West End Bus Transfer Center	Y	Y	Y	Y

Note: "X" indicates facilities within 0.25 mile of the alternative.
Source: PB/AZB Joint Venture

Rosa Parks Plaza is a DART bus facility that was completed in 2009 as a joint project of DART, the City of Dallas, Downtown Dallas, and Dallas Main, LP, with federal funding. Located on approximately 0.25 acre along Lamar Street between Elm Street and Pacific Avenue, the centerpiece of the property is a sculpture of civil rights pioneer and bus rider Rosa Parks. Other amenities include a 13-foot high fountain wall inscribed with a quote by Martin Luther King, Jr., green spaces with seasonal flowers and shade trees, benches, and four passenger shelters. The facility layout includes two bus bays.

3.2.6 Convention Center District

DART currently operates the Convention Center Station on the OC-1 line that stops under the Convention Center at Memorial Drive. The Convention Center annually

holds many company and organizational events, festivals, graduation ceremonies, and the Dallas Auto Show. A City-owned Convention Center Hotel is also proposed for the area. Other community facilities are listed in Table 3-8.

Table 3-8. Convention Center District Community Facilities

Facility	B7	B4	B4a	B4b
Confederate Monument	X	Y	Y	Y
Lightstream (public art)		X		X
Trail Map Dallas	X	X	X	X
Steel Wave (public art)		X	X	X
Information Point			X	X
Images of the City (public art)			X	X
Dallas Convention Center Complex		X	X	X
Proposed Convention Center Hotel		X	X	Y
Union Station		X	X	X
Reunion Arena (recently demolished)				X
Convention Center Station				X
Global Sanctuary of God Church	X			
First United Methodist Church	X			

Note: "X" indicates facilities within 0.25 mile of the alternative. "Y" indicates facilities adjacent to the alternative.
Source: PB/AZB Joint Venture

3.2.7 West End

This district contains Dealey Plaza, the site of the Kennedy Assassination, the John F. Kennedy Memorial, Sixth Floor Museum, and Conspiracy Theory Museum. Approximately two million visitors come to Dealey Plaza annually. DART currently operates the West End Station on Pacific Avenue in this district with most attractions within walking distance. Specific community facilities in the West End are included in Table 3-9. Rosa Parks Plaza, a DART bus station with park-like amenities and which would have access to the Metro Center Station, is discussed in the City Center subsection since it lies along that side of the boundary between the two districts.

Table 3-9. West End Community Facilities

Facility	B7	B4	B4a	B4b
Song for My Father (public art)	X	X	X	X
George Bannerman Dealey Memorial	X	X	X	X
The John F. Kennedy Memorial	X	X	X	X
Dallas Holocaust Museum	X	X	X	X
The Sixth Floor Museum at Dealey Plaza	X	X	X	X
El Centro Community College and Middle College	X	X	X	X
Dealey Plaza	X	X	X	X
Old Red Courthouse	X	X	X	X
The Conspiracy Museum	X	X	X	X
Dallas World Aquarium	X	X	X	X
West End Station	Y	Y	Y	Y

Note: "X" indicates facilities within 0.25 mile of the alternative. "Y" indicates facilities adjacent to the alternative.
Source: PB/AZB Joint Venture

3.2.8 Design District

No community facilities were identified in the Design District.

3.2.9 Victory Park and Uptown

The proposed Museum of Nature and Science is the only community facility in this area that would be located adjacent to the proposed DART LRT. It is located just north of Woodall Rogers Freeway and east of Houston Street (Table 3-10).

Table 3-10. Victory Park and Uptown Community Facilities

Facility	B7	B4	B4a	B4b
Victory Station	Y	Y	Y	Y
Proposed Museum of Science and History	Y	Y	Y	Y
American Airlines Center	Y	Y	Y	Y

Note: "Y" indicates facilities adjacent to the alternative.
Source: PB/AZB Joint Venture

3.2.10 Arts District

The Dallas Arts District is home to thirteen community facilities and organizations including the following: Dallas Museum of Art, Margot and Bill Winspear Opera House, Crow Collection of Asian Art, Morton H. Meyerson Symphony Center, Nasher Sculpture Center, Dallas Center for the Performing Arts, and the Black Dance Theater. In addition, many other organizations perform in the District on an ongoing basis. This includes concerts, outdoor festivals, lectures, youth education programs, and other cultural programs. While there are several arts related facilities within this district, none are located within 0.25 mile of the selected alternatives.

3.2.11 Methodology for Impact Evaluation

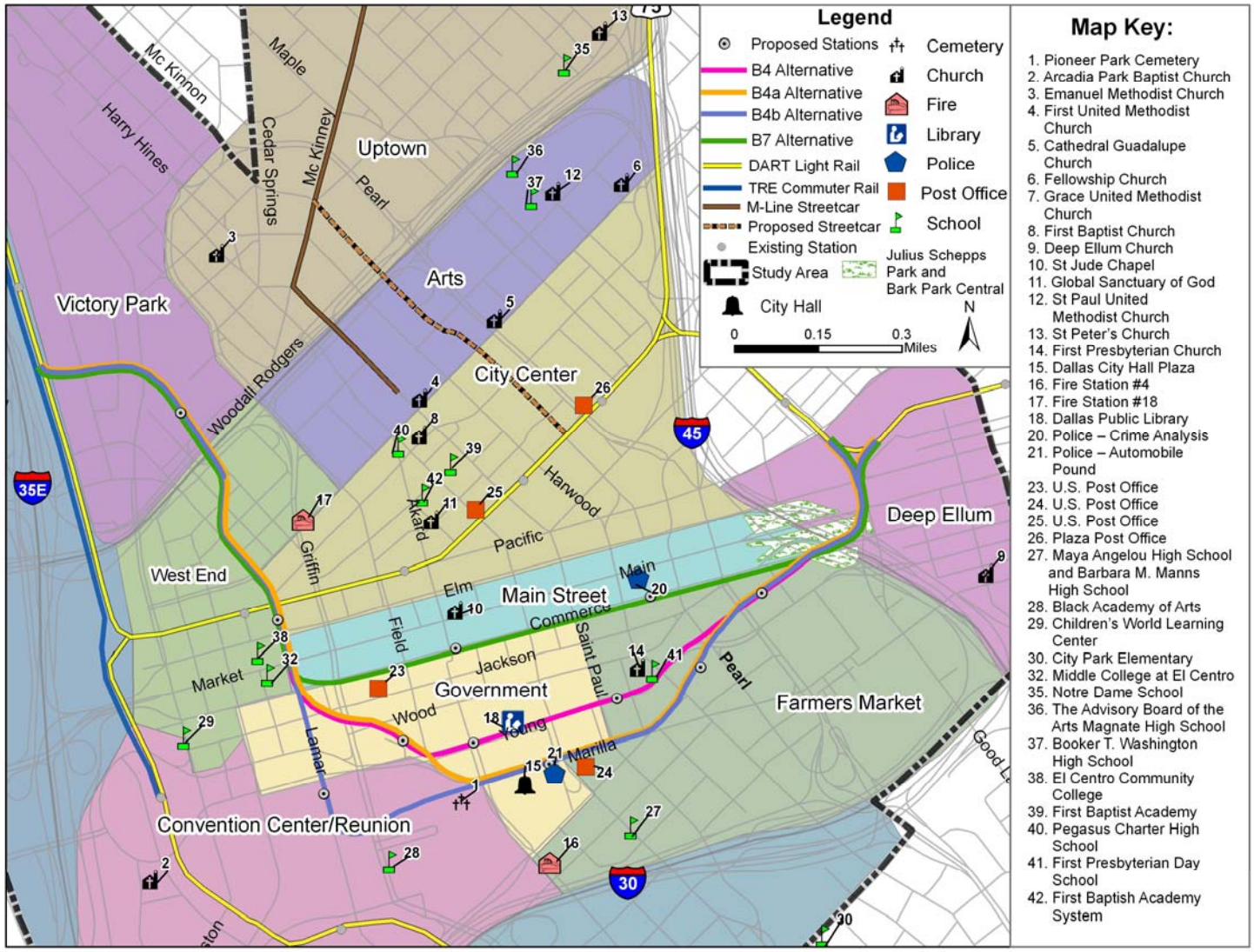
Each of the four alternatives has been explored to determine where potential community facility impacts may occur. The focus of this evaluation relates specifically to access to these facilities and any potential acquisitions that would affect each specific facility. Impacts related to construction and operational issues such as noise, safety, aesthetics and traffic are discussed in other sections of this document.

While there are potential negative impacts associated with construction and operation, the location of DART stations can improve access to important cultural facilities. Users of facilities such as City Hall, the Dallas Public Library, and major office buildings such as the Bank of America Plaza would be able to more easily access these facilities.

In order to determine the level of impact, the alternatives have been assessed based on the location of the facility in relation to the proposed DART alternatives and stations and whether the line is at grade or underground. Facilities located within 0.25 mile are evaluated as part of this EIS. Based on previous studies, this distance is within normal walking distance from a DART facility to a given location. Figure 3-8 shows community facilities located near the Build Alternatives.

In general, if the alignment is adjacent to a facility, the likelihood of enhancing access is high. Similarly, there is a higher potential for impacts. The facilities located within

Figure 3-8. Community Facilities Near the Build Alternatives



Source: PB/AZB Joint Venture

0.25 mile have a moderate degree of access improvement, but low potential for other impacts.

3.2.12 Impacts

This section focuses on the ability to gain access to the community facilities or services identified in the DEIS.

3.2.12.1 No Build Alternative

The No Build Alternative would not change the use of any community facilities or alter their physical characteristics. Since no construction would take place, the area would remain as it is today and no adverse effects would result in these areas as a result of the No Build Alternative. Potential benefits of the proposed Build Alternatives, such as improved access and mobility, would not be realized.

No adverse effects to community facilities are anticipated.

3.2.1.1 Build Alternatives

All of the proposed Build Alternatives have the potential to impact community facilities. Common to all the Build Alternatives are visual and barrier effects. Barrier effects give a feeling of separation from the surrounding community. Also common to the Build Alternatives is the reduction of parking spaces, as there are many parking lots in the downtown area and all the alignments would pass through some of them, including parking lots for community facilities. No community facilities would be affected in The Cedars, Uptown, or Arts Districts. Potential effects on community facilities are discussed by district.

Deep Ellum

All alignments pass through the Deep Ellum District at the same location to connect the D2 LRT to DART's Southeast (Green) line. No impacts on access to community facilities were identified. This is primarily because the alignment would follow Good Latimer in this area and pedestrian access between downtown and Deep Ellum would be maintained at street crossings. The Traveling Man sculpture located in Deep Ellum would not be impacted as it is not adjacent to any of the alternatives.

Farmers Market District

Under Alternative B4, a substantial portion of the facility would be located in the median of Young Street, minimizing its barrier effect. The Farmers Market Station would be located east of South Central Expressway and north of Canton Street. The Harwood District station would impact First Presbyterian Church property and the church's seven-story parking garage. There is a minor barrier affect to the Stew Pot Kitchen, requiring pedestrians to use approved crosswalks to access the facility. This alternative would also have temporary, construction-related impacts to Julius Schepps Park; however, no permanent impacts are anticipated. Access to Bark Park Central would also be temporarily impaired during construction under this alternative but no permanent impacts are anticipated.

Alternatives B4a and B4b would be identical through the Farmers Market area and both would have an at-grade station located in the Scottish Rite Temple parking lot. While this would require parking replacement, a station at this location would

enhance visibility and access to this facility. These alternatives would also have temporary, construction-related impacts to Julius Schepps Park; however, no permanent impacts are anticipated. Access to Bark Park Central would also be temporarily impaired during construction under these alternatives but no permanent impacts are anticipated.

Alternative B7 would be located mostly underground along Commerce Street in this segment and effects on community facilities would be minimal, except at the tunnel portal area. This alignment would impact some metered parking, (not specifically for the Farmers Market), as it would emerge above ground at the east end of the district. This alternative would also have temporary, construction-related impacts to Julius Schepps Park; however, no permanent impacts are anticipated. Access to Bark Park Central would also be temporarily impaired during construction under this alternative but no permanent impacts are anticipated.

Main Street District

Alternative B7 is the only alignment entering this district, running under Commerce Street. Since it is mostly underground, its impact would be minimal. There would be a minor barrier effect to the Earl Cabell Federal Building and Courthouse, located on Commerce Street where the rail facility emerges from a portal east of Pearl Street. Adequate crossings for pedestrians and vehicles would reduce this effect.

Convention Center District

Alternatives B4, B4a, and B4b are the alignments that would enter this district. They would be located underground and impacts would be minimal. Alignment B4b would provide for an underground station located at the proposed Convention Center Hotel. It would be located at the Intersection of Lamar and Young Streets. The station would enhance access and mobility for the convention center and hotel patrons. The only community facility identified adjacent to the Alternatives B4, B4a, and B4b is the Confederate Monument which is located within Pioneer Cemetery. Access to this monument would not be affected by the construction or operation of the D2 project.

West End

Community facilities within the West End neighborhood would not be directly affected by the proposed Build Alternatives. No community facilities in the district are immediately adjacent to the proposed alignment alternatives and impacts would be limited to access improvements.

City Center

The Build Alternatives would require modifications to Rosa Parks Plaza to provide a connection to the underground Metro Center Station. The modifications would be made with the minimal disruption possible to the park-like amenities of the Plaza. The Build Alternatives would also be adjacent to the West End Bus Transfer Center, although the alignment would be underground at this location. The Metro Center Station would provide greater access to the West End Bus Transfer Center.

Victory Park

All four of the Build Alternatives would be identical in the Victory Park District, where the LRT facility would be at grade. No adverse impacts to community facilities were

identified. The connection with the Victory Station would improve access to the American Airlines Center.

The planned Museum Way Station would be located on the west side of the proposed Museum of Nature and Science. It would provide increased access for museum visitors.

Government District

Alternative B4, as it turns onto Young Street east of Field Street, would displace the entrance to City Hall's underground parking facility, which is accessed in the center of Young Street. Design provisions would have to be made to relocate this entrance to the garage. This would provide improved access to City Hall services and employees and improved access to the Dallas Police Memorial. Widening to accommodate space for two eastbound travel lanes would cause encroachment along Young Street at the City Hall Plaza and likely require decreasing the sidewalk width between the curb and the steps leading up to the flagpole platform, as well as the width between the curb and the end of the diagonal wall that separates the paved and grassy areas of the plaza. However, ample room would remain for pedestrians to continue to use the sidewalk. Along the grassy area, the sidewalk could be widened to compensate for encroachment there. Past the intersecting sidewalk adjacent to park benches (about 350 feet west of Browder Street), the alignment angles back out toward center of the Young Street right-of-way, so no encroachment would occur from that location to Browder Street.

Alternatives B4a and B4b would be mostly underground through this district along Marilla Street. The existing street already creates a barrier effect to the Public Library where the rail facility would emerge from the tunnel portal east of Ervay Street; therefore, no new barrier effect would be expected. Adequate crossings could help to minimize the existing effect. Both alternatives provide enhanced access to the Dallas Public Library and City Hall, although they are below-grade. Signage would be important in facilitating access to and from the stations. For safety and security in this district, see Section 3.16, Safety and Security. Since these alternatives would be underground, there would be no impacts to public art located along these alignments. A potential stairway/elevator opening providing access to the City Hall Station would be the only use of the City Hall Plaza anticipated under these alternatives. The proposed underground entrance/exit has not yet been designed, so the dimensions and specific location for the opening have not yet been determined. It is estimated that such an opening could measure a total of 300 to 400 square feet.

Alternative B7 would continue underground under Commerce Street along the northern boundary of this district. No community facilities are located adjacent to Alternative B7 in this District.

3.2.13 Mitigation Measures

With the exception of the parking structure entrance to City Hall and the First Presbyterian Church parking garage under Alternative B4, no community facilities would be displaced by any of the proposed alignments. DART would work with to develop alternative locations and mitigate parking loss for the First Presbyterian Church parking facility. Parking would also be affected at the Scottish Rite Temple under Alternatives B4a and B4b. Please see Section 4.2.1, Parking Impacts, for

proposed mitigation measures related to parking facilities. DART would provide a relocation plan to assist with relocation and to provide compensation for the displaced property in accordance with the Federal Uniform Assistance and Real Property Acquisitions Act of 1970. The majority of potential barrier effects would be mitigated by providing adequate crossings along the alignments to access the surrounding community facilities.

3.3 Demographic and Socioeconomic Factors

The purpose of this section is to provide an overview of the demographic and socioeconomic factors associated with the D2 Transit Study. This section describes the current population that may be either directly or indirectly affected by the construction and operation the Build Alternatives. The analysis includes area population densities and recent growth trends, with examination of demographic characteristics such as race/ethnicity, age, income, and housing. Certain relevant population data, including projections, are also presented for the City of Dallas and Dallas County and NCTCOG forecast districts representing the study area. The information provided was primarily collected from the US Census Bureau and the NCTCOG. As shown in Figure 3-9, 11 census tracts are included in the study area, some extending beyond the corridor boundaries, and there are 10 NCTCOG forecast districts, which also approximate the study area but extend beyond its boundaries somewhat, as well. It should be noted that, since different Census and Census-based data sets are used in this analysis, total populations may vary for the Study Area. Census data as compiled by the Census Bureau provides a more accurate assessment of the population of the Study Area in the year 2000. The use of the Census data and Census-based Forecast Data compiled by NCTCOG is necessary to provide an understanding of future trends and employment in a geographic area that most closely resembles the boundaries of the Study Area.

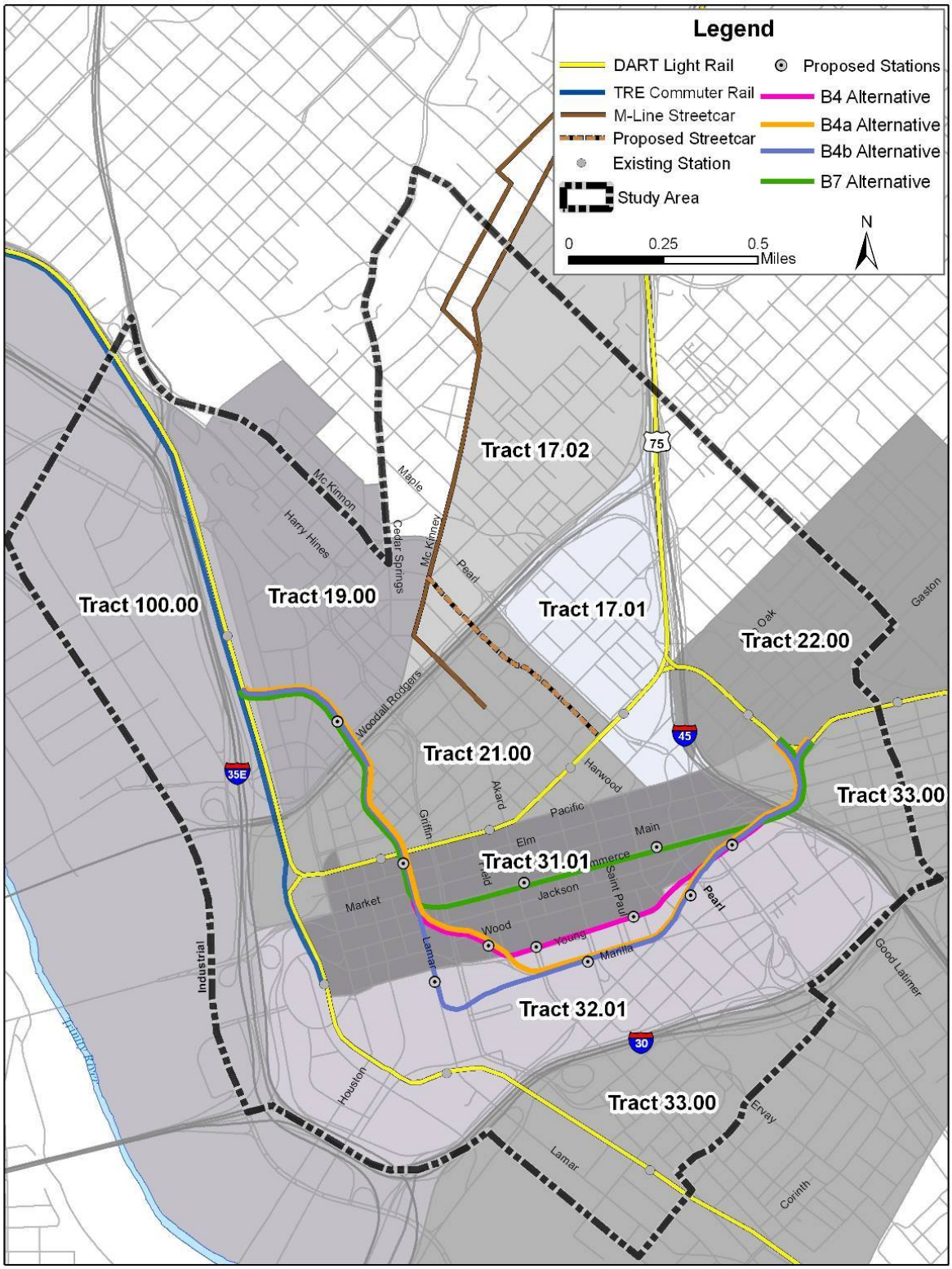
Census data are used to present historic data for the County, City and study area. These data are broken down into specific census block groups and blocks when evaluating issues related environmental justice issues such as race and ethnicity. Block group data are the most geographically specific data available for evaluating economic issues related to environmental justice, specifically populations below the poverty level. Environmental Justice issues are discussed more fully in the following section. The NCTCOG forecast data are the most recently available data for population, household and employment projections for the study area.

3.3.1 Population and Demographic Characteristics

According to the 2000 US Census, there were 2,218,899 people living in Dallas County, and of those, 1,188,580 people were living in the City of Dallas. The NCTCOG 2009 population estimate for Dallas County is 2,471,000 and for the City of Dallas the population estimate is 1,306,350. Based on these data, Dallas County's population increased by 11 percent between 2000 and 2009 and the City's population increased by 10 percent for the same period. This is equivalent to an average annual increase of 1.3 percent per year and 1.1 percent per year respectively.

The study area includes an area of four square miles. Land use in the study area is predominantly commercial developments, industry and government facilities. Only approximately 1.3 percent of the 2000 City of Dallas population, or 15,121 people,

Figure 3-9. Study Area Census Tracts



Source: U.S. Census Bureau, Census 2000

lived in the NCTCOG forecast districts encompassing the study area according to the U.S. Census. Forecast district divisions are shown in Figure 3-10. Since the boundaries of the NCTCOG forecast districts, which cover approximately eight square miles, differ somewhat from the study area boundaries, some populations are included that are actually outside the study area boundaries. The 2010 population for this same geographic area is projected to be 34,897, representing a population increase of approximately 76 percent. This reflects the recent trend of increased residential uses in the CBD.

Between 1990 and 2000, Dallas County experienced the highest population growth (in actual numbers) of any county in the NCTCOG region and the City of Dallas had the highest growth (in actual numbers) of any city in the region. As shown in Table 3-11, the study area had a higher percentage increase in population during this time than the City of Dallas. This is in large part due to the growth in the number of people moving to the CBD and into multi-family residences such as row houses and condominiums. Between 1990 and 2000, the study area changed from 1.1 percent of the City's population to 1.3 percent of the City's population (based on U.S. Census data compiled by NCTCOG). The census tracts centrally located in the study area (Census Tracts 31.01 and 32.01) decreased in population over this same time period. The census tracts that experienced an increase in population are generally located in the northern part of the study area in the Uptown area.

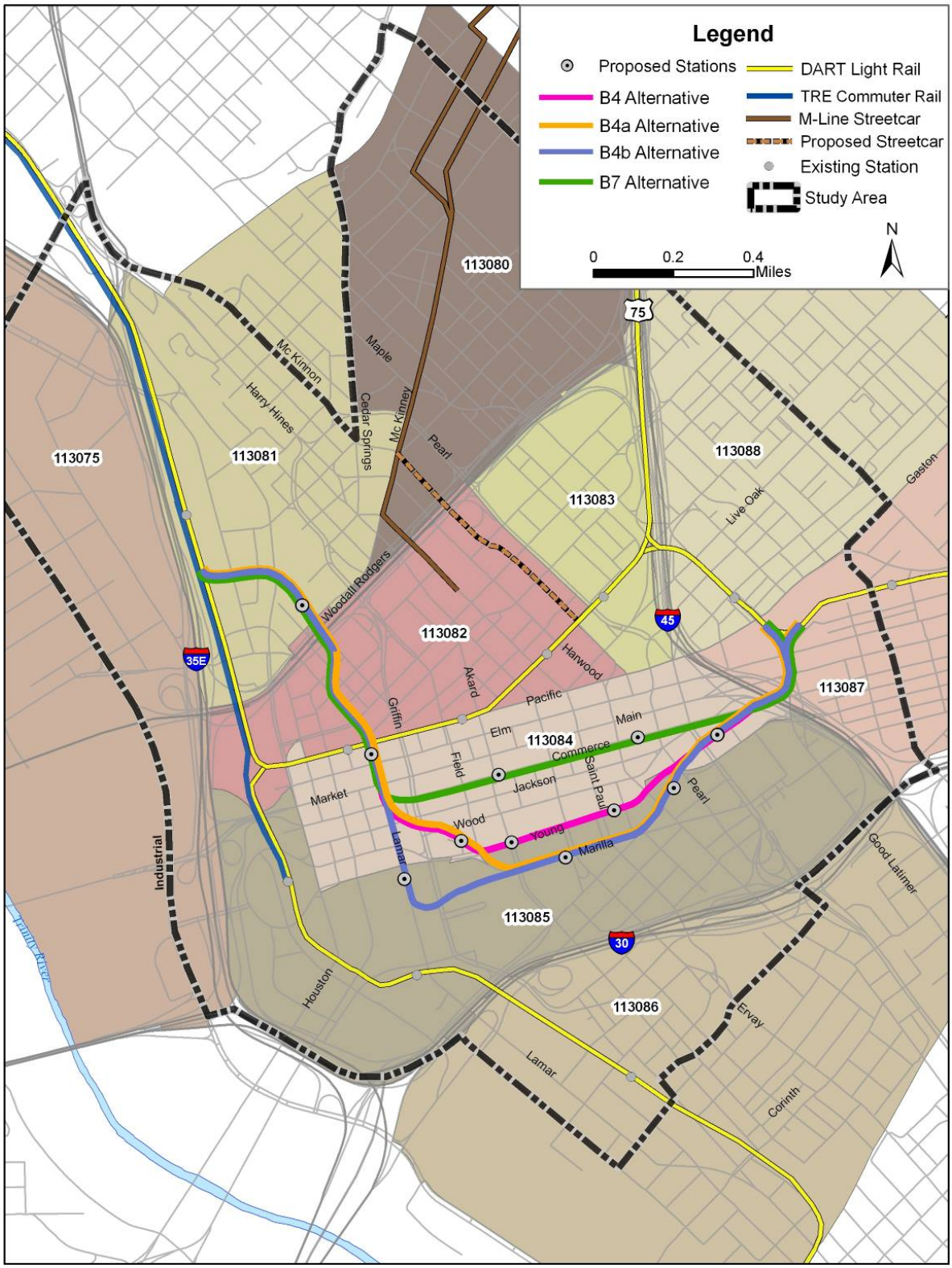
Table 3-11. Population Totals (2000-2010)

Forecast Area or District	2000	2005	2010	% Change 2000-2010
Dallas County	2,232,476	2,390,491	2,486,989	11%
City of Dallas	1,202,592	1,239,190	1,268,500	5%
113075	8	8	8	0%
113080	5,444	5,989	6,363	17%
113081	2,253	3,406	5,751	155%
113082	9	9	943	10,318%
113083	1	149	267	26,600%
113084	1,578	3,938	6,772	329%
113085	66	1,550	2,464	3,663%
113086	1038	2,792	4,643	347%
113087	1,212	1,839	2,559	111%
113088	3,512	4,380	5,127	46%
Study Area Forecast Districts	15,121	24,060	34,897	115%
Percent of City of Dallas Total Population	1%	2%	3%	

Source: US Census Bureau, Census 2000, compiled by NCTCOG; NCTCOG, Forecast for Counties, Cities and Forecast Districts (2009). Note: Boundaries of Study Area NCTCOG forecast districts differ from those of Study Area Census tracts.

A review of census block data for the year 2000, indicates that for the Build Alternatives options evaluated, the total populations potentially affected (located within 0.25 mile of an alternative) range from approximately 3,400 to 3,600 (Table 3-12).

Figure 3-10. Study Area Forecast Districts



Source: NCTCOG

Table 3-12. Population Within 0.25 mile of Build Alternatives (2000)

Build Alternative	2000 Population
B7	3,425
B4	3,445
B4a	3,608
B4b	3,608

Source : US Census Bureau, Census 2000, compiled by NCTCOG.

In 2000, the average population density of the study area was significantly lower than the population density of the City of Dallas or Dallas County as shown in Table 3-13. However, population density varies considerably within the study area, and five districts had a higher than average population density. From the period 2000 to 2010, there was a significant migration of population to the CBD area, most of which is in multi-family residential complexes. As a result, average population density is close to the city average, with some districts having two to three times the density, and will have increased from approximately 1,800 persons per square mile to an estimated 2010 density of approximately 4,100 persons per square mile. There is a growing trend of building large housing developments in the downtown area. Based on the NCTCOG data, population densities are anticipated to double for the forecast districts associated with the study area.

Table 3-13. Estimated Population Density (2000-2010)

Forecast Area or District	Area (sq. mi.)	Population Density (persons/square mile)	
		2000	2010
Dallas County	880	2,537	2,826
City of Dallas	385	3,124	3,295
113075	2.8	3	3
113080	0.6	8,440	9,865
113081	0.6	3,871	9,881
113082	0.4	24	2,564
113083	0.2	5	1,273
113084	0.4	4,393	18,854
113085	0.7	98	3,657
113086	1.2	836	3,737
113087	0.7	1,748	3,690
113088	0.8	4,259	6,218
Study Area Forecast Districts	8.4	1,795	4,142

Source: US Census Bureau, Census 2000, compiled by NCTCOG; NCTCOG, Forecast for Counties, Cities and Forecast Districts (2009). Note: Boundaries of Study Area NCTCOG forecast districts differ from those of Study Area Census tracts.

It is forecasted that between 2010 and 2030 the City of Dallas population will increase by 11 percent, compared to an estimated increase in population of 113 percent for the study area forecast districts. Population projections for study area forecast districts, the City of Dallas and Dallas County are shown in Table 3-14.

Table 3-14. Population Projections (2000-2030)

Forecast Area	2010	2015	2020	2025	2030	% Change 2010-2030
Dallas County	2,486,989	2,564,350	2,624,989	2,746,427	2,817,191	13%
City of Dallas	1,268,500	1,294,003	1,319,788	1,375,983	1,404,847	11%
113075	8	8	8	8	8	0%
113080	6,363	7,193	8,715	10,881	11,568	82%
113081	5,751	7,757	12,591	15,990	19,388	237%
113082	943	1,315	1,883	2,471	2,471	162%
113083	267	327	755	755	755	183%
113084	6,772	6,965	7,326	7,592	8,205	21%
113085	2,464	3,532	3,817	4,280	4,906	99%
113086	4,643	11,113	12,617	13,063	13,505	191%
113087	2,559	2,648	2,948	2,948	3,206	25%
113088	5,127	5,197	7,044	9,391	10,452	104%
Study Area Forecast Districts	34,897	46,055	57,704	67,379	74,464	113%
Percent of City	2.8%	3.6%	4.4%	4.9%	5.3%	

Source: US Census Bureau, Census 2000, compiled by NCTCOG; NCTCOG, Forecast for Counties, Cities and Forecast Districts (2009). Note: Boundaries of Study Area NCTCOG forecast districts differ from those of Study Area census tracts.

As shown in Table 3-15, the largest racial group in the study area in year 2000 was White with 59 percent, Black or African-American at 29 percent, and all other races comprised the remaining 12 percent. The race categories are inclusive of the Hispanic or Latino population, which is distributed mostly between the Some Other Race and White categories. Nearly 20 percent of the study area population was Hispanic or Latino. The White population living in the study area comprises a greater percentage of the population than in the City of Dallas (51 percent). The proportions of all other races are comparable to the City of Dallas, except for the Some Other Race category (which is predominantly Hispanic or Latino). The City of Dallas has a higher percentage of Some Other Race (17 percent) than found in the study area (7 percent). The Hispanic or Latino population in the City of Dallas (36 percent) is also proportionally greater than in the study area (19 percent).

Based on US Census data, the ethnic and racial composition within the region changed during the period 1990 through 2000. Table 3-16 provides a comparison of change in ethnic and racial composition in the study area, City of Dallas, and Dallas County. As shown, the study area's white population (which includes many Hispanics or Latinos) increased by 189 percent, exceeding that of the City and County. Growth rates for some groups were lower in the study area than in the City and County. Substantial growth was observed for several groups (Hispanic or Latino, 70 percent; Asian, Native Hawaiian and Other Pacific Islander, 39 percent). American Indian and Alaska Native population increased in the areas examined, although the actual numbers are relatively small.

Table 3-15. Race and Ethnicity (2000)

Race/Ethnicity	Dallas County		City of Dallas		Study Area	
	Number of Persons	Percent of Total	Number of Persons	Percent of Total	Number of Persons	Percent of Total
White	1,294,769	58%	604,209	51%	11,685	59%
Black or African-American	450,557	20%	307,957	26%	5,786	29%
American Indian and Alaska Native	12,499	1%	6,472	<1%	162	1%
Asian, Native Hawaiian and Other Pacific Islander	89,646	4%	32,708	3%	269	1%
Some Other Race	311,504	14%	204,883	17%	1,386	7%
Two or More Races	59,924	3%	32,351	3%	670	3%
Total	**2,218,899**	**100%**	**1,188,580**	**100%**	**19,958**	**100%**
Hispanic or Latino	662,729	30%	422,587	36%	3,781	19%
Not Hispanic or Latino	1,556,170	70%	765,993	64%	16,177	81%
Total	**2,218,899**	**100%**	**1,188,580**	**100%**	**19,958**	**100%**

Source: U.S. Census Bureau, Census 2000

Table 3-16. Population Growth by Race / Ethnicity (1990 - 2000)

Race / Ethnicity		Dallas County	City of Dallas	Study Area
White	1990	1,241,455	556,760	4,049
	2000	1,294,769	604,209	11,685
	Percent Increase	4%	9%	189%
Black or African-American	1990	369,597	296,994	5,299
	2000	450,557	307,957	5,786
	Percent Increase	22%	4%	9%
American Indian and Alaska Native	1990	9,437	4,792	61
	2000	12,499	6,472	162
	Percent Increase	32%	35%	166%
Asian, Native Hawaiian and Other Pacific Islander	1990	52,238	21,952	193
	2000	89,646	32,708	269
	Percent Increase	94%	74%	39%
Some Other Race	1990	180,083	126,379	1,345
	2000	311,504	204,883	1,386
	Percent Increase	95%	80%	3%
Hispanic or Latino (Any Race)	1990	315,630	210,240	2,226
	2000	662,729	422,587	3,781
	Percent Increase	110%	101%	70%

Source: U.S. Census Bureau, 1990 Census and 2000 Census

Table 3-17 compares the population within the study area to the city and county by age group according to the 2000 U.S. Census. As shown, approximately 71 percent of the study area population is within the 18 to 44 year old age group. Additionally, the population under the age of 18 accounts for only seven percent of the total population, and the population over the age of 65 accounts for seven percent. The percentage of the population in the study area over the age of 65 compares closely

Table 3-17. Population by Age (2000)

Age	Dallas County		City of Dallas		Study Area	
	Number of Persons	Percent of Total	Number of Persons	Percent of Total	Number of Persons	Percent of Total
Under 18 Years	619,031	28%	315,576	27%	1,452	7%
18-44 Years	1,001,717	45%	560,662	47%	14,150	71%
44-64 Years	419,279	19%	210,041	18%	2,945	15%
65 Years and Over	178,872	8%	102,301	9%	1,411	7%
Total	2,218,899	100%	1,188,580	100%	19,958	100%

Source: U.S. Census Bureau, 2000

to that of the City as a whole and Dallas County. The differences are mainly found in the age groups less than 44 years of age. The study area has a much higher concentration of persons between the ages of 18 and 44 years, and a much lower concentration of persons under 18 years old.

3.2.2 Income

Household income in the study area is generally higher than that of the City of Dallas and Dallas County. There are also certain census tracts that have a high concentration of households who have incomes below the poverty rate and others that have high concentrations of households with annual incomes over $200,000 (2000 US Census, “Household Income in 1999”).

Table 3-18 presents a comparison of income distribution for the study area and the City of Dallas. Compared to the City of Dallas, the study area has a greater percentage of incomes in the lower and higher income ranges, and a lower percentage in the middle ranges ($15,000 to $50,000). According to the 2000 Census, the 1999 median household income for the City of Dallas was $37,628 compared to $38,750 in the study area.

Table 3-18. Comparison of 1999 Household Income (2000 Census)

Income Range	City of Dallas		Study Area	
	Households	% of Total	Households	% of Total
Less than $10,000	47,522	11%	1,081	13%
$10,000 to $14,999	27,270	6%	507	6%
$15,000 to $24,999	65,666	15%	778	9%
$25,000 to $34,999	68,020	15%	969	11%
$35,000 to $49,999	77,132	17%	1,195	14%
$50,000 to $74,999	74,160	16%	1,795	21%
$75,000 to $99,999	36,030	8%	758	9%
$100,000 or more	56,209	12%	1478	17%
Total	452,009	100%	8,561	100%

Source: U.S. Census Bureau, Census 2000; Compiled by the North Central Texas Council of Governments (NCTCOG)

While the income range and median household incomes for the City of Dallas and the study area are generally comparable, there is a greater difference in the percentage of the population below the poverty level. The 2000 Census shows the

City of Dallas having a population living below the poverty level of 207,493, while the study area had a population of 2,722. The below-poverty population in the study area accounts for 1.3 percent of the total below-poverty population within the City of Dallas and is located primarily in the southern and western portions of the study area, as well as north of the Main Street District. In the study area, 14 percent of the population lives in households with incomes below the poverty level, compared to the City of Dallas, where 18 percent of the population lives below the poverty threshold. Thus, the study area has a lesser proportion of people with incomes below the poverty level than in the City of Dallas overall. A more detailed analysis of low-income individuals potentially affected by the Build Alternatives is discussed in the section on Environmental Justice (Section 3.19).

3.2.3 Housing

In 2000, there were approximately 9,812 households in the NCTCOG forecast districts representing the study area (a household consists of the people living together in an individual housing unit). This is anticipated to increase to 20,323 households in 2010 (see Table 3-19). The total number of study area households is projected to increase by approximately 30,243, a 308 percent increase, between 2000 and 2030. This is high in comparison to the City of Dallas projected 27 percent increase in households (or approximately 226,936 households).

Table 3-19. Projected Households (2000-2030)

Housing	2000	2005	2010	2015	2020	2025	2030
Dallas County	470,747	486,755	499,413	512,046	523,139	546,424	558,904
City of Dallas	832,864	891,905	929,713	963,107	986,493	1,032,872	1,059,800
113075	4	4	4	4	4	4	4
113080	4,097	4,519	4,806	5,483	6,657	8,328	8,859
113081	1,410	2,151	3,312	4,326	6,686	8,345	10,004
113082	9	9	501	701	1,001	1,313	1,313
113083	1	56	100	123	283	283	283
113084	1,067	2,206	3,814	3,946	4,151	4,302	4,650
113085	45	1,047	1,600	2,259	2,433	2,713	3,094
113086	257	886	1,553	3,899	4,337	4,467	4,596
113087	810	1,204	1,632	1,695	1,868	1,868	2,016
113088	2,112	2,690	3,001	3,042	3,814	4,793	5,236
Study Area Forecast Districts	9,812	14,772	20,323	25,478	31,234	36,416	40,055
Percent of City	1%	2%	2%	3%	3%	3%	4%

Source: US Census Bureau, Census 2000, compiled by NCTCOG; NCTCOG, Forecast for Counties, Cities and Forecast Districts (2009). Note: Boundaries of Study Area NCTCOG forecast districts differ from those of Study Area census tracts.

Table 3-20 below, compares the number of housing units in the study area to the units in the City of Dallas. Vacant housing in Dallas is 7 percent of the total housing stock compared to a vacancy rate of 14 percent in the study area (2000 US Census).

Table 3-20. Housing Units (2000)

Occupancy/ Tenure	City of Dallas		Study Area	
	Number of Units	Percent of Total	Number of Units	Percent of Total
Owner-occupied	195,227	40%	570	9%
Renter-occupied	256,470	53%	4,761	77%
Vacant	32,356	7%	874	14%
Total	484,053	100%	6,205	100%

Source: US Census Bureau, 2000 Census

The majority of housing units in the D2 study area are multi-family units. Approximately 8,000 units are either planned or under construction in the study area, as summarized in Table 3-21. There are 44 more units under construction within 0.25 mile of Alternatives B4, B4a, and B4b than adjacent to Alternative B7. Approximately 400 more units are planned around Alternative B4 than along Alternatives B4a and B4b. Units planned along Alternative B7 number 50 more than along B4 and 450 more than B4a and B4b. In total, 3,061 units are under construction and 5,014 are being planned for all of Downtown Dallas. As Table 3-21 shows, the majority of these planned units are within the study area and six of the development projects are adjacent to the Alternatives.

Table 3-21. Identified New Housing Developments (2009)

Census Tract	Address	Building	Units Under Construction	Announced Units	Adjacent to Alternative
17.01	Ross @ Routh (NWC)	Jefferson at the Arts District	228		
17.01	717 Leonard Street	Sky Lofts of Dallas		202	
17.01	1722 Routh Street	Two Arts Plaza		50	
17.02	1900 McKinney	1900 McKinney	230		
17.02	2812 Thomas	Clay Alley Row Houses	5		
17.02	2604 and 2608 Thomas Avenue	The Avenue at State Thomas	8		
17.02	2403 Thomas	Zaza Condominiums	33		
17.02	2500 McKinney	SNK Realty Development		300	
17.02	McKinney at Fairmont	2500 McKinney		289	
19	McKinnon at Hunt	Alta Rosewood	375		
19	170 Cedar Springs Road	Park Seventeen	292		
19	Victory Park Lane	The House by Starck and Yoo	150		All Alternatives
19	1899 McKinney Avenue	1899 McKinney Avenue		35	
19	Akard at Cedar Springs	Akard Place		80	
19	Harwood at McKinnon	The Square at Harwood		254	
19	Goat Hill Road	Trammel Crow Residential		300	
19	McKinnon at Randall	ZOM Rosewood		331	
19	Victory Park Lane	The Residences at Mandarin Oriental		90	All Alternatives
19	Pearl at McKinney	Tower Residences		120	
21	400 N. Ervay Street	Lofts at Thanks-giving Square	78		
21	800 Olive Street	Museum Tower		122	
21	511 N. Akard Street	City Walk at Akard		209	

Table 3-21. Identified New Housing Developments (2009) (continued)

Census Tract	Address	Building	Units Under Construction	Announced Units	Adjacent to Alternative
22	Bryan at Adair	Glen Vista at Bryan Place	30		
22	2700 Floyd Street	Up East Townhomes	18		
22	Good Latimer at Live Oak	City Lights Phase I		320	
31.01	1808 Main Street	Mercantile Complex	366		
31.01	1600 Pacific Avenue	1600 Pacific		300	
31.01	1900 Pacific Avenue	1900 Pacific		130	
31.01	301 S. Harwood Street	Atmos Complex		265	B7
31.01	1810 Commerce Street	Continental Building		185	B7
32.01	Central @ Marilla	City View at Farmers Market	44		B4, B4a, and B4b
32.01	500 S. Ervay Street	Butler Brothers Warehouse		400	B4
33	1011 Belleview Street	The Beat at Southside	73		
33	1900 Gould Street	Gould Street in the Cedars	12		
100	1400 Turtle Creek Boulevard	1400 Turtle Creek	355		
100	1500 Turtle Creek Boulevard	1525 Turtle Creek	214		
100	I35 @ Oak Lawn (SWC)	Crow Holdings/ Wood Partners Development	240		
100	1531 Inspiration Drive	Wood Partners Project	310		
100	Oak Lawn @ Dragon/ Slocum	Harwood International Phase I		184	
100	Oak Lawn @ Dragon/ Slocum	Harwood International Phase II		317	
100	Oak Lawn @ Dragon/ Slocum	Harwood International Phase III		317	
100	Oak Lawn @ Hi Line	Wood Partners Project		214	
Total Units			**3,061**	**5,014**	

Source: Downtown Dallas, downtowndallas.org

3.2.4 Employment

The number of persons employed in Dallas has increased in recent years. Since 2004, the city job growth rate has averaged 2.3 percent (City of Dallas Office of Economic Development). However, the number of unemployed has grown as well. According to *D Economy* (June 2009), a publication of the Office of Economic Development, the unemployment rate for the City of Dallas reached 7.3 percent, an all-time high for the third time this year. Table 3-22 shows the distribution of employment by industrial sector in the Dallas area.

Since 2003, the office vacancy rate in Dallas has been declining, with the latest available information showing a current rate of 18.1 percent, the lowest in the past six years. The vacancy rate in the CBD, while on the decline, is higher than that of the City of Dallas at 27.2 percent, according to a report released in April 2009 by Cushman and Wakefield, a global real estate solutions company. Nevertheless, the CBD far exceeds all other Dallas business districts in business establishments and employment.

Table 3-22. Dallas Area Employment by Industrial Sector (2005)

Industrial Sector	Percent of Total
Trade, Transportation & Utilities	19.9 %
Professional & Business Services	14.4 %
Government	11.9 %
Manufacturing	9.7 %
Education & Health Services	9.4 %
Leisure & Hospitality	8.8 %
Financial Activities	8.4 %
Other	17.5 %

Note: Data for Dallas-Plano-Irving Metropolitan Division
Source: Texas Workforce Commission

Table 3-23 indicates employment across NCTCOG forecast districts encompassing the study area, with projections to 2030. The forecast districts can be seen in Figure 3-10. There are 80 companies located in the study area with over 250 employees. These 80 companies employed a total of 52,176 in 2005 (NCTCOG, 2005).

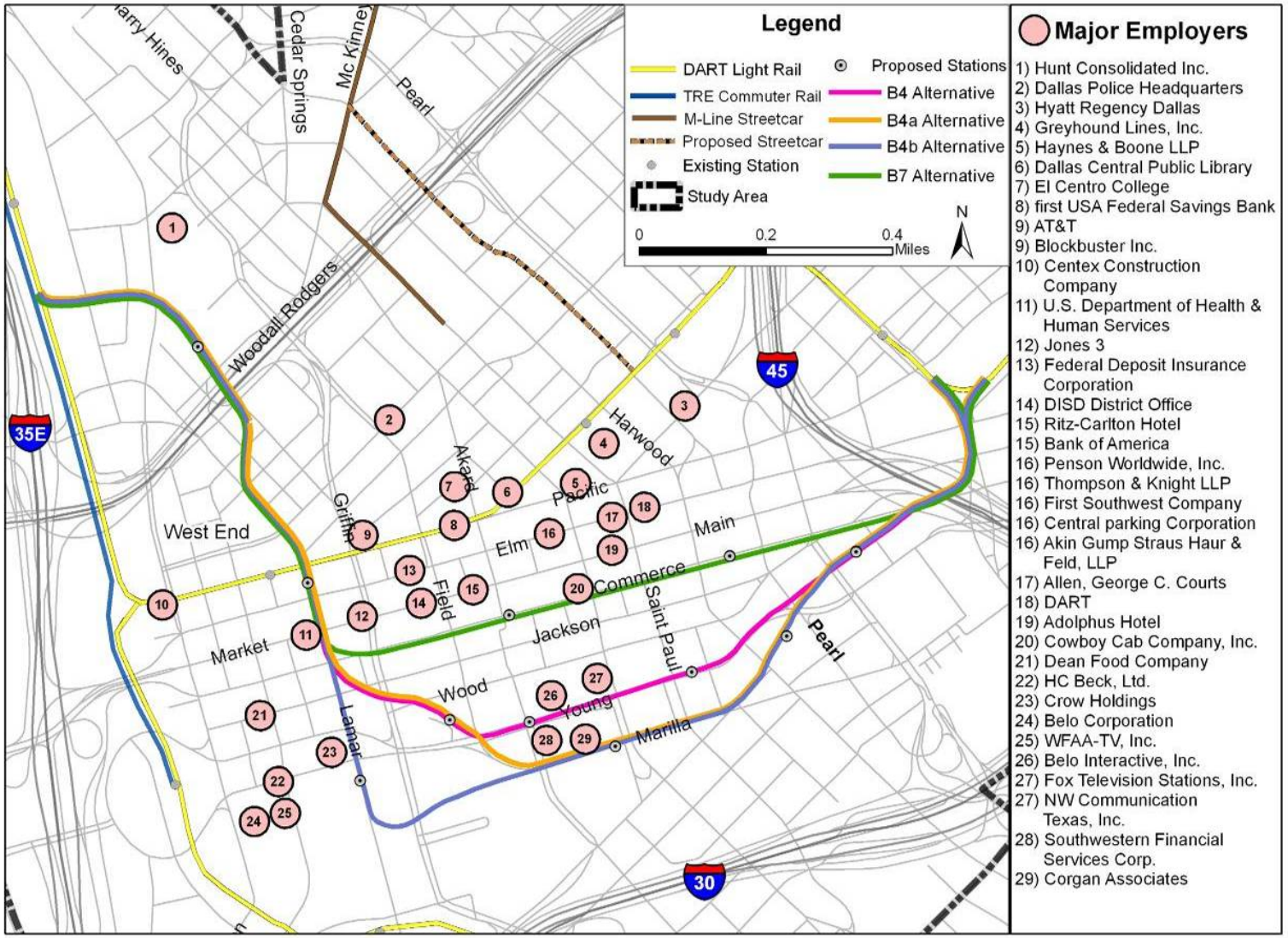
Table 3-23. Employment for 2000 and 2030

Forecast District	2000	2005	2010	2015	2020	2025	2030
Dallas County	1,038,314	1,110,624	1,158,522	1,206,361	1,282,463	1,363,491	1,390,219
City of Dallas	1,745,109	1,924,193	2,055,686	2,198,367	2,344,392	2,467,769	2,529,371
Study Area Forecast Districts	222,170	233,485	242,304	251,750	272,860	290,660	299,158
113075	23,755	23,879	23,872	23,872	23,872	23,872	23,872
113080	14,570	15,717	16,672	17,800	20,085	22,138	24,321
113081	10,135	12,053	14,083	16,531	20,311	23,935	24,031
113082	40,899	43,129	44,720	46,212	50,788	55,560	60,167
113083	9,184	9,444	9,625	9,767	10,198	10,198	10,198
113084	69,527	71,123	71,877	72,547	75,196	75,196	75,326
113085	10,863	11,452	12,002	12,435	13,754	15,042	15,042
113086	12,523	13,267	13,724	14,169	15,706	16,728	18,202
113087	17,632	18,333	18,703	19,065	19,947	19,947	19,955
113088	13,082	15,088	17,026	19,352	23,003	28,044	28,044
Percent of City	10%	9%	9%	9%	9%	10%	10%

Source: US Census Bureau, Census 2000, compiled by NCTCOG. Note: Boundaries of Study Area NCTCOG forecast districts differ from those of Study Area Census tracts.

Figure 3-11 shows the location of the major businesses within 0.25 mile of the Build Alternatives, and a review of 2005 data indicates that these businesses employ 26,325. Table 3-24 lists 29 CBD employers and the number of people employed by each organization within 0.25 mile of the selected alternatives. Firms with the largest numbers of employees (250 or more) were generally in: professional, scientific and technical services; finance and insurance; and management of companies and enterprises.

Figure 3-11. Major Employers in the Study Area



Source: City of Dallas Office of Economic Development ; PB/AZB Joint Venture

Table 3-24. Major Employers (2009)

Business	Address	Number of Employees	Map Key
Hunt Consolidated Inc (Holding Co for Hunt Oil Co & Woodbine Dev. Corp)	1900 North Akard St.	1200	1
Dallas Police Headquarters	1400 South Lamar Street	900	2
Hyatt Regency Dallas	200 Reunion Boulevard	770	3
Greyhound Lines, Inc.	350 North Saint Paul Street	802	4
Haynes & Boone LLP	901 Main St	500	5
Dallas Central Public Library	1515 Young Street	515	6
El Centro College	801 Main Street	629	7
First USA Federal Savings Bank	1601 Elm Street	550	8
Gardere Wynne Sewell, LLP	1601 Elm Street	417	8
Chase Paymentech Solutions	1601 Elm Street	400	8
AT&T (Formerly SBC)	1201 Elm Street	600	9
Blockbuster Inc	1201 Elm Street	500	9
Centex Construction Company	2401 Victory Park Lane	425	10
U.S. Department of Health & Human Services	1301 Young Street	378	11
Jones 3	2727 North Harwood Street	350	12
Federal Deposit Insurance Corporation	1910 Pacific Avenue	500	13
DISD District Office	2501 Flora Street	400	14
Ritz-Carlton Hotel	2121 McKinney Avenue	400	15
Bank of America	411 North Akard Street	375	15
Penson Worldwide, Inc (also Penson Financial Services, Inc)	1700 Pacific Avenue	482	16
Thompson & Knight LLP	1700 Pacific Avenue	458	16
First Southwest Company	1700 Pacific Avenue	313	16
Central Parking Corporation	1700 Commerce Street	300	16
Akin Gump Straus Haur & Feld, LLP	1700 Pacific Avenue	284	16
Allen, George C. Courts	600 Commerce Street	463	17
Dallas Area Rapid Transit	1401 Pacific Avenue	450	18
Adolphus Hotel	1321 Commerce Street	360	19
Cowboy Cab Company, Inc.	1306 Wall Street	350	20
Dean Food Company	2515 Mc Kinney Avenue	350	21
HC Beck, Ltd.	1807 Ross Avenue	300	22
Crow Holdings	2100 McKinney Avenue	295	23
Belo Corporation	400 South Record Street	280	24
WFAA-TV, Inc.	606 Young Street	273	25
Belo Interactive, Inc.	900 Jackson Street	260	26
Fox Television Stations, Inc.	400 North Griffin Street	270	27
NW Communication Texas, Inc.	400 North Griffin Street	250	27
Southwestern Financial Services Corporation	717 North Harwood Street	250	28
Corgan Associates	401 North Houston	255	29
Total		**14,439**	

Source: NCTCOG, 2009

The development of a new convention center hotel near the current Dallas Convention Center could increase the future employment projected in Table 3-23. The Dallas Convention Center Hotel is set to open as early as late 2011 or early 2012. It is a $346 million project that is expected to employ 1,200 people (Convention Center Hotel Impact Update, dallascityhall.com). The City of Dallas is expecting the project to encourage additional investment in the vicinity and stimulate business activity Downtown, resulting in further employment and population growth in the area.

3.4 Displacement and Relocation

This section describes the potential impacts of the Build Alternatives on property, people and businesses due to the acquisition of land and buildings necessary for the project right-of-way.

3.4.1 Methodology

A preliminary estimate of property acquisition was prepared based on conceptual engineering drawings that indicate the potential right-of-way required for each alternative. The purpose of this estimate was to: identify areas of potential property acquisition, compare the potential extent of property acquisition and relocations among the alternatives, and to establish a preliminary market value of the potentially impacted property for the project capital cost estimate.

Following more detailed engineering of an LPA, a refined estimate of property acquisition and displacements will be conducted, including partial parcel takes, whole parcel takes, surface/subsurface easements and the number and type of residential and business displacements and relocations.

Mitigation of all property impacts will be considered, and the number and type of people and businesses will be determined. A relocation plan will be developed pursuant to applicable guidelines.

3.4.2 Property Acquisition

Table 3-25 identifies 48 parcels that may be impacted by the Build alternatives, along with a description of the current use. No determination has been made as to the extent of impact on each parcel (i.e. partial acquisition, total acquisition, or easement). The location of these and other potentially impacted parcels along each of the alternatives is shown in Figure 3-12.

Table 3-25. Potentially Affected Properties

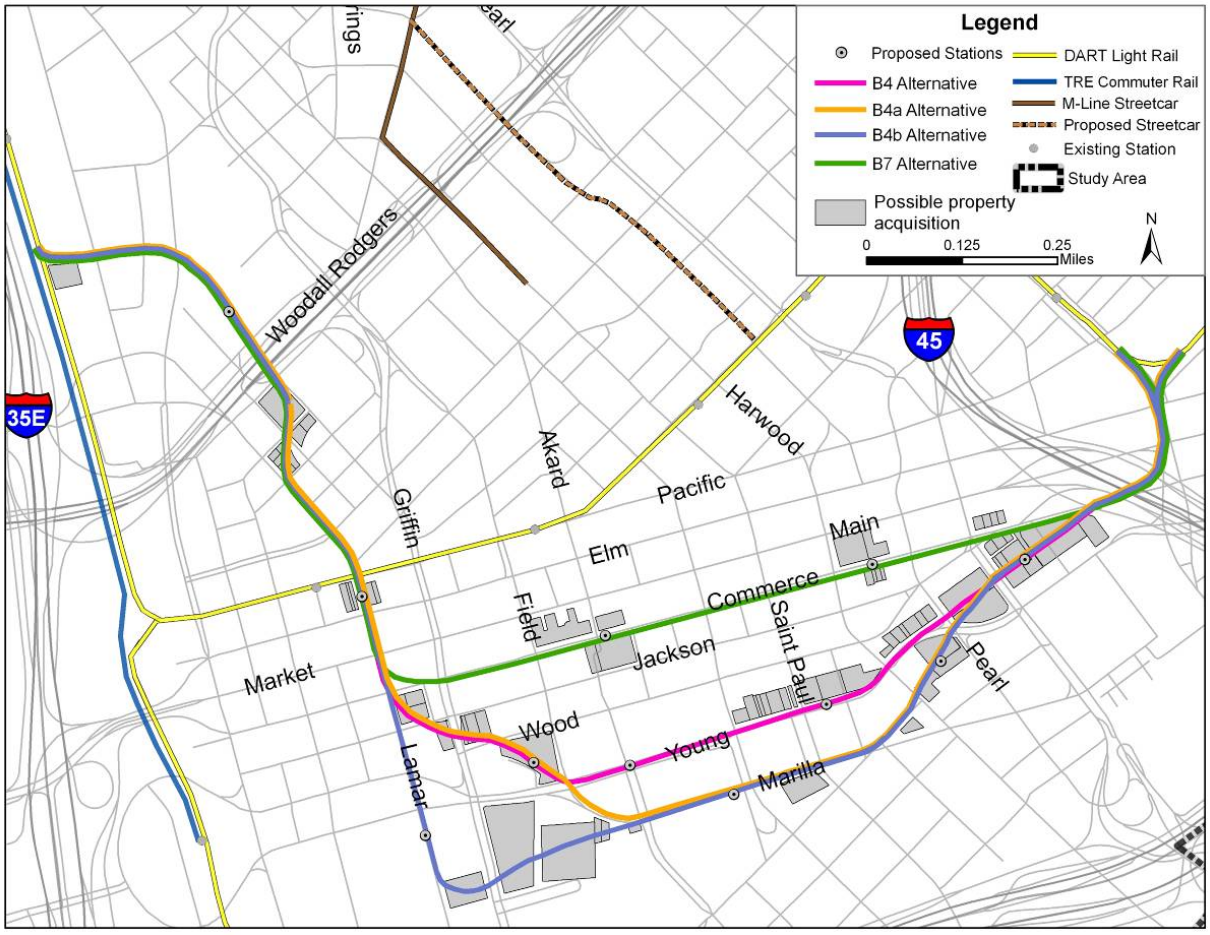
Parcel ID	Location	Current use	Alternative
1	Southwest corner Woodall Rodgers and Laws Streets	Surface parking lot	Common
2	Northwest corner Laws and Corbin Streets	Surface parking lot	Common
3	Southwest corner Laws and Munger Streets	Surface parking lot	Common
4	Northeast corner Lamar and Corbin Street	Surface parking lot	Common
5	East side Lamar Street south of Munger Street	Surface parking lot	Common
6	South side Munger Street east of Lamar Street	Surface parking lot	Common
7	Southeast corner Lamar and Munger Streets	Surface parking lot	Common
8	Southwest corner Laws and Munger Streets	Commercial building	Common

Table 3-25. Potentially Affected Properties (continued)

Parcel ID	Location	Current use	Alternative
9	Northwest corner Munger and North Griffin Streets	Commercial building	Common
10	Northeast corner Lamar and Commerce Streets	Surface parking lot	B7
11	North side Commerce Street east of Lamar Street	Surface parking lot	B7
12	Southeast corner Lamar and Commerce Streets	Surface parking lot	B4, B4a
13	Southwest corner Griffin and Commerce Streets	Surface parking lot	B4, B4a
14	Southwest corner Jackson and Griffin Streets	Open space	B4, B4a
15	Southeast corner Jackson and Griffin Streets	Open space	B4, B4a
16	Adjacent to southeast corner Jackson and Griffin Streets	Surface parking lot	B4, B4a
17	Southwest corner Wood and Field Streets	Surface parking lot	B4, B4a
18	Southwest corner Griffin and Young Streets	Open space	B4b
19	East side Griffin Street south of Young Street	Surface parking lot	B4b
20	Northeast corner Young and Ervay Streets	Surface parking lot	B4
21	North side Young Street east of Ervay Street	Surface parking lot	B4
22	North side Young Street east of Ervay Street	Surface parking lot	B4
23	North side Young Street east of Ervay Street	Surface parking lot	B4
24	North side Young Street east of Ervay Street	Surface parking lot	B4
25	North side Young Street east of Ervay Street	Surface parking lot	B4
26	North side Young Street east of Ervay Street	Surface parking lot	B4
27	Northwest corner Young and St. Paul Street	Residential loft building	B4
28	Northeast corner Young and St. Paul Street	Surface parking lot	B4
29	North side Young Street east of St. Paul Street	Surface parking lot	B4
30	North side Young Street between Park, Harwood Streets	Six-story parking garage	B4
31	Northwest corner Young Street and Harwood Streets	Open space	B4
32	Northeast corner Young Street and Harwood Streets	Residential loft building	B4
33	North side Young Street east of Harwood Street	Surface parking lot	B4
34	North side Young Street east of Harwood Street	Two-story office building	B4
35	North side Young Street east of Harwood Street	Two-story office building	B4
36	North side Young Street east of Harwood Street	Surface parking lot	B4
37	North side Young Street east of Harwood Street	Two-story office building	B4
38	Northwest corner Young and Pearl Streets	Two-story office building	B4
39	East side Pearl Street and abandoned Young Street	Surface parking lot	B4,B4a,B4b
40	West side Central Expressway and abandoned Young Street	One-two story office building	B4,B4a,B4b
41	East side Central Expressway and abandoned Young Street	Surface parking lot	Common
42	South side Commerce and abandoned Young Street	Surface parking lot	Common
43	South east corner Commerce and abandoned Young Street	Warehouse	Common
44	East side Harwood and abandoned Canton Street	Open space	B4a, B4b
45	East side Pearl Street south of Young Street	Surface parking lot	B4a, B4b
46	East side Pearl Street and abandoned Canton Street	Surface parking lot	B4a, B4b
47	Southeast corner Young and Pearl Streets	Surface parking lot	B4a, B4b
48	North side 2100 block Young Street	7 condo housing units	B4a, B4b

Source: Pyles Whatley Corporation

Figure 3-12. Potentially Affected Properties



Source: PB/AZB Joint Venture

Table 3-26 provides a preliminary estimate of the number of parcels and the types of property that will be impacted by the Build Alternatives. The table provides information on the alignment sections that are common to all alternatives and for each distinct alternative alignment. Most of the alignments are within existing City of Dallas streets or DART owned right-of-way. The common sections exist at the beginning and end of each Build Alternative: from Victory Station to the proposed Metro Center Station (of which the portion north of Woodall Rodgers Freeway is within DART-owned right-of-way), and from IH 45 to the connection with the Southeast Corridor.

The data in Table 3-26 do not include off-site or adjacent construction staging areas or property required for underground station access and ventilation and substation facilities. These will be identified and assessed after more detailed design and development of a construction staging plan for the LPA.

Excluding the common parcels affected by all Alternatives, B4 will have the greatest impact on property affecting 30 parcels and eight buildings. However, 22 of these impacts are associated with parking lots or facilities and vacant lots. Potential

Table 3-26. Summary of Estimated Property Impacts by Alternative

Property Impacts	Common Sections [1]	B7	B4	B4a	B4b
Total Property Parcels	3	10	30	15	11
Buildings • Residential • Commercial	3 - 3	8 - 8	8 2 [2] 6	10 7 [3] 3	9 7 [3] 2
Parking Lots	9	2	19	9	6
Parking Structures	-	-	1	-	-
Open Space Lots	-	-	2	1	1

Source: Pyles Whatley Corporation and PB/AZB Joint Venture
[1] Does not include common section from IH 45 to Southeast Corridor junction
[2] Two-story Multi-family buildings
[3] Seven residential condominium units at 2100 Block of Young Street on one parcel
[4] Does not include property required for access and ventilation for two underground stations along Commerce Street.

impacts to built properties are comparable to Alternatives B4a and B4b. Alternative B7 will have the least impact, affecting mostly adjacent buildings at access points to underground stations.

All of the Build Alternatives will result in some displacement and relocation of businesses and residences. In terms of the number of these impacts, Alternatives B4, B4a and B4b will have the most and Alternative B7 the least. Alternative B7 will likely require additional property acquisition to provide access to two underground stations along Commerce Street. The majority of buildings involved are older one and two-story structures converted to commercial or residential space. One complex of seven newly constructed condominium housing units will be impacted by Alternatives B4a and B4b.

3.4.3 Residential and Commercial Displacement and Relocation

Once the LPA is selected, more detailed design will be completed. Future design refinements will strive to minimize the number of residential and commercial displacement and relocations. The number of business and residential displacements and relocations will be determined based on field surveys at that time.

3.4.4 Mitigation Measures

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 (42 *United State Code* [USC] 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). Any real estate acquisitions will be appraised by an independent appraiser to determine the fair market value of the property. This fair market value will be made available to the property owners per federal regulation. Within the framework of the Act, it is necessary to determine the availability of adequate, decent, safe, and sanitary housing for displaced residents and suitable locations and/or facilities for displaced

businesses. All new locations must be available on an open occupancy basis and at costs affordable by those displaced. DART will be responsible at the local level for administering the Act.

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.

3.5 Economic Impacts

The project would offer opportunities for business and residential developers in the CBD. Improved access and coverage associated with another LRT facility would increase both residential and retail development in comparison to the No Build Alternative. It is anticipated that the expansion of the DART system and the addition of DART stations in Downtown Dallas would strengthen the relative market position of the urban center over time.

3.5.1 Environmental Setting

The D2 study area is located within the Dallas Metropolitan Statistical Area, Dallas County and the City of Dallas. In order to gain a better understanding of current and anticipated economic development trends, a review of existing information and data provided by local planning officials, developers, real estate brokers and economic development officials was conducted.

According to NCTCOG and the City of Dallas, Dallas is forecast to continue adding jobs and residents in the coming decades. The City of Dallas' forwardDallas Comprehensive Plan projects that the city will add another 200,000 households and 400,000 jobs by 2030. Dallas is channeling this growth into new developments and redevelopment sites in and around downtown, around transit stations, and in greenfield sites near the University of North Texas (UNT) at Dallas campus and the inland port. As of mid-2009, the expanded downtown area (the CBD and 1-mile surrounding area) has seen:

- 22,867 new/renovated housing units (existing, under construction or planned);
- 2,600 hotel rooms (completed or under construction);
- $338 million Arts District expansion;
- $2.4 billion total investment (existing or planned) in two downtown TIF districts; and
- 1.5 million square feet of new office space under construction.

The Dallas Office of Economic Development has a strategic engagement strategy for future development, coordinating major catalyst programs that together constitute wholesale redevelopment of the city, especially in central and southern Dallas. These programs include a comprehensive plan for urban development areas, a plan for opportunities along the Trinity River (44,000-acre corridor), the DART Rail

System, the Bond Strategic Investment Area package, and economic development strategic priorities for commercial, retail, mixed-use and industrial developments.

Since 2000, nearly $573 million have been invested inside the downtown freeway loop, including a $125 million expansion of the Dallas Convention Center, $75 million renovation of the Republic Center office tower, $32 million construction of Camden Farmers Market Phase 1 Residences, $65 million expansion of Hyatt Regency Dallas, $35 million office-to-residential conversion of the Davis Building, and the $25 million renovation of KPMG Centre.

NCTCOG predicts that downtown Dallas "may change more over the next 39 years than any other area of its size in the region. Historic office buildings will continue to be reshaped into mixed-use residential towers, as a self sufficient livable downtown emerges. Downtown housing continues to succeed due to a growing number of young professionals and empty nesters, convenient transit and proximity to work, entertainment and cultural centers attract this expansion in the number of people living downtown."

The resurgent retail market on Main Street in downtown prompted the Dallas City Council to approve $2.5 million of TIF funding for marketing, promotion and retail recruitment to attract 40,000 square feet of non-restaurant business.

The new University of North Texas (UNT) at Dallas School of Law was established in June 2009 by Senate Bill 956. The School will reside in the historic Dallas Municipal Building and will begin classes in Fall 2011.

A draft report conducted by Economic Research Associates was completed in September 2008 to evaluate the broad economic benefits that may be associated with Build Alternatives B4 and B7. Alternative B4 is intended to be representative of Alternatives B4a and B4b. The results of this report were relied upon for the analysis of impacts that follows.

3.5.2 Potential Impacts

3.5.2.1 No Build Alternative

Without the development of the DART LRT through downtown, Dallas would continue to experience growth; however, Dallas' growth rate may occur at a lower rate than if the LRT were constructed. The City of Dallas Office of Economic Development has identified the proposed DART rail lines as contributors to economic activity through improved access into the CBD and the potential development around LRT stations, especially in the form of transit-oriented design opportunities (*Economic Development Profile*, Dallas Office of Economic Development, November 2008).

3.5.2.2 Build Alternatives

The establishment of another LRT line through the CBD would increase economic activity for a number of reasons. Employment generated by construction and operations is the most direct economic effect, along with the indirect multiplier effect from those jobs and construction-related dollars that are spent locally. In addition, rail transit attracts higher density development near station areas, which, in addition to investment dollars, results in population and employment growth and the economic activity that follows. In addition to high-density residential properties, this development typically also includes

new retail, entertainment and employment centers. Existing businesses and employers near stations would also benefit from the enhanced access provided by the LRT facility. All Build Alternatives would have the added benefit of access to Dallas-Fort Worth International Airport and Love Field via connection to the existing and planned DART LRT system, enhancing the attractiveness of station areas for investment.

Employment and Indirect Economic Benefits

The estimated construction cost for each alternative is presented in Table 3-27. These costs represent the procurement of engineering, materials, labor, and use of heavy equipment for the construction of the selected LRT project. Cost differences for the various Alternatives are the result of the extent of tunneling required, distance of track, right-of-way acquisition requirements, utility relocations and other factors. In a December 2008 article published in Engineering News Record ("Economic Multiplier Effect Makes Transportation Tops"), it was reported that, according to the American Association of State Highway and Transportation Officials, an estimated 35,000 jobs are created for every $1 billion spent on transportation projects. In addition, it is estimated that an additional 97¢ in indirect and induced spending would result from every dollar spent on capital costs. Many transactions would also result in sales tax revenue for state and local governments. Applying these assumptions to the construction cost estimates results in the employment multiplier and indirect economic benefits shown in Table 3-27.

Table 3-27. Construction Costs and Employment and Indirect Economic Benefits

LRT Option	Estimated 2008 Capital Costs ($ Millions)	Employment Multiplier	Indirect Economic Benefit ($ Millions)
B7	$580	20,300	$562.6
B4	$380	13,300	$368.6
B4a	$560	19,600	$543.2
B4b	$615	21,525	$596.6

Overall economic impacts associated with the alternatives include the following:

Construction

- Increased jobs for construction of the rail line
- Orders for materials and equipment for construction of the rail line
- Orders for tunnel boring machine (TBM) and other equipment
- A temporary reduction in business activity where construction interferes with business operations

Operations

- Increased jobs for rail operations and maintenance
- Increased business activity at stations along the rail lines
- Orders for equipment for tunnel, stations, and rail maintenance
- Increased energy sales
- Reduced gasoline and other fuel purchases

Station Area Economic Benefits

A study conducted at UNT, "Assessment of the Potential Fiscal Impacts of Existing and Proposed Transit-Oriented Development in the Dallas Area Rapid Transit Service Area" (November 2007), concludes that the DART LRT System has had a positive economic impact on the communities it serves. LRT stations have been a major catalyst for several economic development projects across the system. A summary of the November 2007 report concluded the following:

> Increasingly, cities that are competing for economic opportunity in a global marketplace see efficient public transportation systems, usually including a rail component, as a necessary condition for long term growth. This remains one of the best reasons for north Texas communities to invest in transit rail services. While the returns on these investments are best measured in broad economic trends, our findings support the conclusion that the transit-oriented developments associated with DART rail stations offer substantial fiscal impacts for local taxing entities. Existing and planned TOD projects near DART Rail stations will eventually provide over $46 million each year to area schools, $23.5 million to member cities, and millions to other local taxing entities. We anticipate that the scale and activity level associated with transit-oriented development in DART's service area and other parts of north Texas will continue to rise offering even greater opportunities for local taxing authorities to see the direct and indirect benefits of supporting and investing in transit rail services.

Alternative B7 has strong potential for encouraging office redevelopment and revitalization due to the historical use of this area as an office and hotel corridor. It is estimated that the Main Street Garden Station area can support an approximate total of 650,000 to 700,000 square feet of additional new or substantially renovated office space by 2030 (Table 3-28). As Downtown Dallas continues to experience the renovation of older office buildings into new residential and mixed-use space, the Main Street Garden Station area would likely see similar renovations and development with the potential for almost 1,000 units by 2030 (Table 3-28), about 60 percent of which would be rental units for the growing population of young professionals.

Table 3-28. Summary of Potential Development Benefits, 2010 – 2030

	Alternative B7 Lamar-Commerce			Alternative B4		
	2010-2020	2020-2030	Total	2010-2020	2020-2030	Total
Office (Square Footage)	288,000	393,000	681,000	92,000	125,000	217,000
Residential (Total Units)	457	531	988	1,325	2,329	3,654
Multi-family for sale	174	209	383	477	708	1,195
Multi-family for rent	283	322	605	848	1,611	2460
Total Residential Units	**914**	**1.062**	**1,976**	**2,650**	**4,648**	**7,309**
Retail (square footage)	38,164	27,831	65,995	72,915	163,953	236,868

Source: PB/AZB Joint Venture, Economic Research Associates.
Note: The study conducted by Economic Research Associates was conducted to provide and represent opportunities for development in north and south downtown. These areas reviewed for Alternatives B7 and B4 did not include the common segments, rather the study conducted covered the independent alignment options for these alternatives

Retail along Alternative B7 would likely have a primary focus on supporting the existing and new office and residential development. It is estimated that there would be approximately 66,000 square feet of retail activity under Alternative B7 by 2030 (Table 3-28). In addition, the renovation of the Dallas Grand Hotel building may capture some of the tourist and visitor market through access to the airport via the DART LRT system.

The eastern ends of Alternatives B4, B4a, and B4b have strong potential for the development of mid-rise transit villages with housing above ground-floor commercial uses. Major national developers have been positioning themselves for development with land purchases in the area east of Harwood Street. The Alternative B4, B4a, and B4b station areas would support more residential development compared to Alternative B7. An estimated 3,600 units would be developed along Alternatives B4, B4a, and B4b by 2030. Units for sale are expected to account for one-third and rental units two-thirds of this new residential development. Due to its somewhat removed location from the downtown office concentration, it is estimated that Alternatives B4, B4a, and B4b would support approximately 200,000 to 250,000 square feet of additional new office space over the next twenty years (Table 3-28).

Retail along Alternative B4/B4a/B4b would likely have a primary focus of supporting new residents and a potential destination entertainment district. It is estimated that there would be approximately 220,000 to 250,000 square feet of retail and restaurant uses for the B4/B4a/B4b Alternatives by the year 2030 (Table 3-28). The proposed DART LRT service would accelerate the evolution of this part of Downtown Dallas.

The City of Dallas will be constructing a new 1,000-room hotel just north of the Dallas Convention Center. Direct light rail access to this facility and surrounding developable property is a major goal of the City. The hotel, with light rail system access to the airport, would be expected to increase convention bookings and related economic multiplier benefits to downtown Dallas and the City. Alternative B4b would serve the hotel directly and Alternatives B4 and B4a provide nearby service with stations located within 1,200 feet and 1,100 feet, respectively. Alternative B7 would serve the Convention Center Hotel area via the Metro Center Station.

In addition, local business leaders and government officials cite DART as a critical factor in sustaining the region's economic growth. They state that DART is needed to address increasing traffic congestion and air quality problems and to help avoid possible EPA sanctions that would negatively impact the region's economy if the air quality issue is not addressed. The D2 project would increase mobility within the CBD by providing an alternative travel mode, thereby encouraging individuals who might otherwise be dissuaded by traffic congestion to travel downtown to either conduct business or participate in the many entertainment opportunities that are located along the selected alternative. Transit improvements can contribute to the economic vitality and continued growth of the community as part of a multimodal transportation strategy to reduce congestion, improve travel times, and improve air quality and quality of life in general.

3.5.3 Mitigation Measures

Because the D2 alternatives would have a positive regional economic impact, no mitigation measures are proposed.

3.6 Air Quality

3.6.1 Environmental Setting

Air quality is regulated by the EPA. The EPA delegates this authority to the states, and in Texas, the Texas Commission on Environmental Quality (TCEQ) is responsible for monitoring and enforcing air quality regulations. The TCEQ monitors specific air pollution levels at 19 air-monitoring stations throughout the Dallas-Fort Worth area.

3.6.1.1 Relevant Pollutants

Ambient air quality is influenced by a number of factors, including climate, topography, wind conditions, and the production of airborne pollutants by natural or artificial sources. Tailpipe emissions from cars and trucks produce almost a third of the air pollution in the United States. Vehicles are major sources of carbon monoxide (CO), oxides of nitrogen/nitrogen dioxide (NO_X/NO_2) and Volatile Organic Compounds (VOCs). CO is the primary component of vehicle exhaust gas and contributes about 60 percent of all CO emission in the United States. Particulate matters (PM_{10} and $PM_{2.5}$) and sulfur dioxide (SO_2) are also emitted from vehicular traffic; however, the emissions are not as significant as CO and NO_x emissions. Ozone (O_3), which is not directly emitted from automobiles (or other sources), is formed in the atmosphere by chemical reactions involving VOCs, NO_X, and sunlight. The following is a summary of major airborne pollutants in the study area and their health effects:

Carbon Monoxide (CO) – Carbon monoxide is an odorless, colorless gas formed by the burning of fuels containing carbon. Motor vehicles are the principal source of CO emissions in urban areas. Maximum concentrations usually occur near intersections and other areas of traffic congestion, and they decrease rapidly with distance from the source. It can cause dizziness and fatigue and can impair central nervous system functions. Exposure to high levels of CO can cause immediate death.

Particulate Matter ($PM_{2.5}$ and PM_{10}) – Particulate matter enters the air from industrial operations, vehicular traffic and other sources, including fireplaces. Most of the particulate matter generated by motor vehicles consists of re-suspended road dust. Measurements of particulate matter concentrations include total suspended particulates (TSP), particles with a diameter less than or equal to 10 micrometers (PM_{10}), and particles with a diameter less than or equal to 2.5 micrometers ($PM_{2.5}$) Particles of this size can be inhaled, irritating the human respiratory tract and aggravating pre-existing respiratory diseases. Certain populations, such as children, the elderly, exercising adults, and those suffering from asthma or bronchitis, are especially vulnerable. Very small particles of substances such as lead, sulfates, and nitrates can cause lung damage directly, can be absorbed into the blood stream and cause damage elsewhere in the body, and can transport adsorbed gases, such as chlorides or ammonium into the lungs and cause injury.

Ozone (O_3) – Ozone in the lower atmosphere is a harmful air pollutant and contributes to the formation of smog. It is a secondary pollutant formed by the reaction of volatile organic compounds and oxides of nitrogen in the presence of strong sunlight. Thus, ozone levels are reduced by minimizing emissions of those precursor pollutants. Ozone causes eye and respiratory irritation, reduces resistance to lung infections, and may aggravate pulmonary conditions in individuals with lung disease. Elevated O_3 levels cause vegetation damage.

Volatile Organic Compounds (VOC) – Volatile organic compounds (VOC) are a key component in the formation of ozone. These hydrocarbons are emitted or evaporate into the atmosphere from a variety of sources, particularly the storage and combustion of fuels in motor vehicles.

Oxides of Nitrogen (NO_X) – is a gaseous mixture of nitric oxide (NO) and nitrogen dioxide ($NO_{2)}$) that damages or irritates the human respiratory system, and can exacerbate damage from respiratory disease and other existing forms of irritation. NO_2 may reduce resistance to certain infections. It is also a precursor of O_3. NO_2 is a product of high-temperature combustion, emitted generally by the same sources as CO. High concentrations of NO_2 cause the brown haze readily observed in urban areas during periods of heavy air pollution. Concentrations of NO_2 are highest during late fall and winter.

Lead (Pb) – Lead is a particulate pollutant that is also a carcinogenic air contaminant. In the past, automobiles were the chief contributors of lead to the atmosphere in the U.S. Currently, lead is primarily emitted in U.S. from a relatively small number of point sources such as smelters and battery plants.

Sulfur Dioxide (SO_2) – Sulfur Dioxide is a product of the combustion of high-sulfur fuels, such as many grades of coal and oil. SO_2 is a human respiratory irritant. It combines with moisture in the atmosphere to form sulfuric acid and damages vegetation and exterior façades of buildings.

3.6.1.2 Air Quality Regulations and Planning

NAAQS

In compliance with the requirements of the Clean Air Act (CAA) of 1970 and the Clean Air Act Amendments (CAAA) of 1977 and 1990, the EPA promulgated and adopted the National Ambient Air Quality Standards (NAAQS) to protect public health, safety, and welfare from known or anticipated effects of the six criteria pollutants. These six criteria pollutants are O_3, CO, SO_2, NO_2, PM, and Pb. Table 3-29 lists the NAAQS for these six pollutants.

Attainment Status

The EPA designates geographic areas in a state with respect to meeting the NAAQS as *attainment, nonattainment,* or *unclassifiable*. Areas transitioning from nonattainment to attainment are termed *maintenance* areas. The nonattainment areas are designated based on the degree of violation of the NAAQS. For O_3 the designations are *extreme, severe, moderate,* or *marginal*.

Table 3-29. Air Pollution Concentrations Required to Exceed the NAAQS

Pollutant	Averaging Period	Standard	Primary NAAQS[1]	Secondary NAAQS[2]
Ozone	8-hr	The average of the annual fourth highest daily eight-hour maximum over a three-year period is not to be at or above this level.	76 ppb	76 ppb
Carbon Monoxide	1-hr	Not to be at or above this level more than once per calendar year.	35.5 ppm	35.5 ppm
	8-hr	Not to be at or above this level more than once per calendar year.	9.5 ppm	9.5 ppm
Sulfur Dioxide	3-hr	Not to be at or above this level more than once per calendar year.	–	550 ppb
	24-hr	Not to be at or above this level more than once per calendar year.	145 ppb	–
	Annual	Not to be at or above this level.	35 ppb	–
Nitrogen Dioxide	Annual	Not to be at or above this level.	54 ppb	54 ppb
Respirable Particulate Matter (10 microns or less)	24-hr	Not to be at or above this level on more than three days over three years with daily sampling.	155 µg/m^3	155 µg/m^3
	Annual	The three-year average of annual arithmetic mean concentrations at each monitor within an area is not to be at or above this level.	51 µg/m^3	51 µg/m^3
Respirable Particulate Matter (2.5 microns or less)	24-hr	The three-year average of the annual 98th percentile for each population-oriented monitor within an area is not to be at or above this level.	35 µg/m^3	35 µg/m^3
	Annual	The three-year average of annual arithmetic mean concentrations from single or multiple community-oriented monitors is not to be at or above this level.	15.1 µg/m^3	15.1 µg/m^3
Lead	Quarter	Not to be at or above this level.	1.55 µg/m^3	1.55 µg/m^3

Source: TCEQ and EPA, March 2009
Footnote: [1] Primary NAAQS: the levels of air quality that the EPA judges necessary, with an adequate margin of safety, to protect the public health.
[2] Secondary NAAQS: the levels of air quality that the EPA judges necessary to protect the public welfare from any known or anticipated adverse effects.
ppm = parts per million
ppb = parts per billion
µg/m^3 = microgram per cubic meter

On April 15, 2004, EPA designated several counties in the North Central Texas area as a moderate nonattainment area under the 8-Hour NAAQS for ozone that came into effect that year. The nonattainment area covered all of Collin, Dallas, Denton, and Rockwall Counties; and portions of Ellis, Johnson, Kaufman, and Parker Counties. On March, 27, 2008, the EPA issued a revision to the 8-hour NAAQS for ozone, lowering it from 84 parts per billion (ppb) to 76 ppb. As a result, it is anticipated that the EPA will again designate the Dallas-Fort Worth area as a moderate nonattainment area and will add Hood County to the nine counties already part of the nonattainment area. EPA is currently reviewing monitoring data and final designations will be made on or before March 12, 2010.

Conformity

The 1990 CAAA require each state that has not attained the NAAQS to prepare separate local air quality plans for each nonattainment region outlining strategies and measures to reduce emissions and attain the NAAQS. These local plans are compiled into a State Implementation Plan (SIP) and submitted through TCEQ to the EPA. Through the SIP, the air quality planning process ties transportation planning to the conformity provisions of the CAAA. This ensures that projected vehicle emissions from regional projects and programs are within the emission budgets established in the applicable air quality plan and documents that transportation control measures are implemented in a timely manner. The determination of conformity is a two-step process in metropolitan areas.

The first step is for the Regional Transportation Council (RTC), the Metropolitan Planning Organization's (MPO) policy body, to develop and maintain 20-year Regional/Metropolitan Transportation Plans and 3-year Transportation Improvement Programs (TIP) that set out transportation policies and programs for the region.

The second step is for the Federal Highway Administration (FHWA) and FTA to make the final transportation conformity determination at the federal level. The Transportation Department of the NCTCOG is designated as the MPO for the Dallas/Fort Worth area, which covers entire boundaries of the proposed project corridor.

The most recent approved/adopted transportation plans in the project area are *Mobility 2030* and the *2008-2011 TIP*. These documents were determined to conform by the FHWA and FTA on June 12, 2007. A 2009 update to *Mobility 2030* and the *2008-2011 TIP* have been issued; conformity determination on these documents was approved on August 31, 2009. Transit elements such as transportation demand management (TDM), high occupancy vehicle (HOV) lanes, and LRT are included in the region's SIP.

Air Toxics

Under the CAAA, 188 air toxics or hazardous air pollutants were identified as pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. Under Section 202 of the CAAA, the EPA issued a final rule for Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17235) on March 9, 2001. This rule identifies 21 Mobile Source Air Toxics (MSAT) labeled as the six priority MSATs. These include benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 13-butadiene. MSAT emissions should be qualitatively and quantitatively analyzed for transportation projects that may have meaningful, low potential, or high potential MSAT effects.

3.6.1.3 Ambient Air Quality in the Corridor

Outdoor air quality in a given location is described by the concentration of various pollutants in the atmosphere. Air quality is a function of several factors, including the quantity and dispersion rates of pollutants in the region, temperature, the presence or absence of inversions, and topographic features of the region.

The D2 study area can be classified by two seasons, summer (April through October) and winter (November through March). The regional climate is humid

subtropical, with hot summers and prevailing winds generally from the south. Winters are generally mild, and the summers, with the hottest temperatures, are accompanied by fair skies, westerly winds, and low humidity. Average monthly maximum temperatures for summer are 87 degrees Fahrenheit (°F) with the highest temperature usually in July and August averaging 95°F. Minimum temperatures during these months average 65°F. Average monthly maximum temperatures for the winter months are 61°F and the minimum temperatures average 23°F. Average annual normal precipitation is 35 inches.

3.6.1.4 Monitored Air Quality

The TCEQ monitors airborne pollutants in the Dallas area on a continuous basis. Ozone is monitored hourly. Table 3-30 lists the four highest daily maximum 8-hour ozone concentrations recorded annually from 2000 to 2008 at the Dallas North No. 2 (CAMS 63), Dallas Hinton Street (CAMS 401), and the Dallas Executive Airport (CAMS 402) monitoring stations, which are the closest active ozone monitoring stations to the study area.

All sites show a decreasing trend of monitored ozone concentrations. However, the average of the annual fourth highest daily eight-hour ozone concentrations over the most recent three year period continues to be above the ozone NAAQS at all three locations.

3.6.2 Impact Assessment

3.6.2.1 Methodology for Impact Evaluation

The primary air pollutants associated with motor vehicle emissions are carbon monoxide, unburned hydrocarbons, and nitrogen oxides. Hydrocarbons and nitrogen oxides are reactive pollutants whose impacts usually occur well beyond the areas immediately adjacent to a roadway. As hydrocarbons and nitrogen oxides diffuse downwind, they can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as ozone and nitrogen dioxide. Because these reactions take place over a period of several hours, maximum concentrations of photochemical oxidants are often found downwind of the precursor sources. Thus, ozone is a regional problem and not a localized condition. The effects of hydrocarbons, vehicular related nitrogen oxides, and ozone are therefore examined on an area-wide basis.

The analysis and evaluation of long-term air quality impacts of the proposed project are based on the traffic analysis completed for the project (DART, *Performance Reports for Dallas County*, 2009). The analysis evaluated the change in traffic operations and transportation circulation in the year 2030. Emissions analyses were evaluated for the proposed project study area for the horizon year 2030 and for No Build and Build Alternatives.

Regional Emissions

Regional operational emissions evaluated for the project Build Alternatives include direct emissions from operation of vehicles within Dallas County.

Table 3-30. Four Highest Eight-Hour Ozone Concentrations

Year	Highest		Second Highest		Third Highest		Fourth Highest	
	Date	Level*	Date	Level*	Date	Level*	Date	Level*
CAMS 63 Dallas North No. 2								
2000	07/14/00	109	08/02/00	107	08/24/00	100	08/14/00	97
2001	08/19/01	100	08/04/01	96	09/12/01	86	08/15/01	84
2002	08/09/02	103	06/23/02	95	09/14/02	88	09/13/02	88
2003	08/07/03	119	05/31/03	102	05/18/03	95	08/10/03	88
2004	08/02/04	98	07/16/04	91	08/04/04	90	07/21/04	87
2005	06/15/05	99	05/20/05	97	09/28/05	95	09/01/05	95
2006	07/21/06	91	08/31/06	90	09/01/06	87	06/18/06	86
2007	08/14/07	88	07/25/07	81	08/15/07	80	09/21/07	79
2008	08/14/08	84	07/01/08	84	08/04/08	78	07/02/08	76
CAMS 401 Dallas Hinton St.								
2000	09/02/00	106	09/03/00	97	09/04/00	94	08/02/00	94
2001	08/04/01	112	08/19/01	92	09/12/01	90	07/14/01	88
2002	08/09/02	118	06/23/02	110	06/24/02	95	07/11/02	91
2003	05/31/03	130	08/07/03	117	08/10/03	92	06/28/03	91
2004	09/10/04	95	08/10/04	89	08/02/04	89	08/09/04	86
2005	06/15/05	104	05/21/05	100	09/01/05	98	08/22/05	95
2006	09/01/06	96	08/31/06	90	06/03/06	84	08/22/06	82
2007	07/25/07	81	09/22/07	78	09/21/07	78	06/02/07	76
2008	09/28/08	66	09/29/08	65	09/27/08	65	07/01/08	64
CAMS 402 Dallas Executive Airport								
2000	09/02/00	101	08/01/00	91	09/04/00	88	09/03/00	85
2001	09/12/01	87	08/04/01	85	09/13/01	84	08/05/01	81
2002	08/09/02	98	06/23/02	91	08/07/02	87	06/24/02	86
2003	08/07/03	112	05/31/03	110	08/06/03	93	08/10/03	89
2004	08/10/04	103	08/09/04	102	07/19/04	90	07/31/04	88
2005	05/21/05	95	06/21/05	91	07/29/05	89	07/11/05	88
2006	09/01/06	95	08/22/06	91	06/27/06	91	06/13/06	89
2007	08/14/07	97	04/25/07	86	09/22/07	80	08/12/07	80
2008	06/20/08	93	06/22/08	80	08/04/08	77	06/30/08	77

Source: TCEQ, 2009
* All ozone measurements are in parts per billion

Impact to the regional air quality is analyzed by comparing the future (2030) air quality conditions with and without the project. The 2030 No Build conditions reflect development, growth and infrastructure improvements that have already been accounted for in the Regional Transportation Plan and the DART 2030 Transit System Plan (DART, *Draft Report - Detailed Definition of Alternatives*, 2009). Project-related impacts were identified based on the net difference in future No Build and Build Alternatives (i.e., how the proposed project would affect future traffic patterns that already consider regional growth). Assumptions about future traffic conditions are described in detail in Chapter 4, Transportation Impacts.

For conformity determination, the 2030 Build conditions were compared to 2030 No Build conditions for Dallas County.

3.6.2.2 Project Impacts

Regional Impacts

Table 3-31 presents the results of the pollutant regional burden analysis from vehicle emissions along the project study area within Dallas County. As Table 3-31 shows, implementation of Alternative B4 would result in a reduction of vehicle miles traveled (VMT) of approximately 30,757 miles annually in 2030 and a resultant reduction of CO, NO_X, and VOC emissions (0.15 tons per day [tpd], 0.02 tpd, and 0.01 tpd, respectively). Implementation of any of the other Build Alternatives (B7, B4a, or B4b) would increase VMT and therefore, potentially increase emissions for all criteria pollutants (CO, NO_X, and VOC); however, these increases would be minimal.

Table 3-31. 2030 Projected Corridor Pollutant Burden (Dallas)

	No-Build	Build B7	Build B4	Build B4a Option	Build B4b Option
Regional VMT[1]					
Total Annual VMT	95,854,966	95,866,954	95,824,209	95,906,565	95,891,499
Criteria Pollutant Emissions (tons per day)					
CO[2]	405.34	405.38	405.19	405.57	405.45
NO_X[2]	39.00	39.00	38.98	39.02	39.01
VOC[2]	26.13	26.14	26.12	26.15	26.14

Notes: VMT = Vehicle Miles of Travel
[1] VMT data obtained from Dallas Area Rapid Transit (DART).
[2] Calculated based on the projected VMT, fleet mix, and emission rates of different types of vehicles using data from MOBILE6 model runs, and as reported in Appendix 9.17 of the 2009 Transportation Conformity - DRAFT for the Mobility 2030.
Source: DART, *Performance Reports for Dallas County*, 2009; NCTCOG, 2009 Transportation Conformity Determination for the Mobility 2030 (2009 Amendment): The Metropolitan Transportation Plan and 2008-2011 Transportation Improvement Program

3.6.3 Project Conformity Assessment

According to EPA Transportation Conformity Rule 40 *Code of Federal Regulations* (CFR) Part 93.102, conformity determinations are required for projects that require the approval, funding, or implementation of Federal Highway Administration/Federal Transit Administration (FHWA/FTA) projects. Since the proposed project needs to be approved by FTA, transportation conformity rules apply. A project-level conformity determination is also required because it is a nonexempt project in a non-attainment area for ozone. FTA cannot approve funding for project activities beyond preliminary engineering unless the Project meets U.S. Environmental Protection Agency (EPA) transportation conformity regulations at the project level. The criteria that the project must satisfy are discussed below.

- §93.110 *The conformity determination must be based on the latest planning assumptions*. The NCTCOG serves as the MPO responsible for determining area-wide population and employment forecasts, modeling regional travel demand, and formulating the Metropolitan Transportation Plan (MTP) and the TIP. Assumptions used in the transportation and traffic analysis for this Project, upon which regional criteria pollutant analyses are based, are derived from

NCTCOG's most recently adopted population, employment, travel, and congestion estimates. Travel forecasts are based on TxDOT travel demand model.

- §93.111 *The conformity determination must be based on the latest emission estimation model available.* Emission estimates are based on EPA's MOBILE6.2, released on September 24, 2003, model for emissions modeling at roadway intersections. MOBILE6.2 model is the most recent model approved by EPA as of August 2009.
- §93.112 *Conformity determination must be made according to the consultation procedures of this rule and in the applicable implementation plan, and according to the public involvement procedures established in compliance with 23 CFR Part 450.* All projects in the 2008-2011 TIP for the Dallas Fort Worth Metropolitan Area that are proposed for federal or other types of funding were initiated in a manner consistent with the Statewide and Metropolitan Planning Final Rule in the federal guidelines, 23 CFR Park 450, and Section 613.2000, Subpart B, of Title 49 CFR and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). On January 14, 2009, the EPA approved the Attainment Demonstration SIP for the Dallas/Fort Worth 1997 8-hour Ozone Nonattainment Area (EPA 2009).
- §93.114 *There must be a currently conforming transportation plan and TIP at the time of Project approval.* The currently conforming transportation plan is the *Mobility 2030: The MTP*, which was adopted on April 9, 2009 by the Regional Transportation Council of the NCTCOG, and the air quality conformity determination was approved by the U.S. Department of Transportation on August 31, 2009.
- §93.115 *The proposed Project must come from a conforming transportation plan and TIP.* The proposed Project is part of the currently conforming MTP and the current TIP (2008-2011 TIP).

Based on the above, the proposed Project satisfies EPA's project-level conformity requirements (40 CFR Part 93).

Table 3-32 shows a summary of the conformity analysis findings. The modeled emissions values consist of roadway-based emissions calculated using the Texas Mobile Source Emission software. The Final Emissions Including Mobile Source Emission Reduction Strategies (MoSERS) are the emission results after consideration of the benefits from transportation improvement measures for emission reduction. Benefits have been quantified for 2009, but were not credited for 2019 and 2030, in order to provide a conservative estimate. As Table 3-32 shows, the final emissions are below the maximum allowable level set forth by the Motor Vehicle Emissions Budgets (MVEB) in the 8-Hour Attainment Demonstration State Implementation Plan for both VOC and NO_x and as such, the conformity requirements for the proposed project are satisfied.

Table 3-32. Conformity Analysis Findings (9-County Attainment Area), Vehicle Emission Summary

Year	VOC tons/day		MoSERS[2] Benefits Effect tons/day	NO_X tons/day		MoSERS[2] Benefits Effect tons/day
	Modeled Emissions	Final Emissions including MoSERS		Modeled Emissions	Final Emissions including MoSERS	
2009	102.54	97.66	4.88	192.62	180.15	12.47
2019	60.02	60.02	<0.01	57.36	57.36	<0.01
2030	52.53	52.53	<0.01	43.12	43.12	<0.01
MVEB[1]	186.81			99.09		

Notes:
[1] Motor Vehicle Emission Budgets (MVEB) for the nine-county nonattainment area.
[2] MoSERS are transportation programs/projects identified as emission reduction benefits. These include: Transportation Control Measures (TCM), Voluntary Mobile Emissions Reduction Programs (VMEP), or Transportation Emission Reduction Measures (TERMs). Included in the TERM category are the programs such as on-street bikeway projects, grade separations and intersection improvements, and extension of High Occupancy Vehicle (HOV) facilities.
Source: NCTCOG 2009a

3.6.4 Air Quality Mitigation

Since no air quality violations are anticipated no additional mitigation measures are required.

3.7 Noise and Vibration

In accordance with FTA guidelines, a general noise and vibration impact assessment was conducted along the proposed alternatives. This section describes the methodology used to characterize the existing noise and vibration conditions along the corridor; provides background information on noise and ground-borne vibration issues related to the proposed transit project; and presents an assessment of potential noise and vibration impacts for the alternatives, and general guidelines on mitigation measures, where required.

At the next phase of the project, once a locally preferred alternative is chosen, the following tasks would be required to advance the noise and vibration impact assessment:

- A detailed noise and vibration impact assessment should be conducted to refine the impacts and mitigation for the preferred alternative.
- Site specific vibration propagation testing should be conducted at sensitive locations, including measurements inside buildings.
- Additional noise measurements should be conducted to refine the existing noise conditions.
- Commit to specific noise and vibration mitigation measures, where appropriate.
- Detailed construction scenarios and staging information should be provided to more accurately assess impacts during construction.
- Define the scope of noise and vibration monitoring to be carried out during construction.

3.7.1 Noise and Vibration Basics

3.7.1.1 Noise Basics

Noise is typically defined as unwanted or undesirable sound, where sound is characterized by small air pressure fluctuations above and below the atmospheric pressure. The basic parameters of environmental noise that affect human subjective response are (1) intensity or level, (2) frequency content and (3) variation with time. The first parameter is determined by how greatly the sound pressure fluctuates above and below the atmospheric pressure, and is expressed on a compressed scale in units of decibels. By using this scale, the range of normally encountered sound can be expressed by values between 0 and 120 decibels. On a relative basis, a 3-decibel change in sound level generally represents a barely-noticeable change outside the laboratory, whereas a 10-decibel change in sound level would typically be perceived as a doubling (or halving) in the loudness of a sound.

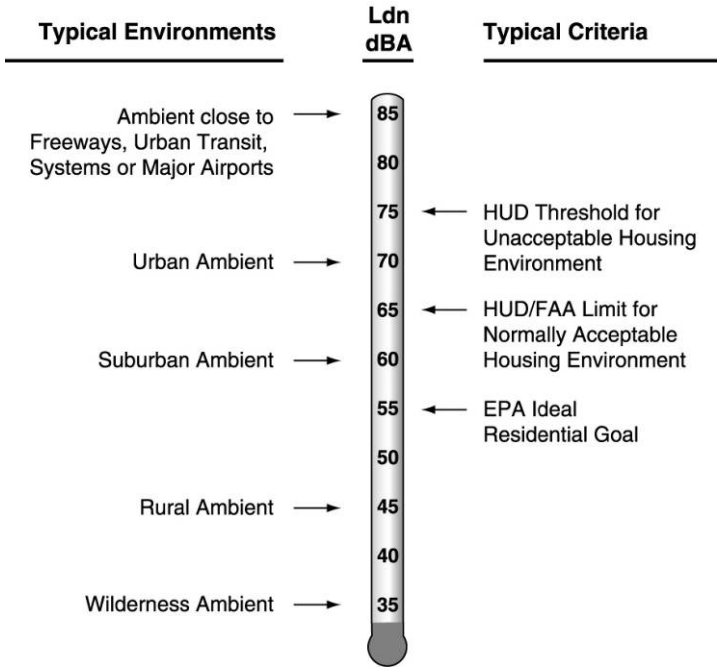
The frequency content of noise is related to the tone or pitch of the sound, and is expressed based on the rate of the air pressure fluctuation in terms of cycles per second (called Hertz and abbreviated as Hz). The human ear can detect a wide range of frequencies from about 20 Hz to 17,000 Hz. However, because the sensitivity of human hearing varies with frequency, the A-weighting system is commonly used when measuring environmental noise to provide a single number descriptor that correlates with human subjective response. Sound levels measured using this weighting system are called “A-weighted” sound levels, and are expressed in decibel notation as “dBA.” The A-weighted sound level is widely accepted by acousticians as a proper unit for describing environmental noise.

Because environmental noise fluctuates from moment to moment, it is common practice to condense all of this information into a single number, called the “equivalent” sound level (Leq). Leq can be thought of as the steady sound level that represents the same sound energy as the varying sound levels over a specified time period (typically 1 hour or 24 hours). Often the Leq values over a 24-hour period are used to calculate cumulative noise exposure in terms of the Day-Night Sound Level (Ldn). Ldn is the A-weighted decibels (dBA) Leq for a 24-hour period with an added 10-decibel penalty imposed on noise that occurs during the nighttime hours (between 10 p.m. and 7 a.m.). Many surveys have shown that Ldn is well correlated with human annoyance, and therefore this descriptor is widely used for environmental noise impact assessment. Figure 3-13 provides examples of typical noise environments and criteria in terms of Ldn. While the extremes of Ldn are shown to range from 35 dBA in a wilderness environment to 85 dBA in noisy urban environments, Ldn is generally found to range between 55 dBA and 75 dBA in most communities. As shown in Figure 3-13 in terms of U.S. federal agency criteria, this spans the range between the goal identified by the EPA for an “ideal” residential environment and the threshold for an unacceptable residential environment according to U.S. Department of Housing and Urban Development (HUD).

3.7.1.2 Vibration Basics

Ground-borne vibration is the oscillatory motion of the ground about some equilibrium position that can be described in terms of displacement, velocity or acceleration. Because sensitivity to vibration typically corresponds to the amplitude

Figure 3-13. Examples of Typical Outdoor Noise Exposure



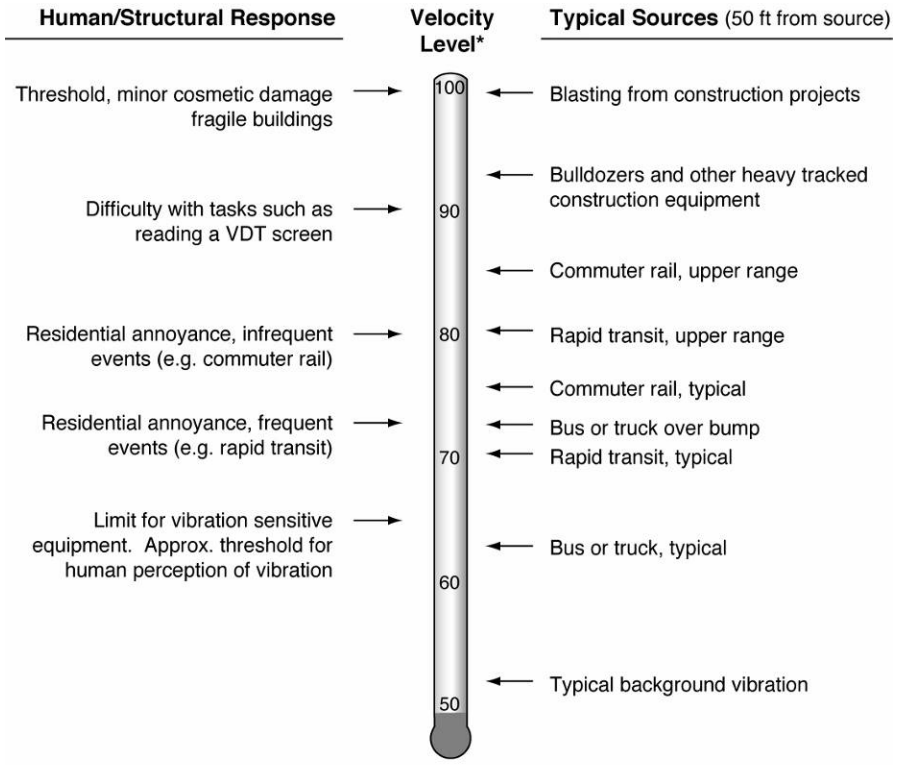
of vibration velocity within the low-frequency range of most concern for environmental vibration (roughly 5-100 Hz), velocity is the preferred measure for evaluating ground-borne vibration from transit projects.

The most common measure used to quantify vibration amplitude is the peak particle velocity (PPV), defined as the maximum instantaneous peak of the vibratory motion. PPV is typically used in monitoring blasting and other types of construction-generated vibration, since it is related to the stresses experienced by building components. Although PPV is appropriate for evaluating building damage, it is less suitable for evaluating human response, which is better related to the average vibration amplitude. Thus, ground-borne vibration from transit operations is usually characterized in terms of the "smoothed" root mean square (rms) vibration velocity level, in decibels (VdB), with a reference quantity of one micro-inch per second. VdB is used in place of dB to avoid confusing vibration decibels with sound decibels.

Figure 3-14 illustrates typical ground-borne vibration levels for common sources as well as criteria for human and structural response to ground-borne vibration. As shown, the range of interest is from 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.

When ground-borne vibrations propagate from transit vehicles to nearby buildings, the floors and walls of the building structure will respond to the motion and may resonate at natural frequencies. The vibration of the walls and floors may cause perceptible vibration, rattling of items such as windows or dishes on shelves or a

Figure 3-14. Typical Ground-Borne Vibration Levels and Criteria



** RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second*

rumble noise. The rumble is the noise radiated from the motion of the room surfaces. In essence, the room surfaces act like a giant loudspeaker; this is called ground-borne noise.

While the potential annoyance of ground-borne noise can be evaluated using the A-weighted sound level, there are potential problems in using this metric to characterize low-frequency ground-borne noise. Human hearing is non-linear and causes sounds with significant low-frequency content to seem louder than broadband sounds that have the same A-weighted level. This is accounted for by setting impact criteria limits lower for ground-borne noise than would be the case for broadband noise.

3.7.2 Transit Noise and Vibration Criteria

3.7.2.1 Noise Impact Criteria

Noise impact for this project is based on the criteria as defined in the FTA guidance manual Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06, May 2006). The FTA noise impact criteria are founded on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale. Although more transit noise is allowed in neighborhoods with high levels of existing noise, smaller increases in total noise exposure are allowed with increasing levels of existing noise. The FTA Noise Impact Criteria group noise sensitive land uses into the following three categories:

- Category 1: Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, such as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.
- Category 2: 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.
- Category 3: 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.

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 Leq during the facility's operating period is used.

There are two levels of impact included in the FTA criteria. The interpretation of these two levels of impact is 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 that 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 noise impact criteria are summarized in graphical form in Figure 3-15. The figure shows the existing noise exposure and the additional noise exposure from a transit project that would cause either moderate or severe impact. The future noise exposure would be the combination of the existing noise exposure and the additional noise exposure caused by the transit project.

Figure 3-16 shows the same criteria in terms of the increase in cumulative noise that can occur in the overall noise environment before impact occurs.

Figure 3-15. FTA Project Noise Impact Criteria

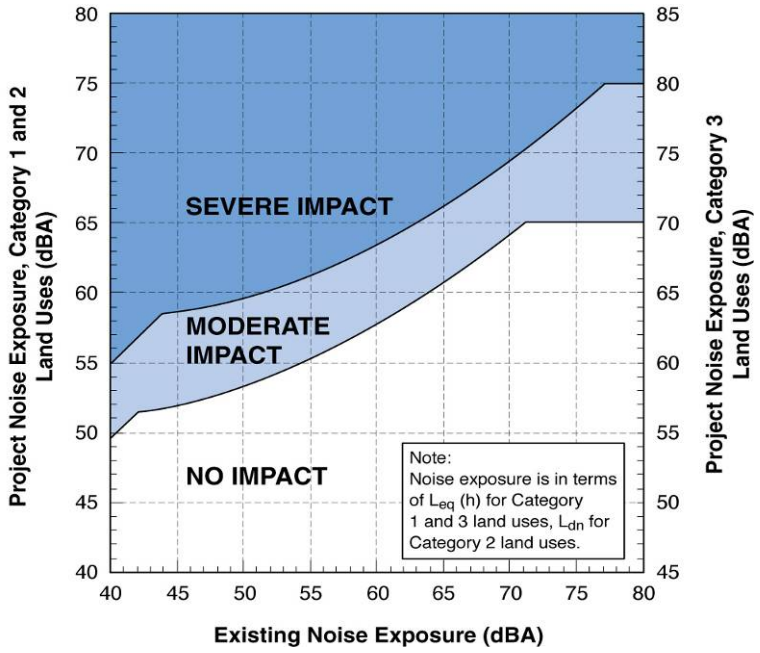
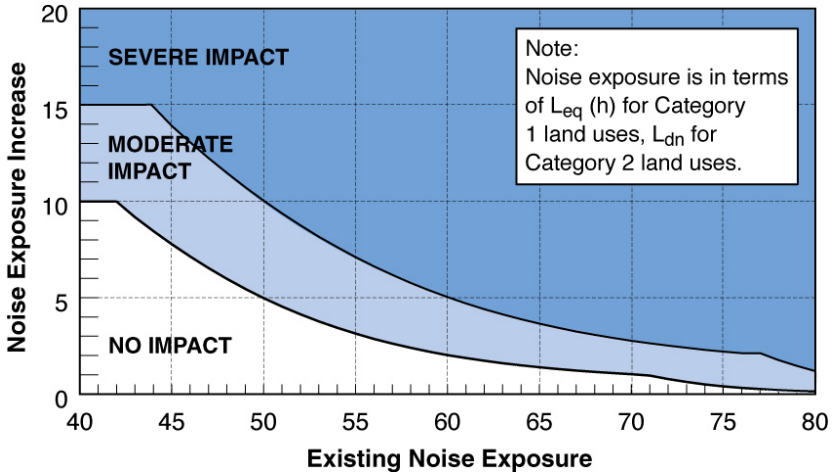


Figure 3-16. Increase in Cumulative Noise Exposure Allowed by FTA C



3.7.2.2 Vibration Impact Criteria

The FTA ground-borne vibration impact criteria are based on land use and operational frequency, as shown in Table 3-33 and are given in terms of the maximum vibration level for an event. 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 listed in Table 3-34. Due to the sensitivity of these buildings, they usually warrant special attention during the environmental assessment of a transit project. Table 3-34 gives criteria for acceptable levels of ground-borne vibration for various types of special buildings.

Table 3-33. Ground-Borne Vibration and Ground-Borne Noise Impact Criteria

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch /sec)			Ground-Borne Noise Impact Levels (dB re 20 micro Pascals)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibrations would interfere with interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]	N/A[4]	N/A[4]	N/A[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

(1) "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
(2) "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.
(3) "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.
(4) Limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building requires special design of HVAC systems and stiffened floors.
(5) Vibration-sensitive equipment is generally not sensitive to ground-borne noise.
Source: Federal Transit Administration, May 2006

Table 3-34. Special Buildings Ground-Borne Vibration and Noise Impact Criteria

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch /sec)		GBN Impact Levels (dB re 20 micro Pascals)	
	Frequent Events[1]	Occasional or Infrequent Events[2]	Frequent Events[1]	Occasional or Infrequent Events[2]
Concert Halls	65 VdB	65 VdB	25 dBA	25 dBA
TV Studios	65 VdB	65 VdB	25 dBA	25 dBA
Recording Studios	65 VdB	65 VdB	25 dBA	25 dBA
Auditoriums	72 VdB	80 VdB	30 dBA	38 dBA
Theaters	72 VdB	80 VdB	35 dBA	43 dBA

(1) "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
(2) "Occasional or Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.
(3) If the building will rarely be occupied when the trains are operating, there is no need to consider impact. As an example, consider locating a commuter rail line next to a concert hall. If no commuter trains will operate after 7 pm, it should be rare that the trains interfere with the use of the hall. Source: Federal Transit Administration, May 2006

It should be noted that Table 3-33 and Table 3-34 include separate FTA criteria for ground-borne noise; the "rumble" that can be radiated from the motion of room surfaces in buildings due to ground-borne vibration. Although expressed in dBA, which emphasizes the more audible middle and high frequencies, the criteria are set significantly lower than for airborne noise to account for the annoying low-frequency character of ground-borne noise. Because airborne noise often masks ground-borne noise for above ground (i.e., at-grade or elevated) transit systems, ground-borne

noise criteria are primarily applied to subway operations where airborne noise is not a factor. For above-grade transit systems, ground-borne noise criteria are applied only to buildings that have sensitive interior spaces that are well insulated from exterior noise.

3.7.2.3 Construction Noise Impact Criteria

Construction noise criteria are based on the guidelines provided in the FTA Guidance Manual. These criteria, summarized in Table 3-35 below, are based on land use and time of day and are given in terms of Leq for an 8-hour work shift.

Table 3-35. FTA Construction Noise Criteria

Land Use	Noise Limit, 8-Hour Leq (dBA)	
	Daytime	Nighttime
Residential	80	70
Commercial	85	85
Industrial	90	90

Source: Federal Transit Administration, May 2006

3.7.3 Noise and Vibration Impact Assessment Methodology

The noise and vibration impact assessment methodology used in the D2 analysis is based on the FTA's general assessment guidelines. The processes for both the noise and vibration methodology are outlined below.

3.7.3.1 Noise

The FTA's general noise impact assessment procedure involves five key steps:

- Identify noise-sensitive land use. Noise-sensitive land use along the project alternatives was initially identified based on preliminary alignment drawings and GIS mapping. Confirmation of noise-sensitive land use occurred during a visual survey conducted during the noise measurement program.
- Characterize the existing noise environment. Existing ambient noise levels were characterized through direct measurements at selected sites along the proposed alignment during April 2009. The measurement sites were located at noise-sensitive receptors and along the proposed alternatives.
- Predict future noise from transit operations. Future transit noise was projected based on data obtained from previous DART projects. Transit operations, track alignments, and location of sensitive land use were included in the projections of noise at individual buildings.
- Assess impact based on the noise criteria. The projections determined the Leq and Ldn values at each receptor and noise impact was assessed according to the appropriate FTA criteria, depending on the land use category.
- Recommend mitigation measures where required and appropriate. Mitigation measures can include noise barriers, sound insulation and other means to reduce noise from transit operations.

3.7.3.2 Vibration

The FTA's general vibration impact assessment procedure involves four key steps:

- Identify vibration-sensitive land use. Vibration-sensitive land use along the project corridor was initially identified based on preliminary alignment drawings and GIS mapping. Confirmation of vibration-sensitive land use occurred during a visual survey conducted during the noise measurement program.
- Predict vibration levels from transit operations based on the FTA's general assessment methodology. This methodology uses a standard set of assumptions for projecting vibration levels from LRT vehicles, and includes general guidance regarding track type and building foundations. This process will be further refined at later stages of the project when detailed vibration testing is carried out.
- Assess impact based on the vibration criteria discussed above. The projections determined the vibration levels at each building and vibration impact was assessed according to the appropriate FTA criteria, depending on the land use category.
- Recommend mitigation measures where required and appropriate. Mitigation can include ballast mats, special fasteners, and other means of reducing vibration levels.

3.7.4 Existing Conditions

Noise and vibration sensitive land use along the project corridor was identified based on preliminary alignment drawings, aerial photographs, a visual survey, and land use information. Areas adjacent to the proposed alternatives include primarily commercial uses, along with several hotels and multi-family residences. There are also a number of parks located near the proposed alternatives. Summary descriptions of noise- and vibration-sensitive land use along the proposed alternatives, from northwest to southeast, are as follows:

<u>Portion common to all four alternatives</u>

- Victory Park Area: The noise and vibration sensitive land uses in this area include several apartment complexes along Museum Way, the W Hotel and the future proposed location of the museum of science, located just to the east of the proposed alignment.
- West End: The noise and vibration sensitive land uses in this area include several loft apartments (at Lamar and Ross and at Lamar and Pacific), the Springhill Suites Hotel, and the Dallas Aquarium.
- Lamar Avenue: The noise and vibration sensitive land uses along this section include the West End Hotel and El Centro College.

<u>Alternative B4</u>

- Young Street West: The noise and vibration sensitive land uses along this section include Pioneer Park, the Dallas Police Memorial, the Dallas Public Library, ALOFT hotel, and the Residences at Jackson apartment complex at the corner of Wood, Field, and Jackson.

- Young Street East: The noise and vibration sensitive land uses along this section include the Masonic Lodge and Temple, the First Presbyterian Church and ministry building, a recording studio, and the Camden Farmers Market apartment complex at the corner of Central and Young.

Alternative B4a

- Young/Marilla Street West: The noise and vibration sensitive land uses along this section include Pioneer Park, the Dallas Police Memorial, a hotel under construction, and an apartment complex at the corner of Wood and Field.
- Young/Marilla Street East: The noise and vibration sensitive land uses along this section include the Masonic Lodge and Temple, the First Presbyterian ministry building, and a recording studio.

Alternative B4b

- Marilla Street West: The noise and vibration sensitive land uses along this section include Pioneer Park, the Dallas Police Memorial, and a proposed Convention Center Hotel at the corner of Young Street and Lamar Avenue.
- Young/Marilla Street East: The noise and vibration sensitive land uses along this section include the Masonic Lodge and Temple, the First Presbyterian ministry building, and a recording studio.

Alternative B7

Commerce Street: The noise and vibration sensitive land uses along this section include several hotels and apartment buildings (Adolphus Hotel, Magnolia Hotel, Manor House Hotel/Apartments and apartments on Commerce between Ervay and St. Paul), and the Main Street Garden park under construction between St. Paul Street and Harwood Street.

3.7.4.1 Noise

Existing ambient noise levels were characterized through direct measurements at selected sites along the proposed alternatives during April 2009. Estimating existing noise exposure is an important step in the noise impact assessment since the thresholds for noise impact are based on the existing levels of noise exposure. The measurements included short-term (60 minute) monitoring of the A-weighted sound level at representative noise-sensitive locations. Long-term (24-hour) measurements were not conducted, but estimates of the Ldn at noise sensitive locations were made using methods described in the FTA guidance manual.

All of the measurement sites were located in noise-sensitive areas, and were selected to represent a range of existing noise conditions along the proposed alternatives. At each site, the measurement microphone was positioned to characterize the exposure of the site to the dominant noise sources in the area. For example, microphones were located at the approximate setback lines of the receptors from adjacent roads, and were positioned to avoid acoustic shielding by landscaping, fences or other obstructions.

The results of the existing ambient noise measurements, summarized in Table 3-36, serve as the basis for determining the existing noise conditions at all noise-sensitive receptors along the proposed alternatives. The results at each site are described below.

- Site ST-1: W Hotel – Museum Way. The Leq measured at this location was 64 dBA and the estimated Ldn was 62 dBA. The ambient noise levels were dominated by traffic on local highways.
- Site ST-2: West End- Lamar Avenue. The Leq measured at this location was 68 dBA and the estimated Ldn was 66 dBA. The ambient noise levels were dominated by traffic on Lamar Avenue.
- Site ST-3: Pioneer Park – Young Street. The Leq measured at this location was 67 dBA and the estimated Ldn was 65 dBA. The ambient noise levels were dominated by traffic on local roadways.
- Site ST-4: Commerce Street and Browder Street. The Leq measured at this location was 69 dBA and the estimated Ldn was 67 dBA. The ambient noise levels were dominated by traffic (primarily buses) on Commerce Street.
- Site ST-5: First Presbyterian Church – Young Street. The Leq measured at this location was 63 dBA and the estimated Ldn was 61 dBA. The ambient noise levels were dominated by traffic on local roadways.
- Site ST-6: Loft Apartments – Young Street and Central Expressway. The Leq measured at this location was 62 dBA and the estimated Ldn was 60 dBA. The ambient noise levels were dominated by traffic on local roadways.

Table 3-36. Summary of Existing Ambient Noise Measurements

Site No.	Measurement Location Description	Start of Measurement		Meas. Time (hrs)	Noise Exposure (dBA)	
		Date	Time		Ldn[1]	Leq
ST-1	W Hotel – Museum Way	4/1/09	14:43	1	62	64
ST-2	West End – Lamar Avenue	4/2/09	12:07	1	66	68
ST-3	Pioneer Park – Young Street	4/2/09	10:34	1	65	67
ST-4	Commerce Street and Browder Street	4/2/09	13:16	1	67	69
ST-5	First Presbyterian Church – Young Street	4/2/09	7:57	1	61	63
ST-6	Loft Apartments – Young Street and Central Expressway	4/2/09	9:11	1	60	62

1. The Leq measurements were used to estimate the Ldn using FTA methodology. This approach tends to be conservative and underestimate the existing noise levels, which can result in higher levels of noise impact for a project.

Source: Harris Miller Miller & Hanson Inc., 2009

3.7.4.2 Vibration

Existing vibration sources along the Build Alternatives include auto, bus and truck traffic on local streets. However, vibration from street traffic is not generally perceptible at receivers along the corridor unless streets have significant bumps, potholes, or other uneven surfaces. Furthermore, the FTA vibration impact criteria are not ambient-based; that is, future project vibrations are not compared with existing vibrations in order to assess impact. Therefore, no existing vibration

measurements were conducted. Vibration measurements may be conducted during subsequent phases of the project to characterize the soil conditions along the proposed alternatives in order to refine the vibration projections.

3.7.5 Noise and Vibration Impact Assessment

A general noise and vibration impact assessment was performed based on the methodology discussed above, using the FTA impact criteria. Specific project inputs to the assessment are described below.

3.7.5.1 Noise Impact Assessment

The primary component of wayside noise from LRT operations is wheel/rail noise, which results from the steel wheels rolling on steel rails. Secondary sources, such as vehicle air-conditioning and other ancillary equipment, will sometimes be audible, but are not expected to be significant factors. The projection of wayside noise from LRT train operations was carried out using the general assessment model specified in the FTA Guidance Manual, with the following assumptions (below). Assumed operating speeds and headways in the Noise and Vibration analysis are identical to the speeds and headways used in the ridership forecast and to the operating characteristics presented in Chapter 2.

- Based on the current DART vehicle noise specification, the predictions assume that a single 93-foot long vehicle operating at 40 mph on ballast and tie track with continuous welded rail (CWR) generates a maximum noise level of 76 dBA at a distance of 50 feet from the track centerline.
- The operating times of the line would be between 4:00 a.m. and 12:00 a.m. The operating plan for LRT service specifies peak-hour headways of five minutes, and off-peak headways of 10 minutes. Two- and three-car trains would operate throughout the day.
- LRT operating speeds are assumed to be 20 mph for at-grade operations and 45 mph in tunnel sections.
- Wheel impacts at crossovers and other special trackwork typically cause a noise increase of about 6 dBA near such locations.

For the Build Alternatives, detailed comparisons of the existing and project noise levels are presented in Table 3-37. Each table includes results for the noise-sensitive receptors along each alignment. In addition to the civil station, distance to the near track and proposed LRT speed, each table includes the existing noise level, the projected noise level from LRT operations and the impact criteria for each receptor or receptor group. Based on a comparison of the predicted project noise level with the impact criteria, the impact category is listed, along with an inventory of the number of moderate and severe impacts at each sensitive receptor location. Noise impact is not assessed for receptors located adjacent to tunnel sections of the proposed alternatives.

The results in Table 3-37 identify moderate noise impacts for the W Hotel and an apartment building along Museum Way for all four alternatives and one additional moderate impact at an apartment building for Alternative B4, at the eastern end of the proposed alternative. The noise impacts at all locations are due to the presence of crossovers near the buildings.

Table 3-37. Projected Noise Impacts

Alt	Location	Land Use[1]	Civil Station	Side of Track	Dist To Near Track (ft)	Speed (mph)	Exist. Noise Level[2]	Project Noise Level[2]			Impact Category	# of Bldg. Impacts	
								Pred.	Impact Criteria			Mod	Sev
									Imp	Sev			
All	W Hotel	2	12+50	WB	30	20	62	62	58	64	Moderate	1	0
	Apartments	2	13+50	EB	40	20	62	61	58	64	Moderate	1	0
	Apartments	2	16+50	WB	30	20	62	58	58	64	None	0	0
	Future Museum of Science	3	20+00	WB	50	20	64	54	65	70	None	0	0
	Dallas Aquarium	3	30+00	WB	200	20	68	49	67	72	None	0	0
	Marriott Springhill Suites	2	32+00	EB	50	20	66	57	61	66	None	0	0
Alternative B7													
B7	No additional noise sensitive receptors near at-grade sections												
Total for B7												**2**	**0**
B4	Hotel	2	60+00	EB	25	20	65	59	61	66	None	0	0
	Apartments	2	58+00	WB	60	20	65	56	61	66	None	0	0
	Pioneer Park	3	62+00	EB	220	20	67	48	67	72	None	0	0
	Cemetery	3	63+00	EB	100	20	67	51	67	72	None	0	0
	Dallas Police Memorial	3	66+00	EB	40	20	67	55	67	72	None	0	0
	Dallas Convention Center	1	66+00	EB	400	20	67	46	67	72	None	0	0
	Dallas City Hall	1	72+00	EB	400	20	67	46	67	72	None	0	0
	City Hall Park	3	72+00	EB	35	20	67	55	67	72	None	0	0
	Dallas Public Library	3	74+00	WB	40	20	67	55	67	72	None	0	0
	First Presbyterian Ministry	3	82+00	EB	50	20	63	54	65	70	None	0	0
	Recording studio	1	84+00	EB	110	20	63	51	60	65	None	0	0
	Masonic Temple	3	85+00	EB	110	20	63	51	65	70	None	0	0
	First Presbyterian Church	3	85+00	WB	115	20	63	51	65	70	None	0	0
	Chapel	3	86+00	WB	50	20	63	54	65	70	None	0	0
	Masonic Lodge	3	88+00	EB	50	20	63	54	65	70	None	0	0
	Apartments	2	95+00	EB	60	20	60	62	57	63	Moderate	1	0
Total for B4												**3**	**0**

Table 3-37. Projected Noise Impacts (continued)

Alt	Location	Land Use[1]	Civil Station	Side of Track	Dist To Near Track (ft)	Speed (mph)	Exist. Noise Level[2]	Project Noise Level[2]			Impact Category	# of Bldg. Impacts	
								Pred.	Impact Criteria			Mod	Sev
									Imp	Sev			
B4a	First Presbyterian Ministry	3	85+00	WB	200	20	63	49	65	70	None	0	0
	Recording studio	1	86+00	WB	130	20	63	50	60	65	None	0	0
	Masonic Temple	3	89+00	WB	40	20	63	55	65	70	None	0	0
	Masonic Lodge	3	93+00	WB	50	20	63	54	65	70	None	0	0
Total for B4a												**2**	**0**
B4b	First Presbyterian Ministry	3	93+00	WB	180	20	63	49	65	70	None	0	0
	Recording studio	1	95+00	WB	130	20	63	50	60	65	None	0	0
	Masonic Temple	3	98+00	WB	40	20	63	55	65	70	None	0	0
	Masonic Lodge	3	101+00	WB	60	20	63	54	65	70	None	0	0
Total for B4b												**2**	**0**

1. Land use Category 1 – Special Buildings. Land use Category 2 – Residential. Land use Category 3 – Institutional.
2. Noise levels are based on Ldn for residential land use and Leq for institutional land use and are measured in dBA. Noise levels are rounded to the nearest decibel.

3.7.5.2 Vibration Impact Assessment

The potential vibration impact from LRT operations was assessed on an absolute basis using the FTA criteria. The approach used for assessing vibration impact generally follows the approach used for the noise impact, except that existing vibration is not considered. The following factors were considered in determining potential vibration impacts along the proposed alternatives:

- Outdoor land use, such as parks, is not sensitive to vibration, and land uses next to at-grade segments are not assessed for ground-borne noise, since the airborne noise dominates.
- The vibration projections were based on the FTA's general vibration impact assessment methodology.
- LRT operating speeds are assumed to be 20 mph for at-grade operations and 45 mph in tunnel sections.
- Wheel impacts at crossovers and other special trackwork typically cause a vibration increase of about 10 VdB near such locations.

For the LRT project, the estimated vibration and ground-borne noise levels are provided in Table 3-38. The table summarizes the results of the analysis in terms of anticipated exceedances of the FTA criteria for "frequent events" (defined as more than 70 events per day). The table lists the location, the civil station, the distance to the near track, and the projected speed at each location for each alignment alternative. In addition, the predicted project vibration and ground-borne noise level and the impact criterion levels are indicated for each receptor.

The results in Table 3-38 identify vibration impact for the W Hotel and ground-borne noise impact at the lofts on Lamar Avenue for all four alternatives. The impacts at the W Hotel are due to the proximity of the building to the alignment and the presence of crossovers near the building. The ground-borne noise impact at the lofts on Lamar Avenue is due to the proximity of the building to the alignment and the speed of the vehicle in the tunnel.

Ground-borne noise impact is projected at the recording studio on Park Street for Alternatives B4, B4a and B4b, due to the proximity of the alignment to the building. Vibration and ground-borne noise impact is projected at the Dallas Convention Center for Alternatives B4a and B4b due to the proximity of the building to the alignment and the speed of the vehicle in the tunnel. In addition, vibration impact is projected at an apartment building for Alternative B4 at the eastern end of the proposed alternative, due to the proximity of the building to the alignment.

The results in Table 3-38 identify vibration and ground-borne noise impact for the Manor House Hotel and Apartments, and the Magnolia Hotel for Alternative B7. The impacts at the hotels are due to the proximity of the buildings to the alignment, and the presence of crossovers near the buildings.

Table 3-38. Projected Vibration Impacts

Alt	Location	Civil Stn	Land Use[1]	Dist to Near Track (ft)[2]	Speed (mph)	Project Level		Impact Criterion		# of Bldg. Impacts	
						Vib	GBN	Vib	GBN	Vib	GBN
All	W Hotel	12+50	2	30	20	73	--	72	--	1	--
	Apartments	13+50	2	40	20	71	--	72	--	0	--
	Apartments	16+50	2	30	20	68	--	72	--	0	--
	Future Museum of Science	20+00	3	50	20	64	--	75	--	0	--
	Dallas Aquarium	30+00	3	200	20	50	--	75	--	0	--
	Hotel	32+00	2	50	20	64	--	72	--	0	--
	Lofts	36+00	2	42	45	71	37	72	35	0	1
	Apartments	39+00	2	47	45	69	34	72	35	0	0
	West End Hotel	42+00	2	245	20	50	15	72	35	0	0
	El Centro College	42+00	3	65	45	67	32	75	40	0	0
B7	Apartments	56+00	2	255	45	66	31	72	35	0	0
	Manor House Hotel/Apartments	58+00	2	60	45	78	43	72	35	1	1
	Adolphus Hotel	60+00	2	65	20	65	30	72	35	0	0
	Magnolia Hotel	64+00	2	65	45	77	42	72	35	1	1
	Apartments	72+00	2	70	45	67	32	72	35	0	0
Total for B7										**3**	**3**
B4	Hotel	60+00	2	25	20	69	--	72	--	0	--
	Apartments	58+00	2	60	20	63	--	72	--	0	--
	Dallas Convention Center	66+00	1	400	20	32	--	65	--	0	--
	Dallas City Hall	72+00	1	400	20	32	--	65	--	0	--
	Dallas Public Library	74+00	3	40	20	66	--	75	--	0	--
	First Presbyterian Ministry	82+00	3	50	20	67	--	75	--	0	--
	Recording studio	84+00	1	110	20	62	27	65	25	0	1
	Masonic Temple	85+00	3	110	20	57	--	75	--	0	--
	First Presbyterian Church	85+00	3	115	20	57	--	75	--	0	--
	Chapel	86+00	3	50	20	69	--	75	--	0	--
	Masonic Lodge	88+00	3	50	20	64	--	75	--	0	--
	Apartments	95+00	2	60	20	76	--	72	--	1	--
Total for B4										**2**	**2**

Table 3-38. Projected Vibration Impacts (continued)

Alt	Location	Civil Stn	Land Use[1]	Dist to Near Track (ft)[2]	Speed (mph)	Project Level		Impact Criterion		# of Bldg. Impacts	
						Vib	GBN	Vib	GBN	Vib	GBN
B4a	Hotel	60+00	2	51	20	61	26	72	35	0	0
	Apartments	58+00	2	75	45	66	31	72	35	0	0
	Dallas Convention Center	68+00	1	57	45	66	31	65	25	1	1
	Dallas City Hall	72+00	1	64	20	57	22	65	25	0	0
	First Presbyterian Ministry	85+00	3	200	20	53	--	75	--	0	--
	Recording studio	86+00	1	130	20	60	25	65	25	0	1
	Masonic Temple	89+00	3	40	20	66	--	75	--	0	--
	Masonic Lodge	93+00	3	50	20	64	--	75	--	0	--
Total for B4a										**2**	**3**
B4b	Future hotel	59+00	2	60	45	68	33	72	35	0	0
	Dallas Convention Center	76+00	1	57	45	66	31	65	25	1	1
	Dallas City Hall	82+00	1	64	20	57	22	65	25	0	0
	First Presbyterian Ministry	93+00	3	180	20	55	--	75	--	0	--
	Recording studio	95+00	1	130	20	55	25	65	25	0	1
	Masonic Temple	98+00	3	40	20	66	--	75	--	0	--
	Masonic Lodge	101+00	3	60	20	63	--	75	--	0	--
Total for B4b										**2**	**3**

1. Land use Category 1 – Special Buildings. Land use Category 2 – Residential. Land use Category 3 – Institutional.
2. Horizontal distance for at-grade sections and slant distance for tunnel sections.

3.7.6 Mitigation of Noise and Vibration Impacts

3.7.6.1 Noise Mitigation Measures

Potential mitigation measures for reducing noise impacts from LRT operations are described below.

- Noise Barriers - This is a common approach to reducing noise impacts from surface transportation sources. The primary requirements for an effective noise barrier are that (1) the barrier must be high enough and long enough to break the line-of-sight between the sound source and the receiver, (2) the barrier must be of an impervious material with a minimum surface density of 4 lb/sq. ft. and (3) the barrier must not have any gaps or holes between the panels or at the bottom. However, it is unlikely that noise barriers would be practical for the segments in existing city streets.
- Relocation of Crossovers or Special Trackwork at Crossovers - Because the impacts of wheels over rail gaps at track crossover locations, or turn-outs for passing tracks increase noise by about 6 dBA, crossovers are a major source of vibration noise impact when they are located in sensitive areas. If crossovers cannot be relocated away from residential areas, another approach is to use spring-rail, flange-bearing or moveable point frogs in place of standard rigid frogs at turnouts. These devices allow the flangeway gap to remain closed in the main traffic direction for revenue service trains.
- Building Sound Insulation - Sound insulation to improve the outdoor-to-indoor noise reduction has been widely applied around airports and has seen limited application for transit projects. Although this approach has no effect on noise in exterior areas, it may be the best choice for sites where noise barriers are not feasible or desirable, and for buildings where indoor sensitivity is of most concern. Substantial improvements in building sound insulation (on the order of 5 to 10 dBA) can often be achieved by adding an extra layer of glazing to the windows, by sealing any holes in exterior surfaces that act as sound leaks, and by providing forced ventilation and air-conditioning so that windows do not need to be opened.

As discussed above, FTA requires that severe impacts be mitigated unless there are no practical means to do so. While mitigation is encouraged at the moderate impact level, the implementation of such mitigation will depend on other project-specific factors. These other factors can include the projected increase over existing noise levels, the types and number of noise-sensitive land uses affected, existing outdoor-to-indoor sound insulation and the cost-effectiveness of mitigating noise to more acceptable levels.

Based on the results of the noise assessment, moderate impact has been identified at several locations. Because noise barriers would not be practical in a downtown area and because all the noise impacts identified are due to the presence of crossovers, mitigation should focus on relocation of crossovers (which may not be feasible due to engineering constraints or impacts on schedule and operations) or the replacement of standard crossovers with spring-rail, flange-bearing or moveable point frogs, and potential sound insulation of specific buildings. Sound insulation

testing would be required to determine the existing outdoor to indoor sound insulation already present at impacted locations. The existing reduction in noise levels provided by the current windows might be sufficient to eliminate the projected impacts. Specific noise mitigation measures, including an enhanced discussion on possible relocation of special trackwork, will be refined for the LPA as design progresses and documented in the FEIS.

3.7.6.2 Vibration Mitigation Measures

The assessment assumes that the 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 LRT operations, as described below.

- Ballast Mats - A ballast mat consists of a pad made of rubber or rubber-like material placed on an asphalt or concrete base with the normal ballast, ties and rail on top. The reduction in ground-borne vibration provided by a ballast mat is strongly dependent on the frequency content of the vibration and design and support of the mat.
- Resilient Rail Fasteners – Resilient fasteners can be used to provide vibration isolation between rails and concrete slabs for direct fixation track on aerial structures or in tunnels. These fasteners include a soft, resilient element to provide greater vibration isolation than standard rail fasteners in the vertical direction.
- Relocation of Crossovers or Special Trackwork - Because the impacts of wheels over rail gaps at track crossover locations or turn-outs for passing tracks increase vibration by about 10 VdB, crossovers are a major source of vibration impact when they are located in sensitive areas. If crossovers cannot be relocated away from residential areas, another approach is to use spring-rail, flange-bearing or moveable point frogs in place of standard rigid frogs at turnouts. These devices allow the flangeway gap to remain closed in the main traffic direction for revenue service trains.
- Floating Slabs - Floating slabs consist of thick concrete slabs supported by resilient pads on a concrete foundation; the tracks are mounted on top of the floating slab. Most successful floating slab installations are in subways, and their use for at-grade track is rare. Although floating slabs are designed to provide vibration reduction at lower frequencies than ballast mats, they are extremely expensive.

Vibration and ground-borne noise impacts that exceed FTA criteria are considered to be significant and to warrant mitigation, if reasonable and feasible. Vibration mitigation should focus on relocation of crossovers or the replacement of standard crossovers with spring-rail, flange bearing or moveable point frogs. In addition to relocation of crossovers, vibration and ground-borne noise mitigation would require the installation of resilient fasteners, as ballast mats would not be feasible in street running and tunnel operations. However, more extensive mitigation may be required to adequately reduce the vibration levels to below the FTA vibration impact criterion. Vibration mitigation will be addressed in more detail in the Final EIS for the project.

3.8 Historic, Architectural, and Archeological Resources

This section presents the ongoing process for identifying and determining the effects on historic properties pursuant to Section 106 of the National Historic Preservation Act of 1966 (as amended). Intensive level research determinations of eligibility, and determinations of effect in coordination with the City of Dallas and the Texas Historic Commission (THC), are underway.

Under Section 106, federal agencies are required to provide the public with information about a proposed project and its potential effect on historic properties and to seek public comment and input, except where confidentiality is considered necessary (as specified in 36 CFR 800.2 and 800.3). The State Historic Preservation Officer (SHPO) is a consulting party; in Texas, the SHPO is the THC. Other identified consulting parties are the City of Dallas and Preservation Dallas, and DART anticipates identifying other consulting parties as part of this process. The Advisory Council on Historic Preservation (ACHP) is also given the opportunity to comment. The consulting parties will participate in the development of a Memorandum of Agreement (MOA) or Programmatic Agreement, should one be required, to address any adverse impacts to historic resources.

3.8.1 Applicable Legal and Regulatory Requirements

3.8.1.1 Section 106 of the National Historic Preservation Act of 1966 (16 USC 470)

Section 106 of the National Historic Preservation Act of 1966 (as amended) requires agencies to consider the impacts of their project undertakings on historic architectural and archeological resources. If a project receives any amount of federal funds or require federal permits, it must comply with Section 106.

In order to determine the presence of historic resources, the Area of Potential Effects (APE) is first delineated. The APE is the area where the project may directly or indirectly impact historic properties. Within the APE, resources are evaluated to determine if they are eligible for listing in the National Register of Historic Places (NRHP), and to determine the presence of any properties that are already listed in the NRHP. To determine if a property is significant, architectural historians evaluate the resource using established criteria set forth by the NRHP.

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of significant persons in or past; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded or may be likely to yield, information important in history or prehistory.

Some resources are ordinarily not considered eligible for the National Register of Historic Places (NRHP). However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they are within the following categories:

a. A religious property deriving primary significance from architectural or artistic distinction or historical importance; or

b. A building or structure removed from its original location but which is primarily significant for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or

c. A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building associated with his or her productive life; or

d. A cemetery that derives its primary importance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or

e. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or

f. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

g. A property achieving significance within the past 50 years if it is of exceptional importance.

Properties that are formally listed in the NRHP and properties that are determined eligible but not formally listed are treated the same under Section 106.

After significant historic properties within the APE are identified and evaluated, effects evaluations are completed to determine if the proposed project has no effect, no adverse effect, or an adverse effect on these resources. Effects are determined by assessing the impacts that the proposed project will have on the characteristics that make the property eligible for listing in the NRHP and how the project will impact the resource's aspects of integrity: location, design, setting, materials, workmanship, association, and feeling. Types of potential adverse effects considered included physical impacts, such as destruction of all or part of a building; property takes that adversely impact the historic setting of a resource, even if built resources are not directly impacted; noise and vibration impacts evaluated according to accepted professional standards; changes to significant viewsheds; and cumulative effects that may occur later in time.

If the project will have an adverse effect on historic resources, measures can be taken to avoid, minimize, or mitigate this adverse effect. In some instances, changes to the proposed project can be made to avoid adverse effects. In other cases, adverse effects may be unavoidable, and mitigation to compensate for these impacts is proposed. Generally, the lead agency involved in the project will consult with the SHPO and other critical consulting parties and develop a Memorandum of Agreement that provides for mitigation that is appropriate for the project's adverse effects.

3.8.1.2 Antiquities Code of Texas (Texas Natural Resources Code of 1977, title 9, Heritage Chapter 191)

The Antiquities Code of Texas establishes the Texas Historical Commission (THC) as the legal custodian of all cultural resources, historic and prehistoric, within the public domain of the State of Texas. The authority of the THC extends to designation and protection of State Archeological Landmarks. These landmarks may include sites, objects, buildings, artifacts, implements and locations of historical, archeological, scientific, or educational interest . . . as well as archeological sites of every character that are located in, on, or under the surface of any land belonging to the State of Texas or to any county, city, or political subdivision of the states are state archeological landmarks and are eligible for designation.

The law states that a structure or building is of historical interest if it:

1. was the site of an event that has significance in the history of the United States or the State of Texas;
2. was significantly associated with the life of a famous person;
3. was significantly associated with an event that symbolizes an important principle or ideal;
4. represents a distinctive architectural type and has value as an example of a period, style, or construction technique, or
5. is important as part of the heritage of a religious organization, ethnic group, or local society.

When a resource is designated as a State Archeological Landmark, it may not be removed, altered, damaged, or destroyed unless the THC issues a contract or permit for the proposed change.

3.8.1.3 Department of Transportation Act of 1966 (49 USC 303)

Projects using U.S. Department of Transportation funds or those that require a license from its agencies must meet the requirements set forth in Section 4(f) Department of Transportation Act of 1966. Section 4(f) intends to preserve public parks, recreation land, wildlife and waterfowl refuges, and historic properties. Section 4(f) prohibits the Secretary of transportation from approving projects that require the use of significant publicly owned parks, recreation areas, or wildlife or waterfowl refuge, or any significant historic site unless a determination is made that:

1) there is no feasible and prudent alternative of such use, and
2) the project includes all possible efforts to minimize harm resulting from such a use.

A Section 4(f) use occurs:

1. when land from one of the above mentioned resources is permanently incorporated into a transportation facility;
2. when there is a temporary occupancy of land that is adverse in terms of the statute's preservation intent as determined by the length of occupancy, scope of

work, anticipated permanent adverse physical impact of the occupancy of land, and possibility of restoration to the resource's original condition prior to occupancy; or

3. when there is a constructive use of land.

If a project will affect Section 4(f) resources, documentation of no feasible or prudent alternative and efforts to minimize harm must be provided in the federal environmental document and a separate report.

3.8.1.4 Texas Parks and Wildlife Code (Chapter 26)

Chapter 26 of the Texas Parks and Wildlife Code prescribes that an agency of the state may not approve any project that requires the use or taking of any public land designated and used prior to the arrangement or the program or project as a park, recreation area, scientific area, wildlife area, or historic site unless the agency determines that:

1. there is no feasible and prudent alternative to the use or taking of such land; and
2. the project includes all reasonable planning to minimize harm to the land as a park, recreation area, scientific area, wildlife refuge, or historic site, resulting from the use or taking.

Chapter 26 applies to all DART rail projects.

3.8.2 City of Dallas Locally Designated Resources

The City of Dallas also designates historic resources as worthy of preservation. These locally designated resources are not necessarily identical to those that are designated at the federal level; furthermore, even if the same resource may be designated at both the federal and local levels, the historic boundaries for these two designations may not be identical.

Resources eligible for local recognition must meet three of the following City of Dallas designation criteria:

A. History, heritage, and culture: Represents the historical development, ethnic heritage or cultural characteristics of the city, state, or country.

B. Historic event: Location of or association with a significant historical event.

C. Significant persons: Identification with a person or persons who significantly contributed to the culture and development of the city, state or country.

D. Architecture: Embodiment of distinguishing characteristics of an architectural style, landscape design, method of construction, exceptional craftsmanship, architectural innovation, or contains details which represent folk or ethnic art.

E. Architect or master builder: Represents the work of an architect, designer or master builder whose individual work has influenced the development of the city, state or country.

F. Historic context: Relationship to other distinctive buildings, sites, or areas which are eligible for preservation based on historic, cultural, or architectural characteristics.

G. Unique visual feature: Unique location of singular physical characteristics representing an established and familiar visual feature of a neighborhood, community or the city that is a source of community pride or cultural significance.

H. Archeological: Archeological or paleontological value in that it has produced or can be expected to produce data affecting theories of historic or prehistoric interest.

I. National and state recognition: Eligible or designated as a National Historic Landmark, Recorded Texas Historic Landmark, State Archeological Landmark, American Civil Engineering Landmark, or eligible for inclusion in the National Register of Historic Places.

J. Historic education: Represents an era of architectural, social, or economic history that allows an understanding of how the place or area was used by past generations.

The D2 project will need to receive a Certificate of Appropriateness for the project, issued by the City of Dallas, for exterior changes or construction activities that will occur within the boundaries of locally designated historic properties, including individual resources and historic districts. Due to the location of the proposed project alignments, and how they are within the boundaries of some locally designated properties within the APE, a Certificate of Appropriateness will be required before construction commences.

3.8.3 Project Methodology

Initial architectural history Section 106 efforts for the first phase of cultural resources assessments focused on establishing communication with the identified consulting parties and gathering existing information on previously identified and evaluated resources. An APE for the D2 project was delineated and the THC concurred on the APE delineation on February 2, 2009. The APE defines a 300-foot buffer from all alternative alignments currently under consideration. All work is being completed by historians and architectural historians who meet or exceed the Secretary of the Interior's Professional Qualifications Standards.

Efforts to identify existing historic properties included coordinating with City of Dallas preservation staff and THC staff to gather information. In January 2009, D2 project staff met with City of Dallas Historic Preservation staff to discuss the project and learn about the files maintained by the city. The City of Dallas staff provided a map that depicts historic resources that are locally designated by the city, as well as those that are listed in the NRHP. In February 2009, DART staff met with Preservation Dallas officials to explain the project, listen to any concerns they may have, and obtain any information that may be helpful to the project. In March 2009, D2 project staff presented project information at a City of Dallas Landmarks Preservation Commission meeting. D2 project staff subsequently met with City of Dallas historic preservation planners and conducted research in their files. D2 project staff then conducted research at the THC in Austin. D2 project staff reviewed prior Section 106 projects filed at THC to determine if any resources within the APE were evaluated as part of prior projects.

In addition to the meetings and coordination, D2 project staff walked the proposed alignment corridors with City of Dallas staff. Numerous resources more than forty

years of age that have not been evaluated exist within the APE. Some of these resources will be evaluated individually while others may be evaluated as small historic districts.

While examining the project corridor, City of Dallas staff indicated that numerous resources within the APE were tax credit projects, meaning that if these buildings received federal tax credit, they should have been evaluated for NRHP eligibility; determined to be significant; and formally listed in the NRHP. However, at the time, the THC had no records of these determinations. During upcoming intensive-level research, efforts will focus on securing this documentation from other sources, including the NRHP offices in Washington, DC.

The D2 project team determined, in consultation with the THC and City of Dallas, to use a forty-year standard for this project to allow for the evaluation of resources that will likely reach the more traditional fifty-year age by the time the project is constructed. This will avoid piecemeal and inconsistent re-evaluations at later phases to include these resources that will achieve fifty years of age in that time frame. Additionally, any resources within the APE that are less than forty years of age, but appear to be exceptionally important and therefore potentially eligible under Consideration G, will be evaluated for NRHP eligibility.

3.8.4 Previously Identified and Evaluated Resources

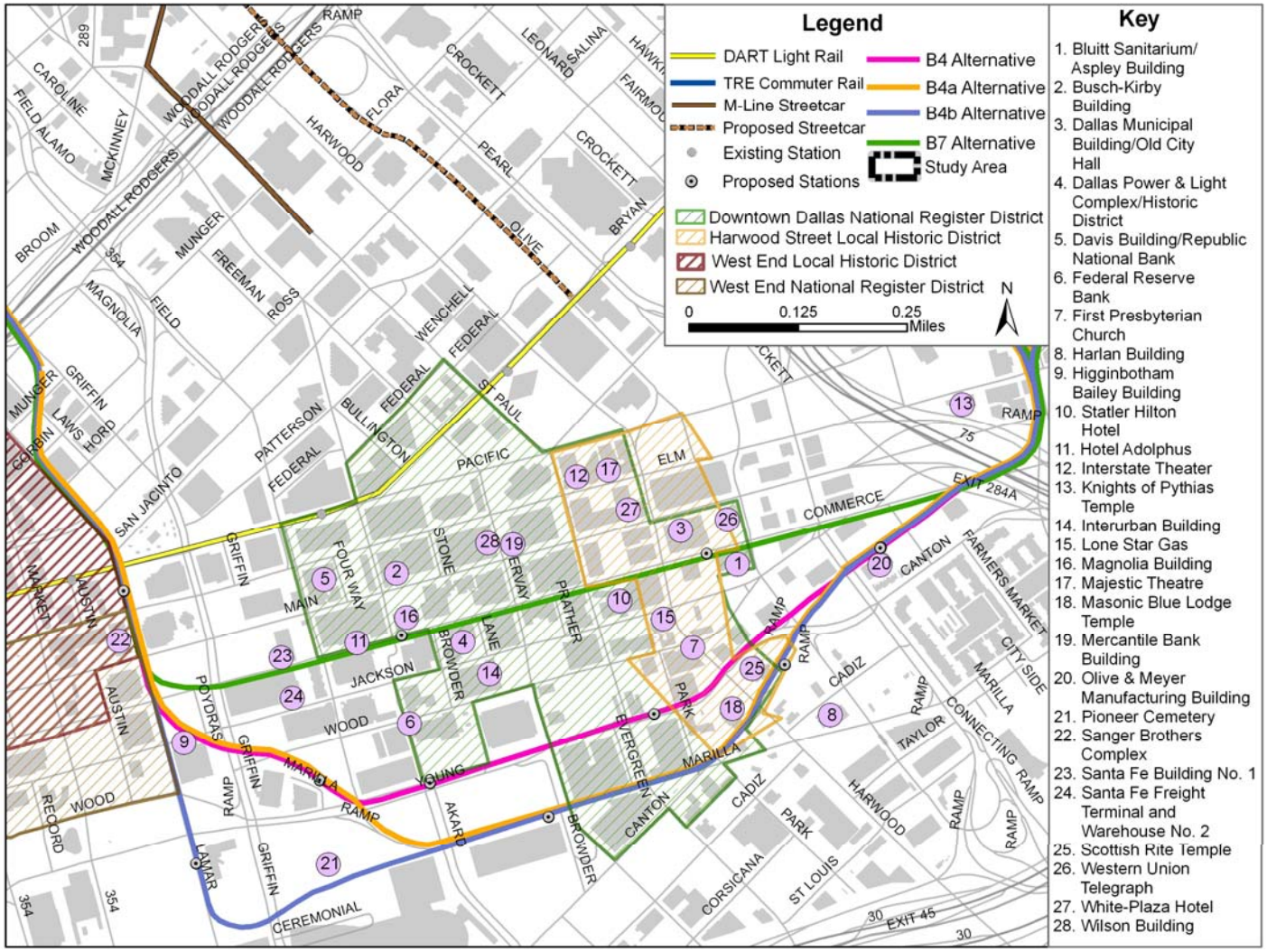
Based on the best available information at this time, the resources shown in Figure 3-17 and listed in Table 3-39 have been listed in the NRHP, evaluated for NRHP eligibility, and/or designated by the City of Dallas as a landmark structure or historic district.

3.8.5 Preliminary Assessment of Potential Historic Preservation Issues

The majority of listed or potentially eligible historic properties flank the project corridors within the APE. Initial project planning and information analysis indicate that these historic properties will not be impacted physically or through air, noise, or vibration issues related to the proposed project. In assessing areas where either potential property acquisitions (either buildings or portions of parcels) may be required, it appears as if the Olive and Meyer Manufacturing Building (Figure 3-18) is a resource that may be potentially adversely affected because of the proximity of the rail line for Alternatives B4, B4a, and B4b and, under Alternative B4, potentially a station. (There are two Olive & Meyers Buildings in the project vicinity. The Olive & Meyers Building, also known as the 2220 Canton Lofts or the Olive & Meyers Furniture Building, has been designated as a historic resource by the City of Dallas. It is tangential to the project's APE and not addressed in this evaluation.)

The Olive & Meyers Manufacturing Building, which is occupied by Brian Loncar & Associates and listed as a City of Dallas Landmark, has not been evaluated formally for National Register eligibility. A NRHP determination of eligibility will be completed for the building as part of upcoming intensive-level assessments. The building may be determined to be eligible for listing under NRHP Criteria A and C pending concurrence from the Texas Historical Commission. Although the building would not be demolished, the proximity of the project (rail line and/or station) would impact the adjacent parking area of the building and would likely result in an adverse effect determination because of changes to the building's integrity of setting. Alternative B4, B4a, and B4b potentially would cause an adverse effect to the building.

Figure 3-17. Cultural Resources near the Build Alternatives



Source: PB/AZB Joint Venture

Table 3-39. Previously Identified Resources within APE

Map #	Historic Property	NRHP Listed	Contributing Resource within Historic District	City of Dallas Landmark	Previously Determined Eligible Resource
1	Bluitt Sanitarium/Aspley Building		X	X	
2	Busch-Kirby Building	X		X	
District	Dallas Downtown Historic District	X			
3	Dallas Municipal Building/Old City Hall		X	X	
4	Dallas Power and Light Complex/Historic District		X	X	
5	Davis Building/Republic National Bank		X	X	
6	Federal Reserve Bank		X	X	
7	First Presbyterian Church		X	X	
8	Harlan Building	X		X	
District	Harwood Street Historic District			X	
9	Higginbotham Bailey Building			X	
10	Statler Hilton Hotel			X	X
11	Hotel Adolphus	X	X	X	
12	Interstate Theater			X	
13	Knights of Pythias Temple			X	
14	Interurban Building		X	X	
15	Lone Star Gas			X	
16	Magnolia Building	X		X	
17	Majestic Theater	X		X	
18	Masonic Blue Lodge Temple			X	
19	Mercantile Bank Building		X	X	
20	Olive & Meyer Manufacturing Building			X	
21	Pioneer Cemetery			X	
22	Sanger Brothers Complex	X			
23	Santa Fe Building No. 1	X		X	
24	Santa Fe Freight Terminal and Warehouse No. 2	X		X	
25	Scottish Rite Temple	X	X	X	
District	Stone Street District		X	X	
District	West End Historic District	X	X		
26	Western Union Telegraph		X	X	
27	White-Plaza Hotel			X	
28	Wilson Building	X			

Source : City of Dallas/Texas Historical Commission/National Register of Historic Places

Figure 3-18. Olive & Meyer Manufacturing Building

Two other resources may be adversely affected by the proposed alignments. First Presbyterian Church (Figure 3-19), which is listed in the NRHP, and its associated chapel would not be physically impacted by the project, but additional testing for potential noise and vibration impacts, particularly those that may impact significant art-glass windows, will be required before an effects determination can be made. Alternative B4, which is closest to the church's parcel, would most likely impact the building due to proximity of the rail line and the church building.

Figure 3-19. The Chapel at First Presbyterian Church

The Scottish Rite Temple (Figure 3-20), listed in the NRHP, would not be physically impacted, but may be adversely affected because the project rail line and station under Alternatives B4a and B4b is proximate to the building. These alternatives would require a portion of the parcel on which the building is located. Specifically, these alternatives would impact the parcel used for parking behind the building.

Figure 3-20. Scottish Rite Temple

Initial research indicates that the cluster of buildings located within the block bounded by Harwood, Young, and Jackson streets, and South Pearl Expressway are more than forty years of age and would require evaluation for NRHP listing. At this time, the project would require portions of the parcels from some of these properties and some buildings may need to be removed to accommodate Alternative B4. However, these buildings do not appear to be eligible for listing in the National Register, and they are not locally designated resources, although intensive-level research may reveal a compelling reason for eligibility.

Other parcels that may require acquisitions either contain buildings less than forty years of age, or the acquisition would require small portions of land, with no direct impacts to buildings and no adverse visual effects. However, if adverse effects are determined for any eligible or listed resources, FTA would develop a Memorandum of Agreement (MOA) in consultation with the THC, consulting parties, and the Advisory Council on Historic Preservation, if its staff chooses to participate.

Potential impacts from a station or the rail line could be minimized with context-sensitive designs. This may result in conditional to adverse effect determinations. A MOA could be developed to allow for this finding and to allow the THC and City of Dallas the opportunity to comment on station design, if desired.

3.8.6 Forthcoming Intensive-Level Section 106 Efforts

At this time, intensive-level research and survey is underway. Formal determinations of eligibility will be made using the THC survey form to document each resource within the APE that is more than forty years of age. This intensive-level architectural survey will utilize mapping, data, and resource information and will be informed by in-depth research. Each resource will also be photographed and mapped. Ongoing

research will provide information regarding previously evaluated but not formally listed resources, as this information is not readily available at the THC. The DART D2 team will use prior DART studies and reports completed by other agencies to gain this information. Determinations of effect will be completed for all resources that are determined eligible for or listed in the NRHP. An assessment of visual impacts will be completed as part of this evaluation. At that time, the team will seek THC concurrence on these evaluations. As described above, if there are adverse effects, the team will consult with the THC to develop a MOA that stipulates appropriate mitigation measures. This MOA as well as the determinations of eligibility and effects will be included in the Final EIS.

3.8.7 Archaeological Resources

This document identifies existing and previously recorded historic properties. However, some historic properties may be entirely below ground surface, and may not be documented through normal inventory efforts (i.e., archaeological sites, burials). Therefore, undocumented subsurface features and deposits may be affected by the project, in addition to those identified during the Section 106 process. 36 CFR 800.4(b)2 provides for a phased approach to identifying historic properties: "Where alternatives under consideration consist of corridors or large land areas, or where access to properties is restricted, the agency official may use a phased process to conduct identification and evaluation efforts." The proposed tunnel alternatives qualify as 'restricted access,' because it will be impossible to identify subsurface resources unless there is a discovery during construction.

This project will use a phased approach to identify archaeological resources, including burials. Toward that end, a Memorandum of Agreement (MOA) will be drafted during the environmental phase, for inclusion in the Final EIS. When final, the MOA will stipulate all Section 106 responsibilities prior to and during construction, identify invited and concurring signatories, and provide direction on mitigation of adverse effects.

3.9 Parklands

This section discusses parklands in Downtown Dallas potentially affected by the proposed project. An inventory was conducted of all public parkland adjacent to the proposed alignments. This included designated public parks and recreation areas, including civic plazas used for public purposes that possess features and attributes that indicate use as a park. Identified impacts to parkland are based on preliminary engineering and may be addressed through further refinement of alignments and other mitigation measures. Coordination with the City of Dallas Park and Recreation Department, TxDOT, and other partner organizations is ongoing.

Section 4(f) of the U.S. Department of Transportation (USDOT) Act, codified in federal statute as 49 USC § 303 and 23 USC 138, states that "it is the policy of the United States government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation land, wildlife and waterfowl refuges, and historic sites." Furthermore, Section 4(f) specifies that the Secretary of Transportation "may approve a transportation program or project...requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national,

State, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site), only if—

1. There is no feasible and prudent alternative to using that land; and
2. The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use."

Section 4(f) is applicable to the proposed project because of USDOT (FTA) involvement in the proposed project. The use of Section 4(f) resources occurs when: (1) land from a Section 4(f) site is permanently acquired for a transportation project, (2) when there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose, or (3) when the proximity impacts of the transportation project on the Section 4(f) site, without acquisition of land, are so great that the purposes for which the Section 4(f) site exists are substantially impaired. The last of these (#3) is termed "constructive use". Constructive use occurs when the transportation project does ***not*** involve land acquisition from a Section 4(f) resource, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired.

Chapter 26 of the Texas Parks and Wildlife Code was established to protect parks, recreational and scientific areas, wildlife refuges, and historic sites from being used or taken by the state or local public agencies for public projects. Chapter 26 is similar to Section 4(f) of the Department of Transportation Act of 1966 in its requirements, except that (1) a public hearing is required for any use or taking of protected land, and (2) the governing body or officer for the property shall consider clearly enunciated local preferences, and the provisions of this chapter do not constitute a mandatory prohibition against the use of the area if that authority's findings are made that justify the approval of a program or project.

Since the project would result in acquisition of parkland, the project will comply with provisions of Chapter 26 of the Texas Parks and Wildlife Code. DART has initiated the coordination process with the City of Dallas to advertise and hold a public hearing. If the City of Dallas finds that, in considering clearly enunciated local preferences, the proposed LRT Alternative requiring parkland is justified, then use of the property would not be prohibited; otherwise, the parkland may only be acquired if (1) there is no feasible and prudent alternative to the use or taking of such land; and (2) the program or project includes all reasonable planning to minimize harm to the land, as a park, recreation area, scientific area, wildlife refuge, or historic site, resulting from the use or taking.

Section 6(f)(3) of the Land and Water Conservation Fund Act (LWCF Act) (16 USC Section 4601-4) contains provisions to protect federal investments in park and recreation resources and the quality of those assisted resources. The law recognizes the likelihood that changes in land use or development may make park use of some areas purchased with LWCF funds obsolete over time, particularly in rapidly changing urban areas, and provides for conversion to other use pursuant to certain specific conditions.

> Section 6(f)(3) - No property acquired or developed with assistance under this section shall, without the approval of the Secretary, be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location.

This requirement applies to all parks and other sites that have been the subject of LWCF grants of any type, and includes acquisition of park land and development or rehabilitation of park facilities. A review of the LWCF grants database and consultation with Texas Parks and Wildlife Department (TPWD) and City of Dallas staff members indicate that in the vicinity of the proposed project no LWCF grant funds were used to acquire parkland. Therefore, none of the affected park properties are subject to Section 6(f)(3).

3.9.1 Environmental Setting

Six public parks are located along the Build Alternatives. Figure 3-21 shows the location of these parklands. Table 3-40 lists the parks located adjacent to the Build Alternatives. Two community facilities are located in TxDOT right-of-way (Julius Schepps Park and Bark Park Central) but are not included here because they are not protected by Section 4(f), Chapter 26, or Section 6(f)(3). In response to a letter from DART (included in Appendix D, Agency Correspondence), the City of Dallas Park and Recreation Department confirmed that these facilities are not dedicated parkland and that their use is conditional on TxDOT's need to use the land for transportation purposes and is subject to an existing multiple use agreement between TxDOT and the City. Both facilities are discussed under the Community Facilities section in this DEIS. A description of the seven parks is as follows:

Founders Square

The grounds surrounding the Founders Square Building are designated parkland and under the jurisdiction of the City of Dallas Park and Recreation Department. Originally landscaped in an effort to beautify downtown for the 1984 Republican National Convention, the 2.4-acre park contains basic features of a passive park, including a square monument with the name Founders Square, manicured lawn, trees and benches. Founders Square is listed in the National Register of Historic Places, and is a Recorded Texas Landmark as well as a City of Dallas Historic Landmark.

Belo Garden

Belo Garden is on one and one-half acres of land and is one of the new parks being implemented in downtown based on recommendations in the 2004 Downtown Parks Master Plan. The City of Dallas Park and Recreation Department is in the process of condemning and acquiring the land. Proposed design suggests a passive space with a grove of shade trees, fountains, moveable tables and chairs, perennial gardens, plaza for informal gatherings, interactive fountain, 10-foot high hill, and sculpture

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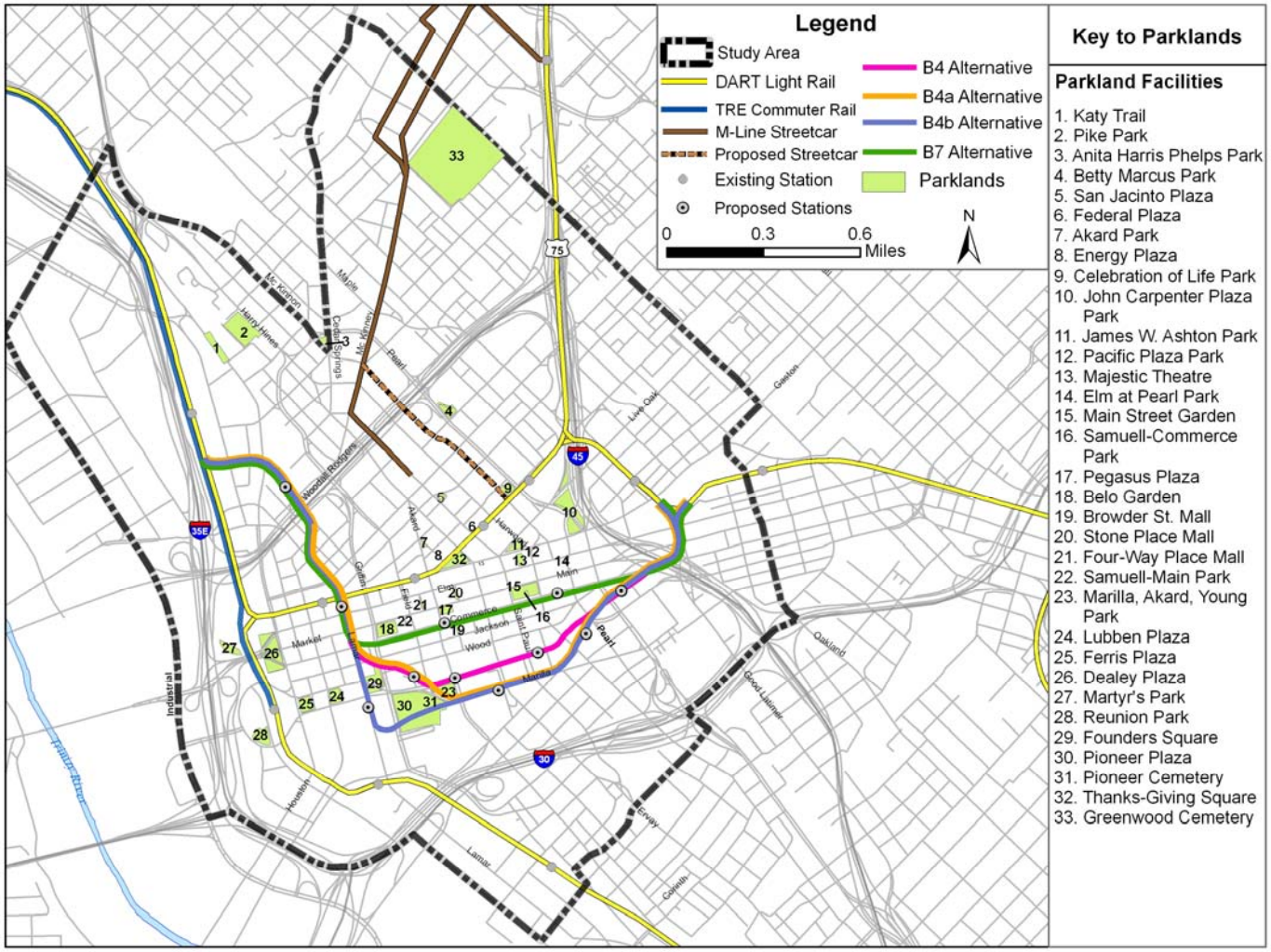
Figure 3-21. Parklands



Source: PB/AZB Joint Venture

Table 3-40. Parks Located Near or Adjacent to Build Alternatives

Map Number	Parkland Facility	Park Amenities	Alternative
15	Main Street Garden	This park is 1.75 acres in size and includes two outdoor stages, garden areas, fountain, playground, dog run, chairs and tables, benches, trails, public art, open space, unique night and accent lighting, and Wi-Fi access.	North of the B7 Alternative
18	Belo Garden	This planned park is one and one half acre in size and will include a grove of shade trees, fountains, moveable tables and chairs, perennial gardens, plaza for informal gatherings, interactive fountain, 10-foot high hill, and sculpture.	North of the B7 Alternative
23	Marilla, Akard, Young Triangle	This park is two acres which contains a lawn with a few trees. It also has an art piece that recognizes City of Dallas Police officers.	Located between the B4 Alternative (north of the park) and B4a and B4b (south and west of the park).
29	Founders Square	This park is about 2.4 acres in size and contains trees and benches. The park is listed on the NRHP and recorded as a Texas Landmark and City of Dallas Historic Landmark.	B4 Alternative located to the north of this park; B4b is located to the west.
30	Pioneer Plaza	This park is approximately four acres in size. It contains bronze sculpture, native plants and trees, and man-made cliffs, flowing stream and waterfall.	B4b Alternative would cross under this park.
31	Pioneer Cemetery	This park is located directly west of Pioneer Plaza. It contains what is believed to be the city's oldest outdoor sculpture, a 60-foot tall marble and granite obelisk memorializing Civil War soldiers of the Confederacy	B4b Alternative would cross under this park.

Source: PB/AZB Joint Venture

Main Street Garden

Main Street Garden is a new park scheduled to open in November 2009. The park encompasses 1.75 acres of land. Facilities at Main Street Garden include two stages for outdoor concerts and events, landscape features such as "garden rooms", a café, fountain, playground, dog run, chairs and tables, benches, trails, public art, open space, unique night and accent lighting, Wi-Fi access and 24-hour visual security with surveillance cameras. The park will host annual events such as City Lights and Main Street Live.

Pioneer Plaza

Pioneer Plaza is a civic plaza and park on just over four acres that commemorates Dallas' beginnings by celebrating the trails that brought settlers to Dallas. The site features a bronze sculpture installation re-creating a cattle drive of the 1850s, which portrays a herd of 40 longhorn steers being driven by three cowboys on horses over the Shawnee Trail. Other features include native plants and trees, and man-made cliffs, flowing stream and waterfall. It is the second most visited site in Downtown Dallas and is often used as an icon of the city. The plaza was developed by the Dallas Trees and Parks Foundation (now the Texas Trees Foundation) on public land dedicated by the City of Dallas. The property is currently owned and maintained by the Dallas Convention Center and is not under the jurisdiction of the Dallas Park and Recreation Department.

Pioneer Cemetery

Designated parkland, Pioneer Cemetery is passive space set on a hill with several large trees. Historians believe the first burials, those of two small children, took place sometime from 1846 to 1849, before it was officially set aside as a graveyard by joint collaboration of the Masons and Odd Fellows fraternal organizations in 1857. The earliest recorded headstones date back to 1853. It is the resting place of four Dallas mayors, one state senator, the city's early business leaders, heroes of the Texas Revolution, and Civil War soldiers. Pioneer Park also has what is believed to be the city's oldest outdoor sculpture, a 60-foot tall marble and granite obelisk memorializing Civil War soldiers of the Confederacy.

Marilla, Akard, Young Triangle

This triangle of two acres of designated parkland contains a green lawn with a few trees and is anchored by a public art piece that recognizes City of Dallas Police officers. A stainless steel construction symbolizes an officer's shield and carries the badge numbers and names of police killed in the line of duty. Paralleling Akard Street, the Dallas Police Memorial commemorates public servants of the city and is also the site for the Police Memorial Ceremony every May.

3.9.2 Impact Assessment

There are two types of impacts that could potentially affect the parklands along the proposed alignments. Direct impacts occur from acquisition of park property for the transportation facility. Proximity impacts arise from construction or operation of the transportation facility, but do not involve the acquisition or direct use of land from the property. These include noise, visual aesthetics, or changes in access. No parklands unaffected by direct use of park property would be subject to proximity impacts under the proposed alternatives that would be so severe as to constitute a constructive use of parkland under Section 4(f).

3.9.2.1 No Build Alternative

The No Build Alternative would have no direct impacts to parklands.

3.9.2.2 Build Alternatives

The Build Alternatives would potentially have impacts on one of the six parks–the Marilla-Akard-Young Triangle, site of the Dallas Police Memorial, as shown in Table 3-41 describes the possible direct impacts to parks by alternative (see Figure 3-22. Parklands near the Build Alternatives). Limited, temporary noise impacts would also occur at the Triangle during station and track construction under Alternative B4.

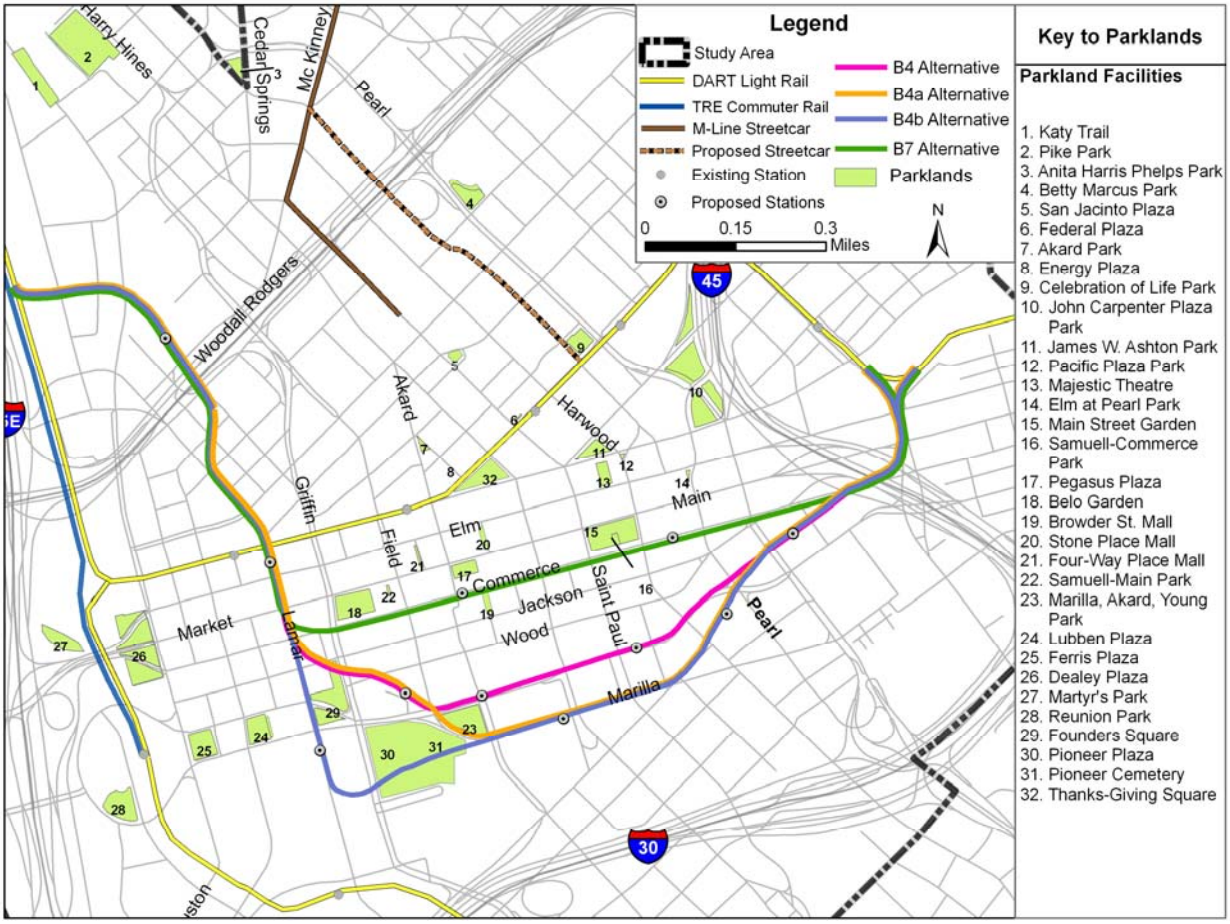
3.9.3 Impact Evaluation

Impacts on the Marilla-Akard-Young Triangle under Alternative B4 would require encroachment on the public sidewalk in the Young Street right-of-way but would require no use of land from the park for the proposed transportation facility. Proximity impacts would not substantially impair or diminish the activities, features or attributes of the park. Correspondence between DART and the City of Dallas Park and Recreation Department is ongoing to ensure that none of the activities, attributes or features of the park would be adversely affected. Results of this coordination will be updated as the project proceeds to the FEIS. Correspondence can be found in Appendix D, Agency Correspondence.

Table 3-41. Effects on Section 4(f) Parklands

Map No.	Parkland	Direct Use	Temporary Use	Constructive Use	Remarks
15	Main Street Garden	No	No	No	No proximity impacts identified.
18	Belo Garden	No	No	No	No proximity impacts identified.
23	Marilla, Akard, Young Triangle	No	No	No	Proximity impacts would not substantially impair or diminish use of the park.
29	Founders Square	No	No	No	No proximity impacts identified.
30	Pioneer Plaza	No	No	No	No proximity impacts identified.
31	Pioneer Cemetery	No	No	No	No proximity impacts identified.

Figure 3-22. Parklands near the Build Alternatives



Source: PB/AZB Joint Venture

Tunneling is only considered a use of parkland under Section 4(f) if it disturbs archeological sites eligible for the National Register of Historic Places that warrant preservation in place, or causes disruption that would harm the purposes for which a park was established. If, when tunneling is required, no qualifying archeological sites are discovered underneath the affected park (Founders Square, Pioneer Plaza, Pioneer Cemetery, Belo Garden, Main Street Garden), and tunneling for the proposed project would not cause any other disruptions harmful to the purposes of the park, then tunneling would not constitute a use of these resources under Section 4(f), and a Section 4(f) evaluation would not be required for the subject property.

3.9.3.1 Alternative B4

On Young Street, between Field Street and Akard Street, widening to accommodate space for two eastbound travel lanes would cause encroachment on the existing public sidewalk (estimated 10 feet wide) on the south side of Young Street adjacent to the Marilla-Akard-Young Triangle (see Appendix C). This encroachment would begin about 150 feet east of Field Street widening to an estimated five feet approaching Akard Street—a length of approximately 200 feet. Only the sidewalk would be affected at this location with none of the parkland being incorporated into the transportation facility (Young Street) or used for transportation purposes. No direct use of parkland for the proposed project would occur. Potential proximity impacts to the park are discussed in Section 3.9.3.3.

Although an underground easement would be needed for a tunnel under the northeast corner of Founders Square near Jackson and Griffin Streets under Alternative B4, no impact on this park property is anticipated since the tunnel would be far enough underground (approximately 27 to 35 feet from top of tunnel to ground surface) to avoid disruption that would harm the purposes for which the park was established.

3.9.3.2 Alternatives B4a and B4b

Although underground easements would be needed for tunnels under the northeast corner of Founders Square near Jackson and Griffin Streets, under Alternative B4a, and near the southern boundary of Pioneer Plaza and the middle of Pioneer Cemetery, under Alternative B4b, no impacts on these park properties are anticipated since they would be far enough underground (approximately 27 to 35 feet from top of tunnel to ground surface) to avoid disruption that would harm the purposes for which the parks were established.

Under Alternative B4b, tunneling would be conducted at a depth far enough under Pioneer Cemetery (approximately 27 to 35 feet from top of tunnel to ground surface) so as not to disturb remains and would, therefore, be compliant with Section 711.004 of the Texas Health and Safety Code.

3.9.3.3 Proximity Impacts

Under Alternative B4 adjacent to the Marilla-Akard-Young Triangle, the LRT would operate in the Young Street median, not near the curb, in the existing mix of bus and automobile traffic. Noise analysis indicates that proposed operational noise levels under Alternative B4 would not exceed FTA noise impact criteria and, therefore, would not constitute a constructive use of the park.

The Government Center Station in the median of Young Street under Alternative B4 would be visible from the park. The park may be considered to derive its value in substantial part due to its setting, in that, as home to the Dallas Police Memorial, the downtown urban setting near City Hall may be seen to represent the central role of police officers in the downtown area and larger community. The proposed transit station is characteristic of this urban downtown environment. This is an environment in which Young Street currently serves five operating bus routes running 286 buses per day and considerable automobile traffic. It is unlikely that the presence of a transit station would widely be considered to detract substantially from the urban downtown setting of the park. Consequently, the aesthetic impacts of the proposed transit station and transit operations would not constitute a constructive use of the park.

Vehicular turning movements would be restricted at Young and Akard Streets under Alternative B4, but this would not substantially affect access to the park since there are no vehicle entrances or parking facilities for the park. However, up to eight on-street, metered parking spaces would be lost as a result of the lane widening on the south side of Young Street. Transportation access would be enhanced by the presence of the proposed Government Center Station by providing an alternative travel mode for reaching the park from other locations in the city. Crosswalks and sidewalks would remain in place, maintaining pedestrian access. This use of the park would not affect the ability of people to gather at the Dallas Police Memorial for periodical observances and ceremonies. Consequently, changes in access to the park would not constitute a constructive use by substantially impairing or diminishing the activities, features, and attributes of the park.

None of the remaining alternatives would affect the Marilla-Akard-Young Triangle. No constructive use of any other parks would occur under any of the alternatives because there is no evidence that proximity impacts to the remaining parklands would be so severe that the protected activities, features or attributes that qualify the properties for protection under Section 4(f) would be substantially impaired. Substantial impairment occurs only when the protected activities, features or attributes of the resource are substantially diminished.

The projected operational noise levels of the proposed Build Alternatives would not exceed FTA noise impact criteria for parklands. The proposed Build Alternatives would not result in restrictions on access that would substantially diminish the utility of a park property (in some cases, access would be enhanced). No impairment to visual or aesthetic qualities would occur under the Build Alternatives that would substantially detract from the setting of a park that derives its value in substantial part due to its setting. No buildings or indoor settings are present on the park sites that would be subject to vibration impacts. The overall (combined) proximity impacts caused by the proposed Build Alternatives would not substantially impair the activities, features, or attributes that qualify the properties for protection under Section 4(f). Therefore, no constructive use of park properties is anticipated.

3.9.3.4 Chapter 26, Texas Parks and Wildlife Code

Under Chapter 26 of the Texas Parks and Wildlife Code, publicly owned parkland can only be acquired if (1) there is no feasible and prudent alternative to the use or taking of such land; and (2) the program or project includes all reasonable planning

to minimize harm to the land, as a park, recreation area, scientific area, wildlife refuge, or historic site, resulting from the use or taking.

The City would be required to conduct a Chapter 26 public hearing if the proposed project would use or take any actual city park property. This public hearing would be conducted by the Dallas City Council. The hearing and associated notification and advertising would be coordinated in close cooperation with DART. This process is required to determine if there is no prudent or feasible alternative to the use or taking of parkland, and show that any impact is appropriately mitigated and compensated. It is not anticipated that any parkland would be acquired for the project under any of the proposed alternatives.

3.9.4 Mitigation

Coordination with the City of Dallas Park and Recreation Department and other partnering agencies, such as the Dallas Police Association, is ongoing to identify appropriate mitigation treatments. Commitments for mitigation of adverse effects will occur further into project development when more information as to the magnitude of each impact is available.

3.10 Visual and Aesthetic Resources

This section addresses the visual and aesthetic resources within the study area that may be affected by the Build Alternatives. The visual assessment of a major transportation project considers the quality of the existing visual environment as defined by the aesthetic character of the surrounding area. This relates to the level of compatibility or contrast a project would have with the existing man-made and/or natural environment.

3.10.1 Existing Visual Characteristics

The study area is located within the heart of downtown Dallas and includes some of the more highly visible and recognizable features of the city. These include historic buildings, as well as architecturally unique buildings, parks, and public spaces. The study area is characterized by high-rise office buildings, mixed-use buildings, new multi-family complexes; redeveloped warehouses, the convention center, surface and structure parking facilities, vacant lots and various public uses.

Much of the study area is already dedicated to transportation corridors and rights-of-way. As such, most viewers do not have an expectation of unrestricted views or open viewsheds. Rather, the general visual character of the study area is varied and urban, and additional development is expected.

The study area includes the high-rise commercial development that forms the skyline of downtown Dallas. The relatively flat topography of the study area allows man-made structures, such as elevated freeways and upper levels of high-rise buildings to provide the best views surrounding the area. As a result of the urbanized nature of the study area, the primary vegetation is comprised of cultivated lawns, trees, shrubs, and flowers in parks and open spaces. The street system follows a grid pattern and mature shade trees typically line many of the arterials and adjoining streets.

Typical views in this urbanized area are multi-dimensional, combing a variety of man-made elements and different land uses. The quality of views within the corridor

varies by location and relationship to existing transportation components and other man-made elements. In some places, views are restricted by intervening structures.

Pedestrian sidewalks and conventional steel tubular streetlights generally line the adjoining streets within downtown. Utility poles and wires have been placed underground for the majority of the study area, providing an uncluttered appearance drawing sight lines to the architectural design of neighboring buildings as well as the numerous bars, restaurants, offices, and commercial retail frontage throughout the urban core.

3.10.2 Methodology for Impact Assessment

The visual quality assessment determines if the components of each alternative would be compatible with the visual character of the setting into which they would be introduced. The impact assessment also takes into consideration the current use of the of the alignment as a transportation corridor.

Federal and state regulations require visual impacts to be addressed for Section 106 and Section 4(f) properties. There are no specific federal or state visual regulatory requirements that apply to properties that are not designated historic and/or eligible for listing in the National Register, or parkland; however, the City of Dallas reviews development plans to ensure compliance with zoning or development code requirements. These requirements relate to open storage, landscaping, lighting, screening, neighborhood protection and signage. Public input regarding visual intrusion and privacy impacts comments were also considered.

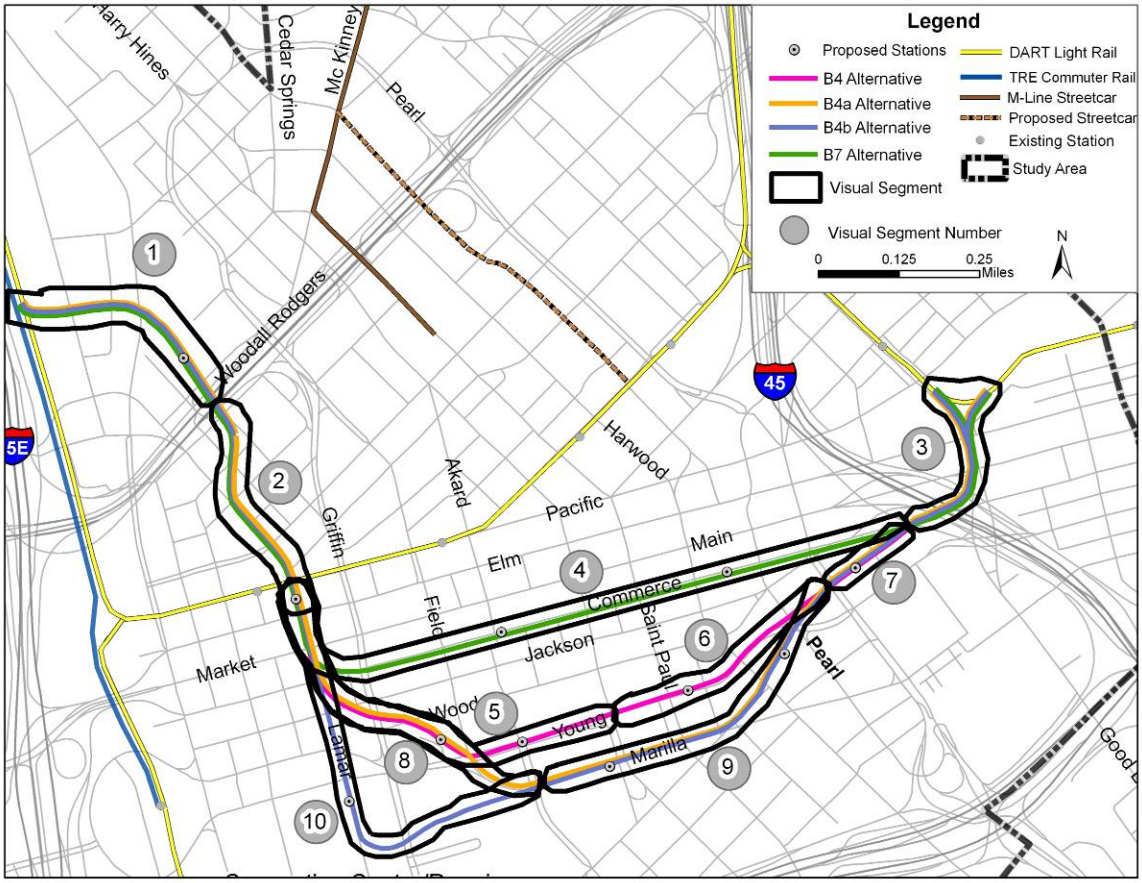
To assess visual and aesthetic impacts, each of the Build Alternatives was analyzed on a corridor basis. A review was conducted of adjacent properties and resources to identify significant structures that could be affected visually by the alternatives. The primary resource used for identifying significant structures or locations was the City of Dallas Development Services and architectural and preservation groups in the Dallas area. A site review of the Build Alternatives was also conducted as part of this analysis to compile a photographic inventory of potentially affected buildings and areas.

3.10.3 Unit Analysis for Impact Assessment

For the purpose of documenting the visual inventory of the corridor, the study area was, based on field observation, categorized into units. These units had similar characteristics in terms of land use, building types, and other site considerations. The units were also determined by the project configuration through the downtown area, specifically at-grade or underground. The units are identified in Figure 3-23.

Table 3-42 provides definitions of the ratings used in evaluating each segment. Some groups, such as visitors and tourists are considered a relatively small portion of the area's primary viewers. They would be subsumed under categories such as motorists and recreational users. Business travelers would be subsumed under commercial and office tenants.

Figure 3-23. Unit Analysis



Source: PB/AZB Joint Venture

Table 3-42. Evaluation Rating Definitions

Primary Viewers	Visual Quality	Visual Sensitivity
A = Arterial Motorists B = Single Family Residents C = Multi-Family Residents D = Recreational Users E = Commercial/Office Tenants F = Industrial Tenants G = Downtown Pedestrians H = Others	High = Assessment unit or portions thereof is of significant visual or aesthetic quality to the primary viewers. Moderate = Assessment unit or portions thereof is of average visual or aesthetic quality to the primary viewers. Low = Assessment unit is of little or no visual or aesthetic quality to the primary viewers.	High = Introduction of new elements into the assessment unit would impact the quality of the visual/aesthetic resource as observed by the primary viewers. Moderate = Introduction of new elements into the assessment unit could impact the quality of the visual/aesthetic resource unit or a portion thereof as observed by the primary viewers. Low = Introduction of new elements into the assessment unit is not likely to have an impact on any visual/aesthetic resource as observed by the primary viewers.

Source: S.R. Beard & Associates, 2001

3.10.4 Affected Environment

The study area is divided into ten units in order to describe the affected environment and consequences. The units capture various elements of the Build Alternatives, generally from west to east. Visual quality and sensitivity are described in a general sense; assessments may not pertain to every specific location within a unit.

3.10.4.1 Unit 1 – Victory to Woodall Rodgers Freeway (Common to all Build Alternatives)

All Build Alternatives would operate along a surface route and have the same effects on visual resources in this unit segment. This unit is adjacent to IH 35 and extends from Victory Station to Woodall Rodgers Freeway. Both ends of the unit are located adjacent to major transportation routes. Unique structures that are located along the route include American Airlines Center, the Dallas House of Blues, the West Dallas Victory Hotel, and the future Museum of Nature and Science. Much of the unit includes parking lots which provide open views of surrounding high-rise buildings. This area is a contemporary urban setting. Primary viewers would include patrons of local businesses, as well as tourists and pedestrians participating in area activities. The overall visual quality is moderate. Visual sensitivity is considered moderate as well. Figure 3-24, Figure 3-25 and Figure 3-26 illustrate typical views and viewsheds in this unit.

Figure 3-24. Victory and Museum Way Intersection Facing Northwest

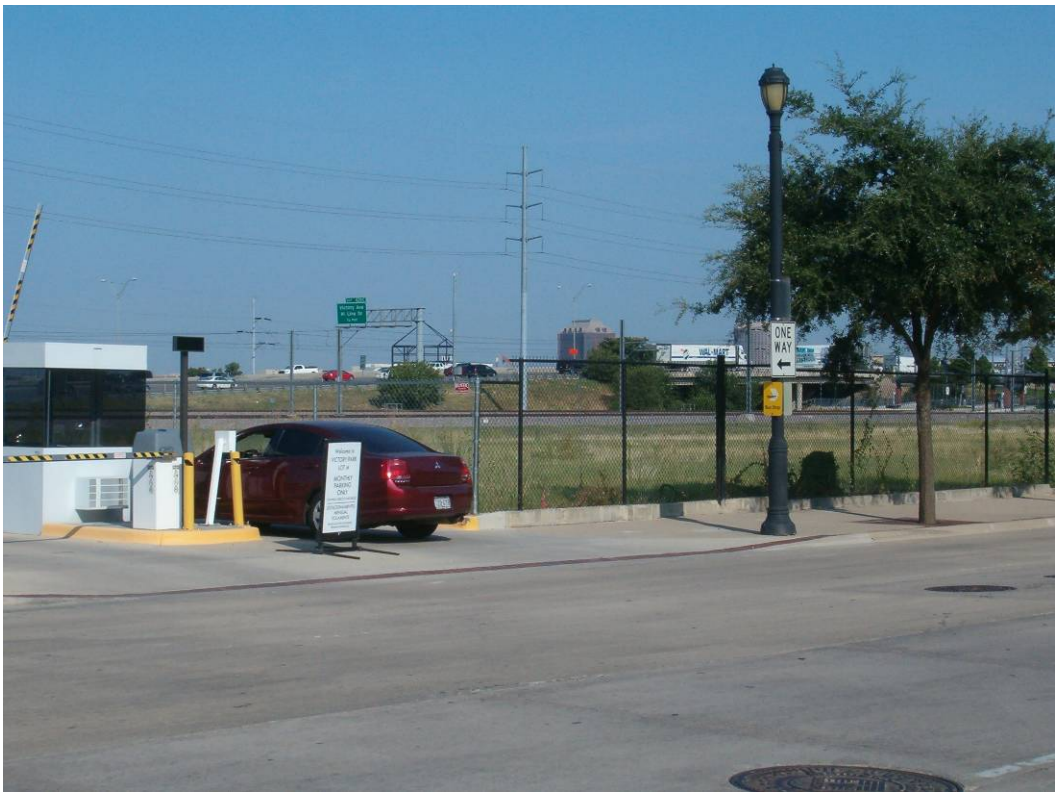


Figure 3-25. Victory Park and Museum Way Facing Southeast

Figure 3-26. Houston Street Parking Lot Facing Woodall Rodgers

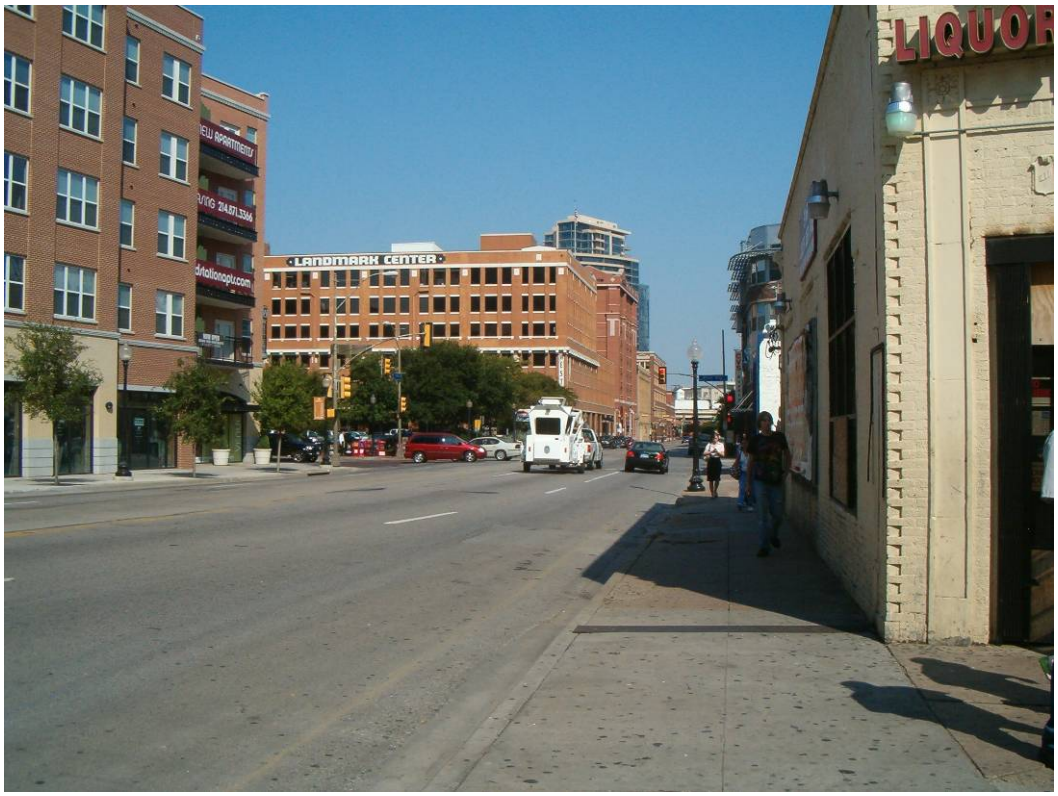
3.10.4.2 Unit 2 – Woodall Rodgers Freeway to Elm Street/Metro Station

All Build Alternatives would enter a tunnel portal south of Woodall Rodgers and would have the same effects on visual resources in this unit segment. Large surface parking lots and structured parking are located at the north end of this unit near Woodall Rodgers. Unique structures that are located along the route include the Dallas World Aquarium, and buildings in the West End Historic District.

The West End Historic District is located along the western side of Lamar from Main Street to Woodall Rodgers, and borders this unit. The West End Historic District includes primarily small businesses, retail businesses and entertainment. The City of Dallas does have specific guidelines established for signs, parking, and facilities to ensure that future construction or new developments do not adversely affect the characteristics of the West End District. The overall visual quality is moderate. Visual sensitivity is considered moderate as well. Figure 3-27 and Figure 3-28 illustrate typical views and view sheds in this unit.

Figure 3-27. Lamar and Corbin Street Facing Southeast

Figure 3-28. Lamar and San Jacinto Facing Northwest



3.10.4.3 Unit 3 – IH 45 to Green Line

This unit represents a surface LRT section at the eastern end of all Build Alternatives. This segment ties into the Green Line, located along Good Latimer north of Elm. There are existing LRT tracks and facilities already contributing to the visual characteristics of this area. Other uses consist of a large multi-family complex and small one-, two-, and three-story commercial buildings, row houses, and community facilities (Bark Park, Central Park and Julius Schepps Park). Aside from the presence of the two parks under IH 45, the area maintains an industrial character. The LRT would be viewed by citizens using the parks, pedestrians, and employees and patrons of adjacent businesses. The overall visual quality is moderate. Visual sensitivity is considered moderate as well. Figure 3-29 and Figure 3-30 illustrate typical views and view sheds in this unit.

Figure 3-29. Good Latimer and Gaston Road

Figure 3-30. Good Latimer and Elm Intersection Facing South

3.10.4.4 Unit 4 – Elm Street to IH 45 (Alternative B7 only)

Only Alternative B7 would impact this unit. The LRT route runs in a tunnel under Commerce Street, through the heart of downtown Dallas to a tunnel portal at the eastern end of Commerce. The corridor is lined with high-rise buildings and urban elements are common components of views. Primary viewers are expected to be building tenants, visitors and motorists. This unit contains Aldophus Hotel, Two AT&T Plaza, One AT&T Plaza, the Magnolia Hotel, and the new Main Street Garden which offer visual and aesthetic significance in downtown Dallas. The overall visual quality is high. Visual sensitivity is considered moderate. Figure 3-31, Figure 3-32 and Figure 3-33 illustrate typical views and view sheds in this unit.

Figure 3-31. Commerce and Field Facing East

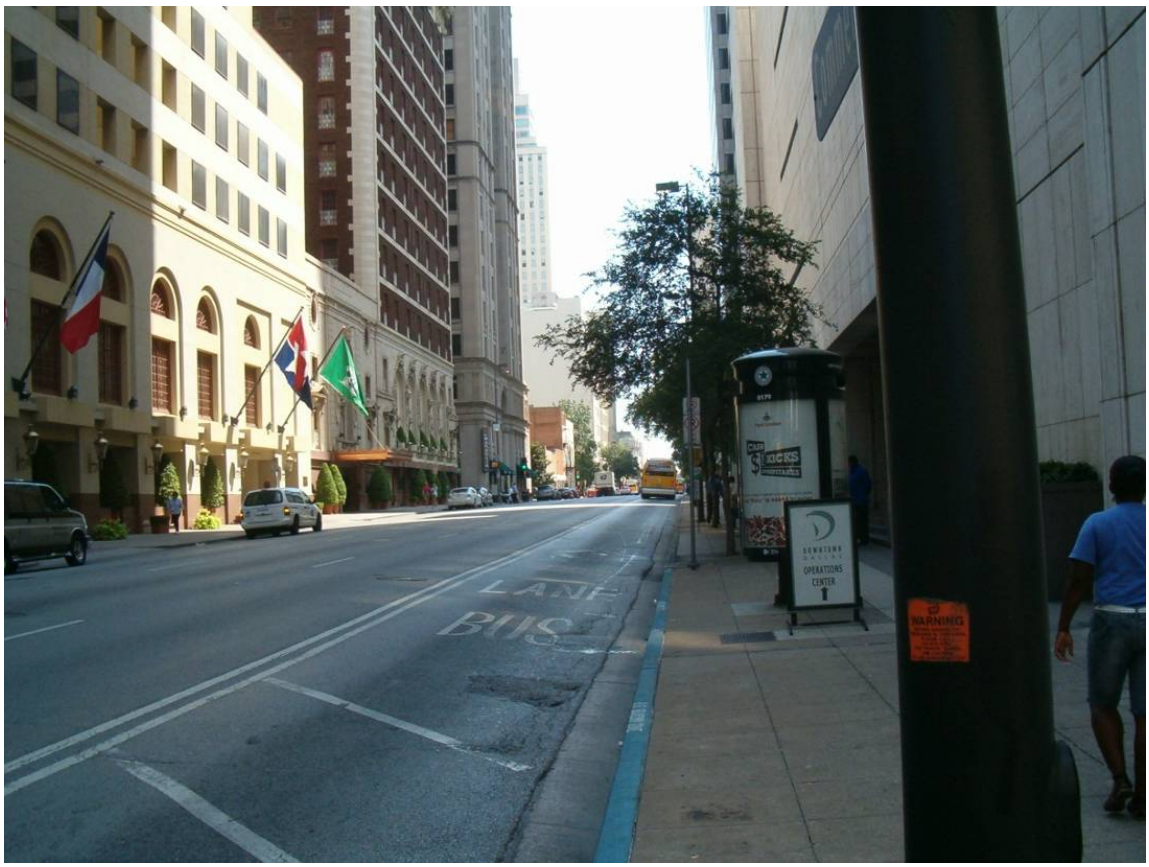


Figure 3-32. Magnolia Hotel, Commerce and Browder Street Facing Northwest

Figure 3-33. Commerce and Pearl Facing Proposed Tunnel Portal

3.10.4.5 Unit 5 – Elm Street to Ervay Street (Alternative B4 only)

Alternative B4 would be in a tunnel from Metro Center station to a portal west of Field Street, then at-grade along Young Street. Major residential structures are located adjacent to the tunnel portal. Along Young Street between Field and Ervay Streets are the J. Erik Jonsson Central Library and City Hall. The Police Memorial, Pioneer Cemetery and Pioneer Plaza are located near the intersections of Akard, Field and Young Streets. The Government Center Station would be located at surface at Young Street and Akard Street. Primary viewers would be drivers on Young, people in surrounding businesses, park visitors, and people using City Hall and the library. The overall visual quality is considered high. Visual sensitivity is considered high as well. Figure 3-34 and Figure 3-35 illustrate typical views and view sheds in this unit.

Figure 3-34. Young and Akard Facing West, Proposed Government Center Station

Figure 3-35. Vicinity of Proposed Tunnel Portal near Wood Street Parking Lot

3.10.4.6 Unit 6 – Ervay Street to Central Expressway (Alternative B4 only)

Visual character in western the western part of this unit consists of some contemporary structures, open surface parking lots and older brick buildings adjacent to the north side of Young Street. South of the alignment is the former City Hall annex and older brick buildings. The Harwood District station would be located in Young Street near St. Paul. Primary viewers include visitors to First Presbyterian Church facilities, pedestrians, motorists using Young Street, employees and patrons of local businesses.

Farther east the unit includes the Harwood Street Historic District. A commercial district on the east end of downtown, Harwood Street Historic District represents a cross-section of Dallas commercial architecture from the 1880's to the 1950's. Significant buildings in this area include Hart Furniture, First Presbyterian Church and Chapel, Dallas Municipal Building, Majestic Theatre, Paramount Pictures, Masonic Temple, the Scottish Rite Cathedral, and the old Dallas Public Library.

The Harwood District station would be located in Young Street near St. Paul. Primary viewers include visitors to First Presbyterian Church facilities, pedestrians, motorists using Young Street, employees and patrons of local businesses and social service facilities.

The overall visual quality is considered moderate. Visual sensitivity is considered moderate as well. Figure 3-36 and Figure 3-37 illustrate typical views and view sheds in this unit.

Figure 3-36. Young and Park Street Facing West

Figure 3-37. Young and Hardwood, Facing Northeast

3.10.4.7 Unit 7 –Central Expressway to IH 45 (Alternatives B4, B4a and B4b)

This unit consists of a mixture of older buildings of historical age or designation and some contemporary structures, including some new residential buildings adjacent to Young Street. The Farmers Market station would be located east of Central Avenue with Alternative B4. Primary viewers include pedestrians, motorists using local parking lots, employees and patrons of local businesses. South of the alignment there are some row houses facing Canton Street.

The overall visual quality is considered moderate. Visual sensitivity is considered moderate as well. Figure 3-38 and Figure 3-39 illustrate typical views and view sheds in this unit.

Figure 3-38. Commerce Street near Underpass Facing Southwest

Figure 3-39. Bark Park, Commerce Street Facing West into Unit 7

3.10.4.8 Unit 8 –Elm Street to Akard Street (Alternative B4a only)

This unit is located near the government and convention center of the downtown core. It is dominated by mid-rise office buildings, several residential conversions and transportation corridors, including streets, parking lots, and underground parking garages. The unit also includes Marilla Akard Young Park. Views are generally open, especially at the park. An LRT station would be located under a vacant part of the old Santa Fe railroad yards adjacent to a warehouse recently converted to a hotel and a converted residential building. Primary viewers are local residents, tourists, visitors to public facilities and workers in the area.

The overall visual quality is considered moderate, except at Marilla Akard Young Park which is a well groomed greenspace area. Visual sensitivity is considered low, with the same exception. The area around the park is considered moderate in both categories. Figure 3-40 and Figure 3-41 illustrate typical views and view sheds in this unit.

Figure 3-40. Marilla Akard Young Park, Young and Akard Facing Southwest

Figure 3-41. Northwest Corner of Wood Street Parking Lot, Facing Northwest

3.10.4.9 Unit 9 –Akard Street to Central Expressway (Alternatives B4a, B4b)

This unit area includes City Hall, the Masonic Temple, the Scottish Rite Temple, a commercial office building, a community soup kitchen, and ONCOR vehicle facilities Commercial property and vacant land predominate to the south of this unit. Alternatives B4a and B4b transition from an underground station at City Hall to a tunnel portal and surface alignment at Harwood Street within the right-of-way of Marilla/Canton Street. Views are along the Marilla Street transportation corridor which is a pedestrian way between Akard and Ervay Streets in front of City Hall. The Scottish Rite Temple, Masonic Temple, and City Hall are significant structures within this unit, as well as the same new housing units identified in unit 6. The Farmers Market station in this unit would be adjacent to the Scottich Rite Temple using an abandoned street section, commercial property and surface parking adjacent to the Temple.

The overall visual quality is considered moderate, except for the prominent buildings which are easily recognizable. Visual sensitivity is considered moderate as well with the same exceptions. Figure 3-42 and Figure 3-43 illustrate typical views and view sheds in this unit.

Figure 3-42. Marilla and Canton Street Corridor Facing West to City Hall

Figure 3-43. Pearl and Canton Facing Scottish Rite Temple Parking Lot

3.10.4.10 Unit 10 –Elm Street to Akard Street (Alternative B4b only)

This unit is located on the edge of the downtown core, and includes mid-rise buildings, parking lots and other urban elements. The LRT route is in a tunnel under Lamar Street and passes parking garages, Founders Square Plaza, Griffin Square to an underground station at the future Convention Center Hotel. The route turns east adjacent to the Dallas Convention Center and continues under Pioneer Park and Pioneer Park Cemetery to a station under City Hall. Pioneer Park and the Convention Center are major tourist destinations.

The overall visual quality is considered high. Visual sensitivity is considered moderate. Figure 3-44, Figure 3-45 and Figure 3-46 illustrate typical views and view sheds in this unit.

Figure 3-44. Lamar Facing Proposed Station Location

Figure 3-45. Northwest Corner of Pioneer Cemetery Facing Southeast

Figure 3-46. Griffin and Ceremonial Facing Northwest

3.10.5 Impacts

3.10.5.1 No Build Alternative

Under the No Build Alternative, the project would not be built, and would have no adverse effect on visual and aesthetic quality of the study area. Other projects would be built, and could impact the visual quality of the study area.

3.10.5.2 Build Alternatives

The Build Alternatives would affect the visual and aesthetic resources in the study corridor. Generally, the assessment identified changes in visual quality and the affect of such changes on the experience of the primary viewers. Primary viewers include arterial motorists, multi-family residents, park users, visitors, commercial/office tenants, industrial tenants, pedestrians, and others who may be affected by the alternatives.

DART has an existing surface LRT transit mall that transects the CBD along Pacific and Bryan Streets. The existing route operates in front of significant structures in the CBD. However, the visual / aesthetic impacts have been determined to be minimal in these areas or have been mitigated. In general, the alternatives considered for the Build Alternatives are comparable to the existing LRT route, except where it the project would be below grade and present new elements such as portals, ventilation shafts and access to underground stations. In contrast to the existing Pacific-Bryan Street surface LRT route, one-third to two-thirds of the Build Alternative would be

located underground, depending on the alternative. This significantly reduces visual impacts. Portals may have the greatest potential for visual impact of any project elements. DART will apply context sensitive design to all portal areas, to make them compatible with local surroundings, and could incorporate TOD elements to minimize and impacts. Surface stations and surface alignment adjacent to sensitive buildings, such as the First Presbyterian Chapel and the Scottish Rite Temple, are also important issues that were assessed for impacts.

Impacts would vary by alternative given the difference in at-grade and underground configurations and are summarized in Table 3-43. All impacts can be mitigated resulting in no adverse effect from any of the Build Alternatives.

Unit 1 – Victory to Woodall Rodgers Freeway (Common to all Build Alternatives)

All Build Alternatives would be at-grade and located within DART-owned right-of-way that is currently used for street parking and surface parking lots. Museum Way Station would be located on Old Griffin Street on the northern side of Woodall Rodgers Freeway adjacent to the planned Museum of Nature and Science. As this unit is surrounded by major transportation corridors and other modern urban elements, the project would not have an adverse effect on the unit's visual and aesthetic resources. At-grade views across the project would include LRT catenary. While this would create some visual intrusion for drivers and the nearby apartments, the impacts would be low.

Unit 2 – Woodall Rodgers Freeway to Elm Street/Metro Station (Common to all Build Alternatives)

Except for the north tunnel portal, the Build Alternatives would be underground for most of this unit, and so there would be little to no visual impact. The tunnel portal would be located between Corbin Street and the Woodall Rodgers Freeway and generally between existing buildings, parking lots and parking structures. The portal site was identified as a visual and aesthetic issue by participants in the D2 Study. Mitigation schemes were created for the site, including transit oriented development above and adjacent to the portal. Even without mitigation, the portal would not obstruct any important views, and would not be out-of-character with the surrounding urban, transportation elements.

Unit 3 – IH 45 to Green Line (Common to all Build Alternatives)

For all Build Alternatives, the LRT is at-grade. Aside from the presence of the two parks under IH 45 and commercial buildings along Good Latimer between Main and Elm Streets, the area maintains a commercial and transportation character. Since the route would be under an elevated interstate highway (IH 45), avoid parkland, and there is an existing LRT facility nearby, the project would not have an adverse effect on the visual and aesthetic resources of the area.

Table 3-43. Visual Impact Analysis

Unit	Setting / Resources	Viewers	Visual Quality/ Sensitivity	Potential Impact		
				At-grade	Station Areas	Portals
1- Victory to Woodall Rodgers Freeway (Common to all)	Amerisuites Hotel West Dallas Victory Hotel, American Airlines Center	A, C, D, E, G, H	Moderate	Low	Low	Low
2 - Woodall Rodgers Freeway to Elm Street/Metro Center (Common to all)	Dallas World Aquarium West End Historic District	A, C, D, E, G, H	Moderate	Moderate	Moderate	Moderate
3 - IH-45 to Green Line (Common to all)	Bark Park Central Park Julius Schepps Park	A, C, D, E, H	Moderate	Low	Low	Low
4 - Elm Street to IH 45 (underground) (B7)	Aldophus Hotel, Two AT&T Plaza, One AT&T Plaza, Magnolia Hotel	N/A	High/ Moderate	Low	Low	Low
5 - Elm Street to Ervay Street	J. Erik Jonsson Central Library and City Hall. The Police Memorial, Pioneer Cemetery, Pioneer Plaza	A, C, D, E, H	High	Moderate	Moderate	Moderate
6 - Ervay Street to Central Expressway (B4)	Hart Furniture, First Presbyterian Chapel, Dallas Municipal Building, Majestic Theatre, Paramount Pictures, Masonic Temple, the Scottish Rite Temple, and the old Dallas Public Library, Harwood Street Historic District	A, C, D, E, G, H	Moderate	Moderate	Moderate	Moderate
7 - Central Expressway to IH 45 (B4, B4a, B4b)	Historic Building, Farmers Market	A, C, D, E, G, H	Moderate	Moderate	Moderate	Moderate
8 - Elm Street to Akard Road (B4a)	Marilla Akard Young Park	N/A	Moderate-Low	Limited - underground		
9 - Akard to Central Expressway (B4a, B4b)	Masonic Temple, City Hall, Scottish Rite Temple, a commercial office building, a community soup kitchen, and ONCOR facilities	A, C, D, E, G, H	Moderate	Moderate	Moderate	Moderate
10 - Elm to Akard (B4b)	Founders Square Plaza, Griffin Square, the Dallas Convention Center, Pioneer Park and Pioneer Park Cemetery	N/A	High/ Moderate	Limited - underground		

Source: PB/AZB Joint Venture

Unit 4 – Elm Street to IH 45 (Alternative B7 only)

Alternative B7 would run underground through this unit and have no impact on its visual and aesthetic resources. There would be three underground stations along the route, each with a number of passenger access points and ventilation facilities. These facilities would be integrated with the existing urban character and streetscape, and designed so as not to obstruct any important views, and would not be out-of-character with the surrounding urban, transportation elements. For example, vertical circulation from the station to street-level would be integrated with existing buildings or designed to complement adjacent resources such as the Main Street Garden Park.

Unit 5 – Elm Street to Ervay Street (Alternative B4 only)

The route from Elm to Wood would be underground and would not have an effect on the visual and aesthetic resources within this unit. The alignment from Wood to Ervay would include a tunnel portal, and at-grade LRT. The portal between Wood and Young would be visible from adjacent residential and hotel buildings, and was identified as a potential visual and aesthetic issue. Redevelopment of the area above and adjacent to the portal was discussed with the property owner who indicated an interest is pursuing transit oriented development at the site. Assuming this type of mitigation, the portal would not obstruct any important views and would not be out-of-character with adjacent buildings.

At-grade views along Young Street would be obstructed by the Government Center Station in the middle of a reconstructed Young Street between Field and Akard Streets. While this would create some visual intrusion, the impact would not be adverse because no important views or viewsheds would be blocked, and the line and station would be within an existing transportation corridor, and would not be out-of-character with the existing urban, transportation elements.

Unit 6 – Ervay Street to Central Expressway (Alternative B4 only)

Alternative B4 would be at-grade in this unit and would include the Harwood District Station. The project would impact some views of historic buildings; the First Presbyterian Chapel, the Masonic Temple and the Scottish Rite Temple. Although no buildings would be completely obscured, catenary would be visible in views across the project, and the Harwood District Station would affect the unit's visual setting. Overall the project would have a moderate impact. Possible mitigation includes streetscaping along Young Street, transit oriented development on vacant property along the north side of Young Street, and visual integration of the new transit station with the street and surrounding redeveloped property

Unit 7 –Central Expressway to IH 45 (Alternatives B4, B4a and B4b)

In this unit the project would be at-grade to IH 45. It would include the Farmer's Market Station (B4 only), located east of Central Avenue. and adjacent to an historic converted warehouse building. The Farmers Market Station would contrast with the character and style of the older adjacent structure. Overall, the impact would be moderate. Possible mitigation includes visual separation or integration of the station and older structure.

Unit 8 –Elm Street to Akard Street (Alternative B4a)

The Build Alternative is entirely underground in this unit and except for surface station entrances and ventilation facilities, it would not impact the visual and aesthetic resources along the corridor. These surface facilities would be integrated with the existing urban setting and character.

Unit 9 –Akard Street to Central Expressway (Alternatives B4a, B4b)

For most of this unit, the Build Alternatives are underground and would not impact the visual and aesthetic resources along the corridor. The alternatives transition to at-grade through a tunnel portal between Ervay and Harwood streets, and would utilize existing Marilla/Canton street. The Farmer's Market Station would be located in an abandoned street section and the Scottish Rite Temple parking lot. This would be out of character with the visual setting of the immediate area, and would require mitigation. Overall the project would have a moderate impact. Possible mitigation includes replacement parking at a nearby site, and/or adjustments to the alignment or station location to avoid visual and aesthetic intrusion to the Scottish Rite resource.

Unit 10 –Elm Street to Akard Street (Alternative B4b)

The Build Alternative is entirely underground in this unit and except for surface station entrances and ventilation facilities, it would not impact the visual and aesthetic resources along the corridor. These surface facilities would be integrated with the existing urban setting and character.

3.10.6 Mitigation of Impacts to Visual and Aesthetic Resources

The visual and aesthetic impacts on the resource include station areas and other vertical elements such as catenary poles, LRT vehicles in operation on track, as well as underground station entrances, ventilation facilities, and TPSS and light standards. In order to mitigate the impacts of visual and aesthetic resources, DART could incorporate design features at stations and other LRT structures such as tunnel entrances in a manner that would be compatible with the surrounding area. DART specifically would need to work with the City of Dallas and affected building owners to develop architectural treatments, visual screening, landscaping and other features designed to minimize visual and aesthetic impacts to these resources.

In accordance with DART policies, mitigation is generally warranted where the proposed project would result in the following:

- Removal of features that are important to a community's visual character, such as a mature landscaping or historic structures;
- Disruption of a locally or regionally significant view such as the view from a residence towards the skyline or a park;
- Placement of the rail project opens up undesirable view or opens views from the trains into previously private spaces;
- Disruption of a community activities view or setting such as activities at adjacent parklands of or nearby schools; and
- Project design features do not conform to city zoning ordinance.

Various mitigation measures would be employed to address the significant impacts of the Build Alternatives and are summarized in Table 3-44. Mitigation measures that have been considered include, but are not limited to, the use of materials and finishes for LRT system elements that are consistent with the existing character of the area, the use of vegetation to screen views of the project, and changes to the guideway or location of elements so as to minimize their intrusion into the visual environment for affected viewers. These potential mitigation measures will be finalized and refined upon selection of a Locally Preferred Alternative.

Table 3-44. Impacts and Mitigation

Unit	Potential Impact	Mitigation
1- Victory to Woodall Rodgers Freeway (Common to all)	Low	None.
2 - Woodall Rodgers Freeway to Elm Street/Metro Center (Common to all)	Moderate	All Build Alternatives will require compliance with the West End Historic District. TOD treatment of north portal area
3 – IH 45 to Green Line (Common to all)	Low	None.
4 - Elm Street to IH 45 (underground) (B7)	Low	Integration of underground station entrances and ventilation facilities with existing adjacent buildings.
5 - Elm Street to Ervay Street (Alternative B4 only)	Moderate	TOD treatment of south portal area. Considered use of compatible materials and finishes for Government Center surface station and streetscaping of reconstructed Young Street.
6 - Ervay Street to Central Expressway (B4)	Moderate	Considered use of compatible materials and finishes for Harwood District surface station and streetscaping of reconstructed Young Street.. All Build Alternatives will require compliance with the Harwood Street Historic District.
7 - Central Expressway to IH 45 (B4, B4a, B4b)	Moderate	Considered use of compatible materials and finishes for Farmers Market surface station. Consider visual separation or integration of the station and older adjacent structure.
8 - Elm Street to Akard Road (B4a)	Low	Integration of underground station entrances and ventilation facilities with existing adjacent buildings.
9 - Akard to Central Expressway (B4a, B4b)	Moderate	Considered use of compatible materials and finishes for Farmers Market surface station. Consider visual separation or integration of the station and Scottish Rite Temple, and adjustments to alignment and station location. All Build Alternatives will require compliance with the Harwood Street Historic District.
10 - Elm to Akard (B4b)	Moderate	Integration of underground station entrances and ventilation facilities with existing adjacent buildings.

All Build Alternatives will require compliance with the Harwood Street Historic District and the West End Historic District. The City of Dallas has specific guidelines established for each of these historic districts regarding signs, parking, and facilities to ensure that future construction or new developments do not adversely affect the characteristics of those districts. DART would work with the City of Dallas' Development Services to meet the objectives of the development codes for this historic area.

3.11 Ecosystems

Existing ecosystems are described in this section, including terrestrial and aquatic habitats, vegetation, and fish and wildlife resources. Supplemental literature reviews, agency contacts, and reconnaissance-level site investigations in the project area were conducted to characterize the vegetation and fish and wildlife resources. A 300-foot project area corridor was established along the proposed Build Alternatives (150 feet on each side of the proposed alignment), to inventory the ecosystem components. A 0.25-mile radius area around proposed station areas was also inventoried for all ecosystem components.

3.11.1 Methodology

Ecological impacts were assessed to satisfy the requirements of NEPA and the Endangered Species Act. Ecological surveys were conducted in November 2008 and July 2009 to identify, characterize, and determine potential impacts to protected species, protected species habitat, and any other vegetation communities of ecological significance. The surveys focused on those areas within the limits of the existing street rights-of-way and areas immediately adjacent to the proposed project alignments. The survey was conducted by walking the alignments and documenting, through visual observation, photographic documentation and the various vegetation and wildlife.

Ecosystems and natural resources include vegetation, wildlife, and threatened, endangered, or otherwise sensitive species. The existing ecosystem in the study area is urban. It consists of planned vegetation and wildlife that has adapted to life in the city. There are no naturally existing ecosystems, all are manmade. The findings from the ecological surveys are provided below as existing conditions.

3.11.2 Environmental Setting

3.11.2.1 Wildlife Inventory Area

The study area is characterized by residential, commercial, industrial, and institutional uses, along with maintained road and railroad rights-of-way. These areas have little-to-no remnant native vegetation and provide sparse, fragmented habitat for common species adapted to urban environments.

3.11.2.2 Existing Habitat and Anticipated Wildlife

Overall, urban areas would potentially provide habitat for 97 bird species, 16 mammal species, 29 snake and lizard species, six turtle species, and three amphibian species (Johnston and Short 1989).

3.11.2.3 Mammal

During field surveys conducted in 2008 and 2009, mammalian wildlife observations documented the presence of eastern fox squirrel (*Sciurus niger*) within the study area.

3.11.2.4 Migratory Birds

During field surveys conducted in 2008 and 2009, one migratory bird species was observed, a common grackle (Quiscalus quiscula) within the study area. In addition

to the Endangered Species Act (ESA) ESA, migratory birds and the bald eagle *(Haliaeetus leucocephalus)* are also protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-712), as amended by the Fish and Wildlife Improvement Act of 1978 (P.L. 95-6-6) and the Bald Eagle Protection Act of 1940 (16 USC 668-668d), as amended.

Regulation 50 CFR Part 10.13 lists all migratory birds protected under the MBTA. The U.S. Fish and Wildlife Service (USFWS) has a legal mandate under the Fish and Wildlife Conservation Act of 1980, as amended (PL 100-653, Title VIII), to Identify, monitor, and assess species, subspecies, and populations of all migratory non-game birds (USFWS 1995b).

No active bird nests were observed during site reconnaissance activities.

3.11.2.5 Rare, Threatened and Endangered Wildlife

A combined total of 14 federal and state-listed rare, threatened, or endangered (RTE) species occurs, or potentially occurs, in the Dallas County area and project area. Information pertaining to the description and habitat requirements of the various species is presented in Table 3-45.

The ESA of 1973 (PL 93-205), as amended, was enacted to provide a program of preservation for federally listed endangered and threatened species and to provide protection for ecosystems upon which these species depend for their survival. An endangered species is a species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Proposed species are those that have been formally submitted to Congress for official listing as threatened or endangered.

The State of Texas has separate laws governing the listing of animals as endangered or threatened. Endangered or threatened animal species on the state list are those species so designated according to Chapters 67 and 68 of the Texas Parks and Wildlife Code and Section 65.171-65.184 of Title 31 of the Texas Administrative Code (TAC). Animals that are not currently listed by the federal government may be listed as endangered or threatened by the state. The state does not have authority, at this time, to list invertebrates. In addition to listing threatened/endangered species, the state also lists rare species that have no regulatory listing status.

All of the species in Table 3-45 that have been listed as threatened or endangered fell under the categories of birds or reptiles. No state or federally-listed threatened or endangered wildlife species or their potential habitat was identified during a field visit of the corridors on November 10, 2008. During the 2008 and 2009 studies, no federally designated critical habitat was observed in support of the listed species within the study area.

The Arctic peregrine falcon (*Falco peregrinus tundrius)* normally nests in the Arctic tundra with a migration range from northern Alaska, Canada, and Greenland to Central and South America during the fall months (USFWS 1999b). This species has been delisted federally; however, it is still listed as threatened in Texas. A peregrine

Table 3-45. Threatened / Endangered Species of Dallas County

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present	Species Effect
Birds					
American Peregrine Falcon *Falco peregrinus anatum*	DL	T	Nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winter along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	No	No
Arctic Peregrine Falcon *Falco peregrinus tundrius*	DL	—	Nests in tundra regions; migrates through Texas; winter inhabitant of coastlines and mountains from Florida to South America. Open areas, usually near water.	No	No
Bald Eagle *Haliaeetus leucocephalus*	DL	T	Nests and winters near rivers, lakes and along coasts; nests in tall trees or on cliffs near large bodies of water.	No	No
Black-capped Vireo *Vireo atricapilla*	LE	E	Prefers oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	No	No
Golden-cheeked Warbler *Dendroica chrysoparia*	LE	E	Nests in juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer.	No	No
Interior Least Tern *Sterna anitllarum athalassos*	LE	E	Nests along sand and gravel bars within braided streams and rivers; also known to nest on man-made structures.	No	No
Peregrine Falcon *Falco Peregrinus*	DL	T	Subspecies migrate across the state from more northern breeding areas in U.S. and Canada to winter along coast and farther south.	No	No
Piping Plover *Charadrius melodus*	LT	T	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats.	No	No
White-faced Ibis *Plegadis chihi*	—	T	Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.	No	No
Whooping Crane *Grus americana*	LE	E	Estuaries, prairie marshes savannah, grasslands, croplands pastures- winter resident at Aransas NWR, Aransas and Matagorda.	No	No

Table 3-45. Threatened / Endangered Species of Dallas County (continued)

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present	Species Effect
Wood Stork *Mycteria americana*	—	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, inhabits mud flats and other wetlands.	No	No
Reptiles					
Alligator Snapping Turtle *Macrochelys temminckii*	—	T	Perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October.	No	No
Texas Horned Lizard *Phrynosoma cornutum*	—	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; sandy to rocky soil.	No	No
Timber/ Canebrake Rattlesnake *Crotalus horridus*	—	T	Swamps, floodplains, upland woodlands, riparian zones, abandoned farmland; prefers dense ground cover, i.e. grapevines or palmetto.	No	No

E, T - Endangered/Threatened, LE – Listed Endangered

Source: Texas Parks and Wildlife Department, August 8, 2007.

falcon (*Falco peregrinus*), probably of the Interior West population (not the Arctic breeding population), was observed in downtown Dallas during the field surveys on March 7, 2001 (Northwest Corridor Final Environmental Impact Statement [FEIS], DART). The falcon was observed flying over downtown Dallas. Food resources such as rock doves (pigeons) are abundant in the area for this bird. No known nesting sites for the falcons are documented in the downtown Dallas area (TPWD 2001a).

The Texas Natural Diversity Database (TxNDD) maintains a database of observations of tracked species and assemblages throughout the state. The TxNDD identified several species that have historically occurred in Dallas County. The TxNDD was searched for Element of Occurrence Record (EOR) to determine if any reports of species having been sighted within the vicinity of the proposed project. The results of that search were provided and covered a radius of approximately ten miles surrounding the project area, and revealed three sightings of threatened or endangered species, rare communities, or rookeries within Dallas County. No managed areas were identified within 1.5 miles of the project.

Two rookeries were recorded in the EO Records (EO Id #'s 1439 and 2952) approximately seven to eight miles from the proposed project. The EO Records do not provide detailed information on the habitat at the location of the recorded sightings, so a direct comparison to the habitat within the project area is not possible. However, the construction impacts for the proposed project would be limited to the immediate vicinity of the proposed trail. Impacts to the recorded species are not anticipated.

The NDD is the TPWD's most comprehensive source of information on rare, threatened, and endangered plants, animals, invertebrates, exemplary natural communities, and other significant features. However, the data is not all-inclusive, as there are gaps in coverage and species data, due to the lack of access to land or data, and a lack of staff and resources to collect and process data on all rare resources. The NDD does not include a representative inventory of rare resources in the state and cannot provide a definitive statement as to the presence, absence, or condition of special species, natural communities, or other significant features in any area. Nor can these data substitute for on-site evaluation by qualified biologists.

3.11.2.6 Vegetation Inventory

Dallas is located on Blackland Prairie soil. Due to the urban development within the project area, only four plant communities were identified, which include urban, grassland, shrubland, and woodland. The plant communities identified had generally uniform species composition and canopy stratification.

3.11.2.7 Existing Vegetation

The Build Alternatives are located in an urban setting with little to no natural vegetation. The majority of the trees, shrubs, and herbaceous cover along the study area represent streets that are landscaped, as are several street medians in the study area.

Where present, dominant trees consist of live oak (*Quercus virginiana*), cedar elms (*Ulmus crassifolia),* Foster's Holly (Ilex x attenuata 'Fosteri"), Mexican Plum (Prunus mexicana), and Texas smoke tree (Cotinus obvatus). Shrubs are generally absent from the study area, but where present generally consist of crepe myrtle (*Lagerstroemia indica*) in street medians. Dominant herbaceous species are present primarily in landscaped areas and consist of Bermuda grass (*Cynodon dactylon*) and St. Augustine grass (*Stenotaphrum secundatum)*

Overall, the variety of existing shrub and ground cover within the study area vegetation is sparse. The area is urbanized, meaning it is mainly man built structures. There is no naturally existing vegetation, only what can be found in planters and in parks. The vegetation that does exist includes grass, hedges and trees.

3.11.2.8 Threatened and Endangered Vegetation

All trees that are more than eight inches in diameter are protected in the city of Dallas except for the following: Chinese Tallow; Silver Maple; Siberian Elm; Velvet Ash; Black Willow; Hackberry; Chinaberry; Tree of Heaven; and Horseapple (fruiting Bois d'arc).

3.11.3 Impact Assessment

Impacts to federally listed threatened and endangered species are regulated under Section 7 of the Federal Endangered Species Act of 1973, as amended (16 USC 1531 et seq.), which provides for the conservation of endangered and threatened species of fish, wildlife, plants, and the critical habitats where they live.

Impacts to state-listed threatened and endangered species are regulated by the Texas Parks and Wildlife Department.

Impacts to migratory birds are regulated under the MBTA of 1918, which prohibits the taking of migratory birds, their nests or their young; no nesting, feeding or breeding areas would be affected.

There are two types of impacts that could potentially affect the ecosystems along the proposed alignments. Direct impacts to such areas result from buildout of the proposed transportation facility. Proximity impacts to ecosystems may arise from construction or operation of the transportation facility. The potential impacts to ecosystems are provided below.

3.11.3.1 Mammals

No Build Alternative

Mammals will not be impacted if no construction commences under a No Build Alternative.

Build Alternatives

Direct Impacts:

On the basis that there was limited observations of mammals and urbanized setting of the study area, the Build Alternatives are not likely to directly impact the habitat of mammalian life.

Proximity Impacts:

It is not anticipated that the construction of this transportation facility will significantly alter habitat for mammalian life as a long-term consequence of its construction and operation.

3.11.3.2 Migratory Birds

No Build Alternative

Under the No Build Alternative, there will be no impacts to migratory birds if no construction is undertaken.

Build Alternatives

Direct Impacts:

On the basis that there was limited observations of migratory birds and urbanized setting of the study area, the Build Alternatives are not likely to directly impact the habitat of migratory birds.

Proximity Impacts:

It is not anticipated that the construction of this transportation facility will significantly alter habitat for migratory birds as a long-term consequence of its construction and operation.

3.11.3.3 Rare, Threatened, and Endangered Species

No Build Alternative

The No Build Alternative will not impact any RTE species since no development will result from that circumstance.

Build Alternatives

Since no habitat exists along any of the proposed alternatives, the Build Alternatives would have not have an effect on any state or federally-listed threatened or endangered wildlife species for Dallas County.

Since there are no threatened or endangered plant species present in the study area, the Build Alternatives would have no effect on any threatened or endangered plant species.

3.11.3.4 Vegetation Impacts

No Build Alternative

Under the No Build Alternative, no impacts to the existing vegetation within the ecosystems would take place since no activity would occur.

Build Alternatives

Direct Impacts

Alternative B7 would be almost entirely in underground and would have little or no impacts to the urban vegetation.

Alternatives B4a and B4b would be primarily underground to the west. East of the underground sections, the alignments become at-grade near Harwood Street and could potentially impact one or two landscape trees in the median of the Central Expressway Downtown access road. These trees, Bradford pear (Pyrus calleryana) ornamentals, are not unique to the area and would be avoided to the maximum extent practicable.

Alternative B4 would have the greatest length of at-grade track of all the alternatives and therefore, has the greatest potential for impacts to the urban vegetation. The vegetation impacted would mainly be trees and shrubs planted in front of buildings along the sidewalks and within sections of the median of Young Street. The trees are predominantly cedar elms (Ulmus crassifolia) and live oaks (Quercus virginiana) and the shrubs are mainly burford holly (*Ilex cornuta 'Burfordii'*) and Texas sage (*Salvia texana)*. These are common plants for the area and would be avoided to the maximum extent practicable.

Proximity Impacts

Landscaping for any of the Build Alternatives would replace existing vegetation removed by construction efforts and would likely increase the number of plantings for the corridor over existing conditions.

3.11.4 Mitigation Measures

Impacts to vegetation and wildlife as a result of the Build Alternatives could potentially occur in a few sparsely wooded lots and where landscaping is proposed to be eliminated (e.g., along street segments lined by residential lots and landscaped street medians). Potential mitigation measures include minimizing clearing, cutting, and pruning of trees where possible and include new landscaping vegetation as part of the design of the D2 project. Because of the lack of potentially impacted natural vegetation communities, no other formal mitigation is proposed for this project. In

accordance with the MBTA, any necessary right-of-way clearing would preferably be conducted outside the general bird nesting season.

3.12 Water Resources

This section describes jurisdictional water resources which exist within the D2 study area. An evaluation of the potential impacts to such areas resulting from construction of the Build Alternatives is presented below, as a consequence for the unavoidable impacts. Additionally, summaries of avoidance, minimization, and mitigation measures for each impacted resource area are also provided herein.

Jurisdictional Waters Resources include surface waters, watersheds, floodplains, and other waters of the US, including Wetlands. Waters of the US are regulated under Section 404 of the Clean Water Act (CWA), which is enforced by the US Army Corps of Engineers (USACE). Waters of the US are defined as, "*All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide*", including, but not limited to:

> Waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters.

3.12.1 Environmental Setting

3.12.1.1 Groundwater

Groundwater data within the D2 study area was procured by reviewing available public records and maps, along with coordination with local authorities. The US Department of Agriculture (USDA) Soil Conservation Service Soil Survey of Dallas County, Texas, Dallas County and the City of Dallas provided a majority of background information regarding soils and hydrogeologic conditions within the D2 study area.

Hydrogeology

The D2 study area consists of basal Trinity sands, the Paluxy sands, and the Woodbine sands provide most of the groundwater in the area, while lesser amounts are produced from sands and gravel of the Quaternary alluvium and terrace deposits. The aquifers are recharged by infiltration of water from precipitation, lakes, and streams along the outcrop.

Ground Water Quality

Common substances that pollute groundwater in the Dallas area consist of organic and inorganic chemicals. The primary organic pollutants are pesticides, solvents, degreasers, petroleum components, and industrial by-products. Inorganic pollutants include fertilizers (nitrates), heavy metals, and bacteria.

Well and Septic Systems

Although most water for public consumption in the Dallas/Fort Worth area is supplied by surface reservoirs, some smaller communities and unincorporated areas still use groundwater as a source of supply.

3.12.1.2 Floodplains

The presence of floodplain boundaries within the D2 study area were evaluated on May 22, 2007, using *Flood Insurance Rate Maps* (FIRM) produced by the Federal Emergency Management Agency (FEMA). The City of Dallas and Dallas County are participants in the National Flood Insurance Program. The D2 study area includes Flood Zone X unshaded, Zone X shaded, and Zone AE. The entire project (Alignment Alternatives B4, B4a, B4b, and B7) is located within Zone X unshaded according to the Flood Insurance Rate map No. 48113C0340J dated August 23, 2001, as shown in Figure 3-47. Zone X unshaded is defined as "areas determined to be outside the 500-year floodplain", Zone X shaded is defined as "areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than one square mile; and areas protected by levees from 100-year flood", and Zone AE is defined as "base flood elevations determined."

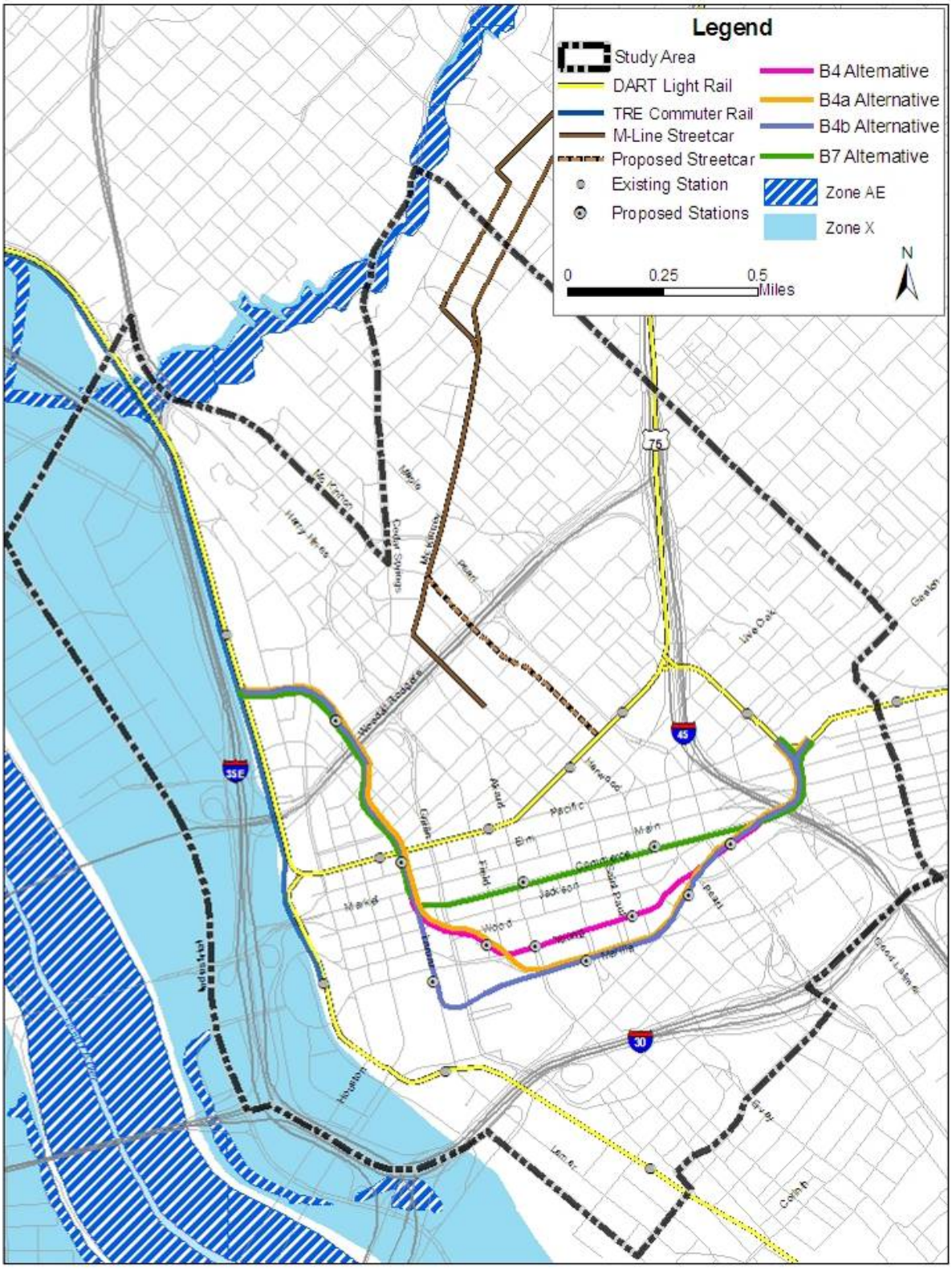
3.12.1.3 Surface Water Resources

Watershed Characteristics and Geomorphic Conditions

Watershed characteristics within the D2 study area were reviewed using published information and coordination with local agencies. The project study area is within the Upper Trinity River watershed, which consists of 460,000 acres. Contact with the City of Dallas' Storm Water Management and Floodplain Management departments indicated no current plan of best management practices (BMPs) for physically reducing pollutants in storm water discharge. However, they have distributed information to the public as to the overuse of lawn chemicals and the hazards of discarding rubbish into storm sewer inlets. The Texas Commission on Environmental Quality (TCEQ) was contacted regarding Total Maximum Daily Loads (TMDLs) for the Upper Trinity River watershed. A TMDL is a determination pursuant to Section 303(d) of the Clean Water Act of maximum amount of a pollutant that can be introduced into a water body in order for that water body to achieve or remain in compliance with applicable water quality standards. The TCEQ stated that TMDLs for segment 0805 of the Upper Trinity River are currently under study for Polychlorinated Biphenyls. Current levels along this segment of the Trinity River have levels of PCBs ranging from 1.6 ng/L to 3.2 ng/L. The Texas Surface Water Quality Standards (TSWQS) has a criterion of 1.3 ng/L for safe consumption of fish by humans. Per the TMDLs for PCBs in Segments 0805, 0806, 0829, and 0841 of the Trinity River Final Technical report, the target goal is to reduce the levels to 0.57 ng/L. TCEQ indicated an implementation plan approved by the stakeholders is slated for late 2010. Since existing sediments within the river represent 63% of the loads and treated waste water effluent from Waste Water Treatment Facilities (WWTF) represented only 8% of the load, the implementation plan would require measures other than reducing the amount treated effluent and storm water discharge.

The contributing watershed of the D2 study area can be generally described as a heavily urbanized area that consists of commercial and residential development, roadways, and the railroads. Runoff within the D2 study area is conveyed to subsurface sewer systems. Currently the City of Dallas does not treat storm water to limit the TMDL for the receiving sewer system that would discharge into the Upper Trinity River.

Figure 3-47. Floodplains



Source: PB/AZB Joint Venture; FIRM 48113C0345J

Chemical Water Quality

Contaminates enter the waterway by several means, including point and non-point sources. Point sources typically refer to regulated facilities that outfall treated effluent into the water body. Three facilities near the project study area are the City of Dallas Central WWTF, City of Dallas Southside WWTF, and the Trinity River Authority Central WWTF. Non-point sources include storm water discharges, upstream pollutants, pollutants within existing sediment, and overland flow into the river. Information pertaining to the ambient water quality was obtained from the TCEQ website in the 2008 Water Quality Inventory. These elements are depicted in Table 3-46 below. In addition, Segment 0805 of the Upper Trinity River is listed as threatened/impaired for polychlorinated biphenyls (PCB) in Edible Tissue on the approved 2008 EPA 303(d) list, which is adjacent to the D2 study area.

Table 3-46. Summary of Field Measurements and Water Chemistry for Trinity River Segment 0805

Constituent	Standard Criteria	Mean Value Detected	Status
Ammonia	0.33	NL	NC
Chlorophyll-a	14.10	NL	CS
Nitrate	1.95	NL	CS
Orthophosphorus	0.37	NL	CS
pH	6.5-9.0	NL	FS
Chloride	175.0	48.64	FS
Sulfate	175.0	74.19	FS
Total Dissolved Solids	850.0	395.69	FS
Chlordane	NL	NL	TMDL Implemented
PCBs	1.3	NL	TMDL Underway
Dissolved Oxygen	5.0	NL	NC

Source: PB/AZB Joint Venture
NC – No Concern
CS – Concern for Screening Level
FC – Fully Supporting
NL – Not Listed

3.12.1.4 Waters of the US, including Wetlands

The presence of waters of the US, including Wetlands, were evaluated using US Geological Survey (USGS) Maps, National Wetland Inventory (NWI) Map (Dallas Quad), local planning records, and subsequent field verification. In reviewing the USGS Maps, NWI Maps, local planning records, and subsequent field verification, it has been determined that there are no waters of the US, including Wetlands, within the D2 study area.

3.12.2 Impact Assessment

There are two types of impacts that could potentially affect jurisdictional water resource areas along the proposed alignments. Direct impacts to such areas result

from build-out of the proposed transportation facility. Proximity impacts to jurisdictional water resources may arise from construction or operation of the transportation facility. The potential impacts to jurisdictional water resource areas are provided below.

3.12.2.1 Ground Water Impacts

No Build Alternative

The No Build Alternative would not cause any impacts to groundwater quality within the D2 study area.

Build Alternatives

Direct Impacts:

The Build Alternatives have the potential to adversely affect groundwater quality. It should be noted however, that this area of Dallas / Fort Worth has been heavily urbanized for many years within the project corridor and has already been impacted by decades of runoff from nearby commercial and residential developments, streets, and the existing railroads. Due to urban development, the groundwater table in this area is low, dropping to as much as 1,200 feet below the surface.

Proximity Impacts:

Long-term impacts to groundwater quality would likely be reduced by the Build Alternatives due to decreases in vehicular traffic associated with use of the LRT. The Build Alternatives are not expected to impact aquifers within the project area. The project is located within Woodbine minor aquifer which is part of the Trinity major aquifer. Because it is near the area of the Woodbine aquifer which falls below other rock layers and not near any outcrops, it is unlikely that surface runoff would impact these groundwater resources.

3.12.2.2 Floodplain

No Build Alternative

The No Build Alternative would not cause impacts to floodplains. No fill material or excavation would take place and the floodplain water elevation would not be altered.

Build Alternatives

Direct Impacts:

Zone X has been determined to be outside of jurisdictional floodplain boundaries; and therefore, no direct impacts to floodplain will occur as a result of the Build Alternatives.

Proximity Impacts:

The proposed Build Alternatives would not increase the base flood elevation to a level that would violate the applicable floodplain regulations or ordinances.

3.12.2.3 Surface Water Resources

No Build Alternative

Under a No Build Alternative, no construction would occur; and therefore, no surface waters impacts would occur.

Build Alternatives

Direct Impacts:

The Build Alternatives do not result in any direct impact to surface waters, other than the contributing watershed of receiving sewer facilities. Therefore, no direct impacts to waters of the U.S. would occur. The D2 study area represents a previously developed, heavily urbanized area within the Dallas/Fort Worth community. Any new fill associated with the Build Alternatives will ultimately occur in areas that are currently paved, or otherwise impervious surfaces. More specifically, the Build Alternatives would either follow the existing roadway pavement, existing paved parking areas, or be tunneled underground. There would be a minimal increase in impervious surface within the D2 study area; therefore, an increase in storm water runoff is not expected within the ultimate watershed region.

Despite most of the runoff from the project being captured in surface inlets and outfall into existing storm drains, some of the runoff would enter the subsurface areas of the guideway through tunnel portals or from seepage through subsurface strata. Since the proposed tunnel sections would be below the grade of existing storm sewer systems, measures would be included in the design to minimize seepage and remove water accumulating within the tunnels. Water entering the tunnels originates from existing surface runoff and percolation and not anticipated to create an additional impact to waters of the U.S.

There are typical values of allowable seepage limits used, dependent on the construction method adopted. The DART design criteria sets limits on allowable seepage for underground works [see Section 18 of the criteria]. For tunnels, the total seepage flows are relatively small but underground stations are usually designed to allow slightly larger volumes of seepage as it is more difficult to seal them as they have a greater surface area. Per DART design criteria relating to soft ground tunnels, the "infiltration of groundwater into the tunnel shall not exceed 0.2 gpm in any 250 linear feet nor more than 0.1 gpm in any 50 linear feet for a single track tunnel. Twin-track tunnels may have twice the above amount."

Inundated conditions within tunnels from existing groundwater seepage and other contributing factors to flooding (i.e., inflow) will be accounted for in the design of the Build Alternatives, including the proposed development at Government Center, Convention Center Hotel, and City Hall stations.

There will also be cooling water return and station cleaning water; however, impacts will not be substantial.

Proximity Impacts:

The proposed design and construction of the guideway alignment and adjacent stations under the Build Alternatives is anticipated to include modifications to the existing storm sewer systems. Modifications to existing storm sewers would result from construction of the project and station facilities. Existing storm sewers affected by the proposed construction would be analyzed during the design phase to ensure no flooding would occur to adjacent properties.

Construction activities have the potential to cause minor impacts to surface waters of the Trinity River due to runoff/sedimentation from grading activities, accidental spills

of fuel or other chemicals that run into existing storm sewers and outfall into the River. A long-term impact to surface water quality is not likely to increase for the Build Alternatives.

Station platforms would consist of impervious surfaces, but since the area is already heavily developed, the Build Alternatives are not likely to increase runoff over existing conditions.

Long-term effects to surface water quality may occur as a result of pollutants emitted from passing vehicles, which would be carried to surface waters via storm sewers.

Overall, degradation of surface water quality is not expected due to the developed nature of the corridor, the limited number of natural resources in the area, and expected reduction in roadway traffic related to implementation of the transit line.

3.12.2.4 Waters of the US, including Wetlands

No Build Alternative

Under the No Build Alternative, no fill material or excavation would take place and the floodplain water elevation would not be altered.

Build Alternatives

Direct Impacts:

Given that no Waters of the US, including Wetlands, were identified within the limits of the D2 study area, the Build Alternatives will not result in impacts to such resources.

Proximity Impacts:

Although the Upper Trinity River (stream segment 0805) borders the study area, its surface water is not likely to be affected by construction of the Build Alternatives. See "Proximity Impacts" under section 3.12.2.3 for additional long-term concerns relating to other adjacent jurisdictional water resources.

3.12.3 Mitigation for Proximity Impacts to Adjacent Jurisdictional Water Resource Areas and Receiving Sanitary Sewer System

The proximity impacts which described above will primarily affect groundwater and surface water quality to jurisdictional water resources adjacent to the D2 study area and the receiving sanitary sewer system. The ensuing mitigation measures will be implemented to address these impacts.

3.12.3.1 Development of Stormwater Pollution Prevention Plan (SW3P), associated Erosion and Sedimentation Controls (ESC)

A Texas Pollutant Discharge Elimination System (TPDES) permit (i.e., Construction General Permit) shall be obtained from the Texas Commission on Environmental Quality (TCEQ) to manage and treat discharge of pollutants into waters of the US that may result from construction of the transportation facility. As required by the TCEQ-TPDES program for disturbance of greater than five acres of land, DART shall prepare a SW3P for these construction activities. As a mandatory requirement of the TCEQ-TPDES permit, the permit holder shall implement a SW3P that must address the surface water and ground water quality concerns of the project by incorporating

temporary and permanent erosion control measures (ESC), as well as drainage and discharge control for the approved project area.

3.12.3.2 Erosion and Sedimentation Controls

Temporary erosion and sedimentation control measures such as silt fences, rock berms, clear water diversions, and/or soil retention blankets would be implemented as needed prior to the initiation of construction. Additional ESC measures will be determined as construction phasing progresses, and installation / maintenance will be evaluated based changing site conditions.

3.12.3.3 Best Management Practices

Additionally, the TPDES prescribes a series of measures or BMPs that may serve to minimize the aforementioned proximity impacts to surface water and ground water quality. Appropriate BMPs used to mitigate these water quality impacts may include: limiting the amount of disturbed earth so the potential for excessive erosion is minimized and sedimentation outside of the right-of-way is avoided and preserving existing vegetation wherever possible.

The construction contractor would also be required to take appropriate measures to prevent, minimize and control spillage of hazardous materials in the construction staging area. All materials being removed or disposed of by the contractor would be done in accordance to applicable state and federal laws and as not to degrade ambient water quality. All of these measures would be enforced under appropriate specifications in the final design plans.

Runoff from this project would discharge into storm sewers within five stream miles upstream of Segment 0805 the Upper Trinity River, which is listed as threatened/impaired for PCBs in Edible Tissue on the approved 2008 EPA 303(d) list. BMPs would be in place prior to construction and post construction to reduce sediment from entering storm sewer systems and to control erosion. The selection of BMPs will be evaluated and determined based on construction phasing and changing site conditions.

3.12.3.4 Rail Line Tie Materials

The majority of rail line ties used for the transportation facility will be concrete. Wood ties would be used in some areas where switches are required. Minimizing the use of wood rail ties, which contain chemical preservatives, would aid in reducing the amount of these chemicals in the runoff. Since the DART trains are electric, petroleum products and related chemicals associated with combustion engine driven vehicles would be reduced; and therefore, would not enter the storm sewers through runoff and consequently degrade water quality.

3.12.3.5 Dewatering / Flood Control

Under the proposed conditions, seepage at these areas will be drained by collecting inflow along the tunnel trackbed to convey positive flow toward the tunnel's low point. The low point will then be dewatered using pumps that will redirect inflow to the station sumps. At the sump locations, a station pumping system will then discharge the seepage to ground level.

There will be separate drainage pumps for seepage and effluent ejector pumps for sanitary sewerage. It is anticipated that discharge permits may be necessary for the separators to discharge into local sewers. Mitigation for facility maintenance appurtenances, such as cooling water returns and cleaning water measures, will be implemented with respect to the guidelines of the aforementioned SW3P.

3.13 Energy

An energy analysis has been conducted for the D2 project that uses "rules-of-thumb" applied to the study corridors to estimate the effect of the alternatives with respect to energy expenditures. Transportation-related energy is usually separated into two main categories: direct energy, which is fuel consumed by traveling vehicles and indirect energy, which is the energy associated with the construction, operation, and maintenance of the facility itself.

3.13.1.1 Rail Effects on Vehicular Traffic

The operation of the Build Alternatives along surface sections would require vehicular traffic crossing the line to be stopped for short durations and therefore require additional consumption of energy resources due to stopped vehicles idling at the crossings. However, this is not expected to result in an adverse impact to energy resources. In addition, the operation of the LRT would provide congestion relief by reducing the number vehicles using roadways. This would result in energy consumption reductions, which may offset any additional energy consumed from vehicles being stopped at crossings.

3.13.2 Energy Use

Energy usage for transportation is measured in VMT, modes of transportation used, and energy usage per mile. The City of Dallas population continues to grow, and NCTCOG forecasts an increase growth in population for the City of Dallas of 17 percent from 2000 to 2030. The population for the region which includes the 10 urban counties within and surrounding the Metropolitan Planning Area is expected to increase by 80 percent within the same timeframe. Increased population results in increases in congestion on roadways and increases in total VMT. Additionally, travel times would likely increase with more vehicles on the roadways. As VMT increases, so does the consumption of fossil fuels leading to poorer air quality. Currently, Dallas is part of a nine-county region that is in non-compliance for ozone per the NAAQS. If air quality continues to deteriorate, it may jeopardize receiving federal funding for future transportation projects.

3.13.2.1 No Build Alternative

Construction of the No Build Alternative would not require the use of energy resources, whereas energy resources, such as petroleum fuel, lubricants, and paving products, would be used for all of the Build Alternatives. The energy required to operate the No Build Alternative would be in the form of increased congestion on roadways and associated fuel consumption.

3.13.2.2 Build Alternative

Implementing any of the Build Alternatives would require the expenditure of substantial amounts of energy. Energy is consumed in operating equipment at the construction site and in producing and transporting construction materials. In considering energy usage

for construction, factors to be evaluated are length of guideway, number of stations, and the amount of underground versus at grade construction. To quantify and compare the amount of energy required to construct each option, each option was divided into the total number of track-miles constructed at grade or in underground structures. Construction energy requirements were then derived by multiplying these lengths by the equivalent barrel of oil (Bbl) use per-mile estimates to determine the amount of energy necessary to construct various types of track. The construction energy requirements for the options are summarized in Table 3-47.

Table 3-47. Construction Energy Use

Build Alternative	Miles of Guideway	Number of Stations	Bbl Consumed Per mile/Per Station	Total Bbl by Track Section	Total Bbl Consumed by Alternative
B7 (Lamar-Commerce)					
Track @ Grade Track Underground Stations Underground Stations @ Grade	0.8 1.4	 3 1	2,900 13,000 1,000 250	2,320 18,200 3,000 250	
Alternative B7 Totals	2.2	4		23,770	23,770
B4 (Lamar-Young)					
Track @ Grade Track Underground Stations Underground Stations @ Grade	1.6 0.5	 1 4	2,900 13,000 1,000 250	4,640 6,500 1,000 1,000	
Alternative B4 Totals	2.1	5		13,140	13,140
B4a (Lamar-Marilla)					
Track @ Grade Track Underground Stations Underground Stations @ Grade	1.1 1.1	 3 2	2,900 13,000 1,000 250	3,190 14,300 3,000 500	
Alternative B4a Totals	2.2	5		20,990	20,990
B4b (Lamar-Convention Center)					
Track @ Grade Track Underground Stations Underground Stations @ Grade	1.1 1.3	 3 2	2,900 13,000 1,000 250	4,060 16,900 3,000 500	
Alternative B4b Totals	2.4	5		24,460	24,460

Source: PB/AZB Joint Venture
Note: Bbl = Equivalent barrel of oil

The energy usage per guideway type is an approximation and is being used to compare energy use during construction for the four Build Alternatives. The overall lengths of the alignment alternatives are similar. Since there are considerable differences in the lengths of underground track between Alternative B4 (Lamar-Young) and the remaining alternatives, there is a statistically significant difference between the expenditure of energy that would be needed to construct the B4 Alternative and the other remaining options. The major energy difference is attributable to B4 having the shortest length of underground construction. The other three options are slightly longer than the B4 Alternative, but have at least 50 percent of their overall alignment being constructed underground. Alignment Alternative B4b would require approximately 85 percent more energy expenditure than Alternative B4.

3.13.3 Operating Energy

Table 3-48 displays energy usage for various forms of transportation per vehicle mile. A common unit of energy measurement is the British Thermal Unit (BTU). For example, one gallon of gasoline contains approximately 0.13 Million BTUs.

Table 3-48 below shows the energy intensity for cars, transit bus, and LRT and their relationship between BTU use per mile. The purpose of this table is to show a relationship between the transport modes of cars and transit bus compared to LRT.

Table 3-48. Transportation Energy Intensity per Vehicle Mile

Transport Mode	BTU/Vehicle Mile
Cars	5,514
Transit Bus	37,310
LRT	62,797

Source: Department of Energy's chart #2-12, Transportation Energy Data Book, 27th Edition. BTU = British Thermal Unit

Table 3-49 shows energy usage for the same modes of transport per passenger mile traveled. When passengers are included in the data set, the BTU per mile for LRT is more efficient than both cars and the transit bus. This is direct result from the number of people using LRT compared to cars and transit buses.

Table 3-49. Transportation Energy Intensity per Passenger Mile

Transport Mode	BTU/Passenger Mile
Cars	3,512
Transit Bus	4,235
LRT	2,784

Source: Department of Energy's chart #2-12, Transportation Energy Data Book, 27th Edition

Based on the daily vehicle miles traveled, the change in energy consumption for implementation of one of the Build Alternatives verses the No Build Alternative was calculated. The daily energy used for the No Build Alternative was calculated to be approximately 393,800 million BTU's. For the Build Alternatives the approximate daily amount of energy calculated 393,600 million BTU's. There is not a significant difference in daily energy consumption between the No Build Alternative and the Build Alternatives. It was considered that all of the alignment alternatives would be similar in vehicle miles traveled.

3.13.4 Mitigation

No mitigation is required. It is concluded that an energy savings would be realized with the any of the Build Alternatives, therefore improving roadway congestion and air quality.

3.14 Geology and Soils

This section describes the existing conditions of and impacts to geology and soils.

3.14.1 Environmental Setting

3.14.1.1 Soil

The soil survey of Dallas County, Texas classifies the soil within the study area as Urban Land. Urban Land consists of soils that have been altered or modified during development (United States Department of agriculture Soil Conservation Service in cooperation with Texas Agricultural Experiment Station soil survey of Dallas County, Texas, February 1980). The study area is extensively built up with over 75 percent covered by buildings or pavement. The capability of the soil is not classified, but would be evaluated during the engineering design of the facility.

3.14.1.2 Subsurface Geology

Dallas County and the city of Dallas are located on the updip edge of the Gulf Coastal Plain at the northwestern limit of a large structural feature known as the East Texas Basin. A wedge of Cretaceous-aged sediments, thickening eastward, overlies Paleozoic rocks. These beds dip toward the East Texas Basin at rates of 50 to 100 feet per mile. The Cretaceous sediments reach a maximum thickness of approximately 4,450 feet toward the east and thin to approximately 1,970 feet toward the west within Dallas County. Immediately overlying the Paleozoic rocks are sediments of the Trinity Group, which in turn are overlain by sediments of the Washita and Woodbine Groups.

The outcropping Cretaceous units in Dallas County are the Eagle Ford Shale, the Austin Chalk, and the Ozan Formation. The older beds are exposed toward the west, and the younger beds are exposed toward the east. Quaternary alluvium and fluviatile terrace deposits are found in the flood plains of rivers. According to the Geologic Atlas of Texas, Dallas Sheet (Bureau of Economic Geology, University of Texas at Austin), the Build Alternatives are located on Quaternary alluvium and fluvial deposits within the Austin Chalk Formation overlying the Eagle Fork Shale Formation.

The proposed tunnels of the Build Alternatives would be located within the Austin Chalk strata. Austin Chalk is a structurally stable non-porous limestone conducive to tunneling operations. The underlying Eagle Ford Shale is an organic carbon mudstone that weathers easily when subjected to the elements and is prone to slaking. Figure 3-48 provides a section cut of the sub-surface geology in the study area.

3.14.2 Impacts

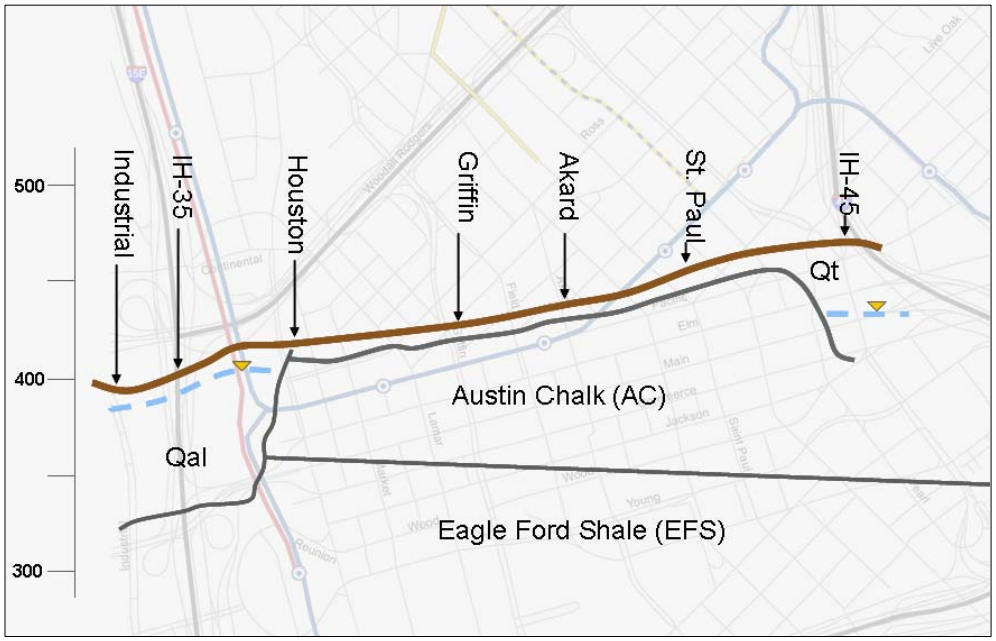
3.14.2.1 No Build Alternative

The No-Build Alternative would involve minimal construction activities and would, therefore, not result in impacts to geology or soils.

3.14.2.2 Build Alternative

The Build Alternatives would consist of subsurface and surface facilities. Changes to the geology would occur as a result of the Build Alternatives. Since the Build Alternatives are located within the Austin Chalk subsurface area, which is conducive to tunneling, disturbance to geological resources would be limited to the tunnel section itself, where

Figure 3-48. Study Area Geology



Source: PB/AZB Joint Venture, Alternatives Development and Alignment Screening Report

rock would be bored and removed. Austin Chalk and Eagle Ford Shale formations contain Paleontological remains. Care should be taken during trenching and tunneling operations to protect archeological resources, as discussed in Section 3.8.

The at-grade sections of the Build Alternatives would involve excavation and grading mainly along existing streets and paved parking areas. The soils that would be impacted under the Build Alternatives have already been disturbed through past development activities. Therefore, adverse impacts to soils are not anticipated.

3.14.3 Mitigation for Impacts to Geology and Soils

Geological disturbances would be limited to the tunnel section itself, and surface areas will require demolition and excavation of previous development. No adverse impacts to geologic resources are expected. Mitigation will be limited to following BMPs and measures specified in the TPDES permit. These include measures for minimizing soil erosion during construction and containment and cleanup of any hazardous spills and discarded construction debris.

3.15 Hazardous/Regulated Materials

Materials that may constitute a hazardous waste include petroleum products, pesticides, organic compounds, heavy metals, or other compounds injurious to human health and the environment. At uncontrolled or abandoned hazardous waste sites, pollutants can seep into the ground, flow into rivers and lakes, and contaminate soil and groundwater.

Hazardous waste sites may be encountered during construction of the projects. The nature and extent of contamination can vary widely. Early detection, evaluation, and remediation of hazardous waste are essential to ensure minimization of project delays, protection of the environment, and construction worker safety.

This section identifies and summarizes regulated and hazardous material sites adjacent to the Build Alternatives. These sites could potentially pose a threat to construction. Encountering hazardous and regulated materials is only expected during construction while conducting subsurface activities. Excavation for preparing the project guideway subgrade, utility relocations, placement of drainage structures, tunneling operations, station construction, and installing devices for system operations would be some of these activities. Identification of regulated and hazardous material sites will help to:

- Protect the health and safety of construction workers and other personnel during construction of the D2 facility.
- Help to avoid encounters with these materials during construction and to minimize releases of any of these materials.
- Help to minimize any remediation efforts and delays in schedule.

Hazardous materials are regulated by numerous laws and regulations, including, but not limited to:

- Resource Conservation and Recovery Act (RCRA)
- Comprehensive Environmental Response Compensation and Liability Act (CERCLA, or Superfund)
- Toxic Substances Control Board (TSCA)

3.15.1 Environmental Setting

The hazardous materials assessment consisted of a review of selected regulatory agency databases to identify sites of concern from the regulatory agency database report. Minimum search distances were measured from the estimated centerline of the Build Alternatives. Following the review of this information, a qualified environmental professional conducted a limited site reconnaissance within the study area to confirm and expand information obtained from the regulatory agency databases. Right of entry was not obtained for any property and some properties were not accessible by public roads or rights of way.

Table 3-50 lists the approximate search distances for the previously identified federal and state databases. The search distances follow the guidelines listed in American Society of Testing Materials (ASTM) E1527-05: *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*.

This initial search is intended to identify potential sites and does not replace more detailed studies such as individual site assessments and subsurface soil testing. Additionally, there may be possibility of encountering hazardous materials during construction. The results of the regulatory database search, review of aerial photographs, and site reconnaissance identified 56 potential sites within areas of right-of-way acquisition and/or construction of the project in proximity of the study area. The search distances for the “type of site” follows the guidelines listed in ASTM E1527-05: Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. These sites consist of hazardous waste handlers with RCRA corrective action activity, spill sites, voluntary cleanup program

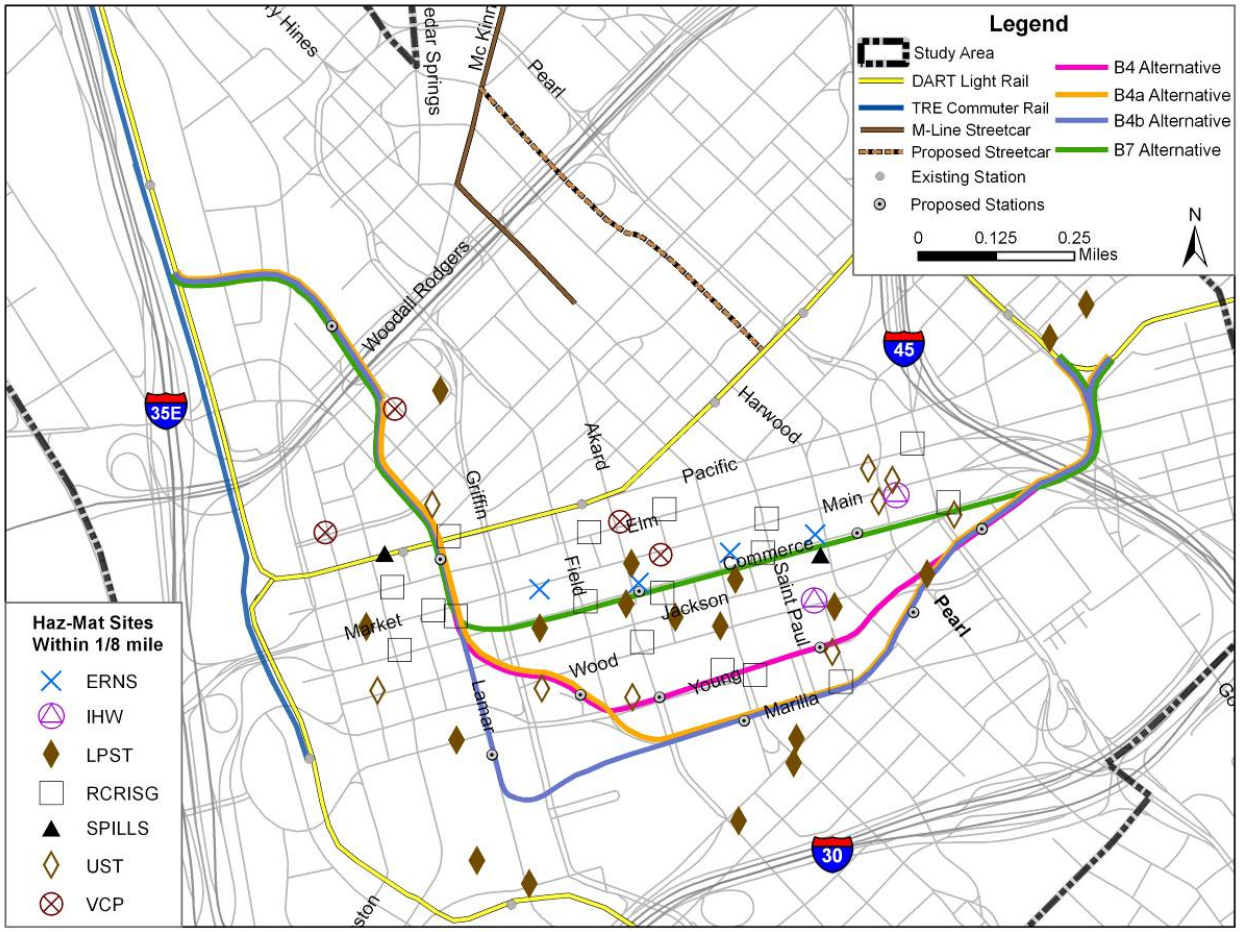
Table 3-50. Types of Hazardous Materials Sites

Type of Site	Acronym	Number of Sites	Search Radius (miles)
Federal			
National Priority List	NPL	0	1.00
Delisted National Priority List	DNPL	0	1.00
Records of Decision	RODS	0	1.00
Comprehensive Environmental Response, Compensation & Liability Information System	CERCLIS	0	0.50
No Further Remedial Action Planned	NFRAP	2	0.50
Resource Conservation & Recovery Act Information System-Corrective Action	RCRISC	1	1.00
Resource Conservation & Recovery Act Information System-Treatment, Storage & Disposal	RCRIS TSD	0	0.50
Resource Conservation & Recovery Act Information System-Generator/Handler	RCRISG	21	0.25
Emergency Response Notification System	ERNS	5	0.25
State			
State Superfund	TXSF	0	1.00
Voluntary Cleanup Program	VCP	5	0.50
Municipal Solid Waste Landfill Sites	MWSLF	0	0.50
Closed & Abandoned Landfill Inventory	CALF	0	0.50
Leaking Petroleum Storage Tank	LPST	33	0.50
Petroleum Storage Tanks	PST	35	0.25
Spills Listing	SPILLS	4	0.25
Industrial and Hazardous Waste	IHW	27	0.25
Innocent Owner/Operator Program	IOP	0	0.50

Source: GeoSearch, Inc., 2005.

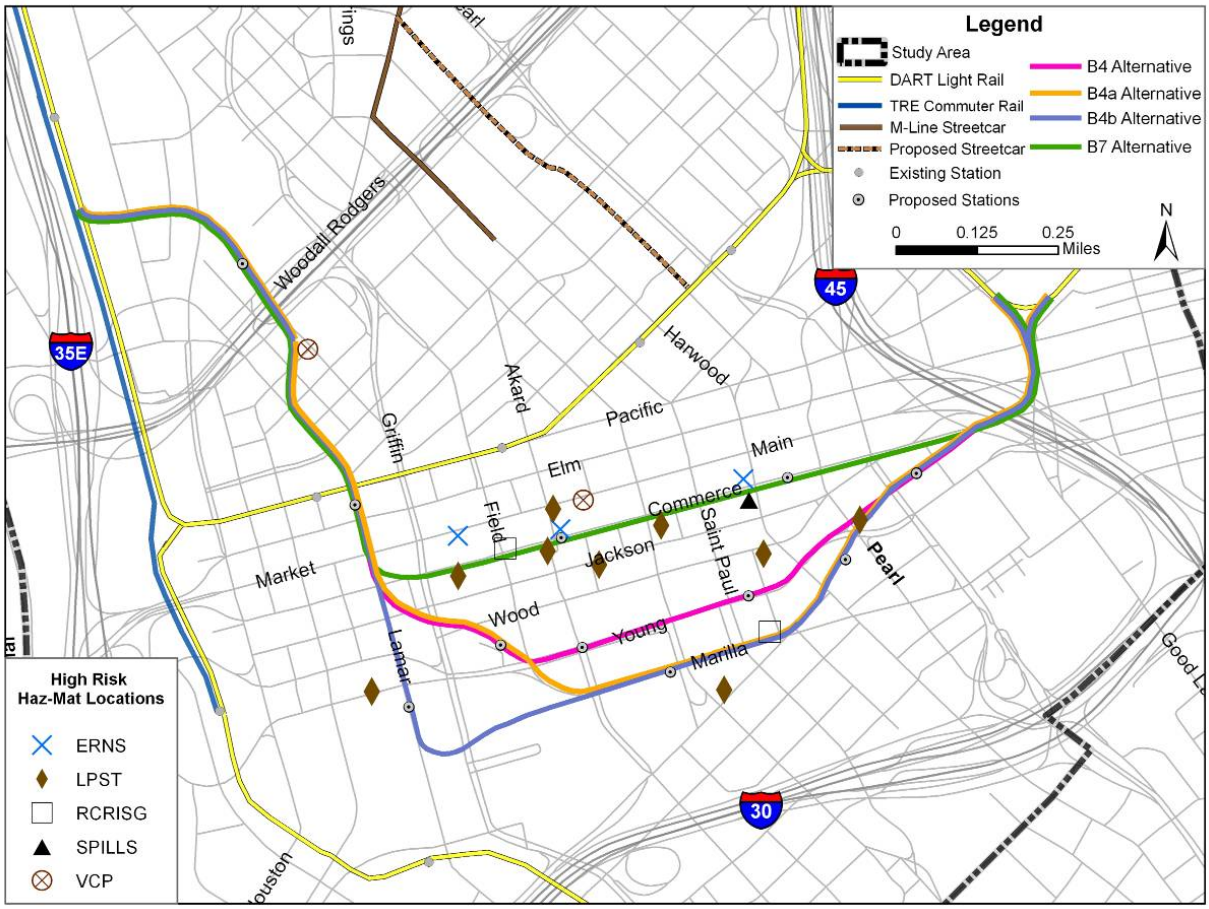
participants currently undergoing investigation and/or remediation, and leaking petroleum storage tanks associated with small petroleum fuel and oil facilities. No landfills associated with municipal disposition of waste were identified in the regulatory database search. The sites were evaluated for their potential risk to each of the four Build Alternatives. The site review was then narrowed down to those falling within a one-eighth mile radius of the proposed alignment alternatives. There were fifty-six sites that fell within these parameters. These sites were considered to have the most potential for impacts to construction of the project. The sites are shown in Figure 3-49. High Risk sites were identified if the hazardous material site was within 200 feet of the proposed right of way for the Build Alternative. High Risk sites within 200 feet from the alignment can be seen in Figure 3-50. Moderate Risk was identified for sites 200 feet to 400 feet from the alignment, and sites greater than 400 feet from the alignment right of way were considered Low Risk. Low Risk sites can be seen in Figure 3-51 Seventeen of the 56 sites were identified as high risk along the corridors of the four Build Alternatives, as listed in Table 3-51.

Figure 3-49. Haz-Mat Sites within 1/8th Mile of Alternatives



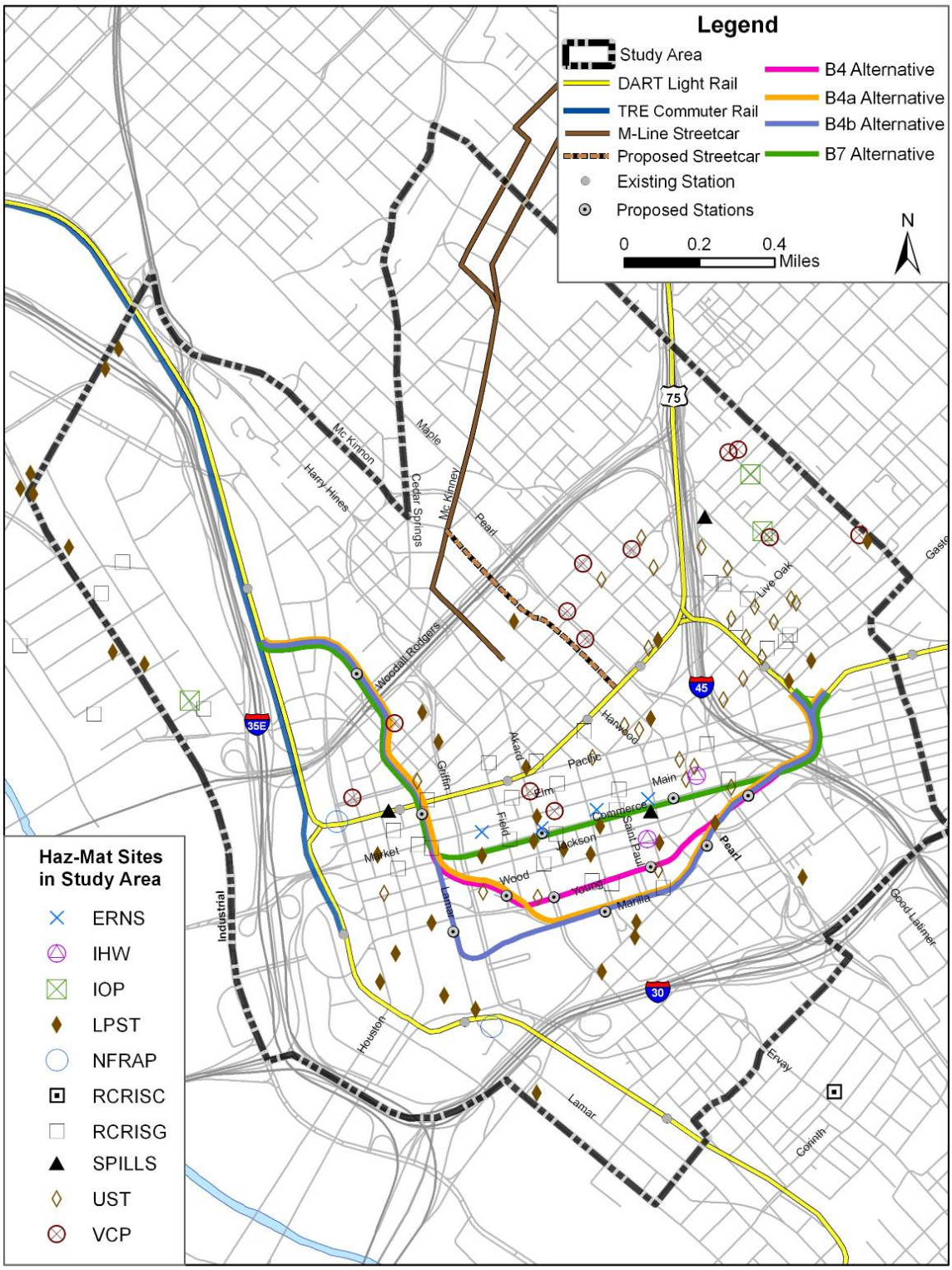
Source: PB/AZB Joint Venture ; GeoSearch, Inc.
Note: Acronyms defined in Table 3-44.

Figure 3-50. Hazardous Material Sites Near the Build Alternatives



Source : PB/AZB Joint Venture; GeoSearch, Inc
Note: Acronyms defined in Table 3-44.

Figure 3-51. Hazardous Material Sites



Source: PB/AZB Joint Venture; GeoSearch, Inc.
Note: Acronyms defined in Table 3-44.

Table 3-51. Hazardous Materials - Potential High Risk Sites

Regulatory Data Base	Regulatory Reference	Facility Name and Location	Adjacent Alternative	Potential to Disturb Site
IHW PST RCRISG	75980 0043687 TXD007926009	Hotel Adolfus 1321 Commerce St. Dallas 75038	B7	Yes
ERNS SPILLS	602104 10/27/98008	Lone Star Gas 1401 Commerce St. Dallas 75038	B7	Yes
ERNS	134339	White & Lassitter 1921 Commerce St. Dallas	B7	Yes
LPST UST	102367 0066353	Koch Materials 1340 Commerce St. Garland 75040	B7	Yes
LPST UST	109361 0029470	Earle Cabell Federal Building 1100 Commerce St. Dallas 75201	B7	Yes
SPILLS	12/10/98003	Texas Mail 1926 W. Commerce St. Dallas	B7	Yes
LPST	108741	1700 Commerce Place 1700 Commerce St. Dallas 75113	B7	Yes
ERNS	602100 618846	Roadway Express, PPMC Reality 1200 Main ST. Dallas	B7	No
VCP	1650	1530 Main St. Dallas	B7	No
LPST	105903	Pegasus Plaza 100 S. Akard St. Dallas 75202	B7	No
LPST UST	102177 0040584	Trailways Inc. 1500 Jackson St. Dallas 75201	B7	No
LPST UST	102403 0031333	First Presbyterian Church 408 Park Ave. Dallas 75201	B4	No
LPST UST	102634 0031237	Young St. Garage 2102 Young St. Dallas 75201	B4, B4a, and B4b	Yes
LPST	107700	Lubbens Plaza E. Parking Lot 815 Young St. Dallas 75202	B4b	Yes
IHW LPST UST RCRISG	8229 104916 0026531 TX0000062067	TXU Electric Co. 515 Park Ave. Dallas 75201	B4a and B4b	No
LPST	094569 108649	Transportation Service Center 1711 Canton St. Dallas 75201	B4a and B4b	No
VCP	0033	Graphics Engraving Facility 2001 N. GRIFFIN ST. Dallas 75202	B4, B4a, B4b, and B7	No

Source: GeoSearch, Inc.; PB/AZB Joint Venture

3.15.2 Impacts

3.15.2.1 No Build Alternative

The No Build Alternative would have no impact to hazardous material sites because there would not be any construction activities associated with this alternative.

3.15.2.2 Build Alternatives

The Build Alternatives would have the potential to encounter soil and groundwater contamination during construction on the RCRA corrective action activity sites, spill sites, voluntary cleanup program sites, and leaking petroleum storage tank sites. All other sites found in the database search are considered to be of low risk to the project. Sites that are considered to be of high risk for right-of-way acquisition and/or construction of the project are listed in Table 3-51 and shown in Figure 3-51 and Figure 3-50 .

Although a site is known or suspected to be contaminated, implementation of the Build Alternative would not necessarily mean that the proposed alternatives would affect the site. No final assessment as to risk or danger has been presented in this document. More detailed information regarding project design, to be developed during the final design phase of this project, would be used to make such assessments.

3.15.3 Mitigation Measures

Additional investigations would be conducted during final design for high risk areas. The investigations would focus specifically on areas where construction activities involve soil excavation and/or dewatering operations, such as tunnel portals, stations, and sections of the bored tunnel. Also, any structures being removed within the acquired right-of-way would be surveyed for the presence of hazardous/regulated materials. These include materials such as asbestos-containing materials, lead-based paint, chemical storage, and any other probable contaminants. Prior to demolition or modification of any structures, a plan would be devised for removal and disposal of any hazardous found and for the remediation of the site. All plans for remediation and subsequent monitoring would be coordinated with the TCEQ. If unanticipated hazardous or regulated materials are encountered during construction, construction activities would cease and the construction manager or engineer would immediately notify DART's Environmental Compliance Division. Specific mitigation activities, which address the type, level, and quantity of contamination encountered, would be immediately implemented. The handling, treatment, and disposal of any hazardous materials would occur in full compliance with all federal, state, and local requirements. The discharge of any wastewater suspected of containing hazardous/regulated materials is prohibited without first obtaining a TPDES Permit issued by the TCEQ covering the one-time discharge of wastewater containing known and specific hazardous constituents. Such a permit may be obtained from the appropriate regulatory agency providing the discharge is well characterized, meets discharge standards and does not pose a threat to the ultimate surface water body receiving the discharge. If fill material is required in the construction of proposed facilities, the construction contractor would be required to ensure that the sources of any fill material are free of contamination.

As stated above, sites within the proposed right-of-way that have structures would be surveyed for the presence of hazardous materials. The results of these surveys would 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 would be initiated as part of demolition and construction activities. All property being acquired by DART would require an individual Phase I Environmental Site Assessment (ESA) to identify the potential risk to construction from hazardous materials. Any site being assessed as being a high risk during the Phase I investigation would require a Phase II investigation. A Phase II ESA would require soil borings and lab testing of the soil for contaminants. Any structures on the property that is suspected of containing hazardous materials would be tested. If hazardous materials are found during the Phase II investigation, a Phase III plan for remediation of the site would be devised and clean up operations would be carried out.

3.16 Safety and Security

This section provides an assessment of safety and security issues related to the operation of the alternatives under consideration by DART for the D2 project. Public Safety and security services for transit operations in the study area are currently provided by a combination of DART police, the Dallas Police Department, and the Dallas Fire Department.

3.16.1 Environmental Setting

3.16.1.1 Transit System Safety and Security Programs

DART understands that providing for public safety is a key component of providing service to the community. Protecting the health and welfare of the community is an important aspect of providing transit services to the public. DART has several programs and plans in place as part of its 2030 Transit System Plan to address transit safety and security.

The *System Safety Program Plan* presents DART safety policy. It defines safety goals and objectives, tasks, responsibilities, schedule of activities, and programs. All transit facilities and systems are reviewed for safety and security exposure and formally certified through DART's *Safety and Security Certification Plan*. In addition, Intelligent Transportation Systems (ITS) support safety and security initiatives through communications systems that provides on-vehicle surveillance, facility surveillance, sensors/alarms, and incident response coordination, command and control.

Existing DART LRT vehicles are equipped with safety features for customer protection. Trains are automatically prevented from entering areas occupied by other trains. If the operator releases the master controller, the automatic features will stop the train. Trains are also equipped with emergency communication systems between train operators and passengers. Vehicles are constructed of flame and shatter resistant materials and have an exterior emergency door release for use by police or firefighters. Similarly, light rail stations are constructed with fire-resistant materials. In addition, DART meets the NFPA 130 standard which covers fire protection requirements for underground, surface, and elevated fixed guideway transit and passenger rail systems, including trainways, vehicles, and vehicle

maintenance and storage areas. DART has developed a *Failure Management Plan* and an *Emergency Procedures Plan* in the event that normal operation of LRVs within the LRT alignment are interrupted.

The DART system is operated in compliance with all provisions of 49 CFR Part 659 Rail Fixed Guideway Systems; NFPA 130 Standard for fixed guideway transit and passenger rail systems; State Safety Oversight, as well as Texas Administrative Code Title 43, Part I, Chapter 31, Subchapter F – Rail Safety Oversight Program. DART meets and/or exceeds all State rail safety requirements. DART also coordinates with the Transit System Safety and Security Manager in the Public Transportation Division of TxDOT on all matters regarding rail safety.

The DART Fire Life Safety Committee is responsible for all safety measures associated with DART services. The committee uses a combination of design, public education, and operations measures to lower the potential for crime and to minimize potential conflicts among trains, people, and other vehicles. Several interagency agreements have been established by the committee to provided additional safety and security services in association with those provided by DART.

3.16.1.2 Police Protection

Police protection for passengers and employees of DART are provided by a combination of DART police and the Dallas Police department. DART's police and security services provide for a safe and secure environment at existing transit routes and light rail stations. These officials currently monitor stations through a variety of security measures, including but not limited to on-site patrols and video monitoring. Because the DART service area is about 700 square miles, DART Police officers routinely work in cooperation with other local law enforcement agencies. In dealing with emergencies, first response is determined by the DART control center, depending on the location and types of emergency either DART Police or the Dallas Police Department is dispatched.

The Dallas Police Department also provides police protection in the study area. The Jack Evans Police Headquarters is located at 1400 South Lamar Street, in the study area. The state-of-the-art facility includes police administration and investigation departments. A second police station is also located in the study area at 2020 North Lamar Street.

3.16.1.3 Fire Protection and Emergency Medical Services

DART does not provide fire and emergency medical services (EMS) for its passengers and employees. Those services are provided by Dallas Fire-Rescue in the study area. The department provides fire suppression and protection, emergency search and rescue capabilities, and emergency medical first response services. The DART Fire Life Safety Committee plans and conducts several trainings, drills, simulations, and educational programs with local fire protection and emergency medical services. This prepares them to respond to emergencies that may occur related to DART service, as well as the best methods for accessing DART right-of-way.

There are two Dallas Fire-Rescue stations located within the study area. Fire Station #4 is located at 816 South Akard and can accommodate three fire engines. Fire Station #18 is located at 660 North Griffin and houses the equipment that refills and

distributes compressed air bottles, oxygen tanks and scuba tanks to surrounding Dallas fire stations.

3.16.1.4 Pedestrian and Vehicle Interaction

DART follows all federal, state and municipal laws regulating safety, design and operating procedures. It designs its system to provide grade-separated crossings at most major arterials so that the potential for accidents with other vehicles is minimized. Installing special signage and providing designated street crossings, reduce the potential for accidents involving pedestrians. In addition, in order to accommodate automobile traffic, all crossing approaches are signed with standard safety and warning signs installed in order to warn drivers of a train's approach. Traffic signal controls or crossing gates are installed at all at-grade crossings such that at the approach of any light rail vehicle the signal changes or the gates lower, and automobile traffic is stopped until the rail vehicles have cleared the street.

In order to increase public awareness about dangers around railroad tracks, DART has developed Operation Lifesaver. This education and public awareness program is designed to encourage safety by users of the DART system and also for pedestrians and automobile drivers who may come in contact with the LRT. As part of the program several presentations are made throughout the year at various events and safety fairs.

3.16.1.5 Transit Education

DART has an education and public awareness program designed to encourage safety by users of the DART system and also for pedestrians and automobile drivers who may come in contact with the LRT. As a part of the education and awareness program, DART offers the following services to the community.

- Classroom presentation on Transportation
- How to Ride DART Safely presentation and tour
- Careers in Transportation presentation and tour
- DART Construction Safety presentation and tour
- Bilingual presentations
- Students in grades 6-12 may participate in job shadowing opportunities at DART as well as unpaid internship opportunities
- Speakers (Career Day, PTA and Staff Development)

3.16.2 Impacts

The operation of public transit projects increases multi-modal traffic and the potential for conflicts with automobiles and pedestrians. The ensuing safety and security issues center around avoiding accidents between competing travel modes and ensuring the daily safety of transit patrons at and near station areas, as well as persons and automobiles who must cross the alignment. Consequently, transit projects can place additional demands on police and fire protection services in the communities they serve. The impacts on safety and security issues for the No-Build Alternatives and Build Alternatives are described below.

3.16.2.1 No-Build Alternative

The No-Build Alternative would expand bus services and facilities in the project corridor in accordance with the DART Five Year Plan. DART Transit Police and the Dallas Police Department would continue to provide public safety services without the need for additional resources beyond those already planned to keep up with transit service growth.

3.16.2.2 Build Alternatives

Impacts to DART Transit System Safety and Security Programs

The proposed four Build Alternatives would be designed and built to all safety and security standards determined by the DART Fire Life Safety Committee. Operation of the build alternatives would be under all current DART safety and security programs.

Impacts on Police Protection

None of the proposed four Build Alternatives is expected to cause any adverse effects to demand for municipal police protection. Police protection for the project would continue to be provided primarily by DART Police with assistance from the local police department.

Impacts on Fire Protection and Emergency Medical Services

All four of the Build Alternatives would be designed and built to NPFA-130 standards, making it rare that a fire would occur in a light rail vehicle or station. Because the potential for fire is low, it is not anticipated that the build alternatives would necessitate the hiring of additional fire protection personnel in the study area.

The potential exists for increased demands for emergency medical services due to the concentration of passengers at the LRT stations. In addition, emergency vehicle response time could be slightly impacted by at-grade LRT crossings. Particularly under the B4 Lamar-Young Alternative as a significant portion of the alignment would be at-grade compared to the other Alternatives. However, the DART Fire Life Safety Committee would continue to work closely with and train local emergency medical services to respond quickly to any incident that may occur.

Impacts on Pedestrian and Vehicle Interaction

The addition of frequent LRT service along the four Build Alternative alignments would present safety and security concerns for adjacent businesses and residents. The proposed project has the potential to affect vehicular and pedestrian safety at points where the alignment crosses streets at-grade and in areas where downtown residents or employees use informal crossings as short cuts to access area facilities.

However, pedestrian accidents are expected be minimal under all four Build Alternatives. Under the B7 Lamar-Commerce Alternative the majority of the alignment that runs through heavy pedestrian traffic along Commerce Street would be placed underground. While a significant portion of the B4 Lamar-Young Alternative alignment would be at-grade, and would run along streets that are minimally occupied by pedestrians. The same is true of the B4a Lamar-Marilla and B4b Lamar-Convention Center Hotel Alternatives; several sections of these alignments would run at grade, along streets minimally occupied by pedestrians.

Impacts to Transit Education

Under the proposed four Build Alternatives, there would be no impacts to current transit education practices performed by DART.

Station Area Safety Impacts

The project would require the construction of new light rail transit stations. As part of the B7 Lamar-Commerce Build Alternative, three underground and one at-grade station would be constructed. As part of B4 Lamar-Young Alternative, one underground and four at-grade stations would be constructed. Both the B4a Lamar-Marilla and B4b Lamar-Convention Center Alternatives would require construction of three underground and two at-grade stations.

Although the addition of light rail service increases the potential for modal conflict in and around station areas, DART incorporates a number of safety considerations into the design of LRT stations. These include measures such as limiting pedestrian access across the tracks to dedicated track crossings, providing adequate lighting, and maintaining good visibility and sight lines though the station areas. Similarly, where bus service would feed light rail station areas, bus bays are designed to allow boarding and alighting from a common rail and bus platform such that pedestrian activity would be separate from buses and automobiles.

3.16.3 Mitigation

3.16.3.1 Transit System Safety and Security Programs

The project will use current policies and standard practices; as such no addition mitigation would be required.

3.16.3.2 Police Protection

Consistent with normal practices the DART Fire Life Safety Committee would continue to coordinate with and train local precinct police.

3.16.3.3 Fire Protection and Emergency Medical Services

Consistent with normal practices the DART Fire Life Safety Committee would continue to coordinate with and train local fire protection and emergency medical services.

3.16.3.4 Pedestrian and Vehicle Interaction

The project will use current policies and standard practices; as such no addition mitigation would be required. Through its public involvement process, DART would identify areas with special safety needs in order to coordinate the most appropriate response for transit patrons.

3.16.3.5 Transit Education

Through its public involvement process, DART would identify areas with special safety needs in order to coordinate the most appropriate response for transit patrons.

3.16.3.6 Station Area Safety

CPTED principles will be used in final design engineering to minimize risks to public safety.

3.17 Construction Impacts

This section describes how the Build Alternatives would be constructed, the potential impacts and possible mitigation options.

3.17.1 Construction Scenario

The construction of the D2 project would require a coordinated effort between DART, the City of Dallas, utility companies, TxDOT, building owners, and downtown residents. DART has already established working relationships with several of these agencies in selecting a route alternative that would have minimal impacts to the local environment. It is DART's intention to increase this level of coordination throughout the construction process. DART would be proactive in its efforts to communicate with both the City of Dallas and TxDOT related to anticipated road closures and other major downtown disruptions associated with construction activities. The benefits of continuous communications from the project's initiation through final construction activities would include greater public acceptance of the project, fewer delays in construction, reduced cost of construction by identifying early any potential concerns so that mitigation efforts can be undertaken in a planned process, not requiring costly emergency measures.

The major phases of the construction project would include:

- Preparation of plans and specifications and procurement
- Selection of a general contractor responsible for all phases of construction
- Purchase of right-of-way
- Utility reconstruction and relocations
- Site preparation and notifications
- Surface construction
- Tunnel construction

DART has an extensive history of constructing light rail projects in the Dallas area. To date, DART has successfully completed many miles of light rail throughout the Dallas metropolitan area, under a wide variety of site conditions, including rail lines that operate in the central business district. DART would hire a contractor for the project who would have oversight over the development of plans and specifications, contract award, contract management including construction monitoring and compliance with all regulatory requirements, including environmental standards and permits.

DART would prepare a set of plans and specifications for the construction of the LRT once a LPA has been selected. These plans and specifications would be prepared by the contractor with DART oversight. These plans and specifications would define

means and methods of construction, specific sequencing requirements, environmental protection, and safety and security requirements.

The project would be constructed over an approximate four-year period, with some advanced activities such as property acquisition, clearance and utility relocations. Over the construction period, the intensity and duration of construction activity would vary along each section of the alignment. For example, construction of underground stations would occur over a two year period, maintenance of street traffic near stations would last approximately nine-months, and construction staging areas would be active for four years. Construction working hours would be 24 hours per day six days per week, including materials delivery and spoil removal.

The construction contract would likely be subdivided into surface and tunnel sections and phased based on the need for close integration among key elements. At least four sections have been identified:

1. Surface - Victory Station to Woodall Rodgers
2. Tunnel - North tunnel portal to south or east tunnel portal
3. Surface - South or east tunnel portal to IH 45
4. Surface – IH 45 to Y connection with Southeast Corridor

Construction would occur primarily in or under city streets and vacant property in order to minimize impacts and risks related to adjacent structures. Surface construction can proceed concurrently with tunnel construction, but would be phased so as not to impede progress on the tunnel.

3.17.1.1 Surface Construction

Surface sections, including track, stations, substations, and centenary would be constructed following property acquisition and clearing of the right-of-way, relocation of utilities and demolition of structures. All the alternatives involve a surface section of DART owned and previously cleared right-of-way between Victory station and Woodall Rodgers.

Surface station construction would commence with platform, canopy and ancillary construction including architectural finishes.

Where rail line and stations would be constructed in city streets, a mitigation program would be developed in order to maintain traffic during construction, provide for signalized at-grade crossings of major streets and intersections, and to provide at least one or two lanes of traffic in each direction.

3.17.1.2 Tunnel Construction

Twin-tube bored tunnels would be constructed using a TBM for longer sections of tunnels and roadheader and/or drill and blast for cross passages and enlargements. With a standard rock TBM and dependent on the construction schedule, tunneling would commence from the north portal, the TBM would then be removed and returned to the original tunnel work site to bore the second tunnel. Tunneling would be expedited if two machines were used with tunneling on the first drive slightly in advance of the second. With Alternatives B4a and B4b, the TBM cutting shield could

be extracted and the TBM parts and trailing gear removed at Akard Street. With Alternatives B4 and B7, the TBM would be removed at the south or east portals. Other major underground components include two tunnel portals including open cut and cut and cover ramps, underground stations, a cross over box, ventilation structures, and construction staging areas. These facilities would be constructed after following a geotechnical desk study and investigation program, topographic surveys, utility data acquisition, property and structure surveys, property acquisition, and relocation of utilities at stations, portals and at cut-and-cover sections near tunnel portals. Where utilities must be left in place, methods of support and working around the utilities would be developed. Dealing with major utilities may involve relocation of station exits and vent shafts.

Excavation of portals and stations would be by drill and blast using cut-and-cover methods. Demolition and blasting would be required at all stations and in the tunnel portals and for cross passages between the tunnels. The TBM excavation is only for the tunnels between stations. For instance, station demolition would include removal of road surfacing and abandoned utilities by hydraulic breaker. Blasting and rock breaking would occur from about 20 feet below ground to the bottom of station excavation.

A temporary ventilation system and storage for TBM fabrication, tunnel equipment, the TBM power substation, tunnel ventilation equipment and excavated material storage would be needed at one portal for tunneling. There would be tower cranes at the portals and underground station sites. Each underground station is expected to involve a two year basic structure construction period, integrated with the twin tube tunnel boring program and provision of access and maintenance of traffic. After basic structure completion, a two year systems and finishes period would follow to include track installation and track related delivery of station systems and equipment such as tunnel ventilation fans, chillers, escalators and lifts.

3.17.2 Temporary Structures

Temporary protection of the existing DART line at the intersection of Pacific and Lamer would be required during TBM excavation beneath the line and underground station construction immediately south of this intersection for all Build Alternatives. Monitoring instrumentation would be installed on the DART catenary and track to monitor ground and structure movement during tunneling. Alert levels would be defined for notification and warning and maximum permitted movements below the DART line would be specified. Should notification levels be reached, the contract documents would require specific action by the Contractor such as monitoring frequencies to increase, coordination with DART operations to operating line speed or to work below the DART tracks on non-working time or if the maximum alert level is reached to stop work and provide increased protection or use an alternate construction method acceptable to DART.

Protection of the Commerce Street sewer line in the vicinity of Lamar and Commerce may be required during TBM excavation beneath the line for all Build Alternatives and monitoring instrumentation would be installed in the sewer line. Prior to construction, a condition survey of the sewer line would be undertaken and this would be closed out after tunnel completion.

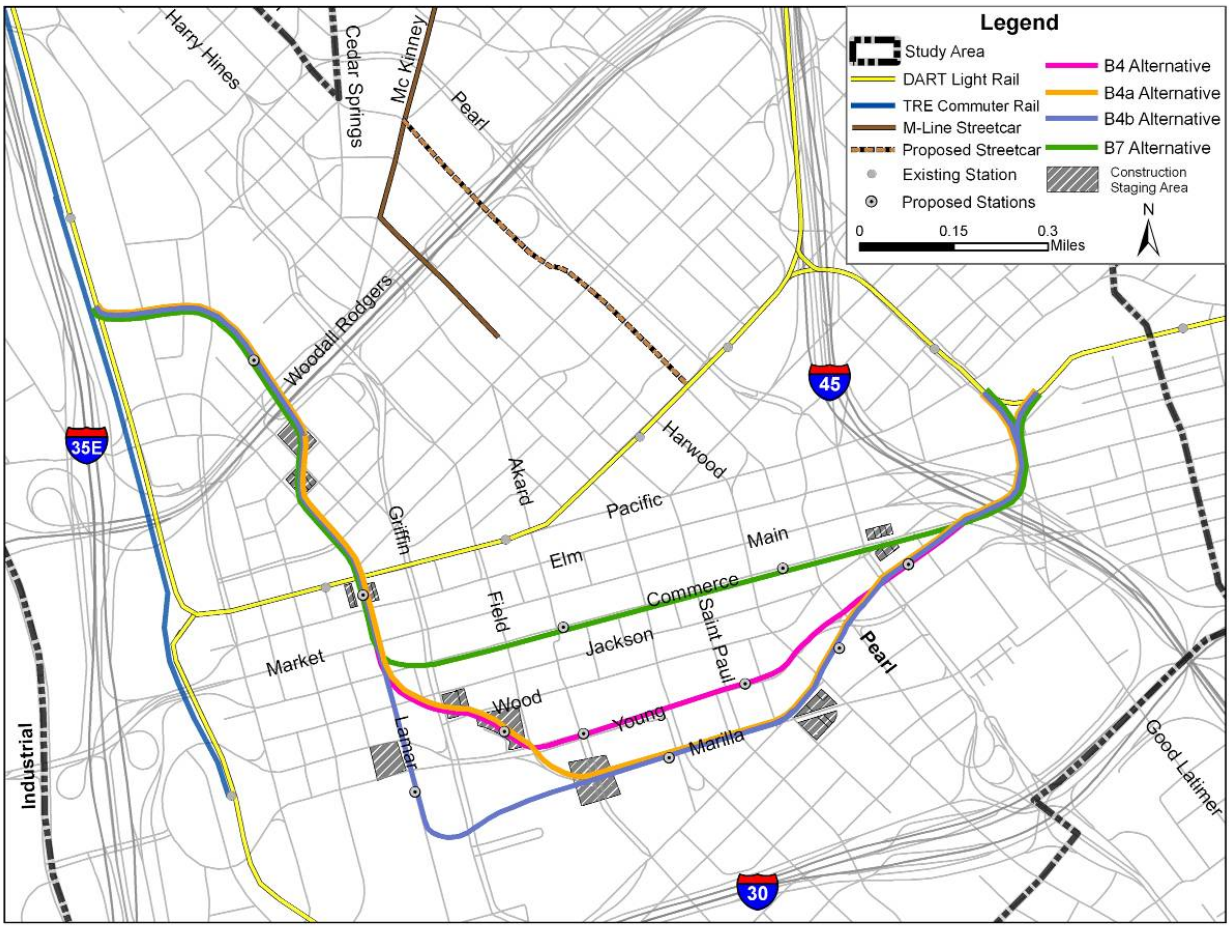
Protection of the Commerce Street sewer line in the vicinity of two underground stations may be required for the B7 Alternative.

Protection of columns under Woodall Rodgers and IH 45 may be needed with all alternatives, based on preliminary engineering. In all cases, specific requirements for monitoring of all impacted structures would be provided during design.

3.17.3 Construction Staging Areas and Mitigation

Construction would be conducted primarily from staging areas adjacent to the two tunnel portals and from station work areas shown in Figure 3-52. Some additional nearby or remote sites may be needed for temporary storage of materials and equipment. Site lighting would be required 24 hours and limits would be set on dust and noise emissions in accordance with local regulations. The final size and location of construction staging areas would be determined as the project's design progresses.

Figure 3-52. Construction Staging Areas for Build Alternatives



Source: PB/AZB Joint Venture

Non-project materials and equipment should not be stored in the staging areas. Materials should not be stored on private property without written authorization from the property owner, and measures should be taken to minimize harm to the private property.

There would be minor short-term impacts to the property due to the storage of construction materials and equipment. If exposed to the weather, some construction equipment and materials have the potential to release chemicals during storm events. The storage of construction equipment and materials on the ground has the potential to disturb the soil and kill or prevent the growth of groundcover, which caused soil to be susceptible to wind and water erosion. Construction equipment has the potential to leak oil and grease, hydraulic fluids, brake fluid and other petroleum hydrocarbons. There is also the possibility of spillage during fuelling operations.

The DART General Provisions, General Requirements and Standard Specifications for Construction Projects have regulations governing construction staging areas. Section 01560 (Part 1.3 C-6 and G, Construction Facilities and Staging Areas) provides measures concerning construction staging areas. These regulations state that the contractor must store equipment and materials in conformance with applicable local regulations. Unnecessary materials and equipment would not be allowed to be stored at the job site. No structure would be allowed to be located with a weight that would endanger its structural integrity or the safety of persons. Materials would not be allowed to be stored on private property without written authorization of the owners or the property. Staging areas would not be allocated in wetlands or on any property list or eligible to be listed in the NRHP without prior approval of the DART Contracting Officer.

3.17.3.1 Mitigation Measures

A Storm Water Pollution Prevention Plan should be developed that would incorporate the best management practices to prevent storm water runoff from the construction staging area. The contractor would use best management practices to prevent stormwater runoff of construction materials and equipment such as covering materials and equipment of awnings, roofs, or tarps; storing materials ad asphalt or concrete pads; surrounding material stockpiling areas with diversion dikes or curbs; and using secondary containment measures such as dikes or berms around fueling areas. The contractor would also mulch and reseed disturbed areas to private air and water erosion on the site after minimization of the construction operations.

No adverse impacts associated with construction staging would be anticipated upon implementation of these mitigations measures.

3.17.4 Coordination with Other Scheduled Construction Projects

The construction of the proposed project would be coordinated with Dallas County, the City of Dallas, TxDOT, utility companies, and adjacent property owners with planned or ongoing construction projects. Table 3-52 summarizes on-going and planned projects that would influence the design and construction of the proposed DART project. DART has communicated with these entities in order to minimize construction–related impacts to residents, property owners and corridor users.

DART has, and would continue to coordinate with TxDOT, Dallas Water Utilities, TXU Energy, Oncor, communication firms in the area and other utility owners to assess where utility conflicts exists and then develop specific plans and strategies for relocating these utilities without affecting utility customers and keeping the cost of construction at a reasonable level.

Table 3-52. Construction Coordination

Related Project or Study	Area of Impact	Issue	Agency/ Responsible Entity
State-Thomas Drainage	Woodall Rodgers at North Griffin Street	Deep drainage tunnel protection with all alternatives	City of Dallas
Convention Center Hotel	Lamar and Young Streets	Station access integration with Alternatives B4, B4a, B4b	City of Dallas
Museum of Nature and Science	Immediately north of Woodall Rodgers	Integration of surface station with Museum Way for all Alternatives	City of Dallas
First Presbyterian Church Redevelopment Plan	East of City Hall between St. Paul and Harwood Streets	Coordination of Alternative B4 alignment and station with revised development plan	Presbyterian Church
Victory Park office building	Victory Station	Coordination of station with office building development	Private
Pegasus IH 35 and IH 30 interchange and Woodall Rodgers Extension	North Griffin at Woodall Rodgers	Maintenance of traffic	TxDOT
Planned Utility Projects	Downtown Dallas	Maintenance of utilities	City of Dallas

Source: PB/AZB Joint Venture

3.17.5 Construction Noise Impact

There are a number of residential buildings and sensitive land uses located along each alignment that could potentially be affected by construction noise, as described in Section 3.8.

Construction noise varies greatly depending on the construction process, type and condition of equipment used, and layout of the construction site. Many of these factors are traditionally left to the contractor's discretion, which makes it difficult to accurately estimate levels of construction noise. Overall, construction noise levels are governed primarily by the noisiest pieces of equipment. For most construction equipment, the engine, which is usually diesel, is the dominant noise source. This is particularly true of engines without sufficient muffling. For special activities such as impact pile driving and pavement breaking, noise generated by the actual process dominates.

Construction noise at a given noise-sensitive location depends on the magnitude of noise during each construction phase, the duration of the noise, and the distance from the construction activities. Projecting construction noise requires a construction scenario of the equipment likely to be used and the average utilization factors or duty cycles (i.e. the percentage of time during operating hours that the equipment operates under full power during each phase). The noise impact assessment for a construction site is based on:

- an estimate of the type of equipment that would be used during each phase of the construction and the average daily duty cycle for each category of equipment,
- typical noise emission levels for each category of equipment, and
- estimates of noise attenuation as a function of distance from the construction site.

Construction noise estimates are always approximate because of the lack of specific information available at the time of the environmental assessment. Decisions about the procedures and equipment to be used are made by the contractor. Project designers usually try to minimize constraints on how the construction would be performed and what equipment would be used so that contractors can perform construction in the most cost effective manner. Potential construction noise impacts would be evaluated during engineering and design of the project, as more details of the construction scenarios are known, including potential haul routes for excavated material.

The City of Dallas Code states that noises that are considered loud an offensive include: "Any construction activity related to the erection, excavation, demolition, alteration, or repair of any building on or adjacent to a residential use, as defined in the Dallas Development Code, other than between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and between the hours of 8:00 a.m. and 7:00 p.m. on Saturdays and legal holidays, except that the director of public works and transportation may issue a written permit to exceed these hours in the case of urgent necessity in the interest of public safety or for other reasons determined by the director of public works and transportation to be necessary for the public health, safety, or welfare. For purposes of this paragraph, "legal holidays" include New Year's Day (January 1), Memorial Day (observed date), Fourth of July (July 4), Labor Day (observed date), Thanksgiving Day (observed date), and Christmas Day (December 25)." There are additional City of Dallas noise ordinances related to the idling of commercial vehicles. The ordinance also defines penalties and defenses associated with the noise ordinance.

Table 3-53 summarizes some of the available data on noise generated from equipment during construction. FTA developed a guide for measuring noise and vibrations in a May 2006 study: Transit Noise and Vibration Impact Study. (FTA; *Transit and Vibration Impact Assessment*; May 2006)

3.17.5.1 Construction Noise Mitigation Measures

Temporary noise during construction has the potential of being intrusive to residents near the construction sites. Construction activities would be carried out in compliance with all applicable local noise regulations. In addition, specific residential property line noise limits would be developed during final design and included in the construction specifications for the project, and noise monitoring would be performed during construction to verify compliance with the limits. This approach allows the contractor flexibility to meet the noise limits in the most efficient and cost-effective manner. Noise control measures that would be applied as needed to meet the noise limits include the following:

- Avoiding nighttime construction in residential neighborhoods.
- Using specially quieted equipment with enclosed engines and/or high-performance mufflers.
- Locating stationary construction equipment as far as possible from noise-sensitive sites.
- Constructing noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.

Table 3-53. Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA) 50 ft from Source
Air Compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pile Driver (Impact)	101
Pile Driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Rail Saw	90
Rock Drill	98
Roller	74
Saw	76
Scarifier	83
Scraper	89
Shovel	82
Spike Driver	77
Tunnel Boring Machine	55 directly under a structure
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	88

Source: Table based on an EPA Report, measured data from railroad construction equipment taken during the Northeast Corridor Improvement Project, and other measured data ; http://www.dublinporttunnel.ie/about/building/pdf/tunnelling_its_effects.pdf.

- Re-routing construction-related truck traffic along roadways that would cause the least disturbance to residents.
- Construction noise mitigation would be addressed in more detail during subsequent phases of the project.

3.17.6 Construction Vibration Impact

Construction vibration, similar to noise, is highly dependent on the specific equipment and methods employed. There is a range of potential results due to construction vibrations including influence on vibration-sensitive equipment even at levels where there is no human perception; low rumbling or ground-borne noise that is perceptible to humans from vibrations at moderate levels; or potentially even slight damage to buildings at the highest levels. Generally, construction vibrations are assessed at locations where prolonged annoyance or damage could be expected.

The most significant potential construction activity considered is tunnel boring. The proposed tunnel alternatives are expected to be constructed using a tunnel-boring machine with sheet piling techniques at the portals. If the tunnel alignment penetrates the underlying Eagleford Shale, a precast concrete tunnel lining may be required, necessitating a double shielded rock TBM. This may result in a longer period of tunnel construction due to the slower progress rates which can be achieved. Background vibration monitoring would be carried out during design and analysis of anticipated vibration caused by blasting and TBM tunneling would be ascertained. The impact of vibration on receptors and whether more severe limits need to be imposed on the generation of vibration would be assessed. It is likely that vibration limits and lower noise limits would need to be imposed where the works are undertaken in close proximity to residential structures such as hotels, particularly at night and to offices such as the Bank of America Tower and City Hall during the day.

Muck trains are expected to transport excavate from the tunnel-boring machine. Potential vibration and ground-borne noise impacts from tunnel boring depends on the type of ground material being excavated. Vibration propagates more efficiently in rock, which can result in vibration and ground-borne noise impact at greater distances than in soil. Potential impacts from tunnel boring, sheet piling, and muck trains would be evaluated in subsequent phases of the project.

Table 3-54 provides a summary of vibration sources from construction equipment that may be utilized in the construction of the LRT.

3.17.6.1 Construction Vibration Mitigation Measures

Measures for mitigation of ground-borne vibration and ground-borne noise from the tunnel-boring machine are rather limited. Time-of-day restrictions would be beneficial for considering human annoyance and the residential nighttime criterion in particular, but this may not be possible due to construction scheduling. Other approaches for minimizing ground-borne noise and vibration from tunnel-boring machines could be to reduce the thrusting force of the tunnel-boring machine or reduce the rotational speed. The drawback to this measure is that the tunneling process would take longer and the duration of construction noise and vibration impact would be extended. In addition, other tunneling methods could be explored that might reduce the potential

Table 3-54. Vibration Source Levels for Construction Equipment (from measured data)

Equipment		PV at 25 ft (in/sec)	Approximate L_v† at 25 ft
Pile Driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58
Tunnel Boring Machine		0.012	
†RMS velocity in decibels (VdB) re 1 micro-inch/second			

Source: Table based on an EPA Report, measured data from railroad construction equipment taken during the Northeast Corridor Improvement Project, and other measured data.

for vibration impact. However, because the tunnel boring machine would be moving as construction occurs, the duration of vibration impact at any one location would be limited.

Mitigation measures to address potential noise and vibration impact from muck train operations include maintaining smooth rails without wheel flats or corrugations. If possible, the use of continuous-welded rail instead of jointed rail can minimize vibration levels. Limiting the speed of muck train operations can also help control the levels of vibration and ground-borne noise. Additionally, the use of conveyors and rubber-tired vehicles could be explored to help reduce vibration levels from construction.

Finally, mitigation measures to address potential noise and vibration impact from sheet piling include the use of alternative piling methods to avoid or minimize impact from pile driving. Construction vibration mitigation would be addressed in more detail during subsequent phases of the project.

3.17.7 Disruption of Utilities

Early coordination with the major utility companies has been ongoing since the initial stages of planning for the D2 project. Utilities would need to be protected and/or relocated at surface, cut-and-cover, portal and underground station sections for maintenance of utility supplies to adjacent buildings.

Construction of Alternative B7 would occur near water utilities and in the vicinity of a major interceptor sewer line under Commerce Street. Methods of protection of utilities would be developed during design in conjunction with the utility companies.

Tunnel construction would require a temporary power supply and provision of a large capacity substation for tunnel operations. Load factors for tunnel construction are generally poor as peak load occurs intermittently during start up and push forward of the TBM. Coordination with Oncor would be required to assess the requirements for TBM temporary power supplies and temporary substation requirements.

Permanent station utilities would be required and coordination with utility companies would be undertaken to ensure provision of this equipment in accordance with the project schedule.

Electrical currents can potentially leak out of the circuit and escape into the soil and find the pat of least resistance through any available conductor back to the substation. These paths may be buried utility pipelines and cables, other structures containing metal or be the soil itself. Stray currents from the positive side of the circuit are generally very small. The current from the negative side tends to be larger due to the proximity of the track to the ground. If the electrical continuity of the tract structure is poor, more electricity will return as stray current than through the running rails. Corrosion on the surface of a conductor results when electric current leaves the conductor and returns to the soil. If left uncontrolled, stray currents can be detrimental for a number of LRT components. To manage this stray current, DART would identify potential leakage paths and would mitigate potential corrosion problems by electrical isolation and the provision of suitable protection measures such as selecting materials and equipment that would be resistant to corrosion.

3.17.8 Traffic Impacts

For each of the four proposed LRT alternatives, the impacts during the construction period as it relates to street closures, detours, access limitations and truck routing were evaluated.

The following sections below narrate the impacts to parking, driveways, pedestrian circulation, bicycle circulation, intersections, loading and unloading zones, emergency routes, DART bus routes, and truck hauling routes during construction. Traffic detours during construction are also discussed. Table 3-55 quantifies these impacts for each of the four alternatives as well as those impacts common to all alternatives.

3.17.8.1 Impacts to Parking

The four alternatives analyzed in this DEIS have various impacts to existing surface, garage and on-street parking spaces. The subsections below detail those parking space impacts common to all alternatives as well as for each alternative specifically.

The proposed LRT alignment (all alternatives) would temporarily impact parking spaces at the following locations:

- On-street metered parking would be impacted along Lamar Avenue from north of Corbin Street to south of Ross Avenue. Due to the cut and cover operation of the LRT line along this segment, it is assumed that all twenty-six on-street metered parking within these limits would be temporarily impacted during construction.

Table 3-55. Roadway Impacts During Construction

	No Build	B7	B4	B4a	B4b	Common to all alternatives
Parking Spaces Temporarily Impacted						
On Street	-	20	-	7	7	45
Parking Lot	-	-	-	254	254	-
Driveways Temporarily Impacted						
Active	-	-	21	9	8	14
Vacant	-	-	3	-	-	1
DART Bus Stops Temporarily Impacted	-	-	1	2	4	2
DART Bus Routes Temporarily Impacted	-	-	-	-	5	11
Pedestrian Sidewalks (LF) Temporarily Impacted	-	1,010	7,710	1,971	1,971	2,743
Bike Routes Temporarily Impacted	-	-	Route 190 Route 39	-	-	-
Intersections Temporarily Impacted	-	-	7	6	6	9
Detour Length (LF) due to Temporary Road Closures	-	1,590	2,550	6,572	9,342	5,250
Number of Detours due to Temporary Road Closures	-	-	2	1	2	2

Source: Parsons Transportation Group

- The Metro Center Station on Lamar Avenue between Main Street and Pacific Avenue would be constructed via an open cut operation. This would temporarily impact eight on-street metered parking spaces during construction.
- The proposed LRT line would resurface at-grade on Commerce Street just east of North Central Expressway and continues at-grade for the remainder of the route. This would temporarily impact five on-street parking spaces on the south side of Commerce Street. Five on-street metered parking spaces along Good Latimer Expressway between Elm and Main Streets would also be temporarily impacted during construction.

Alternative B7 Lamar-Commerce

The Pegasus Plaza station along Commerce Street between Field and Akard Streets would temporarily impact four on-street metered parking spaces located along the north side of Commerce Street. Since this station would be constructed via an open cut method, the existing on-street parking spaces would be temporarily removed during construction. The Main Street Garden Station located between Harwood and Pearl Expressway would have the same impact to the existing 12 on-street metered parking spaces during construction. The LRT line would also be constructed via a cut and cover operation on Commerce Street between Pearl Expressway to east of N. Central Expressway and a tunnel portal would be built from this location to west of the US 75 southbound off-ramp structure. This would temporarily impact 18 on-street metered parking spaces during construction.

Alternative B4 Lamar-Young

The LRT line from west of Griffin Street to the intersection of Young and Field Streets would be constructed via a cut & cover operation and a tunnel portal.

There will not be any impacts to parking that are temporary in nature for this alternative.

Alternative B4a Lamar-Marilla

Construction of the below-grade Government Center Station between Young and Wood Streets west of Field Street would temporarily impact 144 parking spaces in the surface parking lot. Four on-street metered parking spaces would be impacted during construction.

The proposed LRT line along Marilla/Canton Street between Ervay and Harwood Streets would be constructed via cut and cover operation and a tunnel portal. This would temporarily impact three on-street metered parking spaces along Marilla Street between Ervay and Park Streets.

Construction of Farmers Market Station near the existing Scottish Rite Temple parking lot would temporarily impact 110 parking spaces.

Alternative B4b Lamar-Convention

Impacts to parking for this alternative are very similar to the B4a Lamar-Marilla alternative except that this alignment offers an additional underground station (Convention Center Hotel Station). This alternative would impact on-street metered parking spaces along Lamar Avenue during construction.

Parking Mitigation

During construction, the parking disruption that occurs for any alternative shall only be temporary in nature and shall be restored to original status unless otherwise described in the permanent parking impacts (see Section 4.2.1). The contractor will work with DART and the City of Dallas to properly mitigate specific impacts to private parking spaces by either providing near-by spaces for private use or allowing on-street parking to be utilized by property owners/tenants.

3.17.8.2 Impacts to Driveways

A number of driveways would be temporarily affected by all four alternatives as described below. Suggested alternate driveway access for impacted properties will be coordinated and approved by the City of Dallas prior to construction at the impacted driveway locations.

The section of the LRT line from the Metro Center Station would be constructed via a tunnel portal and cut and cover operation. This would impact access to the surface parking lot via the driveways located on Lamar Street between Hord Street and Ross Avenue during construction. Access to this parking lot would be from Ross Avenue until construction of the light rail is completed.

The Metro Center station at the West End along Lamar Street from Pacific Avenue to south of Elm Street would be constructed via an open cut operation. This would impact the driveway to the surface parking lot for the office building located west of

Lamar Street and the existing driveways to the surface parking lot located east of Lamar Street. Access to these parking lots would be via Elm Street during construction. There is also an exit driveway from an office building located in the southeast quadrant of Elm and Lamar Streets. It is assumed that this access can be shifted to Elm Street temporarily until construction is completed.

The proposed LRT line at the southeast end runs at-grade along Commerce Street to Good Latimer Expressway until it converges at a common point south of the existing Deep Ellum Station, where it would utilize the median on Good Latimer Expressway. There are various driveways to the adjacent business surface parking lots. It is assumed that since the travel lanes would be opened for traffic during construction, these driveways would not be impacted during normal business hours.

Alternative B7 Lamar-Commerce

The Pegasus Plaza station on Commerce Street between Field and Akard Streets would be constructed via an open cut operation. This could impact the driveways (entrance and exit) to the hotel located on the north side of Commerce Street and a driveway to the parking garage located on the same side. It is assumed that Commerce Street would always remain open during construction of this station; therefore, these driveways are also assumed to remain open during normal business hours.

The Main Street Garden Station on Commerce Street between Harwood Street and Pearl Expressway would be constructed similar to the Pegasus Plaza Station between Field and Akard Streets. There are several driveways to nearby surface parking lots from Commerce Street. It is assumed that these parking lots would continue to have access during construction of the station since Commerce Street would remain open to traffic. These driveways can also be accessed from Pearl Expressway and Harwood Street. There is also a driveway to an office building's loading/unloading area on the north side of Commerce Street. Since Commerce Street would not be permanently closed for traffic during construction, it is assumed that access to this driveway would remain open during normal business hours.

The LRT line along Commerce Street from Pearl Expressway to west of the US 75 off-ramp would be constructed via a cut and cover method and a tunnel portal. There is one driveway located in the northeast corner of Commerce Street and Pearl Expressway which leads to a surface parking lot for an office building. This is the only access to this property. Since Commerce Street would not be permanently closed for traffic during construction, it is assumed that access to this driveway would remain open during normal business hours. The existing driveway to the surface parking lot in the southeast corner of Pearl Expressway and Commerce Street can be accessed from both Pearl Expressway and Commerce Street. Assuming construction of the LRT line at this location is through staged construction, access to this parking lot would not be disrupted during normal business hours. Driveway access to an office building located in the southwest corner of Commerce Street and Central Expressway can be accessed from Jackson Street. It is assumed that this driveway would remain open during normal business hours.

Alternative B4 Lamar-Young

The proposed LRT line from west of Griffin Street to the intersection of Field and Young Streets would be constructed via a cut and cover operation and a tunnel portal. The driveway exit to Jackson Street at the McDonald's would be temporarily closed during construction. This driveway is the drive-through exit only. The driveways to the McDonald's from Commerce Street however would remain open. The surface parking lots located south of Jackson and Wood Streets between Griffin and Field Streets would be impacted during construction. Two driveways to these parking lots located along Wood Street would be closed permanently. The parking lot located in the southeast corner of Griffin Boulevard and Jackson Street can be accessed via the driveway located on Jackson Street. Access to the surface parking lot located in the northwest corner of Young and Field Street would be via Young Street, Field Street or a second additional driveway located on Wood Street.

Construction of the at-grade LRT line along Young Street between Ervay and St. Paul Streets would impact two driveways to the surface parking lot located on the north side of Young Street. It is assumed that Young Street would be widened so that the traffic can be shifted before construction of the median running LRT line. This should allow for the driveways to remain accessible to the parking lots during normal business hours.

The limits of the Young Street widening would begin at Ervay Street and terminate just west of Pearl Expressway. Part of this reconstruction would include resurfacing the existing pavement on Young Street due to the construction of the at-grade LRT line. It is assumed impacts to the existing driveways to the surface parking lots and properties located along this segment would be minimal due to the phased construction of the roadway widening and LRT line. Between St. Paul and Harwood Street, the following driveways would be impacted during construction:

- Two driveways to the surface parking lot on the north side of Young Street. These driveways are also accessible from St. Paul Street and Park Street.
- Driveway entrance to the Scottish Rite of Freemasonry parking lot located south of Young Street. This parking lot is also accessible via Canton Street.
- Between Harwood Street and Pearl Expressway, the LRT line follows the north side of Young Street. This would impact two driveways to parking lots of businesses that are currently inactive. With the construction of the LRT line, access to these parking lots would be permanently closed from Young Street. These parking lots can still be accessed from Wood Street, however.

Alternative B4a Lamar-Marilla

The construction of Government Center station in the northwest corner of Young and Field Street would impact the driveway to the parking lot from westbound Young Street during construction. Access to this parking lot from Field Street and Wood Street would remain open.

Construction of the City Hall station below City Hall would impact the existing driveway from Ervay Street. City Hall access would remain with the main access on Young Street.

East of Ervay Street, the proposed LRT line runs along Marilla Street and then east along Canton Street. Marilla Street between Ervay Street and Canton Street is a two-lane roadway with one lane in each direction. This segment of roadway is assumed to be closed for traffic during construction of the LRT line via cut and cover operation. There is a driveway located in the southeast corner of Marilla and Ervay Streets. Access to this parking lot would be via Ervay Street during construction.

Construction of the tunnel portal along Canton Street between Park and Harwood Streets would impact the driveway to the parking lot entrance for Scottish Rite of Freemasonry building. This parking lot can be alternatively accessed from Young Street during construction.

The at-grade LRT line crosses Central Expressway between Canton and Jackson Streets. This would impact the driveway access to the parking lot of the business located west of Central Expressway permanently. Access to this parking lot would be from Pearl Expressway.

The LRT line continues at grade through the abandoned Young Street right-of-way corridor. There is a driveway to the parking lot located east of Central Expressway between Canton Street and Jackson Street. Access to the parking lot via this driveway would be permanently closed. This driveway needs to be relocated approximately 100 feet north from its current location.

Alternative B4b Lamar-Convention

Impacts to driveways are the same as the Lamar-Marilla Alternative except this alternative has an additional underground station (Convention Center Hotel Station). There are no driveways that would be impacted at this location. Since the future Hotel layout is not known at this time, the construction impacts analysis did not consider the effects upon any of the Hotel's driveways.

Driveway Mitigation

The review of driveway impacts along the routes show that through construction, with few exceptions, access to buildings would be maintained during hours of operation. Alternative routes for driveways that are anticipated to be closed have been identified. DART would coordinate with property owners to inform them of when impacts to driveways would occur with sufficient time for the property owners and the City of Dallas to address changes in access and inform property or building users of alternative access into the facility or parking lot. All traffic control and access plans would also be approved by the City of Dallas.

3.17.8.3 Impacts to Pedestrian Circulation

Near the intersection of Museum Way and Houston Street, the proposed LRT line would run at grade through a nearby surface parking lot. There is a sidewalk that currently runs along both sides of Houston Street. Due to the reconstruction of Museum Way to accommodate the future LRT line, the sidewalk would be closed for pedestrians temporarily at this location. Pedestrians could use the sidewalk located on the west side of Houston Street with sidewalk closed signs posted at Lamar Street and Olive Street for through pedestrian traffic.

Similarly, the sidewalk located along the West Frontage Road of Woodall Rodgers would be impacted due to reconstruction of the roadway and construction of Museum Way station adjacent to the future Museum of Nature and Science. Pedestrians can utilize the newly constructed roadway between Field Street and Houston Street until the frontage road travel lanes and sidewalk are reconstructed.

Construction of the tunnel portal south of McKinney Avenue would require the sidewalk on the south side to be closed for pedestrians. During this construction period, pedestrians could be detoured via Munger Avenue. Similarly, during construction of the tunnel portal along Munger and Laws Streets, pedestrians can use the McKinney Avenue sidewalk assuming construction at this location would be phased to accommodate pedestrian activity.

Construction of the LRT line along Lamar Street from north of Corbin Street to south of Ross Avenue would be via a cut and cover operation. This street would remain open for traffic during construction with a reduced number of travel lanes. The existing sidewalks on either side of Lamar Street would not be closed to pedestrian traffic except at the intersection of Corbin Street and Munger Avenue. The only impacts would be at the intersections where pedestrians may not be able to cross Lamar Street. Instead, they would have to cross at Pacific Avenue or Munger Avenue.

Construction of Metro Center Station on Lamar Street from Pacific Avenue to south of Elm Street would impact the pedestrian traffic at the intersection of Elm and Lamar Streets. Pedestrians can use either Pacific Avenue or Main Street to cross Lamar Street until construction is complete.

Construction of the LRT line crossing Commerce Street on the east end of the project would impact the pedestrian sidewalks on either side of Commerce Street. It is assumed that at least one sidewalk would always be open for pedestrian traffic along Commerce Street.

With the proposed LRT line running through the median of Good Latimer Expressway, the roadway would be widened to accommodate the proposed LRT line. It is assumed that at least one sidewalk along Good Latimer would be open to pedestrian traffic during construction.

Table 3-55 quantifies the total linear feet of sidewalk impacted as it relates to pedestrians during construction.

Alternative B7 Lamar-Commerce

Construction of the Pegasus Plaza Station on Commerce Street between Field and Akard Streets would impact the pedestrians crossing Akard Street at Commerce Street. During this period, pedestrians can utilize either the Browder Street Pedestrian Mall crossing or the Field Street intersection. Construction of the Main Street Garden station on Commerce Street between Harwood Street and Pearl Expressway should not impact any sidewalks.

Construction of the LRT line on Commerce Street from Pearl Expressway to east of Central Expressway would involve a cut and cover operation. This would impact

pedestrians crossing Commerce Street. Pedestrians can use Pearl Expressway to cross Commerce Street during construction.

Alternative B4 Lamar-Young

Construction of the LRT line from west of Griffin Street to south of Wood Street would require the sidewalks along Wood Street and Griffin Street to be closed during construction. This would require pedestrians to use Young Street and Field Street, or Young Street and Lamar Avenue as a detour during construction.

Construction of the LRT line at-grade along Young Street would require widening of the roadway on the south side from east of Field Street to Ervay Street. This would also require reconstruction of the existing sidewalk. Pedestrians can use the sidewalk on the north side of Young Street as a detour. Additionally construction of Government Center Station at the intersection of Akard and Young Streets would prohibit pedestrians from crossing Young Street. Pedestrians could proceed to Field Street to access the sidewalk on the north and south sides of Young Street.

Widening of Young Street from St. Paul Street to Pearl Expressway to accommodate the LRT line would require reconstruction of sidewalk on both sides. However, it is assumed that the sidewalk on one side of the street would be open to pedestrian traffic at all times during this phased construction.

Construction of the Farmers Market Station east of Central Expressway would restrict the use of sidewalk on the east side of the roadway. Pedestrians could use the sidewalk located on the west side of Central Expressway.

Alternative B4a Lamar-Marilla

Construction of the Government Center Station at the intersection of Young and Field Streets would impact pedestrian traffic on both sides of Young Street. Through pedestrian traffic on Young Street can use Griffin, Wood and Field Streets as a detour during construction.

Construction of The City Hall Station would impact through pedestrian traffic on Ervay Street. Pedestrians can use Akard Street or St. Paul Street as an alternate route until construction is completed.

Construction of the LRT line from Ervay Street to Harwood Street along Marilla Street would also impact access to pedestrian traffic. It is assumed that the sidewalk would remain open on one side of the roadway at all times during construction.

Construction of the LRT line through the intersections of Harwood and Canton Streets, Young Street and Pearl Expressway, and Central Expressway and abandoned Young Street would impact pedestrian access at these locations. However, it is assumed that pedestrian access would still be provided in some limited fashion through each of these intersections until construction is completed.

Alternative B4b Lamar-Convention

Impacts to pedestrian traffic for this alternative are similar to the Lamar-Marilla alternative except for the construction of an additional underground station (Convention Center Hotel Station). Through pedestrian traffic on Young Street crossing Lamar Avenue would be impacted during construction of this station.

Pedestrians can use Wood Street as a detour until construction is completed. Hotel pedestrian accessibility would be maintained at all times.

Pedestrian Circulation Mitigation

Where pedestrian routes would be affected by the construction of the LRT, alternative routes would be identified for pedestrians to use. DART would require contractors to provide adequate safety for any pedestrians that are in close proximity to the construction area. These safety measures would include maintaining a significant clear zone from construction, providing adequate barriers to keep pedestrians away from construction activities, providing adequate signage for pedestrians to understand street and sidewalk closures and the available alternative routes.

3.17.8.4 Impacts to Bicycle Circulation

No active bicyclists were observed during several days of field investigation along any of the four alternative alignments. Bike route 190 is an east-west route that runs parallel along Wood Street and Jackson Street in opposite directions through downtown Dallas. Bike route 39 is a north-south route that runs parallel along Ervay Street and St. Paul Street in opposite directions through downtown Dallas. Construction of the LRT line for Alternative B4 would involve cut and cover operation along Wood Street between Griffin Street and Field Street. Therefore, bicyclists using Route 190 East would have to detour via Young – Field – Wood Streets during construction.

Bike routes would not be impacted for the remaining alternatives.

Bicycle Mitigation

Alternative B4 would cause a temporary rerouting of bicyclists from Wood Street during construction. No impacts would result from the remaining alternative. No mitigation program is needed for bicycle routes.

3.17.8.5 Intersection Impacts

Various intersections would be impacted by the four proposed LRT alternatives during the construction period. Where possible, the intersections shall remain accessible to drivers and pedestrians by phasing the construction activities and limiting lane reduction or closures during peak periods. Table 3-55 quantifies the total number of intersections impacted during construction of this alternative.

The following intersections would be impacted during construction that is common to all alternatives:

- Victory Avenue and Museum Way
- Houston Street and Museum Way
- Elm Street and Lamar Avenue
- Ross Avenue and Lamar Avenue
- Corbin Street and Lamar Avenue
- Munger Avenue and Laws Street

- Griffin Street and McKinney Avenue
- Main Street and Good Latimer Expressway
- Elm Street and Good Latimer Expressway

Alternative B7 Lamar-Commerce
Intersections that would be impacted during construction are as follows:

- Commerce Street and Akard Street
- Commerce Street and Central Expressway

Alternative B4 Lamar-Young
Intersections that would be impacted during construction are as follows:

- Griffin Street and Jackson Street
- Young Street and Field Street
- Young Street and Akard Street
- Young Street and Ervay Street
- Young Street and St. Paul Street
- Young Street and Park Street
- Young Street and Harwood Street

Alternative B4a Lamar-Marilla
Intersections that would be impacted during construction are as follows:

- Young Street and Akard Street
- Young Street and Field Street
- Marilla Street and St. Paul Street
- Marilla Street and Park Avenue
- Canton Street and Harwood Street
- Canton Street and Pearl Expressway

Alternative B4b Lamar-Convention Center Hotel
Intersections that would be impacted during construction are as follows:

- Marilla Street and Ervay Street
- Marilla Street and St. Paul Street
- Marilla/Canton Street and Park Street
- Canton Street and Harwood Street
- Canton Street and Pearl Expressway

Intersection Mitigation

Construction phasing would be the primary means of mitigating impacts to intersections along any of the routes. As part of the overall traffic control plan, impacted intersections would be identified and a schedule for construction developed. When the entire intersection is required to be closed, then detour signs would be posted and alternative routes would be identified for affected drivers.

3.17.8.6 Impacts to Loading and Unloading Zones

There is one loading/unloading zone that exists for the property located in the northeast quadrant of Marilla and Ervay Street along Marilla Street. This building is unoccupied and no activity has been observed at this property. There is also a second loading/unloading zone that exists for the property located in the northwest corner of Marilla and Park Streets. Again, there was no activity observed at this location. Other than these two apparently unused loading/unloading zones located along Alternatives B4a and B4b, no other loading/unloading zones exist for the other Build Alternatives.

3.17.8.7 Impacts to Emergency Services during Construction

During construction of the LRT, access to certain buildings would be affected, particularly with at-grade lines in close proximity to existing structures. The traffic control plan would include provisions to allow for continued access to these buildings by emergency services. The discussion of driveway impacts identified specific access issues. DART would coordinate with emergency services agencies to allow for continued access to all buildings and facilities for emergency service vehicles.

Mitigation Measures

As a part of the approved traffic management plan that would be prepared for the D2 construction, DART would address the issue of providing access to the buildings for emergency vehicles, as well as notifying these agencies which streets would be closed thereby allowing them to adjust any routes requiring use of these streets to access an emergency situation. DART would coordinate with police, fire, hospitals and ambulance providers. Each of the alternatives under consideration would have impacts to the frontage of buildings or street access.

Building owners would be provided sufficient notice regarding construction taking place in front of their buildings so they would have time to adjust their own emergency response programs to address any emergency exit strategies.

3.17.8.8 Impacts to DART Bus Routes

DART bus stops located east and west of Lamar Street along Elm Street would be impacted with the construction of Metro Center Station at the intersection of Elm and Lamar Street. Since Elm Street is a major east-west street serving the Central Business District, at least three travel lanes need to remain open to traffic during peak hours. Griffin Street – Main Street – Market Street was identified as the recommended detour for DART bus routes serving Elm Street during any short duration closures of this roadway due to station construction. Table 3-55 quantifies the DART bus stops and bus routes impacted during construction.

Alternative B7 Lamar-Commerce

Since Commerce Street is a major downtown roadway, it was assumed that its travel lanes would always remain open, although they may be reduced to fewer lanes at certain times. Therefore, all of the current DART bus routes are assumed to continue utilizing Commerce Street with only minor bus stop relocations as needed during construction.

Alternative B4 Lamar-Young

No impacts to DART bus routes were identified for this alternative.

Alternative B4a Lamar-Marilla

No impacts to DART bus routes were identified for this alternative.

Alternative B4b Lamar-Convention Center

This alternative is similar to Alternative B4a except for the new underground station (Convention Center Hotel Station). DART bus routes serving Young Street east and west of Lamar Street need to be detoured via Market Street – Commerce Street – Griffin Street during closure of eastbound Young Street at Lamar Avenue.

At this time, no permanent bus route changes have been analyzed due to the provision of the D2 rail service. Future route modifications are possible but are undefined at this time.

3.17.8.9 Potential Truck Hauling Routes during Construction

The potential truck haulage routes would utilize Woodall Rodgers Freeway – Woodall Rodgers Frontage Roads (inbound and outbound) for the cut and cover, tunnel portal and Metro Center Station. This would be common to all alternatives. The two main staging areas identified for all alternatives are the existing parking lots located diagonally from each other at the intersection of Laws Street and Munger Street, and the vacant parcel located on the south side of Commerce Street near the IH 45/US 75 on-ramp. For the station and cut and cover sites, there would be approximately 400 to 600 truck movements per day inbound and outbound performing excavation work.

Alternative B7 Lamar-Commerce

This alternative has the majority of the alignment underground. The Pegasus Plaza Station on Commerce Street between Field and Akard Street would utilize Commerce Street – Griffin Street – Woodall Rodgers Freeway (inbound and outbound). The Main Street Garden Station on Commerce Street between Harwood Street and Pearl Expressway would route trucks via Commerce Street – IH 45 (outbound) and IH 45 – Main Street (inbound).

Alternative B4 Lamar-Young

For the cut and cover and tunnel portal construction between Griffin and Field Streets the potential truck haulage route would be Griffin Street – Woodall Rodgers Freeway (inbound and outbound).

Alternative B4a Lamar-Marilla

For the Government Center Station at the intersection on Young and Field streets, Griffin Street – Woodall Rodgers freeway would be utilized as the truck haulage route. For the City Hall Station and the cut and cover operation along with construction of the tunnel portal along Marilla Street east of Ervay Street, the following are the proposed truck haulage routes:

- IH 45 – Main Street – Harwood Street (Inbound)
- Harwood Street – Commerce Street – IH 45 (Outbound)

Alternative B4b Lamar-Convention

This alternative is similar to the Lamar-Marilla Alternative except that it has an additional underground station (Convention Center Hotel Station). The truck haulage routes would generally remain the same as Alternative B4a.

3.17.8.10 Traffic Detours during Construction

Construction of a tunnel portal south of Woodall Rodgers freeway adjacent to the frontage road would result in permanent closure of Laws Street and Munger Avenue for vehicular traffic. Traffic can use McKinney Avenue, Lamar Street, Corbin Street and Griffin Street as alternate roadways. N. Griffin Boulevard can also be used as an alternate roadway to avoid Lamar Street during construction even though this section of Lamar would not be permanently closed to vehicular traffic during construction.

Construction of Metro Center station on Lamar Street at Elm Street would require westbound traffic on Elm Street to use Griffin Street – Main Street – Market Street as a detour during construction closures. This detour would be in effect only during non-business hours since Elm Street serves as a major roadway in the Central Business District and cannot be fully closed to traffic during regular business hours.

Table 3-55 quantifies the total length of detour for each alternative, as well as the total number of work zone areas.

Alternative B7 Lamar-Commerce

Construction of a new underground station on Lamar Street at Elm Street would require westbound traffic on Elm Street to use N Griffin Street – Main Street – Market Street as a detour during construction closures. This detour would be in effect only during non-business hours since Elm Street serves as a major roadway in the Central Business District and cannot be fully closed to traffic during regular business hours.

The proposed LRT line on Commerce Street from east of Harwood Street to the off-ramp of US 75 would require construction of Main Street Garden Station, cut and cover section and a tunnel portal. The number of traffic lanes along Commerce Street would be reduced during construction. There is a possibility of eastbound traffic utilizing Main Street as an alternate roadway to avoid construction delays along Commerce Street. However, it is not anticipated that full closure of Commerce Street would be permitted by the City of Dallas.

Alternative B4 Lamar-Young

Construction of the LRT line utilizing a cut and cover operation and a tunnel portal through Griffin and Wood Streets would require Wood Street to be closed for traffic. Griffin – Young – Field streets has been identified as a recommended detour.

Construction of Government Center Station in the median of Young Street between Field and Akard Streets would permanently restrict the southbound through traffic along Akard Street. Traffic can use Young Street – Marilla Street as a permanent detour to travel southbound.

Alternative B4a Lamar-Marilla

Construction of the LRT line from Ervay Street to Harwood Street along Marilla/Canton Street is assumed to be closed for traffic during construction. Detour routes identified are as follows:

- Ervay - Cadiz Street for eastbound Marilla Street;
- Harwood – Young – Akard Street for westbound Marilla/Canton Street;
- Harwood - Young – Akard Street for westbound Canton Street.

Alternative B4b Lamar-Convention

This alternative is similar to B4a except that it has an additional underground station (Convention Center Hotel Station). Alternative B4b would impact the eastbound traffic along Young Street due to the construction of the station via the open cut method. The detour identified for eastbound Young Street traffic is Market – Commerce – Griffin Street.

3.17.9 Air Quality Impacts

No measurable overall change in air quality, but some temporary site-specific degradation due to equipment exhaust and odor for all alternatives. Truck and equipment idling would be restricted.

Previous DART underground construction encountered petroleum products during tunnel construction. If flammable gasses are anticipated during construction, the temporary tunnel ventilation system would remove gasses arising from construction and this may involve the use of chemical treatment incorporated into the tunnel ventilation plant at the tunnel work sites. Gas monitoring, protection and handling requirements for all construction sites would be prepared during design should there be a risk of encountering flammable gasses during construction.

Increased truck traffic along the construction route would increase air emissions during construction. These emissions would include NO_X, VOC, CO, and other vehicle related emissions. In addition to truck traffic, there would be a wide array of equipment used for construction purposes. Diesel equipment such as front-end loaders, pile drivers, scrapers, and other non-stationary equipment would be required during construction.

Construction activities associated with excavations, grading and fill and other operations disturb the soil, generate dust and remove groundcover which causes the soil to be susceptible to wind and water erosion. There are no federal, state or local

regulations concerning the generation of dust from construction activities except as a nuisance complaint, however, DART has its own regulations concerning dust control.

The City of Dallas has by reference adopted the following air quality regulations for construction activities: 30 TAC, Chapter 116, (Regulation VI) Control of Air Pollution by Permits for New Construction or Modification. DART's construction activities would be in accordance with these regulations.

Mitigation of Air Quality Impacts

Areas disturbed by construction activities would be covered or treated with dust suppressors. Dry power brooming would not be permitted. Only wet cutting of concrete block, concrete and asphalt would be permitted. All vehicles would be inspected prior to their leaving the construction site to minimize matter being dislodged from the vehicles during transit. Tarpaulins would be used on loaded trucks carrying loose material to prevent the material from becoming airborne. The sprinkling of water would be required on dust generating surfaces such as roads and other areas where construction equipment is in operation.

The control of exhaust emissions emanating from various construction equipment would be in accordance with EPA guidelines. To minimize exhaust emissions, contractors would be required to use emission control devices and limit the unnecessary idling of construction vehicles.

Construction of the project would not violate any federal, state or local laws concerning air quality. Therefore, air quality impacts form construction activities would not be significant.

3.17.10 Disruption of Downtown Activities

All of the Build Alternatives would involve significant impacts on activities adjacent to or in close proximity to the areas of construction. However, these impacts would be temporary and mitigated to the extent reasonable. DART is committed to the development and implementation of a comprehensive construction mitigation program for the project, based on the best practices from other similar projects and focused on the particular challenges and issues facing Downtown Dallas. This program is reflected in the project cost estimate and would be developed for the selected alternative during preliminary engineering. It would include continuous public and business community relations, maintenance of transportation plan, maintenance of utilities plan, economic and cultural activities mitigation plan, and emergency/contingency response plan.

All of the Build Alternatives would have the same temporary impacts in the area from Victory Station to Main Street, and from IH 45 to the connection with the Southeast Corridor.

Victory Station to Main Street

- maintenance of traffic patterns in the Victory/Hillwood development areas
- maintenance of traffic and access to/from the West End Historic District area and Dallas Aquarium

- maintenance of bus and pedestrian circulation and access to the West Bus Transfer Center, West End LRT station and Bank of America Building

IH 45 to the connection with the Southeast Corridor

- maintenance of traffic at Commerce Street and IH 45
- maintenance of access to Bark Park
- maintenance of traffic and access along Good Latimer

Table 3-56 includes a distinction of relative impacts for each of the options at various points along the Build Alternative, ranking the impact as either "high," "moderate," or "low." The Build Alternatives vary with respect to both the extent and type of temporary disruption to Downtown Dallas activities during construction, as presented in Table 3-57.

3.17.11 Mitigation for Disruption of Downtown Activities

These impacts would be temporary and mitigated to the extent reasonable. DART is committed to the development and implementation of a comprehensive construction mitigation program for the project, based on the best practices from other similar projects and focused on the particular challenges and issues facing Downtown Dallas. This program is reflected in the project cost estimate and would be developed for the selected alternative during preliminary engineering. It would include continuous public and business community relations, maintenance of transportation plan, maintenance of utilities plan, economic and cultural activities mitigation plan, and emergency/contingency response plan.

3.17.12 Historic and Archaeological Resources

3.17.12.1 Historic Resources

Section 3.10 describes the process currently being taken to complete the determination of effects to historic resources. Coordination with the Texas SHPO is ongoing.

Table 3-56. Definition of Relative Impacts for Downtown Activity Disruption

Degree of Impact	Evaluation Criteria
High Relative Impact	• Requires major investment to maintain either access to, or the elimination of impacts to priority downtown activity during construction • Major route changes for users of facilities are required • Construction activity will take place in very close proximity to the adjacent land user • Adjacent land owners are highly sensitive receptors to possible construction impacts such as noise, traffic impacts, other factors
Moderate Relative Impact	• Only moderate investments such as additional traffic control devices such as signs are required to maintain current activities • Access is still available to destinations, but users may have minor detours to reach destination • Impacts such as noise, vibration and other activities are limited to non-priority areas, or non-sensitive receptors such as parking garages
Low Relative Impact	• Minimal to no investments required to manage construction impacts to an area • Access remains available to sites without any detours • Very few receptors to negative impacts of construction

Source: PB/AZB Joint Venture

Table 3-57. Temporary Impact on Downtown Activities During Construction

Alternative	Area Affected	Activities Affected	Relative Impact
B7 Lamar-Commerce	Underground stations and portal area at three locations along Commerce Street	Hotels, offices and retail/commercial businesses DART bus routes	High
B4 Lamar-Young	Cut-and-cover tunnel portal area from Griffin and Jackson to Field and Young Surface LRT and stations from Field and Young to Central Avenue	Adjacent residential and office buildings. City Hall garage Dallas Public Library First Presbyterian Church, Masonic Temple, Scottish Rite Residential and commercial buildings.	High High
B4a Lamar-Marilla	Underground station at Santa Fe site City Hall station East portal in Marilla from Ervay to Harwood Harwood to Central Ave.	Adjacent residential buildings. City Hall garage ONCOR vehicle ctr. Soup kitchen Homeless ctr. Masonic Temple Scottish Rite Residential and commercial buildings.	High Moderate Low Moderate
B4b Lamar-Convention Center Hotel	Underground station at Lamar and Young City Hall Station East portal in Marrilla from Ervay to Harwood Harwood to Central Ave.	Convention Ctr. Hotel Federal Bldg Founders Square Plaza Greyhound Bus Terminal City Hall Garage ONCOR vehicle ctr. Soup kitchen Homeless ctr. Masonic Temple Scottish Rite Residential and commercial buildings.	Moderate Moderate Low Moderate

Source: PB/AZB Joint Venture

3.17.12.2 Archaeological Resources

There is the possibility that unrecorded historic archaeological sites may exist within the downtown area based on the number of previously recorded, though not listed or eligible, sites in the surrounding area. Subsurface archaeological and paleontological resources may be encountered during construction. Monitoring by a professional archaeologist during the construction phase of the project may be necessary for the portion of the corridor where subsurface impact is greatest within downtown Dallas and/or where previous subsurface disturbance has been minimal. The likelihood that such resources could be encountered, however, is low. In the event that such resources are encountered, work shall be halted to allow for the investigation of the resource, which may potentially cause construction delays and associated financial

impacts. Upon implementation of mitigation measures, impacts associated with archaeological and paleontological resources would not be considered adverse.

3.17.12.3 Mitigation Measures

Historic Resources

No significant adverse construction effects would occur to historic resources, so no additional mitigation measures would be required.

Archaeological Resources

Mitigation measures would include a worker education program and work stoppage and notification of SHPO and other appropriate agencies if archaeological or paleontological resources are encountered. These measures would be documented in a memorandum of agreement that could include the development of a Monitoring Plan, an Unanticipated Discovery Plan, and mitigation measures to resolve adverse effects on archaeological resources eligible for the national, county, or city registers. The agreement should be developed by FTA in consultation with the SHPO and other interested parties. Upon implementation of such mitigation measures, impacts associated with archaeological and paleontological resources would not be considered adverse.

3.17.13 Parkland Construction Impacts

3.17.13.1 Parklands

As described in Section 3.10, Parklands, the presence of the proposed LRT alternatives would have minor effects on certain park properties. In addition, certain parks located near the LRT alternatives would be temporarily affected by increased noise and impaired access during construction. The affected park properties would be City Hall Park Plaza, and Young/Marilla/Akard Park,. Two other community facilities—Bark Park Central and Julius Schepps Park—are located on TxDOT right-of-way and maintained by the City of Dallas under a multiple use agreement with TxDOT. As such, they are considered properties primarily intended for transportation use and are, therefore, not subject to Section 4(f) of the Department of Transportation Act. They are not addressed in this section.

City Hall Park Plaza and Young/Marilla/Akard Park are protected by Section 4(f). Permanent effects on these properties are documented in Section 3.10. However, temporary construction impacts are generally not considered to be a prohibited use of parkland under Section 4(f) as long as they are of short duration, cause no change in ownership or long-term occupancy, do not adversely affect park resources, and include only minor amounts of land. In addition, some of the temporary construction impacts are proximity impacts that would not be considered severe enough to be considered a constructive use of the properties under Section 4(f) even if they were permanent.

Limited, temporary noise impacts would occur at the Young/Marilla/Akard Park (B4) and City Hall Park Plaza (B4, B4a, B4b) during station construction, and during track construction under Alternative B4 at the Young/Marilla/Akard site. None of these temporary, limited effects would constitute Section 4(f) impacts.

3.17.13.2 Mitigation Measures

Where access issues are present, alternative vehicle or pedestrian access would be identified for park users. Construction noise and traffic impacts are anticipated to be minimal around these areas and therefore, no additional mitigation efforts are planned.

3.17.14 Water Quality and Natural Environment

Discharge of industrial waste water, including waste water from transportation equipment cleaning operations would require a permit from the Dallas Water Utilities. Water discharge would be required during construction and permanently during station and tunnel operation. Permits provided by Dallas Water Utilities and permit treatment requirements would be defined in the contract documents.

Storm water permits are obtained from the TCEQ. Under the existing Construction General Permit TXR150000 (PDF), issued March 5, 2008, construction activities which include runoff that goes into or adjacent to any surface water in the state are regulated according to the area of land disturbed.

DART, through its construction contractor shall comply with all terms and conditions of a construction general permit or a specific National Pollutant Discharge Elimination System (NPDES) permit, whichever is obtained for the site from the EPA. The contractor would, to the maximum extent practicable, use best management practices to control and minimize the discharge into the storm water drainage system, waters of the United States, and state water of any sediment, silt, earth, soil, or other material associated with clearing, grading, excavation, land filling, and other construction activities. Erosion control elements meeting the criteria for best management practices must be installed either before any construction site is established or in accordance with an installation schedule as specified in a storm water pollution prevention plan required by the construction general permit or a specific NPDES permit.

3.17.14.1 Mitigation of Storm Water Pollution During Construction

Specific best management practices that would be employed by DART and its contractors during construction would include those required by the TCEQ for the Construction General Permit TPDES General Permit TXR150000. These include the following:

(a) Good Housekeeping - Good housekeeping measures must be developed and implemented in the area(s) associated with concrete batch plants.

  (1) Operators must prevent or minimize the discharge of spilled cement, aggregate (including sand or gravel), settled dust, or other significant materials from paved portions of the site that are exposed to storm water.

  (2) Operators must prevent the exposure of fine granular solids, such as cement, to storm water. Where practicable, these materials must be stored in enclosed silos, hoppers or buildings, in covered areas, or under covering.

(b) Spill Prevention and Response Procedures - Areas where potential spills that can contribute pollutants to storm water runoff, and the drainage areas from these locations, must be identified in the SW3P. Where appropriate, the SW3P must

specify material handling procedures, storage requirements, and use of equipment. Procedures for cleaning up spills must be identified in the SW3P and made available to the appropriate personnel.

(c) Inspections - Qualified facility personnel (i.e., a person or persons with knowledge of this general permit, the concrete batch plant, and the SW3P related to the concrete batch plant(s) for the site) must be identified to inspect designated equipment and areas of the facility specified in the SW3P. The inspection frequency must be specified in the SW3P based upon a consideration of the level of concrete production at the facility, but must be a minimum of once per month while the facility is in operation. The inspection must take place while the facility is in operation and must, at a minimum, include all areas that are exposed to storm water at the site, including material handling areas, above ground storage tanks, hoppers or silos, dust collection/containment systems, truck wash down and equipment cleaning areas. Follow-up procedures must be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections must be maintained and be made readily available for inspection upon request.

(d) Employee Training - An employee training program must be developed to educate personnel responsible for implementing any component of the SW3P, or personnel otherwise responsible for storm water pollution prevention, with the provisions of the SW3P. The frequency of training must be documented in the SW3P, and at a minimum, must consist of one training prior to the initiation of operation of the concrete batch plant.

(e) Record Keeping and Internal Reporting Procedures - A description of spills and similar incidents, plus additional information that is obtained regarding the quality and quantity of storm water discharges, must be included in the SW3P. Inspection and maintenance activities must be documented and records of those inspection and maintenance activities must be incorporated in the SW3P.

(f) Management of Runoff - The SW3P shall contain a narrative consideration for reducing the volume of runoff from concrete batch plants by diverting runoff or otherwise managing runoff, including use of infiltration, detention ponds, retention ponds, or reusing of runoff.

DART, through its construction contract requires contractors to secure SW3P permits for construction activities and would implement a monitoring program during construction to inspect the contractor's compliance with these requirements.

3.17.15 Excavations, Fill, Debris and Spoil

The preliminary contamination study indicated a number of contaminated sites adjacent to the proposed Build Alternatives. Typically contamination cleanup would be completed before the construction begins; however, when additional contamination is encountered during construction, the contamination would have to be removed or otherwise remedied. Depending on the length of time required for remediation, there may potentially be construction delays and this would have associated financial consequences. Upon implementation of mitigation measures impacts associated with excavation, fill materials, debris, and spoils of hazardous materials would not be considered adverse.

Tunneling and underground station construction would result in a large amount of excavated material. At least one surface station (B4 Field-Young Station) would contribute to the amount of material. Debris would also be generated by the demolition of buildings that are acquired for the alignment and stations. The currently estimated bulked quantities for spoils removal by alternatives are:

- Alternative B7- 475,000 yd^3 soil and 1,080,000 yd^3 rock
- Alternative B4 - 338,000 yd^3 soil and 340,000 yd^3 rock
- Alternative B4a - 720,000 yd^3 soil and 894,000 yd^3 rock
- Alternative B4b - 720,000 yd^3 soil and 925,000 yd^3 rock.

With Alternatives B4, B4a and B4b, a significant amount of this material would be removed from areas formerly occupied by the Santa Fe Railroad in the vicinity of Lamar and Young Streets. These soils may be contaminated particularly near the surface and the rock may also be contaminated which may also include petroleum products. The large quantities involved for all Build Alternatives require that excavated material be disposed off-site. Table 3-58 describes the underground structure bulk excavation by Build Alternative.

Table 3-58. Excavated, Debris, and Soil

Item	Underground Structure Bulk Excavation			
	B7	B4	B4a	B4b
Excavated Material (yds^3)	1,550,000	670,000	1,600,000	1,650,000
Number of Truckloads	193,750	83,750	200,000	206,250
Estimated Construction Period	48 months	42 months	48 months	48 months
Peak Bulk Excavation Period	9 months	9 months	9 months	9 months
Average Truckloads per day during Peak Excavation	835	360	860	890
No of Underground Stations	3	1	3	3
Average Truckloads per day per station site during Peak Excavation	240	250	250	260
Average Truckloads per day from tunnel portals during Peak Excavation	115	110	110	110

Source: PB/AZB Joint Venture

Assumptions:

- Smaller truck size (18 tons, 8 yds^3) for operation on city streets
- Portals would be used primarily for construction staging and tunnel drives, rather than spoils removal
- No hauling during morning and evening weekday peak periods (2 hours each)
- Excavation occurs 6 days/week
- Truckloads are only exiting site (one-way trips)
- Truckloads do not include other materials to and from the site and adjacent or remote construction staging areas

3.17.15.1 Mitigation of Excavated Spoil

During design, detailed investigations would be conducted to provide a basis for determining specific construction health and safety specifications, and appropriate contaminated soil management procedures for construction of proposed project.

The design and preparation of a Remedial Action Work Plan would be coordinated with and approved by the TCEQ and local regulatory authorities.

A project spoils disposal program would be developed to ensure the safe and efficient transport and disposal of all excavated materials. The program would ensure compliance with DART's "General Provisions" for construction projects which provides measures concerning disposal of debris and spoil. It would also include a soil testing and monitoring program under the supervision of the DART Environmental Compliance Officer.

No hauling permits are required by the City of Dallas. However, hazardous waste is not accepted at many landfills. During preliminary engineering, major projects in the region would be contacted regarding their requirements for fill, and designated landfills in the vicinity of the project area would be surveyed for their capacity and requirements. If some portion of the spoils is contaminated, special arrangements would be made for the disposal of this material.

DART's Construction Manager shall be required to develop an Emergency Response Plan as part of the overall Health and Safety Plan for the project. The plan shall establish response procedures to be implemented should hazardous conditions be encountered or should a spill of hazardous materials occur during construction. The design and preparation of the Emergency Response Plan shall be coordinated with TCEQ and other appropriate agencies (e.g., fire, police, and rescue). Upon the discovery of potentially hazardous material(s), construction activities shall be stopped and the substance(s) identified. If the presence of hazardous material(s) is verified, TCEQ shall be contacted, and an appropriate response would be implemented. Any handling, treatment, and disposal of hazardous materials shall occur in full compliance with all federal, state, and local requirements.

The disposal of soil is regulated at the federal and state level by the Federal RCRA, based on the Hazardous and Solid Waste Amendments (HSWA). Sampling of soil slated for disposal shall be conducted in accordance with the applicable federal and state protocols, in order to determine the proper location and method of for off-site disposal. For known contaminated soils, the facility provider shall be required to develop a Hazardous Materials Management Plan for construction activities that would be prepared by a Certified Hazardous Materials Specialist. This plan shall address the proper methods for excavation, handling and disposal of contaminated materials, as well as for the storage, handling, and use of hazardous materials required during construction.

For any contaminated groundwater identified, the following options are available for the handling of discharge water, with the approval of the TCEQ and local authorities:

- Containment and off-site treatment and disposal at a permitted facility;
- Discharge to a surface water body, with or without pretreatment under a NPDES; and
- The applicability of these options would be determined after a more thorough investigation of specific sites.

No adverse construction impacts associated with excavation, fill materials, debris, and spoil are anticipated with the implementation of these mitigation measures.

3.17.16 Construction Safety

With respect to construction activities, there are major differences between the four Build Alternatives as it relates to the construction activities required for lines that are at-grade versus lines that are underground. Table 3-59 provides a summary and location of construction-related safety issues with each of the Build Alternatives.

The majority of the construction would take place in the downtown area, either at grade or below grade depending on the location and the alternative selected. Construction safety issues would include general construction activities and worker safety; safety for pedestrians and occupants of buildings located adjacent to or near the DART light rail line; and safety of the community as construction activities could potentially impact utilities serving a vital part of the Dallas community.

Special construction considerations would have to be made where the light rail would operate underground. Tunneling practices would require consideration of geotechnical conditions, location of existing and proposed utility lines, ventilation and illumination, structural integrity of the tunnel and other safety factors relevant to constructing tunnels and underground rail lines. DART has a history of being able to safely construct light rail lines underground for distances comparable to those under consideration for this line.

3.17.16.1 Safety Mitigation Measures

DART currently has in place several safety requirements for construction of DART LRT projects. These standards are designed to accomplish the following: minimize accidents and injuries to workers and non-workers and minimize the environmental impacts. The design of any transportation improvement, particularly LRT, should meet the following objectives at a minimum:

- Design for minimum hazard through the identification and elimination of hazards through the appropriate safety design concepts and/or alternative design;
- Use of fixed, automatic, or other protective safety devices to control hazards which could not be eliminated; and
- Use of warning signal and devices, if neither design nor safety device could effectively eliminate or control an identified hazard.

DART would provide special procedures to control hazards which cannot be controlled by the aforementioned devices.

Major safety issues associated with construction, which would be addressed in DART's construction specifications include:

- On-site hazardous materials
- Excavation
- Utilities and manholes
- Trench and confined spaces

Table 3-59. Construction-Related Safety Concerns

Sector	Alternative	At Grade – Underground	Construction Safety Concerns
Good Latimer to IH 45	B4, B4a, B4b, B7	At grade	• Traffic at Good Latimer would require a traffic control (TCP) plan to facilitate motorists through the intersection. Also barricades installed to protect workers from traffic. • Construction under IH 45 and height constraints and columns associated with bridges. Design to incorporate minimum clearance heights. Stipulations to restrict construction equipment exceeding certain heights from operating under bridges. • Pedestrians using Julius Schepps Park and Bark Park. Provide designated walkways with ample signing for pedestrians.
IH 45 to Young and Field	B4	At grade	• Traffic along Young Street Requires TCP for worker safety and to facilitate traffic thru the area. • Pedestrians and traffic associated with Scottish Rite Cathedral and Presbyterian Church. Requires combined pedestrian and vehicular TCP to protect workers and pedestrians.
Young and Field to Woodall Rodgers	B4	Underground	Tunnel construction safety would include proper ventilation and emergency respirators, an evacuation plan in case of emergency and tunnel shoring during construction. Also construction at the tunnel portals would require necessary separation from traffic. Security fences to be installed to protect pedestrians from entering the construction area.
Woodall Rodgers to Victory	B4, B4a, B4b, B7	At grade	• Construction under Woodall Rogers and height constraints and columns associated with bridges. Design to incorporate minimum clearance heights. Stipulations to restrict construction equipment exceeding certain heights from operating under bridges • Pedestrians and vehicles in parking lots and users of facilities around recreational facilities. Provide barrier to separate the work area from the facilities operation. Provide signing for pedestrians and vehicles. • Pedestrians and traffic associated with multi-family households. Provide staged TCP to maintain pedestrian and vehicular traffic.
IH 45 to Marilla and Harwood	B4a, B4b	At grade	Traffic and pedestrian traffic safety issues. Provide designated walkways with ample signing for pedestrians. Install barriers to separate construction, traffic, and pedestrians.
Marrilla and Harwood to Woodall Rodgers	B4a, B4b	Underground	Tunnel construction safety issues; would include proper ventilation and emergency respirators, an evacuation plan in case of emergency and tunnel shoring during construction. Also construction at the tunnel portals would require necessary separation from traffic. Security fences to be installed to protect pedestrians from entering the construction area.
IH 45 to Woodall Rodgers	B7	Underground	Tunnel construction safety issues. Would include proper ventilation and emergency respirators, an evacuation plan in case of emergency and tunnel shoring during construction. Also construction at the tunnel portals would require necessary separation from traffic. Security fences to be installed to protect pedestrians from entering the construction area.

Source: PB/AZB Joint Venture

- Ventilation and illumination
- Electrical
- Fire Protection
- Construction Equipment
- Restricting access to construction areas
- Noise and vibration
- Traffic control
- Equipment usage

Contractors doing construction work for DART are required to submit for DART review and Safety and Security Program Plan (SSPP) (May 2004 Rev 7). DART specifications also provide guidance on factors of safety associated with any construction that is undertaken.

3.18 Cumulative Impacts

The cumulative effects of a project are those effects which are the result of a series of incremental, human-induced changes in the environment in the past, present and foreseeable future, which include both direct and indirect effects of the project activity, as well as effects of unrelated activities located in the project area and its surroundings (40 CFR 1508.7). When combined, these impacts are considered cumulative impacts. Cumulative effects may occur at a later point in time than the direct impacts or at some distance from the initial activity. The analysis takes into consideration not only the project as proposed, but other anticipated changes to the environment in the planning area and, how combined, these changes present potential environmental consequences that may require mitigation.

3.18.1 Methodology

In order to analyze the potential cumulative effects of the proposed D2 project, past, present and future projects and activities in the vicinity of the study area must be considered. All direct and indirect impacts of the proposed D2 project, all programmed LRT and other planned development/improvement activities should be considered in this analysis. The first consideration is taking into account all direct and indirect, or secondary, impacts determined by environmental studies conducted so far. If particular resources are anticipated to be affected directly or indirectly by the D2 proposed alternatives, then other past, present or reasonably foreseeable actions are also considered for what effects they may have on these resources. Taking account of all of these factors results in a determination of the cumulative impacts of the proposed alternatives.

The analysis is performed with the knowledge that the CBD is a dynamic and growing center of commerce and housing for the City of Dallas. A specific project such as the D2 LRT is only one of several projects recently completed, underway, or planned in the CBD and surrounding areas. Projects improving other transportation facilities, expanding commercial districts, providing new residential communities, creating transit-oriented developments, and expanding cultural or educational facilities could contribute to cumulative impacts in the CBD. To determine the

proposed project's cumulative impacts, it is necessary to review the projects and plans of DART, the City of Dallas, and other entities, public and private, to determine what major actions have recently been completed, are currently underway, or will be occurring in the CBD.

3.18.2 Other Past, Present and Reasonably Foreseeable Actions

The following past, present and reasonably foreseeable actions could contribute to the cumulative effects of the proposed alternatives:

Past

- DART LRT Red Line
- DART LRT Blue Line
- DART LRT Green Line (Southeast Corridor)
- Trinity Railway Express
- Victory Park mixed use development
- American Airlines Center
- West End mixed use redevelopment
- Downtown Parks
- Arts District expansion

Present and Under Design/Construction

- DART LRT Orange Line (Northwest Corridor)
- Project Pegasus (TxDOT)
- Convention Center Hotel
- Museum of Science and Natural History

Future Committed and Probable

- CBD Streetcar network
- Trinity Parkway
- City Center residential redevelopment
- Farmers Market District mixed use development/redevelopment
- Central Avenue and Pearl Street network modifications (from two to one-way)

In addition, projects in the DART 2030 Transit System plan located outside the CBD may have indirect effects on ridership, operations and service to and through the CBD. These projects include proposed extensions to existing and new lines, as well as new commuter rail or LRT projects that interconnect with the DART network. As these services are added to the system over time, it is anticipated that adjustments in operations and service will be made in order to accommodate additional ridership and maintain sufficient capacity.

3.18.3 Population and Employment

Implementation of the proposed D2 project, any resulting induced development, and other development projects in the CBD would lead to population and employment impacts. Such types of development would likely translate into an increase in population and employment near the proposed stations. The *Forward Dallas* Comprehensive Plan states that there was a clear consensus from planning process participants that a thriving downtown was central to the City's overall well being, as well as the well being of the entire North Central Texas region. Furthermore, participants believed that increasing jobs and housing near downtown LRT stations would be a positive outcome of this public investment and would simultaneously provide desirable housing choices. Achieving these goals would require that the City garner the resources necessary to provide for the health and well-being of the new population centers, with adequate provision of emergency services and infrastructure improvements, such as water and wastewater service and sanitation services. In addition, more people living downtown and traveling downtown to shop and work could increase traffic flows in the downtown area, but would be off-set by increased transit usage over time. Overall, the proposed action when considered with other past, present, and future actions would likely have a net beneficial cumulative impact on population and employment in the project area.

3.18.4 Environmental Justice Assessment (Executive Order 12898)

The overall population of the study area only encompasses a small percentage of the City's population – less than 2 percent. No disproportionately high and adverse direct or indirect impacts to minority or low-income populations would be likely to occur as a result of the proposed D2 project. There is a potential that the development of the proposed D2 project would have a beneficial cumulative impact on low and/or minority populations, as mobility, housing and employment options would be enhanced.

3.18.5 Public Facilities and Services

The D2 project, in combination with other existing and planned LRT lines and other nearby transportation projects, has the potential to create greater access to public facilities located in the CBD, especially City Hall and the City Library, the American Airlines Center and other public attractions. Access to these facilities varies depending on the Alternative. Table 3-60 below presents a comparison of public facilities that are provided greater access due to the development of the D2 LRT. Other community facilities include medical centers, places of worship, police and fire stations, libraries, schools, and a community college. Therefore, the construction of the proposed D2 project would have a positive cumulative impact both within the D2 Study area and the broader metropolitan context as access to these facilities would be enhanced.

3.18.6 Land Use and Economic Impact

The proposed D2 project has been developed in conjunction with planned public transportation and roadway improvements as well as local land use plans and projects. Consideration of a second LRT alignment began when the City of Dallas and DART entered into the Master Inter-local Agreement (ILA) in 1990. The ILA requires DART to supplement the current light rail transit system when specific

Table 3-60. Comparison of Options – Public Facility Access

	B7 Lamar Commerce	B4 Lamar Young	B4a Lamar Marilla	B4b Lamar Convention Center
Access to Public Facilities	Bark Park Central Scottish Rite Temple Bank of America Tower West End District Amerisuites Hotel American Airlines Center		Julius Schepps Park First Presbyterian Church El Centro College Dallas World Aquarium Victory Park	
	Western Union Building Police & Court Bldg. Mercantile Bldg Magnolia Hotel One & Two AT&T Plaza Adolphus Hotel	Dallas Public Library City Hall Convention Center Pioneer Cemetery Pioneer Park Police Memorial	Dallas Public Library City Hall Convention Center Pioneer Cemetery Pioneer Park Police Memorial Founders Square	Dallas Public Library City Hall Convention Center Pioneer Cemetery Pioneer Park Police Memorial Founders Square

Source : PB/AZB Joint Venture

operating and/or ridership needs are met. One goal of DART and the City of Dallas is to encourage TOD in new LRT station areas. TOD can take many forms, but generally involves improving land use around rail transit stations by encouraging higher-density, mixed commercial and residential development in the vicinity of stations. These developments take shape as a result of improved access via LRT to recreation, commerce and housing. Existing examples of TOD are found at the Mockingbird and Downtown Plano stations in the DART LRT system.

The City of Dallas' *Forward Dallas* plan supports the expansion of Dallas' public transit system. In developing Forward Dallas, six core values were identified for the plan, including the statement that convenient transportation offers choices in how to get around. Dallas residents want options on how to get around the city and the region that include public transit and attractive streets to walk. Having more opportunities to walk to transportation hubs, housing and entertainment are particularly valued. The goal of the plan's transportation plan is to allow for people and goods to move reliably, efficient and safely through the city. (Source: City of Dallas, *forward Dallas*, June 2006). The plan goes on to strongly recommend that future mass transit projects, especially light rail projects, incorporate transit oriented design as a way of providing greater service to residents and encourage more sustainable development.

DART is coordinating with the recently initiated CBD Master Plan Study. This study is a collaborative effort between the City of Dallas, the downtown business and residential community and DART. Its goal is to development the framework needed to facilitate planned economic development and needed transportation improvements such as the D2 project and CBD streetcar project.

3.18.6.1 Induced Development

An important factor in the evaluation of cumulative impacts of new transit facilities is induced growth resulting from improved transportation access, especially around station areas, in combination with development induced by other transit projects or

unrelated projects. Implementation of a new LRT facility, in combination with other transportation and development projects in the CBD, such as the proposed CBD Streetcar network would lead to improved land use and development planning and greater economic development through transit-oriented design and greater access to downtown locations. This would therefore transform certain parts of downtown, increasing the number of people working in the CBD and the number of people living in the area. Current and projected land use would change as more buildings and facilities would be constructed or expanded. These effects are balanced against the need to build additional infrastructure to support non-LRT transportation modes such as automobiles, trucks and buses, and the increased need for road improvements, more parking lots, and less development under a No Build Alternative.

The analysis of the four Build Alternatives considers their potential economic impact in combination with other past, present and future actions. In general, the differences among the alternatives in terms of cumulative economic effects are primarily determined by differences in direct and indirect economic impacts. The added effects of other past, present and reasonably foreseeable actions would serve to increase these effects for all the Build Alternatives. Table 3-61 presents a summary of anticipated growth in development of office, retail and lodging for the two primary development corridors that encompass the four build alternatives.

Table 3-61. Summary of Demand Potentials 2010 – 2030

	CBD Central Corridor Alternative B7			CBD South Corridor Alternatives B4, B4a, B4b		
	2010-2020	2020-2030	Total	2010-2020	2020-2030	Total
Office (Square Footage)	288,000	393,000	681,000	92,000	125,000	217,000
Retail (square footage)	38,164	27,831	65,995	72,915	163,953	236,868
Lodging (Total Rooms)	0	164	164	0	98	98

Source: Economic Research Associates; Market Outlook for Dallas Downtown DART Station Areas, 2008

It is anticipated that the Proposed DART D2 would encourage further development in the downtown area through TOD and improved access to undeveloped and underdeveloped areas within the study area. It would integrate the CBD with surrounding neighborhoods and enhance access to other areas of Dallas and the metropolitan area by improving service and access, in combination with other existing and planned improvements to the regional transportation system, to more destinations throughout these areas.

Improved access to the CBD, in combination with the great variety of major transportation infrastructure and land development/redevelopment projects is anticipated to increase economic activity in the CBD, resulting in fewer building vacancies and underutilized land, and lead to the creation of new centers of commerce, culture, and community living in undeveloped areas of the CBD. This increase in land use activity could increase traffic downtown, but with the increased LRT service to, through and within the CBD, increased traffic would be partly offset by LRT ridership. Overall, the cumulative benefits would outweigh the adverse cumulative impacts on land use and the local economy.

3.18.6.2 Acquisition of Property

The majority of the right-of-way for all Build Alternatives would utilize DART owned property or City of Dallas owned streets. Alternatives B4 and B4a would likely require the most private property acquisition of mostly vacant, surface or structured parking uses. Several commercial and residential two-three story buildings may be acquired with all alternatives.

At this time, the extent of potential private property acquisition has been estimated, but not yet finalized along any of the alternatives. For example, for some parcels where tunneling is proposed, an underground easement may be possible rather than purchase of the surface property. Partial purchases of surface parcels may also be negotiated, as well as public access easements to underground stations.

The cumulative impact of property acquisition could lead to an increase or decease in project cost, and thus affect project funding and financing by the project sponsors. All commercial and residential building acquisitions will follow DART uniform acquisition and relocation procedures,. Any impacted parking essential to public facilities and services will be replaced in kind. To the extent that property is required in the vicinity of stations, TOD is possible which will be a beneficial impact of the project

3.18.6.3 Barriers to Social Interaction

Increased mobility between the CBD and other City of Dallas neighborhoods and suburban communities would enhance community cohesion because the D2 project stations, with connections to other LRT lines, would promote greater access to the CBD. Each of the Alternatives would improve access to City Hall and the J. Erik Jonsson Central Library, especially Alternatives B4, B4a and B4b, which have a station located at City Hall. This increased access would promote greater citizen participation in city government and increase access to the library for meetings and other uses. Other projects in downtown such as the Woodall Rodgers Park also serve to remove barriers and enhance opportunities for social interaction. The cumulative effect of the proposed D2 project would therefore be to contribute beneficially to social interaction among residents of the CBD and the City of Dallas generally.

3.18.7 Safety and Security

The proposed D2 project in combination with proposed Streetcar and other LRT projects and TOD projects would contribute to a trend away from automobile use and toward public transportation in the CBD. This effect could reduce cumulative accident potential within the proposed Study area and beyond.

The proposed D2 project includes a number of potential at-grade and underground LRT stations that would require additional security. This would be especially true for the stations located at City Hall, a highly visible public facility. The location of the City Hall Station with Alternatives B4a and B4b is influenced by security measures which provide for separate public and City Hall employee/visitor access, and overall passenger safety. All stations would require continuous monitoring for both safety and security purposes. With proper security measures, such as patrols and the use of video cameras to monitor these sites, incremental security requirements can be

reduced. The cumulative effect on safety and security would include these added personal and equipment requirements.

Construction activities associated with the D2 project may require tunneling in the central business district. This activity could potentially impact downtown utility services, traffic, and businesses. DART would work with all affected parties and conduct a detailed analysis of temporary disruption and contingency measures in the area to reduce any potential impacts. Construction safety would be paramount and specific safety plans would be developed for building the line, whether at-grade or underground.

Construction of the proposed D2 project could cause a slight increase in demand for additional fire or police personnel. Impacts on fire and police services from this project in conjunction with other DART projects and multiple development projects in the CBD would result in short-term cumulative impacts. It is anticipated that these impacts would be minor through the use of mitigation treatments such as issuing advanced notice on traffic detours and closures.

For operation of the DART LRT system, fewer safety impacts are associated with lines that are below grade. This is due to the fact that there would be less impact on traffic through the CBD and less opportunities for pedestrian accidents. Alternative B4 has one proposed gated intersection at (Field and Young) to prevent vehicular access to the tunnel entrance. Safety impacts associated with the at-grade sections of the other build alternatives can be managed through adequate signage, signals, and management of LRT speed through sensitive areas. The use of underground facilities would help to minimize overall cumulative safety impacts. With adequate increases in security and safety requirements, the development and operation of the LRT can be accomplished in a safe and secure manner without contributing substantially to cumulative safety and security impacts.

3.18.8 Air Quality

The proposed D2 project would not directly increase air pollution in the vicinity of its operation. There would be an increase in electric power demand, and this demand would incrementally increase air pollution at the point of the generation facility. At the location of outlying DART stations having parking facilities, there would be an increase in non-point air pollution as drivers go to park at these locations to use the LRT. Because most of the anticipated ridership would be traveling to and from points outside the CBD, non-point air pollution is not anticipated to increase substantially, and may actually decrease from projected levels because fewer automobiles operating in the CBD than currently projected. Other projects in downtown are focused on increase pedestrian activity, density, as well as reducing the need to use an automobile or enhancing traffic circulation. The cumulative effect on air quality would likely be a reduction in currently projected levels of air emissions as the D2 LRT facility provides a transportation alternative to automobile use.

3.18.9 Noise and Vibration

Cumulative noise levels would increase slightly in the CBD due to the D2 project and other projects. The greatest factor in future noise level increases is expected to be traffic growth in the CBD due to increased business activity and population growth,

as well as improved access from nearby highway projects, with or without the D2 project.

These increases may be offset by anticipated reductions in vehicular traffic from currently projected levels because of greater reliance on transit within the CBD. Potential noise impacts within the proposed D2 project would be mitigated in accordance with FTA noise guidelines. Similar noise mitigation efforts would be undertaken for any additional transportation and redevelopment projects. It is therefore assumed that no adverse cumulative noise impacts would result from the proposed D2 project.

Allowable levels of vibration along the proposed D2 project are governed by FTA impact criteria. Calculations indicate that projected ground-borne vibration levels at some locations along the D2 project may require mitigation. Once mitigated, however, all locations along the D2 project would meet FTA standards. No cumulative impacts as related to vibration are therefore anticipated as a result of the proposed action.

3.18.10 Historic, Cultural and Archeological Resources

Section 106 of the National Historic Preservation Act of 1966 requires that impacts on historic and archaeological resources are comprehensively considered for all proposed actions. Impacts to historic and archaeological resources within the DART D2 study area would therefore be evaluated and appropriately mitigated as per Section 106. Any additional current or future projects within the CBD would be similarly regulated under Section 106. It is therefore assumed that no adverse cumulative impacts as related to historic and archaeological resources would result from the proposed DART D2 LRT.

3.18.11 Parklands and Recreational Facilities

Demand for and use of parks and recreation facilities has increased in proportion to the growth of the region. Population growth and continuing development in neighborhoods surrounding parks would increase demand for and use of existing parks and recreation facilities. The development of LRT, other transportation facilities, and major land development projects throughout the CBD could result in cumulative impacts over time (such as noise, visual and traffic impacts) to parks and recreation facilities. These potential impacts would be mitigated on a project by project basis in accordance with all applicable laws, statutes and regulations.

3.18.12 Visual and Aesthetic Resources

The areas where DART would be constructing the proposed project are in areas that generally have already been developed or are awaiting redevelopment. Only a small portion of the proposed alternatives are aligned through residential areas that may be visually sensitive. With DART's standards for minimizing visual effect, the impacts to residential areas are not likely to be extensive. These standards apply to other existing and planned LRT facilities, as well.

Aesthetically, the proposed project would operate along a few sensitive areas of the CBD, including Pioneer Cemetery, Founders Park, Dallas Public Library, City Hall, First Presbyterian Church, and Scottish Rite Temple. Given there are currently severally highly traveled roadways in these locations; the impacts of the proposed

D2 LRT facility are not anticipated contribute substantially to the cumulative aesthetic impacts. The proposed stations in the CBD would be developed to be context sensitive and minimally intrusive in CBD neighborhoods and districts.

3.18.13 Water Resources and Floodplains

No streams, waters of the US, or floodplains are anticipated to be impacted by this project. No cumulative impacts to these resources are anticipated.

3.18.14 Hazardous/Regulated Materials

The proposed D2 project has the potential to affect or be affected by hazardous waste sites, both known and unknown. Any additional transportation and redevelopment projects also have this same potential. No adverse impacts would occur with proper mitigation in accordance with the application of hazardous waste laws, statutes and regulations. Therefore, no adverse cumulative hazardous materials impacts are anticipated to result from the proposed alternatives. Additionally, hazardous materials that may be encountered during construction would be removed or treated in place, thus reducing the potential for cumulative impacts within or surrounding the CBD.

3.18.15 Transportation Facilities

If the proposed D2 project is implemented, travel opportunities by transit would be enhanced, non-transit trip times would be reduced to some locations, transit mode-share would increase and patronage would increase. DART's plans also include integrating the proposed D2 project with existing DART LRT and bus services, and the proposed Streetcar network in the CBD. The D2 project would also improve access to the existing rail services provided to Fort Worth via the Trinity Railway Express. Net cumulative traffic impacts associated with the proposed D2 project are expected to be beneficial.

3.18.16 Biological and Natural Resources

Wetlands

There are no wetlands identified that would be impacted by any of the four Build Alternatives under consideration. No other wetland cumulative impacts are identified for the project.

Geology and Soils

The impact of the proposed D2 project on geology and soils would occur at various locations and areas within the proposed D2 project alignment. It is anticipated that none of the potential impacts would produce additive effects on general geology and soil conditions in the Dallas metropolitan area. Therefore, it is assumed that no adverse cumulative impacts on mineral resources and geology would result from the proposed D2 project.

Vegetation

DART maintains policies to reduce the impacts to native vegetation along LRT corridors. Given the acquisition required for right-of-way for the proposed Build Alternatives and the limited impacts of other DART projects on vegetation in the CBD, cumulative impacts on vegetation (e.g. trees and shrubbery) from LRT projects are not anticipated to be substantial or extensive. Consequently, cumulative impacts

on vegetation in the CBD can be mainly attributed to other unrelated actions and would not differ substantially among the No Build Alternative and Build Alternatives.

Wildlife and Threatened and Endangered Species

A number of regulatory measures have been introduced in an effort to curb impacts to wildlife and threatened or endangered species. These regulatory measures are in reaction to past actions, which have resulted in the direct take of species or indirectly caused a substantial loss or degradation of habitat. Coordination with the USFWS during final design and construction of the proposed D2 project would ensure that appropriate mitigation treatments are implemented to minimize impacts on wildlife.

Minimal wildlife displacement is anticipated along any of the four Build Alternatives, given their location within the CBD. The proposed D2 project is therefore not expected to contribute to an adverse cumulative impact on wildlife and threatened and endangered species.

3.18.17 Utilities

Where utilities must be protected or where new construction is warranted, coordination with utility companies and government agencies would take place in order to ensure design conformance and environmental compliance. Any additional current or planned transportation and redevelopment projects would also be subject to these requirements.

Construction activities associated with the D2 project may require tunneling in the central business district. This activity could potentially impact CBD utility services. DART is working with local utilities to conduct a detailed analysis of utilities in the area to reduce any potential impacts. Any new construction projects that are in the planning process would require coordination between DART and the respective project management to assure that construction activities do not conflict. An example would be the relocation of utilities to a location that would impede another development. DART is actively working with the business community, developers in the area and the City's Development Services Department to identify possible developments and coordinate construction activities. It is, therefore, assumed that no adverse cumulative effects pertaining to utilities would result from the proposed D2 project.

3.19 Environmental Justice

This section describes environmental justice populations and determines if there would be low-income and minority populations that would suffer disproportionately high and adverse impacts from the construction or operation of the D2 project.

Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (1994) requires federal agencies to ensure that disproportionately high and adverse human health or environmental effects of proposed federal projects on minority and low-income communities are identified and addressed. The general principles required under 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.

A review of environmental justice principles was conducted for the study area using census tract, census block group and block data.

DART meets the requirements set forth in Title VI of the Civil Rights Act of 1964 prohibiting race, color, and national origin discrimination, including language access for persons of limited English proficiency, and Section 504 of the Rehabilitation Act of 1973 prohibiting disability discrimination. DART provides services and operates programs without regard to race, color, and national origin in compliance with Title VI. Through its internet page and other media, DART makes clear its policy with respect to Title VI and provides a process for submitting complaints. This information is provided in Spanish as well as English.

3.19.1 Methodology for Impact Assessment

The environmental justice analysis in this document follows guidance provided by the Office of Federal Activities, "Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses" (April 1998), as well as guidance provided by other FHWA, FTA, EPA and CEQ publications. The analysis identifies minority and low-income populations within the project corridor study area and the potential adverse impacts to these populations if the proposed D2 project were implemented. The Study Area is defined in Chapter 1 and is represented for purposes of this analysis by the census tracts that provide the best geographic coverage of that area. If adverse impacts of the proposed project fall disproportionately on minority and low-income populations, mitigation measures or alternatives are identified.

A minority population is defined as a group of people and/or community experiencing common conditions of exposure or impact, which consists of persons classified by the U.S. Census Bureau as: Black or African-American, Hispanic or Latino, Asian, Native Hawaiian and other Pacific Islander, American Indian and Alaska Native, or persons of two or more races. Based on the Census data sets that were used, minority populations are reported here as racial ("Non-White") or ethnic (Hispanic or Latino) minorities. According to the Census Bureau, a low-income population is defined as a group of people and/or community, which as a whole, lives below the national poverty level.

For this evaluation, definitions of minority and low-income areas were established based on guidance provided by an Office of Federal Activities publication. The guidance states that a minority population may be determined to be present if a minority or minorities comprise over 50 percent of population in the affected area, or a "meaningfully greater" proportion of population in the area. For low-income populations, the guidance states that, "…low-income populations in an affected

area… should be identified with the annual statistical poverty thresholds from the Bureau of Census' Current Population Reports, Series P-60 on Income and Poverty."[1] The reports state that the use of national decennial census data in depicting the low-income/poverty and minority statistics is one of the most prevalent methods used to define affected communities. For this analysis, the City of Dallas is used as the geographic unit of comparison[2]. The analysis utilizes 2000 U.S. Census data to identify high minority and low-income/poverty populations located within the Study Area. Census block groups with percentages of below-poverty population more than twice the average percentage (18%) for (or "meaningfully greater than") the City of Dallas were considered to have substantial low-income populations, i.e. these include block groups with below-poverty populations of 36 percent or more.[3] 2000 Census poverty data are taken from a sample and are available at the block group level, but not at the block level. The location of the resident population based on census block data was checked and supplemented by examination of aerial photography, streetside photographs of existing land use, and Dallas Central Appraisal District property records.

Potential adverse impacts of the proposed project on the human population were identified and the census geography in which they occur was determined to identify where these impacts would affect minority and low-income populations. Possible alternatives and/or mitigation measures to avoid and mitigate disproportionate and adverse environmental impacts on affected populations were identified and assessed for feasibility, as necessary.

3.19.2 Decision-Making and Outreach

Over the course of the study, DART has taken action to ensure that environmental justice populations were included in the decision-making process. DART conducted four rounds of public meetings to solicit public comment on the approach to route selection and to hear comments on specific routes. There have not been any comments indicating a concern about disproportionate impacts on low income or minority populations in either the approach or selected options. DART has a citizens advisory committee, a technical advisory committee and has made various presentations to audiences throughout the region, some of which have been in neighborhoods comprised primarily of minority and low-income populations. The Citizens Advisory Committee and the Technical Advisory Committee have members that represent minority and low-income communities. Table 7-1 in Chapter 7.0 presents a listing of public outreach meetings that have been sponsored by DART over the course of the study's development.

Below is a list of additional activities undertaken to ensure that underserved populations were reached, and to determine if proposed actions were biased or presented disproportionately adverse impacts.

[1] Office of Federal Activities, "Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis," April 1998.
[2] The City of Dallas was used as the geographic unit of comparison with a reference population because the study area encompasses several census tracts and the next highest level of geographic coverage for census data is the City of Dallas.
[3] The meaningfully greater threshold of 36% used in this study is twice the below-poverty percentage for the City of Dallas (18%).

Newsletters

Each edition of the study newsletter was published in Spanish and English to keep stakeholders, including minority and low-income populations, informed of study activities and decision-making. Newsletters were distributed at various locations, including bus stops, and public buildings.

Notification of Public Meetings

Notifications of public meetings were published in 15 Dallas area newspapers prior to each round of public meetings. A few of these newspapers included the *Dallas Morning News,* the newspaper of highest circulation in the metropolitan Dallas area, and minority newspapers including *Al Día* and *El Hispano* (Hispanic), *Dallas Weekly* and *The Examiner* (African American), *Dallas Chinese News* and *Korean Daily* (Asian), and *Dallas Voice* (Gay and Lesbian). All 15 newspapers and the dates of advertisement publication are included in Table 3-62 below and are discussed in Chapter 7.

Table 3-62. Public Meeting Notifications by Newspaper

Type	Newspaper	Dates
General	Dallas Morning News	**April** 13, 17, 20, 2008; **December** 7, 11, 14, 2008; **June** 7, 11, 14, 2009
	Quick	**April** 16, 21, 23, 2008; **December** 15, 2008
	Downtown Business News	**April** 14, 2008; **December** 10, 2008; **June** 15, 2009
	Dallas Observer	**April** 16, 2008; **December** 10, 2008; **June** 10, 2009
	Peoples Newspapers (Oak Cliff, Park Cities)	**April** 18, 2008; **December** 12, 2008; **June** 11, 12, 2009
	Park Cities News	**December** 11, 2008; **June** 11, 2009
	Oak Cliff Tribune	**December** 11, 2008
Hispanic	Al Dia	**April** 16, 21, 23, 2008; **December** 10, 15, 2008; **June** 10, 13, 2009
	El Hispano	**December** 11, 2008; **June** 11, 2009
African American	Dallas Weekly	**April** 16, 23, 2008; **December** 11, 2008; **June** 11, 2009
	Examiner	**December** 11, 2008; **June** 11, 2009
Asian	Dallas Chinese News	**April** 18, 2008; **December** 12, 2008; **June** 12, 2009
	Korea Daily	**April** 16, 22, 23, 2008; **December** 10, 12, 2008; **June** 10, 12, 2009
	Nguoi Viet	**April** 18, 2008
Gay & Lesbian	Dallas Voice	**April** 18, 2008; **December** 12, 2008; **June** 12, 2009

Source : DART

Online Notification

Notifications of the public meetings were also provided online at eight different websites. A few of these included the D2 project website (www.DART.org/D2), North Dallas Chamber of Commerce, Southeast Dallas Chamber of Commerce, West Dallas Chamber of Commerce, and the Central Dallas Association. Notification was also provided online to the Greater Dallas Asian Chamber of Commerce, the African American Chamber of Commerce, and the ForwardDallas websites. The publications listed in Table 3-63 are discussed in Chapter 7.

Table 3-63. Public Meeting Notifications by Online Publication

Online Publication	Advertisement Publication Dates		
North Dallas Chamber of Commerce	4/14/2008	12/1/2008	6/1/2009
Greater Dallas Asian Chamber	4/14/2008	12/1/2008	6/1/2009
Southeast Dallas Chamber	4/14/2008	12/1/2008	6/1/2009
West Dallas Chamber	4/14/2008	12/1/2008	6/1/2009
Black Chamber	4/14/2008	12/1/2008	6/1/2009
Central Dallas Association	4/14/2008	12/1/2008	6/1/2009
ForwardDallas.org	4/14/2008	12/1/2008	6/1/2009
D2 Website	N/A	N/A	N/A

Source : DART

Public Meeting Invitations

Public meeting invitations were printed in both English and Spanish and were distributed to locations frequented by minority and low-income populations including DART stations and DART buses and trains, via Postal Service, to local businesses, schools, and buildings, and a few other additional advertising means. Below are the specifics relating to public meeting invitation distribution by category. Contracted Spanish translators attended each public meeting to assist non-English speakers, and all public meetings had written surveys.

DART Locations and Stations

- DART Headquarters Lobby
- DART Parker Road Station
- DART Downtown Garland Station
- DART Addison Transit Center
- DART North Carrollton Transit Center
- DART Centerport Station
- DART Westmoreland Station
- DART Ledbetter Station
- DART North Irving Transit Center
- DART Red Bird Transit Center

- DART Rowlett Park and Ride
- DART Farmers Branch Park and Ride
- DART Lake Ray Hubbard Transit Center
- DART CBD East Transfer Center
- DART CBD West Transfer Center
- Hand distributed to transit riders aboard DART buses and others in the Dallas CBD
- Windshield Distribution at the four end stations (Westmoreland, Ledbetter, Parker Road, and Downtown Garland)

Mailings

- Over 13,000 mailed to the CBD and surrounding area (all zip codes within the project study area) for the scoping meetings
- All contacts in the DART database with downtown area zip codes
- City, County, state, and federal staff and elected officials representatives for the Downtown Dallas area

Businesses, Schools, and Buildings

- El Centro College Campus Kiosks and Student Center
- Urban Market
- Dallas Central Library
- Downtown Residents Council
- Downtown Dallas Association
- Mosaic Loft Party Info Table
- Dallas City hall
- AT&T Plaza
- Cooperating and affected federal and local agencies

Additional Advertising

- DART Website
- Automated email and cell phone alerts
- LED messages on all DART buses and trains
- “Corner Marker” (kiosks) Posters in the CBD area

Stakeholder Meetings and Traveling Exhibits

Stakeholder meetings and traveling exhibits were conducted throughout the study to disseminate information, address questions and solicit input. Meetings were held with interests such as property owners, arts groups, business groups, and groups representing minority and low-income populations. Input was captured orally for

stakeholder meetings and then turned into written overviews of the oral conversations. In addition, nine staffed traveling exhibits were hosted around the Central Business District to update downtown residents, workers, and transit users, and to capture input. Input was received via a written survey during the traveling exhibits. The traveling exhibit locations included four DART stations, Urban Market, Farmers' Market, Cabell Federal Building and Dallas City Hall. Locations were selected to capture a broad cross-section on input, including feedback from minority and low-income stakeholders. DART staff present at these meetings included the bilingual project manager and Community Affairs representative. Comments from stakeholder meetings and traveling exhibits were captured in a comment database.

3.19.3 Impact Assessment

Table 3-64 provides a summary of population characteristics for the County, the City and the study area. The study area is similar in population characteristics to the overall racial and ethnic composition of the City. The D2 Study Area has somewhat higher percentages of White and Black or African-American residents than the City, but a lower percentage of Hispanic or Latino residents. The Study Area also has a higher percentage of residents with household incomes below the poverty level, but a considerably lesser percentage of people under 18 years of age.

Table 3-64. Population, Racial/Ethnic Composition, Poverty/Income and Age

Characteristic	Dallas County		City of Dallas		Study Area	
	Population	Percent	Population	Percent	Population	Percent
White	1,294,769	58%	604,209	51%	11,685	59%
Black or African-American	450,557	20%	307,957	26%	5,786	29%
American Indian and Alaska Native	12,499	1%	6,472	1%	162	1%
Asian, Native Hawaiian and Other Pacific Islander	89,646	4%	32,708	3%	269	1%
Some Other Race	311,504	14%	204,883	17%	1,386	7%
Two or More Races	59,924	3%	32,351	3%	670	3%
Total	**2,218,899**	**100%**	**1,188,580**	**100%**	**19,958**	**100%**
Hispanic or Latino (Any Race)	662,729	30%	422,587	36%	3,781	19%
Not Hispanic or Latino (Any Race)	1,556,170	70%	765,993	64%	16,177	81%
Total	**2,218,899**	**100%**	**1,188,580**	**100%**	**19,958**	**100%**
Under 18 Years	617,421	28%	315,576	27%	1,452	7%
65 Years and Over	177,864	8%	102,301	9%	1,411	7%
Total	**2,218,899**	**100%**	**1,188,580**	**100%**	**19,958**	**100%**
Below Poverty	293,267	13%	207,493	18%	2,722	26%
Total (For Whom Poverty Status Was Determined)	**2,183,570**	**100%**	**1,167,205**	**100%**	**10,601**	**100%**
Median Household Income	$43,324		$37,628		$38,750	

Race categories are inclusive of Hispanic or Latino population. Hispanic or Latino persons may be of any race. Below poverty percentages are of total persons for whom poverty status has been determined.
Sources: U.S. Census Bureau, PL94-171 as compiled by NCTCOG Research and Information Services, March 2001; Census 2000 Summary File 1 (2001) and Summary File 3 (2002).

Table 3-65 outlines population, racial, ethnic and poverty data for the City of Dallas, the Study Area, and the census blocks and block groups within 0.25 mile of the proposed Build Alternatives. For this analysis, a "meaningfully greater" percentage has been defined as a percentage twice as high (36%) as the City of Dallas percentage for low-income populations (18%). Also consistent with the guidelines, high minority (non-White and/or Hispanic) areas include those blocks or block groups where over 50 percent of the population was minority (non-White or Hispanic).

The City of Dallas had a population of 1,188,580 in 2000 according to the 2000 U.S. Census. Approximately 49% of the population was a racial (non-White) minority, 36% Hispanic or Latino, and 18% had an annual household income below the poverty level. There are nine census block groups within 0.25 mile of the proposed Build Alternatives and, within them, 34 populated census blocks (according to the 2000 Census), which vary considerably in their socioeconomic characteristics. Owing to the largely non-residential land use character of much of the Study Area, many of the potentially affected census blocks have no population. The affected census blocks with high proportions of minority residents in 2000 are concentrated near the convergence of the Government District with the Farmers Market and Convention Center Districts. Census data did not indicate substantial numbers of low-income residents along the proposed Build Alternatives, that is, although two block groups had percentages of below-poverty population that met the meaningfully greater threshold (36%, as discussed above), actual numbers of residents in populated census blocks adjacent to alternatives within these block groups were extremely low (from one to 11 persons), while other block groups were below the threshold. Table 3-65 shows the comprehensive evaluation of all census blocks within a 0.25 mile radius from the proposed Build Alternatives. Figure 3-53 illustrates the distribution of minority and low-income residents within 0.25 mile of the proposed Build Alternatives. The census blocks and block groups highlighted in Table 3-65 represent areas that had high concentrations of minority/low-income populations in 2000 within 0.25 mile of the proposed Build Alternatives.

For the non-White and Hispanic columns, this represents blocks with more than 50% non-White or Hispanic/Latino populations (since the Federal threshold is 50% or a "meaningfully greater" proportion for minorities). Non-White populations in these areas were predominantly Black or African-American. The Hispanic or Latino populations were predominantly Mexican. For populations living below the poverty level, the "meaningfully greater" threshold was used.

Figure 3-53 depicts a 2000 Census block map illustrating the location of the census blocks that had a high percentage of minority or low-income populations in 2000. Although eight of the blocks had a high percentage of minority persons, the four blocks that were 100 percent minority in 2000 each had a population of only one person.[4] The remaining four blocks identified had populations ranging from 57 percent to 85 percent racial minorities, mostly Black or African-American. These blocks lie near the convergence of the Government District with the Farmers Market and Convention Center Districts. However, visual assessment of Census Tract 32.01, Block 1034 (bounded by Marilla, St. Paul, Canton, and Ervay Streets), reveals

[4] Tract 17.02, Block 2034; Tract 31.01, Block 1092; Tract 32.01, Block 1024; Tract 33, Block 1046.

Table 3-65. Environmental Justice Evaluation of Study Area Census Blocks/Block Groups

Census Tract	Block Group	Block	Total Population	Total Non-White	Percent Non-White	Total Hispanic	Percent Hispanic	Below Poverty	% Below Poverty*	Alternatives w/in 0.25 mi
17.02	**2**	**—**	**681**	**103**	**15%**	**42**	**6%**	**18**	**3%**	**All**
17.02	2	2034	1	1	100%	0	0%			All
19	**1**	**—**	**1,860**	**550**	**30%**	**190**	**10%**	**209**	**11%**	**All**
19	1	1046	61	20	33%	3	5%			All
19	1	1058	172	47	27%	13	8%			All
19	1	1059	355	79	22%	36	10%			All
19	1	1060	52	15	29%	6	12%			All
21	**1**	**—**	**9**	**0**	**0%**	**0**	**0%**	**12****	**100%**	**All**
21	1	1022	2	0	0%	0	0%			All
21	1	1046	7	0	0%	0	0%			All
22	**1**	**—**	**853**	**233**	**27%**	**73**	**9%**	**121**	**14%**	**All**
22	1	1025	9	2	22%	0	0%			All
22	1	1049	22	10	45%	10	45%			All
22	1	1060	3	0	0%	0	0%			All
22	1	1069	10	0	0%	0	0%			All
22	**2**	**—**	**1,231**	**322**	**26%**	**70**	**6%**	**49**	**4%**	**All**
22	2	2011	596	163	27%	50	8%			All
31.01	**1**	**—**	**1,911**	**519**	**27%**	**268**	**14%**	**124**	**6%**	**All**
31.01	1	1018	16	0	0%	0	0%			All
31.01	1	1027	126	13	10%	12	10%			All
31.01	1	1028	158	13	8%	4	3%			All
31.01	1	1030	171	36	21%	15	9%			All
31.01	1	1034	1	0	0%	0	0%			All
31.01	1	1048	713	262	37%	176	25%			All
31.01	1	1054	319	51	16%	27	8%			All
31.01	1	1074	236	50	21%	13	6%			All
31.01	1	1092	1	1	100%	0	0%			All
31.01	1	1093	99	76	77%	11	11%			All
32.01	**1**	**—**	**277**	**161**	**58%**	**36**	**13%**	**94**	**31%**	**All**
32.01	1	1010	2	0	0%	0	0%			All
32.01	1	1012	64	4	6%	1	2%			All
32.01	1	1024	1	1	100%	0	0%			All
32.01	1	1034	91	68	75%	14	15%			B4a, B4b, B7
32.01	1	1035	72	61	85%	10	14%			B4a, B4b, B7
32.01	1	1064	47	27	57%	11	23%			All
33	**1**	**—**	**1,550**	**850**	**55%**	**906**	**58%**	**799**	**45%**	**All**
33	1	1046	1	1	100%	0	0%			All
33	1	1056	5	0	0%	0	0%			B4, B4a, B4b
33	1	1101	1	0	0%	0	0%			All
33	1	1104	11	0	0%	0	0%			All
33	1	1107	5	0	0%	0	0%			
100	**3**	**—**	**8,255**	**3,769**	**46%**	**1,502**	**18%**	**558**	**6%**	**All**
100	3	3105	178	52	29%	16	9%			B4, B4a, B4b
Study Area			19,958	8,273	41%	3,781	19%	2,722	14%	
City of Dallas			1,188,580	584,371	49%	422,587	36%	207,493	18%	

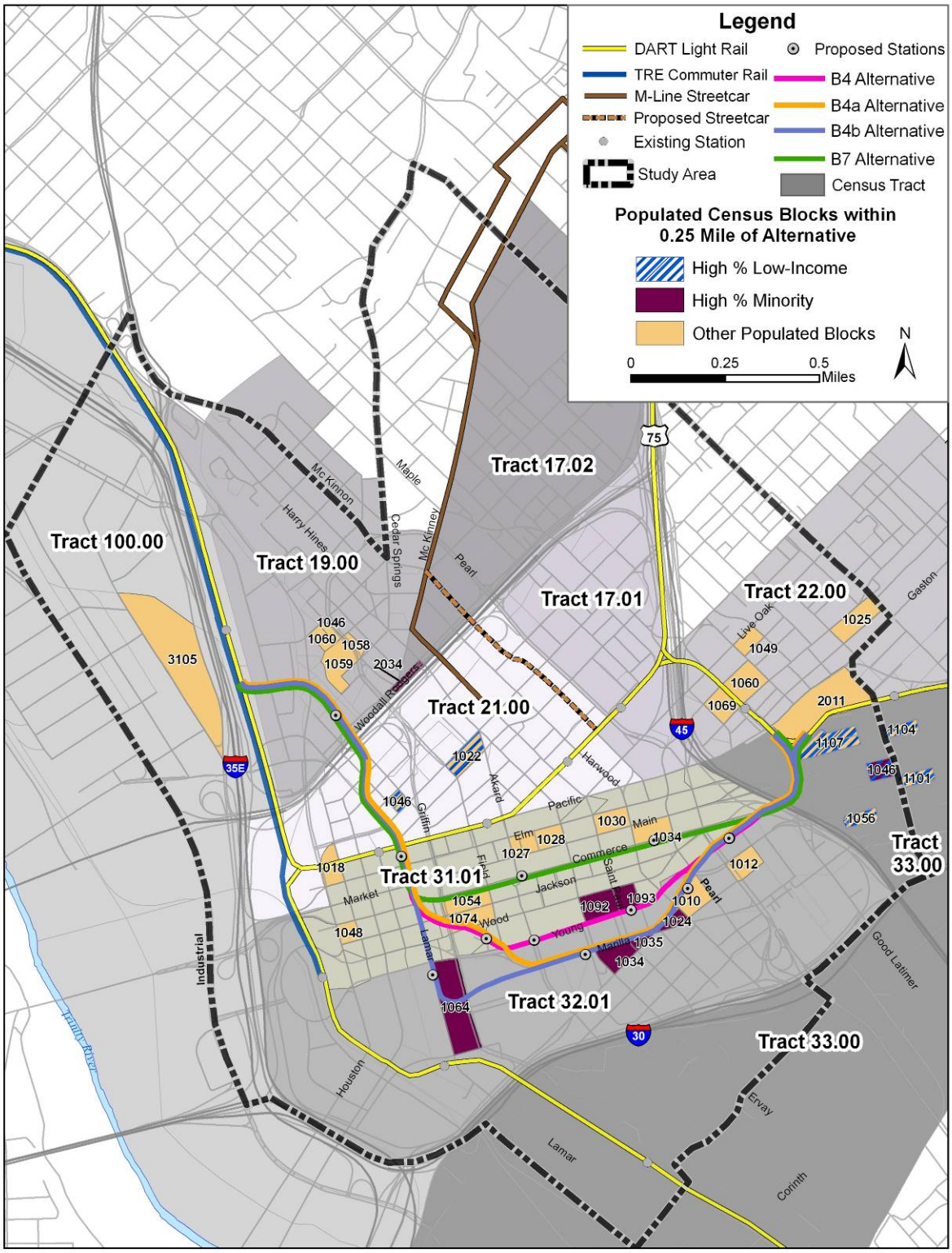
Note: The shaded cells of the table represent areas that have high concentrations of minority or low-income populations. The rows that are bolded are total counts for that census block group.

* Percent of population for whom poverty status has been determined, not total population.

** Poverty data are sample data (SF3) with extrapolated totals, which do not necessarily match totals from 100% actual data (SF1) for total and minority populations.

Source: US Census Bureau, Census 2000 Summary File 1 (SF1) – 100% actual data (2001), Census 2000 Summary File 3 (SF3) – sample data (2002), www.census.gov.

Figure 3-53. Populated Census Blocks within 0.25 Mile of Alternatives



Source : PB/AZB Joint Venture ; US Census Bureau, Census 2000 Summary Files 1 and 3, Census 2000 Block Maps, 2001, 2002

that the block has been redeveloped and is now entirely occupied by non-residential uses (office/commercial) and is no longer inhabited. In Block 1035 (bounded by St. Paul, Marilla and Canton Streets), all structures within the block have been demolished and it is also no longer inhabited. Likewise, Block 1064 (bounded by Young, Lamar, Memorial and Griffin) has also been redeveloped and consists entirely of non-residential uses (office/government). These findings were confirmed in a review of the Dallas Central Appraisal District's on-line records. In Tract 31.01, Block 1093 (bounded by Wood, St. Paul and Young Streets on the north, west and south, and the First Presbyterian Church on the east), the 2000 population was entirely residing in non-institutional group quarters. No group quarters or other residences remain in this census block, based on review of aerial and streetside photographs, and appraisal district records.

The only displacement among the census blocks examined for environmental justice impacts would occur in Tract 31.01, Block 1092, an area where only one person resided in 2000. This would result from Alternative B4. One building would be displaced; however, although this building was inventoried as residential lofts, it was until recently a boutique bed-and-breakfast hotel (Amelia's Place) and remains listed as a hotel use in the Dallas Central Appraisal District's tax records. Consequently, no relocations of minority or low-income persons are anticipated as a result of this displacement. No other displacements would occur in any of the minority or low-income census blocks. Consequently, there is no evidence that minority populations would be subject to disproportionately high and adverse impacts as a result of the proposed Build Alternatives.

Two census block groups within 0.25 mile of the proposed Build Alternatives had a high percentage of persons with incomes below the poverty level in the 2000 Census. Although Census Tract 21, Block Group 1 (the entire census tract), had a population of which 100 percent were reported below the poverty level by the 2000 Census, only two census blocks were populated in this tract, with a total population of nine people. One block with only two people (Block 1046) has been redeveloped and is now occupied by half of the Jefferson at 1001 Ross Luxury Apartments. Likewise, the only part of Block 1022—which had seven people in 2000—with a standing structure is the location of the Downtown Dallas YMCA, with the remainder of the block paved parking.

Similarly, Tract 33, Block Group 1, had a poverty rate of 45 percent, but only five blocks populated in 2000 lie within 0.25 mile of the proposed Build Alternatives, having a total population of 23. Two of these blocks were inhabited by only one person each, both blocks currently characterized by existing retail or redeveloped properties. Block 1056, just east of Central Expressway with five people in 2000, has been redeveloped as the Adam Hats Lofts Apartments. Block 1107, east of Good Latimer Expressway and north of Elm Street, had five people in 2000, but has been extensively redeveloped and is now occupied by office/commercial uses. Only Block 1104, east of Malcolm X Street and north of Elm Street, which had 11 people in 2000, still has residences that were existing in 2000—11 condominium apartments. However, the proposed Build Alternatives would not cause any displacements, noise impacts, or impacts on access, aesthetics, air quality,

safety/security, community facilities, or community cohesion in this census block.[5] Consequently, no disproportionately high and adverse impacts on the low-income population are anticipated as a result of the proposed Build Alternatives. Table 3-66 outlines the census blocks that were examined for adverse impacts.

Table 3-66. Summary of Census Blocks with Potential Environmental Justice Impacts

Census Tract	Block	Total Population	Percent Non-White	Percent Hispanic or Latino	Percent Below Poverty*
17.02	2034	1	100%	0%	3%
21	1022	2	0%	0%	100%
21	1046	7	0%	0%	
31.01	1092	1	100%	0%	6%
31.01	1093	99	77%	11%	
32.01	1024	1	100%	0%	31%
32.01	1034	91	75%	15%	
32.01	1035	72	85%	14%	
32.01	1064	47	57%	23%	
33	1046	1	100%	0%	45%
33	1056	5	0%	0%	
33	1101	1	0%	0%	
33	1104	11	0%	0%	
33	1107	5	0%	0%	

*For entire Census block group (lowest level available).
Source: US Census Bureau, Census 2000 Summary File 1 (SF1) – 100% actual data (2001), Census 2000 Summary File 3 (SF3) – sample data (2002), www.census.gov.

Although it does not lie within a census block group where a substantial number of low-income residents was reported, The Bridge, a facility providing shelter to low-income individuals who are homeless, opened in May 2008 and, while the success of the program is still under debate among local residents and officials, the building itself has contributed to the redevelopment of downtown Dallas. It is located at 1818 Corsicana Street, which falls approximately 0.25 mile south of Alternatives B4a and B4b. The facility has become a destination for hundreds of the city's homeless who would otherwise be living in vacant buildings and outdoors in the surrounding neighborhood. The Bridge provides services to assist the homeless in becoming healthy, working contributing members of the community and has been planned to provide more services than a typical homeless shelter. Another community service facility is the Presbyterian Soup Kitchen referred to as the Stew Pot. The Stew Pot provides meals and other services to low-income individuals. It is operated by Presbyterian Ministries and is located at 408 Park Avenue at the intersection of Park and Young Street.

Alternatives that use Young Street would be adjacent to the Stew Pot. No land would be acquired and the facility would not be displaced as a result of the construction of the D2 project. Access from north of the facility may require facility participants to

[5] The moderate noise impacts and construction air quality impacts discussed in Section 3.7 are located away from low income and minority populations and would not impact those populations.

use one of the pedestrian crosswalks to access the facility, but no other obstacles are presented as a result of the development of any of these options. Access to The Bridge, which is located approximately 0.25 mile south of Alternatives B4a and B4b, would not be adversely affected by these alternatives. No other barrier effects to minority or low-income communities were identified.

The integrity of minority or low-income communities within the Study Area would not be adversely affected by the proposed Build Alternatives. The LRT would not create barriers that would prohibit vehicular or pedestrian crossings, except where fences may be constructed along the sections of routes on dedicated right-of-way, for both security and safety reasons. No major barriers to the existing communities would be caused by either the construction or operation of the LRT. Except for the First Presbyterian Church Community Center and parking garage with Alternative B4, and the Scottish Rite Temple parking lot with alternatives B4a and B4b, vehicular access to public and private facilities and services (schools, churches, shopping and emergency services) would not be adversely affected by the construction or operation of the LRT. Regarding effects on the safety of children traveling to and from school, a review of the station areas and the alternative alignments shows that there are no elementary or secondary schools located within 0.25 mile of the proposed Build Alternatives. In addition, no adverse health effects are anticipated to result from any of the proposed Build Alternatives.

The No Build Alternative would not cause disproportionately high and adverse impacts related to human health, natural resources, or social and community issues for minority or low-income communities, since no substantial change to the environment would occur under this alternative. However, the No Build Alternative would provide no added benefits to minority or low-income communities related to improved access to community facilities, greater mobility, reduced traffic congestion and better air quality in the study area.

At this time, no additional adverse impacts were identified for any of the remaining Environmental Justice census blocks. This will be reexamined as project design advances and will be addressed further, as necessary, in the Final EIS.

3.19.4 Benefits to Environmental Justice Populations

A number of beneficial effects from the Build Alternatives were identified. These are listed and described in the paragraphs that follow.

Transit Service Equity: Persons served by the D2 LRT are those defined as living within a 0.25-mile radius of the proposed station locations. Minority and low-income populations living within these radii would benefit from access to the proposed LRT service. This would be a notable benefit to transit-dependent and transportation-disadvantaged populations, including low-income households, elderly, young, and disabled.

Traffic Congestion: The Build Alternatives would reduce reliance on automobile transportation throughout the study area by providing an alternative mode of travel. This would reduce the number of vehicle trips into or through the study area from what would otherwise be projected during future years of LRT operation. However, traffic is still projected to increase and congestion will likely increase as well, although not to the same extent as it would in the absence of the LRT travel mode.

Community Cohesion: The operation of the LRT would improve transit access to a number of services and community facilities such as El Centro College. Community cohesion would be enhanced by the alternatives that allow for easier access to City Hall and the Dallas Public Library.

Employment Opportunities and Economic Development: The construction and operation of the LRT would enhance employment opportunities for minority businesses and individuals in the study area and throughout the City. Employment opportunities for minority and low-income communities would not be negatively affected by the LRT. Short-term, construction-related jobs and long-term employment created by improved access would be a benefit to the study area communities. Specific long-term employment opportunities would be enhanced by providing residents near the Build Alternatives greater access to the job market through improved public transportation alternatives, in and outside of the study area. One of the City's major policy and planning goals for the CBD is to encourage greater TOD and transit-associated development (TAD) in areas around DART stations. The development of the areas around the stations would increase business development and thereby increase employment around these stations. Most of the land that would be redeveloped is currently in non-residential use (commercial, office, industrial or vacant). Consequently, it is unlikely that widespread displacement of long-term, low-income residents would indirectly result or that, in the near term, rising property values would place a disproportionate tax burden on such residents. Additionally, DART will require additional employees to operate and maintain the routes and has specific hiring policies which encourage hiring of minority an disadvantaged populations. Therefore, disproportionately high and adverse effects on minority business and low-income employment are not anticipated.

DART maintains policies that encourage the use of minority firms in the design and construction of its projects. Specifically, this policy states:

> The Department of Economic Opportunity and Government Relations is responsible for the development, implementation, coordination, and monitoring of all Disadvantaged, Minority and Women-Owned Enterprises (DMWBEs), Government Relations, and Outreach programs. The department advocates the agency's commitment to promoting a working environment, which recognizes and values the diverse social profile of the DART service areas, customers, stakeholders, contractors and employees. The department strives for equitable representation and advancement of members of all protected groups at all levels of employment and inclusion of disadvantaged businesses in all agency purchasing and contracting activities.
>
> The Economic Opportunity Division develops, manages and implements processes for ensuring that Disadvantaged, Minority and Women-Owned Business Enterprises (DMWBE) are aware of and educated on the procedures for competing and bidding for purchases and contracts at DART. The primary goal of the agency's minority business program, in existence since 1987, is to help achieve the agency's annual DMWBE contract and procurement goals. The DMWBE Program has been developed in accordance with DART's Board Policy and applicable state and federal regulations.

DART also maintains an affirmative action plan (AAP), which is intended to "assure equal employment opportunity (EEO) without regard to race, color, religion, sex, national origin, age, disability, veteran status, or any other characteristics protected by law." The plan states that:

> Achieving a technically qualified, productive, and highly motivated workforce through practices and procedures, which manifest themselves in equal opportunity, is a priority. We are committed to employment-related actions that further these principles, including but not limited to recruitment, hiring, promotions, terminations, transfers, layoffs, compensation, benefits and training.
>
> When workforce underutilization exists, goals will be established as an integral part of our AAP and will be designed to improve DART's workforce representation in these identified areas. Through good faith efforts, DART is committed to this objective through regular monitoring and reporting.
>
> Managers and supervisors are responsible for ensuring that their employment decisions comply with federal and state laws and regulations, DART personnel policies and the EEO/AA Program philosophy. All members of management and supervisors will be evaluated on EEO/AA compliance as part of the performance management process.

3.19.5 Limited English Proficiency

Executive Order 13166 requires federally assisted programs to identify any need for services to those persons with limited English proficiency (LEP) and develop and implement a system to provide those services so LEP persons can have meaningful access to them. The 2000 Census data (U.S. Census Bureau, 2002) indicate that 7 percent of study area residents have limited English proficiency. Approximately 17 percent of the total study area population is Spanish-speaking and 1 percent speaks Asian or Pacific languages. In implementing the Build Alternative selected in the FEIS, DART will take reasonable steps to ensure meaningful access to its programs and activities by LEP persons. As noted previously, public meeting invitations were printed in both English and Spanish, as well as distributed in the Dallas Chinese News and Korea Daily News, and materials were distributed to locations including DART stations, DART buses and trains—including use of the DART LED system on buses and trains, and on large kiosks located prominently downtown. A Spanish language translator attended each public meeting to assist non-English speakers. Dart has also and will continue to attend regular public special events and special interest groups that target Asian speaking populations and promote awareness for public input of the D2 project, such as: the Annual Asian heritage Festival in the Dallas Arts District (information table is provided every May); and briefings to the Greater Dallas Asian American Chamber of Commerce occur on an as-needed basis.

3.19.6 Mitigation

Adverse impacts were examined for 14 census blocks within 0.25 mile of the proposed Build Alternatives identified as having high concentrations of minority and/or low-income populations in the 2000 Census. Visual assessment of the potentially affected census blocks and review of aerial photography and Dallas Central Appraisal District on-line records indicated that land use change and

redevelopment in most of these areas have resulted in the prior relocation of minority and low-income populations from the affected census blocks. There were no disproportionately high and adverse effects on minority and low-income populations identified in any of the 14 blocks. In addition, no impacts on facilities serving low-income populations, such as The Bridge or The Stew Pot, would result in disproportionately high and adverse effects. It is likely that the project would provide numerous benefits to environmental justice populations in the study area. While vehicular access to two Church/Temple facilities would be adversely affected, the project would provide substantially enhanced transit access across the CBD, which is a major employment, business, and educational destination for transportation system users throughout Dallas.

In addition, DART staff have documented their efforts to ensure full and fair participation by all potentially affected communities in the transportation decision making process. Therefore, no mitigation is needed or required to address environmental justice concerns.

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CHAPTER 4.0
TRANSPORTATION IMPACTS

4.0 TRANSPORTATION IMPACTS

This chapter describes how the Build Alternatives would affect Dallas Area Rapid Transit (DART) light rail transit (LRT) and bus transit within the Study area and throughout the system, compared to the No Build Alternative. Roadway impacts along the alternatives are also described in terms of physical changes to the Downtown Dallas street network, vehicular traffic volumes and level of service. To the extent that pedestrian routes would be affected, these impacts are also identified.

4.1 Impacts on Transit Service and Ridership

By 2030, a total of 57,400 transit trips are forecast to be drawn to the Dallas Central Business District (CBD). Another 38,800 trips are forecast to travel through the CBD to reach other regional destinations. The Build Alternatives would add LRT rail service within the CBD, afford all system transit users access to more of the CBD and provide two ways for LRT transit users to travel through the CBD to reach final non CBD destinations. Each of the Build Alternatives provide service from the existing Victory multi-modal rail station just north and east of the CBD, south to the West End and Convention Center districts and east through the Government Center and Farmers Market districts before connecting with the current LRT network in Deep Ellum. The Build Alternatives would accommodate Green and Orange line service shifted from the Pacific/Bryan transit mall when compared to the No Build. The Build Alternatives would also provide a new Metro Center station connection with the transit mall at the West End station and the West Bus Transfer Center. The Build Alternatives each interface with the local and express bus services serving the CBD along with DART proposed 2030 bus corridor improvements that are focused on the CBD (see section 2.2 Definition of Alternatives for a complete description).

4.1.1 Transit Service Level

Current transit service in the CBD consists of bus, Commuter Rail, LRT and vintage streetcar service. Bus service in the CBD is extensive and operates along most CBD arterials. With the exception of bus service along Elm and Commerce streets where buses operate exclusively in the curb lane in the peak, CBD bus service operates in mixed flow. Express and local bus service interchange at a number of locations within the CBD, however the majority of the transfers occur at two major bus transfer centers; West Transfer Center and East Transfer Center. The McKinney Avenue Transit Authority (MATA) vintage streetcar line connects the northern portion of the CBD with the McKinney Ave corridor in Uptown, north of the CBD. A direct bus connection to the current LRT service occurs at the West End bus transfer center at Lamar Street and Pacific Avenue. The Trinity Railway Express connects to the current LRT system in the CBD at Union Station located at the western edge of the downtown.

By 2030, as described in detail in section 2.2, the No Build Alternative does include some changes to the bus network both in and near the CBD, in order to keep pace with population and employment growth. The majority of bus service would continue however, to operate in unpredictable mixed traffic conditions. Streetcar service would be extended from McKinney Avenue along Olive Street in mixed flow and connect to the existing LRT line at the St. Paul Station, but would offer only limited new service connecting Uptown with the CBD. The No Build Alternative assumes continued

compliance with the DART/City of Dallas Master Inter-local Agreement which does not allow LRT headways to go below 2.5 minutes per direction in the peak hour. This restriction allows for DART's existing Red and Blue lines and future Green and Orange lines to operate on the transit mall but it precludes the future West Dallas and Southport lines from doing so. These two lines are truncated prior to the CBD forcing transfers to other lines for passengers to complete their trips.

The Build Alternatives would provide new exclusive guideway capacity so the West Dallas and Southport lines can serve the CBD more directly. They would also provide more predictable travel times, and more reliable service for a broader base of potential new ridership. Mobility would be enhanced for a broader portion of the CBD.

As is shown in Table 4-1, with the Build Alternatives, the DART system would experience increased passenger usage. Compared to the No Build Alternative, the Build Alternatives create added riders from a high of 10,900 or 2.4 percent (B4 Lamar-Young) on a daily basis to a low of 6,000 1.3 percent (B7 Lamar-Commerce). These differences reflect both new riders to transit and slight shifts of transit riders between transit modes.

Table 4-1. 2030 Transit Demand and Performance (System Wide)

Daily Performance Measure	No Build	B7 Lamar Commerce	B4 Lamar Young	B4a Lamar Marilla	B4b Lamar CC Hotel
Transit Ridership					
1) Local Bus	205,400	205,600	205,200	205,200	205,300
2) Express Bus	2,700	2,600	2,800	2,900	2,900
3) BRT & Enhanced Bus	58,500	57,800	60,800	60,100	60,300
3) DART LRT & Commuter Rail(1)	180,500	187,100	189,200	188,300	188,000
4) Total	447,100	453,100	458,000	456,500	456,500
5) Added Riders vs. No Build		**6,000**	**10,900**	**9,400**	**9,400**
6) Added Rail Riders vs. No Build		**6,600**	**8,700**	**7,800**	**7,500**
Passenger Miles					
1) Total	2,751,095	2,789,371	2,795,432	2,790,020	2,792,424
2) Percent Change vs. No Build		+1.4%	+ 1.6%	+1.4%	+1.5%
Passenger Hours					
1) Total	108,852	110,322	110,530	110,460	110,464
2) Percent Change vs. No Build		+1.4%	+1.6%	+1.5%	+1.5%

Source: DART Model Runs - NoBuild - 2030_CBD_NoBuild2_TRNT; B4 - 2030_Lamar_Young2_TRNT; B4a - 2030_Lamar_Marilla2_TRNT; B4b - 2030_CBD_Lamar_Conv2_TRNT; B7 - 2030_CBD_Commerce2_TRNT.
Note (1): does not include rail ridership on DCTA or the T SW2NE commuter rail lines that connect to DART rail except for transfers to DART rail from those systems.

Table 4-1 shows the total system rail ridership would increase from a high of 8,700 riders or 4.8 percent (B4 Lamar-Young) to a low of 6,600 riders or 3.6 percent (B7 Lamar-Commerce). The relative increase in system passenger miles and passenger hours for all transit modes shows between a 1.4 percent to 1.6 percent increase across all alternatives.

Transit service level impacts are further described according to geographic coverage, CBD core capacity, travel times to select destinations, transportation system user benefits, system transfers and system reliability.

4.1.1.1 Geographic Coverage

The No Build Alternative would not expand the geographic coverage of rail service beyond the current coverage of the Pacific-Bryan transit mall alignment. Current bus service would increase to respond to population and employment changes in the CBD. The TSM alternative provides a specific bus route serving the same new CBD travel corridor as the Build Alternatives. Because of anticipated increases in CBD traffic congestion, any bus service, including the TSM option, would have reliability issues and would increase user travel time compared to the Build Alternatives for those passengers traveling to destinations near the Convention Center, Government Center and Farmers Market areas. This fact would inhibit the expansion of new transit markets in this portion of the CBD.

The Build Alternatives would expand rail geographic coverage between the Victory Plaza area and the future Museum of Nature and Science just north of Woodall Rodgers Freeway, the Lamar Street corridor from Woodall Rodgers Freeway, past the West End LRT station and south to the vicinity of the proposed Convention Center hotel. The Build Alternatives also expand rail service coverage in the south and east part of the CBD by continuing east of the Convention Center hotel area to serve Dallas City Hall, and an area just north of the Farmers Market before continuing under IH 45 and connecting with the existing LRT system near Deep Ellum and the Baylor station.

4.1.1.2 CBD Core Capacity

The No Build Alternative assumes that all approved 2030 Transit System Plan LRT service destined to the CBD would use the existing Pacific-Bryan LRT transit mall. Because of peak hour service headway restrictions of the existing transit mall, the West Dallas and Southport 2030 LRT lines would require transfers so the transit mall headway restrictions would not be exceeded. The LRT Build Alternatives provide the opportunity to add LRT capacity in the CBD. This is illustrated in Table 4-2. The resultant service frequency with the addition of the LRT Build Alternatives (see Chapter 2, Section 2.2) provides for the increase of 50 percent in the number of trains (12 more train sets) called for in the DART 2030 Transit System Plan. With any of the Build Alternatives, theoretical train unit capacity in the CBD doubles. This provides future opportunities for expansion including Regional Rail Initiatives supported by local officials throughout North Texas but not yet funded.

For the Build Alternatives, generally, two vehicle trains would operate most of the day, with three vehicle trains operating during the peak periods when demand warrants, similar to the No Build. This service schedule and proposed fare structure is the same as that for DART's existing LRT system, as described in Chapter 2, section 2.2.

Table 4-2. 2030 Train Unit Capacity Comparisons

Alternative	Year 2030 Train Operations			
	Scheduled Peak Direction Headway	Scheduled Trains per Hour	Maximum Possible Trains per Hour	Percent Change in available Train Unit Capacity
No Build Alternative				
Transit Mall	2.5 min	24	24	0%
Build Alternatives				
Transit Mall (Blue & Red lines plus West Dallas & Southport)	2.5 min	24	24	0%
Second Alignment (Green & Orange lines)	5.0 min	12	24	100%
Total Two Alignments		36	48	33%
Change From No Build				
Increase in Trains		12	24	
Percent Increase		50%	100%	

Source: PB/AZB Joint Venture and Connetics

4.1.1.3 Travel Times

The LRT vehicles are capable of a maximum operating speed of 65 mph although average speeds would be much lower because of station stop requirements and alignment design. Travel times vary by alternative depending on station spacing and the degree of change in vertical and horizontal alignment. Station dwell times would average 20 seconds.

A primary purpose of the Build Alternatives is to serve new markets. Such markets include travel through the CBD to other regional destinations and travel to the CBD to major destinations. Travel time summary results as shown in Table 4-3 reveal that travel times from Victory Station to Baylor/Deep Ellum compared to the No Build differ only slightly across the Build Alternatives. This result is an indicator that for regional transit travel through the CBD, travel time remains competitive with the current condition on the transit mall. The Build Alternatives offer an additional means to travel through the CBD with comparable through CBD travel times.

Table 4-3. Select Travel Time Comparisons between Alternatives

Alternative	Mode	Travel Time from Victory to Baylor (min)	Travel Time From DFW To Metro Center (min)	Travel Time from DFW to Convention Center Hotel (min)
No Build	LRT	10.0(1)	48.2(2)	53.6(3)
B7	LRT	9.3	49.3	54.7(4)
B4	LRT	9.9	49.3	56.3 to 60.3(5)
B4a	LRT	10.2	49.3	54.3 to 58.3(5)
B4b	LRT	10.4	49.3	50.3

Notes (1): Assumes 2.5 minute headways on the transit mall sustained by service changes elsewhere; (2) : to West End Station ; (3) : time includes 1,400 ft walk from West End Station to hotel ; (4) : time includes 1,400 ft walk with vertical circulation from Metro Center station to hotel ; (5) : Travel times assume either an 1,100 foot (B4a) or 1,300 foot (B4) walk or trip on a moving sidewalk along Young Street ;
Source: DART

One particular CBD destination also examined is the future Convention Center Hotel and Convention Center complex. The No Build Alternative serves the Convention Center but the station is at the southwest edge of the expansive complex and requires a ¼ mile walk from the station to the main entrance. The LRT routing is also somewhat indirect as rail riders using the Green and Orange lines in the No Build must travel to the West End Station and transfer to the Red or Blue lines and back track to then arrive at the Convention Center Station.

An example of relative benefit for travelers to the CBD is illustrated by travel time comparisons between DFW International Airport (DFWIA) and the Convention Center Hotel. These results comparing the alternatives are also summarized in Table 4-3. For ease of comparison, all times, including walk time, key off the estimated trip time from DFWIA to the Metro Center station which is 49.3 minutes. The travel distance using LRT is 21.5 miles. All Build Alternatives serve the Metro Center Station. The B4b Alternative has an underground station immediately adjacent to the proposed Convention Center hotel. Travel time from DFWIA to this hotel is just over 50 minutes. Both Government Center stations (nearest to the hotel) serving B4 and B4a are within 1/4 mile walk of the Convention Center hotel. The B4a station is approximately 1,100 feet east of the Convention Center hotel and the B4 station is approximately 1,300 feet east. Assuming average walking speeds of 3 MPH or the presence of a moving sidewalk (which has an average speed of 6 MPH), travel time to the Convention Center hotel would take another 4 to 8 minutes for a total of 54.3 to 58.3 minutes for the B4a alternative. For the B4 alternative, another 6 to 10 minutes would be added for a total trip time of 56.3 to 60.3 minutes. This compares to the No Build Alternative of 53.6 minutes which includes a walk of 5.4 minutes from the West End Station (nearest station to the hotel in terms of total trip time) and 54.7 minutes for the Alternative B7 which includes a walk from the Metro Center station, also 5.4 minutes.

4.1.1.4 User Benefits

User benefits include the calculations of travel time benefits to all users as a result of the build alternatives. Under the No Build Alternative, transit service coverage would only expand to meet increases in population and employment through added bus service in the CBD. The No Build Alternative would not allow DART to implement its 2030 Transit System Plan in its entirety because of the current constraint on the existing Pacific-Bryan LRT alignment. Without the second alignment, the Southport and West Dallas LRT lines would be truncated forcing transfers to other portions of the LRT system and reducing ridership overall. Effectively, the DART LRT system serving the CBD would be capped and would not be able to expand to better serve the CBD and the region. In addition continued operation of the regional LRT system with a single CBD alignment may cause a steady degradation of service. Operation with tight headways, signalized at grade crossings involving major downtown streets and increased usage requiring longer boarding and alighting times would have a major negative impact on service in general and system reliability in particular

Transit user benefit calculations will be included in the Final EIS pending approval of the updated regional travel demand model by FTA.

4.1.1.5 System Transfers

Transit trip making in the DART service area would involve transfers. These transfers involve all modes. For comparative purposes Table 4-4 shows the rail to rail transfers comparing No Build and Build Alternatives. These transfer results reflect the operating plan described in Chapter 2.

Table 4-4. 2030 Transit System LRT Rail-to-Rail Transfers

Daily Transfers at Key Stations	Alternative				
	No Build	B7 Lamar-Commerce	B4 Lamar-Young	B4a Lamar-Marilla	B4b Lamar-Conv. Cntr. Hotel
Victory	1,359	553	576	554	553
West End	3,522	3,795	4,052	4,287	4,154
Metro Center	0	5,459	6,211	5,938	5,677
Pearl	3,408	1,213	1,197	1,245	1,255
Other study area stations	957	574	595	608	593
Total study area transfers	9,246	11,594	12,631	12,632	12,232
Change from No Build		2,348	3,385	3,386	2,986
Percent change		25.4%	36.6%	36.6%	32.3%
Total System Transfers	12,701	14,718	15,727	15,731	15,353
Change from No Build		2,017	3,026	3,030	2,652
Percent change		15.9%	23.8%	23.9%	20.9%
Percent Study Area to Total	72.8%	78.8%	80.3%	80.3%	79.7%

Notes:
DART Model Runs - NoBuild - 2030_CBD_NoBuild2_TRNT; B4 - 2030_Lamar_Young2_TRNT; B4a - 2030_Lamar_Marilla2_TRNT; B4b - 2030_CBD_Lamar_Conv2_TRNT; B7 - 2030_CBD_Commerce2_TRNT.

The biggest change in rail transfer activity between No Build and the Build Alternatives is due to the addition of the Metro Center Station which is common to all Build Alternatives. Metro Center LRT rail transfers range from a low of 5459 for B7 to a high of 6211 for B4. The increase in CBD study area transfers ranges from 25.4 percent for B7 to 36.6 percent for B4 and B4a. Examining specific station locations, the Build alternatives reduce the transfers at the Pearl Station because riders now transfer at Metro Center. Build Alternative rail transfers are reduced at Victory Station because the West Dallas LRT line no longer is truncated at the Victory Station. Overall system transfers increase between 15.9 percent for B7 and 23.9 percent for B4a.

Rail to rail transfers increase as a result of the need to have the Build Alternatives cross the existing transit mall so Green, Orange, Red, Blue, West Dallas and Southport line riders can reach their respective CBD destinations. Although the travel markets include both through trips and trips to the CBD, trip volumes to the CBD are much larger. The need to transfer within the CBD to complete certain trips is unavoidable and necessary to expand service to new portions of the CBD.

4.1.1.6 System Reliability and Operating Flexibility

It has been DART's experience that the LRT service it provides has better on-time performance characteristics than its bus service. According to the DART FY09 Business Plan, during the past year, LRT on-time performance was 97.5% and bus

on-time performance was 92%. This difference is easy to explain with the competition for street space that buses encounter as opposed to the less encumbered operation by LRT on a rail guideway. One complication is the 2030 Transit System Plan defines more LRT service into and through the CBD than there is capacity available because of the restriction of 2.5 minute headways by direction in the peak periods along the existing transit mall. As a result the No Build alternative forces the West Dallas and Southport lines to terminate outside the CBD. The No Build operating plan is described in Ch-2. System reliability will be compromised if the West Dallas and Southport lines also operate on the existing transit mall thus lowering peak period headways even further. With a second CBD alignment the 2030 Transit System Plan can be realized and its proposed service requirements maintained without negative impacts on LRT system reliability and on-time performance.

Another important aspect of a second alignment, beyond preserving LRT system reliability, relates to operating flexibility. Incidents do occur on the rail system that may, at times, temporarily degrade operations. Although rare, train crashes with other vehicles, temporary power losses and mechanical failures have caused train delays and required bus bridges to take effect so that passengers are not stranded. A second CBD alignment provides the opportunity to re-route trains to and through the CBD if one of the two alignments experience a temporary unplanned event that interrupts normal operations. Trains can be routed from either the Victory Station or the Baylor Station to avoid the portion of the CBD system that might be experiencing an unplanned delay. This added operations flexibility is important because such unplanned events have a system affect beyond just the CBD. This added operations flexibility is provided with each of the Build alternatives.

4.1.2 Transit Ridership

Table 4-5 summarizes the year 2030 daily rail ridership by station for each of the four Build Alternatives estimated for year 2030. The forecast uses the NCTCOG Regional Travel Model with 2030 demographics approved in April 2003. These estimates include the daily passengers who are expected to access the passenger rail system at the stations from automobiles (drop off only), walking, rail and bus transfers. Because of the interaction between the existing Pacific-Bryan mall alignment with the second alignment Build Alternatives, station ridership is shown for both the existing CBD LRT transit mall and the Build Alternatives.

Because of their location in the CBD, all stations with one exception (Metro Center) are primarily destination stations. The Metro Center station is also a major transfer point given its proximity to the existing West End station and West Bus Transfer facility. Given the split of LRT line service on the existing transit mall and LRT line service on the second alignment, passengers who wish to travel from the Red, Blue, West Dallas and Southport lines on the existing transit mall to the Orange and Green lines on the second alignment are able to make connections at Metro Center. Metro Center is expected to be one of the heaviest used stations on the 2030 LRT system.

Comparing the rail ridership across the four build alternatives, Alternative B4 has slightly higher ridership, accounting for 19,431 daily riders. The lowest ridership alternative is Alternative B4b at 17,828 daily riders, an 8.2 percent decrease over the

Table 4-5. CBD Station 2030 Daily Ridership

Existing CBD Pacific Bryan Alignment Stations					
Total Station Riders	Station	B7 Lamar Commerce	B4 Lamar Young	B4a Lamar Marilla	B4b Lamar CC Hotel
	Pearl	4,153	4,159	4,233	4,233
	St. Paul	4,356	4,256	4,394	4,379
	Akard	4,850	5,143	5,320	5,367
	West End	14,773	15,224	15,273	14,745
	Union Station	3,742	3,799	3,828	3,750
	Convention Center	1,190	1,092	1,085	1,467
	Total: Current Alignment	33,064	33,673	34,133	33,941
CBD Build Alternative Stations					
Total Station Riders	Station	B7 Lamar Commerce	B4 Lamar Young	B4a Lamar Marilla	B4b Lamar CC Hotel
	Museum Way	612	601	606	611
	Metro Center	12,859	14,670	15,045	13,947
	Government Center	-	1,485	880	-
	Convention Center Hotel	-	-	-	1,720
	City Hall	-	-	1,040	1,141
	Pegasus Plaza	2,812	-	-	-
	Harwood District	-	767	-	-
	Main Street Garden	1,619	-		-
	Farmer's Market	-	1,908	417	409
	Total: Second Alignment	17,902	19,431	17,988	17,828
Total: Both Alignments		50,966	53,104	52,121	51,769

Source: DART Model Runs - NoBuild - 2030_CBD_NoBuild2_TRNT; B4 - 2030_Lamar_Young2_TRNT; B4a - 2030_Lamar_Marilla2_TRNT; B4b - 2030_CBD_Lamar_Conv2_TRNT; B7 - 2030_CBD_Commerce2_TRNT.

Alternative B4. Combined ridership for both alignments ranges from 50,966 for B7 to 53,104 for B4. This compares to 45,400 for the No Build. The increase over the No Build condition reflects ridership to new CBD markets reported at the Station level and reflects two new lines going through downtown – West Dallas and Southport.

The ridership model reflects use of on-board surveys conducted in 1998 to enhance the mode choice model. May 2007 surveys were conducted and have been integrated into an updated model that will be used for the FEIS. In addition DART completed several surveys specific to the CBD (parking, visitor, mid-day and special event) to supplement and strengthen travel forecast information in the CBD. These additional trip attributes are important to CBD transit ridership estimation in order to get a more complete picture of transit demand. Revised estimates will be reported prior to the completion of the FEIS that reflect the updated model.

In June of 2006, The Dallas City Council adopted 'forwardDallas!' a new citywide comprehensive plan and vision for transportation, land use, and economic development. Part of that effort included alternative development scenarios throughout the City, including the CBD. At the time of the adoption of the new plan, the four LRT build alternatives were not yet defined. Because of the importance on making a strong connection between transit and land use in the FTA New Starts guidelines (land use and economic development impacts now account for 40% of the

Project Justification rating process being used by FTA), work is underway to develop a more focused land use/economic development scenario for the corridor defined by the LRT build alternatives. This scenario is not fully incorporated into the approved regional demographics. Once those new scenarios are developed sensitivity tests will be conducted and analyzed against the baseline ridership estimates developed with regionally approved demographics. FTA New Starts guidelines permit the comparison of new scenarios outside the adopted demographics in the project rating process.

4.1.3 Cost Effectiveness

Cost effectiveness is a standardized computation required as part of the FTA New Starts process and provides a consistent way for the FTA to evaluate all project applications. This section is divided in to two parts. The first is a discussion of a more basic cost effectiveness measure – cost per rider using annualized figures. The second is the New Starts standard Cost Effectiveness Index – cost per hour of transportation system user benefit.

4.1.3.1 Cost per Rider

The cost per rider is computed by annualizing the daily rail ridership for each of the Build Alternatives using a DART empirical annualization factor of 300 for rail ridership and comparing that against annual operating costs changes from No Build and the annualization of the estimated capital costs. The results are shown in Table 4-6. Under this measure the Lamar-Young alternative is more cost effective than the other three build alternatives. Alternatives B7, B4, B4a, and B4b are fairly close together in cost per rider. While the annual operating cost changes for the alternatives do not vary much, the key factor in cost per rider differences are the annual capital costs.

Table 4-6. 2030 Cost per Rider of Build Alternatives

Performance Measure	B7 Lamar Commerce	B4 Lamar-Young	B4a Lamar-Marilla	B4b Lamar CC Hotel
Capital Cost (2008 constant $)	$580 M	$378 M	$558 M	$613 M
Annualized Capital Cost (1)	$46.7M	$30.5M	$45.0M	$49.4M
Change in Annual Operating Cost from No Build	$25.9M	$27.0M	$27.4M	$27.6M
Total Annual Cost	**$72.6M**	**$57.5M**	**$72.4M**	**$77.0M**
Daily Ridership (2030)	17,902	19,431	17,988	17,828
Annual Ridership (2030 Daily X 300)	**5.4M**	**5.8M**	**5.4M**	**5.3M**
Cost per Rider	**$13.4**	**$9.9**	**$13.4**	**$14.5**

Notes (1) capital recovery @ 7 percent/30 yrs
Source: DART; PB/AZB Joint Venture

4.1.3.2 FTA Cost Effectiveness Index – Cost per hour of transportation system user benefit (TSUB)

Cost Effectiveness, as evaluated by FTA, is measured in terms of the project cost relative to the hours of user benefits generated using the FTA SUMMIT software. This Cost Effectiveness measure is one of many measures used by FTA to evaluate projects for potential federal funding across the country and is expressed in terms of hours of travel time saved by transit users in the forecast year. Cost Effectiveness is important because, as described in 'Final Guidance on New Starts/Small Starts

Policies and Procedures; Federal Transit Administration; July 29, 2009; the FTA Cost Effectiveness measure accounts for 20% of the Project Justification score for projects competing for New Starts funding and therefore carries importance in determining Project Justification. As mentioned in section 4.1.2, land use and economic development impacts, two other Project Justification criteria, each account for 20% of this rating as well. Taken together, all Project Justification measures account for 50% of the New Starts rating. Financial Justification accounts for the other 50% (see chapter 5).

On January 13, 2010, U.S. Transportation Secretary Ray LaHood announced new funding guidelines for major transit projects that would be based on livability issues such as economic development opportunities and environmental benefits, in addition to cost and time saved, which are currently the primary criteria. The change will apply to how the Federal Transit Administration evaluates major transit projects. Projects must achieve a "medium" or better overall rating and have a satisfactory financial plan to be recommended to Congress for FTA funding. DART will monitor the new policy guidelines and rule making that result from this change.

For SUMMIT analysis purposes the CBD has been subdivided into six districts that are similar to the primary study area districts described in Chapter's 2 and 3. The Cost Effectiveness for this proposed project is not yet calculated. SUMMIT analysis is in progress so results will be provided once the analysis is complete. The analysis and results of both SUMMIT and Cost Effectiveness will be included before publication of the Final EIS and its official release to the public.

4.1.3.3 Ongoing Coordination with FTA and NCTCOG

NCTCOG is in the process of updating the regional transportation demand model in close coordination with FTA. While the regional model is traditionally used to forecast ridership and user benefits for DART rail projects, DART is working with FTA to develop an alternative forecasting methodology using simplified methods for the D2 project. The preparation of travel forecasts and corresponding user benefit estimates for the D2 project requires recognition of the unique setting of the project and the potential markets served by the new alignment through the CBD. To a large extent, the potential benefits of the project will be derived from existing users of the system (in 2030) who will benefit from improved wait and travel times offered by enhanced system reliability with a second alignment. Additionally, a relatively modest amount of potential new riders would stem from improved accessibility to downtown destinations not well served by the existing LRT transit mall.

4.2 Roadway Impacts

The following sections below narrate the permanent impacts to parking, driveways, and intersections after construction has been completed. Table 4-7 quantifies these impacts separately for each alternative as well as for those impacts common to all alternatives. More detailed analysis results are presented in the DART D2 Preliminary Traffic Analysis Report (including figures). Additional plan and profile drawings for all of the alternatives are provided in Appendix C.

4.2.1 Impacts to Parking

The proposed LRT alignment (all alternatives) would have permanent impacts to parking at the following locations:

- Surface parking lot west of Victory Avenue (located within DART owned right-of-way) would permanently eliminate 15 parking spaces.

Table 4-7. Roadway Impacts of Build Alternatives

	B7	B4	B4a	B4b	Common to all alternatives
Parking Spaces Eliminated					
On Street	6	48	18	18	24
Parking Lot	-	248	82	82	399
Driveways Eliminated					
Active	-	6	5	5	2
Vacant	-	1	-	-	-
Intersections Eliminated	-	2	-	-	1

Source: Parsons Transportation Group

- On-street metered parking located in the median along Museum Way (located within DART owned right-of-way) would permanently eliminate 15 parking spaces.
- Surface parking lot east of Houston Street in the northeast quadrant of Laws Street and West Frontage Road of Woodall Rodgers freeway (partially located within DART owned right-of-way) would permanently eliminate 65 parking spaces.
- Surface parking lot located under the existing Woodall Rodgers freeway would permanently eliminate 32 parking spaces.
- The surface parking lot located east of McKinney Avenue between Laws Street and N. Griffin Street would permanently eliminate 81 parking spaces. The parking lot located east of Munger Avenue between N. Lamar Street and Laws Street would permanently eliminate 66 parking spaces due to the proposed LRT alignment.
- The proposed Build Alternatives would share a common at-grade section on Commerce Street just east of N. Central Expressway and would continue at-grade for the remainder of their routes. All of these would impact the existing on-street parking on the south side of Commerce Street. Five on-street metered parking spaces would be permanently removed.

All of the surface parking lots that are impacted are privately owned and operated paid parking lots.

4.2.1.1 Lamar-Commerce Alternative (B7)

The LRT line would be constructed via a cut and cover operation on Commerce Street between Pearl Expressway to east of N. Central Expressway and include a

tunnel portal that would be built from this point to west of the US 75 southbound off-ramp structure. The proposed LRT line would permanently eliminate six on-street metered parking spaces located just east of North Central Expressway.

4.2.1.2 Lamar-Young Alternative (B4)

The LRT line from west of Griffin Street to the intersection of Young and Field Streets would be constructed via a cut and cover operation and a tunnel portal. This would eliminate 121 parking spaces in the surface parking lots located south of Jackson Street and south of Wood Street between Griffin and Field Streets.

Construction of the alignment in the median of Young Street, as well as the two stations (Harwood District and Government Center) near Akard and between St. Paul and Harwood Streets would eliminate 24 on-street metered parking spaces on both sides of the street. Farmers Market Station located east of S. Central Expressway would eliminate 55 parking spaces in the surface parking lot located east of North Central Expressway between Canton and Commerce Streets.

The entrance to the First Presbyterian Church parking garage from eastbound westbound Young Street would be eliminated due to the construction of LRT line. This would eliminate 450 spaces in the parking garage and 61 spaces in the surface parking lot.

4.2.1.3 Lamar-Marilla Alternative (B4a)

The proposed LRT line along Marilla/Canton Street between Ervay and Harwood Streets would be constructed via cut and cover operation and a tunnel portal. This would eliminate 18 on-street metered parking spaces along Canton Street between Park and Harwood Streets.

Construction of Farmers Market Station near the Scottish Rite Temple parking lot would eliminate 24 parking spaces. Continuation of this alignment at–grade through the Pearl Expressway/Young Street intersection, the abandoned Young Street right-of-way, and the surface parking lot located east of North Central Expressway between Canton and Commerce Streets would eliminate 34 parking spaces.

4.2.1.4 Lamar-Convention Alternative (B4b)

Impacts to parking for this alternative are similar to the Lamar-Marilla alternative except that this alignment offers an additional underground (Convention Center Hotel Station). The same impacts would occur to parking spaces.

4.2.1.5 Parking Mitigation

It is anticipated that a LRT system in the CBD would reduce traffic, and thereby reduce the amount of vehicles requiring parking. Each of the Build Alternatives would have impacts to parking spaces along roadways and to existing surface lots along the route. Metered spaces would be replaced elsewhere in the CBD as identified by the City of Dallas unless it is determined that enhanced LRT access reduces the need for metered parking. Surface parking spaces would be replaced as necessary to meet the current City of Dallas zoning requirements.

To the extent that the north tunnel portal under all Alternatives eliminates parking spaces used for attendance at the near-by Dallas World Aquarium, the loss of these

spaces would be mitigated. Mitigation will be considered for the loss of parking spaces that serve property adjacent to the Farmers Market Station (alternative B4) or within the LRT right-of-way east of Central Avenue (alternatives B4a and B4b). Under Alternative B4, mitigation for the surface parking and parking garage impact at First Presbyterian church would be negotiated as part of property acquisition and could involve replacement parking. Similarly, the loss of parking spaces adjacent to the Scottish Rite Temple under Alternatives B4a and B4b due to station and LRT track construction would be mitigated.

4.2.2 Impacts to Driveways

For all Build Alternatives, the driveway to the existing surface parking lot located east of Houston Street and the driveway located adjacent to the West Frontage Road of Woodall Rodgers Freeway near the intersection of Laws Street is planned to become a new permanent roadway prior to construction of D2 project.

4.2.2.1 Lamar-Commerce Alternative (B7)

No driveways are permanently impacted in this alternative.

4.2.2.2 Lamar-Young Alternative (B4)

The surface parking lots located south of Jackson and Wood Streets between Griffin and Field Streets would be impacted during construction. Driveways to these parking lots located along Wood Street would be closed permanently.

The City Hall underground parking garage entrance/exit would be relocated from Young Street to Marilla Street. Therefore, access from Young Street would be permanently removed. Several new parking garage access options have been identified. If this alternative is advanced, a preferred solution would be identified in coordination with the City of Dallas staff.

Between St. Paul and Harwood Streets the following driveways would be impacted permanently:

- Between Harwood Street and Pearl Expressway, the LRT line follows the north side of Young Street. This would impact the existing driveways to parking lots of businesses that are currently inactive. With the construction of the LRT line, access to these parking lots would be permanently closed from Young Street. However, these parking lots can still be accessed from Wood Street.
- The driveway from Central Expressway (along abandoned Young Street) would be moved to accommodate the LRT alignment and Farmers Market Station and would impact access to a business at this location.

4.2.2.3 Lamar-Marilla Alternative (B4a)

East of Ervay Street, the proposed LRT line would run along Marilla Street and then east along Canton Street. Marilla Street between Ervay Street and Canton Street is a two-lane roadway with one lane in each direction. This segment of roadway is assumed to be closed for traffic during construction, but would reopen once the light rail work has been completed.

Construction of the tunnel portal along Canton Street between Park and Harwood Streets would impact a secondary driveway to the parking lot entrance for the Scottish Rite of Freemasonry building. Just east of Harwood Street, the driveway to the Scottish Rite Temple would be impacted by the Farmers Market Station and would have to be reconfigured with any parking changes for the Scottish Rite Temple.

The at-grade LRT line crosses Central Expressway between Canton and Commerce Streets, which would impact the driveway access to the parking lot of the business located west of Central Expressway.

The LRT line continues at street level through the abandoned Young Street right-of-way. There is a driveway to the parking lot located east of Central Expressway between Canton Street and Commerce Street. Access to the parking lot via this driveway would be permanently closed. A new driveway would need to be constructed approximately 100 feet north of its current location.

4.2.2.4 Lamar-Convention Alternative (B4b)

Impacts to driveways are the same as the Lamar-Marilla Alternative (B4a).

4.2.2.5 Driveway Mitigation

All driveways permanently impacted by any alternative would be replaced by relocated driveways or alternate access points as described above.

4.2.3 Intersections Impacts

Table 4-7 quantifies the intersections permanently impacted following the construction for each alternative. The intersection of Munger Avenue and Laws Street would be permanently removed for all alternatives. In addition, the Lamar-Young Alternative (B4) would permanently remove the north-south through movements at the intersections of Akard Street and Young Street with Park Street. None of the other alternatives permanently remove any intersections.

4.2.3.1 Permanent Lane Closures

<u>Common to all Alternatives</u>

The auxiliary northbound left turn lane at the intersection of Good Latimer Expressway and Elm Street would be permanently eliminated. The inside through lane would serve as a shared through and left turn lane to accommodate the left turning traffic.

<u>Lamar-Commerce Alternative (B-7)</u>

Construction of a tunnel portal east of Central Expressway on Commerce Street would result in permanent closure of three (3) through travel lanes from just east of Central Expressway to IH 45 overpass. There would be only two (2) travel lanes that would be open to eastbound through traffic within this segment. Past the IH 45 overpass all lanes would be open for traffic.

<u>Lamar-Young Alternative (B-4)</u>

Construction of Government Center Station would permanently eliminate one eastbound travel lane on Young Street between Field Street and Ervay Street. At the

intersection of Young Street and St. Paul Street, the westbound left turn lane from Young Street onto St. Paul Street would be permanently eliminated. The inside through traffic lane on Young Street in the westbound direction would act as a shared through and left lane for the left and through traffic. Similarly the existing left turn lanes at the intersection of Young Street and Harwood Street would be permanently eliminated. The left turning traffic in the eastbound and westbound direction of Young Street would have to use the inside through lane for left turning movements.

Lamar-Marilla Alternative (B4a)

Construction of the tunnel portal between Park Street and Harwood Street along Canton Street would result in permanent closure of this section of the roadway. This section of Canton Street is one-way in the southbound direction. Alternate routes would be Young-St. Paul Street or Young-Akard Street.

Lamar-Convention Center Alternative (B4b)

Permanent lane closures for this alternative are same as Alternative B4a.

4.2.3.2 Permanent Impacts at Tunnel Portal Locations

Common to all Alternatives:

Construction of a tunnel portal through the surface parking lots adjacent to Laws Street and Munger Street will permanently eliminate through traffic access and sidewalk continuity along Laws Street between McKinney Avenue and Corbin Street as well as Munger Street between Lamar Street and N. Griffin Street. Pedestrians would still be allowed to use Laws Street from McKinney Avenue to the northwest quadrant of Munger Street and Laws Street. Pedestrians would also be able to walk along Laws Street and Munger Street south and east of the proposed LRT alignment. However to achieve connectivity between these two streets, a new sidewalk connection would need to be constructed on private property located at the southeast quadrant of Laws and Munger Streets.

Lamar-Commerce Alternative (B-7)

Construction of a tunnel portal east of Central Expressway on Commerce Street would result in permanent closure of three (3) through eastbound travel lanes from just east of Central Expressway to the IH 45 overpass. It is assumed that only two (2) eastbound travel lanes would be open to through traffic within this segment. Past the IH 45 overpass, all lanes along Commerce Street will be open for traffic. The existing sidewalk along the south side of Commerce Street will need to be reconstructed beginning at Central Expressway and continuing along the South side of the tunnel portal. Pedestrians will be separated from the portal with a retaining wall topped by a fence.

Lamar-Young Alternative (B-4)

Construction of the tunnel portal in the existing surface parking lot between Wood Street and Young Street will not have any permanent traffic impacts. The only impact will be the separation of the surface parking lot from the office building located adjacent to this parking lot. The only connection between the surface parking lot and the office building will be along Wood Street or Young Street sidewalks.

Lamar-Marilla Alternative (B-4a)

Construction of the tunnel portal between Park Street and Harwood Street along Marilla Street/Canton Street would result in permanent closure of this section of the roadway. This section of Canton Street is one-way in the southbound direction. Alternate access to Canton Street southbound would be via Young Street to Park Street, Harwood Street to Marilla Street to Canton Street or Young Street to Akard Street. Existing sidewalk is located only along the north side of Marilla Street and Canton Street. New sidewalks would need to be constructed in the vicinity of the Marilla Street/Park Street intersection to accommodate any future pedestrian activity.

Lamar-Convention Alternative (B-4b)

Permanent lane closures for this alternative are the same as Alternative B4a.

4.2.4 Summary of Traffic Analysis

Traffic counts were obtained at 15 intersections for both the morning and evening peak hours. In addition, five 24-hour bi-directional counts were also collected. These counts were taken during the week of March 16-20, 2009. Although this was during Spring Break, other counts obtained from City of Dallas confirm that the traffic volumes are consistent with a typical non-Spring Break time period.

Using these counts, field verified geometry, and other intersection data such as DART bus stops and the presence of on-street parking, Synchro software analysis was performed for the base year (2009) and future year conditions (2030) for all alternatives in order to determine traffic operational levels of service and traffic queues.

Definitions of the various levels of service for signalized and unsignalized intersections are presented in Table 4-8 and Table 4-1. Based on typical evaluation criteria, level of service "D" is considered to be the minimum acceptable design level of service for all intersections.

Table 4-8. Level of Service Criteria for Signalized Intersections

LOS	Average Total Delay (sec/veh)	Description
A	≤ 10	Very low delay; most vehicles do not stop at all.
B	.10 and ≤ 20	More vehicles stop than with LOS A, increasing the average delay.
C	.20 and ≤ 35	The number of vehicles stopping is significant; however, many still pass through the intersection without stopping.
D	.35 and ≤ 55	Congestion is readily apparent with many vehicles stopping and individual cycle failures are noticeable (i.e., not all vehicles waiting in the intersection queue are able to get through the intersection on the first green indication).
E	.55 and ≤ 80	Poor progression; long cycle lengths and frequent cycle failures.
F	.80	Unacceptable operations, which include many cycle failures caused by arrival flow rates exceeding intersection capacity.

Table 4-9. Level of Service Criteria for Unsignalized Intersections

LOS	Average Total Delay (sec/veh)	Description
A and B	≤ 15	Very low delay; all vehicles clear quickly
C	15 and ≤ 25	Moderate delays at the intersection. Light congestion and occasional back-ups on critical approaches.
D	25 and ≤ 35	Significant congestion on critical approaches, but intersection is functional.
E	35 and ≤ 50	Heavy traffic flow condition. Delays of two or more minutes probable. Limit of stable flow.
F	50	Unstable traffic flow. Heavy congestion. Traffic moves in forced-flow condition. Total breakdown with extremely long queues.

The 95th percentile queue lengths were obtained from the Synchro software and are shown in Table 4-11, Table 4-13, Table 4-15, and Table 4-17 for the base year and future years. The queue lengths represent the maximum back distance where vehicles stop during a typical signal cycle. Generally, queues that are cleared during each signal cycle and do not spill over beyond one street block length are considered acceptable. When queues begin to build up across upstream intersections and the cycle length is too short, this would quickly deteriorate the intersection levels of service. These conditions exist only at the intersection of Commerce Street and Central Expressway for the 2030 PM Peak, primarily in the eastbound direction.

Table 4-10 and Table 4-12 show the AM and PM peak hour levels of service at each intersection for the base year (2009). The base year volumes were projected to year 2030 using a one percent annual average growth rate for the Build condition. Table 4-14 and Table 4-16 show the AM and PM peak hour levels of service for the 2030 No Build scenario. The 2030 No Build volumes were estimated using a 2 percent annual average growth rate Table 4-18 and Table 4-20 show the AM and PM peak hour levels of service for the 2030 future year of the light rail system. The 2030 analysis also incorporated the planned City of Dallas conversion of several one way streets to two-way operation as well as other roadway modifications provided by DART in a refined network planning model.

All alternatives (including No Build for 2030) during both the existing and future years operate at acceptable levels of service except for the 2030 AM and PM peak hour at the intersection of Commerce Street and Central Expressway which operates at a level of service of F for the 2030 Build and No Build condition. This particular intersection carries a significant amount of traffic in the evening hours that are headed either towards IH 30/IH 45 or US 75, since both Commerce Street and Central Expressway have direct ramps to the highway system. The LRT Build Alternatives do not cause additional traffic impacts at this intersection so no mitigation is required specific to the D2 project. No significant queue backups were observed from the analysis results for any alternatives except for eastbound Commerce Street during the 2030 PM peak hour. It should be noted that no future building developments were considered in this traffic analysis. Large scale developments can trigger substantial increases in traffic volumes which may in turn detrimentally affect both intersection levels of service and queues.

Table 4-10. 2009 AM Peak Level of Service

Intersections	Level of Service				
	Intersection	Approach			
		EB	WB	NB	SB
Common to all Alternatives					
Main Street and Good Latimer Expressway	A	B	B	A	A
Elm Street and Good Latimer Expressway	B	-	B	A	B
Commerce Street and Good Latimer Expressway	B	B	-	B	A
North Lamar Street and McKinney Avenue	B	C	B	B	C
Laws Street and Munger Avenue	A	A	A	-	A
B4 Lamar Young Alternative					
Young Street and South Field Street / Marilla Street	A	B	A	B	B
Young Street and South Akard Street	B	B	B	-	B
Young Street and South Ervay Street / Browder Street	B	B	B	C	-
Young Street and South St. Paul Street	B	A	B	-	A
Young Street and Park Avenue	A	A	B	A	A
Young Street and South Harwood Street	B	B	B	B	A
B4a / B4b Lamar Marilla Alternative					
Canton Street, Marilla Drive and Park Avenue	A	A	A	A**	A
Canton Street and South Harwood Street	A	-	-	A	A
Pearl Street and Young Street / Canton Street	B	B	B	-	A
B7 Lamar Commerce Alternative					
Commerce Street, Central Expressway and Jackson Street	C	B	B*	C	-

*Jackson Street (one-way in the northeast direction); **Canton Street (one-way in the southwest direction)

Table 4-11. 2009 AM Peak Queue Length

Intersections	Queue (feet)			
	Through Movement			
	EB	WB	NB	SB
Common to all Alternatives				
Main Street and Good Latimer Expressway	46	12	14	16
Elm Street and Good Latimer Expressway	-	62	12	68
Commerce Street and Good Latimer Expressway	24	-	41	12
North Lamar Street and McKinney Avenue	67	91	84	50
Laws Street and Munger Avenue	1	1	1	1
B4 Lamar Young Alternative				
Young Street and South Field Street / Marilla Street	68	107	103	11
Young Street and South Akard Street	39	106	-	10
Young and South Ervay Street / Browder Street	74	67	107	-
Young Street and South St. Paul Street	76	124	-	24
Young Street and Park Avenue	14	38	0	0
Young Street and South Harwood Street	144	45	88	24
B4a / B4b Lamar Marilla Alternative				
Canton Street, Marilla Drive and Park Avenue	0	9	0**	11
Canton Street and South Harwood Street	-	-	-	-
Pearl Street and Young Street / Canton Street	60	112	-	38
B7 Lamar Commerce Alternative				
Commerce Street, Central Expressway and Jackson Street	53	21*	235	-

*Jackson Street (one-way in the northeast direction); **Canton Street (one-way in the southwest direction)

Table 4-12. 2009 PM Peak Level of Service

Intersections	Level of Service				
	Intersection	Approach			
		EB	WB	NB	SB
Common to all Alternatives					
Main Street and Good Latimer Expressway	B	B	B	B	A
Elm Street and Good Latimer Expressway	A	-	B	A	B
Commerce Street and Good Latimer Expressway	B	B	-	B	A
North Lamar Street and McKinney Avenue	C	C	B	B	C
Laws Street and Munger Avenue	A	A	A	-	A
B4 Lamar Young Alternative					
Young Street and South Field Street / Marilla Street	B	B	A	B	B
Young Street and South Akard Street	B	B	B	-	B
Young Street and South Ervay Street / Browder Street	B	B	B	B	-
Young Street and South St. Paul Street	B	A	B	-	B
Young Street and Park Avenue	B	B	A	A	A
Young Street and South Harwood Street	B	A	B	B	C
B4a / B4b Lamar Marilla Alternative					
Canton Street, Marilla Drive and Park Avenue	A	A	A	A**	A
Canton Street and South Harwood Street	A	-	-	A	A
Pearl Street and Young Street / Canton Street	B	B	B	-	B
B7 Lamar Commerce Alternative					
Commerce Street, Central Expressway and Jackson Street	C	C	C*	C	-

*Jackson Street (one-way in the northeast direction); **Canton Street (one-way in the southwest direction)

Table 4-13. 2009 PM Peak Queue Length

Intersections	Queue (feet)			
	Through Movement			
	EB	WB	NB	SB
Common to all Alternatives				
Main Street and Good Latimer Expressway	109	94	36	24
Elm Street and Good Latimer Expressway	-	54	17	96
Commerce Street and Good Latimer Expressway	84	-	25	21
North Lamar Street and McKinney Avenue	136	117	89	136
Laws Street and Munger Avenue	1	2	1	1
B4 Lamar Young Alternative				
Young Street and South Field Street / Marilla Street	87	77	29	62
Young Street and South Akard Street	51	57	-	27
Young and South Ervay Street / Browder Street	165	61	29	-
Young Street and South St. Paul Street	184	55	-	142
Young Street and Park Avenue	55	13	0	0
Young Street and South Harwood Street	-	-	28	129
B4a / B4b Lamar Marilla Alternative				
Canton Street, Marilla Drive and Park Avenue	8	3	7**	13
Canton Street and South Harwood Street	-	-	-	-
Pearl Street and Young Street / Canton Street	205	61	-	212
B7 Lamar Commerce Alternative				
Commerce Street and Central Expressway	323	126*	112	-

*Jackson Street (one-way in the northeast direction); **Canton Street (one-way in the southwest direction)

Table 4-14. 2030 AM Peak Level of Service (No Build)

Intersections	Level of Service				
	Intersection	Approach			
		EB	WB	NB	SB
Common to all Alternatives					
Main Street and Good Latimer Expressway	A	B	B	A	A
Elm Street and Good Latimer Expressway	B	-	B	A	B
Commerce Street and Good Latimer Expressway	A	B	-	A	A
North Lamar Street and McKinney Avenue	B	C	B	B	C
Laws Street and Munger Avenue	A	A	A	-	A
B4 Lamar Young Alternative					
Young Street and South Field Street / Marilla Street	B	B	A	B	B
Young Street and South Akard Street	B	B	B	-	B
Young and South Ervay Street / Browder Street	C	B	C	C	-
Young Street and South St. Paul Street	B	A	B	-	A
Young Street and Park Avenue	B	B	C	A	A
Young Street and South Harwood Street	B	B	B	B	A
B4a / B4b Lamar Marilla Alternative					
Canton Street, Marilla Drive and Park Avenue	A	A	A	A**	A
Canton Street and South Harwood Street	B	-	-	C	A
Pearl Street and Young Street / Canton Street	A	A	B	A	A
B7 Lamar Commerce Alternative					
Commerce Street and Central Expressway	**F*** **	C	C*	**F**	**F**

*Jackson Street (one-way in the northeast direction); **Canton Street (one-way in the southwest direction)
***Level of Service of F already exists in the No Build condition

Table 4-15. 2030 AM Peak Queue Length (No Build)

Intersections	Queue (feet)			
	Through Movement			
	EB	WB	NB	SB
Common to all Alternatives				
Main Street and Good Latimer Expressway	64	16	21	22
Elm Street and Good Latimer Expressway	-	96	15	98
Commerce Street and Good Latimer Expressway	34	-	60	17
North Lamar Street and McKinney Avenue	86	122	113	66
Laws Street and Munger Avenue	1	1	1	1
B4 Lamar Young Alternative				
Young Street and South Field Street / Marilla Street	106	167	158	15
Young Street and South Akard Street	55	153	-	13
Young Street and South Ervay Street / Browder Street	104	**294**	167	-
Young Street and South St. Paul Street	120	**201**	-	37
Young Street and Park Avenue	4	10	-	-
Young Street and South Harwood Street	67	81	135	32
B4a / B4b Lamar Marilla Alternative				
Canton Street, Marilla Drive and Park Avenue	0	12	0**	7
Canton Street and South Harwood Street	-	-	-	-
Pearl Street and Young Street / Canton Street	54	104	20	47
B7 Lamar Commerce Alternative				
Commerce Street and Central Expressway	108	22*	**703**	**347**

Bold = Queue may extend beyond one city block.; *Jackson Street (one-way in the northeast direction)
**Canton Street (one-way in the southwest direction)

Table 4-16. 2030 PM Peak Level of Service (No Build)

Intersections	Level of Service				
	Intersection	Approach			
		EB	WB	NB	SB
Common to all Alternatives					
Main Street and Good Latimer Expressway	B	B	B	B	A
Elm Street and Good Latimer Expressway	B	-	B	A	B
Commerce Street and Good Latimer Expressway	B	B	-	B	A
North Lamar Street and McKinney Avenue	C	C	B	B	C
Laws Street and Munger Avenue	A	A	A	-	A
B4 Lamar Young Alternative					
Young Street and South Field Street / Marilla Street	B	B	B	B	B
Young Street and South Akard Street	B	B	B	-	B
Young Street and South Ervay Street / Browder Street	B	C	B	B	-
Young Street and South St. Paul Street	B	B	B	-	C
Young Street and Park Avenue	C	D	B	A	A
Young Street and South Harwood Street	C	A	D	B	D
B4a / B4b Lamar Marilla Alternative					
Canton Street, Marilla Drive and Park Avenue	A	A	A	A**	A
Canton Street and South Harwood Street	B	-	-	A	B
Pearl Street and Young Street / Canton Street	B	C	B	A	B
B7 Lamar Commerce Alternative					
Commerce Street and Central Expressway	**F*** **	**F**	**F***	**F**	**F**

*Jackson Street (one-way in the northeast direction); **Canton Street (one-way in the southwest direction)
***Level of Service of F already exists in the No Build condition

Table 4-17. 2030 PM Peak Queue Length (No Build)

Intersections	Queue (feet)			
	Through Movement			
	EB	WB	NB	SB
Common to all Alternatives				
Main Street and Good Latimer Expressway	109	94	36	24
Elm Street and Good Latimer Expressway	-	54	17	96
Commerce Street and Good Latimer Expressway	84	-	25	21
North Lamar Street and McKinney Avenue	189	160	122	191
Laws Street and Munger Avenue	1	1	1	1
B4 Lamar Young Alternative				
Young Street and South Field Street / Marilla Street	137	94	36	24
Young Street and South Akard Street	84	82	-	38
Young and South Ervay Street / Browder Street	**265**	68	41	-
Young Street and South St. Paul Street	**301**	82	-	**245**
Young Street and Park Avenue	62	15	0	0
Young Street and South Harwood Street	**211**	195	38	**211**
B4a / B4b Lamar Marilla Alternative				
Canton Street, Marilla Drive and Park Avenue	9	3	0**	12
Canton Street and South Harwood Street	-	-	-	-
Pearl Street and Young Street / Canton Street	**321**	64	24	**292**
B7 Lamar Commerce Alternative				
Commerce Street and Central Expressway	**1199**	**408***	**403**	**554**

Bold = Queue may extend beyond one city block.; *Jackson Street (one-way in the northeast direction)
**Canton Street (one-way in the southwest direction)

Table 4-18. 2030 AM Peak Level of Service (Build)

Intersections	Level of Service				
	Intersection	Approach			
		EB	WB	NB	SB
Common to all Alternatives					
Main Street and Good Latimer Expressway	A	B	B	A	A
Elm Street and Good Latimer Expressway	B	-	B	A	B
Commerce Street and Good Latimer Expressway	A	B	-	A	A
North Lamar Street and McKinney Avenue	B	C	B	B	C
Laws Street and Munger Avenue	A	A	A	-	A
B4 Lamar Young Alternative					
Young Street and South Field Street / Marilla Street	A	A	A	C	B
Young Street and South Akard Street	A	A	B	-	A
Young and South Ervay Street / Browder Street	C	B	C	C	-
Young Street and South St. Paul Street	A	A	A	-	B
Young Street and Park Avenue	A	A	A	B	A
Young Street and South Harwood Street	B	A	A	C	B
B4a / B4b Lamar Marilla Alternative					
Canton Street, Marilla Drive and Park Avenue	A	A	A	A**	A
Canton Street and South Harwood Street	A	-	-	A	A
Pearl Street and Young Street / Canton Street	B	B	B	B	A
B7 Lamar Commerce Alternative					
Commerce Street and Central Expressway	**E*** **	E	D*	**F**	**E**

*Jackson Street (one-way in the northeast direction); **Canton Street (one-way in the southwest direction)
***The Build Condition Level of Service of E is not caused due to construction of the D2 alignment

Table 4-19. 2030 AM Peak Queue Length (Build)

Intersections	Queue (feet)			
	Through Movement			
	EB	WB	NB	SB
Common to all Alternatives				
Main Street and Good Latimer Expressway	59	11	12	17
Elm Street and Good Latimer Expressway	-	72	15	43
Commerce Street and Good Latimer Expressway	33	-	43	12
North Lamar Street and McKinney Avenue	73	92	104	57
Laws Street and Munger Avenue	1	1	1	1
B4 Lamar Young Alternative				
Young Street and South Field Street / Marilla Street	105	1	149	15
Young Street and South Akard Street	25	173	-	-
Young Street and South Ervay Street / Browder Street	112	**201**	139	-
Young Street and South St. Paul Street	11	64	-	40
Young Street and Park Avenue	4	10	-	-
Young Street and South Harwood Street	73	171	139	34
B4a / B4b Lamar Marilla Alternative				
Canton Street, Marilla Drive and Park Avenue	0	12	0**	7
Canton Street and South Harwood Street	-	-	-	-
Pearl Street and Young Street / Canton Street	64	118	31	57
B7 Lamar Commerce Alternative				
Commerce Street and Central Expressway	143	29*	**649**	**395**

Bold = Queue may extend beyond one city block; *Jackson Street (one-way in the northeast direction)
**Canton Street (one-way in the southwest direction)

Table 4-20. 2030 PM Peak Level of Service (Build)

Intersections	Level of Service				
	Intersection	Approach			
		EB	WB	NB	SB
Common to all Alternatives					
Main Street and Good Latimer Expressway	B	B	B	B	B
Elm Street and Good Latimer Expressway	B	-	B	A	B
Commerce Street and Good Latimer Expressway	B	B	-	B	B
North Lamar Street and McKinney Avenue	B	C	B	B	B
Laws Street and Munger Avenue	A	A	A	-	A
B4 Lamar Young Alternative					
Young Street and South Field Street / Marilla Street	A	A	A	B	B
Young Street and South Akard Street	A	A	B	-	B
Young Street and South Ervay Street / Browder Street	A	A	A	B	-
Young Street and South St. Paul Street	B	C	B	-	C
Young Street and Park Avenue	A	A	A	A	A
Young Street and South Harwood Street	B	A	B	B	D
B4a / B4b Lamar Marilla Alternative					
Canton Street, Marilla Drive and Park Avenue	A	A	A	A**	A
Canton Street and South Harwood Street	A	-	-	A	A
Pearl Street and Young Street / Canton Street	C	C	B	C	A
B7 Lamar Commerce Alternative					
Commerce Street and Central Expressway	**F*** **	**F**	**F***	**F**	**F**

*Jackson Street (one-way in the northeast direction); **Canton Street (one-way in the southwest direction)
***The Build Condition Level of Service of E is not caused due to construction of the D2 alignment

Table 4-21. 2030 PM Peak Queue Length (Build)

Intersections	Queue (feet)			
	Through Movement			
	EB	WB	NB	SB
Common to all Alternatives				
Main Street and Good Latimer Expressway	124	106	56	37
Elm Street and Good Latimer Expressway	-	72	25	53
Commerce Street and Good Latimer Expressway	90	-	30	30
North Lamar Street and McKinney Avenue	172	147	111	127
Laws Street and Munger Avenue	1	1	1	1
B4 Lamar Young Alternative				
Young Street and South Field Street / Marilla Street	128	33	45	96
Young Street and South Akard Street	40	107	-	-
Young and South Ervay Street / Browder Street	75	24	39	-
Young Street and South St. Paul Street	180	63	-	194
Young Street and Park Avenue	-	-	1	1
Young Street and South Harwood Street	23	104	38	**218**
B4a / B4b Lamar Marilla Alternative				
Canton Street, Marilla Drive and Park Avenue	9	3	0**	12
Canton Street and South Harwood Street	-	-	-	-
Pearl Street and Young Street / Canton Street	**267**	36	10	206
B7 Lamar Commerce Alternative				
Commerce Street and Central Expressway	**917**	**277**	**318**	**527**

Bold = Queue may extend beyond one city block; *Jackson Street (one-way in the northeast direction)
**Canton Street (one-way in the southwest direction)

4.3 Bicycle and Pedestrian Impacts

4.3.1 Impacts to Pedestrian Circulation

Near the intersection of Museum Way and Houston Street, the proposed LRT line would run at grade through a nearby surface parking lot. Sidewalks currently run along both sides of Houston Street. Due to the reconstruction of an impacted driveway to accommodate the future LRT line, the east sidewalk would be closed for pedestrians temporarily. Pedestrians can use the sidewalk located on the west side of Houston Street with "sidewalk closed" signs posted at Lamar Street and Olive Street for through pedestrian traffic.

Similarly, the sidewalk located along the West Frontage Road of Woodall Rodgers would be impacted due to reconstruction of the roadway and construction of an at-grade station adjacent to the future Museum of Nature and Science. Pedestrians can utilize the newly constructed roadway between Field Street and Houston Street until the frontage road travel lanes and sidewalk are reconstructed.

Construction of the tunnel portal south of McKinney Avenue would require the sidewalk on the south side to be closed to pedestrians. During this construction period, pedestrians can be detoured via Munger Avenue. Similarly, during construction of the tunnel portal along Munger and Laws Streets, pedestrians can use the McKinney Avenue sidewalk assuming construction at this location would be phased to accommodate pedestrian activity.

Construction of the LRT line along Lamar Street from north of Corbin Street to south of Ross Avenue would be via a cut and cover operation. Lamar Street would remain open to traffic during construction but with a reduced number of travel lanes. The existing sidewalks on either side of Lamar Street would not be closed to pedestrian traffic except at the intersections of Corbin Street and Munger Avenue. The only impacts would be at the intersections where pedestrians may not be able to cross Lamar Street. Instead, they would have to cross at Pacific Avenue or Munger Avenue.

Construction of an underground station on Lamar Street from Pacific Avenue to south of Elm Street would impact the pedestrian traffic at the intersection of Elm and Lamar Streets. Pedestrians can use either Pacific Avenue or Main Street to cross Lamar Street until construction is complete.

Construction of the LRT line crossing Commerce Street on the east end of the project would impact the pedestrian sidewalks on either side of Commerce Street. It is assumed that at least one sidewalk would always remain open to pedestrian traffic along Commerce Street.

With the proposed LRT line running through the median of Good Latimer Expressway, the roadway would be widened to accommodate the proposed LRT line. It is assumed that at least one sidewalk along Good Latimer would remain open to pedestrian traffic during construction.

Table 4-22, quantifies the total linear feet of sidewalk impacted as it relates to pedestrians during construction.

Table 4-22. Construction Impacts of Build Alternatives

	B7	B4	B4a	B4b	Common to all alternatives
Pedestrian Sidewalks (LF) Impacted	1,010	7,710	1,971	1,971	2,743
Bicycle Routes Impacted	-	Route 190, 39	-	-	-

Source: Parsons Transportation Group

4.3.1.1 Lamar-Commerce Alternative (B7)

Construction of an underground station on Commerce Street between Field and Akard Streets would impact the pedestrians crossing Akard Street at Commerce Street. During this period, pedestrians can utilize either the Browder Street Pedestrian Mall crossing or the Field Street intersection. Construction of the underground station on Commerce Street between Harwood Street and Pearl Expressway should not impact the sidewalks.

Construction of the LRT line on Commerce Street from Pearl Expressway to east of Central Expressway would involve a cut and cover operation. This would impact pedestrians crossing Commerce Street. Pedestrians can use Pearl Expressway to cross Commerce Street during construction.

4.3.1.2 Lamar-Young Alternative (B4)

Construction of the LRT line from west of Griffin Street to south of Wood Street would require the sidewalks along Wood Street and Griffin Street to be closed during construction. This would require pedestrians to use Young Street and Field Street, or Young Street and Lamar Avenue as a detour during construction.

Construction of the LRT line at-grade along Young Street would require widening of the roadway on the south side from east of Field Street to Ervay Street. This would also require reconstruction of the existing sidewalk. Pedestrians can use the sidewalk on the north side of Young Street as a detour. Additionally construction of an at-grade station at the intersection of Akard and Young Streets would prohibit pedestrians from crossing Young Street. Pedestrians can proceed to Field Street to access the sidewalk on the north and south sides of Young Street.

Widening of Young Street from St. Paul Street to Pearl Expressway to accommodate the LRT line would require new construction of sidewalk on both sides of Young Street. However, it is assumed that either existing or new sidewalk on one side of the street would always be available to pedestrian traffic during this phased construction.

Construction of an at-grade station east of Central Expressway would restrict the use of sidewalk on the east side of the roadway. Pedestrians can use the sidewalk located on the west side of Central Expressway.

4.3.1.3 Lamar-Marilla Alternative (B4a)

Construction of an underground station at the intersection of Young and Field Streets would impact pedestrian traffic on both sides of Young Street. Through pedestrian traffic on Young Street can use Griffin, Wood and Field Streets as a detour during construction.

Construction of an underground station at City Hall would impact through pedestrian traffic on Ervay Street. Pedestrians can use Akard Street or St. Paul Street as an alternate route until construction is completed.

Construction of the LRT line from Ervay Street to Harwood Street along Marilla Street would also impact pedestrian access. It is assumed that at least one sidewalk would remain open on one side of the roadway at all times during construction.

Construction of the LRT line through the intersections of Harwood & Canton Streets, Young Street and Pearl Expressway, and Central Expressway and abandoned Young Street right-of-way would impact pedestrian access at these locations. However, it is assumed that pedestrian access would still be provided in some limited fashion through each of these intersections until construction is completed.

4.3.1.4 Lamar-Convention Alternative (B4b)

Impacts to pedestrian traffic for this alternative are similar to the Lamar-Marilla alternative except for the construction of an additional underground station at the proposed Convention Center Hotel. Through pedestrian traffic on Young Street crossing Lamar Avenue would be impacted during construction of this station. Pedestrians can use Wood Street as a detour until construction is completed. Hotel pedestrian accessibility would be maintained at all times.

4.3.2 Impacts to Bicycle Circulation

No active bicyclists were observed during several days of field investigation along any of the four Build Alternative alignments. Bike route 190 is an east-west route that runs parallel along Wood Street and Jackson Street through downtown Dallas. Bike Route 39 is a north-south route that runs parallel with Ervay Street and St. Paul Street through downtown Dallas. Based on the Dallas Bike Plan map, the Lamar-Young Alternative (B4) may impact bicyclists using Route 190 East to detour via Young – Field - Wood streets during construction. None of the other alternatives impact bicyclists during construction.

CHAPTER 5.0
COST AND FINANCIAL ANALYSIS

5.0 COST AND FINANCIAL ANALYSIS

This chapter presents estimates for capital and operating and maintenance (O&M) costs for the No Build and Build Alternatives. These cost estimates are based on conceptual engineering and operations analysis developed during the Downtown Dallas (D2) Transit Study, which included a corridor alternatives analysis phase. This chapter also presents a financing plan for the Project.

Year-of-expenditure dollar (YOE) cost estimates represent a mid-point of construction (2014) estimate at 5% annual inflation to support a year 2016 revenue date.

Today's expenditure dollar cost estimates reflect prices in year 2008.

This financial analysis only considers costs, resources, and funding strategies associated with public transit services provided by Dallas Area Rapid Transit (DART). Unless otherwise stated, costs and revenues in this chapter are presented in calendar year 2008 dollars and/or year-of-expenditure (YOE) 2014 dollars to support a revenue date in 2016. The forecast period referred to is between 2008 and 2030.

5.1 Cost Estimate Methodology

5.1.1 Capital Costs Methodology

The capital cost estimate is the total cost of implementing the project. It is based on standard cost categories the Federal Transit Administration (FTA) created to establish a consistent format for reporting, estimating, and managing capital costs for New Start Projects. This method allows for the summary of quantities to be tracked during the Project's follow-on design phases. These categories are:

- Guideway and Track Elements-includes construction of the guideway structure and all supportive structural elements, including preparatory work, trackwork, and special track work elements.
- Stations, Stops, Terminals, Intermodals-includes rough grading, excavation, ventilation structures and equipment, station power and lighting, and other station elements.
- Support Facilities-includes construction of and equipment for support facilities (yards, shops, and administrative buildings).
- Site Work and Special Conditions-includes unique or non-typical elements and those that address project-wide construction activities such as clearing, demolition, fine grading, and other earthwork items outside the guideway limits.
- Systems-includes traction power, traction power substations, signals, crossing protection, communication, the fare collection system, equipment and central control.
- Right-of-Way, Land, and Existing Improvements-includes securing and providing all property rights and relocations.

- Vehicles-includes rail rolling stock and support vehicles.
- Professional Services (Soft Costs)-includes engineering and design services, project management for design and construction, and other design-related activities.
- Unallocated Contingency (Project Reserve)-includes contingency that applies to the overall project and cannot be applied to a specific standard cost category.
- Finance Charges-includes costs related to financing the Project, including interest and bond issuance costs.

In this chapter, the cost estimates for specific items are based on typical construction practices and procedures on similar projects. Quantities are estimated based on conceptual engineering and service plans performed to date. Estimated costs for each standard cost category were increased with a 35 percent design contingency in accordance with FTA guidance for estimates developed prior to preliminary engineering, to account for unknown but expected additional expenses.

An annual inflation (five percent annual escalation) was applied to the cost estimate to achieve a YOE (2014) estimate based on the Project's implementation timeframe of 2016.

5.1.2 Operating and Maintenance Cost Methodology

Transit O&M expenses include the costs associated with providing a certain level of bus or rail service. A large percentage of these costs are for earnings and fringe benefits for drivers, mechanics, and administrative staff. Other items include fuel and lubricants, materials and supplies, utilities, and insurance. The O&M cost model for the D2 Study has been limited to light rail because that is the only mode relevant to the project alternatives.

Annual light rail O&M cost estimates were developed based on unit costs calculated from actual operating characteristics and expenses reported in DART's fiscal 2007 National Transit Database (NTD) report. Together, these cost and service elements comprise the calibration system for the project's O&M cost model.

- Operating Characteristics – Operational characteristics used to build the model's unit costs included peak vehicles, annual revenue train-hours and car-miles, revenue track miles, the number of passenger stations by type, and the number of maintenance yards.
- Operating Costs – Operating Costs were reported to the NTD for four functional areas called Vehicle Operations, Vehicle Maintenance, Non-Vehicle Maintenance, and General Administration. For each area, DART summarized expenses for labor and fringe benefits, contract services, materials and supplies, utilities, casualty and liability, and miscellaneous. Unit costs for items related to traction power and vehicle maintenance were adjusted by 25 percent to account for the expected additional costs related to operation and maintenance of a fleet of Super Light Rail Vehicles (SLRV), planned to replace DART's 2007 fleet of smaller vehicles by the time the light rail alternatives in this project would be implemented. The fleet changeover began in 2008 and will be completed by the end of 2010.

DART's 2007 expenses were inflated to 2008 dollars using a factor of 1.043, based on the Consumer Price Index for the Dallas-Fort Worth area. In 2008 dollars, DART's calibration annual light rail expenses totaled $83.3 million.

5.2 Capital Plan

The capital plan analyzes capital expenditures for each Build Alternative and for ongoing systemwide capital costs. The capital plan reflects the costs and revenues related to implementing the Project and maintaining the bus and fixed guideway systems in a state of good repair.

5.2.1 Capital Costs

The capital cost estimate of implementing each Build Alternative is presented in Table 5-1. Capital cost estimates, excluding finance charges, range from $377.56 million for the B4 Alternative to $612.56 million for the B4b Alternative in year 2008 dollars.

Table 5-1. Capital Cost Estimates for the Build Alternatives by Cost Category (millions of 2008 and YOE dollars)

Cost Categories	Build Alternatives							
	B7 Lamar-Commerce		B4 Lamar-Young		B4a Lamar-Marilla		B4b Lamar-Convent. Ctr. Hotel	
	2008	YOE	2008	YOE	2008	Y0E	2008	YOE
Guideway Construction	$137.48	$184.24	$79.33	$106.31	$108.63	$145.57	$147.02	$197.02
Station Construction	$188.08	$252.05	$84.35	$1113.03	$185.40	$248.46	$185.40	$248.46
Yard, shops and support facilities	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Site work and special conditions	$32.03	$42.92	$35.56	$47.65	$33.11	$44.37	$33.95	$45.50
Systems	$22.60	$30.29	$25.55	$34.24	$25.24	$33.82	$26.17	$35.07
Right-of-way	$19.85	$26.59	$41.01	$54.96	$36.78	$49.29	$33.21	$44.50
Vehicles	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Professional services	$127.17	$170.42	$77.44	$103.78	$118.27	$158.50	$131.13	$175.72
Contingency	$52.72	$70.65	$34.32	$46.00	$50.74	$68.00	$55.69	$74.63
Total Cost (Excluding Finance Charges)	$579.93	$777.16	$377.56	$505.97	$558.17	$748.00	$612.56	$820.89
Project cost (construction, row, soft costs)	$527.21	$706.51	$343.24	$459.97	$507.43	$680.00	$556.87	$746.26
Contingency	$52.72	$70.65	$34.32	$46.00	$50.74	$68.00	$55.69	$74.63
Total Cost (Excluding Finance Charges)	$579.93	$777.16	$377.56	$505.97	$558.17	$748.00	$612.56	$820.89

*Totals do not add due to rounding

* YOE dollars represent mid-point of construction in year 2014
Source: PB/AZB Joint Venture

5.2.2 Proposed Capital Funding Sources for Build Alternatives

This section describes the various funding sources assumed for implementation of the Project. These sources includes DART and possible Federal and Local assistance.

DART Funding

The three primary DART funding sources are sales tax revenue, operating revenues and federal funding. Excluding federal funds or debt, sales tax revenues account for approximately 80 percent of DART's annual revenues. The DART Twenty-Year Financial Plan includes $511 million in YOE funds for a second downtown light rail transit (LRT) alignment. This assumes all local funding from sales tax or debt issuance. DART is pursuing additional funds for all Build Alternatives, which will allow some funds to be allocated to other agency projects. This additional funding is important for alternatives (B7, B4a, and B4b) that exceed the budget amount already contained in the Financial Plan.

Federal Funds

DART is exploring and evaluating possible federal funding sources for the D2 project. At the time that this document was prepared, the federal surface transportation program that authorizes federal funding programs, the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) expires on September 30, 2009. It is not clear when Congress will enact new authorizing legislation, how existing funding programs might be modified or eliminated or whether potential new programs will be created. Also, DART has submitted to Congress the D2 project as one of three potential projects of regional significance to be authorized under the new transportation bill to replace SAFETEA-LU. Both existing federal funding programs and potential new ones are discussed below.

FTA Section 5309 New Starts Program (49 USC 5309)

The FTA's discretionary New Starts program is the primary source of federal funds established for supporting fixed guideway transit projects. An application for funding has not yet been submitted to FTA. In order to be eligible for funding, the project must be evaluated and rated against a range of project justification criteria and DART must demonstrate project readiness and technical capacity to complete the project. DART will submit an application that addresses these criteria and requirements to the FTA, a step which is done at the completion of the Alternatives Analysis (AA) phase and the selection of a Locally Preferred Alternative (LPA) by the DART Board of Directors.

Title 23 Projects of National and Regional Significance

This program was created under SAFETEA-LU Section 1301 as a discretionary program administered by the FHWA and can be used to fund both highway and transit projects. The criteria established in law for the program are similar to the New Starts criteria. When SAFETEA-LU was enacted, funding was earmarked by Congress to specific projects. DART will monitor reauthorization and consider submitting a request should it appear that Congress intends to replicate this program.

Surface Transportation Program (STP)/Congestion Mitigation and Air Quality (CMAQ) Funds (also known as "Flex Funds")

Flexible funds are certain legislatively specified funds that may be used either for transit or highway purposes where a local area can choose to use certain Federal surface transportation funds based on local planning priorities, not on a restrictive

definition of program eligibility. In urbanized areas over 200,000 population, the decision on the transfer of flexible funds is made by the Metropolitan Planning Organization (MPO). Under these programs, Federal Highway Administration (FHWA) funds can be a source of funds for transit projects and can be used for a variety of transit improvements such as new fixed guideway projects, bus purchases, construction and rehabilitation of rail stations, maintenance facility construction and renovations, alternatively-fueled bus purchases, bus transfer facilities, multimodal transportation centers, and advanced technology fare collection systems. As the Regional Transportation Planning Organization (RTPO), North Central Texas Council of Governments (NCTCOG) is responsible for working with local jurisdictions and agencies to establish allocate the federal Surface Transportation Program (STP) and Congestion Mitigation and Air Quality (CMAQ) funds in the region.

Potential New "Core Capacity" Program

Currently there is no specific federal program for funding transit core capacity projects. Because it will create a new rail corridor in downtown Dallas parallel to the existing rail line, and therefore create additional capacity through the downtown central business district (CBD), the D2 Project is a core capacity project. DART will monitor reauthorization and explore the opportunity of advancing the D2 project as a potential demonstration project to help in the development of new criteria for core capacity projects with particular focus on system efficiency and effectiveness, safety and traffic benefits and land use and economic development impacts and opportunities.

Potential New "Metropolitan Mobility" Program

Currently there is no federal program designed to fund major multimodal projects in metropolitan areas. However, there has been some discussion within the transportation industry and among congressional leaders that suggests one might be created during SAFETEA-LU reauthorization. A potential precursor program, known as the National Surface Transportation Program, was created as part of the American Recovery and Reinvestment Act (ARRA) which is referred to as the "TIGER Program" (Transportation Investment Generating Economic Recovery). Funds from this discretionary grant program are to be directed to projects with a "significant impact on the Nation, a metropolitan area or a region." DART will monitor reauthorization and, if this program is created, consider whether the D2 Project is eligible for funding under it.

Potential New Funding from Climate Change/Energy Legislation

As this document was prepared, legislation was being developed in Congress to address climate change and energy issues. It is not yet clear what shape any final legislation may take or whether it will include provisions that direct funds to public transportation. DART will monitor this legislation to determine whether it might provide potential funding for the D2 Project.

Local Funds

DART is exploring a range of potential options for enhancing revenue to help fund its capital program and long-term operations and maintenance requirements. There are a number of potential local option taxes or fees that might be viable to help fund the D2 Project. Examples of potential options are parking fees, motor vehicle emissions

fees, local option fuel taxes, and parking management fees, among others. DART will continue to explore and evaluate these options.

5.3 Operating and Maintenance Plan

This section discusses the data and unit costs used to calculate O&M needs and the sources and uses of operating funds through year 2030 by alternative.

5.3.1 Operating and Maintenance Costs

O&M costs were calculated for the 2030 No Build and Build Alternatives. For each operating scenario, operating statistics calculating peak vehicles, annual revenue train-hours and car-miles, revenue track miles, passenger stations by type, and number of maintenance yards were developed.

By 2030, additional LRT lines and extensions are expected to be in operation based on the adopted 2030 Transit System Plan. The 2030 No Build represents how these lines and extensions would operate if there is no second downtown alignment:

- Red Line extended to Red Bird Lane
- Blue Line extended to Rowlett and University of North Texas (UNT)
- Green Line extended from Frankford to Buckner, via the existing transit mall
- Orange Line extended from DFW to Masters, via the existing transit mall, with trains alternating peak service between Masters and Parker Road
- West Dallas Line extended from Bernal to Victory
- Southport Line extended from IH 20 to 8th/Corinth

The 2030 Build alternatives all assume a second alignment serving downtown Dallas, by which the Green and Orange Lines are re-routed. This frees up capacity on the transit mall, allowing the West Dallas and Southport Lines to continue into downtown Dallas and then interline with other LRT lines:

- Red Line extended to Red Bird Lane
- Blue Line extended to Rowlett and UNT
- Green Line from Frankford to Buckner, via D2
- Orange Line from DFW to Masters, via D2
- West Dallas Line from Bernal to Lawnview via transit mall
- Southport Line from IH 20 to Parker Road (peak) or LBJ Central (off-peak) via transit mall

Table 5-2 and Table 5-3 summarize operating statistics used for calculating O&M costs for the 2030 alternatives. Table 5-4 presents the resulting O&M costs for 2030 No Build and 2030 Build Alternatives.

Table 5-2. LRT Systemwide Track, Station, and Yard Assumptions for 2030 Alternatives

	Revenue Track Miles	Stations				Total Yards*
		At-Grade	Aerial	Subway	Total	
2030 No Build	237	66	10	1	77	2.25
2030 Build B7 Lamar-Commerce	238	67	10	4	81	2.75
2030 Build B4 Lamar-Young	239	70	10	2	82	2.75
2030 Build B4a Lamar-Marilla	239	68	10	4	82	2.75
2030 Build B4b Lamar-Convention Ctr. Hotel	239	68	10	4	82	2.75

Source: DART

*Some amount of light maintenance/storage assumed to be added by 2030 as additional lines are built. Not counted as full yards; proportional to growth in total light rail vehicle fleet.

Table 5-3. LRT Systemwide Operating and Maintenance Statistics for 2030 Alternatives

	Peak Light Rail Vehicles	Annual Revenue Train-Hours	Annual Revenue Car-Miles
2030 No Build	154	340,700	13,434,100
2030 Build B7 Lamar-Commerce	177	397,400	15,238,800
2030 Build B4 Lamar-Young	179	402,000	15,272,300
2030 Build B4a Lamar-Marilla	179	402,000	15,290,600
2030 Build B4b Lamar-Convention Ctr. Hotel	179	402,000	15,321,000

Source: DART

Table 5-4. 2030 Operating and Maintenance Costs for 2030 Alternatives (in millions, 2008 dollars)

	Total LRT O&M Costs	Difference from No Build	Difference from B7 Lamar-Commerce
No Build	$197.2	-	-
B7 Lamar-Commerce	$223.1	$25.9	-
B4 Lamar-Young	$224.2	$27.0	$1.1
B4a Lamar-Marilla	$224.6	$27.4	$1.5
B4b Lamar-Convention Ctr. Hotel	$224.8	$27.6	$1.7

Source: DART

The 2030 No Build LRT system is estimated to cost $197.2 million annually to operate. All 2030 Build Alternatives add a minimum of nearly $26 million in O&M costs annually, compared to the No Build Alternative, largely because of the longer route patterns for the West Dallas and Southport Lines.

There are very minimal differences in operating costs between the Build Alternatives. The highest capital cost alternative (B4b Lamar-Convention Center Hotel) costs only $1.7 million more annually to operate than the lowest capital cost alternative (B7 Lamar-Commerce).

5.3.2 Operating and Maintenance Funding Sources

This section describes the range of O&M funding sources anticipated. These sources include DART funding, FTA Section 5307 funds for preventive maintenance, fare revenues and contributions from other sources. In 2030, the total O&M budget is $795.3 million. Sources projected to cover the O&M costs are summarized in Table 5-5.

Table 5-5. 2030 O&M Funding Sources

Funding Source	O&M Budget*	% of Total	Comments
Sales Tax Revenues	$519.3	65.3%	Chapter 452 of the Texas Transportation Code enables DART to collect a one-percent sales and use tax on certain transactions within its member jurisdictions.
Operating Revenues	$195.9	24.6%	Operating Revenues primarily consist of farebox revenues (80 - 85%). The remaining 15-20% of operating revenues include such items as: advertising revenues, corridor rental income, reimbursements from the NCTCOG for operations and maintenance of HOV lanes outside the DART service area, the NCTCOG's contributions to the Vanpool program, etc.
Federal (Capital Preventative Maintenance)	$46.7	5.9%	DART receives Urbanized Area Formula Program funds under Section 5307 for preventive maintenance. These costs include maintenance service contracts, parts, as well as in-house labor and benefits.
Interest Income	$20.7	2.6%	
T/Mid-cities Contributions to the TRE	$12.7	1.6%	The Trinity Railway Express (TRE) is a Commuter Rail service provided between Dallas and Fort Worth that is jointly operated by DART and the Fort Worth Transportation Authority (the T). The entire cost of this service is included in DART's budget, and the T's portion of the cost of this service is shown as a contribution to offset these expenses. In addition, there are Inter-local agreements with cities served by the TRE, but members of neither transit authority.
TOTAL	$795.3	100%	

* O&M budget figures are in millions.
Source: DART Budget and Finance

5.4 Cash Flow Analysis

The cash flow analysis compares costs with revenues on a year-by-year basis, factoring in financing as necessary.

5.4.1 Financing Assumptions for the Project

The FY09 Financial Plan includes $511 million (YOE) for the D2 project. As discussed above, DART is actively pursuing and monitoring other funding opportunities to supplement funding with any of the build alternatives. This additional funding is more critical for Alternatives B7, B4a, and B4b, all of which exceed the current financial plan budget.

5.4.2 Project Cash Flow

As the Project progresses through planning, a Locally Preferred Alternative (LPA) is adopted, cost estimates are updated and a project phasing plan is developed, DART

will prepare a cash flow analysis for the project. This analysis will show projected project expenditures for final design, construction and startup on an annual basis. At the same time, DART will develop a refined plan of finance for the project which compares projected expenditures (uses) to projected revenues (sources). Over the course of project development, this cash flow analysis will be refined by DART as cost estimates are further refined and revenue sources are more clearly established

5.5 Risks and Uncertainties

The financial analysis described in this chapter and the sources and uses of funds are subject to a number of risks and uncertainties. Some risks are project specific and others are related to macro-level uncertainties affected by the local and global economies. Although this analysis has defined a set of most-likely scenarios based on the cost, revenue, funding and financing assumptions described, several operating and capital risks could materially affect the final financial results. Uncertainties can be organized into the following major categories.

5.5.1 Project Cost Risks

Changes in Project Scope

As the Project progresses through the planning stages and more information is gathered, differences in construction costs could occur. Cost increases could be due to unexpected soil conditions and geotechnical issues, the need for unexpected utility relocations, the presence of unanticipated groundwater and other environmental impacts and mitigation measures, and changes stemming from the community involvement process.

Changes in Project Schedule

Schedule delays could be related to unforeseen construction challenges, local decision-making processes, equipment malfunctions, or general construction delays. Although a longer construction period would translate into a greater exposure to inflationary risk, this may be somewhat mitigated by a better match between available sources and uses of funds, which would reduce the amount of borrowing required.

Operating Cost Increases

Potential increases in labor, fuel, electrical rates, and other key variables that comprise operating expenses could have a material impact on O&M costs. As an example, fuel costs have risen drastically in the past year and continue to go up. Differences in bus and rail operating costs are possible, due to difference in technology and variations in labor productivity and unit costs between the two modes.

5.5.2 Economic and Financial Risks

Inflation

Inflation is applied to costs and revenues alike, and risks would exist if construction-related inflation is underestimated. For example, global factors such as a supply/demand imbalance in commodities play a major role in construction material prices, such as steel.

Interest Rates

Variations in interest rates could affect the interest earnings rate on cash balances and the interest paid on any outstanding debt, as well as the size of the long-term bonded debt service.

Bond Market Uncertainties

Given the global credit climate and the challenges that bond insurance providers are currently experiencing, liquidity and access to credit enhancement mechanisms may be structurally different in the future.

Local Tax Revenues

DART's sales tax forecast is a critical element of the long-range financial plan. Small shifts in the sales tax rate can have significant long-term effects on the plan. However, higher than expected sales tax growth can significantly increase financial capacity. In general, the DART sales tax growth rate is approximately 5 percent. Recently, this has been adjusted downward to reflect a more conservative growth rate with the economic downtown being experienced locally and nationally.

5.5.3 Funding Risks

FTA New Starts Funding

DART intends to seek Federal participation in funding through the Section 5309 New Starts process. It has not yet been determined, however, that the project will be eligible for funding under the New Starts program (and as discussed in Section 5.2 DART is also evaluating other potential sources of funding). If the project is eligible for New Starts funds, DART will be required to advance the project through the New Starts program requirements to the point where the FTA executes a funding commitment for the project, known as a Full Funding Grant Agreement. The magnitude of this funding source requires DART to have confidence and assurance that Federal funding will be forthcoming once a commitment is made to the Project. For its part, FTA must assure that any Federal funds provided will be fully and productively used and leveraged by DART to the greatest extent possible. During final design, these and other mutual assurances would be described in a Full Funding Grant Agreement between DART and FTA.

The amount of money that a project sponsor can expect to receive in any given year depends on available authorizations by Congress and the nationwide competition for this funding. The availability of New Starts or other funds could affect the Project's timing and ultimate cost. Additional bond proceeds could be used to cover shortfalls in capital funds, but as a result the Project's overall cost could increase due to debt service expenses.

Fare Policy and Ridership

Growth in transit ridership is uncertain because the availability of alternate modes and riders' price sensitivity could decrease ridership, at least in the short-term. Upside risks also exist, and demand could be higher than expected. Although this would affect fare revenues positively, it could also increase the system's level-of-service requirements. Any changes in ridership that vary from what is forecasted could also affect the required level-of-service, which would affect operating costs.

CHAPTER 6.0
EVALUATION OF ALTERNATIVES

6.0 EVALUATION OF ALTERNATIVES

This chapter presents the results of the evaluation and trade-offs analysis conducted for the alternatives developed for the Downtown Dallas (D2) Transit Study. The purpose of this chapter is to bring together the key findings, both qualitative and quantitative, for each alternative so that benefits, costs, and environmental consequences can be evaluated against the stated project goals and objectives. This chapter draws on information in prior chapters and summarizes how well each Build Alternative is projected to meet the project's purpose and need. Discussions are provided regarding the Build Alternatives' potential effect on transportation and the environment; a cost effectiveness comparison that considers benefit relative to capital and operating costs; the affordability given the available funding sources; and trade-offs to be made in selecting an alternative for implementation. The chapter concludes with a description of identified, but currently unresolved, issues that will be addressed during refinement of the locally preferred alternative (LPA) and preparation of the Final Environmental Impact Statement (FEIS) for the LPA.

The evaluation measures used in this chapter reflect local goals and objectives for the project, as described in Chapter 1, as well as Federal Transit Administration (FTA) criteria for evaluating projects proposed for funding under Section 5309 New Starts program. FTA criteria that are meaningful to a comparative analysis of the Build Alternatives include user benefits and development potential (both measures of effectiveness) and the FTA's cost-effectiveness index (which is currently under review by the Obama administration). By including these criteria, this chapter fulfills Council on Environmental Quality regulations (40 *Code of Federal Regulations* [CFR] 1502.23), which require that an Environmental Impact Statement (EIS) "indicate those considerations, including factors not related to environmental quality, which are likely to be relevant and important to a decision."

6.1 Effectiveness in Meeting Project Purpose and Need

Chapter 1, Section 3 describes five needs that the Project is intended to meet. This section evaluates how well each alternative meets these needs, based on the variety of measures of effectiveness shown in Table 6-1. Some of these measures are primarily intended to address local goals and objectives, while others are also factors considered in FTA New Starts Evaluations.

6.1.1 Enhance Mobility

Under the No Build Alternative, the light rail transit (LRT) system would continue to operate after 2016, but with a gradual deterioration of service and reliability due to capacity constraints along the transit mall and at junctions. Network expansion within and beyond the 2030 Transit System Plan and the Mobility 2030 Regional Transit Plan would be jeopardized.

The Build Alternatives would allow DART to realize its vision for the 2030 Transit System Plan by: providing increased capacity to meet demand; enhancing system operational flexibility and schedule reliability; improving Central Business District (CBD) access and circulation; promoting economic development in the CBD; and accommodating travel demands associated with continued regional growth.

Table 6-1. Project Goals, Objectives and Criteria

Goal	Objectives	Evaluation Measures
Enhance mobility	• Provide sufficient capacity to meet 2030 demand • Maintain and enhance quality of service • Ensure sustainable and reliable transit system • Increase direct access to transit service	• Peak-Off Peak trains per hour on Transit Mall • Service Levels and headways • Operational flexibility • Geographic distribution of service • FTA New Starts Criteria (transit ridership and user benefits, corridor travel time, PMT, PHT, PHD)
Strive for regional consensus	• Solicit input and participation of all downtown interests • Gain support of member cities • Consider all recent studies and plans	• Advisory Committee and public input • Benefits to member cities • Consistent with City development policies
Be fiscally responsible	• Be consistent with DART Board financial direction • Pursue all applicable Federal, State and local funding sources • Maximize potential for transit oriented development (TOD) • Explore Public Private Partnership (PPP) and new financial arrangements	• Consider available DART funds for project • FTA cost effectiveness and financial feasibility criteria, and competitiveness for other funding sources • Number of potential TOD opportunities, and extent of economic development • City and private sector participation commitments
Consider appropriate technologies	• LRT is starting point for study • Define and evaluate multimodal alternatives	• Integration with bus network • Compatibility with proposed streetcar and pedestrian networks
Consider effects on the corridor	• Acceptable Impacts on traffic, natural and built environment • Concentrate transit on the most desirable streets • Avoid historic and cultural resources	• Transportation and environmental consequences

PMT – Passenger miles of travel
PHT – Passenger hours of travel
PHD – Passenger hours of delay

Source: PB/AZB Joint Venture

The Build Alternatives assume continued operation of the Red and Blue lines on the transit mall, and shifts the Green and Orange lines to the new transit line. This allows for future 2030 rail corridor to use the existing transit mall. This service plan will maintain the 2.5 minute transit mall train frequency cap in each direction on the existing mall and results in a five-minute frequency on the D2 line. This enhances service by reducing transfers and boardings for expanded LRT coverage to downtown.

The Build Alternatives would allow for improved system optimization and operational flexibility by providing two additional Y connections with the existing system, providing the ability to interline routes to meet changing demand. These connections along with strategically placed track crossovers would also provide the option of rerouting or bypassing trains during emergencies and to better accommodate peak period and special event demand.

Regional mobility would greatly expand with the Build Alternatives due to improved transit access to key destinations within Downtown Dallas and the ability to transfer between the existing West End surface station and the proposed underground Metro Center station. All Build Alternatives would result in system ridership increases compared to the No Build Alternative, which vary slightly among the alternatives. Ridership changes within Downtown Dallas depend on the alignment selected, location of each station, and the potential for new and redevelopment within the surrounding area of these stations.

6.1.2 Regional Consensus

The D2 study conducted an intensive public outreach and involvement program focused on both the downtown Study Area and the region. The results of this program are documented in Chapter 7.0.

The four Study Advisory Committees (technical, stakeholder, policy, and community) helped develop and screen the alternatives and identify key issues. Based on preference surveys of committee members, Alternatives B4 and B4b received the most support among the four Build Alternatives from the Stakeholder Advisory Committee (SAC). Alternatives B7 and B4 received the most support from the Community Advisory Committee (CAC). The Technical Advisory Committee (TAC) was not surveyed.

Public meetings confirmed the alternatives screening process and the evaluation results of the four Build Alternatives. They also raised key issues for specific alternatives, including the impacts of the Alternative B4 Harwood District station on First Presbyterian Church, the impact of Alternatives B4a and B4b Farmers Market station on the Scottish Rite Temple property, and the ability to directly serve the proposed Convention Center Hotel with Alternative B4b.

The four Build Alternatives are generally located within the study corridor defined in the Dallas CBD Transportation Study. Most recent and ongoing studies favor future expansion of the CBD south of the historic downtown business district area. At the request of the City of Dallas, one of the two alternatives resulting from the D2 alternatives development and screening process (Alternative B4) was refined to serve the proposed Convention Center Hotel Site. This resulted in two additional Build Alternatives (Alternatives B4a and B4b) that provide nearby and direct hotel access, respectively. The City of Dallas supports Alternative B4b, which was evidenced by a motion at the August 11, 2009 City of Dallas Transportation and Environmental Committee meeting (see Appendix D). As of the publishing date of this document, no formal action has been taken by any of the DART member cities (Addison, Richardson, Plano, Carrollton and University Place) to recommend a preferred alternative.

6.1.3 Be Fiscally Responsible

The D2 Project is included in DART's annual 20-year Financial Plan as a specific line item. DART's 2009 Financial Plan includes a placeholder of $386 million (in 2008 dollars) in local dollars for the D2 project. No other funds, including federal funds, are currently assumed at this juncture.

Based on a June 2009 updated capital cost estimate, only one of the Build Alternatives (Alternative B4 Lamar-Young) is affordable with the local funds set aside for this project. In constant 2008 dollars, the projected funding gap associated with the remaining three alternatives (Alternatives B7, B4a and Bb) ranges from $194 to $229 million.

The D2 Study team conducted a financial strategy assessment. Financial planning to fill the "funding gap" and meet Federal criteria for Financial Feasibility is continuing. The findings and results to date are summarized in Chapter 5.0

In early summary 2009, the DART Board revised the project opening date from 2014 to 2016 and updated the year-of-expenditure dollars accordingly. The project funds available amount converts to $511 million which will be reflected in the 2010 Business Plan scheduled to be adopted by the DART Board in fall 2009.

All 2030 Build Alternatives require a minimum of nearly $26 million additionally in operating and maintenance (O&M) costs annually compared to the No Build Alternative. This is not directly associated with a new CBD alignment, but is due to the opportunities it provides to achieve longer route patterns for the West Dallas and Southport Lines, as envisioned in the 2030 Transit System Plan. There are very minimal differences in operating costs between the Build Alternatives. The highest capital cost alternative (B4b Lamar-Convention Center Hotel) costs $1.7 million more annually to operate than the lowest capital cost alternative (B7 Lamar-Commerce).

Because D2 is a core capacity project, its user benefits are primarily system-wide rather than corridor-specific. As such, it may be at a disadvantage in terms of yielding significant user benefits based upon the existing FTA cost effectiveness measure, one of the key criteria that FTA uses to evaluate projects proposed for Section 5309 New Starts funding. However, further analysis is being done to identify and optimize user benefits specific to the project in order to maintain the option of seeking New Starts funds for the project.

Based on discussions with private developers and the number of vacant sites required for project right-of-way in comparison to the other alternatives, Alternative B4 has the most potential transit-oriented development (TOD) sites. Alternative B7 would require the least property acquisition, and the fewest potential TOD sites. Alternatives B4a and B4b have TOD potential in the middle of this range.

The extent of land use change and economic development associated with Build Alternatives B4, B4a and B4b would be greater than with Alternative B7. This is due to the amount of vacant land along Alternatives B4, B4a, and B4b, compared to the existing high density development along Commerce Street (Alternative B7). However, the potential land use change and economic development benefits of Alternatives B4, B4a, and B4b are not reflected in the official North Central Texas Council of Governments (NCTCOG) demographic forecasts. City policies are being pursued that will incorporate and document this potential for the LPA.

Discussions with private developers have occurred and considerable interest in the project expressed. However, other than DART, no financial commitments have been made to the project or any of the Build Alternatives.

6.1.4 Consider appropriate technologies

D2 is a core capacity project that is essential to the continued operation of the LRT network at acceptable levels of service and reliability. The alternatives were developed as mode neutral transit alignments with a wide range of location options. In addition to LRT, bus and streetcar technologies were considered and adopted. Bus technology was selected for the lower cost Transportation System Management (TSM) Alternative for New Starts evaluation purposes. Modern streetcar technology is proposed for improved CBD circulation and access to the D2 alternatives stations and is being pursued as a separate, complimentary project, led by the City of Dallas.

6.1.5 Consider Effects on Corridor

A corridor Alternatives Analysis is being conducted concurrently with this Draft Environmental Impact Statement (DEIS) that compares a lower-cost TSM Alternative to the four Build Alternatives with respect to cost effectiveness, user benefits, and other criteria in compliance with FTA guidance. The DEIS compares a No Build Alternative to the four Build Alternatives in terms of their transportation and environmental impacts in compliance with National Environmental Policy Act (NEPA). The important impacts of the Build Alternatives on the corridor are discussed and compared in Section 6.2.

6.2 Transportation and Environmental Consequences

The Build Alternatives generally provide greater mobility, transit service capacity, and higher transit ridership than the No Build Alternative. With few exceptions, the Build Alternatives' effect on transportation and on the environment would be neutral or beneficial compared to the No Build Alternative.

6.2.1 Transportation Consequences

Each Build Alternative would have a positive effect on transit use within the Study Corridor and would help reduce delay throughout the transportation system as a whole, regardless of travel mode.

Although each Build Alternative would be effective in attracting additional transit ridership compared to the No Build Alternative, Alternative B4 has the highest ridership, accounting for 19,431 daily riders. The lowest ridership alternative is Alternative B4b at 17,828 daily riders, an 8.2 percent decrease over Alternative B4, as shown in Table 6-2.

Table 6-2. Transit Consequences of the Build Alternatives

Measure	Alternative				
	No Build	B7	B4	B4a	B4b
Daily Corridor Riders (year 2030)	N/A	17,902	19,431	17,988	17,828
Added System Riders (year 2030)	N/A	6,000	10,900	9,400	9,400
Transit Delay (person hours)	TBD	TBD	TBD	TBD	TBD
Through CBD Travel Time (minutes)	12.2*	9.5	9.9	10.2	10.4

*Assumes 2.5 minute headways on the transit mall sustained by service changes elsewhere.
Source: DART

Travel times through the CBD would be greater for the No Build Alternative than for two of the four Build Alternatives. Alternative B7 would have the shortest travel time through downtown (approximately 9 minutes), because of the shortest alignment, longer tunnel segment and fewer station stops. Alternatives B4, B4a, and B4b would have similar or slightly longer travel times (approximately 10 minutes).

Alternative B7 would be more effective in serving existing high density transit markets currently served by the Pacific Street Transit Mall and Commerce Street bus routes. Alternative B7's two underground stations along Commerce Street are within a 0.25 mile walking distance from existing Transit Mall stations at Akard and St. Paul Streets. With the exception of the Metro Center Station, stations for Alternatives B4, B4a and B4b would serve new transit markets with little or no overlap and none of the stations would overlap with Transit Mall stations. Alternative B4b's Convention Center station overlaps slightly with the CBD convention center station.

Key locations would be served differently by each of the four Build Alternatives. The time to specific destinations would vary depending on the destination and the alignment; the differences in travel time to these locations would differ from within one to two minutes from Victory to Baylor and differing between three to ten minutes from DFW to the Convention Center Hotel.

The project would directly benefit both transit and vehicular circulation in the most congested part of the CBD. By tunneling under the existing Pacific Street transit mall and several major east-west (Elm, Main, Commerce) and north-south (Lamar and Griffin) arterial streets, which provide direct access to the CBD, critical transit and traffic routes would remain undisturbed.

Implementation of any of the Build Alternatives would affect parking availability, both during construction and permanently once the Project is complete and in operation. Alternative B4 would remove approximately 758 spaces (excluding the First Presbyterian Church 7-story parking garage), which would be the highest among all of the Build Alternatives. Alternative B7 would remove approximately 423 parking spaces, which would be the smallest impact among the Build Alternatives. Mitigation of parking loss could include replacing lost spaces or implementing a parking management program.

During the construction period, one or more traffic lanes would be temporarily closed for the construction of surface guideway, underground stations and tunnel portals located primarily in City streets and vacant property. The greatest number of lane closures during construction would occur with Alternative B4 along Young Street and B4b along Lamar Street. The fewest would occur with Alternative B4a.

Tunnel construction will require the removal and disposal of a large amount spoils material with related temporary increases in truck traffic. Alternatives B7, B4a and B4b would have the longest tunnels, the most excavated material, requiring the most trucks (approximately 850 trucks per day during peak excavation period). Alternative B4 would have the shortest tunnel, the least excavated material, requiring the least trucks (approximately 360 trucks per day during peak excavation period).

6.2.2 Environmental Consequences

The Build Alternatives would have varying impacts on the natural environment or built environment. Where potential impacts have been identified, they could be mitigated. The differences in effects on the environmental resources among the alternatives would not be an important differentiator.

The project would be constructed largely using DART owned right-of-way and existing streets, so a relatively small amount of land would be converted to transportation use. Alternative B4 would require substantially more property (approximately 30 parcels), than any other alternative.

All Build Alternatives would result in reduced air pollution and energy consumption compared to the No Build Alternative. The differences among the Build Alternatives would be minimal. The Build Alternatives would have no substantial effect on natural hazards or threatened, endangered, or protected species.

The design of the tunnel and surface sections would ensure that ground-level environmental noise and vibration levels with the Build Alternatives would be comparable to the No Build Alternative. Project-generated noise at two locations (W Hotel and Museum Way) would exceed the FTA impact criteria, resulting in moderate impacts for all Build Alternatives. One additional moderate impact at an apartment building would result from Alternative B4.

Alternatives B4, B4a and B4b would provide improved transit access to important community facilities and services, including several Federal office buildings, the Convention Center, City Hall, Dallas Library, “the Bridge” Community Center, and the Farmers Market. These Alternatives would also have property and access impacts on the First Presbyterian Church (B4) and the Scottish Rite Temple (B4a and B4b).

Alternative B4 would require the removal of a small number of street trees, primarily along Young Street. None of the removed trees are anticipated to be transplanted. Mitigation for the tree removal is discussed in construction impacts.

Archeological resources and burials would unlikely be encountered with any of the Build Alternatives. The likelihood of encountering burials would be greater with Alternatives B4b than with Alternatives B7, B4, or B4a since Alternative B4b traverses under Pioneer Cemetery.

Construction of the project could encounter contaminated soils. The greatest potential exists with Alternatives B4, B4a and B4b in the area of the former Santa Fe railroad yards (near the Griffin and Young Streets intersection).

The Build Alternatives would impact the geology of the corridor due to the construction of tunnel sections and the removal of excavated spoils. The effect would be greater with the longer tunnels (Alternatives B7, B4b and B4a respectively), and lower with the shortest tunnel Alternative B4.

6.3 Cost Effectiveness

The cost-effectiveness analysis compares the benefits of each alternative with its costs. It considers whether an alternative’s benefit would justify its capital and

operating costs and whether the added benefits of a more expensive alternative would justify the added costs.

Cost-effectiveness is one of the key criteria that FTA uses to evaluate projects proposed for Section 5309 New Starts funding. The FTA's cost-effectiveness measure is a ratio formed by adding an alternative's annualized capital cost to its year 2030 operating and maintenance cost, and the total is divided by hours of user benefit obtained through the FTA Summit model. Cost and benefits were both calculated compared to a baseline alternative that represents the best that can be done to improve transit service in the study corridor without building a new fixed-guideway transit facility.

6.4 Financial Feasibility

6.4.1 Capital Financial Feasibility

The primary sources of funds for the project are DART funds and potentially Federal funds. Any capital funding shortfalls, including any shortfall on debt repayment incurred from the issuance of bonds, would need to be covered using additional revenues form other as-yet unidentified sources.

6.4.2 Operating and Maintenance Financial Feasibility

Future operating and maintenance costs of the project would be covered within the projected revenue needs and fare structure presented in the DART Financial Plan.

6.4.3 Comparison of Alternatives

Alternative B4 would be financially feasible with the currently available capital revenue sources. Other alternatives would be financially feasible, if federal funding or some other source of funds is identified and committed to fill the gap between the DART funds available and the total cost of the Alternative. The No Build Alternative would be financially feasible, assuming that the DART Board approved the reallocation of funds available for the D2 project for other transit improvements.

6.5 Important Trade-Offs

The Build Alternatives would have both positive and negative aspects that must be balanced by decision-makers in selecting a LPA. In the trade-offs analysis, only those differences that are discernable among the alternatives are considered. This helps focus on key differentiators, and permits decision-makers to apply their individual judgments with respect to what is being given up relative to what is being gained for each alternative. Table 6-3 summarizes these trade-offs.

At $378 million, Alternative B4 would be the least expensive and most cost effective to construct due to the shortest tunnel with only one underground station and the highest ridership. It would serve new transit markets and would have the greatest potential for transit oriented development. It would also require the most property acquisition, including property impacts on First Presbyterian Church adjacent to the proposed Harwood District Station. It would also require the reconstruction of Young Street east of Field Street and the relocation of the Young Street access ramp to City

Table 6-3. Trade-offs among Alternatives

Trade-Off Categories	Alternatives and Key Differentiators				
	2030 No Build Alternative	B7	B4	B4a	B4b
Transportation	• Gradual erosion of LRT service and reliability • No improved or new access to CBD transit markets • Lowest ridership	• Improved access to existing transit markets • Station areas overlap with Transit Mall • Higher ridership	• Access to new transit markets • No station area overlap with Transit Mall • Highest ridership	• Access to new transit markets • No station area overlap with Transit Mall • Higher ridership	• Access to new transit markets • No station area overlap with Transit Mall • Higher ridership
Environmental	• N/A	• Property acquisition (14 parcels)* • Potential impacts to adjacent buildings due to underground station access and tunnel ventilation facilities	• Property acquisition (39 parcels) • Property and parking Impacts at First Presbyterian Church • Relocation of Young St. access to City Hall Garage	• Property acquisition (22 parcels) • Property and parking Impacts at Scottish Rite Temple parking lot • Impacts to City Hall Garage	• Property acquisition (18 Parcels)* • Property and parking Impacts at Scottish Rite Temple parking lot • Impacts to City Hall Garage
Land Use and Economic Development	• No change from NCTCOG forecast within the project corridor	• Potential redevelopment along Commerce St.	• Greatest TOD potential	• Good TOD potential	• Direct access to proposed Convention Center Hotel • Good economic development potential
Construction	• N/A	• Greatest construction impacts within Commerce Street • Higher spoils disposal	• Greatest construction impacts along Young Street • Least spoils disposal	• Moderate overall construction impacts • Higher spoils disposal	• Greatest construction impacts within Lamar Street • Higher spoils disposal
Capital Cost (Millions 2008 $)	• N/A	• $580 • Higher	• $378 • Low	• $558 • High	• $613 • Highest
Cost Effectiveness Capital Cost per Rider TSUB	• N/A • N/A	• $50.22 • TBD	• $43.65 • TBD	• $50.10 • TBD	• $51.29 • TBD
Financial	• N/A	• Requires additional funds	• Feasible	• Requires additional funds	• Requires additional funds

Table 6-3. Trade-offs among Alternatives (continued)

Trade-Off Categories	Alternatives and Key Differentiators				
	2030 No Build Alternative	B7	B4	B4a	B4b
Public and Agency Support	• N/A	• Transit rider and local resident support • Less stakeholder support than for other alternatives	• Local resident and stakeholder support	• Local resident and stakeholder support	• Preferred by City of Dallas • Local resident and stakeholder support

*Does not include private property required for access to underground stations along Commerce Street or at the Convention Center Hotel.
Source: PB/AZB Joint Venture

Hall Garage. Alternative B4 has the support of some local residents and stakeholders, but is not supported by the First Presbyterian Church and the City of Dallas.

Alternative B4b would directly serve the proposed Convention Center Hotel, as well as development of vacant property in the surrounding area. It would serve new transit markets throughout the corridor, including redevelopment areas east and south of City Hall and the Farmers Market area. It is the preferred alternative of the City of Dallas along with a number of stakeholders and some downtown residents. As currently defined, Alternative B4b would impact Scottish Rite Temple property for construction of the Farmers Market Station, which is opposed by the property owners. It would be the most expensive alternative ($613 million) with the longest alignment, over a mile of tunnel and three underground stations, including a station within an existing cavern under City Hall. Alternative B4b would not be financially feasible without additional federal funding or other funding sources.

Alternative B4a is similar to Alternative B4b, but it would have an underground station approximately 1,200 feet east of the Convention Center Hotel. It would have a slightly lower cost ($558 million), and fewer construction impacts.

Alternative B7 would have a high cost ($580 million) and would serve an existing transit market that is already served by the Pacific/Bryan Street Transit Mall and Commerce Street bus routes, which happens to be the highest transit market. Construction impacts would be severe along Commerce Street and public support was less than for other alternatives.

6.6 Unresolved Issues

A number of issues have been identified during the preparation of this document that will be addressed based on more detailed engineering of the selected LPA. These issues are summarized below:

Bored Tunnel vs. Cut-and-Cover Construction

This document assumes a combination of tunnel construction using a tunnel boring machine (TBM) and temporary cut-and-cover techniques. Depending on the final

selection of an LPA, geotechnical boring results and other factors, this assumption may change.

Tunnel Spoils Disposal

A plan for the disposal of the large amount of spoils created by tunnel, portal and station excavation will need to be developed and the increase in truck traffic mitigated to the extent necessary.

Design Issues

Several design issues along the alternatives will be resolved based on more detailed engineering:

- Northern Y connection - A Y connection at the northern terminus of all alternatives was investigated during the DEIS but is not included as a project element. This connection is desirable from an LRT network operations and reliability perspective, but is not essential to the project. A major private development project is planned for the property required for this Y connection. DART will continue discussions with the property owner regarding this project design option.
- City Hall Young Street Garage Entrance Relocation – The Young Street access to City Hall Garage would be relocated with Alternative B4. Several location options have been identified. If Alternative B4 is advanced, a preferred solution will be identified in coordination with the City of Dallas staff.
- Convention Center Hotel Pedestrian Connection – Several options have been identified for providing a pedestrian connection between Government Center Station and the proposed Convention Center Hotel with Alternatives B4 and B4a. These include elevated, surface and underground facilities covering approximately 1,100-1,300 feet. If requested by the DART Board, these options will be examined further.
- Scottish Rite Temple/Farmers Market Station – Discussions with representatives of the Scottish Rite Temple have been initiated regarding property and parking impacts and the location of the Farmers Market Station with Alternatives B4a and B4b. DART will continue these discussions until a mutually agreeable solution has been reached.

Operations and Service Issues

The opening of the Green line in June 2009 has identified several service and operations issues that affect capacity and reliability through Bryan Hawkins junction and the Transit Mall. A strategic operations assessment of the D2 project is currently underway to review the affects of two additional downtown connections and the incremental addition of network expansion projects.

Section 106 Eligible Properties

A survey of potentially eligible Section 106 properties has been completed and detailed forms on individual properties have been submitted to the City of Dallas Historic Preservation Department and the Texas Historic Commission (THC) for determination of eligibility. Following the concurrence of the FEIS, the THC would enter into a MOU/MOA with DART should it be necessary.

Pioneer Cemetery

Alternative B4b passes beneath Pioneer Cemetery. The status of Pioneer Cemetery in terms of ownership, land use designation, jurisdiction and impact of Alternative B4b (e.g., finding of *de minimus* impact) has not yet been officially determined.

First Presbyterian Church Redevelopment

Alternative B4 Lamar-Young would require property fronting on the North side of Young Street, including surface parking and a seven story parking garage owned by the First Presbyterian Church. These impacts would necessitate reconfiguration of existing access to church property, and require altering Church plans to redevelop the site. If this Alternative is advanced, a mitigation plan will be needed to address these and related issues.

Property Acquisition

A preliminary survey of property acquisition was conducted for the Build Alternatives based on current level of design and exclusive of property required for vehicle circulation and access to underground stations, as well as vent shaft requirements. A more thorough estimate of property requirements and cost based on more detailed design will be prepared.

Ridership Forecasts

NCTCOG is updating the regional transportation forecasting model to conform with FTA guidance on Alternatives Analysis. When the new regional model, special generator surveys, and alternative land use development scenario for the corridor are available, the forecasts in this document will be refined and updated.

Capital Cost Estimates

The capital cost estimates in Chapter 5.0 of this document are based on year 2006 data escalated to the base year 2008 and a 2014 mid-point of construction year of expenditure (YOE) estimate based on project completion in 2016. When more current data on completed projects is available from DART, and conceptual engineering is advanced for the D2 LPA, the cost estimates in this document will be refined.

Funding Gap

At this time, no funding source has been identified to fill the gap between the money DART has available for the D2 project and the cost of three of the four Build Alternatives. As discussed in section 6.4, funding sources may be available. The funding plan will be developed and confirmed after the LPA is selected.

Project Competitiveness for Federal Funding

Because D2 is a core capacity project, its benefits are primarily system-wide benefits rather than corridor-specific. It may be at a disadvantage in terms of yielding significant user benefits based upon the existing FTA cost effectiveness measure. However, further analysis is being done to identify and optimize user benefits and land use/economic development benefits specific to the project in order to maintain the option of seeking New Starts funds for the project.

CHAPTER 7.0
PUBLIC AND AGENCY CONSULTATION AND COORDINATION

7.0 PUBLIC AND AGENCY CONSULTATION AND COORDINATION

A Public Involvement and Agency Consultation Program was developed specific to the Downtown Dallas (D2) Transit Study. It was designed and implemented to receive public and agency input throughout the study, particularly in coordination with decision-making milestones including Public Scoping, Alternatives Screening, the Alternatives Analysis (AA) / Draft Environmental Impact Statement (DEIS) evaluation of No Build and Four Build Alternatives, and the refinement of the Locally Preferred Alternative. This chapter summarizes public involvement and agency actions. After circulation of the DEIS, this chapter will also document and respond to written and verbal public and agency comments received on the DEIS during the comment period.

7.1 Public Involvement Plan

The goals of the Public Involvement and Agency Consultation Program are to:

- Provide opportunities for early and continuous agency and public participation.
- Educate the public on the Federal planning process, the National Environmental Policy Act (NEPA) process and the project development process.
- Provide the public and participating agencies with presentations on the technical issues, focusing on analysis results, key factors, and the benefits and impacts of competing choices.
- Assure inclusion of traditionally under-represented groups in the process.
- Understand the competing community interests and address them, while striving for consent.
- Evaluate the effectiveness of outreach activities in order to refine the Public Involvement Plan and utilize the most cost effective techniques.

Public involvement and agency consultation on this project officially began in April 2007 when a Notice of Intent (NOI) was published on April 12, 2007 in the Federal Register. A mailing list was developed and 14,072 scoping meeting invitations were distributed by mail to interested parties. The mailing list included residents and businesses within the study area, Central Business District (CBD) employers, organizations, downtown residents, elected officials, member cities' officials and staff, and coordinating and cooperating agencies. Five thousand additional invitations were hand distributed to transit riders and others in the Dallas Central Business District.

Public scoping meetings were held on May 2, 2007, at noon and on May 3, 2007, at 6:30 p.m. An interagency scoping meeting was held on May 3, 2007, at noon. Attendees received meeting materials and handouts at each meeting, and each meeting included a formal presentation. Written and verbal comments were accepted during the meetings and until the close of the scoping comment period on June 1, 2007. Meetings were accessible to persons with disabilities, and a Spanish language translator was available at each of the two public meetings.

Public involvement continues and activities to date are summarized in subsequent sections of this chapter.

7.2 Methods and Tools

The tools summarized below were used throughout the study to offer easy access to clear, accurate information so that stakeholders could develop and further their opinions, and to allow interested parties to provide recommendations and comments.

Methods used to increase involvement of targeted stakeholder groups included:

- Advisory committees
- Targeted meetings
- Surveys and meeting notices
- Bi-lingual communications
- Distribution of information to media with environmental justice audiences/ readership
- Distribution of information at transit locations

7.2.1 Advisory Committees

Stakeholder, Community, Technical, and Policy Advisory Committees provided forums for dialogue, coordination, and consultation. Advisory committee members participated in multiple meetings and workshops (see Table 7-1 to weigh information and communicate their diverse perspectives and interests in the screening of alternatives and selection of a LPA. Stakeholder, Community, Technical, and Policy Advisory Committee members represented the interest groups identified in Figure 7-1.

7.2.2 Public Meetings

Four rounds of public meetings were held prior to the publishing of the DEIS. Round one meetings were for Public Scoping. Round two and round three public meetings allowed the public to review progress on the screening of Alternatives and to identify issues. Round four public meetings reviewed the narrowed list of transit alternatives and requested input. Each round of public meetings included at least two meetings (mid-day and evening) with an “open house” prior to each session. Public comments were accepted for at least a 21-day comment period. Public and agency comments were documented and reviewed. New alignment options and refinements to the alternatives were developed to respond to comments, where appropriate. Table 7-2 shows the types and specific newspapers that ran advertisements for the public meetings.

Figure 7-1. Advisory Committees

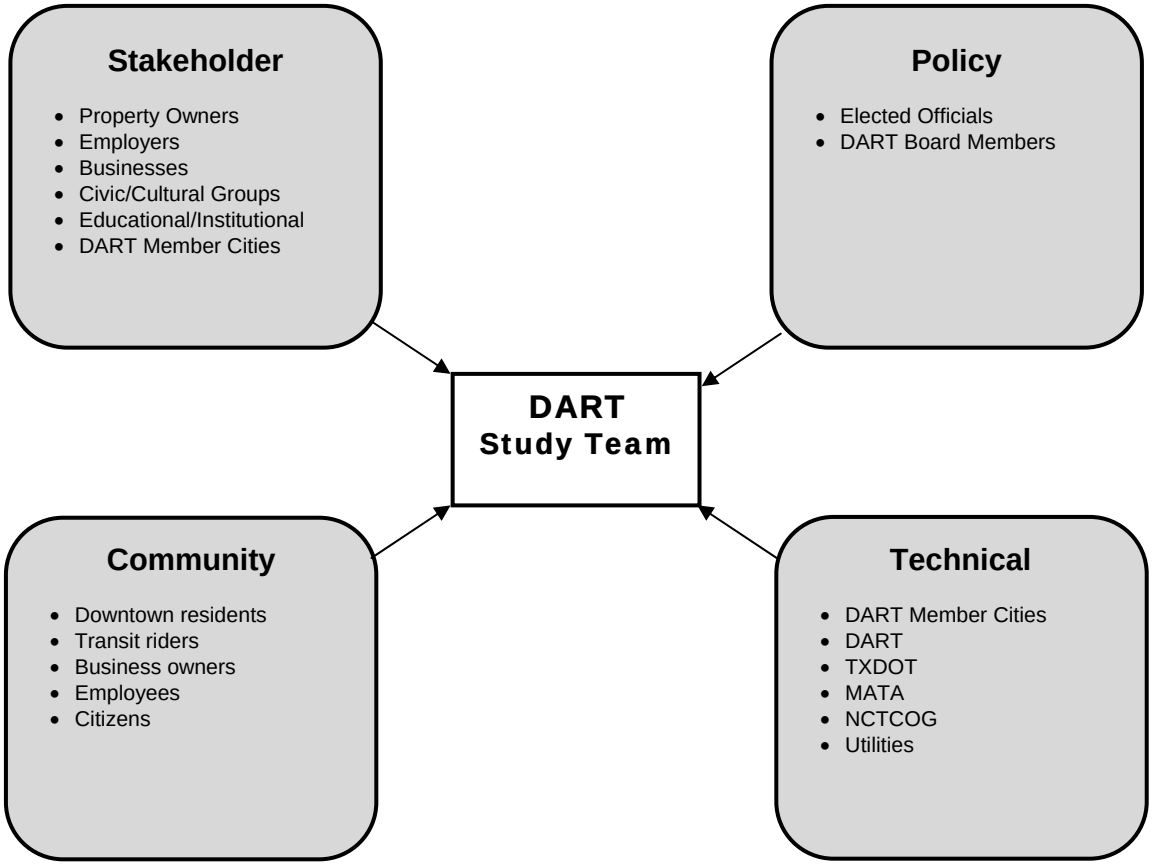

Table 7-1. Summary of Public and Agency Participation

MEETINGS	DATE
PUBLIC MEETINGS/HEARINGS	
Scoping Public Meeting (Noon)	May 2, 2007
Interagency Scoping Meeting (Noon)	May 3, 2007
Scoping Public Meeting (6:30 p.m.)	May 3, 2007
Public Meeting (Noon)	April 24, 2008
Public Meeting (6:30 p.m.)	April 24, 2008
Public Meeting (Noon)	December 16, 2008
Public Meeting (5:30 p.m.)	December 16, 2008
Public Meeting (Noon)	June 16, 2009
Public Meeting (6:00 p.m.)	June 16, 2009
Public Hearing (DEIS)	TBA
D2 COMMUNITY ADVISORY COMMITTEE MEETINGS	
D2 Community Advisory Committee Meeting	July 31, 2007
D2 Community Advisory Committee Meeting	November 1, 2007
D2 Community Advisory Committee Meeting	April 10, 2008
D2 Community Advisory Committee Meeting	July 29, 2008
D2 Community Advisory Committee Meeting	November 20, 2008
D2 Community Advisory Committee Meeting	June 10, 2009

Table 7-1. Summary of Public and Agency Participation (continued)

MEETINGS	DATE
D2 POLICY ADVISORY COMMITTEE MEETINGS	
D2 Policy Advisory Committee Meeting	December 19, 2007
D2 Policy Advisory Committee Meeting	November 19, 2008
D2 STAKEHOLDER ADVISORY COMMITTEE MEETINGS	
D2 Stakeholder Advisory Committee Meeting	June 20, 2007
D2 Stakeholder Advisory Committee Charrette	September 13, 2007
D2 Stakeholder Advisory Committee Meeting	March 27, 2008
D2 Stakeholder Advisory Committee Meeting	April 16, 2008
D2 Stakeholder Advisory Committee Meeting	June 26, 2008
D2 Stakeholder Advisory Committee Meeting	August 7, 2008
D2 Stakeholder Advisory Committee Meeting	October 9, 2008
D2 Stakeholder Advisory Committee Streetcar Workshop	October 9, 2008
D2 Stakeholder Advisory Committee Meeting	November 19, 2008
D2 Stakeholder Advisory Committee Meeting	June 4, 2009
D2 TECHNICAL ADVISORY COMMITTEE MEETINGS	
D2 Technical Advisory Committee Meeting	June 18, 2007
D2 Technical Advisory Committee Meeting	August 20, 2007
D2 Technical Advisory Committee Meeting	December 17, 2007
D2 Technical Advisory Committee Meeting	March 13, 2008
D2 Technical Advisory Committee Meeting	June 25, 2008
D2 Technical Advisory Committee Meeting	October 9, 2008
D2 Technical Advisory Committee Meeting	November 17, 2008
Phil Cobb, TAC member update	December 9, 2008
D2 Technical Advisory Committee Meeting	January 15, 2009
D2 Technical Advisory Committee Meeting	June 8, 2009
CITY OF DALLAS TRANSPORTATION AND ENVIRONMENT COMMITTEE MEETINGS	
City of Dallas Transportation & Environment Committee	September 24, 2007
City of Dallas Transportation & Environment Committee	November 26, 2007
City of Dallas Transportation & Environment Committee	March 24, 2008
City of Dallas Transportation & Environment Committee	June 9, 2008
City of Dallas Transportation & Environment Committee	December 8, 2008
City of Dallas Transportation & Environment Committee	January 26, 2009
DART BOARD PLANNING COMMITTEE MEETINGS	
DART Board Planning Committee	September 26, 2006
DART Board Planning Committee	April 24, 2007
DART Board Planning Committee	August 28, 2007
DART Board Planning Committee	October 28, 2008
DART Board Planning Committee	November 18, 2008
DART Board Meeting	January 27, 2009
DART Board Planning Committee	March 24, 2009
DART Board Planning Committee	May 26, 2009
DART Board Planning Committee	June 23, 2009

Table 7-1. Summary of Public and Agency Participation (continued)

MEETINGS	DATE
AGENCY/CITY COORDINATION MEETINGS	
Leonard Martin, City Manager, member city, Carrollton	September 22, 2006
Modeling and Alternatives Workshop with NCTCOG	October 4, 2006
Mary Suhm, City Manager, Ramon Miguez, Asst. City Manager, Jill Jordan, Asst. City Manager and David Dybala, Director of Public Works, all City of Dallas	November 20, 2006
Keith Manoy & Jacobs, City of Dallas	December 19, 2006
Mayor's Sustainable Downtown Committee Meeting	February 9, 2007
Officials of GSA, Agency Telephone Conference	March 5, 2007
DART Member City Briefing	April 30, 2007
Representatives of DART member cities	May 1, 2007
Eastern Downtown Improvements Meeting	May 2, 2007
Ron Whitehead, Town Manager, Town of Addison, DART member city	May 7, 2007
Leonard Martin, City Manager, City of Carrollton, member city	June 4, 2007
Mary Suhm, City Manager, City of Dallas	June 14, 2007
Keith Manoy, City of Dallas Public Works and Transportation	July 24, 2007
Streetcar Strategy Meeting with Agency Representatives	July 31, 2007
Jill Jordan, Frank Poe and Keith Manoy, City of Dallas	August 6, 2007
Keith Manoy, City of Dallas Public Works and Transportation	August 15, 2007
Laura Wallace, FRA Regional Director, Agency Meeting	August 20, 2007
TxDOT, Review of Conceptual Alignments, Agency Meeting	December 14, 2007
City of Dallas Coordination (Katy Trail Extension)	February 19, 2008
Bill Davidson Modeling Workshop with NCTCOG	February 28, 2008
Vernae Martin, City Economic Development, Agency Meeting	March 7, 2008
Keith Manoy, City of Dallas Public Works and Transportation	March 11, 2008
Angela Hunt, Councilwomen, Dallas City	April 15, 2008
City of Dallas Coordination (Katy Trail Extension)	April 23, 2008
DART Board members, Dallas City Council members, Stakeholders Committee members	May 23, 2008
City of Dallas Coordination (Santa Fe tunnels)	May 29, 2008
Joint Meeting of DART Board and City Council	June 9, 2008
Steve Skidmore, US Homeland Security, Agency Meeting	July 30, 2008
Agency Meeting, Keith Manoy, City of Dallas	July 31, 2008
Sherman Catalon, Federal GSA Building Impacts, Agency Meeting	August 6, 2008
City Council and Trammel Crow, Agency Meeting	August 22, 2008
Mary Suhm, City Manager, City of Dallas	November 13, 2008
Streetcar Meeting with City Staff	November 17, 2008
City of Dallas Coordination (Economic Development Dept)	November 20, 2008
Mary Suhm, City of Dallas Coordination (Victory Park Station)	December 4, 2008
City of Dallas Coordination (Historic Preservation Dept)	January 28, 2009
Dallas Economic Development Department Meeting	February 2009
City of Dallas Coordination (Parks Dept)	February 12, 2009
Dallas Landmarks Commission	March 2, 2009
Texas Historic Commission	March 3, 2009
City of Dallas Historic Preservation	March 5, 2009
Texas Tree Foundation	April 9, 2009

Table 7-1. Summary of Public and Agency Participation (continued)

MEETINGS	DATE
Mike Hellman, Dallas Parks and Recreation, Agency Meeting	April 9, 2009
INDIVIDUAL/LAND USE/COMMUNITY MEETINGS	
Bill Lively, Dallas Center for the Performing Arts	October 13, 2006
John Scovell, Hunt Oil, downtown stakeholder	October 31, 2006
Bill Lively, Dallas Center for the Performing Arts	November 6, 2006
Jan Hart Black, President, Greater Dallas Chamber	September 22, 2006
John Tatum, key stakeholder	February 19, 2007
Larry Good, Stakeholder Interview	February 21, 2007
Robert Decherd and Dan Blizzard, Belo Corporation, key stakeholders	February 23, 2007
Walt Humann, key stakeholder	February 27, 2007
Mike Rawlings, Chair Dallas Convention & Visitors Bureau and Homeless Task Force, key stakeholder	March 9, 2007
Larry Hamilton, Stakeholder Telephone Conference	March 21, 2007
Jan Hart Black, Stakeholder Telephone Conference	March 22, 2007
Steve Skidmore, General Services Administration, key stakeholder and downtown property owner	March 23, 2007
Lee Ann Stone, Deep Ellum Foundation	March 26, 2007
Larry Hamilton, downtown property owner and Jim Wood and Paul Lindenberger, Downtown Dallas	March 27, 2007
Tracy Curts, Uptown Public Improvement District	March 28, 2007
Jack Matthews and Kristian Teleki, Matthews Southwest, downtown property owner	March 29, 2007
Jim Truitt, Forest City, downtown property owner	April 9, 2007
Don Raines, Downtown Residents Council	April 13, 2007
John Bradley, Bradley and Bradley	April 18, 2007
Ken Reese, Hillwood, key stakeholder	May 3, 2007
John Chilton and David Arbuckle, AT&T, downtown property owner	May 8, 2007
Rev. Dr. Bruce Buchanan, First Presbyterian Church and Director of Stewpot	May 30, 2007
Victory Area Transit Summit	June 5, 2007
Glen Boehl, Atmos Energy, downtown stakeholder	August 14, 2007
Ken Reese, Hillwood Development (i.e. Victory Park)	August 15, 2007
Bury Partners (The Gables)	August 21, 2007
Joseph Cahoun, The Gables	September 12, 2007
Joseph Cahoun, The Gables	October 4, 2007
Dallas Arts District Alliance	October 18, 2007
Joseph Cahoun, The Gables	November 14, 2007
Joseph Cahoun, The Gables	November 28, 2007
Ken Reese, Hillwood Development (i.e. Victory Park)	January 30, 2008
Farmer's Market	February 7, 2008
Hillwood Development, Stakeholder Meeting	February 7, 2008
Joseph Cahoun, The Gables	February 13, 2008
Museum of Nature and Science, downtown property owner	February 19, 2008
Arts District Planning Meeting	April 28, 2008
Keith Williams, Oncor Utilities Meeting, Stakeholder Interview	April 29, 2008
Downtown Dallas-Planning Committee	May 5, 2008
Dan Blizzard, Belo Corporation	June 12, 2008

Table 7-1. Summary of Public and Agency Participation (continued)

MEETINGS	DATE
Greg Chilton, Cushman and Wakefield	June 18, 2008
Larry Hamilton, Hamilton Properties, Stakeholder Meeting	June 25, 2008
Ken Reese, Hillwood Development (i.e. Victory Park)	June 27, 2008
Trammell Crow	July 8, 2008
Ken Reese, Hillwood Development (i.e. Victory Park)	July 18, 2008
Reggie Graham, B4 Development Site Stakeholder Interview	July 30, 2008
General Services Administration	August 6, 2008
Ken Reese, Hillwood Development (i.e. Victory Park)	August 7, 2008
Trammell Crow Attorneys	August 8, 2008
Convention Center Hotel	August 27, 2008
Brian Loncar, Stakeholder Interview	August 27, 2008
Reggie Graham, Maharger Development	September 9, 2008
Reggie Graham, B4 Development Site Stakeholder Interview	September 19, 2008
Ken Reese, Hillwood Development (i.e. Victory Park)	September 26, 2008
ASCE, Project Status Presentation	October 6, 2008
Brian Loncar, Brian Loncar and Associates	October 9, 2008
Joseph Cahoun, The Gables	November 11, 2008
Art Anderson, Brian Loncar/Winsted	November 14, 2008
Keith Williams, Utility Review, Stakeholder Interview	November 21, 2008
Downtown Dallas-Planning Committee	December 12, 2008
First Presbyterian Church	December 17, 2008
First Presbyterian Church	January 13, 2008
ASCE UTA Student Section, Presentation	February 4, 2009
Preservation Dallas	February 12, 2009
A Alsobrook, Texas Historic Commission	March 3, 2009
First Presbyterian Church, Station Update	March 3, 2009
John Scovell and Associates, Woodbine Development Corp.	April 1, 2009
Downtown Dallas Board of Directors	April 3, 2009
Downtown Dallas Association, Board of Directors Interview	April 4, 2009
Developers of Masonic Temple Site, Stakeholder Interview	February 4, 2009
Dallas Police Association	April 8, 2009
Valetta Forsythe Lill, Executive Director, Dallas Arts District	April 10, 2009
North Texas Forum	April 10, 2009
Sixth Floor Museum Officials	April 15, 2009
Urban Market, Staffed Exhibit	April 15, 2009
Farmers Market, Staffed Exhibit	April 18, 2009
D2 Funding Gap Presentation Review Meeting	April 19, 2009
D2 Funding Gap Options Workshop	April 21, 2009
Chris Cummings, BOA Cushman & Wakefield	April 22, 2009
Federal Building at Lamar and Young	April 22, 2009
Latino Cultural Center at DART	April 22, 2009
Downtown Residents Association at Old Red Courthouse	April 22, 2009
Urban Market, Staffed Exhibit	April 22, 2009
Federal Building, Staffed Exhibit	April 29, 2009

Table 7-1. Summary of Public and Agency Participation (continued)

MEETINGS	DATE
Dallas World Aquarium, Stakeholder Interview	April 29, 2009
Pearl Street LRT Station, Staffed Exhibit	May 7, 2009
St. Paul LRT Station, Staffed Exhibit	May 13, 2009
Dallas City Hall, Staffed Exhibit	May 13, 2009
West End Transfer and LRT Station, Staffed Exhibit	May 20, 2009
Union Station, Staffed Exhibit	June 2, 2009

Source: Group Solutions RJW

Table 7-2. Public Meeting Notifications by Newspaper

Type	Newspaper	Dates
General	Dallas Morning News	**April** 13, 17, 20, 2008; **December** 7, 11, 14, 2008; **June** 7, 11, 14, 2009
	Quick	**April** 16, 21, 23, 2008; **December** 15, 2008
	Downtown Business News	**April** 14, 2008; **December** 10, 2008; **June** 15, 2009
	Dallas Observer	**April** 16, 2008; **December** 10, 2008; **June** 10, 2009
	Peoples Newspapers (Oak Cliff, Park Cities)	**April** 18, 2008; **December** 12, 2008; **June** 11, 12, 2009
	Park Cities News	**December** 11, 2008; **June** 11, 2009
	Oak Cliff Tribune	**December** 11, 2008
Hispanic	Al Dia	**April** 16, 21, 23, 2008; **December** 10, 15, 2008; **June** 10, 13, 2009
	El Hispano	**December** 11, 2008; **June** 11, 2009
African American	Dallas Weekly	**April** 16, 23, 2008; **December** 11, 2008; **June** 11, 2009
	Examiner	**December** 11, 2008; **June** 11, 2009
Asian	Dallas Chinese News	**April** 18, 2008; **December** 12, 2008; **June** 12, 2009
	Korea Daily	**April** 16, 22, 23, 2008; **December** 10, 12, 2008; **June** 10, 12, 2009
	Nguoi Viet	**April** 18, 2008
Gay & Lesbian	Dallas Voice	**April** 18, 2008; **December** 12, 2008; **June** 12, 2009

Source : DART

7.2.3 Agency Coordination

Federal, state, and local resource agencies received notification of Public Scoping and were invited to participate in Interagency Scoping. These agencies and their correspondence letters (including dates) can be found in Appendix D. Included in this list of agencies were:

- Federal Transit Administration (FTA)
- North Central Texas Council of Governments (NCTCOG)
- Texas Department of Transportation (TxDOT)
- U.S. Department of the Interior (DOI)
- U.S. Army Corps of Engineers (USACOE)
- U.S. Fish and Wildlife Service (USFWS)
- Bureau of Indian Affairs (BIA)
- Environmental Protection Agency (EPA)
- Texas Parks and Wildlife Department (TPWD)
- Texas Historical Commission (THC)
- Dallas County
- City of Dallas

In addition, DART staff met with the Federal Transit Administration, North Central Texas Council of Governments, Texas Department of Transportation, Texas Historical Commission, Dallas Landmarks Commission, Dallas County, and the City of Dallas to discuss alternatives, to ensure concurrence on potential environmental impacts, and to coordinate mitigation efforts with other guidance and current planning provisions.

Copies of the agency coordination letters are reproduced in Appendix D of this document. These agencies and others have the opportunity to review and comment on this DEIS. Additional coordination with resource agencies will occur once a LPA is selected and FEIS and Preliminary Engineering is initiated.

7.2.4 Website

A web page was established at the initiation of the study to maintain on-going communications with all interests. The web page is hosted on the DART website at www. DART.org/D2. The web page provided updated information (e.g., maps, study reports, schedule, public meeting dates, Frequently Asked Questions, etc.) and allowed continuous feedback. Periodic surveys and comment forms were also posted on the website. All website comments were captured in a comment database.

There were several websites that advertised public meeting dates, as shown in Table 7-3.

Table 7-3. Public Meeting Notifications by Online Publication

Online Publication	Advertisement Publication Dates		
North Dallas Chamber of Commerce	4/14/2008	12/1/2008	6/1/2009
Greater Dallas Asian Chamber	4/14/2008	12/1/2008	6/1/2009
Southeast Dallas Chamber	4/14/2008	12/1/2008	6/1/2009
West Dallas Chamber	4/14/2008	12/1/2008	6/1/2009
Black Chamber	4/14/2008	12/1/2008	6/1/2009
Central Dallas Association	4/14/2008	12/1/2008	6/1/2009
ForwardDallas.org	4/14/2008	12/1/2008	6/1/2009
D2 Website	N/A	N/A	N/A

Source : DART

7.2.5 Meetings and Traveling Exhibits

Meetings and traveling exhibits were held to disseminate information, address questions and solicit input throughout the study (see Table 7-1). Briefing meetings were held with interests such as property owners and their representatives, arts groups, business groups, representatives of DART member cities, and downtown organizations. In addition, staffed traveling exhibits were hosted around the Central Business District to update downtown residents, workers, and transit users, and to capture in input. Comments from meetings and traveling exhibits were captured in a comment database.

7.3 Summary of Public and Agency Participation

During the scoping and planning of the proposed project, DART actively engaged agencies and interested parties along the alignment in a proactive and iterative public involvement process. In addition to being especially informative to the design option alternatives that were developed in response to comments, this process was consistent with DART's commitment to its Public and Agency Involvement Plan. Table 7-1 summarizes public and agency input meetings and venues.

7.4 Public Hearing

In accordance with federal regulations, the DEIS will be available for public comment for 45 days after the publication of the Notice of Availability (NOA) in the *Federal Register*. Copies of the document will be sent to affected and interested local, regional, state, and federal agencies. Parties with a known interest in the project will be notified by direct mailing of the availability of the document and the public comment period. A final decision on the preferred alternative will not be made until after the close of the comment period and all comments have been reviewed and taken into consideration.

APPENDIX A
LIST OF DEIS RECIPIENTS

APPENDIX A LIST OF DEIS RECIPIENTS

Federal Agencies

Dallas Central Public Library
Blythe Semmer, Administration Director, Advisory Council on Historic Preservation
Judith Wilson, NEPA Coordinator, Bureau of Indian Affairs
Carla Byrd, Group Manager, Planning, Assessment, and Community Support, Bureau of Land Management
Ken Salazar, Secretary of Interior, Department of the Interior
Willie Taylor, Director, Office of Environmental Policy and Compliance, Department of the Interior
Tony Russell, Regional Director, Federal Emergency Management Agency Region 6
Sal Deocampo, District Engineer, Federal Highway Administration, Texas Division
Bonnie Murphy, Regional Manager, Federal Railroad Administration
Juan Salinas, Regional Administrator, General Service Administration, Region 7
Bob Cook, Field Office Director, U.S. Department of Housing and Urban Development, Dallas Office
Colonel Christopher Martin, Commander, U.S. Army Corps of Engineers, Fort Worth District
Wayne Lea, Chief, Regulatory Branch, U.S. Army Corps of Engineers, Fort Worth District
Rear Admiral Mary E. Landry, District Commander, U.S. Coast Guard, 8th District
Dr. Alfredo Armendariz, Administrator, U.S. Environmental Protection Agency, Region 6
Michael Jansky, EIS Review Coordinator, Compliance Assurance and Enforcement Division, Office of Planning and Coordination, U.S. Environmental Protection Agency
Dr. Benjamin Tuggle, Acting Director, U.S. Fish and Wildlife Service, Region 2
Jon Jarvis, National Parks Service

State Agencies

John Tintera, Executive Director, Railroad Commission of Texas
Mark Wolfe, Executive Director, Texas Historical Commission
Jim Bruseth, Archeologist, Director of State and Federal Review, Texas Historical Commission
Adrian Campbell, Preservation Consultant, Texas Historical Commission
Greg Smith, National Register Coordinator, Texas Historical Commission
William Hale, Dallas District Engineer, Texas Department of Transportation
Dianna F. Noble, P. E., Director, Environmental Affairs Division, Texas Department of Transportation
Dan Perge, Environmental Affairs – Dallas, Division, Texas Department of Transportation
James Randall, Director, Transportation Planning & Programming Division, Texas Department of Transportation
Tony Walker, Region 4 Director, Texas Natural Resource Conservation Commission
Carter Smith, Executive Director, Texas Parks & Wildlife Department

Regional Agencies

Michael Eastland, Executive Director, North Central Texas Council of Governments (NCTCOG)
Michael Morris, Director of Transportation, NCTCOG
Chad Edwards, Principal Transportation Planner, NCTCOG
John Promise, Director Environmental Resources, NCTCOG
John Carpenter, Executive Director, Dallas Regional Mobility Coalition
Dick Ruddell, Executive Director, Fort Worth Transportation Authority
Jim Cline, President, Denton County Transportation Authority (DCTA)
Rick Herrington, Deputy Executive Director, North Texas Tollway Authority (NTTA)

Local Agencies

City of Dallas
Mary K. Suhm, City Manager
Ryan S. Evans, First Assistant City Manager
Jill A. Jordan, P. E. Assistant City Manager
A.C. Gonzalez, Assistant City Manager
Forest Turner, Assistant City Manager
David K. Cook, Chief Financial Officer
Worris Levine, Director, Communication and Information Services
Tom Perkins, City Attorney
David Kunkle, Chief of Police
Eddie Burns, Sr., Chief, Fire Department
Karl Zavitkowsky, Department Director, Economic Development
Karen Rayzer, Department Director, Environmental and Health Services
Candi Chamber, Fair Housing Administrator
Theresa O'Donnell, Department Director, Developmental Services
Ricardo Galceran, Department Director, Public Works and Transportation
John Brunk, P. E., Assistant Director, Public Works and Transportation – Transportation Programs
Beth Ramirez, P. E., Assistant Director, Public Works and Transportation-Transportation Operations
Paul D. Dyer, Department Director, Parks and Recreation
Michael Hellman, Manager, Parks and Recreation
Ade Williams, Department Director, Business Development and Procurement
Kelly High, Acting Department Director, Street Services
Jody Puckett, P. E., Department Director, Water Utilities
Joey Zapata, Department Director, Code Compliance
Bonnie Meeder, Development Services Department, Real Estate Division
Jerry Killingsworth, Department Director, Housing
Rebecca Dugger, Trinity River Project
Jim Anderson, Historic Preservation Planner
Christopher Gonzales, Chair, Dallas Landmark Commission
Donald Holzwarth, Director of Public Works
Mary Phinney, Parks and Open Space Program

Town of Addison
Ron Whitehead, Town Manager

City of Carrollton
Leonard Martin, City Manager

City of Cockrell Hill
Brett Haney, Interim City Manager

City of Farmers Branch
Gary Greer, City Manager

City of Garland
Bill Dollar, City Manager

City of Glenn Heights
Jacqueline L. Lee, City Manager

Town of Highland Park
Bill Lindley, Town Administrator

City of Irving
Tommy Gonzalez, City Manager

City of Plano
Thomas Muehlenbeck, City Manager

City of Richardson
Bill Keffler, City Manager

City of Rowlett
Lynda Humble, City Manager

City of University Park
Bob Livingston, City Manager

Dallas County
Donald Holzwarth, Director of Public Works

U.S. Legislators

Senator Kay Bailey-Hutchison, United States Senator
Senator John Cornyn, United States Senator
Representative Sam Johnson, United States Congressman (3rd District)
Representative Ralph Hall, United States Congressman (4th District)
Representative Jeb Hensarling, United States Congressman (5th District)
Representative Joe Barton, United States Congressman (6th District)
Representative Kenny Marchant, United States Congressman (24th District)
Representative Michael Burgess, United States Congressman (26th District)
Representative Eddie Bernice Johnson, United States Congresswoman (30th District)
Representative Pete Sessions, United States Congressman (32nd District)

State Elected Officials

Governor Rick Perry, Texas
Senator Bob Deuell, Texas State Senate (2nd District)
Senator Florence Shapiro, Texas State Senate (8th District)
Senator Chris Harris, Texas State Senate (9th District)
Senator Jane Nelson, Texas State Senate (12th District)
Senator John Carona, Texas State Senate (16th District)
Senator Kip Averitt, Texas State Senate (22nd District)
Senator Royce West, Texas State Senate (23rd District)
Senator Craig Estes, Texas State Senate (30th District)
Representative Jim Pitts, Texas House of Representatives (10th District)
Representative Tan Parker, Texas House of Representatives (63rd District)
Representative Myra Crownover, Texas House of Representatives (64th District)
Representative Burt Solomons, Texas House of Representatives (65th District)
Representative Brian McCall, Texas House of Representatives (66th District)
Representative Jerry Madden, Texas House of Representatives (67th District)
Representative Ken Paxton, Texas House of Representatives (70th District)
Representative Jodie Laubenberg, Texas House of Representatives (89th District)
Representative Terri Hodge, Texas House of Representatives (100th District)
Representative Robert Miklos, Texas House of Representatives (101st District)
Representative Carol Kent, Texas House of Representatives (102nd District)

Representative Rafael Anchia, Texas House of Representatives (103rd District)
Representative Roberto Alonzo, Texas House of Representatives (104th District)
Representative Linda Harper-Brown, Texas House of Representatives (105th District)
Representative Kirk England, Texas House of Representatives (106th District)
Representative Allen Vaught, Texas House of Representatives (107th District)
Representative Dan Branch, Texas House of Representatives (108th District)
Representative Helen Giddings, Texas House of Representatives (109th District)
Representative Barbara Mallory, Texas House of Representatives (110th District)
Representative Yvonne Davis, Texas House of Representatives (111th District)
Representative Angie Chen Button, Texas House of Representatives (112th District)
Representative Joe Driver, Texas House of Representatives (113th District)
Representative Will Hartnett, Texas House of Representatives (114th District)
Representative Jim Jackson, Texas House of Representatives (115th District)

Local Elected Officials

City of Dallas
The Honorable Mayor Tom Leppert
Councilmember Delia Jasso, District 1
Councilmember Pauline Medrano, Deputy Mayor Pro-Tem, District 2
Councilmember David A. Neumann, District 3
Councilmember Dwaine Caraway, Mayor Pro-Tem, District 4
Councilmember Vonciel Jones Hill, District 5
Councilmember Steve Salazar, District 6
Councilmember Carolyn Davis, District 7
Councilmember Tennell Atkins, District 8
Councilmember Sheffie Kadane, District 9
Councilmember Jerry Allen, District 10
Councilmember Linda Koop, District 11
Councilmember Ron Natinsky, District 12
Councilmember Ann Margolin, District 13
Councilmember Angela Hunt, District 14

Dallas County
The Honorable Jim Foster, County Judge
The Honorable Maurine Dickey, County Commissioner, District 1
The Honorable Mike Cantrell, County Commissioner, District 2
The Honorable John Wiley Price, County Commissioner, District 3
The Honorable Kenneth Mayfield, County Commissioner, District 4

Libraries

Dallas Central Public Library
University Park Public Library
Rowlett Public Library
Richardson Public Library
Plano Municipal Reference Library
Central Irving Library
Highland Park Library
Garland Central Library
Farmers Branch Manske Library
Cockrell Hill Public Library
Carrollton Public Library
Carrollton Public Library

Interested Organizations/Associations/Property Owners

Michael Anderson, Chavez Land Income Properties
Adam Bernhardt, Stream Realty Partners
Dan Blizzard, Belo Investment Corporation
Gregg Chilton, Cushman & Wakefield
John Chilton, AT&T Corporate Real Estate
Rev. Dr. Joe Clifford, Sr., Pastor of First Presbyterian Church in Dallas
Afra Cobb, Cobb Professional Services
Tracy Curts, Uptown Public Improvement District
Alejandrina Drew, Latino Cultural Center for the City of Dallas
Tom Garcia, The Adolphus Hotel
Reggie Graham, Maharger Development
Kathie A. Griffith, Southwest Check and Lockbox Services for Bank of America
Laurence E. Hamilton, Hamilton Properties Corp.
Chuck Hixson, Westdale Asset Management
Ed Kirkpatrick, Dallas Scottish Rite Cathedral
Dr. Wright L. Lassiter, Jr., Dallas County Community College District
Bill Lively, Dallas Center for the Performing Arts
Jack Matthews, Matthews Southwest
Rev. Elzie Odom, Jr., Senior Pastor of St. Paul United Methodist Church in Dallas
Carolina Pace, Property Owner
John Pace, Property Owner
Tom Persch, West End Association
Frank Poe, Dallas Convention Center
Connie Pruett, Bank of America
John Rader, Homer Rader Properties
Steve Sheperd, Downtown Dallas Residents Council
Michael Rawlings, CIC Partners, LP
Ken Reese, Hillwood Capital
Jon Ruff, Spire Realty Group, LP
Steve Skidmore, GSA
Andrew Taylor, RAK Group
Jim Truitt, Forest City Residential Group
Jeff West, South Side Quarter Development Corporation
Kirby White, Crescent Real Estate Equities, Ltd.
Ron Whitehead, City Manager of Addison
Jim Wood, DowntownDallas
John Hollingsworth, AT&T
David Coker, Atmos
Keith Williams, ONCOR
Charlie Brock, TXU
Buddy Smith, Verizon
Wallace Coffey, Chairman, Comanche Nation of Oklahoma
Barry Henry, Crow Holdings
Phillip Jones, Dallas Convention and Visitors Bureau
Clyde Porter, Dallas County Community College District
Mary Phinney, Administrator, Dallas County-Parks/Open Space Program
Velia Lara, Dallas Independent School District
James C. Oberwetter, President, Greater Dallas Chamber of Commerce
Arturo Violante, Hispanic Chamber of Commerce
Susybelle Gosslee, League of Women Voters
Katherine Seale, Preservation Dallas
Anthony E. Street, President, Tonkawa Tribe of Oklahoma
Gary McAdams, Wichita and Affiliated Tribes

APPENDIX B
LIST OF PREPARERS

APPENDIX B LIST OF PREPARERS

PUBLIC AGENCIES

Federal Transit Administration, Region VI Office.
Federal agency responsible for project. Key personnel include:

Peggy Crist, Director of Planning and Development
Laura Wallace, Community Planner
Lynn Hayes, Community Planner
Gail Lyssy, Regional Engineer

Federal Transit Administration

Brian Jackson, Community Planner
Tricia Harr, Environmental Protection Specialist

Dallas Area Rapid Transit, Dallas, Texas.

Client agency responsible for project. Key personnel include:

Ernie Martinez, Planning Project Manager
Carlos Huerta, Community Affairs
Steve Salin, Vice President, Rail Planning
Kay Shelton, Planning Project Manager III
Tim McKay, Senior Vice President, Rail Program Development
George Avalos, Project Manager III

Phil Johnson, Travel demand forecasting
Barbara Weigel, Funding and agency coordination
John Hoppie, Cultural resources
Jack Wierzenski, TOD and economic development
Mike Levitan, Financial analysis
Victor Ibewuike, Traffic operations
Abed Abukar, Transit operation
Rob Smith, Bus operations
Jennifer Jones, Bus operations
Michael Shaw, Property impacts
Lawrence Meshack, Public involvement

PROJECT TEAM

Parsons Brinckerhoff, Inc.

Ronald H. Bixby, Project Manager Purpose and Need, Alternatives Evaluation	B.A, Sociology, University of Notre Dame M.C.P, City Planning, University of Pennsylvania
Becky Blatnica, AICP DEIS Task Leader	B.A, History and Geography, University of Texas at Austin M.S., Community and Regional Planning, University of Texas at Austin
Tom Ryden, P.E., AICP* Alternatives Definition, Transportation Impacts, QA/QC support	B.S.C.E., Civil Engineering, Washington University M.S. Traffic and Transportation, Washington University
Malcolm Hudson Tunnel Engineering, Underground Stations, Construction Impacts	B.S., Civil Engineering, Heriot Watt University
Hugh T. Kelly, P.E. Geotechnical	B.S., Geological Engineering, New Mexico State University M.S., Civil (Geotechnical) Engineering, University of Texas at Arlington
Sheila Dezarn Funding and Financial Analysis	B.A., Political Science, University of Washington M.A., Public Policy, University of Washington
Robert Harbuck Capital Cost Estimating	B.S., Civil Engineering Technology, Southern Polytechnic State University
Stephanie S. Foell Cultural Resources	B.S., History and Psychology, Towsen State University M.S., Historic Preservation, University of Georgia
James Hamilton, AICP Parkland	M.U.P., Urban Planning, University of Kansas B.A., Political Science, Wichita State University M.A., Political Science, University of Kansas
Emily Kreisa, AICP* Parkland, Graphics	B.A., Urban and Environmental Planning, University of Virginia M.R.P., Regional Planning, University of North Carolina at Chapel Hill

Jason Bright Archaeology	B.S., Anthropology, Utah State University M.S., Anthropology, University of Utah
Chelsea Young Graphics	B.A., Architectural Studies, University of Kansas M.S., Community and Regional Planning, University of Texas at Austin

Arredondo, Zepeda & Brunz, LLC

L.A. Avery Surface Transit Engineering, Surface Stations, Utility impacts	B.S., Civil Engineering, The Ohio State University M.S., Civil Engineering, The University of Kansas
Charles J. Sharkus Environmental Impacts	B.S., Civil Engineering, The University of Missouri at Rolla
Michael Carleton Environmental Impacts	Bachelors in Public Administration, Ferris State University Masters in Public Administration, Central Michigan University
Ashley M. Kelly Neighborhoods and Community Facilities	B.S. Candidate, Civil Engineering, University of Texas at Arlington (December 2009)

Group Solutions RJW

Robena Jackson Public Involvement	B.A., English and Sociology, Texas Christian University M.A., Sociology, University of Texas
Jennifer LeBaron Public Involvement	B.A., Communication, Arizona State University

Connetics Group

Susan Rosales Transit Service Plan, Operations and Maintenance Cost Estimates	B.A., Psychology, University of California, Los Angeles M.S., Urban Planning, University of California, Los Angeles

EJES

Max Gefahr, P.E. Appendix C Plans and Profiles	B.S., University of Science and Technology, Tehran, Iran M.S. Civic Structures, The George Washington University in D.C.

DART GENERAL PLANNING CONSULTANT (GPC)

URS Corporation

Emily Schieffer Senior Environmental Program Manager Air Quality	B.S. in Ecology Evolution and Conservation Biology, University of Texas at Austin
Oscar F. Perez Air Quality	B.S., Metallurgical and Materials Engineering, University of Texas at El Paso

Harris Miller Miller & Hanson

Lance D. Meister Senior Consultant Noise & Vibration Analysis	B.S., Civil Engineering, Temple University

Dunbar Transportation Consulting

Julie Dunbar, P.E. Ridership Forecasting and Modeling Methodology Support	B.A., Physics, Illinois Wesleyan University, Bloomington, IL B.S., Civil Engineering, University of Illinois – Urbana/Champaign M.S., Civil Engineering, University of Illinois – Urbana/Champaign

Parsons Transportation Group

Boro Dedeitch, P.E. Traffic and Pedestrian Impact Analysis Manager	B.S., Industrial Engineering, Purdue University M.S., Civil Engineering, University of Texas at Austin
Srinivasa S.N. Battula, P.E. Traffic and Pedestrian Impacts	B.E., Civil Engineering, Andra University M.S., Civil Engineering, University of North Carolina

DART REAL ESTATE DIVISION

Pyles Whatley Corporation

Kreg Hodge Real Estate Acquisition	Stephen F. Austin State University

* No longer with the agency/company

APPENDIX C
PLANS AND PROFILES

APPENDIX C PLANS AND PROFILES

Appendix C is included under a separate cover.

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APPENDIX D
AGENCY CORRESPONDENCE

APPENDIX D AGENCY CORRESPONDENCE

DART D2 Study Interagency Scoping Meeting Invitation List
Robert Duncan District Commander, U.S. Coast Guard, 8th District
Richard Greene Administrator, U.S. Environmental Protection Agency, Region 6
Robert C. Patrick Regional Administrator, Federal Transit Administration, Region 6
Ron Castleman Regional Director, Federal Emergency Management Administration, Region V1
Wayne Lea Chief, Regulatory Branch, U.S. Army Corps of Engineers, Fort Worth District
H. Stan Hall District Advance Project Development Engineer, TxDOT Dallas District
Mark Denton Archeology reviewer, Texas Historical Commission
Robert L. Cook Executive Director, Texas Parks & Wildlife Department
Ronald Kitchens Executive Director, Railroad Commission of Texas
Jack Hatchell Chair, Regional Transportation Council
James McCarley Executive Director, Dallas Regional Mobility Coalition
Michael Morris Director of Transportation, North Central Texas Council of Governments

John Hollingsworth AT&T Texas
Charlie Brock TXU Electric Delivery Company
Glenn Boehl ATMOS Gas
Buddy Smith Verizon
Chad Edwards NCTCOG
John O. Hedrick Executive Director, Denton County Transportation Authority (DCTA)
Paul Brown Manager, APT System
Vince Thill Utility Coordinator, City of Dallas
Theresa O'Donnell Director, Development Services, City of Dallas
John Brunk Assistant Director, Transportation & Public Works, City of Dallas
Karl Zavitkovsky Director, Office of Economic Development

DART
Dallas Area Rapid Transit
P.O. Box 660163
Dallas, Texas 75266-0163
214/749-3278

April 20, 2007

Jack Hatchell
Chair
Regional Transportation Council
616 Six Flags Drive
P.O. Box 5888
Arlington, TX 76005-5888

Dear Mr. Hatchell:

SUBJECT: Interagency Scoping Meeting – Dallas CBD Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) project

Dallas Area Rapid Transit (DART) has recently initiated efforts to conduct an Alternatives Analysis (AA) and prepare a concurrent Draft Environmental Impact Statement (DEIS) for transit improvements in downtown Dallas. The Federal Transit Administration (FTA) has authorized DART to begin this effort by issuing a Notice of Intent (NOI) to prepare an EIS in the Federal Register on April 12, 2007 (see attached).

For the purposes of initiating interagency coordination for this effort, DART will hold an interagency scoping meeting for interested federal, state, regional and local agencies. The meeting is scheduled for:

Thursday, May 3, 2007 - 12:00 pm (lunch provided)
DART Board Conference Room 1-C
1401 Pacific Avenue, Dallas, Texas

The AA/DEIS effort is intended to address future capacity needs of the light rail system, including the need for operational flexibility and the desire to maintain service reliability, as well as improve access and circulation to and through downtown Dallas. The study will consider a range of alternatives, including bus, streetcar and light rail. Public scoping meetings will also be held and are being announced through a variety of means, including the NOI.

DART recognizes that this effort will have a range of issues relating to items such as traffic operations, parking, utilities, right-of-way, economic development, pedestrian facilities, and historic resources. To ensure these issues are addressed during the effort, DART is seeking participation by agency representatives on a Technical Advisory

Committee. Duties would include reviewing documents, analyzing issues, and providing technical guidance. Meetings will typically be held monthly. Department heads are asked to participate or designate experienced and knowledgeable employees that can serve on this committee. These qualifications are desired to facilitate discussions and to ensure accountability of the participants, as the effort will culminate in an endorsement or consent of study recommendations. DART requests that you submit the name of recommended representatives to Carlos Huerta via e-mail (chuerta@dart.org) by Friday, April 27, 2007 and/or have this individual attend the interagency coordination meeting.

We look forward to your participation on this important project. Limited parking at DART is available for the meeting. If you require parking, please inform Carlos Huerta by April 30. If you cannot attend the meeting, but have information or comments useful for the environmental process, please forward those to me no later than June 1, 2007.

If you have any questions, please email me at emartine@dart.org or call me at 214. 749.3201.

Respectfully,

Ernie G. Martinez
Project Manager

EM/ks

Enclosure
- Federal Register Notice of Intent

C: Doug Allen
Sue Bauman
Steve Salin
Michael Miles
Carlos Huerta

Downtown Dallas Transit Study
Dallas CBD AA/DEIS

Letter from the Department of the Army

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

REPLY TO ATTENTION OF

April 24, 2007

Planning, Environmental, and Regulatory Division
Regulatory Branch

SUBJECT: Project Number SWF-2007-163, DART Dallas CBD Improvements

Mr. Ernie G. Martinez
Project Manager
Dallas Area Rapid Transit
P.O. Box 660163
Dallas, Texas 75266

Dear Mr. Martinez:

Thank you for your letter dated April 20, 2007. Your request has been assigned Project Number SWF-2007-163.

Ms. Kelly Allen has been assigned as the regulatory project manager for your request and will be evaluating it as expeditiously as possible. However, because of our permit workload it will take a while for us to respond.

You may be contacted for additional information about your request. For your information, please reference the Fort Worth District Regulatory Branch homepage at http://www.swf.usace.army.mil/regulatory/ and particularly guidance on submittals at http://www.swf.usace.army.mil/pubdata/environ/regulatory/introduction/submital.pdf, and mitigation at http://www.swf.usace.army.mil/pubdata/environ/regulatory/permitting/mitigation/fwmitguid.pdf that may help you supplement your current request or prepare future requests.

If you have any questions about the evaluation of your submittal or would like to request a copy of one of the documents referenced above, please contact Ms. Kelly Allen at the address above or telephone (817)886-1732 and refer to your assigned project number. Please note that it is unlawful to start work without a Department of the Army permit if one is required.

Wayne A. Lea
Chief, Regulatory Branch

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

REPLY TO
ATTENTION OF:

January 14, 2008

Planning, Environmental, and Regulatory Division
Regulatory Branch

SUBJECT: Project Number SWF-2007-00163

Mr. Ernie G. Martinez
Project Manager
Dallas Area Rapid Transit
P.O. Box 660163
Dallas, Texas 75266

Dear Mr. Martinez:

Thank you for your letter of April 20, 2007, concerning a proposal by Dallas Area Rapid Transit to construct transit improvements located in the City of Dallas, Dallas County, Texas. This project has been assigned Project Number SWF-2007-00163. Please include this number in all future correspondence concerning this project. Failure to reference the project number may result in a delay.

We have reviewed this project in accordance with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Under Section 404, the U. S. Army Corps of Engineers (USACE) regulates the discharge of dredged and fill material into waters of the United States, including wetlands. Our responsibility under Section 10 is to regulate any work in, or affecting, navigable waters of the United States. Any such discharge or work requires Department of the Army authorization in the form of a permit. For more information on the USACE Regulatory Program, please see our Internet homepage at www.swf.usace.army.mil and select "Regulatory Program".

We are unable to determine from the information that you provided in your letter whether Department of the Army authorization will be required. Please provide us with a more detailed description of the proposed project, a suitable map of the proposed project area showing the location of proposed discharges, the type and amount of material (temporary or permanent), if any, to be discharged, and plan and cross-section views of the proposed project. Please refer to the enclosed guidance for Department of the Army submittals for additional details about what you should submit for this and future projects. For more information on the USACE Regulatory Program, please refer to our Internet homepage at www.swf.usace.army.mil and select "Regulatory Program."

If a Department of the Army permit is required, the project may be authorized by one or more general permits such as nationwide permit 14 for Linear Transportation Projects (enclosed). For work to be authorized by general permit it must comply with the specifications and conditions of the permit. Projects that would not meet the specifications and conditions of a general permit may require authorization by individual permit.

Important cultural resources are known to occur in Dallas County. Several endangered and threatened species, including the black-capped vireo (*Vireo atricapilla*), golden-cheeked warbler (*Dendroica chrysoparia*), least tern (*Sterna antillarum*), and piping plover (*Charadrius melodus*) are known to occur in Dallas County. Please consider the potential effects of your proposed action on cultural resources and endangered species in your planning efforts. For additional information about endangered and threatened species, please contact the U. S. Fish and Wildlife Service.

We encourage you to avoid and minimize adverse impacts to streams, wetlands, and other waters of the United States in planning this project. Please forward your response to us as soon as possible so that we may continue our evaluation of your request. Please note that it is unlawful to start work without a Department of the Army permit when one is required.

Thank you for your interest in our nation's water resources. If you have any questions concerning our regulatory program, please contact Ms. Kelly Allen at the address above or telephone (817)886-1732.

Sincerely,

Wayne A. Lea

Wayne A. Lea
Chief, Regulatory Branch

Enclosure

Dallas Area Rapid Transit
P.O. Box 660163
Dallas, Texas 75266-0163
214/749-3278

January 6, 2009

Mr. F. Lawerence Oaks
State Historic Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711-2276

Attn: Adam Alsobrook

Re: Section 106 Review of Dallas Area Rapid Transit D2 Study
Concurrence on Area of Potential Effects (APE)

Dear Mr. Oaks,

Dallas Area Rapid Transit (DART) is conducting an Alternative Analysis/Draft Environmental Impact Statement (AA/DEIS) for transit improvements in downtown Dallas. The study, known as D2, is examining a range of transit improvements, including several potential alignments for light rail transit (LRT). The study assumes federal funding for future implementation of study recommendations and therefore, it is subject to compliance with Section 106 of the National Historic Preservation Act as amended (Section 106, 16 U.S.C. 470f) and its implementing regulations (36 CFR 800).

Enclosed for your review is a description of the D2 Study, remaining LRT alternatives under evaluation, and a map identifying the proposed Area of Potential Effects (APE). The proposed APE is defined as 300 feet from the remaining alternatives. In accordance with 36 CFR 800.4(a)(1), DART is seeking SHPO concurrence on the extent of the APE.

Following your concurrence, DART will move forward with cultural resources documentation described in 36 CFR 800.4(a). This will include examination of local, state, and federal lists of historic properties and surveys, including but not limited to, the National Register of Historic Places and the Texas Historical Commission Sites Atlas. DART will also coordinate with local historical organizations and Indian tribes to help identify any historic buildings, districts, sites, objects or archeological sites of significance.

Thank you for your review and please do not hesitate to contact D2 Project Manager Ernie Martinez at 214-749-3201 should you have any questions.

Sincerely,

Stephen L. Salin, AICP
Vice President, Rail Planning

C: Ernie Martinez, DART
Kay Shelton, DART
Ron Bixby, PB

CONCUR
by _____
for F. Lawerence Oaks
State Historic Preservation Officer
Date FEB 2, 2009

D2 Study Overview

Background

The purpose of the D2 Study is to ensure the sustainability of the DART transit system by providing needed capacity and system reliability through downtown Dallas. More specifically, once the future DART Green (2009-2010) and Orange Lines (2011-2013) are open, the existing LRT Transit Mall will be operating at capacity. This operating scenario does not allow the addition of service over time or allow future projects envisioned in the DART 2030 Transit System Plan to operate through downtown. As a result, DART is evaluating a No Build, Transportation System Management (TSM), and LRT as alternatives to accommodate future travel needs to, through and within downtown.

Process

The D2 Study is following Federal Transit Administration's project development and New Starts Alternatives Analysis (AA) process. To date, the process has identified and considered a range of alternatives, including light-rail (LRT), streetcar and bus solutions. After screening through 16 possible new transit alignments through downtown Dallas, the D2 Study Team has identified two LRT candidates and two additional LRT options for detailed analysis. It is anticipated that one or more of these LRT alternatives will be fully evaluated within the Draft Environmental Impact Statement (DEIS). A detailed evaluation is currently in progress. Streetcar options are being coordinated with the D2 study, but are being developed in a separate effort.

Build Alternatives

All proposed alternatives extend from Victory Station on the DART Northwest line, utilizing existing DART right-of-way in an at-grade configuration through the new Victory Development. The alternatives pass under the Woodall Rodgers Freeway at-grade and then would enter a tunnel portal that turns southwest from Griffin Street to Lamar Street. The alternatives would then continue underground following Lamar Street. Two proposed stations would be located in this common segment: one north of Woodall Rodgers Freeway at the future Museum of Nature and Science site, and one under Lamar Street just south of the existing transit mall. This latter station will allow for interface with the West End Station and West Bus Transfer Center. In the vicinity of Lamar and Main Streets, the alternatives separate into different alignments.

The B7 Lamar-Commerce Street alternative turns directly east and would run underground beneath Commerce Street through the central business district. At a tunnel portal immediately west of I-45, it surfaces and continues at-grade to a connection with the DART Southeast line. Two additional underground stations would be located east of Akard and Harwood Streets.

The B4 Lamar-Young alternative continues underground on Lamar Street before turning southeast to a tunnel portal northwest of the intersection of Young and Field Streets. It then follows Young Street east at-grade, passing under I-45 to a connection with the DART Southeast line. Stations would be located along Young Street at City Hall, and in the vicinity of the Farmers Market.

Two alignment options were developed for the B4 Lamar-Young alternative in coordination with the City of Dallas and project stakeholders in order to examine options that could provide more direct access to a planned convention center hotel at the southwest corner of Lamar and Young. These options are described below:

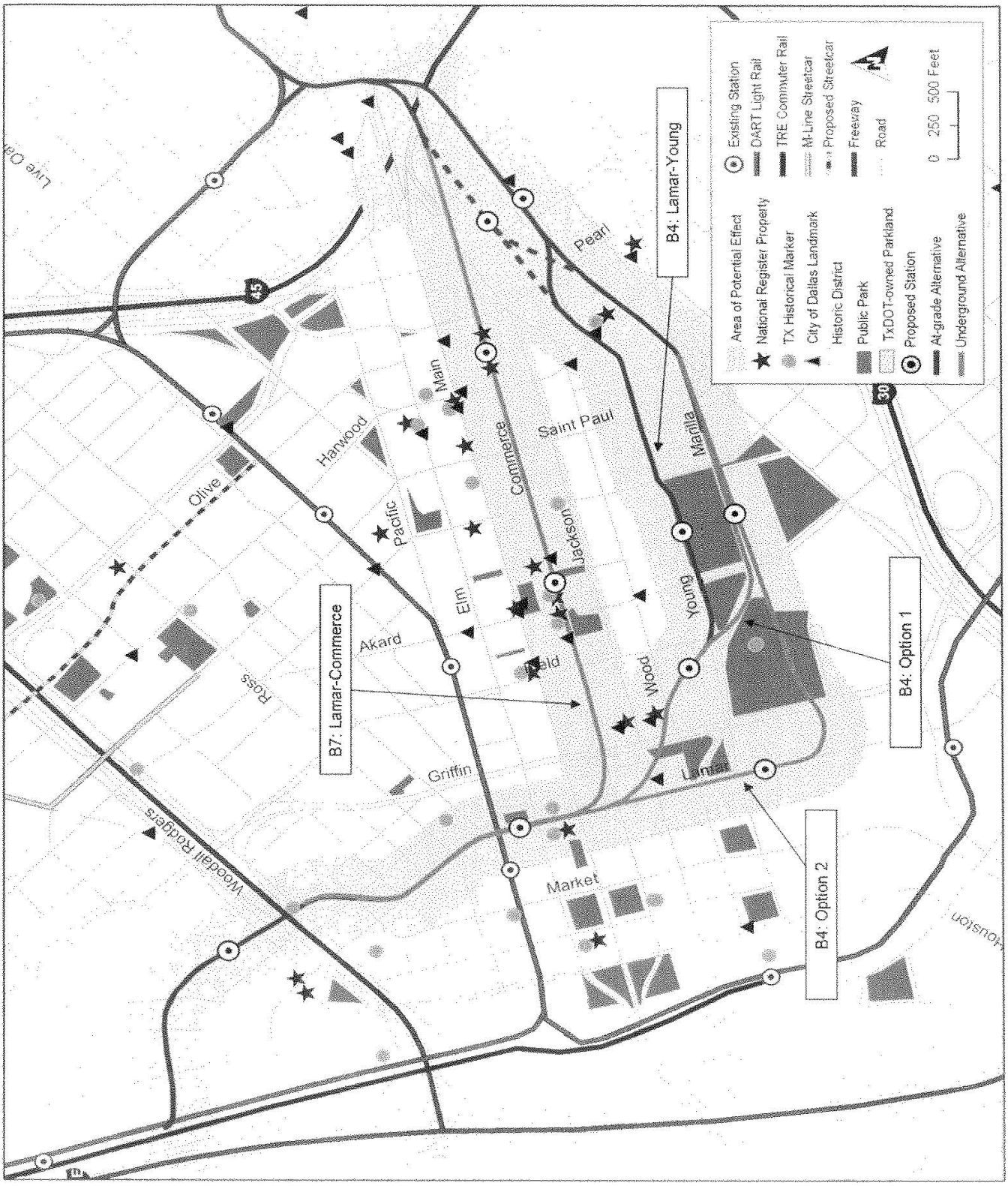
- The B4 Lamar-Marilla option would continue underground to Marilla Street rather than turn onto Young at-grade. The alignment would utilize an excavated cavity in the third sub-level of City Hall, and then would become at-grade via a tunnel portal on Marilla east of Ervay Street. The option would remain at-grade on Marilla Street, turning northeast to travel parallel to and north of Canton Street or returning to the Lamar-Young alignment in order to connect with the Southeast

Corridor line. The proposed APE is wider in this location to account for alignment options north of Canton Street. Stations would be located below the Hamilton property site northwest of Field and Young, and near the Farmers Market area.

- The other option, known as B4 Lamar-Convention Center, continues south under Lamar Street before turning east adjacent to the future convention center hotel site. It would remain underground passing below the Pioneer Plaza and Cemetery and the third sub-level of City Hall. This option also becomes at-grade at a tunnel portal on Marilla east of Ervay Street and would connect back to the Southeast Corridor line as described above. Stations would be located adjacent to the convention center hotel site under Lamar, at City Hall in the third level cavity, and near the Farmers Market area.

Next Steps

DART is in the process of defining all alternatives in detail in order to complete the evaluation of alternatives. It is anticipated that the DART Board will select a Locally Preferred Alternative in late Spring/early Summer 2009 after completion of the Draft EIS.


B4: Lamar-Young
B7: Lamar-Commerce
B4: Option 1
B4: Option 2
Area of Potential Effect
National Register Property
TX Historical Marker
City of Dallas Landmark
Historic District
Public Park
TxDOT-owned Parkland
Proposed Station
At-grade Alternative
Underground Alternative
Existing Station
DART Light Rail
TRE Commuter Rail
M-Line Streetcar
Proposed Streetcar
Freeway
Road
0 250 500 Feet
N
Live Oak
Pearl
Main
Harwood
Olive
Pacific
Commerce
Saint Paul
Jackson
Manilla
Young
Akard
Elm
Field
Wood
Ross
Griffin
Lamar
Market
Woodall Rodgers
Houston
45
30
75

Dallas Area Rapid Transit
P.O. Box 660163
Dallas, Texas 75266-0163
214/749-3278

February 10, 2009

Mr. F. Lawerence Oaks
Executive Director
Texas Historical Commission
PO Box 12276
Austin, Texas 78711-2276

Attn: Adam Alsobrook

RE: Dallas Area Rapid Transit D2 Study
Concurrence on Approach to Section 106/Historic Resources Evaluation Process

Dear Mr. Oaks:

Dallas Area Rapid Transit (DART) is conducting an Alternative Analysis/Draft Environmental Impact Statement (AA/DEIS) for transit improvements in downtown Dallas. The study, known as D2, is examining a range of transit improvements, including several potential alignments for light rail transit (LRT). The study assumes federal funding for future implementation of study recommendations and therefore, it is subject to compliance with Section 106 of the National Historic Preservation Act as amended (Section 106, 16 U.S.C. 470f) and its implementing regulations (36 CFR 800).

Per your concurrence letter dated February 2, 2009, DART will conduct the historic resources analysis within the approved Area of Potential Effects (APE), defined as 300 feet from the remaining alternatives.

DART is now initiating documentation for the Preliminary Draft Environmental Impact Statement (DEIS) for the D2 project pursuant to NEPA. The immediate purpose of this preliminary document is to support the DART Board of Directors in a decision to select a Locally Preferred Alternative (LPA) from the remaining four LRT build alternatives.

In order to maintain the proposed project schedule and avoid potentially unnecessary intensive-level efforts and costs related to the full assessment of all four alternatives, the DART Study Team led by Parsons Brinkerhoff (PB) proposes the following approach to the architectural history component of the Section 106/ Historic Resources Evaluation process:

- PB will gather information on the historic designation/evaluation status of resources more than 40 years of age within the APE of the four alignments. This information will identify properties (and their appropriate historic boundaries) that have been formally listed in the National Register of Historic Places; determined to be eligible for listing in the National Register (although not formally listed); and designated as City of Dallas landmarks.

- PB's architectural historian will walk the alignments with staff from DART, the City of Dallas, and the Texas Historical Commission (THC), if available, to become aware of any important information on resources that may not be readily apparent during this preliminary evaluation phase, and to discuss any potential concerns that agency staff may have about historic resources.

- Remaining resources that are 40 years of age or more that have not been evaluated for National Register eligibility will be evaluated using a form similar to those recently used by DART on other projects. These forms will have an appropriate level of detail to make preliminary Determinations of Eligibility, but will not include intensive-level information. Cursory research efforts and visual evaluations, along with information provided by the above-mentioned agency staff, will inform this process. Each resource will also be photographed and mapped.

- PB will complete the forms and an accompanying map showing the status of resources, including proposed preliminary Determinations of Eligibility. Text and tables explaining this process and outlining findings with respect to the four alternatives will be included in a draft report. The THC and City of Dallas will be asked to comment on these preliminary findings.

- These preliminary Determinations of Eligibility, coupled with existing designations, can be used with information from other disciplines to inform the selection of the LPA. Formal THC concurrence on eligibility will not be sought at this level, but will occur during the intensive-level documentation process following selection of the LPA. Determination of Effects would be requested only on the LPA as well.

DART is requesting the THC and City of Dallas agree to this process. We welcome your input or ideas to streamline this process while still meeting all local and state requirements. Thank you for your consideration, and please feel free to contact D2 Project Manager Ernie Martinez at 214-749-3201 should you have any questions.

Sincerely,

Stephen L. Salin, AICP
Vice President
Rail Planning

C: Ernie Martinez, DART Project Manager
Kay Shelton, DART
Victor Ibewuike, DART
Ron Bixby, PB
Mark Doty, City of Dallas – Historic Preservation
Lynn Hayes, FTA Region VI
File

TEXAS HISTORICAL COMMISSION
The State Agency for Historic Preservation

RICK PERRY, GOVERNOR
JOHN L. NAU, III, CHAIRMAN
F. LAWERENCE OAKS, EXECUTIVE DIRECTOR

DALLAS AREA RAPID TRANSIT
CAPITAL PLANNING & DEVELOPMENT

MAR 18 2009

RECEIVED

March 11, 2009

Stephen L. Salin, AICP
Vice President, Rail Planning
Dallas Area Rapid Transit
P O Box 660163
Dallas, Texas 75266-0163

Re: *Project review under Section 106 of the National Historic Preservation Act of 1966, as amended,* **Proposed DART D2 Study**, Alternative Analysis/Draft Environmental Impact Statement, Dallas, Dallas County, Texas (FTA)

Dear Mr. Salin:

With regard to the above referenced project, this letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC).

THC History Programs Division review staff has reviewed your research design proposal for the Alternative Analysis/Draft Environmental Impact Statement (AA/DEIS) for transit improvements in downtown Dallas and **concurs** with your proposed research methodology for the four alignments as described in your letter dated 10 February 2009. We acknowledge that architectural historians from Parsons Brinkerhoff will be conducting this archival and field research, and we look forward to reviewing the completed DEIS for the four alignments in the near future.

If you have any questions, please contact historian Rachel Leibowitz at (512) 463-6046 or by e-mail at rachel.leibowitz@thc.state.tx.us. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas.

Sincerely,

Rachel Leibowitz, Ph.D., Historian
for F. Lawerence Oaks, Executive Director
State Historic Preservation Officer

P.O. BOX 12276 • AUSTIN, TX 78711-2276 • 512/463-6100 • FAX 512/475-4872 • TDD 1-800/735-2989
www.thc.state.tx.us

SPECIAL CALLED TRANSPORTATION AND ENVIRONMENT COMMITTEE MEETING RECORD

The Transportation and Environment Committee (TEC) meetings are recorded. Agenda materials and audiotapes may be reviewed/copied by contacting the Public Works and Transportation TEC Staff Coordinator at 214.670.4147.

Meeting Date: August 11, 2009 **Start Time:** 2:08 p.m. **Adjournment:** 4:08 p.m.

Committee Members Present:
Linda L. Koop (Chair), Sheffie Kadane (Vice Chair), Jerry Allen, Tennell Atkins, Carolyn R. Davis, Angela Hunt, Delia Jasso, Pauline Medrano, Ron Natinsky

Committee Members Absent:
None

Other Council Members Present:
None

City Executive Staff Present:
Forrest Turner, Assistant City Manager

RECEIVED
2009 AUG 20 AM 9:27
CITY SECRETARY
DALLAS, TEXAS

TRANSPORTATION AND ENVIRONMENT COMMITTEE AGENDA

1. **Approval of Minutes for June 1, 2009 and June 8, 2009**

   Action Taken/Committee Recommendation:

   Motion was made to approve the minutes for the June 1, 2009 and June 8, 2009 meetings subject to corrections. No corrections were suggested and the minutes were approved as submitted.

   Made by: Kadane Seconded by: Atkins Passed unanimously

2. **Downtown Dallas Transit Study (D2) Update – LRT Alignment**

   Presenter: Michael Miles, Dallas Area Rapid Transit

   Mr. Miles distributed a map showing the remaining four alternative alignments for a second light rail transit line through the Central Business District.

   Action Taken/Committee Recommendation:

   Ms. Hunt and Ms. Medrano expressed support for the route that provides the most direct service to the new Convention Center Hotel – identified as the "B4b Lamar-Convention Center Hotel" alignment on the DART map.

Mr. Atkins asked if the Committee was looking at a possible route from the southern sector to downtown. Ms. Koop stated that this fall the Committee will be looking at future transit projects such as a streetcar project that would connect the southern sector with downtown. Ms. Koop stated that a briefing would be provided in the next few weeks on streetcars to bring everyone on the Committee up to speed.

Mr. Natinsky stated that he also favors the line that runs to the new Convention Center Hotel.

Ms. Jasso indicated her interest in pursuing a streetcar project that would connect Oak Cliff to downtown via the Houston Street Viaduct. Ms. Jasso stated that she also supports the line that runs to the new Convention Center Hotel.

Motion was made to approve the "B4b Lamar-Convention Center Hotel" alignment as the City's preferred option for a second light rail transit line through downtown and to forward that recommendation to Dallas Area Rapid Transit. Ms. Koop asked staff to schedule an agenda item for full Council consideration as well.

Made by: Atkins Seconded by: Natinsky Passed unanimously

3. **Regulation of Vehicle Immobilization (Booting) on Private Parking Lots**

Presenter: John Brunk, Assistant Director, Public Works and Transportation

Mr. Brunk provided an overview of the vehicle booting issue and explained that the Committee agenda materials included two draft ordinances for their consideration. Version 1 would allow booting provided that either a parking fee receipt is provided or a video audit procedure is utilized to document nonpayment. Version 2 is identical to the first version, except that the video audit procedure would expire on April 15, 2010 -- from that date forward a parking fee receipt would have to be provided.

Action Taken/Committee Recommendation:

Mr. Atkins made a motion for a third option to adopt Version 1, but bring it back to the Committee for review by April 15, 2010. There was no second to this motion.

Mr. Kadane suggested that Version 2 be modified to require a parking fee receipt for parking lots that charge over a certain amount. However, if a parking lot charged less than the designated amount, a parking fee receipt would not be required, and booting would be allowed with the video audit procedure.

Ms. Hunt stated that she favored Version 2 that requires parking fee receipts after the video audit provision expires on April 15, 2010. Ms. Hunt stated that people who are legitimately paying their parking fees are still having their cars booted, and this is driving business out of Dallas. A receipt gives the person parking their car the proof

that they paid. Ms. Hunt made a motion to recommend approval of Version 2 of the proposed ordinance. There was no second to this motion.

Ms. Davis stated that she favored Version 2 with the addition of Mr. Atkins' suggestion that the results be reviewed by April 15, 2010 to see if the process was effective.

Mr. Allen made a motion to recommend approval of Version 1 of the ordinance with an addition that the video must be available for viewing at the time that enforcement personnel arrive to remove the boot from the vehicle, and that the Committee is briefed on the performance of the ordinance within six months of its passage.

Made by: Allen Seconded by: Atkins 4 For/5 Opposed
Failed

Mr. Natinsky made a motion to recommend approval of Version 2 of the ordinance with the modification that the video audit option is eliminated on January 1, 2010.

Made by: Natinsky Seconded by: Medrano 6 For/3 Against
Passed

4. Adoption of iSWM

Presenter: Elias Sassoon, Assistant Director, Building Inspection

Mr. Sassoon gave the Committee a brief overview of the iSWM Manual as it is currently being proposed as part of the drainage criteria for the City of Dallas. Development of the iSWM Regional Manual was a collaboration between NCTCOG and sixty area cities. The goal of the manual is to manage storm water runoff as close to the development site as possible.

In 2007, a City task force was put together that consisted of citizens, professional groups, developers and staff members to add local criteria to supplement the iSWM Regional Manual that was adopted by NCTCOG in 2006. The task force held four public meetings from October 2008 to January 2009.

Action Taken/Committee Recommendation:

Ms. Koop invited Mr. David Marquis, co-chair of the task force and Mr. Alan Greer, with Freese and Nichols, to talk about the iSWM process. A representative from the development community also spoke, stating that they were not aware of the meetings that occurred during the process of putting this manual together. They indicated that the development community does not support the iSWM Manual as currently proposed.

Ms. Koop stated that she would like to take a few more weeks for the City Staff to engage the development community and get their input. Ms. Koop asked staff to

provide all Committee members a list of the email contacts that were notified of the meetings.

Mr. Atkins asked staff how much it would cost developers to provide the separate site plan. Mr. Sassoon stated that the cost would vary depending on the size of the land. Mr. Atkins expressed his concern about the additional costs that would be borne by the developers and asked Mr. Sassoon to provide a chart illustrating the range of costs based on the size of developments.

Ms. Jasso expressed her concern that developers feel their input has not been incorporated into this proposal. Ms. Jasso agreed with Ms. Koop that more time was needed on this issue.

Ms. Davis asked staff to provide a sign-in sheet of task force participants who attended each meeting.

Ms. Hunt stated her support for this proposal. However, she feels that the development community should be more engaged before moving forward.

Ms. Koop asked staff to follow-up with the development community about their concerns, and requested a letter from the Home Builders Association and Texas Real Estate Council indicating that they were fully engaged in the process. Ms. Koop stated that she would like to be able to move this forward within a month or so, such that it doesn't have any financial implications to the developers, but is more of an educational program to the development community.

A motion was made to defer action on this item, and instruct staff to work with the development community before bringing it back to the Committee

Made by: Medrano Seconded by: Hill Passed unanimously

5. **Greenhouse Gas Emissions**

Presenter: Eric Griffin, Interim Director, Office of Environmental Quality

Due to time constraints, this item was not briefed.

Linda L. Koop (RB)

Linda L. Koop, Chair
Transportation and Environment Committee

Dallas Area Rapid Transit
P.O. Box 660163
Dallas, Texas 75266-0163
214/749-3278

October 5, 2009

Name
Title
Agency
Address
City, State Zip

Re: Dallas Area Rapid Transit D2 Study – Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS)

Dear Title LastName:

Dallas Area Rapid Transit (DART) is conducting an Alternative Analysis/Draft Environmental Impact Statement (AA/DEIS) for transit improvements in downtown Dallas. The study, known as D2, is examining a range of transit improvements, including several potential alignments for light rail transit (LRT). The study assumes federal funding for future implementation of study recommendations and therefore, it is subject to compliance with federal regulations.

The purpose of this letter is to give you an update on the D2 Study and solicit any feedback on potential issues specific to your agency or organization as we develop the Draft EIS. Enclosed for your information is a description of the D2 Study, including a map of the four remaining LRT Build alternatives under evaluation in the Draft EIS along with a No Build Alternative. Agency and public scoping meetings were held in May 2007 after publication of a Notice of Intent to prepare an EIS in the Federal Register. However, now that the remaining alternatives are defined in greater detail we want to provide you with an opportunity to submit comments prior to completion of impact assessments and publication of the Draft EIS. We also continue to work closely with a Technical Advisory Committee made up of key local and regional agency representatives.

Please review the enclosed description and map and inform us of any issues for consideration in the Draft EIS. Thank you for your review and please do not hesitate to contact D2 Project Manager Ernie Martinez at 214-749-3201 should you have any questions.

Sincerely,

Stephen L. Salin, AICP
Vice President, Rail Planning

C: Ernie Martinez, DART
Kay Shelton, DART
Ron Bixby, PB
Becky Blatnica, PB

D2 Study Overview

Background

The purpose of the D2 Study is to ensure the sustainability of the DART transit system by providing needed capacity and system reliability through downtown Dallas. More specifically, once the future DART Green (2009-2010) and Orange Lines (2011-2013) are open, the existing LRT Transit Mall will be operating at capacity. This operating scenario does not allow the addition of service over time or allow future projects envisioned in the DART 2030 Transit System Plan to operate through downtown.

Process

The D2 Study is following Federal Transit Administration's project development and New Starts Alternatives Analysis (AA) process. To date, the process has identified and considered a range of alternatives, including light-rail (LRT), streetcar and bus solutions. After screening through 16 possible new transit alignments through downtown Dallas, the D2 Study Team has identified two LRT candidates and two additional LRT options for detailed analysis. These four Build Alternatives are being evaluated within the Draft Environmental Impact Statement (DEIS) along with the No Build Alternative.

Build Alternatives

All proposed alternatives extend from Victory Station on the DART Northwest line, utilizing existing DART right-of-way in an at-grade configuration through the new Victory Development. The alternatives pass under the Woodall Rodgers Freeway at-grade and then would enter a tunnel portal that turns southwest from Griffin Street to Lamar Street. The alternatives would then continue underground following Lamar Street. Two proposed stations would be located in this common segment: the Museum Way Station north of Woodall Rodgers Freeway at the future Museum of Nature and Science site, and the Metro Center Station, which would be located under Lamar Street just south of the existing transit mall. This latter station will allow for interface with the West End Station and West Bus Transfer Center. In the vicinity of Lamar and Main Streets, the alternatives separate into different alignments.

The B7 Lamar-Commerce Street alternative turns directly east and would run underground beneath Commerce Street through the central business district. At a tunnel portal immediately west of IH 45, it surfaces and continues at-grade to a connection with the DART Southeast line. Two additional underground stations would be located east of Akard (Pegasus Plaza Station) and Harwood (Main Street Garden Station) Streets.

The B4 Lamar-Young alternative continues underground on Lamar Street before turning southeast to a tunnel portal northwest of the intersection of Young and Field Streets. It then follows Young Street east at-grade, passing under IH 45 to a connection with the DART Southeast line. Stations would be located along the median of Young Street between Field and Akard (Government Center Station), between St. Paul and Harwood (Harwood District Station), and on abandoned Young Street east of Central (Farmers Market Station).

Two alignment options were developed for the B4 Lamar-Young alternative in coordination with the City of Dallas and project stakeholders in order to examine options that could provide more direct access to a planned convention center hotel at the southwest corner of Lamar and Young. These options are described below:

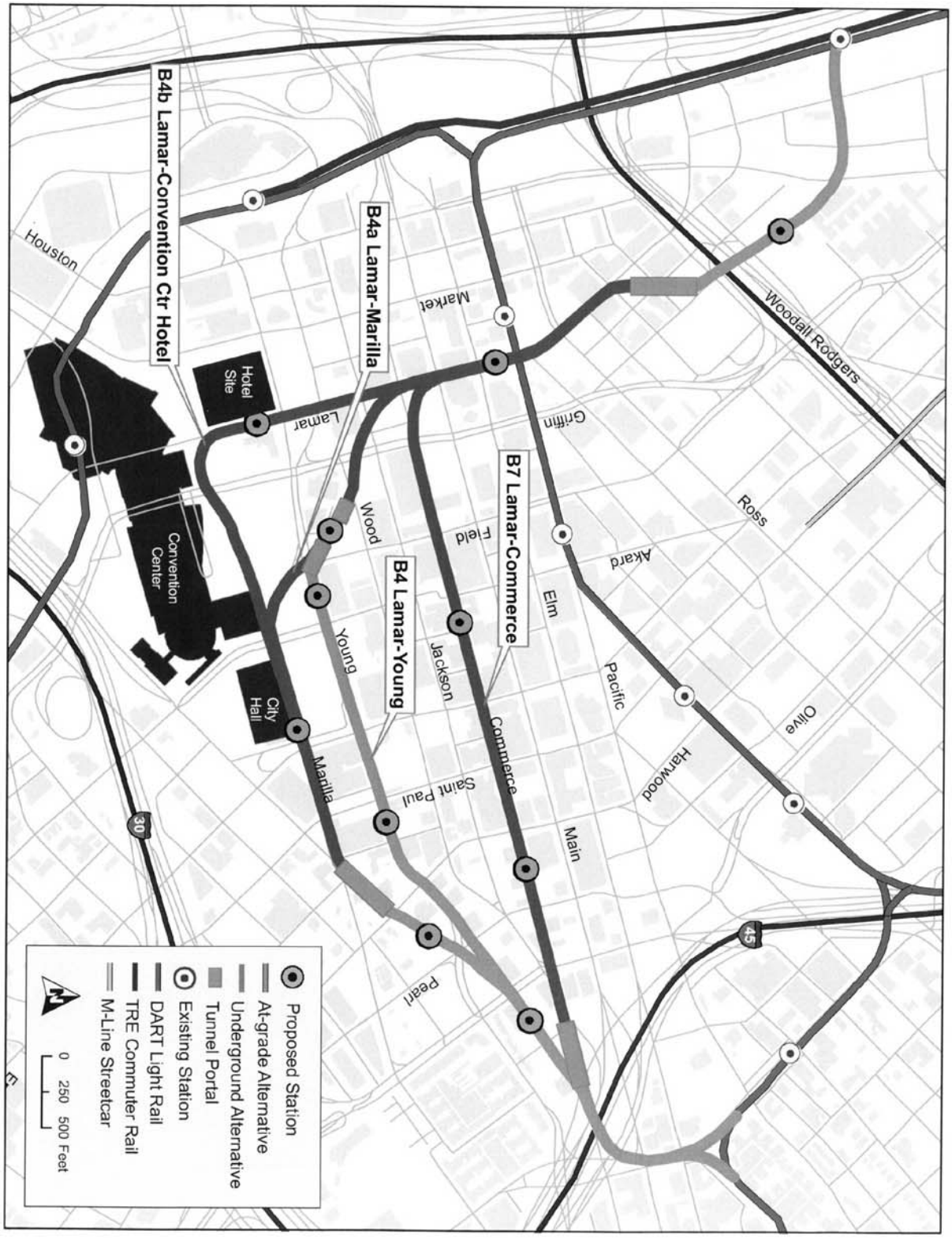
- The B4a Lamar-Marilla option would continue underground to Marilla Street rather than turn onto Young at-grade. The alignment would utilize an excavated cavity in the third sub-level of City Hall, and then would become at-grade via a tunnel portal on Marilla east of Ervay Street. The option would remain at-grade on Marilla Street, turning northeast to rejoin the Lamar-Young alignment in order to connect with the Southeast Corridor line. Stations would be located below

the Hamilton property site northwest of Field and Young (Government Center), below City Hall (City Hall Station), and in the parking lot of the Scottish Rite Temple (Farmers Market Station).

- The other option, known as B4b Lamar-Convention Center, continues south under Lamar Street before turning east adjacent to the future convention center hotel site. It would remain underground passing below the Pioneer Plaza and Cemetery and the third sub-level of City Hall. This option also becomes at-grade at a tunnel portal on Marilla east of Ervay Street and would connect back to the Southeast Corridor line as described above. Stations would be located adjacent to the convention center hotel site under Lamar (Government/Convention Center Station), as well as at City Hall (City Hall Station) and Farmers Market as described for B4a.

Next Steps

DART is in the process of completing the Draft EIS and evaluation of alternatives. It is anticipated that the Draft EIS will be circulated for comment in late 2009, with DART Board selection of a Locally Preferred Alternative in early 2010. Upon selection of the LPA, DART would initiate more detailed preliminary engineering and prepare the Final EIS. The current revenue service date for D2 is in year 2016.


B4b Lamar-Convention Ctr Hotel
B4a Lamar-Marilla
B7 Lamar-Commerce
B4 Lamar-Young
Houston
Hotel Site
Convention Center
City Hall
Lamar
Market
Griffin
Wood
Field
Young
Jackson
Elm
Akard
Ross
Woodall Rodgers
Pacific
Olive
Harwood
Commerce
Main
Saint Paul
Marilla
Pearl
30
45
Proposed Station
At-grade Alternative
Underground Alternative
Tunnel Portal
Existing Station
DART Light Rail
TRE Commuter Rail
M-Line Streetcar
0 250 500 Feet

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Albuquerque, NM 87103

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Mr. Jim Anderson
Historic Preservation Planner
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Chair, Dallas Landmark Commission
City of Dallas
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Dallas, TX 75202

Mr. John Hollingsworth
Manager, Utility Coordination North Texas
AT&T
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ONCOR
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Fort Worth, TX 76102

Mr. Wallace Coffey
Chairman
Comanche Nation of Oklahoma
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President/CEO
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Ms. Katherine Seale
Director
Preservation Dallas
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Dallas, TX 75204

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President
Tonkawa Tribe of Oklahoma
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Tonkawa, OK 74653

Mr. Gary McAdams
Wichita and Affiliated Tribes
P.O. Box 729
Anadarko, OK 73005

Ms. LaRue Martin Parker
Chairperson
Caddo Nation
P.O. Box 487
Binger, OK 73309

REPLY TO ATTENTION OF

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P.O. BOX 17300
FORT WORTH, TEXAS 76102-0300

October 13, 2009

DALLAS AREA RAPID TRANSIT
CAPITAL PLANNING & DEVELOPMENT
OCT 15 2009
RECEIVED

Planning, Environmental, and Regulatory Division
Regulatory Branch

SUBJECT: Project Number SWF-2009-00398, Dallas Area Rapid Transit D2 Study

Mr. Stephen Salin
Dallas Area Rapid Transit
P.O. Box 660163
Dallas, TX 75266-7213

Dear Mr. Salin:

Thank you for your letter received October 06, 2009. Your request has been assigned Project Number SWF-2009-00398.

Mr. Frederick Land has been assigned as the regulatory project manager for your request and will be evaluating it as expeditiously as possible. However, because of our permit workload it may take a while for us to respond.

You may be contacted for additional information about your request. For your information, please reference the Fort Worth District Regulatory Branch homepage at http://www.swf.usace.army.mil/regulatory and particularly guidance on submittals at http://www.swf.usace.army.mil/pubdate/environ/regulatory/introduction/submital.pdf, and mitigation at http://www.usace.army.mil/CECW/Pages/final_cmr.aspx that may help you supplement your current request or prepare future requests.

If you have any questions about the evaluation of your submittal or would like to request a copy of one of the documents referenced above, please contact Mr. Frederick Land at the address above or telephone (817) 886-1729 and refer to your assigned project number. Please note that it is unlawful to start work without a Department of the Army permit if one is required.

Please help the Regulatory Program improve its service by completing the survey on the following website: http://per2.nwp.usace.army.mil/survey.html.

Stephen L. Brooks
Chief, Regulatory Branch

Texas Department of Transportation
DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-8585

October 22, 2009

Mr. Stephen L. Salin, AICP
Vice President, Rail Planning
Dallas Area Rapid Transit
P.O. Box 660163
Dallas, Texas 75266-0163

Re: Dallas Area Rapid Transit D2 Study

Dear Mr. Salin:

Reference is made to your letter dated October 5, 2009, to Dianna Noble, providing an update to the D2 Study and soliciting comments. Your letter has been forwarded to me to handle. Please note that your letter has been deferred to our Dallas District office for response, since they represent our local presence of the project details to answer your concerns as you continue your planning and environmental assessment efforts.

Should you need further assistance, please contact either Jennifer Moczygemba (512-486-5125) in TxDOT's Multimodal Section of the Transportation Planning and Programming Division, Margaret Canty (512-416-2598) or myself (512-416-2613) in the Environmental Affairs Division.

Sincerely,

James P. Barta Jr., P.E.
Director, Project Management Section
Environmental Affairs Division

cc: Dianna F. Noble, P.E., Director, ENV

Dallas
CONVENTION & VISITORS BUREAU

October 15, 2009

Mr. Stephen L. Salin, ACIP
Vice President, Rail Planning
Dallas Area Rapid Transit
P.O. Box 660163
Dallas, TX 75266

Re: Dallas Area Rapid Transit D2 Study

Dear Mr. Salin:

Upon review of the D2 Study Overview, the Dallas Convention & Visitors Bureau (CVB) strongly encourages DART to adopt the B4b Lamar-Convention Center Hotel option.

A light rail station at the Omni Dallas Convention Center Hotel will reduce transportation costs and add convenience to conventions and meetings booked in Dallas. The seamless connectivity provided by DART light rail from both Dallas Love Field Airport and Dallas/Fort Worth International Airport in the coming years to the convention center hotel makes Dallas a highly attractive option to meeting planners booking conventions and will benefit DART, the CVB, the Dallas Convention Center, the hotel and the city.

We also believe this option will help spur much-needed additional commercial development on the south side of downtown near the Dallas Convention Center and Omni Dallas Convention Center Hotel.

We value our relationship with DART and look forward to working closely with you in the future. If I can provide any additional feedback or answer any questions, please feel free to call me.

Sincerely,

Phillip J. Jones
President/CEO
Dallas Convention & Visitors Bureau

325 North St. Paul Street, Suite 700
Dallas, Texas 75201
214-571-1000
www.visitdallas.com

TEXAS HISTORICAL COMMISSION
real places telling real stories

October 16, 2009

DALLAS AREA RAPID TRANSIT
CAPITAL PLANNING & DEVELOPMENT
OCT 26 2009
RECEIVED

Stephen L. Salin, AICP
Vice President, Rail Planning
Dallas Area Rapid Transit
P.O. Box 660163
Dallas, Texas 75266-0163

Re: Project review under Section 106 of the National Historic Preservation Act of 1966, as amended: Dallas Area Rapid Transit (DART), D2 Study – Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS), Dallas, Dallas County (FTA/106/201002002)

Dear Mr. Salin:

Thank you for your correspondence describing the above referenced project. This letter serves as additional comment on the proposed undertaking from the State Historic Preservation Officer (SHPO), the Executive Director of the Texas Historical Commission (THC).

The review staff, led by Adam Alsobrook, has completed its review of the material received by our office on October 7, 2009 for the Alternative Analysis/Draft Environmental Impact Statement for transit improvements in downtown Dallas. We appreciate your update regarding the progress that DART has made developing the AA/DEIS, and we look forward to reviewing the document when it is distributed later this year.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Adam Alsobrook at 512/463-6183.**

Sincerely,

Adam Alsobrook, Project Reviewer
For: Mark Wolfe, State Historic Preservation Officer

MW/aa

cc: Michael Lowenberg, Chair, Dallas County Historical Commission

RICK PERRY, GOVERNOR • JON T. HANSEN, CHAIRMAN • MARK WOLFE, EXECUTIVE DIRECTOR
0. BOX 12276 • AUSTIN, TEXAS • 78711-2276 • P 512.463.6100 • F 512.475.4872 • TDD 1.800.735.2989 • www.thc.state.tx.us

APPENDIX E
LIST OF ACRONYMS

APPENDIX E LIST OF ACRONYMS

Acronym	Definition
°F	degrees Fahrenheit
AA	Alternatives Analysis
AAP	Affirmative Action Plan
APE	Area of Potential Effects
ARRA	American Recovery and Reinvestment Act
ASTM	American Society of Testing Materials
Bbl	barrel of oil
BMPs	best-management practices
BTU	British thermal unit
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAB	
CAC	Community Advisory Committee
CBD	Central Business District
CDTMA	Central Dallas Transportation Management Association
CEI	Cost Effectiveness Index
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	*Code of Federal Regulations*
CMAQ	Congestion Mitigation and Air Quality
CO	carbon monoxide
CWA	Clean Water Act
CWR	continuous welded rail
D2	Downtown Dallas Transit Study
Dallas MSA	Dallas-Arlington-Fort Worth Metropolitan Statistical Area
DART	Dallas Area Rapid Transit
dBA	A-weighted decibels
DCTA	Denton County Transportation Authority
DEIS	Draft Environmental Impact Statement
DFW	Dallas Fort Worth
DFWIA	Dallas-Fort Worth International Airport
DLC	Dallas Landmarks Commission
DMWBEs	Disadvantaged, Minority and Women-Owned Enterprises
DOI	U.S. Department of Interior
EEO	Equal Employment Opportunity
EIS	Environmental Impact Statement

Acronym	Definition
EMS	Emergency Medical Services
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESA	Environmental Site Assessment
ESC	Erosion and Sedimentation Controls
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	*Flood Insurance Rate Maps*
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FWTA	Fort Worth Transportation Authority
FY	Fiscal year
GBN	ground-borne noise levels
HOV	High Occupancy Vehicle
HSWA	Hazardous and Solid Waste Amendments
HUD	U.S. Department of Housing and Urban Development
Hz	Hertz
IH	Interstate Highway
ILA	Inter-local Agreement
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITS	Intelligent Transportation Systems
Ldn	Day-Night Sound Level
LEP	limited English proficiency
Leq	equivalent sound level
LP	Limited Partnership
LPA	Locally Preferred Alternative
LRT	Light Rail Transit
LRV	Light Rail Vehicle
LWCF	Land and Water Conservation Fund
MA	Metropolitan Area
MATA	McKinney Avenue Transit Authority
MBTA	Migratory Bird Treaty Act
MoSERS	Mobile Source Emission Reduction Strategies
mph	miles per hour
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area

Acronym	Definition
MSAT	Mobile Source Air Toxics
MTP	Metropolitan Transportation Plan
MVEB	Motor Vehicle Emissions Budgets
NAAQS	National Ambient Air Quality Standards
NBA	National Basketball Association
NCTCOG	North Central Texas Council of Governments
NEPA	National Environmental Policy Act
NHL	National Hockey League
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NO_X	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPS	U.S. National Parks Service
NRHP	National Register of Historic Places
NTD	National Transit Database
NWI	National Wetland Inventory
O&M	operating and maintenance
O_3	ozone
Pb	lead
PCB	polychlorinated biphenyls
PE	Preliminary Engineering
PHD	Passenger hours of delay
PHT	Passenger hours of travel
PL	Public Law
PM	particulate matter
PMT	Passenger miles of travel
ppb	parts per billion
PPP	Public Private Partnership
PPV	peak particle velocity
RCRA	Resource Conservation and Recovery Act
rms	root mean square
ROD	Record of Decision
RTC	Regional Transportation Council
RTE	Rare, Threatened and Endangered
RTI	Regional Transit Initiative
RTPO	Regional Transportation Planning Organization
SAC	Stakeholder Advisory Committee

Acronym	Definition
SAFETEA-LU	Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users
SHPO	State Historic Preservation Office
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLRV	Super Light Rail Vehicles
SO_2	Sulfur Dioxide
SSPP	Safety and Security Program Plan
STP	Surface Transportation Program
SW3P	Stormwater Pollution Prevention Plan
TAC	Technical Advisory Committee
TAC	Texas Administrative Code
TBM	Tunnel boring machine
TCEQ	Texas Commission on Environmental Quality
TCM	Transportation Control Measures
TDM	transportation demand management
TEC	Transportation and Environment Committee
TERMs	Transportation Emission Reduction Measures
THC	Texas Historical Commission
TIF	Tax Increment Financing
TIGER Program	Transportation Investment Generating Economic Recovery Program
TIP	Transportation Improvement Program
TIRZ	Tax Increment Reinvestment Zone
TLOTA	Texas Local Option Transportation Act
TMDLs	Total Maximum Daily Loads
TNRCC	Texas Natural Resource Conservation Commission
TOD	transit oriented development
tpd	tons per day
TPDES	Texas Pollutant Discharge Elimination System
TPSS	traction power substation
TPWD	Texas Parks and Wildlife Department
TRE	Trinity Railway Express
TSCA	Toxic Substances Control Act
TSM	Transportation Systems Management
TSP	Transit System Plan
TSUB	Transportation System User Benefit
TTF	Texas Tree Foundation
TxDOT	Texas Department of Transportation

Acronym	Definition
UNT	University of North Texas
USACE	U.S. Army Corps of Engineers
USC	United State Code
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMEP	Voluntary Mobile Emissions Reduction Programs
VMT	vehicle miles of travel
VOCs	Volatile Organic Compounds
YOE	year of expenditure

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APPENDIX F
REFERENCES

APPENDIX F REFERENCES

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