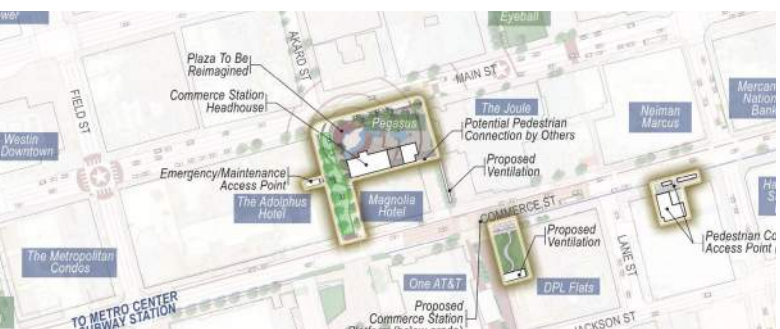




MAY 2020

DALLAS CBD SECOND LIGHT RAIL ALIGNMENT (D2 SUBWAY)

SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT



PREPARED BY:
US DEPARTMENT OF TRANSPORTATION (USDOT)
FEDERAL TRANSIT ADMINISTRATION (FTA)
DALLAS AREA RAPID TRANSIT (DART)

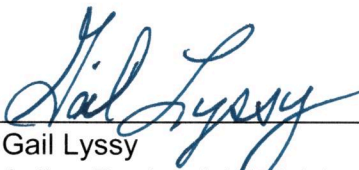
**DALLAS CBD SECOND LIGHT RAIL ALIGNMENT (D2 SUBWAY)
DALLAS, TEXAS
SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT**

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


Applicable federal environmental laws, regulations, and executive orders during the environmental review process. These requirements include, but are not limited to: National Environmental Policy Act of 1969 (42 U.S.C. § 4321 et seq.); applicable Federal Transit Laws (49 U.S.C. § 5301 et seq.); U.S. Department of Transportation Act (USDOT) of 1966, Section 4(f) (49 U.S.C. § 303 and 23 U.S.C. §138); National Historic Preservation Act of 1966, Section 106 (54 U.S.C. § 306108 et seq.); Clean Water Act (33 U.S.C § 1251 et seq.); Endangered Species Act of 1973 (16 U.S.C § 1531 et seq.); Clean Air Act (42 U.S.C. § 7401 et seq.); Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C § 4601 et seq.); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA) (40 CFR Parts 1500-1508); and FTA's regulations on environmental impact and related procedures (23 CFR Parts 771 and 774); Executive Order 11988 (Floodplain Management); Executive Order 11990 (Protection of Wetlands); Executive Order 12898 (Environmental Justice); USDOT Order 5610.2(a) (Environmental Justice); and all relevant laws, regulations, and procedures of the State of Texas, among others.

by the
U.S. Department of Transportation, Federal Transit Administration
and Dallas Area Rapid Transit

The Federal Transit Administration will issue a single document that consists of the Final Environmental Impact Statement and Record of Decision (FEIS/ROD) pursuant to 23 U.S.C. 139(n)(2) unless it is determined that statutory criteria or practicability considerations preclude issuance of such a combined document.

For FTA: 
Gail Lyssy
Acting Regional Administrator, Federal Transit Administration Region 6,
Lead Agency

Date: 5/5/2020

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

Date: 4/20/2020

COVER SHEET

Abstract: The Federal Transit Administration (FTA) as the federal lead agency, in cooperation with Dallas Area Rapid Transit (DART) as the local project sponsor, provides this Supplemental Draft Environmental Impact Statement (SDEIS) for the Dallas CBD Second Light Rail Alignment (D2 Subway) (Project) in Dallas, Texas. The SDEIS for the Project has been prepared in accordance with regulations developed by the Council on Environmental Quality for the National Environmental Policy Act (NEPA) and the U.S. Department of Transportation's FTA *Environmental Impact and Related Procedures (23 CFR Parts 771 and 774)*.

The Project is a future second light rail transit (LRT) line through downtown Dallas that would consist of a 2.4-mile alignment extending from the existing Victory Station through the core of downtown Dallas, reconnecting to the Green Line along North Good Latimer Expressway in the Deep Ellum Area. The Project would include four new stations and would relocate the existing Green Line Deep Ellum Station to the north as the Live Oak Station. The alignment would be a combination of at-grade and below-grade sections. The below-grade subway segment would run primarily under Griffin and Commerce Streets. The existing Green and Orange lines would shift operations from the existing Bryan-Pacific Transit Mall to the Project, thereby increasing capacity on the mall for additional service in the near and long-term, while also enhancing operational reliability and flexibility. Two alternatives are being considered in this SDEIS, a No-Build Alternative and a Build Alternative. The SDEIS identifies the Build Alternative as the preferred alternative. The No-Build Alternative includes transportation and transit projects that have a reasonable expectation of funding and are programmed for implementation. The No-Build Alternative is used as a basis for determining the potential environmental impacts that would be associated with the proposed Build Alternative. The Build Alternative would add capacity to the transit system by adding a second LRT line through downtown, enhance operational flexibility by incorporating connections that allow for potential new LRT patterns in the future and options for special events; improve system reliability by reducing conflicts at major junctions that constrain operations and scheduling, while providing system redundancy during incidents; and serve new markets, while supporting land use and economic development initiatives. FTA and DART will examine the public and agency comments received during the SDEIS public circulation period, make a final decision based on the input received, and advance the selected alternative for implementation.

The FTA may issue a single document that consists of the Final Environmental Impact Statement and Record of Decision pursuant to 23 U.S.C. 139(n)(2) unless it is determined that statutory criteria or practicability considerations preclude issuance of such a combined document.

Comments: The SDEIS will be available to the public for a 45-day review and comment period from May 15, 2020 to June 29, 2020. Public hearings will be conducted during the review and comment period at the following location:

June 11, 2020 – 12:00 pm and June 11, 2020 – 6:30 pm
DART Headquarters Building, Board Room
1401 Pacific Avenue
Dallas, Texas 75202

If in-person public hearings cannot be held due to COVID-19 restrictions, on-line and public access television opportunities will be posted on www.DART.org/D2.

During the 45-day review and comment period, a copy of the SDEIS will be available at the following local library:

J. Erik Jonsson Central Library
1515 Young Street
Dallas, TX 75201

Library hours may be affected by COVID-19 restrictions. Please contact DART Community Engagement at 214-749-2543 to make arrangements for viewing hard copy if needed.

In addition, the SDEIS will be available for review on-line at www.DART.org/D2.

For further information concerning this document, contact the following individuals:

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Local Agency Contact

Ernie Martinez
Project Manager
Dallas Area Rapid Transit
P.O. Box 660163
Dallas, TX 75266-7213

DART has established an email address for receiving comments on the document: D2@DART.org. Additionally, comments on this document may be made orally at the public hearings or submitted in writing to Mr. Martinez at the above address. For additional information or special needs accommodations, visit DART.org/D2 or contact DART Community Engagement at (214) 749-2543.



Table of Contents

Executive Summary	ES-1
1. Purpose and Need	1-1
1.1 Introduction.....	1-1
1.2 Project Background and Regional Context	1-1
1.3 Study Area.....	1-4
1.3.1 Study Area Setting	1-4
1.3.2 Growth and Development Trends	1-6
1.3.3 Transportation Services and Facilities	1-7
1.4 Purpose and Need for the Proposed Action	1-9
1.4.1 Purpose of the Proposed Action	1-9
1.4.2 Need for the Proposed Project.....	1-11
1.4.3 Objectives.....	1-13
1.5 Planning Context.....	1-14
2. Alternatives Considered	2-1
2.1 Planning History	2-1
2.2 No-Build Alternative	2-2
2.2.1 Transit Service and Capital Projects	2-2
2.2.2 Roadway Projects	2-4
2.2.3 Sensitivity Test Scenarios	2-5
2.3 Proposed Build Alternative.....	2-5
2.3.1 Alignment	2-5
2.3.2 Stations	2-9
2.3.3 Operating Plan	2-21
2.3.4 Bus and Streetcar Interface	2-23
2.3.5 Capital Costs	2-24
2.3.6 Operations and Maintenance Costs.....	2-24
2.4 Alternatives Considered but Eliminated from Further Consideration.....	2-24
2.4.1 North of Swiss Avenue Alignment Option	2-25
2.4.2 CBD East Alignment and Station Refinement.....	2-25
2.4.3 Good Latimer Median vs. West-side Running Alignment Option.....	2-26
2.4.4 Extended Commerce Tunnel / Two Portal Alignment Option	2-26
3. Transportation Facilities and Services	3-1
3.1 Transit Service and Ridership	3-1
3.1.1 Capacity and Service Levels	3-4
3.1.2 Geographic Coverage	3-5
3.1.3 Travel Time	3-5
3.1.4 Operational Flexibility and System Reliability	3-11
3.2 Station Access.....	3-12
3.2.1 Museum Way Station	3-12
3.2.2 Metro Center Station	3-13
3.2.3 Commerce Station.....	3-13
3.2.4 CBD East Station	3-14
3.2.5 Live Oak Station	3-14
3.3 Streets and Intersections	3-15
3.3.1 Affected Environment.....	3-15
3.3.2 Traffic Impact Analysis Methodology	3-15
3.3.3 Impact Evaluation.....	3-17
3.3.4 Summary of Mitigation.....	3-27
3.4 Parking.....	3-28
3.4.1 Affected Environment.....	3-28
3.4.2 Impact Evaluation.....	3-29



3.4.3	Parking Mitigation.....	3-30
3.5	Parking Garage and Loading Dock Access	3-32
3.5.1	Affected Environment.....	3-32
3.5.2	Impact Evaluation.....	3-32
3.5.3	Mitigation	3-33
3.6	Active Transportation	3-33
3.6.1	Affected Environment.....	3-33
3.6.2	Impact Evaluation.....	3-35
3.6.3	Mitigation.....	3-35
4.	Affected Environment and Environmental Consequences	4-1
4.1	Introduction.....	4-1
4.1.1	Affected Environment.....	4-1
4.1.2	Impacts of the Project Alternatives.....	4-1
4.1.3	Measures to Avoid, Minimize, or Mitigate Impacts.....	4-1
4.2	Land Use and Zoning.....	4-2
4.2.1	Introduction and Regulatory Setting.....	4-2
4.2.2	Methodology.....	4-2
4.2.3	Affected Environment.....	4-4
4.2.4	Impact Evaluation.....	4-8
4.2.5	Mitigation Measures	4-12
4.3	Socioeconomic Characteristics and Cohesion.....	4-12
4.3.1	Introduction and Regulatory Setting.....	4-12
4.3.2	Methodology.....	4-12
4.3.3	Affected Environment.....	4-13
4.3.4	Impact Evaluation.....	4-20
4.3.5	Mitigation Measures	4-26
4.4	Acquisitions and Displacements	4-27
4.4.1	Introduction and Regulatory Setting.....	4-27
4.4.2	Methodology.....	4-28
4.4.3	Impact Evaluation.....	4-29
4.4.4	Mitigation Measures	4-40
4.5	Parks and Recreation Facilities.....	4-41
4.5.1	Introduction and Regulatory Setting.....	4-41
4.5.2	Methodology.....	4-41
4.5.3	Affected Environment.....	4-41
4.5.4	Impact Evaluation.....	4-41
4.5.5	Mitigation Measures	4-44
4.6	Cultural Resources.....	4-46
4.6.1	Introduction and Regulatory Setting.....	4-46
4.6.2	Methodology.....	4-46
4.6.3	Affected Environment.....	4-47
4.6.4	Impact Evaluation.....	4-52
4.6.5	Mitigation Measures	4-54
4.7	Visual and Aesthetic Resources	4-55
4.7.1	Introduction and Regulatory Setting.....	4-55
4.7.2	Methodology.....	4-55
4.7.3	Affected Environment.....	4-56
4.7.4	Impact Evaluation.....	4-61
4.7.5	Mitigation Measures	4-63
4.8	Noise and Vibration	4-64
4.8.1	Introduction and Regulatory Setting.....	4-64
4.8.2	Methodology.....	4-66
4.8.3	Affected Environment.....	4-68
4.8.4	Impact Evaluation.....	4-69



4.8.5	Mitigation Measures	4-70
4.9	Air Quality	4-72
4.9.1	Introduction and Regulatory Setting	4-72
4.9.2	Methodology	4-72
4.9.3	Affected Environment	4-73
4.9.4	Impact Evaluation	4-74
4.9.5	Mitigation Measures	4-75
4.10	Public Safety and Security	4-75
4.10.1	Introduction and Regulatory Setting	4-75
4.10.2	Methodology	4-75
4.10.3	Affected Environment	4-75
4.10.4	Impact Evaluation	4-76
4.10.5	Mitigation Measures	4-77
4.11	Environmental Justice	4-79
4.11.1	Introduction and Regulatory Setting	4-79
4.11.2	Methodology	4-80
4.11.3	Affected Environment	4-81
4.11.4	Impact Evaluation	4-84
4.11.5	Mitigation Measures	4-86
4.12	Soils and Geology	4-87
4.12.1	Introduction and Regulatory Setting	4-87
4.12.2	Methodology	4-87
4.12.3	Affected Environment	4-87
4.12.4	Impact Evaluation	4-88
4.12.5	Mitigation Measures	4-88
4.13	Water Resources	4-89
4.13.1	Introduction and Regulatory Setting	4-89
4.13.2	Methodology	4-89
4.13.3	Affected Environment	4-89
4.13.4	Impact Evaluation—Wetlands Resources	4-90
4.13.5	Impact Evaluation—Surface Water Quality	4-91
4.13.6	Impact Evaluation — Groundwater Resources	4-92
4.13.7	Impact Evaluation — Floodplains	4-92
4.13.8	Mitigation Measures	4-92
4.14	Biological and Natural Resources	4-93
4.14.1	Introduction and Regulatory Setting	4-93
4.14.2	Methodology	4-93
4.14.3	Affected Environment	4-93
4.14.4	Impact Evaluation	4-94
4.14.5	Mitigation Measures	4-94
4.15	Hazardous and Regulated Materials	4-95
4.15.1	Introduction and Regulatory Setting	4-95
4.15.2	Methodology	4-95
4.15.3	Affected Environment	4-95
4.15.4	Impact Evaluation	4-96
4.15.5	Mitigation Measures	4-108
4.16	Indirect Impacts and Cumulative Impacts	4-109
4.16.1	Introduction and Regulatory Setting	4-109
4.16.2	Methodology	4-110
4.16.3	Affected Environment	4-110
4.17	Draft Section 4(f) and Chapter 26 Evaluation	4-113
4.17.1	Introduction and Regulatory Setting	4-113
4.17.2	Methodology	4-114
4.17.3	Affected Environment	4-115



4.17.4	Impact Evaluation.....	4-115
4.17.5	Section 4(f) and Chapter 26 Application	4-116
4.17.6	Minimization and Mitigation Measure Summary	4-124
4.17.7	Section 4(f) Findings	4-124
4.17.8	Chapter 26 Findings.....	4-125
5.	Construction Activities and Impacts	5-1
5.1	Introduction.....	5-1
5.2	Overview of Construction Methods	5-7
5.2.1	Surface Construction.....	5-8
5.2.2	Subsurface Construction.....	5-9
5.2.3	Additional Construction Considerations	5-11
5.2.4	Description of Site-Specific Subsurface Construction Methods.....	5-13
5.3	Construction Impacts and Mitigation.....	5-15
5.3.1	Traffic and Transportation Impacts	5-16
5.3.2	Utilities Impacts	5-23
5.3.3	Adjacent Buildings and Structures Impacts	5-25
5.3.4	Visual Impacts.....	5-26
5.3.5	Noise/Vibration Impacts	5-26
5.3.6	Cultural Resources Impacts	5-28
5.3.7	Parks Impacts.....	5-29
5.3.8	Air Quality Impacts	5-30
5.3.9	Water Quality Impacts.....	5-30
5.4	Permits	5-31
5.4.1	Surface Water Quality	5-31
5.4.2	Archeological Resources	5-31
5.4.3	City of Dallas	5-31
5.5	Coordination with Other Scheduled Construction Projects.....	5-31
5.6	Communications.....	5-32
6.	Public and Agency Consultation and Coordination.....	6-1
6.1	Public Involvement Plan.....	6-1
6.2	Methods and Tools.....	6-2
6.3	Summary of Public and Agency Participation	6-4
6.4	Agency Coordination.....	6-8
6.5	Public and Agency Involvement and the Supplemental Draft EIS	6-9
7.	List of Preparers	7-1
7.1	Introduction.....	7-1
7.2	Public Agency Staff	7-1
7.3	Consultant Team Members.....	7-1
8.	Distribution List.....	8-1

Tables

Table ES-1	Summary of Build Alternative Transportation Impacts and Mitigation.....	ES-5
Table ES-2	Summary of Build Alternative Environmental Impacts and Mitigation.....	ES-9
Table 1-1	Relevant D2 Subway System and Project Planning Efforts	1-3
Table 1-2	Population and Employment Growth Trends.....	1-7
Table 2-1	Summary of Station Characteristics	2-9
Table 3-1	D2 Green Line Travel Times between Victory Station and Baylor UMC Station.....	3-7
Table 3-2	D2 Orange Line Travel Times between Victory Station and Cityplace/Uptown Station	3-7
Table 3-3	Year 2045 Daily Regional System Ridership for No-Build and Build Alternative	3-8
Table 3-4	2045 Daily LRT System Ridership for No-Build and Build Alternative	3-8
Table 3-5	Year 2045 Daily LRT Station Ridership within D2 Study Area	3-9
Table 3-6	Level of Service (LOS) Criteria	3-17



Table 3-7 Summary Comparison of Intersection LOS for Year 2017 Existing Conditions, Year 2024 and Year 2045 No-Build and Build Alternatives	3-18
Table 3-8 Summary of Project Street Crossings and Proposed Changes	3-20
Table 3-9 Summary of 2024 No-Build vs. Build Traffic Analysis	3-24
Table 3-10 Summary of 2045 No-Build vs. Build Traffic Analysis	3-25
Table 3-11 Year 2045 Daily Vehicle Miles of Travel Comparison	3-27
Table 3-12 Year 2045 Daily Hours of Congestion Delay Comparison	3-27
Table 3-13 Potential Permanent Impacts to On- and Off-Street Parking	3-29
Table 4-1 City of Dallas and Study Area Existing Land Use.....	4-5
Table 4-2 Summary of Study Area Districts.....	4-5
Table 4-3 Current and Future Developments within the Study Area	4-7
Table 4-4 Total Population for Dallas County and City of Dallas.....	4-15
Table 4-5 Community Facilities and Schools by District.....	4-18
Table 4-6 Community Facilities and Schools within 500 Feet of the Proposed Alignment	4-24
Table 4-7 Summary of D2 Potential Acquisitions and Displacements.....	4-35
Table 4-8 Historic Districts within Project Area of Potential Effect (APE).....	4-47
Table 4-9 Visual Assessment Rating and Impacts by Section	4-58
Table 4-10 Mitigation for Visual Impacts.....	4-64
Table 4-11 Summary of Noise Impacts without Mitigation.....	4-71
Table 4-12 VMT for No-Build and Build Alternatives per Geographic Area.....	4-74
Table 4-13 Low-Income Characteristics for the Population within the Study Area	4-83
Table 4-14 LEP Population Data for the Study Area	4-84
Table 4-15 Soil Characteristics Related to Construction	4-88
Table 4-16 High, Moderate and Indeterminate Hazardous Materials Risk Sites*	4-99
Table 4-17 Land Use Categories within the AOI	4-111
Table 4-18 Summary of Section 4(f)/Chapter 26 Properties.....	4-115
Table 5-1 Project Underground Geological Characteristics.....	5-13
Table 5-2 Anticipated Construction Methods.....	5-14
Table 5-3 Estimated Order of Magnitude Excavation	5-20
Table 5-4 Construction Equipment Noise Emission Levels	5-27
Table 5-5 Construction Coordination	5-32
Table 6-1 Public and Agency Coordination Meetings.....	6-4
Table 7-1 Public Agency Staff.....	7-1
Table 7-2 Consultant Team Members (GPC 6 Consultant Team).....	7-2

Figures

Figure ES-1 D2 Subway Project Location.....	ES-1
Figure 1-1 D2 Subway Light Rail Transit Project.....	1-2
Figure 1-2 D2 Subway Study Area	1-5
Figure 1-3 Districts within the D2 Subway Study Area	1-6
Figure 1-4 Existing and Future Rail Network	1-8
Figure 1-5 Multi-Modal Interfaces within the Downtown Dallas Area	1-10
Figure 2-1 No-Build Alternative	2-3
Figure 2-2 Regional Transit Expansion Projects.....	2-6
Figure 2-3 D2 Subway Project Map	2-7
Figure 2-4 Typical At-Grade Cross-Section along Museum Way	2-8
Figure 2-5 Museum Way Station Area Urban Design Plan	2-11
Figure 2-6 Metro Center Station Urban Design Plan	2-13
Figure 2-7 Metro Center Station Architectural Plan	2-14
Figure 2-8 Commerce Station Urban Design Plan	2-15



Figure 2-9 Commerce Station Architectural Plan	2-16
Figure 2-10 CBD East Station Urban Design Concept	2-18
Figure 2-11 CBD East Station Architectural Site Plan	2-19
Figure 2-12 Live Oak Station Urban Design Concept.....	2-20
Figure 2-13 Build Alternative LRT Network and Headways.....	2-22
Figure 3-1 Downtown Dallas Bus and Rail Map	3-2
Figure 3-2 Existing and Planned Streetcar System	3-3
Figure 3-3 Proposed High Speed Rail Dallas Station Location	3-4
Figure 3-4 Existing LRT and D2 Subway Geographic Station Coverage	3-6
Figure 3-5 Transportation Network in the Study Area	3-16
Figure 3-6 Proposed Permanent Changes in the Victory Park/Museum Way Area	3-22
Figure 3-7 Proposed Permanent Changes in the Deep Ellum/Good Latimer Expressway Area	3-23
Figure 3-8 Affected Parking Locations.....	3-31
Figure 3-9 Downtown Dallas Existing and Proposed Bicycle Route and Trails.....	3-34
Figure 4-1 Land Use	4-3
Figure 4-2 Neighborhoods and Home Owners Associations.....	4-14
Figure 4-3 Community Facilities	4-16
Figure 4-4 Community Facilities	4-17
Figure 4-5 Major Employers.....	4-21
Figure 4-6 Major Employers.....	4-22
Figure 4-7 Real Estate Potential Acquisitions and Displacements.....	4-30
Figure 4-8 Real Estate Potential Acquisitions and Displacements.....	4-31
Figure 4-9 Real Estate Potential Acquisitions and Displacements.....	4-32
Figure 4-10 Real Estate Potential Acquisitions and Displacements.....	4-33
Figure 4-11 Real Estate Potential Acquisitions and Displacements.....	4-34
Figure 4-12 Existing and Planned Public Parkland.....	4-42
Figure 4-13 Historic Resources	4-48
Figure 4-14 Historic Resources	4-49
Figure 4-15 Historic Resources	4-50
Figure 4-16 Visual Assessment Units	4-59
Figure 4-17 Visual Assessment Unit Photos.....	4-60
Figure 4-18 Noise and Vibration Measurement Sites and Noise Impact Locations	4-67
Figure 4-19 Environmental Justice	4-82
Figure 4-20 High and Moderate Hazardous Materials Risk Sites.....	4-97
Figure 4-21 Indeterminate Hazardous Materials Risk Sites	4-98
Figure 5-1 Overview of Construction Methods.....	5-2
Figure 5-2 Overview of Construction Methods.....	5-3
Figure 5-3 Overview of Construction Methods.....	5-4
Figure 5-4 Overview of Construction Methods.....	5-5
Figure 5-5 Overview of Construction Methods.....	5-6
Figure 5-6 Proposed Haul Routes	5-22
Figure 6-1 Public and Agency Involvement Framework	6-2
Acronyms.....	A-1
References.....	R-1



Appendices (Provided under separate cover at www.DART.org/D2)

Appendix A: 20% Preliminary Engineering Plans and Design Reports

- A.1 Volume A, Design Plans (Guideway Plan and Profile, Alignment Data, Right-of-Way, Cross Sections, Street Modifications, Structural, Drainage, Utilities)
- A.2 Volume B, Station Architecture Plans
- A.3 20% Preliminary Engineering Design Report
- A.4 Urban Design Process and Focus Area Summary Report
- A.5 Methods of Construction Report, October 2019

Appendix B: Technical Memoranda and Reports

- B.1 Land Use Existing Conditions Technical Memorandum
- B.2 Socioeconomic Existing Conditions Technical Memorandum
- B.3 Existing Parks and Recreational Facilities Technical Memorandum
- B.4 Historic-age Resource Reconnaissance Survey Report (August 2019)
- B.5 Visual Assessment Existing Conditions Technical Memorandum
- B.6 Capital Cost Estimating Methodology Technical Memorandum
- B.7 Geology and Soils Existing Conditions Technical Memorandum
- B.8 Water Resources and Water Quality Technical Memorandum
- B.9 Air Quality Existing Conditions Technical Memorandum
- B.10 Noise and Vibration Technical Report (January 2019) and East End Addendum Technical Memorandum (February 2020)
- B.11 Hazardous Materials Existing Conditions Technical Memorandum
- B.12 Biological Resources Existing Conditions Technical Memorandum
- B.13 Indirect and Cumulative Impacts Assessment and Mitigation Technical Memorandum
- B.14 Determination of Effects Report (April 2020)
- B.15 Traffic Analysis Methodology Technical Memorandum
- B.16 D2 Subway Traffic Analysis Results Technical Memorandum
- B.17 Definition of Operating Plans Technical Memorandum
- B.18 Operations and Maintenance Cost Methodology and Results Report, February 2020
- B.19 Property Acquisitions and Displacements Technical Memorandum
- B.20 CBD East Alignment Refinement Technical Memorandum
- B.21 Ridership and Capacity Analysis Technical Memorandum
- B.22 North vs. South of Swiss at the Good Latimer / Green Line Connection Technical Memorandum
- B.23 Extended Commerce / Two Portal Alignment Option Technical Memorandum

Appendix C: Agency Coordination and Consultation (July 2018 through April 2020)

Appendix D: D2 Project Public and Agency Involvement Plan, July 2018



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Executive Summary

The subject of this Supplemental Draft Environmental Impact Statement (SDEIS) is the Dallas Central Business District (CBD) Second Light Rail Alignment (D2 Subway). The D2 Subway, or “Project,” would consist of a 2.4-mile light rail transit (LRT) alignment extending from the existing Victory Station through the core of downtown Dallas, reconnecting to the Green Line along Good Latimer in the Deep Ellum Area. The Project would include four new stations and would relocate the existing Deep Ellum Station approximately one block to the north, renamed as the Live Oak Station, due to the new Green Line connection. The alignment would be a combination of at-grade and below-grade sections, with the below-grade subway segment running primarily under Griffin and Commerce Streets. The Green and Orange lines would shift operations from the Bryan-Pacific LRT transit mall to the proposed D2 Subway alignment, thereby opening up capacity on the existing LRT transit mall for additional service in both the near and long terms, while also enhancing operational reliability and flexibility. The proposed Project is identified in the Dallas Area Rapid Transit (DART) Transit System Plan (TSP) and FY20 20-Year Financial Plan, and the North Central Texas Council of Governments (NCTCOG) Mobility 2045 Metropolitan Transportation Plan (MTP), June 2018. **Figure ES-1** below, shows the Project location.

Figure ES-1 D2 Subway Project Location

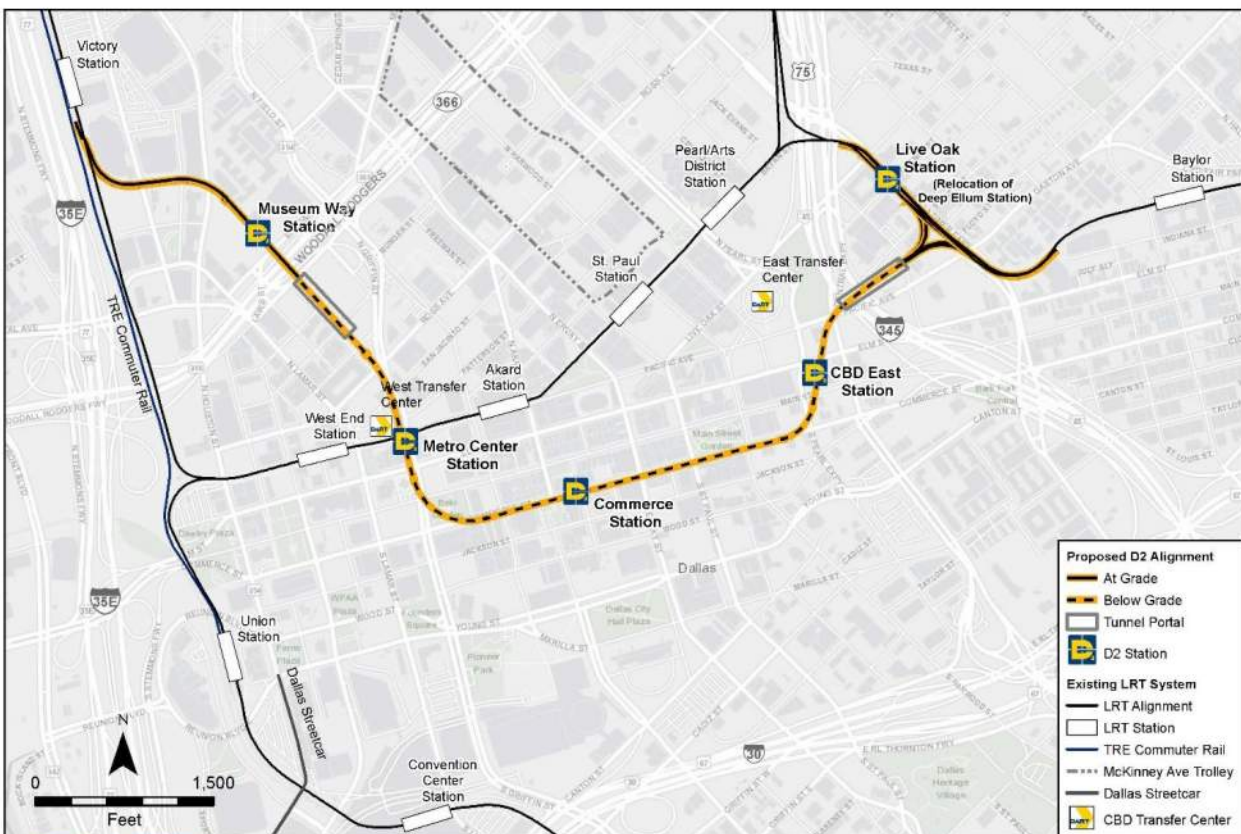


Figure ES-1
D2 Subway Light Rail Transit Project
 Data Source: DART, GPC6

D2 Subway Project
 Supplemental Draft
 Environmental Impact Statement



The National Environmental Policy Act of 1969 (NEPA) (42 USC § 4321 et seq.) requires that federal agencies prepare an Environmental Impact Statement (EIS) for any major federal action that may have a significant impact on the environment. This SDEIS has been prepared by DART under its responsibilities as the local lead agency to implement the Project. This document has been submitted in coordination with the Federal Transit Administration (FTA), the lead federal agency.

The EIS serves as documentation for the NEPA process and thoroughly analyzes the Build Alternative for potential impacts on the human and natural environment as compared to a No-Build Alternative. The Build Alternative was identified during alternatives analysis efforts to be the preferred alternative from among the other Build Alternatives studied (see **Section 1.2** and **2.4** for more details on other alternatives considered). The EIS is the primary document to facilitate review of the Project by federal, state, and local agencies, as well as the public.

This SDEIS will be circulated for public and agency comment over a 45-day review period. During this time, a public hearing will be held to present the results of the SDEIS and formally record all comments received. In order to complete the environmental review process, a combined Final EIS (FEIS) and Record of Decision (ROD) would be prepared by FTA and DART. The combined FEIS/ROD will respond to the substantive comments received on this SDEIS, and will state the proposed action, environmental findings, and mitigation requirements. In accordance with the Fixing America's Surface Transportation (FAST) Act and 23 United States Code (USC) § 139(n), the FTA intends to issue a single document that consists of the FEIS and ROD, unless it is determined that circumstances—such as changes to the proposed action, anticipated impacts, or other new information—preclude issuance of such a combined document. After circulation of the SDEIS, preliminary engineering and environmental analyses will be completed. Additional analyses may be required upon receipt of SDEIS comments. Mitigation commitments will be developed, and responses to comments received during the comment period will be prepared and incorporated as appropriate.

Once the FEIS/ROD is issued, DART can continue advancing the Project. The FEIS/ROD will include a Mitigation Monitoring Program (MMP) to ensure that mitigation commitments are carried to completion through final design and construction.

This Executive Summary describes the purpose and need of the Project, alternatives considered in this SDEIS, the affected environment, potential impacts and recommended mitigation measures, public and agency involvement, and key issues to be resolved.

Purpose and Need

The Project is in the Dallas CBD, within a region experiencing high growth and increasing traffic congestion. Strong growth along with regional transit expansion and a proposed privately-funded high-speed rail project will increase DART system demand and compound DART's limited core capacity. Additionally, reliance upon the existing at-grade Bryan-Pacific Transit Mall for all LRT lines constrains the ability of both DART and the region to implement additional rail projects or improve headways on the existing light rail lines and affects quality of service. Dependence on one single downtown transit mall also increases the risk for system-wide service disruption due to incidents on the mall, such as traffic accidents or incidents in adjacent buildings.

The purpose of the Project would be to address the core capacity issues and increase operational flexibility, reliability, and quality of passenger service through downtown and throughout the entire LRT system. The Project would also enhance access to both established and growing markets in



downtown, including the Commerce Street corridor, the south Victory Park area, and the eastern part of the CBD where recent new development and redevelopment initiatives are underway.

The Project is needed to address several specific needs of the DART rail system. These needs range from broad issues such as regional growth and transit expansion, to specific light rail operational constraints that affect service and capacity. Specific transportation needs are listed below and are discussed in more detail in **Chapter 1** of this SDEIS:

- Relieve the CBD LRT Capacity Constraint
- Accommodate Growing Regional Demand
- Maintain a Quality System and Service
- Serve New CBD Markets
- Enhance Land Use and Redevelopment Potential

Alternatives Considered

Two alternatives are considered in this SDEIS, the No-Build Alternative and a D2 Subway Build Alternative (Build Alternative). The No-Build Alternative includes transportation projects that have a reasonable expectation of funding and are programmed for implementation. Two sensitivity tests related to potential headway improvements and regional rail expansion are analyzed as well. The Project would not be in operation, and conditions would continue to exist as they do today. Train throughput capacity would continue to be constrained for the foreseeable future to 15-minute headways, or 16 trains-per-hour per-direction, to maintain schedule reliability. The Red Line exceeds capacity today on some peak trips. No-Build Alternative conditions in 2045 indicate that additional DART LRT lines will be over capacity and exceed the 3-car passenger capacity during the peak period. Although it does not meet the need and purpose of the Project, the No-Build Alternative allows for the environmental impact analysis to assess the impacts of no action as a comparison to the Build Alternative.

The Build Alternative includes all the programmed transportation projects contained in the No-Build Alternative, plus the Project. The Project consists of a 2.4-mile LRT alignment extending from the existing Victory Station through the core of downtown Dallas, reconnecting to the Green Line along Good Latimer in the Deep Ellum area. In June 2005, the City of Dallas published the Comprehensive Transportation Plan for the Dallas Central Business District plan that recommended an LRT corridor that encompasses the proposed Project through the center of downtown. In 2007, a notice of intent (NOI) was published in the *Federal Register* announcing the FTA's and DART's intention to prepare an EIS for the Project.

The D2 Subway is primarily located within the downtown freeway loop but would pass under two major freeways: Woodall Rogers Freeway (Spur 366) and Interstate (I)-345, which connects US 75 (North Central Expressway) to I-45. The alignment consists of at-grade, retained cut, cut and cover, and tunnel sections. Four new potential station locations have been identified for the Project including one surface station (Museum Way), three underground stations (Metro Center, Commerce, and CBD East), and one relocated surface station (Deep Ellum Station relocated as Live Oak Station). Two or more station access points would be provided for underground stations in open spaces downtown, within sidewalks, or incorporated into new or existing buildings. Fare collection for the Project would introduce a fare barrier system for subway station access at the Metro Center, Commerce, and CBD East stations. The Museum Way and Live Oak stations would continue to use DART's current barrier-free concept. Underground stations would also include emergency egress and ventilation shafts.



The Project would be designed as a double track alignment with 15.5-foot track centers in at-grade locations. Track center spacing in tunnel and underground stations would be from 36.2 feet to 45 feet. The Project would modify the DART Rail operating plan by shifting the Green and Orange lines from the existing transit mall to the D2 Subway line, while the Red and Blue lines would continue to operate on the existing transit mall. The initial operating plan assumes that the Project would operate seven days a week, with 15-minute peak headways and 20-minute off-peak headways from 3:30 AM to 1:30 AM, similar to LRT operations today.

The estimated cost for the Build Alternative is approximately \$1.7 billion (2020 dollars). The Project is proposed to be financed with a combination of local and external sources. At 20 percent design, the estimate includes significant contingency and the Project will undergo value engineering and a risk assessment to refine and reduce costs where possible and update the FY21 Financial Plan with the latest cost and external funding assumptions. Annual operations and maintenance (O&M) costs are estimated to add \$4.65 million per year to DART LRT operating expenses. More detailed information on costs is contained in **Section 2.3**.

Affected Environment

Existing conditions of the social, natural, and built environments were documented as part of this SDEIS for a range of impact assessment categories. The existing conditions formed the basis of impact evaluations within each category. Detailed information on the affected environment is contained in **Chapters 3** and **4** and in **Appendix B**. The following sections summarize transportation, environmental, and construction impacts and mitigation associated with the Project.

Transportation Impacts and Mitigation

Transit and transportation improvements would continue to be made incrementally under the No-Build Alternative. Increasing traffic congestion would result in more delays and impacts to travel and transit reliability. The No-Build Alternative would not offer the ability for enhanced headways or interface with regional rail expansion to access other parts of the region.

Transit operations and flexibility are projected to improve under the Build Alternative. Train operations along the Bryan-Pacific transit mall would improve. With the D2 Subway in place, DART would shift the Orange and Green Lines from the transit mall to the new corridor, thereby adding capacity for increased train service during peak periods. Initially, DART would add a Red Line insert train during the peak hour of crowding to improve headways. In the future, the Build Alternative provides the option to increase headways on all lines, and to potentially change service patterns to address changing demographics and travel patterns.

The Metro Center Station would serve as the primary transfer hub, providing connections to the West Transfer Center and Rosa Parks Plaza bus facilities, as well as the West End and Akard LRT stations for access to the Red and Blue lines. The CBD East Station would provide opportunities to transfer to buses at the East Transfer Center, as well as bus routes operating along Elm and Commerce streets. Bus routes serving downtown and the East and West Transfer Centers may be modified under the DARTzoom Bus Network Redesign. This effort will be completed in early 2021.

Table ES-1 provides a summary of the potential impacts and mitigation for surface transportation. Detailed information is contained in **Chapter 3**.



Table ES-1 Summary of Build Alternative Transportation Impacts and Mitigation

Impact Category	Impacts	Proposed Mitigation Measure(s)
Transit Service and Ridership	Benefits: Capacity for improved service levels on all rail lines; reliability and geographic coverage would be improved. Ridership change is minimal, and passenger loads are spread among downtown rail stations.	None required
Station Access	Station design will influence pedestrian and mode connectivity. Potential access impacts at Museum Way and Metro Center.	Urban plans and station designs will integrate pedestrian access to maximize accessibility. DART will coordinate with the Perot Museum to allow for potential integration of museum expansion over or adjacent to the Museum Station. The station platform will be integrated with pedestrian access improvements to reinforce connectivity to surrounding areas. The West Transfer Center will be redesigned to accommodate the headhouse. Rosa Parks Plaza will be reconfigured to accommodate a smaller headhouse.
Streets and Intersections	Benefit: Project would reduce Vehicle Miles Traveled (VMT) and hours of congestion delay.	None required
	Benefit: Project would improve Level of Service (LOS) at least 11 intersections proximate to the existing LRT corridor.	None required
	The Project would include several permanent changes to streets and intersections. Based on the traffic analysis there are no projected impacts associated with the Build Alternative related to degradation of LOS or queuing that would require consideration of capacity or intersection improvements. One queuing impact at southbound Good Latimer and Gaston would require signal timing coordination.	DART will coordinate with the City of Dallas on the installation of new traffic signals and gated crossings at new LRT crossing locations to integrate them into the network. With most of the alignment in a subway configuration, traffic impacts will be minimized. With several ongoing studies and development plans that may influence downtown traffic growth and street changes, DART will continue to work with the City of Dallas as final design progresses to reassess traffic conditions to refine traffic signal system modifications and determine if changes in traffic controls will be necessary.



Table ES-1 Summary of Build Alternative Transportation Impacts and Mitigation

Impact Category	Impacts	Proposed Mitigation Measure(s)
	<p>Some streets would be closed, changed to one-way, or turn lanes may be eliminated. Closures include: Corbin Street at Old Griffin, northbound Central Expressway/I-345 frontage road between Pacific and Swiss, and Miranda Street between Hawkins and Good Latimer Expressway). Swiss Avenue would change to one-way westbound between Good Latimer Expressway and Hawkins. Southbound Good Latimer Expressway to Live Oak left-turn lane would be eliminated.</p>	<p>DART will coordinate with the City of Dallas and TxDOT on the changes. Changes in land use development will incorporate changes or alternative routing options are available. DART will coordinate with the City of Dallas to determine if it is desirable to include a left turn signal phase at the southbound Good Latimer/Live Oak intersection.</p>
	<p>The Project would introduce new light rail operations through Victory Park, which could result in traffic impacts during peak event times.</p>	<p>DART will coordinate with venue operations staff to determine if supplemental traffic control is needed in the area during these events to manage automobile and/or pedestrian traffic.</p>
	<p>The DART overhead catenary system (OCS) may need to be attached to the substructure of the Woodall Rodgers Freeway. The depth of the D2 Subway portal within TxDOT I-345 right-of-way would require that a below-grade I-345 option be constructed deeper than typical.</p>	<p>DART will continue to coordinate with the City of Dallas, TxDOT, and NCTCOG on a solution and agreement for the I-345 crossing that maintains options for future I-345 scenarios. In addition, DART will coordinate with TxDOT on design and construction requirements relative to Project improvements under their facilities and adjacent to structural support columns.</p>
Parking	<p>The Project would impacts on-street and off-street parking lots. Specific impacts include: Modifications to the parking lot and booth at 2371 Victory Avenue which is located within DART right-of-way; Museum Way parking and curbside uses would transition from the median to the outside lane; and, Perot Museum parking lots B and C would be impacted by the project alignment and associated facilities, some of which is within DART right-of-way.</p>	<p>The Project will increase service to new market areas and could reduce the parking demand in downtown Dallas. Where on-street parking spaces or metered spaces are affected, DART will work with the city of Dallas to reestablish them if desired for local business access. DART will coordinate with property owners on parking mitigation. Perot Museum Lot C parking mitigation will be negotiated as part of a new real estate agreement. DART will work with Perot and the City of Dallas to reconfigure Lot B under Woodall Rodgers Freeway to maintain the same or a similar number of parking spaces if possible.</p>
	<p>Some parking lots driveways would be impacted by the Project.</p>	<p>All parking lot driveways permanently impacted by the D2 Project will be replaced by relocated driveways or alternate access points.</p>



Table ES-1 Summary of Build Alternative Transportation Impacts and Mitigation

Impact Category	Impacts	Proposed Mitigation Measure(s)
Parking Garage and Loading Dock Access	Museum Way cross-section would be modified in areas with loading docks and garage entrances.	Access will be maintained. The design of the embedded tracks in Museum Way and delineation between the travel lanes will be marked and signed in a way to minimize conflicts between trucks backing into the loading docks or bays with the LRT operational envelope.
	Broom Street would be shifted to the south and will impact driveways along Broom.	Driveway or loading dock driveways will be extended to meet the new street configuration to maintain access.
	Final configuration of ventilation requirements at Commerce Station may impact service areas of adjacent buildings.	DART will continue to coordinate with stakeholders around Commerce Station to finalize the ventilation placement opportunities to minimize impacts to service/loading areas near Pegasus Plaza.
Active Transportation	The Project would cross two bicycle facilities at grade: shared bike lanes on Victory Avenue, and a cycle track on Houston Street. The Swiss Avenue bike lane mid-block crossing to Deep Ellum Station would be relocated due to new wye junction.	Where bicycle lanes cross the tracks at a skew, DART will coordinate with the City to determine appropriate mitigation if warranted, which could range from signage, striping or track filler. Where future facilities are planned, DART will coordinate with the local jurisdiction to ensure that non-motorized facilities are not precluded. Bicyclists or pedestrians using Swiss Avenue from the east will be directed to crossing locations outside of the wye junction.
	The Project would create new conflict points for pedestrians, bicyclists and scooters or other mobility options in at-grade segments and around stations.	Stations will be designed to accommodate clear and safe pedestrian linkages across the tracks and between station platforms where transfers occur. Fencing will be located under Woodall Rogers Freeway and at the new wye junction in Deep Ellum to channel pedestrians to safe crossing locations. DART will work with the stakeholders in these two areas to determine the materials and the height of the fencing.

Source: GPC6; DART Capital Planning



The following is a summary of environmental consequences and proposed mitigation for the No-Build Alternative and the Build Alternative. Detailed information is contained in **Chapter 4**. The Study Area generally refers to a 0.5-mile buffer on either side of the alignment, depending on the resource. The Study Area includes the entire downtown core generally bounded by a freeway loop system consisting of I-35 E (Stemmons Freeway) on the west, I-30 on the south, I-345 on the east, and Spur 366 (Woodall Rodgers Freeway) on the north.

No-Build Alternative

The No-Build Alternative is defined as existing and committed transportation projects through year 2045 as discussed in **Chapter 2**. The No-Build Alternative is not a no impact alternative, as it includes actions by DART or other agencies that have been or will be addressed in separate environmental reviews. The No-Build Alternative is included as a benchmark against which the potential significant environmental benefits and impacts of the proposed Build Alternative will be measured.

The No-Build Alternative would not be consistent with local land use and transportation plans, which reflect the Build Alternative to help support sustainable growth and achieve transit-oriented development plans.

The No-Build Alternative would not require the acquisition or displacement of any property by the Project. There would be no changes or impacts to existing districts or neighborhoods. However, neighborhoods and community facilities within the Study Area could be negatively affected over time by increasing congestion and inability to increase transit services over time.

Build Alternative

Table ES-2 provides a summary of the potential impacts and proposed mitigation for environmental resources under the Build Alternative. Since the Build Alternative is located within a highly developed urban area, there are limited environmental impacts along much of the corridor.

The D2 Subway, when combined with supportive public policies, plans, and favorable real estate market conditions, would likely 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 in areas within close proximity to the five proposed station locations. The Project would enhance the potential for intensification of the land use pattern in the corridor by improving transit connections with other parts of the existing and planned transit system, including such modes as bus, LRT, and streetcar. 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 between the CBD, Deep Ellum, Victory Park, and future connections to other activity centers. The City of Dallas and DART partnered for a transit-oriented development grant to focus on transit-supportive land use and multi-modal access planning along the Build Alternative corridor.



Table ES-2 provides more information on anticipated impacts and mitigation.

Table ES-2 Summary of Build Alternative Environmental Impacts and Mitigation

Impact Category	Impacts	Proposed Mitigation Measure(s)
Land Use and Zoning	Benefits: The Project would likely attract transit-supportive development or redevelopment to the corridor, especially around stations, by improving transit connections and access. The Project is consistent with regional, local and downtown land use plans.	While there are no impacts, DART will coordinate planning efforts with the City of Dallas and private developers. Potential impacts to land use will be minimized by designing stations and pedestrian portals to be respectful of the primary land use in the surrounding area, making safety a priority, and minimizing conflict between cars, pedestrians, and other non-motorized uses particularly along at-grade segments.
Socioeconomic Characteristics and Cohesion	At train portal sections, permanent excavation could divide areas within districts.	DART will coordinate with private developers at tunnel portal sites to minimize impacts and explore the potential for pedestrian linkages and development over the portals.
	No impacts to structures would occur except at two DART facilities, West Transfer Center and Rosa Parks Plaza. The Museum Way Station and alignment would impact museum parking. The construction of the train portal would avoid the Dallas World Aquarium building but would limit access from parking areas to the east to only Hord Street as Corbin Street would be closed. Minor right-of-acquisition would be needed from Latino Cultural Center and St. James AME Temple for sidewalk reconstruction.	Coordination will continue between DART and Perot Museum representatives to mitigate parking impacts and provide seamless integration of the Museum Way Station. DART will coordinate with the Dallas World Aquarium to minimize access impacts and enhance connectivity. A permanent station headhouse will be constructed on a portion of the West Transfer Center and the facility will be reconstructed. The station portal at Rosa Parks Plaza will modify the plaza layout and statue placement. DART will coordinate with three area schools to provide these education sessions prior to operations as needed.
Acquisitions and Displacements	The Project would result in the full or partial acquisition (permanent and/or temporary) of approximately 90 parcels. Approximately 22 businesses and one residence would be displaced.	DART will focus on reducing property acquisitions and displacements to the extent reasonably feasible as design proceeds and will work with affected property owners and businesses. All acquisition of property will adhere to DART policy and the Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act) of 1970 (42 USC § 4601 et seq.), including benefits and relocation services.



Table ES-2 Summary of Build Alternative Environmental Impacts and Mitigation

Impact Category	Impacts	Proposed Mitigation Measure(s)
Parks and Recreation Facilities	The Project would include a tunnel 45 feet beneath Belo Garden. The top of the tunnel would be approximately 45 feet below ground and would avoid disruption or impacts that would harm the park.	An underground Mass Transit easement will be sought from the City of Dallas for the Project following Chapter 26 of Texas Parks and Wildlife Department (TPWD) code requirements.
	A ventilation shaft would be located next to Browder Street Mall on private property and would change the visual setting.	Direction will be provided to contractors to avoid any direct impact the park. Ventilation elements will be designed to blend with the area. Minimization of any potential noise impacts will be considered during final design.
	Project construction would require temporary use of Pegasus Plaza. A permanent headhouse would be built along the south side near the back of the Magnolia Hotel. Pegasus Plaza would be re-established after construction. Public art on site would be impacted but could be reintegrated into a new plaza design. Access to the park would be unavailable during construction. The addition of the station headhouse would visually change the setting. The headhouse and some elements of ventilation would be located on Pegasus Plaza.	There is support for the headhouse approach and a desire to maintain the Pegasus myth theme and reincorporate public art elements with a new design. A Mass Transit easement is proposed for the permanent headhouse on the site. Ventilation elements will be located near and/or on the park as part of an integrated design. Minimization of any potential noise impacts will be considered during final design. An agreement is in development between DART and the City of Dallas to address mitigation requirements and establish the vision and guidelines for park redesign. DART will consult with the Park and Recreation Board and the Arts and Culture Advisory Commission. DART and the City of Dallas will also follow Chapter 26 of the TPWD code. See Section 4(f) below for additional information.
	No impact to Main Street Garden.	None required
	No impact to Carpenter Park.	Direction will be provided to contractors to avoid any direct impact to the park and maintain sidewalk access during reconstruction of the Pacific Avenue/Cesar Chavez Blvd. intersection.
Cultural Resources (Archeological)	Potential for buried archeological deposits (including high potential for intact historic-age deposits where surface rail will go below grade and where pedestrian entrances to the subway will be located).	DART will obtain an Antiquities Permit for archeological surveys, monitoring, testing, and any potential mitigation. THC concurred with the proposed work plan on September 23, 2019 and it will be included in proposed PA. If the proposed undertaking should uncover archeological resources, all construction activities will cease in the area until additional review and clearance by the THC has been completed.



Table ES-2 Summary of Build Alternative Environmental Impacts and Mitigation

Impact Category	Impacts	Proposed Mitigation Measure(s)
Cultural Resources (Historic)	<p>Potential adverse visual effects (indirect) to resources within the NRHP-Listed, West End Historic District, City of Dallas Downtown District, and the City of Dallas Harwood Street Historic District Landmark. Effects would not be completely determined until the 90% design level. The visual elements within the City of Dallas Landmark Districts (Downtown Dallas and Harwood Street) would also need to be coordinated with the City of Dallas through their preservation ordinances.</p>	<p>Prior to the design/build phase, a Programmatic Agreement (PA) will be implemented to establish measures to avoid, minimize, or mitigate any effects to the NRHP listed and eligible resources and NRHP listed Historic Districts and Dallas Landmarks with concurrence and consultation among DART, FTA, and the Texas Historical Commission (THC), and Advisory Council on Historic Preservation (ACHP). City of Dallas Landmarks will be addressed to avoid and/or minimize any effects to the properties.</p>
	<p>Adverse effect to Magnolia Gasoline Station (902 Ross Avenue) due to potential acquisition and demolition for construction staging.</p>	<p>Mitigation will be outlined in the PA in consultation with the THC and consulting parties. DART will comply with Section 4(f). DART will seek to avoid use pending final construction needs.</p>
	<p>Adverse effect to St. James A.M.E. Temple due to relocated Live Oak Station and acquisition of 800 square feet of property to shift street and sidewalk to the east, which would impact characteristics of the resource that make it eligible for the NRHP.</p>	<p>Mitigation will be outlined in the PA in consultation with the THC and consulting parties. DART will comply with Section 4(f). DART will coordinate with property owner and Landmark Commission on mitigation to minimize impacts.</p>
	<p>Potential indirect noise and vibration impacts to foundations and basements of NRHP listed and eligible districts and properties.</p>	<p>Blasting will be avoided during construction. Mitigation will be outlined in the PA and will include additional construction vibration studies to determine if any effects would occur to the foundations and basements during construction activities.</p>
Visual and Aesthetic Resources	<p>Visual impacts may occur throughout the corridor due to new physical features, facilities, and stations.</p>	<p>DART will apply context sensitive design to minimize impacts. DART will coordinate with property owners and the City of Dallas in accordance with Urban Transit Design Guidelines. Mitigation measures are intended to be consistent with those used in other parts of the DART system. In addition, each station will utilize an Art and Design program that will include community input, with selection of colors, finishes and materials complementary to the setting.</p>



Table ES-2 Summary of Build Alternative Environmental Impacts and Mitigation

Impact Category	Impacts	Proposed Mitigation Measure(s)
	<p>Victory Station to Woodall Rodgers Freeway: Potential visual impacts associated with removal of the trees within median of Museum Way and along Broom Street due to street relocation, and new Project elements such as catenary poles, light standards, and a new at-grade station.</p>	<p>Alignment and Museum Way Station will be designed to integrate the surrounding area. Proposed paths along the alignment will be coordinated with the City and area stakeholders. Station design will be coordinated with the Perot Museum. Broom Street trees will be replaced with new trees in an expanded sidewalk near Perot Museum. Additional replacement trees will be planted where possible.</p>
	<p>Woodall Rodgers to Metro Center Station: The west tunnel portal would be a new visual element. Trees within the Griffin Street median would be removed. The Metro Center Station would introduce new visual elements with the headhouse on the West Transfer Center site, and three additional proposed access portals as well as ventilation shafts and light-well in Griffin Street median.</p>	<p>The tunnel portal will be designed to integrate with future private development and minimize visual effects. DART will design the headhouse and access portals, especially those in the West End Historic District, to be compatible with surrounding uses. The proposed light-well and emergency exit in the Griffin Street median will be designed to blend in with the surrounding area.</p>
	<p>Metro Center Station to CBD East Station: Visual impacts would occur due to Commerce Station access points, ventilation facilities, including new headhouse at Pegasus Plaza. Public art at Pegasus Plaza would be removed and potentially re-integrated in a new park design.</p>	<p>Station access and ventilation elements will be integrated with the existing urban setting. Pegasus Plaza is envisioned as a transparent structure, and ventilation requirements will be integrated with a new park design and placed along Magnolia Hotel pass-through. The Commerce/Ervey access point options will be integrated within existing buildings or designed to fit in with the urban fabric. The ventilation shaft south of Commerce Street will be clad to not distract from the Browder Street Mall and recent area improvements. Pegasus Plaza redesign, including the headhouse and public art, will be guided by an agreement with the City of Dallas.</p>



Table ES-2 Summary of Build Alternative Environmental Impacts and Mitigation

Impact Category	Impacts	Proposed Mitigation Measure(s)
	<p>CBD East Station to Eastern Terminus: Visual impacts would be minimal given existing major transportation corridors, LRT, and other urban elements. New visual elements would be the CBD East Station access portals, tunnel portal, wye junction, TPSS and signal house, and relocated Live Oak Station.</p>	<p>The CBD East station pedestrian portals and ventilation shafts will be designed to integrate with the surrounding area. The tunnel portal may be integrated into a future development pending coordination with the property owner. The signal house and TPSS will be designed or clad to complement the area. Ballasted track will be replaced with embedded track. The Live Oak Station will incorporate the same or similar design features as the Deep Ellum Station.</p>
<p>Noise and Vibration</p>	<p>Moderate noise impacts (less than 3 dB) at three locations affecting a total of 176 residential units (W Dallas Residences, the Vista Apartments, and the Northend Apartments).</p>	<p>Consistent with DART policy, noise mitigation for moderate noise impacts with less than a 3 dB increase is not required, and no mitigation is proposed.</p>
	<p>Wheel squeal may occur at sensitive receptors near curves in at-grade segments.</p>	<p>Potential wheel squeal will be monitored during operations to determine if mitigation is necessary.</p>
	<p>No vibration impacts are projected due to operations.</p>	<p>None required.</p>
<p>Air Quality</p>	<p>No new air quality violations of NAAQS would be anticipated.</p>	<p>None required</p>
<p>Public Safety and Security</p>	<p>Potential for increased police to maintain community safety.</p>	<p>DART Police will provide coverage at facilities and on vehicles, and coordinate with Dallas Police. A safety officer podium will be at each subway station. Subway stations are proposed to include fare control barriers. DART will host sessions with police, fire, schools, emergency response teams, employers, and other interested parties to discuss rail operations, potential safety or security issues, and agency or public responsibilities.</p>
	<p>Potential for fire and impact to emergency services.</p>	<p>Vehicles and facilities will be constructed with fire resistant materials. Vehicles will be equipped with on board fire protection systems and have exterior emergency door releases. The tunnel and subway stations will contain occupant protection systems and emergency egress routes. Alternate routes for fire and emergency service vehicles will be evaluated during final design with Fire/Life Safety Committee. Final design will be done in accordance with NFPA-130 (Standard for Fixed Guideway Transit and Passenger Railway Systems) and applicable fire and building codes of local jurisdictions.</p>



Table ES-2 Summary of Build Alternative Environmental Impacts and Mitigation

Impact Category	Impacts	Proposed Mitigation Measure(s)
	<p>Potential for multi-modal traffic and conflicts with automobiles and pedestrians in at-grade segments. Conflicts may be higher during peak event times for venues.</p>	<p>During final design, DART will coordinate with the city, venue managers, and adjacent property owners to determine needs for enhanced pedestrian crossing features. DART will provide outreach events through the Transit Education Program on best safety practices. Street crossings will be protected with warning signs, lights, bells, and traffic signals or gates.</p>
	<p>Increased potential for conflicts between rail vehicles, automobiles, bicycles, and pedestrians in and around stations. The potential for crime would also exist.</p>	<p>Crime Prevention through Environmental Design (CPTED) principles will be followed to enhance safety and security at stations. Stations will be regularly patrolled by police to deter crime and will include security cameras, emergency assistance systems. DART will limit pedestrian access to dedicated track crossings, provide adequate lighting, and maintain good visibility. Platform edge doors will be considered.</p>
<p>Environmental Justice (EJ)</p>	<p>No disproportionately high and adverse effects to EJ populations.</p>	<p>None required.</p>
<p>Soils and Geology</p>	<p>Potential soil erosion and sedimentation during construction.</p>	<p>DART will follow Best Management Practices (BMPs) detailed in a Stormwater Pollution Prevention Plan (SWPPP).</p>
	<p>Potential for differential soil movements to impact track, station foundations and platform slabs.</p>	<p>Improve track and station subgrade soils including chemical stabilization of active clays or synthetic geogrid reinforcement for tracks and conditioning on-site soils or replace soils with non-expansive soils to limit soil movement for station structures. Station foundation movements will be mitigated by placing the foundations below the active soil depth with foundation</p>
<p>Water Resources</p>	<p>Potential impacts to surface water quality and groundwater resources. No wetlands or floodplains impacts.</p>	<p>DART will comply with Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit TXR150000, including implementation of SWPPP, submission of notice of intent (NOI), and posting of a site notice.</p>
<p>Biological and Natural Resources</p>	<p>Potential vegetation impacts due to removal of trees. No impacts to critical habitat or threatened and endangered species.</p>	<p>Tree removal will be done in accordance with City ordinances, and permits will be obtained, if necessary. DART will coordinate with the City to replace trees within street and expanded sidewalk areas, and in Pegasus Plaza. Trees in front of FOX4 building and in front of St. James A.M.E. Temple will be protected to the greatest extent possible.</p>



Table ES-2 Summary of Build Alternative Environmental Impacts and Mitigation

Impact Category	Impacts	Proposed Mitigation Measure(s)
Hazardous and Regulated Materials	Potential impacts associated with 10 high risk, 17 moderate risk, and 77 indeterminate risks sites along corridor. Potential to uncover or disturb existing hazardous and toxic materials, as well as fill from unknown sources.	Excavated spoils will be disposed of in accordance with applicable local, state and federal guidelines and regulations. If unanticipated sources of hazardous or regulated materials are suspected or encountered during construction, the DART Environmental Compliance division shall be notified immediately to implement mitigation. Environmental due diligence activities will be performed prior to acquisition, including Phase I Environmental Site Assessments (ESA).
Section 4(f) and Chapter 26 Evaluation	Section 4(f) use of Magnolia Gasoline Station due to proposed demolition. Prior to FTA approval, its use will be reviewed in coordination with the U.S. Department of the Interior pursuant to 23 CFR 774.5(a).	Measures to minimize harm include historic documentation of the station. DART will seek to avoid use pending final construction needs.
	Section 4(f) use of St. James A.M.E. Temple due to right-of-way acquisition to shift the street and sidewalk east to accommodate Live Oak Station. Prior to FTA approval, its use will be reviewed in coordination with the U.S. Department of the Interior pursuant to 23 CFR 774.5(a).	Measures to minimize harm include historic documentation of the Temple. The relocation of sidewalk and historic marker will be done in cooperation with the Dallas Landmark Commission and property owner.
	Proposed Section 4(f) <i>de minimis</i> impact determination and Chapter 26 use of Pegasus Plaza.	The headhouse at Pegasus Plaza will be designed to be integrated into the plaza to minimize the direct impacts to features and attributes of the park. During final design, DART will work with the City to finalize a reimagined park site plan for future construction based on a Pegasus Plaza agreement, which is in development. 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.
	Chapter 26 use of Belo Garden.	The City of Dallas considers the acquisition of an underground mass transit easement would constitute a Chapter 26 use. 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.

Source: GPC6; DART



Construction Impacts and Mitigation

Detailed information on the construction impacts is contained in **Chapter 5**. Project construction would consist of four new stations (one surface and three underground stations) and the relocation of an existing station, surface tracks from just south of Victory Station through Victory Park to the tunnel portal south of Woodall Rodgers Freeway, a tunnel containing two tracks beneath Commerce Street, a tunnel portal near I-345, construction of surface tracks east of I-345 and track modifications near Deep Ellum, and construction of ventilation shafts and fan plants for each underground station. Methods available for underground excavations include tunnel boring machine (TBM) methods; Sequential Excavation Method (SEM) tunneling; conventional drill; roadheader excavation for rock; and cut-and-cover for mixed soils or in areas where there is not enough cover above the tunnel area. Where possible, construction activities and associated worker and trucking movements would be concentrated at construction staging areas to minimize disruptions at the surface.

An assessment of tunneling vibration indicated that there is the potential for ground-borne vibration impact at the KDFW FOX4 TV Studio from both tunnel boring machine (TBM) and muck train operations. In addition, 173 ground-borne noise impacts are anticipated due to muck train operations, including spaces in nearly all of the sensitive buildings adjacent to the proposed tunnel. However, the projected vibration levels from TBM and muck train operations are below the most stringent FTA damage criteria for buildings that are extremely susceptible to vibration damage. Final construction methods have not been selected and would be determined by the Design-Build contractor. A quantitative assessment of construction noise and vibration impacts resulting from tunneling and other activities will be conducted during the design phase of the Project when detailed construction scenarios are available. In particular, potential construction-related impacts to historic/special structures will be considered. Specific construction noise and vibration mitigation measures will then be developed as appropriate, and requirements for noise and vibration monitoring will be evaluated.

The Project would be constructed over an approximate four-year period, with some advance activities prior to that period such as property acquisition for corridor preservation and utility relocations. During the construction period, the intensity and duration of construction activities would vary by method and/or section. For example, construction of underground stations would occur over a two-year period, maintenance of street traffic operations near stations would last approximately nine months, and construction staging areas would be active for the full four years. Depending on the method, construction working hours would be 24 hours-per-day, six days-per-week, including materials delivery and spoil removal.

A key consideration of construction would be the interface with major buildings and above-ground structures. For all these structures, both before and after, conditions surveys will be required. In addition, structural and geotechnical instrumentation will be required to monitor each building's performance during and after tunnel, station, or shaft excavation. Additional structural and geotechnical surveys and investigations during final design will be performed to confirm whether stabilization of any buildings and structures are necessary.

Short-term impacts and mitigation associated with constructing the Project would be anticipated to occur for traffic and transportation facilities, construction staging areas, utilities, adjacent buildings and structures, visual, noise and vibration, cultural resources, parks, water quality, air quality, and business disruption. Mitigation measures for construction-related impacts are outlined in DART Light Rail Project—General Provisions, General Requirements, and Standard Specifications for Construction Project, including DART standard specification 02270, Erosion



and Sediment Control. Section 01560, titled Environmental Protection, includes environmental protections considerations related to, but not limited to the following:

- Natural resources including air, water, and land;
- Solid waste disposal;
- Noise and vibration;
- Control of toxic substances and hazardous materials;
- Chemical, physical, and biological elements that adverse effect ecological balances;
- Degradation of the aesthetic use of the environment, and;
- Historical, archeological, and cultural resources.

Public and Agency Coordination and Consultation

The Project has included a comprehensive public participation and agency consultation program. A Public and Agency Involvement Plan (PAIP) was developed to proactively and effectively communicate the Project scope, issues, and potential impacts and benefits while collecting valuable public, agency, and stakeholder input for the Project and this SDEIS.

Public and agency involvement activities officially started with the publication of the NOI to prepare an EIS for the Project. The NOI was issued in the *Federal Register* by the FTA on April 12, 2007. Early planning on alternatives and environmental considerations was conducted through 2017. In summer 2018, DART relaunched EIS documentation efforts. There have been three rounds of public meetings, and several meetings with Focus Area committees. Focus Area committee participants were identified or signed up based on their interests in the specific area (property owner, major employer, residential association representative, transit user representative, etc.). Five areas were defined as focus areas: Victory/Perot (including west portal), Metro Center, Commerce, CBD East, and Deep Ellum (including east portal). Numerous other briefings and meetings were held and are documented in **Chapter 6**. Both the initial scoping effort and more recent activities provided the basis for identification of issues important to Project definition and the SDEIS.

Evaluation of Alternatives

As described in **Section 1.4**, the Project's primary purpose is to address the core capacity issues and to increase operational flexibility, reliability, and quality of passenger service through downtown and throughout the entire LRT system. Specific transportation needs identified for the Project are to relieve the CBD LRT capacity constraint, accommodate growing regional demand, maintain a quality system and service, serve new CBD markets, and enhance land use and redevelopment potential.

The information in this SDEIS provides the basis for the public, agencies, and decision-makers to assess the potential environmental consequences, benefits, and costs of the alternatives against the Project goals.

No-Build Alternative

The No-Build Alternative would not achieve the purpose or needs identified in the corridor, and would not fulfill the Project goals. The No-Build Alternative would not relieve the CBD LRT capacity constraints or accommodate growing regional demands. The No-Build Alternative would continue reliance upon the existing at-grade Bryan-Pacific Transit Mall where the LRT lines constrain the ability of both DART and the region to implement additional rail projects or improve headways on the existing light rail lines and affect quality of service. Dependence on one single downtown transit mall also increases the risk for system-wide service disruption due to incidents on the mall, such as traffic accidents or incidents in adjacent buildings.



Operational and capacity constraints are compounded by continued high regional growth, increasing highway congestion, planned regional transit expansion, and the introduction of a privately-funded high-speed rail project. These items would further increase DART system demand and stress DART's limited core capacity. Existing travel and transit modes would continue to be subject to increasing congestion and less reliable travel times. The No-Build Alternative is also not consistent with the goal to promote economic development and sustainable land use patterns and is not consistent with land use and station area transit-oriented development plans that are in process. Lastly, the No-Build Alternative would not implement transit investment in the Study Area.

Build Alternative

The Build Alternative would meet the purpose and needs identified for the corridor. The Project would be designed to provide core capacity by adding another LRT line through downtown Dallas, which would allow for improved headways or new lines. It would also enhance flexibility by incorporating connections that allow for potential new LRT patterns in the future and would provide options for special events. Additionally, the Project would serve new markets while supporting land use and economic initiatives.

The Build Alternative would fulfill each of the Project goals. In 2045, approximately 11 percent of transit trips into the DART Service Area are forecast to come from areas outside of the service area, and 22 percent of all transit trips are destined to the downtown Dallas area. The D2 Subway would improve system capacity to accommodate this projected growth. Corridor mobility and accessibility would be improved through direct connections to key transit facilities, including the Trinity Rail Express at Victory Station, the Red/Blue Lines at Metro Center Station, access to the West and East Transfer Centers, and connections to the future Dallas Streetcar Central Link. These connections would enhance mobility options for residents to access activity and employment centers within the Study Area and would provide more direct linkages for Study Area residents to access other areas for entertainment, education, or jobs.

Compared to a No-Build condition, the Build Alternative would also reduce Vehicle Miles Traveled (VMT) in the region by 124,390; 46,472 across the DART Service Area; and nearly 10,000 across the Downtown Dallas area. Congestion delays would be reduced by 3,380 hours per day in the region; 1,200 hours per day in the DART Service Area; and 250 hours in the Downtown Dallas area. Both factors contribute positively to air quality.

The Build Alternative would promote economic development and sustainable land use patterns. The Project would be consistent with local plans, including the Dallas 360 Plan, which focus on new development around stations, and regional plans that promote a more sustainable development pattern and livable communities.

Lastly, the Build Alternative would support the goal of providing an environmentally-sensitive transit investment. The Project would be developed to minimize negative impacts to the community through sensitive design. Where impacts are identified, mitigation would be implemented to ensure the Project would be implemented in a manner sensitive to the downtown community. The Project would also have minimal impacts to the natural environment, as it would be located in an urban setting.

Next Steps and Issues to be Resolved

This SDEIS identifies the Build Alternative as the preferred Alternative. FTA and DART will examine the public and agency comments received during the SDEIS public circulation period, make a final decision based on the input received, and advance the identified alternative for



implementation. The comments and continued public and agency input will also assist in resolving issues. Specific issues that will require resolution include:

Mitigation Measures: Proposed mitigation measures are identified in this SDEIS. Mitigation commitments will be determined following the public circulation period. Final mitigation commitments will be included in the FEIS/ROD and documented in a Mitigation Monitoring Program (MMP). Some mitigation measures may not be finalized until final design pending additional studies.

I-345 Crossing: DART continues to coordinate with the City of Dallas, NCTCOG, and TxDOT on the I-345 interface given that TxDOT has recently initiated an I-345 Feasibility Study. The agencies meet regularly to develop a solution that accommodates potential below-grade configurations for a future reconstruction of I-345.



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1. Purpose and Need

1.1 Introduction

Dallas Area Rapid Transit (DART) proposes to construct a second light rail transit (LRT) alignment through the Dallas Central Business District (CBD), referred to as the D2 Subway. The D2 Subway (or Project), shown in **Figure 1-1**, would consist of a 2.4-mile alignment extending from the existing Victory Station through the core of downtown Dallas, reconnecting to the Green Line along Good Latimer in the Deep Ellum Area. The Project would include four new stations and would relocate the existing Deep Ellum Station to the north as the Live Oak Station. The alignment would be a combination of at-grade and below-grade sections. The below-grade subway segment would run primarily under Griffin and Commerce Streets. The existing Green and Orange LRT lines would shift operations from the existing Bryan/Pacific transitway mall to the proposed D2 Subway alignment, thereby increasing capacity on the mall for additional service in the near and long-term, while also enhancing operational reliability and flexibility.

1.2 Project Background and Regional Context

Rail alignments in downtown Dallas were first included in the 1983 DART Service Plan to accommodate interlining of multiple future corridors in the DART Service Area. The 1983 plan envisioned three corridors with a policy position that the initial development focus on an east-west subway rather than an at-grade transitway mall if funding allowed. In 1988, a failed bond referendum led to development of the 1989 DART New Directions Transit System Plan, which recommended a modification to the DART Service Plan to include a surface transit way along Bryan/Pacific. This was followed by a 1990 DART Board resolution approving a Master Interlocal Agreement (ILA) with the City of Dallas, which included terms and conditions related to the planning, design and construction of a future subway in the Dallas CBD. These conditions related to headway and ridership thresholds.

The 1995 DART Transit System Plan laid out an extensive light rail expansion program and included initial funding for a future CBD subway project. As expansion of the DART light rail system continued, both the City of Dallas and DART began planning for a second light rail alignment. In June 2005, the City of Dallas published their *Comprehensive Transportation Plan for the Dallas Central Business District* to guide future planning relative to streets, transit, and other downtown circulation needs. This plan recommended an LRT corridor that encompasses the proposed Project through the center of downtown. Specific recommendations on the length of the subway and portal locations were not included subject to further alternatives analysis and an environmental impact statement.

DART began planning for the D2 Subway in 2007. On April 12, 2007, the Federal Transit Administration (FTA) and DART published a notice of their intent to prepare an environmental impact statement (EIS), concurrent with a planning Alternatives Analysis (AA), for transportation improvements in the Dallas CBD. From 2007 through 2010, FTA and DART prepared a draft environmental impact statement (DEIS). In May 2010, DART released the AA/DEIS but postponed completion of the final EIS (FEIS) and Record of Decision (ROD) due to several factors resulting in changed conditions in downtown Dallas. Over the last several years, DART has continued to advance the D2 Project including addressing these new conditions and is now preparing the supplemental DEIS based on direction from the DART Board and City of Dallas.

Section 2.1 summarizes the planning history for the Project, including the range of alternatives considered. **Table 1-1** summarizes the key plans that have included the Project.

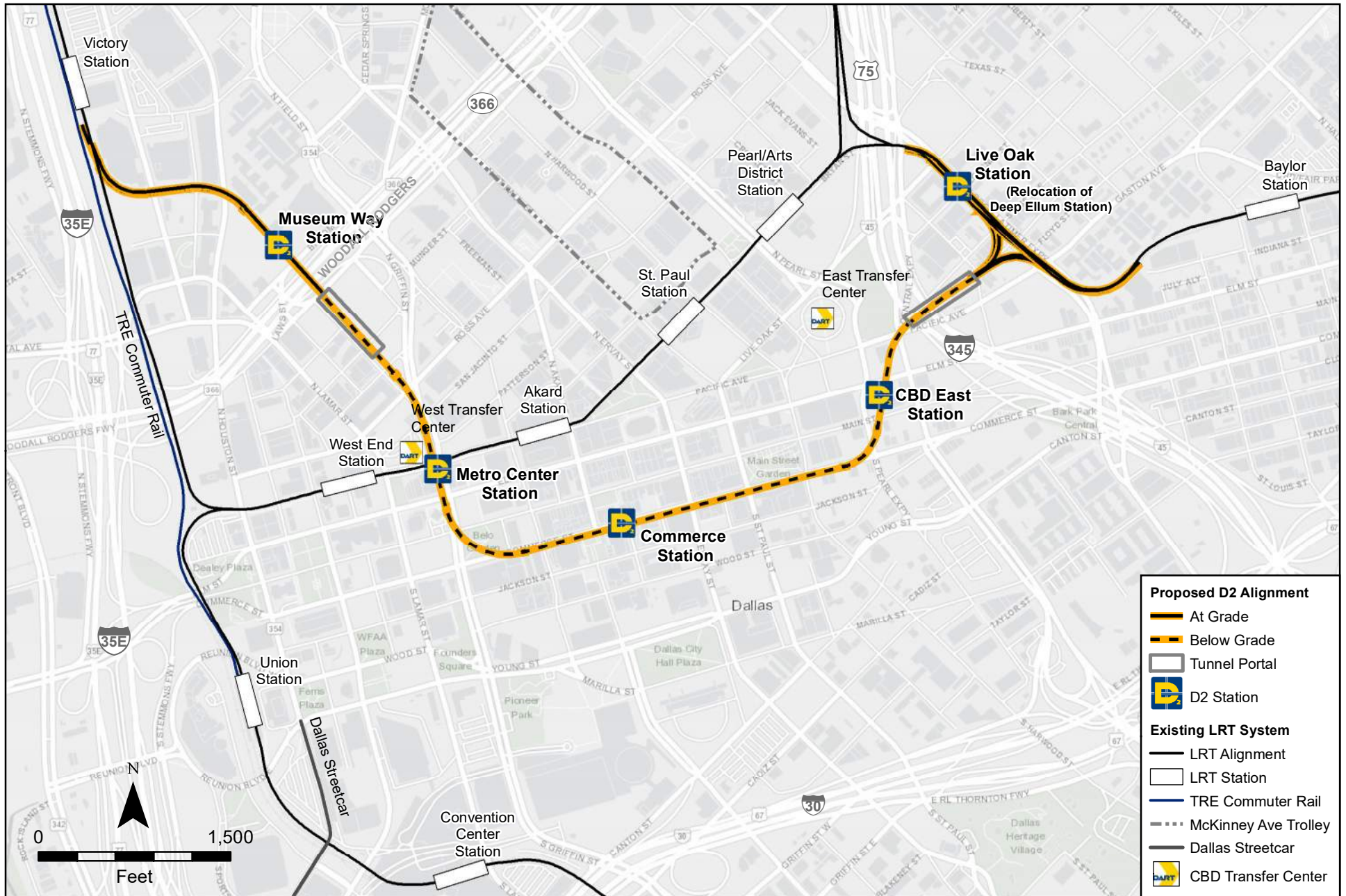


Figure 1-1
D2 Subway Light Rail Transit Project

Data Source: DART, GPC6

D2 Subway Project
 Supplemental Draft
 Environmental Impact Statement





Table 1-1 Relevant D2 Subway System and Project Planning Efforts

Document	Key Information
1983 DART Service Plan	The original DART Service Plan included an extensive rail system and envisioned three downtown corridors to accommodate interlining and system growth.
City of Dallas/DART Master ILA, February 1990	City of Dallas/DART Master Interlocal Agreement (ILA), approved in February 27, 1990, reclassified the CBD LRT line in the Service Plan from subway-running to a surface transit way facility along Pacific/Bryan. The key stipulation was that DART amend its Financial Plan to include a line item for a future second CBD alignment that would be subway-running.
Comprehensive Transportation Plan for the Dallas CBD, 2005	13 LRT alignments were identified during DART workshops in 2002 which were screened to three potential alignment corridors. The study recommended a broad corridor for the location of a second 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.
Forward Dallas, City of Dallas Comprehensive Plan, 2006	Recommendations included improving transportation connections throughout the City, increasing density around transit stations and along designated transit corridors, and assessing the modern streetcar technology. The plan included 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 Transit System Plan (TSP).
North Central Texas Council of Governments (NCTCOG) Metropolitan Transportation Plan: Mobility 2025, April 2005 Amendment	This plan included a placeholder alignment for a second downtown light rail alignment. Prior plans had indicated that downtown capacity and the need for a second alignment would continue to be monitored.
DART 2030 Transit System Plan, October 2006	The plan recommended five rail projects and identified several additional promising corridors in the Vision Element. Established the planning framework and need for additional transit capacity through the CBD.
NCTCOG Metropolitan Transportation Plan: Mobility 2030, January 2007	Mobility 2030 outlined the expenditure of nearly \$71 billion of federal, state, and local funds expected to be available for transportation improvements through the year 2030. It included \$9.6 billion of rail recommendations, including \$3 billion of Regional Transit Initiative (RTI) rail lines. The findings of the sustainable development scenarios increased demands on the DART system. The D2 alignment was included in this plan.
Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS), May 2010	The AA/DEIS included the evaluation of four primary alternatives. A formal action on a Locally Preferred Alternative (LPA) was not taken given changing conditions in downtown Dallas and a recession which affected the schedule for the D2 Project.
Downtown Dallas 360 Plan, 2011	The plan reflected the range of alternatives under consideration in the AA effort.
AA/Selection of Locally Preferred Alternative, September 2015	Phase 2 of the AA built on the original effort in response to comments on the AA/DEIS and changed conditions in downtown which included the new Dallas Streetcar (Oak Cliff Line) and planned extensions, the Downtown Dallas 360 Plan, and proposed High Speed Rail (HSR) from Houston to downtown Dallas. These comments and issues led to new D2 Alternatives as well as refinements to those considered in the AA/DEIS. On September 22, 2015, the DART Board of Directors passed Resolution No. 150101 Approval of the Locally Preferred Alternative for the Second CBD Light Rail Alignment (D2).
Project Development for Original LPA B4 Lamar-Young/Jackson (2015-2016)	The 2015 LPA was approved as Alternative B4 Lamar-Young with a Modified Jackson Alignment, which incorporated an alignment shift east of Dallas City Hall to address potential impacts along Young Street. Project Development (PD) was started on this alternative and continued until 10 percent design submittal was made. PD on this alternative stopped in late Summer 2016 due to community concerns.



Table 1-1 Relevant D2 Subway System and Project Planning Efforts

Document	Key Information
LPA Refinement Phase to Select D2 Subway (2016-2017)	DART conducted a LPA Refinement phase between December 2016 and June 2017. The effort was in response to direction from the Dallas City Council (Resolution No. 161692) and the DART Board to develop D2 as a primarily-subway light rail line through downtown Dallas. The LPA Refinement Phase culminated with the approval of the D2 Subway LPA. In September 2017, both the Dallas City Council (Resolution No. 171426) and the DART Board (Resolution No. 170101) approved Commerce via Victory/Swiss as the LPA.
Mobility 2040 – The Metropolitan Transportation Plan for North Central Texas, March 2016	Mobility 2040 reflects the second downtown alignment consistent with Mobility 2030. The plan also includes a range of regional rail expansion corridor recommendations and high speed rail facility recommendations.
Downtown Dallas 360 Plan, 2017	Update of the 2011 360 Plan, including revised D2 Project alignment along approved Commerce via Victory/Swiss corridor.
Mobility 2045 – The Metropolitan Transportation Plan for North Central Texas, June 2018	Latest iteration of the MTP, reflects the Commerce via Victory/Swiss D2 project alignment consistent with City of Dallas and DART approvals in 2017. The plan retains several regional rail corridors and high speed rail recommendations which will influence system capacity needs.
DART 2045 Transit System Plan, in development	The long-range TSP includes DART's plans for advancing the D2 Project and is evaluating additional rail or high capacity corridor expansion opportunities and operating scenarios for long term system enhancements. The 2045 TSP will also incorporate a bus service plan and outline streetcar opportunities throughout the service area.

Source: DART Capital Planning

1.3 Study Area

The Study Area for the D2 Subway (herein after referred to as "Study Area") is generally a 0.5-mile buffer on either side of the alignment. See **Figure 1-2** for the Study Area. In certain sections of the SDEIS, the Study Area is different depending on the type of resource and the extent of potential impacts. The Study Area is located within the metropolitan area of Dallas, in Dallas County, Texas. As defined in the City of Dallas *360 Plan*, Downtown Dallas is the traditional CBD core bounded by a freeway loop system consisting of I-35E (Stemmons Freeway) on the west, I-30 on the south, I-345 on the east, and Spur 366 (Woodall Rodgers Freeway) on the north. This downtown core contains six distinct districts and is surrounded by several additional districts and neighborhoods. **Figure 1-3** illustrates the districts located within and surrounding the Study Area.

The Study Area includes the entire downtown core and most directly interacts with portions of the Victory Park, Uptown, Deep Ellum, and Baylor districts. Several additional districts and neighborhoods are located near or beyond the Study Area boundary. **Section 4.2** describes the Study Area districts in detail.

1.3.1 Study Area Setting

Downtown Dallas is a significant employment center with major corporate headquarters, government institutions, schools, hotels, plus a variety of restaurants and shops. Major attractions and venues in downtown range from Arts District attractions like the Dallas Museum of Art, Nasher Sculpture Center, Crowe Collection of Asian Art, Wily Theater, Winspear Opera Center, and Majestic Theater, to attractions like the Dallas World Aquarium, Perot Museum of Nature and Science, Reunion Tower, Pioneer Plaza, the Dallas Convention Center, Klyde Warren Park, and Main Street Garden. The Study Area also includes national attractions such as Dealey Plaza, the Sixth Floor Museum/Book Depository and the JFK Memorial. The American Airlines Center fills its 18,500-seating capacity just over 80 times per year for NBA and NHL games, not including various concerts and other events throughout the year.

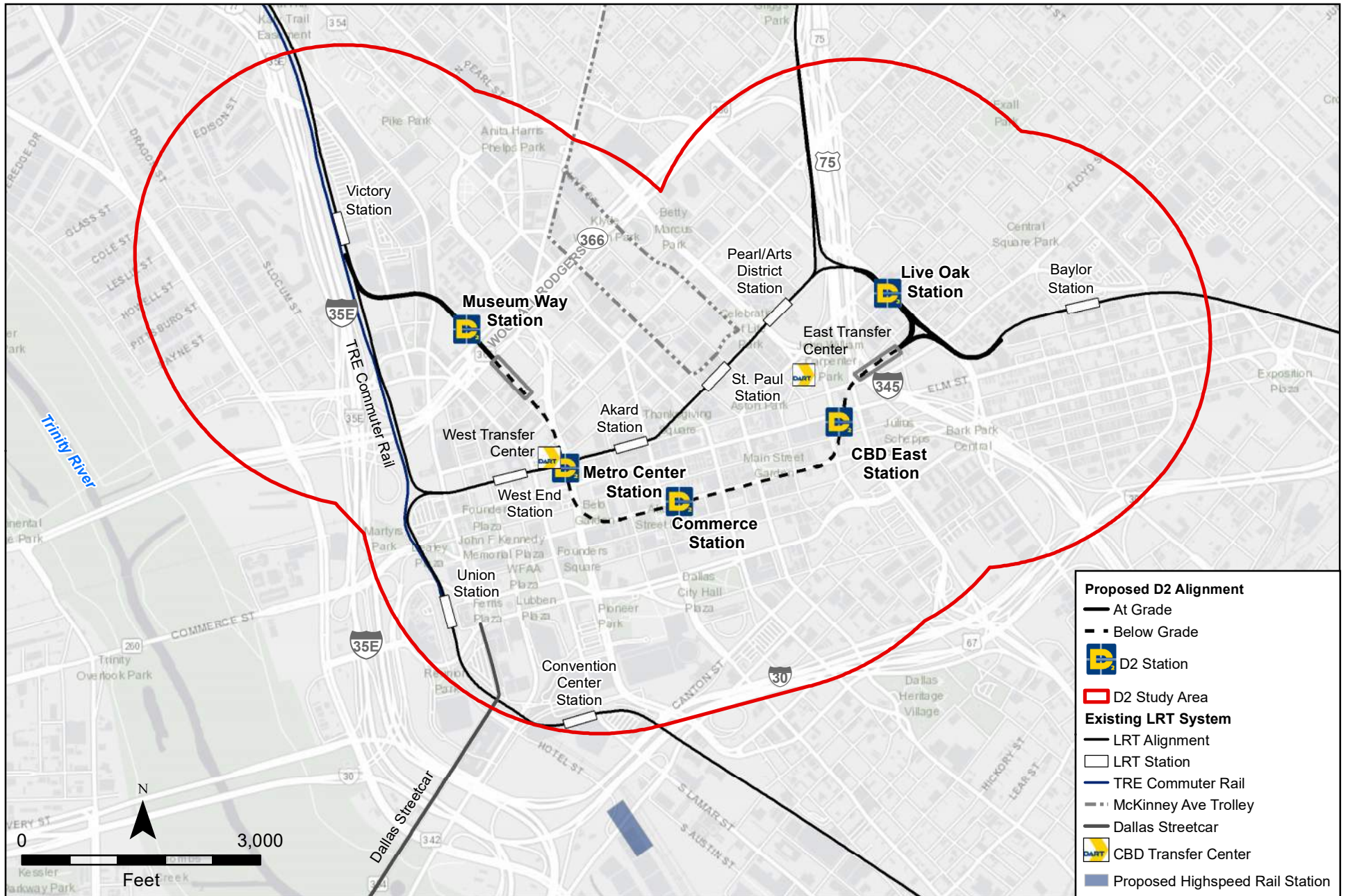


Figure 1-2
Project Study Area
 Data Source: DART, GPC6





Figure 1-3 Districts within the D2 Subway Study Area



Source: Dallas 360 Plan

1.3.2 Growth and Development Trends

North Texas continues to be one of the fastest growing areas in the country. **Table 1-2** identifies employment and population growth in the Study Area in relation to Dallas County and the 12-county Metropolitan Planning Area (MPA). The MPA is centered on the four urban counties: Collin, Dallas, Denton, and Tarrant.



Table 1-2 Population and Employment Growth Trends

Geographic Area	Population		2017 – 2045 Percent Growth	Employment		2017 – 2045 Percent Growth
	2017	2045		2017	2045	
Study Area	26,906	54,057	101%	143,728	291,122	103%
City of Dallas	1,270,170	1,646,773	30%	1,120,028	1,791,041	60%
Dallas County	2,600,408	3,445,204	32%	2,147,027	3,298,213	54%
Region (MPA)	7,235,508	11,246,531	55%	4,584,235	7,024,227	53%

Source: NCTCOG Demographic 2045 Forecast; US Census Bureau

As shown, regional population is forecast to increase 55 percent from approximately 7.2 million in 2017 to 11.2 million residents by the year 2045. A similar increase in employment is projected with over 7 million jobs in 2045. While much of this growth will be decentralized, Dallas County and downtown Dallas will remain key employment destinations, with nearly half of the region’s jobs in Dallas County, and nearly 10 percent of those forecast to be in the Study Area. According to the City of Dallas 2017 Economic Development Profile, downtown Dallas is home to more corporate and regional headquarters than any other North Texas location, including AT&T and Baylor University Medical Center.

Within the Study Area, the largest growth in residential population is expected to occur in and adjacent to downtown Dallas. Population is expected to double to 54,000 by 2045, a substantially higher growth rate than the City of Dallas and Dallas County. Over 11,000 residents live within the freeway loop alone, with over 70,000 in a 2.5-mile radius of downtown. Strong employment, diverse attractions, education, restaurants, shopping, arts and music venues, coupled with a growing residential component, are transforming downtown in a vibrant mixed-use center.

1.3.3 Transportation Services and Facilities

The Study Area is served by or intersects a variety of transportation systems including roadways, and rail and bus transit facilities. The following describes the existing and planned transportation conditions.

Roadways

The D2 Project is primarily located within the downtown freeway loop but would pass under two major freeways: Woodall Rodgers Freeway (Spur 366) and I-345, which connects US 75 (North Central Expressway) to I-45. A network of major thoroughfares, collectors and local streets serve the Study Area (see **Figure 3-5 in Chapter 3**). The roadway network is a modified grid with streets on a diagonal orientation to the north and south, and on a more east-west orientation in the center of downtown. Many downtown streets operate one-way but several have been modified as two-way or narrowed down in past years in order to widen sidewalks to support a more pedestrian friendly network with slower speeds. Elm Street (westbound) and Commerce Street (eastbound) serve as the primary east-west couplet through downtown, while Griffin Street and Pearl Street, both two-way, are key north-south roadways.

Public Transit

DART provides a range of services for 13 service area cities. Downtown Dallas serves as the hub of the radial LRT system. The four DART LRT lines (Red, Blue, Green, and Orange) all operate through downtown on the existing Bryan/Pacific transitway mall. **Figure 1-4** illustrates the existing and future rail network for the DART Service Area. The LRT network not only provides direct service to the Dallas CBD, but connects residents to major employment centers, regional medical



facilities, several colleges and universities, two airports, and various entertainment destinations throughout the service area.

In addition to LRT, DART jointly operates the Trinity Railway Express (TRE) with Trinity Metro between Dallas Union Station and Fort Worth and is advancing design-build of the east-west Silver Line regional rail corridor (formerly referred to as the Cotton Belt) in the northern part of the service area. DART also operates an extensive bus system, shuttles, and 14 demand-response app-based GoLink zones. More than 46 bus routes operate to or through downtown. Elm and Commerce Streets up to 60 buses per hour in peak periods.

The McKinney Avenue Transit Authority (MATA) operates the vintage M-Line trolley line from downtown near the St. Paul Station to the Uptown area along McKinney Avenue and Cole Avenue, where it connects with the DART CityPlace Station. The City of Dallas contracts with DART to operate their modern streetcar from Union Station to the Bishop Arts District and is planning for the Dallas Streetcar Central Link through the core of downtown Dallas. More information on future transit projects is provided in **Section 2.2.1**. Multi-modal interfaces occur at several locations within the downtown area (see **Figure 1-5**). The Victory Station provides a transfer opportunity with the TRE, where a large majority of inbound commuters transfer to the Green or Orange lines to continue into the core of downtown Dallas. Union Station serves the Red and Blue lines, TRE, Amtrak and the current terminus of the Dallas Streetcar. Two major bus transfer facilities are also located downtown. The West Transfer Center and Rosa Parks Plaza serve 19 bus routes and facilitate bus-to-bus transfers and transfers to all four LRT lines at the West End Station. The East Transfer Center is located one block south of the Pearl Street/Arts District Station and serves six bus routes as well as interstate Megabus routes. **Chapter 3** provides additional details on transportation facilities and services in the Study Area.

1.4 Purpose and Need for the Proposed Action

1.4.1 Purpose of the Proposed Action

The purpose of the D2 Subway would be to ensure the sustainability of the DART system into the future by:

- Providing additional system and core capacity by adding another LRT line through downtown Dallas, which would allow for improved headways or new lines;
- Enhancing operational flexibility by incorporating connections that allow for potential new LRT patterns in the future and options for special events;
- Improving system reliability by reducing conflicts at major junctions that constrain operations and scheduling, while providing system redundancy during incidents; and
- Serving new markets while supporting land use and economic development initiatives.

Reliance upon the existing at-grade Bryan/Pacific transitway mall for all LRT lines constrains the ability of both DART and the region to implement additional rail projects or improve headways on the existing light rail lines and affects quality of service. Dependence on one single downtown transit mall also increases the risk for system-wide service disruption due to incidents on the mall, such as traffic accidents or incidents in adjacent buildings.

Operational and capacity constraints are compounded by continued high regional growth, increasing highway congestion, planned regional transit expansion, and the introduction of a privately-funded high-speed rail project. These items will further increase DART system demand and stress DART's limited core capacity.

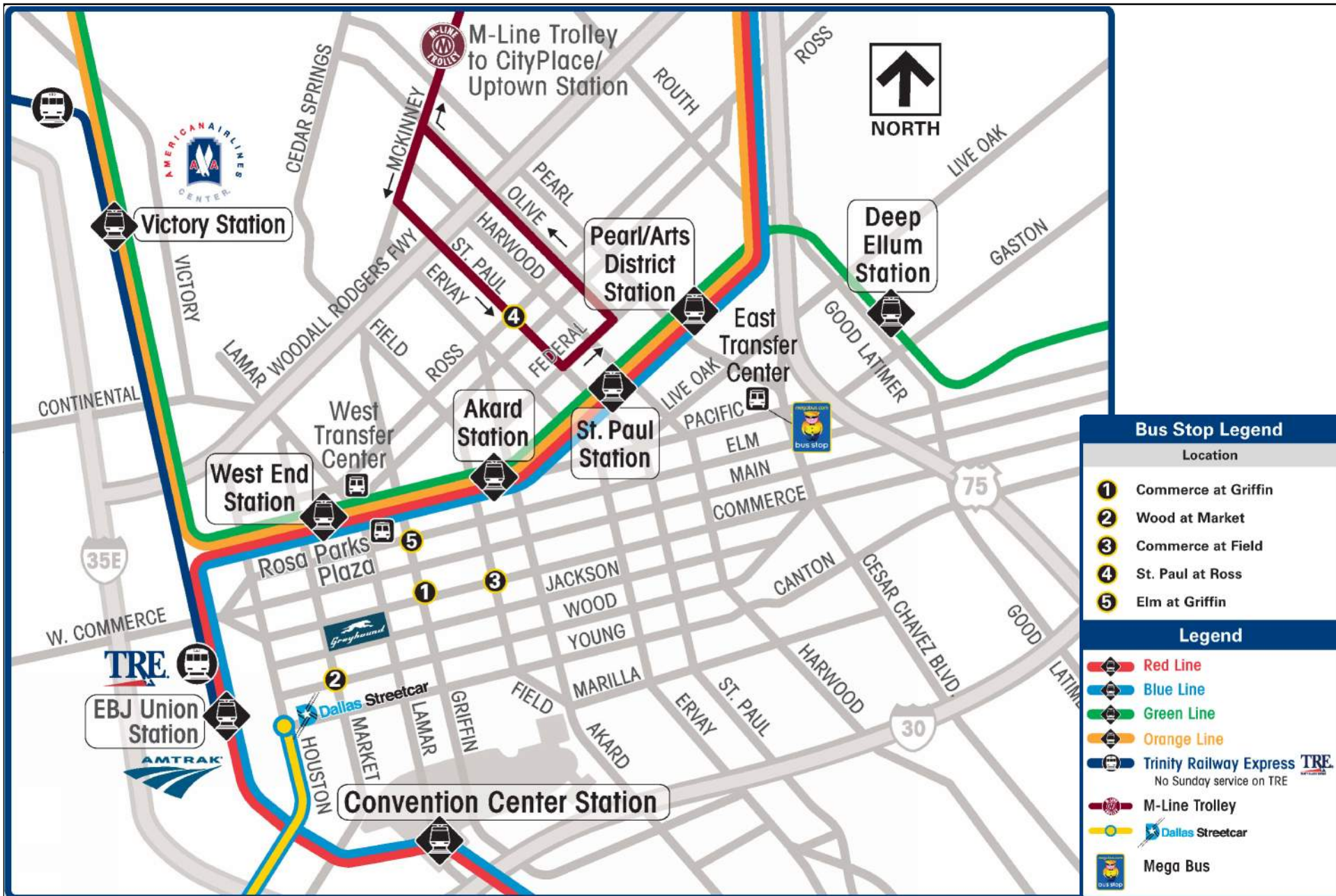


Figure 1-5
Multi-Modal Interfaces within the Downtown Dallas Area

Data Source: DART, GPC6





The D2 Subway would be designed to address the core capacity issues and increase operational flexibility, reliability, and quality of passenger service through downtown and throughout the entire LRT system. The D2 Subway would also enhance access to both established and growing markets in downtown, including the Commerce Street corridor, the south Victory Park area, and the eastern part of the CBD where recent new development and redevelopment initiatives are underway.

1.4.2 Need for the Proposed Project

A second light rail alignment through downtown Dallas would address several needs of the DART rail system. These needs range from broad issues such as regional growth and transit expansion, to specific light rail operational constraints that affect service and capacity. Specific transportation needs are outlined below.

Relieve the CBD LRT Capacity Constraint

Train operations through the existing transit mall are at or near capacity. In 2009, the LRT system operated at 10-minute peak headways. Service testing before the Green Line opened in 2010 revealed that the system was not able to maintain 10-minute headways without affecting on-time performance and service quality of all lines. While the modeled theoretical capacity in each direction was 24 trains per hour (2.5-minute combined headway), the practical capacity based on restrictive junction movements and schedule variations was 16 trains. As a result, DART increased peak headways to 15 minutes and has maintained that headway since.

Because of this capacity constraint, DART is limited in its ability to add insert trains or improve peak headways to either accommodate increasing demand, add new LRT lines, or provide a higher level of service.

DART LRT lines are currently restricted to two-car train operations due to limited station platform length on the Red and Blue lines. While various segments on the system experience crowding, the highest peak hour/peak direction loads are generally seen in the PM peak in the northbound direction on the Red and Orange lines, which serve the growing areas of northeast Dallas County and Collin County. Based on observations and ridership data, these lines experience crowding on a regular basis, which affects schedule reliability and passenger comfort. DART is advancing a program of interrelated projects to enhance core and system capacity. This program includes the D2 Subway, the Red/Blue Platform Extension project, and the Dallas Streetcar Central link. The Red/Blue Platform Extension project will enable all lines to operate three-car trains and thus address passenger capacity issues on specific trips. However, that project does not address the ability to improve headways or add new lines. Furthermore, existing junction timing would need to be modified to accommodate longer train movements, thus limiting the ability to operate three-car trains on all lines during the peak periods.

Accommodate Growing Regional Demand

Regional population and employment growth in the DFW region continue to outpace most of the country. Regional population and employment are expected to grow by more than 50 percent through year 2045. All counties will experience an increase in vehicle miles travelled (VMT), and more importantly, will see hours of congestion delay increase at twice the rate of VMT, or in some counties up to seven times the rate. This increasing congestion will make transit expansion in both the DART Service Area and the region a higher priority to help alleviate mobility issues and offer a higher capacity alternative to driving. In 2045, approximately 11 percent of transit trips into the DART Service Area are forecast to come from areas outside of the service area, and 22



percent of all transit trips are destined to the downtown Dallas area. Continued regional growth and strong downtown attractions indicate that D2 Subway capacity solutions would be of regional significance. For example, Trinity Metro opened its TEXRail line in January 2019, increasing transfers to the Orange Line at DFW Airport. The DCTA A-Train already requires that three-car trains be used on peak Green Line trips.

In response to growth forecasts, DART is evaluating a range of potential high capacity expansion corridors as part of its 2045 Transit System Plan, some of which would require operations through the CBD. DART is also advancing a core frequent bus network which would match LRT service levels to drive ridership and improve transfers. The NCTCOG Mobility 2045 Metropolitan Transportation Plan recommends eight additional rail corridors that would connect to or extend the LRT network, adding passengers and requiring longer trains or additional service to accommodate demand. These and other future projects are detailed in **Chapter 2**.

Beyond regional projects, Texas Central Partners is planning to bring high speed rail (HSR) to downtown Dallas from Houston by 2025. Initial plans call for 24 trips per day between Houston and Dallas, including a train every 30 minutes during peak times. Each train is expected to carry up to 400 passengers, resulting in nearly 800 potential passengers arriving or leaving downtown Dallas every hour. With convenient transit connectivity to bus and light rail, it is anticipated that transfers would increase the capacity needs of the DART LRT system. NCTCOG also recommends a higher speed rail connection between Dallas and Fort Worth to complement the HSR project.

While regional forecasts demonstrate need, the phasing of regional development and adjustments to demographic forecasts to focus more on higher density transit-oriented developments could also influence the timing of core capacity improvements.

Maintain a Quality System and Service

Quality service for customers translates into frequent and reliable service. Dependence on one transit mall for the current LRT system forces DART to cap peak period schedules, diminishing operating flexibility, efficiency and service. Due to the cycle time of the two junctions located at either end of the mall, the current operations represent the practical operating capacity without compromising schedule reliability during the peak period. In addition, the current configuration does not allow for optimal scheduling throughout the Service Area. For example, the Orange Line and Red Line 15-minute peak headways are evenly spaced in the North Central Corridor (downtown Dallas to Plano). This allows for equal distribution of train arrivals of 7 to 8 minutes, minimizing wait time for customers. However, given operational constraints at junctions, the Green Line must be scheduled in such a way that it operates a tighter headway with the Orange Line in the Northwest Corridor from downtown to the Bachman junction, a segment that serves a large employment area including the Medical District. During peak periods, the Orange and Green Lines are only four minutes apart, resulting in an 11-minute wait for customers rather than a more evenly spaced headway.

Any disruption along the transit mall disrupts the entire system and reduces reliability. Ensuring a reliable, quality system is what attracts customers to DART and provides a competitive advantage over the automobile.

Serve New CBD Markets

Downtown Dallas continues to redevelop and add a greater mix of uses. While much of the commercial and office core is along the existing Bryan/Pacific transitway mall, the southern part



of downtown and the Commerce Street corridor is home to several offices including AT&T Headquarters, numerous hotels and restaurants, and is within a short walk to the Government District along Young Street. The eastern area of downtown is also seeing new and redevelopment and enhancements and expansion of Carpenter Park. The new East Quarter District includes renovation of several historic buildings into commercial, retail and restaurants. The Epic development is an 8-acre site at the intersection of the downtown, Deep Ellum, and the Farmers Market areas and includes office space, high-rise residential, a signature hotel in the historic Pittman building (Grand Lodge of the Colored Knights of Pythias), and retail.

In addition to this area, the northern West End and Victory Park areas have seen extensive new development in the past few years including the Perot Museum of Nature and Science, The Union, improvements to the West End Marketplace, and several additional high density residential or office buildings. The Union includes office, residential, and a Tom Thumb urban grocery store. More redevelopment is planned for the area. This area has limited accessibility from the existing Victory Station and the West End Station.

Enhance Land Use and Redevelopment Potential

The Dallas 360 Plan identifies several catalytic development areas, including the Northern West End, AT&T Discovery District, and the Carpenter Park area. All of these areas are identified as having the opportunity to capitalize on transportation projects like the D2 Subway, have great development potential, and the ability to catalyze other areas of downtown.

1.4.3 Objectives

The D2 Subway would ensure the sustainability of the DART system into the future by providing additional system and core capacity, enhancing operational flexibility, improving system reliability, and serving new markets, while supporting land use and economic development initiatives. Detailed objectives include:

- Improve System Capacity
 - Allow for additional train operations through downtown
 - Accommodate projected regional population and employment growth through transit investments
 - Provide added person carrying capacity to help satisfy future transit expansion
- Enhance Operational Flexibility
 - Provide options in operating plans for future service
 - Improve ability to operate special events service
- Improve System Reliability and Quality
 - Provide redundancy to maintain system performance during incidents
 - Improve junction operations by limiting conflicts
- Serve New Markets
 - Increase transit ridership
 - Improve transit accessibility to underserved areas
 - Serve new areas for existing and future LRT riders
- Support Land Use and Economic Development
 - Encourage economic development opportunities
 - Enhance land use planning initiatives
 - Promote high-density uses



1.5 Planning Context

The Role of the Supplemental EIS in Project Development

DART and the FTA have prepared this Supplemental Draft EIS (SDEIS) in accordance with the National Environmental Policy Act (NEPA: 42 USC 4321 et seq.) of 1969 and the regulations implementing NEPA set forth in 40 CFR Parts 1500-1508 and 23 CFR Parts 771 and 774.

Based on coordination with FTA and a July 27, 2018 written evaluation completed pursuant to Title 23, CFR §771.129(a), FTA concurred that a SDEIS could be prepared under the original 2007 notice of intent. This written evaluation and FTA concurrence is provided in **Appendix C**.

The SDEIS is prepared to inform the public of potential environmental, social and economic impacts associated with the Project compared to a No-Build Alternative. The No-Build Alternative provides a baseline condition for identifying changes that would occur with the D2 Project in place.

DART has developed and implemented a comprehensive Public and Agency Involvement Program (PAIP) as part of the SDEIS. The PAIP builds on prior planning efforts and includes agency meetings; community-wide public information meetings; regular briefings to a D2 Subway stakeholder work group; meetings with elected officials, and other local and regional officials; focus area meetings along the corridor; one-on-one stakeholder meetings; and information dissemination via a project website, newsletters, and social media.

Public, stakeholder, and focus area meetings have provided the public and key downtown stakeholders an opportunity to comment on the scope of the SDEIS, the Project purpose and need, and other elements.

This SDEIS will be available for a 45-day public and agency review and comment period. During this time, public hearings will be held to present the findings of this SDEIS and formally receive comments. Written comments may be submitted throughout the full comment period as well. After circulation of the SDEIS, preliminary engineering and environmental analyses will be completed. Additional analyses may be required upon receipt of substantive comments. DART will develop mitigation commitments and will respond to comments received during the comment period, as appropriate.

In keeping with current environmental regulations, FTA and DART plan to issue a combined FEIS/ROD document. The combined FEIS/ROD would incorporate the above elements, state the proposed action, and be made available to the public. In addition, the combined FEIS/ROD would include a Mitigation Monitoring Program (MMP) to ensure that mitigation commitments are carried through final design and construction.



2. Alternatives Considered

This chapter presents the definition of the No-Build Alternative and Build Alternative. These two alternatives are evaluated and compared in subsequent sections of this document in accordance with the National Environmental Policy Act (NEPA). Federal Transit Administration (FTA) regulations dictate that “The draft EIS (DEIS) must evaluate all reasonable alternatives to the action and document the reasons why other alternatives, which may have been considered, were eliminated from detailed study” (23 CFR 771.123). The Council on Environmental Quality (CEQ), the federal commission responsible for coordinating federal environmental efforts, further addresses reasonable alternatives as “those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant” (46 Fed. Reg. 18026, question 2a). Background information supporting the Build Alternative as the preferred alternative is discussed in **Section 2.1** of this Supplemental DEIS (SDEIS) documents alternatives and design options considered but eliminated from further consideration.

2.1 Planning History

A second downtown light rail alignment has been included in various DART and NCTCOG planning documents since 1983 as noted in **Section 1.2**. Planning for the alignment was officially initiated in 2007 as part of the Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) effort. The Project webpage (www.DART.org/D2) includes information on the alternatives development and screening process that led to the selection of the proposed Build Alternative presented in this Chapter from among several other build alternatives. A brief summary of that process is provided below.

D2 Study Phase One: AA/DEIS (2007-2010)

In the spring of 2007, DART conducted scoping pursuant to FTA and NEPA requirements. A long list of over 20 alternatives was developed. Phase One of the D2 Study concluded with the AA/DEIS in May 2010. The AA/DEIS included the evaluation of four primary alternatives including: Lamar-Commerce (Build B7), Lamar-Young (Build B4), Lamar-Marilla (Build B4a), and Lamar-Convention Center (Build B4b). A locally preferred alternative (LPA) was not selected at that time due to changing downtown conditions that resulted in a desire by the City of Dallas to evaluate additional alternatives, and the 2009 recession, which deferred the implementation date.

D2 Study Phase Two: Additional Alternatives Analysis (2011-2015)

In early 2011, DART initiated Phase Two of the study, which built on the original effort in response to comments on the AA/DEIS. These comments led to new D2 Alternatives as well as refinements to those considered in the AA/DEIS. In February 2013, DART held public meetings to present the alternatives and refinements. In June 2015, DART held meetings to present the evaluation results which supported the selection of an LPA. On September 22, 2015, the DART Board of Directors passed Resolution No. 150101 *Approval of the Locally Preferred Alternative for the Second CBD Light Rail Alignment (D2)*. The 2015 LPA was Alternative B4 Lamar-Young/Jackson, a mostly at-grade alignment with a below grade crossing of the existing transit mall.

Project Development for Original LPA B4 Lamar-Young/Jackson (2015-2016)

DART received authorization into Project Development under the FTA Capital Investment Grant (CIG) program in November 2015 to conduct preliminary engineering and a supplemental DEIS.



By mid-2016, there were community concerns with the at-grade alignment along Young/Jackson and requests from the City of Dallas and key stakeholders to pursue a subway option. As a result, on October 25, 2016, the DART Board of Directors approved the FY17 Financial Plan, which doubled the project budget to \$1.3 billion for development of a D2 Subway. Based on this action, DART initiated an LPA Refinement Phase in December 2016.

LPA Refinement Phase to Select D2 Subway (2016-2017)

The LPA refinement phase entailed significant coordination with technical staff and downtown stakeholders that started with input on potential subway corridors. The screening and evaluation process led to broad stakeholder support for an alignment along Commerce via Victory/Swiss and culminated with the following actions supporting advancement of the D2 Subway as the new LPA:

- On September 6, 2017, DART provided its annual CIG program submittal to the FTA in support of a future Core Capacity grant, which received a subsequent medium-high rating.
- On September 13, 2017, the Dallas City Council approved the Victory/Commerce/Swiss alignment as the LPA (Resolution No. 171426).
- On September 26, 2017, the DART Board of Directors selected and approved the Commerce via Victory/Swiss Alternative as the LPA (Resolution No. 170101).

2.2 No-Build Alternative

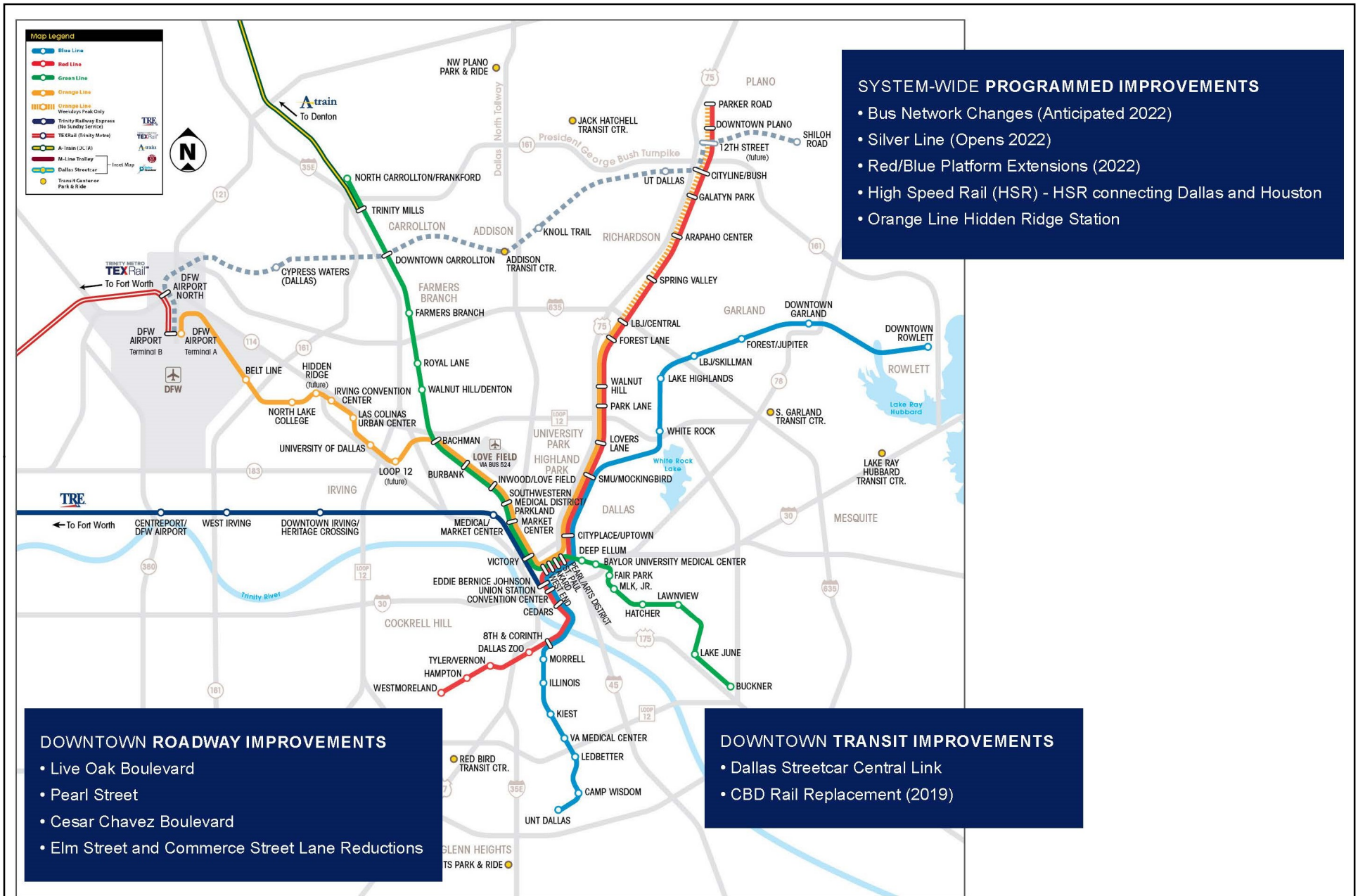
The No-Build Alternative is defined as existing and committed transportation projects through year 2045. It includes DART services and facilities that are programmed and funded within the FY20 DART 20-Year Financial Plan, as well as the regional projects contained in the NCTCOG Metropolitan Transportation Plan (MTP), *Mobility 2045*. *Mobility 2045* also includes an extensive regional rail network that is subject to additional funding and is not included in the No-Build Alternative. In addition, the DART 2045 Transit System Plan (TSP) is in development so there are no additional major programmed DART rail expansion projects or service level improvements defined at this time. However, the plan may include system-wide headway improvements and possible LRT expansion corridors. Given the potential impact of these new service plans or regional connections on the DART LRT system demand, the No-Build Alternative includes two sensitivity test scenarios for supplemental discussion, which are summarized in **Section 2.2.3**.

The No-Build Alternative is not a no impact alternative, as it includes actions by DART or other agencies that have been or will be addressed in separate environmental reviews. The No-Build Alternative is included as a benchmark against which the potential significant environmental benefits and impacts of the proposed Build Alternative will be measured. A summary of substantial projects programmed and funded that are part of the No-Build Alternative are shown in **Figure 2-1** along with the existing transit network and discussed below.

2.2.1 Transit Service and Capital Projects

The No-Build Alternative includes recently completed and future capital investments in the transit network, including:

- The CBD Rail Replacement project was completed in late 2019, including installation of new rail and two new crossovers for added LRT system operational flexibility.
- The DART Red and Blue Line Platform Extension Project includes modifications to 28 stations constructed prior to 2004. The modifications will enable the platforms to accommodate 3-car Light Rail Vehicle (LRV) consists and will be complete in 2022.



**Figure 2-1
No-Build Alternative**

Data Source: DART, GPC6, City of Dallas, 2019





- The Silver Line Regional Rail project is a 26-mile east-west corridor in the northern part of the DART Service Area. It is in the design-build phase and will open in late 2022.
- The Dallas Streetcar Convention Center Loop project will extend modern streetcar from Union Station to the Omni Hotel/Convention Center area. The City of Dallas is reviewing the design, funding sources, and schedule and anticipates service in 2022.
- The Dallas Streetcar Central Link will extend modern streetcar from the Convention Center area through downtown Dallas to overlap with the M-Line in the Uptown/Klyde Warren Park area via an Elm/Commerce couplet. Main Street and Young Street remain under consideration as well, pending additional review by the City. It is anticipated that this line would open concurrent with D2 Subway given construction coordination. This schedule may change pending additional planning and work towards an FTA Small Starts grant.

The LRT system and regional rail lines will continue to operate as they do today. The No-Build Alternative also assumes minor changes to the bus network both in and out of downtown Dallas in order to keep pace with population and employment growth. Specific bus service improvements are currently in development as part of a DARTzoom Bus Network Redesign effort anticipated to be complete in early 2021.

The No-Build Alternative also assumes that High Speed Rail (HSR) is operational. Texas Central Partners, a private venture, is developing high speed passenger rail service that will connect Dallas and Houston in under 90 minutes. The project is currently under federal environmental review, with anticipated Record of Decision in 2020.

2.2.2 Roadway Projects

The No-Build Alternative assumes completion of several freeway improvements around downtown Dallas. Texas Department of Transportation (TxDOT) improvements focus on the Interstate (I)-30/I-35E interchange on the western edge of downtown Dallas, the depressed portion of I-30 south of downtown (the Canyon), and a portion of I-35E to State Highway (SH) 183 (Lower Stemmons). Improvements include reconstruction and widening, managed lanes, frontage road and ramp improvements, and operational improvements. The I-30 canyon design study is underway, and construction is underway for Lower Stemmons.

Structural improvements were also recently completed on I-345 from I-30 to Woodall Rodgers Freeway to extend the life of this facility. Potential reconstruction or removal of the facility is being evaluated by TxDOT as part of an I-345 Feasibility Study with a recommendation anticipated in 2 to 3 years; however, future improvements to I-345 are not funded or contained in the MTP. More information on D2 Subway design interface with the I-345 options is discussed in **Section 3.3.3**.

Key street modifications underway in downtown include:

- Live Oak Boulevard – Olive Street to Cesar Chavez Boulevard: convert from 1-way to 2-way from DART East Transfer Center to new Cesar Chavez Boulevard.
- Pearl Street – Commerce Street to Live Oak Boulevard: convert from 1-way to 2-way.
- Cesar Chavez Boulevard – Commerce Street to Live Oak Boulevard: construct six lane divided roadway (completed late 2019).

The City of Dallas Thoroughfare Plan reflects Commerce Street as 3 lanes and Elm Street as 4 lanes from Houston Street to Cesar Chavez Boulevard. Ongoing development in downtown has led to several blocks along Commerce and Elm being reduced from 5 lanes to 3 or 4 lanes. While reduced lanes along the entire length of these streets is not programmed by the City, development trends indicate that these improvements may continue to occur with private investment. Thus, this ultimate configuration is assumed for the No-Build Alternative.



2.2.3 Sensitivity Test Scenarios

Regional expansion and service level improvements for the DART system continue to be discussed in long-range agency plans. While not funded at this time, these improvements could have a substantial effect on the DART transit system in terms of capacity requirements. As a result, two sensitivity tests are included in the No-Build Alternative for discussion in **Chapter 3** as follows.

Enhanced Headway Scenario

The DART Board has discussed a desire to enhance LRT system headways and potentially return to 10-minute peak service in the future. While enhanced service is not yet included in the 20-year Financial Plan, it could be advanced as a long-range recommendation in the TSP. Understanding the capacity needs of a more frequent network is needed to determine if the No-Build system could accommodate increased passenger loads. This enhanced headway scenario would also modify Silver Line peak service from every 30 minutes to every 20 minutes, and Dallas Streetcar from every 20 minutes to every 15 minutes.

Regional Rail Expansion Scenario

The NCTCOG MTP, *Mobility 2045*, includes recommendations for several regional rail corridors that would directly interface or be interlined with DART rail lines, or that could terminate in downtown Dallas. **Figure 2-2** summarizes the regional rail lines, headways, and key interface points with the DART system.

2.3 Proposed Build Alternative

The D2 Subway is defined as the Build Alternative (see **Figure 2-3**). The Project would be primarily below-grade through downtown Dallas, generally from Woodall Rodgers Freeway to I-345. An at-grade section from Victory Station to Woodall Rodgers Freeway would be mostly within DART-owned right-of-way, and another at-grade section would be located east of I-345 and south of Swiss Avenue to connect with the existing Green Line. The alignment and stations are described below from west to east starting at Victory Station. More detailed 20 percent preliminary engineering design plans are included in **Appendix A**. The plans include the horizontal and vertical alignment, typical sections, proposed street modifications, and station architectural plans.

2.3.1 Alignment

The D2 Subway would be designed as a double-track alignment with 15.5-foot track centers in at-grade locations. Track center spacing varies in tunnel and underground stations from 36.2 feet to 45 feet. The alignment consists of at-grade, retained cut, cut and cover, and tunnel sections. Construction methods are described in **Chapter 5**.

The Project would begin south of Victory Station with a junction from the existing DART Rail alignment. The alignment would then proceed at-grade in a southeasterly direction within DART-owned right-of-way in the center of Museum Way crossing Victory Avenue and Victory Park Lane. The existing median opening at Victory Park Lane would be maintained to allow through north-south automobile traffic. After crossing Houston Street, the alignment would continue within DART right-of-way through the parking lot adjacent to the Northend Apartments and the Perot Museum

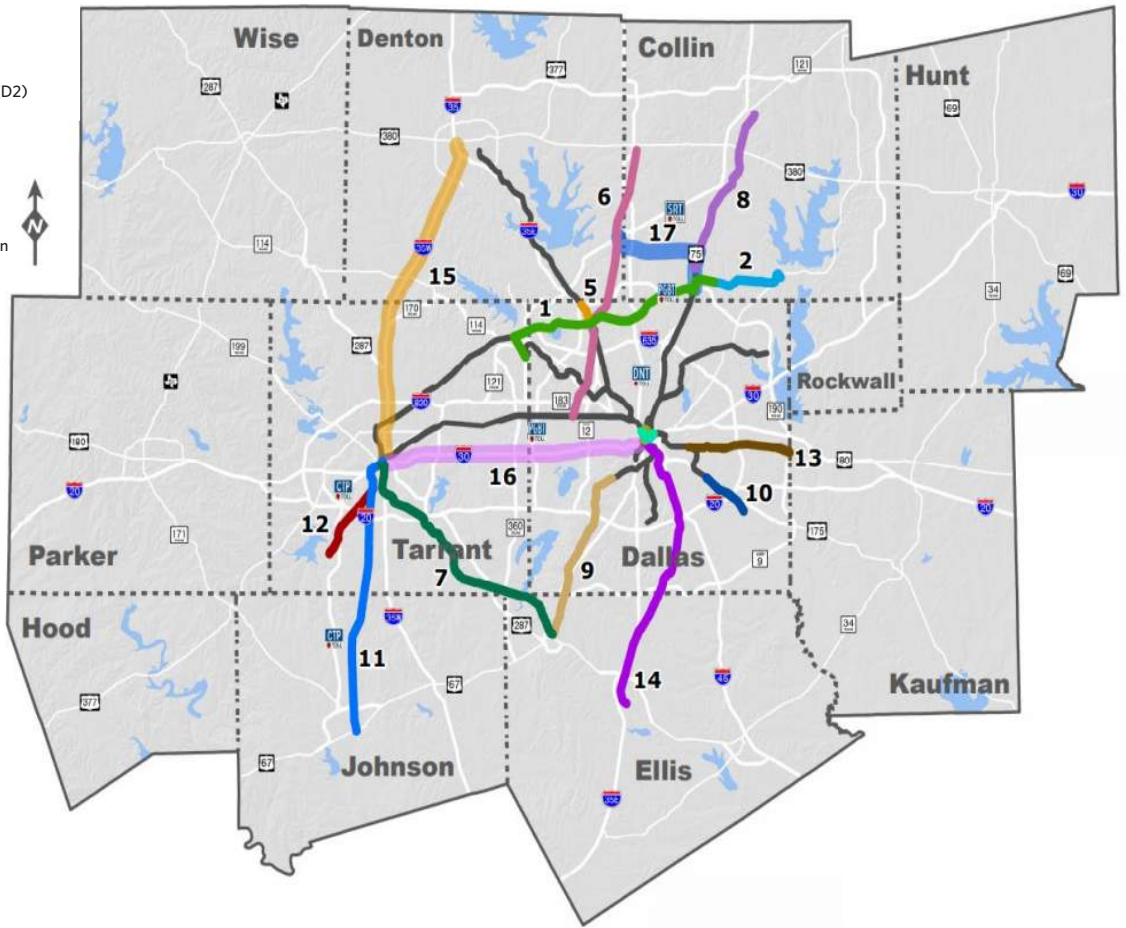
REGIONAL TRANSIT EXPANSION PROJECTS

Rail

- 1: Cotton Belt
- 2: Cotton Belt East Extension
- 3: Downtown Subway Alignment (D2)
- 4: Dallas Streetcar (Central Link)
- 5: A-train South Extension
- 6: Frisco Line
- 7: Mansfield Line
- 8: McKinney Line
- 9: Midlothian Line
- 10: Green Line Southeast Extension
- 11: Cleburne
- 12: Southwest TEX Rail
- 13: Scyene Line
- 14: Waxahachie Line

High-Intensity Bus

- 15: IH 35W Express
- 16: IH 30 Express
- 17: Spring Creek Parkway
- Existing Rail



CORRIDOR/EXTENSION	FROM-TO	HEADWAY	DART SYSTEM INTERFACE
2 - SILVER LINE EXTENSION	Shiloh Road to Downtown Wylie	20/60	Extension of Silver Line from Shiloh Road
5 - A-TRAIN EXTENSION	Trinity Mills to Downtown Carrollton	20/60	Transfers to Green Line, Silver Line
6 - FRISCO LINE	South Irving to Frisco	20/-, -/60	Peak direction headways; transfers to Green, Orange and TRE lines
7 - MANSFIELD LINE	Fort Worth to Mansfield	20/-, -/60	Peak direction headways; links to Corridor 9
8 - MCKINNEY LINE	Parker Road to McKinney North	20/60	Transfers at Parker Road Station
9 - MIDLOTHIAN LINE	Westmoreland to Midlothian	20/60	Transfers at Westmoreland Station
10 - GREEN LINE EXTENSION	Buckner to South Belt Line	15/20	Extension from existing Buckner Station
11 - CLEBURNE	Fort Worth to Cleburne	20/-, -/60	Peak direction headways; transfers to TRE
12 - SOUTHWEST TEXRAIL	Fort Worth to McPherson	20/60	Extension of TEXRail to southwest
13 - SCYENE EXTENSION	Downtown Dallas to Masters	15/20	Deep Ellum Station to Masters
14 - WAXAHACHIE	Dallas to Waxahachie	20/-, -/60	Peak direction headways; TRE at Union Station
16 - IH 30 EXPRESS BUS	Fort Worth to Dallas	30/30	High intensity bus service into downtown Dallas



Figure 2-2
Regional Transit Expansion Projects

Data Source: DART, GPC6

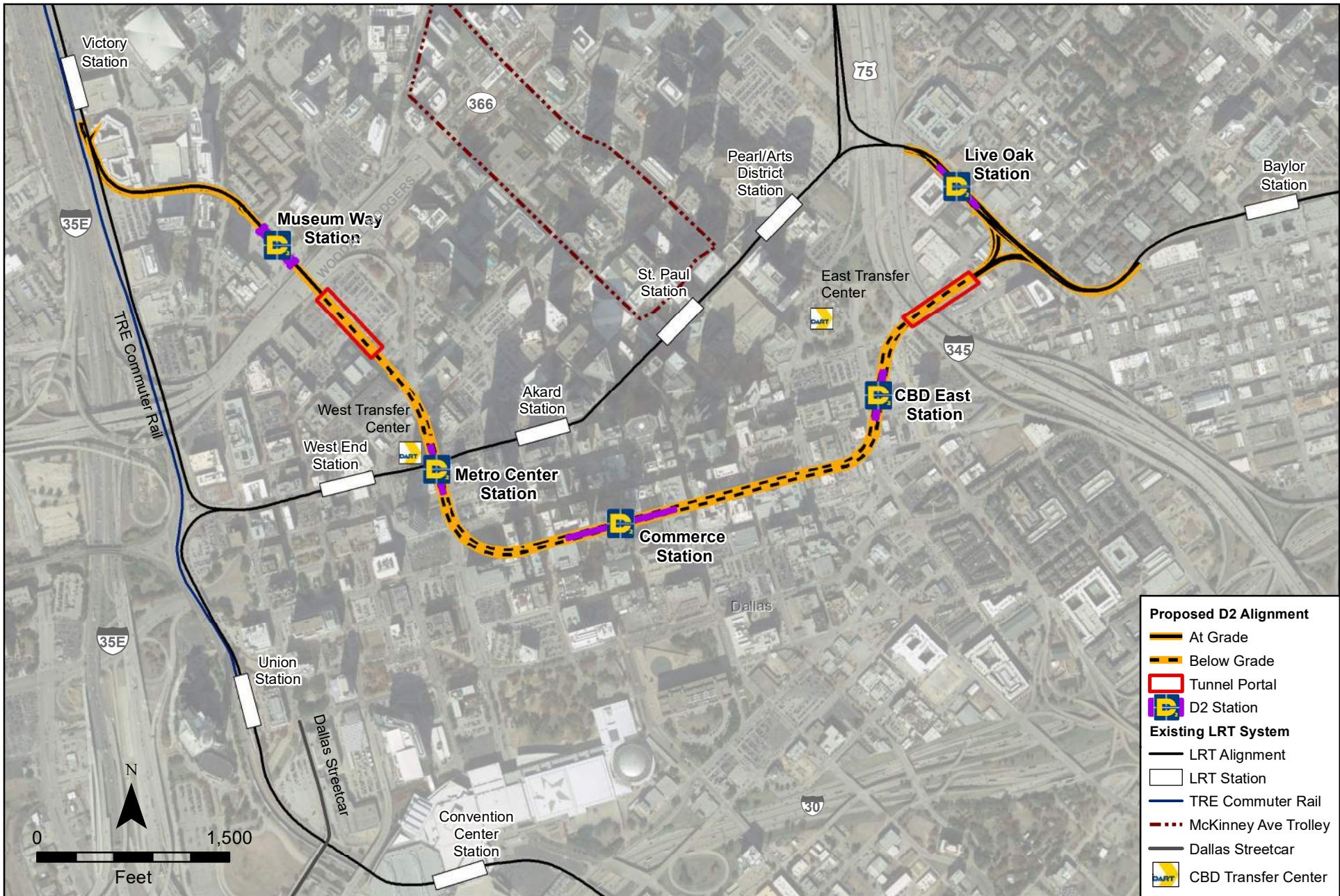


Figure 2-3
D2 Subway Light Rail Transit Project

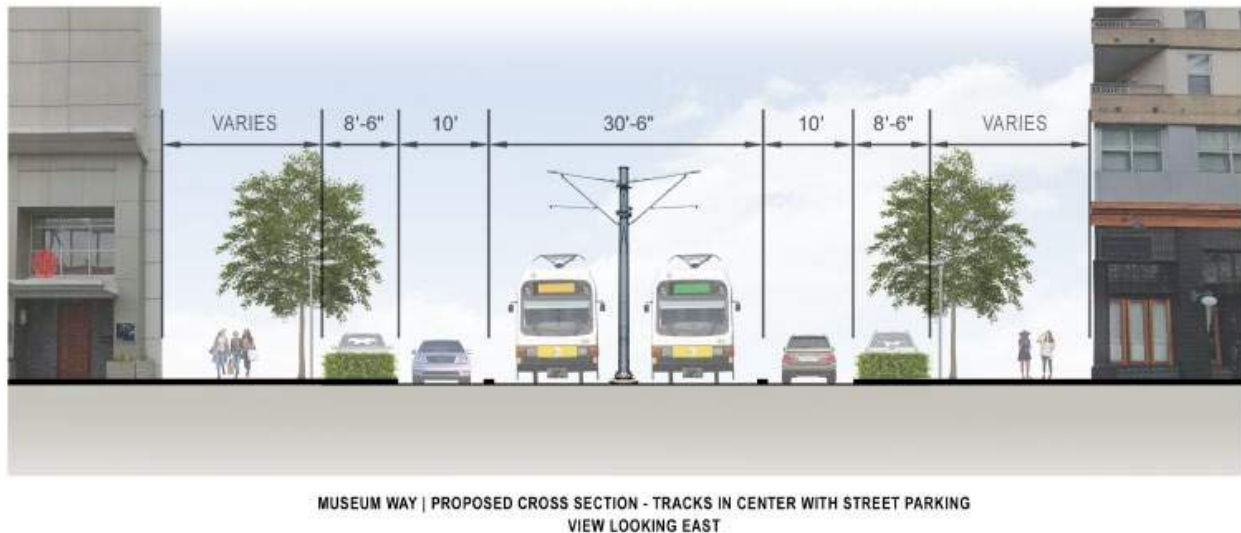
Data Source: DART, GPC6





of Nature and Science (Perot Museum) where an at-grade, side platform light rail station would be located (Museum Way Station). **Figure 2-4** illustrates the typical double-track, at-grade section along Museum Way. Proposed changes to the street cross-section include removal of median parking and modifying the street to one-lane each direction with parking or loading/valet areas along the sidewalk.

Figure 2-4 Typical At-Grade Cross-Section along Museum Way



After leaving the station, the alignment would cross under Woodall Rodgers Freeway. Given limited clearances under Woodall Rodgers Freeway and the westbound on-ramp from Field Street, the alignment would be slightly lowered at Broom Street and McKinney Avenue, requiring those street crossings to be lowered by about one to two feet as well. Broom Street would be shifted to the south closer to Woodall Rodgers Freeway to accommodate the Museum Way Station platform. After crossing McKinney Avenue the alignment would begin its transition underground in a U-wall structure. This segment is referred to as the west tunnel portal. The U-wall structure, or an open-topped box, is required as a transition from the at-grade line to the underground part of the alignment. These structures have the appearance of a pair of retaining walls but are typically one structure.

Munger Avenue would remain in the same configuration, while Corbin Street would be closed at North Griffin Street. Hord Street and Griffin Street would be rebuilt after construction of the D2 Subway. Additional street modifications are described in **Chapter 3**. The alignment and west tunnel portal would be located on a property currently occupied by a parking lot but planned for development in the near future. The alignment remains underground until I-345. After passing under Hord Street near the Dallas World Aquarium, the alignment continues south under Griffin Street. Between San Jacinto Avenue and Elm Street, an underground station (Metro Center Station) is planned, which would provide the ability to transfer to the West Transfer Center and the West End and Akard Stations.

After crossing under Main Street, the alignment would turn east under Belo Garden and follow under Commerce Street. While under Commerce Street, another underground station is planned approximately between Akard and Ervay streets (Commerce Station). Before passing under South Pearl Street, the alignment would begin to turn northeast, crossing diagonally underneath city blocks. Another underground station (CBD East Station) would be provided between Main



Street and Elm Street. This station would provide opportunities to transfer to buses at the East Transfer Center. Streets in this area would be reconstructed to existing conditions.

After passing under Cesar Chavez Boulevard, the alignment would begin the transition back to the surface in a U-wall structure for the east tunnel portal. This transition area would be under I-345 and along the south side of Swiss Avenue. Immediately after resurfacing, the alignment would cross Hawkins Street and come to a full wye junction that would allow trains to move either north or south along the proposed rebuilt Good Latimer tracks, which would change from ballasted track to embedded track. The Deep Ellum Station would be relocated north of its current location and would be renamed Live Oak Station. With the new Live Oak location, only the Orange Line would serve the Live Oak Station; the Green Line would serve Deep Ellum via the Baylor University Medical Center Station. North Central Expressway frontage road along I-345 would be closed at the tunnel portal between Pacific and Swiss. Hawkins Street would be realigned from Swiss Avenue to Pacific Avenue to align with the new Jett Way. Miranda Street would be closed and abandoned. Other street modifications and traffic movement changes are described in **Chapter 3**.

2.3.2 Stations

The Project would introduce four new stations: one surface station (Museum Way), three underground stations (Metro Center, Commerce, and CBD East) and one relocated surface station (Deep Ellum Station relocated as Live Oak Station). The underground stations would be accessed by stairs, elevators, and/or escalators, and would have fare barrier systems to control access. DART is also considering use of platform edge doors in the subway stations. Platform edge doors are an automatically controlled barrier to the tracks, which only allows passengers access when a train arrives and stops at a station. Two or more station access points would be provided for underground stations. The access points would be provided in open spaces downtown, within the sidewalks, or incorporated into new or existing buildings. The underground station infrastructure would also include emergency egress and ventilation shafts. **Appendix A.2** includes the station architectural plans for each station. **Appendix A.4** includes the urban design plans and process summary for each station area.

The underground stations would be designed using National Fire Protection Association (NFPA) 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems* (2018). This NFPA standard is used internationally for new and existing transit systems as a baseline for which calculations to use and how to apply them to common situations found in the design of fixed guideway transit stations. The NFPA requirements focus on fire and life safety requirements within both surface and underground stations. The Project would adopt the current year of the NFPA once final design and construction is underway.

Table 2-1 summarizes key features of each station. Each station is described in more detail below.

Table 2-1 Summary of Station Characteristics

Station	Platform Type	Access Portals	Fare Barrier Location	Vertical Circulation Elements
Museum Way	At-Grade, Side Platform	N/A	Open	N/A
Metro Center	Subway, Center Platform	West Transfer Center Headhouse	Street level	Elevators, escalators, stairs, emergency egress stairs



Station	Platform Type	Access Portals	Fare Barrier Location	Vertical Circulation Elements
		Rosa Parks Plaza	Street level	Elevators, escalators, stairs, emergency egress stairs
		Lamar/Pacific	Street level	Elevators only, emergency egress stairs
		Pacific/Griffin	Street level	Elevators, stairs
		Griffin Street median	N/A	Emergency egress stairs
Commerce	Subway, Center Platform	Pegasus Plaza Headhouse	Upper mezzanine	Elevators, escalators, stairs
		Two Options: 1. Commerce/Ervay sidewalk, or	Lower mezzanine	Elevators only, emergency egress stairs
		2. Inside the parking garage in first floor retail area	Street level	Elevators only, emergency egress stairs
		Adolphus Tower ground level	N/A	Emergency egress stairs
CBD East	Subway, Center Platform	Pearl/Elm	Street level	Elevators, escalators, stairs, emergency egress stairs
		North side of Elm	Street Level	Emergency egress stairs
		Pearl/Main	Street level	Elevators, escalators, stairs
Live Oak	At-Grade, Center Platform	N/A	Open	N/A

Source: DART, GPC6

Museum Way

The Museum Way Station would be an at-grade, side platform station located southwest of the Perot Museum and north of Woodall Rodgers Freeway. **Figure 2-5** illustrates the overall urban design plan to show the relationship of the station to the surrounding area. The station would be located to allow for potential integration of the Perot Museum expansion over or adjacent to the station platforms, which could include new museum facilities and a multi-story parking garage. The station canopy elements would be similar to that for other side platform stations in downtown Dallas until potential museum expansion occurs, which could replace the canopies with museum infrastructure elements. The Museum Way Station platforms would each be 17'-4" x 386'-0". Landings and access ramps wrap around the back of the platform to reduce the overall effective length of station to fit in between River Street and Broom Street. Even with the reduced platform length, Broom Street would need to be realigned to the south to accommodate the platform length and allow for a future River Street connection to the north of the station. Shifting Broom Street south would create a more pedestrian friendly edge along the museum property leading to the platform.

Accessibility to the station would be via sidewalks and potential new pathways along the Project corridor to areas south of Woodall Rodgers Freeway where new developments are planned.

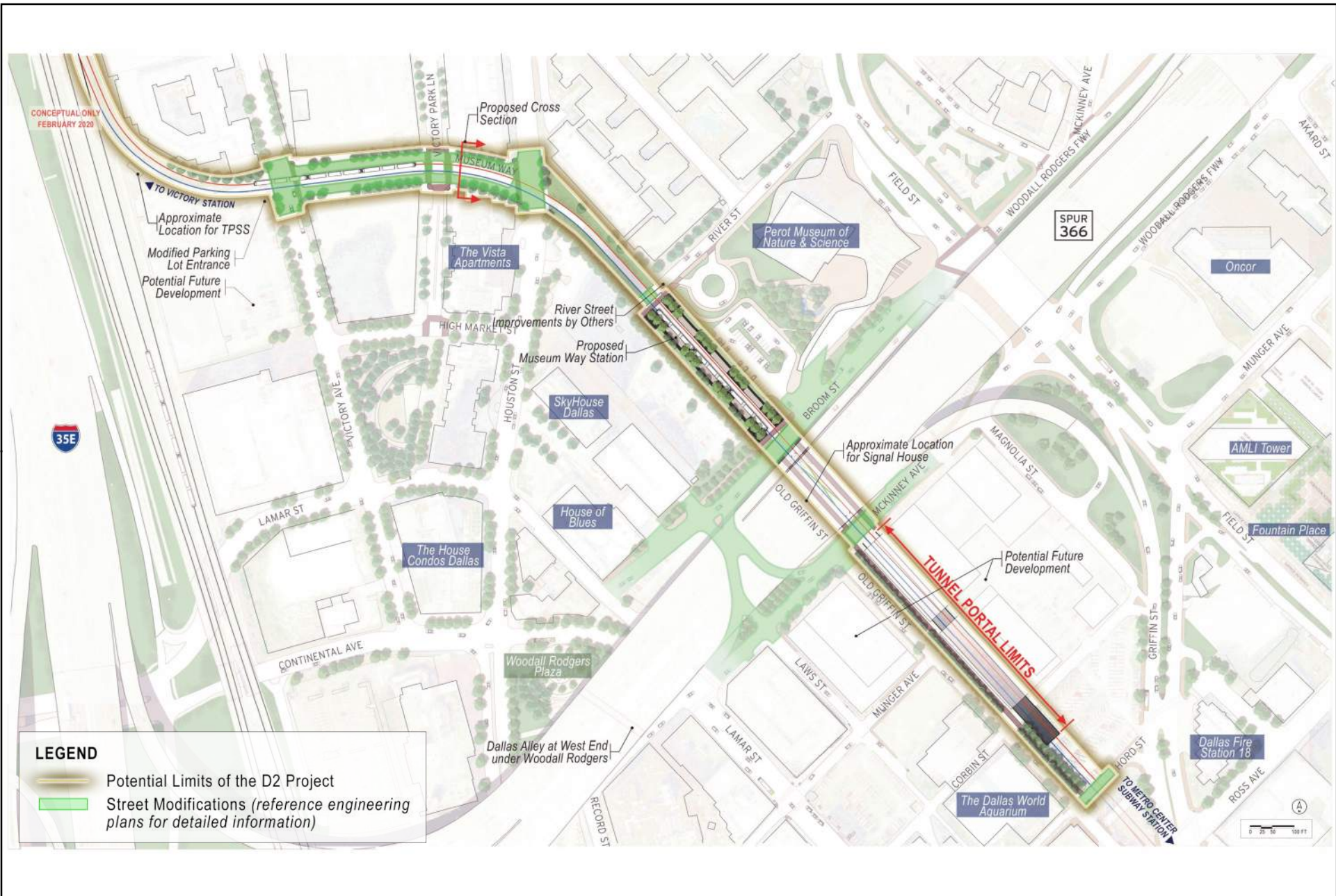


Figure 2-5
Museum Way Station and North Tunnel Portal Urban Design Plan

Data Source: DART, GPC6



Metro Center

The Metro Center Station urban design plan is shown in **Figure 2-6**, while **Figure 2-7** illustrates the station architectural plan. The Metro Center Station would be a subway station located under North Griffin Street between San Jacinto and Elm Streets, near the West Transfer Center and Rosa Parks Plaza and adjacent to Homewood Suites and Crowne Plaza. The station is accessible to both the West End Station (one block to the west) and the Akard Station (one block to the east). The station would have a mezzanine level, a public concourse level, and a center platform level accessible from elevators, escalators and/or stairs from up to four access points. Vertical circulation at each access point is dependent on availability of space. The access points are located to enhance connectivity and transfers to bus service, the Red and Blue lines, and area destinations including the West End Historic District, major employers, and El Centro College.

The primary access point at Metro Center would consist of a new headhouse at the West Transfer Center site, which will require reconfiguration of the bus bays at this location. The redesign is pending the outcome of the DART Bus Network Redesign effort which may modify the number of required bus bays. The main head house would be located at the northwest corner of North Griffin Street and Pacific Avenue. This space would contain necessary functions to serve as the main entrance into the subway station and would be utilized as a transfer point to surface transportation. These functions include a pre-fare public space that includes seating for bus transfers, restrooms, vending, DART staff and a police podium. Post-fare collection would be a large open concourse, spaces for concessions, large open platform, and non-public service spaces for DART staff, Dallas Fire-Rescue Department (DFD) and DART police. The building would also include ancillary spaces for ventilation, mechanical and electrical purposes. Other pedestrian portals would be located at the northeast corner of Griffin Street and Pacific Avenue, at Rosa Parks Plaza, and the northwest corner of North Lamar Street and Pacific Avenue. Vertical circulation at each access point is summarized in **Table 2-1**. An emergency egress stairway and ventilation would be in the median of North Griffin Street north of Elm Street, along with a light-well to allow natural light into the station below.

Commerce

The Commerce Station urban design plan is shown in **Figure 2-8** to show its relationship to the surrounding area. **Figure 2-9** shows the architectural site plan. Commerce Station would be located under Commerce Street near AT&T's headquarters, and the Magnolia and Adolphus hotels. The station would be 730 feet in length with a center platform. The station platform is longer than typical given right-of-way constraints such as subsurface utilities, building foundations, vertical circulation elements required at each end of the platform, and is designed to maintain visual wayfinding through the platform area.

The primary access point for Commerce Station would consist of a new headhouse at Pegasus Plaza located at the southeast corner of Main Street and Akard Street. The space would contain functions to serve as the main entrance into upper and lower mezzanine levels to access the platform. Fare control would be below-grade at the upper mezzanine level to minimize the surface footprint of the headhouse. Post-fare collection areas would include a large open concourse generally under Akard Street, spaces for concessions, and non-public service spaces for DART staff, DFD and DART police. The station would also include ancillary spaces for ventilation, mechanical and electrical purposes. The majority of the station mechanical systems/ electrical systems, and tunnel ventilation would be located under the plaza. Staff spaces, service spaces, public passage, ventilation shafts and egress corridors would be located under Akard Street.

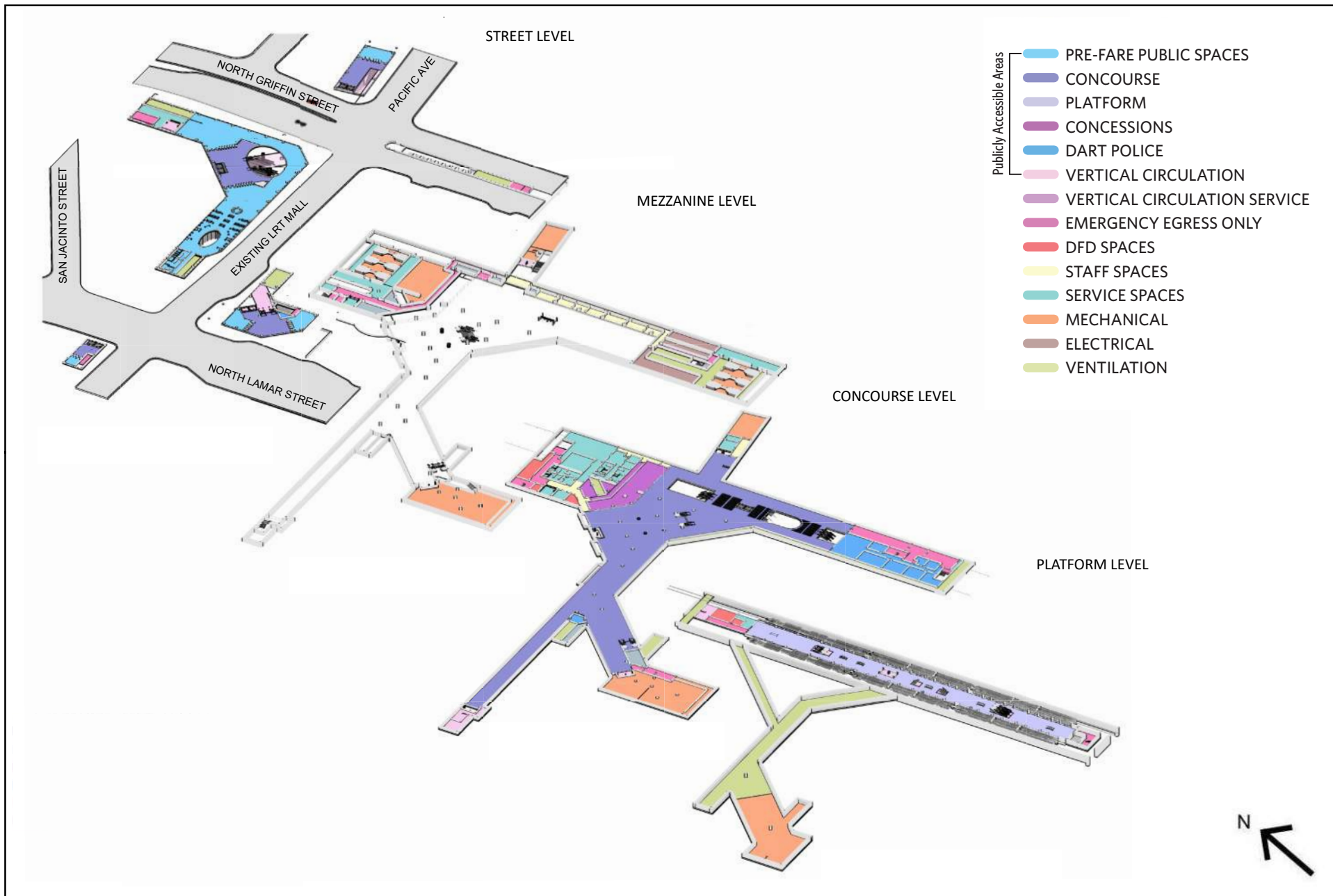
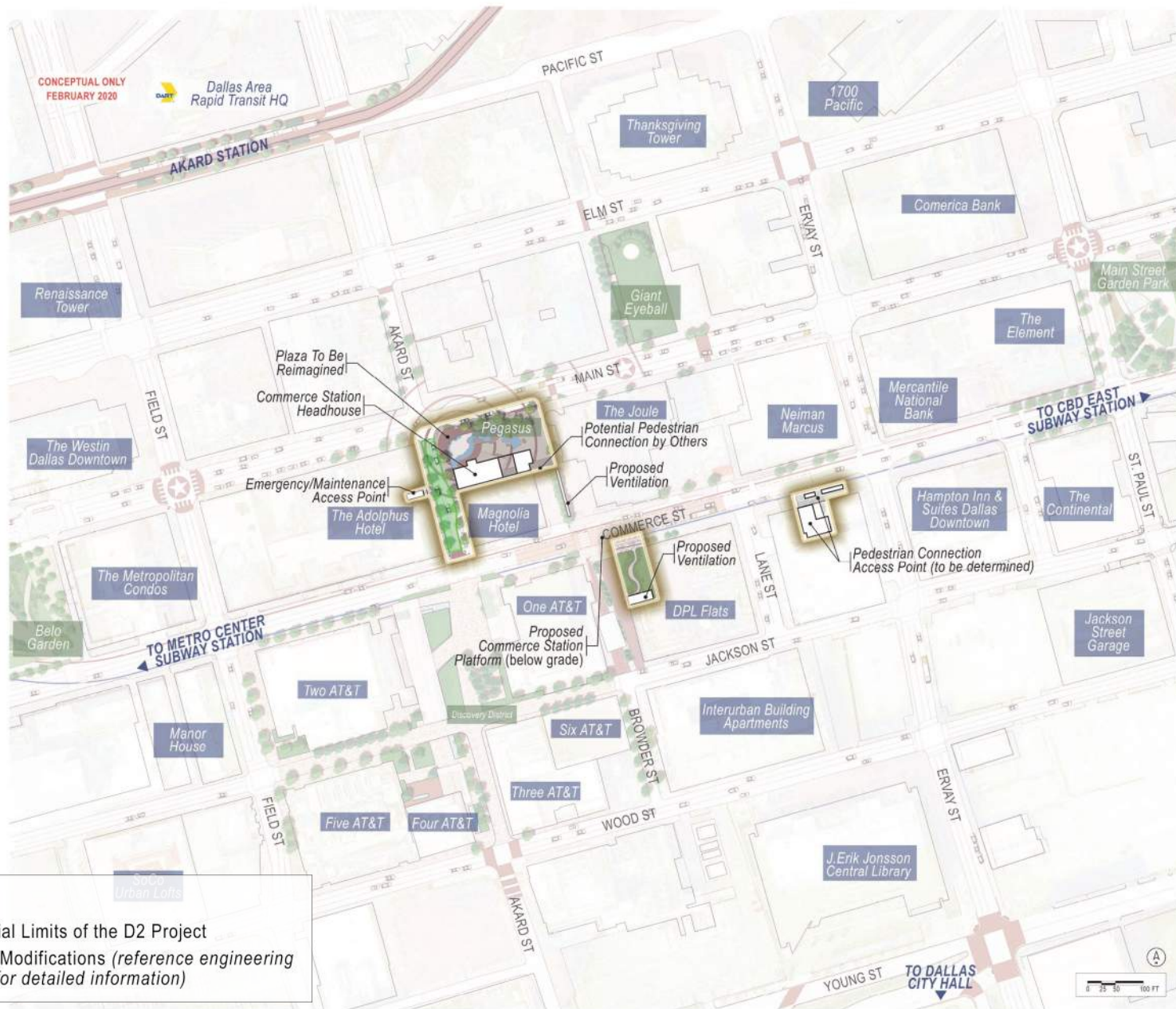


Figure 2-7
Metro Center Station Architectural Plan

Data Source: DART, GPC6



LEGEND

- Potential Limits of the D2 Project
- Street Modifications (*reference engineering plans for detailed information*)



Figure 2-8
Commerce Station Urban Design Plan

Data Source: DART, GPC6

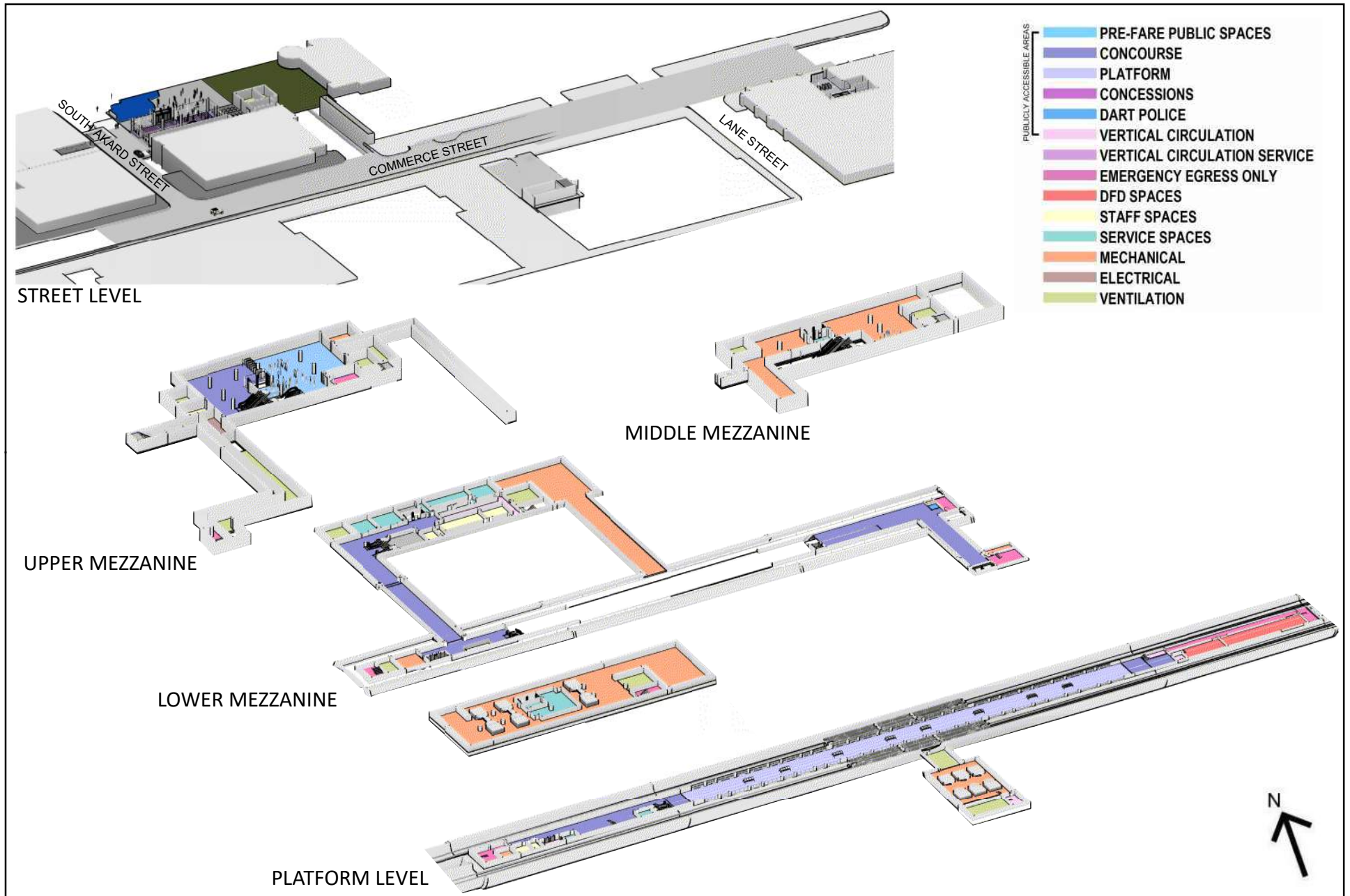


Figure 2-9
Commerce Station Architectural Plan

Data Source: DART, GPC6



An emergency egress exit would be located across Akard Street in the Adolphus Tower ground level. Discussions are underway to determine the potential for this to be an access point as well to complement the Pegasus Plaza headhouse. An additional pedestrian portal would be located near Commerce Street and Ervay Street. Two options are being considered at this location. One could be within public right-of-way in an expanded sidewalk with two elevators and emergency egress stairs. A public lobby portal with fare control and a DART police office would be located at the lower mezzanine at this pedestrian portal. A second option could be incorporated into ground floor retail space within DalPark garage. This second option would offer the same vertical circulation elements but would include fare control at ground level. The ventilation shafts for the station would be located at the east side of the headhouse, within the Magnolia Hotel pass-through, and along the rear side of private property located at Commerce and Browder Street.

Since Pegasus Plaza would be used as a temporary construction access point to mine the station without cut-and-cover construction along Commerce Street, this station represents an opportunity to re-establish and reimagine Pegasus Plaza in cooperation with the city of Dallas. More information on the future plaza and construction approach is in **Sections 4.5, 4.17, and Section 5.3.8**, respectively.

CBD East

The CBD East Station is shown in **Figure 2-10** and would be an underground, center platform station located between Main and Elm streets just east of South Pearl Street. The station would be 550 feet in length with a center platform. **Figure 2-11** shows the architectural site plan.

The primary access point for the CBD East Station would be a new headhouse at Elm Street and South Pearl Street. The space would include a pre-fare public space that includes seating, vending, DART staff and a police podium. Post-fare collection would be a large open concourse, spaces for concessions, platform, and service spaces for DART staff, DFD and DART police. The building would also include ancillary spaces for ventilation, mechanical and electrical purposes. A secondary entrance would be located at Main Street and South Pearl Street. The building would include pre-fare public space and concourse to the platform. The building would also include ancillary spaces for ventilation, mechanical and electrical purposes.

An emergency egress pedestrian portal would be located mid-block on the north side of Elm Street between Pearl Street and Cesar Chavez Boulevard.

Live Oak

Figure 2-12 illustrates the Live Oak Station area urban design plan. The Live Oak Station would replace the Deep Ellum Station which would be removed by the wye junction. The Live Oak Station would be an at-grade, gull-wing, center platform station located in the median of Good Latimer Expressway, south of Live Oak Street. The station canopy elements would be the same as that for the existing Deep Ellum Station. It would be a standard 23'-8" x 385' platform.

Good Latimer would be rebuilt to remove ballast and replaced with embedded track. Accessibility to the station would be via sidewalks and potential new pathways along the Project corridor to surrounding neighborhoods and destinations.

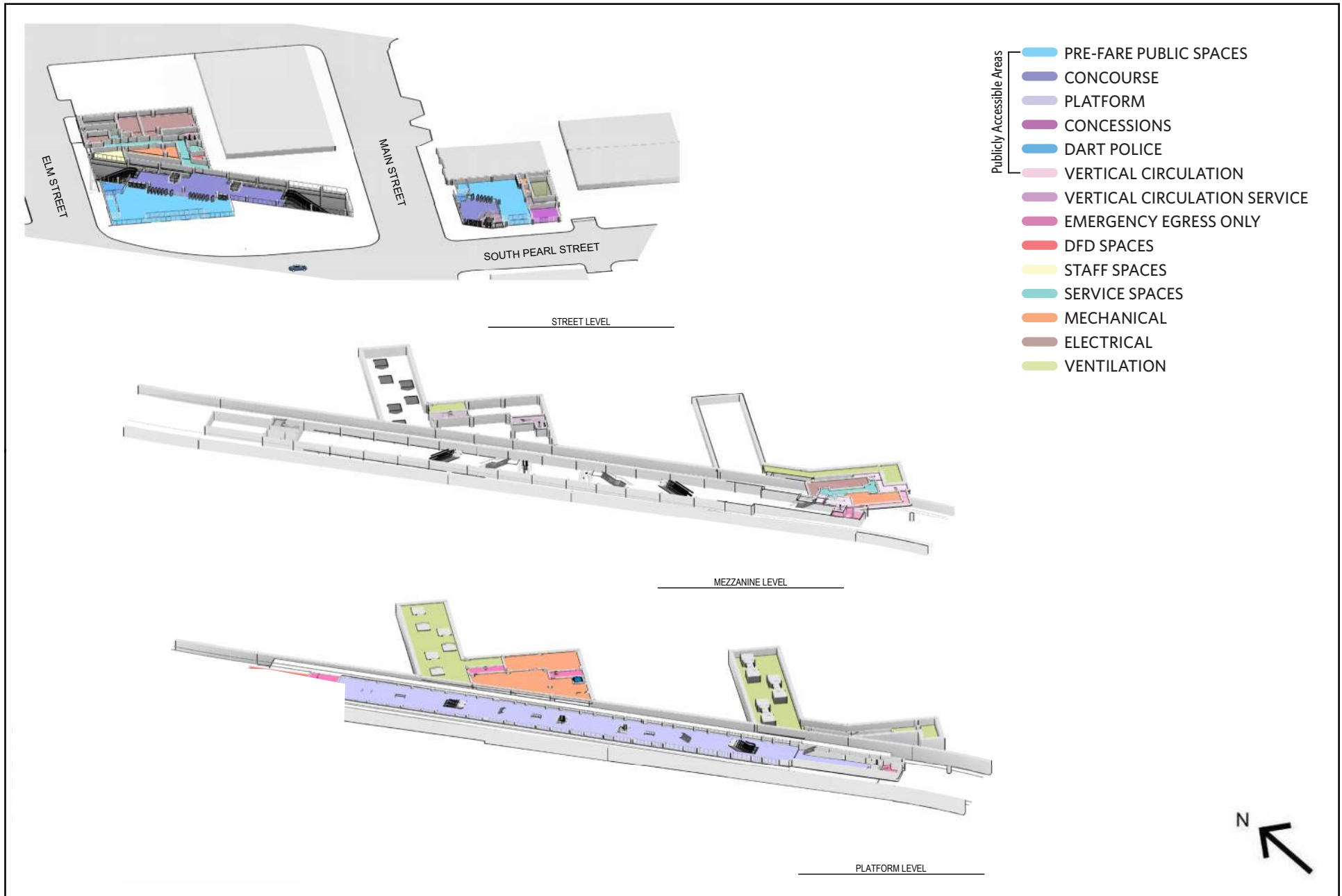


Figure 2-11
CBD East Station Architectural Plan
 Data Source: DART, GPC6

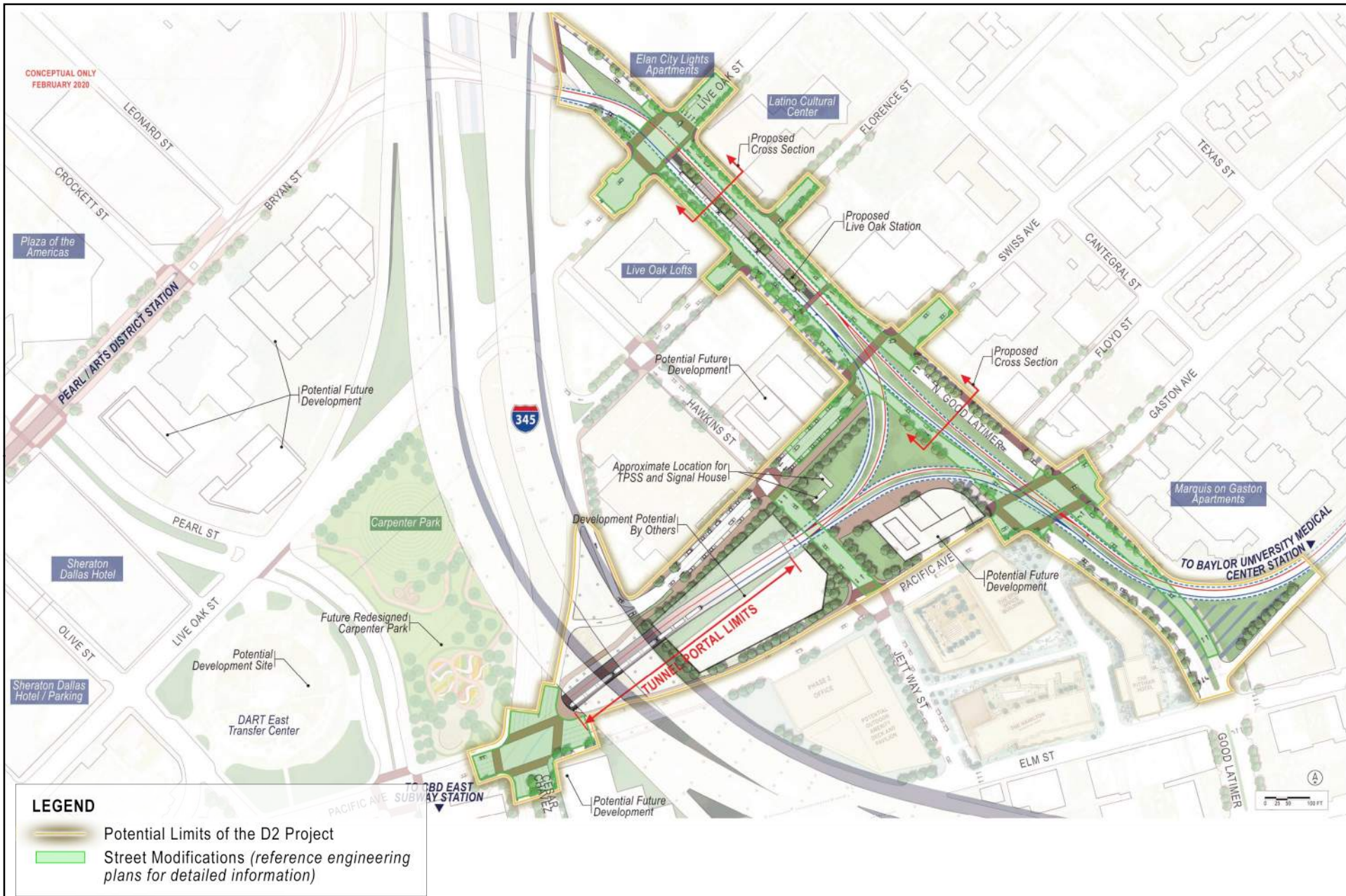


Figure 2-12
Live Oak Station and East Tunnel Portal Urban Design Plan

Data Source: DART, GPC6



2.3.3 Operating Plan

The Project would modify the DART Rail operating plan by shifting the Green and Orange Lines from the existing transit mall to the D2 Subway corridor, maintaining their current service patterns. The Red and Blue Lines would continue to operate on the existing transit mall. The LRT system would continue to operate at a 15/20-minute peak/off-peak headway and with the same span of service from approximately 3:30 AM to 1:30 AM. **Figure 2-13** illustrates the operating concept and proposed headways with the Project in place. Incident and special event operations are described in **Chapter 3**. Based on core capacity needs, an additional Red Line would be added during the peak hour from the Cedars Station to the Parker Road Station to address crowding. Routes would operate with two- or three-car trains as defined in the *DART Rail Fleet Management Plan*.

Based on operations plan modeling, the Build Alternative would operate at an average speed of 16 mph, with maximum speed of 22 mph between the Museum Way Station and Metro Center Station. The average train speed is influenced by civil engineering design conditions, alignment location conditions, and time spent at each passenger station (dwell time). Station dwell times average 30 seconds. Additional information is provided in the *Definition of Operating Plans Technical Memorandum* in **Appendix B.17**. Travel times are discussed in **Chapter 3**.

Fleet and Technology

The Project would not require an increase in fleet size beyond the 163 light rail vehicles (LRVs) currently in the DART fleet. The vehicles and systems technologies for this Project would be identical to the light rail services currently operating in the DART Service Area. The electrically powered vehicles collect primary electrical power [845 Volts-Direct Current (Vdc)] via a pantograph from an overhead catenary system (OCS) that distributes the power from wayside traction power substations. The OCS requires two wires for each track, supported on 15 to 23 feet tall steel poles about 200 feet apart. The poles are typically between the two tracks. The OCS system will be modified to accommodate the lower clearance under the westbound Woodall Rodgers Freeway Field Street ramp to I-35E. Potential alternatives to the OCS within the tunnel will be considered upon further design.

Vehicle control is primarily the responsibility of the light rail vehicle operator with guidance from a cab signal system, grade crossing protection, and operating rules.

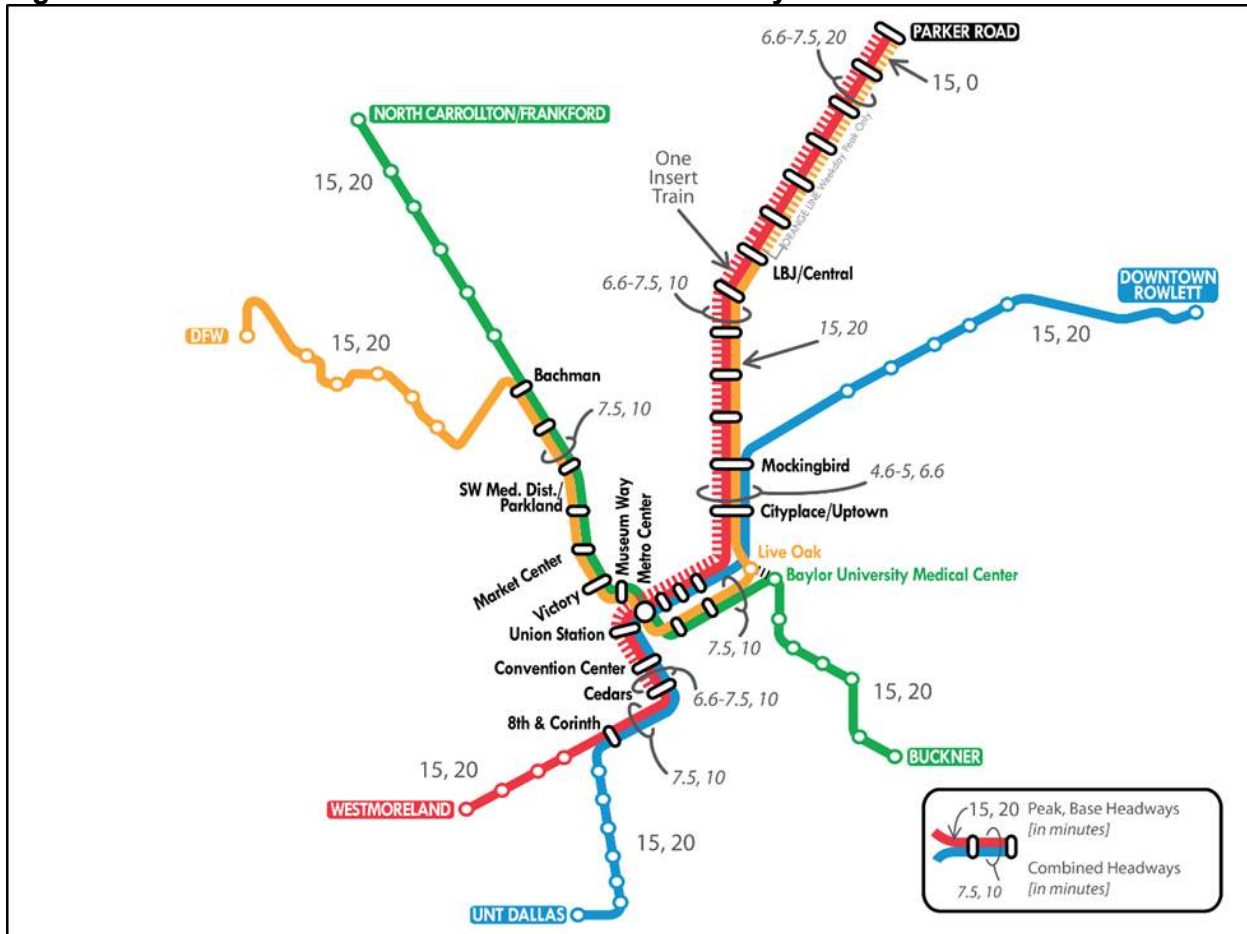
DART has two light rail operating facility locations, including the Central Rail Operations Facility (CROF) immediately southeast of downtown Dallas and the Northwest Rail Operating Facility (NWROF) along the Green Line north of Bachman Station. DART performs major maintenance functions on light rail vehicles, as well as cleaning, washing, and sanding. DART also has an associated facility at CROF responsible for wayside maintenance signals, traction electrification, track, and station maintenance.

Fare Collection

Fare collection for the Project would introduce a fare barrier system for subway station access at the Metro Center, Commerce, and CBD East Stations. The Museum Way and Live Oak stations would continue to use DART's current barrier-free concept. Fares and fare collection policies would be consistent with current operations. DART offers a variety of fares for travel on buses and trains, and the GoPass app and GoPass Tap Card automatically provide the best fare for users.



Figure 2-13 Build Alternative LRT Network and Headways



Source: GPC6, 2019

The fare barrier system would help to control access in and out of subway stations. Key elements of the system include:

- Fare gates would be installed at the three subway stations similar to other subway systems throughout the country.
- Actual location of the fare gates would vary by subway station, either at surface level or subsurface mezzanine level, depending on space availability, security issues, and site configuration.
- The fare gates and collection system would be compatible with DART fare media.
- The fare gates and barrier system would be compliant with the Americans with Disabilities Act (ADA), with accommodations for disabled patrons, children and patron-operated devices such as wheelchairs, strollers, walkers and bicycles.
- Separate emergency access gates would be installed to comply with fire-life safety regulations.
- Video surveillance cameras will be installed at all gate entrances for security purposes.
- At the fare barrier system locations, DART security would be on-hand to respond to situations or assist patrons where needed.



Electric Power Substations, Special Trackwork and Passenger Crossovers

The Project would include three new traction power substations (TPSS) along the proposed project route to supply sufficient power to meet the operating plan. The substations would be 2.5 megawatt prefabricated units where possible. One TPSS would be located under Woodall Rodgers Freeway, one near the Commerce Station, and at the southeast intersection of Swiss Avenue and Hawkins Street. TPSS locations are generally 10 feet by 40 feet in size. There would also be three signal houses. One would be on the east side of existing DART tracks just south of the Victory Station, and the other two would be co-located with the TPSS under Woodall Rodgers Freeway and at Swiss and Hawkins Street. These are generally 10 by 40 feet as well and need to be located near the junctions and special trackwork. The approximate locations are shown on the design plans in **Appendix A.1**. Final locations would be confirmed during detailed final design.

The track layout would incorporate special trackwork (crossovers and switches) to permit service under track outage conditions and to facilitate LRT operating flexibility during incidents or special events. The Build Alternative would include one universal crossover location under Woodall Rodgers Freeway north of the tunnel portal south of the freeway. A second crossover was considered under Commerce Street but not advanced because it would have required a raised profile and a new cavern would likely require significant cut-and-cover disruption to Commerce Street. There are also turnout tracks located at the east wye junction to allow for full movements in all directions. Special trackwork is available beyond the D2 Subway project limits that will assist with operations, including a pocket track north of Victory Station and a full crossover immediately west of the Baylor Station.

Transit tunnels require cross-passageways between twin bore running tunnels to provide for the safety of passengers in case of emergency, especially emergencies due to fires in the underground guideway where passengers are required to evacuate from affected guideway into non-affected guideway on their exit route to the street. Passenger crossovers would be located just west of the Commerce Street and Field Street intersection and just east of the Commerce Street and Harwood Street intersection. Cross passage dimensions would range from 13 to 16 feet. Cross passageways would be a minimum of 3.7 feet wide and 7 feet tall and the doors in egress routes serving trainways would have a minimum clear width of 2.7 feet.

2.3.4 Bus and Streetcar Interface

The D2 Subway Project would interface with existing and future bus and streetcar services. DART has an extensive bus network in downtown Dallas, including two major transfer centers. The most recent bus service changes were made in August 2019, which included changes to downtown express bus routing. A Bus Network Redesign effort is underway during 2020 to support decisions for bus service changes in 2021-2022. The Build Alternative assumes the current bus network and does not include any specific route modifications as part of the Project. Ultimately, the new bus plan may propose route changes and bus stop changes to maximize interface with existing LRT stations and proposed D2 Subway stations. DART's existing bus operations in downtown Dallas are shown in **Figure 3-1**.

The Build Alternative would not directly interface with the existing Dallas Streetcar or MATA M-Line trolley. The Build Alternative would directly interface with the planned Dallas Streetcar Central Link project. The preferred alignment for the Central Link based on a 2017 Dallas City Council resolution is an Elm Street/Commerce Street couplet. Two other alternatives are under consideration along Main Street or Young Street. The Build Alternative would have the highest



level of interface with Elm/Commerce or Main Street options. The preferred Central Link alignment and routing options are shown on **Figure 3-2**.

2.3.5 Capital Costs

Capital cost estimates reflect 20 percent preliminary engineering and understanding of the principal structural and systems elements. The estimated cost for the Build Alternative in 2020 dollars is approximately \$1.7 billion and \$1.9 billion for year of expenditure (YOE; assumed year 2023 mid-point of construction). This includes a 30 percent design contingency and 10 percent unallocated contingency consistent with FTA guidance at this level of design. This estimate includes expenses for the development of civil/structural elements, accommodation of known site conditions, purchase and installation of system control components. The cost to construct passenger stations and vertical circulation from station access points is included. The estimated cost for right-of-way is also included and will continue to be refined as exact property needs are identified based on the construction approach and tunneling method. More detail is provided in **Appendix B.6, D2 Subway Capital Cost Estimating Methodology Technical Memorandum (GPC6, 2019)**.

The Project is proposed to be financed with a combination of local and external sources. The financial plan assumes a conservative amount for external funding of \$300 million and a local funding share of \$1.1 billion. DART is seeking a higher amount from a Capital Investment Grant (CIG) of approximately 50 percent of the Project budget to minimize use of the entire \$1.1 billion of local funds. In prior CIG submittals, the D2 Subway rated “medium-high” as a core capacity project. Although the current cost estimate is higher than the financial plan budget, the estimate still includes significant contingency and the project will undergo value engineering and a risk assessment to refine and reduce costs where possible and update the future FY21 Financial Plan with the latest cost and external funding assumptions.

2.3.6 Operations and Maintenance Costs

D2 Subway annual operation and maintenance (O&M) costs are estimated to add approximately \$4.65 million dollars per year to the DART LRT operating expense. More detailed information on the O&M cost estimate is documented in **Appendix B.18, D2 Subway O&M Cost Methodology and Results Technical Memorandum (GPC6, 2019)**. The O&M cost model is under refinement and will be updated in the FEIS/ROD.

2.4 Alternatives Considered but Eliminated from Further Consideration

In addition to the Build Alternative, other alternative alignments and design options were considered but were eliminated from further consideration for a variety of reasons. The alternatives represented a range of reasonable alternatives as required by NEPA. Additional information on these alternatives considered during prior planning efforts is discussed in **Section 2.1**. During project development for the Build Alternative, DART evaluated one other alignment option suggested by stakeholders, incorporated an alignment and station refinement in the CBD East area, and considered design options along Swiss Avenue and Good Latimer Expressway. A summary of these other alternatives and design options is provided below. **Appendices B.20, B.22, and B.23** contain additional information on the options.



2.4.1 North of Swiss Avenue Alignment Option

On the east side of the alignment, the Project would include a wye junction that would allow trains to move either north or south along the proposed rebuilt Good Latimer Expressway tracks. The Build Alternative reflects an alignment south of Swiss Avenue, but DART also considered an option north of Swiss Avenue. North of Swiss Avenue would result in closely spaced junctions in this segment of the system.

Issues identified for an alignment north of Swiss Avenue included:

- Due to the closely spaced junctions (existing junction and new junction), blockage of Live Oak Street would result if a three-car train was stopped between the two junctions. Live Oak Street carries significant vehicular, bicycle, and pedestrian traffic in and out of downtown and this condition would present safety and operational concerns.
- The proximity of the junctions would require they be coordinated and operate together to allow a train to move through both at the same time to prevent blocking of Live Oak Street. This would extend the time allotted to some train movements and have the effect of reducing capacity for train throughput which is counter to the Project purpose.
- Potential impacts to the southern edge of future Carpenter Park improvements, as well as Cesar Chavez Boulevard.

In addition, as the Swiss options were reviewed, community input was strong to retain a station along Good Latimer. The north of Swiss option would have precluded the ability to relocate the Deep Ellum Station further north to Live Oak. Inclusion of the Live Oak Station allows for safe train storage between the junctions and would allow this growing part of Dallas to continue to be served by rail. As a result, DART advanced the south of Swiss alignment option as part of the Build Alternative.

2.4.2 CBD East Alignment and Station Refinement

The original D2 Subway corridor approved in 2017 included a concept that placed the alignment and CBD East Station under the Elm Street garages. During August 2018 Focus Area meetings, downtown Dallas stakeholders and property owners in this area raised comments and concerns about the alignment and station under these garages and potential impacts to Carpenter Park. In addition, DART was advancing engineering analyses and constructability reviews of the alignment. Key observations that led to an alignment and station refinement in this area included:

- Construction of a tunnel and subway station under the Elm Street garages would require foundation underpinning that could require the closure of the parking garage for long periods, pending further analysis.
- Stakeholder input confirmed the critical importance of public parking in the area, and the owners of the Elm Street garages noted plans for expansion of the garage in the future.
- Desire by Parks for Downtown Dallas and City of Dallas Parks Department staff to avoid construction impacts to the south end of Carpenter Park.

As a result, the CBD East Alignment Refinement was developed. This alignment refinement continued the tunnel under Commerce one additional block to turn north near Pearl Street and shifted the station one block east to avoid mining under the Elm Street garages. DART reviewed this refinement with the DART Board, city staff and elected officials, and stakeholders in fall of 2018. While this results in some different property acquisition requirements, the overall response was positive, and the station location presents an opportunity to integrate access into the urban fabric and create development opportunities. DART refined the Project alignment to incorporate the change in early 2019.



2.4.3 Good Latimer Median vs. West-side Running Alignment Option

The existing Green Line currently runs within the median of Good Latimer Expressway and includes the Deep Ellum Station between Swiss Avenue and Gaston Avenue. Since the D2 Subway would include a new wye connection at this location, the station would be removed, and the tracks would be reconstructed with embedded track.

Due to this reconstruction, consideration was given to two possible options for track construction within Good Latimer Expressway: 1) maintain a median-running configuration; or 2) modify as a west-side running configuration. In analyzing these two options, the following engineering and operational issues were considered:

- Automobile and LRT train interaction, recognizing potential traffic conflicts of the LRT train operations through the wye junction and automobile through and turning movements, especially along southbound Good Latimer Expressway.
- Pedestrian and LRT train interaction, both along Good Latimer sidewalks and at crossings of nearby streets.
- Potential restrictions for automobile access into properties fronting southbound Good Latimer, including potential disruption to parking, driveways, and LRT train operational conflicts.

Stakeholder and public comments were provided during Focus Area meetings and public meetings. In general, stakeholders supported the median-running option to maximize property access from southbound Good Latimer. Traffic analyses indicate minimal differences and potential conflicts can be managed with gates and traffic control. In addition, urban design and street modification plans would be optimized to minimize conflicts and enhance visibility for drivers and pedestrians. Lastly, the median option provided the best opportunity to accommodate the proposed Live Oak Station using a center platform, while maintaining travel lanes in both directions.

2.4.4 Extended Commerce Tunnel / Two Portal Alignment Option

The Extended Commerce Tunnel/Two Portal Alignment Option was suggested by stakeholder(s) during the LPA refinement phase in 2017 and was screened out as part of that evaluation process. This option was brought forward again in this Project Development phase as an option that would minimize property acquisition for the CBD East Station and that would allow for a deeper LRT tunnel at I-345 to allow flexibility for design of potential future below-grade I-345 scenarios. This option would extend further east under Commerce Street and Good Latimer until it connected to the Green Line where it would emerge to connect at-grade with two portals – one within the median of Good Latimer and one near Baylor Station.

The issues and impacts identified for this option include the following:

- A larger open cut construction area would be required for the underground junction and would impact or close portions of Commerce, Good Latimer Expressway, Monument Street, and Elm Street for up to 24 months.
- The Deep Ellum Station would be removed and there would not be an opportunity for a relocated station given the portal locations and grades along Good Latimer Expressway.
- The CBD East Station would be shifted under Commerce Street between Harwood and Pearl Streets and would require cut-and-cover construction unless adjacent property could be used for a mined condition if geology was suitable.

Based on reviews with stakeholders, the DART Board, and city staff and elected officials, DART decided not to advance this option because:



-
- The Green Line would be inoperable (closed down) for up to 24 months to accommodate the connection and portal construction significantly affected thousands of riders, many of whom are low-income and transit dependent.
 - A bus bridge would require adding approximately \$10M to the operating cost over 2 years plus \$7M for additional buses.
 - The Project would be delayed for at least seven years given additional costs, which would move the project out of eligibility for Core Capacity funding.
 - Approximately \$900M would be added to the cost estimate given additional construction costs and inflation with a longer timeframe.



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3. Transportation Facilities and Services

This chapter describes the characteristics of the transportation system in the D2 Study Area and discusses potential impacts and mitigation measures associated with the No-Build and Build alternatives described in **Chapter 2**. Affected environment, impacts, and potential mitigation measures are considered separately for each of the elements of the transportation system. Cumulative impacts are discussed in **Chapter 4, Section 4.16**, Indirect and Cumulative Impacts. Short-term construction impacts are discussed in **Chapter 5**, Construction.

3.1 Transit Service and Ridership

The DART transit system is comprised of various modes, facilities, services and programs. DART operates a multi-modal transit system within a 13-city service area encompassing approximately 700 square miles. Currently, DART operates more than 160 bus routes, shuttles and on-demand GoLink zones, 93 miles of light rail serving 64 stations, and paratransit services.

Many local and express routes circulate through or terminate in downtown. A heavy amount of bus activity occurs at the two downtown transfer centers, West Transfer Center and East Transfer Center. The East Transfer Center serves six bus routes, while the West Transfer Center and Rosa Parks Plaza serve 19 bus routes. **Figure 3-1** illustrates the bus routes and light rail routes in the downtown area. Commerce Street and Elm Street serve as the primary east-west bus transit corridors with up to 60 buses per hour operating during the peak period.

The light rail transit (LRT) system consists of four LRT lines operating in a radial fashion centered in downtown Dallas, where all four lines operate on the at-grade Bryan/Pacific transitway mall. While there are four stations (West End, Akard, St. Paul, Pearl/Arts District) on the transitway mall, the broader Study Area is also served by the Victory, Union Station, Convention Center, Deep Ellum, and Baylor University Medical Center stations.

Two streetcar systems operate in Dallas and interface with LRT, including the McKinney Avenue Transit Authority (MATA) M-Line and the modern Dallas Streetcar. The M-Line links downtown, Uptown, and West Village using vintage trolley cars with connections to the LRT system at the DART Cityplace/Uptown and St. Paul stations. The Dallas Streetcar stops at Union Station with connections to Bishop Arts District and Oak Cliff. As described in **Section 2.2**, the No-Build Alternative include the Dallas Streetcar Central Link project using an Elm/Commerce couplet through downtown. Both Main Street and Young Street remain under consideration for the Central Link alignment as well. **Figure 3-2** illustrates the existing and planned streetcar system.

DART and Trinity Metro jointly own and operate the 34-mile Trinity Railway Express (TRE) commuter rail service between Fort Worth and downtown Dallas which provides connections to the Green and Orange Lines at Victory Station, and to the Red and Blue Lines at Union Station. In addition, the Denton County Transportation Authority (DCTA) operates the A-Train Regional Rail between Denton and the Green Line Trinity Mills Station, which brings additional regional riders into the system. The Silver Line Regional Rail project (in Cotton Belt corridor) is under construction and will be operational in late 2022. The Silver Line will extend east 26 miles from DFW International Airport Terminal B through northern Dallas County to Plano. The Silver Line will enhance system connectivity to employment and activity centers in the north by providing transfer opportunities with the Orange, Green and Red lines. The existing and planned rail network is shown on **Figure 2-1**.

2045 Transit System Plan

As discussed in **Section 2.2**, the DART Transit System Plan (TSP) is currently under development and will determine future bus and rail investments through year 2045.



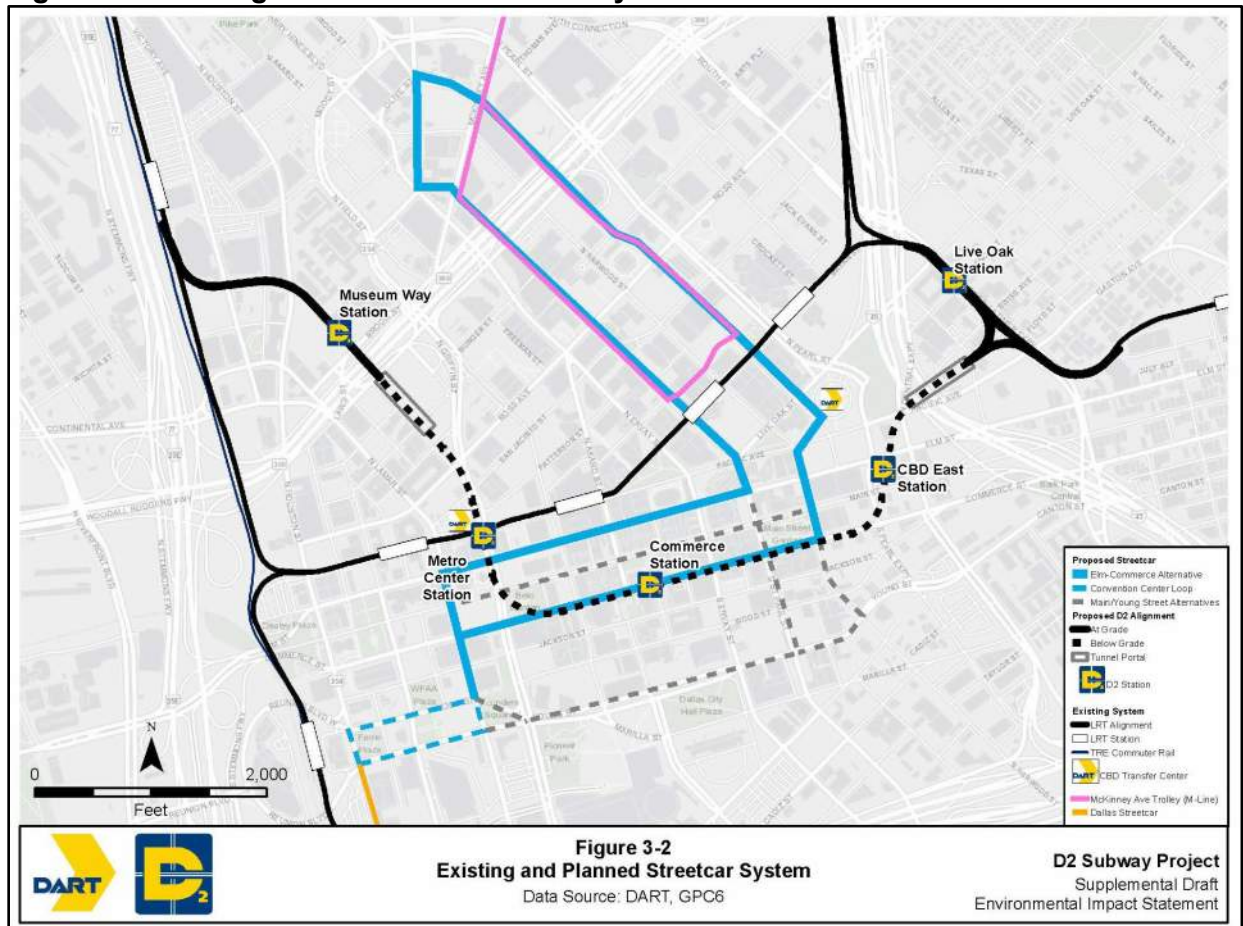
Figure 3-1
Downtown Dallas Bus and Rail Map

Data Source: DART, GPC6





Figure 3-2 Existing and Planned Streetcar System



This may include new corridor expansion, strategies to increase service levels for bus and rail over time, streetcar expansion recommendations, mobility hubs at DART facilities, and a focus on transit-oriented development and land use coordination to grow ridership on the system and reduce dependence on the automobile. A key component of the TSP is the DARTzoom Bus Network Redesign. This effort will be completed in early 2021 and will document policy direction on ridership versus coverage focus, and propose service changes for the bus network for 2022.

Mobility 2045 Metropolitan Transportation Plan

The North Central Texas Council of Governments (NCTCOG) Metropolitan Transportation Plan (MTP) Mobility 2045 also includes transit corridor recommendations as shown in **Figure 2-2** (in **Chapter 2**). These recommendations include programmed DART projects, as well as several regional rail or high intensity bus corridors. These projects either terminate in downtown Dallas, or would interface with DART at other station locations, ultimately bringing more passengers onto the DART network and into and through downtown Dallas. A sensitivity test with these corridors in place is discussed in **Section 3.1.4**.

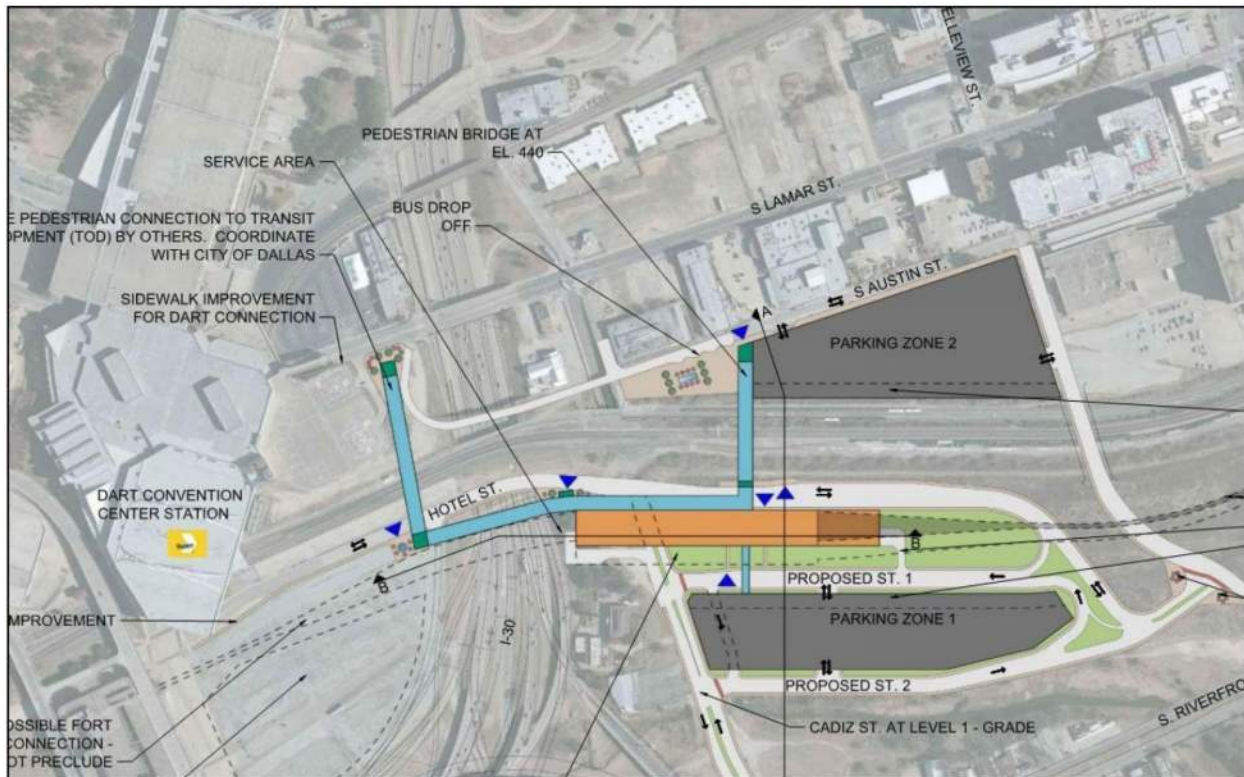
Dallas to Houston High Speed Rail

As presented in **Section 2.2.1**, Texas Central Partners (TCP) is a private company planning to develop a 240-mile High Speed Rail (HSR) connection between downtown Dallas and Houston. Corridors and station locations are under evaluation as part of their environmental review process.



In downtown Dallas, the HSR station is planned to be located near IH 30 just south of the convention center area. The City of Dallas is initiating planning for an intermodal facility that would accommodate a variety of modes, including DART services and pedestrian connections to the Cedars and/or Convention Center stations. Potential ridership from HSR is addressed in **Section 3.1.1**. Located in the Cedars area, the currently undeveloped land includes the 10 to 20 acres needed for terminal station and parking. See **Figure 3-3** for the proposed location of the HSR Dallas station.

Figure 3-3 Proposed High Speed Rail Dallas Station Location



Source: Dallas Intermodal Transportation Facility Fatal Flaw Analysis (October 2019); Texas Central HSR Draft EIS

3.1.1 Capacity and Service Levels

The D2 Subway is being advanced as a Core Capacity project under the FTA Capital Investment Grant (CIG) Program. A key element of qualifying under core capacity is demonstrating that the system is at or over capacity currently or will be within the next five years based on vehicle crowding, and that with the Project in place a minimum 10 percent capacity increase is achieved.

No-Build Alternative

The DART Red Line is currently over capacity in the peak hour based on existing conditions. Under the No-Build Alternative, train throughput capacity would continue to be constrained for the foreseeable future to 15-minute headways, or 16-trains per hour per direction, to maintain schedule reliability. While the Red/Blue platform extensions project will improve passenger capacity by allowing for 3-car trains, it does not address the long-term discussions around improving LRT system headways or potentially including additional service patterns in the future. No-Build Alternative conditions in 2045 indicates that additional DART LRT lines will be over capacity and exceed 3-car passenger capacity during the peak period. This is due to continued strong demographic growth and an expanding regional system (TEXRail, A-Train, and Silver Line) that increase passenger loads.



Within downtown Dallas where passenger loads are highest, the proposed HSR between Dallas and Houston would add passengers to the LRT system. HSR is anticipated to have a strong transit mode share, especially if the planned intermodal facility and pedestrian connections allow for convenient transfers. Based on HSR operating plans, trains carrying up to 400 passengers would arrive every 30 minutes in peak periods. A conservative 10 percent LRT mode share equates to 80 passengers an hour, which would further strain conditions. Under the No-Build Alternative, LRT service levels could not be increased to address this and other needs.

Build Alternative

With the D2 Subway in place, DART would shift the Orange and Green Lines from the transit mall to the new corridor, thereby freeing up capacity for increased train service during peak periods. Upon completion of construction and the start of revenue service, DART would add a Red Line insert train during the peak hour of crowding as part of the Project operating plan. This additional Red Line service would improve headways and achieve the minimum 10 percent capacity increase under the CIG program. In the future, the Build Alternative provides the option to increase headways on all lines, and to potentially change service patterns to address changing demographics and travel patterns.

3.1.2 Geographic Coverage

No-Build Alternative

The No-Build Alternative would not expand the geographic coverage of rail service beyond the current coverage of the Bryan/Pacific transitway mall. Current bus service may increase to respond to population and employment changes in the CBD pending the Bus Network Redesign effort. Because of anticipated increases in CBD traffic congestion, any bus service would continue to face reliability and schedule issues. The No-Build Alternative would not enhance rail access to growing markets in the southern part of downtown. The Commerce Street corridor has seen a revitalization in recent years and new areas such as the East Quarter are drawing more people to this part of downtown.

Build Alternative

The Build Alternative would expand rail geographic coverage between the Victory Plaza area and the Perot Museum, and also expand rail service coverage in the south and east portion of the CBD connecting with the existing LRT in Deep Ellum and the Baylor UMC Station. **Figure 3-4** illustrates the ¼-mile radius coverage of the proposed stations. As shown on the figure, the expanded geographic coverage will enhance transit access for more residents, employees and visitors, as well as provide more direct LRT service to major attractions, hotels, and the growing part of south and east downtown Dallas.

3.1.3 Travel Time

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 depending on station spacing and the degree of change in vertical and horizontal alignment.

Station-to-station travel times were estimated for the D2 Subway alignment, accounting for speed limitations introduced by curves and station placement. This geometric data is used in tandem with vehicle acceleration and deceleration rates to provide vehicle travel times between stations along the corridor. Because these stations serve central Dallas, a dwell time of 30 seconds per station was assumed.

Table 3-1 and **Table 3-2** provide resulting travel times. The total travel time for the Green Line from Victory Station to the Baylor UMC Station is approximately 11 minutes.

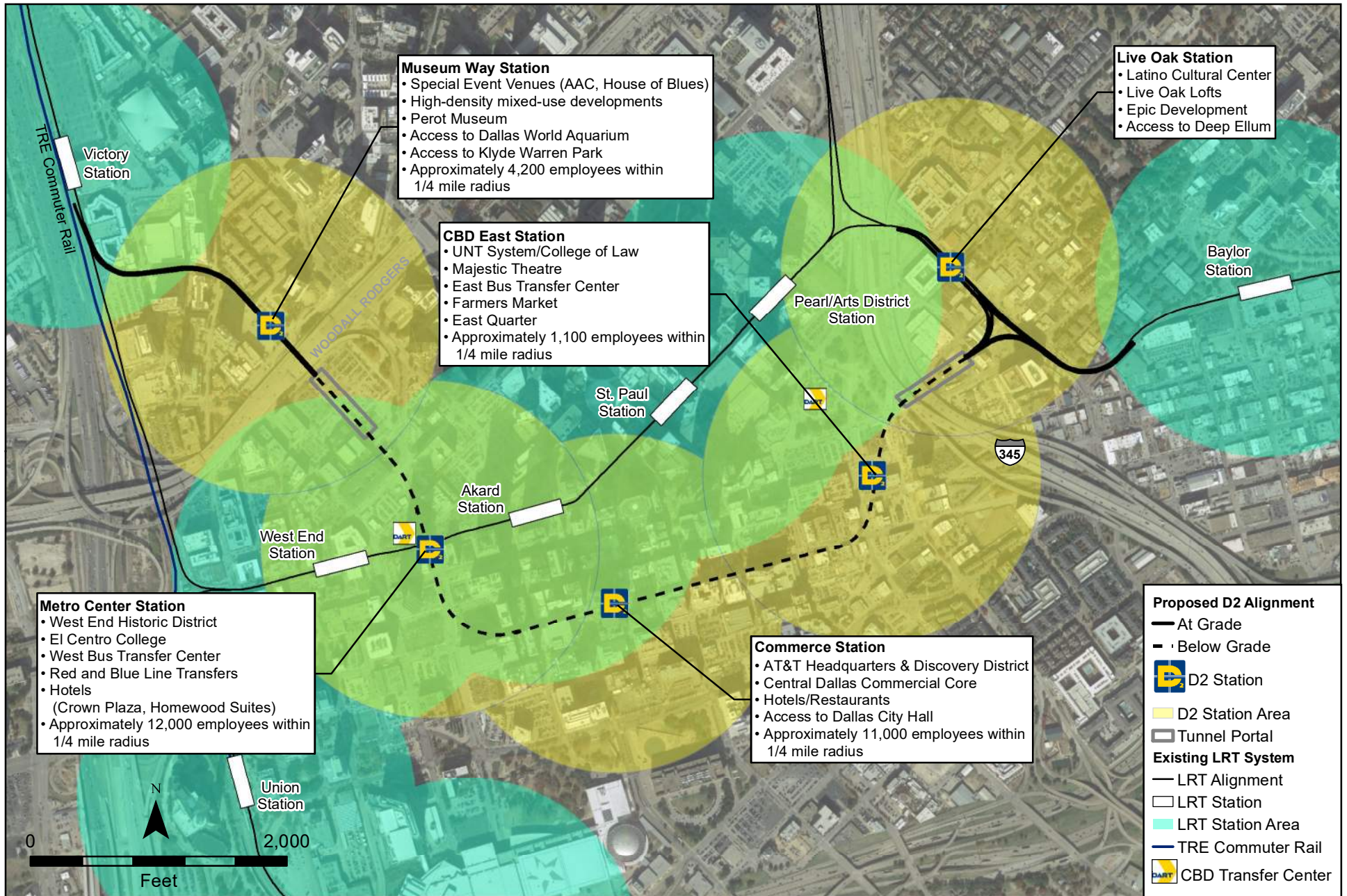


Figure 3-4
Existing LRT and D2 Subway Geographic Station Coverage

Data Source: DART, GPC6, City of Dallas, NCTCOG, 2019





The total travel time for the Orange Line from Victory Station to Cityplace/Uptown Station is approximately 14 minutes. For the Green Line, the D2 Project is about 0.13 miles shorter and saves about 2.8 minutes compared to the existing transit mall. For the Orange Line, the D2 Project adds about 0.4 miles and adds about 1.2 minutes compared to the existing transit mall.

Table 3-1 D2 Green Line Travel Times between Victory Station and Baylor UMC Station

Begin Station	End Station	Distance (mile)	Travel Time	Dwell Time	Total Time	Avg. Speed
Victory Station	Museum Way Station	0.45	0:02:05	0:00:30	0:02:35	12.8
Museum Way Station	Metro Center Station	0.42	0:01:07	0:00:30	0:01:37	22.4
Metro Center Station	Commerce Station	0.44	0:01:30	0:00:30	0:02:00	17.6
Commerce Station	CBD East Station	0.38	0:01:17	0:00:30	0:01:47	17.8
CBD East Station	Baylor UMC Station	0.74	0:02:42	0:00:30	0:03:12	16.4
TOTALS		2.42	0:08:41	0:02:30	0:11:11	16.7

Source: GPC6

Table 3-2 D2 Orange Line Travel Times between Victory Station and Cityplace/Uptown Station

Begin Station	End Station	Distance (mile)	Travel Time	Dwell Time	Total Time	Avg. Speed (mph)
Victory Station	Museum Way Station	0.45	0:02:05	0:00:30	0:02:35	12.8
Museum Way Station	Metro Center Station	0.42	0:01:07	0:00:30	0:01:37	22.4
Metro Center Station	Commerce Station	0.44	0:01:30	0:00:30	0:02:00	17.6
Commerce Station	CBD East Station	0.38	0:01:17	0:00:30	0:01:47	17.8
CBD East Station	Live Oak Station	0.39	0:02:02	0:00:30	0:02:32	11.5
Live Oak Station	Cityplace/Uptown Station	1.33	0:03:09	0:00:30	0:03:39	25.3
TOTALS		3.40	0:11:10	0:03:00	0:14:10	18.3

Source: GPC6

Transit Ridership

The D2 Subway would add a second light rail line through downtown Dallas extending from Victory Park to Deep Ellum and would introduce four new stations: one at-grade station (Museum Way) and three underground stations (Metro Center, Commerce, and CBD East). One existing at-grade station (Deep Ellum) would be relocated as Live Oak Station. **Section 2.3** illustrates the locations and station access in more detail. Victory Station would continue to provide transfer opportunities to the Green and Orange Lines before they continue into the D2 Subway corridor. The Metro Center Station would serve as the primary transfer hub, providing connections to the West Transfer Center and Rosa Parks Plaza bus facilities, and the West End and Akard LRT stations for access to the Red and Blue lines. The CBD East Station would provide opportunities to transfer to buses at the East Transfer Center as well as bus routes operating along Elm and Commerce streets.

As a part of this Project, the West Transfer Center and Rosa Parks Plaza would be modified to accommodate the primary headhouse at Griffin and Pacific, and an access point at Rosa Parks Plaza. It is anticipated that the same or a similar number of bus routes would still serve the facilities. However, the DARTzoom Bus Network Redesign effort could result in a restructuring of how buses operate to and through downtown. This effort will be completed in early 2021 and will provide information to support the redesign of the West Transfer Center. The effort could influence the future use of the East Transfer Center as well, which is independent of the D2 Project. Bus operations would experience temporary disruptions during subway construction as well. This is addressed in **Chapter 5**.

The following sections describe ridership changes that are forecast to occur with the D2 Subway in place. System, corridor and station information are discussed. Forecasts are based on approved year 2045 demographics and utilize the NCTCOG Regional Travel Demand model.



Since D2 Subway is a core capacity project and primarily shifts service from one corridor to another with targeted service level increases, ridership changes are minimal. Its primary purpose is to add capacity and flexibility to the system to sustain the region into the future and open up new markets for enhanced economic development opportunities.

The NCTCOG model generates trips using approved regional demographics and assigns those trips to the roadway and transit network based on anticipated travel patterns. In many cases, recent development within the last few years and future development opportunities are not yet realized in long range demographic forecasts that were updated in 2017. For example, year 2045 forecasts do not account for the Epic Development, which includes a 23-story office tower, residential tower and hotel, or recent East Quarter projects including an office and residential tower. There is also no or very minimal development forecast for several vacant parcels surrounding the CBD East Station. Based on City of Dallas input, site specific demographic data for the Dallas 360 Plan area was provided as input to NCTCOG in 2017 but has not yet been incorporated into any future official demographic dataset.

The model also incorporates elasticities related to changes in travel time or transfers. Within downtown Dallas, direct walk access is important and is the primary mode of access. However, without up to date demographics representing existing and planned development at a station level, which influences the model estimate of how many people can easily walk to a station (direct walk access), the model is somewhat limited and may underestimate station level activity, especially in the southeast part of downtown.

Appendix B.21 includes the *D2 Subway Ridership and Capacity Analysis Technical Memorandum* which documents information in this section.

System-wide Ridership

Table 3-3 shows the 2045 daily regional system ridership for the No-Build and Build Alternatives.

Table 3-3 Year 2045 Daily Regional System Ridership for No-Build and Build Alternative

Mode	No-Build	Build	Percent Change
Local Bus	257,200	257,000	-0%
Express Bus	7,400	7,300	-1%
Streetcar	4,600	4,500	-1%
Light Rail	147,300	143,900	-2%
Regional Rail	38,200	38,500	+1%
Total Regional System	454,600	451,200	-0.7%

Source: DART, 2019

When looking at the entire transit system, changes between the No-Build and Build Alternative are minimal. The largest changes are generally within downtown Dallas and in outlying transfer stations relative to how riders transfer among the four LRT lines.

LRT System Ridership

Table 3-4 shows the 2045 daily ridership for the total LRT system for the No-Build and Build Alternatives.

Table 3-4 2045 Daily LRT System Ridership for No-Build and Build Alternative

LRT Line	No-Build	Build	Percent Change
Red Line + Red Insert	35,200	37,500	+6%
Blue Line	30,900	30,400	-2%
Green Line	42,400	40,600	-4%
Orange Line	38,700	35,400	-9%
Total LRT	147,200	143,900	-2%

Source: DART, 2019



Under the Build Alternative, changes in overall LRT ridership are primarily associated with the Green and Orange Lines due to their new route in a less dense corridor. As noted above, 2045 demographics do not currently reflect development that is new, under construction or planned, especially in the southeast part of downtown near D2 Subway. With future demographic data updates to account for land use changes, and increasing density, it is anticipated that ridership would be higher than that associated with year 2045 demographics. The D2 Subway frees up capacity on the transit mall, allowing additional Red Line service to be added during the peak hour to increase Red Line ridership by 6 percent. Some of the Orange Line ridership shifts over to the new Red Line insert as well.

Station Ridership

Table 3-5 summarizes year 2045 daily ridership for stations within the D2 Study Area, including the estimated percentage by mode of access. This gives an indication of which stations would emphasize direct walk access versus a focus on bus and/or rail transfer. D2 Subway stations are highlighted in bold.

Table 3-5 Year 2045 Daily LRT Station Ridership within D2 Study Area

Station	Year 2045 Average Weekday Ridership	Mode of Access		
		Bus	Rail ¹	Walk
Victory Station	5,400	3%	75%	23%
Museum Way Station	1,400	27%	8%	65%
Convention Center Station	800	0%	2%	97%
Union Station	3,800	7%	46%	46%
West End Station	6,100	22%	30%	48%
Metro Center Station	5,600	14%	33%	53%
Akard Station	4,200	6%	1%	93%
Commerce Station	3,800	16%	0%	83%
St. Paul Station	3,300	4%	0%	96%
Pearl/Arts District Station	3,400	12%	5%	84%
CBD East Station	4,400	17%	39%	44%
Live Oak Station (former Deep Ellum)	500	7%	0%	93%
Baylor UMC	1,000	12%	0%	88%
Total	43,400	12%	26%	62%

Source: DART Capital Planning; NCTCOG Model

Notes: D2 Subway Stations highlighted in **BOLD** type

¹ Rail access includes transfers to/from LRT, TRE commuter rail, and streetcar

As noted previously, NCTCOG demographics do not reflect the most recent development trend, most of which is occurring in the southern part of downtown, so ridership at some stations may be underestimated. The model also does not account for special event ridership associated with concerts, games or museum attendance. Based on prior year special event surveys by DART, direct LRT access can equate to a 15 to 20 percent mode share. Furthermore, the City of Dallas and DART have applied for an FTA Transit Oriented Development (TOD) Pilot Program grant to develop a TOD implementation plan around the Project corridor and stations to maximize development and ridership potential.

Observations relative to specific stations include:

- Victory Station continues to be a strong rail to rail transfer station, allowing TRE riders to transfer to and from the Green and Orange lines.
- Museum Way Station ridership, estimated to be 1,400, does not account for visitors to adjacent attractions such as the Perot Museum, Dallas World Aquarium, and House of Blues. Perot Museum alone has about 1,000,000 visitors per year. A 15 to 20 percent



mode share could be 500 to 650 additional riders per day associated with the museum. Walk access is strong, supporting the need for pedestrian linkages in the area as outlined in urban design plans.

- Metro Center and West End Station both generally split mode share between walk access (48 to 53 percent) and bus/rail transfer activity (47 to 52 percent). Sharing the transfer activity between these two stations would help to spread the passenger loads between the two stations. The Metro Center station is designed to facilitate these transfers.
- Akard, Commerce, and St. Paul Stations all have strong walk access of 83 to 96 percent. Of these, Commerce Station has 16 percent bus mode share, indicating strong connections with the Elm and Commerce bus routes.
- The CBD East Station has strong rail transfer activity. This is associated with transfers between the Orange and Green lines. Riders from south Dallas can transfer at this location to the Orange Line to continue north towards Richardson and Plano. Southbound Orange Line riders can transfer at CBD East to continue towards Baylor Medical Center or Fair Park. Station ridership could also be higher given recent development trends in the East Quarter and Farmers Market areas that are not yet included in year 2045 demographics.
- Ridership generally shifts from Deep Ellum Station to the relocated Live Oak Station. The forecast of 500 riders is comparable to existing ridership. Ridership at this station is anticipated to be higher given development trends in that area that are not yet reflected in regional demographic forecasts.

Sensitivity Test Scenarios

As described in **Section 2.2.3**, two sensitivity test scenarios for year 2045 were analyzed to understand future passenger load constraints without D2 Subway in place, enhanced headways and regional rail expansion. It should be noted that LRT passenger loads in the year 2045 No-Build Alternative would exceed three-car train capacity (seated and standing) in some corridors. This demonstrates that the Project is needed in the long-term to accommodate growth projections even without scenarios that incorporate enhanced headways or regional rail expansion. **Appendix B.21** includes the *D2 Subway Ridership and Capacity Analysis Technical Memorandum* which documents conditions under the No-Build and sensitivity test scenarios.

The light rail system in the No Build scenario is projected to carry 147,200 riders in the year 2045. The entire transit system daily ridership is forecast to be 454,600. Under the enhanced headway scenario, LRT system ridership would increase by 9 percent to 162,000 riders a day. All other transit modes would increase by one to five percent over the No Build Alternative as well. The system level ridership would reach 476,000 trips a day, a 5 percent increase from the No Build. Enhanced headways would require the Project be in place given that the current transit mall is at capacity. Prior to 2010, DART operated 10-minute peak LRT headways on the Red and Blue lines. With the Project in place, DART would have the flexibility to improve headways in the future.

Under the regional rail expansion scenario, which is consistent with the *Mobility 2045* Metropolitan Transportation Plan, LRT ridership is expected to increase by 20 percent to 177,000 trips a day. Regional rail ridership in this scenario would increase from 38,200 in the No-Build to almost 84,000, an increase of about 120 percent. At the system-wide level, transit ridership would increase from 454,500 to 549,400, about 21 percent. Higher passenger loads and transfers to the DART system would necessitate running more service on almost all lines in order to provide enough capacity to handle peak demand.

In summary, the Project is essential to serve the projected demand under the regional rail expansion scenario as additional service with more frequent headways would be required. While the D2 Subway is necessary to handle future passenger loads of the DART system under the No-



Build Alternative, these analyses also suggest the Project is of regional significance for planned transit expansion beyond the DART Service Area.

3.1.4 Operational Flexibility and System Reliability

In addition to added system capacity and enhanced access to new markets and development opportunities, the Project would enhance operational flexibility and improve system reliability. The No-Build Alternative would continue to have the system rely upon the existing Bryan/Pacific transitway mall and would not enhance flexibility or system reliability.

The D2 Subway frees up capacity on the transitway mall, allowing for increased headways. Adding Red Line service during the peak hour increases capacity by at least 10 percent. The D2 Project incorporates full wye movements at the Deep Ellum Junction, allowing operational flexibility for interaction between the lines. While a full junction was not feasible near Victory, a pocket track north of the station provides operational flexibility for turnbacks associated with incidents or events.

Incidents do occur on the rail system that may, at times, temporarily degrade operations. In the CBD urban setting, vehicles, construction activity and pedestrians may encroach into the right-of-way causing temporary delays. Although rare, vehicular accidents, 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. This added operational flexibility is important because such unplanned events have a system-wide effect beyond downtown, affecting schedules and taking time to get back to a regular schedule. The LRT on-time performance goal is 93 percent, with actual on-time performance slightly below that. With a second CBD alignment, LRT system reliability and on-time performance could be improved.

Special Events Flexibility

DART operates special event services (bus, light rail, and TRE) to the State Fair of Texas, college football games at the Cotton Bowl during State Fair, the New Year's Eve celebration in downtown Dallas, St. Patrick's Day Parade, concerts, basketball, hockey games, and a wide variety of other events. For special events, DART is in coordination with the American Airlines Center (AAC) and any event with over 10,000 persons in attendance. DART provides extra trains at the end of the event. Generally, DART provides one Green Line north, one Orange Line to Plano and a specially routed Blue Line to Rowlett.

Additional capacity during special events is usually limited to off-peak and evening service enhancement given peak period constraints through downtown. Extra service has been provided by limited stop services that use non-revenue track, or that require transfers outside of downtown Dallas.

During the annual State Fair held each fall, the following modifications are made to routine service:

- Extra Green Line trains are added approximately every 20 minutes between Victory and Lawnview stations from 9:30 a.m. to 3:30 p.m. weekdays and 9:30 a.m. to 7:30 p.m. on weekends, effectively providing 10-minute Green Line service between Victory and Lawnview.
- Blue Line weekend evening service is enhanced from 30 minutes to 15 minutes.
- Orange Line trains are extended to Parker Road Station (except game day for Red River Showdown, where the Orange Line stops at Bachman for transfers to the Green Line).

The D2 Subway Project would provide DART with added capacity and flexibility to create service plans responsive to a wide variety of needs. This could include more direct service, special service



patterns, and additional peak hour capacity to ensure accommodate of regular transit riders and special event patrons.

Incident Management Flexibility

Whether due to DART service interruptions, disabled vehicles in downtown Dallas, or emergency actions interfering with DART right-of-way and blocking the Bryan/Pacific transitway mall, the D2 Subway Project would provide an alternate path through downtown Dallas and would allow DART to reroute LRT service from one downtown corridor to the other.

If service in the Bryan/Pacific transitway mall was suspended, then southbound Red and Blue lines would have the option to either come to Pearl or West End Stations and turnback using track crossovers, allowing patrons to transfer to service in the D2 Subway corridor, or would use D2 Subway via the Deep Ellum Junction or the Victory Station pocket track. If there would be a service interruption or disabled vehicle in the Project corridor, then Green and Orange Lines would revert back to the transitway mall per existing operations.

3.2 Station Access

The following discussion focuses on access to stations, which can range from at-grade pedestrian connections from existing or future linkages to access from other transit modes.

The at-grade Museum Way and Live Oak Stations would be primarily be accessed by sidewalks and new pathways. The three subterranean stations would be accessed by a combination of stairs, elevators and escalators from two or more access points. The location and number of the access points were developed with public and stakeholder input and are also based on land availability and the facilitation of linkages to other transit modes. Station portal access points range from smaller locations within the sidewalks, incorporation into existing buildings, or new headhouse buildings that provide a clear focal point and are integrated into the urban fabric. Station infrastructure would also include emergency egress and ventilation shafts (see **Appendix A.2 and Section 2.3**). While there is a network of pedestrian tunnels and sky bridges in the downtown CBD, none of these presented an opportunity to connect with stations given their distance or closure. Many stakeholders preferred bringing activity up to street level as much as possible to continue to activate downtown streets.

Each station area includes an associated urban design plan (see **Appendix A.4 and Section 2.3**) to help establish how the station and pedestrian connections fit within the urban context and relate to surrounding buildings or districts. The following sections describe the current level of design for access to the stations and their relationship to the urban design plans.

3.2.1 Museum Way Station

The Museum Way Station would provide a new direct rail access point to the Victory Park area, while directly serving the Perot Museum of Nature and Science and several other new developments planned for the surrounding area. While the Victory Station is seeing expansion of the Victory Plaza pedestrian connection to the AAC and Victory Park, many stakeholders in the area view Museum Way Station as a way to draw people through the retail areas of Victory Park towards the AAC. The new crossing and signal at Houston Street would provide a new safe linkage across this street. Currently, crosswalks and signals are only provided at Olive to the north and Lamar to the south.

The Museum Way Station would not only serve residents and employees of this growing area but would be a destination station to access the museum, Dallas World Aquarium, music venues and the AAC. DART is currently working with the Perot Museum to ensure that the Museum Way Station complements the museum and would continue to work with the Perot Museum as the D2



Subway progresses. The station would be designed to allow for potential integration of the Perot Museum expansion over or adjacent to the facility, which could include new museum facilities and a multi-story parking garage.

The at-grade station platform would be integrated with pedestrian access improvements to reinforce connections to Victory Park to the north, and to new planned developments such as the Field Street District, the Dallas World Aquarium, and the West End district to the south. Improvements to Broom Street would emphasize connections toward Klyde Warren Park, which will be expanding to the west. Pedestrian paths would be created along the alignment and under Woodall Rodgers Freeway. These connections are being coordinated with private property owners over and around the tunnel portal just south of Woodall Rodgers Freeway to minimize the impact of the tunnel portal in this area.

As described in **Section 3.3**, Broom Street would be realigned to accommodate the Museum Way platform and to allow a connection of River Street to the north of the station. Landings and access ramps have been pushed to the back of the platform to reduce overall effective length of station to fit between River Street and Broom Street. This would create a more pedestrian-friendly edge along the museum property.

3.2.2 Metro Center Station

The Metro Center Station would enhance access to the surrounding area, provide direct transfer opportunities to other transit facilities, and help to sustain existing activity and enhance future redevelopment in the area. The headhouse would be on the corner of Griffin Street and Pacific Avenue on DART-owned property that is currently used for the West Transfer Center. Bus transfers would be temporarily relocated during construction and the West Transfer Center would be redesigned to accommodate the headhouse. The headhouse would have two or more points of entry at the surface with direct access to and from bus transfers and provide access to and from Akard and West End Stations via Pacific Avenue. A ticketing area, a lower mezzanine, and transitions that allow access to the subway platform below would be located at this headhouse. The transitions would include elevator, stair, and escalator options. A light-well would be located in the median of Griffin Street that would allow light to filter from the surface opening into the mezzanine and platform levels.

A smaller headhouse would be located at the DART-owned Rosa Parks Plaza. The smaller headhouse would have two points of entry at the surface with direct access from the West End Station and other downtown destinations. The smaller headhouse provides ticketed access under Pacific Avenue and connects riders to the mezzanine level of the larger headhouse. Rosa Parks Plaza would be reconfigured to accommodate the new station facility, including relocation of the water wall and statue.

Additional pedestrian portals would be located at the northeast corner of Griffin Street and Pacific Avenue, and the northwest corner of North Lamar Street and Pacific Avenue. The portal at Griffin and Pacific Avenue would allow ticketed riders to transition under Griffin Street and provide direct access to Akard Station and other downtown destinations. The portal would use elevators and stairs to connect to the north end of the platform. The portal at Lamar and Pacific would allow ticketed riders to transition under Lamar Street using a dual elevator and connect to the concourse level of the larger headhouse.

3.2.3 Commerce Station

The Commerce Station would be located under Commerce Street. The headhouse would be located on the southeast corner of Main Street and Akard Street in Pegasus Plaza. Two points of entry to the headhouse would be available. Ticketing would be located one level below. Access



to the subway platform from the headhouse would be provided by elevators, escalators, and stairways. Pedestrian connections would use Akard Street and potentially re-establish the Magnolia hotel pass-through to connect riders to attractions along Commerce Street and towards City Hall and the library. Transfers to several bus routes along Commerce would be provided from existing bus stops in the corridor. In addition to bus, the future Dallas Streetcar Central Link may use an Elm-Commerce couplet or Main Street, and could incorporate a stop near this headhouse.

An additional pedestrian portal would be located near the eastern end of the platform at the southwest corner of Commerce Street at Ervay Street. There are two options for this portal: one in the public right-of-way within an expanded sidewalk on Commerce Street, or in the retail level of a parking garage between Ervay Street and Lane Street. Access to the portal would be provided by elevators to the lower concourse to connect the station platform. This secondary portal will provide access to Ervay Street which is a strong north-south pedestrian connector.

3.2.4 CBD East Station

The CBD East Station would be an underground station located at the southeast corner of Pearl Street and Elm Street. The headhouse would front Pearl Street and would have one or more surface entry points to the platform. The station would provide transfer opportunities to the existing East Transfer Station one block north, as well as buses that use Elm and Commerce. Access to the platform from this primary headhouse would be provided by elevators, escalators and stairways.

A secondary headhouse entrance would be located at the southeast corner of Main Street and Pearl Street. Access to the platform from the secondary headhouse would be provided by stairways and elevators. Both of these facilities create an opportunity for strong connectivity with the public street realm.

Urban design plans emphasize strong pedestrian connections to the north and east via Pearl, Cesar Chavez, and Pacific. These linkages would enhance access to Carpenter Park, the East Transfer Center, and the Deep Ellum/Good Latimer area, including the Swiss Avenue corridor.

3.2.5 Live Oak Station

The Live Oak Station would be an at-grade, center platform station located in the median of Good Latimer Expressway, south of Live Oak Street and would replace the Deep Ellum Station (see **Figure 2-12**). Access to the station would be provided at the north and south ends of the platform and potentially at the mid-point at the west side at Florence Street. A pedestrian signal would be installed at this crossing. With the new Live Oak location, only the Orange Line would serve the Live Oak Station; the Green Line would serve Deep Ellum via the Baylor University Medical Center Station.

The cross section of Good Latimer and sidewalks would be revised to accommodate the Live Oak Station. The travel lanes on Good Latimer would be reduced to 10 feet and sidewalks on the east side would be reduced. Tracks in the median of Good Latimer would be rebuilt to remove ballast and be replaced with embedded track.

The at-grade station platform would be integrated with pedestrian access improvements to reinforce connections to Live Oak Lofts, Latino Cultural Center, the Epic development, Deep Ellum, and growing destinations and residential areas along Live Oak Street. Connectivity with Swiss Avenue to the east would be integrated with pedestrian improvements in the corridor.



3.3 Streets and Intersections

3.3.1 Affected Environment

An extensive network of freeways, major arterials, collectors, and local streets are located within the downtown Dallas area (see **Figure 3-5**). The freeway loop formed by US 75 and I-45 to the east, I-30 to the south, I-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 several one-way pairs. Griffin Street and portions of Pearl Street and Cesar Chavez Boulevard function as the two-way north-south arterials, with Ross Avenue, Main Street, and Young Street providing bi-directional movement from east to west. Elm and Commerce Streets function as one-way pairs and are the primary east-west arterials in the core of downtown, linking to neighborhoods to the east and west of downtown.

In the Victory Park area, Field Street, Houston Street and Victory Avenue provide north-south access, while a series of more local streets provide east west access and circulation. To the east, Cesar Chavez was recently widened and provides two-way access to the I-345 corridor, functioning as Central Expressway frontage roads north of Pacific Avenue. Good Latimer Expressway is the primary north-south street in the Deep Ellum area, while Live Oak and Pacific/Gaston are major east-west thoroughfares. Gaston is a key arterial important for Baylor Hospital emergency access. All of the freeways and several of the downtown streets currently operate under congested conditions, especially during peak hours. Many intersections in downtown experience significant delay, especially due to construction projects, often requiring supplemental police traffic control during the evening peak hour to facilitate movements.

3.3.2 Traffic Impact Analysis Methodology

This section describes the methodology for assessing the potential traffic impacts associated with the Build Alternative. The traffic analysis is based on a series of networks developed using Transmodeler software, which is compatible with the NCTCOG TransCAD-based regional travel demand model. **Appendix B.15, *Traffic Analysis Methodology Development Memorandum***, documents the model development and calibration. A total of five models were developed:

- 2017 Existing Conditions
- Year 2024 No-Build Alternative
- Year 2024 Build Alternative
- Year 2045 No-Build Alternative
- Year 2045 Build Alternative

The Year 2024 model was used to estimate opening year conditions with the Project in place and can also be used during future phases of design to estimate traffic impacts under different construction and traffic control scenarios. The Year 2045 model estimated future long-term conditions with and without the Project.

A total of 160 intersections were included within the Study Area and a combination of existing data and new data was used to calibrate the 2017 existing conditions model, including turning movement counts, travel time, signal timing, signal preemption, and other field observations. Based on a discussion with City of Dallas staff, a growth rate of 1 percent per annum was assumed to forecast traffic volumes to year 2024. Based on a meeting with city staff on December 19, 2019, the growth rate from 2024 to 2045 is assumed to be 0.5 percent per annum.

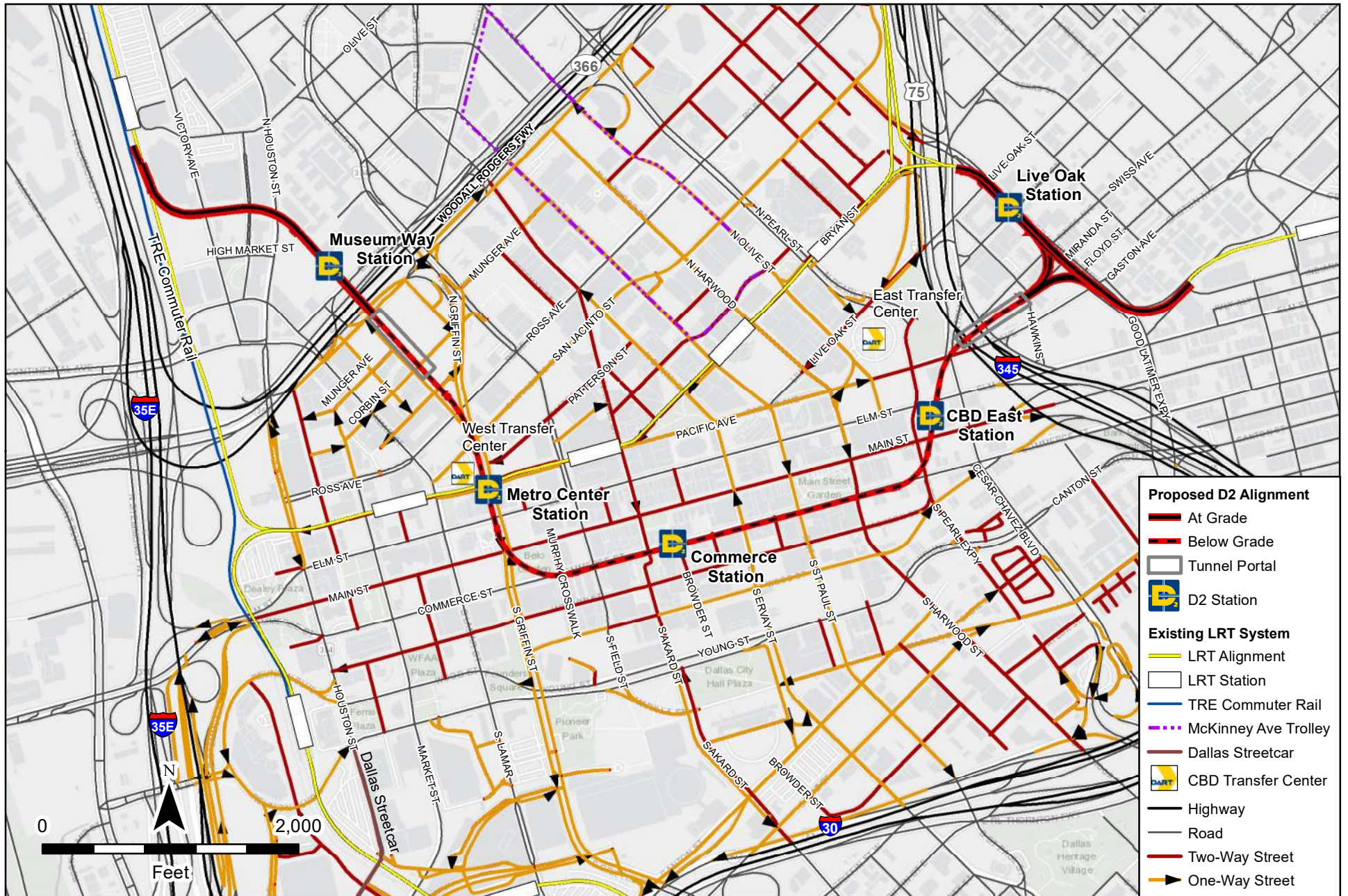


Figure 3-5
Transportation Network in the Study Area

Data Source: DART, GPC6





Article IX “Traffic Mitigation Measures” of the Planning and Development Supplemental Agreement #1 to the DART/City of Dallas Interlocal Agreement outlines the analysis process for determining potential traffic impacts. In general, an impact is likely to occur when either one of two warrants is exceeded: (1) Level of Service (LOS) and (2) queuing. Based on DART policy and industry standards, mitigation should be initially considered when the LOS along major or minor thoroughfares, or at intersections, is reduced from the No-Build condition by two or more levels or creates a LOS “F.” LOS D is considered an acceptable LOS. If the presence of the Build Alternative causes vehicular traffic on streets adjacent to the rail line to queue through adjoining intersections, or queue through the D2 Subway tracks, a queuing impact may exist. **Table 3-6** summarizes LOS criteria.

Table 3-6 Level of Service (LOS) Criteria

Level of Service	Average Control Delay (seconds/vehicle)	
	Signalized	Unsignalized
A	Less than or equal to 10.0	Less than or equal to 10.0
B	Greater than 10.0 to 20.0	Greater than 10.0 to 15.0
C	Greater than 20.0 to 35.0	Greater than 15.0 to 25.0
D	Greater than 35.0 to 55.0	Greater than 25.0 to 35.0
E	Greater than 55.0 to 80.0	Greater than 35.0 to 50.0
F	Greater than 80.0	Greater than 50.0

Source: Highway Capacity Manual (HCM) 2010

The traffic analysis in the following sections describes conditions and changes assumed under the No-Build and Build Alternatives. The analysis evaluates the AM and PM peak period conditions and identifies potential traffic impacts of the Project based on proposed permanent changes to the downtown transportation network, including changes to lane capacity, elimination or modification of turning movements, proposed street closures, and new street connections.

3.3.3 Impact Evaluation

No-Build Alternative

The following geometry changes are assumed to be completed by 2024 and were incorporated into the network for the No-Build Alternative:

- Pearl Street will operate as a two-way street between Pacific Avenue and Young Street.
- Cesar Chavez Boulevard will operate as a two-way street between Pacific Avenue and Young Street.
- Live Oak will operate as a two-way street between CBD East Transfer Center (Olive) and Cesar Chavez.
- Commerce Street will operate as a three-lane, one-way street between Akard Street and Lane Street.

Table 3-7 is a summary of LOS conditions under the 2017 Existing Conditions, and the 2024 and 2045 No-Build and Build Alternatives. Overall, changes from 2017 to 2024, and from 2024 to 2045, indicate that most of the intersections will continue to operate at LOS C or better in the AM and PM peak.



Table 3-7 Summary Comparison of Intersection LOS for Year 2017 Existing Conditions, Year 2024 and Year 2045 No-Build and Build Alternatives

Year 2017 Existing Conditions		Year 2024				Year 2045				
LOS	AM Peak Period	PM Peak Period	AM Peak Period		PM Peak Period		AM Peak Period		PM Peak Period	
			No-Build	Build	No-Build	Build	No-Build	Build	No-Build	Build
A	62	55	56	69	52	70	46	55	38	68
B	83	75	92	79	86	75	78	79	80	64
C	12	25	12	15	22	17	30	25	38	30
D	2	5	2	1	2	2	5	4	5	1
E	1	0	0	0	0	0	2	1	1	1
F	0	0	0	0	0	0	1	0	0	0
Total	160	160	162	164	162	164	162	164	162	164

Source: GPC6

During 2024 No-Build Alternative AM peak period, the following intersections are projected to operate at LOS D:

- Ross Avenue and Pearl Street
- Woodall Rodgers westbound service road and Field Street

Year 2024 No-Build Alternative PM peak period LOS D conditions are at two intersections:

- Pacific Avenue and Pearl Street
- Woodall Rodgers westbound service road and Field Street

For year 2045, the following additional changes were assumed to be in place based on the City of Dallas thoroughfare plan:

- Commerce Street converted to three lane roadway between Houston Street and Cesar Chavez Boulevard; and
- Elm Street converted to four lane roadway between Houston Street and Cesar Chavez Boulevard.

During the 2045 No-Build Alternative AM peak period, the following intersections are projected to operate at LOS D or worse:

- Main Street and Houston Street
- Commerce Street and Houston Street
- SB Good Latimer Expressway and Canton Street
- Cesar Chavez Blvd and Canton Street
- Ross Avenue and Pearl Street
- WB Woodall Rodgers Service Road and Field Street
- Commerce Street and Cesar Chavez Blvd and Jackson Street
- Young Street and Market Street

During the 2045 No-Build Alternative PM peak period, the following intersections are projected to operate at LOS D or worse:

- Ross Avenue and Griffin Street
- Ross Avenue and Pearl Street



- Federal Street and St Paul Street
- Live Oak Street and Good Latimer Expressway
- Pacific Avenue and Pearl Street
- WB Woodall Rodgers Service Road and Field Street

Under the No-Build Alternative, the Project would not be built and no impacts to streets and roadways in the area of the alignment would occur due to the Project. There would be no change to train volumes operating along the Bryan/Pacific transitway mall, and no roadway or intersection changes would be made. As such, there would be no regional benefits due to the Project or benefits associated with fewer trains operating at-grade through downtown Dallas.

Build Alternative

The Project would operate within exclusive right-of-way and is proposed to have full signal priority within the at-grade segments in the Victory Park and Deep Ellum areas using appropriate crossing protection of either gates or traffic signals. Along surface sections of the alignment where in-street operation is proposed, roadway, intersection and/or pedestrian sidewalk reconfiguration would be required. These improvements are anticipated between Victory Station and the west tunnel portal located south of Woodall Rodgers; and between the east portal located under I-345 and Good Latimer Expressway. Between the portals within the core of downtown Dallas, no permanent street modifications are proposed although there may be some modifications to better accommodate bus interface near Metro Center and CBD East stations. Temporary street impacts due to construction are discussed in **Section 5.3.1**. A summary of permanent changes and proposed crossing protection is provided in **Table 3-8**. These proposed changes were reviewed with the city of Dallas and stakeholders. **Figures 3-6** and **3-7** illustrate the proposed permanent changes to the downtown street network with the Project in place, as well as key intersections analyzed in at-grade segments.

Signal systems at grade crossings within the Project right-of-way will include all signs, signals, and warning devices. The function of these systems is to permit safe and efficient operation of the train, on-track equipment, vehicle traffic, and pedestrians through at-grade crossings.

A summary of 2024 LOS and queueing impacts at key intersections along the Project corridor are shown in **Table 3-9**. A summary of 2045 LOS and queueing impacts at key intersections along the Project corridor are shown in **Table 3-10**. Based on a review of queue length and LOS changes between the No-Build and Build Alternatives, only one potential queueing impact was identified as a result of changes due to the Project.

In the No-Build, queueing occurs at the Good Latimer and Gaston intersection for southbound traffic movement. With the Build Alternative in place, the queue is similar but would extend across the new wye junction. The average 2045 AM and PM peak hour queue on the southbound approach is expected to be just over 100 feet and the northbound approach is just under 100 feet. Based on observations made during the simulation, the queue goes past the wye tracks in the southbound direction and approaches the intersection with Swiss Avenue during a few cycles when there is a surge in traffic. The queue in the northbound direction does not reach the tracks.

This intersection and particularly the southbound approach would need to be operated similar to the junction at the intersection of Central Expressway and Good Latimer Expressway.

There are track crossings on the eastbound and northbound approach at that intersection which are protected by a gate that stops vehicles from queueing over the tracks. Southbound Good Latimer Expressway at Live Oak operates this way as well. In addition, there are some street segments closed or modified, and turn movements eliminated, both of which would require alternate routes.



Table 3-8 Summary of Project Street Crossings and Proposed Changes

Map ID	Street	Existing/No-Build Condition	Proposed Crossing Configuration	Proposed Traffic Control and Changes with Project
Victory/Museum Way Station Area				
161	Victory Avenue	Two-way, four-lane concrete roadway	At-grade	Traffic signal
3	Victory Park Lane	Two-way, two-lane concrete roadway	At-grade	Traffic signal
A	Museum Way	Two-way, four-lane concrete roadway with median parking; DART-owned 35-foot right-of-way in median	Project to be located within median.	Maintain access; new signals at Victory, Victory Park, Houston; maintain curb/sidewalk; modify cross-section to include one lane each direction with curb parking lane and embedded track in median.
162	Houston Street	Two-way, three-lane concrete roadway with center left turn lane. Striped/barrier separated cycle track in each direction.	At-grade	Traffic signal
B	River Street	Private gated access roadway for Perot Museum; roadway does not formally cross DART right-of-way	At-grade	Gated; crossing panels for future through street by others
163	Broom Street (Woodall Rodgers WB Frontage Road)	One-way, three-lane concrete roadway	At-grade	Gated; Reconstruction of roadway closer to Woodall Rodgers. Roadway lowered by 1.5 feet at track crossing. Reconstruction of Broom results in minor modification to its intersection with Laws and Lamar Streets.
C	Woodall Rodgers (SH 366) and Field Street on-ramp	Elevated freeway and elevated on-ramp from Field Street	Under elevated freeway and ramp	None; DART would seek low OCS clearance to avoid modification to ramp
164	McKinney Ave (Woodall Rodgers EB Frontage Road)	One-way, three-lane concrete roadway	At-grade	Gated. Roadway lowered by 0.5 feet at track crossing. Minor modifications to Old Griffin would be associated with this change.
D	Corbin Street	One-way, two-lane roadway.	Tunnel portal location	Would be closed due to location of portal.



Map ID	Street	Existing/No-Build Condition	Proposed Crossing Configuration	Proposed Traffic Control and Changes with Project
Deep Ellum/Good Latimer Expressway Area				
E	I-345	Elevated two-way, 10-lane facility.	Under I-345	Crossing permit and agreement required with TxDOT. Tunnel portal u-wall to be built adjacent to bridge foundations.
F	I-345 Frontage Road (northbound North Central Expressway)	One-way, one-lane frontage road.	Tunnel portal location	Northbound frontage road closed from Pacific to Swiss; possible local access south of the portal available to adjacent property.
62	Swiss Avenue	Two-way local street from I-345 to southbound Good Latimer. No through movements across Good Latimer	At-grade through intersection of Swiss and southbound Good Latimer	Swiss Avenue would be one-way westbound between Hawkins and Good Latimer to reduce conflicts with wye junction.
G	North Hawkins Street	Two-way local street.	At-grade	Gated. Proposed realignment with new Jett Way to the south.
H	Miranda Street	One-way, two lane local street	None	Close and abandon street between Hawkins and Good Latimer due to new wye junction
61	Live Oak Street	Two-way, five lanes with center left-hand turn lane. At-grade crossing of existing Green Line	At-grade crossing retained	Elimination of southbound Good Latimer left turn movement onto Live Oak due to track widening for Live Oak Station. Intersection to remain signalized.
I	Good Latimer Expressway	Two-way, four lane roadway; Green Line operates in the median between Live Oak and Elm Streets.	Alignment remains in median. Two new at-grade crossings on southbound lanes at wye junction	Two gated crossings near Swiss and Pacific. Sections would be reconstructed with embedded track and relocated median station. All travel lanes would be reduced to 10 feet. Elimination of southbound Good Latimer left turn movement onto Live Oak due to track widening for Live Oak Station.
63	Pacific/Gaston Avenue	Two-way, five lanes with center turn lanes and existing Green Line crossing	At-grade crossing retained.	Intersection to remain signalized.

Source: GPC6, DART

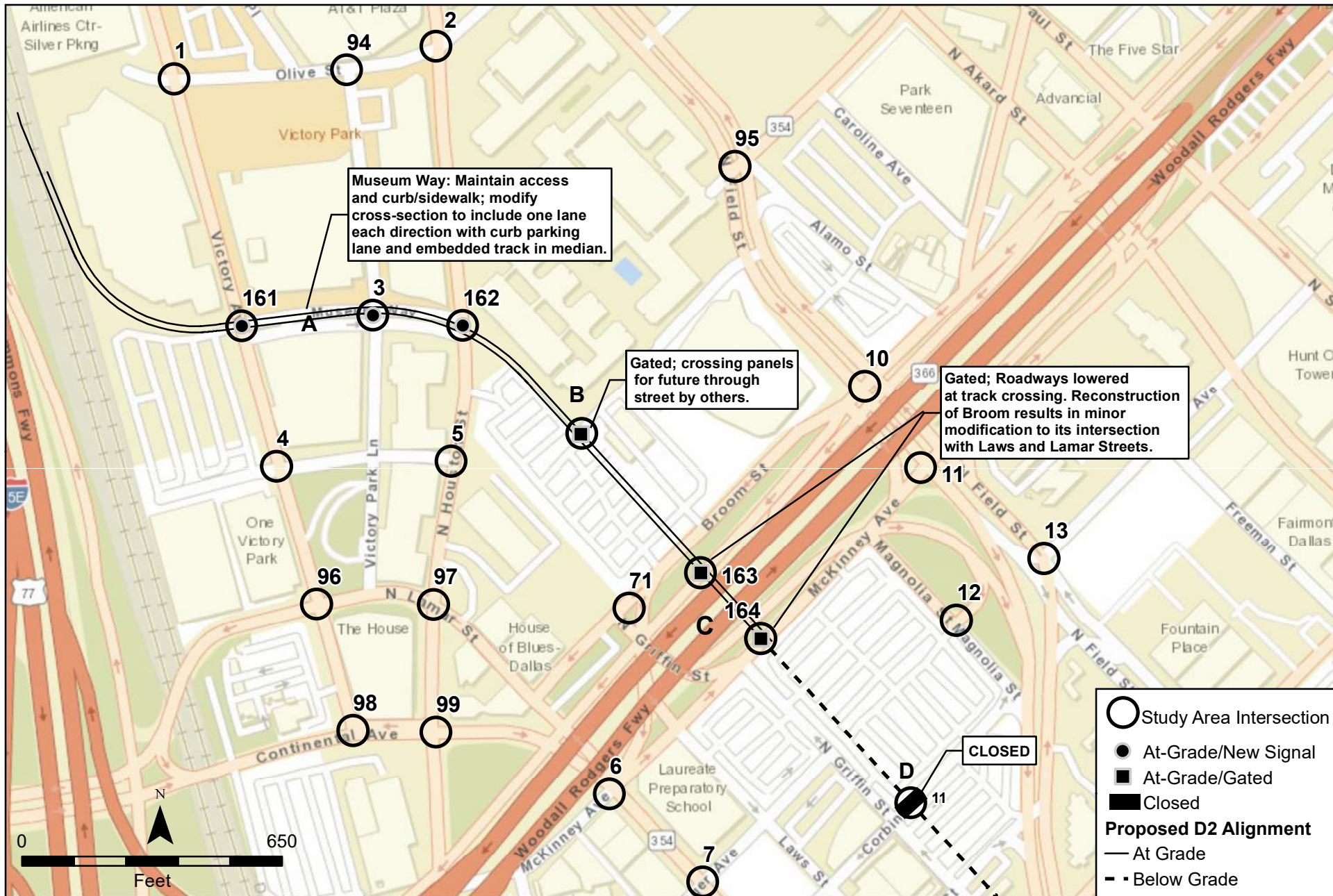


Figure 3-6
Proposed Permanent Changes in the
Victory Park/Museum Way Area

Data Source: DART, GPC6



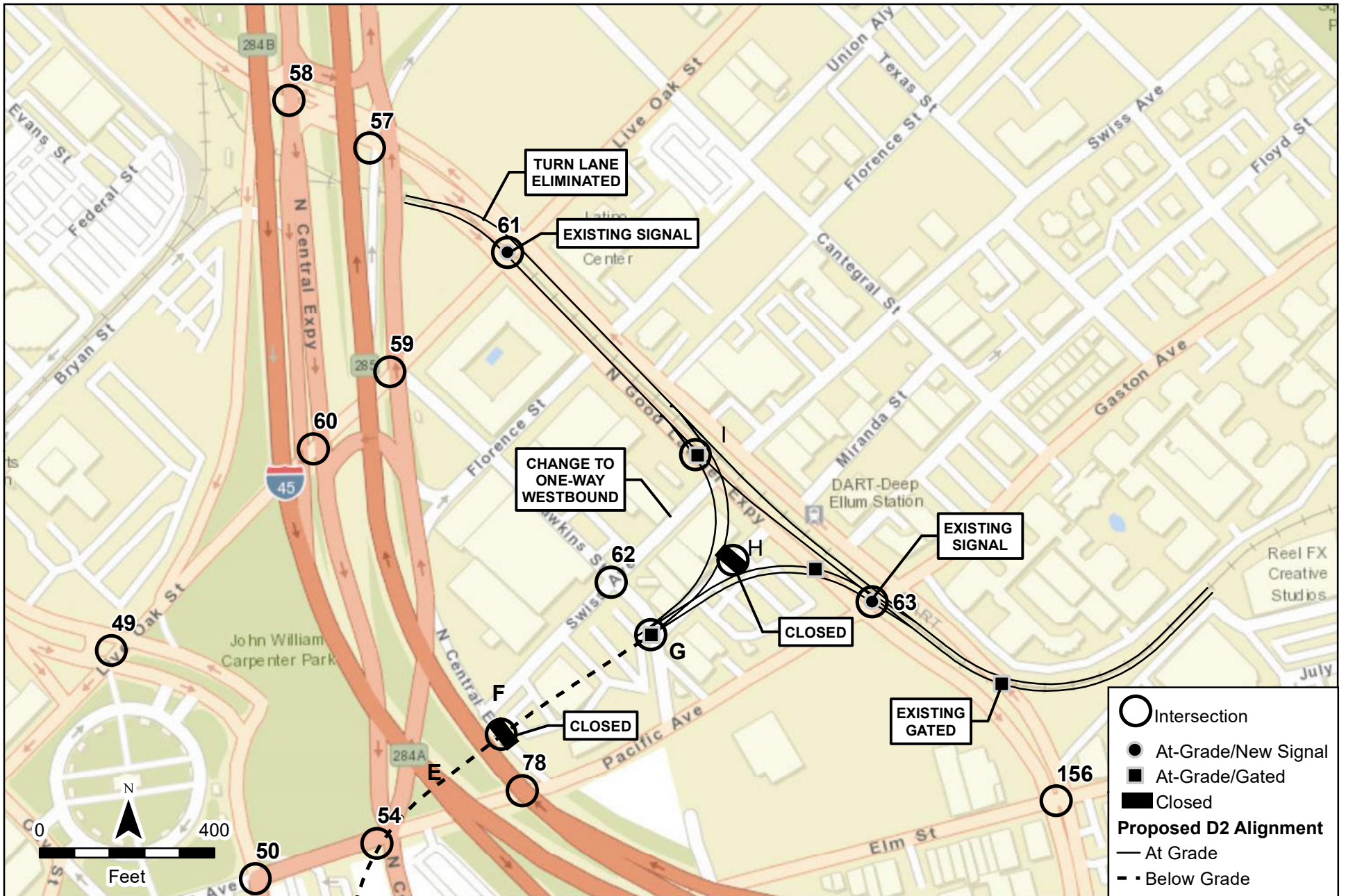


Figure 3-7
Proposed Permanent Changes in the
Deep Ellum/Good Latimer Area

Data Source: DART, GPC6





Table 3-9 Summary of 2024 No-Build vs. Build Traffic Analysis

Map ID Intersection		AM Peak				PM Peak			
		No-Build	Build			No-Build	Build		
		LOS	LOS	LOS Impact?	Queue Impact?	LOS	LOS	LOS Impact?	Queue Impact?
Victory Park/Museum Way Area									
1	Olive St/Victory Ave	A	A	No	No	A	A	No	No
94	Olive St/Victory Park Lane	B	B	No	No	B	B	No	No
2	Olive St/Houston St	B	B	No	No	C	B	No	No
161	Museum Way/Victory Ave	A	A	No	No	A	A	No	No
3	Museum Way/Victory Park Lane	A	A	No	No	A	A	No	No
162	Museum Way/Houston St	A	A	No	No	A	A	No	No
4	High Market St/Victory Ave	A	A	No	No	A	A	No	No
5	High Market St/Houston St	A	A	No	No	A	A	No	No
71	Broom St/Laws St.	A	A	No	No	A	A	No	No
10	Woodall Rodgers WB/Field St	D	D	No	No	D	D	No	No
11	Woodall Rodgers EB/Field St	B	B	No	No	C	C	No	No
163	D2/Broom St Crossing	-	A	No	No	-	A	No	No
164	D2/McKinney St Crossing	-	A	No	No	-	A	No	No
Good Latimer/Deep Ellum Area									
60	Live Oak St /Central Expy SB	A	B	No	No	C	C	No	No
59	Live Oak St/Central Expy NB	C	C	No	No	B	B	No	No
58	Good Latimer Expy/ Central Expy SB	B	B	No	No	C	C	No	No
57	Good Latimer Expy/Central Expy NB	B	B	No	No	B	B	No	No
61	Good Latimer Expy/ Live Oak St	C	B	No	No	C	C	No	No
63	Good Latimer Expy / Gaston St	B	C	No	Yes	C	C	No	Yes
156	Good Latimer Expy/Elm St	C	B	No	No	B	B	No	No
62	Swiss Ave/Hawkins St	A	A	No	No	A	A	No	No

Source: GPC6



Table 3-10 Summary of 2045 No-Build vs. Build Traffic Analysis

Map ID Intersection		AM Peak				PM Peak			
		No-Build	Build			No-Build	Build		
		LOS	LOS	LOS Impact?	Queue Impact?	LOS	LOS	LOS Impact?	Queue Impact?
Victory Park/Museum Way Area									
1	Olive St/Victory Ave	B	A	No	No	A	B	No	No
94	Olive St/Victory Park Lane	A	A	No	No	A	B	No	No
2	Olive St/Houston St	B	B	No	No	C	C	No	No
161	Museum Way/Victory Ave	A	A	No	No	A	B	No	No
3	Museum Way/Victory Park Lane	A	A	No	No	A	A	No	No
162	Museum Way/Houston St	A	B	No	No	A	B	No	No
4	High Market St/Victory Ave	A	A	No	No	A	A	No	No
5	High Market St/Houston St	A	A	No	No	A	A	No	No
71	Broom St/Laws St.	A	A	No	No	A	A	No	No
10	Woodall Rodgers WB/Field St	D	D	No	No	E	E	No	No
11	Woodall Rodgers EB/Field St	C	C	No	No	C	C	No	No
163	D2/Broom St Crossing	-	A	No	No	-	A	No	No
164	D2/McKinney St Crossing	-	A	No	No	-	A	No	No
Good Latimer/Deep Ellum Area									
60	Live Oak St /Central Expy SB	B	B	No	No	C	C	No	No
59	Live Oak St/Central Expy NB	C	C	No	No	B	B	No	No
58	Good Latimer Expy/ Central Expy SB	C	B	No	No	C	C	No	No
57	Good Latimer Expy/Central Expy NB	C	C	No	No	B	B	No	No
61	Good Latimer Expy/ Live Oak St	D	B	No	No	C	C	No	No
63	Good Latimer Expy / Gaston St	C	C	No	Yes	C	C	No	Yes
156	Good Latimer Expy/Elm St	C	C	No	No	B	C	No	No
62	Swiss Ave/Hawkins St	A	A	No	No	A	A	No	No

Source: GPC6



The Green and Orange lines would shift over to the D2 Subway alignment, reducing the number of trains operating along the existing Bryan/Pacific transitway mall from 16 trains per hour per direction to eight per hour per direction. Red Line peak hour insert trains would also operate through the transit mall. In the long term, transit mall operations could reach their existing levels again as the regional transit network grows and additional light rail service is added.

Based on fewer trains on the Bryan/Pacific transitway mall, the Project would improve LOS in 2045 at 8 intersections in the AM peak period and 10 intersections in the PM peak period proximate to the mall. The LOS of each intersection analyzed is identified in **Appendix B.16, D2 Subway Traffic Analysis Results Technical Memorandum**.

TxDOT Facility Coordination

As shown in **Table 3-8**, the Project interfaces with two TxDOT facilities: Woodall Rodgers Freeway and I-345. The Project would not affect Woodall Rodgers Freeway or the Field Street on-ramp with the proposed low overhead catenary system (OCS) clearance and modifications to Broom and McKinney. However, the LRT OCS may need to be attached to the substructure of the ramp and/or freeway pending final design. The alignment under the freeway would not impact any structural columns.

On the east, one of the key Project issues is interface with I-345. TxDOT completed their CityMAP process in 2016 to outline the range of possibilities for this and other downtown highways. Currently, modifications to I-345 are not included or funded within the *Mobility 2045* Metropolitan Transportation Plan. In late 2019, TxDOT initiated a two- to three-year feasibility study to develop and evaluate options for I-345, ranging from removal of the facility coupled with arterial roadway improvements, rebuilding an elevated structure, or placing the structure below-grade.

As designed, the D2 Subway portal would be located under the elevated facility, passing between structural support columns. The depth of the portal within the TxDOT right-of-way would require that a below-grade I-345 option be constructed deeper than if the D2 Subway portal was not present. The City of Dallas, TxDOT, NCTCOG and DART meet regularly to coordinate and develop a mutually agreeable solution. TxDOT is advancing early concepts for I-345 below-grade scenarios to better understand interface with the D2 Subway. Discussions were held in April 2020 to review design concepts that integrate D2 Subway with future I-345 scenarios. Based on those concepts, DART is working with TxDOT, the City of Dallas, and NCTCOG to outline deal points that would serve as the basis for a future third-party agreement and issuance of a crossing permit from TxDOT. This agreement would be finalized during the project engineering phase and prior to execution of an anticipated FTA grant agreement.

Regional Analysis

The Project is anticipated to have beneficial impacts to the regional transportation system by helping to reduce Vehicle Miles Traveled (VMT) and hours of congestion delay. Three different geographic areas were defined to illustrate the changes: DFW region, the DART 13-city service area, and the Dallas 360 Plan area, which includes downtown Dallas and surrounding areas.

Table 3-11 summarizes projected average weekday VMT under the No-Build and Build Alternatives. As shown, the Project would result in a decrease of 124,390 VMT at the regional level, a decrease of 46,472 across the DART Service Area, and a decrease of nearly 10,000 across the Downtown Dallas area. Annually, this translates to about 3,000,000 fewer vehicle miles of travel in the Dallas 360 Plan area with the Project in place.



Table 3-11 Year 2045 Daily Vehicle Miles of Travel Comparison

Geographic Area	No Build VMT	Build VMT	Reduction in VMT
DFW Region	340,462,593	340,338,202	124,390
DART Service Area	104,800,829	104,754,357	46,472
360 Plan Area	7,745,885	7,736,293.00	9,592

Source: NCTCOG travel demand model PERF reports; HDR Engineering

Table 3-12 shows the potential reductions in hours of congestion delay. The Project is projected to reduce hours of congestion delay in the Dallas 360 area by approximately 249 hours per day.

Table 3-12 Year 2045 Daily Hours of Congestion Delay Comparison

Geographic Area	No Build Hours	Build Hours	Reduction in Hours of Congestion Delay
DFW Region	3,244,213	3,240,833	3,380
DART Service Area	1,259,454	1,258,247	1,207
360	134,418	134,169	249

Source: NCTCOG travel demand model PERF reports; HDR Engineering

3.3.4 Summary of Mitigation

The Project would include several permanent changes to streets and intersections. Based on the traffic analysis there are no projected impacts associated with the Build Alternative related to degradation of LOS or queuing that would require consideration of capacity or intersection improvements. One queuing impact at southbound Good Latimer and Gaston would require signal timing coordination. DART would coordinate with the City of Dallas on the installation of new traffic signals and gated crossings at new LRT crossing locations to integrate them into the network. With most of the alignment in a subway configuration, traffic impacts will be minimized.

With the modification of Broom Street and the need to reconfigure parking under Woodall Rodgers Freeway, DART will continue to work with the City of Dallas and private property owners to determine if alternative roadway modifications should be considered under Woodall Rodgers between Broom and McKinney, or if existing connections should be maintained.

As described in **Section 3.3.3**, some streets would be closed, changed to one-way, or turn lanes may be eliminated. These changes are not significant given proposed changes in land use development or because alternative routing options are available. However, DART will coordinate with the City of Dallas and TxDOT on the changes. A discussion of each is provided below:

- Corbin Street closure – Corbin Street is a one-way local access street from Griffin to Old Griffin. Properties that it provides access to would be acquired as part of the Project. In addition, development plans on surrounding parking lots would create new access and internal circulation options. Hord Street immediately to the south would remain open and provides access to Old Griffin. No mitigation is necessary.
- Central Expressway/I-345 Frontage Road closure – One block of this northbound frontage road would be closed between Pacific and Swiss Avenue. There are alternatives available by using either Cesar Chavez or Good Latimer for northbound traffic. Potential options to rebuild I-345 in the future would likely reconfigure this frontage road as well. Portions of this segment could remain usable for local access associated with future development on adjacent property. No mitigation is necessary.
- Swiss Avenue – Swiss Avenue west of Good Latimer would remain a local access street. With the junction and new connection across Good Latimer near Swiss, it is proposed to change this block of Swiss to one-way westbound. Depending on ultimate redevelopment



in this area, Swiss could be closed to southbound Good Latimer and become internal circulation. No mitigation is necessary.

- Miranda Street – A one block section of this street from Hawkins to Good Latimer would be closed. The parcels along this street are proposed for acquisition to accommodate the new junction and would be incorporated into the Project. No mitigation is necessary.
- Southbound Good Latimer to Live Oak left turn elimination – When the Green Line was constructed, a stand-alone left turn lane was created from southbound Good Latimer to eastbound Live Oak. The proposed Live Oak Station would widen the tracks at this location, resulting in the removal of this turn lane. Traffic can be shifted to alternate routes, including using southbound Central Expressway and turning left onto Live Oak. According to the model simulation, the LOS and queue lengths at Good Latimer and Live Oak would not degrade to an unacceptable level and 2045 AM peak LOS improves. While no mitigation is necessary, DART would coordinate with the City of Dallas to determine if it is desirable to include a left turn signal phase at the intersection. Based on traffic model observations, most of the traffic from this turning movement gets reassigned to the left turn from southbound Central Expressway to Live Oak. The average and maximum queues for this southbound movement are expected to reach 140 feet and 230 feet, respectively during 2045 PM peak conditions. The current queue storage of approximately 240 feet would be able to accommodate the queue length.

The Project would introduce new light rail operations through Victory Park, which includes several events that are not reflected in the traffic model, such as concerts and games at the AAC, or events at venues such as Perot Museum or House of Blues. Traffic associated with these events is typically off-peak with the highest concentration of traffic after an event ends. DART would coordinate with operations staff to determine if supplemental traffic control is needed in the area during these events to manage automobile and/or pedestrian traffic.

With several ongoing studies and development plans that may influence downtown traffic growth and street changes, DART would continue to work with the City of Dallas as final design progresses to reassess traffic conditions to refine traffic signal system modifications and determine if changes in traffic controls would be necessary.

DART will continue to coordinate with the City of Dallas, TxDOT, and NCTCOG on a solution and agreement for the I-345 crossing that integrates the D2 Subway with future I-345 scenarios. In addition, DART will coordinate with TxDOT on design and construction requirements relative to Project improvements under their facilities and adjacent to structural support columns.

3.4 Parking

3.4.1 Affected Environment

Downtown Dallas has a substantial number of parking spaces in the form of private surface lots or garages, city-owned lots, leased parking lots, and on-street parking meters. These parking areas provide spaces for downtown employees, residents, or visitors to park. Information on existing parking facilities and on-street parking near the Project alignment and station locations was collected through field surveys and mapping. The following sections describe proposed changes to parking and potential impacts with the Project in place. Temporary parking impacts are discussed in Section 5.6.



3.4.2 Impact Evaluation

Table 3-13 summarizes the locations, existing conditions, and proposed changes under the Build Alternative. The locations of each area are shown on **Figure 3-8**. Several of the identified parking areas would be acquired for the Project. **Section 4.4** summarizes real estate acquisitions.

Table 3-13 Potential Permanent Impacts to On- and Off-Street Parking

Map ID	Location	Existing/No-Build Condition	Build Condition
1	West of Victory Avenue (2371 Victory Avenue)	Paid parking for approximately 373 spaces in Victory Park Lot M. Small portion of parking lot is in DART-owned right-of-way. Property owner has plans to develop site with office tower and parking garage.	Project would eliminate 15 parking spaces including parking booth that is located within DART-owned right-of-way. Property owner may develop site prior to D2 Subway construction.
2	Museum Way from Victory Avenue to Houston Street	Parking and valet spaces are within DART owned right-of-way median, including 18 2-hour parking spaces and four valet spaces (11 am-2 am).	Project would eliminate all median parking with double-track alignment within DART-owned right-of-way.
3	Perot Museum (Museum Parking Lots A and C)	Lot A - 114 special permit spaces Lot C - 188 parking spaces used for bus and event parking	Lot A would not be permanently affected. Approximately 90 parking spaces in Lot C would be eliminated due to alignment and at-grade Museum Way station, many of which are within DART owned right-of-way.
4	Broom Street between N Field Street and N Lamar Street	Seven metered parking spaces along Broom Street	Broom Street would be shifted south; parking meters could be re-established if desired by City of Dallas.
5	City owned right-of-way under Woodall Rodgers Freeway (Perot Museum Lot B)	City leases property to Perot Museum for 157 paid parking spaces and 8 handicap parking spaces	Project would eliminate 42 parking spaces due to track alignment, pedestrian walkways, and signal house/TPSS facilities. 18 spaces would be displaced due to Broom Street relocation.
6	1100 McKinney Avenue surface parking lots	Closed; private developer plans to create mixed-use development with structured parking.	Tunnel portal proposed on site in coordination with private developer.
7	North Griffin Street from Corbin Street to Hord Street, North Lot and South Lot	North lot has 42 paid parking spaces and 2 handicap parking; south lot has 78 paid parking spaces	Both properties would be acquired for the Project.
8	Corbin Street	9 metered parking spaces on north side of Corbin Street	Proposed elimination of three meters due to partial street closure associated with tunnel portal.
9	Parking lot between N Lamar Street and N Griffin Street, Ross Avenue, and San Jacinto	126 paid parking spaces, along with limited parking for small businesses and gas station.	Proposed acquisition of parcels within this block would eliminate all parking spaces.
10	Parking lot northeast corner of Griffin Street and Pacific Avenue	159 paid parking spaces	Project would eliminate approximately 9 spaces due to station access portal.
11	Central Parking System parking lot along Pearl Street (Main to Commerce)	36 paid parking spaces	Project would eliminate 25 parking spaces due to station headhouse south of Main.



Map ID	Location	Existing/No-Build Condition	Build Condition
12	Parking Company of America parking lots along Pearl Street (Main to Elm)	29 paid parking spaces in south lot 67 paid parking spaces in north lot	Proposed acquisition of parcels to accommodate station headhouse and alignment.
13	Platinum Parking lot northeast corner Elm Street and Pearl	126 paid parking spaces	Proposed acquisition or temporary easement and reestablishment of surface parking.
14	South of Swiss Avenue between I-345 and Hawkins	Private parking lots for Lizard Lounge. Future development site for Epic Phase 3.	Tunnel portal proposed on site in coordination with private developer.
15	South of Swiss between Hawkins and Good Latimer	126 paid parking spaces in parking lot at Pacific/Good Latimer; eight (8) private parking spaces for 2509 Pacific Avenue.	Proposed acquisition of parcels for wye connection to existing Green Line.
16	Southbound Good Latimer	16 public parking spaces along Good Latimer	Project would potentially remove up to 16 parking spaces between Florence and Pacific.

Source: GPC6

No-Build Alternative

Under the No-Build Alternative, no parking would be impacted except for that planned by private developers. Several surface parking lots in downtown continue to transition to new development where parking is typically reestablished in a parking structure. Several venue owners, including Perot Museum and Dallas World Aquarium, are discussing development of parking garages as part of future expansion to assist with the continued loss of surface parking for new development.

Build Alternative

As shown in **Table 3-13**, the Build Alternative has several potential permanent impacts to off-street and on-street parking spaces. Mitigation is discussed in **Section 3.4.3**.

3.4.3 Parking Mitigation

DART anticipates that the Project would increase service to new market areas and encourage higher ridership over time. This could reduce traffic, and thereby reduce the parking demand in downtown Dallas. Reducing surface parking in downtown and encouraging new development that supports more walking, biking and transit use is consistent with Dallas plans.

The Build Alternative would have impacts to parking spaces along roadways and to existing surface lots along the route as shown in **Table 3-13**. Where on-street parking spaces or metered spaces are affected, DART would work with the city of Dallas to reestablish them if desired for local business access. Where DART is acquiring property that serves as parking, some of the land would be permanently transitioned to Project use and the owner would be compensated (see Real Estate **Section 4.4**). However, the remainder of some parcels could be used for surface parking or could be part of future transit-oriented development, which could incorporate structured parking by the developer. It is not anticipated that parking removed due to property acquisition would need to be mitigated with the creation of more parking unless an existing use requires it as part of their zoning. Rather, the existing inventory in Dallas would be used, along with potential increased use of transit and other modes. All parking lot driveways permanently impacted by the D2 Project would be replaced by relocated driveways or alternate access points.

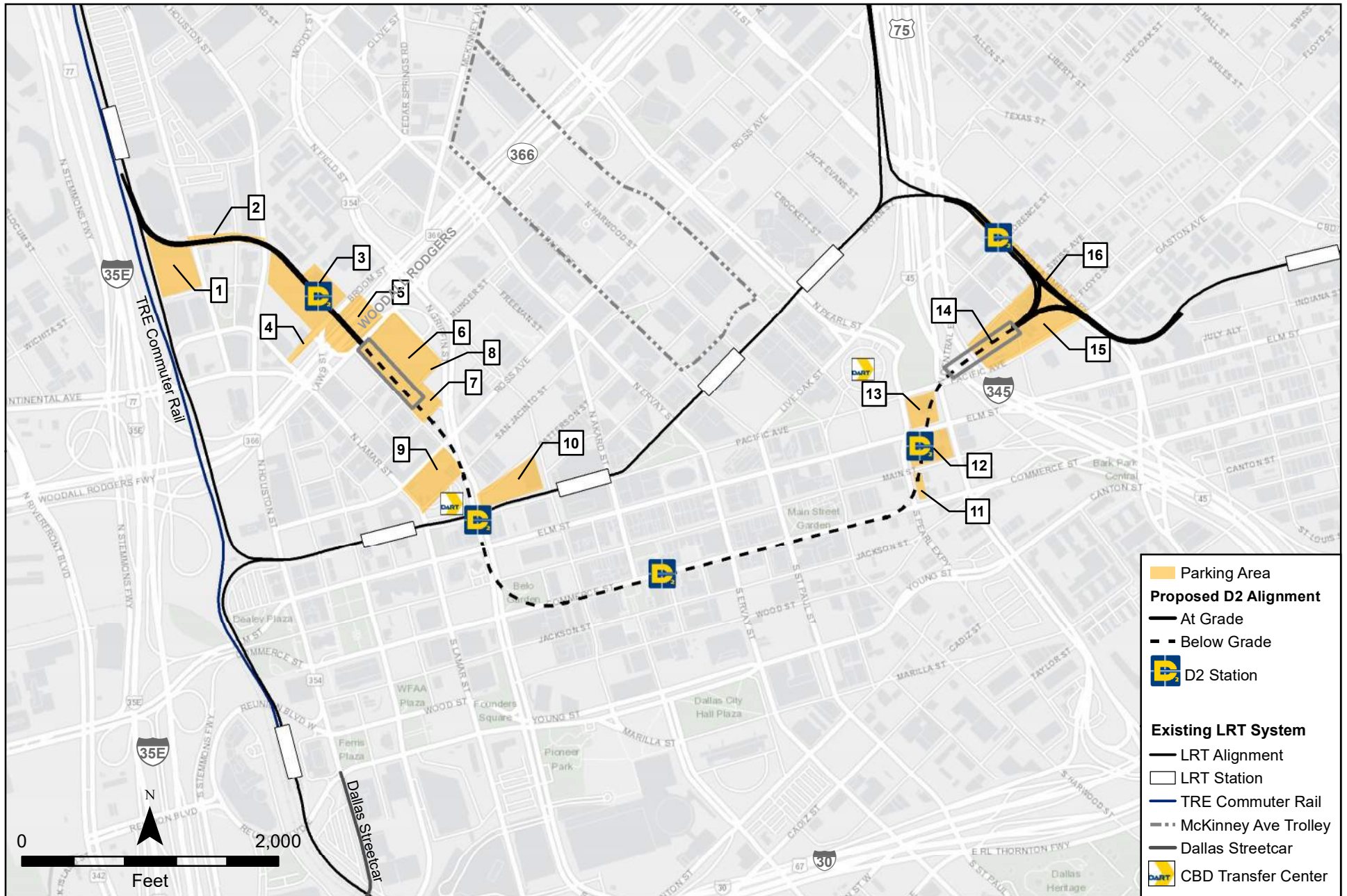


Figure 3-8

Affected Parking Facilities within the Project Area

Data Source: DART, GPC6

D2 Subway Project

Supplemental Draft
Environmental Impact Statement





Specific mitigation and coordination for other impacts include:

- Modifications to the parking lot and booth at 2371 Victory Avenue would be coordinated with the property owner as the parking was intended to be a temporary use on a portion of DART right-of-way. Future development plans may occur prior to D2 Subway construction.
- The cross section of Museum Way would be modified to include one travel lane in each direction and parking/curbside uses would transition from the median to the curb to continue to allow for short-term parking and valet needs.
- Mitigation for parking impacts in Perot Museum Lot C would be negotiated as part of a new real estate agreement. Currently, DART owns 35 feet of right-of-way through the parking lot, and parking was created as a temporary use. Perot Museum has potential expansion plans in the future into Lot C, which could include a parking structure and new museum facilities.
- Museum Lot B under Woodall Rodgers is used by Perot Museum through a lease agreement with the City of Dallas. DART would work with Perot and the City of Dallas to reconfigure the parking lot to maintain the same or a similar number of parking spaces if possible. One concept under discussion is two separate parking lots on either side of the tracks. The Broom Street entrance would be relocated to McKinney to access the east lot. DART is working with the City of Dallas and area stakeholders to potentially reconfigure street connections under the freeway to create a second lot to the west for Perot Museum. This second lot would have an entrance from Broom Street. There is also an opportunity to add spaces to Lot C with the relocation of Broom Street to the south.

3.5 Parking Garage and Loading Dock Access

3.5.1 Affected Environment

Parking garage driveway entrances and commercial loading docks are mostly concentrated in Victory Park. The north side of Museum Way between Victory Avenue and Victory Park Lane includes an entry/exit into the South Victory 1 garage, as well as an adjacent loading bay that allows for trucks to back in at a diagonal, and a private service entry. The south side of this block includes three loading/trash bays for trucks to back in at a diagonal. No other facilities are in this immediate area that could be affected.

Along Broom Street, the Perot Museum has a loading dock just west of Field Street. Further west towards Lamar Street, the Sky House apartment building has a parking garage entrance/exit, and the House of Blues has two loading bays.

Near the Commerce Station, several hotels and restaurants have service docks for trash and other access. These could potentially be affected depending on the final configuration of ventilation requirements for the station in the vicinity of the headhouse at Pegasus Plaza.

While there are several surface parking lots in the CBD East Station area, there are no parking garages or loading docks along the alignment.

3.5.2 Impact Evaluation

No-Build Alternative

Under the No-Build Alternative, there would be no changes to the transportation network and thus no effects on parking garages or loading docks.



Build Alternative

Under the Build Alternative, the Museum Way cross-section would be modified to maintain existing curb lines and relocate median parking to the curb where feasible. Existing loading docks and garage entrances would be maintained as the Project alignment would be within DART-owned right-of-way in the median.

Broom Street would be shifted to the south closer to Woodall Rodgers freeway. The Project would extend driveway or loading dock driveways to meet the new street configuration to maintain access.

Currently ventilation space near the Commerce Station headhouse is shown along the Magnolia Hotel pass-through area between Pegasus Plaza and Commerce Street. The Joule also has service space adjacent to the pass-through. Depending on the final configuration of ventilation requirements at Commerce Station, there may be opportunities to coordinate with adjacent property owners to integrate DART needs into existing service spaces and create an overall more efficient space.

3.5.3 Mitigation

Most of the impacts to parking and loading docks may occur as a result of temporary construction, which is addressed in **Section 5.3**. Based on the current design, access will be maintained to garages and loading docks. The design of the embedded tracks in Museum Way and delineation between the travel lanes would be marked and signed in a way to minimize conflicts between trucks backing into the loading docks or bays with the LRT operational envelope.

DART will continue to coordinate with stakeholders around Commerce Station to finalize the ventilation placement opportunities to minimize impacts to service/loading areas while also minimizing the footprint within Pegasus Plaza.

3.6 Active Transportation

3.6.1 Affected Environment

Downtown Dallas has an extensive pedestrian network via sidewalks and paths and has added several bicycle routes and lanes to enhance safety and accessibility for short trips. There is also a network of pedestrian tunnels and sky bridges within downtown that provide connections between buildings. On June 27, 2018, the Dallas City Council approved Dockless Vehicle Ordinance 30936 to manage the growing number of other mobility options in the city. The ordinance allows the City to permit dockless vehicle companies to operate within the city limits and ensures that the companies practice ethical standards as they expand mobility options.

Figure 3-9 shows existing and proposed bike routes, lanes, cycle tracks, and trails in Downtown Dallas, as well as the sidewalk riding prohibition area for motorized scooters and bikes. Proposed bike routes are included in the Dallas 360 Plan. Bicycles and scooters can be parked anywhere in Dallas at bike racks or on sidewalks as long as they do not block pedestrian access. According to operators, many of these new mobility options serve last-mile trips from transit centers and rail stations.

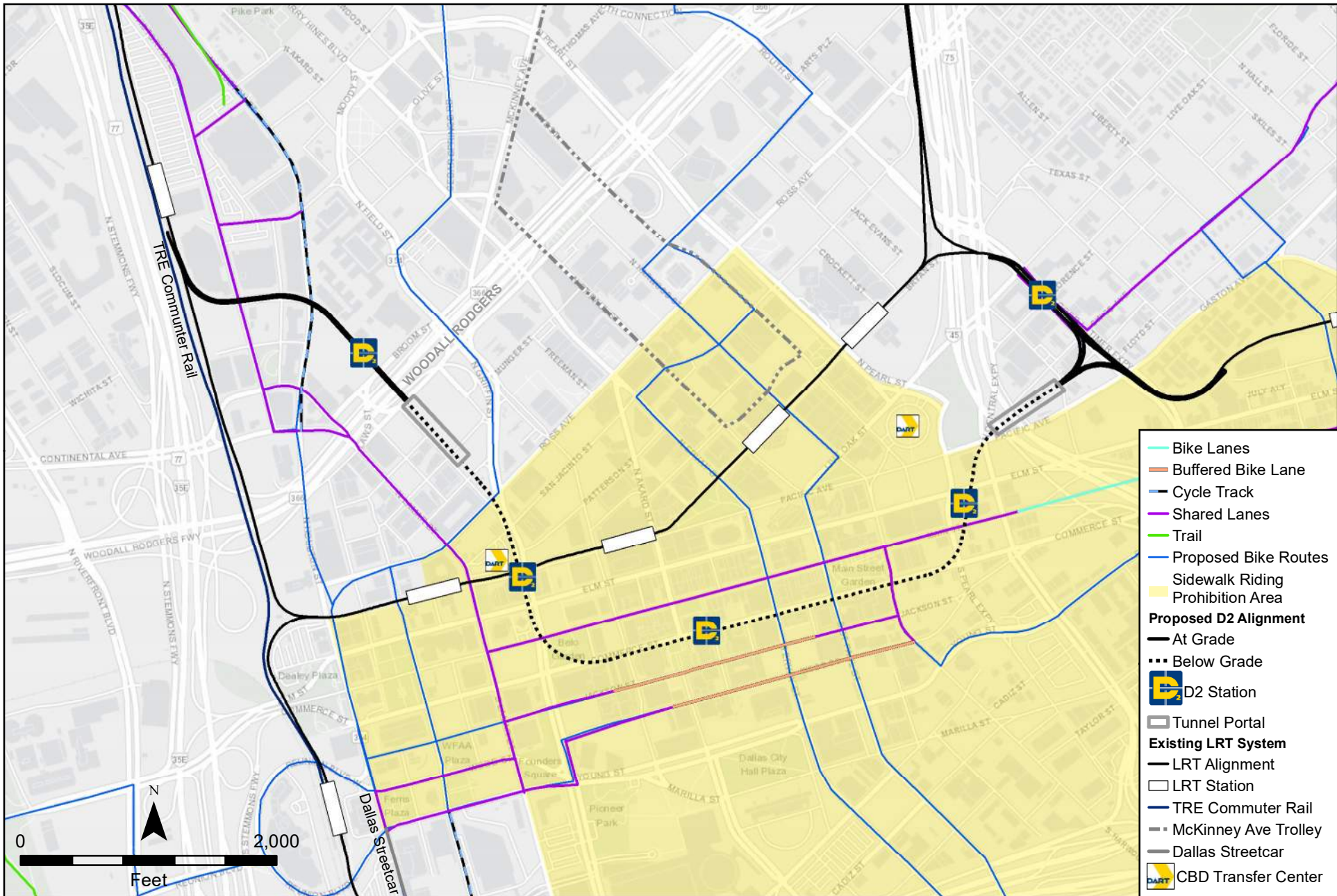


Figure 3-9
Downtown Dallas Existing and Proposed Bicycle Routes and Trails

Data Source: DART, GPC6, City of Dallas, NCTCOG





3.6.2 Impact Evaluation

No Build Alternative

The No-Build Alternative would not affect active transportation modes. It would also not offer opportunities to enhance linkages between new station areas and these modes

Build Alternative

Pedestrian and on-street bicycle facilities that intersect the project corridor may be temporarily affected by the construction of the Project. Construction impacts are described in **Chapter 5**. In general, where the Project crosses a street it would also interface with sidewalks that are part of the street cross-section and signals or gates would be added to control movements and create a safe crossing. The Project would cross two bicycle facilities at grade in the Victory Park area, shared bike lanes on Victory Avenue, and a cycle track on Houston Street. These facilities would remain in place with the Project. While a 90-degree crossing is desirable, the LRT tracks would be crossing at a slight skew at Houston Street as the alignment starts to turn south towards the Museum Way Station.

Many facilities shown in **Figures 3-9** are planned and the type of facility is not yet determined. While these will not be affected by the Project, coordination is necessary to ensure they are not precluded from future implementation by city of Dallas.

The urban design plans presented in **Chapter 2** include recommendations for enhanced pedestrian connectivity around stations and along the alignment. Around Museum Way Station and under Woodall Rodgers Freeway, new pedestrian paths are proposed that would link new developments to the south with the Museum Way Station and further north to Houston Street. Station access improvements and opportunities are more fully discussed in **Section 3.2**. In the Good Latimer/Deep Ellum area, the Project includes a wye connection to the median track alignment which creates new conflict points for pedestrians, bicyclists and scooters or other mobility options in this area along southbound Good Latimer. Swiss Avenue is a designated bike lane and provides access to the existing Deep Ellum Station. The Project would relocate this station to Live Oak Station, and the existing mid-block crossing would be modified.

3.6.3 Mitigation

Pedestrian access is important at rail stations and is a priority of station design. Urban design factors have been developed for use in defining the pedestrian access to the stations related to walkability and pedestrian connections to adjacent land uses and interface with existing or proposed development. This is especially important for the Project at stations where transfer activity occurs with buses, streetcars, and other rail lines. Stations would be designed to accommodate clear and safe pedestrian linkages across the tracks and between station platforms where transfers occur. The dimensions and configurations of station access points may be modified as engineering continues.

Where bicycle lanes cross the tracks at a skew, DART will coordinate with the City to determine appropriate mitigation if warranted, which could range from signage, striping or track filler. Where future facilities are planned, DART would coordinate with the local jurisdiction to ensure that non-motorized facilities are not precluded.

Fencing would be located under Woodall Rodgers Freeway and at the new wye junction in Deep Ellum to channel pedestrians to safe crossing locations. The locations of the proposed fencing in these two areas are shown in **Appendix A, Street Modification Drawings**. DART would work



with the stakeholders in these two areas to determine the materials and the height of the fencing. At the Museum Way Station and on Good Latimer at the Live Oak Station, railings would be installed along platforms adjacent to the traffic lanes to control pedestrian access and enhance safety. Pedestrian movements would be channelized to platform entrances with enhanced crossing treatments.

Bicyclists or pedestrians using Swiss Avenue from the east would be directed to crossing locations outside of the wye junction. Urban design plans recommend strengthening pedestrian access along Swiss into downtown Dallas towards Carpenter Park. DART would coordinate with the city of Dallas to maintain strong pedestrian connectivity through this area.



4. Affected Environment and Environmental Consequences

4.1 Introduction

Chapter 4 describes the existing human, social, and natural environment resources analyzed for the No-Build and Build Alternatives. These resources were evaluated and are documented in separate sections within this chapter. Construction and impacts are described in **Chapter 5**.

Each resource section of **Chapter 4** generally follows this organization:

- Introduction and Regulatory Setting
- Methodology
- Affected Environment
- Impact Evaluation
- Mitigation Measures

4.1.1 Affected Environment

This section of each analysis describes existing conditions today, as of the date when this SDEIS was completed and the affected environment as it will be in the future, independent of the No-Build or Build Alternative (sometimes referred to as the “No Action condition” or the “future affected environment”). This section of the evaluation considers the other initiatives and projects reasonably anticipated to occur in the Study Area as well as the changes likely to occur because of growth in population and traffic or other ongoing trends. **Section 2.2.1** outlines the changes the SDEIS incorporates as part of the analysis of the future affected environment. This chapter describes the potential environmental impacts, both positive and negative, that would occur with the No-Build and the Build Alternative. Unless otherwise stated for a given environmental category, the No-Build Alternative would have no impact. Detailed data and information are provided in technical reports and memoranda, as referenced in this chapter. Proposed mitigation measures for the proposed action are also included in each section.

4.1.2 Impacts of the Project Alternatives

Impacts of No-Build Alternative: This section of each analysis describes impacts of the No-Build Alternative, which is the alternative if the preferred alternative is not implemented. The No-Build Alternative serves as a baseline against which the effects of the Build Alternative can be measured.

Permanent Impacts of the Build Alternative: This section considers the direct and indirect impacts of the Build Alternative once it's in operation. This analysis considers conditions in the year the Project would be completed.

4.1.3 Measures to Avoid, Minimize, or Mitigate Impacts

This section of each analysis identifies measures that would be undertaken by DART to avoid, minimize, or mitigate adverse impacts of the Build Alternative.



4.2 Land Use and Zoning

4.2.1 Introduction and Regulatory Setting

This section analyzes the potential effects of the No-Build Alternative and Build Alternative on land use, zoning, and adopted public planning and policy documents. “Land use” refers to the activity that occurs on land and within the structures that occupy it—for example, residential; commercial, industrial, institutional, and community facilities; transportation-related, parks and recreational uses; and vacant land. Zoning is the legal method by which municipalities define what land uses are allowed on a given parcel of land and the physical restrictions, such as bulk, height, or setbacks, that have been placed on development. The analysis considers the uses and development trends in the area that may be affected by the Project and determines whether the Project is compatible with those conditions or may affect them. The analysis also considers the Project’s consistency with, and effect on, the area’s zoning and other applicable public policies. Direct effects on Study Area land uses, zoning, or public policy may constitute an adverse impact if the change would negatively affect community facilities or community character, or if the Project would generate land use or zoning designation that would be incompatible with existing or surrounding uses or development patterns. The basis for this regulatory power at the local level comes from Chapter 211, Municipal Zoning Authority, of the Texas Local Government Code.

Zoning is the division of land into districts. These districts have uniform zoning regulations including those on land use, height, setbacks, lot size, density, coverage, and floor area ratio. Zoning ordinances approved by local municipal jurisdictions form the framework for regulating land uses within city limits. Land uses in the City of Dallas are regulated by the City’s Current Planning Department through predefined zoning designations. Zoning regulations help ensure that the City of Dallas grows and changes in a managed, predictable way to help safeguard the health, safety, and welfare of the general public.

The Project is contained entirely within the City of Dallas. Zoning around the D2 Subway proposed alignment and stations includes the following categories: Planned Development Districts (PD), Specific Use Permits (SUP), Central Area (CA-1(A)), Central Area (CA-2(A)), and Mixed-Use (MU-3).

4.2.2 Methodology

A Study Area of 0.5 mile on either side of the D2 Subway proposed alignment was used to evaluate existing land use. Existing land uses for all parcels within the Study Area were reviewed utilizing 2015 land use data accessed from the NCTCOG Regional Data Center, existing (2017) and projected population and employment data from both the U.S. Census Bureau and the NCTCOG. Consultation with City of Dallas and Downtown Dallas Inc. (DDI) staff was also completed to obtain land use changes and development trends in downtown Dallas. The Study Area was categorized using this data to identify the most recent condition as well as trends of development through the use of ArcGIS mapping and analysis. The Study Area land uses were then compared to existing City of Dallas city-wide land use data, and a comparison between the two data sets was conducted. Limited field verification of existing land use was conducted in July 2018 with further verification conducted through online research using Google Earth[®]. **Figure 4-1** illustrates the existing land use types within the Study Area. **Appendix B.1** provides additional details on the land use types within the Study Area.

The above methodology is consistent with DART’s *Environmental Impact Assessment and Mitigation Guidelines for Transit Projects* (available at www.DART.org/D2).

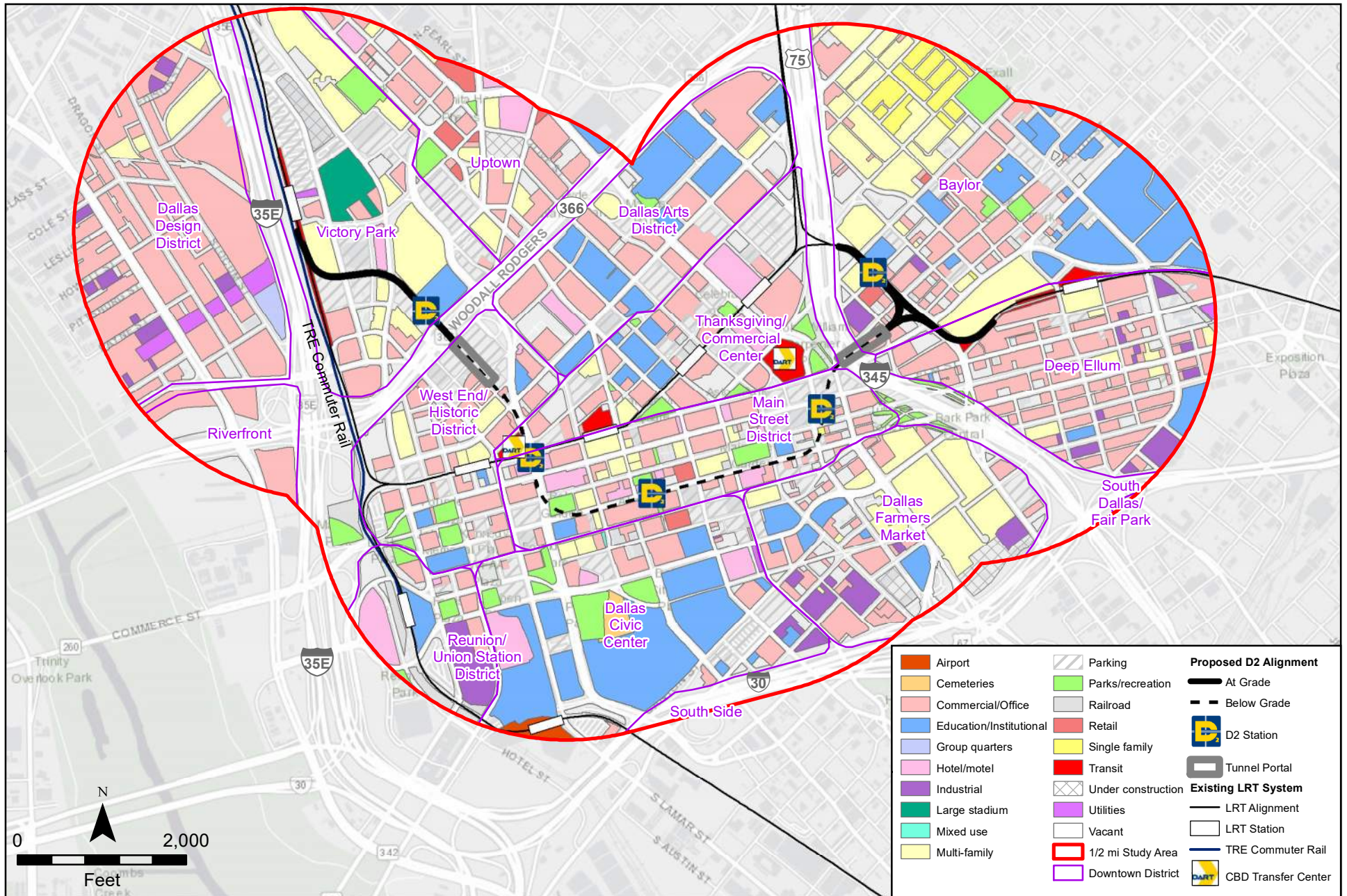


Figure 4-1
Land Use
 Data Source: DART, GPC6



4.2.3 Affected Environment

Regional Summary

The DART Service Area covers an area of 700 square miles with 13 cities. According to the 2017 U.S. Census estimate, the City of Dallas has a total population of 1,270,170. 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 13 counties: Wise, Denton, Collin, Hunt, Parker, Tarrant, Dallas, Rockwall, Kaufman, Hood, Somervell, Johnson, and Ellis. The estimated 2017 population for the Dallas MSA was 7,235,508 according to the 2017 U.S. Census estimate, making it the largest metropolitan area in both Texas and the Southwest, and the fourth-largest in the U.S. The Dallas MSA covers 6,165,350 acres. The City of Dallas has a total land area of 246,342 acres.

Study Area Existing Land Use

The Study Area is approximately 1,163 acres in size which encompasses approximately 3 square miles, including the CBD. **Table 4-1** compares the number and percentage of acres by land use category for the Study Area to the City of Dallas. The top three land use categories for the Study Area are commercial/office, education/institutional, and multi-family residential, whereas the City of Dallas is mainly comprised of single-family residential, parks and recreation, and water bodies. Over 72 percent of the Study Area land use consists of commercial/office, education/institutional, multi-family, and parking; whereas, these land uses make up less than 17 percent of the City of Dallas city-wide land uses.

Commercial/office is the most common land use, accounting for nearly 33 percent of the Study Area. Education/institutional and parking account for over 15 percent and over 10 percent, respectively, of Study Area land uses compared to only 4 percent and less than 1 percent, respectively, for the City of Dallas. Less than 2 percent of the Study Area land use is single-family residential compared to nearly 26 percent for the City of Dallas. Multi-family residential comprises over 14 percent of the Study Area compared to 4.5 percent for the City of Dallas.

The Study Area also includes all or a portion of the following districts in downtown Dallas: Design, Victory Park, Uptown, Arts, Riverfront, West End Historic, Thanksgiving Commercial Center, Baylor, Main Street, Civic Center, Reunion/Union Station, Farmers Market, and Deep Ellum. **Table 4-2** provides a summary of each of these districts.

The Dallas CBD is the core of the Study Area. Downtown Dallas is the location of over 2,500 businesses representing the region's major industries: accounting, advertising, banking, architecture, communications, finance, government, law, hospitality, insurance, real estate, and trade.

Within the last decade, the downtown area has experienced a rapid increase in multi-family residential housing. According to the NCTCOG, nearly 11,000 people reside within the Dallas CBD, an increase of nearly 136 percent since the year 2000. DDI's 2019 annual report states downtown's residential population has grown by 71 percent in the past decade. More than 75,000 residents live in the City Center (within a 2-mile radius of Downtown). In terms of employment, approximately 170,000 people were employed in the downtown area in 2000. For the same area in 2009, approximately 190,000 were employed; by 2030 this is forecasted to increase to 245,000.



Table 4-1 City of Dallas and Study Area Existing Land Use

Land Use	City of Dallas Acres	City of Dallas Percentage	Study Area Acres	Study Area Percentage
Single-Family	61,701	25.9	16	1.3
Parks and Recreation	34,600	14.5	44	3.7
Water	32,280	13.5	0	0
Other	30,551	12.9	48	4.1
Vacant	26,114	10.9	114	9.8
Commercial/Office	18,080	7.6	380	32.7
Multi-Family	10,822	4.5	164	14.1
Education/Institutional	10,038	4.2	176	15.1
Industrial	8,405	3.5	34	3.0
Retail	1,865	0.8	8	0.7
Railroad	1,386	0.6	11	1.0
Cemetery	1,246	0.5	3	0.3
Airport	585	0.2	4	0.3
Hotel	458	0.2	39	3.4
Parking	378	0.2	122	10.5
Total	238,509	100.0%	1,163	100.0%

Sources: NCTCOG, 2015 Land Use; GP6 Team, July 2018.

Table 4-2 Summary of Study Area Districts

District	Description
Design	Located between Stemmons Freeway and the Trinity River at Oak Lawn. District contains a variety of retail outlets, services and art, as well as office spaces. A growing market of mixed-use and residential lofts and condominiums are being developed.
Victory Park	Master planned development with modern office, residential, entertainment, and mixed-use projects, centered on the American Airlines Center, home to the Dallas Mavericks and Dallas Stars. The Perot Museum of Nature and Science (Perot Museum) is located on the southern boundary of the district. The area also features public plazas with outdoor art and special events. As part of a prior agreement, DART owns a surface transit right-of-way through the area from Victory Station to Woodall Rodgers Freeway.
Uptown	A dense, urban mixed-use district which includes the State Thomas neighborhood. The area includes high-rise condos, townhouses, office towers and mixed-use developments and serves as an entertainment district with numerous restaurants, bars, shops, and services along McKinney Avenue.
Arts	District is bound by Ross Street to the south, Woodall Rodgers Freeway to the north, Field Street to the west, and Julius Schepps Freeway to the east. Home to a number of facilities and institutions that attract visitors from throughout the region, including cultural, educational and religious facilities, such as the Dallas Museum of Art, Nasher Sculpture Garden, Morton H. Meyerson Symphony Center, and the Dallas Center for the Performing Arts. District is popular for concerts, outdoor festivals, lectures, youth educational programs, and other cultural programs and is home to a growing number of office and residential towers.
Riverfront	As the front door to the Trinity River, this district has created one of the most significant changes to the Dallas skyline with the construction of the Margaret Hunt Hill Bridge, designed by internationally renowned architect and engineer Santiago Calatrava. The district is experiencing rapid development and redevelopment centered along Riverfront Boulevard, including an eclectic mix of restaurants, retail, and mid-rise apartments and mixed-use developments.
West End Historic	This district contains 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, as well as 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 has experienced a second building boom in recent years.



District	Description
Thanksgiving Commercial Center	Located in the heart of downtown Dallas, this district is a dense, urban environment consisting of many iconic skyscrapers and several landmarks, including Thanksgiving Tower, Thanksgiving Square, Bryan Tower, and Plaza of the Americas. While traditionally an office-focused district, several conversions of older skyscrapers have made the district more mixed-use in nature, with the addition of residences and ground floor retail.
Baylor	Baylor University Medical Center anchors this district, which is comprised of pedestrian-friendly streets, historic homes, condos and apartments. This district is home to several nonprofit organizations located along Swiss Avenue, as well as the Latino Cultural Center, Bryan Place neighborhood, and Exall Park.
Main Street	This district, the historic core of downtown Dallas, has seen rapid redevelopment over the past two decades. The Neiman Marcus flagship store, Comerica Bank Tower, Bank of America Plaza, The Joule, Magnolia Hotel, The Adolphus, and numerous restaurants combine to form the central space known as the Main Street District. With landmarks such as Main Street Garden, Belo Garden, Stone Street Gardens, and Pegasus Plaza, as well as historic buildings that have been converted to residential buildings, the Main Street District has become a true 24/7 live, work, and play environment.
Civic Center	Home to the Omni Dallas Hotel and the Kay Bailey Hutchison Convention Center, one of the largest convention centers in the country, this district is the regional hub of many landmark destinations. Within the district is Dallas City Hall, Earle Cabell Federal Building and Courthouse, J. Erik Jonsson Central Library, George L. Allen Sr. Courts Building, Pioneer Plaza, and Pioneer Park Cemetery.
Reunion/ Union Station	This district, originally named La Reunion by 200 French colonists in the mid-1800s, is widely known for two primary landmarks: Reunion Tower and Union Station. Reunion Tower, one of Dallas' most iconic symbols, includes Five Sixty, a restaurant by Wolfgang Puck. Union Station is a hub for the Trinity Railway Express, DART Light Rail, and Amtrak Intercity Rail.
Farmers Market	Anchored by the Dallas Farmers Market, which has been providing Dallas with fresh fruits, vegetables, and meats for more than six decades, this district encompasses a large area bounded by Jackson Street, North Central Expressway, R.L. Thornton Freeway, and St. Paul Street. It is also home to historic buildings, contemporary townhomes, and apartments. This district has experienced huge growth in residential development over the past decade, mainly townhomes and apartments, with additional developments under construction and planned over the next few years.
Deep Ellum	Nestled east of downtown Dallas, this district was established as Freedman's Town by former slaves after the Civil War. Today it is an eclectic entertainment district comprising avant-garde shops, nightclubs, art galleries, restaurants, and loft and apartment developments. The district is currently experiencing rapid development and redevelopment with several large developments planned or under construction, including the dense mixed-use Epic Development immediately east of I-345 on Elm Street.

Sources: Dallas 360 Plan; GP6 Team, April 2019

Current Development Trends

Development along the D2 Subway proposed alignment is robust. Commercial/office, multi-family residential, and mixed-use developments are underway along all segments of the alignment. Victory Park, a planned development, is currently in the final phase of build out with high-rise office and residential towers under construction and new ground-floor retail establishments opening throughout the development. New mixed-use developments are planned just to the south and east of Victory, including the recent Union and future Field Street District. Within the CBD, infill residential and mixed-use developments are common and the few remaining vacant office buildings are being renovated and repurposed into a variety of hotel, multi-family residential and mixed-use development. Additionally, there are numerous surface parking lots that are ripe for or are planned for near-term redevelopment.



The east end of downtown and across I-345 into the western edge of Deep Ellum is currently experiencing a development boom as a number of developers are currently constructing or have plans to soon begin construction on a variety of mixed-use developments, ranging from low-rise commercial/retail developments to high-rise mixed-use developments. The Epic development in Deep Ellum is the largest of these and is adjacent to the D2 Subway proposed alignment on the western edge of Deep Ellum. The mixed-use Epic development will contain 250,000 square feet of office space, 42,000 square-feet of retail, a 140,000 square-foot hotel, a 26-story residential high-rise and will include the renovation of the historic Pittman building (Grand Lodge of the Colored Knights of Pythias) which will contain a portion of the hotel. Phase 2 of the Epic development is under construction, including a 23-story office tower for Uber Technologies headquarters.

The Research and Information Services Department of the NCTCOG tracks major developments for the 16-county region as part of the Development Monitoring Program. Additionally, Downtown Dallas Inc. tracks major developments within the greater Downtown Dallas core. **Table 4-3** provides a summary of developments recently completed (2017), under construction, announced, or speculated within the Study Area and accounts for the following types of projects: cultural (museums and concert halls), education (public grade schools, colleges, universities), hotel (hotels and motels), mixed-use, multi-family (apartments, townhouses and condos with at least 100 units), office (offices with at least 100,000 square feet or 400 employees), parking garages, recreation, retail, service (restaurants) and single-family developments. Multi-family, multi-use, and office projects are the predominate developments. The *Land Use Existing Conditions Technical Memorandum* in **Appendix B.2** includes additional details on current development trends in the Study Area.

Table 4-3 Current and Future Developments within the Study Area

Development Type	Recently Completed	Under Construction	Announced	Speculated	Total
Cultural	0	1	0	2	3
Education	0	2	0	1	3
Hotel	6	1	2	1	10
Mixed-Use	8	5	9	0	22
Multi-Family	16	8	3	1	28
Office	10	5	9	2	26
Parking	3	1	2	0	6
Recreation	1	2	3	0	6
Retail	9	0	0	0	9
Service	1	4	0	0	5
Single-Family	1	0	0	0	1
Total	55	29	28	7	119

Sources: NCTCOG, Research and Information Services Department, 2018. GP6 Team, September 2018. Downtown Dallas Inc., March 2019

Future Land Use Plans

The D2 Subway Project is contained entirely within the City of Dallas and predominantly within the CBD. A number of long-range plans exist or are currently under development within the Study Area including plans specific to individual districts such as the Arts District or the AT&T Discovery District, parks and trails plans, complete streets plans for specific thoroughfares downtown, and the City of Dallas' upcoming Strategic Mobility Plan (Connect Dallas) which will encompass the Study Area, among others. However, the overarching plan for the Study Area is the *Downtown Dallas 360 Plan (360 Plan)* which was adopted by the City of Dallas in 2017.



The *360 Plan* is a strategic document that sets a clear, cohesive vision for Downtown Dallas and its surrounding neighborhoods. Building upon the strategies found in the original plan, adopted in 2011, the *360 Plan* is organized around the idea of creating a complete and connected City Center that provides an enriching urban experience for area residents, workers, and visitors. The public-private planning process coalesced into a unified vision and three transformative strategies to advance urban mobility, build complete neighborhoods and promote great place making. The D2 Subway Project and, more specifically, the adopted locally preferred alternative are included in the *360 Plan*. The Project is a vital component of the plan and the ability to successfully create the vibrant and connected urban core envisioned in the *360 Plan*.

Portions of downtown Dallas, south of the proposed Project were designated as an Opportunity Zone in April 2018. Opportunity Zones were added to the tax code by the Tax Cuts and Jobs Act on December 22, 2017. The Zones are designed to spur economic development by providing tax benefits to investors. An Opportunity Zone is an economically-distressed area where new investments, under certain conditions, may be eligible for preferential tax treatment. Areas designated as Opportunity Zones were nominated by the state and certified by the Secretary of the U.S. Treasury via delegation authority to the Internal Revenue Service. Opportunity Zones can drive capital to support new businesses and investments in the targeted census tracts by providing Opportunity Zone investors with a deferral of capital gains taxes, among other tax benefits.

4.2.4 Impact Evaluation

The potential impacts described in this section are based on current planning efforts and available information. These impacts are considered reasonably representative of future conditions for the purpose of comparing the Build Alternative and the No-Build Alternative. For the purposes of this analysis, potential impacts are discussed in terms of general land use impacts, station vicinity land use impacts, and consistency with local plans.

General Land Use Impacts

No-Build Alternative

The No-Build Alternative would generally result in a continuation of current development patterns and trends. Downtown has experienced and continues to experience significant development/redevelopment over the past decade and this would continue under the No-Build Alternative. The No-Build Alternative would not impact regional land use and development as currently planned.

Build Alternative

The Build Alternative, when combined with supportive public policies, plans, and favorable real estate market conditions, would likely 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 in areas within close proximity to the five proposed station locations. The Build Alternative 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 Alternative would enhance the potential for intensification of the land use pattern in the corridor by improving transit connections with other parts of the existing and planned transit system, including modes such as bus, LRT, and streetcar. 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 between the CBD, Deep Ellum, Victory Park, and future connections to other activity centers. The City of Dallas and DART recently partnered for a transit-oriented development grant to focus on transit-supportive land use and multi-modal access planning along the Build Alternative corridor.

Station Vicinity Land Use Impacts

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. Portions of the Study Area could experience difficulty attracting transit-supportive and pedestrian-oriented development and could remain primarily automobile-dependent.

Build Alternative

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. The Build Alternative would provide new opportunities for intensification, infill, and mixed-use development and would attract transit-supportive and pedestrian-oriented development, including transit-oriented development (TOD). The proposed station locations and surrounding land use are shown in **Figure 4-1**. The potential impacts around the five proposed stations are described below.

Museum Way

The area surrounding the Museum Way Station consists mainly of multi-family residential, parking, institutional (museum), and commercial/office land uses. This station's impacts would be to help sustain these existing uses and encourage similar or higher-density mixed-use development/redevelopment in the area. This station would also assist in making the Perot Museum and the future planned museum expansion more accessible, with this proposed station serving as a destination station. DART is currently working with the Perot Museum to ensure that the Museum Way Station complements the museum development, and DART will continue to work with the Perot Museum as the Project progresses.

Metro Center

The Metro Center Station area consists primarily of commercial/office, parking, multi-family, mixed-use, parkland, transit, and institutional land uses. 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, provide direct transfer opportunities to other transit facilities, and help to sustain existing activity and enhance future redevelopment in the area. Intensification of land uses and redevelopment of vacant or underutilized parcels would be likely, including parcels at the West Transfer Center, where a potential reimagining and redevelopment of the transfer facility is under consideration that could integrate a higher-density, mixed-use development at the site.



Commerce

The Commerce Station is proposed to be constructed under Commerce Street in the heart of downtown Dallas. The surrounding area consists primarily of commercial/office, retail, hotel, parking, mixed-use, parkland, transit, and institutional land uses. The station area is highly developed and includes some of the highest densities within the city, including the adjacent AT&T campus which is currently undergoing a major redevelopment in a pedestrian-friendly environment known as the Discovery District.

The proposed Commerce Station would provide direct access to help sustain and serve the downtown core. Additionally, the station would have a headhouse located in Pegasus Plaza. DART is currently working with the City of Dallas Parks Department and associated stakeholders to reimagine the park to further activate it after construction of the Project is complete.

CBD East

The CBD East Station is located in the east end of downtown Dallas with surrounding land uses consisting of commercial/office, parking, multi-family, hotel, industrial, transit, and parkland. The station area is currently experiencing rapid redevelopment from a lower-density area with numerous large parking lots and vacant lots into a higher-density area of mixed-use development known as The East Quarter.

The East Quarter is an urban neighborhood spanning eight blocks within the eastern end of Dallas' urban core, bound by Pearl Street, Jackson Street, and Cesar Chavez Boulevard between the Farmers Market, CBD, and Deep Ellum. The development/redevelopment is underway and will ultimately consist of mixed-use residential, retail, and office complexes, with a 17-story tower called 300 Pearl that will integrate with preserved buildings in the area, including the Meletio Electric building on Cesar Chavez Boulevard. The CBD East Station would provide direct access to this development which is likely to result in increased density and development intensity surrounding the station. DART is coordinating with area property owners and the developers of the East Quarter to maximize the impacts of the station and integrate the station into the surrounding development.

Apart from The East Quarter, several underutilized parking lots and vacant lots still exist within the station area. Implementation of the CBD East Station is anticipated to spur development in these underutilized areas.

Live Oak

The Live Oak Station is the relocated Deep Ellum Station along Good Latimer Expressway, immediately east of the downtown Dallas core. Surrounding land uses are predominantly multi-family, parking, community center, commercial/office, retail, industrial, parkland, and vacant. While a number of vacant parcels are located within the station area, this area is experiencing rapid changes with developments currently under construction or planned for construction in the near future. The Live Oak Station would provide direct access to the Latino Cultural Center, the Epic development, Deep Ellum and the growing east Dallas community.

The Epic development is a mixed-use project that combines office, multi-family, retail, and a boutique hotel to create a natural transition from the iconic skyscrapers of Dallas into the intimate neighborhood of Deep Ellum, serving as the future gateway into Deep Ellum from downtown Dallas. Phase 1 of the Epic development is nearing completion, with Uber announcing in August 2019 that it will open a major hub at this location that would occupy the majority of the Phase 1 office building as well as a planned Phase 2 office building which broke ground in November



2019. Uber has already moved employees into the Phase 1 office building and will continue to move employees into the development over the next several years.

In addition to providing direct access to the surrounding mixed-use developments, museums, and Deep Ellum entertainment district, the Live Oak Station would also likely impact future developments in the station area by creating an impetus for higher-intensity and higher-density, mixed-use developments.

Consistency with Local Plans

This section examines the Build Alternative for consistency with the plans and policies for the CBD, including the plans discussed in the *D2 Subway Project Environmental Land Use Existing Conditions Technical Memorandum (Appendix B.1)*.

No-Build Alternative

The No-Build Alternative is not consistent with any of the land use plans and policies examined for Dallas. All 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 Alternative

The D2 Subway Project is contained entirely within the City of Dallas and predominantly within the CBD. The proposed project is consistent with existing plans developed by the City of Dallas, including the *forwardDallas! Comprehensive Plan*, in collaboration with DART to provide an efficient local and regional transportation network. *Connect Dallas* is the City's first five-year strategic transportation vision and is led by the Dallas Department of Transportation. Through an on-going planning process, City leadership, residents, planners, and stakeholders are working together to develop a transportation system that supports the City's housing, economic, equity and sustainability goals. *Connect Dallas* is a multimodal plan that is considering all forms of transportation, including biking, walking, transit, automobiles, freight, and new mobility options such as bike-share, transportation network companies, and e-scooters. The construction and operation of the D2 Subway Project would contribute to the attainment of these stated goals.

The focus of the various parks plans in and around downtown Dallas, including the *Downtown Dallas Parks Master Plan*, is to enhance greater access to and improved recreation in the Study Area. The proposed project will not interfere with the development of major recommendations presented in these plans, and by improving access to these areas, the project is consistent with these plans.

In addition to the above plans, the overarching plan for the Study Area is the *Downtown Dallas 360 Plan* which was adopted by the Dallas City Council in 2017. The D2 Subway Project and, more specifically, the adopted locally preferred alternative are included in the *360 Plan*. The Project is a vital component of the plan and the ability to successfully create the vibrant and connected urban core envisioned in the *360 Plan*. The Project would provide a key linkage by establishing a second downtown LRT line to allow for increased use of light rail by DART customers.

The D2 Subway is consistent with Downtown Dallas Inc.'s plan to improve access between downtown and the surrounding urban districts. 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. DART will continue to work with the City as the proposed project advances to improve access to these areas.



4.2.5 Mitigation Measures

With the exception of direct impacts caused by the proposed acquisitions and displacements discussed in **Section 4.4**, no other adverse impacts to land use are anticipated with the construction of the proposed project as local planning activities have attempted to encourage more intensified growth in the Study Area, especially around future transit stations.

Consideration of potential impacts on land use will continue throughout the study and design of the D2 Subway proposed alignment with a view to minimize any potential negative impacts and maximize transit-supportive opportunities through coordinated planning with the City of Dallas and private developers. Mitigation measures will include, but are not limited to, the following:

- Design at-grade stations and pedestrian portals providing access to the subway stations to be respectful of the primary land use in the surrounding area. For example, at Museum Way, continued collaboration with the Perot Museum during station design would help ensure that the station integrates with and complements the adjacent museum development. In areas that are best suited for redevelopment and intensification, stations and pedestrian portals could be appropriate in scale, and designed in conjunction with existing land use and adjacent developments.
- Make safety a priority in design and operational planning, with special diligence where pedestrian activity is high due to events or attractions.
- Institute appropriate neighborhood traffic measures to help prevent conflict between cars, pedestrians, and other non-motorized uses and the fixed guideway, particularly in the Victory Park area and Good Latimer/Swiss Avenue areas.

4.3 Socioeconomic Characteristics and Cohesion

4.3.1 Introduction and Regulatory Setting

Adverse effects on environmental resources from a proposed federally funded project must be identified and avoided or minimized, including potential impacts to the human environment and social interactions. Executive Order (EO) 13045, Protection of Children from Environmental Health and Safety Risks mandates that federal agencies identify and assess environmental safety risks that may disproportionately affect children as a result of implementation of federal policies, programs, activities and standards. Information on impacts to Environmental Justice populations, including minority and low-income populations, is in **Section 4.11**.

4.3.2 Methodology

The following methodology is consistent with DART's *Environmental Impact Assessment and Mitigation Guidelines for Transit Projects* and is also consistent with FTA guidance.

The socioeconomic analysis for the Project includes data collection, development of community profiles, assessment of impacts, and mitigation considerations. In order to evaluate socioeconomic characteristics, the affected communities were identified. Per Federal Highway Administration community impact assessment guidance, communities are based on a common characteristic or interest, such as religion, ethnicity, income strata, or concern for the economic viability of a region, which provides a psychological unity among members. Communities can also be defined by shared perceptions or attitudes, typically expressed through individuals' identification with, commitment to, and attitude towards a particular identifiable area. To determine community areas affected by the proposed project, characteristics were researched within the Study Area, and the following features were assessed and evaluated:



- Neighborhoods and Districts
- Community Facilities
- Schools
- Demographics
- Employment
- Economic Development

Community facilities were evaluated and include recreational facilities, community centers, places of worship, daycare centers, public service locations, medical facilities, and other areas of community importance. Schools, school attendance zone boundaries, neighborhood associations, and appraisal district property information were evaluated to establish community areas and neighborhoods. In conjunction with this information, demographic data such as census data and population projections for the cities and counties is used to characterize the communities potentially affected by the proposed project. The most recent data available was gathered and supplemented with data acquired during field reconnaissance and anecdotal information gathered throughout the planning process.

The primary source of data for demographics is the US Census Bureau (USCB). For the proposed project, the 2012-2016 American Community Survey (ACS) was utilized as the main source of data. The ACS is a data set developed by the USCB in 1-year, 3-year and 5-year increments. It involves an annual survey of randomly-selected individuals on subjects that are not included in the short form of the decennial census, such as household income. The USCB then develops estimates for 1-year, 3-year and 5-year periods. ACS estimates are not available at the census block level; therefore, the 2010 Decennial Census was used for block level data for race and ethnicity. Baseline comparison data is also gathered for the city and county limits within the Study Area. Demographic data included total population, total households, and population percentages by age, gender, disability status, income, English language proficiency, vehicle access, race and ethnicity. In addition, employment and economic development characteristics were evaluated using several sources including the U.S. Bureau of Economic Analysis, the NCTCOG Regional Data Center, and the Bureau of Labor Statistics data.

4.3.3 Affected Environment

Existing Conditions

Neighborhoods and Districts

Community cohesion refers to the level of social interaction experienced within and across neighborhoods. Registered neighborhood associations, homeowners associations (HOAs), and schools within the Study Area serve to bind neighbors to one another under a common identity or set of ideals and create more meaningful social interactions. Downtown Dallas is also described as a series of districts or neighborhoods, each with unique assets and character, providing residents and business owners with a sense of community.

City of Dallas data was used to gather the local neighborhood associations and HOAs within the Study Area and are shown on **Figure 4-2**. As discussed in **Section 4.2**, downtown Dallas consists of 15 districts, and the Study Area encompasses all or a portion of 13 of these districts.

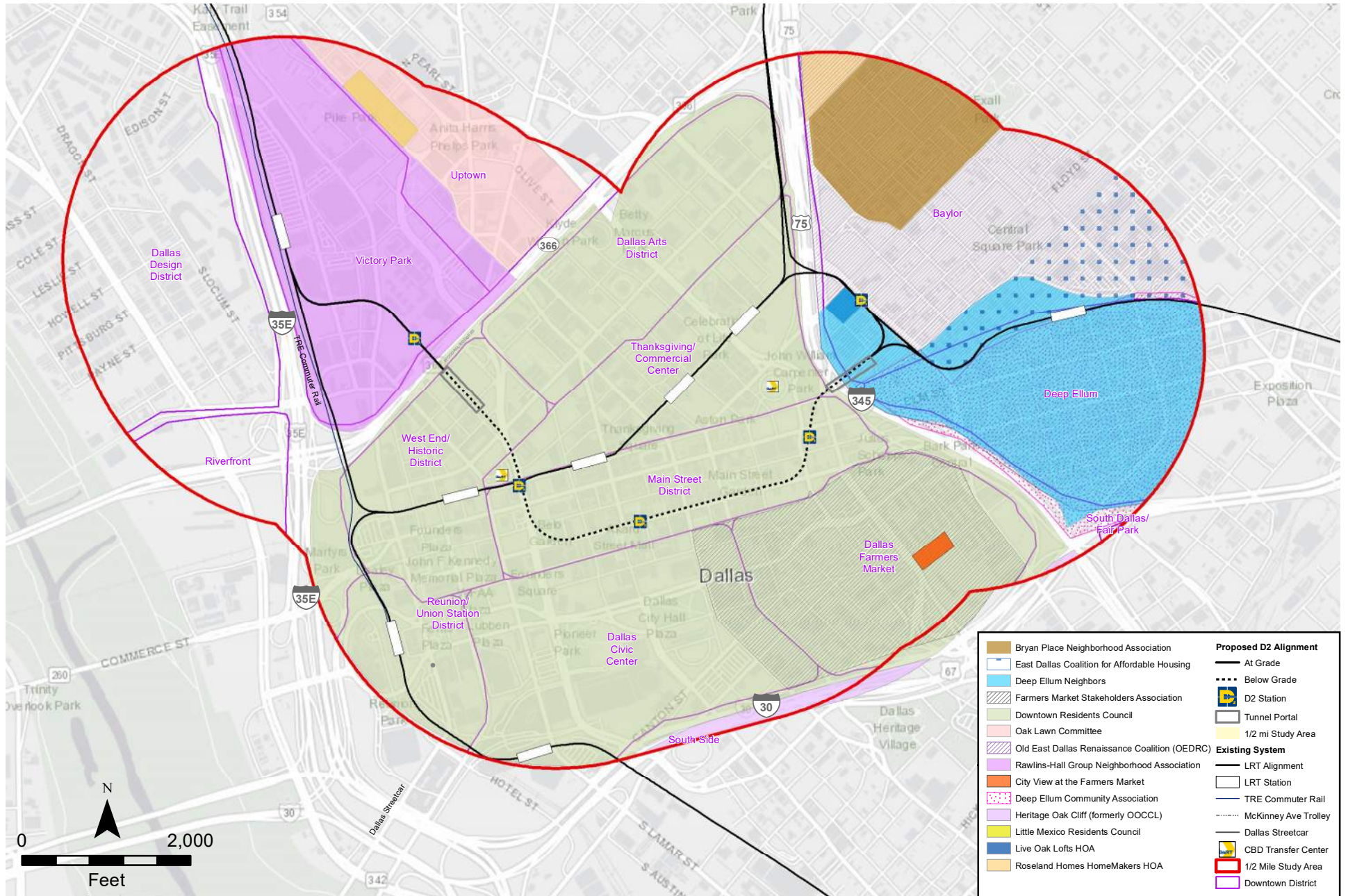


Figure 4-2
Neighborhood and Home Owner Associations
 Data Source: DART, GPC6, City of Dallas





Community Facilities

Existing community facilities assessed within the Study Area include community centers, places of worship, daycare centers, public service and government locations, medical facilities, and other areas of community importance. Field reconnaissance to verify sites and locations was performed in May 2018. **Figure 4-3** and **Figure 4-4** show the community facilities and their locations within the Study Area. **Table 4-4** summarizes the community facilities by district. See **Appendix B.2, Socioeconomic Existing Conditions Technical Memorandum** for additional information.

Schools

In accordance with EO 13045, areas within the Study Area where high concentrations of children are likely, such as schools, were identified. The Study Area is within several school attendance zones for the Dallas Independent School District (DISD). Other charter and private schools identified as part of the community facilities, including DISD's CityLab High School, were not evaluated because these schools neither have a delineated boundary or attendance zone nor is their attendance limited by a boundary or zone. The DISD schools with attendance zones extending into the Study Area are Madison and North Dallas High Schools, Rusk and Spence Middle Schools, Dade and King Jr. Learning Centers, and Medrano, Milam and Zaragoza Elementary Schools. The proposed alignment is within a highly urbanized, downtown area. However, all of these schools are located outside the Study Area and are not adjacent to the proposed alignment. There are three schools near the alignment. **Table 4-4** summarizes the schools identified in the districts, while **Figure 4-3** and **Figure 4-4** shows their location.

Demographics

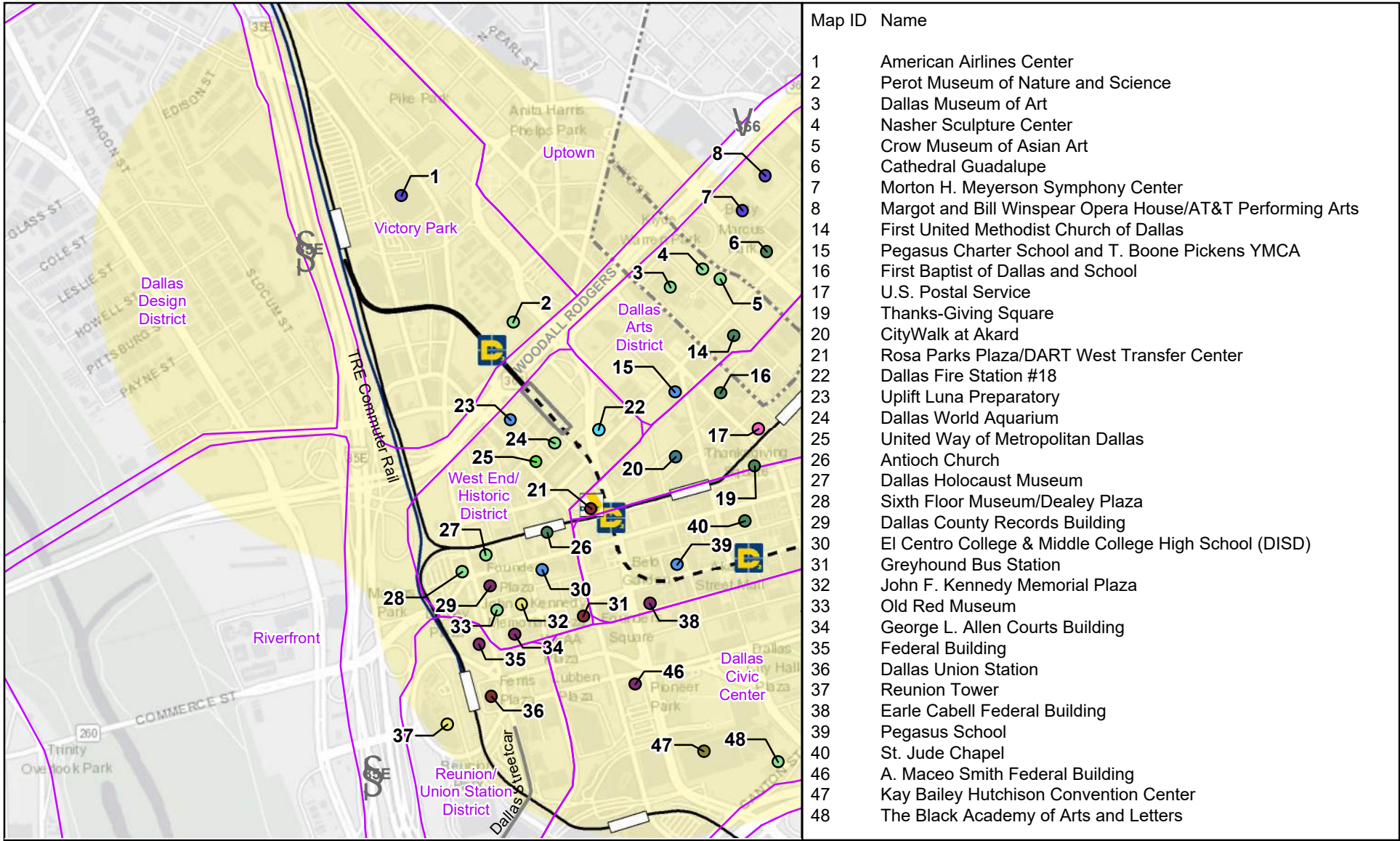
Demographic data was gathered from the U.S. Census Bureau (USCB) 2010 Census geographies, city and county limits either wholly or partially within the Study Area using the USCB 2012-2016 *American Community Survey (ACS) 5-Year Estimates* data. Demographic data analyzed included total population, total number of households, and population percentages by race and ethnicity, income, vehicle access, and other languages spoken at home. Demographic data is detailed in **Section 4.11**.

Table 4-5 provides the Study Area, and city and county population data from the 2000 and 2010 Decennial Censuses. The Study Area population increased by 18 percent from 2000 to 2010. Both the City of Dallas and Dallas County also experienced an increase in population from 2000 to 2010.

Table 4-4 Total Population for Dallas County and City of Dallas

Geographic Unit	2000 Total Population	2010 Total Population	Population Change	Percent Change
Study Area	20,076	24,597	4,521	23%
City of Dallas	1,188,580	1,197,816	9,236	0.8%
Dallas County	2,218,899	2,368,139	149,240	6.7%

Source: USCB, 2010 Census and 2000 Census, September 2018.



Map ID	Name
1	American Airlines Center
2	Perot Museum of Nature and Science
3	Dallas Museum of Art
4	Nasher Sculpture Center
5	Crow Museum of Asian Art
6	Cathedral Guadalupe
7	Morton H. Meyerson Symphony Center
8	Margot and Bill Winspear Opera House/AT&T Performing Arts
14	First United Methodist Church of Dallas
15	Pegasus Charter School and T. Boone Pickens YMCA
16	First Baptist of Dallas and School
17	U.S. Postal Service
19	Thanks-Giving Square
20	CityWalk at Akard
21	Rosa Parks Plaza/DART West Transfer Center
22	Dallas Fire Station #18
23	Uplift Luna Preparatory
24	Dallas World Aquarium
25	United Way of Metropolitan Dallas
26	Antioch Church
27	Dallas Holocaust Museum
28	Sixth Floor Museum/Dealey Plaza
29	Dallas County Records Building
30	El Centro College & Middle College High School (DISD)
31	Greyhound Bus Station
32	John F. Kennedy Memorial Plaza
33	Old Red Museum
34	George L. Allen Courts Building
35	Federal Building
36	Dallas Union Station
37	Reunion Tower
38	Earle Cabell Federal Building
39	Pegasus School
40	St. Jude Chapel
46	A. Maceo Smith Federal Building
47	Kay Bailey Hutchison Convention Center
48	The Black Academy of Arts and Letters

CBD Transfer Center	Proposed D2 Alignment	D2 Station	Existing LRT System	Dallas District	Event Center	Library	Museum	School
1/2 mi Study Area	Below Grade	McKinney Ave Trolley	LRT Station	Dallas District	Affordable Housing	Local Point of Interest	Place of Worship	Transportation
TRE Commuter Rail	Tunnel Portal	Dallas Streetcar			Fire	Community Center	Market	Police
					Fire Station	Convention Center	Medical	Post Office
					Government			

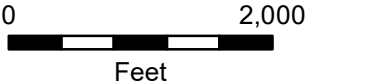
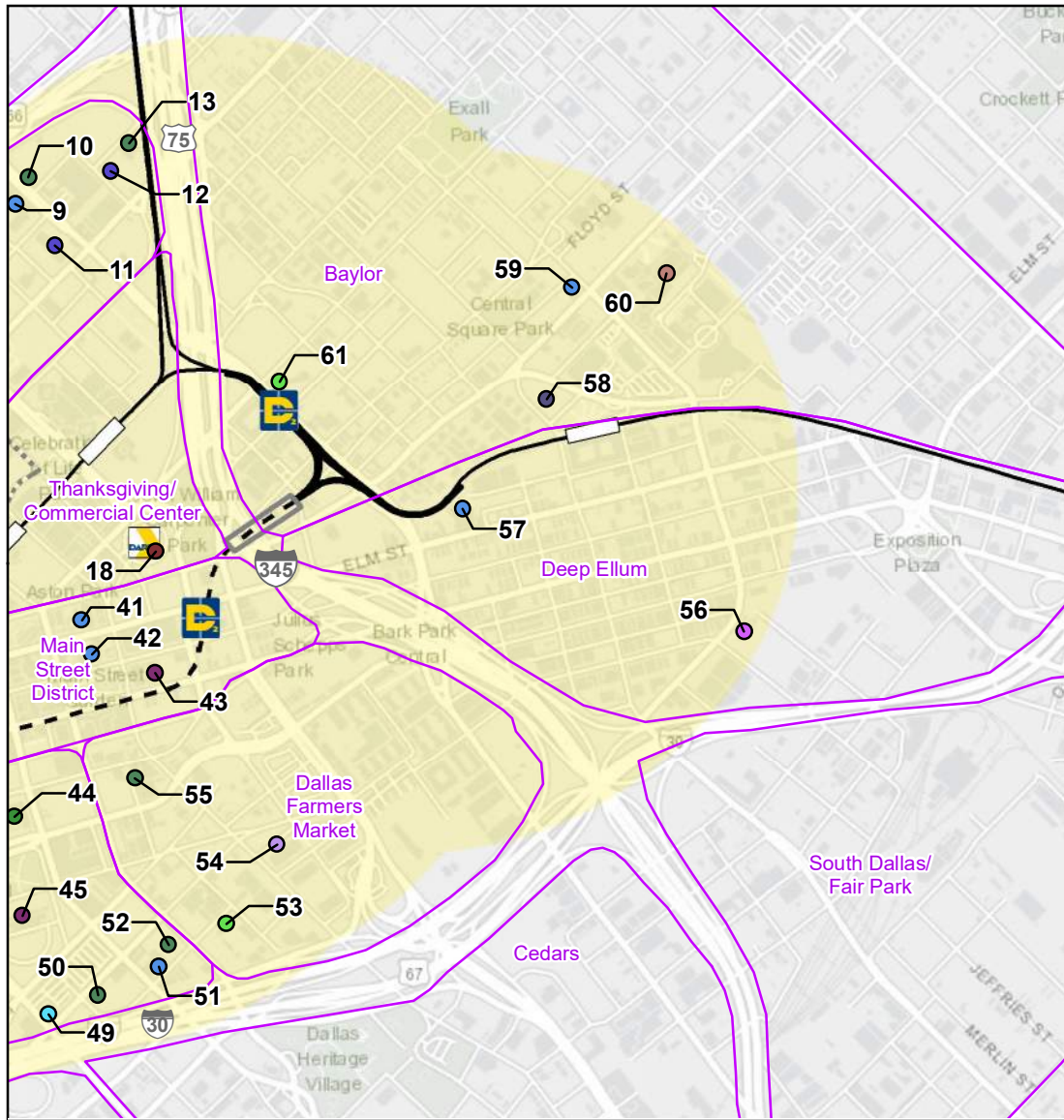


Figure 4-3
Community Facilities and Schools
 Data Source: DART, GPC6



Map ID	Name
9	Booker T. Washington High School for the Arts
10	St. Paul Methodist Church
11	Moody Performance Hall
12	Dallas Black Dance Theatre
13	Fellowship Church Dallas Campus
18	DART East Transfer Center
41	Texas A&M University - Commerce
42	UNT Dallas College of Law
43	Dallas Municipal Court
44	J. Erik Jonsson Central Library
45	Dallas City Hall
49	Dallas Fire Station #4
50	Eagles Nest Cathedral
51	CityLab High School (DISD)
52	Soul Church
53	The Bridge Homeless Recovery Center
54	Dallas Farmer's Market
55	First Presbyterian Church of Dallas
56	Dallas Police Department - Central Patrol Division
57	Uplift Education Laureate Prep
58	Dallas Fire Station #3
59	Texas A&M College of Dentistry
60	Baylor University Medical Center
61	Latino Cultural Center

		Proposed D2 Alignment		Existing LRT System					

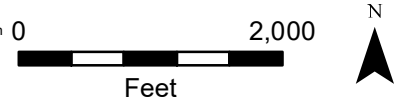


Figure 4-4
Community Facilities and Schools
 Data Source: DART, GPC6



Table 4-5 Community Facilities and Schools by District

District	Description
Design	No community facilities were identified in this district within the Study Area.
Victory Park	The American Airlines Center (AAC) and the Perot Museum are located in this district. The AAC is a multi-purpose arena facility located within 0.25 mile of the proposed alignment. In addition to sporting events, the AAC holds concerts and other live entertainment events. The Perot Museum is located adjacent to the proposed alignment just north of Woodall Rodgers Freeway and east of Houston Street. It is a popular destination for families with educational programs for children. This facility also includes a café, a store, event spaces, exhibit halls, and offices.
Uptown	No community facilities were identified in this district within the Study Area.
Arts	The Arts District has 13 community facilities: Dallas Museum of Art, Nasher Sculpture Center, Crow Museum of Asian Art, Cathedral Guadalupe, Morton H. Meyerson Symphony Center, Margot and Bill Winspear Opera House/AT&T Performing Arts Center, Booker T. Washington High School for the Performing and Visual Arts, St. Paul United Methodist Church, Moody Performance Hall, Black Dance Theatre, Fellowship Church Dallas Campus, First United Methodist Church of Dallas, and Pegasus Charter School/T. Boone Pickens YMCA. The four places of worship within this district serve a large population and provide spiritual, educational and training services. Many various arts organizations, including the Booker T. Washington High School for the Performing and Visual Arts, have performances in the district which includes concerts, outdoor festivals, lectures, youth educational programs, and other cultural programs. The T. Boone Pickens YMCA facility holds classes throughout the day with hours of service running from early morning to evening hours (5:30 a.m. to 9:00 p.m.). The Pegasus Charter School serves students in grades 7 through 12. The Pegasus Charter School and T. Boone Pickens YMCA are the only facilities in this district located within 0.25 mile of the proposed alignment.
Riverfront	No community facilities were identified in this district within the Study Area.
West End Historic	This district contains thirteen community facilities: Dallas Fire Station #18, Uplift Luna Preparatory - Primary, Dallas World Aquarium, United Way of Metropolitan Dallas, Antioch Church, Dallas Holocaust Museum, Sixth Floor Museum/Dealey Plaza, Dallas County Records Building, El Centro College/Middle College High School, Greyhound Bus Station, John F. Kennedy Memorial Plaza, the Old Red Museum and the George L. Allen Courts Building. Approximately two million visitors come to Dealey Plaza annually to visit the site of the John F. Kennedy assassination and Sixth Floor Museum. DART currently operates the West End Station on Pacific Avenue in this district with most attractions within walking distance. This district is mostly known as a popular tourist destination with the John F. Kennedy destinations as well as several restaurants and entertainment venues in the district. A portion of the district was listed on the National Register of Historic Places (NRHP) in 1978 as well as the Dealey Plaza Historic District in 1993.



District	Description
Thanksgiving Commercial Center	<p>This district includes parks, plazas, a post office, an affordable housing building and a church. 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 Historic 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. First Baptist Church of Dallas is a megachurch that includes multiple buildings covering five blocks and has a congregation of about 12,000. The facility also operates a school, radio station, and provides homeless services.</p> <p>The Rosa Parks Plaza and DART West Transfer Center lie along this district's western side near its boundary with the West End Historic and Main Street districts. Rosa Parks Plaza, located adjacent to the DART West Transfer Center on 0.25 acre along Lamar Street between Elm Street and Pacific Avenue, has park-like amenities and 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 West Transfer Center is a DART bus facility that was completed with federal funding in 2009 as a joint project of DART, the City of Dallas, downtown Dallas, and Dallas Main, LP. The Rosa Parks Plaza and West Transfer Center are located adjacent to the proposed alignment.</p>
Baylor	<p>The Baylor District includes five community facilities including a fire station, Texas A&M College of Dentistry, Baylor University Medical Center, the Latino Cultural Center, and the St. James A.M.E. Temple. The most notable feature of the district is the medical center which influences the land use of the district being primarily medical facilities. The Latino Cultural Center is also a community facility that attracts visitors and holds several cultural events throughout the year. This facility is a division of the City of Dallas Office of Cultural Affairs.</p>
Main Street	<p>This district runs along Main Street and is bounded by Lamar Street, Elm Street and the US 75/IH 45 elevated highway and Commerce Street. The five community facilities in the Main Street District include the Earle Cabell Federal Building, Pegasus School, St. Jude Chapel, Texas A&M University - Commerce, and UNT Dallas College of Law. This district is predominantly composed of private commercial offices, hotels, restaurants, federal offices and higher education and graduate colleges.</p>
Civic Center	<p>The Civic Center district has several public buildings. Among these are the J. Erik Jonsson Central Library, Dallas City Hall and Plaza, and the A. Maceo Smith Federal Building. The City Hall and Plaza complex is two blocks long and two blocks wide (a 7-acre plaza) and is bounded by Young, Ervay, Canton, and Akard streets. City Hall Plaza is cut diagonally into two triangular spaces. The plaza 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.</p> <p>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.</p> <p>The other facilities identified within this district include: Kay Bailey Hutchison Convention Center, the Black Academy of Arts and Letters, Dallas Fire Station #4, Eagles Nest Cathedral, CityLab High School, and Soul Church. DART currently operates the Convention Center Station on the Red and Blue lines 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.</p>



District	Description
Reunion/ Union Station	This district includes three community facilities. A federal building is located on the northern edge of this district which houses several federal and other government offices. The other two community facilities after which the district is named are the Reunion Tower and the Dallas Union Station. Reunion Tower is a major feature of the Dallas skyline and recognizable landmark since constructed in 1978. The Dallas Union Station is an active transportation hub that serves Amtrak train lines, the Trinity Railway Express (TRE) commuter rail and DART light rail as well as freight traffic. The Dallas Union Station was listed on the NRHP in 1975 and also includes offices and meeting/event spaces.
Farmers Market	Three community facilities are identified within the Farmers Market District: The Bridge Homeless Recovery Center, First Presbyterian Church of Dallas, and Dallas Farmers Market. The Dallas Farmers Market, established in 1941, is the dominating community facility encompassing over 26,000 square feet of fresh produce, flowers, houseplants and specialty items displayed, where cooking classes and multi-cultural festivals are held. The Farmers Market also holds community yard sales for residents to buy and sell used goods.
Deep Ellum	Deep Ellum includes a significant entertainment sector. This district includes two community facilities, the Dallas Police Department Central Patrol Division and Uplift Luna Preparatory - Secondary which are police and educational facilities, respectively. This district is mostly known as a music, concert and entertainment destination with several restaurants and venues.

Source: GPC6 Team, August 2018

Employment

According to the City of Dallas 2017 Economic Development Profile, downtown Dallas is home to more corporate and regional headquarters than any other North Texas location. Major headquarters situated within the area include A.H. Belo, AT&T, Comerica Bank, EnLink Midstream Partners, Oncor, Hunt Consolidated Oil, Neiman Marcus, and Tenet Healthcare, among others. In addition, recent relocations to the downtown area have occurred for other companies including Omnitrac, Active Networks, Grant Thornton, Invesco, Santander Consumer, HKS, Blue Cross Blue Shield of Texas, Goldman Sachs, Jacobs Engineering, and WeWork.

There are 77 major employers within the Study Area. The NCTCOG defines “major employer” as a single location of a business which employs 250 or more individuals. Major employers within the Study Area and adjacent to station locations would likely generate considerable activity in those areas, and thus, it is important to identify major employment facilities in addition to residential populations. **Figure 4-5 and Figure 4-6** show the major employers within the Study Area.

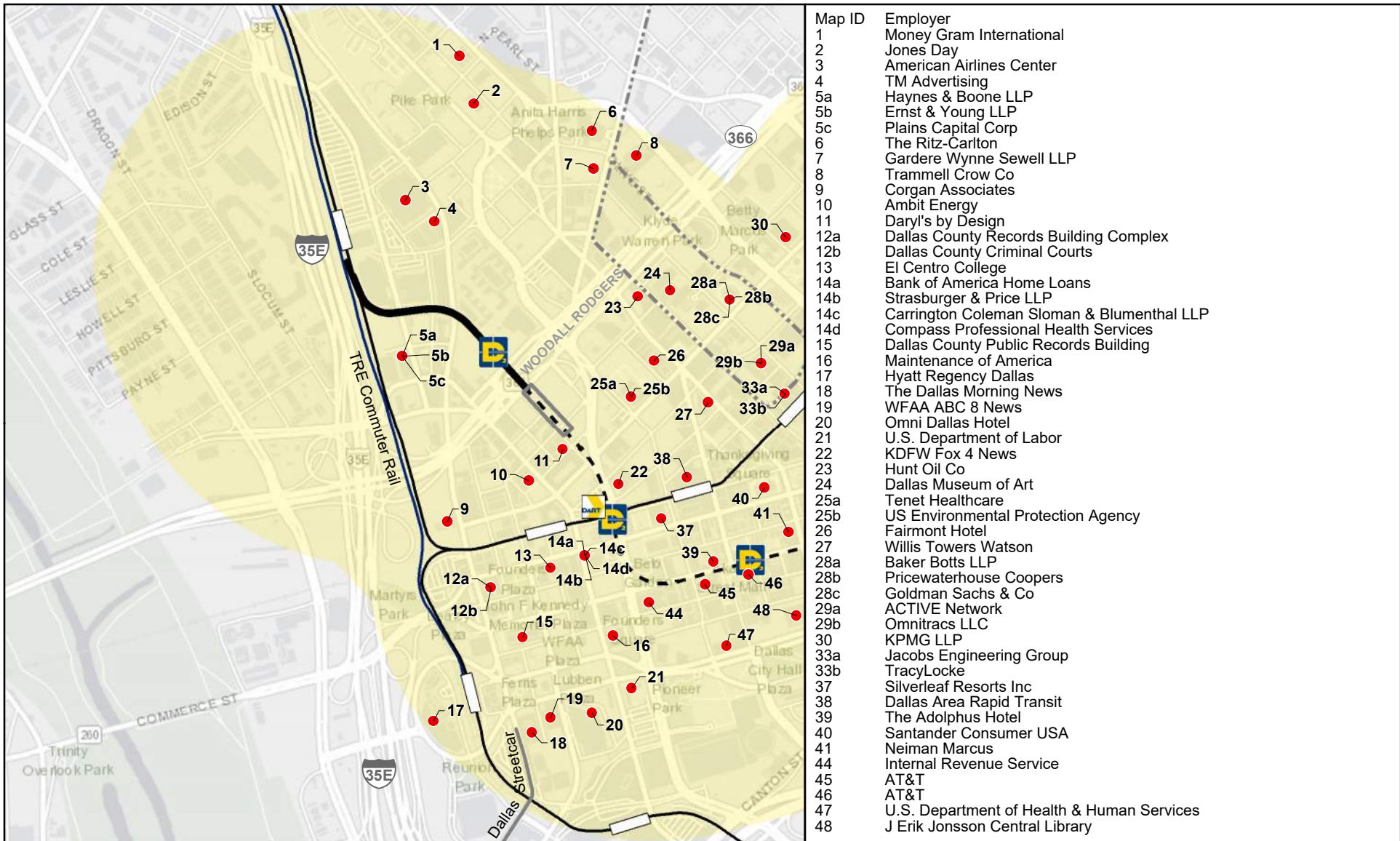
4.3.4 Impact Evaluation

No-Build Alternative

Under the No-Build Alternative, the proposed Project would not be built. No impacts to socioeconomic characteristics in the area of the alignment would occur. Physical boundaries of neighborhoods would remain unchanged and social interactions would not be altered.

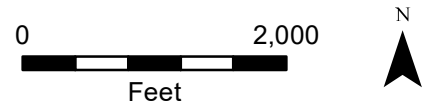
Build Alternative

The evaluation of potential impacts to socioeconomic resources resulting from the Project is discussed in terms of potential permanent impacts resulting from the proposed project. Potential



Map ID	Employer
1	Money Gram International
2	Jones Day
3	American Airlines Center
4	TM Advertising
5a	Haynes & Boone LLP
5b	Ernst & Young LLP
5c	Plains Capital Corp
6	The Ritz-Carlton
7	Gardere Wynne Sewell LLP
8	Trammell Crow Co
9	Corgan Associates
10	Ambit Energy
11	Daryl's by Design
12a	Dallas County Records Building Complex
12b	Dallas County Criminal Courts
13	El Centro College
14a	Bank of America Home Loans
14b	Strasburger & Price LLP
14c	Carrington Coleman Sloman & Blumenthal LLP
14d	Compass Professional Health Services
15	Dallas County Public Records Building
16	Maintenance of America
17	Hyatt Regency Dallas
18	The Dallas Morning News
19	WFAA ABC 8 News
20	Omni Dallas Hotel
21	U.S. Department of Labor
22	KDFW Fox 4 News
23	Hunt Oil Co
24	Dallas Museum of Art
25a	Tenet Healthcare
25b	US Environmental Protection Agency
26	Fairmont Hotel
27	Willis Towers Watson
28a	Baker Botts LLP
28b	Pricewaterhouse Coopers
28c	Goldman Sachs & Co
29a	ACTIVE Network
29b	Omnitracs LLC
30	KPMG LLP
33a	Jacobs Engineering Group
33b	TracyLocke
37	Silverleaf Resorts Inc
38	Dallas Area Rapid Transit
39	The Adolphus Hotel
40	Santander Consumer USA
41	Neiman Marcus
44	Internal Revenue Service
45	AT&T
46	AT&T
47	U.S. Department of Health & Human Services
48	J Erik Jonsson Central Library

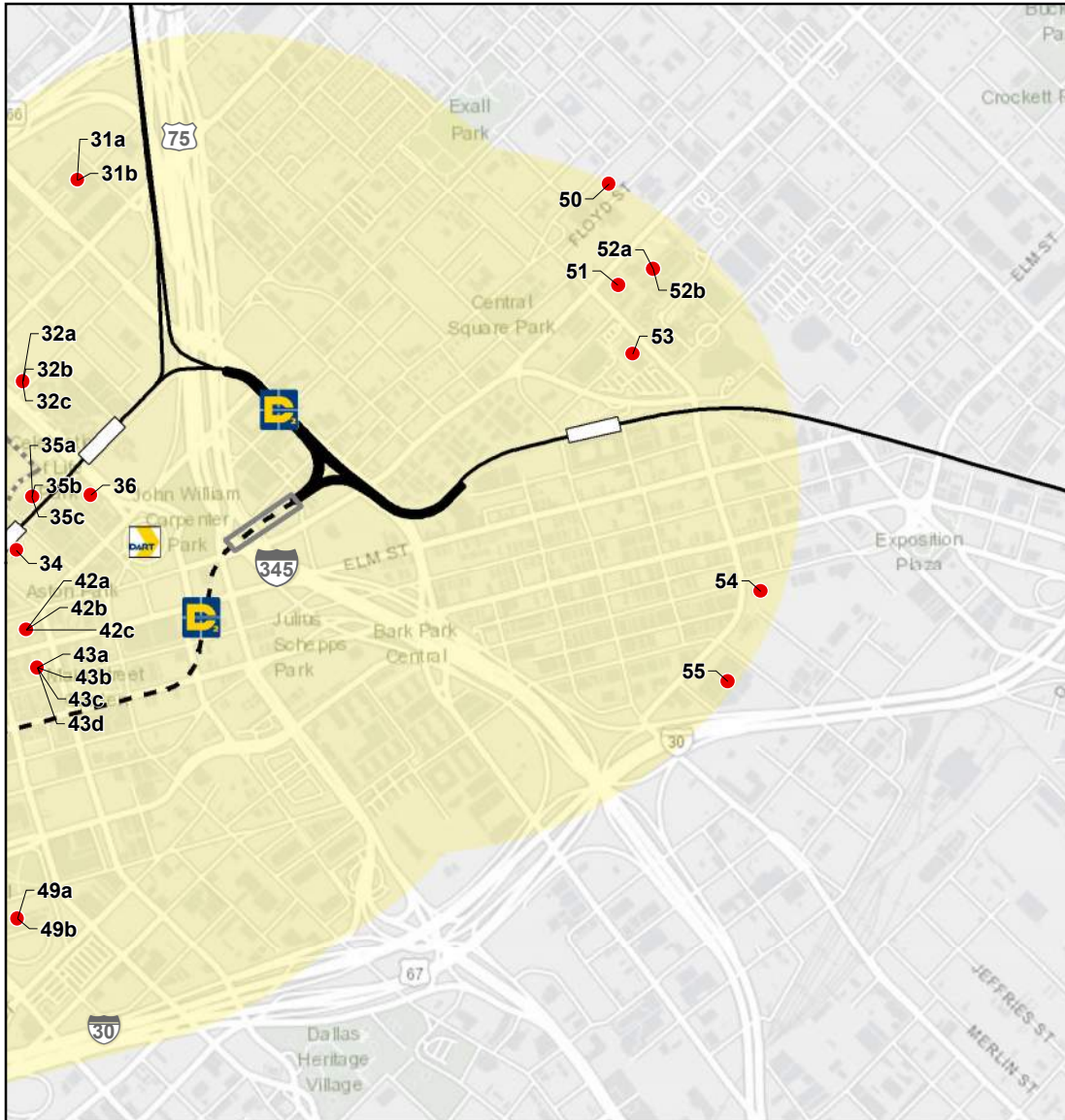
● Major Employer
 Proposed D2 Alignment
D D2 Station
Existing LRT System
 TRE Commuter Rail
DART CBD Transfer Center
 At Grade
 Below Grade
D LRT Station
 LRT Alignment
 McKinney Ave Trolley
 1/2 mi Study Area
 Tunnel Portal
 LRT Station
 Dallas Streetcar



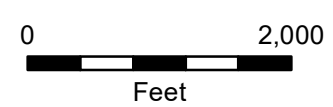
**Figure 4-5
Major Employers**

Data Source: DART, GPC6,
NCTCOG Regional Data Center, Major Employers (July 2017), accessed in August 2018





Map ID	Employer
31a	EnLink Midstream
31b	Thompson & Knight LLP
32a	Locke Lord Law Firm
32b	JP Morgan Chase Bank
32c	Deloitte
34	HKS Architects
35a	Federal Insurance Co
35b	Baylor Scott & White Health
35c	Chubb Group of Insurance Co
36	Sheraton Dallas Hotel
42a	JP Morgan Chase Bank
42b	Akin Gump Strauss Hauer & Feld
42c	Neiman Marcus
43a	Orix USA Corp
43b	Invitation Homes
43c	Comerica Bank Headquarters
43d	Grant Thornton LLP
49a	Dallas City Hall
49b	Dallas Housing Department
50	Baylor Specialty Hospital
51	Texas A&M University College of Dentistry
52a	Baylor Health Cancer Hospital
52b	Baylor University Medical Center
53	Baylor Jack & Jane Hamilton Heart & Vascular Hospital
54	Dallas Sanitation Services Department
55	Glasfloss Industries





effects were evaluated for neighborhoods and districts, community facilities, schools, demographics, employment and economic development.

Neighborhoods and Districts

The *Socioeconomic Existing Conditions Technical Memorandum* discusses local neighborhood associations and HOAs that are evaluated in this impact analysis (See **Appendix B.2**). The proposed alignment is not anticipated to separate or further divide any of these neighborhoods. The proposed alignment would consist of at-grade sections, train portals, and a tunnel section. Most of the impacts would be temporary and disturbed areas would be restored to pre-existing, if not better, conditions. At train portal sections, permanent excavation and impacts would occur; however, opportunities for pedestrian connections and integration with future developments over or adjacent to both tunnel portal locations are being planned in coordination with property owners to minimize potential impacts and maximize connectivity.

In the northern segment through the Victory Park District, the proposed alignment would be integrated into DART-owned ROW in the center of Museum Way and through the parking lot adjacent to the Perot Museum, and would not impact district connectivity or community cohesion. The Project would provide added access to this area of high-density, mixed land uses, and would maintain walkability and traffic access. Museum Way would not be widened, as the proposed alignment would remain within the DART-owned ROW. Additional pedestrian traffic may result in this area from the proposed station located adjacent to the Perot Museum and would be accommodated through enhanced, safe pedestrian connections.

The below grade section of the proposed alignment passes under and would not separate the Main Street, Thanksgiving Commercial Center and West End Historic Districts. Station access portals in these areas would become integral elements of the districts and enhance mobility and access. The portion of the proposed alignment within the Deep Ellum and Baylor District would follow the existing rail line within Good Latimer Expressway and would add a new junction south of Swiss Avenue, including a portal partially under I-345. The proposed alignment south of Swiss Avenue would be designed to maintain connectivity along Hawkins and Good Latimer from areas to the north near Live Oak Lofts and the new Epic development south of Swiss Avenue and Pacific Avenue. Coordination with future development and the City of Dallas will further emphasize connectivity in this area between I-345 and Good Latimer.

Community Facilities

Existing community facilities assessed within the Study Area include community centers, places of worship, daycare centers, public service and government locations, medical facilities, and other areas of community importance. Project impact was assessed based on the location of the facility in relation to the proposed alignment and stations and whether the line is at grade or underground. Facilities not traversed or adjacent to the proposed alignment are unlikely to be adversely affected by noise or access effects; however, facilities located adjacent and within 500 feet of the proposed alignment were further investigated for impacts. Of the 62 community facilities and schools inventoried, 15 facilities are adjacent or within 500 feet of the proposed alignment. **Table 4-6** lists these community facilities. The Map Id number corresponds to the number on **Figures 4-3** and **4-4**. 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. These facilities are discussed by district in the following sections.

No community facilities were identified in the Arts, Uptown, Design, Reunion/Union Station, Riverfront, Civic Center, and Farmers Market districts within 500 feet of the proposed alignment.



Table 4-6 Community Facilities and Schools within 500 Feet of the Proposed Alignment

Map Id	Facility Name	Street Address
Victory Park		
2	Perot Museum of Nature and Science	2201 N. Field St.
Thanksgiving Commercial Center		
18	DART East Transfer Center	330 N. Olive St.
21	Rosa Parks Plaza/DART West Transfer Center	920 San Jacinto St.
West End Historic		
22	Dallas Fire Station #18	660 N. Griffin St.
23	Uplift Luna Preparatory - Primary	2020 N. Lamar St.
24	Dallas World Aquarium	1801 N. Griffin St.
25	United Way of Metropolitan Dallas	1800 N. Lamar St.
Main Street		
38	Earle Cabell Federal Building	1100 Commerce St.
39	Pegasus School	1222 Commerce St.
40	St. Jude Chapel	1521 Main St.
42	University of North Texas (UNT) Dallas College of Law	1901 Main St.
43	Dallas Municipal Court	2014 Main St.
Deep Ellum		
57	Uplift Luna Preparatory - Secondary	2625 Elm St.
Baylor		
61	Latino Cultural Center	2600 Live Oak St.
62	St. James A.M.E. Temple	624 Good Latimer

Source: GP6 Team and NCTCOG Regional Data Center, August 2018

Victory Park

The Perot Museum of Nature and Science is adjacent to the proposed alignment. The Perot Museum is located north of Woodall Rodgers Freeway and west of Field Street. The proposed Museum Way Station would be located adjacent to the museum and could positively benefit the museum with direct rail access for visitors. DART and museum facility representatives continue to coordinate for a seamless integration with the current facility and potential future expansion. The key impacts to Perot Museum would be associated with impacts to the parking lots north and south of Broom Street, some of which are on DART-owned right-of-way. Ongoing coordination would continue between DART and Perot Museum representatives to mitigate parking impacts. **Section 3.4** provides a more detailed description of parking impacts and potential mitigation options.

Thanksgiving Commercial Center

The DART East Transfer Center, Rosa Parks Plaza and DART West Transfer Center are within 500 feet of the proposed alignment. The DART East Transfer Center is not adjacent to the proposed alignment and adverse impacts to access would not result from the proposed project. In fact, increased accessibility would result from the proposed project providing connections to this facility through the proposed CBD East Station. The Rosa Parks Plaza and DART West Transfer Center are located adjacent to the proposed alignment. Both facilities are owned by DART and would be modified to incorporate access to the Metro Center Station to facilitate bus-rail transfers.

A permanent station headhouse would be constructed on a portion of the West Transfer Center and the facility would be reconstructed. The station portal at Rosa Parks Plaza would modify the plaza layout and statue placement. Incorporation of the station access is integral to providing safe and convenient intermodal connections between the West End Station, Metro Center Station and bus facilities. More information is contained in **Sections 2.3** and **3.1**.



West End Historic

This district contains four community facilities within 500 feet of the proposed alignment which are the Dallas Fire Station #18, Uplift Luna Preparatory - Primary, Dallas World Aquarium, and United Way of Metropolitan Dallas. The section of the proposed alignment within this district includes a train portal section and a temporary cut and cover construction section. The proposed project would not impact the Dallas Fire Station #18, Uplift Luna Preparatory - Primary, and United Way of Metropolitan Dallas because these facilities are not located adjacent to the proposed alignment or stations. The Dallas World Aquarium is located adjacent to the proposed alignment and is adjacent to the train portal along Old Griffin Street. The construction of the train portal would avoid the Dallas World Aquarium building but would limit access from parking areas to the east to only Hord Street as Corbin Street would be closed. However, the aquarium is proposing a future parking garage north of their facility which would reduce any crossing of the portal. In addition, development plans east of Old Griffin Street would replace surface parking with a mixed-use development and alter pedestrian access in the area. DART is coordinating with property owners to ensure strong north-south pedestrian connectivity along the alignment in this area which would benefit facilities like the aquarium. During construction, decking would be provided to avoid and minimize disruption to the street traffic within this section. More information on construction is provided in **Chapter 5**.

Main Street

This district contains four community facilities within 500 feet of the proposed alignment which are the Earle Cabell Federal Building, Pegasus School, St. Jude Chapel, and University of North Texas at Dallas College of Law. Most of the alignment within the district would be constructed as a subway tunnel and would not result in adverse impacts to these facilities. Temporary traffic detours may occur nearby due to cut and cover sections on the western and eastern ends of the tunnel section but access to these facilities would be maintained.

Deep Ellum

This district includes one community facility, the Uplift Luna Preparatory – Secondary, that is located adjacent to the proposed alignment. No impacts are anticipated to this facility because the school is located adjacent to the existing Green Line and the proposed alignment would not relocate this segment of track.

Baylor

This district includes the Latino Cultural Center and St. James A.M.E. Temple, both located adjacent to the proposed alignment. The existing Green Line tracks within Good Latimer would be modified to incorporate the Live Oak Station (relocated Deep Ellum Station), resulting in a slightly reduced sidewalk width adjacent to these facilities. However, overall transit access would be improved with a station closer to the facilities.

Schools

In accordance with EO 13045, areas within the Study Area where high concentrations of children are likely, such as schools, were identified. Similar to community facilities discussed, schools not traversed or adjacent to the proposed alignment are unlikely to be adversely affected by noise or access effects; however, schools located adjacent or within 500 feet of the proposed alignment were further investigated for impacts. DISD schools and its students would not be adversely affected by the Project due to its distance from the proposed alignment. As discussed in the *Socioeconomic Existing Conditions Technical Memorandum*, the Study Area is contained within nine school attendance zones for the Dallas Independent School District (DISD); however, all of the DISD schools are located outside the Study Area and are not adjacent to the proposed



alignment (See **Appendix B.2**). The nearest school is located more than one mile from the proposed alignment.

Charter and private schools located within 500 feet of the proposed alignment are the Uplift Luna Preparatory – Primary, the Pegasus School, the UNT Dallas School of Law, and the Uplift Luna Preparatory – Secondary (see **Table 4-6**).

According to the *Noise and Vibration Technical Report*, the Project is not anticipated to result in noise effects at these facilities. Access would not be eliminated to these facilities and would not be adversely impacted by the Project (See **Appendix B.10**). The Pegasus School and UNT Dallas School of Law are not located adjacent to the alignment and access to these facilities would not be adversely impacted. The Uplift Luna Preparatory - Secondary School is adjacent to the proposed alignment and existing Green Line and would not be impacted. The Uplift Luna Preparatory - Primary School is located along the proposed tunnel section of the Project but is separated by a parking lot. Some temporary noise or traffic impacts may occur; however, no direct effects to this facility's buildings are anticipated.

Demographics

Impacts to the demographics of the local community as a result of the Project are not anticipated. Potential transit-oriented development may occur adjacent to the proposed stations; however, this Project alone would not result in substantial demographic shifts within the local area.

Employment

Adjacent and nearby properties are areas of potential economic growth. These properties may attract employees and employers who desire convenient access and mobility.

As shown on **Figure 4-5** and **Figure 4-6**, 18 major employers at 11 addresses are located within 500 feet of the proposed alignment, including 6 employers with 1,000 or more employees. It is anticipated that the Project would result in positive impacts to these adjacent employers to retain and attract employees. Their employees would also experience potential reduction in travel time with this transportation alternative to their employment location. Furthermore, the Project would provide an opportunity for people without vehicles to find additional employment options that otherwise would not be available.

Economic Conditions

The Project has the potential to encourage growth and redevelopment in the CBD. An additional transportation corridor would support more accessibility to the local businesses at and around station locations. The Project is not anticipated to adversely affect economic conditions; in fact, it is anticipated that the Project would positively impact adjacent businesses through increased pedestrian traffic, exposure and accessibility at the proposed stations. The added capacity provided by the Project for long-term transit system growth also has the potential to increase the city's and the region's competitiveness in the long term.

4.3.5 Mitigation Measures

Districts and neighborhoods were evaluated for potential impacts to community cohesion as a result of the Build Alternative. These impacts are not considered to be substantial and will not require mitigation. DART will provide safe pedestrian, bicycle and automobile crossings at all existing streets that would cross the alignment.

Train portals would be located near Woodall Rodgers Freeway and I-345. At these locations, a separation would result from the construction of the train portals. DART will coordinate with private developers at these sites to minimize impacts and explore the potential for pedestrian linkages and development over these portals.



Adverse impacts to community facilities were evaluated and determined no potential impacts to access or structures of any of the facilities except for existing DART facilities (West Transfer Center and Rosa Parks Plaza); therefore, no mitigation is proposed. DART will reconstruct their two facilities. As stated in **Section 3.5**, ongoing coordination will continue between DART and Perot Museum representatives to mitigate parking impacts and provide seamless integration of the Museum Way Station with this facility. DART will also coordinate with the Dallas World Aquarium to minimize access impacts and enhance connectivity.

No schools were identified as having potential access impacts because the Build Alternative would not affect the accessibility to the schools; therefore, no mitigation is proposed. However, DART has a comprehensive transit education program used at schools and other community organizations. These programs are for all ages and can range from presentations and tours covering topics such as how to ride DART, construction safety, environmental stewardship, and code of conduct rules. DART will coordinate with schools in the corridor to provide these education sessions prior to operations as needed.

No adverse impacts to demographics, employment, or economic development are anticipated; therefore, no mitigation is proposed. During construction, temporary access impacts would be mitigated through ongoing communication with nearby businesses and places of employment to avoid disruption of businesses. See **Chapter 5** for more information on construction impacts.

4.4 Acquisitions and Displacements

4.4.1 Introduction and Regulatory Setting

This section describes the potential acquisitions and displacements associated with the No-Build and Build Alternative. This assessment is based on the draft 20 percent level of preliminary engineering. As such, it may be refined with additions or deletions as project design advances. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act), provides benefits to homeowners, businesses, community facilities, and farm operators resulting from acquisition. According to 49 CFR Part 24.205(A)-(F), relocation planning and services would be provided to businesses. These relocation services include the following:

- Site requirements, current lease terms, and other contractual obligations
- Providing outside specialists to assist in planning and moving, assistance for the actual move, and the reinstallation of machinery and other personal property
- Identification and resolution of personal property/real property issues
- An estimate of time required for the business to vacate the site
- An estimate of the anticipated difficulty in locating replacement property
- An identification of any advance relocation payments required for the move

DART has also established guidance for acquisitions and displacements in *Environmental Impact Assessment and Mitigation Guidelines for Transit Projects, 2019* (available at www.DART.org/D2).

The Uniform Act contains specific requirements that direct the manner in which a government entity acquires private property for public use when federal funds are used for the project. This act provides a uniform policy for fair and equitable treatment of persons and businesses displaced as a result of federal and federally assisted programs. Consistent with the U.S. DOT policy as mandated by the Uniform Act, all property owners from whom property is needed are entitled to receive just compensation for their land based on fair market value of the property. DART adopted a *Real Estate Policy* (August 1987, updated October 2000), which is based on the requirements of the Uniform Act (available at www.DART.org/D2). The document sets policies and procedures



for property appraisal, property acquisition, relocation, property management, and joint development. Following a decision to acquire property, the DART Real Estate Department will prepare a displacement analysis in which the needs of individual displacees will be documented, and information on relocation entitlements will be provided to displacees. DART will assist those displaced in finding replacement locations.

DART also adopted the *Light Rail Transit System Development Procedures Policy*, Resolution No. 010117, in 2001 (available at www.DART.org/D2). This resolution outlines procedures under which DART will work with service area cities to implement and operate the DART LRT system. Specifically, *Article 4, Acquisition, Use and Ownership of Land and/or Facilities*, outlines procedures DART will follow regarding acquiring land by DART for the City or acquiring land by the City for DART.

4.4.2 Methodology

The following methodology is consistent with DART's *Environmental Impact Assessment and Mitigation Guidelines for Transit Projects* and is also consistent with FTA Guidance.

Two main categories of impacts were identified after evaluation: conversion and acquisition. Conversion refers to the change in land use to transportation use from any other use and may be temporary or permanent depending on the limits of disturbance (LOD). The term 'limits of disturbance' is the construction footprint of the Build Alternative, including any permanent and temporary easements, all locations of ancillary facilities (passenger stations, associated entrance and ventilation facilities, cross passages, cut-and-cover structures, three underground station caverns, and two U-wall section portal structures) and any other project-specific locations designated in the design report (see **Appendix A.3, D2 Subway Preliminary Engineering Design Report**).

Temporary conversion is defined as the use of land for the period of construction (up to 4 years). Permanent conversion is defined as the permanent conversion of land from its original use to a transportation use. Permanent conversion would include direct impacts of the Build Alternative, including stations and ancillary facilities. Permanent or temporary conversion of land use could create indirect impacts adjacent to the alignment. Acquisition refers to a change in the ownership of or right to use the property and may also be classified as either permanent or temporary acquisition (i.e., leased) depending on the duration of impact. While converted property may also be acquired, this assessment considers conversion and acquisition as two different types of impact.

The identification of parcels for potential acquisition was based on a number of factors including the displacement of structures in or within proximity of the alignment, percentage of the overall parcel impacted by the track placement, lack of or permanent disruption to access, and the creation of remnant parcels.

There are four categories of anticipated property acquisition based on the location and duration of impacts:

- Full acquisition – permanent acquisition of the entire parcel
- Partial acquisition – permanent acquisition of a portion of the parcel
- Temporary full acquisition – temporary acquisition or use of the entire parcel
- Temporary partial acquisition – temporary acquisition or use of a portion of the parcel

To be conservative and to avoid underestimating acquisitions and relocations, all businesses on partially acquired parcels, including those that may ultimately be temporarily affected by construction, are counted as full acquisitions requiring relocation. This assumption allows for a worst-case assessment of potential property acquisition impacts. DART would require temporary



construction easements, permanent easements, and the use of public rights-of-way owned by the City of Dallas, TxDOT, and other stakeholders.

4.4.3 Impact Evaluation

No-Build Alternative

Under the No-Build Alternative, the Project would not be built, and no acquisitions or displacements would be necessary.

Build Alternative

For partial acquisitions, only the portion of the parcel falling within the right-of-way footprint is assumed to be acquired. In cases where a parcel would fall completely within the proposed right-of-way footprint, or where the parcel remainder would be substantially small (such that the remaining portion of the parcel would have little to no value or use), a whole acquisition is assumed to occur. For whole acquisitions, the total parcel acres would be acquired. A discussion of the key acquisitions and displacements associated with the Project follows. Final determinations of partial or whole acquisitions are subject to negotiation and would be finalized as project design advances. **Figures 4-7** through **4-11** show the parcels proposed for acquisition. **Table 4-7** provides a summary of the potential acquisitions and displacements. See **Appendix B.19, Property Acquisitions and Displacements Technical Memorandum** for additional information.

The following sections describe the potential acquisitions and displacements.

Victory Station to Museum Way Station/Woodall Rodgers

New at-grade track would be constructed from the existing Victory Station to Museum Way Station and under Woodall Rodgers Freeway, primarily within DART-owned right-of-way. The existing TRE corridor in which freight, TRE and LRT operates is jointly owned by DART and Trinity Metro. DART will require approval from Trinity Metro to construct the junction with existing LRT within the jointly-owned corridor. A signal house would be located near the junction. A parallel access road or shared access easement would be required from the adjacent property owner immediately south of the connecting track to allow for access to this facility from time to time. As the Project nears Woodall Rodgers Freeway, the alignment deviates from the DART-owned right-of-way. The existing agreement with Perot Museum would be renegotiated to reflect revised DART right-of-way requirements.

Under Woodall Rodgers Freeway, the Perot Museum leases property from the City of Dallas for surface visitor parking. Parking impacts and proposed mitigation is discussed in **Section 3.4**. DART would work with the Perot Museum and the City to revise this agreement to reflect the proposed future condition.

No displacements are anticipated for this segment.

West Portal to East Portal

South of McKinney Avenue, the Project transitions in a tunnel portal to the subway. DART is coordinating with the property owner of the large parking lot to integrate the portal into their site plan for a future mixed-use development. Based on this coordination, temporary and permanent real estate needs would be defined, including potential air or subsurface rights. Between Corbin and Hord Streets, parcels with surface parking would be acquired. South of Hord Street, cut-and-cover construction would require acquisition of a property and displacement of the building which includes a commercial business (SMR Landscape Architects) and one residence. South of Ross Avenue, DART transitions to Griffin Street right-of-way but proposes to acquire the block bound by Ross, Griffin, San Jacinto and Lamar for construction staging.

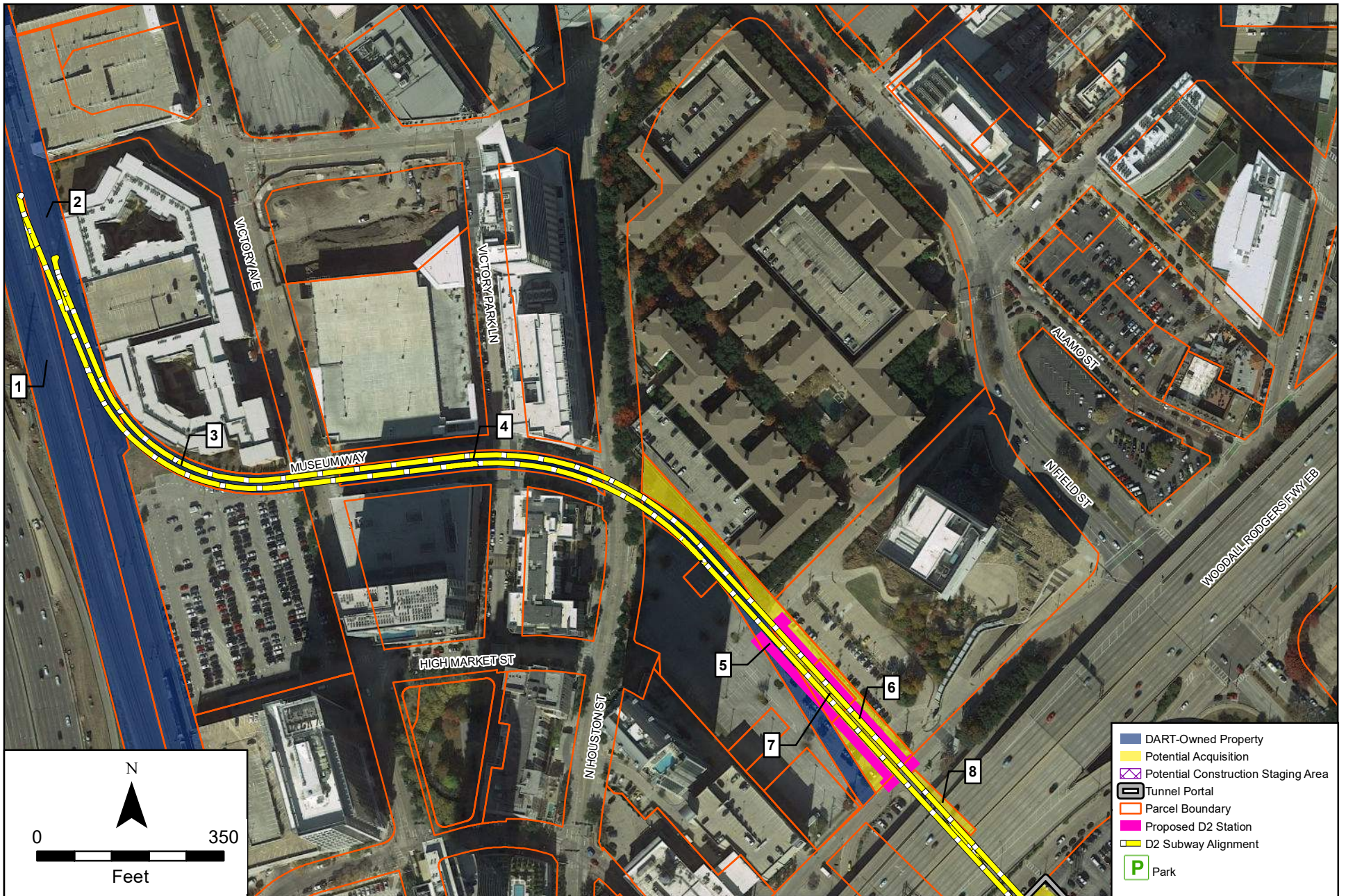


Figure 4-7
Real Estate Potential Acquisitions and Easements
 Data Source: DART, GPC6, Dallas County Appraisal District



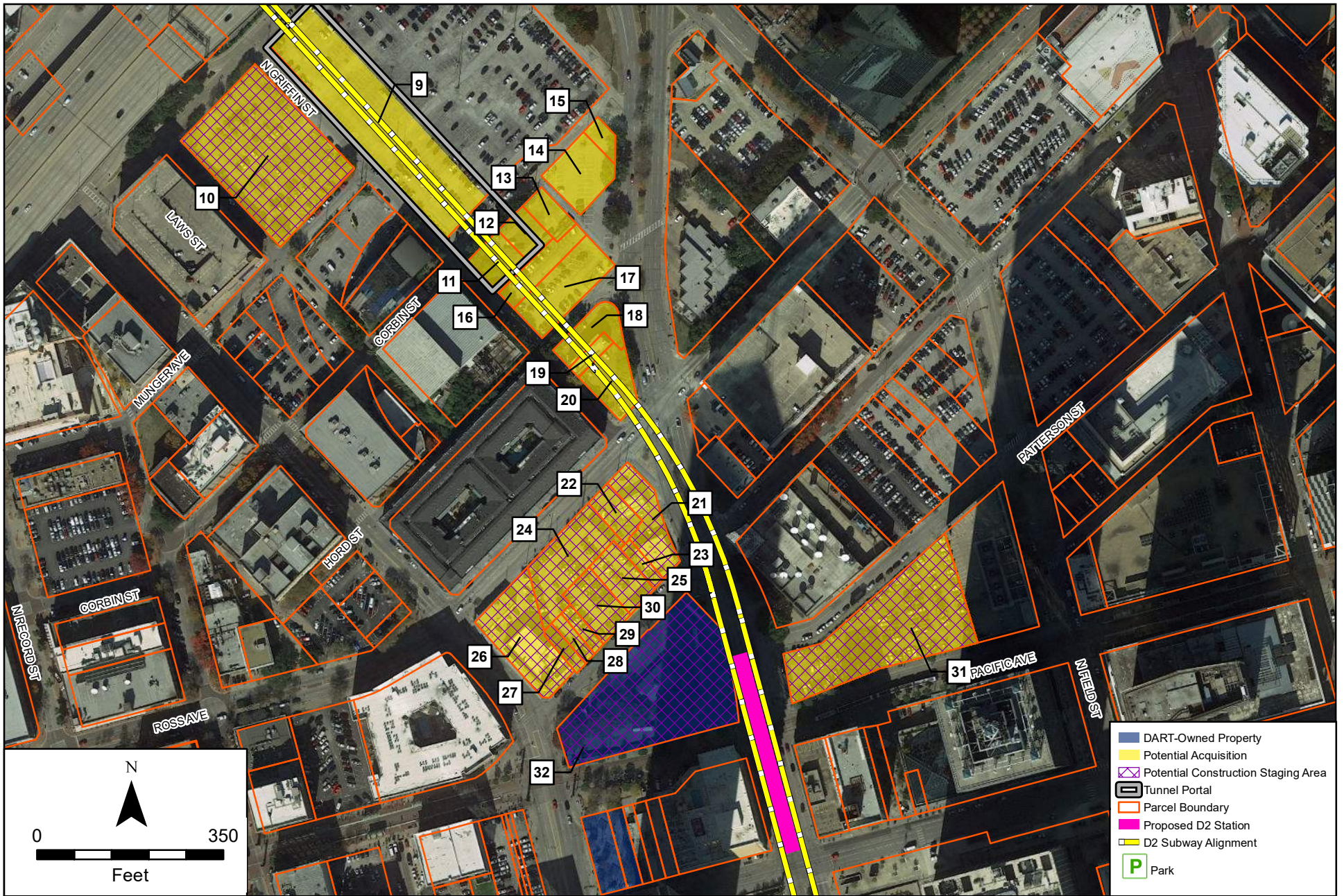


Figure 4-8
Real Estate Potential Acquisitions and Easements
 Data Source: DART, GPC6, Dallas County Appraisal District



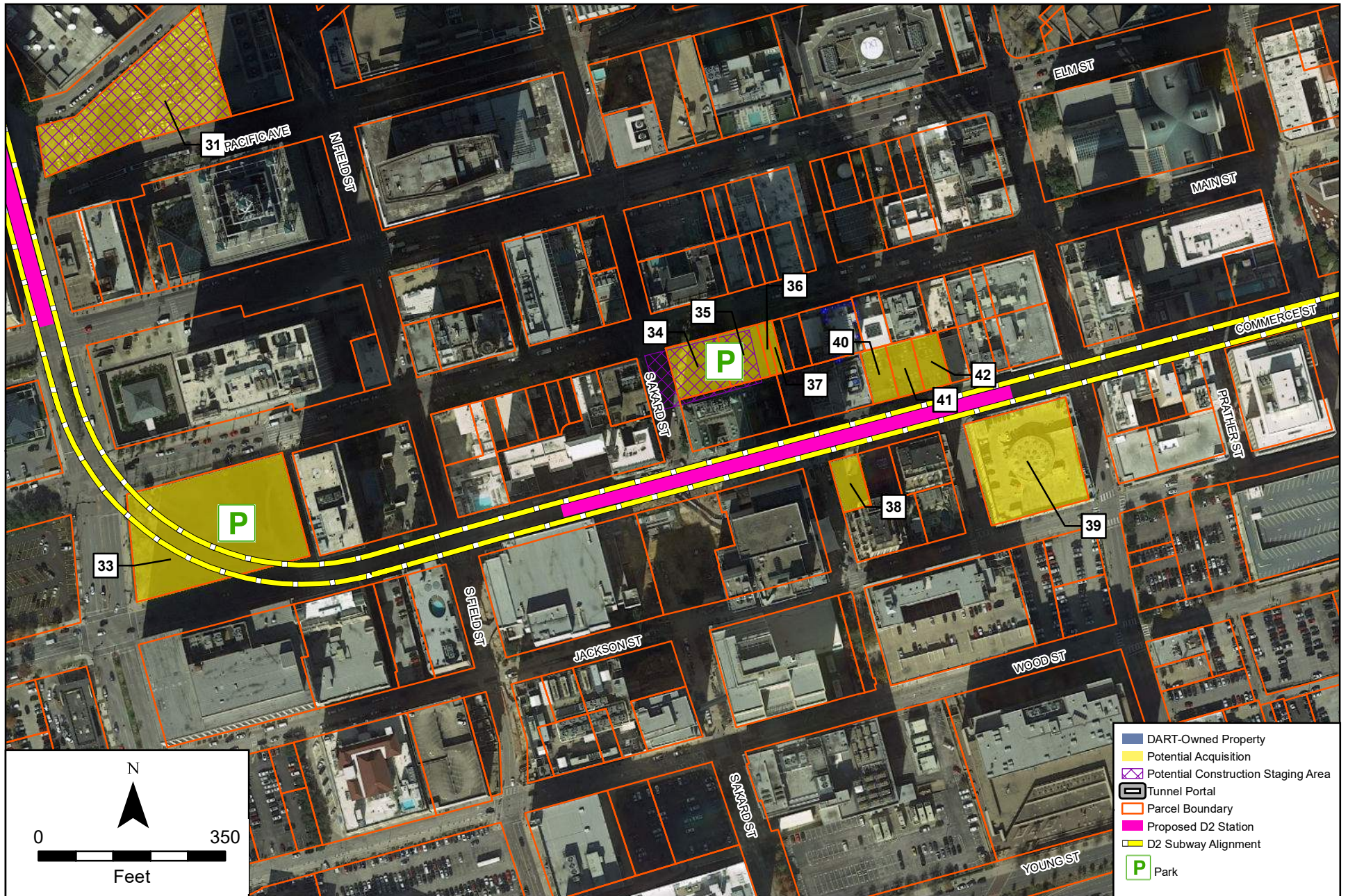


Figure 4-9
Real Estate Potential Acquisitions and Easements
 Data Source: DART, GPC6, Dallas County Appraisal District

D2 Subway Project
 Supplemental Draft
 Environmental Impact Statement



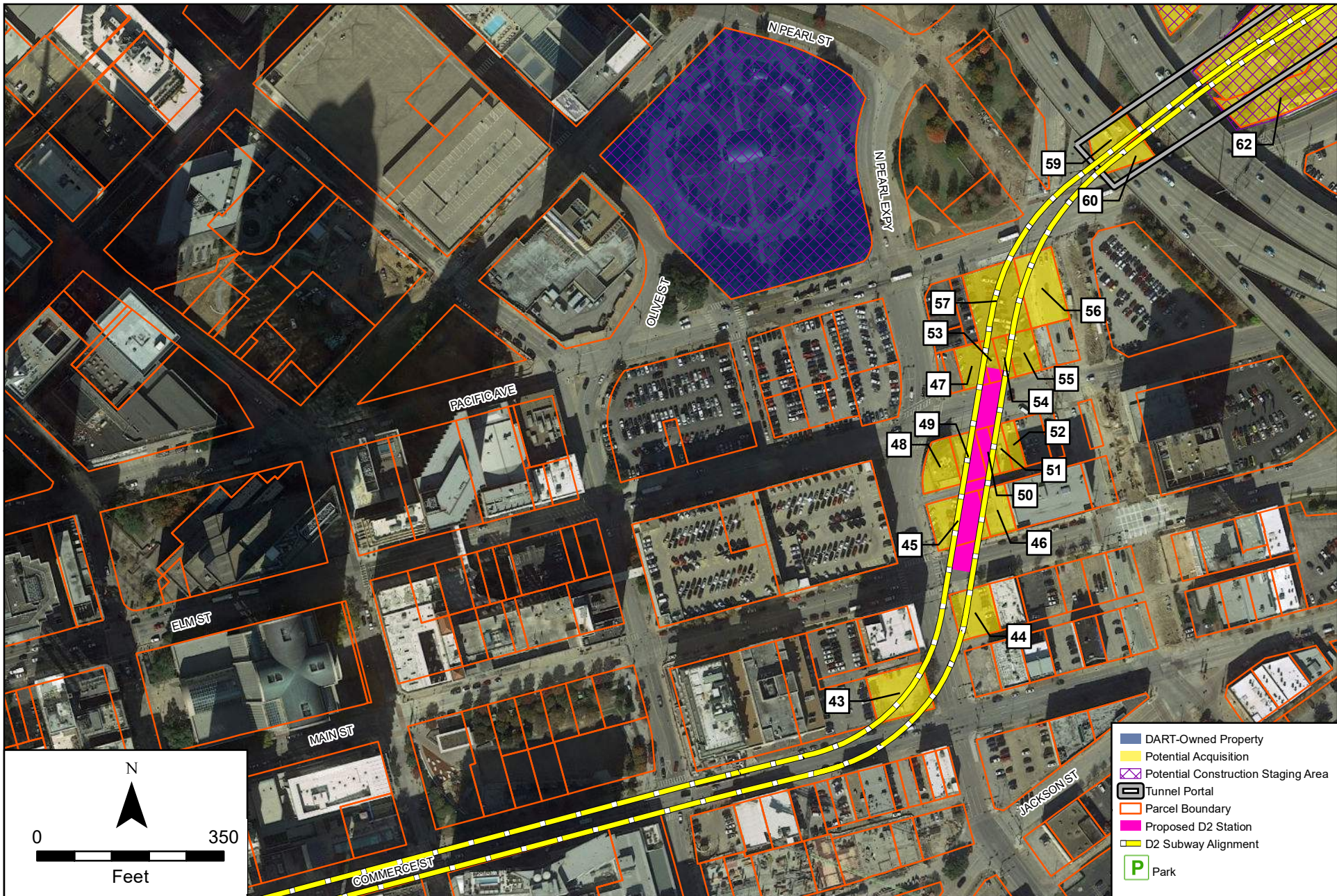


Figure 4-10
Real Estate Potential Acquisitions and Easements
 Data Source: DART, GPC6, Dallas County Appraisal District



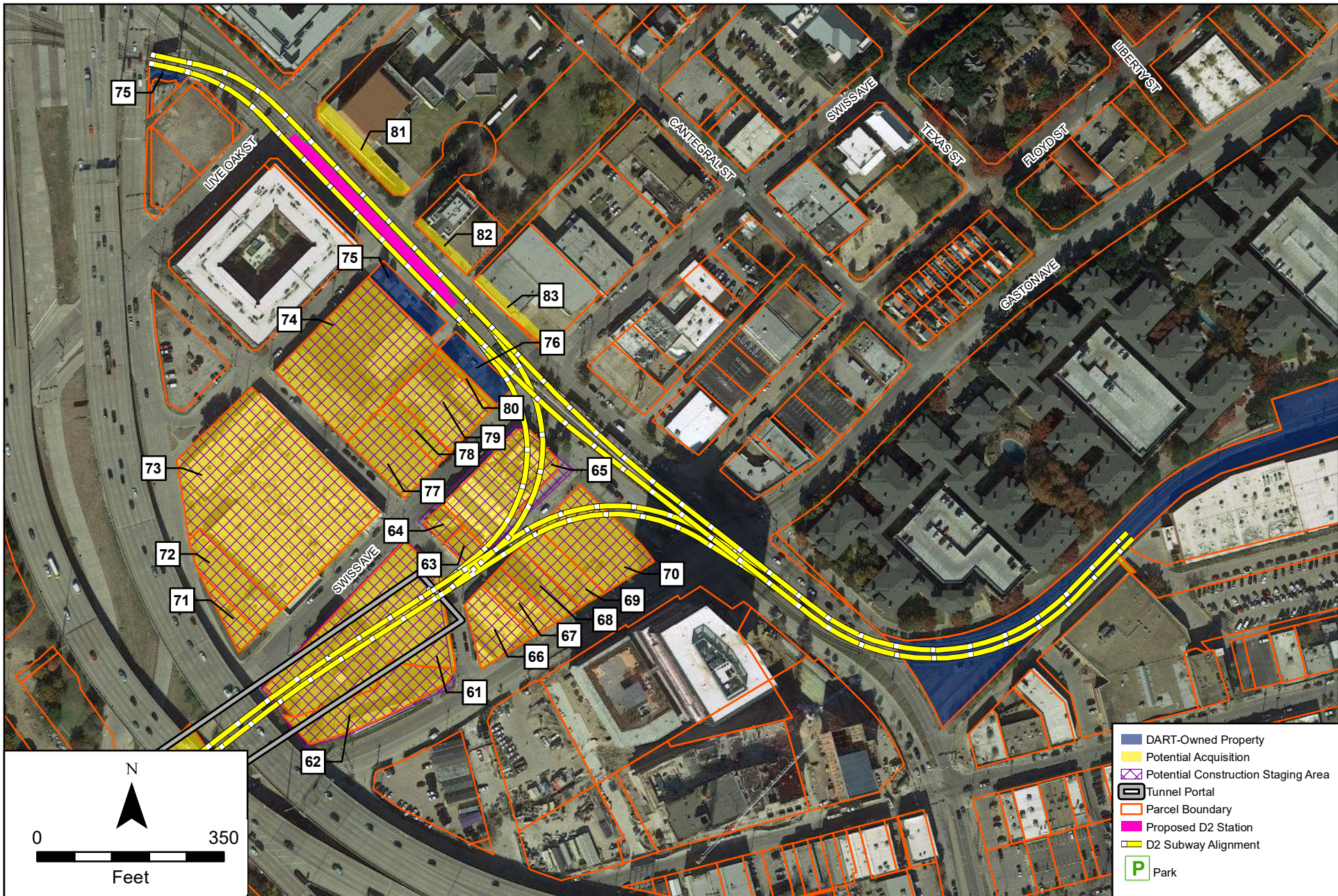


Figure 4-11
Real Estate Potential Acquisitions and Easements
 Data Source: DART, GPC6, Dallas County Appraisal District





Table 4-7 Summary of D2 Potential Acquisitions and Displacements

Figure Number	Map ID Number	Property Use (DCAD) / Current Use	Property Owner	Property address or location	Estimated Area Needed (sf) (Full or Partial Acquisition)	Potential Displacement
Victory Station to West Portal						
4-7	1	Railroad Corridor / Transportation Corridor	DART & FT WORTH TRANSP AUTH	Victory Station/TRE	None, DART owned	No
4-7	2	Railroad Corridor / Transportation Corridor	DART	South of Victory Station	None, DART owned	No
4-7	3	Commercial – Transportation Corridor	DART	Museum Way median	None, DART owned	No
4-7	4	Commercial – Transportation Corridor	DART	Museum Way median	None, DART owned	No
4-7	5	Commercial – Transportation Corridor	DART	Southwest of Perot Museum	None, DART owned	No
4-7	6	Commercial – Parking for the museum	Museum of Nature and Science	Southwest of Perot Museum	15,000 (partial)	No
4-7	7	Commercial – Parking for the museum	Museum of Nature and Science	Southwest of Perot Museum	5,658 (full)	No
4-7	8	Commercial – Parking under Woodall Rogers	City of Dallas	Under Woodall Rodgers	2,400 (full)	No
West Portal to East Portal						
4-8	9	Commercial – Parking lot	DKW Partners LLC	1100 McKinney Ave	55,000 (partial)	No
4-8	10	Commercial – Parking lot	DKW Partners LLC	1012 McKinney Ave	54,715 (full)	No
4-8	11	Commercial – Parking lot	Taylor Catherine 2016	1102 Corbin Street	6,708 (full)	No
4-8	12	Commercial – Parking lot	Taylor Catherine	1108 Corbin Street	2,577 (full)	No
4-8	13	Commercial – Parking lot	Taylor Catherine 2016	1110 Corbin Street	2,278 (partial)	No
4-8	14	Commercial – Parking lot	City of Dallas	1206 Corbin Street	11,495 (partial)	No
4-8	15	Commercial – Parking lot	City of Dallas	1210 Corbin Street	2,550 (partial)	No
4-8	16	Commercial – Parking lot	Walker Investments Inc.	1810 N. Griffin Street	7,405 (full)	No
4-8	17	Commercial – Parking lot	Chavez Land Income Ppties.	1802 N. Griffin Street	15,015 (full)	No
4-8	18	Commercial – Parking lot	JNW Holdings LP	1102 Hord Street	7,339 (full)	No
4-8	19	Commercial / Building-SMR Landscape Architects	JNW Holdings LP	1708 N. Griffin Street	2,400 (full)	Yes, – 1 business, 1 residence
4-8	20	Commercial – Parking lot	JNW Holdings LP	1704 N. Griffin Street	8,796 (full)	No



Figure Number	Map ID Number	Property Use (DCAD) / Current Use	Property Owner	Property address or location	Estimated Area Needed (sf) (Full or Partial Acquisition)	Potential Displacement
4-8	21	Commercial / Convenience Store (7-11)	Schwartz Hymie Trust & Jeannett Schwartz TR	1010 Ross Ave.	11,313 (full)	Yes, – 1 business
4-8	22	Commercial / 7-11 Gasoline Dispensers	Schwartz Hymie Trust & Jeannett Schwartz TR	1012 Ross Ave.	5,653 (full)	Yes, – see above
4-8	23	Parking Lot and 7-11 Store	28 th Street LLC	1003 San Jacinto St.	2,250 (full)	Yes, – see above
4-8	24	Commercial – Parking Lot	Key Applications LLC	912 Ross Ave.	18,538 (full)	No
4-8	25	Commercial - Parking Lot	Key Applications LLC	1001 San Jacinto St.	7,041 (full)	No
4-8	26	Retail Strip- FedEx and Liquor Store	WAA Holdings LLC	460 N Lamar St.	18,713 (full)	Yes, – 3 businesses
4-8	27	Parking Lot	Key Applications LLC	909 San Jacinto St.	2,375 (full)	No
4-8	28	Parking Lot	Key Applications LLC	911 San Jacinto St.	2,375 (full)	No
4-8	29	Parking lot	Key Applications LLC	913 San Jacinto St.	2,250 (full)	No
4-8	30	Parking lot	Key Applications LLC	915 San Jacinto St.	7,500 (full)	No
4-9	31	Parking lot	Chavez Land Income	1100 Patterson Ave.	49,800 (full)	No
4-8	32	West End Transfer Station	DART	202 N. Lamar St	62,547	No
4-9	33	Belo Garden	City of Dallas	1014 Main Street	63,685 (portion needed for sub-grade easement)	No
4-9	34	City Park / Pegasus Plaza	City of Dallas	1500 Main Street	10,000 (partial)	Yes – see Sections 4.5, 4.17
4-9	35	City Park / Pegasus Plaza	City of Dallas	1510 Main Street	7,610 (partial)	Yes – see above
4-9	36	City Park / Pegasus Plaza	City of Dallas	1516 Main Street	1,466 (partial)	Yes – see above
4-9	37	City Park / Pegasus Plaza	City of Dallas	1516 Main Street	1,500 (partial)	Yes – see above
4-9	38	Commercial – vacant	DPL Land LLC	1500 Commerce Street	5,497 (partial)	No
4-9	39	Parking Garage	DalPark Land Lease LTD	1600 Commerce Street	2,200 (partial)	No
4-9	40	Commercial – Parking lot – Neiman Marcus	1530 Main LP	1513 Commerce Street	5,000 (to be determined)	No
4-9	41	Commercial – Parking lot – Neiman Marcus	1530 Main LP	1517 Commerce Street	5,000 (to be determined)	No
4-9	42	Commercial – Parking lot – Neiman Marcus	1530 Main LP	1523 Commerce Street	5,000 (to be determined)	No



Figure Number	Map ID Number	Property Use (DCAD) / Current Use	Property Owner	Property address or location	Estimated Area Needed (sf) (Full or Partial Acquisition)	Potential Displacement
4-10	43	Commercial – Parking lot	Easterwood Eva est	2033 Commerce Street	9,990 (full)	No
4-10	44	Commercial – Parking lot	Cate James L. Jr 7 Allison Cate Hartman	2100 Main St	6,750 (full)	No
4-10	45	Commercial – Parking Lot	42 EADO LP	2101 Main St	9,117 (full)	No
4-10	46	Commercial / Building-Business	Southwestern Blueprint Company	2107 Main St	4,500 (full)	Yes– 1 business
4-10	47	Commercial –Parking lot	Grey James C	2209 Elm St	4,000 (full)	No
4-10	48	Commercial / Building	Victor Ballas	2202 Elm St	5,358 (full)	Yes– 1 business
4-10	49	Commercial – Parking lot	42 EADO LP	2206 Elm St	4,500 (full)	No
4-10	50	Commercial – Parking lot	DPC Cedars LLC	2210 Elm St	2 250 (full)	No
4-10	51	Commercial – Parking lot	DPC Cedars LLC	2212 Elm St	2 250 (full)	No
4-10	52	Commercial - Parking lot	DPC Cedars LLC	2214 Elm St	2 250 (full)	No
4-10	53	Commercial –Parking lot	Grey James C	2211 Elm St	2,000 (full)	No
4-10	54	Commercial –Parking lot	Oconnor JC Estate et al	2213 Elm St	2,000 (full)	No
4-10	55	Commercial –Parking lot	Oconnor JC Estate et al	2217 Elm St	4,000 (full)	No
4-10	56	Commercial – vacant	City of Dallas	2219 Elm St	2,333 (partial)	No
4-10	57	Commercial – Parking lot	Oconnor JC Estate et al	2210 Pacific Ave	12,600 (full)	No
4-11	59	Commercial –under I-345	City of Dallas	400 North Central Expy	3,955 (full)	No
4-11	60	Commercial –under I-345	City of Dallas	400 North Central Expy	2,961 (full)	No
East Portal to Terminus						
4-11	61	Commercial Bar/Night Club-Lizard Lounge	Westdale Properties America I LTD	2424 Swiss Ave.	55,940 (full)	Yes– 1 business
4-11	62	Commercial Building (temporary construction office)	Westdale Properties America I LTD	2441 Pacific Ave	20,292 (full)	Yes– 1 business
4-11	63	Commercial Office Building	BB Phase II LLC	404 Hawkins St.	2,757 (full)	Yes– 1 business
4-11	64	Commercial Converted Service Station	BB Phase II LLC	2500 Swiss Ave	2,818 (full)	Yes– 1 business
4-11	65	Commercial - Restaurant Bottled Blonde	BB Dallas LLC (73%) & Outer Spring Volcano LP (27%)	505 N. Good Latimer Expy	22,825 (full)	Yes– 1 business
4-11	66	Commercial - Nightclub-vacant	Pacifico Partners LTD	2501 Pacific Ave.	10,019 (full)	Yes– 1 business



Figure Number	Map ID Number	Property Use (DCAD) / Current Use	Property Owner	Property address or location	Estimated Area Needed (sf) (Full or Partial Acquisition)	Potential Displacement
4-11	67	Commercial - Midtowne Spa	Nolimiter LLC	2509 Pacific Ave.	12,297 (full)	Yes- 1 business
4-11	68	Commercial Parking Lot with small building	Francor LLC	2515 Pacific Ave.	7,688 (full)	Yes- 1 business
4-11	69	Commercial Parking lot	Alfralyn LLC	2525 Pacific Ave.	8,335 (full)	No
4-11	70	Commercial –Parking lot	Pacifico Partners LTD	2529 Pacific Ave.	21,083 (full)	No
4-11	71	Commercial Parking lot	PSA Institutional Partners LP	2413 Swiss Ave	4,189 (full)	No
4-11	72	Commercial Public Storage	PSA Institutional Partners LP	2411 Swiss Ave	11,901 (full)	Yes- 1 business
4-11	73	Commercial Public Storage	Greenway Good Latimer LP	2439 Swiss Ave	86,331 (full)	Yes- 1 business
4-11	74	Commercial Office Building	Greenway Good Latimer LP	615 N Good Latimer	46,419 (full)	Yes- 1 business
4-11	75	Commercial ROW	DART	South side of Good Latimer	-	No
4-11	76	Commercial ROW	DART	South side of Good Latimer	-	No
4-11	77	Commercial – Parking lot	Greenway Good Latimer LP	2501 Swiss Ave	1,291 (full)	No
4-11	78	Commercial - Parking lot	Greenway Good Latimer LP	2507 Swiss Ave	5,156 (full)	No
4-11	79	Commercial Lofts	Greenway Good Latimer LP	2511 Swiss Ave	16,954 (full)	Yes, 8 units available
4-11	80	Commercial Office Building	Greenway Good Latimer LP	2519 Swiss Ave	1,568 (full)	Yes- 1 business
4-11	81	Commercial	Latino Cultural Center	2600 Live Oak St.	3,046 (Partial)	No
4-11	82	Commercial	Meadows Foundation	624 N Good Latimer	824 (Partial)	No
4-11	83	Commercial	Storage Warehouse	606 N Good Latimer	2,000 (Partial)	No

Source: DART, Dallas County Appraisal District, 2019

Note: To be conservative, all full and partial acquisitions are assumed to be permanent. As design progresses some may be temporary or avoided.



Most of this block is a surface parking lot, with some existing businesses, including a 7-11 store and gas station, strip center with small businesses and a liquor store, and an additional building occupied by a FedEx Office. The FedEx office occupies an historic resource and is discussed more in **Section 4.6** and **4.17**. Just south of this location, DART owns the West Transfer Center and Rosa Parks Plaza which would be reconfigured to accommodate access points for the Metro Center Station. At the northeast corner of Griffin and Pacific, DART proposes permanent use of a portion of the existing parking lot for a station access portal. This property could be potentially used for temporary bus operations or staging during construction as well.

After leaving the Metro Center Station, the alignment would be located in the public right-of-way under Griffin Street until it turns east to Commerce Street. As the alignment makes the turn, the subway would require a subsurface public transportation easement under the city-owned Belo Garden, but no surface property would be impacted. The alignment would be located in the public right-of-way under Commerce Street after passing under Belo Garden.

The Commerce Station would require property, both temporarily for construction and permanently for station access and ventilation requirements. Temporary use of Pegasus Plaza is proposed to construct the vertical circulation and access to a mined Commerce Station; thus, avoiding cut-and-cover construction of Commerce Street. A permanent headhouse would be located on a portion of Pegasus Plaza and the park would be re-established after construction. An agreement with the City of Dallas is in development for the temporary and permanent use of Pegasus Plaza. More information on impacts to parkland under Section 4(f) are discussed in **Section 4.5** and **4.17**. A portion of Pegasus Plaza is used by the Iron Cactus Restaurant for outdoor dining under a lease agreement with the City of Dallas. This agreement would need to be temporarily modified during construction but could be re-established after construction. Additional property needs for ventilation requirements are identified in the Magnolia pass-through area (between the Joule and Magnolia Hotels) and south of Commerce adjacent to Browder Plaza. The final configuration of ventilation needs would be coordinated with property owners and would be designed to blend in with adjacent developments.

At the east end of the Commerce Station, two options for station access are under consideration. First, a pedestrian portal located in first floor, now vacant retail area of the DalPark parking garage which would require a lease agreement; or second, within the public right-of-way in front of the garage within an expanded sidewalk area. An emergency egress would also be located in the Adolphus Tower office building, which would require a permanent lease agreement.

The alignment would remain under Commerce Street right-of-way until it turns north near Pearl Expressway and would continue to the portal that begins east of Cesar Chavez Boulevard. Several properties would be acquired for the CBD East Station and the alignment where it is shallower and requires cut-and-cover construction. Most of these are parking lots, but two businesses would be impacted, Southwestern Blueprint Company and a commercial building occupied by a bar/lounge. When construction is complete, the properties could be reestablished above for parking, but would likely require some permanent easement or acquisition by DART subject to negotiation with the property owners.

Overall, approximately nine businesses and one residence would be displaced in this section.

East Portal/Cesar Chavez to Good Latimer Junction

In this section, the alignment would begin the transition back to the surface after passing under Cesar Chavez Boulevard. This transition area would be under I-345 and along the south side of Swiss Avenue. Immediately after resurfacing, the alignment would come to a full wye junction with the Green Line. This connection would require acquisition of several properties. Similar to the north portal, DART is coordinating with the property owner at 2425 Swiss where the portal would be located to determine how best to integrate the project into a future development. This



coordination would form the basis for a real estate agreement and any temporary, permanent, subsurface or surface rights. East of Hawkins, DART proposes to permanently acquire several parcels that include businesses (Bottled Blonde, Midtowne Spa, nightclub and parking lots). Several other parcels are identified as potential temporary construction staging areas which include Public Storage, Sherwin Williams, and warehouse.

The Deep Ellum Station would be relocated north of its current location as the Live Oak Station. Placing the platform at this location will require a partial acquisition of property to shift and maintain sidewalk along northbound Good Latimer. No structures would be impacted but property would be required from the City of Dallas (Latino Cultural Center) and the historic St. James A.M.E. Church property. This is discussed more in **Section 4.6** and **4.17**. North Central Expressway frontage road would be closed at the tunnel portal. Hawkins Street would be realigned from Swiss Avenue to Pacific Avenue. Miranda Street would be closed and abandoned. These street changes are discussed in **Section 3.3**.

There would be 13 commercial displacements in this section, including: the Lizard Lounge, a retail building for sale, an office building, a converted service station, the Bottled Blonde restaurant, a vacant nightclub, the Midtowne Spa, a commercial parking lot with a small building, one public storage business, two office buildings, a commercial loft building with 8 units, and a parking lot.

Corridor Preservation Properties

Under FTA's corridor preservation authority (49 U.S.C. § 5323(q)) acquisition of right-of-way before the completion of the environmental review process under NEPA for any transit project that eventually will use that right-of-way may be allowable in certain conditions. To allow for potential early real estate acquisition, DART requested this ability to preserve right-of-way for 62 parcels. FTA found that preserving the use of these properties for transit purposes is essential to the Project and would serve to minimize adverse impacts. In letters to DART dated October 1, and December 18, 2019, FTA found that acquisition of these properties meets the criteria for a categorical exclusion in accordance with FTA's regulations implementing NEPA (23 CFR §771.118(d)(4) and 23 CFR §771.118(a)). These documents are included in **Appendix C**. The 62 parcels are included in the above discussion. If appropriate, DART would work with the affected property owners to advance early acquisition of some or all of these parcels prior to the FEIS/ROD on the Project. Implementation of the Project would not proceed until the NEPA process for the D2 Subway project has been completed.

4.4.4 Mitigation Measures

DART's intention is to refine the design as the Project advances, with focus being to reduce property acquisitions and displacements to the extent reasonably feasible. DART would work with affected property owners and businesses as the Project advances in regard to specific business and property impacts.

All acquisition of property would adhere to the DART Board of Directors' Real Estate Policy and Procedures, adopted August 25, 1997, 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 (Uniform Act) of 1970 (42 USC § 4601 et seq.). 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 donations would be appraised by an independent appraiser to determine the fair market value of the property. This fair market value would be made available to the property owners per federal regulation.

The Uniform Act, as amended, provides benefits to homeowners, businesses, community facilities, and farm operators resulting from acquisition. According to 49 CFR Part 24.205(A)-(F),



relocation planning and services would be provided to businesses. These relocation services following are described in **Section 4.4.1**.

4.5 Parks and Recreation Facilities

4.5.1 Introduction and Regulatory Setting

This section analyzes the Project's potential effects on publicly accessible parks, open spaces, and recreational resources. For the purposes of this analysis, parks, open space, and recreational facilities include publicly or privately-owned land that is publicly accessible for leisure, play, or sport, or serves to protect or enhance the natural environment. This section considers the permanent effects of the Build Alternative once construction is complete. **Chapter 5** addresses construction. **Section 4.17** contains the Section 4(f) and Chapter 26 evaluation.

4.5.2 Methodology

For the environmental review, the Study Area for park and recreational facilities includes a Study Area of 0.5 mile on either side of the D2 Subway proposed alignment and the proposed station locations. Park and recreational trails data were gathered through coordination with the City of Dallas in conjunction with a review of city maps, parks and trails master plans, and GIS shapefiles from NCTCOG. Any park or trail within the Study Area buffer was included in the analysis.

4.5.3 Affected Environment

There are 34 parks, trails, and recreational facilities within the Study Area. **Figure 4-12** shows publicly-owned parks and recreational facilities that may be subject to Section 4(f) regulations and Chapter 26 of the Texas Parks and Wildlife code. Sizes and key amenities of the parks are included in the *Parks and Recreation Trails Technical Memorandum* in **Appendix B.3**.

4.5.4 Impact Evaluation

No-Build Alternative

Under the No-Build Alternative, the Project would not be built and no impacts to parks or recreation facilities would occur.

Build Alternative

With implementation of the Project, there could be impacts to parks and recreational facilities. There are two types of impacts that can affect parkland:

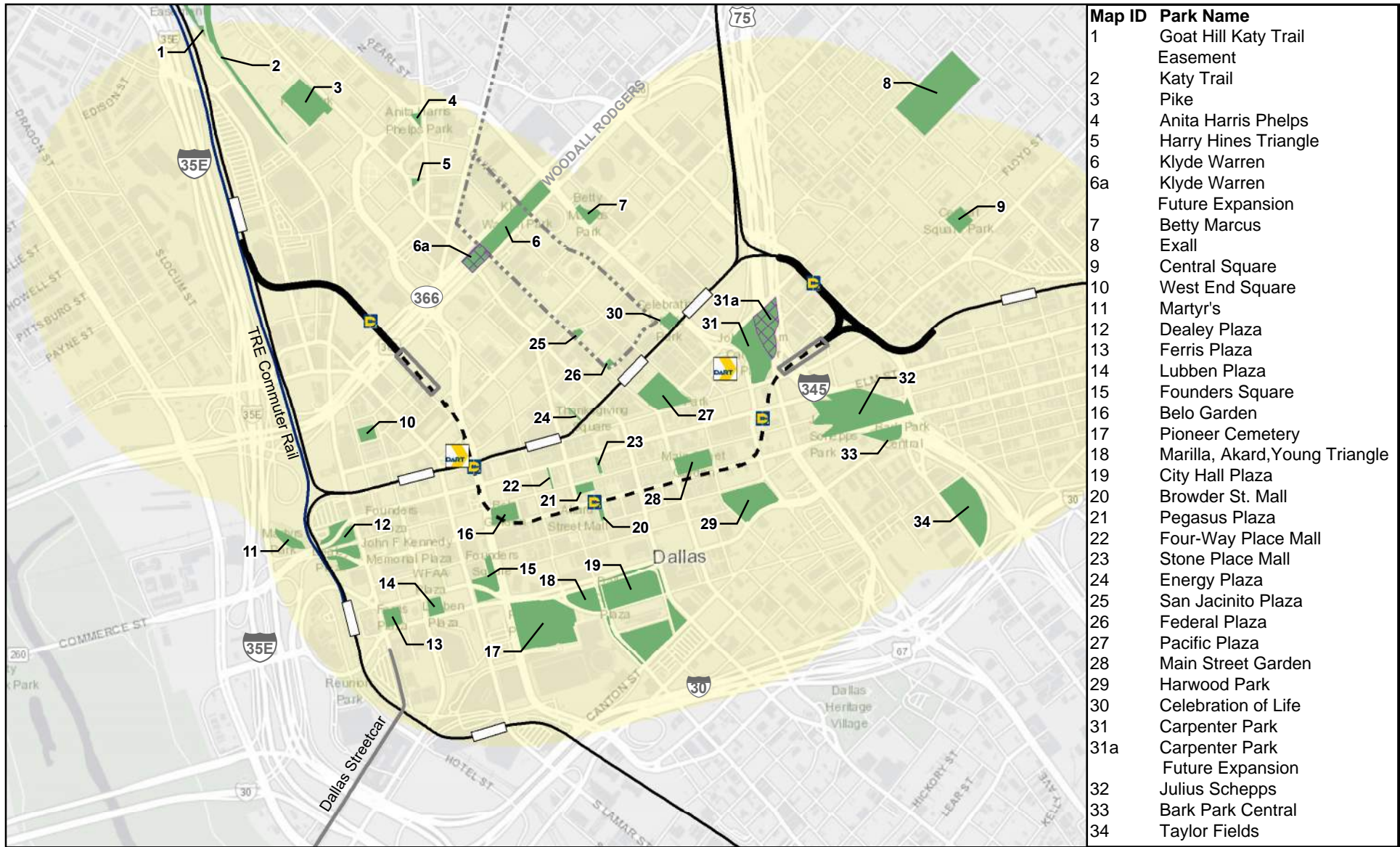
- Direct impacts are those that will occur from acquisition of park property or the location of a transportation system element on park property; and
- Indirect impacts are those that arise from some feature or operation of a transportation system element.

Examples of indirect impacts are noise or vibration, changes in the visual environment, or changes in access. Where indirect impacts occur, an evaluation must be made as to whether the impact is of sufficient magnitude to have a substantial negative effect on a park, park function or park characteristic.

As shown on **Figure 4-12**, five parks are adjacent to the proposed D2 corridor. The following is a summary of the results of the direct and indirect impacts analysis for the five park and recreation facilities.

Belo Garden

Belo Garden is owned and maintained by the City of Dallas with support from the Belo Foundation, and managed by Downtown Dallas, Inc. The Build Alternative's permanent tunnel alignment



Map ID	Park Name
1	Goat Hill Katy Trail Easement
2	Katy Trail
3	Pike
4	Anita Harris Phelps
5	Harry Hines Triangle
6	Klyde Warren
6a	Klyde Warren Future Expansion
7	Betty Marcus
8	Exall
9	Central Square
10	West End Square
11	Martyr's
12	Dealey Plaza
13	Ferris Plaza
14	Lubben Plaza
15	Founders Square
16	Belo Garden
17	Pioneer Cemetery
18	Marilla, Akard, Young Triangle
19	City Hall Plaza
20	Browder St. Mall
21	Pegasus Plaza
22	Four-Way Place Mall
23	Stone Place Mall
24	Energy Plaza
25	San Jacinto Plaza
26	Federal Plaza
27	Pacific Plaza
28	Main Street Garden
29	Harwood Park
30	Celebration of Life
31	Carpenter Park
31a	Carpenter Park Future Expansion
32	Julius Schepps
33	Bark Park Central
34	Taylor Fields

1/2 mi Study Area
 Proposed D2 Alignment
 Tunnel Portal
 Existing LRT System
 TRE Commuter Rail
 CBD Transfer Center
 Park
 At Grade
 D2 Station
 LRT Alignment
 McKinney Ave Trolley
 Proposed Expansion
 Below Grade
 LRT Station
 Dallas Streetcar

0 2,000
 Feet N



Figure 4-12
Existing and Planned Public Parkland
 Data Source: DART GPC6, 2019; City of Dallas, 2017; NCTCOG, 2017;
 Dallas 360 Plan, 2017; Parks for Downtown Dallas, 2019



would be located beneath Belo Garden. The top of the tunnel would be approximately 45 feet below ground and would avoid disruption or impacts that would harm the park. When construction is occurring, the mining or boring methods operating 45 feet below the park would not result in noticeable vibrations and therefore also would not result in any damage to the park. Once the tunnel is complete and operational, the presence of the tunnel would not be noticeable in the park or affect the protected activities in the park. Operation of trains in the completed tunnel would not result in vibration impacts (see **Section 4.8** Noise and Vibration).

- Land Acquisition – There would be no land acquisition from Belo Garden. An underground mass transit easement would be sought from the City of Dallas for the Project.
- Access – Entry to the park would not be restricted.
- Noise and Vibration – There are no noise or vibration impacts projected for this park.
- Visual – The addition of the Project would not change the visual qualities or use of the area since the rail would be below grade.

Browder Street Mall

Browder Street Mall is owned and maintained by the City of Dallas. The mall is located on abandoned Browder Street and is a 0.2-acre pedestrian walkway with sculpture areas.

A ventilation shaft would be located next to Browder Street Mall on private property. The projected operational noise levels of the Project would not exceed FTA noise impact criteria for parklands. There are limited, temporary noise impacts as well as indirect visual changes projected for this park. No impairment to visual or aesthetic qualities would occur as a result of the Project that would substantially detract from the setting of a park that derives its value in substantial part due to its setting. The proximity impacts caused by the Build Alternative would not substantially impair the activities, features, or attributes of the park.

- Land Acquisition – There would be no land acquisition from Browder Street Mall.
- Access – Entry to the park would not be restricted.
- Noise and Vibration – There are limited, temporary noise impacts projected for this park during construction. The projected operational noise levels of the Project would not exceed FTA noise impact criteria for parklands.
- Visual – The addition of the Project would change the visual setting by adding a ventilation shaft along the back wall of a building adjacent to the mall. It would not change the use of the area. The ventilation shaft would be clad to blend with surroundings and be compatible with the Browder Street Mall. All other facilities would be below grade. No impairment to visual or aesthetic qualities would occur as a result of the Project that would substantially detract from the setting of a park that derives its value in substantial part due to its urban setting.

Pegasus Plaza

Pegasus Plaza is owned by the City of Dallas and managed by DDI. It includes a public art installation by artist Brad Goldberg. The park has a limestone fountain and winding stream which anchors the design of the plaza based on the Greek myth of Pegasus.

The construction of the Project proposes using an off-set headhouse approach to avoid cut-and-cover construction along Commerce Street. This approach would require full use of the park site for temporary construction and then would establish a permanent headhouse along the south side near the back of the Magnolia Hotel. Pegasus Plaza would be re-established after construction.

DART briefed the Dallas Park and Recreation Board on September 5, 2019 on the approach. This was followed by the resolution on September 19, 2019 (see **Appendix C**) to advance the concept



further and return to the Park and Recreation Board with an integrated concept. Coordination between DART and the City of Dallas Park and Recreation Department and park stakeholders is ongoing to ensure the reconstructed Pegasus Plaza benefits the surrounding community, complements the surrounding urban fabric, and provides pedestrian access to the underground Commerce Station.

- Land Acquisition – There would be temporary use for construction of the station, vertical circulation and headhouse. A mass transit easement is proposed for the permanent headhouse on the site.
- Access – Access to the park would be temporarily unavailable while the site is used for construction. Entry to the park would not be restricted after the project is in place and discussion with the City of Dallas and stakeholders emphasizes enhanced access to and through the site as part of the re-design.
- Noise and Vibration – There are no noise or vibration impacts projected for this park. The projected operational noise levels of the Project would not exceed FTA noise impact criteria for parklands.
- Visual – The addition of the station headhouse would visually change the setting of the area. The headhouse and some elements of ventilation would be located on Pegasus Plaza. The public art installation would be disassembled and potentially reinstalled in a different configuration.

Main Street Garden

Main Street Garden is owned by the City of Dallas and managed and maintained by Downtown Dallas, Inc. It is used for passive and active uses and for special events and concerts.

- Land Acquisition – There would be no land acquisition from Main Street Garden.
- Access – Entry to the park would not be restricted.
- Noise and Vibration – There are no noise or vibration impacts projected for this park.
- Visual – The addition of the Project would not change the use of the area since the rail will be below grade under Commerce Street adjacent to Main Street Garden.

Carpenter Park

Carpenter Park is an existing/planned 5.6-acre park consisting of the existing 4.0-acre John C. Carpenter Plaza special-use park, established in 1975, and a 1.6-acre designed expansion and renovation scheduled to begin mid-2020. The Carpenter Park is owned by the City of Dallas.

- Land Acquisition – There would be no land acquisition from Carpenter Park.
- Access – Entry to the park would not be restricted.
- Noise and Vibration – There are no noise or vibration impacts projected for this park.
- Visual – The D2 tunnel portal would be located under I-345 which is located east of the park. No visual impacts to the park would occur. The rail will be below grade in the vicinity of Carpenter Park.

4.5.5 Mitigation Measures

The City of Dallas Park and Recreation Board approved a resolution on September 19, 2019 addressing potential impacts and mitigation of the Project on parks. Correspondence can be found in **Appendix C**, Agency Correspondence. The resolution specifies that City staff continue to coordinate with DART on agreements that may be required for City parks, using procedures in accordance with local, state and federal regulations; and, that DART agrees that should there be impact in connection to the D2 Subway to any park, including Belo Garden, Pegasus Plaza, Main Street Garden and Carpenter Park, that DART will make the City whole and the parks will be



returned to their original condition or incorporate appropriate enhancements as mitigation. Proposed mitigation recommendations for specific parks are discussed below.

Belo Garden

Although an underground easement would be needed for the tunnel under the southwest corner of the Belo Garden near Griffin and Commerce Street, no impacts on the park property are anticipated since the tunnel would be far enough underground (approximately 45 feet from top of tunnel to ground surface) to avoid disruption that would harm the purposes for which the parks were established. DART and the City will follow Chapter 26 of Texas Parks and Wildlife code requirements. The City of Dallas, in coordination with DART, will advertise and hold a public hearing in compliance with Chapter 26.

Pegasus Plaza

The Dallas Park and Recreation Board resolution specified that DART continue to develop the concept of using the Pegasus Plaza site to enable construction of the Commerce Station without the need for significant cut-and-cover construction along Commerce Street. It also recommended that DART and the City of Dallas develop a fully integrated concept for a reimagined Pegasus Plaza that retains the spirit of the existing park while providing renewed purpose for Dallas citizens and DART riders; and that DART consider how to incorporate safety and security elements in their design. Public restrooms were suggested for consideration as well, subject to community input.

DART and the City of Dallas hosted a workshop with park stakeholders and founders on January 29, 2020 to discuss the headhouse approach and outline the vision and key priorities for a reimagined Pegasus Plaza. Based on the workshop, there is support for the approach and a desire to maintain the Pegasus myth theme and reincorporate public art elements with a new design that makes the plaza more functional, inviting, and accessible, while ensuring a high-quality space for residents and visitors. Attendees did not support restrooms at the plaza given other restrooms in public spaces nearby and because this will not be a major transit transfer center.

Ventilation elements would be located near and/or on the park as part of an integrated design. Noise associated with ventilation is anticipated to be lower than ambient levels of an urban downtown location. Minimization of any potential noise impacts will be considered during final design.

An agreement is in development between DART and the City of Dallas to address mitigation requirements and establish the vision and guidelines for park redesign based on the workshop. This will include how to best re-incorporate public art elements. DART will consult with the Park and Recreation Board and the Arts and Culture Advisory Commission as the agreement is developed.

DART and the City of Dallas would also follow Chapter 26 of the Texas Parks and Wildlife Code to demonstrate that there is no prudent and feasible alternative to the use of the park. The agreement will document that the Project will include all reasonable planning to minimize harm to the park resulting from the use. The City of Dallas, in coordination with DART, will advertise and hold a public hearing in compliance with Chapter 26.

Browder Plaza

The Project would include a ventilation shaft along the east boundary of this park. Direction will be provided to contractors to avoid any direct impact the park. Ventilation elements would be designed to blend with the area. Noise associated with ventilation is anticipated to be lower than ambient levels of an urban downtown location. Minimization of any potential noise impacts will be considered during final design.



Main Street Garden

The Project would be located under Commerce Street, near the southern boundary of Main Street Garden. No impacts are anticipated, and no mitigation is required.

Carpenter Park

The Project would include reconstruction of the Pacific Avenue/Cesar Chavez Boulevard intersection near the southern boundary of this park. Direction will be provided to contractors to avoid any direct impact to the park and to maintain sidewalk access along this edge to the greatest extent possible. No other mitigation is required.

4.6 Cultural Resources

4.6.1 Introduction and Regulatory Setting

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 (54 USC § 300101 et seq.) and its implementing regulations (36 CFR 800). Under Section 106, federal agencies are required to consult about a proposed project and its potential effect on historic properties and to seek public comment and input. Identified consulting parties here include the State Historic Preservation Officer (SHPO); in Texas, the SHPO is the Texas Historical Commission (THC). Other identified consulting parties are the City of Dallas and Preservation Dallas. The Advisory Council on Historic Preservation (ACHP) is also given the opportunity to comment. Consulting parties would have the opportunity to review and comment on the research completed and measures to address any adverse impacts to historic resources.

4.6.2 Methodology

Per Section 106 requirements, the lead federal agency in consultation with the SHPO, develops the area of potential effects (APE), identifies properties (i.e., NRHP-listed and NRHP-eligible properties) in the APE, and makes determinations of the proposed project's effects on historic properties in the APE. Section 106 regulations require that the lead federal agency consult with the SHPO and identified parties with an interest in historic resources during planning and development of the Project.

FTA, in consultation with THC, determined the APE for identification of built resources (Tracking No. 201811103) (See **Appendix B.4**). Prior to fieldwork, a Study Area which extends 1,300-feet beyond the Project corridor was reviewed for previously recorded historic properties or areas of interest. **Appendix B.4** contains the *Historic-age Resource Reconnaissance Survey for DART D2 Subway, August 2019* and a summary table and maps of these properties and districts, as well as previously completed forms of resources encountered within the Project APE. A search of the Texas Historic Sites Atlas (THSA) was conducted to identify any known recorded resources within the APE, including Recorded Texas Historic Landmarks (RTHLs), State Antiquities Landmarks (SALs), National Register of Historic Places (NRHP) properties or historic districts, Official Texas Historic Markers, and cemeteries. In addition, existing reports, records, maps, and aerial photographs were examined. Information collected during the records search was obtained from sites, including, but not limited to:

- THSA;
- Previous survey reports, including reconnaissance survey conducted for the 2010 Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) and the 2001 Determination of Effects Report conducted by Myra L. Frank for the Southeast Corridor study;
- City of Dallas Historic Preservation Office records;



- Preservation Dallas site survey records;
- The Handbook of Texas online;
- Online records of Dallas County appraisal districts; and
- City of Dallas Historic Preservation website.

4.6.3 Affected Environment

Based on best available information, the resources shown in **Figures 4-13** through **4-15** have been listed in the NRHP, recommended for NRHP eligibility, and/or designated by the City of Dallas as a landmark structure or historic district.

A total of 90 historic-age resources were identified within the Project's APE. Twenty-two resources were previously determined eligible to the NRHP as individual resources; contributing resources to one of the three National Register Historic Districts; contributing resources to the Dallas City Landmark (City of Dallas labels their districts "landmarks"); or a Recorded Texas Historic Landmark. Sixty-seven historic-age resources which were not previously documented were recorded within the APE.

The APE crosses through two districts, the Dallas Downtown Historic District (NRHP-listed) and the City of Dallas Landmark District – Harwood Street Historic District. A small portion of the West End District is located within the proposed APE. One proposed station, Commerce, is within the NRHP-listed Downtown Dallas Historic District.

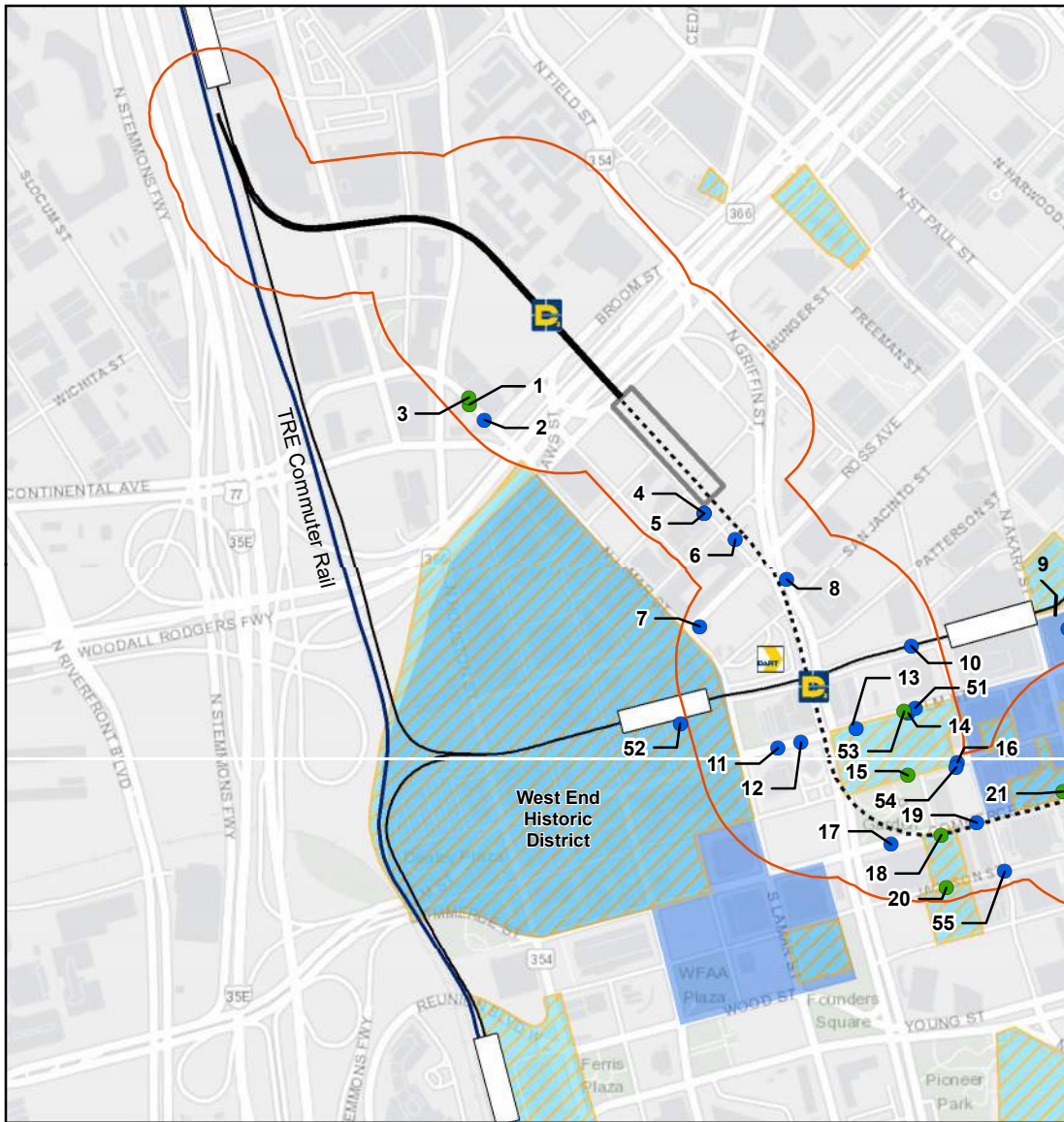
Seven newly documented historic-age resources were recommended eligible for listing in the NRHP as individual resources. Thirteen resources were recommended as a historic district in the National Register as being a cohesive group of buildings related to the Automobile Era in Downtown Dallas for a historic district under Criterion A for significance in social and cultural trends at the local level. Historians identified 10 resources immediately adjacent to the streets where the stations are proposed.

There are three historic districts and one proposed historic district within the 1,300-foot APE (see **Table 4-8**). The Deep Ellum Historic District, while recommended for eligibility in 2001, was never formally listed in the NRHP nor were boundaries for the district established.

Table 4-8 Historic Districts within Project Area of Potential Effect (APE)

Historic Name	Address	Designation
Dallas Downtown Historic District	Roughly bounded by Federal, N. St. Paul, Pacific, Harwood, S. Pearl, Commerce, S Ervay, Akard, Commerce and Field Streets	National Register Historic District
Harwood Street Historic District	Various addresses along Harwood and Elm Streets	City Landmark District
West End Historic District	Bounded by Lamar, Griffin, Wood, Market and Commerce Streets, plus MKT Railroad	National Register Historic District; City Landmark District
Automobile Row Historic District	Roughly bounded by N Pearl Expy to the west; Jackson Street on the south to S. Cesar Chavez Blvd; S. Cesar Chavez Blvd on the west, the alley to the east of S. Cesar Chavez Blvd upwards north to Main Street; Main Street west to S. Cesar Chavez Blvd; then back to N. Pearly Expy	Recommended National Register Historic District

Source: GPC6, THC

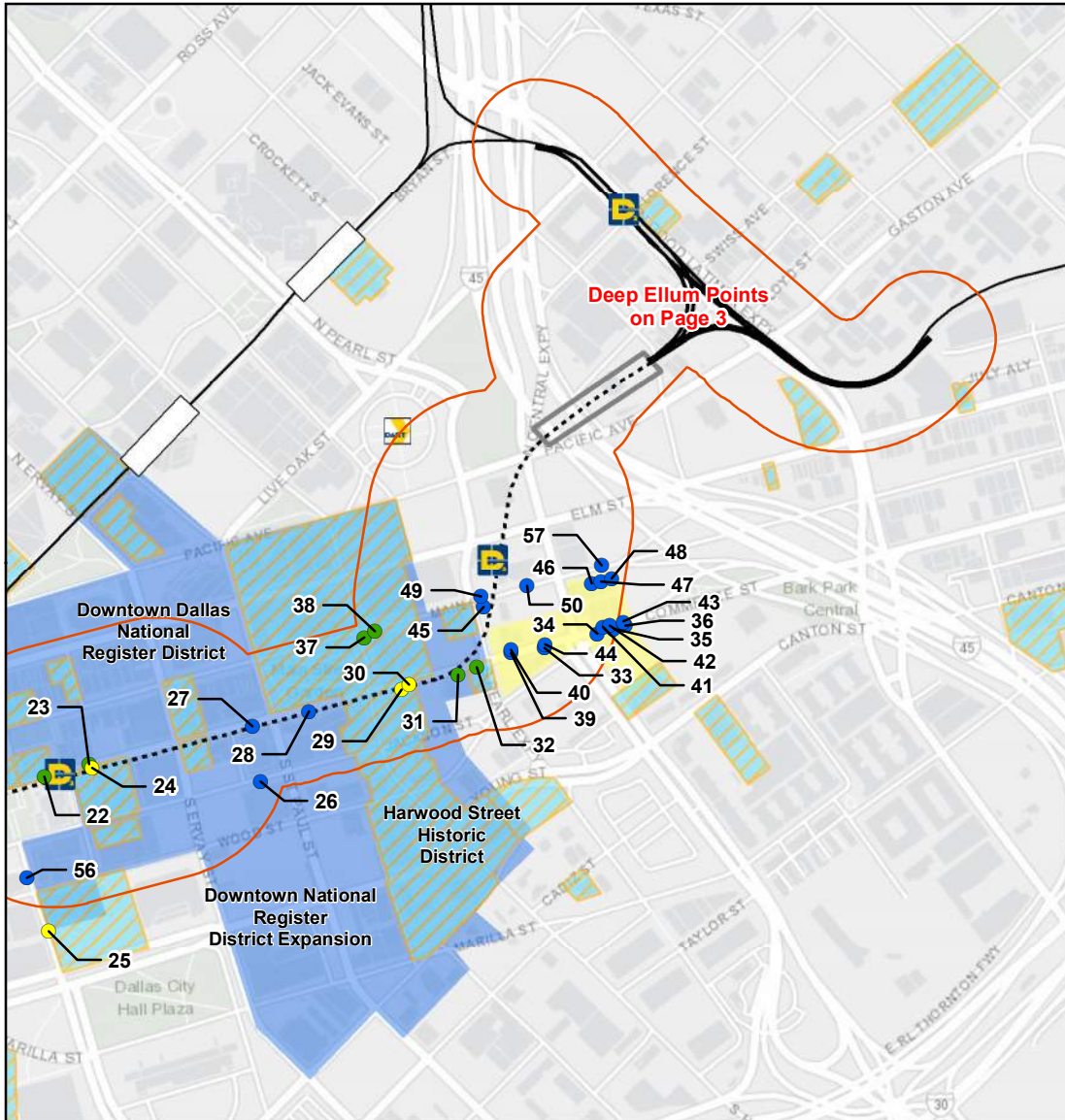


Map ID	Name
1	Waples-Platter Coffee Roaster
2	Unknown (Hooters Restaurant)
3	Waples-Platter Coffee Grocery
4	Unknown (Dallas World Aquarium)
5	Mohawk Rubber Co (Dallas World Aquarium)
6	Unknown
7	Magnolia Gas Station
8	Unknown
9	LTV tower
10	Renaissance Tower parking garage
11	Millner Supply Company
12	Unknown (Crowne Plaza Hotel)
13	Huey and Philip
14	First International Bancshares
15	One Main Place
16	Unknown (Commissary)
17	Earle Cabell Federal Building
18	Santa Fe Terminal 1
19	Unknown (Manor House)
20	Santa Fe Terminal 2
21	Adolphus Hotel and Tower
51	Morris Dry Good
52	Emerson-Brantingham Building
53	Sangar Brothers Building
54	The Metropolitan
55	Unknown

<ul style="list-style-type: none"> APE Boundary City of Dallas Historic District (Previously Identified) NRHP District (Previously Identified) Recommended National Register District (Identified during 2018 Survey) 	<ul style="list-style-type: none"> City of Dallas Individual Landmark NRHP Recommended Eligible Resource NRHP Individual Resource 	<ul style="list-style-type: none"> Proposed D2 Alignment At Grade Below Grade Tunnel Portal 	<ul style="list-style-type: none"> D2 Station CBD Transfer Center 	<ul style="list-style-type: none"> Existing LRT System LRT Alignment LRT Station 	<p>0 1,500</p> <p>Feet</p> <p> N</p>
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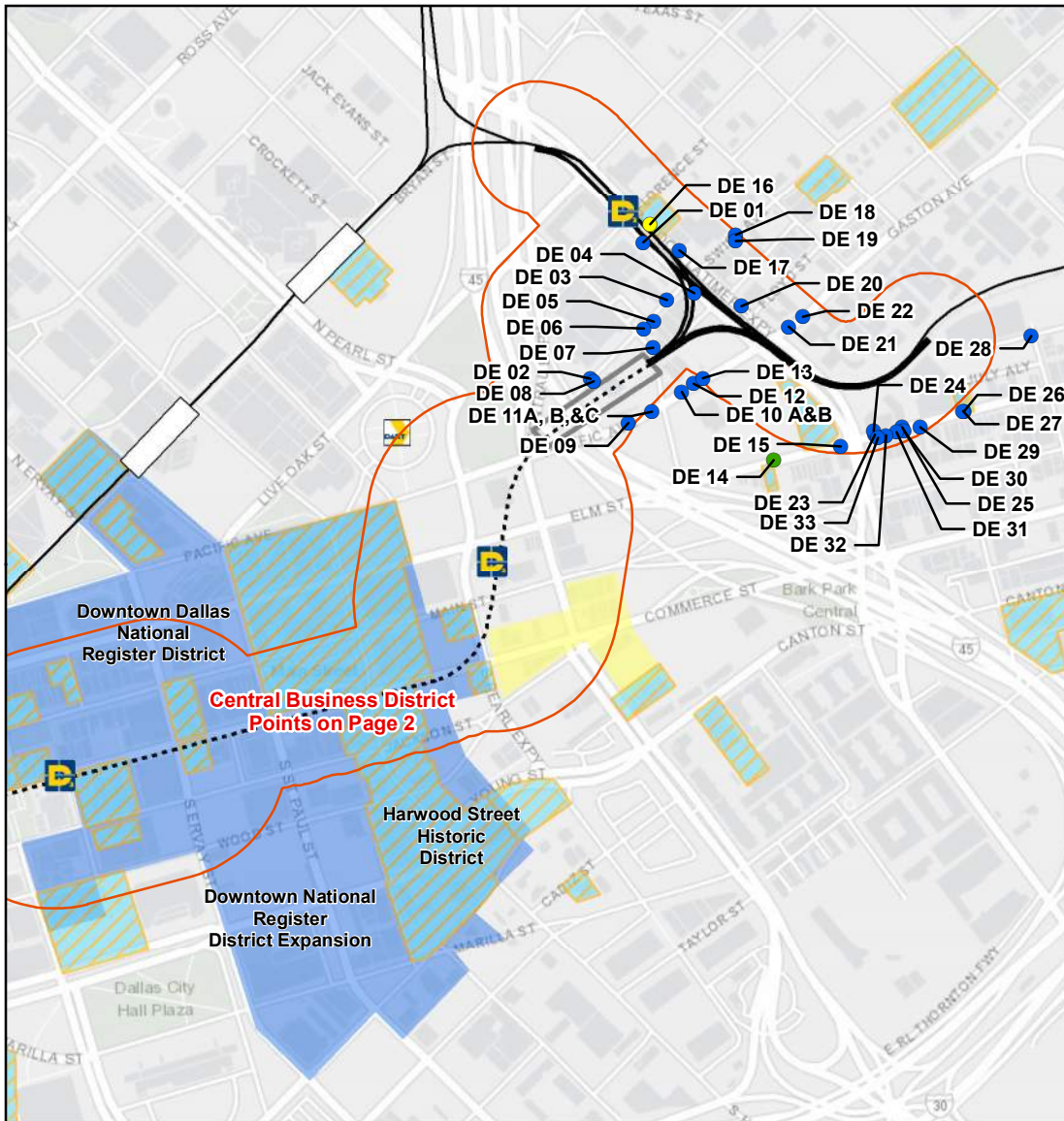


Figure 4-13
Historic Resources
 Data Source: DART, GPC6, THC



Map ID	Name
22	Magnolia Petroleum Building
23	Dallas National Bank Annex
24	Dallas Power & Light Building
25	Federal Reserve Bank
26	Jackson Street Garage
27	Mercantile National Bank/Continental Building
28	Statler Hilton Hotel
29	Unknown (Doug's Gym/7 Eleven)
30	Unknown (Guns and Roses)
31	Bluitt Sanitarium
32	Purvin Hexter Building (RF Aspley Building)
33	Magnolia Oil Service Station
34	Unknown (vacant)
35	Unknown (vacant)
36	Unknown (vacant)
37	Old City Hall
38	Dallas Municipal Building
39	Unknown
40	Unknown
41	Unknown (vacant)
42	Unknown (vacant)
43	Unknown (vacant)
44	Waters Building
45	Unknown (South Print)
46	Unknown (vacant)
47	Unknown (vacant)
48	Unknown (vacant)
49	Unknown (South Print)
50	Old Central Fire Station
56	Four AT&T Plaza
57	Blue Cross Blue Shield

<ul style="list-style-type: none"> APE Boundary City of Dallas Historic District (Previously Identified) NRHP District (Previously Identified) Recommended National Register District (Identified during 2018 Survey) 	<ul style="list-style-type: none"> City of Dallas Individual Landmark NRHP Recommended Eligible Resource NRHP Individual Resource 	<ul style="list-style-type: none"> Proposed D2 Alignment At Grade Below Grade Tunnel Portal 	<ul style="list-style-type: none"> D2 Station CBD Transfer Center 	<ul style="list-style-type: none"> Existing LRT System LRT Alignment LRT Station 	<p>0 1,500</p> <p>Feet</p> <p> N</p>
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Map ID	Name
DE 01	Unknown
DE 02	Buell & Co (1952)
DE 03	Unknown
DE 04	Unknown
DE 05	Unknown
DE 06	Unknown (Gas Station)
DE 07	Unknown
DE 08	Unknown (Lizard Lounge)
DE 09	Unknown
DE 10 A&B	Unknown
DE 11A,B,&C	Tiled Street Address
DE 12	"...son Fire Proof Storage & ... Co."
DE 13	Unknown
DE 14	Grand Lodge of the Colored Knights of Pythias
DE 15	Unknown
DE 16	St. James AME Temple
DE 17	Standard Supply
DE 18	Unknown
DE 19	Unknown
DE 20	Unknown
DE 21	Unknown
DE 22	Unknown
DE 23	Unknown
DE 24	Southern Refrigeration Co.
DE 25	American Transfer & Storage Co.
DE 26	North American Van Lines
DE 27	Unknown
DE 28	Unknown
DE 29	Unknown
DE 30	Agrovitz Dry Goods
DE 31	Allen's Drug Store
DE 32	Unknown
DE 33	Santa Fe Paint

<ul style="list-style-type: none"> APE Boundary City of Dallas Historic District (Previously Identified) NRHP District (Previously Identified) Recommended National Register District (Identified during 2018 Survey) 	<ul style="list-style-type: none"> City of Dallas Individual Landmark NRHP Recommended Eligible Resource NRHP Individual Resource 	<ul style="list-style-type: none"> Proposed D2 Alignment At Grade Below Grade Tunnel Portal 	<ul style="list-style-type: none"> D2 Station CBD Transfer Center 	<ul style="list-style-type: none"> Existing LRT System LRT Alignment LRT Station 	<p>0 1,500 Feet</p>	<p>N</p>
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**Figure 4-15
Historic Resources**
Data Source: DART, GPC6, THC



Infrastructure Historic Resources

In November 2010, the U.S. Army Corps of Engineers (USACE) conducted a final intensive engineering inventory and analysis of the Dallas Floodway in Dallas County, Texas. The findings of the report contained a cultural resources inventory and evaluation of the engineering components associated with the Dallas Floodway Project. The recommendations were that the Dallas Floodway is a single engineering system for flood control and reclamation, and has a local significance relating to the flood control for the City of Dallas, both in city planning and community development. In addition, it is a significant example of a statewide engineering system designed for flood control. The period of significance was determined to span from 1928 to 1959. While the USACE was not required to make determinations under the NHPA, the language used corresponds to the Dallas Floodway being eligible for listing in the National Register under Criterion A for community planning and development and Criterion C for engineering. The Dallas Branch Pressure Sewer, which was built circa 1932 and roughly follows McKinney Street, from the Trinity River to Field Street (northwest portion of the Study Area and APE), was identified as an element of the Floodway that “supported” its historic significance (USACE 2014).

Previous Archeological Surveys

Eleven archeological surveys have been completed within one kilometer (0.62 mile) of the alignment. Three of these surveys documented archeological sites within one kilometer of the proposed route: 1999 City of Dallas survey (41DL390), 2002 Lopez Garcia Group survey (41DL410), and 2013 Geo-Marine (GMI) survey (41DL515).

Previously Recorded Archeological Sites

Eight previously recorded archeological sites are located within one kilometer of the proposed route. Of these sites, none are adjacent to the APE and would therefore not be affected by the proposed undertaking.

Historic-Age Archeological Potential

A review of historic Sanborn maps (1888-1905) shows that the area along the proposed route has the potential for buried archeological deposits dating from the mid-nineteenth century to the early twentieth century. By 1888, there had been considerable residential and commercial development in the project area. The 1892 and 1905 Sanborn maps show that the entire length of the proposed route was flanked by residential and commercial development. In 1892, houses were scattered along the route with the majority of commercial development occurring along Lamar Street, rail-lines at the eastern and western termini, and a lumber yard near the eastern terminus. By 1905, commercial development expanded along Young Street and Dallas Electric Light and Power had a station located near the western project terminus. Following 1905, street configuration remains largely unchanged to the present.

There are many historic resources located adjacent to the proposed route, including a number of historic buildings. The proposed route primarily follows existing roads or streets, the construction of which has likely disturbed any unrecorded sites in the area. It is likely that there are buried archeological deposits along the route, but the potential for intact sub-surface features is low to moderate. Of primary interest are the penetration points where the surface rail will go below grade, and the pedestrian entrances to the subway portion of the Project. These locations have high potential for intact historic-age deposits.

Prehistoric-Age Archeological Potential

Although the Project is located within a heavily urbanized area, it is also situated along the T2 and T1 terraces directly north of the Trinity River. Similar settings along the Trinity River are known to produce alluvial terrace sites, often associated with Trinity River sand deposits (Polk 2017).



Therefore, there is some potential for deeply buried prehistoric archeological deposits. If prehistoric deposits were encountered in an intact setting (demonstrating stratification and preservation of materials) they would most likely be considered significant. However, geotechnical core samples collected throughout downtown contained very little sand and no documentation can be found indicating that, of the previous hundreds of construction activities in downtown Dallas, any prehistoric archeological deposits or artifacts have been encountered and therefore it is generally thought that prehistoric sites once present in the area have been destroyed by development.

Geotechnical Core Samples

Nineteen geotechnical three-inch bore test cores excavated throughout the APE and the surrounding area were inspected by an archeologist to identify any potential buried archeological deposits. One core sample north of the current project area at Elm and Harwood Streets contained a shallowly buried brick fragment from construction rubble or street pavers, but no samples contained indications of buried historic or prehistoric archeological features. Historically, some streets in downtown Dallas were paved with bois d'arc wood blocks, which were replaced with paver bricks by the 1920s (Acheson 1938). Core samples demonstrated no evidence of wood or brick roadways existing beneath the modern streets. Most of the area in downtown Dallas contains asphalt underlain by chalky limestone roadbase material, which is underlain by black clay soils to depths exceeding potential archeological deposits. Austin Chalk was encountered at depths ranging from as little as two feet to as much as 30 feet below the surface. Generally, it appears that soils with potential to contain cultural deposits are limited to the upper five feet, most of which has almost certainly been previously impacted by the numerous historic and modern construction activities throughout the entire D2 route.

Additional core samples to supplement geotechnical data will be done in the future. Additional analysis of these samples will be done at that time to identify any potential buried archeological deposits.

4.6.4 Impact Evaluation

No-Build Alternative

Under the No-Build Alternative, the Project would not be built and no impacts to historic or archeological resources in the area of the D2 alignment would occur.

Build Alternative

Archeological Resources

Of the previously recorded archeological sites identified in the one-kilometer Study Area, none are adjacent to the APE and therefore, none would be affected by the proposed undertaking.

It is likely that there are buried archeological deposits along the route, but the potential for intact sub-surface features is low to moderate. Of primary interest are the penetration points where the surface rail will go below grade, and the pedestrian entrances to the subway portion of the Project. These locations have high potential for intact historic-age deposits. One to two weeks prior to the start of construction (and following surface stripping) an archeological survey would be conducted of those project components where improvements will go below the depth of modern street construction and utilities.

Non-archeological Historic Resources

In general, potential effects on historic or architectural resources can include both direct physical effects—demolition, alteration, or damage from construction on nearby sites—and indirect effects



such as the isolation of a property from its surrounding environment, or the introduction of visual, audible, or atmospheric (e.g., pollutants) elements that are out of character with a property or that alter its historic setting and context (e.g., contextual effects). Significant adverse effects can occur indirectly, if a project would cause a change in the quality of a property that qualifies it for inclusion in the NRHP. The Project—including new tunnel, stations, shaft sites, and temporary construction staging areas—may indirectly affect historic structures due to noise, vibration, and/or visual effects.

The Magnolia Gasoline Station located at 902 Ross Avenue is located within a parcel proposed for acquisition (see Map ID 7 on **Figure 4-13**). The resource, which was determined eligible for listing in the NRHP by the THC in September 2019, would be demolished. Physical destruction of the resource is an adverse effect under the Section 106 of the National Historic Preservation Act (per 36 CFR 800.5(a)) Criteria of Effect and Adverse Effect [36 CFR 800.9(b)] guidelines.

There would be a change of the St. James A.M.E. Temple property's physical landscape features as a result of the relocation of the Live Oak Station. St. James A.M.E. Temple is a NRHP-eligible resource and a City of Dallas Landmark with defined boundaries which contribute to the integrity, location, feeling, and setting of the property (see Map ID DE16 on **Figure 4-15**). The moving of the Live Oak Station presents a new visual element in front of the NRHP eligible and City of Dallas Landmark. The new station location poses a visual adverse effect because the rail alignment will be positioned closer to the property resulting in a 1.5-foot to 5.4-foot-wide portion of property on the west/front side of the church be acquired to accommodate necessary right-of-way for the Live Oak Station, which needs ADA access, street and sidewalk reconstruction. The proposed design would require shifting the street and sidewalk closer to the building and reconstructing the concrete steps and driveway along the existing gate/fence to meet the new proposed sidewalk location. The existing fence and gate would remain in place and mature trees would be preserved to greatest extent possible. In addition, the historical marker on the northwest corner of the church property would need to be removed and relocated at a location to be determined by the City of Dallas. The placement of the sidewalk closer to the NRHP eligible property and City of Dallas Landmark encroaches within the "No Build Zone" boundaries established by the City of Dallas through their preservation ordinance #24396 and would result in an adverse visual effect. In addition, the removal of land, concrete steps and mature vegetation alters the historic physical setting of the NRHP eligible resource and City of Dallas Landmark (**Appendix B.14, DOE Report**).

The proposed pedestrian portals, to be placed within the NRHP-Listed, West End Historic District, City of Dallas Downtown District, and the City of Dallas Harwood Street Historic District Landmark would result in a potential adverse visual effect (indirect) to the resources situated within the Districts (**Figures 4-13 through 4-15**). The full adverse visual effects of the portals on these resources would not be completely determined until the 90 percent design level. The visual elements within the City of Dallas Landmark Districts (Downtown Dallas and Harwood Street) would also need to be coordinated with the City of Dallas through their preservation ordinances.

Indirect impacts from noise and vibration could occur during construction. Construction vibration elements would be introduced to the foundations and basements of the listed and eligible districts and contributing buildings within the districts as well as the individually listed properties while tunneling construction is occurring. The assessment of potential ground-borne vibration at sensitive receptors from light rail operations indicated no impacts. However, specific mitigation measures will be developed during project design to avoid vibration impacts to sensitive buildings during project construction. There are also ground-borne noise impacts anticipated due to muck train operations at sensitive buildings adjacent to the proposed tunnel.

Additional details of the Project on listed and eligible resources are located in the *Determination of Effects (DOE) Report* in **Appendix B.14**. The DOE report was provided to THC on April 14,



2020 for its review. Concurrence is pending at this time. Appropriate changes to effects and mitigation will be incorporated into the FEIS/ROD.

4.6.5 Mitigation Measures

Archeological Resources

Coordination with the THC will take place to create a research design, if needed, and obtain an Antiquities Permit for the purposes of archeological surveys, monitoring, testing, and any potential mitigation. Following surface stripping, and one to two weeks prior to the start of construction, it is recommended that archeologists oversee the removal of concrete and other recent overburden at the penetration points, scraping of all tunnel entrances and pedestrian access areas. Should apparently intact archeological deposits be encountered, testing is recommended at the time of the survey to determine if there is potential for eligibility for listing in the NRHP so that mitigation would be required. The survey would follow a THC-approved method as outlined in the proposed work plan (**Appendix C**). The THC concurred with the proposed work plan on September 23, 2019 (**Appendix C**).

If the proposed undertaking should uncover archeological resources or is altered so that it has the potential to affect archaeological resources, all construction activities will cease in the area, until it can be monitored by a certified historian or archeologist. Work would not proceed with the undertaking until additional review and clearance by the THC has been completed.

Non-Archeological Historic Resources

Preliminary engineering identifies the approximate locations and massing of station pedestrian portals. Final design efforts would determine the precise locations and designs for the pedestrian portals, and thereby would help to establish which properties could be visually affected. Additional engineering vibration studies would also determine the levels of vibration during construction and help to establish which properties could be affected by vibration.

Prior to the design and build phase of the D2 Subway, a Programmatic Agreement (PA) would be implemented among DART, FTA, and THC to establish measures to avoid, minimize, or mitigate any effects to the listed and eligible resources, Historic Districts and Dallas Landmarks. The PA is would address archeology survey requirements, the complete pedestrian portal designs (which currently are at 20 percent), and construction vibration studies along Commerce Street.

Stipulations recommended to be included within the PA may include:

1. Coordination with THC throughout the remaining design-build phase of the Project. Since the D2 Project is currently at 20 percent design, on-going consultation with THC is required to ensure no future adverse effects occur to the identified historic resources due to on-going design changes.
2. DART would work with THC in the design process of the pedestrian portals which are immediately adjacent to any listed or eligible resource, contributing resources within any of the listed historic districts, and within any of the City of Dallas Historic Landmarks. Coordination will occur throughout the design phase, up to 90 percent design, to develop designs which are complementary to the historic resources and districts, and to determine if any future adverse visual effects would occur to the resources.
3. Additional construction vibration studies should be conducted within all listed or eligible districts, and adjacent to all listed or eligible individual resources and City of Dallas Landmarks to determine if any effects would occur to the foundations and basements during all construction activities. DART will consult with THC throughout the design process up to the 90 percent design.



4. DART would work with THC to assure that no blasting will occur during the project construction stages.
5. Further study pertaining to the locations of any basements attached to any of the historic resources identified within the project corridor, especially along Commerce Street, in order to prevent any unknown adverse vibration effects due to construction activities.
6. Prior to the demolition of the Magnolia Gasoline Station located at 902 Ross Avenue, historic documentation of the historic resource would be completed. DART will also seek to avoid acquisition of the parcel pending final construction needs.
7. Prior to acquiring any new right-of-way from the St. James A.M.E. Temple, historic documentation of the historic resource would be completed.
8. Coordination with the City of Dallas Historic Landmark Commission on all identified City of Dallas Landmarks following their preservation ordinances.
9. Prior to any construction activities, and once 90 percent design is complete, coordination would be held with THC with regards to archeological resources. THC will work with DART and their consultant to prepare a work plan and develop an archaeology permit for conducting a survey/monitoring during the construction phase of the project under Section 106 guidelines.

4.7 Visual and Aesthetic Resources

4.7.1 Introduction and Regulatory Setting

The following is a review of the existing visual environment along the Project corridor. As previously described, the Project would include 1.2 miles of subway, but would also include several surface-level features which would be designed to fit in the urban context of downtown Dallas. There would be two tunnel portals; the west portal would provide an urban design opportunity for development over the portal and pedestrian linkages between the Victory and West End areas in coordination with the developer. The east portal would transition from underground to the surface along Swiss Avenue and would provide the opportunity for urban development and pedestrian linkages between downtown and the Deep Ellum area, as well as potential for integration of development over or around the portal. A new at-grade wye junction would be constructed and most of the at-grade segment would utilize existing DART-owned right-of-way within Good Latimer Expressway. Both the west terminus and the east terminus would provide connection to the existing DART LRT system.

NEPA states the need to “assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.” 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.

4.7.2 Methodology

Documenting the visual resources of the corridor included a field observation, geographic information system (GIS) data, aerial imagery and analyzing different viewpoints on Google Earth[®]. The visual resources were inventoried and photographed during a site visit to the D2 corridor on July 12, 2018. Additional details are included in **Appendix B.5: Visual and Aesthetic Existing Conditions Technical Memorandum**. Visual resources are considered to be components of the natural and constructed environment that are capable of being seen. Viewers are considered to be neighbors who can see the proposed project and travelers who would use the proposed transit facility. Neighbors are defined as civic neighbors and adjacent land uses



including: residential, retail, commercial, industrial, and recreational. Travelers are defined as transit system users, arterial drivers, haulers, tourists, pedestrians, and the recreating public.

For the purpose of visual analysis, the width of the Study Area extends approximately 300 feet (the minimal length of a common city block) on either side of the D2 corridor. The Study Area was divided into four sections in order to describe the affected environment. Visual quality and sensitivity are described in a general sense; assessments may not pertain to every specific location within a section.

4.7.3 Affected Environment

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, including 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, parks, 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, including the existing DART LRT system which runs along the edge of the Study Area, from north to south, and bisects it from east to west along Pacific Avenue and Bryan Street. Additionally, there are seven existing LRT stations in the Study Area and a portion of the TRE, which runs parallel to the LRT. DART bus routes run along almost every street in the Study Area and two major transfer centers are present. The M-Line trolley runs within the north central portion of the Study Area and Dallas Streetcar is near Union Station to the southwest. Visual elements that accompany transit include: station platforms, signage, catenary poles, station lighting, transfer center buildings, bus stops, bus bays, signal houses, traction power substations, among other elements. 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 of the surrounding area. Typical views are multi-dimensional, combining 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.

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 generally follows a grid pattern and mature shade trees typically line many of the arterials and adjoining streets. 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.

The western portion of the Study Area is northeast of the West End Historic District. Here, the corridor would be located within Victory Park within the tree-lined median of Museum Way and adjacent to the Perot Museum of Nature and Science and nearby the Dallas World Aquarium. The landscape is dominated by streets, parking lots, and mid-rise buildings. The subway portion of the alignment would pass adjacent to One Main Place, a Dallas Landmark and NRHP-listed building. One Main Place is a Modernist style structure built in 1965-1968 with the goals of reversing urban decay and stimulating growth in Downtown Dallas (NPS, 2018).

Commerce Street runs through the Dallas Downtown Historic District. The Project would be a subway under this portion of the district. The Dallas Downtown Historic District is approximately 91 acres and was designated as a historic district in 2006 to preserve the diverse architectural



history of the area. This area is dominated by a variety of high-rise buildings, pocket parks, and grid streets with landscaping.

The eastern portion of the Study Area crosses under I-345 and enters an area of mid-rise buildings, street art and murals, with a backdrop of high-rise structures still visible to the west and ongoing new development including the Epic. The Grand Lodge of Colored Knights of Pythias, an NRHP-listed structure, is being renovated and integrated into the Epic as part of new hotel. This structure served as a civic, business, and social center during a time when segregation offered few other alternatives (NPS, 2018).

The D2 Study Area was divided into four sections (see **Figure 4-16**) in order to further describe the affected environment, starting with the westernmost section. Each section was assessed as to the existing nature of the visual quality and visual sensitivity to the dominant or highly sensitive type of land uses within the section. An inventory of the sensitive receptors and visual assets, if any, was also collected. **Table 4-9** provides the general rating of each D2 section and the evaluation definitions.

Section 1 – DART Victory Station to Woodall Rodgers Freeway

The Project would operate adjacent to I-35E along an existing section of LRT line from south of Victory Station, then extend southeast within DART-owned right-of-way in the center of Museum Way which contains trees within the median and on the sidewalks. It would then traverse the Perot Museum parking lot to Woodall Rodgers Freeway, ending at the proposed Museum Way Station, all generally within DART-owned right-of-way. **Figure 4-17** depicts photos of this visual section. Both termini of this section are adjacent to major transportation routes. The Project would be visible to and from the West End Historic District and would pass adjacent to the architecturally unique Perot Museum of Nature and Science. Victory Park has several high-rise buildings with ground level retail in a pedestrian-friendly environment. Along Museum Way east of Victory Avenue, there are several loading docks.

Museum Way Station, a proposed at-grade LRT station, with catenary poles and light standards, would be located adjacent to the Perot Museum of Nature and Science. The station would be within an area that is currently a parking lot north of Broom Street between Field and Houston Streets.

Section 2 – Woodall Rodgers Freeway to Proposed Metro Center Station

After leaving Museum Way Station, the alignment would cross under Woodall Rodgers Freeway at-grade and then begin its transition underground with a tunnel u-wall section. The tunnel portal would be within an area currently occupied by a parking lot (see **Figure 4-17**). This area is planned for redevelopment as a mixed-use center with residential, retail, and office uses. The alignment continues south to the proposed Metro Center Station, adjacent to the DART West Transfer Center and near the West End Historic District. Metro Center Station would be an underground station located between San Jacinto Avenue and Elm Street, including a new headhouse at a reconfigured West Transfer Center and several other pedestrian portal access points to facilitate connections to rail and bus. Unique structures located along this route include the Dallas World Aquarium and KDFW Television Station.

Section 3 – Proposed Metro Center Station to Proposed CBD East Station

After leaving Metro Center Station, the alignment would cross under Main Street, turn east under Belo Garden, and continue under Commerce Street. Commerce Station is proposed between Akard and Ervay streets. The alignment along Commerce Street extends through the core of the central business district with many high-rise and historic buildings. Several bus stops are along the corridor.



Table 4-9 Visual Assessment Rating and Impacts by Section

Section	Name	Primary Viewers	Visual Quality	Visual Sensitivity	Sensitive Receptors/Assets	Project Elements/Features	Impacts
1	DART Victory Station to Woodall Rodgers Freeway	A, C, E, G, H	Moderate	Moderate	Victory Park Retail and Museum Way Multi-Family Residential, Perot Museum of Nature and Science	Vertical elements include the catenary poles and light standards. Museum Station (at-grade station with platform, etc.); removal of ornamental trees within median of Museum Way; signal house at junction with existing LRT	Neutral
2	Woodall Rodgers Freeway to Proposed Metro Center Station	A, E, H	Moderate	Low	Dallas World Aquarium, KDFW Television Studio; West End Historic District	Tunnel portal; Headhouse at West Transfer Center with station access portals at Griffin and Pacific, at Rosa Parks Plaza, and North Lamar and Pacific; removal of trees within median of Griffin Street; signal house and Traction Power Substation (TPSS) under Woodall Rodgers-Portal	Not significant
3	Proposed Metro Center Station to Proposed CBD East Station	A, C, E, G	High	High	Dallas Downtown Historic District, Harwood Street Historic District, One Main Place, Belo Garden, The Adolphus Hotel, Pegasus Plaza, Main Street Garden, and the Statler Dallas Hilton	Headhouse at Pegasus Plaza, pedestrian portal options at Commerce/Ervay, ventilation shafts at the headhouse and near Browder Street Plaza	Potentially significant
4	Proposed CBD East Station to Eastern Project Terminus	A, E, G	Moderate	Moderate	Majestic Theatre, Epic development, Knights of Pythias, Lizard Lounge	Headhouse and pedestrian portals for CBD East, ventilation shafts, relocation of station to Live Oak	Not significant

Evaluation Rating Definitions

Primary Viewers	Visual Quality	Visual Sensitivity
A= Motorist B= Single-Family Resident C= Multi-Family Resident D= Recreational Users E= Commercial/Office Tenants F= Industrial Tenants G= Pedestrians H= Others	High = section or portions thereof is of significant visual quality to the primary viewers Moderate = section is of average visual quality to the primary viewers Low = section is of low visual quality to the primary viewers	High = Introduction of new elements could significantly impact the aesthetic quality of the section as observed by the primary viewers Moderate = Introduction of new elements may impact the aesthetic quality of the section or a portion thereof as observed by the primary viewers Low = Introduction of new elements is not likely to have an impact on the aesthetic quality of the section as observed by the primary viewers

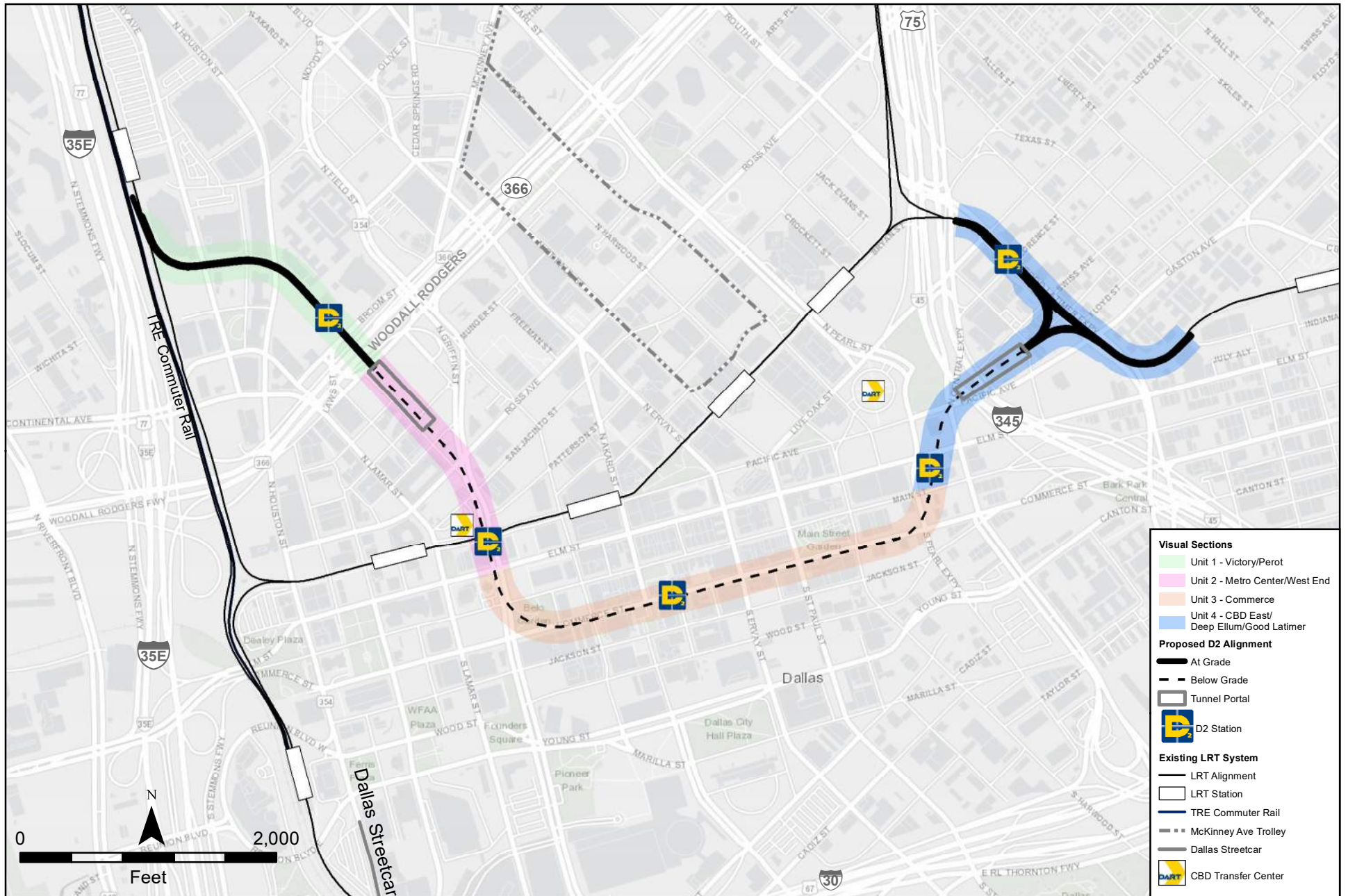


Figure 4-16
Visual Assessment Units
 Data Source: DART, GPC6



Section 1- South-Southeast of Victory Avenue



Section 2- Pacific Avenue and North Griffin Street



Section1- Museum Way and Victory Park Lane



Section 3- Commerce Street and Browder Street



Section 2- North Griffin Street and Munger Avenue



Section 3- Commerce Street and Pearl Expressway



Section 2- North Griffin and Ross Avenue



Section 4- North Good Latimer Expressway and Florence Street



Figure 4-17
Visual Assesment Units
Existing Conditions Photos



The alignment turns to the northeast near Pearl Street and crosses diagonally under city blocks to another proposed underground station, CBD East Station (see **Figure 4-16** and **Figure 4-17**). Visual elements of the Project in this section would include a new headhouse at Pegasus Plaza, a pedestrian portal near Commerce/Ervay, and ventilation shafts near the Magnolia Hotel pass-through area (between the Joule and Magnolia Hotels) and south of Commerce adjacent to Browder Plaza. Unique features within Section 3 include locations such as One Main Place, Belo Garden, the Adolphus Hotel, Pegasus Plaza, Main Street Garden, AT&T Headquarters complex, and the Statler Dallas.

Section 4 – Proposed CBD East Station to Eastern Project Terminus

Section 4 begins at the proposed CBD East Station and continues east to the Live Oak Station. CBD East Station would be located between Main Street and Pacific Avenue. The alignment would begin the transition back to the surface east of Cesar Chavez Boulevard and would be in a u-wall tunnel portal under I-345 and south of Swiss Avenue. After reaching the surface near Hawkins Street, the alignment would include a full wye that would allow trains to move either north or south along partially rebuilt Good Latimer tracks (see **Figure 4-16** and **Figure 4-17**).

The headhouse for CBD East Station would be at Elm Street and Pearl Street. A second pedestrian portal would be located at Main Street and Pearl Street. The headhouse and pedestrian portal would also contain ventilation shafts.

Unique features within Section 4 include the Majestic Theatre, Deep Ellum Station, new Epic development including Knights of Pythias, St. James A.M.E. Temple, Latino Cultural Center, and Live Oak Lofts. The track in Deep Ellum would change from ballast to embedded to create a more urban environment.

4.7.4 Impact Evaluation

No-Build Alternative

Under the No-Build Alternative, the Project would not be built and no impacts to visual and aesthetic conditions in the area of the downtown Dallas alignment would occur.

Build Alternative

The Build Alternative would affect the visual and aesthetic resources in the Study Area. Generally, the assessment identified changes in visual quality and the effect of such changes on the experience of the primary viewers. Primary viewers include downtown residents, park users, visitors, commercial/office tenants, industrial tenants, pedestrians, arterial motorists, and others who may be affected by the Build Alternative.

DART and its LRT elements represent a significant visual component of downtown Dallas. The existing LRT lines operate near significant structures in the CBD; however, the visual/aesthetic impacts from the LRT were determined to be minimal in these areas or have been mitigated. In general, the alignment considered for the Build Alternative is comparable to the existing LRT route, except where it would be below-grade it would present new elements such as portals, ventilation shafts and access to underground stations. Visual receptors and assets were assessed to determine which project characteristics would potentially have an impact, including:

- Station areas, including platforms, pedestrian portals and/or headhouses
- Tunnel portals
- Other vertical elements, such as catenary poles, light standards, and ventilation shafts

Impacts would vary by section given the difference in at-grade and underground configurations. Surface stations and surface alignment adjacent to sensitive buildings are also important issues



that were assessed for impacts. DART has and will continue to coordinate with the City Urban Design Peer Review Panel. Design elements of the Project (materials, brands of vehicles, colors, etc.) have yet to be determined, therefore, the following assessment of effects is based on typical design features.

Section 1 – DART Victory Station to Woodall Rodgers Freeway

The Build Alternative 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 adjacent to the Perot Museum of Nature and Science. As this section is currently surrounded by major transportation corridors including I-35E, Woodall Rodgers Freeway, major streets, and the existing LRT line; and other modern urban elements such as mid- and high-rise buildings and museums, the Project would be compatible with this section's visual and aesthetic resources. The Project would include the removal of the trees and would place LRT catenary lines within the median of Museum Way. While the Project would also create some new visual elements for pedestrians, motorists and nearby residents, including catenary poles, light standards, signal house and TPSS under the freeway, and a new at-grade station, the impacts are anticipated to be neutral, due to the fact that the Project is in an urban area with major transportation corridors and elements already present. Moreover, the Museum Way alignment and Museum Way Station would be designed to integrate with the surrounding area and coordinated with the museum. Proposed paths along the alignment would be coordinated with the City and area stakeholders. Broom Street would be relocated closer to the freeway and existing trees would be replaced with new trees in an expanded sidewalk near Perot Museum. Additional replacement trees would be planted where possible within this section. Primary viewers are considered to be moderately sensitive and would not be adversely impacted by the Project in this section.

Section 2 – Woodall Rodgers Freeway to Proposed Metro Center Station

Except for the west tunnel portal and removal of trees within the median of Griffin Street, the Build Alternative would be underground for most of this section, and as such, there would be little to no visual impact associated with the alignment. The tunnel portal would be located between Corbin Street and the Woodall Rodgers Freeway and would be designed to integrate with future private development on the property. Even without development, the portal would not obstruct any important views, and would not be out-of-character with the surrounding urban and transportation elements. The Metro Center Station would introduce new visual elements with the headhouse on the West Transfer Center site, and three additional proposed access portals as well as ventilation shafts. This area has low to moderate sensitivity and impacts would be potentially significant. DART would design the headhouse and access portals, especially those in the West End Historic District, to be compatible with surrounding uses. The proposed light-well and emergency exit in the Griffin Street median would be designed to blend in with the surrounding area.

Section 3 – Proposed Metro Center Station to Proposed CBD East Station

The Build Alternative would run underground through this section and have minimal impact on its visual and aesthetic resources. There would be one underground station in this section, with access points, ventilation facilities, and a new headhouse at Pegasus Plaza. As this is a high visual quality, high visual sensitivity section, these facilities would be integrated with the existing urban character and streetscape, and designed so as not to obstruct any important views, and to be compatible with the surrounding urban and transportation elements. For example, the Pegasus Plaza headhouse would be located along the back wall of Magnolia Hotel as a transparent structure, and ventilation requirements would be integrated with a new park design and placed along Magnolia Hotel pass-through (see **Section 4.5**). The Commerce/Ervey access point options would be integrated within existing buildings or designed to fit in with the urban fabric. The ventilation shaft south of Commerce Street would be clad to not distract from the Browder Street



Mall and recent area improvements. Pegasus Plaza redesign, including the headhouse and public art, would be guided by an agreement with the City of Dallas.

Section 4 – Proposed CBD East Station to Eastern Project Terminus

As this section is surrounded by major transportation corridors, existing LRT, and other urban elements, the Project would be compatible with this section's visual and aesthetic resources. While the Project would also create some new visual elements for motorists and nearby residents with the tunnel portal and wye junction, the impacts are anticipated to be neutral, due to the fact that the Project is in an urban area with major transportation corridors and similar elements already present. Like at the west portal, this portal may be integrated into a future development pending coordination with the property owner. There would be a signal house and TPSS near the wye junction along Swiss Avenue. They would be designed or clad to complement the changing nature of this area. The Live Oak Station would be very similar to the Deep Ellum Station and would incorporate the same or similar design features. Ballasted track would be replaced with embedded track to better integrate the tracks with the redeveloping area. The CBD East station pedestrian portals and ventilation shafts, would be designed to integrate with the surrounding area, including in the growing East Quarter area. Primary viewers are considered to be moderately sensitive and would not be adversely impacted by the Project in this section.

4.7.5 Mitigation Measures

The visual and aesthetic impacts of the Project include new station areas and other vertical elements such as catenary poles, LRT vehicles in operation on the track, as well as underground station entrances, ventilation facilities, signal houses, and TPSS and light standards. In order to mitigate the impacts of visual and aesthetic resources, DART would 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 will apply context sensitive design to all portal areas, to make them compatible with local surroundings, and could incorporate design elements to minimize impacts. Stations will all include an Art & Design program to guide colors, materials and other features. DART specifically will 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. DART will develop these recommendations in coordination with the City of Dallas in accordance with approved Urban Transit Design Guidelines, which include:

- The relationship of the station to any surrounding development would be considered to ensure a positive integration that opens up views, and sightlines and maximizes connectivity to adjacent development.
- Underground station entrance portals would be designed to complement the surrounding architectural character of the area with special attention to historic districts.
- Lighting shall be “cut-off” type to avoid illuminating the sky and surrounding development.
- Higher illumination around transit stops would be gradual rather than sudden to avoid creation of virtual shadows as driver and bicyclist eyes adjust.

Mitigation measures are intended to be consistent with those used in other parts of the DART system and would be consistent with design criteria related to landscaping and lighting for new visual elements at the stations. In addition, each station would utilize an Art and Design program that will include community input, with selection of colors, finishes and materials complementary to the setting.

To minimize visual impacts, the following mitigation measures would be implemented, as shown in **Table 4-10**. The table also presents the assessment of the visual units and indicates whether the impacts are potentially significant.



Table 4-10 Mitigation for Visual Impacts

Section	Potential Impact and Rating	Proposed Mitigation
1 - DART Victory Station to Woodall Rodgers Freeway	Potential visual impacts associated with removal of the trees within median of Museum Way and along Broom Street due to street relocation, and new Project elements such as catenary poles, light standards, and a new at-grade station. / Not significant	Alignment and Museum Way Station will be designed to integrate the surrounding area. Proposed paths along the alignment will be coordinated with the City and area stakeholders. Station design will be coordinated with the Perot Museum. Broom Street trees would be replaced with new trees in an expanded sidewalk near Perot Museum. Additional replacement trees will be planted where possible.
2 - Woodall Rodgers Freeway to Proposed Metro Center Station	The west tunnel portal would be a new visual element. Trees within the Griffin Street median would be removed. The Metro Center Station would introduce new visual elements with the headhouse on the West Transfer Center site, and three additional proposed access portals as well as ventilation shafts and light-well in Griffin Street median. / Not significant	The tunnel portal will be designed to integrate with future private development and minimize visual effects. DART will design the headhouse and access portals, especially those in the West End Historic District, to be compatible with surrounding uses. The proposed light-well and emergency exit in the Griffin Street median would be designed to blend in with the surrounding area.
3 - Proposed Metro Center Station to Proposed CBD East Station	Visual impacts would occur due to Commerce Station access points, ventilation facilities, including new headhouse at Pegasus Plaza. Public art at Pegasus Plaza would be removed and potentially re-integrated in a new park design. / Significant	Station access and ventilation elements would be integrated with the existing urban setting. Pegasus Plaza is envisioned as a transparent structure, and ventilation requirements will be integrated with a new park design and placed along Magnolia Hotel pass-through. The Commerce/Ervey access point options will be integrated within existing buildings or designed to fit in with the urban fabric. The ventilation shaft south of Commerce Street would be clad to not distract from the Browder Street Mall and recent area improvements. Pegasus Plaza redesign, including the headhouse and public art, would be guided by an agreement with the City of Dallas.
4 - Proposed CBD East Station to Eastern Project Terminus	Visual impacts would be minimal given existing major transportation corridors, LRT, and other urban elements. New visual elements would be the CBD East Station access portals, tunnel portal, wye junction, TPSS and signal house, and relocated Live Oak Station. / Not significant	The CBD East station pedestrian portals and ventilation shafts would be designed to integrate with the surrounding area. The tunnel portal may be integrated into a future development pending coordination with the property owner. The signal house and TPSS will be designed or clad to complement the area. Ballasted track will be replaced with embedded track. The Live Oak Station will incorporate the same or similar design features as the Deep Ellum Station.

Source: GPC6

4.8 Noise and Vibration

4.8.1 Introduction and Regulatory Setting

Noise and vibration impact assessment and mitigation development have been carried out in accordance with the guidelines specified in the U.S. Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (FTA, 2018) and in the DART policy document *Environmental Impact Assessment & Mitigation Guidelines for Transit Projects* (April 2019). The



objective of the assessment was to document the potential noise and vibration impacts at sensitive locations and identify appropriate mitigation measures as a part of the Project.

Noise

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). 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 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 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.).

Vibration

Ground-borne vibration from trains refers to the fluctuating or oscillatory motion experienced by persons on the ground and in buildings near railroad tracks. Vibration can be described in terms of displacement, velocity, or acceleration. Displacement is the easiest descriptor to understand. For a vibrating floor, the displacement is simply the distance that a point on the floor moves away from its static position. Velocity represents the instantaneous speed of the floor movement, and acceleration is the rate of change of the speed. Although displacement is easier to understand, the response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.

Ground-borne noise is a low-volume, low-frequency rumble inside buildings, resulting when ground vibration causes the flexible walls of the building to resonate and generate noise. Ground-borne noise is normally not a consideration when trains are elevated or at grade. In these situations, the airborne noise usually overwhelms ground-borne noise, so the airborne noise level is the major consideration. However, ground-borne noise becomes an important consideration where there are sections of the corridor that are in a tunnel or where sensitive interior spaces are well-isolated from the airborne noise. In these situations, airborne noise is not a major path and ground-borne noise becomes the most important path into the building. Ground-borne noise may also need to be considered in cases where the airborne noise from a project is mitigated by a sound wall.



4.8.2 Methodology

Noise

This section describes the methodology used to characterize the existing noise conditions along the Build Alternative and provides background information on airborne noise issues related to the proposed transit project.

Based on the screening distances provided in Section 4.3 of the FTA manual, the noise study area for the project was typically within 350 feet of the alignment. Based on the screening distances provided in Section 6.3 of the FTA manual, the vibration study area for the project was typically limited to within 150 feet of the alignment, except for highly vibration-sensitive land uses where facilities within about 450 feet of the alignment were considered.

The affected noise and vibration environment along the D2 Study Area was investigated based on a review of current project and land use information, and measurements conducted during September and December of 2018 (see **Figure 4-18** for noise and vibration measurement locations).

Noise levels were projected based on noise data for the DART low-floor Super Light Rail Vehicle (SLRV), the Project's operating plan and the prediction model specified in the FTA guidance manual. The D2 Subway Project operating plan has been revised from the 2010 AA/DEIS due to track geometry, vehicle upgrade, and revised peak headways. Significant factors are summarized below:

- Based on measurement data for a prototype DART low-floor SLRV (HMMH, 2006), the predictions assume that a single 124-foot long vehicle operating at 50 mph on at-grade ballast and tie track with continuous welded rail (CWR) generates a Sound Exposure Level (SEL)¹ of 82 dBA at a distance of 50 feet from the track centerline. This value, which corresponds to a reference SEL value of 76 dBA at a speed of 25 mph, is consistent with the FTA reference SEL values for rail cars and streetcars.
- Based on FTA guidance, an adjustment of +3 dBA is applied to the noise computations in areas where the trains will be operating at grade on embedded or direct fixation track to account for the noise increase relative to operation on ballast and tie track.
- It is assumed that all trains will consist of three vehicles, although actual operations may have shorter trains depending on time of day.
- Based on the current DART Orange Line and Green Line weekday schedules, it is assumed that there will be 102 trains operating during the daytime hours (7 am to 10 pm) and 30 trains operating during the nighttime hours (10 pm to 7 am) in each direction. This schedule corresponds to a total of 264 trains passing by a given location during a 24-hour weekday period. Peak transit hour headways are assumed 15 minutes on each of the two lines, with eight trains per hour passing by in each direction.
- It is assumed that the above train volumes are reduced by one half beyond the Good Latimer junction where Green Line trains turn south toward Baylor University Medical Center Station on the Southeast Corridor and where Orange Line trains turn north toward the Live Oak Station to the North Central Corridor.

¹ The SEL describes a receiver's cumulative noise exposure from a single noise event. It is represented by the total A-weighted sound energy during the event, normalized to a one-second interval.

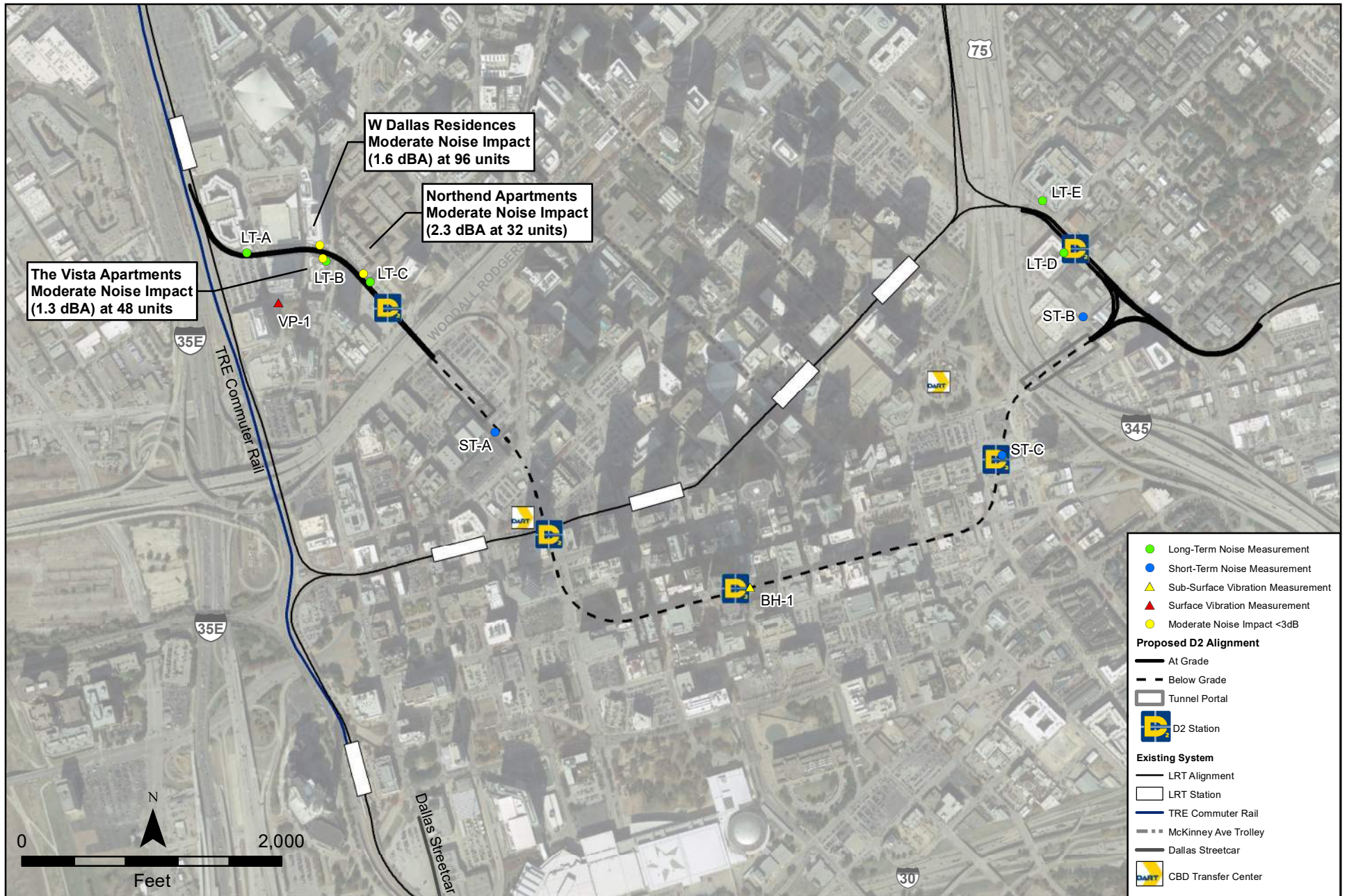


Figure 4-18
Noise and Vibration Measurement Sites
and Noise Impact Locations
 Data Source: DART, GPC6





- Based on DART audible warning signal equipment and policy, train whistles are assumed to generate a sound level of 78 dBA at 50 feet from the track for a five-second period as trains approach gated grade crossings. It is assumed that the only gated crossings will be at Broom Street, McKinney Avenue, Hawkins Street, and southbound Good Latimer at Pacific Avenue and Swiss Avenue; and that traffic signals will be used at all other crossings without audible warning signals.
- Stationary warning bells, generating a sound level of 73 dBA at 50 feet, would be sounded at gated grade crossings before and after each train for a total duration of 30 seconds. It is assumed that only gated crossings will be at Broom Street, McKinney Avenue, Hawkins Street, and southbound Good Latimer at Pacific Avenue and Swiss Avenue.
- Based on FTA guidance, wheel impacts at crossovers and turnouts are assumed to cause localized noise increases of 5 dBA within a distance of 300 feet.

Vibration

Vibration propagation measurements were conducted in the Study Area during September of 2018 to determine the vibration response characteristics of the ground near vibration-sensitive locations (see **Figure 4-18**). The measurements included a surface test to characterize vibration propagation for at-grade train operation and a borehole test to characterize vibration propagation for subway operation.

The operational vibration impact criteria used for the Project are based on the information contained in Chapter 6 of the FTA noise and vibration guidance manual. The criteria for a general vibration assessment are based on land use and train frequency. Projections of ground-borne vibration and ground-borne noise from train operations were carried out using the detailed vibration analysis procedures specified in the FTA guidance manual, based on the following factors:

- Vibration source level data for the DART vehicle operating at grade on ballast and tie track with continuous welded rail (CWR) were obtained from measurements conducted on a prototype DART low-floor SLRV (HMMH, 2006).
- The source level data were adjusted for speed and for embedded track conditions (where applicable) based on data from vibration measurements for the Central Corridor LRT Project (METRO Green Line) in Minneapolis-St. Paul, MN (ATS Consulting, 2008).
- Vibration propagation tests were conducted at two sites along the D2 alignment as described in **Section 4.8.2**. These tests measured the response of the ground to an input force. The results of these tests were combined with vibration source level data for the DART vehicle to project vibration levels from trains operating along the project corridor.
- Based on FTA guidance, wheel impacts at track crossovers and turnouts are assumed to cause localized vibration increases of 10 VdB within a distance of 100 feet, and increases of 5 VdB at distances between 100 feet and 200 feet.
- The ground-to-building coupling loss (i.e. vibration reduction) is assumed to be 7 VdB for 1-2 story buildings and 10 VdB for taller buildings.
- A floor-to-floor attenuation (i.e. vibration reduction) of 2 VdB/floor is assumed.

4.8.3 Affected Environment

Noise

Land use in the Study Area includes a combination of residential, institutional and commercial zones. Existing noise sources along the project alignment include roadway traffic, rail operations and local activities. The existing ambient sound levels vary by location, depending on the proximity to roads and other noise sources, and are generally typical of an urban environment.



Noise-sensitive land uses in the Study Area were identified based on alignment drawings, aerial photographs, visual surveys, and land use information. Sensitive receptors located along the alignment include multi-family residences, hotels, courthouses, a museum, an aquarium, a school, a church, a medical office, a cultural center and a TV studio. Summary descriptions of noise and vibration sensitive land use along segments of the proposed alignment, from west to east, are provided below.

- Victory Development: Along this segment, the alignment travels from the existing light rail system down Museum Way at grade. Nearby noise sensitive receptors include the Arpeggio Victory Park Apartments, the Vista Apartments, the W Dallas Residences, the Northend Apartments and the SkyHouse Dallas Apartments, as well as the Perot Museum of Nature and Science.
- N Griffin Street: Along this segment, the alignment parallels N. Griffin Street in subway. Nearby noise sensitive receptors include the Dallas World Aquarium, the Ross Apartments, the KDFW FOX TV studio, the Homewood Suites Hotel and the Crowne Plaza Hotel.
- Commerce Street: Along this segment, the alignment travels in subway below Commerce Street. Nearby noise receptors include the Earle Cabell Federal Building and Courthouse, the Metropolitan Condos, the Manor House Apartments, the Adolphus Hotel, the Magnolia Hotel, the Joule Hotel, the Dallas Power and Light Flats, the Hampton Inn Hotel, the Continental Apartments, the Merc Apartments, the Element Apartments, the Statler Residences, the UNT Dallas College of Law and the Dallas Municipal Court building.
- Commerce Street to I-345: Along this segment, the alignment travels in subway with a proposed shallow passenger station section located near a building with a medical office.
- I-345 to N Good Latimer Expressway: Along this segment, the alignment parallels Swiss Avenue at grade before tying into the existing light rail system. There are a number of noise sensitive receptors in the area, including the Elan City Lights Apartments (currently closed), the Live Oak Lofts, the Latino Cultural Center, the former St. James A.M.E. Temple church (now known as the Meadows Foundation office), the Epic Deep Ellum mixed-use development and the Marquis on Gaston Apartments.

Vibration

Vibration-sensitive land use along the project segments is essentially the same as the noise-sensitive land use, except for parks and other outdoor sites which are not considered vibration-sensitive. In addition, there is a vibration-sensitive TV studio (KDFW Fox 4) along the alignment.

Existing vibration sources along the project alignment include auto, bus and truck traffic on local streets. However, vibrations from street traffic are not generally perceptible at receivers in the Study Area unless streets have significant bumps, potholes, or other uneven surfaces. The only significant sources of existing ground vibration along the Project corridor are existing train operations at each end of the alignment where it ties into the existing light rail system. Furthermore, the FTA vibration impact criteria are not ambient-based; that is, future project vibrations are not compared with existing vibrations to assess impact. Therefore, the vibration measurements for the project focused on characterizing the soil conditions along the proposed alignments rather than on characterizing the existing vibration levels.

4.8.4 Impact Evaluation

No-Build Alternative

No-Build noise and vibration levels in the Study Area would continue to be generated principally from motor vehicles traveling on Study Area roadways and existing train operations. In the absence of planned roadway improvements or other major developments that would alter traffic



patterns to a great degree, future No-Build noise levels can be expected to increase slightly due to projected traffic growth. However, the increase in noise would not be perceptibly different from existing noise levels.

Build Alternative

The results of the noise impact assessment are shown in **Table 4-11** and identified moderate noise impacts (less than 3 dB) at three locations affecting a total of 176 residential units from light rail operation. These three locations are residential apartments at the W Dallas Residences, the Vista Apartments, and the Northend Apartments (see **Figure 4-18**). No severe impacts were identified. Additional details are provided in the *Noise and Vibration Technical Report* (January 2019) and *East End Addendum Technical Memorandum* (February 2020) in **Appendix B.10**.

There is the potential for additional noise impact from wheel squeal at sensitive receptors near curves in at-grade portions of the D2 alignment. There is also the potential for additional noise impact at locations above the subway portions of the alignment due to fan noise and train noise transmitted to the surface through ventilation shafts and gratings. Noise from these sources is not anticipated to be more than ambient conditions but would be evaluated during project design when detailed information becomes available and mitigation measures, such as acoustical louvers, would then be developed as appropriate.

Vibration from light rail operations is of particular concern to stakeholders along the Project alignment. A detailed vibration impact assessment was carried out based on FTA noise impact assessment methodology described in the *Noise and Vibration Technical Report* (January 2019) and *East End Addendum Technical Memorandum* (February 2020) in **Appendix B.10**. The assessment was revised based on the latest D2 project design and operating plan. The results of the vibration impact assessment indicated there is no potential for ground-borne vibration. Detailed results are contained in **Appendix B.10**.

Potential vibration impacts from construction activities are described in **Chapter 5**. It should be noted that final construction methods have not been selected and will be determined by the Design-Build contractor. A quantitative assessment of construction noise and vibration impacts resulting from tunneling and other activities would be conducted during the final design phase of the Project when detailed construction scenarios are available. In particular, potential construction-related impacts to historic/special structures would be considered. Specific construction noise and vibration mitigation measures would then be developed as appropriate, and requirements for noise and vibration monitoring would be evaluated.

4.8.5 Mitigation Measures

Noise

FTA states that, in determining the need for noise mitigation, severe impacts should be mitigated unless there are no practical means to do so. At the moderate impact level, more discretion should be used, and other project-specific factors should be included in the consideration of mitigation. These other factors can include the predicted 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. Consistent with DART policy, noise mitigation for moderate noise impacts is warranted at locations where a noise exposure increase of three (3) decibels or more is projected. Other moderate impacts would be evaluated on a case-by-case basis, depending on proximity to other mitigation measures.



Table 4-11 Summary of Noise Impacts without Mitigation

Noise-Sensitive Receiver Description	FTA Land Use Category	Side of Track ¹	Distance from Near Track (feet)	Train Speed (mph)	Existing Noise Level ²	Project Noise Level ²			Total Noise Level ²	Noise Level Increase ²	Number of Residential Impacts	
						Predicted ³	Impact Criteria				Moderate	Severe
							Moderate	Severe				
Arpeggio Victory Park Apartments	2	NB	23	15	68	62	63	68	69	1.1	0	0
W Dallas Residences	2	NB	34	15	68	64	62	68	69	1.6	96	0
The Vista Apartments	2	SB	43	15	68	63	62	68	69	1.3	48	0
Northend Apartments	2	NB	35	15	66	64	61	66	68	2.3	32	0
Perot Museum of Nature and Science	3	NB	254	15	61	54	63	69	62	0.8	0	0
SkyHouse Dallas Apartments	2	SB	251	15	66	57	61	66	66	0.6	0	0
Dallas World Aquarium	3	SB	81	15	62	58	64	69	63	1.3	0	0
IPS Psychotherapist Office	3	SB	59	15	63	58	64	70	64	1.2	0	0
Elan City Lights Apartments	2	NE	66	25	79	57	65	75	79	0.0	0	0
Latino Cultural Center	3	NE	81	12	69	57	69	74	69	0.3	0	0
Live Oak Lofts	2	SW	48	12	74	61	65	72	74	0.2	0	0
St. James A.M.E. Temple	3	NE	51	12	69	64	69	74	70	1.2	0	0
Epic Deep Ellum	2	SB	85	16	74	62	65	72	74	0.3	0	0
Marquis on Gaston Apartments	2	NB	61	16	74	64	65	72	74	0.4	0	0
TOTAL NUMBER OF NOISE IMPACTS:											176	0

Source: Cross-Spectrum Acoustics, 2020

¹ Relative to track for trains in Northbound (NB) direction heading towards Victory Station or for trains in Southbound (SB) direction heading away from Victory Station; Northeast (NE) or Southwest (SW) side of track (relative to N Good Latimer Expressway).

² Noise levels are measured in dBA (rounded to the nearest decibel) and are based on Ldn for FTA Land Use Category 2 receivers and on Leq for FTA Land Use Category 3 receivers. For better resolution, noise level increases are shown to the nearest 0.1 decibel.

³ Predicted levels include whistle, bell and passenger station noise, where applicable (rounded to the nearest decibel).



The range of typical mitigation measures for reducing noise impacts include:

- Noise Barriers
- Building Sound Insulation
- Wheel/Rail Lubrication
- Special Trackwork

Noise barriers, which are the most common and cost-effective noise mitigation would be impractical in the street running through an urban setting where the three locations of moderate noise impacts were identified. No noise mitigation is recommended as all noise increases are projected to be less than 3 dB and mitigation is not required.

As there is the potential for additional noise impact from wheel squeal at sensitive receptors near curves in the D2 alignment, DART will evaluate wheel squeal during operations to determine the need for wheel/rail lubrication measures.

Construction activities will be carried out in compliance with DART specifications and all applicable local noise regulations. Construction impacts are included in **Chapter 5**.

Vibration

The results indicate that no ground-borne vibration or ground-borne noise impacts are projected. If future assessment identifies any impacts, there a range of options available.

The range of typical mitigation measures for reducing vibration impacts include:

- Ballast Mats
- Tire Derived Aggregate (TDA) Wheel/Rail Lubrication
- Floating Slabs
- Resiliently Supported Concrete Ties (Under-Tie Pads)
- Resilient Rail Fasteners
- Special Trackwork

Specific construction noise and vibration mitigation measures will be developed during the design phase of the Project when more detailed construction information is available, and requirements for noise and vibration monitoring will be evaluated at that time.

4.9 Air Quality

4.9.1 Introduction and Regulatory Setting

The federal Clean Air Act (CAA) of 1970 and the Clean Air Act Amendments (CAAA) of 1977 and 1990 require that states adopt ambient air quality standards. The standards were established to protect the public from potentially harmful amounts of pollutants. The EPA has set national ambient air quality standards (NAAQS) for the following six criteria pollutants: ozone (O₃), particulate pollution (PM₁₀, PM_{2.5}), nitrogen dioxide (NO₂), carbon monoxide (CO), sulfur dioxide (SO₂), and lead (Pb). Additional details are provided in the *Air Quality Existing Conditions Technical Memorandum* in **Appendix B.9**.

4.9.2 Methodology

Impacts to air quality are analyzed by comparing the future air quality conditions with and without the Project. The 2045 No-Build conditions reflect development, growth, and infrastructure improvements that have already been accounted for in the Metropolitan Transportation Plan. Project traffic impacts were identified based on the differences between future No-Build and Build Alternative conditions. Assumptions about future traffic conditions are described in **Section 3.3**.



The modeling procedures for ozone require long-term meteorological data, detailed area-wide emission rates, and activity levels for all emission sources (on-road, non-road, point, and area). Accordingly, concentrations of ozone are modeled by the regional air quality planning agency for the State Implementation Plan (SIP).

4.9.3 Affected Environment

Air quality is a regional concern, not a localized condition. The Study Area is located in Dallas County, part of the Dallas-Fort Worth Air Quality Control Region, which has been designated as a marginal nonattainment area for eight-hour ozone (2015 Standard) by the EPA. The NCTCOG eight-hour ozone nonattainment region includes Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise counties (TCEQ, 2018). The formation of ozone is directly related to emissions from motor vehicles and point sources (AIRNow, 2018). The primary pollutants from motor vehicles are VOCs, CO, and NO_x. VOCs and NO_x can combine under the right conditions in a series of photochemical reactions to form ozone. The Dallas-Fort Worth region is in attainment for CO, sulfur dioxide, nitrogen dioxide, and PM.

The TCEQ monitors airborne pollutants in the Dallas-Fort Worth region on a continuous basis. Ozone is monitored hourly. There are four active monitoring stations in the Study Area; however, only one of the four, the Dallas Hinton Street [CAMs] 60, monitors for ozone. The *Air Quality Existing Conditions Technical Memorandum* in **Appendix B.9** includes a table with the historical ozone trends. The Dallas Hinton Street CAMs 60 shows a trend of decreasing monitored ozone concentrations since 2005. However, the three-year average of the annual four highest daily maximum eight-hour ozone concentrations in the period between 2015 and 2018 continued to be above the ozone NAAQS at the monitoring location.

Conformity

As mentioned above, the Study Area is located within a marginal non-attainment area for eight-hour ozone (2015 Standard). Therefore, the transportation air quality conformity rule does apply. Transportation conformity ensures that federal funding and approval goes to projects which are consistent with the region's air quality goals. Under Section 176(c) of the CAA [42 USC Section 7670(c)], federal agencies such as the Federal Transit Administration (FTA) and Federal Highway Administration (FHWA) are prohibited from engaging in, supporting in any way, providing financial assistance for, licensing or permitting, or approving any activity that does not conform to an approved State Implementation Plan (SIP). Because this Project is located in a nonattainment area, the federal implementing agency would be responsible for ensuring that projects conform to the SIP. A conforming project is one that conforms to the SIP objectives of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of those standards.

Under Section 176(c) of the CAAA of 1990, Metropolitan Planning Organizations (MPOs) must conduct an air quality conformity analysis to ensure Metropolitan Transportation Plans (MTP) and Transportation Improvement Programs (TIP) are consistent with the region's air quality goals, (NCTCOG, 2018b). The EPA reviewed submitted conformity determination documentation from the NCTCOG, and as of November 16, 2018, the EPA supported the conformity finding for the DFW area, and the FHWA/FTA confirmed the regional 2045 MTP and 2019-2022 TIP meet the requirements for a conformity determination on November 21, 2018. If a project is included in the emissions analysis of the MTP or TIP, and the plan or program has been approved as conforming to the SIP, then the project is presumed to conform.

On June 14, 2018, the Regional Transportation Council of NCTCOG adopted *Mobility 2045: The Metropolitan Transportation Plan for North Central Texas* (NCTCOG, 2018a). The Project is included as a recommended transit project in Mobility 2045 and is part of the 2018 Transportation



Conformity (NCTCOG, 2018b). Mobility 2045 is intended to meet the transportation air quality conformity requirements of the CAAA, the air quality plan, the transportation conformity rule, and the transportation conformity-related provisions contained in the United States Code, Title 42 §7506.

4.9.4 Impact Evaluation

No-Build Alternative

No new violations of the NAAQS and no adverse regional or local air quality impacts are expected. However, the No-Build Alternative maintains the status quo for automobile travel and would not enhance transit capacity or access, or support continued land use changes that create a more sustainable development pattern that is less dependent on automobile use.

Build Alternative

The Build Alternative was assessed at a regional level and a local level relative to potential air quality and emission impacts by assessing projected changes in vehicle travel.

Vehicle Technology

The Project would use the existing Light Rail Vehicle (LRV) fleet which is powered by overhead electrical wires. DART electric energy contracts use 30 percent renewable energy sources and this is expected to increase over time.

Project Conformity Assessment

Conformity determinations must demonstrate consistency between emissions expected from the implementation of transportation plans and programs and Motor Vehicle Emission Budgets (MVEBs) in the SIP. Conformity determinations in nonattainment areas must perform a MVEB test to demonstrate the estimated emissions are less than the MVEBs in the applicable SIP. First, the MPO makes their initial transportation conformity determination at the local level, and then the FHWA and FTA make a joint transportation conformity determination at the federal level. The local and federal conformity determinations were approved in November 2018 for Mobility 2045 and the 2019-2022 TIP. The Project is included in Mobility 2045 and the 2019-2022 TIP as an approved project.

Building the Project would most likely result in some trips getting diverted from the automobile mode to transit. This would result in a decrease of Vehicle Miles Traveled (VMT) across the region. For this analysis, three different geographic areas were chosen to illustrate the decrease of VMT. The Project will result in a decrease of VMT of 124,390 at the DFW region level, a decrease of 46,472 across the DART Service Area, and a decrease of 9,592 across the Downtown Dallas area. **Table 4-12** summarizes the VMT totals for the different geographies between the No-Build and D2 Build scenario.

Table 4-12 VMT for No-Build and Build Alternatives per Geographic Area

Geographic Area	No-Build VMT	Build D2 VMT	Reduction in VMT
DFW Region	340,462,593	340,338,202	124,390
DART Service Area	104,800,830	104,754,357	46,472
360	7,745,885	7,736,293	9,592

Source: GPC6; NCTCOG travel demand model PERF reports.

The City of Dallas Office of Environmental Quality and Sustainability has drafted a Comprehensive Environment & Climate Action Plan (CECAP). The goal of the CECAP is to create a comprehensive roadmap that outlines the specific activities that the city can undertake to reduce



greenhouse gas emissions and improve environmental quality in the city. The Project would help achieve the CECAP goal by reducing VMT in Dallas and the region.

4.9.5 Mitigation Measures

Based on this assessment, no new air quality violations of the NAAQS would be anticipated as a result of the Project; therefore, no mitigation measures would be required.

4.10 Public Safety and Security

4.10.1 Introduction and Regulatory Setting

This section provides an assessment of safety and security issues related to the operation of the 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.

The DART system is operated in compliance with all provisions of 49 CFR Part 659 Rail Fixed Guideway Systems; National Fire Protection Association (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 provide additional safety and security services in association with those provided by DART.

4.10.2 Methodology

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 to address transit safety and security.

The System Safety Program Plan presents DART's 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 provide on-vehicle surveillance, facility surveillance, sensors/alarms, incident response coordination, and command and control.

4.10.3 Affected Environment

DART maintains a police force and also employs fare enforcement officer. DART police have the same power as a municipal officer and focus on maintaining a safe and secure transit system. 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.

4.10.4 Impact Evaluation

No-Build Alternative

Under the No-Build Alternative, the Project would not be built and no impacts to safety or security in the area of the D2 alignment would occur. Public safety services would continue to be provided as they are today and as planned to keep up with growth.

Build Alternative

The construction and 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 that 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 under the proposed Build Alternative are described below. The potential safety and security impacts address considerations including:

- Police protection and community safety services;
- Fire protection and emergency services;
- Pedestrian and vehicle activity; and
- Station area activity.

Police Protection and Community Safety Services

The Build Alternative is not expected to cause any increased demand for municipal police protection or community services. Police protection will be required during construction and operation of the Project, but DART Police will take responsibility for those services. Both uniformed and undercover DART police will monitor the facilities and vehicles. Should it be necessary, DART police will partner with local police to apprehend any criminals. The presence of DART police and other personnel will help to maintain a secure environment and reduce opportunities for crime on vehicles and at stations. Each subway station would include a podium for concierge space for a safety officer. One police facility is located within the Study Area, the Dallas Police Department - Central Patrol Division - in Deep Ellum. This division has a CBD Unit responsible for patrol duties in downtown. No project related impacts are anticipated for this facility.

Fire Protection and Emergency Services

There are three fire stations located within the Study Area: Dallas Fire Station #18 on North Griffin Street, Dallas Fire Station #4 on Akard near I-30, and Dallas Fire Station #3 in the Baylor District. With any new project or development, there may be a need for fire protection services should a fire occur on vehicles or at a facility. As the potential for fire is low, it is not anticipated that the Build Alternative would necessitate the hiring of additional fire protection personnel in any of the affected communities. The tunnel and subway stations would contain occupant protection systems and emergency egress routes. The fire sprinkler system will be a dry pipe type system and will follow NFPA 130.



There is one medical facility in the Study Area: the Baylor University Medical Center. The Project and its operations are not expected to necessitate the need for additional emergency medical services in the area.

Pedestrian and Vehicle Activity

Passenger rail service under the Build Alternative could increase the potential for multi-modal traffic and the potential for conflicts with automobiles and pedestrians in and around the at-grade crossings along the corridor from Victory Station to the west portal just south of Woodall Rodgers and from the east portal east of I-345 to the Live Oak Station and in the Swiss Avenue/ Good Latimer area. These conflicts may be higher during peak event times for venues in Victory Park or during high visitor periods at the Perot Museum. Pedestrian activity is also increasing in the Deep Ellum area with new mixed-use developments. Increased potential for conflicts could also be located around the headhouse and pedestrian access portals for the underground stations due to pedestrians using informal crossings as short cuts to access facilities. The majority of the alignment would be subsurface and avoid pedestrian or automobile conflicts. Pedestrian incidents are expected to be minimal under the Build Alternative as urban design plans incorporate enhanced pedestrian connectivity to direct people to safe crossings.

Station Area Activity

As part of the Build Alternative, three underground and two at-grade stations would be constructed. Passenger rail service under the Build Alternative would increase the potential for conflicts between rail vehicles, automobiles, bicycles, passengers, and pedestrians in and around the at-grade Museum Way and Live Oak station areas and the headhouse and pedestrian portals for the underground stations. The potential for crime would also exist due to the regular gathering of waiting passengers at predictable times in and around all stations. DART incorporates a number of safety considerations into the design of LRT stations and has policies and practices in place to prohibit and deter criminal activities.

4.10.5 Mitigation Measures

Several mitigation measures can be implemented to enhance safety and security. Many of these measures will be implemented corridor wide, and some are specific to certain areas where specific concerns or issues exist. Mitigation is consistent with those in DART's *Environmental Impact Assessment and Mitigation Guidelines for Transit Projects* (available at DART.org/D2).

Police Protection and Community Safety

Police coverage will be provided by DART Police. A safety officer podium would be included in each subway station design to monitor activities. Subway stations are proposed to include fare control barriers to further enhance security. The officers operate on regular schedules and patrol the trains along with fare enforcement staff, providing support to the conductors as well as a visible deterrent to crime. During construction and before service start-up, DART will host sessions with police, fire, schools, emergency response teams, employers, and other interested parties to discuss rail operations, potential safety or security issues, and agency or public responsibilities.

Fire Protection and Emergency Medical Services

Vehicles and facilities will be constructed with fire resistant materials. Vehicles will be equipped with on board fire protection systems and have exterior emergency door releases. The tunnel and subway stations will contain occupant protection systems and emergency egress routes. Alternate routes for fire and emergency service vehicles operating near at-grade crossings would be evaluated as part of the final design phase of the Project through the Fire/Life Safety Committee. This committee was established in 1992 and provides a forum for regular communication and



action plans with emergency service providers. Furthermore, final design of the Project will be done in accordance with NFPA-130 (Standard for Fixed Guideway Transit and Passenger Railway Systems), as well as the applicable Dallas fire and building codes.

Pedestrian and Vehicle Activity

All federal, state, and municipal laws regulating safety, design and operating procedures will be followed for the project. General and specific mitigation measures are outlined below.

During final design, DART would coordinate with the city, venue manager, and adjacent property owners to determine needs for enhanced pedestrian crossing features such as additional signage, tactile strips, safety lights, or pedestrian crossing gates to address localized concerns. Specific areas where enhanced features may be needed are at new signalized LRT crossings at Houston Street and Victory Avenue given heavy pedestrian activity during concerts and games. Enhanced pedestrian connections would be made parallel to the tracks to create a comfortable and safe connection from Victory Park to the Museum Way Station, and further south under Woodall Rodgers Freeway toward the Metro Center Station. DART will also coordinate with local schools and interested parties to provide outreach events through the Transit Education Program to educate children, residents, businesses, and others about the Project and best safety practices.

Station access and traffic considerations are described in **Chapter 3**. Generally, public crossing approaches would be protected with warning signs, lights, bells, and gates to warn drivers, pedestrians, and cyclists of an approaching train. Within downtown, traffic signals rather than gates would be used where appropriate. During the approach of any rail vehicle, the gates will lower, and automobile traffic would be stopped until the rail vehicles have cleared the intersection. Adjacent traffic signals and at-grade crossings would be coordinated to improve traffic flow and clear intersections prior to train arrival. Signal timing, signal phasing, turns, and other operations would be coordinated with the city. Specific standard safety features for the at-grade crossings are further detailed in **Section 3.3**.

DART and the City of Dallas have implemented partial transit signal priority for the existing downtown Bryan/Pacific transitway mall. The proposed approach in the at-grade segments in Victory Park and near Swiss/Good Latimer would be for full transit priority.

To mitigate potential on board vehicle accidents, safety features on rail vehicles will include emergency manual door releases, a public address system inside and outside the car, an automatic feature that stops the train if operators release the control lever, safety mirrors, sight and sound warning systems, impact resistant windows and windshields, “sensitive edges” on passenger doors to detect possible obstructions, and two brake systems per rail car— dynamic brakes and disc brakes.

Station Area Activity

Crime Prevention through Environmental Design (CPTED) principles would be followed to enhance safety and security at stations. This includes design elements, adequate lighting, clear pedestrian access points at dedicated crossings, and good visibility and sight lines. In addition, station cameras will be located on platforms and monitored 24 hours per day. Stations will be regularly patrolled by police as well to deter crime. DART police podiums would be located in each of the subway stations.

In order to further enhance pedestrian movements in the station area, DART would include measures such as limiting pedestrian access across the tracks to dedicated track crossings, providing adequate lighting, and maintaining good visibility and sight lines through the station areas. Station access and the relationship with pedestrian access points to subway stations is further discussed in **Section 3.2**.



Access and Emergency Services

Stations will be designed to ensure emergency services can respond to any incidents as quickly as possible and also so DART can maintain air quality and ensure adequate emergency exits.

- Security cameras will allow DART Police officers to easily monitor train and station activity and quickly respond to any incidents.
- Stations will incorporate fare control barriers to ensure that only DART customers can enter the station platform areas and may include doors that lock during non-service areas.
- Platforms will have emergency assistance systems to ensure a fast response and passenger safety in an emergency situation.
- The DART Say Something Safety and Security App offers riders a quick and discreet method for reporting concerns directly to DART Police. App users can send photos, six second videos, text descriptions, and locations of suspicious people or activities
- Stations will also have an effective ventilation system to maintain good air quality in the station, as well as to filter and remove any unhealthy air conditions associated with emergency situations, like a fire.
- Stations will include emergency exits in addition to those used for daily access, to ensure that customers can exit stations within specific time frames in case of an emergency.

Platform Edge Doors

DART is considering use of platform edge doors in the subway stations. Platform edge doors are an automatically controlled barrier to the tracks, which only allows passengers access when a train arrives and stops at a station. These barriers can improve station security by restricting access to the tracks and tunnels, and enhance passenger safety by preventing accidental falls off the platform onto the lower track area. Platform edge doors prevent litter build up on the track as well as improve the sound quality of platform announcements.

Signage and Lighting

Stations would have intuitive signage throughout, to make it easy for passengers to access their train, but also connect from stations to local attractions and destinations. Pedestrian-scale lighting, typically including lamps less than 25 feet high, to increase comfort and safety around stops would be used. People's ease of getting around would be further enhanced by effective lighting design, which would keep the platform open, visible, and well-lit, and would support security and surveillance technology.

Railings

Railings would be installed along platforms adjacent to the through lane to control pedestrian access and discourage dangerous crossings. Pedestrian movements would be channelized to platform entrances with enhanced crossing treatments.

4.11 Environmental Justice

4.11.1 Introduction and Regulatory Setting

This section assesses the potential impacts to minority and low-income populations within the Study Area. The purpose is to ensure that these populations do not incur disproportionately high or adverse impacts as a result of the proposed project. Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice (EJ) in Minority Populations and Low-Income Populations" was signed in February 1994. It 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 of EO 12898 are as follows:



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

DART policies also require that the potential impacts of any proposed project (whether federally or locally funded) be assessed, and if adverse effects are found, that these impacts be avoided, or minimized and mitigated. As described in DART's *Environmental Impact Assessment and Mitigation Guidelines for Transit Projects*, DART's three main objectives regarding a proposed transit project's impact on the human environment, particularly on community character and cohesion, are as follows:

- contribute to community cohesion
- contribute to the local economy, where possible, and avoid negative economic impacts
- provide for an equitable distribution of costs and benefits and ensure that the project does not have a disproportionately high and adverse impact on low-income or minority populations

United States Department of Transportation (USDOT) Order 5610.2(a), *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, originally published in 1997 and updated in 2012, describes the process for incorporating EJ principles into all existing DOT programs, policies, and activities. The USDOT order defines "minority" as a person who is Black; American Indian and Alaskan Native; Asian; Native Hawaiian and other Pacific Islander; or of Hispanic origin. An individual is considered to be "low-income" by the USDOT if the individual's median household income is at or below the Department of Health and Human Services (DHHS) poverty guidelines.

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

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

Executive Order 13166, *Improving Access to Services for Persons with Limited English Proficiency*, outlines guidance for ensuring that non-English speakers do not experience discrimination on the basis of national origin in their ability to access federally funded programs.

Executive Order 13045, *Protection of Children from Environmental Health and Safety Risks*, mandates that federal agencies identify and assess environmental safety risks that may disproportionately affect children as a result of implementation of federal policies, programs, activities, and standards.

4.11.2 Methodology

The primary source of data for EJ populations is the US Census Bureau (USCB). For the proposed project, the 2012–2016 American Community Survey (ACS) was utilized as the main source of data. The ACS is a data set developed by the USCB in 1-year, 3-year, and 5-year increments. It



involves an annual survey of randomly-selected individuals on subjects that are not included in the short form of the decennial census, such as household income. The USCB then develops estimates for 1-year, 3-year, and 5-year periods. ACS estimates are not available at the census block level; therefore, the 2010 Decennial Census was used for block level data for race and ethnicity. Baseline comparison data is also gathered for the city and county limits within the Study Area. Demographic data included total population, total households, and population percentages by age, gender, disability status, income, English language proficiency, vehicle access, race, and ethnicity. In addition, employment and economic development characteristics were evaluated using several sources including the U.S. Bureau of Economic Analysis, the North Central Texas Council of Governments (NCTCOG) Regional Data Center, and the Bureau of Labor Statistics data.

4.11.3 Affected Environment

Environmental justice refers to identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects caused by the Project on minority populations and/or low-income populations (collectively “EJ populations”). Environmental justice is a key element of the NEPA process and requires a holistic approach to its assessment. The two terms “minority” and “low-income” should not be presumptively combined. In an EJ assessment, impacts across all resource areas are examined to determine how those impacts would affect EJ populations relative to non-EJ populations. While a true “existing condition” does not exist for environmental justice, the demographics of the county of the existing project Study Area are the basis for a determination of whether EJ populations exist within the Study Area boundaries. An overview of the EJ population and the existing demographics of the Study Area that will be used in the EJ impacts assessment for the D2 Subway is provided below. The *Socioeconomics Technical Memorandum* provides additional information on the EJ population and is provided in **Appendix B.2**.

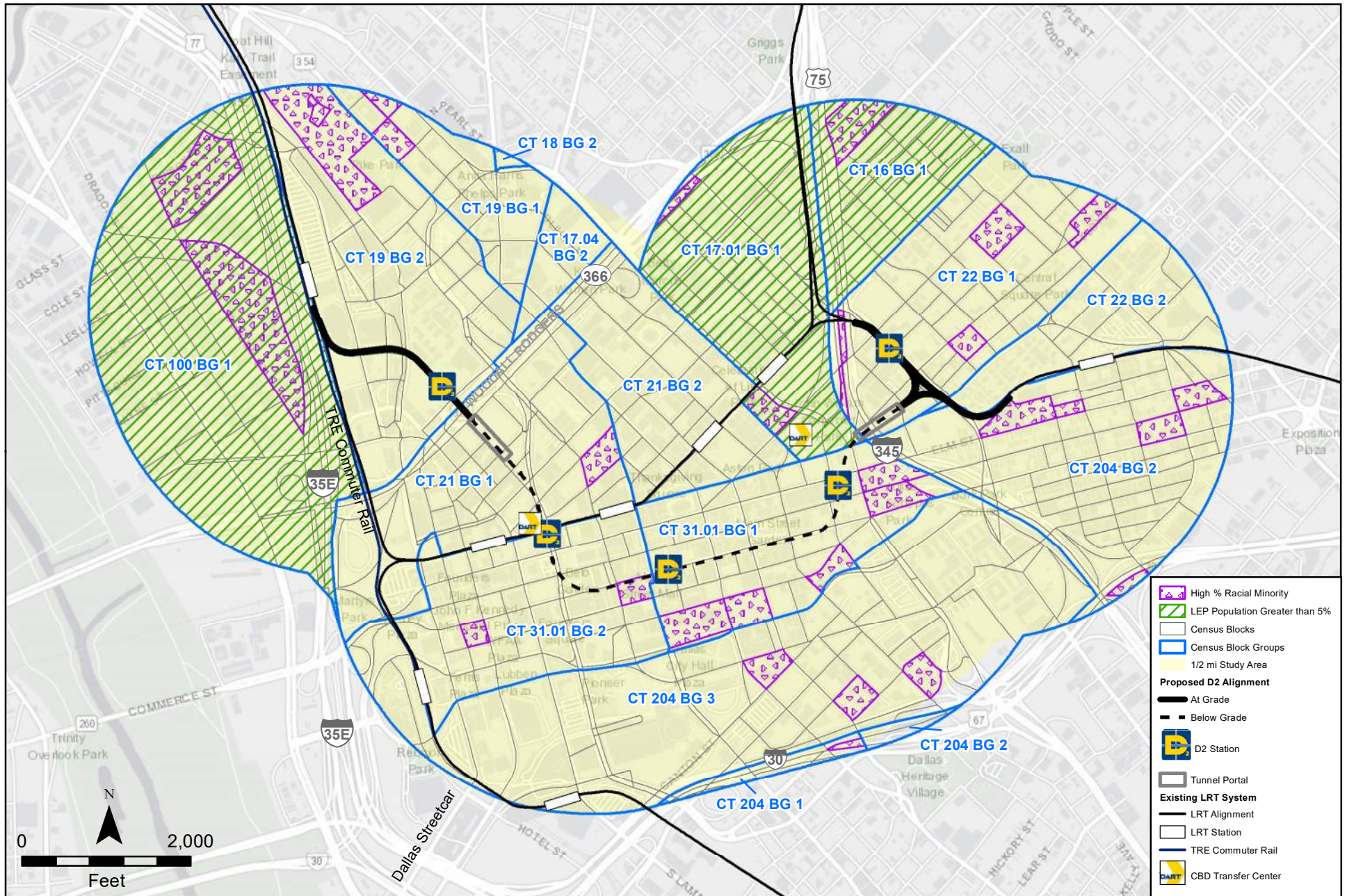
Minority Populations

Minority population data is displayed by census tract (CT) and block and illustrated on **Figure 4-19**. The 2010 Census is the most recent date where race and ethnicity data are available at the census block level which is also referenced as block level. EJ data could be outdated due to the rapid pace of development within the CBD.

Race and ethnicity are used as indicators that provide an assessment of the proportions of racial and ethnic minorities in the populations of each block in the Study Area. Baseline county and city data was referenced to determine if a block has a significant racial minority or Hispanic population. A block is considered to have a predominantly minority population if the population is greater than twice the county average or if it is equal to or greater than 50 percent of the total population, whichever is least. For the analysis, a block has a predominantly minority population if it is equal to or greater than 50 percent of the total population, because the county percent minority is 69 percent total (or overall). The data shows that 129 of the 735 blocks within the Study Area have a reported population. Of the 129 blocks, 33 blocks are identified with a predominantly minority population (consisting of 50 percent or more of the total population) scattered throughout the Study Area. **Figure 4-19** shows these blocks and that they are not concentrated in any specific portion of the Study Area or proposed station area. The Study Area has a minority population that is approximately 39 percent of the total population.

Low-Income Populations

Low-income populations, as defined by the USDOT, consist of households with a median annual income that falls below the DHHS poverty guidelines, an estimate of the federal poverty threshold. The DHHS poverty guidelines, updated periodically in the *Federal Register* by the DHHS under



**Figure 4-19
Environmental Justice**

Data Source: DART, GPC6, 2018; U.S. Census Bureau
2012-2016 American Community Survey and 2010 Census





the authority of 42 USC 9902(2), provide a rough estimate of the federal poverty threshold that is reported by the USCB. For a family of four, the 2018 DHHS poverty guideline is \$25,100. The median household income values for the block groups (BGs) within the Study Area range from \$36,111 to \$121,000. There are no census BGs where the median household income falls below the 2018 DHHS poverty guideline of \$25,100.

Median Household Income and Vehicle Availability

Median household income data provides a sense of the economic character of an area. The term “median” refers to the number at which half the data points fall below the number and half the data points fall above it. The median household income for the Study Area was determined using the USCB 2012-2016 ACS 5-Year Estimates at the census BG level. In addition, the number of vehicles available at a household can also be an indicator of potential ridership for transit services. Vehicle availability identifies the number of vehicles available at a household. For the purposes of this analysis, the data provided is for households with no vehicles available, which would be potential transit riders. **Table 4-13** reports the income, median household income, and percentage of households without a vehicle available for the 16 census BGs within the Study Area.

Table 4-13 Low-Income Characteristics for the Population within the Study Area

Geographic Unit	Total Number of Households	Median Household Income	No Vehicle Available (%)
City of Dallas	487,855	\$45,215	9.8
Dallas County	894,542	\$51,411	7.2
CT 16, BG 1	1,517	\$94,075	3.6
CT 17.01, BG 1	284	\$102,321	9.5
CT 17.04, BG 2	260	\$101,333	0.0
CT 18, BG 2	2,129	\$86,486	0.8
CT 19, BG 1	1,664	\$121,000	0.0
CT 19, BG 2	1,649	\$100,532	1.8
CT 21, BG 1	544	\$36,111	41.2
CT 21, BG 2	610	\$87,679	4.6
CT 22, BG 1	1,026	\$42,401	20.2
CT 22, BG 2	303	\$62,138	2.3
CT 31.01, BG 1	1,228	\$54,648	11.3
CT 31.01, BG 2	1,026	\$102,500	5.3
CT 100, BG 1	1,362	\$80,610	0.6
CT 204, BG 1	532	\$57,287	0.0
CT 204, BG 2	827	\$52,327	2.3
CT 204, BG 3	1,355	\$78,583	1.7
Total Study Area	16,316	\$83,548	5.1

Source: USCB, 2012-2016 ACS 5-Year Estimates –Tables B19001, B19013 and B25044.

Limited English Proficiency Population

While the purpose of including limited English proficiency (LEP) populations is not to identify EJ populations, it has been included to inform any future public engagement campaigns to help ensure non-English-speaking populations are engaged in the process in accordance with EO 13166. LEP individuals have a native language other than English and have identified themselves as being able to speak English less than “very well.” This means that the individuals cited in the table below consider themselves to speak English “well,” “not well” or “not at all.” If substantial LEP populations are found within the Study Area, it would be necessary to provide written



materials in the predominant language(s) of the LEP individuals and advertise the availability of a translator in the language(s) upon request.

Table 4-14 identifies the LEP populations within the Study Area. No BGs had a percentage of LEP individuals that was twice the county percentage of approximately 21 percent. Out of the 16 census BGs within the Study Area, only three BGs (CT 16, BG 1; CT 17.041, BG 1; and CT 100, BG 1) had more than 5 percent LEP populations. Although these percentages for the BGs in the Study Area are lower than the City of Dallas and Dallas County percentages, LEP populations account for approximately 3 percent of the population, and individuals who speak a language other than English at home account for approximately 18 percent of the total population in the Study Area. The three census BGs with more than 5 percent LEP populations are shown on **Figure 4-19**.

Table 4-14 LEP Population Data for the Study Area

Geographic Unit	Total Population 5 Years and Older	Speaks a Language Other than English at Home (%)	Speaks English Less Than “Very Well”	Percent LEP Population (%)
City of Dallas	1,176,196	43.0	264,450	22.5
Dallas County	2,318,428	42.1	482,380	20.8
CT 16, BG 1	2,500	15.4	131	5.2
CT 17.01, BG 1	472	14.2	24	5.1
CT 17.04, BG 2	373	17.2	0	0.0
CT 18, BG 2	3,256	20.5	97	3.0
CT 19, BG 1	2,515	8.8	0	0.0
CT 19, BG 2	2,813	17.6	52	1.8
CT 21, BG 1	828	10.9	20	2.4
CT 21, BG 2	905	22.0	43	4.8
CT 22, BG 1	1,837	15.2	52	2.8
CT 22, BG 2	473	14.6	15	3.2
CT 31.01, BG 1	1,790	15.6	66	3.7
CT 31.01, BG 2	1,505	16.9	42	2.8
CT 100, BG 1	8,482	23.5	524	6.2
CT 204, BG 1	1,378	29.4	18	1.3
CT 204, BG 2	2,270	17.5	89	3.9
CT 204, BG 3	2,798	8.1	32	1.1
Total Study Area	34,195	17.8	1,205	3.5

Source: USCB, 2012-2016 ACS 5-Year Estimates – Table B16004.

Note: The languages spoken by the LEP population are as follows: 2.7% Spanish, 0.4% other Indo-European languages, 0.4% Asian or Pacific Island languages, 0.4% other languages.

4.11.4 Impact Evaluation

Public Participation

DART conducted public outreach during initial AA/DEIS effort, and continued outreach during planning for the project until the DART Board and City Council approved the subway alignment in September 2017. In June 2018, DART relaunched the public process for the PE/SDEIS phase of the approved Project. A series of three public meetings were held in September 2018, April 2019



and November 2019. A summary of the public and focus area meetings is provided in **Chapter 6**. As DART sought meaningful public input specific to EJ communities, a special effort was made to involve these communities. EJ involvement efforts included bilingual advertisements and publications. The following specific notifications were issued for the Project for each of the public community meetings:

- 30,000 brochures were printed and distributed system wide on DART Rail, TRE, and all Bus Routes connecting in Downtown Dallas;
- Bilingual meeting brochures were placed on all DART vehicles including bus routes, LRT, and TRE;
- Newspaper ads were placed in the following publications:
 - Dallas Morning News
 - Dallas City Greensheet
 - Al Dia (Spanish)
 - Dallas Weekly (African American)
 - Dallas Chinese News (Asian)
 - Dallas Voice (LGBTQ)
- Alerts to 7,790 Email/Text Subscribers
- Alerts to 3,350 D2 Email/Text Subscribers;
- Posted on DART.org, Twitter, and Facebook page;
- Email to all media outlets and to focus area stakeholders, all previous meeting attendees and any other appropriate contacts;
- Email to Chamber of Commerce including the Hispanic, African American, and Asian Chambers; and
- Email to DART's congressional delegation, council members, mayors, city managers, and appropriate city staff.

In general, EJ community input and concerns with the Project mirrored those expressed by the community as a whole. These were primarily associated with residential properties near the Victory area on the western side and the Deep Ellum area on the eastern side of the Study Area; and traffic impacts during construction.

Demographic Analysis

Adverse impacts were examined for the census blocks within 0.25 mile of the proposed Build Alternative identified as having high concentrations of minority and/or low-income populations in the 2010 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.

Minority Populations

The minority population data for the Study Area is included in the **Appendix B.2, Socioeconomic Existing Conditions Technical Memorandum**. Of the 129 census blocks reporting a population, 33 census blocks are identified with a predominantly minority population (consisting of 50 percent or more of the total population). Of these 33 census blocks, eight census blocks are within 500 feet of the proposed alignment. **Figure 4-19** shows these blocks which are in the Design, the Main Street, and Deep Ellum Districts. These predominantly minority census blocks are not concentrated in any specific portion of the Study Area or proposed station. No displacements, no impacts to community facilities and no noise impacts are anticipated by the Project within the census block (CT 100, Block 1163) in the Design District. Potential property and noise impacts are anticipated by the Project within the census block (CT 31.01, Block 2031) in the Main Street



District because it is located along the proposed alignment. Although this census block is in the subway section of the proposed alignment, the potential noise impact at locations above the subway portions of the alignment would be due to fan noise and train noise transmitted to the surface through ventilation shafts and gratings. As discussed in **Section 4.8.4**, noise from these sources is not anticipated to be more than ambient conditions but would be evaluated during project design when detailed information becomes available, and mitigation measures, such as acoustical louvers, would then be developed as appropriate.

The other three census blocks located within the Main Street District would not be impacted by the proposed Project. No displacements, no impacts to community facilities, and no noise impacts are anticipated by the proposed Project within these three census blocks. The one final census block (CT 204, Block 2015) is within the Deep Ellum District. Although this census block is adjacent to the proposed alignment, there is an existing rail line which the proposed project would not affect; therefore, no impacts are anticipated in this census block. The potential displacements would occur in non-EJ population census areas. Based on this information, disproportionately high and adverse effects to minority populations would not result from the proposed Project.

Low-Income Populations

No low-income census block groups were identified in the *Socioeconomic Existing Conditions Technical Memorandum* (See **Appendix B.2**). Since the time of that memorandum, updated census data have become available; however, the latest data also show that the census block groups do not have median household incomes below the 2019 DHHS poverty guideline of \$25,750 for a family of four. Based on this information, disproportionately high and adverse effects to low-income populations would not result from the proposed Project.

Limited English Proficiency Population

Three census block groups with LEP populations were identified within 500 feet of the proposed alignment. Reasonable steps have been and would continue to be taken to ensure LEP persons have meaningful access to the programs, services, and information associated with the proposed Project. Persons who require special communication or language needs will be accommodated in compliance with EO 13166. Translation and language assistance services and publication of notices in English and Spanish will be included as part of the public involvement activities for the proposed Project.

There were no disproportionately high and adverse effects on minority and low-income populations identified in any of the 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. 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 and the region.

4.11.5 Mitigation Measures

The Project is not expected to cause disproportionately high and adverse human health or environmental effects on minority populations and/or low-income populations. Impacts are not disproportionate compared to non-EJ areas: minimal visual impacts and noise and vibration impacts are anticipated to occur along the alignment both inside and outside of EJ population areas.

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.



4.12 Soils and Geology

4.12.1 Introduction and Regulatory Setting

The Farmland Protection Policy Act (FPPA), as detailed in Subtitle I of Title XV of the Agricultural and Food Act of 1981, provides protection to the following: 1) prime farmland; 2) unique farmland; and 3) farmland of local or statewide importance. Farmland of local or statewide importance is determined by the appropriate state or local government agency or agencies.

4.12.2 Methodology

Existing literature and maps in addition to Geographic Information Systems (GIS) resources were used to evaluate the geology and soils of the Study Area. Non-digital maps examined included the Geologic Atlas of Texas Dallas Sheet (UT-GEB, 1987), and the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Soil Survey for Dallas County (NRCS, 1980).

Preliminary ground characterization and site geotechnical conditions have been completed for the design. The technical memorandums and reports present the geologic setting, preliminary geotechnical ground characterization, geotechnical parameters for design, and supporting information for the underground portions of the proposed Project can be found in the *Methods of Construction Report* in **Appendix A.4**.

4.12.3 Affected Environment

Geology

Dallas is located in the Blackland Prairies physiographic region of Texas (BEG, 1996). The Blackland Prairies, a subprovince of the Gulf Coastal Plains, consists of rolling terrain with beds tilted toward the south and east. Underlying bedrock types include chalks and marls; these weather to deep, black, fertile clay soils which characterize this region. The *Geology and Soils Existing Conditions Technical Memorandum* can be found in **Appendix B.7**.

The Study Area is located in an area underlain by Terrace deposits over the Austin Chalk Limestone and Eagle Ford formation. Fluvial Terrace is Quaternary Age deposits consisting of gravel, sand, silt and clay. The Austin Chalk formation typically consists of limestone with interbedded layers of clay. The underlying Eagle Ford Formation typically consists of shale strata. Soils derived from the Austin Chalk and Eagle Ford formations are typically plastic clays exhibiting a moderate to high shrink/swell potential with variations in moisture content

Soils

Two different soil map units are found within the Study Area in addition to Urban Land Complex. Descriptions of each soil map unit are included below (NRCS, 2020).

- Houston Black-Urban land complex, 0 to 4 percent slopes – In Dallas County, this complex is made up of approximately 40 percent Houston Black soil, 35 percent urban land, and 25 percent minor soils. This soil is not classified as prime farmland (NRCS, 1980, NRCS, 2018).
- Trinity-Urban land complex – This complex is made up of deep, nearly level, somewhat poorly drained soils and areas of urban land on floodplains. It is comprised of approximately 60 percent Trinity soil, 20 percent urban land, and 20 percent minor soil. This soil is found in Dallas County and is not classified as prime farmland (NRCS, 1980; NRCS, 2018).

Table 4-15 lists individual soil types, including shrink-swell potential, risk of erosion, risk of corrosion, and constraints related to construction/excavation. Detailed geotechnical borings



would be completed prior to the final design stage in order to identify and avoid any potential structural stability issues.

Table 4-15 Soil Characteristics Related to Construction

General Soil Type	Shrink-Swell Potential	Risk of Erosion	Risk of Corrosion		Construction/Excavation constraints
			Uncoated Steel	Concrete	
Houston Black	Very high	Slight-moderate	High	Low	Shrink-swell, low strength, corrosively, cut banks cave, very plastic material
Trinity	Very high	Slight	High	Low	Low strength, wetness, floods, shrink-swell, cutbanks cave, corrosively

Source: NRCS, 1980.

Urban Land consists of soils that have been altered or modified during development. The Study Area is extensively build up with the majority of land covered by buildings or pavement. The capability of the soil would be evaluated during the final design of the Project.

4.12.4 Impact Evaluation

No-Build Alternative

Under the No-Build Alternative, the Project would not be built and would not have any impacts to soils and geology due to construction or excavation.

Build Alternative

The Study Area is primarily committed to urban use and does not contain any soil types that are designated as prime farmland soils. Thus, no FPPA-regulated farmlands would be impacted by the Build Alternative and NRCS, FPAA coordination would not be required for project development within the Study Area.

Potential soil erosion and sedimentation during construction would be addressed in a Stormwater Pollution Prevention Plan (SWPPP), to be prepared prior to beginning construction activities. The SWPPP will detail best management practices (BMPs) which should be incorporated into the project design related to erosion control, sedimentation control, and post-construction total suspended solids (TSS) removal. Soils, where present along the rail alignment and at station locations, have the potential to cause differential movements and loss in foundation integrity. The differential soil movements could impact vertical alignment of track and track support and cause differential movements of station foundations and platform slabs. There are no anticipated long-term impacts to the soils from the proposed Build Alternative. Direct impacts to soil could include removal of vegetation, exposure of the soil, mixing soil, or loss of topsoil, and short-term increased susceptibility to wind and water erosion due construction.

Tunneling for the proposed Project would result in boring and removal of some of the bedrock units. A variety of technical analyses were completed in support of the 20 percent design as described in the *Preliminary Engineering Design Report* (see **Appendix A.3**).

The proposed Project would not affect regional geology and impacts would be limited to those directly attributed to tunnel and subway construction.

4.12.5 Mitigation Measures

The Project would include the construction of a tunnel, and three new subgrade stations, as well as areas of tunnel portals. Existing utilities along the alignment have been reviewed, and potential conflicts have been identified in the cut and cover, portal, and underground station areas. All



subgrade utilities and infrastructure will be delineated prior to construction. This will be done by placing a request two days prior to construction activities with the local One Call Center, <http://www.texas811.org/>. Adverse impacts to urban soils and geology in the Study Area are not expected, and project impacts, including soil excavation, tunneling, and earthmoving would be mitigated by following BMPs that will be detailed in the SWPPP.

The effect of restrictive soils will be mitigated by strengthening the track and station subgrade soils. Mitigation for the track will include chemical stabilization of active clays to improve the track subgrade where necessary or the use of synthetic geogrid reinforcement. For station structures, the effect of these soils will be mitigated by either conditioning the on-site soils or replacing the soils with non-expansive soils to limit soil movements to acceptable levels. The potential for station foundation movements will be mitigated by placing the foundations below the active soil depth with the addition of potential foundation anchors.

Increased runoff and erosion will be reduced with the establishment of protective vegetation and the use of BMPs. These can include silt fences, straw bale dikes, diversion ditches, rip-rap channels, water bars, and water spreaders. Existing vegetation will be preserved to the greatest extent possible to protect soils.

Design analyses for proposed foundations, retaining walls, and support of excavations will be performed after finalized site-specific geotechnical data and as-built foundation records are available. Analyses will include tunneling-induced settlement estimates for existing foundations systems and global stability of walls.

4.13 Water Resources

4.13.1 Introduction and Regulatory Setting

This section describes several hydrologic and water quality issues that must be addressed prior to construction. These issues include surface water quality impacts, impacts to groundwater resources, and floodplain impacts. The following sections provide information related to minimizing impacts to these resources.

Surface waters, impoundments, floodplains, and other waters of the U.S. are regulated under Section 404 of the Clean Water Act (CWA), and enforced by the U.S. Army Corps of Engineers (USACE). Additionally, Federal Emergency Management Agency (FEMA) has regulations governing alterations or development within floodplains. Under FEMA regulations, no alterations of flood zones can result in an increase in the 100-year base flood elevation or cause an increase in the velocity of floodwaters.

4.13.2 Methodology

As described in the *Water Resources Existing Conditions Technical Report (Appendix B.8)*, desktop resources were reviewed and a field observation was completed to document the water resources within the Study Area.

4.13.3 Affected Environment

This section describes the existing conditions with respect to surface water and groundwater resources in the Study Area. More information about each of these resources can be found in the *Water Resources Existing Conditions Technical Report*.

Waters of the U.S., Including Wetlands

The presence of waters of the U.S., including wetlands, was evaluated using the online U.S. Geological Survey (USGS) topographic server (2018) and the online U.S. Fish and Wildlife



Service (USFWS) National Wetland Inventory (NWI) mapper (2018). Data obtained from the National Hydrography Dataset (NHD), NWI, and USGS topographic server show no waters of the U.S., including wetlands within the Study Area. On-site field observations, in August 2018, confirmed that no potential waters of the U.S. including wetlands were present within the Study Area (see Figure 1 in *Water Resources Existing Conditions Technical Report*).

Surface Water Quality

The Study Area is located within the Trinity River basin, within the watershed of Segment 0805-Upper Trinity River. Defined uses of Segments 0805 include aquatic life use, recreation use, general use, and fish consumption use. According to the 2016 Texas Integrated Report of Surface Water Quality, segment 0805-Upper Trinity River is listed as impaired for dioxin in edible tissue and PCBs in edible tissue (TCEQ, 2017).

Groundwater

The Study Area is located over the downdip portion of the Trinity Aquifer and the Woodbine Aquifer (TWDB, 2014). The Trinity Aquifer is a major aquifer extending across much of the central and northeastern part of the state. The Woodbine Aquifer is a minor aquifer located in northeast Texas and overlies the Trinity Aquifer.

The downdip portion of the Trinity Aquifer is involved in subsurface water storage (as opposed to surface water recharge). Water quality within the southern portion of the aquifer is generally better than in the northern portion, which is highly mineralized. The source aquifer for the Study Area is the downdip portion of the Woodbine Aquifer. Only the lower two zones of this aquifer are developed to supply water for domestic and municipal uses. The main use of groundwater in the Study Area is municipal use (George, P. et al, 2011). According to the Texas Water Development Board's (TWDB) water well database, there are 19 water well records within the Study Area and 8 wells within 200 feet of the proposed alignment (TWDB, 2013). Water pressure within the aquifer shows declines around major cities as a result of heavy use. Some of the state's largest water level declines, ranging from 350 to more than 1,000 feet, have occurred in counties along the I-35 corridor from McLennan County to Grayson County (TWDB, 2017). As a result of intense groundwater extraction and depletion over time, 18 counties in this region, including Tarrant, Collin, and Dallas counties, have been included in the list of Priority Groundwater Management Areas of the state by the TCEQ (TCEQ, 2013).

Floodplains

FEMA floodplain maps were consulted for the Study Area (Map ID 48113C0345J). According to the FEMA floodplain map, the Study Area lies entirely within Zone X, areas defined as having minimal flood hazard.

4.13.4 Impact Evaluation—Wetlands Resources

No-Build Alternative

The No-Build Alternative would not impact any wetlands or other potentially jurisdictional waters of the U.S. because this alternative would not have any ground disturbance. Furthermore, no waters of the U.S. are present in the Study Area.

Build Alternative

No waters of the U.S., including wetlands, exist within the Study Area. There would be no impacts by the proposed project upon waters of the U.S. or wetlands, and no mitigation measures would be necessary.



4.13.5 Impact Evaluation—Surface Water Quality

No-Build Alternative

Under a No-Build Alternative, no construction would occur; and therefore, no surface water quality impacts would occur.

Build Alternative

The Build Alternative would not result in any direct impact to surface waters, other than the contributing watershed of receiving sewer facilities and no direct impacts to waters of the U.S. would occur. The D2 Study Area represents a previously developed, heavily urbanized area within the city of Dallas. Any new fill associated with the Build Alternative would ultimately occur in areas that are currently paved, or otherwise impervious surfaces. More specifically, the Build Alternative 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 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 tunnel. Water entering the tunnels originates from existing surface runoff and percolation and would not be 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 gallons per minute (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 Alternative, including the proposed development at the stations.

There will also be cooling water return and station cleaning water; however, impacts would not be substantial.

The proposed design and construction of the guideway alignment and adjacent stations for the Build Alternative 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 or accidental spills of fuel or other chemicals that run into existing storm sewers and outfall into the River.

Station platforms would consist of impervious surfaces, but since the Study Area is already heavily developed, the Build Alternative is 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, expected reduction in roadway traffic related to implementation of the transit line and BMPs used during construction as required by the TPDES permit.

4.13.6 Impact Evaluation — Groundwater Resources

No-Build Alternative

Under the No-Build Alternative, the Project would not be built and would not have any impacts to groundwater resources within the Study Area.

Build Alternative

Potential impacts to groundwater resources are expected to be minor. The Trinity Group, the primary source of groundwater for the upper Trinity River Basin, and the Woodbine Aquifer, a minor aquifer also producing water in this basin, are the two major components of the area's groundwater resources. The Study Area is within the downdip portion of both aquifers. Both aquifers outcrop west of Dallas County. Construction of below-grade sections of the alignment would not be expected to contact groundwater resources and impacts to the Trinity or Woodbine aquifers are not anticipated.

4.13.7 Impact Evaluation — Floodplains

No-Build Alternative

Under the No-Build Alternative, the Project would not be built and would not have any impacts to floodplains within the Study Area.

Build Alternative

According to the FEMA floodplain map, the Study Area lies entirely within Zone X, areas defined as having minimal flood hazard. None of the Study Area is within the 100-year floodplain. No direct impacts to the floodplain would occur as a result of the Build Alternative.

4.13.8 Mitigation Measures

Surface Water Quality

A long-term impact to surface water quality is not likely to occur with the Build Alternative, and construction BMPs would be employed. Since the Project would impact more than 5 acres, the Project would be required to comply with the Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit TXR150000, for large construction projects. This permit requires development and implementation of a SWPPP, submission of a notice of intent (NOI) to the TCEQ, and posting of a site notice before and during construction. The TPDES, administered by the TCEQ, is part of the EPA's National Pollutant Discharge Elimination System permit program, authorized by the Clean Water Act to control water pollution by regulating point sources that discharge pollutants into waters of the U.S.

Mitigation measures for surface water quality would be achieved through compliance with the TPDES Construction General Permit TXR150000, including preparation and implementation of the SWPPP, submission of an NOI and posting of a site notice.

Groundwater Resources

Implementation of the mitigation measures identified for surface water quality impacts (see above), and **Chapter 5**, Construction Impacts, would similarly mitigate impacts to shallow groundwater.



4.14 Biological and Natural Resources

4.14.1 Introduction and Regulatory Setting

This section describes the existing natural vegetation types, ecoregion and Biotic Province areas found within the Study Area, and provides information regarding rare, threatened, or endangered species of potential occurrence in Dallas County.

Federally-listed species and their habitats are protected under the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended. Texas state law includes provisions which prohibit direct harm to state-listed species.

4.14.2 Methodology

Typically, a larger search radius may be used to examine threatened or endangered species occurrence data, but, due to the high intensity urban use of the project area and surrounding region, a one-mile search radius was used for an assessment of the potential for threatened or endangered species to occur in the Study Area. Existing literature and mapping were reviewed for the project study area to identify potential vegetative communities, potential wildlife assemblages, and threatened or endangered species of potential occurrence. Maps examined included aerial Imagery for the Study Area, United States Geological Survey (USGS) topographic maps for the Dallas, Texas quadrangle (USGS, 1973; USGS, 1981), GIS files obtained from the Texas Parks and Wildlife Department's (TPWD) Ecological Systems Classification and Mapping Project (EMST), and the EPA's Ecoregions of Texas. Due to the high intensity urban use of the project area, no field reconnaissance was necessary.

4.14.3 Affected Environment

The Study Area occurs within the Northern Blackland Prairie Ecoregion (Griffith et al, 2007). The majority of the Northern Blackland Prairie has since been converted to agricultural or urban uses. The Study Area is also located within the Texan Biotic Province (Blair, 1950). The Texan Biotic Province is a variable region which trends from north to south, extending from the Red River to the Gulf Coast. This province includes sandy soils which support the growth of post oak-blackjack oak-hickory savannahs scattered among tallgrass prairies (Werler and Dixon, 2000). This biotic province also contains numerous interior wetland areas including freshwater marshes, peat bogs, and major river systems. Additional information can be located in *Biological Resources Existing Conditions Technical Memorandum* in **Appendix B.12**.

Vegetation

A desktop vegetation analysis was performed within the Study Area using EMST spatial data. The Study Area is contained within areas defined by the EMST criteria as urban (high- and low-intensity). At-grade vegetation communities within the Study Area are found in urban parks, roadside plantings, and commercial developments and are generally comprised of turf grasses, such as bermudagrass (*Cynodon dactylon*) or St. Augustine grass (*Stenotaphrum secundatum*), and ornamental plantings which can include a variety of types of trees, shrubs, or herbaceous plants. The Project crosses underneath or near five urban parks/plazas in the downtown area, Belo Garden, Pegasus Plaza, Browder Street Mall, Main Street Garden, and John Carpenter Park. Many mature and prominent trees are located along the alignment at Museum Way, Broom Street, Griffin Street, and Good Latimer Expressway.

Wildlife

Approximately 49 species of mammals, 57 species of reptiles, and 23 species of amphibians occur in the Texan Biotic Province (Blair, 1950). In addition, approximately 471 avian species,



including both residents and migrants, have been reported in the Oaks and Prairies of Texas (Freeman, 2003), an area that is roughly analogous to the Texan Biotic Province. The surface of the project area is high and low intensity urban habitats and the wildlife species inhabiting this area would be anticipated to be those which are generally adapted to high intensity urban land use.

Threatened and Endangered Species

USFWS' endangered species list for Dallas County and TPWD's Annotated County List of Rare Species for Dallas County were examined along with project area information to determine whether the Project is likely to have an effect on listed species or their habitats. In addition, TPWD's Texas Natural Diversity Database (TXNDD) was reviewed to determine previously recorded occurrences of any of the listed species within or near the Study Area. Four federally-listed endangered species, two federally-listed threatened species, four state-listed endangered species, ten state-listed threatened species, and over 40 state species of greatest conservation need (SGCN) or species of concern (SOC) (which are tracked by TPWD for monitoring purposes, but do not currently receive regulatory protection) are listed as having potential to occur in Dallas County (TPWD, 2019; USFWS, 2019). None of the habitats for these species are located within the Study Area. Additional information can be located in **Appendix B.12, Biological Resources Existing Conditions Technical Memorandum**.

4.14.4 Impact Evaluation

No-Build Alternative

Implementation of the No-Build Alternative would result in no impacts to biological or natural resources.

Build Alternative

The Study Area is contained within areas defined by the EMST criteria as urban (high- and low-intensity). In addition, most of the alignment for the project is underground and would not impact surface vegetation. The Project would require modification of the cross section along Museum Way. DART would seek to preserve the trees along the sidewalks along Museum Way, but would remove the trees located within the DART-owned median. Broom Street would be relocated closer to Woodall Rodgers Freeway requiring displacement of several trees. Trees within Griffin Street would be removed for cut-and-cover construction. Large trees along Griffin Street near the FOX4 TV studio may be affected by construction. Construction of the Metro Center Station headhouse will also require removal of trees within the DART West Transfer Center property. Trees in Pegasus Plaza would be removed due to temporary use of the site for construction. Some street trees along Good Latimer Expressway may be removed to accommodate the Live Oak Station.

No designated critical habitat or preferred habitat for any federally listed species was identified within or near the Study Area; therefore, the proposed Project will have no effect on federally-listed species for Dallas County. Due to the high intensity urban use of the Study Area, no suitable habitat for any state or federally-listed species is present.

4.14.5 Mitigation Measures

Any tree removals associated with project activities would be done in accordance with city ordinances, and permits would be obtained, if necessary. DART would coordinate with the city to replace trees within street or expanded sidewalk areas, as well as in the reimagined Pegasus Plaza. Trees along Griffin near the TV studio as well as those in front of the St. James A.M.E. Temple would be protected to the greatest extent possible to avoid impacts and DART would



consult would arborists where appropriate. No other impacts to vegetation, wildlife, or threatened or endangered species are anticipated by the proposed Project.

4.15 Hazardous and Regulated Materials

4.15.1 Introduction and Regulatory Setting

Materials that may be considered hazardous waste include petroleum products, pesticides, organic compounds, heavy metals, or other compounds which may cause damage to human health and the environment. Pollutants have the potential to seep into the ground, flow into rivers and lakes, and contaminate soil and groundwater.

Hazardous waste sites may be encountered during construction of the Project. A *Hazardous Materials Existing Conditions Technical Memorandum* was completed for the D2 corridor and is included in **Appendix B.11**. The purpose was to identify potential hazardous materials sites with proximity to the corridor and rank them as follows: Low Risk sites generally had few indications of potential for release of hazardous materials, Moderate Risk sites were those that had some indications of possible hazardous materials issues, High Risk sites were those that had high potential for releasing hazardous materials to the soil or groundwater, or have had a documented release, and Indeterminate Risk sites were those that did not include enough information to accurately rank the site. More information on how sites were ranked is included in the technical memorandum.

Multiple regulatory acts address contaminants and hazardous materials, including the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Superfund Amendments and Reauthorization Act (SARA), the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Clean Air Act (CAA), and the Clean Water Act (CWA). These, and other regulatory acts are described in the Environmental Data Resources, Inc. (EDR) report, which was generated for this Project. Federal, state, and local databases have been developed to keep track of sites which handle, generate, transport, store, or dispose of hazardous and/or regulated materials and wastes, in accordance with applicable environmental laws.

4.15.2 Methodology

The Study Area was evaluated by reviewing available regulatory agency databases and topographic maps, and by performing a limited site reconnaissance. These documents and site visits were intended to serve as an overall environmental screening method for the Study Area, in order to identify sites with potential hazardous waste issues that are known to regulatory authorities. This environmental screening does not consider historical sites, or sites with no recorded regulatory history (but with potential issues). Therefore, it does not constitute an ASTM 1527-13-conforming Phase I Environmental Site Assessment (ESA). In addition, sites may be missed or not considered if they existed prior to modern environmental recordkeeping (generally pre-1990). It is also important to note that this screening report, like the ASTM E 1527-13 Phase I ESA scope, does not include asbestos, mold, radon, indoor air quality, or any of the other “non-scope considerations” listed in the ASTM E 1527-13 standard. Asbestos, as an example, could be a significant issue during any building demolitions for the Project, but a separate asbestos assessment protocol exists to manage that issue.

4.15.3 Affected Environment

The EDR environmental regulatory database report included over 1,700 hazardous materials listings within the ASTM search radius for the D2 corridor. The number of sites was narrowed



based on the nature of each database listing, and only included those that were located within the 300 or 600 foot buffer (for limits of disturbance and at-grade versus below-grade improvements, respectively) of the D2 Corridor. Over 340 potential risk sites had listings from databases of concern. Sites were eliminated from further consideration, or ranked as Low Risk, if database listings were from “pointer” databases, air emission sites, or had listings for issues such as paperwork violations that do not necessarily lead to a risk of contaminant release.

Of the 338 sites of concern ranked by this protocol, 10 sites were ranked as High Risk, 17 as Moderate Risk, and 77 as Indeterminate Risk (of the Indeterminate Risk sites, 70 were listed in either the EDR Hist Auto or EDR Hist Cleaners databases). The remainder of the sites were ranked as having Low Risk to impact the project corridor. This risk classification is based on the nature of the site contamination, proximity to the project corridor, and groundwater flow direction. It is important to note that this risk ranking would be applicable to the corridor area only if the ground is disturbed during construction activities. If subsurface soils will not be disturbed during construction, then these sites would not pose a risk to the project corridor. The approximate location and nature of contamination of the identified High and Moderate Risk sites are summarized in **Table 4-16**. For the full analysis, see **Appendix B.11**.

High Risk Sites

Ten sites are rated as a High Risk. The locations of these sites are shown in red on **Figure 4-20** and are described in **Table 4-16**.

Moderate Risk Sites

Seventeen sites were ranked as a Moderate Risk. The locations of these sites are depicted in yellow on **Figure 4-20** and are described in **Table 4-16**.

Indeterminate Risk Sites

Indeterminate Risk sites are those where more information is needed to determine whether the site would pose a risk to the project. Seventy-seven sites were considered to be of Indeterminate Risk. Seventy of those were listed in the EDR Hist Auto and EDR Hist Cleaner database. The additional sites considered to be Indeterminate Risk, but not listed in the EDR Hist Auto or EDR Hist Cleaners databases were Map IDs: 125A, 131B, 168, 444, and 452C. These Indeterminate Risk sites were depicted with blue dots on **Figure 4-21**. More information about these sites can be found in **Table 4-16** and in **Appendix B.11**.

4.15.4 Impact Evaluation

No-Build Alternative

With no project related construction or project-related property acquisition, there would be no anticipated hazardous materials impacts associated with the Project.

Build Alternative

The High or Moderate Risk sites could affect construction if subsurface soil were to be disturbed. Indeterminate Risk sites require more information to determine potential risk to the proposed Project. The vast majority, 70 of 77 total, of the Indeterminate Risk sites were identified in the EDR Hist Auto or EDR Hist Cleaner databases as formerly operating an automobile garage or service station or a drycleaner within close proximity to the proposed Project. Three Municipal Setting Designation (MSD) sites are located near or adjacent to the west portal area. Based solely upon the site reconnaissance, no additional hazardous materials concerns were identified.

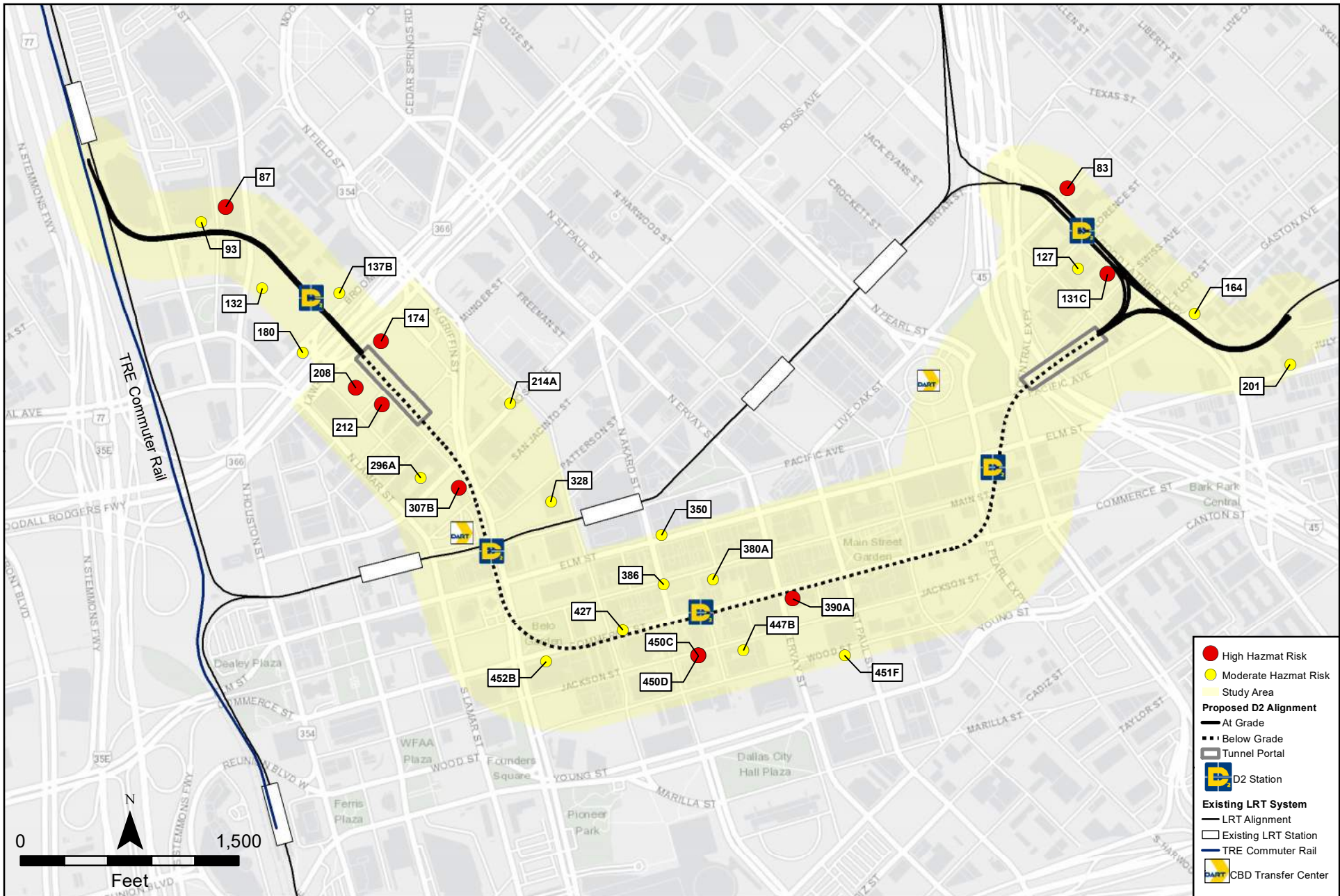


Figure 4-20
High and Moderate Hazardous Materials Risk Sites

Data Source: DART, GPC6



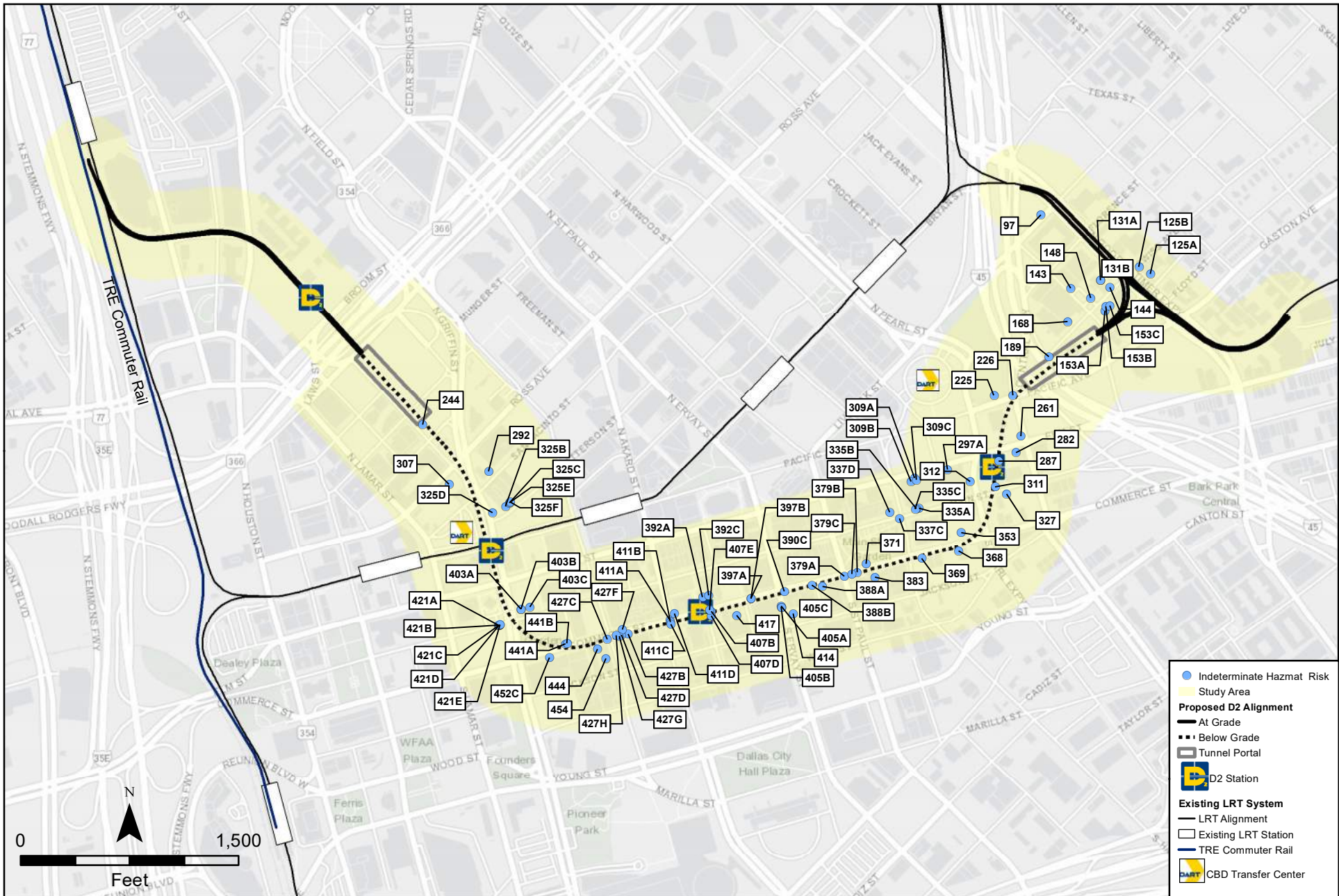


Figure 4-21

Indeterminate Hazardous Materials Risk Sites

Data Source: DART, GPC6





Table 4-16 High, Moderate and Indeterminate Hazardous Materials Risk Sites*

Map ID (EDR Site ID)	Site Name/Address	Approximate Distance / Direction of Site from D2	Databases of Concern/Comments
83	City Lights Property / Dallas Can! Academy / Carter's Service Station 2601 Live Oak St., Dallas, TX	146' /Northeast	Databases of Concern: VCP, GCC, TX MSD, Hist Auto In 2013, a multifamily developer entered the VCP to address soils and groundwater contaminated with VOCs, SVOCs, heavy metals, chlorinated solvents and TPH. The VCP is listed as being in the investigation phase. The GCC database listed the same contaminants of concern, with a date of earliest known contamination of 2013. This site was listed in the MSD database in 2015 for the contaminants tetrachloroethylene, 2-methyl naphthalene and TPH. This site had violations related to asbestos in schools, and was also identified as a service station in the Hist Auto database listed in 1930.
87	Tuec North B and Tuec North A / Dallas Steam Electric West of Alamo St./ 2727 Flynn St., Dallas, TX	172'/North	Databases of Concern: AUL, VCP, GCC The facility completed the VCP in 1996 for soils and groundwater contaminated by TPH and SVOCs: affected materials were moved offsite to a landfill. In 1999, facility received a certificate of completion from the VCP for excavation and offsite disposal of soils and groundwater affected by petroleum hydrocarbons and metals. Purchaser accepted a non-residential AUL in 1998. This facility was listed in the GCC database for historic groundwater contamination from 1994-2012. TPH and SVOCs were the contaminants described.
93	Houston Street / UP South Property North of Woodall Rodgers/McKinney	70' /North	Databases of Concern: TX VCP The purchaser of this railyard/railroad track property completed the VCP in 2000, for soils and groundwater contaminated with TPH, metals and PAHs. The remedy listed was excavation and disposal, and non-residential institutional controls were implemented.
97	Mack's Service Station 2525 Live Oak	89'/West	Databases of Concern: EDR Hist Auto This location was listed under multiple names as a gasoline and oil service station/automobile repairer. Years of operation were sporadic between 1930 and 1961.
125A	Giddings and Wells Paint and Body Shop 2606 Swiss Ave.	90'/East	Databases of Concern: Hist Auto, IHW, RCRA NonGen/NLR Giddings and Wells was listed as a non-generator of waste and a former small quantity generator. No violations were listed in the IHW or RCRA databases. In the Hist Auto database, this facility was listed as an automobile repairing facility including the years 1930, 1977, 1981, 1986 and 1987.
125B	Swiss Avenue Garage 2602 Swiss Ave	Adjacent /East	Databases of Concern: EDR Hist Auto This facility was listed under two names for automobile repairing in 1941 and 1946.
127	615 North Good Latimer Expressway, Dallas, TX 2501, 2507, 2511, & 2519 Swiss Ave	140'/West	Databases of Concern: VCP In 2017, the purchaser of these properties completed the VCP for soils contaminated with arsenic, barium and lead, and received a certificate of completion.
131A	Day and Night Ford Service – Dallas Quality Motor 2511 & 2513 Swiss Ave	Adjacent	Databases of Concern: EDR Hist Auto This facility was listed as an automobile repair shop, operating at various times under various names, between 1925 and 1961.



Map ID (EDR Site ID)	Site Name/Address	Approximate Distance / Direction of Site from D2	Databases of Concern/Comments
131B	Earl Scheib Auto Painters 2511 Swiss Ave	Adjacent	Databases of Concern: RCRA NonGen/NLR, IHW, ECHO Site was listed as a non-generator with no violations. Furthermore, no compliance violations were listed in the ECHO database.
131C	None / Glenn E. Underwood 2519 Swiss Ave	Adjacent	Databases of Concern: UST, EDR Hist Auto This facility was listed as inactive in the UST database for three tanks, a 4,000 gallon, 6,000 gallon, and 8,000 gallon UST which were removed from the ground in 1991. A gasoline service station was also reported under various names between 1966 and 1986.
132	Laws Street Development 2200 Laws Street	200'/Southwest	Databases of Concern: VCP In 2006, this development area received a certificate of completion from the VCP for addressing soils and groundwater contaminated with VOCs, SVOCs, metals and TPH.
137B	CEMARK R990016 2219 Summer St	260'/Northeast	Databases of Concern: LPST, UST Cemark was listed as inactive in the UST database for one 10,000 gallon tank that was removed from the ground in 1991. An LPST incident was reported in 1990 in which groundwater was affected, but no apparent threats or impacts to receptors occurred. Final concurrence was issued and the case is closed.
143	Jackson's Garage / Hawkins St. Garage 506 & 508 N. Hawkins	65'/North	Databases of Concern: EDR Hist Auto Jackson's Garage was listed as an automobile repairer in 1936. Hawkins St. Garage was listed as an automobile repairer in 1925, 1930, and 1936.
144	Jennings Jack Automobile Service Co. 2513 Swiss Ave	Adjacent	Databases of Concern: EDR Hist Auto Jennings Jack Automobile Service was listed as an automobile repairer in 1930.
148	Swiss Av. Filling Station / Bob's Garage 2501 & 2505 Swiss Ave.	Adjacent	Databases of Concern: EDR Hist Auto Swiss Ave. Filling Station was listed as a gasoline and oil service station for years 1930 and 1936. Bob's Garage was listed as an automobile repairer in 1936.
153A	C & R Auto Repair 2504 Swiss Ave.	115'/Southeast	Databases of Concern: EDR Hist Auto C And R Auto Repair was identified as a general automotive repair shop, with operations between 1930 and 2000.
153B	Swiss Ave. Garage 2506 Swiss Ave	115'/Southeast	Databases of Concern: EDR Hist Auto Swiss Avenue Garage was listed as an automobile garage, operating in 1930.
153C	Clayton Chevrolet Service 2508 & 2510 Swiss Ave	115'/Southeast	Databases of Concern: EDR Hist Auto Clayton Chevrolet Service was listed as an automobile repair shop at both of these addresses in 1930, Collins Garage was listed for automobile repairing in 1951.
164	Missouri Pacific Railroad Co. 2606 Gaston Ave	111'/Northeast	Databases of Concern: LPST, UST This facility was listed as inactive in the UST database for one tank (volume was not reported) which was permanently filled in place in 1987. Two LPST incidents had been reported, the first in 1993 with soil contamination only, and the second reported in 1995 where the extent of contamination was defined and groundwater was not affected. Final concurrence has been issued in both of these cases, and the cases are closed.



Map ID (EDR Site ID)	Site Name/Address	Approximate Distance / Direction of Site from D2	Databases of Concern/Comments
168	Swiss Avenue Self Storage 2439 Swiss Ave	Adjacent	Databases of Concern: UST Swiss Avenue Self Storage was listed as inactive in the UST database. The facility reported one 8,000 gallon gasoline UST which was removed from the ground in 1998.
174	LG Magnolia LP 1100 McKinney Ave	Adjacent	Databases of Concern: AUL, VCP, MSD, GCC This property had soils and groundwater contaminated with VOCs, SVOCs, metals, TPH, PCBs, and solvents. LG Magnolia LP completed the VCP, and received a certificate of completion in 2009. The applicants agreed to AUL, with MSD institutional controls. According to the GCC database, the date of earliest known contamination was 2007.
180	Laws Street Lots (2201 - 2225) 2201, 2213, 2217 & 2221 Laws St.	210'/Southwest	Databases of Concern: VCP The applicant received a certificate of completion from the VCP in 2000. Contaminant categories included VOCs, SVOCs and metals affecting soils and groundwater.
189	Long Super Service Station / Barney Google Garage 2300 & 2305 Swiss Ave	40'/South	Databases of Concern: EDR Hist Auto These Barney Google Garage was listed as automobile repairing in 1951, and a gasoline and oil service station was listed at the location of Long Super Service Station in 1930 and 1936.
201	2625 Elm Street 2625 Elm St.	168'/Southeast	Databases of Concern: VCP, MSD, GCC In 2012, this site was in the investigation phase of the VCP, and was listed in the GCC database for soils and groundwater affected by VOCs, SVOCs, heavy metals, chlorinated solvents, and TPH. In 2016, a MSD was certified for the site for contaminants including TPH, vinyl chloride and trichloroethane, among others.
208	Graphics Engraving Facility 1012 McKinney Ave	168'/Southwest	Databases of Concern: VCP, MSD, GCC In 2014 a GCC case was reported for the property. The facility entered the VCP for soil and groundwater affected by VOCs, heavy metals and TPH. The contaminants trichloroethylene and arsenic are listed in the MSD.
212	Graphics Engraving 1911 & 2001 N. Griffin St.	66-112'/Southwest	Databases of Concern: TX IHW Corr Action, VCP, GCC As of 1995, this facility was listed as inactive in the IHW Corr Action database. The facility entered the VCP in 1995 for soils and groundwater affected by spent solvents and metals. The phase of the VCP is listed as "terminated." The facility is listed in the GCC database with date of earliest known contamination listed as 1995.
214A	Woodall United Investors Property 1305 Ross Ave. & 704 N. Griffin	506'/Northeast	Databases of Concern: VCP, MSD, GCC The purchaser of this property completed the VCP in 2008, for soils and groundwater contaminated with VOCs, SVOCs, and metals. The date of earliest known contamination for the GCC was listed as December 2005, and The MSD certification was listed as December 2006. Contaminants included benzene and TPH.
225	Smith & Williams 2211 N. Pacific Ave.	On alignment	Databases of Concern: EDR Hist Auto Ridout Motors Inc. was listed in the database as an automobile repairing station in 1951.
226	Enos Service Station 2301 N. Pacific Ave	91'/East	Databases of Concern: EDR Hist Auto Jimmie's Service Center was listed in the database as a gasoline station.
244	Diamond Alkali Co. of Texas S. Lamar at Lenway Green 1812 Griffin	On alignment	Databases of Concern: EDR Hist Auto Diamond Alkali was reported as an automobile repairer in 1946.



Map ID (EDR Site ID)	Site Name/Address	Approximate Distance / Direction of Site from D2	Databases of Concern/Comments
292	Flag Petroleum Inc. 1111 San Jacinto	125'/Northeast	Databases of Concern: EDR Hist Auto Gasoline service station listed in 1982
296A	CVS Pharmacy #8391 1001 Ross Ave., Ste. 112	264'/South-Southwest	Databases of Concern: RCRA-CESQG, LPST, IHW As a CESQG, no violations were reported in the database search. An LPST was reported in 2005. The assessment was incomplete, and no apparent impacts to receptors occurred. Final concurrence was issued and the case was closed. No violations were reported in the IHW database.
297A	Elm Street Garage 2100 Elm St.	34'/Southeast	Databases of Concern: UST, IHW CORR ACTION Elm Street Garage was listed as inactive in the UST database for three 8,000 gallon USTs (two for gasoline and one for diesel), which were permanently filled in place in 1998. This facility had an inactive status in the IHW CORR ACTION database as of 2002.
307A	Walter S. Clifton Garage 1012 & 1020 Ross Ave.	127'/South-Southwest	Databases of Concern: EDR Hist Auto Automobile repairing, dated 1951 and 1956.
307B	7-Eleven 34997 1010 Ross Ave.	79'/South-Southwest	Databases of Concern: UST This retail facility was listed in the UST database with two active USTs. One UST is 20,000 gallons and stores gasoline, the other is 12,000 gallons and stores diesel fuel.
309A	A. Rolnick Hat Co. 2016 Elm St.	76'/North-Northwest	Databases of Concern: EDR Hist Cleaner This hat cleaner and blocker was listed in the database in 1930.
309B	Fabrik Cleaner 2000 Elm St.	84'/North-Northwest	Databases of Concern: EDR Hist Cleaner This location was listed in the database as Rio Grande Dry Cleaner in 1992-1993, and as Fabrik Cleaner between 2006 and 2012. These facilities were identified as dry cleaning plants, except rugs.
309C	Player's Cleaners 2024 A Elm St.	59'/ North-Northwest	Databases of Concern: EDR Hist Cleaner Players Cleaners was reported as a clothes presser, cleaner and repairer in 1941.
325B	Cook's Garage 1107 Patterson Ave.	144'/East	Databases of Concern: EDR Hist Auto This automobile repair shop was listed in 1951.
325C	E.C. Allen Auto Storage 1109 & 1111 Patterson Ave.	177'/Northeast	Databases of Concern: EDR Hist Auto Allen Auto Storage, an automobile garage, was reportedly at the site in 1930.
325D	Queen Garage 1101 & 1103 Patterson Ave.	45'- 80'/Northeast	Databases of Concern: EDR Hist Auto This automobile garage as listed as Queen Garage, Kelly's Automotive Service and Gibbs Auto Service. The dates reported were between 1930 and 1946.
325E	C.H. Siebenhausen 1113 Patterson Ave.	180'/Northeast	Databases of Concern: EDR Hist Auto An automobile repair shop was reportedly at this location between 1925 and 1946 under various names including Steve's Garage.
325F	Steve's Garage 1115 Patterson Ave.	182'/Northeast	Databases of Concern: EDR Hist Auto This automobile garage was reported at this location in 1930.



Map ID (EDR Site ID)	Site Name/Address	Approximate Distance / Direction of Site from D2	Databases of Concern/Comments
328	Renaissance Tower Parking Garage 1201 Pacific Ave.	450'/East	Databases of Concern: IOP, VCP, GCC Parking garage had soils and groundwater contaminated with VOCs and chlorinated solvents. The owners terminated their involvement in the IOP and entered and completed the VCP in 2009 for soils and groundwater affected by VOCs and heavy metals. According to the GCC, the date of earliest known contamination was 2007.
335A	Main Street Cleaners 2007 Main St.	27'/South-Southeast	Databases of Concern: EDR Hist Cleaner Main Street Cleaners was identified as a clothes cleaners, presser, dyer and repairer with years listed as 1941 and 1956.
335B	Ever-Ready Service Station 2003 Main St.	16'/South-Southeast	Databases of Concern: EDR Hist Cleaner This site was a gasoline and oil service station, reportedly in operation in 1930.
335C	Main Garage Inc. 2001 Main St.	11'/South-Southeast	Databases of Concern: EDR Hist Cleaner An automobile garage reportedly operated at this site under two different names in 1930 and 1936.
337C	Crystal Cleaners and Dyers 115 S Harwood	1'/Northwest	Databases of Concern: EDR Hist Cleaner Clothes cleaner, presser, repairer, and dyer, with dates between 1930 and 1951.
337D	White Plaza Hotel Valet Service 1931 & 1937 Main St.	82'/Northwest	Databases of Concern: EDR Hist Cleaner Operation dates between 1941 and 1951 for this clothes cleaners, presser, repairer and dyer.
350	Elm Building 1505 Elm St.	550'/North	Databases of Concern: VCP, GCC The owners entered the VCP in 1998 for soils and groundwater affected by solvents. No certificate of completion has been received, and the facility has been terminated in the VCP. The facility is listed in the GCC database for historic groundwater contamination from 1994-2015.
371	Bell Cleaners 1937 Commerce St.	15'/Northwest	Databases of Concern: EDR Hist Cleaner Bell Cleaners, a laundry and drycleaner, was listed in the Hist Cleaner database for operating between 1986 and 2010.
379A	Majestic Service Stations 1900 Commerce St.	3'/North-Northwest	Databases of Concern: EDR Hist Cleaner This gasoline and oil service station operated in 1930.
379B	Frank Akin 1920 Commerce St	5'/Southeast	Databases of Concern: EDR Hist Cleaner An automobile repair shop/garage operated at this location, under different names, between 1936 and 1941.
379C	Brantley Cleaning & Dyeing 1912 Commerce St.	On the alignment	Databases of Concern: EDR Hist Cleaner This facility was listed as a clothes presser, cleaners and repairer in 1930.
380A	Joule Hotel 1530 Main St.	174'/North-Northwest	Databases of Concern: VCP A heating oil UST caused TPH contamination of groundwater. The purchaser completed the VCP in 2007 through the TRRP.
383A	Zip Dry Cleaning & Laundry 1914 Commerce St.	96'/Southeast	Databases of Concern: EDR Hist Cleaner This facility was listed in the Hist Cleaner database, with operations between 1992 and 1995.
386	Pegasus Plaza 100 S Akard St.	229'/North	Databases of Concern: LPST



Map ID (EDR Site ID)	Site Name/Address	Approximate Distance / Direction of Site from D2	Databases of Concern/Comments
			An LPST case was reported in 1992, which did not result in groundwater impacts or threats or impacts to receptors. The vertical extent of contamination was defined, and groundwater was not affected. Final concurrence has been issued, and the case is closed.
388A	Post Office Garage 1800 Commerce St.	On alignment	Databases of Concern: EDR Hist Auto The Post Office Garage was reportedly in business between 1925 and 1936 as a gasoline and oil service station and garage.
388B	Manhattan Laundry & Dry Cleaning Co. 207 Prather St.	On alignment	Databases of Concern: EDR Hist Cleaner This facility historically operated as a family and commercial laundry between 1966 and 1988.
390A	1700 Commerce Place 1700 Commerce St.	54'/South-Southeast	Databases of Concern: LPST An LPST case was reported at this location, which resulted in impacts to a designated major or minor aquifer. Final concurrence has been issued, and the case is closed.
390C	Manhattan Laundry & Dry Cleaning Co. 1710 Commerce St.	On alignment	Databases of Concern: EDR Hist Cleaner The Manhattan Laundry and Dry Cleaning Co. was listed in the database for operations in 1951 and 1956.
392A	Expressway General Str. & Clrs. 1417 Commerce St.	75'/North-northwest	Databases of Concern: EDR Hist Auto Expressway General was identified as a gasoline service station with operations between 1995 and 1998.
392C	Anjul Inc. 1505 Commerce St.	75'/North-northwest	Databases of Concern: EDR Hist Cleaner Anjul Inc., a cleaners and garment pressing operation, was operated between 1997 and 2008.
397A	Abraham Geo 1611 Commerce St.	20'/North-northwest	Databases of Concern: EDR Hist Cleaner A clothes cleaner and dyer was reported at this location in 1925.
397B	Victor Hatters & Cleaners 1612 Commerce St.	20'/North-northwest	Databases of Concern: EDR Hist Cleaner Vitor Hatters and Cleaners, was listed as a hat cleaner and blocker in years 1930 and 1951.
403A	Heinens Inc. 917 Main St.	69'/East-Northeast	Databases of Concern: EDR Hist Cleaner Reportedly a clothes cleaner and dyer operated at this location in 1925.
403B	DTS Standard Transmission 917 Main St.	69'/East-Northeast	Databases of Concern: EDR Hist Auto An automotive transmission repair shop was listed at this location for the year 1992.
403C	Le Beau Pressing Parlor 1023 Main St.	131'/East-Northeast	Databases of Concern: EDR Hist Cleaner Le Beau was listed as a clothes cleaners and dyers that operated in 1925.
405A	Moore Bros. 209 S. Ervay	83'/South-Southeast	Databases of Concern: EDR Hist Cleaner Moore Bros was listed as a clothes cleaner and dyers in business in 1925 and 1930 (under the name McGuire Cleaning and Dyeing Co.).
405B	Free Mending Hand Laundry 213 S. Ervay	91'/Southeast	Databases of Concern: EDR Hist Cleaner Listed as a laundry, Free Mending Hand Laundry, was identified as operating in 1936.
405C	J.B. Hatitorium	93'/South-Southeast	Databases of Concern: EDR Hist Cleaner



Map ID (EDR Site ID)	Site Name/Address	Approximate Distance / Direction of Site from D2	Databases of Concern/Comments
	215 S. Ervay		A hat cleaner and blocker reportedly operated at this site in 1930 and 1961 (as Columbia Mater Hatters).
407B	Not listed 1502 Commerce St.	On alignment	Databases of Concern: EDR Hist Cleaner Listed as clothes cleaners and dyers, this facility reportedly operated in 1925.
407D	Laundry Limo 222 Browder St. Apt. 1003	26'/Southeast	Databases of Concern: EDR Hist Cleaner This laundry and drycleaner agents were reportedly operating in 2012.
407E	Nobby Tailors 206 Browder St.	16'/Northwest	Databases of Concern: EDR Hist Cleaner Nobby Tailors was listed as a clothes cleaner and dyer operating in 1925.
411A	Oriental Laundry Branches 205 S. Akard St.	18'/North-northwest	Databases of Concern: EDR Hist Cleaner Several entries for 1930 were in this listing as a dry cleaner, presser, repairer and dyer.
411B	Bakadolph One Hour Cleaners 209 S. Akard St.	On alignment	Databases of Concern: EDR Hist Cleaner This facility was listed as a cleaner and dyer operating in 1956.
411C	J.C. Clark 213 S. Akard St	On alignment	Databases of Concern: EDR Hist Cleaner JC Clark was identified in the Hist Cleaner database as a clothes cleaner and dyer in 1925.
411D	Anjul Inc. 1409 Commerce St.	On alignment	Databases of Concern: EDR Hist Cleaner A&A Quality Cleaners was also included in this entry. Both facilities were listed as garment pressing and cleaners' agents. Years listed were between 1988 and 1996.
414	Perfect Hand Laundry & Dry Cleaning Co. 210 S Ervay	154'/South-southeast	Databases of Concern: EDR Hist Cleaner The Hist Cleaner database identified this business as a laundry operating in 1941.
417	Diversified Service Corp. 1512 Commerce St.	67'/ South-southeast	Databases of Concern: EDR Hist Auto Diversified Service Corp was identified as a gasoline service station, years listed were 1970 and 1971.
421A	Main Street Cleaners 904 Main St.	75'/West-Southwest	Databases of Concern: EDR Hist Cleaner A clothes cleaner and dyer was identified at this location in 1925 and in 1951 and 1956 as Weston Cleaning Co.
421B	Weston Thos A 906 Main St.	75'/West-Southwest	Databases of Concern: EDR Hist Cleaner Thos A Weston was listed as a clothes presser, cleaner and repairer with a year of 1930.
421C	City Tailors and Hatters 908 Main St.	74'/ West-Southwest	Databases of Concern: EDR Hist Cleaner City Tailors and Hatters was listed as a hat cleaner and blocker (1930) and also a clothes presser, cleaner and repairer (1930 and 1941).
421D	Brownie Tailor Shop 910 Main St.	64'/West-Southwest	Databases of Concern: EDR Hist Cleaner Brownie Tailor Shop was identified as a clothes cleaner and dyer listed in 1925.
421E	McGuire Cleaning and Dyeing Co. Inc. Branches 912 Main St.	60'/West	Databases of Concern: EDR Hist Cleaner This facility was identified as a cleaner and dyer operating in 1930.
427A	The Adolphus Hotel 1321 Commerce St	On alignment	Databases of Concern: IHW, IHW Corr Action, UST, RCRA-CESQG, ECHO, TX Asbestos, AST



Map ID (EDR Site ID)	Site Name/Address	Approximate Distance / Direction of Site from D2	Databases of Concern/Comments
			The last amendment on their IHW registration was listed as 1992. The hotel was listed as a small quantity generator of waste. The IHW Corr Action listing was inactive as of 2014. The hotel was listed as active in the UST database, however, the two 3,000 gallon gasoline USTs which were listed were reported as permanently filled in place in 1979. The facility was listed as a CESQG, with no violations in the RCRA or ECHO databases. An asbestos survey was completed in 2015. The hotel has one 4,000 gallon AST for storing diesel.
427B	Baker Press Shop 1332 Commerce St	On alignment	Databases of Concern: EDR Hist Cleaner This shop apparently operated as a clothes presser, cleaner and repairer around 1930.
427C	Lone Star Service Station 1210 Commerce St.	On alignment	Databases of Concern: EDR Hist Auto Lone Star Service Station was listed as operating in 1930.
427D	Nichols Bros. Garage 1314, 1316, 1318 & 1320 Commerce St.	On alignment	Databases of Concern: EDR Hist Auto This automobile garage listed multiple addresses and was likely in operation 1930 to 1936.
427F	Flag Petroleum Inc. 1226 Commerce St.	On alignment	Databases of Concern: EDR Hist Auto According to the database listing, Flag Petroleum was a gasoline service station between 1978 and 1980.
427G	Washington Garage 1310 & 1312 Commerce St.	On alignment	Databases of Concern: EDR Hist Auto Listed as an automobile garage, this facility reportedly operated in 1930 and 1936.
427H	Adolphus Garage Dunlap Swain Co. Inc. Owners 1326 Commerce St.	On alignment	Databases of Concern: EDR Hist Auto Listed as a garage and gas and oil service station, this facility was reportedly in operation between 1925 and 1956.
427I	Adolphus Laundry 1313 Commerce St.	On alignment	Databases of Concern: EDR Hist Cleaner This facility was listed as a laundry in 1925.
441A	ACME Tailor Shop 1203 Commerce St.	On alignment	Databases of Concern: EDR Hist Cleaner Acme Tailor Shop reportedly operated as a clothes cleaner and dyer in 1925.
441B	Southland Press Shop 1207 Commerce St.	On alignment	Databases of Concern: EDR Hist Cleaner Southland Press Shop was a cleaner and dyer in 1946, according to the Hist Cleaner database.
444	Manor House Apartments 1222 Commerce St.	45'/South-southeast	Databases of Concern: FTTS, ICIS The Manor House Apartments was in the FTTS database as a landlord/rental facility which had a violation. The ICIS database indicated the facility received a notice of noncompliance and was issued an administrative, informal enforcement.
447B	Trailways 1500 Jackson St.	310'/ South-southeast	Databases of Concern: LPST, UST, TX Asbestos This site is inactive in the UST database for one 12,000 gallon diesel UST that was permanently filled in place in 1991. An LPST case reportedly started in 1992 and resulted in impacted groundwater with an incomplete site characterization. Final concurrence has been issued, and the case is closed. The site (now a tattoo parlor) was in the Asbestos database for a routine inspection in 2016.
450C	AT&T Telephone Facility	276'/ South-southeast	Databases of Concern: Tier 2, GCC



Map ID (EDR Site ID)	Site Name/Address	Approximate Distance / Direction of Site from D2	Databases of Concern/Comments
	1410 Jackson St.		This facility reported to the Tier 2 database in 2006, but information on chemicals stored was not reported. This facility was reported in the GCC database for gasoline contamination of groundwater. The date of earliest known contamination was listed as March of 2006.
450D	Six SBC Plaza - T44121 1410 Jackson St.	276' / South-southeast	Databases of Concern: UST, LPST, Tier 2 This facility is listed as active in the UST database with one 25,000 gallon UST. The UST stores both gasoline and diesel. The facility also listed one 10,000 gallon gasoline UST which was removed from the ground in 2005. An LPST case, in which groundwater was affected, was reported in 2005. No apparent threats or impacts to receptors occurred. Final concurrence has been issued and the case is closed. SBC was listed in the Tier 2 database for storing chemicals including diesel fuel #2 and unleaded gasoline. This facility passed all validation checks.
451F	Commercial Parking Lot Property 1720 Wood St.	525' / South	Databases of Concern; AUL, VCP, GCC This property completed the VCP in 2013 for groundwater contaminated by chlorinated solvents. A MSD institutional control was placed on the lot. The site was listed in the GCC database for earliest known contamination in 2011 and groundwater affected by VOCs, heavy metals and TPH. The site is identified in the AUL database as having an MSD.
452B	General Services Administration 1100 Commerce St.	68' / South-southwest	Databases of Concern: LPST, UST, TX Asbestos The facility was listed as inactive in the UST database for one 12,000 gallon diesel tank for fleet refueling, which was removed from the ground in 1999. The LPST case started in 1995, and the vertical and horizontal extent of contamination was defined and no groundwater impact occurred. Final concurrence has been issued, and the case is closed. In 2017, notification of asbestos abatement was reported.
452C	Department of the Army 1114 Commerce St.	41' / South-southwest	Databases of Concern: MLTS According to the MLTS database, the facility does not store material, redistribute, incinerate or bury radioactive material on site. The last inspection was in 1988.
454	Lone Star Service Station 1208 Commerce St.	122' / South-Southeast	Databases of Concern: EDR Hist Auto Lone Star was identified as a gasoline and oil service station, and was reportedly operating in years between 1930 and 1946.
<p>Notes: These are sites with listings of concern within 300 feet of the at-grade portions of the D2 Corridor and 600 feet of the below-grade portion of the D2 Corridor. Key: AUL: Activity and Use Limitation; AST: Aboveground Storage Tank; ECHO: EPA Enforcement and Compliance History Online; FTTS: FIFRA, TSCA, EPCRA Tracking System; GCC: Groundwater Contamination Cases; ICIS: Integrated Compliance Information System; IOP: Innocent Owner/Operator Property; IHW: Industrial Hazardous Waste; LPST: Leaking Petroleum Storage Tank; MLTS: Material Licensing Tracking System; RCRA: Resource Conservation and Recovery Act; UST: Underground Storage Tank; VCP: Voluntary Cleanup Program. Source: EDR, 2018</p>			



Additional investigation (in the form of ASTM-conforming Phase I ESAs) is warranted for sites identified as High Risk, Moderate Risk, or Indeterminate Risk. Once design progresses, the Design-Build contractor will determine where subsurface soils will be disturbed during construction, and determine their proximity to High Risk, Moderate Risk, or Indeterminate Risk sites. From this more specific information, investigative efforts (Phase IIs) can be refined to focus on areas within the construction prism that are most likely to intercept contaminated areas. Based upon the results of Phase II sampling and analysis, a Contaminated Media Management Plan may be developed, which would guide appropriate response actions during construction.

Due to the dozens of former gas stations and drycleaners that have operated in the downtown area, contamination from VOCs, SVOCs, metals, and chlorinated solvents could occur almost anywhere along the project corridor. Therefore, contractors should be prepared to encounter potentially hazardous conditions at any time. Specifically, when working in proximity to High or Moderate risk sites, contractors should have appropriately-trained staff (environmental consulting and remediation expertise) available during all ground-disturbing activities. Proper equipment and processes shall be available to protect workers, the public, and the environment if hazardous materials are encountered.

4.15.5 Mitigation Measures

Mitigation measures would be needed only in areas where construction activities encounter known or suspected contaminated soil or groundwater. Where the alignment is located near or over part of a known contaminated site, the construction may involve excavation to a depth that exposes contaminated soil. **Chapter 5** provides an overview of the likely construction methods that would be used for the Project. Much of the construction activity for the Project would occur underground for the tunnel segment. Two methods considered for the subway portion of the alignment include use of a tunnel boring machine (TBM) method or Sequential Excavation Method (SEM) tunneling; and cut-and-cover.

For all contaminants, if contaminated soil or rock requires excavation, procedures would be developed to properly separate contaminated material from non-contaminated material and ensure proper management of the solid waste and contaminated spoils. Excavated contaminated and uncontaminated spoils would be disposed of in accordance with applicable local, state, and federal guidelines and regulations under a Spoils Management Plan, and would generally be handled through a program of excavation and off-site disposal.

In addition, any existing structures will be surveyed for the presence of hazardous/regulated materials such as asbestos-containing materials, lead-based paint, chemical storage, etc., prior to their demolition or modification. These investigations will provide a basis for determining construction health and safety specifications, contaminated soil and groundwater remediation, and disposal procedures and asbestos or lead based paint management or remediation practices. The design and preparation of required monitoring and remediation plans would be coordinated with the TCEQ.

Construction of the subway would require removal of groundwater from the excavation area (dewatering). It is likely that some of the groundwater requiring removal might be contaminated.

Different types of contaminants and media (i.e., whether the contaminants are found in soil, soil gas, rock, or groundwater) require different management approaches. For example, VOCs are of concern because they can move through the soil and into the air, thereby affecting a wider geographic area. Therefore, measures to manage VOCs typically include ventilation with treatment as necessary and transporting contaminated materials in containers and/or covered trucks. Most other soil contaminants are only transmitted when attached to dust.



For this reason, all work with the potential to generate dust (e.g., excavation) is done in accordance with OSHA requirements to protect workers (who have the greatest potential for exposure because of their close proximity to the work areas), and with NAAQS to protect the public.

Additionally, environmental records would be reviewed to identify potential vapor encroachment/intrusion issues for the fan plant locations, tunnel ventilation, and any other enclosed structures that may be affected by contaminated materials as a result of implementing the Build Alternative.

If unanticipated sources of hazardous or regulated materials are suspected or encountered during construction activities, the construction manager or designee will immediately notify DART's Environmental Compliance Division. Specific mitigation activities, which address the type, level, and quality of contamination encountered, will be immediately implemented. The handling, treatment, and disposal of any hazardous materials will occur in full compliance with all federal, state, and local requirements. For activities within the MSD zones, the construction contractor must enact precautions to restrict human exposure to contaminated groundwater. Any sub-surface soils being excavated from the MSD zones to facilitate construction would require segregation for laboratory analysis and may require special handling and disposal.

DART would acquire real estate along the corridor for portions of the alignment, some stations, and other facilities. Environmental due-diligence activities will be performed prior to property acquisition or other real estate transactions. According to ASTM 1527-13, "due diligence is the process of inquiring into the environmental characteristics of a parcel of commercial real estate or other conditions, usually in connection with a commercial real estate transaction. The degree and kind of due diligence vary for different properties and differing purposes." A compliant Phase I ESA will be conducted; if the Phase I ESA concludes that one or more recognized environmental conditions (RECs) exist, Phase II testing would be performed to help establish whether contamination is present and, if present, its nature and extent.

4.16 Indirect Impacts and Cumulative Impacts

4.16.1 Introduction and Regulatory Setting

In addition to direct impacts, major transportation projects may also have indirect and cumulative impacts on land use and the environment. The Council on Environmental Quality (CEQ) requires that potential indirect and cumulative impacts be considered during the National Environmental Policy Act (NEPA) process. Indirect impacts (i.e., effects) are defined as impacts that are "caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable" per the CEQ (40 CFR §1508.8) and may "include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems." In addition, the CEQ (40 CFR §1508.7) defines cumulative impacts as "the impact on the environment which results from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions."

The potential indirect and cumulative impacts of the proposed Project are described below utilizing guidance from the 2016 American Association of State Highway and Transportation Officials (AASHTO) Practitioner's Handbook on Assessing Indirect Effects and Cumulative Impacts under NEPA. The methodology for the project is consistent with DART, FTA, and CEQ guidance regarding indirect and cumulative impacts assessments.



4.16.2 Methodology

For this analysis, the evaluation of indirect impacts is focused on induced growth impacts. Induced growth impacts are defined by AASHTO as “changes in the location, magnitude or pace of future development that result from changes in accessibility caused by the project.” The primary goal of the indirect impacts analysis is to understand the relationship between the proposed project, induced growth, and the resources potentially affected as a result of induced growth. The *Indirect and Cumulative Impacts Assessment and Mitigation Technical Memorandum* is located in **Appendix B.13**.

The Area of Influence (AOI) developed for the project is composed of a 0.5-mile radius around the project alignment beginning at Victory Park on the west, and ending at Deep Ellum on the east. It is approximately 1,909 acres in size (3 square miles), including the Dallas CBD. The 0.5-mile radius was selected as the AOI to include those areas where induced growth and development could occur from the proposed stations and alignment. The AOI includes a portion of the following districts in downtown Dallas: Design, Victory Park, Uptown, Arts, Riverfront, West End Historic, Thanksgiving Commercial Center, Baylor, Main Street, Civic Center, Reunion/Union Station, Farmers Market, and Deep Ellum.

The evaluation of potential indirect impacts as a result of the proposed Build Alternative follows the four-step process outlined by AASHTO:

- Step 1: Assess the potential for increased accessibility;
- Step 2: Assess the potential for induced growth;
- Step 3: Assess the potential for impacts on sensitive resources; and
- Step 4: Assess potential minimization and mitigation measures.

4.16.3 Affected Environment

No-Build Alternative

Under the No-Build Alternative, the Project would not be built and there would be no indirect or cumulative effects associated with the project.

Build Alternative

In Step 1, the proposed project was evaluated to assess the potential for increased accessibility within the AOI. The Project plans were analyzed for potential accessibility changes within the project limits. The Project would shift the DART Orange and Green lines to a new corridor to open capacity for additional Red Line service in the existing transitway mall. The Project would introduce five new stations: Museum Way, Metro Center, Commerce, CBD East, and Live Oak (relocation of Deep Ellum Station), thus allowing riders outside of the CBD increased access to other parts of downtown Dallas. All proposed stations would be accessible from nearby bus routes. Transfers to several bus routes, as well as the Red and Blue lines, would be available at the Metro Center Station, which would result in increased accessibility throughout the AOI for transit users. The Project would expand rail coverage in downtown, and the rail system would connect to the proposed high-speed rail system to be located near the existing Cedars and Convention Center stations. In summary, rail users can access areas along the corridor from any of the proposed stations, as well as areas along the other existing rail line corridors through connections at the proposed stations. Additionally, riders departing at the proposed stations could connect to bus options to reach a farther distance than from walking and biking; however, it is more likely that riders are attempting to reach destinations within walking distance to the stations.



Although all stations are interconnected through the proposed D2 rail line, once reaching the desired station, additional transportation modes may be needed to reach ultimate destinations. Destinations near or within walking distance from the D2 stations would receive the most benefit and increased accessibility.

In Step 2, feedback from local planners was collected in September 2018 to get their professional opinion on potential areas of development and redevelopment. Local planners and staff provided feedback and input on future developments planned or likely to occur, potential impacts of the proposed project, and induced growth within the AOI. Input was received from City of Dallas and Downtown Dallas Inc. staff. Their planners identified areas that could be impacted by the proposed Project. Using this feedback as well as information from the North Central Texas Council of Governments (NCTCOG) Regional Data Center, the potential for induced growth was determined and areas of development and redevelopment were identified. It is anticipated that the proposed project has the potential to increase the rate and intensity of potential development specifically in the Victory and Deep Ellum Districts. The east end of downtown into the western edge of Deep Ellum is currently experiencing a development boom with a variety of mixed-use improvements including office space, a hotel, a residential high-rise, and a renovation of the historic Knights of Pythias Temple.

A cartographic analysis was conducted to examine the amount of developable land within the AOI. The geographic area of the AOI is 1,909 acres, but approximately 735 acres are composed of roadways. The remaining 1,163 acres are assigned land uses by NCTCOG 2015 data so that number was used to calculate the amounts of developable and undevelopable land in the AOI. **Table 4-17** lists the land use types and acres within the AOI. Approximately 20 percent (235 acres) of the AOI is developable which includes parking areas and vacant parcels that are subject to induced growth effects. Undevelopable parcels within the AOI make up approximately 80 percent (912 acres) and consist of parks and recreation areas that restrict most urban development, as well as already developed land. More focused development around project stations would also enhance accessibility and job opportunities for transit-dependent populations from throughout the service area. The City of Dallas and DART jointly submitted a grant application for the FTA Pilot Program for Transit-Oriented Development (TOD) Planning to focus on a TOD implementation plan for the D2 corridor. Assuming a grant award, this effort would be done concurrent with the City's comprehensive plan update in 2020-2021.

Table 4-17 Land Use Categories within the AOI

Land Use Category	Acres within the AOI	Percent Total within the AOI
Developed Land <i>(Airport, Cemetery, Commercial, Education, Group Quarters, Hotel/Motel, Industrial, Institutional, Large Stadium, Mixed Use, Multi-family, Office, Railroad, Retail, Single Family, Transit, Under Construction, Utilities)</i>	869	46%
Undevelopable Land <i>(Flood Control, Small Water Bodies, Parks and Recreation, Water)</i>	43	2%
Developable/Redevelopable Land <i>(Parking and Vacant)</i>	235	13%
Roadways	735	39%
Total AOI	1,909	100%

Sources: NCTCOG, 2015 Land Use



For Step 3, information on socioeconomic resources was gleaned from the Socioeconomic and Land Use technical memoranda for the Project. Sixty community facilities, including museums, performing arts centers, post offices, churches, federal buildings, libraries, police stations, schools, and fire departments exist within the AOI. Community cohesion is represented throughout the AOI by 12 neighborhood associations and homeowners associations (HOAs), and 9 DISD schools which serve to bind neighbors to one another under a common identity or set of ideals. There are 43.58 acres of parks and recreational areas within the AOI. While there are no Environmental Justice (EJ) communities within the AOI, there are 33 blocks with a minority population greater than 50 percent scattered throughout the AOI, and three block groups with Limited English Proficiency (LEP) populations greater than 5 percent.

The Project is expected to have long-term positive effects on the economy of the downtown region in the way of job growth, increased housing, and increased mobility and accessibility for commuters. Businesses and residents along the corridor could benefit from the potential for TOD near new transit stations, as well as from additional access that could draw customers and employees to businesses. Services that accommodate population growth in the region may positively impact schools and community facilities in the AOI. The Project would also enhance accessibility and job opportunities for transit-dependent populations throughout the service area and have a beneficial impact on low income and/or minority populations as housing, employment, and mobility options would be enhanced. The proposed project would act as an asset to the area by enhancing access to both established and growing markets in the region and downtown, including the south Victory Park area, the Commerce Street corridor, and the eastern portion of the CBD where new development and redevelopment initiatives are currently underway. In general, the Project would support the region's growing population by providing accessible work opportunities to employees and employers, and support revitalization efforts in the area. No substantial impacts to any human or natural resources are anticipated as a result of the proposed D2 line or its construction.

In Step 4 various methods were utilized to assess the existing and future conditions of the AOI. Cartographic review, GIS analysis, review of planning documents, and city planner input were utilized in this report. City planners provided professional judgment based on years of experience and knowledge of development trends specific to the AOI. The consensus of city planners is that the proposed Project would potentially add momentum to ongoing development within the AOI. The induced growth impacts from the Project would be considered a benefit for the area and surrounding communities. As mentioned in Step 3, socioeconomic resources are the only resource that has the potential to be impacted by induced growth from the proposed project. Any negative impacts to socioeconomic resources could be minimized through the continued monitoring of safety, access, proposed station locations. Additionally, impacts to community resources would be minimized and mitigated through existing land use development regulations and downtown TOD plans, which would govern induced development projects within the AOI. Indirect impacts from the project, particularly potential land use redevelopment effects, are consistent with local goals and trends. As a result, no mitigation is proposed for induced growth impacts.

Based on the amount of developable land within the AOI, the pace of development within the region, and the response of local planning experts, the proposed project has potential to induce development, but is not anticipated to generate substantial induced development. Along the 2.4-mile corridor, 80 percent of the AOI is already developed and been converted to urbanized use or is undevelopable due to land use restrictions, and the amount of developable land within the AOI is 20 percent. Planners indicated that the Project has the potential to increase the rate and



intensity of potential development, specifically in the Victory and Deep Ellum Districts. Although other areas within the AOI also contain developable land, feedback from the City of Dallas planners is that these areas would likely not be influenced by the Project due to their distance from the alignment or stations. Businesses and employers along the corridor are anticipated to benefit from the proposed project because of additional access opportunities around proposed stations for potential employees and customers. Impacts to community resources would be minimized and mitigated through existing land use development regulations.

Cumulative Impacts. The purpose of the cumulative impacts analysis is to assess the direct and indirect impacts of the proposed project within the larger context of past, present, and future activities that are independent of the proposed project, but which are likely to affect the same resources in the future. This approach evaluates the incremental impacts of the proposed project in respect to the overall health and abundance of selected resources.

Cumulative impacts are analyzed in terms of the specific resource being affected by the proposed project. Before initiating the cumulative impacts analysis, key resources/issues are identified and it is determined whether a cumulative analysis is warranted for each resource/issue. The cumulative impacts analysis focuses on 1) those resources substantially impacted by the project (directly or indirectly) and 2) resources currently in poor or declining health or at risk even if project impacts (either direct or indirect) are relatively small.

TxDOT is conducting a feasibility study of I-345. The study will include scenarios for I-345, which include consideration of its removal or rebuilding it in an elevated or depressed configuration. DART will continue to coordinate with the City of Dallas, TxDOT, and NCTCOG on a solution and agreement for the I-345 crossing that integrates the D2 Subway with future I-345 scenarios.

The proposed action would likely have a net beneficial cumulative impact on socioeconomic resources in the project area. The Project would not directly or indirectly impact resources in poor or declining health; therefore, a cumulative effects analysis is not required.

Construction Impacts are described in **Chapter 5**.

4.17 Draft Section 4(f) and Chapter 26 Evaluation

4.17.1 Introduction and Regulatory Setting

Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 USC § 303 and 23 USC §138) protects publicly-owned parks and recreation areas, as well as wildlife and waterfowl refuges and historic sites, and directs the conditions under which such properties may be used. Properties may only be used if:

1. There is no prudent and feasible 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) regulations also require coordination with the U.S. Department of the Interior and relevant state and local officials. For historic sites, consultation with the State Historic Preservation Office (SHPO) is required. For recreational resources, consultation with the agency responsible for the resources is also required.

23 CFR 774.17 defines the types of uses under Section 4(f). Use may be direct (temporary or permanent) or constructive. Constructive use involves an indirect impact to the Section 4(f) property of such magnitude as to severely impact important features, activities or attributes associated with it, and to substantially impair it.



A determination of *de minimis* impact on parks, recreation areas, and wildlife and waterfowl refuges, may be made when all three of the following criteria are satisfied:

1. The transportation use of the Section 4(f) resource, together with any impact avoidance, minimization, and mitigation or enhancement measures incorporated into the project, does not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f);
2. The public has been afforded an opportunity to review and comment on the effects of the project on the protected activities, features, and attributes of the Section 4(f) resource; and
3. The official(s) with jurisdiction over the property are informed of U.S. DOT's intent to make the *de minimis* impact determination based on their written concurrence that the project will not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f).

Tunneling under a Section 4(f) property will result in a Section 4(f) use only if one or more of the following conditions are met:

- Archeological sites that warrant preservation in place are adversely affected;
- There is permanent harm to the purposes for which the park, recreation area, or refuge was established;
- There is substantial impairment to the integrity of a historic site; or,
- The exception for temporary occupancy is not met.

Chapter 26 of the Texas Parks and Wildlife Code was established to protect public 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.

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965, as amended, (16 USC 4601-4 et seq.) protects recreational lands purchased or improved with LWCF program funds.

Section 106 of the National Historic Preservation Act of 1966 as amended (54 USC § 300101 et seq.) and its implementing regulations (36 CFR 800) is discussed in **Section 4.6**. Intensive level research determinations of eligibility have been completed in consultation with the Texas Historic Commission (THC). Determinations of effect are underway in coordination with the City of Dallas, Preservation Dallas and the THC. Determinations of adverse effect are considered a Section 4(f) use and require evaluation.

4.17.2 Methodology

For Section 4(f) historic resources, the NRHP-listed and eligible resources in the APE were evaluated to determine the effects from the proposed project under the Criteria of Adverse Effect (see **Section 4.6**).

For the Section 4(f) park resources, parks or trails within the Study Area of 0.5 mile on either side of the D2 Subway proposed alignment and the proposed station locations were included in the



analysis. Park resources and potential direct effects of the Build Alternative are discussed in **Section 4.5**.

Similarly, Chapter 26 applies to publicly-owned park and historic resources directly impacted by the Project. Park resources and potential direct effects of the Build Alternative are discussed in **Section 4.5**. Historic resources are discussed in **Section 4.6**.

4.17.3 Affected Environment

The proposed Project intersects or is adjacent to seven Section 4(f) protected resources. These resources consist of five publicly owned parks and two historic resources (an NRHP-eligible resource and City of Dallas Landmark) that would have an adverse effect under Section 106, pending THC concurrence. A description of these seven resources is provided in **Sections 4.5** and **4.6**. The following sections provide the Section 4(f) and Chapter 26 evaluation for the impacted properties. Evaluated alternatives include the No-Build Alternative and the Build Alternative. While not anticipated, other Section 106 historic resources may have constructive impacts pending further design and consultation.

4.17.4 Impact Evaluation

No-Build Alternative

Under the No-Build Alternative, the Project would not be built and there would be no impacts to Section 4(f) resources associated with the Project. The No-Build Alternative would not meet the purpose and need of the Project.

Build Alternative

Table 4-18 summarizes the Section 4(f) and Chapter 26 use of properties within the Study Area. As shown in **Table 4-18**, there is no proposed Section 4(f) use of four of the park facilities. The fifth, Pegasus Plaza, is proposed as a Section 4(f) *de minimis* impact. Belo Garden and Pegasus Plaza both would result in a Chapter 26 use. Magnolia Gasoline Station and St. James A.M.E. Temple both would result in a Section 4(f) use. Proposed use determinations and the Section 4(f) and/or Chapter 26 evaluations are discussed in the following sections for those resources where a use was found, either under Section 4(f) or Chapter 26.

Table 4-18 Summary of Section 4(f)/Chapter 26 Properties

Name	Distance (feet) from Alignment or Station Location	Address Or Location	Size	4(f) Use	Chapter 26 Use
Magnolia Gasoline Station*	Construction Staging Area	902 Ross Avenue	2,567 sq. ft.	Direct use due to Section 106 Adverse Effect, pending THC concurrence.	N/A
Belo Garden*	30 to 60 feet above grade	1014 Main Street	1.7 acres	No use.	Use. Proposed mass transit easement under the park.
Pegasus Plaza*	Headhouse on Pegasus Plaza	1500 Main Street	0.5 acre	Proposed Section 4(f) <i>de minimis</i> use.	Use. Proposed surface and subsurface mass transit easement for headhouse and temporary easement for construction site use.



Name	Distance (feet) from Alignment or Station Location	Address Or Location	Size	4(f) Use	Chapter 26 Use
Browder Street Mall	30 feet from ventilation shaft	200 Browder Street	0.2 acre	No use.	No use.
Main Street Garden	Adjacent below grade	1902 Main Street	1.75 acres	No use.	No use.
Carpenter Park	50 feet	2201 Pacific Avenue	5.6 acres	No use.	No use.
St. James A.M.E. Temple*	Adjacent to the alignment	624 N. Good Latimer Expressway	800 sq. ft	Direct use due to Section 106 Adverse Effect, pending SHPO concurrence.	N/A

Source: GPC6.

Note: *Additional consultation with THC, Dallas Park and Recreation Board, and /or Dallas Landmark Commission is underway.

4.17.5 Section 4(f) and Chapter 26 Application

Both Section 4(f) and Chapter 26 allow the use of protected resources provided that there is no prudent and feasible alternative to that use. Alternatives that have been considered to the Project as a whole are discussed below. Site specific alternative considerations are discussed in the evaluation for each resource.

D2 Subway Project Alternatives Considered

A second downtown light rail alignment has been included in various DART and North Central Texas Council of Governments (NCTCOG) planning documents since 1983. The Project webpage (DART.org/D2) includes information on the alternatives development and screening process that led to the selection of the proposed Project from among several other build alternatives. DART began planning for D2 in 2007. Since then, several studies and planning efforts have been completed which led to approval of a mostly at-grade Locally Preferred Alternative (LPA) in September 2015.

That 2015 LPA would have avoided several resources but may have impacted others. DART initiated Project Development (PD) for that LPA in November 2015, which included early preliminary engineering and preparation of an EIS. During summer 2016, there were community concerns with the alignment and requests from the City of Dallas and key stakeholders to pursue a subway option. As a result, on October 25, 2016, the Board of Directors approved the FY17 Financial Plan, which doubled the project budget for a D2 Subway. Based on this action, DART initiated an LPA Refinement Phase in December 2016. This refinement phase entailed significant coordination with technical staff and downtown stakeholders and resulted in both the Dallas City Council (Resolution No. 171426) and the DART Board of Directors (Resolution No. 170101) approving the D2 Subway LPA in September 2017.

- The SDEIS includes a No-Build Alternative that would avoid the use of all Section 4(f) and Chapter 26 resources. As the No-Build Alternative does not address the transportation needs of the City and the region, it is not considered to be a prudent or feasible alternative to the Project.
- Previously studied rail alignments, including the initial 2015 LPA that would have avoided some or all protected resources, were deemed unacceptable by the City of Dallas and downtown Dallas stakeholders.



- The Project LPA refinement process during 2016-2017 eliminated other subway alternatives based on stakeholder input and technical review.
- The development process considered factors such as: capital costs, ridership, affordability, constructability, transferability/connectivity with LRT lines/bus transfer facilities, land use, underground utility considerations, access to jobs, residents and visitor/entertainment attractions, interoperability with the existing LRT Transitway Mall, private property impacts, and ability to maintain train operations during construction.
- The Project alignment and station access points are the result of significant coordination with downtown stakeholders. There is broad based support for the current Project alignment and station access points.
- The Project was approved by the Dallas City Council and the DART Board of Directors. The Dallas Transportation Committee was briefed on the Project status on January 21, 2020 including the proposed construction approach and use of protected resources.

Magnolia Gasoline Station: Section 4(f) Evaluation

As detailed in **Section 5.2.4**, the tunnel portion of the Project begins with a west tunnel portal just south of Woodall Rodgers Freeway. Cut-and-cover construction extends south under North Griffin Street approximately 1,300 feet through the Metro Center Station. The Metro Center Station would be located under North Griffin Street between San Jacinto and Elm Streets adjacent to the West Transfer Center. A new headhouse serving the station would be located at the West Transfer Center site, which will require reconfiguration of the bus bays at this location.

To facilitate tunnel construction, DART has identified construction staging areas. These facilities would have to also accommodate workshops, temporary muck piles, loadout facilities, shipping containers, electrical power centers, material supplies, office space, bath houses, lubricant storage areas, compressor houses, frac tanks, sedimentation ponds, haul truck queuing areas and possibly TBM assembly. Initially, DART proposed to use a large 4.7-acre parking lot site to the east of the west tunnel portal. A smaller 1.3-acre site to the west was identified for contingency use. Within the last year, development plans were initiated with new construction on the 4.7-acre site planned to occur prior to Project construction. Subsequently, two sites were identified near the Metro Center Station to replace the 4.7-acre site, a 1.1-acre site at the northeast corner of Griffin Street and Pacific Avenue and a 1.8-acre site located immediately north of the West Transfer Center. The West Transfer Center (1.4 acres) would also be used as it would contain the new station headhouse and bus transfer area. These three sites total approximately 4.3 acres.

The 1.8-acre site north of the West Transfer Center is bounded by Lamar Street, San Jacinto Street, Griffin Street, and Ross Avenue. Most of this block is a surface parking lot, with some existing small businesses, including a building occupied by a FedEx Office. As discussed in **Section 4.6**, this building is the Magnolia Gasoline Station which is a Section 4(f) resource that was determined eligible for listing in the NRHP. Using the site for staging requires the demolition of the Magnolia Gasoline Station which constitutes a Section 4(f) use. FTA intends to make a direct use impact determination following public and City of Dallas review and input. Prior to FTA approval, its use must be reviewed in coordination with the U.S. Department of the Interior pursuant to 23 CFR 774.5(a).

The existing West Transfer Center site would be reconfigured to accommodate access points for the Metro Center Station. As such, a portion these construction staging sites would also be used for temporary bus operations during construction.



Alternatives Considered

Based on initial construction staging requirements, it was determined that approximately 4 to 5 acres, preferably contiguous as one large site, would be needed for construction. In the downtown Dallas urban environment, there is limited opportunity to provide sufficient acreage for the construction staging in proximity to the open cut tunnel. Significant development has occurred on most surrounding property. The 4.7-acre site immediately east of the west portal is no longer available as the site is currently being designed for a \$1 billion mixed use development. DART is working with the developer to incorporate the portal into the property and the development schedule precludes using the property as a staging area. Without this site, construction staging would be limited to the 1.8-acre site north of the West Transfer Center, the 1.1-acre site east of Griffin, and the 1.4-acre West Transfer Center site. The three sites together total 4.3 acres and a portion may be required for temporary bus operations. The 1.3-acre contingency site west of the tunnel portal to the north may also be used for construction staging or access to the portal. Until final construction methods and requirements are known, all sites are assumed to be required.

Planning to Minimize Harm

To minimize harm to the use of Magnolia Gasoline Station a complete historic documentation of the historic resource will be completed prior to demolition. Additionally, DART will coordinate with design and construction contractors to seek to avoid demolition of this resource pending confirmation of construction staging area needs. If successful, the original Magnolia Gasoline Station Building could be preserved and integrated into potential higher-density, mixed-use redevelopment of the site.

Belo Garden Chapter 26 Evaluation

The Project would place a permanent tunnel alignment beneath a public park. Belo Garden is owned and maintained by the City of Dallas with support from the Belo Foundation, and managed by Downtown Dallas, Inc. The top of the tunnel would be approximately 45 feet below ground and would avoid disruption or impacts that would harm the park. When construction is occurring, the mining or boring methods operating 45 feet below the park would not result in noticeable vibrations and therefore also would not result in any damage to the park. Once the tunnel is complete and operational, the presence of the tunnel would not be noticeable in the park or affect the protected activities in the park. Operation of trains in the completed tunnel would not result in vibration impacts. An underground mass transit easement would be sought from the City of Dallas for the Project.

- Land Acquisition – There would be no land acquisition from Belo Garden. An underground mass transit easement would be sought from the City of Dallas for the Project.
- Access – Entry to the park would not be restricted.
- Noise and Vibration – There are no noise or vibration impacts projected for this park.
- Visual – The Project would not change the visual qualities or use of the Park.
- Archeological Resources – No previously recorded archeological sites were identified within the alignment.

FTA proposes a finding of a no use under Section 4(f), as the Project does not meet tunneling conditions that would result in use, and there would be no permanent harm to the purposes of which the park was established.

The City of Dallas considers that the acquisition of an underground mass transit easement would constitute a Chapter 26 use. As demonstrated above, there is no feasible and prudent alternative to the use. Additionally, no impacts to the park have been identified as a result of the use. The



City of Dallas, the entity with jurisdiction over the Chapter 26 Resource, supports the Project. After consideration of avoidance alternatives, there are no feasible and prudent alternatives to tunneling under Belo Garden and the Project includes all reasonable planning to minimize harm to the land.

Alternatives Considered/Planning to Minimize Harm

Alignment alternatives for the Project are discussed above. As there are no identified impacts, no mitigation is required.

Pegasus Plaza: Section 4(f) *de minimis* Impact and Chapter 26 Evaluation

The construction of the Project proposes using an offset headhouse approach to avoid cut-and-cover construction along Commerce Street. This approach would require full use of the park site for temporary construction purposes, and then would construct a permanent headhouse along the south side near the back of Magnolia Hotel. Pegasus Plaza would be re-established after construction.

- Land acquisition – There would be temporary use for construction of the station, vertical circulation and headhouse. A mass transit easement is proposed for the headhouse on the site.
- Access – Access to the park would temporarily be unavailable while the site is used for construction. Entry to the park would not be restricted after the project is in place and discussion with the City of Dallas and stakeholders emphasizes enhanced access to and through the site as part of the re-design.
- Noise and Vibration – There are no noise or vibration impacts projected for this park. The projected operational noise levels of the Project would not exceed FTA noise impact criteria for parklands.
- Visual – The addition of the station headhouse would visually change the area. The headhouse and some elements of ventilation would be located on Pegasus Plaza but would be integrated into the overall re-design to complement and enhance the park.

A temporary use will not constitute a Section 4(f) use if all the conditions in 23 CFR 774.13(d) are satisfied. DART's occupancy of the plaza would be temporary and limited to the time needed for construction. Changes to Pegasus Plaza would be minimal with the park being fully restored and returned to a condition at least as good as which existed prior to construction.

The permanent easement for the headhouse would constitute a *de minimis* impact to Pegasus Plaza. The easement would be for the sole purpose of providing public access to the Commerce Street station. Moreover, the easement would be limited to only that portion of the park needed for the headhouse and the City of Dallas would retain full access after construction.

FTA intends to make a Section 4(f) *de minimis* impact determination. In accordance with 23 CFR 774.5(b), this determination will be made following public review and input and with the City of Dallas written approval on FTA's determination of a *de minimis* impact finding. A *de minimis* impact involves the use of §4(f) property that, after taking into account avoidance, minimization, mitigation, and enhancement measures, results in no adverse effect to the activities, features, or attributes qualifying a park, recreation area, or refuge for protection under §4(f). For publicly-owned recreation 4(f) resources, *de minimis* impacts are defined as those that do not "adversely affect the activities, features and attributes" of the Section 4(f) resource. Although the Pegasus Plaza would be closed during construction, the plaza would be reconstructed with similar features and attributes to the existing park. When completed the activities, features and attributes of the



park would not be adversely affected and the overall use and activity at Pegasus Plaza would be enhanced as part of the redesign.

The construction in Pegasus Plaza would constitute a Chapter 26 use of publicly-owned parkland under state law. The following sections demonstrate that there is no feasible and prudent alternative to the use and the Project includes all reasonable planning to minimize harm to the land, as a park, resulting from the use.

Alternatives Considered

The Commerce Station is located beneath a key city arterial street in a densely developed portion of downtown Dallas. The area has seen significant investment and revitalization, including the AT&T Discovery District. Initial concepts that focused station access within the street right-of-way or adjacent properties would require cut-and-cover construction of Commerce Street. Several stakeholders and property owners along Commerce Street, as well as City of Dallas staff, did not support cut-and-cover construction for the station. In addition, the Dallas City Council resolution included direction to minimize impacts to City streets. As a result, this approach was not determined to be prudent or feasible. During discussions, DART proposed the offset headhouse construction approach to allow for the alignment and station to be mined at this location with minimal surface disruption. Given right-of-way constraints, such as subsurface utilities and building foundations, Pegasus Plaza provides the best location to provide construction access and a headhouse for pedestrian access and can ultimately provide a benefit for this part of downtown Dallas.

Planning to Minimize Harm

DART has undertaken consultation and planning efforts to ensure that all planning to minimize harm has been accomplished. The Pegasus Plaza headhouse would provide pedestrian access to the Commerce Station. The headhouse would be designed to be integrated into the plaza to minimize the direct impacts to features and attributes of the park. Surface elements of the station would be minimized to the greatest extent possible. The headhouse space would serve as the main entrance into upper and lower mezzanine levels to access the platform. Fare control would be below-grade at the upper mezzanine level to minimize the surface footprint in the park. Post-fare collection areas would include a large open concourse generally under Akard Street, spaces for concessions, and non-public service spaces for DART staff, DFD and DART police. The station would also include ancillary spaces for ventilation, mechanical and electrical purposes. Most of the station mechanical systems/electrical systems, and tunnel ventilation would be located under the plaza. Staff spaces, service spaces, public passage, ventilation shafts and egress corridors would be located under Akard Street.

DART and the City of Dallas hosted a workshop with park stakeholders and founders on January 29, 2020 to discuss the headhouse approach and outline the vision and key priorities for a re-imagined Pegasus Plaza. Based on the workshop, there is support for the approach and a desire to maintain the Pegasus myth theme and reincorporate public art elements with a new design that makes the plaza more functional, inviting, and accessible, while ensuring a high-quality space for residents and visitors and ambient levels of an urban downtown location. While not anticipated due the existing urban environment, minimization of any potential noise impacts would be considered during final design.

DART also held an additional coordination meeting on March 27, 2020 with the park founder, original public artist, city public art staff, and park and recreation department staff, to review the



approach and how best to potentially retain public art and reintegrate into a park design. Coordination will continue as design progresses.

During final design, DART would work with the City of Dallas, the official with jurisdiction over Pegasus Plaza, to finalize a reimagined park site plan for future construction based on a Pegasus Plaza agreement, which is in development. The goal of ongoing coordination is to ensure the reconstructed Pegasus Plaza benefits the surrounding community, complements the surrounding urban fabric, and provides pedestrian access to the underground Commerce Station.

Project Coordination

DART has coordinated the Project with the City of Dallas staff, downtown stakeholders, including Parks for Downtown Dallas, and the general public. The City of Dallas Park and Recreation Board was briefed on the D2 Subway on September 5, 2019 and approved a resolution on September 19, 2019 addressing potential impacts and mitigation of the Project on parks. The resolution stated that DART return to the Park and Recreation Board with a fully integrated concept for Pegasus Plaza and the headhouse. This meeting is anticipated in June 2020. The resolution also specifies that city staff continue to coordinate with DART on agreements that may be required for city parks, using procedures in accordance with local, state and federal regulations; and, that DART agrees that should there be impact in connection to the D2 Subway to any park, including Pegasus Plaza, that DART will make the city whole and the park will be returned to their original condition or incorporate appropriate enhancements as mitigation.

DART will be coordinating with the Arts and Culture Advisory Commission and the Landmark Commission on the D2 Subway project. Coordination with the Arts and Culture Advisory Commission will include a briefing relative to the potential to salvage and reintegrate public art into a reimagined plaza design, as well as the station art and design program. The Landmark Commission will be briefed on potential effects on historic resources around Pegasus Plaza. A programmatic agreement with the THC is in development and will emphasize design elements that minimize visual effects, which is in alignment with minimizing impacts to Pegasus Plaza.

This documentation has been provided to the City of Dallas Parks and Recreation Department, the entity with jurisdiction over Pegasus Plaza, for review in order to schedule the appropriate actions by the City of Dallas Park and Recreation Board and Dallas City Council to authorize a public hearing in accordance with Chapter 26 of the Texas Parks and Wildlife Code for the proposed surface and subsurface mass transit easements.

St. James A.M.E. Temple Section 4(f) Evaluation

The Project would displace the Deep Ellum Station which would be replaced by the Live Oak Station located approximately 600 feet to the north along the existing Green Line. Good Latimer Expressway would be rebuilt to remove ballast and replaced with embedded track. Accessibility to the station would be via sidewalks and potential new pathways along the Project corridor to surrounding neighborhoods and destinations.

The Live Oak Station would be located directly in front of the St. James A.M.E. Temple, an eligible resource and a City of Dallas Landmark with defined boundaries which contribute to the integrity and setting of the property. The property is now owned by the Meadows Foundation and used for office space. The relocated station would introduce a new visual element in front of the landmark. The new station location poses a visual adverse effect because the rail alignment would be positioned closer to the property. As a result of the Project, the existing sidewalk would be relocated closer to the building and a new a 1.5-foot to 5.4-foot-wide portion of property on the west/front side of the resource would be acquired to accommodate necessary right-of-way for the



Live Oak Station and accessible sidewalk. The proposed design would require shifting the street and sidewalk closer to the building and reconstructing the concrete steps and driveway along the existing gate/fence to meet the new proposed sidewalk location. The existing fence and gate would remain in place and mature trees would be preserved to greatest extent possible. In addition, the historical marker on the northwest corner of the church property would need to be removed and relocated at a location to be determined by the City of Dallas. The placement of the sidewalk closer to the NRHP eligible property and City of Dallas Landmark encroaches within the “No Build Zone” boundaries established by the City of Dallas through their preservation ordinance #24396 and would result in an adverse visual effect. In addition, the removal of land, concrete steps and mature vegetation alters the historic physical setting of the NRHP eligible resource and City of Dallas Landmark (**Appendix B.14, DOE Report**).

According to City of Dallas Ordinance, the current property boundaries consist of 20,550 square feet (sf) (**Appendix B.14, DOE Report**). The proposed use of the property would consist of approximately 800 sf. The total use of property is therefore approximately 4 percent of the total parcel. The Project would result in a visual effect of the St. James A.M.E. Temple attributes that qualify the resource for protection under Section 4(f). FTA intends to make a direct use impact determination following public and City of Dallas review and input. Prior to FTA approval, its use must be reviewed in coordination with the U.S. Department of the Interior pursuant to 23 CFR 774.5(a).

Alternatives Considered

Elimination of the Deep Ellum Station but not replacing it with the Live Oak Station would avoid the Section 4(f) use of the St. James A.M.E. Temple. Without the Live Oak Station, the northbound Green Line tracks would remain in the current configuration and location. There would be no direct impacts to the northbound lanes, sidewalk or St. James A.M.E. Temple property. There would still be some reconstruction as the tracks are proposed to be in an embedded track condition rather than the current ballasted condition. Southbound Good Latimer lanes would still be reconstructed. No additional impacts to St. James A.M.E. Temple have been identified. Elimination of this station would result in a loss of community benefits of maintaining a station along Good Latimer. The area has seen significant investment and revitalization by the City of Dallas, the Meadows Foundation and private developers. The existing station serves Live Oak Lofts Apartments, the Latino Cultural Center, Meadows Foundation non-profit organizations, and the Epic mixed-use development. During early project development, Project plans did not include the station. However, based on strong community feedback during Fall 2018 public and stakeholder meetings to retain a station in this area, DART modified the track alignment to shift the station to Live Oak. Public and stakeholder input to date supports the current design.

Planning to Minimize Harm

DART has undertaken consultation and planning efforts to ensure that all planning to minimize harm has been accomplished. DART has coordinated the design with the Meadows Foundation, the current owner of the property. Concerns expressed about the Project include noise, vibration (including impact to structural integrity of historic property), pedestrian/ADA access, utilities, driveway impacts and vegetation impacts.

- As discussed in **Section 4.8**, there is no noise or vibration impact to the St. James A.M.E. Temple due to transit operations. Additionally, it is extremely rare for vibration from train operations to cause substantial or even minor cosmetic building damage. The assessment of potential ground-borne vibration at sensitive receptors from light rail operations



indicated no impacts. However, specific mitigation measures will be developed during project design to avoid vibration impacts to sensitive buildings during project construction.

- DART proposes to retain similar access with rebuilt steps to the gate. As is currently provided, pedestrian ADA access would be in the back of the building at the main entrance.
- Until detailed design is underway, it is unknown how construction will affect utilities. If they are impacted, DART would relocate or modify as required.
- The roadway elevation will remain similar to existing. The proposed driveway design conforms to the City of Dallas criteria for driveway grades. The slope may encroach into the parking lot slightly.
- DART will make efforts to preserve trees on the property as part of the final design and during construction. If tree removal is unavoidable, a replacement tree will be planted on the property. If the existing or new tree were to die within one year of completion of construction, DART will replace the tree with a similar tree.

Project Coordination

- Prior to acquiring any new right-of-way from the NRHP eligible and City of Dallas Landmark St. James A.M.E. Temple, a complete historic documentation of the historic resource will be completed. The relocation of sidewalk and historic marker will be done in cooperation with the Dallas Landmark Commission and property owner.
- Concurrent with SDEIS review, FTA and DART will coordinate with the Meadows Foundation and Dallas Landmark Commission regarding impacts to the St. James A.M.E. Temple property and apply for any required Certificates of Appropriateness from the commission.

Other Potential Section 4(f)/Chapter 26 Resources

While there are no direct impacts to other protected resources, the potential for constructive use was also evaluated. A constructive use occurs when the proximity impacts of a proposed project adjacent to, or nearby a Section 4(f) property result in substantial impairment to the property's activities, features, or attributes that qualify the property for protection under Section 4(f). These could include noise, vibration, and visual effects.

The proposed subway line, to be placed within the NRHP-listed, City of Dallas Downtown District and the City of Dallas Harwood Street Historic District Landmark would result in the introduction of vibration elements to the historic resources situated within the districts. DART seeks to avoid vibration impacts to foundations and basements of the listed and eligible districts and buildings while tunneling construction is occurring, and also during day-to-day rail operations. The assessment of potential ground-borne vibration at sensitive receptors from light rail operations indicated no impacts. However, specific mitigation measures will be developed during project design to avoid vibration impacts to sensitive buildings during project construction.

The proposed pedestrian portals, to be placed within the NRHP-listed, City of Dallas Downtown District and the City of Dallas Harwood Street Historic District Landmark may result in a potential adverse visual effect to the resources situated within the Districts. Not only are the portals being proposed within two historic districts, but the portals are proposed within Pegasus Plaza. While Pegasus Plaza is not a contributing resource to the NRHP City of Dallas Downtown Historic District, it is adjacent to four individually NRHP-listed properties; the Adolphus Hotel and Tower, the Magnolia Petroleum Building, the Dallas Power and Light Building, and Dallas National Bank Annex (**Appendix B.14, DOE Report**). The introduction of new above-ground elements within the NRHP-listed district and the City of Dallas Landmark would result in a change of visual quality of



the historic property's setting. Until the pedestrian portals have been designed to 90 percent, it is unknown if there will be adverse visual effects to these resources. Design of the portals will be coordinated with both the THC and the City of Dallas to minimize visual effects and design elements to fit within the surrounding context and not detract from resources. As a result, adverse visual effects are not anticipated. The introduction of visual elements within the City of Dallas Landmark Districts (Downtown Dallas and Harwood Street) will also be coordinated with the City of Dallas through their preservation ordinance.

4.17.6 Minimization and Mitigation Measure Summary

The following measures to minimize harm have been identified based on coordination to date.

- Prior to the demolition of the Magnolia Gasoline Station located at 902 Ross Avenue, a complete historic documentation of the historic resource will be completed. DART will also seek to avoid demolition of this resource pending confirmation of construction staging area requirements.
- The headhouse at Pegasus Plaza will be designed to be integrated into the plaza to minimize the direct impacts to features and attributes of the park. During final design, DART will work with the City to finalize a reimagined park site plan for future construction based on a Pegasus Plaza agreement, which is in development.
- Prior to acquiring any new right-of-way from the NRHP-eligible, and City of Dallas Landmark St. James A.M.E. Temple, a complete historic documentation of the historic resource will be completed. The relocation of sidewalk and historic marker will be done in cooperation with the Dallas Landmark Commission and property owner.
- Specific vibration mitigation measures will be developed during project design to avoid vibration impacts to sensitive buildings during project construction.
- Concurrent with SDEIS review, FTA and DART will coordinate with the City of Dallas, the official with jurisdiction over Pegasus Plaza; as well as the property owner and Dallas Landmark Commission regarding impacts to the St. James A.M.E. Temple property.
- DART will make efforts to preserve trees on the St. James A.M.E. Temple property as part of the final design and during construction. If tree removal is unavoidable, a replacement tree will be planted on the property. If the existing or new tree were to die within one year of completion of construction, DART will replace the tree with a similar tree.

4.17.7 Section 4(f) Findings

Magnolia Gasoline Station: Pending THC concurrence of FTA's findings in the DOE Report, the Section 106 process described in **Section 4.6**, and review of the SDEIS, the FTA has preliminarily determined that there are no feasible and prudent alternatives to the Section 4(f) use of Magnolia Gasoline Station. FTA intends to make a direct use impact determination following public and City of Dallas review and input. Prior to FTA approval, its use must be reviewed in coordination with the U.S. Department of the Interior pursuant to 23 CFR 774.5(a).

Pegasus Plaza: FTA intends to make a Section 4(f) *de minimis* impact determination following public review and input and will seek City of Dallas written approval on FTA's determination of a *de minimis* finding.

St. James A.M.E. Temple: Pending THC concurrence of the DOE Report, the Section 106 process described in **Section 4.6**, and review of the SDEIS, the FTA has preliminarily determined that there are no feasible and prudent alternatives to the Section 4(f) use of the St. James A.M.E. Temple. FTA intends to make a direct use impact determination following public and City of Dallas



review and input. Prior to FTA approval, its use must be reviewed in coordination with the U.S. Department of the Interior pursuant to 23 CFR 774.5(a).

4.17.8 Chapter 26 Findings

Belo Garden: The permanent use of Belo Garden would constitute a Chapter 26 use of publicly-owned parkland. Pending City of Dallas concurrence, the SDEIS demonstrates that there is no feasible and prudent alternative to the use and the project includes all reasonable planning to minimize harm to the land, as a park, resulting from the use.

Pegasus Plaza: The permanent direct use and temporary construction use of Pegasus Plaza would constitute a Chapter 26 use of publicly-owned parkland. Pending City of Dallas concurrence, the SDEIS demonstrates that there is no feasible and prudent alternative to the use and the project includes all reasonable planning to minimize harm to the land, as a park, resulting from the use.



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5. Construction Activities and Impacts

5.1 Introduction

Chapter 5 provides an overview of the likely construction methods that would be used for the Project, a discussion of locations where construction would occur, assessment of short-term construction impacts and measures to avoid, minimize, or otherwise mitigate impacts, and a description of the potential sequencing and schedule for construction. Additional details pertaining to construction of the underground segments of the project can be found in the *Methods of Construction Report* in **Appendix A.5. Figure 5-1** through **Figure 5-5** illustrate an overview of the anticipated construction methods (at-grade, cut-and-cover, mined) of the Project. The figures also highlight DART-owned property, proposed construction staging areas, and pedestrian portal or ventilation areas. Additional details on construction methods are discussed in **Section 5.2**.

Project construction would consist of four new stations (one surface and three underground stations) and the relocation of an existing station; surface tracks from just south of Victory Station through Victory Park to the tunnel portal south of Woodall Rodgers Freeway; a tunnel containing two tracks beneath Commerce Street; a tunnel portal near I-345; construction of surface tracks east of I-345 and track modifications near Deep Ellum; and construction of ventilation shafts and fan plants for each underground station. Impacts would typically stem from temporary road and lane closures, staging areas and haul routes, and traffic detours.

Project implementation is following steps outlined in the FTA Capital Investment Grant (CIG) program. These steps provide both FTA and DART the needed opportunities for oversight and review and provide the greatest assurance of cost and schedule control. Following issuance of the FEIS/ROD, DART would proceed into the FTA Engineering phase, and advance project delivery through an appropriate contracting method. A variety of project delivery methods, including Design/Build, are under consideration. During this phase, DART would ensure compliance with mitigation measures, which will be part of the FEIS/ROD. Following construction, there would be a period of system testing prior to revenue service.

Once contractor(s) responsible for design and construction are selected, the major phases of design and construction would include:

1. Preparation of plans, specifications, and procurement
2. Purchase of right-of-way
3. Utility reconstruction and relocations
4. Site preparation and notifications
5. Surface construction
6. Tunnel construction

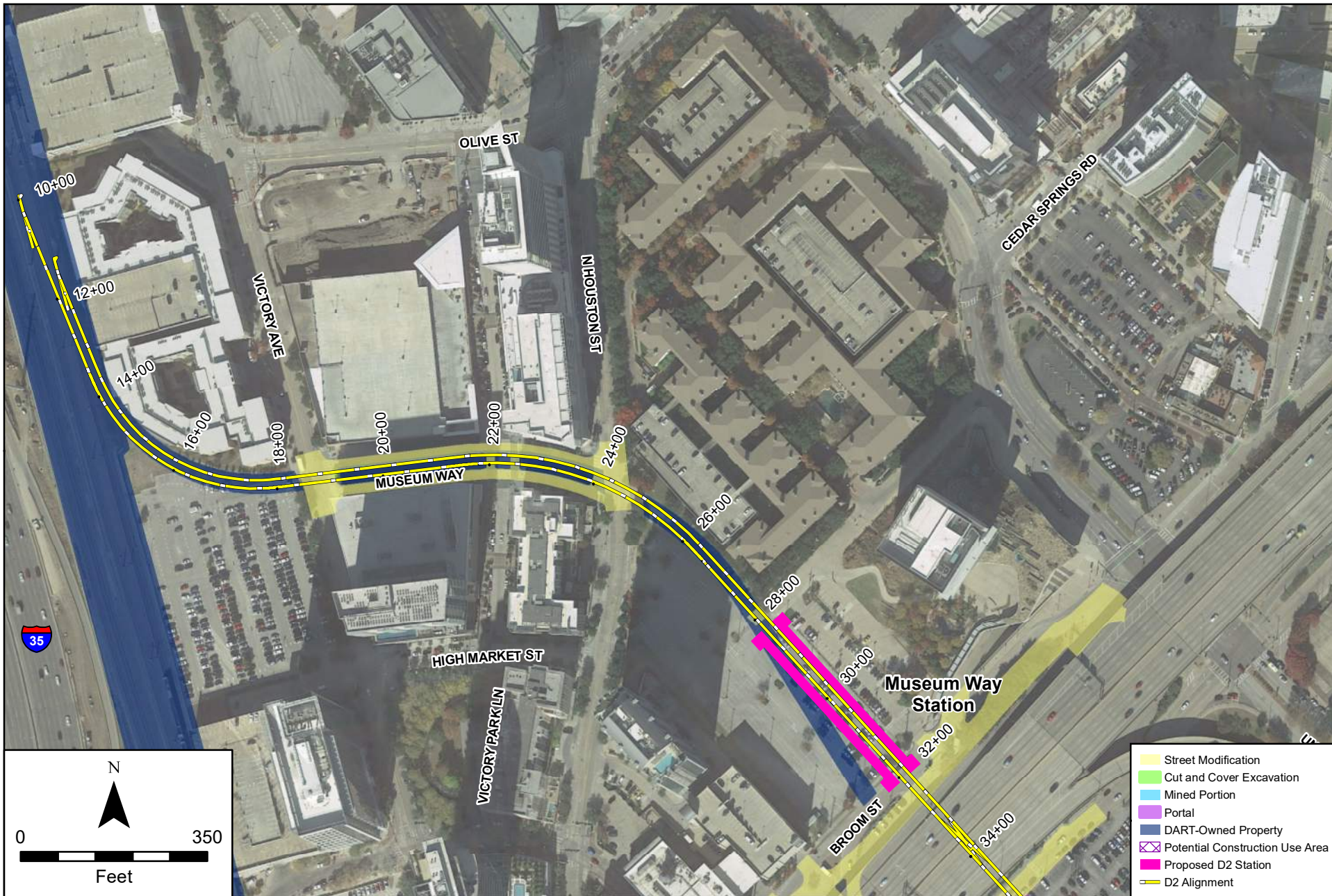


Figure 5-1
Overview of Proposed Construction Methods

Data Source: DART, GPC6



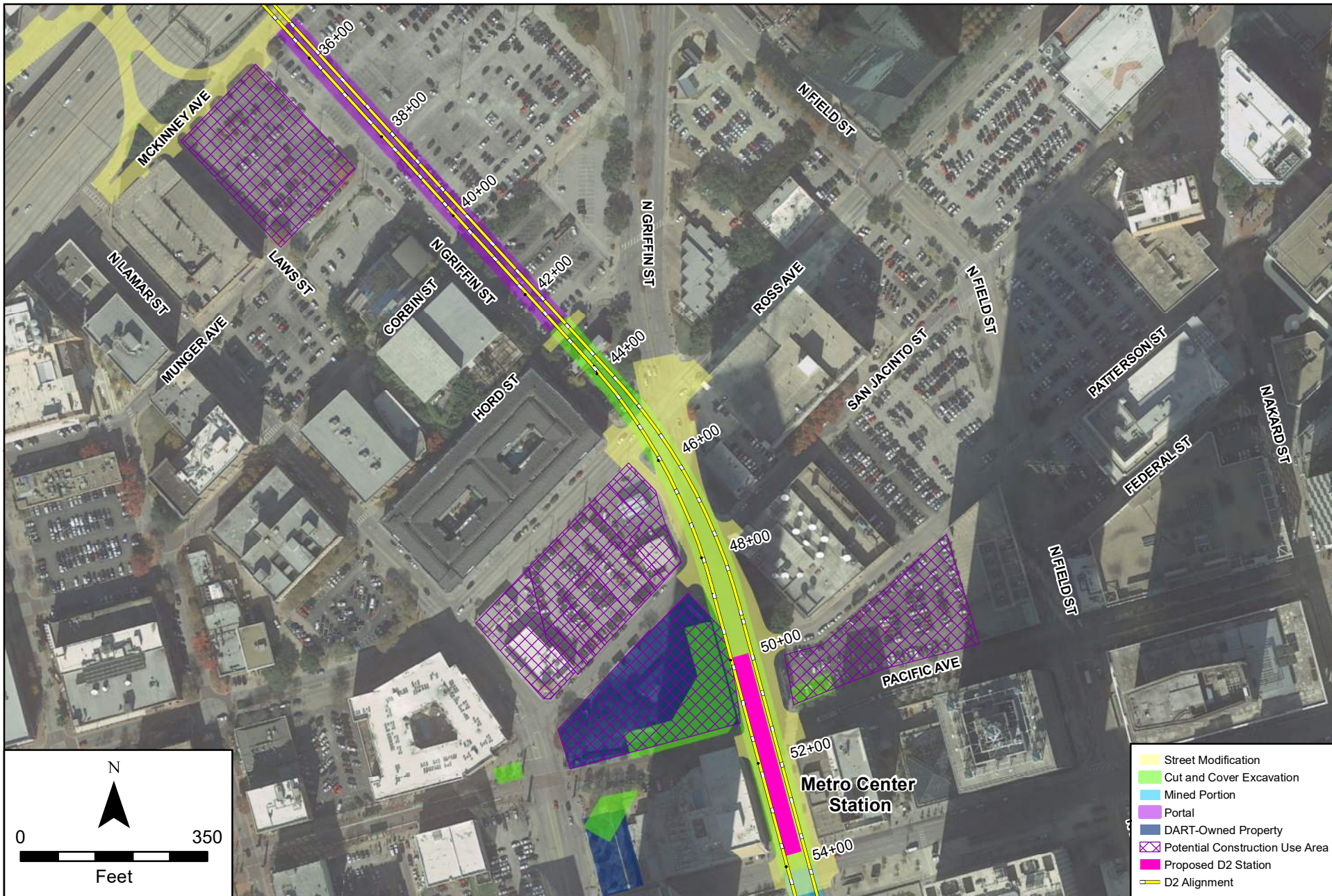


Figure 5-2
Overview of Proposed Construction Methods

Data Source: DART, GPC6



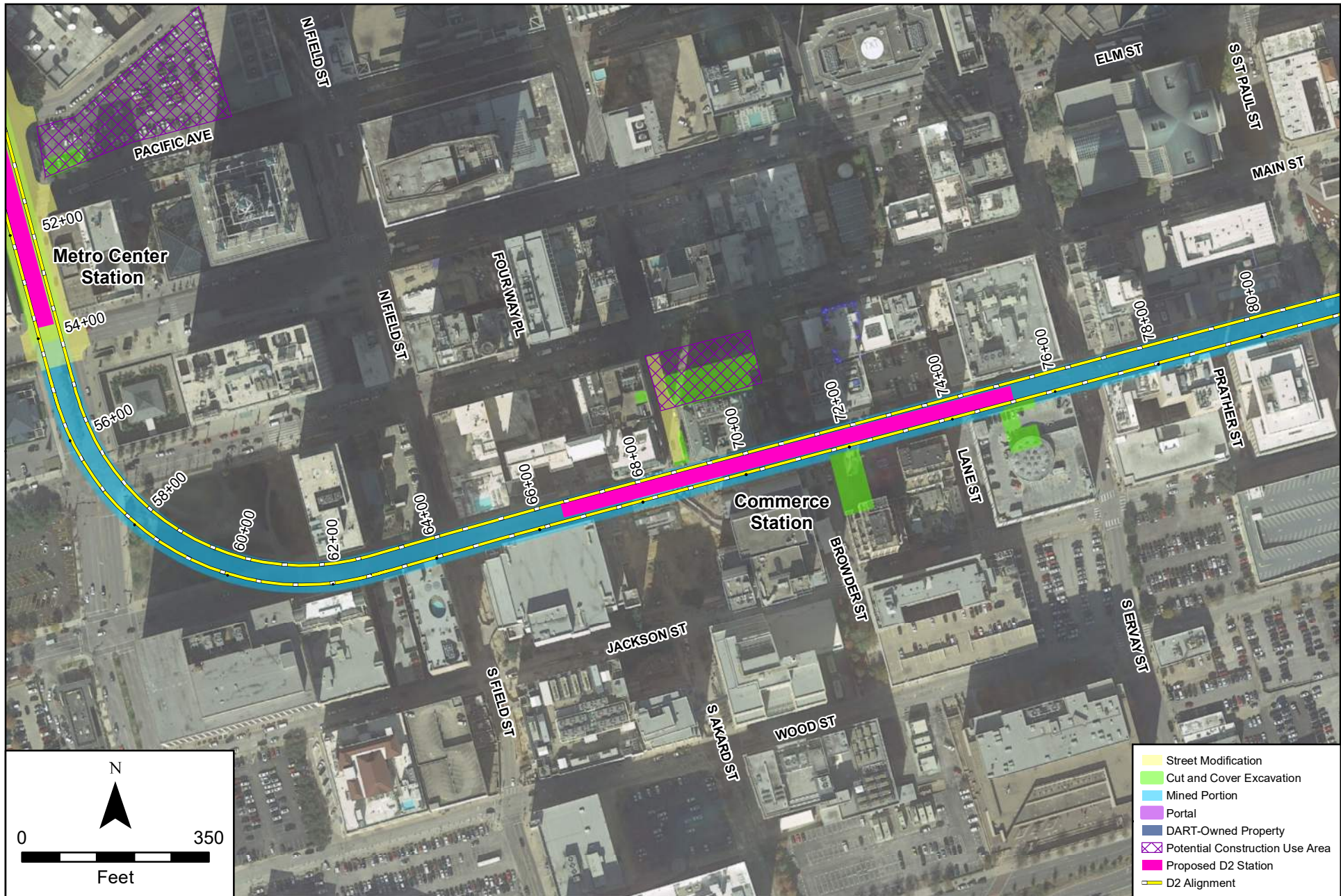


Figure 5-3
Overview of Proposed Construction Methods

Data Source: DART, GPC6



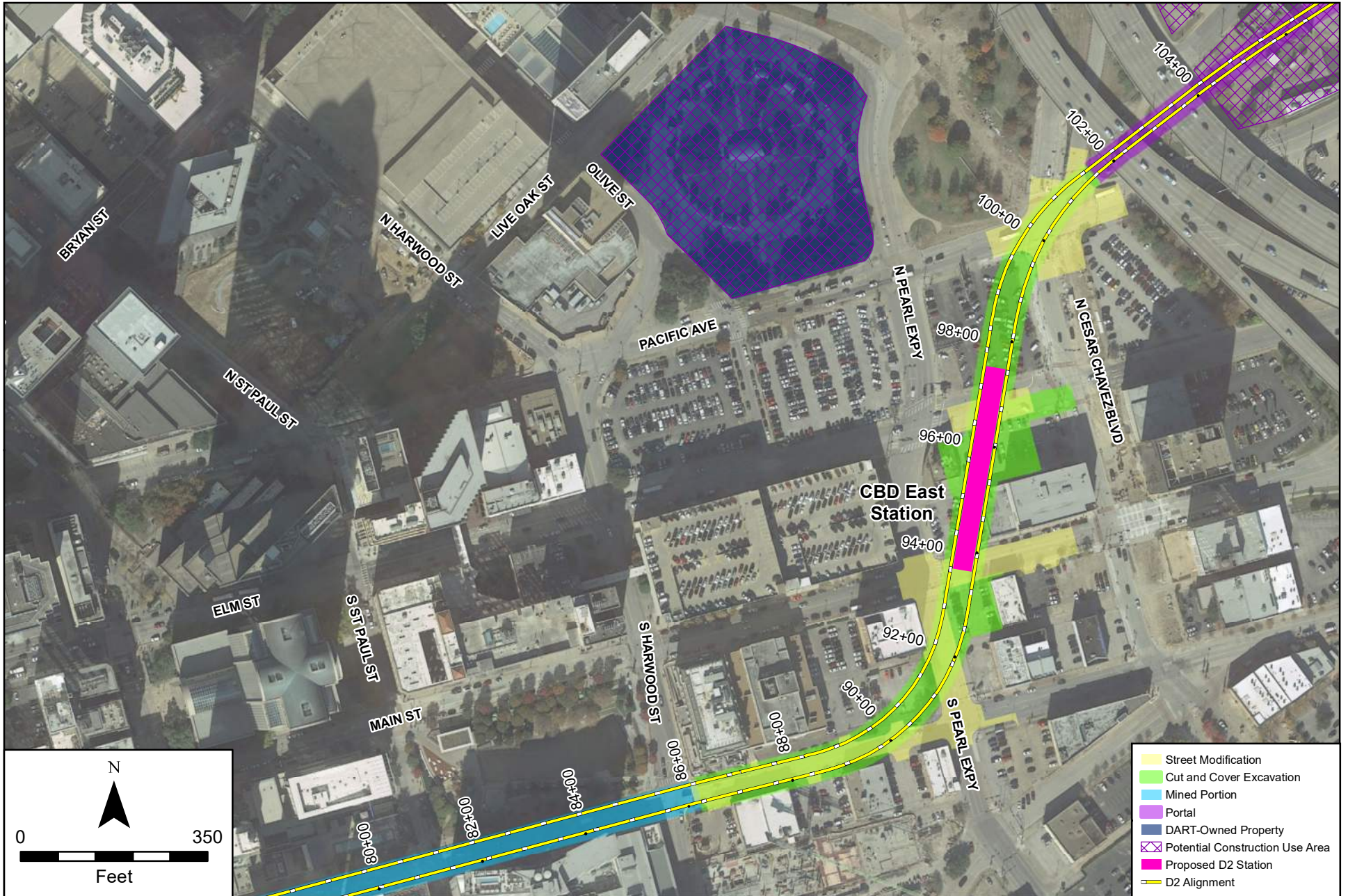


Figure 5-4
Overview of Proposed Construction Methods

Data Source: DART, GPC6



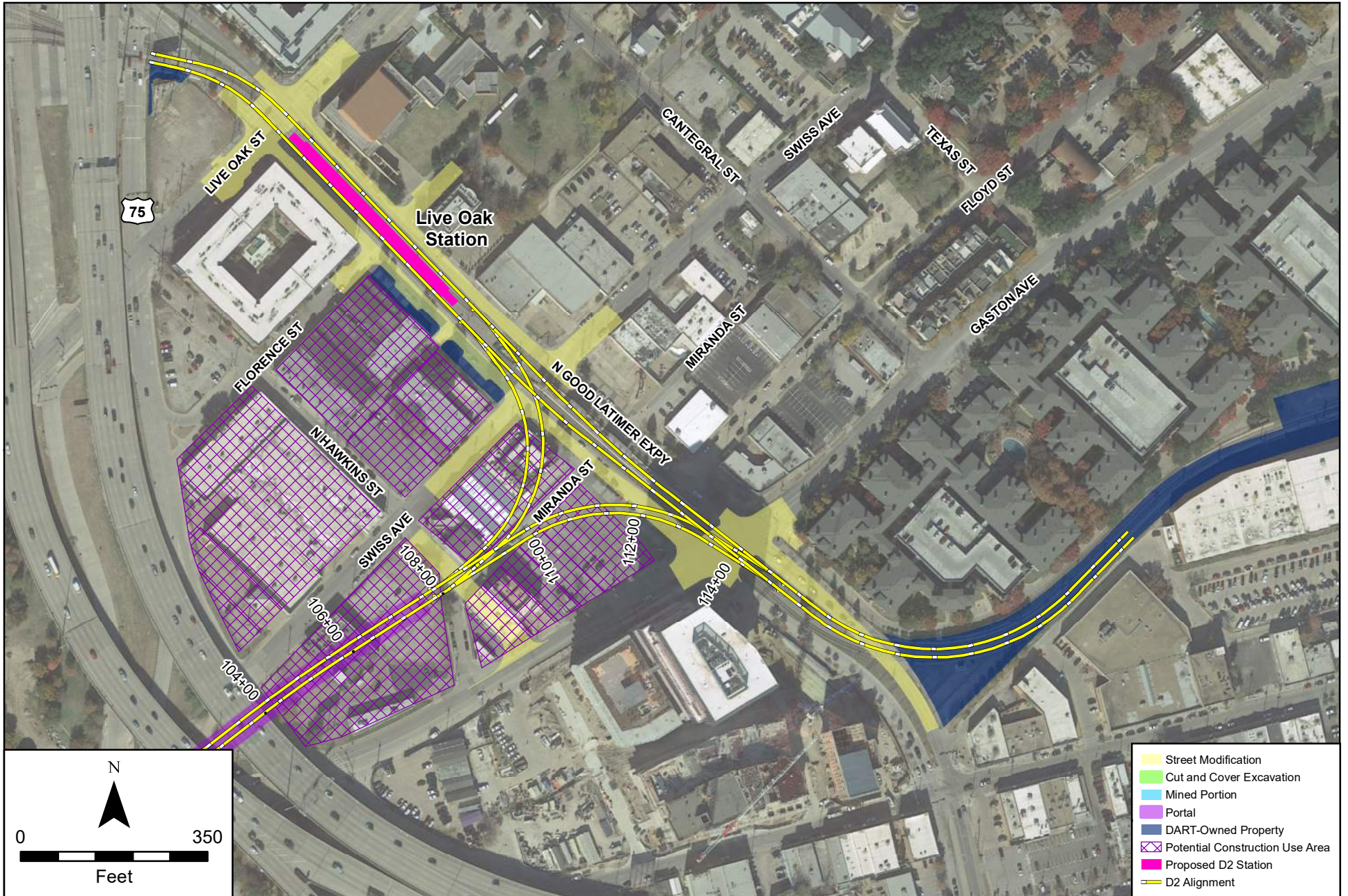


Figure 5-5
Overview of Proposed Construction Methods

Data Source: DART, GPC6





The Project would be constructed over an approximate four-year period, with some advance activities such as property acquisition for corridor preservation and utility relocations. During the construction period, the intensity and duration of construction activities would vary by method and/or section. For example, construction of underground stations would occur over a two-year period, maintenance of street traffic operations near stations would last approximately nine months, and construction staging areas would be active for the full four years. Depending on the method, 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 three distinct construction sections have been identified:

1. Surface: Victory Station to Woodall Rodgers Freeway
2. Tunnel: West tunnel portal to east tunnel portal
3. Surface: I-345 to wye connection with existing Green Line

Construction would occur on DART-owned right-of-way, newly acquired right-of-way, on or under city streets, and potentially on leased vacant property. DART would seek 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 and to ensure traffic impacts are not compounded by different construction areas on a single corridor or district.

Information presented in this chapter and analyzed throughout this SDEIS is based on preliminary engineering (20 percent design) and is likely to evolve as the Project advances toward final design. Accordingly, the preliminary sequencing plan and overall construction schedule developed for the proposed construction activities represents a reasonable estimate of how the Project could be constructed, based on conceptual engineering. Potential environmental impacts that could result from the construction of the Project, as well as mitigation measures to lessen their effects are based on reasonable, worst-case assumptions regarding the Project's construction activities. As final design and construction advances, DART would identify opportunities to advance the Project more efficiently and with reduced impacts through innovation, use of improved technologies, and sustainable long-term maintenance considerations.

5.2 Overview of Construction Methods

Major construction activities for the Project would include civil construction—including utility relocation, foundation and column placement, guideway construction, track work, and construction of facilities such as stations and other ancillary facilities; installation of electrical systems; and testing and startup activities such as communications, safety and emergency systems testing, and certification before beginning revenue operations.

Much of the construction activity for the Project would occur underground, with the exception of surface features such as new surface track alignment and ancillary facilities like vent shafts and fan plants, the implementation of ground stabilization or soil improvement methods, soil and rock excavation, and improvements and underpinning of buildings, roadways, or other structures. Above-ground construction methods are described in more detail in **Section 5.2.1**.

Surface station construction would commence with platform, canopy, and ancillary construction including architectural finishes.

Methods available for underground excavations include tunnel boring machine (TBM) methods; Sequential Excavation Method (SEM) tunneling; conventional drill; roadheader excavation for rock; and cut-and-cover for mixed soils or in areas where there is not enough cover above the tunnel area. Subsurface conditions obtained from hydrogeological and geotechnical assessments



are among the deciding factors for selecting an underground construction method. Mined segments using TBM or SEM tunneling and segments using cut-and-cover methods are shown in **Figures 5-1** through **5-5**. Mining and tunneling techniques are described below in **Section 5.2.2**.

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 street traffic operations. After basic structure completion, a two-year systems and finishes period would follow that would include track installation and track-related delivery of station systems and equipment such as tunnel ventilation fans, chillers, escalators, and elevators.

Where possible, construction activities and associated worker and trucking movements would be concentrated at construction staging areas to minimize disruptions at the surface. Three principal staging sites would be located:

- West portal: Area generally bordered by McKinney Avenue on the north, Munger Avenue on the south, Laws Street on the west, and Old Griffin Street on the east;
- West Transfer Center area: Bordered by Ross Avenue on the north, Pacific Avenue on the south, N. Lamar Street on the west, and N. Griffin Street on the east; and
- East portal: Area generally bordered by Florence Street on the north, Pacific Avenue on the south, North Central Expressway on the west, and Good Latimer Expressway on the east.

Some additional nearby or remote sites may be needed for temporary storage of materials and equipment. Site lighting would be required 24 hours per day, 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.

5.2.1 Surface Construction

There are two types of transit guideway configurations and construction methodologies for the non-tunnel portions of the Project, at-grade and retained-cut.

At-Grade Construction

Construction methods and impacts for at-grade guideways would be similar to typical road construction, sequenced as follows:

1. Preparing the project footprint and relocating conflicting utilities;
2. Performing shallow excavations to construct the subgrade, track, and station platform slabs; and
3. Installing drainage structures and below-grade light rail infrastructure.

Retained-Cut Construction

Retained-cut segments of railroad infrastructure are depressed sections like open cuts, but where space is insufficient for full side slopes, and the surrounding grade is supported by retaining walls. The retaining walls would be installed on foundations supported by deep piles. Portal locations would be constructed as retained-cut segments with U-wall structures.

Both ends of the alignment would reconstruct street crossings over the end of the retained-cut transition sections where the east and west portals are located. The total length of both U-wall section structures is approximately 1,365 feet.



5.2.2 Subsurface Construction

There are several different construction techniques that can be used for the execution of underground structures. Several factors must be considered before choosing the most appropriate tunneling method for the Project, including the horizontal and vertical alignment, structure configuration, geologic profile, tunneling in soft-ground, mixed face or rock and associated ground behavior, groundwater inflow, underground obstructions, as well as impacts of underground construction on existing infrastructure. All of these factors play a role in the decision-making process.

Design assumptions include a prohibition on blasting, restrictions on trucking along Commerce Street, undrained running tunnels, and a maximum 6 percent vertical grade at east and west portal approaches. Construction assumptions include portal approaches that would be U-wall structures, and portals would be retained-cut with the opportunity for being covered or built over as part of adjacent development plans.

Most of the D2 alignment could be constructed using a combination of four mining or tunneling techniques:

- Mined tunnel construction with a TBM;
- Mined tunnel construction using SEM;
- Excavation using cut-and-cover construction; and
- Other conventional forms of underground mining.

Mined tunnel construction, including the use of a TBM, SEM, and other mining techniques, allows for tunnel excavation to occur underground without substantially disrupting the surface above. Typically, the only visible evidence of a mining operation to the general public occurs where a vertical shaft connects the ground surface to the tunnel below, and where associated lay-down areas for equipment and supplies are located.

Two primary vertical shafts would be constructed, one at Pegasus Plaza on Main Street, and one near Browder and Commerce streets. Other smaller shafts would be located in the Adolphus Tower office building and in the DalPark Garage for construction of pedestrian portals. Generally, the shaft sites would be enclosed or protected by fencing and would be open to the surface level to permit materials and workers to enter and exit the tunnel. Cranes and other construction machinery would be located alongside the primary shafts. These shafts are necessary for inserting tunneling equipment and removing the spoils and would also be the locations where ventilation fan plants and emergency egress would be located for the new tunnel.

The highest-impact construction condition includes consideration of the following:

- Impacts of construction-related traffic on street traffic operations, including additional construction related truck trips, construction site access, and construction staging areas; and,
- Impacts on traffic operations, property access, and parking related to potential road, sidewalk, bicycle, parking, or other transportation facility closures or detours during construction.

Tunnel Boring Machine

TBMs are large-diameter horizontal drills that continuously excavate predominantly circular tunnel sections using a full-face cutter head. Different machines are designed for different geological conditions. In rock, a rock TBM is used; in soil and degraded rock, a different type of TBM is used



that is specifically designed for drilling through materials that are not self-supporting. Multi-purpose machines that combine the attributes of both rock and soft-ground machines can also be used through both ground types, as well as through mixed-face (i.e., rock and soil within a single excavation section) conditions. A TBM is able to move below ground, generally avoiding removal of surface elements. However, construction with a TBM may require *underpinning* (i.e., stabilizing or reinforcing the support of a structure from below) or other removal of subsurface elements. At the 20 percent level of design, underpinning of any adjacent buildings is not anticipated, but will be confirmed during final design.

TBMs are powered by electricity brought to the machine from substations near or along the tunnel route. This power is supplied to a substation generally located at the ground surface by a direct feed from the local electric utility provider.

With all these components, TBMs are very large pieces of equipment that are brought to the start of the tunnel operation and lowered into the ground in pieces, where they are assembled at the start of the tunnel. TBMs are normally manufactured for individual projects, according to the project's specific dimensions and site conditions, and can take approximately 18 months to manufacture and mobilize.

Sequential Excavation Method

Sequential Excavation Method (SEM) mining is a technique in which a tunnel is sequentially excavated in phases and supported in a controlled manner. The excavation can be carried out with common mining methods and equipment, chosen according to the soil conditions. This underground method of excavation divides the space to be excavated into segments, then mines the segments sequentially, one portion at a time. While TBMs can only excavate a fixed (generally circular) shape, SEM mining permits a tunnel of any shape or size to be excavated. This makes it useful in areas where ground conditions would not allow for tunneling using a TBM, or where the tunnel shape or size needs to change.

Cut-and-Cover Excavation

Cut-and-cover excavation is a construction method in which a trench is excavated from the ground surface, and a tunnel is constructed within the trench, and then covered over. A cut-and-cover tunnel may require temporary stabilization of the ground to support the excavation. When the excavation is complete, the tunnel structure is constructed within the excavated trench, the remaining space is backfilled, and the surface is restored. Temporary supports for cut-and-cover construction typically consist of vertical support walls, including the following:

- Soldier piles with timber lagging: piles installed at regularly spaced intervals combined with timber planks or steel sheeting;
- Slurry walls: concrete walls constructed through the use of a slurry of bentonite, a natural, clay-like liquid material that is poured into the void and then replaced by concrete poured afterward;
- Sheet piles: steel sheet sections with intersecting edges that are driven in place similar to piles; or
- Secant piles: individual drilled holes filled with concrete and steel, reinforced and installed adjacent to one another to form a continuous wall.

During construction of cut-and-cover tunnel segments, street crossings and adjacent areas may be decked to allow unimpeded traffic flow and use of properties above the cut.



Two different cut-and-cover techniques are possible:

- **Bottom-up construction:** Conventional construction method for cut-and-cover structures. The street would be closed until the installation of concrete decking for temporary traffic. Utilities would be relocated and suspended from under the decking beam, which serves as a top bracing structure. Subsequently, the main excavation would extend down to the grade elevation of the invert by adding several tiers of the bracing or anchoring system, as needed. A temporary drainage system such as a French drain would be considered to release the hydrostatic pressure at the bottom of invert. Upon completion of the tunneling, the permanent structure would be constructed from the bottom elevation up to the top of structure, as the installed bracing system is sequentially removed.
- **Top-down construction:** Alternative method for cut-and-cover structures where right-of-way constraints govern choice of construction method. The final structure would be constructed by following the excavation stage from the top to the bottom. In order to implement this method, interlocking secant pile wall and/or concrete diaphragm wall systems would be considered permanent structures. The major advantage of this construction concept is the utilization of the support of excavation (SOE) as both a temporary and a permanent structure. Consequently, the construction cost would likely be less than for conventional bottom-up staging. Temporary decking could be removed once the permanent roof structure is installed, which would be earlier than for the conventional method. This method would reduce community impacts, especially in the CBD. One disadvantage with top-down construction is that contractors may be less familiar and/or experienced with this construction approach than with the conventional bottom-up method.

Conventional Mining

Conventional mining is conducted primarily underground with work at the street surface only at entry and exit points for spoils and supplies, as well as for such permanent design features such as station ingress and egress points, emergency service egress areas, and vent shafts. Conventional mining in rock typically consists of controlled drilling and blasting. DART's Design Criteria generally precludes the use of blasting techniques.

Continuous mining using roadheaders—small rotating heads attached to the ends of tractor-mounted booms—would also be considered. Roadheaders are more flexible than TBMs and can excavate profiles of almost any shape, but have limitations based on rock hardness and abrasiveness. Mined excavations are typically supported by rock bolts and specialized steel supports, which are frequently used in combination with either or both welded steel mesh and pneumatically sprayed concrete known as “shotcrete.” Roadheaders would facilitate excavation of non-circular geometry SEM structures, causing minimal over-break.

5.2.3 Additional Construction Considerations

The following sections describe additional construction considerations along the alignment, including surface and subsurface structures, ventilation during construction, and site-specific construction methods.

Buildings and Above Ground Structures

A key consideration of construction will be the interface with major buildings and above ground structures. Major surface thoroughfares parallel to or perpendicular to the proposed underground



alignment are Ross, San Jacinto, Griffin, Pacific, Elm, Main, Commerce, Pearl, and Cesar Chavez. Principal highway and rail lines crossing the proposed alignment consist of the Woodall Rodgers Freeway (elevated), I-345 (elevated) and a bi-directional light rail service on Pacific Avenue.

The west section of the underground alignment from Civil Station 40+00 to 56+00 (see **Appendix A.1** Plan and Profile for civil station locations) would be in proximity to buildings on either side of North Griffin Street, including the Dallas World Aquarium, Homewood Suites hotel, Crowne Plaza Dallas hotel, and two high-rise buildings, the Bank of America Plaza and One Main Place. This section also crosses under the existing DART LRT transit mall, on which all four lines operate. This line is located at ground surface elevation +430 feet at approximate Civil Station 51+50. Existing LRT service would need to be maintained during construction.

The central section of the underground alignment from Civil Station 60+00 to 88+96 would be adjacent to buildings on either side of Commerce Street, including federal buildings, residential buildings, hotels, office buildings, and parking garages, some of which are historic.

The third section of the underground alignment from Civil Station 90+00 to 104+00 would not be adjacent to any high-rise buildings but would cross under I-345 (with foundations) and frontage roads, as well as Pacific Avenue and Cesar Chavez Boulevard. Buildings along this east section near Swiss Avenue include the Public Storage facility and Lizard Lounge. However, both are proposed acquisitions for the Project or construction staging areas.

For all these structures, both before and after conditions surveys would be required. In addition, structural and geotechnical instrumentation would be required to monitor each building's performance during and after tunnel, station, or shaft excavation. Additional structural and geotechnical surveys and investigations during final design would be performed to confirm whether stabilization of any buildings and structures are necessary. If required, relocation compensation and assistance would be provided in accordance with Federal and State requirements.

Subsurface Structures

The Project includes several subsurface structures including cross passages between the running tunnels, stations, access portals, a transmission power substation and ventilation shafts. Construction of cross passages includes temporary support, waterproofing, and structural lining. Construction of underground stations and portals includes the construction of SOE secant pile or slurry walls or similar waterproof and permanent structures, excavation and support of entrance shafts and ventilation shafts, station excavations with temporary support, waterproofing, and structural concrete up to the finished ground level. Underground construction is also assumed to include invert drains, embedded conduits, penetrations, and sleeves for mechanical, electrical, and plumbing (MEP), temporary power, lighting, and flood control facilities.

Safety walkways for passenger evacuation would be located throughout all parts of the tunnels. Cross passages would be excavated from within the bored tunnels through preformed breakout panels installed as part of the tunnel segmental lining units. Installation of equipment and the location and routing of utilities and services would be performed after installation of the permanent lining.

Tunnel Ventilation during Construction

Temporary fire-life safety systems would be installed within the new tunnel as it is excavated to protect workers during construction activities. This would include temporary tunnel ventilation,



powered by large fans that would operate continuously during construction at the portal sites. A standpipe system would be installed, and sufficient illumination levels would be maintained at the walking surface for worker safety. In addition, fire extinguishers and fire hoses would be provided in the tunnel during construction.

5.2.4 Description of Site-Specific Subsurface Construction Methods

The ground or surface in the construction area will respond differently, depending on conditions, including:

- Orientation, condition, and spacing of rock mass discontinuities;
- Groundwater conditions;
- In-situ and construction-induced stresses in the rock mass;
- Swelling and slaking properties of soil and of layers of bentonite and shale, and the thickness and location of these layers with respect to the excavation; and
- Methods of excavation and construction.

Table 5-1 provides a summary of the characteristics for the geologic conditions of the underground portions of the Project.

Table 5-1 Project Underground Geological Characteristics

Segment	General Geology Class Distribution (Primary)	Approximate Depth (ft. bgs)	Approximate Depth to Groundwater (ft. bgs)
1 – West Portal	Alluvium	5 to 30	19.5
West Running Tunnel	Limestone	30 to 57	19
Metro Center Station	Limestone/Shale	55 to 62	19
4 – West Twin Bore Running Tunnel	Limestone/Shale	62 to 74	15.5
Commerce Station and Crossover Cavern	Limestone	78	12.5
6 – East Twin Bore Running Tunnel	Limestone	34 to 73	9
7 – CBD East Station	Limestone	30 to 33 to	21.4
8 – East Running Tunnel	Limestone	25 to 30	19.2
9 – East Portal	Alluvium	0 to 25	14

Source: GPC6

Note: bgs = below ground surface

Depth from the ground surface to planned top of rail ranges from 53 to 80 feet, averaging about 59 feet. **Table 5-2** summarizes anticipated site-specific construction methods for the subsurface segments based on the general geology and approximate lengths and depth of each segment. The average radius of each tunnel is approximately 22 feet. A more detailed description of each structure and/or segment follows.



Table 5-2 Anticipated Construction Methods

Structure/Segment	Anticipated Construction Method	Segment (Sta. to Sta.) from to		Approximate Length (ft)	Approximate Top of Rail Elevation (ft)
West Portal U-Wall Section & Headwall	Open Cut	35+29.77	41+50.00	620	Varies
West Portal Running Tunnel	Cut-and-cover or SEM (optional)	41+50.00 44+80.00	44+80.00 49+26.58	330 447	Varies
Metro Center Station	Cut-and-cover	49+26.58	54+22.42	496	370
West Twin Bore Running Tunnel	TBM or SEM	54+22.42	68+05.00	1,383	365
Commerce Street Station Cavern	SEM	68+05.00	75+26.10	721	354
East Twin Bore Running Tunnel	TBM or SEM	75+26.10	86+29.61	1,103	Varies
East Running Tunnel	Cut-and-cover or SEM (optional)	86+29.61	93+13.09	683	Varies
CBD East Station	Cut-and-cover	93+13.09	98+05.17	492	430
East Portal Running Tunnel	Cut-and-cover	98+05.17	101+55.23	350	Varies
East Portal U-Wall Section & Headwall	Open Cut	101+55.23	107+60.00	605	Varies
Cross-Passage 1	SEM	61+00.00		18	-
Cross-Passage 2	SEM	80+00.00		18	-
Cross-Passage 3 (optional) (3)	SEM	87.00+00.00		18	-
Pump/Sump Station	SEM	66+25.00		-	-

Source: GPC6

Notes:

1. Structure locations and dimensions are based on alignment current as of Aug. 12, 2019.
2. Cross passage pump/sump stationing is at structure center line. Length is perpendicular to running tunnels.
3. Cross-Passage 3 applies only to the SEM option for the segment between the east end of the TBM tunnel and the west limit of the CBD East Station and shall be omitted if a cut-and-cover tunnel option is selected for this segment.

West Portal U-Wall Section & Headwall—the portal would consist of 620-foot long retained cut and cut-and-cover approach structures from McKinney Avenue to Hord Street, with depths up to 37 feet and approximate 75-foot width at the headwall. The tunnel portal would be constructed so that future development could span over the U-wall section.

West Portal Running Tunnel to Metro Center Station—this segment would be constructed either entirely cut-and-cover or a cut-and-cover followed by SEM tunnel. Secant pile walls are recommended for the SOE system of cut-and-cover construction in this section.

Metro Center Station—both mined and cut-and-cover construction were identified as feasible for the construction of Metro Center Station based on the limited available subsurface data and anticipated shallow cover conditions. However, the mined station would have to consist of a SEM, mined, 60-ft wide binocular station cavern with a center platform and ceiling height of 33 feet. As a result, the cut-and-cover station would be a more favorable construction method for accommodating this requirement than the mined binocular station option.

West Twin Bore Running Tunnel—this is the longest running tunnel and would be constructed with TBM or SEM. In the segment from Metro Center Station to Commerce Street Station, the existing parking garage entrance structure for the Bank of America building (901 Main Street at



the southwest corner of Griffin Street and Elm Street) is directly above the tunnel and is a major obstacle at the east bulkhead of the Metro Center station box. This entrance structure is crossing Elm Street with a shallow rock cover. The Design-Build Contractor would need to identify the exact as-built condition in relation to the tunnel alignment and geotechnical/geological conditions. The second major construction issue in this sector would be the 440-foot radius curve, approaching Commerce Street from Griffin Street under Belo Garden. Special consideration of the TBM specification would be necessary to accommodate this tight curve within allowable tolerances and for ensuring the short- and long-term structural stability.

Commerce Station—a multi-stage construction approach would be required for this mined underground station. Major existing utilities within the planned station limits would need to be protected prior to the SEM excavation. Both low-profile and high-profile cross-sections would be used within the station limits to accommodate the unique site constraints. Low profile and high profile sections refer to the shapes of the station caverns. The “high profile section” is used in the location where the mezzanine level enters the station cavern from the Akard Entrance. The main access for Commerce Station construction would be from a proposed muck house on Akard Street and the Pegasus Plaza headhouse vertical shaft and passenger tunnel to mezzanine level in the high-profile station cross-section configuration. Secondary access may be considered through the ventilation shaft near Browder Street Plaza. The low-profile cross-section would be constructed within the normal platform alignment to minimize the impact on existing utilities.

East Portal Running Tunnel—this section would consist of a cut-and-cover tunnel with a 400-foot radius curve and a 6 percent vertical gradient. The cut-and-cover tunnel section would require the installation of concrete decking for the live traffic segments during the construction period.

East Portal U-Wall Section and Headwall—this 605-foot section would require open cut construction. Because the open cut will be crossing under I-345 with more than 20 feet of vertical clearance, protection of the existing pier foundation will be a major construction consideration.

Cross Passages and Sump Pump Station—based on the NFPA 130, cross passages are required to be constructed at intervals of not more than 800 feet. Based on this criterion, two cross passages would be excavated between the running tunnels. If the option of an SEM tunnel is adopted for the segment west of the CBD East station, then a third cross passage would be added in that segment. These cross passages connecting the eastbound and westbound egress walkways would be located at Civil Station 61+00, Civil Station 80+00, and Civil Station 87+00, depending on the classification of the surrounding rock. A sump and pump station would be located at the lowest point of the alignment (Civil Station 66+25), with a capacity to extract the quantities of water expected from firefighting activities in the tunnel. The SEM is feasible to use for this sump/pump station excavation.

5.3 Construction Impacts and Mitigation

No-Build Alternative

No construction impacts are anticipated under the No-Build Alternative, because no rail construction would occur. No-Build Alternative impacts would continue to be associated with ongoing construction projects in downtown Dallas and would not benefit from the potential coordination of projects offered by the Project to minimize overall disruption.

Build Alternative

Short-term impacts and mitigation associated with constructing the Project would be anticipated to occur for traffic and transportation facilities, construction staging areas, utilities, adjacent



buildings and structures, visual, noise and vibration, cultural resources, parks, water quality, air quality, and business disruption. Construction activities will be carried out in accordance with DART Facilities Standard Specifications. As part of the overall construction mitigation program, DART would establish a \$5 million Business Assistance Allowance to help mitigate private business impacts during construction activities. It is anticipated that impacts to operating businesses would occur as result of tunnel construction excavation, temporary street closures, utility relocations, and temporary uses of public parking.

For key structures along the alignment, both before and after conditions surveys will be done. In addition, structural and geotechnical instrumentation will monitor each building's performance during and after tunnel, station, or shaft excavation. Additional structural and geotechnical surveys and investigations during final design will be performed to confirm whether stabilization of any buildings and structures are necessary. If required, relocation compensation and assistance will be provided in accordance with Federal and State requirements.

Mitigation measures for construction-related impacts are outlined in DART Light Rail Project – General Provisions, General Requirements, and Standard Specifications for Construction Project, including DART standard specification 02270, Erosion and Sediment Control. Section 01560, titled Environmental Protection, includes environmental protections considerations related to, but not limited to the following:

- Natural resources including air, water, and land;
- Solid waste disposal;
- Noise and vibration;
- Control of toxic substances and hazardous materials;
- Chemical, physical, and biological elements that adverse effect ecological balances;
- Degradation of the aesthetic use of the environment, and;
- Historical, archeological and cultural resources.

5.3.1 Traffic and Transportation Impacts

Automobile and Pedestrian Traffic Impacts

Construction of proposed stations, tracks, tunnels, cut and cover sections, tunnel portals, and rail crossings would result in some detours, lane closures, and access changes. Although access would be maintained for all facilities and properties, alternate routes would be required as a result of these temporary detours and lane closures. Consequently, this may also result in a minor increase in travel time and distance compared to original routes. Where and when this would occur, traffic would be rerouted to maintain access to businesses and residences. Traffic closures or detours would require approval by the City of Dallas or by TxDOT and would conform to their requirements and the Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA, 2009).

The Project would result in short-term effects on access, affecting adjacent residences due to construction. Many of the residences in the Study Area are multi-family apartment complexes and high-rise buildings with a combination of homeowner and rental units. Although construction is temporary, the length and duration of construction could lead residents to choose to relocate due to these potential disturbances. These temporary construction effects could result in a redistribution of residents in the local area, which are likely to be more renters than homeowners. Homeowners would be more likely than renters to stay through the duration of the construction. After construction, the benefit of newly renovated areas and added access from the proposed project and stations could encourage people to return to their original location. The districts within



the Study Area are not likely to be affected by the proposed project because the dynamic nature, setting, and character of the districts have long been established and are not likely to be changed by temporary construction of the proposed project.

These short-term effects on access, would also affect adjacent businesses. The ability of clients and customers to access adjacent businesses may be affected by the level of construction. Detours, lane closures, and construction of tracks and cut-and-cover sections could require alternative routes, which may reduce ease of access and increase time and distance to get to and from local businesses. Although these short-term effects are temporary, the length of construction may over time reduce the amount of economic revenue for businesses because of customer attrition. Furthermore, this impact could potentially lead businesses to choose to relocate or close due to these potential disturbances. These effects could result in a redistribution of businesses in the local area. However, after construction, the benefit of newly renovated areas and added access from the proposed project and stations could encourage people and businesses to return to their original locations.

There would be some impacts on non-motorized travel (pedestrians and bicyclists). Where feasible, sidewalks would remain open in the construction areas, with protected sidewalks next to the construction area when detour routes are not feasible. Short sections of sidewalks may require closure during construction on or adjacent to the roadway and would require pedestrians to detour to the closest signalized crossing. Bicycle routes and lanes adjacent to construction areas may be temporarily removed or detoured during construction.

Transit services and facilities, and roadways adjacent to or intersecting potential construction activities and/or that could be used as a detour route, would be assessed for their ability to accommodate the construction impact and/or additional traffic volumes as a detour route. This includes analysis of interchange areas, construction site access locations, major haul routes, and transit stop closures or relocations.

Mitigation

A mitigation program will be developed in order to maintain street traffic operations during construction, provide for at-grade crossings of major streets and intersections, and to provide at least one or two lanes of traffic in each direction. Traffic closures or detours would require approval by the City of Dallas or by TxDOT and would conform to their requirements and the Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA, 2009). DART will provide detours within construction areas, such as protective walkways, and notify the public as appropriate.

Commercial driveway access will be maintained during business hours, although periodic short-term closures might be necessary. Cross-street roadway and lane closures would likely occur overnight or over weekends, with detours to maintain access. The limited number of detour routes along the corridor would affect traffic, bus transit, bicyclists, and pedestrians. Access modifications (such as right-in, right-out only) would also occur on these roadways within the construction areas. These changes could reduce some vehicle conflicts at these locations.

For roads with two or more lanes in each direction, at least one lane in each direction will be kept open. Roads with one lane in each direction, such as Akard between Commerce Street and Main Street, may be closed for a portion of the construction period and vehicles rerouted to a nearby road. Drivers on these roads would likely have increased delays.



General traffic control activities that apply to all stages of the construction include elimination of parking on streets within the work area limits and maintenance of local access to businesses at all times.

DART would minimize closures of pedestrian and bicycle facilities as roadway crossings are rebuilt. Measures to provide a safe environment for operation and access to pedestrian facilities may include enhanced traffic signals, crosswalks, striping, and signage and notifications of road and sidewalk closures and detours during construction.

Protection of columns under Woodall Rodgers Freeway and I-345 may be required. Specific requirements for monitoring of all impacted structures would be provided during design.

Potential minimization measures for construction traffic impacts will include:

- Conform to the *Manual on Uniform Traffic Control Devices* and jurisdictional agency requirements for all maintenance of traffic plans.
- Install advance warning signs and highly visible construction barriers and use flaggers where needed.
- Consider a variety of traffic and travel demand management strategies.
- Clearly sign and provide reasonable detour routes when cross streets are closed for cut-and-cover construction. The Design-Build contractor would be required to keep nearby parallel facilities open to facilitate access and mobility.
- Use lighted or reflective signage to direct drivers to truck haul routes to ensure visibility during nighttime work hours. Use special lighting for work zones and travel lanes, where required.
- Communicate public information through tools such as print, radio, posted signs, websites, social media, and e-mail to provide information regarding street closures, hours of construction, business access, and parking impacts. DART would provide this plan.
- Coordinate access closures with affected businesses and residents. The Design-Build Contractor would be required to perform this task in coordination with DART staff. If access closures are required, property access to businesses and residences would be maintained to the extent possible. If access to the property cannot be maintained, the specific construction activity would be reviewed to determine if it could occur during non-business hours, or if the parking and users of the access could be accommodated at an alternate location.
- Post advance notice signs prior to construction in areas where construction activities would affect access to surrounding businesses.
- Provide regular updates to emergency providers, local agencies, solid waste utilities, and postal services.
- Schedule traffic lane closures and high volumes of construction truck traffic off-peak hours to minimize delays, where practical.
- Cover potholes and open trenches, where possible, and use protective barriers to protect drivers from open trenches.

With these minimization measures, it is anticipated that traffic impacts can be minimized in the Project area.

Transit Impacts

As a part of this Project, the West Transfer Center and Rosa Parks Plaza would be modified. Bus bays associated with the West Transfer Center would need to be temporary relocated to construct the headhouse. Bus transit routes and schedules may be modified due to detours or temporary relocation of transfer points. Relocation of bus stops would occur within work areas. As stated in



Section 5.2.3, the existing DART LRT transit mall, on which all four lines operate is located at ground surface elevation +430 feet at approximate Civil Station 51+50. LRT operations could be impacted during construction.

Mitigation

For the construction phase, the Design-Build contractor would determine how construction on the Metro Center Station, West Transfer Center, headhouse and the cut-and-cover segment along Griffin Avenue would be phased to maintain bus and rail operations. Temporary weekend roadway closures may be necessary, and adjustments to routes, schedules and bus bay locations may occur. DART will coordinate with the contractor to develop a bus operations mitigation plan to document affected routes, facilities and stops. Alternative routing and facilities locations will be identified and communicated to customers to maintain accessibility. As presented in **Section 3.2.2**, the West Transfer Center and Rosa Parks Plaza would be reconstructed with the design based on the DARTzoom Bus Network Redesign recommendations.

Temporary protection of the existing DART line at the intersection with Pacific would be required during excavation beneath the line and underground station construction immediately south of this intersection for the Build Alternative. 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 Design-Build contractor such as, increasing monitoring frequency, coordination with DART operations to operating line speed, to work below the existing DART tracks outside of service hours, to stop work and provide increased protection if the maximum alert level is reached, or to use an alternate construction method that is acceptable to DART.

Construction Staging Areas

Construction staging areas are needed before, during, and for a short time after construction work, for the following:

- Construction
- Equipment Storage
- Construction materials delivery and storage
- Demolition or spoils handling
- Contractor trailers
- Access roads
- Construction crew parking

Construction staging areas would be strategically located along the alignment. Contractors would use the property in which the facility is being constructed, property that DART acquired, or other properties as negotiated by the Design-Build contractor for use as temporary construction easements during the estimated 4-year construction period. Following construction, these areas would be restored to preconstruction conditions or as agreed to with the owners, with respect to the temporary-leased properties.

A proposed muck shaft and muck house enclosure at Akard Street between Commerce and Main streets would require temporary closure of Akard at this location during construction of Commerce Station and the headhouse at Pegasus Plaza. Mucking shafts are typically 30 to 45 feet wide and can be rectangular or circular. Safety features for the mucking shaft include a safety barricade and a ventilation fan with a ventilation line extending down the shaft to provide airflow. Other



safety features include primary and secondary egress points. The shaft would require an elevated muck house to preclude dust from escaping which would minimize impacts to surrounding residents, hotel guests, and employees.

Besides the two main staging areas at the west portal and east portal and the muck house on Akard Street, other construction staging areas or equipment yards may be located as shown in **Figures 5-1** through **5-5**.

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 also has the potential to disturb the soil and kill or prevent the growth of groundcover, which causes the soil to be susceptible to wind and water erosion. Construction equipment has the potential to leak oil and grease, hydraulic fluid, brake fluid, and other petroleum hydrocarbons. There is also the possibility of spillage during fueling operations.

The DART General Provisions, General Requirements and Standard Specifications for Construction Projects Section 01560 (Part 1.3 C-6 and G, Construction Facilities and Staging Areas) details required 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 are not permitted 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 property owner. Staging areas cannot be located in wetlands or on any property listed or eligible to be listed in The National Register of Historic Places (NRHP) without prior approval of the DART Contracting Officer.

Excavated Material and Disposal

Excavated rock and soil (referred to as “spoils”) would be removed from the tunnel primarily at the west and east portals and brought out of the tunnel at the staging sites. Spoils would also be excavated at the muck house and Metro Center Station headhouse construction area. In total, approximately 1,127,000 cubic yards of spoils would be excavated from the tunnels, stations, and cross passages as they are constructed. **Table 5-3** provides an estimate of the excavated materials from the structure or station area. The estimated volume was determined by many factors, including construction methodology and swell factor of the soil or rock.

Table 5-3 Estimated Order of Magnitude Excavation

Structure or Station	Amount (cubic yards)
West Portal	19,066
Cut and Cover Tunnel	136,348
Metro Center Station (includes entrances and ancillary features)	220,989
Running Tunnel	77,704
Commerce Station (includes entrances and ancillary features)	137,185
Running Tunnel	92,249
Cut and Cover Tunnel	172,066
CBD East Station (includes entrances and ancillary features)	104,225
Cut and Cover Tunnel	45,972
East Portal	17,900
Subtotal	1,023,704
10% additional contingency	102,370
TOTAL	1,127,000*

Source: GPC6, 2019, * rounded up nearest thousand



Depending on means and methods selected by the Design-Build contractor, approximately 1/3 of excavated spoils could be removed from each portal and from the muck house location.

Figure 5-6 shows the potential location of construction staging areas and the muck house and lays out the routes of the temporary access roads and truck haul routes. The potential truck haul routes for the cut-and-cover, tunnel portal, and Metro Center Station on the west side of the Project would utilize Field and Lamar streets to access Woodall Rodgers Freeway.

The potential haul routes for a muck house located on Akard Street between Main Street and Commerce Street for construction of the Commerce Station and Pegasus Plaza would utilize Main Street and/or Commerce Street to access I-345/I-45. The potential truck haul routes for the east side of the Project would utilize Pacific to reach I-345/I-45.

For the subway station and cut-and-cover sites, there would be approximately 75 to 100 truck movements per day inbound and outbound, performing excavation-related work at each construction area. This would entail carrying construction materials to the site and hauling away construction debris, which may include hazardous materials encountered during construction.

On average, 5 to 6 trucks per hour would travel to and from the staging site during construction of the surface alignment. Approximately 15 to 19 trucks per hour would operate from construction zones during the most intensive tunneling construction activity periods.

Protocols developed during final design would be followed to identify spoils that may contain contaminated materials so that they can be handled appropriately and disposed of at a suitable location. Most of the excavated material would be clean, crushed rock, which can be reused. Protocols for the transport of spoils from the construction sites would be developed to ensure the safe handling of these materials and would include procedures to secure the material from spilling off trucks, as well as for any inadvertent or accidental spills of materials falling from trucks removing this material from the staging sites. For spoils that cannot be reused, commercial disposal sites may be appropriate. These facilities are required to meet all applicable regulations and typically process soils and dredge materials to recycle or beneficially reuse them. The Design-Build contractor would be responsible for finding a suitable location for reuse or disposal of spoils from the tunnel mining.

Mitigation

Mitigation measures to prevent spillage at construction staging areas include using detention basins, covering stockpiled dirt and materials, and using wash-off containment facilities, etc.

Following construction, staging areas may be used for the Project or redeveloped by others consistent with the current zoning. Areas acquired through temporary construction easements from adjacent properties would be restored to preconstruction conditions.

Construction staging areas and haul routes would be located away from sensitive land uses such as neighborhoods, schools, or churches. Staging areas would be restored to their original condition as soon as possible once the construction is completed.

DART Construction Guidelines Specifications Section 01560 Part 1.4B states that a Storm Water Pollution Prevention Plan (SW3P) should be developed that would incorporate the best management practices (BMPs) to prevent stormwater runoff from the construction staging area.



The Design-Build contractor would use BMPs to prevent stormwater runoff of construction materials and equipment such as covering materials and equipment of awnings, roofs, or tarps; storing materials on 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 Design-Build contractor would also mulch and reseed disturbed areas to prevent air and water erosion on the site after the termination of construction operations.

If unanticipated sources of hazardous or regulated materials are suspected or encountered during construction activities, the construction manager or designee will immediately notify DART's Environmental Compliance Division. Specific mitigation activities, which address the type, level, and quality of contamination encountered, will be immediately implemented. The handling, treatment, and disposal of any hazardous materials will occur in full compliance with all federal, state, and local requirements.

Impacts associated with construction staging and hauling would be minimized upon implementation of these mitigation measures.

5.3.2 Utilities Impacts

Major utilities crossing the Project have been identified and include public and private utilities. Public utilities include water, wastewater, and storm drain utilities. Private utilities include, but are not limited to, electric, telecom, fiber optic, and gas utilities.

Utilities affected by cut-and-cover construction would include sewer lines, water mains, telecommunications cables, electrical power, and gas lines along streets as indicated in the design drawings included in **Appendix A.1**.

Early identification of utility conflicts is imperative for addressing all critical issues to avoid unscheduled delays during the detailed design and construction. Where utilities must be left in place, methods would be developed to support and work around the utilities. Dealing with major utilities may involve relocation of station exits and vent shafts.

There are three major subsurface obstructions identified along the tunnel alignment. A 7-foot inner diameter storm sewer and a 24-inch diameter sanitary sewer are located beneath Commerce Avenue from Griffin Street to St. Paul Street (Civil Station 42+00 to Civil Station 65+00). These sewer lines spatially conflict with the Project for approximately 2,300 linear feet. Both the tunnel and Commerce Station designs are deeper to account for this conflict. The third obstruction is a 24-inch sanitary sewer along the entire alignment under Commerce Street. This utility is situated 20 feet below grade.

From Commerce Street Station to CBD East Station a potentially considerable impact on the running tunnel construction should be anticipated from the existing storm sewer between St. Paul Street and S. Pearl Expressway under Commerce Street, and between Commerce Street and Main Street under S. Pearl Expressway. The existing storm sewer tunnel invert elevation is approximately +401 to +407 feet and the inner diameter varies from 5 to 7 feet as per the as-built drawing dated 09-21-1959. The impact zone is approximately 1,200 feet between Civil Station 81+00 and Civil Station 93+00. The existing storm sewer may be relocated by routing it via Main Street and Harwood Street. A micro tunnel boring machine (MTBM) with three or more new vertical shafts may be considered feasible to perform the relocation of existing storm sewer.

Utility relocation would be required for underground or overhead utilities depending on the location. Utilities to be relocated would include storm drains, sanitary sewers, water mains, electricity and electrical lines, gas lines, and communication lines. Utilities within the vicinity of



cut-and-cover excavations that are in physical conflict with the permanent or temporary structures (cut-and-cover boxes for the portals and stations, station entrances, ventilation shafts, temporary roadway decking, and bored tunnels) would require relocation. A list of existing major utilities along the alignments is included in the *Methods of Construction Report (Appendix A.5)*. Utility relocation and decking of streets may occur months before major construction activities, as described above. Utility relocation would apply to all construction options.

Utilities that would not require temporary or permanent relocation would be uncovered during the early stages of excavation. These buried utilities, with the possible exception of sewers, are generally found within 10 feet of the street surface (e.g., telephone, traffic utilities, electric). These utilities would be reinforced, if necessary, and supported during construction by hanging from support beams spanning across the excavation. In addition, an allowance would be included within the Project budget to cover adjustment, protection and/or consolidation of all utilities along the alignment. Utility adjustment and protection would be closely coordinated with impacted companies and designed to avoid any disruption in service.

Strong consideration would be given to utilizing trenchless technologies during mitigation or utility relocation of public water and wastewater utilities. Dallas Water Utilities (DWU) design manual provides guidance on commonly acceptable trenchless technologies utilized by DWU. These technologies are primarily divided into two major categories as Trenchless Construction Methods (TCM) and Trenchless Rehabilitation Methods (TRM). TCM can be used for new utility installation while TRM is used for renewing, rehabilitating, and/or renovating an existing utility main.

High pressure gas mains relocation, if needed, would need to be prioritized for scheduling impacts. Should it become necessary to change the feed point of electrical utilities to private businesses, thoughtful scheduling and owner approval would be required in advance of any utility relocation work. It is possible that excavation for utility relocation within some areas might encounter environmentally sensitive soil conditions. Potentially impacted soils, if encountered during construction would be screened regularly. In such instances, the Design-Build contractor would be responsible for having an Environmental Professional who may provide insight on evaluating the hazards and determining appropriate health and safety measures as applicable. The Design-Build contractor would be solely responsible for the means and methods of managing utility work within impacted zones and for all costs associated with such work.

In the event utilities must be rebuilt or new construction is warranted, the Project would be designed in conformance with requirements of the owning/operating utility company and the jurisdictional agency. Locations and elevations of all existing utilities would be field verified during final design, and the proposed improvements would be coordinated with all utility companies prior to construction to avoid conflicts.

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.

Mitigation

Mitigation measures for potential utility impacts as a result of the Project would include, but may not be limited to, the following:

- Prior to construction, all area utility companies would be contacted through One Call and requested to provide line location measures.



- Businesses and residences affected by utility disruptions during construction of the proposed project would be notified of the disruption at least two weeks in advance, unless there is an emergency situation requiring immediate attention.
- Disruptions in service to businesses would be scheduled during off-business hours and would never exceed a 24-hr period except during unusual circumstances.
- The 7-foot horseshoe stormwater utility line on Commerce Street would be supported by temporary structures during boring or mining operations. If necessary, portions of the line may be rebuilt. Protection of the Commerce Street sewer line may be required during TBM/SEM excavation beneath the line for the Project, and monitoring instrumentation would be installed in the sewer line. Prior to construction, a condition survey of the sewer line would be undertaken, which would be closed out after tunnel completion.
- To the extent possible, businesses such as restaurants, grocery stores, or food preparation/manufacturing facilities would be accommodated to protect food preparation and storage mechanisms.
- Should utilities be discovered during construction that were not previously identified, work would cease in that area, and the appropriate utility companies and agencies would be contacted to identify the line(s). The newly identified utilities would not be disrupted until businesses and residences are notified and the utility owner/operator has approved or made the required adjustment.

5.3.3 Adjacent Buildings and Structures Impacts

As stated in **Section 5.2.3.1**, the Project would be in proximity to buildings on either side of North Griffin Street, including the Dallas World Aquarium, Homewood Suites hotel, Crowne Plaza Dallas hotel, and two high-rise buildings, the Bank of America Plaza and One Main Place and adjacent to buildings on either side of Commerce Street, including federal buildings, residential buildings, hotels, office buildings, and parking garages.

Mitigation

As-built building foundation surveys of adjacent structures would be conducted during design to gain an understanding of structural issues and to ensure the protection of adjacent structures from being affected.

A Construction Management Program (CMP), will be implemented and incorporated into the plans and specifications of all D2 project contracts during final design to establish the various construction phases and construction contracts, their estimated schedules and durations, and appropriate sequencing. The CMP will include three parts: Construction Education and Outreach Plan (CEOP), Construction Transportation Management Plan (CTMP), and Emergency Services Coordination Plan (ESCP). The CMP would also include the following:

- A detailed project description, including site maps;
- A detailed description of the potential physical, environmental, and other impacts of the construction activities and their duration on residents, businesses, commuters, and other potentially impacted parties; and
- A detailed description of the mitigation measures proposed to be undertaken by the Design-Build contractor and subsequent mitigation measures for each of the construction impacts identified to the extent practicable.



The following mitigation measures would be implemented to minimize and reduce construction-related transportation impacts and inform the public and other stakeholders of the construction schedule and associated activities. These measures would be implemented for all options:

- Develop and Implement a CEOP. The CEOP will ensure that the D2 Project coordinates construction activities with existing business operations and other development projects to minimize disruption and delays. The CEOP will also establish a process that will address the concerns of businesses and their customers, property owners, residents, and commuters. The CEOP will be incorporated into the plans and specifications of all contracts through which the D2 Project would be implemented.
- Develop and Implement a Construction Transportation Management Plan (CTMP). The CTMP will ensure that the D2 Project adheres to a set of strategies for managing the construction impacts of the Project. The CTMP will include the information on project alternatives, coordination, existing traffic conditions, construction phasing, road closures, and CTMP implementation and monitoring strategies.

5.3.4 Visual Impacts

Construction activities would temporarily impact the visual environment, varying by construction method. Typically, visual impacts result from movement of equipment, placement of construction fences and screens, and material storage.

Mitigation

During final design, construction measures will be developed to mitigate potential impacts in a more site-specific manner. These could include minimizing fugitive light from portable sources used for construction and restoring staging areas once decommissioned. Screening element material and heights would also be site specific to minimize impacts to surrounding residents and businesses.

5.3.5 Noise/Vibration Impacts

Construction activities associated with a large transportation project often generate noise and vibration complaints even though they only take place for a limited time. For the Project, construction noise and vibration impacts are assessed where the exposure of noise- and vibration-sensitive receivers to construction-related noise or vibration is projected to occur at levels exceeding standards established by FTA and established thresholds for architectural and structural building damage (FTA, 2006). See **Section 5.3.6** for cultural resource considerations.

Construction noise and impacts are assessed using a combination of the methods and construction source data contained in the FTA guidance manual and the FHWA Roadway Construction Noise Model (RCNM) from the FHWA Construction *Noise Handbook* (Final Report FHWA-HEP-06-015, August 2006). Typical noise levels generated by representative pieces of equipment are listed in **Table 5-4**.

Temporary noise and vibration impacts could result from activities associated with the construction of new tracks and stations, utility relocation, grading, excavation, track work, demolition, and installation of systems components. Such impacts may occur in residential areas and at other noise-sensitive land uses located within several hundred feet of the rail alignment. A listing of noise sensitive receptors in the Project area can be viewed in **Table 4.11** in **Chapter 4**. The potential for noise impact would be greatest at locations near pavement breaking, and at locations close to any nighttime construction work. The potential for vibration impact would be greatest at locations close to vibratory compaction operations.



A quantitative assessment of construction noise and vibration impacts will be conducted during the design phase of the Project when detailed construction scenarios are available.

Table 5-4 Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA)-50 ft from Source	Usage Factor (U.F.), %
Air Compressor	80	40
Backhoe	80	40
Ballast Equalizer	82	50
Ballast Tamper	83	50
Compactor	82	20
Concrete Mixer	85	40
Concrete Pump	82	20
Crane, Derrick	88	16
Crane, Mobile	83	16
Dozer	85	16
Generator	82	50
Grader	85	40
Impact Wrench	85	50
Jack Hammer	88	20
Loader	80	40
Paver	85	50
Pile Driver (Impact)	101	20
Pile Driver (Vibratory)	95	20
Pneumatic Tool	85	50
Pump	77	50
Rail Saw	90	20
Rock Drill	85	20
Roller	85	20
Saw	76	20
Scarifier	83	20
Scraper	85	40
Shovel	82	40
Spike Driver	77	20
Tie Cutter	84	20
Tie Handler	80	20
Tie Inserter	85	20
Truck	84	40

Source: FTA, 2018 and FHWA, 2006

Mitigation

Construction activities will be carried out in compliance with DART specifications and all applicable local noise regulations. In addition, the following mitigation measures will be applied as needed to minimize temporary construction noise and vibration impacts:

- Avoiding nighttime construction in residential neighborhoods;
- 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;
- Routing construction-related truck traffic to roadways that will cause the least disturbance to residents; and



- Using alternative construction methods to minimize the use of impact and vibratory equipment (e.g., pile-drivers and compactors).

Specific construction noise and vibration mitigation measures will be developed during the design phase of the Project when more detailed construction information is available, and requirements for noise and vibration monitoring will be evaluated at that time.

There are no feasible and practical methods to mitigate the vibration produced by TBM mining. However, TBM mining activities are temporary, and any detectable ground-borne vibration or ground-borne noise will occur for a limited number of days depending on the advance rate of the tunneling.

Muck Train Mitigation

Ground-borne vibration and ground-borne noise generated by material supply and muck trains could last for the duration of the tunneling construction. A primary cause for the high vibration of these trains is the track joint gap size. However, other factors contribute such as poor quality rail, mismatched rail profiles, and rigid attachments to the tunnel invert. Potential mitigation options are:

- Conveyor Belt System: Utilize a conveyor belt system to remove spoils and muck. Operation of a conveyor belt system is unlikely to cause vibration or ground-borne noise concerns and will reduce the number of material supply train operations.
- Rail isolation: Ground-borne noise reduction should be provided by supporting the rails on cross-ties and with an elastomer isolator installed between the floor of the tunnel and the rails and ties.
- High-Quality Rail: Using good quality rail with careful installation, not bent or warped, and free from pits will reduce vibrations.
- Minimize rail joint gap size or use filler weld at joints: Typically, material supply and muck train rail is constructed without much regard to the rail joint gap size. As the wheel traverses the gap, a “wheel strike” occurs, potentially causing a large vibration event. The joint gap should therefore be minimized, and the use of filler weld should be used if the filler weld is ground to smooth the transition.
- Train speed control: Operating the train at a reduced speed will reduce vibration. It has been shown that reducing the train speed by half reduced the vibration by 3-7 dB depending on the frequency. However, reducing the train speed over long distances may affect completion schedules.
- Use rubber tire vehicles: This option removes a rail-based system entirely, as all supplies and/or spoils are conveyed by a vehicle with rubber tires. The use of such a vehicle has the potential to remove all ground-borne noise issues as well as vibration issues except at all but the lowest frequencies (usually below 5 Hz where a tire resonance may occur).
- Maintenance: Regardless of the mitigation measures used, over time, rail degrades, gaps open, and train speed limits are violated. The construction management team will need to proactively check the condition of the imposed measures and respond quickly to make corrective actions, if needed.

5.3.6 Cultural Resources Impacts

Cultural resources potentially impacted by the Project are discussed in **Section 4.6**.



Archeological Resources

As discussed in **Section 4.6.4**, no previously recorded archeological sites would be affected by the Project. However, construction activities have the potential to uncover previously unknown archeological resources.

Mitigation

If archeological resources are discovered during construction, all construction activities will cease in the area and be monitored by a certified historian or archeologist. Work will not proceed until additional review and clearance by the THC has been completed.

Coordination with the THC will take place to create a research design, if needed, and obtain an Antiquities Permit for the purposes of archeological surveys, monitoring, testing, and any potential mitigation. Following surface stripping, and one to two weeks prior to the start of construction, it is recommended that archeologists oversee the removal of concrete and other recent overburden at the penetration points, scraping of all tunnel entrances and pedestrian access areas. Should apparently intact archeological deposits be encountered, testing is recommended at the time of the survey to determine if there is potential for eligibility for listing in the NRHP and mitigation would be required.

Non-Archeological Resources

Indirect impacts from noise and vibration could occur during construction. Noise and vibration analysis was conducted in December 2018 in accordance with FTA guidelines (See **Section 4.8**). There are also ground-borne noise impacts anticipated due to muck train operations at sensitive buildings adjacent to the proposed tunnel. However, the projected vibration levels from these operations would be well below the most stringent FTA damage criteria for historic buildings that are extremely susceptible to vibration damage.

A quantitative noise and vibration impacts assessment would be conducted during the design phase of the Project when detailed construction scenarios are available. Specific construction noise and vibration mitigation measures would be developed as appropriate, and requirements for noise and vibration monitoring would be evaluated and coordinated with the THC. It is recommended that blasting be avoided during construction.

Mitigation

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

5.3.7 Parks Impacts

As discussed in **Section 4.5** and **4.17**, the construction of the Project proposes using an off-set headhouse approach to avoid cut-and-over construction along Commerce Street. This approach would require full use of Pegasus Plaza for temporary construction.

Mitigation

During construction Pegasus Plaza would be closed and fenced for safety. After construction of the D2 Subway, Pegasus Plaza will be re-established under guidelines that will be developed



through an agreement between DART and the City of Dallas, taking into consideration input from park stakeholders.

5.3.8 Air Quality Impacts

Air quality impacts during construction will be limited to short term, increased fugitive dust and mobile source emissions. These impacts will be short-term and cease once construction is complete. As discussed in Section 4.9, the D2 Subway is located within a “marginal” non-attainment area for eight-hour ozone and has been included in current Transportation Improvement Plan (TIP) conformity analysis. Air quality impacts from transportation projects generally focus on changes in motor vehicle-related pollution caused by on road vehicles; however, during construction non-road equipment will be expected to generate exhaust emissions which could contribute to a localized area of degraded air quality.

Other impacts to air quality due to construction activities include dust generated from construction activities associated with concrete demolition, delivery trucks, and earth-moving operations.

Mitigation

The control of exhaust emissions emanating from non-road equipment and other construction related vehicles will be in accordance with EPA guidelines. To minimize exhaust emissions, contractors will be required to use emission control devices and limit the unnecessary idling of construction vehicles. DART proposes to establish a muck house along Akard Street for construction of the Commerce Station to help control dust, visual and noise concerns. Other measures to mitigate air quality include minimizing emissions through the use of clean fuels in construction equipment, deployment of clean diesel construction equipment (new, retrofit, rebuilt or repowered), and the implementation of anti-idling practices at construction sites.

There are no federal, state or local regulations concerning the generation of dust from construction activities except as a nuisance complaint; however, the DART General Provisions, General Requirements and Standard Specifications for Construction Projects, Section 01560 (Part 1.8, Dust Control) provides dust control measures for construction activities. The regulations state that the contractor will be required to have sufficient equipment at the site to implement dust control measures. The measures will be implemented at all areas of construction at all times including non-working hours, weekends, and holidays. Common dust mitigation techniques on construction sites include applying water or other soluble moisture-retaining agents to dirt areas, cleaning construction equipment and adjacent paved areas that may be covered with dirt or dust, and covering haul trucks carrying loose materials to and from construction sites.

5.3.9 Water Quality Impacts

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, issued March 5, 2018, 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 Design Build contractor would 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 Project from the EPA. The Design Build 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.

Mitigation

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.

5.4 Permits

Construction of the Project is anticipated to include the following permits. Additional permits would be identified as design progresses.

5.4.1 Surface Water Quality

A TPDES TCEQ Storm Water Construction General Permit (GCP) TX150000 is required for large construction projects, effective March 5, 2018 for 5 years. This permit requires development and implementation of a SWPPP, submission of an NOI to the TCEQ, and posting of a site notice before and during construction.

5.4.2 Archeological Resources

A Texas Antiquities Permit is required from the THC for purposes of conducting archeological surveys, monitoring, testing, and any potential mitigation of archeological resources.

5.4.3 City of Dallas

A Certificate of Appropriateness would be required by the City of Dallas for exterior changes or construction activities that would occur within the boundaries of locally designated historic properties.

Any tree removals associated with project activities would be done in accordance with City ordinances, and permits would be obtained, if necessary.

5.5 Coordination with Other Scheduled Construction Projects

The construction of the 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 5-5** summarizes on-going and planned projects that would influence the design and construction of the 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, Atmos, communication firms in the area, and other utility owners to assess where utility conflicts exist 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 5-5 Construction Coordination

Related Project or Agency	Study Area of Impact	Issue	Responsible Entity
Hines/Cousins' Victory Center	South of the Arpeggio Victory Park Apartments and west of Victory Ave	Coordination locating a signal house and an associated access lane, while avoiding the planned Victory Center development	DART, City of Dallas, and developer
Perot Museum of Nature and Science expansion	Immediately north of Woodall Rodgers	Integration of surface station with planned expansion and garage.	DART, City of Dallas, and developer
Woods Development	Immediately south of Woodall Rodgers	Integration of west portal and construction storage area with planned development.	DART, City of Dallas, and developer
City of Dallas	Pegasus Plaza	Commerce Station Headhouse and station pedestrian access at Pegasus Plaza	DART, City of Dallas, AT&T, and others
City of Dallas Thoroughfare Plan - Commerce Street Improvements	Commerce Station	Integration of Commerce Station pedestrian portals and ventilation shafts into Commerce Street sidewalk widenings	DART, City of Dallas
Epic Development	Swiss Avenue	Integration of east portal and track with construction staging area with future phases of development.	DART, City of Dallas, and developer
Planned Utility Projects	Downtown Dallas	Maintenance of utilities	DART, City of Dallas, and Utility providers
Wastewater/Water	Along Commerce Street from Houston to Harwood Street	1.5 miles of water/wastewater replacement	Dallas Water Utilities

Source: GPC6

5.6 Communications

It is DART's intention to maintain coordination with stakeholders 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. All construction activities, regardless of size, taking place in Dallas must comply with Dallas City Code Sec.19-118 (City of Dallas). The benefits of continuous communications from the Project's initiation through final construction activities would include increased public acceptance of the Project, fewer delays in construction, and reduced cost of construction by identifying any potential concerns early so that mitigation efforts can be undertaken in a planned process without requiring costly emergency measures. Businesses (restaurants, retail stores) and DART would coordinate on communication with customers/clients to ensure proper signage, information and access is made available.

DART will use various means to provide the public with information regarding the D2 Subway including public meetings, newsletters, fact sheets, electronic mailings, and on-line content. DART



has established a D2 Subway website (www.dart.org/D2) to keep stakeholders informed. As design and construction proceeds, new sections will be added to the webpage to communication information. This website provides Project information and allows the public to sign up for Project updates. D2 comments and questions may be directed to the D2 email address D2@dart.org.



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6. Public and Agency Consultation and Coordination

6.1 Public Involvement Plan

This chapter summarizes public participation and agency consultation and coordination during development of the environmental studies and documentation of this SDEIS. A DART D2 *Public and Agency Involvement Plan (PAIP)* was developed to proactively and effectively communicate the project scope, issues, and potential impacts and benefits while collecting valuable public, agency and stakeholder input for the Project. Refer to **Appendix D** for the *D2 Subway: Dallas Central Business District (CBD) Second Light Rail Alignment Public and Agency Involvement Plan*.

Goals of the PAIP are as follows:

1. Provide opportunities for early and continuous agency and public participation to a wide range of individuals and public/private organizations.
2. Educate the public on the Federal National Environmental Policy Act (NEPA) process, the Project Development process, and future project implementation efforts.
3. Provide the public with a thorough presentation of the technical issues throughout the process, while focusing on the salient analysis results, the key decision points, and the benefits and impacts of the project.
4. Assure inclusion of traditionally under-represented groups in the process.
5. Understand the different public and stakeholder interests and address them throughout the process, integrating them into the analyses associated with the PE/EIS efforts.
6. Evaluate the effectiveness of outreach activities on a continuing basis in order to refine this plan and utilize the most cost-effective techniques.

Public and Agency Scoping

Public and agency involvement activities officially started with the publication of the Notice of Intent (NOI) to prepare an environmental impact statement for the proposed Dallas Central Business District (CBD) Second Light Rail Alignment Project. The NOI was issued in the *Federal Register* by the FTA on April 12, 2007. It provided information on the scoping process purpose and meeting logistics, the project's proposed purpose and need, location and environmental setting, possible alternatives, possible effects, FTA procedures, and other pertinent project information.

The initial public scoping meeting was held on May 2, 2007 at 12:00 p.m. and on May 3, 2007, at 6:30 p.m. at the DART Headquarters. DART held an Interagency Scoping Meeting on May 3, 2007 at 12:00 p.m. 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 public meetings. Numerous federal, state, tribal, regional and local agencies were invited to provide input during the scoping process. Public involvement has continued since that date at each stage of project planning as described in **Sections 1.2** and **2.1**.

While an LPA was adopted in September 2015, DART relaunched the public process with a series of LPA Refinement meetings in December 2016 to redefine that mostly at-grade LPA as a subway alignment. Numerous stakeholder and technical group meetings were held from December 2016 to May 2017 to arrive at a consensus for the D2 Subway LPA. Public meetings were also held on



January 19, 2017; April 18, 2017; and June 21, 2017. A Facebook Live public meeting was held on June 22, 2017, which had over 7,000 views. Input from these meetings lead to the approval of the Victory/Commerce/Swiss as the D2 Subway LPA in September 2017.

In summer 2018, DART relaunched EIS documentation efforts for the D2 Subway. DART held a stakeholder meeting on June 21, 2018 and an interagency meeting on July 27, 2018. Federal, state, tribal, regional and local agencies were updated on project re-initiation and invited to the interagency meeting, or to provide comments in writing. This chapter focuses on the outreach done since that time. Both the initial scoping effort and more recent activities provided the basis for identification of issues important to project definition and EIS development.

6.2 Methods and Tools

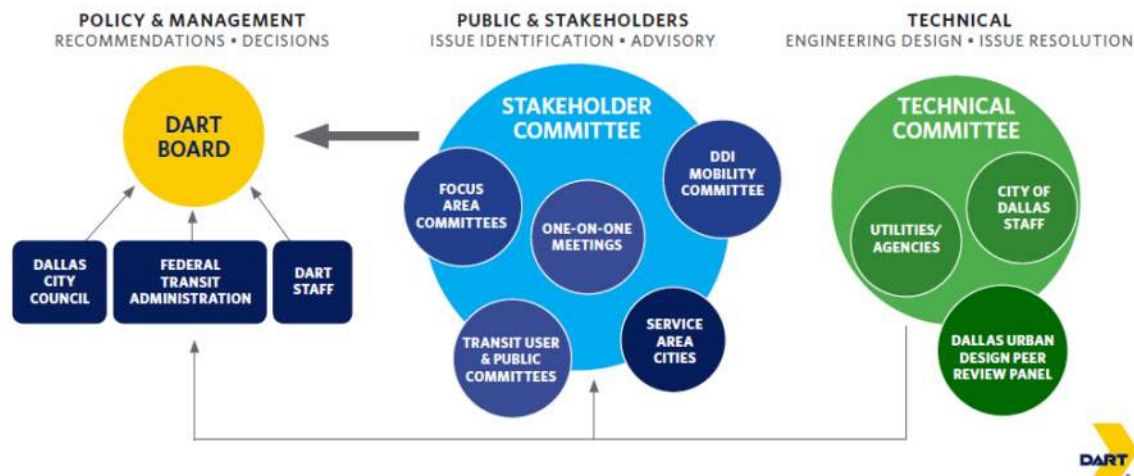
Implementation of the PAIP involves a variety of methods and tools, ranging from regular DART Board of Directors meetings, federal agency meetings, city technical staff meetings, and stakeholder coordination meetings. Committees and area-specific groups were formed to create consensus-building opportunities for the areas that have the potential to be most affected by the project.

Figure 6-1 illustrates the overall framework for the plan, highlighting the work groups and committees, agency coordination, and role of the DART Board of Directors. Ultimately, feedback goes to the DART Board to support decision-making throughout the process. The policy and management group consists of the decision-making bodies (DART Board and Dallas City Council), and the lead Federal agency (Federal Transit Administration). DART staff manages the project and makes technical recommendations. These decision-making bodies are briefed regularly on progress.

The public and stakeholders group is advisory and focuses on issue identification to inform the environmental review, engineering, and urban design process. This group is involved through one-on-one meetings, focus area committees, public meetings, and briefings.

The technical group consists of professionals from a range of disciplines that will help to resolve issues related to engineering and design. This includes topics such as utilities, historic buildings, tunnel design, urban design, pedestrian access to stations, traffic considerations and more.

Figure 6-1 Public and Agency Involvement Framework





One of the primary methods to obtain feedback and support project development was through Focus Area Committees. Participants were identified or signed up based on their interests in the specific area (property owner, major employer, residential association representative, transit user representative, etc.). Five areas were defined as focus areas: Victory/Perot (including west portal), Metro Center, Commerce, CBD East and Deep Ellum (including east portal). This approach allowed a smaller group of stakeholders to focus in on key design/access or environmental issues related to a specific station area or segment of the project, as well as discuss issues related to temporary construction needs and overall long-term vision of integrating the D2 Subway into downtown. Initial meetings were held in August 2018 with all focus areas, and additional meetings as well as one-on-one meetings were held as appropriate.

A web page was also established for the Project at (www.DART.org/D2). Persons visiting the website can obtain information on the status of the Project, reference material, prior studies, meeting presentations and materials, and meeting summaries and comments. The website is a comprehensive source of project information. The website also provides a means for the public to provide comments. Since March 2007, the site has registered nearly 83,000 page hits. DART also established a project email D2@DART.org to provide an additional method for receiving comments.

Project development meetings for the D2 Subway were initiated in summer 2018. Public meetings were held on September 12, 2018; April 25, 2019; and November 13, 2019 to present information and receive input from the affected community. Public meetings were tailored to meet community needs and have occurred in accordance with project milestones. Meeting presentation materials, technical information, and documentation of the meeting summaries were posted to the project website for each meeting.

For public meetings, a variety of outreach methods were used. As DART sought meaningful public input specific to the EJ communities, a special effort was made to involve these communities. EJ inclusion efforts included bilingual advertisements and publications, outreach to minority organizations, and material distribution within EJ communities. The following specific notification efforts were used for D2 Subway public meetings:

- 30,000 bilingual (Spanish/English) brochures were printed and distributed system wide on DART Rail, TRE, all Bus Routes connecting in Downtown Dallas;
- Newspaper ads were in the following publications:
 - Dallas Morning News
 - Dallas City Greensheet
 - Al Dia (Spanish)
 - Dallas Weekly (African American)
 - Dallas Chinese News (Asian)
 - Dallas Voice (LGBTQ)
- Alerts to 7,790 Email/Text Subscribers
- Alerts to 3,350 D2 Email/Text Subscribers
- Posted on DART.org, Twitter and Facebook page;
- Emails to stakeholder groups;
- Email to Chambers of Commerce including the Hispanic, African American and Asian Chambers; and
- Emails to the DART congressional delegation, councilmembers, mayor, city manager, and appropriate city staff.



6.3 Summary of Public and Agency Participation

Public participation strategies and activities have been used to disseminate project information and solicit and receive public input and comment on project-related issues, concerns and potential environmental impacts of the Project. A summary of public and agency coordination meetings since the August 2018 project re-initiation is provided in **Table 6-1**.

Table 6-1 Public and Agency Coordination Meetings

Meeting	Date	Location
Public Meetings/Hearings		
Project Re-Initiation Meetings	September 12, 2018 (12:00 pm) September 12, 2018 (6:30 pm)	DART Board Room
Project Update Meetings	April 25, 2019 (12:00 pm) April 25, 2019 (6:30 pm)	DART Board Room
Project Update Meetings	November 13, 2019 (12:00 pm) November 13, 2019 (6:30 pm)	DART Board Room
SDEIS Public Hearings	June 11, 2020	DART Board Room
Stakeholder Committee Meetings		
Stakeholder Committee #1	June 21, 2018	Westin Hotel Downtown Dallas
Stakeholder Committee #2	October 24, 2018	UNT-Downtown Dallas
Stakeholder Committee #3	April 18, 2019	DART
Stakeholder Committee #4	November 7, 2019	DART
Focus Area Meetings		
Deep Ellum Focus Area	August 8, 2018	Latino Cultural Center
Victory/Perot Focus Area	August 9, 2018	Huitt-Zollars Office
CBD East Focus Area	August 21, 2018	UNT-Downtown Dallas
Commerce Focus Area	August 22, 2018	AT&T Office
Metro Center Focus Area	August 23, 2018	Bank of America Plaza
CBD East Focus Area	March 28, 2019	UNT-Downtown Dallas
Commerce Focus Area	December 10, 2018	Adolphus Hotel
Commerce Focus Area	November 20, 2019	AT&T Office
Metro Center Station Focus Area	March 23, 2020	Via conference call
Victory/Perot Focus Area	March 24, 2020	Via conference call
DART Board/Committee Meetings		
DART Planning Committee	July 10, 2018	DART
DART Planning Committee	August 28, 2018	DART
DART Planning Committee	September 18, 2018	DART
DART Planning Committee	October 30, 2018	DART
DART Planning Committee	November 13, 2018	DART
DART Planning Committee	December 11, 2018	DART
DART Planning Committee	January 22, 2019	DART
DART Planning Committee	February 26, 2019	DART
DART Planning Committee	March 26, 2019	DART
DART Planning Committee	April 23, 2019	DART
DART Planning Committee	May 28, 2019	DART
DART Planning Committee	June 18, 2019	DART



Table 6-1 Public and Agency Coordination Meetings

Meeting	Date	Location
DART Planning Committee (including Executive Session)	August 27, 2019	DART
DART Planning Committee (including Executive Session)	September 24, 2019	DART
DART Planning Committee	October 22, 2019	DART
DART Planning Committee	November 12, 2019	DART
DART Planning Committee	December 10, 2019	DART
DART Planning Committee	January 28, 2020	DART
DART Planning Committee	February 25, 2020	DART
DART Planning and Capital Programs Committee	March 10, 2020	DART
DART Planning and Capital Programs Committee	April 14, 2020	DART
Interagency Meetings		
Project Initiation Meeting (DART, FTA, TPWD, and TCEQ)	July 27, 2018	DART
DART, City of Dallas, TxDOT, and NCTCOG	April 18, 2019	Dallas City Hall
DART, City of Dallas, TxDOT, and NCTCOG	May 28, 2019	Dallas City Hall
DART, City of Dallas, TxDOT, and NCTCOG	June 7, 2019	DART
DART, City of Dallas, TxDOT, and NCTCOG	June 19, 2019	DART
DART, City of Dallas, TxDOT, and NCTCOG	July 2, 2019	DART
DART, City of Dallas, TxDOT, and NCTCOG	July 22, 2019	DART
DART, City of Dallas, TxDOT, and NCTCOG	August 5, 2019	DART
DART, City of Dallas, TxDOT, and NCTCOG	September 6, 2019	Dallas City Hall
DART, City of Dallas, TxDOT, and NCTCOG	September 16, 2019	Dallas City Hall
DART, City of Dallas, TxDOT, and NCTCOG	December 17, 2019	DART
DART, City of Dallas, TxDOT, and NCTCOG	February 14, 2020	Dallas City Hall
DART, City of Dallas, TxDOT, and NCTCOG	April 16, 2020	Video Conference
FTA Coordination Meetings		
FTA Bi-Weekly Conference Calls		
FTA Project Management Oversight Contractor (PMOC Monthly Meetings)		
FTA Quarterly Meetings		
Agency/City Coordination Meetings		
DART Interdepartmental Meeting	January 10, 2018	DART
City of Dallas/Parks for Downtown Dallas	February 15, 2018	Dallas City Hall
City of Dallas	July 10, 2018	Dallas City Hall
City of Dallas	July 18, 2018	Dallas City Hall
City of Dallas	August 2, 2018	DART
City of Dallas	August 16, 2018	Dallas City Hall
City of Dallas	August 30, 2018	Dallas City Hall
City of Dallas	September 13, 2018	Dallas City Hall
City of Dallas	September 27, 2018	Dallas City Hall
City of Dallas	October 11, 2018	Dallas City Hall
Texas Department of Transportation (TxDOT)	October 19, 2018	DART
City of Dallas	October 25, 2018	Dallas City Hall
TxDOT	November 15, 2018	TxDOT Dallas District Office
City of Dallas	November 19, 2018	Dallas City Hall
Urban Design Peer Review Panel	November 30, 2018	Dallas City Hall
City of Dallas Councilmember, Lee Kleinman	January 10, 2019	NCTCOG Office
TxDOT	January 18, 2019	DART



Table 6-1 Public and Agency Coordination Meetings

Meeting	Date	Location
City of Dallas Urban Design	April 5, 2019	Dallas City Hall
City of Dallas Open House	April 10, 2019	Dallas City Hall
City of Dallas Councilmember Lee Kleinman and Transportation staff	April 26, 2019	DART
Dallas Park and Recreation Board	September 5, 2019	Dallas City Hall
City of Dallas Coordination	September 6, 2019	Dallas City Hall
Dallas Park and Recreation Board	September 19, 2019	Dallas City Hall
City of Dallas	September 23, 2019	DART
Park and Recreation Staff	September 20, 2019	Dallas City Hall
City of Dallas	September 30, 2019	DART
FTA/THC Staff Walking Tour	November 15, 2019	D2 Corridor
City of Dallas Transportation Department	December 10, 2019	Dallas City Hall
TxDOT	December 11, 2019	DART
City of Dallas Technical Workshop	December 19, 2019	Dallas City Hall
Dallas City Council Transportation and Infrastructure Committee Briefing	January 21, 2020	Dallas City Hall
City of Dallas Park and Recreation Department	March 4, 2020	Dallas City Hall
City of Dallas Transportation & Urban Design	March 6, 2020	Dallas City Hall
City of Dallas Public Art, Park & Recreation, Pegasus Plaza founder and original artist	March 27, 2020	Conference Call
City of Dallas Transportation & Urban Design	April 8, 2020	Video Conference
City of Dallas Park and Recreation staff	April 10, 2020	Conference Call
City of Dallas Urban Design Peer Review Panel	April 24, 2020	Video Conference
Individual/Organization Meetings/Briefings		
Downtown Dallas Inc. (DDI)	May 9, 2018	DART
Perot Museum of Nature & Science	June 13, 2018	Perot Museum
Hunt Consolidated	June 21, 2018	Westin Hotel
General Services Administration	April 25, 2018	Earl Cabell Federal Building
General Services Administration	May 16, 2018	A Maceo Smith Federal Building
General Services Administration	May 16, 2018	Terminal Annex Federal Building
Deep Ellum Foundation	July 11, 2018	Madison Partner Offices
DDI	July 12, 2018	DDI Office
The Real Estate Council (TREC)	July 17, 2018	TREC Office
Deep Ellum/CBD East individuals	July 18, 2018	All Good Café
AT&T	July 19, 2018	AT&T
Parks for Downtown Dallas	July 24, 2018	Bank of America Plaza
Gensler/Victory/Museum Way Station	August 3, 2018	Gensler
Bottled Blonde	August 8, 2018	DART
Shawn Todd	August 10, 2018	Todd Interests Office
Baylor Hospital	August 13, 2018	2001 Bryan Street
Statler Hotel	August 16, 2018	Centurion American
M-M Properties	August 23, 2018	1717 Main Street
Magnolia Hotel	August 28, 2018	DART
Asana, Cielo Property	August 29, 2018	Common Desk, 2929 Commerce
Hunt/Perot	August 29, 2018	Perot Museum



Table 6-1 Public and Agency Coordination Meetings

Meeting	Date	Location
Neiman-Marcus	September 17, 2018	Neiman Marcus
Hunt/Perot	September 20, 2018	Perot Museum
AT&T Employee Survey	October 15, 2018	AT&T
Hines	October 16, 2018	Hines Office
Renaissance Tower (CBRE)	October 24, 2018	Renaissance Tower
Bottled Blonde	October 24, 2018	E-mail correspondence
One Main (Stream Realty)	October 26, 2018	One Main Place
Deep Ellum	October 26, 2018	All Good Café
Homewood Suites	October 31, 2018	Homewood Suites
Scott Rohrman	October 31, 2018	DART
TREC	November 1, 2018	TREC Office
Deep Ellum Property Owners	November 5, 2018	Madison Partner Offices
Greater Dallas Planning Council	November 6, 2018	Park Cities Club
Todd Interests	November 14, 2018	Todd Interests Office
DDI Mobility Committee	November 14, 2018	DDI Office
TREC	November 20, 2018	TREC Office
Deep Ellum Foundation (DEF), Others	November 23, 2018	Common Desk
Hamilton Properties	February 15, 2019	Hamilton Property Office
Greenway Investments	February 20, 2019	HNTB Office
Bottled Blonde	February 20, 2019	Teleconference
Hamilton Properties	February 22, 2019	HNTB Office
Madison Partners	February 25, 2019	HNTB Office
DDI	February 25, 2019	DDI Office
Epic/Westdale	February 26, 2019	HNTB Office
DEF Good Latimer Committee Meeting	February 28, 2019	Common Desk
Todd Interests	March 4, 2019	Todd Interests Office
Westdale/KDC	March 5, 2019	Westdale Office
Bottled Blonde	March 14, 2019	DART
John Tatum	April 5, 2019	Joule Hotel
Larry Hamilton	April 10, 2019	DART
Museum Way Station/Perot Museum	May 9, 2019	DART
Woodall Rodgers Ramp Discussion with Kaizen Development, Woods Capital Management, City of Dallas, and DDI	May 20, 2019	McKinney Ave and Field Street
Live Oak Lofts Board and Residents	May 20, 2019	Live Oak Lofts
Pegasus Plaza Stakeholders	May 21, 2019	HNTB Office
Magnolia Hotel	May 30, 2019	HNTB Office
Woods Capital	May 31, 2019	Woods Capital Office
Newt Walker	June 13, 2019	DART
James Grey	June 18, 2019	Teleconference
Meadows Foundation	June 19, 2019	Meadows Foundation Office
Joule Hotel	June 28, 2019	Joule Hotel
Statler Hotel	June 28, 2019	Statler Hotel
Woods Capital	July 8, 2019	Woods Capital Office
Dallas County Community College District (DCCCD)	July 10, 2019	DART
Magnolia Hotel	July 10, 2019	Teleconference
Woods Capital	July 11, 2019	Woods Capital



Table 6-1 Public and Agency Coordination Meetings

Meeting	Date	Location
Todd Interests	July 15, 2019	Todd Interests Office
Hamilton Properties	July 31, 2019	Hamilton Properties Office
Newt Walker and Terry Miller	August 1, 2019	DART
Todd Interests	August 6, 2019	Todd Interests Office
Bottled Blonde	August 6, 2019	Conference Call
Epic/Westdale	August 8, 2019	Epic Office
Coalition for New Dallas	August 9, 2019	HNTB Office
Scott Rohrman	August 14, 2019	HNTB Office
DDI	September 3, 2019	DDI Office
Development Coordination	September 13, 2019	Woods Capital Office
Todd Interests	September 16, 2019	Todd Interests Office
Epic and D2 Coordination	September 18, 2019	Westdale Office
Bottled Blonde	September 25, 2019	DART
Greater Dallas Planning Council (GDPC) Board Briefing	October 1, 2019	Park City Club
Westdale	November 21, 2019	Perkins + Will
FOX4 TV	December 11, 2019	FOX4 TV Office
Perot Museum/Woods Capital	December 11, 2019	Woods Capital
American Airlines Center	January 22, 2020	AAC Offices
Victory Area Property Owners Briefing	January 24, 2020	Hillwood Offices
Woods Capital Field Development Briefing	January 24, 2020	HKS Architect Offices
Kirby Building Management	January 27, 2020	Kirby Building
Pegasus Plaza Stakeholders Workshop	January 29, 2020	Magnolia Hotel
John Tatum, DalPark Garage	March 4, 2020	Joule Hotel
Adolphus Tower Tour	March 11, 2020	Adolphus Tower
42 Real Estate	March 12, 2020	42 Real Estate Office
Meadows Foundation	March 17, 2020	Conference Call
Westdale/Perkins & Will East Portal Meeting	April 29, 2020	Video Conference
Utility Providers Design Review Meeting	May 1, 2020	Video Conference

Source: DART

6.4 Agency Coordination

DART has coordinated with agencies to ensure review of potential environmental impacts and obtain comments or concurrence on the proposed approach to mitigate impacts. **Appendix C** includes agency coordination documentation since re-initiation of the Project in summer 2018. Original consultation letters were provided at the time of the NOI to prepare an EIS. Project and issue specific coordination has continued since that time.

Specific agency coordination has focused on issues most relevant to integration of the Project into the downtown environment including:

- Texas Historical Commission (THC) staff coordination and review, including a walking tour of the corridor to support the determination of effects findings.



- Joint meetings between DART, TxDOT, City of Dallas, and NCTCOG to coordinate on integration of the east portal under IH 345 concurrent with the TxDOT Feasibility Study and development and review of freeway alternatives.
- City of Dallas Park and Recreation Department review and coordination related to the temporary use of Pegasus Plaza and integration of the Commerce Station headhouse on the site.

6.5 Public and Agency Involvement and the Supplemental Draft EIS

The SDEIS acts as a public decision-making document, in accordance with applicable state and federal regulations, by presenting the anticipated environmental consequences of the Build and No-Build Alternatives with appropriate mitigation measures. This SDEIS has been approved for public circulation by the FTA. The SDEIS has been made available to the public, stakeholder organizations, and local, regional, state and federal agencies for their review and comment. Its availability for review and comment has been officially advertised in the *Federal Register*, as well as through the local media and press. Formal public hearings will be held to give affected and interested parties the opportunity to formally submit comments on the SDEIS. The hearings may include a technical presentation to be followed by time for testimony during the public comment period. Additional or subsequent written comments may be received at DART headquarters via written or email form. Public hearing transcripts and all correspondence will be reviewed at the close of the SDEIS public and agency review period. Substantive comments will be classified and recorded into appropriate subject areas. All comments will be reviewed and documented. However, only substantive comments will receive responses and will be documented in the FEIS/ROD.



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7. List of Preparers

7.1 Introduction

This chapter lists the individuals who have provided key input, technical expertise and/or guidance for preparation of the D2 Subway SDEIS and 20 percent design.

7.2 Public Agency Staff

Table 7-1 lists public agency individuals that provided oversight, guidance and/or technical review for the SDEIS.

Table 7-1 Public Agency Staff

Name	Title
Federal Transit Administration (Lead Federal Agency)	
Robert Patrick*	Region 6 Administrator
Gail Lyssy	Region 6 Acting Regional Administrator.
Don Koski	Region 6 Director of Planning and Program Development
Ronisha Hodge	Region 6 Community Planner
Suleman Shoab	Region 6 Engineer
Brian Hooker*	Region 6 General Engineer
Melissa Foreman*	Region 6 Community Planner
Terence Plaskon	Region 6 Environmental Protection Specialist
Dallas Area Rapid Transit	
Tim McKay	Executive Vice President, Growth and Regional Development
Steve Salin	Vice President, Capital Planning
Edie Diaz	Vice President, Government Relations
Chad Edwards*	Assistant Vice President, Capital Planning
Kay Shelton	Assistant Vice President, Capital Planning
Ernie Martinez	D2 Subway Project Manager
John Hoppie	Capital Planning, Project Manager
J. Lawrence Meshack, III	Senior Manager, Community Engagement
Carlos Huerta	Community Engagement Representative
John Rhone	Vice President, Capital Design & Construction
David Ehrlicher	Assistant Vice President, Capital Design & Construction
Evelio Hernandez	Assistant Vice President, Streetcar-Systems Engineering
Sherry Abraham	Project Manager, Design & Construction
Phil Johnson	Capital Planning, Travel Demand Modeling
Connie Xu	Capital Planning, Travel Demand Modeling
Victor Ibewuike	Capital Planning, Environmental Coordination
Cleo Grounds*	Assistant Vice President, Real Estate
Leticia Delgado	Interim Assistant Vice President, Real Estate
Greg Althoff	Acquisition and Relocations Manager
Rob Smith	Assistant Vice President, Bus Service Planning

*no longer with the Agency

7.3 Consultant Team Members

Table 7-2 lists consultant team staff that provided technical input and oversight for preparation of the SDEIS document and associated preliminary engineering documents.



Table 7-2 Consultant Team Members (GPC 6 Consultant Team)

Name and Title	Years of Experience	Role
HDR Engineering, Inc.		
Tom Shelton, P.E., Vice President	37	Contract Manager, Project Manager
Israel Crowe, P.E., Senior Transportation Engineer*	22	Rail Engineering
Amanda Stahlnecker, P.E., Rail Section Manager	15	Rail Engineering
Daryl Brown, P.E., Transit Engineer	26	Track Design, Engineering QA/QC
Gregory Tallos, Senior Project Architect	13	Station Design Lead
Daeland Angle, EIT, Rail EIT	8	Rail Engineering
Lucas Gublo, EIT, Rail	7	Rail Engineering
Lindsey Boitsov, P.E., Rail Engineer	10	Rail Engineering
Reddy Edulakanti, P.E., Senior Traffic Engineer	14	Traffic Engineering
Fan Gao, EIT, Traffic Engineer	5	Traffic Engineering
Kristine Lloyd, NEPA Project Manager	27	Document Preparation, Public Involvement
Maggie Cowling, GIS Manager	10	GIS Mapping
Terri Asendorf Hyde, Environmental Project Manager	11	Indirect and Cumulative Impacts Analysis, Document Preparation, QA/QC Technical Reviewer
Jory Dille, Transportation Planner*	10	Transportation Analysis, Acquisitions and Displacements
Madison Gordey, Environmental Scientist	2	Acquisitions and Displacements, Document Preparation
Teresa Hanson, Editor	31	Document QA/QC
Gwen Jurisich, Editor	15	Document Preparation
Erin Hatchett, Environmental Scientist	32	Water Resources, Habitat Assessment
Sara Moren, Environmental Scientist	13	Air Quality, Hazardous Materials, Document Preparation
Adam Roberts, Environmental Scientist	10	Geology and Water Quality, Visual and Aesthetic Resources
Vijay Mahal, Transit Planner/modeler	33	Transit and Ridership Performance Analysis
Adam Socki, Transit Planner/modeler	5	Transit and Ridership Performance Analysis
Sherry Sultenfuss, Environmental Scientist	30	Parks, Safety and Security
Shane Valentine, P.G., Senior Project Manager	20	QA/QC Technical Reviewer
KAI Texas		
Darren James, AIA	26	Station Design Lead
Veronica Castro de Berrera, RA, AIA, LEED AP*	22	Station Architecture
Timothy McMinn	14	Station Architecture
Derwin Broughton, AIA	20	Station Architecture
Kristi Sheffy, RID	10	Station Architecture
Cross Spectrum Acoustics		
Dave Towers, Principal Associate	43	Noise and Vibration Specialist
Scott Edwards, Senior Associate	7	Noise and Vibration Analyst
Joelle Suits, Associate	5	Noise and Vibration Analyst



Name and Title	Years of Experience	Role
AmaTerra Environmental		
Deborah Dobson-Brown, PhD, RPA, Cultural Resources Program Manager	33	Cultural Resources, Historic Resources Survey
Joel Butler, Principal Investigator/GIS Analyst*	15	Archeological Survey, Document Preparation, GIS analysis, Figure Preparation
Cherise Bell, Architectural Historian	10	Historic Resources Survey, Document Preparation
Erin Mace, Architectural Historian	7	Historic Resources Survey, Document Preparation
Erica Howard, M.A., Staff Architectural Historian	10	Historic Resources Survey, Document preparation
Vanessa Cragle, GIS Specialist	7	GIS Mapping, Figure Preparation
Civil Associates, Inc.		
Jenn-Hwan Ma, P.E.	27	Civil Engineering and Station Civil Design
Iconic Consulting Group, Inc.		
Jeffrey Briscoe, P.E.	18	Street Modifications and Drainage Design
HNTB		
Brandi Reaves Crawford ASLA, LEED® AP BD+C, ENV SP	24	Urban Design
James Frye*, Project Manager	25	Project Manager
Ian Bryant, Planner	16	Transportation Planner
Selena Solis Asire, P.E., Systems Engineer	21	Passenger Rail Systems Design
Charles A. Stone, Ph.D., PE, Tunnel Engineer	25	Tunnel Design Engineer
Mala Ciancia, P.G., Principal Tunnel Geologist	43	Tunnel Engineering Geologist
Eric Wang, Principal Geotechnical/ Tunnel Engineer	16	Principal Geotechnical/ Tunnel Engineer
Julie Morse, Environmental Task Lead	21	Land Use, Parklands, and Socioeconomics
Michele Lopez, Environmental Planner	12	Land Use, Parklands, and Socioeconomics
Nathan D. Maier Consulting Engineers, Inc.		
Gary Matthews, RPLS	39	Field Surveying & R.O.W. Confirmation
William Wallace, RPLS	40	Field Surveying & R.O.W. Confirmation
Rudy Santini	14	Field Surveying & R.O.W. Confirmation
Alliance		
Samuel Tran, P.E., Geotechnical Engineer	15	Field Geotechnical
Urban Engineers Group		
Faisal Syed, P.E., PTOE, LEED AP	21	Project Engineer, Utility Research
Hasan Raza	5	Project Designer, Utility Research
Urban Opportunity		
Frank Turner, Principal	40	Stakeholder Coordinator

*No longer with firm
Source: GPC6, 2019



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8. Distribution List

Chapter 8 contains the distribution list for the notice of availability for this SDEIS.

FEDERAL AGENCIES

Mr. Reid Nelson, Director - Advisory Council on Historic Preservation
Ms. Judith Wilson, NEPA Coordinator - Bureau of Indian Affairs
Mr. David Bernhardt, Secretary of Interior - Department of the Interior
Ms. Michaela Noble, Director, Office of Environmental Policy and Compliance - Department of the Interior
Mr. Tony Robinson, Regional Director - Federal Emergency Management Agency, Region VI
Mr. Al Alonzi, Division Administrator - Federal Highway Administration-Texas Division
Mr. Vence Haggard, Regional Administrator - Federal Railroad Administration - Region 5
Mr. Stephen Brooks, Chief, Regulatory Branch - U.S. Army Corps of Engineers
Vacant, Field Office Director - U.S. Department of Housing and Urban Development, Dallas Office
Mr. Arturo Blanco, Deputy Director, Region 6 Tribal Program - U.S. Environmental Protection Agency, Region 6
Mr. Ken McQueen, Administrator - U.S. Environmental Protection Agency, Region 6
Ms. Kimeka Price, EIS Reviewer, Transportation Projects - U.S. Environmental Protection Agency, Region 6
Ms. Debra Bills, Field Supervisor - U.S. Fish and Wildlife Service, Ecological Services
Ms. Amy Lueders, Southwest Regional Director - U.S. Fish and Wildlife Service, Region 2
Ms. Tara Katuk Mac Lean Sweeney, Assistant Secretary - Bureau of Indian Affairs
Mr. Kevin Wright, Environmental Protection Specialist - Federal Railroad Administration
Mr. Robert Babcock, Regional Administrator - General Services Administration
Mr. Mike Reynolds, Regional Director - National Park Service Intermountain Region
Rear Admiral John Nadeau, District Commander - U.S. Coast Guard, 8th District

STATE AGENCIES

Mr. Mohamed Bur, PE, District Engineer - Texas Department of Transportation
Ms. Ceason Clemens, PE, Deputy District Engineer - Texas Department of Transportation
Mr. Peter Espy, Rail Division Director - Texas Department of Transportation
Mr. William Hale, PE, Chief Engineer - Texas Department of Transportation
Mr. Dan Perge, Director, Advance Project Development - Texas Department of Transportation
Mr. Carlos Swonke, Director, Environmental Affairs Division - Texas Department of Transportation
Mr. Marc Williams, Deputy Executive Director, Transportation - Texas Department of Transportation
Mr. Justin Kockritz, Lead Architectural Historian - Texas Historical Commission
Mr. Mark Wolfe, Executive Director - Texas Historical Commission
Mr. Bob Gottfried, Program Supervisor, Texas Natural Diversity Database - Texas Parks and Wildlife Department
Ms. Karen Hardin, Habitat Assessment Biologist, WHAP - Texas Parks and Wildlife Department
Mr. Carter Smith, Executive Director - Texas Parks and Wildlife Department
Ms. Laura Zebehazy, Program Leader, WHAP - Texas Parks and Wildlife Department
Ms. Christi Craddick, Chairman - Railroad Commission of Texas
Ms. Alyssa Taylor, Regional Director - Texas Commission on Environmental Quality, Dallas/Fort Worth Region
Mr. George P. Bush, Commissioner - Texas General Land Office, Asset Management
Ms. Becky Shelton, Regional Archeologist - Texas Historical Commission



REGIONAL AGENCIES

Mr. Drew Campbell, Executive Director - Dallas Regional Mobility Coalition
Mr. Raymond Suarez, President - Denton County Transportation Authority
Mr. Michael Eastland, Executive Director - NCTCOG
Mr. Dan Lamers, Senior Program Manager - NCTCOG
Ms. Edith Marvin, Director of Environment & Development - NCTCOG
Mr. Michael Morris, Director of Transportation - NCTCOG
Mr. James Hofmann, Executive Director - North Texas Tollway Authority
Mr. Bob Baulsir, President/Executive Director - Trinity Metro

CITY MANAGERS AND ADMINISTRATORS

Ms. Erin Rinehart, City Manager - City of Carrollton
Mr. Brett Haney, City Manager - City of Cockrell Hill
Mr. Majed Al-Ghafry, Assistant City Manager - City of Dallas
Mr. T.C. Broadnax, City Manager - City of Dallas
Ms. Nadia Chandler-Hardy, Assistant City Manager - City of Dallas
Mr. Jon Fortune, Assistant City Manager - City of Dallas
Mr. Joey Zapata, Assistant City Manager - City of Dallas
Mr. Charles Cox, City Manager - City of Farmers Branch
Mr. Bryan Bradford, City Manager - City of Garland
Mr. David Hall, City Manager - City of Glenn Heights
Mr. Chris Hillman, City Manager - City of Irving
Mr. Mark Israelson, City Manager - City of Plano
Mr. Dan Johnson, City Manager - City of Richardson
Mr. Brian Funderburk, City Manager - City of Rowlett
Mr. Robbie Corder, City Manager - City of University Park
Mr. Wes Pierson, City Manager - Town of Addison
Mr. Bill Lindley, Town Administrator - Town of Highland Park

CITY OF DALLAS STAFF

Mr. Dominique Artis, Chief, Fire Department - City of Dallas
Ms. Molly Carroll, Project Manager, Dallas High Speed Rail - City of Dallas
Mr. Christopher Caso, Interim City Attorney - City of Dallas
Mr. Peer Chacko, Chief Planning Officer and Director, Planning and Urban Design - City of Dallas
Mr. Daniel Church, Senior Planner, Planning and Urban Design - City of Dallas
Ms. Beverly Davis, Fair Housing - City of Dallas
Mr. Arturo Del Castillo, Chief Planner - City of Dallas
Ms. Liz Casso, Senior Planner - City of Dallas
Ms. Hayley Dyer, Business Manager, Majestic Theater - City of Dallas
Ms. Louise Elam, Assistant Director of Planning and Facilities, Dallas Parks - City of Dallas
Mr. Benjamin Espino, General Manager, Latino Cultural Center - City of Dallas
Ms. Chhunny Chhean, Department Director, Business Development and Procurement - City of Dallas
Ms. Genesis Gavino, Deputy Resilience Officer - City of Dallas
Ms. Rosa Fleming, Convention and Event Services - City of Dallas
Ms. Renee Hall, Chief of Police, Police Department - City of Dallas
Mr. John Jenkins, Department Director, Parks and Recreation - City of Dallas
Ms. Kay Kallos, Public Art Manager - City of Dallas
Mr. Gus Khankarli, Assistant Director, Transportation Planning - City of Dallas
Mr. Raymond Lee, III, Streets Service Manager - City of Dallas
Mr. Terry Lowery, Department Director, Water Utilities - City of Dallas
Mr. Auro Majumdar, Assistant Director, Transportation Operations - City of Dallas
Mr. James McGuire, Department Director, Office of Environmental Quality - City of Dallas



Mr. Michael Mendoza, Chief of Economic Development and Neighborhood Services - City of Dallas
Mr. Hugh Miller, Chief Information Officer - City of Dallas
Mr. Jason Ney, Park Planning and Acquisitions Manager - City of Dallas
Mr. Robert Perez, Department Director, Public Works and Transportation - City of Dallas
Mr. Courtney Pogue, Department Director, Economic Development - City of Dallas
Mr. Don Raines Jr., Senior Planner, Planning and Urban Design - City of Dallas
Ms. Michelle Ranum, Chief Ethics and Compliance Officer - City of Dallas
Ms. Elizabeth Reich, Chief Financial Officer - City of Dallas
Mr. Michael Rogers, Director, Transportation Department - City of Dallas
Mr. Michael Schwedler, General Manager, Majestic Theater - City of Dallas
Ms. Jennifer Scripps, Director Office of Arts & Culture - City of Dallas
Ms. Carl Simpson, Department Director, Code Compliance - City of Dallas
Mr. Kris Sweckard, Department Director, Sustainable Development and Construction - City of Dallas
Ms. Kimberly Tolbert, Chief of Staff to the City Manager - City of Dallas
Mr. Jared White, Bicycle Transportation Manager - City of Dallas

DALLAS PARK AND RECREATION BOARD

Ms. Amanda Schulz, Dallas Park and Recreation Board, Council District 14 - Dallas Park and Recreation Board

CITY STAFF

Mr. Tom Hammons, Transportation Engineering Manager - City of Carrollton
Mr. Daniel Paredez, Director of Public Works - City of Cockrell Hill
Mr. Marc Bentley, Director of Public Works - City of Farmers Branch
Mr. Paul Luedtke, Director of Transportation - City of Garland
Mr. Christopher Patterson, Utility Superintendent / Pre/Post Construction - City of Glenn Heights
Mr. Dan Vedral, Director of Transportation - City of Irving
Mr. Bryan Shewski, Transportation Manager - City of Plano
Mr. Mark Nelson, Director of Transportation & Mobility - City of Richardson
Mr. Gary Enna, Interim Public Works Director - City of Rowlett
Mr. Jacob Speer, Director of Public Works - City of University Park
Mr. Shannon Hicks, Director of Public Works & Engineering - Town of Addison
Ms. Lori Chapin, Director of Transportation - Town of Highland Park

DALLAS COUNTY STAFF

Ms. Alberta Blair, Director of Public Works - Dallas County
Mr. Tushar Solanki, Assistant Director Transportation Planning - Dallas County

FEDERAL ELECTED OFFICIALS

The Honorable Colin Allred, Congressman - U.S. House of Representatives
The Honorable Michael Burgess, Congressman - U.S. House of Representatives
The Honorable Lance Gooden, Congressman - U.S. House of Representatives
The Honorable Eddie Bernice Johnson, Congresswoman - U.S. House of Representatives
The Honorable Kenny Marchant, Congressman - U.S. House of Representatives
The Honorable Van Taylor, Congressman - U.S. House of Representatives
The Honorable Ron Wright, Congressman - U.S. House of Representatives
The Honorable John Cornyn, Senator - U.S. Senate
The Honorable Ted Cruz, Senator - U.S. Senate

STATE ELECTED OFFICIALS

The Honorable Greg Abbott, Governor, State of Texas - Office of the Governor
The Honorable Rafael Anchia, State Representative, District 103 - Texas House of Representatives
The Honorable Michelle Beckley, State Representative, District 65 - Texas House of Representatives
The Honorable Lorraine Birabil, State Representative, District 100 - Texas House of Representatives
The Honorable Rhetta Bowers, State Representative, District 113 - Texas House of Representatives



The Honorable Angie Chen Button, State Representative, District 112 - Texas House of Representatives
The Honorable Yvonne Davis, State Representative, District 111 - Texas House of Representatives
The Honorable Jessica Gonzalez, State Representative, District 104 - Texas House of Representatives
The Honorable Justin Holland, State Representative, District 33 - Texas House of Representatives
The Honorable Julie Johnson, State Representative, District 115 - Texas House of Representatives
The Honorable Jeff Leach, State Representative, District 67 - Texas House of Representatives
The Honorable Morgan Meyer, State Representative, District 108 - Texas House of Representatives
The Honorable Thresa "Terry" Meza, State Representative, District 105 - Texas House of Representatives
The Honorable Victoria Neave, State Representative, District 107 - Texas House of Representatives
The Honorable Candy Noble, State Representative, District 89 - Texas House of Representatives
The Honorable Tan Parker, State Representative, District 63 - Texas House of Representatives
The Honorable Jared Patterson, State Representative, District 106 - Texas House of Representatives
The Honorable Ana-Maria Ramos, State Representative, District 102 - Texas House of Representatives
The Honorable Toni Rose, State Representative, District 110 - Texas House of Representatives
The Honorable Scott Sanford, State Representative, District 70 - Texas House of Representatives
The Honorable Matt Shaheen, State Representative, District 66 - Texas House of Representatives
The Honorable Carl Sherman, State Representative, District 109 - Texas House of Representatives
The Honorable Lynn Stucky, State Representative, District 64 - Texas House of Representatives
The Honorable John Turner, State Representative, District 114 - Texas House of Representatives
The Honorable John Wray, State Representative, District 10 - Texas House of Representatives
The Honorable Brian Birdwell, Texas Senator, District 22 - Texas Senate
The Honorable Pat Fallon, Texas Senator, District 30 - Texas Senate
The Honorable Bob Hall, Texas Senator, District 2 - Texas Senate
The Honorable Kelly Hancock, Texas Senator, District 9 - Texas Senate
The Honorable Nathan Johnson, Texas Senator, District 16 - Texas Senate
The Honorable Jane Nelson, Texas Senator, District 12 - Texas Senate
The Honorable Dan Patrick, Lt. Governor, State of Texas - Texas Senate
The Honorable Angela Paxton, Texas Senator, District 8 - Texas Senate
The Honorable Royce West, Texas Senator, District 23 - Texas Senate

LOCAL ELECTED OFFICIALS

The Honorable Kevin Falconer, Mayor - City of Carrollton
The Honorable Luis Carrera, Mayor - City of Cockrell Hill
Councilmember Carolyn Arnold, District 4 - City of Dallas
Councilmember Tennell Atkins, District 8 - City of Dallas
Councilmember Adam Bazaldua, District 7 - City of Dallas
Councilmember Paula Blackmon, District 9 - City of Dallas
Councilmember David Blewett, District 14 - City of Dallas
The Honorable Eric Johnson, Mayor - City of Dallas
Councilmember Lee Kleinman, District 11 - City of Dallas
Deputy Mayor Pro Tem Adam McGough, District 10 - City of Dallas
Mayor Pro Tem Adam Medrano, District 2 - City of Dallas
Councilmember Cara Mendelsohn, District 12 - City of Dallas
Councilmember Omar Narvaez, District 6 - City of Dallas
Councilmember Jaime Resendez, District 5 - City of Dallas
Councilmember Jennifer Staubach Gates, District 13 - City of Dallas
Councilmember Casey Thomas, II, District 3 - City of Dallas
Councilmember Chad West, District 1 - City of Dallas



The Honorable Robert Dye, Mayor - City of Farmers Branch
The Honorable Scott LeMay, Mayor - City of Garland
The Honorable Harry Garrett, Mayor - City of Glenn Heights
The Honorable Rick Stopfer, Mayor - City of Irving
The Honorable Harry LaRosiliere, Mayor - City of Plano
The Honorable Paul Voelker, Mayor - City of Richardson
The Honorable Tammy Dana-Bashian, Mayor - City of Rowlett
The Honorable Olin Lane, Mayor - City of University Park
The Honorable Theresa Daniel, Dallas County Commissioner, District 1 - Dallas County
The Honorable Dr. Elba Garcia, Dallas County Commissioner, District 4 - Dallas County
The Honorable Clay Jenkins, Dallas County Judge - Dallas County
The Honorable J.J. Koch, Dallas County Commissioner, District 2 - Dallas County
The Honorable John Wiley Price, Dallas County Commissioner, District 3 - Dallas County
The Honorable Joe Chow, Mayor - Town of Addison
The Honorable Margo Goodwin, Mayor - Town of Highland Park

INTERESTED ORGANIZATIONS, STAKEHOLDERS, PROPERTY OWNERS

Sharon Taylor, Assistant - Hilton Worldwide
Noel Rodriguez, General Manager - 1200 Main
Brett Clark, Real Estate Investments - 42 Real Estate
Benton Payne, Project Manager - 42 Real Estate
Scott Rohrman, President CEO - 42 Real Estate
Aaron Kelley, Financial Advisor - Adolphus Hotel
Randy Linberg, Director of Engineering - Adolphus Hotel
Dev (Devarati) Rastogi, Board Member, Perot Museum of Nature & Science - AECOM
Dave Brown, COO/General Manager - American Airlines Center
Brittany Buck, Assistant (Dave Brown) - American Airlines Center
Taylor Bowen, President of AMLI Development Company - AMLI Residential
Gia Brodt, Vice President-Development - AMLI Residential
Amy Malone, CWS Capital-Investment Manager - Marquis Apartments
Russ McFadden, VP Portfolio Management - AT&T
Mike Peterson, Vice President, External Affairs - AT&T
Charles Shelburne, VP Campus Planning - Baylor Scott White
Amy Meadows, President and CEO - Parks for Downtown Dallas
Les Corieri, Owner - Bottled Blonde
Bob Agahi, Partner and owner - Bottled Blonde (Evening Entertainment Group)
Sean Lingenfelter, Director of Planning and Construction - Boxer Property Management Corp.
Michael Pariza, President- Boxer Retail & Resorts - Boxer Property Management Corp.
April Sarkissian, General Manager, Renaissance Tower - CBRE
Gail Thomas, Director - The Dallas Institute of Humanities and Culture (Pegasus Plaza founder)
Colin Moore, Assistant Director of Development - Centurion (Statler)
Michael Anderson, General Council - Chavez Properties
Miguel Solis, Executive Director - Coalition for a New Dallas
Matt Tranchin, President - Coalition for a New Dallas
Kyle Vinson, Senior Portfolio Manager - Cushman Wakefield (Victory Plaza)
Daryl Richardson, Owner - Dallas World Aquarium
Gerald R. Richardson, Management Consultant - Dallas World Aquarium
Harrison Blair, President - Dallas Black Chamber of Commerce
Craig Davis, President/CEO - VisitDallas
Jose Adames, El Centro President - Dallas County Community College District
Joe May, Chancellor - Dallas County Community College District
Michael Hinojosa, Superintendent - Dallas Independent School District
Dale Petroskey, President - Dallas Regional Chamber



Jasmond Anderson, Facilities Design, Business Affairs - DCCCD
Dustin Bullard, VP Public Space and Design - DDI
Evan Sheets, Senior Director, Economic Development and Mobility - DDI
Stephanie Hudiburg, Executive Director - Deep Ellum Foundation
Kourtney Garrett, President/CEO - Downtown Dallas Inc. (DDI)
Carolina Pace - Downtown Property Investor
Ben Reavis - Downtown Residents Council representative
Matt Vermillion, Board Member - Downtown Residence Council (Farmers Market Stakeholders Association)
John Tatum, President/CEO - Elm Development Company (DalPark)
Lance Fair, COO - EsteinUSA
Kathy Saunders, VP General Manager - Fox 4 TV
David Retzsch, Board Executive Committee, At-Large - Greater Dallas Planning Council
Crispin Lawson, President - Friends of the West End Commons
Richard Kuhlman, Property Manager - General Services Administration
Chris Callegari, Studio Director - Gensler (Hunt representative)
Larry Good, Architect, retired - GFF Architecture (Pegasus Plaza)
Mark Hardaway, Vice President/ Partner - Greenway Investment Company
Ricardo Ortiz, President & CEO - Greater Dallas Hispanic Chamber of Commerce
Jerry Stool, President - Greenway Investment Company
Bob Faith, CEO - GreyStar
Dan Warfield, Senior Vice President - Halff and Associates (Victory)
Larry Hamilton, CEO - Hamilton Properties
Ted Hamilton, President - Hamilton Properties
Carline Leal, Property Manager - Hamilton Properties
Nick Galen, VP Planning and Development - Headington Companies
Ken Reese, Executive VP - Hillwood
Ben Brewer, Managing Director - Hines
Rob Witte, Senior Managing Director - Hines
Ralph Hawkins, Chairman Emeritus - HKS
David Williamson, Principal, Director Construction Services - HKS
Louis Dracoulis, General Manager - Homewood Suites
Mike Hoque, CEO - Hoque Global
Arthur Santa-Maria, VP, Real Estate Development - Hoque Global
Mike Wallace, Senior VP - Hunt Realty Investments (Northend Apartments)
Todd Watson, Senior Vice President - Hunt Realty Investments (Northend Apartments)
Allan Zreet, Mobility Committee - DDI
Pete Lewis, VP - KFK Group
Rachel Triska, Executive Director - Life in Deep Ellum
Jamie Coker - Life Oak Lofts Resident
Donald Nedler, Operator - Lizard Lounge
Jon Hetzel, Partner - Madison Partners (Chair Deep Ellum Foundation)
Kevin Gilbert, General Manager - Magnolia Hotel
Eric Holtze, Co-CEO - Magnolia Hotel
Sarah Treadway, Co-CEO - Magnolia Hotel
Kristian Teleki, VP Development - Mathews Southwest
Deborah Carpenter, Assistant to the President - Meadows Foundation
Deborah Fitzpatrick, VP Human Resource and Admin. - Meadows Foundation
Thomas Dempsey, Senior VP - Metropolis Investments
Melissa Graham, Senior Property Manager - MM Properties
Joel McCarty, Senior VP - MM Properties
Mike Silliman, Senior VP Leasing - MM Properties



Tim Adair, General Manager - Neiman Marcus
Kristin Grimm, Director Retail Operations - Neiman Marcus
Brent Laffere, Sr. VP, Capital Planning, Properties - Neiman Marcus
Mike Litwin, Director of Real Estate - Neiman Marcus
Newt Walker, President - Newt Walker Company
Nancy Churchwell, Manager - Northend Apartments
Sarah Hughes, Project Associate - Parks for Downtown Dallas
Carl Roberts, Lower Campus Facilitator - Pegasus Charter School
Adam Bernhardt, VP Senior Manager - Pelton Commercial Real Estate
David Humphries, COO - Perot Museum
David Preziosi, Executive Director - Preservation Dallas
James Grey, Property Owner
Allen Baskind, General Surgery Specialist - Property Owner
Lynn Baskind, Property/ Business Owner - Property Owner
Jacob Johnson, District Manager - Public Storage
Ryan Behring, Managing Partner - Re:Studio Architecture (Dallas World Aquarium)
Brandon Wade, General Manager, The Kirby - Sentinel Corporation
John Jagers, General Partner – JLL (Perot Museum Board member)
Maria Machado, Executive Director - Shared Housing Center
Andrew Sigle, Branch Manager - Sherman Williams
Rev. Jonathan Austin, Chaplain - St. Jude Chapel
Amanda Horstman, Property Manager - Stream Realty
Mike Rollins, Property Owner
Linda McMahon, President/CEO - The Real Estate Council
Bryan Tony, Director of Public Policy - The Real Estate Council
Stephanie Herold, Director - Todd Interests
Shawn Todd, CEO - Todd Interests
Scott Krikorian, Senior Managing Director - Trammel Crow Company
Jennifer Buckhannon, Residential Property Manager - Trinity Properties (owner of Arrive West End)
Tammie Love, Regional Manager - Trinity Properties (owner of Arrive West End)
David Rollins, Property Owner
Cynthia Hall, Director of System and External Relations - UNT
Al Ellis, Community Outreach Facilitator - UNT Dallas College of Law
James Davis, Associate Vice Chancellor for Facility Planning and Development - UNT System
Mauricio Dominguez, High School Managing Director - Uplift Luna Preparatory
Kaitlin McDermott, Primary School Managing Director - Uplift Luna Preparatory
Kristina Nanini, Middle School Managing Director - Uplift Luna Preparatory
Robert Miller, Property Owner - Venture Commercial (Deep Ellum Owner)
Jeremy Scott, President - West End Association President
Joe Beard, CEO - Westdale Real Estate
Chuck Hixson, VP Commercial - Westdale Real Estate
Dennis Trimarchi, Managing Principal - Westdale Real Estate
Jonas Woods, CEO - Woods Capital Management
Billy Prewitt, Executive VP - Woods Capital Management, LLC
Bekah Sturgeon, Business Manager, Third Rail Lofts - ZRS Management

TRIBAL NATIONS

JoAnn Battise, Chairperson - Alabama - Coushatta Tribe of Texas
Bryant J. Celestine, Historical Preservation Clerk - Alabama - Coushatta Tribe of Texas
Tamara Michele Francis Four-killer, Chairperson - Caddo Nation of Oklahoma
Phil Cross, THPO - Caddo Nation of Oklahoma
Willie Nelson, Chairman - Comanche Nation of Oklahoma
Martina Callahan, THPO - Comanche Nation of Oklahoma



Roy B Brown, Chairman - Northern Arapaho
Devon Oldman, THPO, Director - Northern Arapaho
Russell Martin, President - Tonkawa Tribe of Oklahoma
Nelson Harjo Sr., Chief - Alabama - Quassarte Tribal Town
Bobby Komardley, Chairman - Apache Tribe of Oklahoma
Bill John Baker, Principal Chief and THPO - Cherokee Nation of Oklahoma
Lovelin Poncho, Chairman - Coushatta Tribe of Louisiana
Linda Langley, THPO - Coushatta Tribe of Louisiana
Mekko-Tiger Hobia - Kialegee Tribal Town
David Pacheco, Chairperson - Kickapoo Tribe of Oklahoma
Matthew Komalty, Chairperson - Kiowa Tribe of Oklahoma
Danny H. Breuninger, Sr., President - Mescalero Apache Tribe
Holly Houghten, THPO - Mescalero Apache Tribe
Stephanie Bryan, Chairwoman - Poarch Band of Creek Indians
Carolyn White, THPO - Poarch Band of Creek Indians
Leonard M. Harjo, Principal Chief - Seminole Nation of Oklahoma
Theodore Isham, THPO - Seminole Nation of Oklahoma
Marshall Sampson Sr. & Beverly Chapman-Rachal, Co-Administrators - Tunica-Biloxi Tribe of Louisiana
Earl J. Barbry, Jr., THPO - Tunica-Biloxi Tribal Historic Preservation Office
Terri Parton, President - Wichita and Affiliated Tribes

UTILITIES

David Coker, Sr. Project Specialist - Atmos
Stan Breckenridge, Project Specialist - Atmos
Sue Inurrigarro, Project Manager - Atmos
Robert Aldape, Manager OSP Planning & Engineering Design - AT&T
Peter Russell, Engineering Project Manager - AT&T
Ken Huckabee, Operations, Dallas and Oklahoma Division - Century Link
Scott Whaley, Project Manager - Century Link
Erik Baker, Project Manager - Golden Field Services (Century Link)
Jon Bowers, Sr. Right of Way Agent - ONCOR
Keith Williams, New Construction Manager Sr. - ONCOR
Terence Enloe, Staff Engineer/Project Designer - ONCOR
Johnny Walker - ONCOR
James Stuart, National Field Ops - Field Engineer - US Sprint
Roger Underwood, Operations Engineer - Level 3
Jorge Barrera, Construction Coordinator 3 - TWC Charter
Jeff Buehler, Construction Manager - Verizon
Buddy Smith, Engineer IV - Verizon

LIBRARY

Dallas Public Library



List of Acronyms

AA/DEIS	Alternatives Analysis/Draft Environmental Impact Statement
AAC	American Airlines Center
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ACM	Asbestos Containing Materials
ACS	American Community Survey
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
AFG	Area Focus Group
AOI	Area of Influence
APAR	Affected Property Assessment Report
APE	Area of Potential Effect
ASCE	American Society of Civil Engineers
AST	Above Ground Storage Tank
ASTM	American Society for Testing and Materials
AUL	Activity and Use Limitation
BEA	Bureau of Economic Analysis
BG	Block Group
BGS	Below Ground Surface
BMP	Best Management Practices
CA	Central Area
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CBD	Central Business District
CECAP	Comprehensive Environment & Climate Action Plan
CEOP	Construction Education & Outreach Plan
CEQ	Council on Environmental Quality
CESQG	Conditionally Exempt Small Quantity Generator
CERCLA	Comprehensive Environmental Response Compensation & Liability Act
CERCLIS	Comprehensive Environmental Response Compensation & Liability Information System
CFR	Code of Federal Regulations
CGP	Construction General Permit
CIG	Capital Investment Grant
CLI	Closed and Abandoned Landfills
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CO	Carbon Monoxide
CORRACTS	RCRA Corrective Action
CMP	Construction Management Plan
CPTED	Crime Prevention through Environmental Design
CROF	Central Rail Operations Facility
CT	Census Tract
CTMP	Construction Transportation Management Plan
CWA	Clean Water Act
CWR	Continuous Welded Rail
D2	Second Light Rail Alignment
DART	Dallas Area Rapid Transit



dBa	Decibel
dbh	Diameter At Breast height
DCAD	Dallas Central Appraiser District
DCCCD	Dallas County Community College District
DCTA	Denton County Transportation Authority
DDI	Downtown Dallas Inc.
DHHS	Department of Health and Human Services
DEF	Deep Ellum Foundation
DEIS	Draft Environmental Impact Statement
DFD	Dallas Fire-Rescue Department
DFW	Dallas-Fort Worth
DFW Airport	Dallas-Fort Worth International Airport
DISD	Dallas Independent School District
DOCKETS	EPA Docket Data
DOD	Department of Defense
DOE	Determination of Effects
DOT	Department of Transportation
DOI	Department of the Interior
DWU	Dallas Water Utilities
ECHO	EPA Enforcement and Compliance History Online
EDMS	Emissions and Dispersion Modeling System
EDR	Environmental Data Resources Inc.
EIS	Environmental Impact Statement
EJ	Environmental Justice
EMF	Equipment Maintenance Facility
EMST	Ecological Mapping Systems of Texas
ENF	Enforcement Report
EPA	U.S. Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Sites Assessment
ESCP	Emergency Services Coordination Plan
EO	Executive Order
FAST	Fixing America's Surface Transportation Act
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIRM	Flood Insurance Rate Maps
FPPA	Farmland Protection policy Act of 1981
FR	Federal Register
Ft	Feet
FTA	Federal Transit Administration
FTTS	FIFRA/TSCA Tracking System
FWTA	Fort Worth Transportation Authority (also known as The T)
GCOR	General Code of Operating Rules
GCP	General Construction Permit
GCC	Groundwater Contamination Cases
GDPC	Greater Dallas Planning Council
GHG	Greenhouse Gas



GIS	Geographic Information System
GPC	General Planning Consultant
gpm	Gallons Per Minute
HOA	Homeowners Association
HC	Hydrocarbons
HMIRS	Hazardous Material Information Resource System
HSR	High Speed Rail
Hz	Hertz
I-3	Orange Line DFW Airport Extension (IRVING-3)
I-35E	Eastern Split of Interstate Highway 35 (also commonly referred to as IH-35E)
IHW	Industrial Hazardous Waste
ILA	Interlocal Agreement
IOP	Innocent Owner/Operator Program
ITS	Intelligent Transportation System
LBJ	Lyndon B. Johnson Freeway
Ldn	Day-Night Sound Level
LEED	Leadership in Energy and Environmental Design
LEP	Limited English Proficiency
Leq	Equivalent Sound Level
LNAPL	Light Non-Aqueous Phase Liquid
LOD	Level of Disturbance
LOS	Level of Service
LQG	large quantity generator
LRT	Light Rail Transit
LRV	Light Rail Vehicle
LPST	Leaking Petroleum Storage Tank
LWCF	Land and Water Conservation Fund Act
MAP-21	Moving Ahead for Progress in the 21st Century
MATA	McKinney Avenue Transit Authority
MBTA	Migratory Bird Treaty Act
MEP	Mechanical, Electrical, and Plumbing
MMP	Mitigation Monitoring Program
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
MKT	Missouri, Kansas and Texas Railroad
MMP	Mitigation Monitoring Program
MOA	Memorandum of Agreement
Mobility 2035	NCTCOG Regional Long Range Transportation Plan (Mobility 2035: The Metropolitan Transportation Plan for the Dallas-Fort Worth Area)
Mobility 2040	NCTCOG Regional Long Range Transportation Plan (Mobility 2040: The Metropolitan Transportation Plan for the Dallas-Fort Worth Area)
Mobility 2045	NCTCOG Regional Long Range Transportation Plan (Mobility 2045: The Metropolitan Transportation Plan for the Dallas-Fort Worth Area)
MOU	Memorandum of Understanding
MPA	Metropolitan Planning Area
MPO	Metropolitan Planning Organization
MPH	Miles per hour
MSA	Metropolitan Statistical Area
MS4	Municipal Separate Storm Sewer System



MSAT	Mobile Source Air Toxics
MTBM	Micro Tunnel Boring Machine
MTP	Metropolitan Transportation Plan
MU	Mixed Use
MVEB	Motor Vehicle Emissions Budget
NAAQS	National Ambient Air Quality Standards
NCTCOG	North Central Texas Council of Governments
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NIST	National Institute of Standards and Technology
NLEV	National low emission vehicle
NLR	No Longer Regulated
NMHC	non-methane hydrocarbon
NOA	Notice of Availability
NOI	Notice of Intent
NOV	Notice of Violation
NO _x	Nitrous Oxides
NO ₂	Nitrogen Dioxide
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NTD	National Transit Database
NTTA	North Texas Tollway Authority
NWI	National Wetlands Institute
NWP	Nation Wide Permit
NWROF	Northwest Rail Operating Facility
O ₃	Ozone
O&M	Operations and Maintenance
OCS	Overhead Catenary System
OEDRC	Old East Dallas Renaissance Coalition
OHWM	Ordinary High Water Mark
PA	Programmatic Agreement
PAIP	Public and Agency Involvement Plan
Pb	Lead
PCB	polychlorinated biphenyl
PCN	Pre-Construction Notification
PD	Project Development
PDD	Planned Development District
PE	Preliminary Engineering
PGBT	President George Bush Turnpike
PM ₁₀	Particulate matter equal to or less than ten micrometers in diameter
PM _{2.5}	Particulate matter equal to or less than 2.5 micrometers in diameter
ppb	parts per billion
RCNM	Roadway Construction Noise Model



RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Conditions
ROD	Record of Decision
ROE	Right-of-Entry
ROW	Right-of-Way
RTC	Regional Transportation Council
RTI	Regional Transit Initiative
RTHL	Recorded Texas Historic Landmarks
SAL	State Antiquities Landmark
SARA	Superfund Amendments and Reauthorization Act
SDEIS	Supplemental Draft Environmental Impact Statement
SEL	Sound exposure level
SEM	Sequential Excavation Method
SEMS	Superfund Enterprise Management System
Sf	Square feet
SGCN	Species of Greatest Conservation Need
SH	State Highway
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLRV	Super Light Rail Vehicle
SO ₂	Sulfur Dioxide
SOC	Species of Concern
SOE	Support of Excavation
SUE	Subsurface Utility Engineering
SUP	Specific Use Permit
SWPPP	Storm Water Pollution Prevention Plan
TAC	Texas Administrative Code
TAD	Tarrant Appraisal District
TARL	Texas Archeological Research Laboratory
TASA	Texas Archeological Sites Atlas
TBM	Tunnel Boring Machine
TCEQ	Texas Commission on Environmental Quality
TCM	Trenchless Construction Methods
TCP	Texas Central Partners
TDA	Tire Derived Aggregate
THC	Texas Historical Commission
The T	Fort Worth Transportation Authority (also known as FWTA)
THSA	Texas Historic Sites Atlas
TIP	Transportation Improvement Program
TMDL	total maximum daily loads
TMP	Traffic Management Plan
TOD	Transit-Oriented Development
TPDES	Texas Pollutant Discharge Elimination System
TPSS	Traction Power Substation
TPWD	Texas Parks and Wildlife Department
TRB	Transportation Research Board
TRE	Trinity Railway Express
TREC	The Real Estate Council
TRM	Trenchless Rehabilitation Methods



TRIS	Toxic Release Inventory System
TSA	Transportation Security Administration
TSCA	Toxic Substances Control Act
TSP	Transit System Plan
TSS	Total Suspended Solids
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
TxDPS	Texas Department of Public Safety
TXNDD	Texas Natural Diversity Database
UNT	University of North Texas
URA	Uniform Relocation Assistance
USACE	United States Army Corps of Engineers
USC	United States Code
USCB	United States Census Bureau
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
V/C	Volume Capacity
VCP	Voluntary Cleanup Program
VdB	Vibration velocity (in decibels)
VOC	Volatile Organic Compounds
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
YOE	Year of Expenditure



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