Regional Rail Corridor Study

Corridors Report

North Central Texas Council of Governments

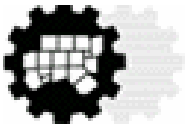
August 3, 2005

What is NCTCOG?

The North Central Texas Council of Governments is a voluntary association of cities, counties, school districts, and special districts which was established in January 1966 to assist local governments in **planning** for common needs, **cooperating** for mutual benefits, and **coordinating** for sound regional development.

It serves a 16-county metropolitan region centered around the two urban centers of Dallas and Fort Worth. Currently the Council has **232 members**, including 16 counties, 163 cities, 26 independent school districts and 27 special districts. The area of the region is approximately **12,800 square miles**, which is larger than nine states, and the population of the region is over **4.8 million**, which is larger than 30 states.

NCTCOG's structure is relatively simple; each member government appoints a voting representative from the governing body. These voting representatives make up the **General Assembly** which annually elects a 15-member Executive Board. The **Executive Board** is supported by policy development, technical advisory, and study committees, as well as a professional staff of 179.



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NCTCOG's Department of Transportation

Since 1974 NCTCOG has served as the Metropolitan Planning Organization (MPO) for transportation for the Dallas-Fort Worth Area. NCTCOG's Department of Transportation is responsible for the regional planning process for all modes of transportation. The department provides technical support and staff assistance to the Regional Transportation Council and its technical committees, which compose the MPO policy-making structure. In addition, the department provides technical assistance to the local governments of North Central Texas in planning, coordinating, and implementing transportation decisions.

Prepared in cooperation with the Texas Department of Transportation and the U. S. Department of Transportation, Federal Highway Administration and Federal Transit Administration.

REGIONAL RAIL CORRIDOR STUDY – FINAL REPORT

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REGIONAL RAIL CORRIDOR STUDY – FINAL REPORT

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I. PREFACE AND ACKNOWLEGEMENTS

PREFACE

In keeping with its responsibilities for planning to meet the transportation demands of the Dallas-Fort Worth metropolitan area, the Regional Transportation Council (RTC) commissioned a study of existing freight railroad corridors for possible passenger rail service. Interest in pursuing expanded passenger rail service in the region comes in part from projections of growth in population and employment in the coming 20 years that are predicted to result in a severely congested transportation system. Additionally, developing rail service is also viewed as a mechanism for focusing population and employment growth to contribute to quality of life for the region.

The North Central Texas Council of Governments (NCTCOG) public transportation staff coordinated the work effort with a multi-pronged approach that included NCTCOG staff and consultants consisting of four teams. The lead public transportation staff manager coordinated the overall team effort, while the Transportation Director provided oversight for the entire project. Team 1 coordinated all staff work, performed the travel modeling/ ridership projections, developed land use data, led transit oriented development (TOD) efforts, and was responsible for all public involvement arrangements and coordination. Team 2 acted as a liaison with the freight railroads in the region and contributed to the overall effort. Team 3 examined the possibilities for providing passenger service on corridors in Tarrant, Johnson, Dallas, Denton, Collin, and Ellis Counties.

The fourth team was selected to perform additional detailed support tasks for the overall project and continues to do so as this report is completed. The work efforts of Team 4

are focused on supplying an additional level of information to promote implementation of facilities deemed desirable by the region's policy and technical leaders.

This report, Regional Rail Corridor Study – Corridors Report, presents the detailed information compiled and developed for use in the study process and the resulting analysis leading to the recommendations.

An additional report, Regional Rail Corridor Study – Study Report, documents the work culminated in an August 13, 2004, Transportation Summit of elected and appointed regional leadership, who endorsed the plan for regional rail passenger service and agreed upon implementation concepts. It provides a description of study results and process. A CD-ROM is also included with that report that captures all of the public website information on the project that has been made available by NCTCOG.

NCTCOG's *Regional Mobility Initiatives on Regional Rail*, Vol. IX, No. 1, October 2005, provides a popular summary of the study and follow-on activities. In the summary, the corridors have been renamed. Below is a listing of the numbered corridors described in this Study Report and the accompanying Corridors Report, correlated to the popular names used in the Regional Mobility Initiatives document.

W1 – Union Pacific Mainline
W-2 – Hulen/DFWIA Line
W-3 – Trinity Railway Express (west)
W-4 – Cleburne Line
E-1 – Trinity Railway Express (east)
E-2 – Denton Line
E-3 – McKinney Line
E-4 – Frisco Line
E-5 – Midlothian Line
E-6 – Waxahachie Line

ACKNOWLEDGEMENTS

The NCTCOG staff and consultants would like to acknowledge all of the technical staff and elected officials who participated in the Regional Rail Corridor Study Policy and Technical Committee meetings held throughout the region as the effort was under way. Additionally, the service of many technical staff, elected and appointed leaders who served on the Regional Transit Initiative (RTI) committees is also commended. These committees were put into action in January 2004 to examine overall institutional, financial, and legislative issues for regional passenger rail implementation. RTI efforts culminated in the August 2004 Transportation Summit, where regional leaders agreed upon guiding principles for implementing regional rail service.

II. CORRIDOR DESCRIPTION AND EVALUATION

CORRIDOR DESCRIPTIONS

At the Regional Rail Corridor Study got underway, ten designated corridor segments were identified for detailed study. The map in Exhibit II-1 shows the location of these segments. This chapter presents a summary description of each of the corridors and an overview of the process by which they were evaluated for feasibility.

Corridors E-1 and W-3 shown in the following map, represent the Trinity Railway Express. Based on initial discussions of the project team, the Trinity Railway Express was removed from further analysis as part of the RRCS work. TRE operates daily service between Dallas and Fort Worth and has a Capital Improvement Plan already in place. In addition, funds for double tracking portions of the right-of-way and adding other improvements are anticipated to be addressed in the Regional Transportation Council's Partnership Program #2. TRE development and operating costs were used as a real-world, in-region experience to develop the unit costs used for estimating the other corridors, where appropriate.

More information on the process used in the study is presented in an accompanying document, Regional Rail Corridors Study – Study Report.

EXHIBIT II-1

CORRIDOR LOCATION MAP

Northeast:
E-3: Dallas Area Rapid Transit: Plano/Allen/Fairview/McKinney
E-4: Burlington Northern Santa Fe: Carrollton/The Colony/Frisco

Southeast:
E-5: Burlington Northern Santa Fe: Duncanville/Cedar Hill/Midlothian
E-6: Burlington Northern Santa Fe: Dallas/Lancaster/Red Oak/Waxahachie

Central:
E-1: Trinity Railway Express: Dallas County line/Downtown Dallas
W-3: Trinity Railway Express: Fort Worth/Tarrant County Line
W-1: Union Pacific Mainline: Fort Worth/Dallas
(includes Dorothy Spur)

W-4: Burlington Northern Santa Fe:
Fort Worth/Burleson/Joshua/Cleburne

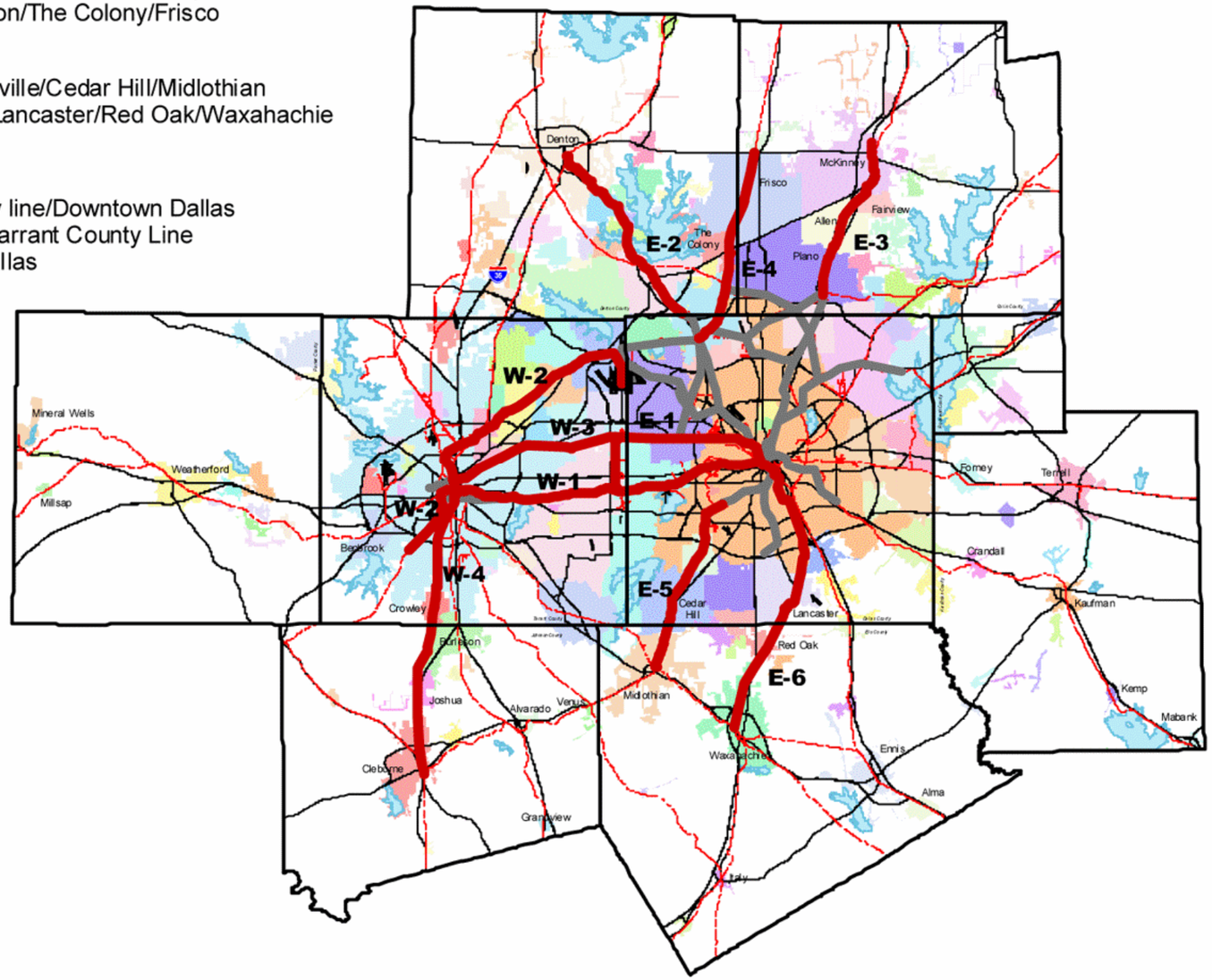
W-2: Fort Worth & Western/Cotton Belt:
Southwest Fort Worth/Tarrant
County Line

E-2: Union Pacific: Carrollton/Denton

Legend

Rail Corridors Under Study
Existing Rail Corridors
Roadway

E = East/URS Corporation
W = West/Carter-Burgess, Inc.



North Central Texas Council of Governments (NCTCOG) Transportation

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E-2 – Denton Line Corridor Description

Corridor E-2 is a former Missouri Kansas Texas (MKT) railroad, then owned briefly by the Union Pacific Railroad before being bought by DART. It extends between Carrollton and Denton, a distance of 22.9 route miles. The milepost (MP) designations covered during the hi-rail inspection trip of May 19, 2003 were MP 730.9 at Lake Dallas at Swisher Road and MP 744.6 at the Carrollton Depot. Of the 22.9 miles, 13.7 miles between Carrollton and Lake Dallas are in operation and 9.2 miles between Lake Dallas and Denton has had the track removed and has been converted to the Denton Branch Rail Trail. The trail portion of the line was inspected on July 9, 2003 between MP 721.7 in Denton and MP 730.9 in Lake Dallas.

The City of Denton owns the trail right-of-way between Denton and Lake Dallas and DART owns the rights to replace the track and operate rail service. The right-of-way is consistently 100 feet or less in width. DART owns the right-of-way between Lake Dallas and Carrollton. The right-of-way is also consistently 100 feet or less in width. There are also several large billboards within the right-of-way along portions of the line between Lake Dallas and Carrollton.

A shortline railroad, the Dallas Garland & Northeastern Railroad (DGNO), operates one round trip local train per day, Monday through Friday, between Carrollton and Lake Dallas. The current maximum operating speed limit is 10 mph due to track conditions. The line is not signaled and is operated as “Other than Main Track” (OMT). A fact sheet summarizing the existing conditions and issues for the E-2 corridor is shown in Exhibit II-2.

EXHIBIT II-2

E-2 CORRIDOR FACT SHEET

Owner(s) of the line	DART (for the existing rail section)
Operator(s) of the line	DGNO
Trackage rights	DGNO (between Carrollton and Lake Dallas, 13.7 miles)
Length of the corridor	22.9 Miles (9.2 miles is Denton Branch Rail Trail)
Average trains per weekday	Two local switching trains.
Track summary	▪ Single main track. ▪ 10 mph maximum speed. ▪ No passing sidings and no railroad signaling.
Railroad crossings	▪ Thirty-eight (38) at-grade highway/railroad crossings. ▪ Three (3) grade-separated highway/railroad crossings ▪ Two (2) at-grade railroad/railroad crossings
Jurisdictions	▪ Denton, Corinth, Lake Dallas, Hickory Creek, Lewisville, and Carrollton.
Industrial sidings	▪ 10 total
Corridor issues	▪ All new track for entire corridor. ▪ Replace bridges on Trail portion between Denton and Lake Dallas. ▪ Additional study needed to determine actual condition of Lake Lewisville and Trinity River bridges. ▪ Need to add CTC signal system.

E-3 – McKinney Line Corridor Description

Corridor E-3 is a former Union Pacific Railroad line that extends between Plano and McKinney, a distance of approximately 16.3 route miles. The milepost (MP) designations covered during the inspection trip of July 9, 2003 were MP 282.1 at the former St. Louis Southwestern Railroad (SSW or Cotton Belt) track in Plano and MP 298.4 at McIntyre/ Collin County Road 274 in McKinney.

DART owns the entire right-of-way. The right-of-way is consistently 100 feet in width north of Plano. Through Plano, the right-of-way is 40 feet to 60 feet in width. The Dallas Garland & Northeastern (DGNO) has trackage rights between Stacy Road (FM2786) and Sherman. The segment of track between the former SSW line in Plano and Stacy

Road, a distance of approximately 8.4 miles, has not been in operation for 5 or 6 years. A fact sheet summarizing the existing conditions and issues for the E-3 corridor is shown in Exhibit II-3.

EXHIBIT II-3

E-3 CORRIDOR FACT SHEET

Owner(s) of the line	DART
Operator(s) of the line	DART/DGNO
Trackage rights	None
Length of the corridor	16.3 Miles
Average trains per weekday	two local switching
Track summary	▪ Single track with 1 siding in McKinney. No railroad signaling. Operated as yard limits with maximum speed of 10 mph. No service between Plano and approximately MP 290.5 (about 8 miles).
Railroad crossings	▪ Twenty-eight (28) at-grade highway/railroad crossings. ▪ Four (4) grade-separated highway/railroad crossings. ▪ One (1) at-grade railroad/railroad crossings.
Jurisdictions	▪ Plano, Allen, Fairview, and McKinney
Industrial sidings	▪ Four
Corridor issues	▪ All new track and rehabilitation of all bridges. ▪ Issue of ending commuter rail service at DART station at Parker Road or connecting to SSW (UP) track. ▪ Need to add CTC signal system.

E-4 – Frisco Line Corridor Description

Corridor E-4 is a Burlington Northern and Santa Fe Railway (BNSF) line that extends between Carrollton and Frisco, a distance of approximately 19.5 route miles. The milepost (MP) designations covered during the hi-rail inspection trip of July 8, 2003 were MP 700.5 in Carrollton and MP 681.03 in Frisco. The hi-rail inspection trip was ended some 3.8 miles south of U.S. Highway 380 at MP 684.8 because of train traffic on the line north of Frisco.

The BNSF owns all of the right-of-way along the E-4 Corridor. The right-of-way is consistently 100 feet in width with some locations being as much as 300 feet in width. A fact sheet summarizing the existing conditions and issues for the E-4 corridor is shown in Exhibit II-4.

EXHIBIT II-4

E-4 CORRIDOR FACT SHEET

Owner(s) of the line	BNSF
Operator(s) of the line	BNSF
Trackage rights	None
Length of the corridor	19.5 Miles
Average trains per weekday	12 to 14 (approximately half are rock trains)
Track summary	▪ Single track with 1 siding at Hebron. ▪ No railroad signaling. ▪ Maximum speed is 48 mph.
Railroad crossings	▪ Twenty-six (26) at-grade highway/railroad crossings. ▪ Six (6) grade-separated highway/railroad crossings. ▪ Two (2) at-grade railroad/railroad crossings and one (1) over-crossing.
Jurisdictions	▪ Carrollton, through The Colony, ends in Frisco.
Industrial sidings	▪ Six
Corridor issues	▪ High value homes along tracks in Frisco. ▪ Need to add CTC signal System.

E-5 – Midlothian Line Corridor Description

Corridor E-5 is a Burlington Northern and Santa Fe Railway (BNSF) line that extends between Midlothian and the DART light rail station at Westmoreland Road in Dallas, a distance of approximately 18.8 route miles. The milepost (MP) designations covered during the hi-rail inspection trip of July 8, 2003 were MP 26.9 in Midlothian and MP 45.7 at the DART Westmoreland Station.

BNSF owns all of the right-of-way along the E-5 Corridor. DART has LRT operating rights between the Westmoreland Station and Duncanville. The right-of-way is typically

100 feet in width. A fact sheet summarizing the existing conditions and issues for the E-5 corridor is shown in Exhibit II-5.

EXHIBIT II-5

E-5 CORRIDOR FACT SHEET

Owner(s) of the line	BNSF
Operator(s) of the line	BNSF
Trackage rights	DART has LRT rights between DART Westmoreland Station and Duncanville.
Length of the corridor	18.8 Miles
Average trains per weekday	Four local
Track summary	▪ Single track without passing sidings (except at industries). ▪ No railroad signaling. ▪ Maximum speed is 20 mph.
Railroad crossings	▪ Twenty-five (25) at-grade highway/railroad crossings. ▪ Eight (8) grade-separated highway/railroad crossings. ▪ One (1) at-grade railroad/railroad crossing.
Jurisdictions	▪ Midlothian, through Cedar Hill, Duncanville, ends in Dallas.
Industrial sidings	▪ Sixteen (16) including auto facility, coal-fired power plant, cement plant near Midlothian, and Cedar Hill Industrial Park.
Corridor issues	▪ Track to be upgraded for higher speeds. ▪ Need to add CTC signal system. ▪ Communities along the line appear to be sparsely populated.

E-6 Waxahachie Line Corridor Description

Corridor E-6 is a Burlington Northern and Santa Fe Railway (BNSF) line that extends between Dallas and Waxahachie, a distance of approximately 30.7 route miles. The milepost (MP) designations covered during the hi-rail inspection trip of July 8, 2003 were between MP 768.4 at Forest Avenue in Dallas and MP 796.7 in Waxahachie.

BNSF owns all of the right-of-way along the E-6 Corridor except for the 2.4 miles between Dallas Union Station and Forest Avenue. Between Union Station and Forest Avenue, the UP owns and dispatches the track. Union Pacific also has trackage rights

to serve local industries. The right-of-way is typically 100 feet in width. A fact sheet summarizing the existing conditions and issues for the E-6 corridor is shown in Exhibit II-6.

EXHIBIT II-6

E-6 CORRIDOR FACT SHEET

Owner(s) of the line	BNSF
Operator(s) of the line	BNSF
Trackage rights	UP
Length of the corridor	30.7 Miles
Average trains per weekday	Six
Track summary	▪ Single track with passing sidings at Lancaster, Sterret, and Armaglass. ▪ Automatic Block Signal (ABS) system with maximum freight speed of 40 mph and passenger speed of 60 mph.
Railroad crossings	▪ Thirty-nine (39) at-grade highway/railroad crossings. ▪ Ten (10) grade-separated highway/railroad crossings. ▪ Two (2) at-grade railroad/railroad crossings.
Jurisdictions	▪ Waxahachie, through Red Oak, Lancaster, ends in Dallas.
Industrial sidings	▪ 24 with several at Sargent, Sterret, Service, and Armaglass.
Corridor issues	▪ Communities along the line appear to be sparsely populated. ▪ BNSF/UP at-grade railroad crossing at Forest Avenue is a bottleneck for commuter rail operations. ▪ BNSF/UP at-grade railroad crossing near Grand Avenue is a bottleneck for commuter rail operations.

W-1 Union Pacific Mainline Corridor Description

Corridor W-1 is a Union Pacific rail line that extends 37 miles from the T&P Terminal in downtown Fort Worth to Union Station in downtown Dallas. The Union Pacific Mainline between downtown Fort Worth and downtown Dallas is a Class I rail line that carries a high volume of freight rail traffic, currently carrying approximately 30 trains per day. The Union Pacific Railroad owns all of the right-of-way along the W-1 corridor. The railroad right-of-way is typically 100 feet in width. The Burlington Northern Santa Fe has trackage rights for shared use of the mainline under agreement with the Union Pacific

Railroad. The mainline is double tracked throughout the entire corridor, with Centralized Train Control (CTC) signaling and maximum operating speed of 60 mph. A fact sheet summarizing the existing conditions and issues for the W-1 corridor is shown in Exhibit II-7.

EXHIBIT II-7

W-1 CORRIDOR FACT SHEET

Owner(s) of the line	Union Pacific Railroad
Operator(s) of the line	Union Pacific Railroad
Trackage rights	BNSF
Length of the corridor	37 Miles
Average trains per weekday	30
Track summary	▪ Double tracks with Centralized Traffic Control Signaling ▪ Maximum operating speed is 60 mph. ▪ Garrett Yard (auto facility) is located near Hwy. 360 in Arlington. ▪ Centennial Yard is located in Fort Worth.
Railroad crossings	▪ Thirty-five (35) at-grade highway/railroad crossings. ▪ Twenty-eight (28) grade-separated highway/railroad crossings.
Jurisdictions	▪ Cities of Dallas, Grand Prairie, Arlington, and Fort Worth. ▪ Dallas and Tarrant Counties.
Industrial sidings	▪ Pioneer Paper, Pioneer South Central Inc., General Motors, Great Industrial Southwest District.
Corridor issues	▪ High volume freight traffic. ▪ Tower 55 congestion. ▪ Planned new intermodal terminal location to be determined. ▪ Capacity of Dallas Union Station and Fort Worth T&P Station limited by existing rail activity.

W-2 Hulen/DFWIA Line Corridor Description

Corridor W-2 consists of approximately 26 miles of the Cotton Belt Line from Dallas-Fort Worth International Airport (DFWIA) (MP 610.0) to Fort Worth (MP 632.0) and approximately 6 miles of the Southwest Extension from downtown Fort Worth to Hulen Street.

An inspection of the Cotton Belt from SH 121 to Fort Worth was performed on August 26, 2003 and an inspection of the Southwest Extension was performed on September 18, 2003. The Cotton Belt track was also inspected by riding the Tarantula Excursion Train on August 30, 2003, from the Tarantula Train Depot in Grapevine to the Fort Worth Stockyards.

DART owns the Cotton Belt from DFW Airport to Tower 60 in Fort Worth. DART leases the track to the Fort Worth and Western Railroad and the City of Grapevine has trackage rights for the Tarantula excursion train operating on the track between Grapevine Station and the Fort Worth Stockyards. The maximum operating speed over the Cotton Belt is 25 mph and the train traffic is controlled by track warrants. A fact sheet summarizing the existing conditions and issues for the W-2 corridor is shown in Exhibit II-8.

EXHIBIT II-8

W-2 CORRIDOR FACT SHEET

Owner(s) of the line	DART
Operator(s) of the line	Fort Worth & Western Railroad
Trackage Rights	Fort Worth & Western Railroad
Length of the corridor	32 Miles including Fort Worth Southwest Extension.
Average trains per weekday	Two passenger trains daily; freight trains average three per week.
Track summary	▪ Single Track; speed varies between 10 mph and 25 mph. ▪ Train traffic control by track warrant. ▪ Hodge Yard is located in Fort Worth. ▪ Grapevine Station is located in Grapevine on Main Street.
Railroad crossings	▪ Thirty-six (36) at-grade highway/railroad crossings. ▪ Eight (8) grade-separated highway/railroad crossings.
Jurisdictions	▪ Cities of Grapevine, Colleyville, Hurst, North Richland Hills, and Fort Worth. ▪ Tarrant County.
Industrial sidings	▪ Grapevine, Hodge, Fort Worth.
Corridor issues	▪ UPPR crossing diamond located at MP 627.72; UPPR is upgrading the existing DART track from MP 627.73 to MP 630.60 (Deen Road). This is a joint effort between UPRR and BNSF for directional running with northbound trains on UP and southbound trains on BNSF. ▪ Existing timber trestle bridges are in need of repair/replacement. ▪ Capacity of T&P Station in Fort Worth limited by existing rail activity. ▪ Existing track in poor condition. ▪ Southwest extension should extend to Hulen Street in Fort Worth.

W-4 – Cleburne Line Corridor Description

Corridor W-4 is a 29-mile corridor extending from the Intermodal Transportation Center and T&P Terminal in downtown Fort Worth south, paralleling the Burlington Northern Santa Fe (BNSF) mainline to the communities of Crowley, Burleson, Joshua, and Cleburne. The corridor also parallels the highway alignments of IH-35, SH 174, and the planned Southwest Parkway. The W-4 corridor extends from the T&P Terminal in downtown Fort Worth south to the communities of Crowley, Burleson, Joshua, and Cleburne.

The BNSF owns the railroad right-of-way from MP 344.86 to MP 319 and beyond. The Union Pacific owns the right-of-way from MP 344.38 to MP 344.86 and the BNSF has trackage rights to also operate over this section. A fact sheet summarizing the existing conditions and issues for the W-4 corridor is shown in Exhibit II-9.

EXHIBIT II-9

W-4 CORRIDOR FACT SHEET

Owner(s) of the line	BNSF
Operator(s) of the line	BNSF
Trackage rights	BNSF operates over UPRR MP 344.38 to MP 344.86
Length of the corridor	29 Miles
Average trains per weekday	Approximately 27 freight trains.
Track summary	▪ Single track with passing tracks at Cleburne, Joshua, Crowley, Burleson, and Fort Worth. ▪ Maximum operating speed is 79 mph. ▪ BNSF has yards at Cleburne and Fort Worth. ▪ Track is controlled by Centralized Traffic Control signaling.
Railroad crossings	▪ Thirty-one (31) at-grade highway/railroad crossings. ▪ Twelve (12) grade-separated highway/railroad crossings.
Jurisdictions	▪ Cities of Cleburne, Joshua, Crowley, Burleson, and Fort Worth. ▪ Tarrant and Johnson Counties.
Industrial sidings	▪ Johns Manville Products, Rubbermaid.
Corridor issues	▪ Hampton Road overpass was under construction at approximate MP 332.0. ▪ Sycamore Strip Airport is located at approximate MP 336.0. ▪ BNSF Main Line from Temple to Fort Worth carries a high volume of freight traffic.

EVALUATION OF ALTERNATIVES

Each alternative considered was evaluated with a set of performance indicators. The corridors were scored based upon a five-point system, with five indicating a “good” score and one indicating a “poor” score. The individual criteria scores were then added to reflect a total score for each alternative, including a performance benchmark representing the overall cost effectiveness of each option. Although the benchmark is

not identical to that currently in use by the Federal Transit Administration in the official New Starts Alternatives Analysis process to evaluate cost effective transit investments, it is similar enough in nature to allow reasonable conclusions to be drawn.

The list of performance indicators follows:

1. *Performance benchmark* – Reflects the relative benefit per rider by calculating the annualized cost per annual rider. Represents a balance of capital cost and the use of the system. The RRCS Performance Benchmark is a measure used to normalize the evaluation of each of the corridors with various lengths, costs, and ridership. This benchmark is a "cost effectiveness" measure using the annualized capital cost, annualized operating cost, and annualized ridership producing a resulting calculation of annual cost per rider. It is similar to the original Federal Transit Administration's cost effectiveness index. The one now being used by FTA adds in the additional considerations for travel time savings and user benefits.
2. *Total daily ridership forecast* – The average number of riders using the system on a daily basis. Reflects the usefulness and attractiveness of the system.
3. *One-way trip time* – The total time, in minutes, that a train or bus takes to travel from the terminal station at one end of a route to the terminal station at the other end of the route. The faster the one-way trip time, the more riders the system is likely to attract.
4. *Estimated capital cost* – The estimated capital cost to construct the system. Systems with lower capital cost are preferred over those with higher capital cost.
5. *Estimated annual O&M cost* – The estimated cost to operate and maintain the system on an annual basis. Systems with lower O&M cost are preferred over those with higher O&M cost.

6. *Local authority and funding* – The existence of a local transportation authority and the availability of funding reflect local support and are required for the system to be constructed and operated in a more timely manner than if an authority and funding were not in place.
7. *Community acceptance* – Reflects the degree to which the local communities accept or reject the proposed corridor improvements and transit system. Solid support for a particular system is desirable.
8. *Ease of implementation* – The degree of ease of difficulty that might be expected to construct and implement a proposed system. A system that is easy to implement because right-of-way acquisition, environmental issues, station site locations, and other major elements of a transit system are easily accommodated or are known are more likely to be completed on schedule and within budget.
9. *Connectivity with existing and planned transit operations* – The compatibility of the proposed transit system with any existing or planned transit service. Technology that is compatible with connecting transit services may preclude the need for riders to transfer between modes rather than to remain on the same train or bus to, or near, their destination. The ability to interline service is more convenient for riders and allows faster trip times, which could attract more riders to the service.
10. *Compatibility with freight railroad operations* – The ability to operate the proposed service and technology with freight railroad operations. If track is jointly used in railroad right-of-way, the transit service must use FRA compatible equipment. If the equipment is not “compatible” the transit operation must use new, separate tracks. Transit operations that are compatible with freight railroad operations may be able to share railroad trackage and facilities, which may result in savings in both capital and operating cost as well as the implementation schedule for the proposed system.

11. *Serves area of unmet mobility need* – The ability of the proposed transit system to potentially serve unmet mobility needs, especially with respect to roadway capacity. The severity of the current and projected deficiency in roadway capacity determines whether the proposed transit service will have any noticeable impact upon roadway congestion. Because most roadways already have moderate to severe deficiencies in capacity, the implementation of transit service may not appear to have any effect upon roadway congestion. If new traffic lanes are constructed, they are immediately filled with cars due to the unmet roadway capacity need. The implementation of transit service will result in the removal of some of the traffic, which will allow some of the unmet need to be filled. The more ridership the transit system attracts from roadways, the more the unmet need for capacity can be alleviated.
12. *Impact upon adjacent highways and air quality* – The potential impact of a proposed transit service on adjacent highways express as an equivalent number of traffic lanes in each direction. The impact upon air quality is assumed to be proportional to the number of equivalent traffic lanes. The higher the number of equivalent traffic lanes, the greater the benefit the transit system will have on highway congestion and construction and air quality.
13. *Transit oriented development potential* – The ability of the proposed transit service to attract growth and development along the system, especially at station locations. Usually, systems with higher ridership attract growth and development at a faster pace than do systems with low ridership.

DEVELOPMENT OF RIDERSHIP FORECASTS

Performance Indicator 2, Total Projected Daily Ridership, is a critical performance criterion when evaluating the viability of different scenarios. Average weekday ridership

is often generated by a set of mathematical models that use, as input, the digitally coded transportation system as well as the study area's land use and demographics scenario, and generate projected average weekday riders for each line in the transit network. A series of statistical and behavioral relationships constitute the body of these simulation models.

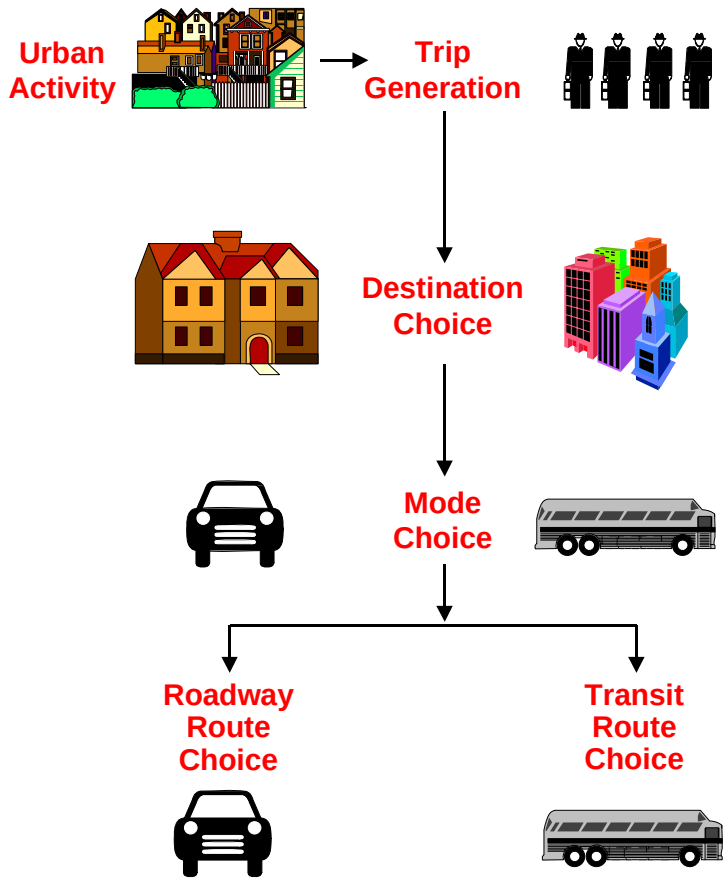
The state of the practice of travel demand modeling breaks up the process into four sequential steps intended to simulate the decision-making behavior of a given traveler and is composed of the following four steps:

1. *Trip Generation* – the process of estimating the number of trips produced by and attracted to each zone.
2. *Destination Choice* – the process of linking trip productions and attractions across the region.
3. *Mode Choice* – the process of estimating the number of person trips using a particular mode of travel between zones.
4. *Trip Assignment (Roadway and Transit Route Choice)* – the process of loading auto and transit trips onto the roadway and transit networks in the region.

Exhibit II-10 illustrates the order and flow of this process.

EXHIBIT II-10

FOUR STEP TRAVEL DEMAND FORECASTING PROCESS



Source: NCTCOG

Model development and calibration typically follows this sequential process with each of the four steps iteratively adjusted until the highway, or transit, assignment yields results that closely replicate observed values. When the calibrated travel model steps have been defined for an observed base year, then future year travel demand can be projected for a given planning horizon year. The Dallas-Fort Worth Regional Travel Model (DFWRTM) was used to estimate year 2030 average weekday riders for each corridor alternative. The DFWRTM is the regionally approved travel-forecasting model used for all corridor planning analysis in the Dallas-Fort Worth area. The 2030

demographic scenario used in this analysis was adopted as the official set of population and employment forecasts for the region. Each RRCS corridor was evaluated under 2030 conditions, with varying station locations, interlining assumptions, and modal (regional rail, light rail, and bus rapid transit) assumptions.

In order to streamline the development of travel forecasts for the study, the various feasible modal alternatives for each corridor were combined into a series of system alternatives for forecasting. Several of the corridors also serve travel markets that interact or compete with each other, so it was important to design the system forecasts to minimize this interrelationship as much as possible. Travel demand forecasts for four Rail System Alternatives were developed initially. Exhibit II-11, Exhibit II-12, Exhibit II-13, and Exhibit II-14 show the combinations of regional and light rail in the RRCS corridors. In addition, a Bus Rapid Transit System Alternative was developed and forecasts prepared. The BRT System Alternative is shown in Exhibit II-15. Ridership summaries for these alternatives are included later in this chapter.

In addition to the assumptions pertaining to different technologies and operating characteristics (station locations, headways, operating speeds, and supply of feeder buses at stations), each system alternative had a different configuration of transit options in other planning corridors.

Rail System Modeling Alternative 1

Rail System Alternative 1, shown in Exhibit II-11, included regional rail in the W-2 FW&W/Cotton Belt, W-3 Trinity Railway Express and W-4 BNSF Fort Worth to Cleburne corridors in the west and in E-1 Trinity Railway Express, E-4 BNSF Carrollton to Frisco

and E-6 BNSF Dallas to Waxahachie corridors in the east. The W-2 and W-4 corridors and the W-3 and E-1 Trinity Railway Express Corridors and the Dorothy Spur were interlined. All were evaluated with 20-minute peak and 60-minute off-peak headways.

Rail System Modeling Alternative 2

Rail System Alternative 2, shown in Exhibit II-12, included regional rail in the W-1 UP Fort Worth – Dallas, W-4 BNSF Fort Worth to Cleburne corridors in the west and the E-2 DART/MKT Carrolton to Denton, E-3 DART Plano to McKinney and the E-5 BNSF Duncanville to Midlothian corridors in the east. None of these corridors were interlined and the W-4 Corridor was different from Alternative 1 with a routing change near the Fort Worth Central Business District to include a stop at the T&P Building. All were evaluated with 20-minute peak and 60-minute off-peak headways.

Rail System Modeling Alternative 3

Rail System Alternative 3, shown in Exhibit II-13, included regional rail in the W-2 FW&W Cotton Belt through to southwest Fort Worth and light rail in the W-1 UP Fort Worth – Dallas, E-2 DART/MKT Carrolton to Denton, E-3 DART Plano to McKinney and the E-6 BNSF Dallas to Waxahachie corridor. The W-1 UP Fort Worth – Dallas corridor and the E-6 BNSF Dallas to Waxahachie corridor were not interlined, but the E-2 DART/MKT Carrolton to Denton Corridor was evaluated as an extension of the DART NW/SE LRT line and the E-3 DART Plano to McKinney was evaluated as an extension of the DART North Central LRT line. The regional rail headways were as in the previous alternatives, 20-minute peak and 60-minute off-peak. The light rail service was evaluated at 10-minute peak and 20-minute off-peak headways, as is currently operated in the DART LRT system.

Rail System Modeling Alternative 4

Rail System Alternative 4, shown in Exhibit II-14, included both regional rail and light rail options. The W-3/E-1 Trinity Railway Express corridor was interlined with the Fort Worth Southwest extension of the W-2 corridor service as regional rail. The E-5 BNSF Duncanville to Midlothian corridor service was evaluated as an extension of the DART West Oak Cliff light rail and the E-4 BNSF Carrolton to Frisco line as an extension of the DART NW/SE LRT line. As before, the regional rail was tested at 20-minute peak and 60-minute off-peak headways, and the light rail at 10-minute peak and 20-minute off-peak headways.

Bus Rapid Transit System Modeling Alternative

A fifth alternative was also developed to evaluate Bus Rapid Transit system alternatives throughout the RRCS corridors. This option used roadway, rail bed, and portions of the High Occupancy Vehicle system already contained in the 2004 update to Mobility 2025, used as the background for the forecasts. The BRT service was evaluated in exclusive right-of-way as no other vehicles would be allowed on the running ways. The BRT System Alternative is shown in Exhibit II-15.

EXHIBIT II-11

REGIONAL RAIL CORRIDOR STUDY – RAIL SYSTEM MODELING ALTERNATIVE 1

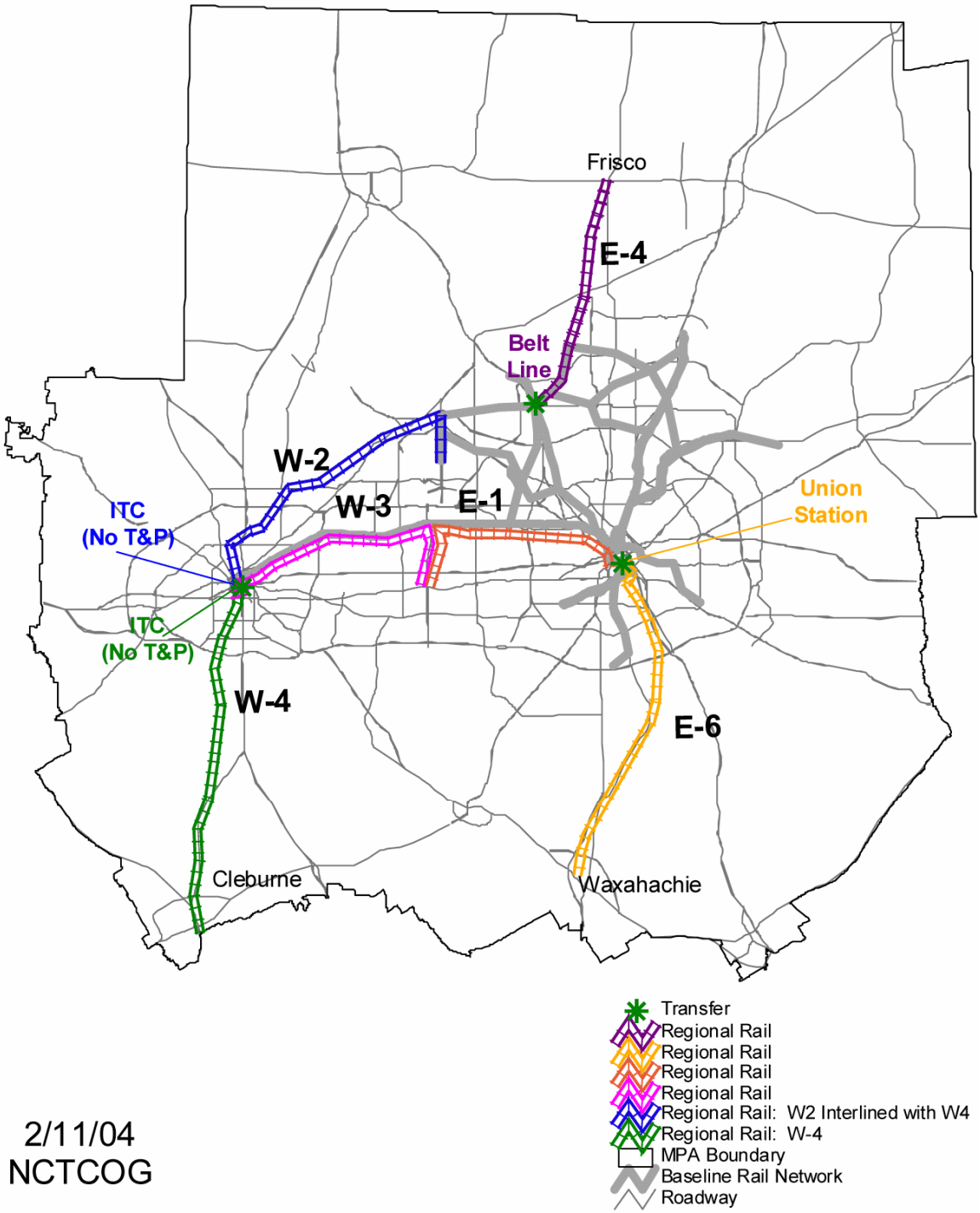


EXHIBIT II-12

REGIONAL RAIL CORRIDOR STUDY – RAIL SYSTEM MODELING ALTERNATIVE 2

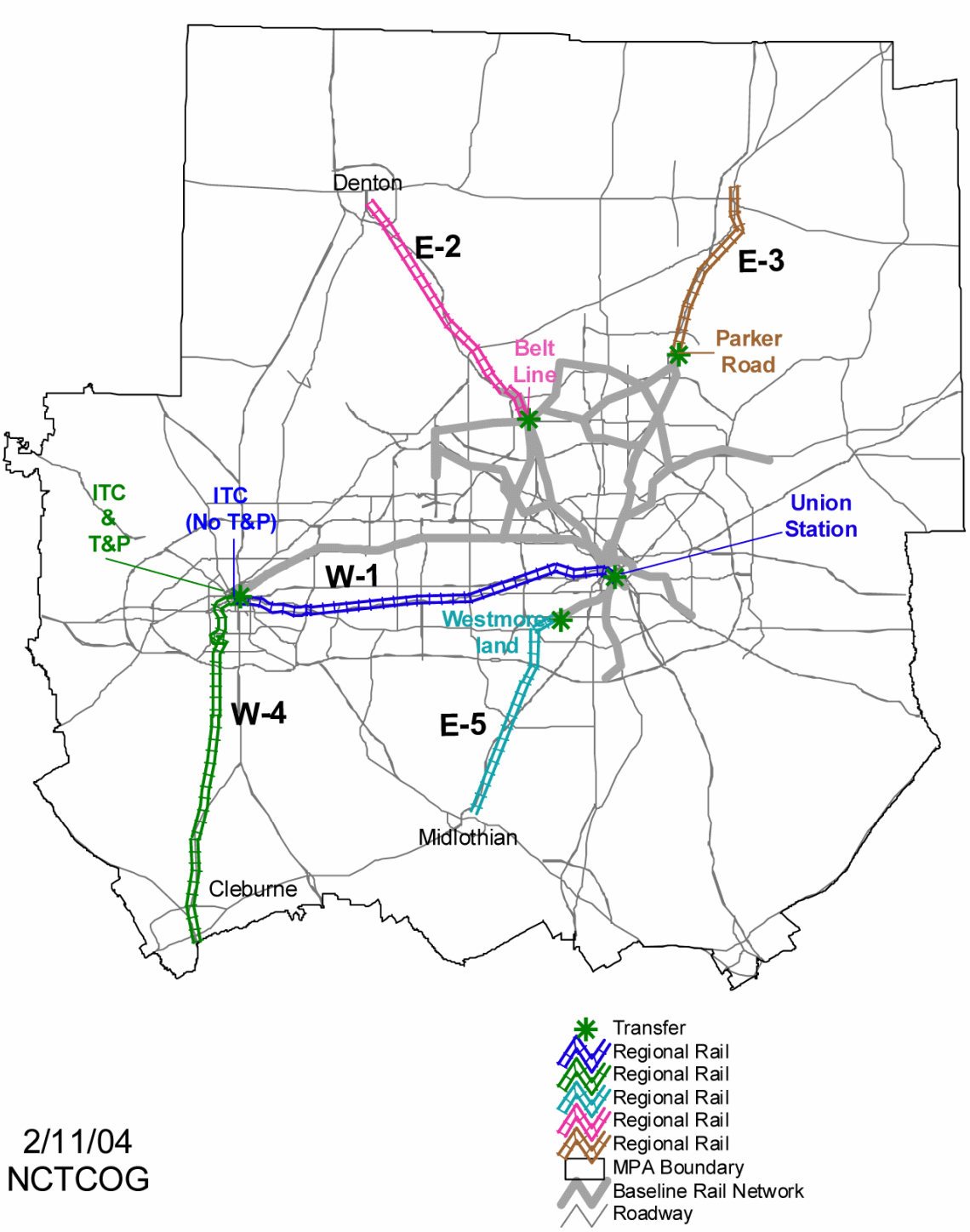


EXHIBIT II-13

REGIONAL RAIL CORRIDOR STUDY – RAIL SYSTEM MODELING ALTERNATIVE 3

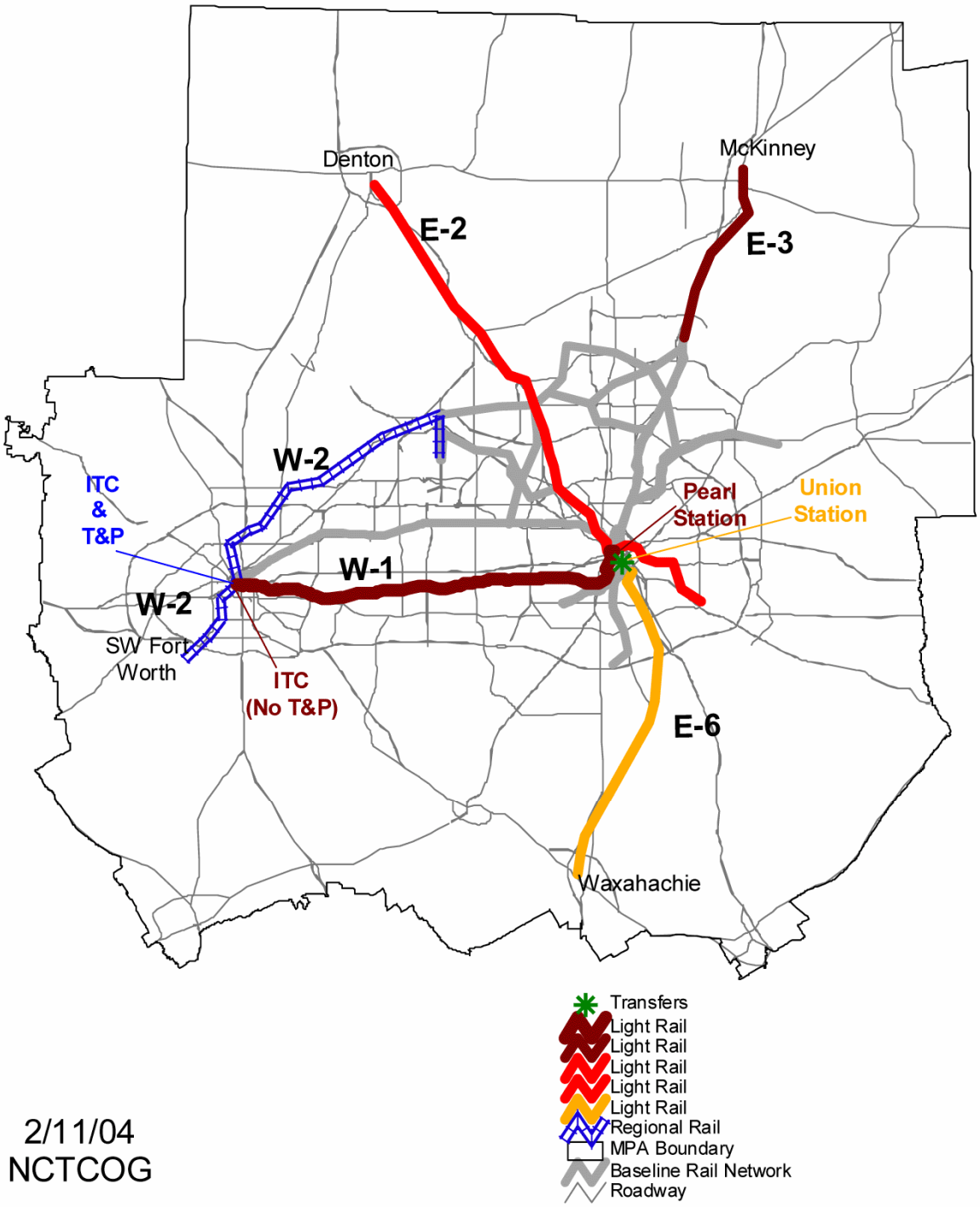


EXHIBIT II-14

REGIONAL RAIL CORRIDOR STUDY – RAIL SYSTEM MODELING ALTERNATIVE 4

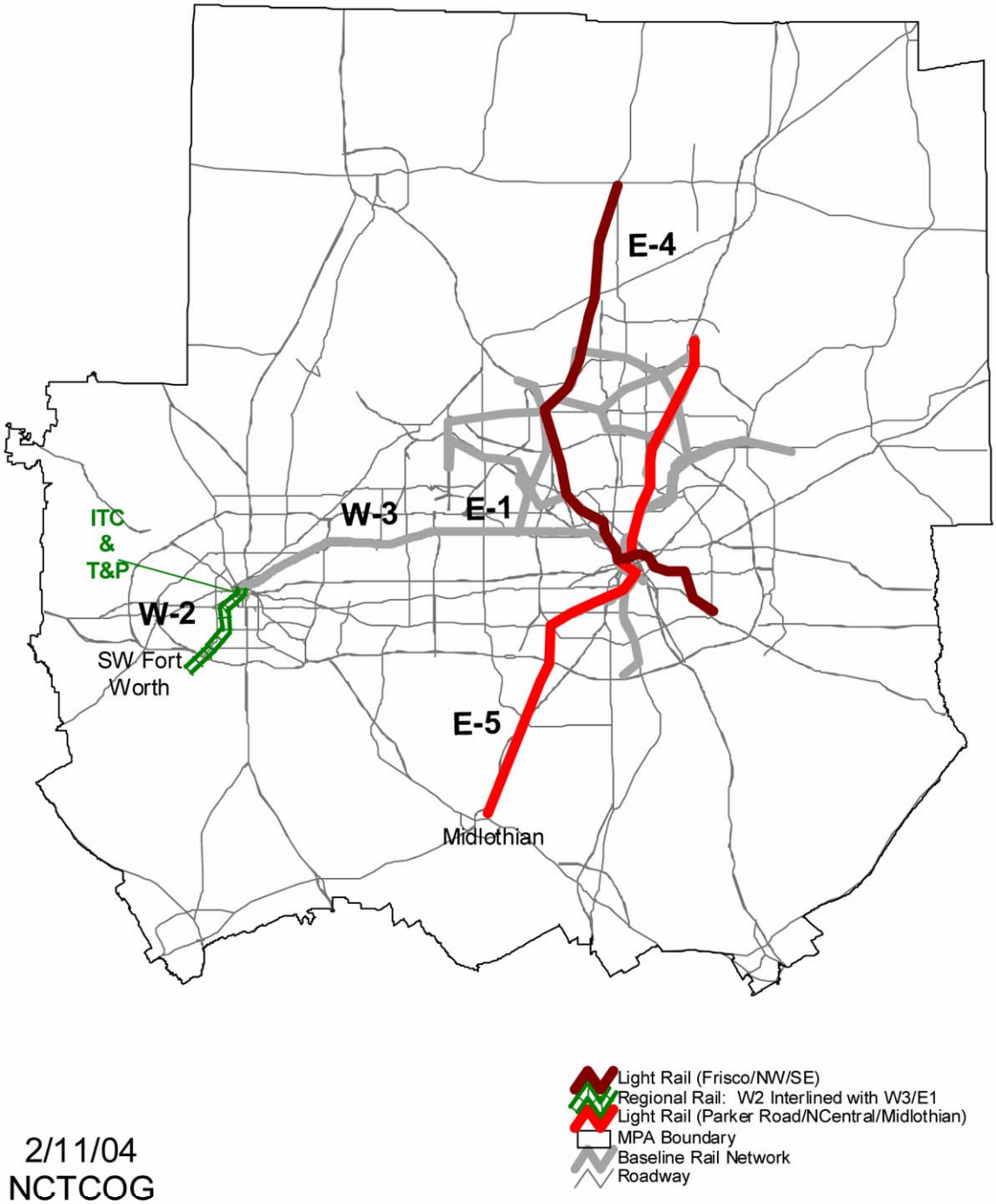
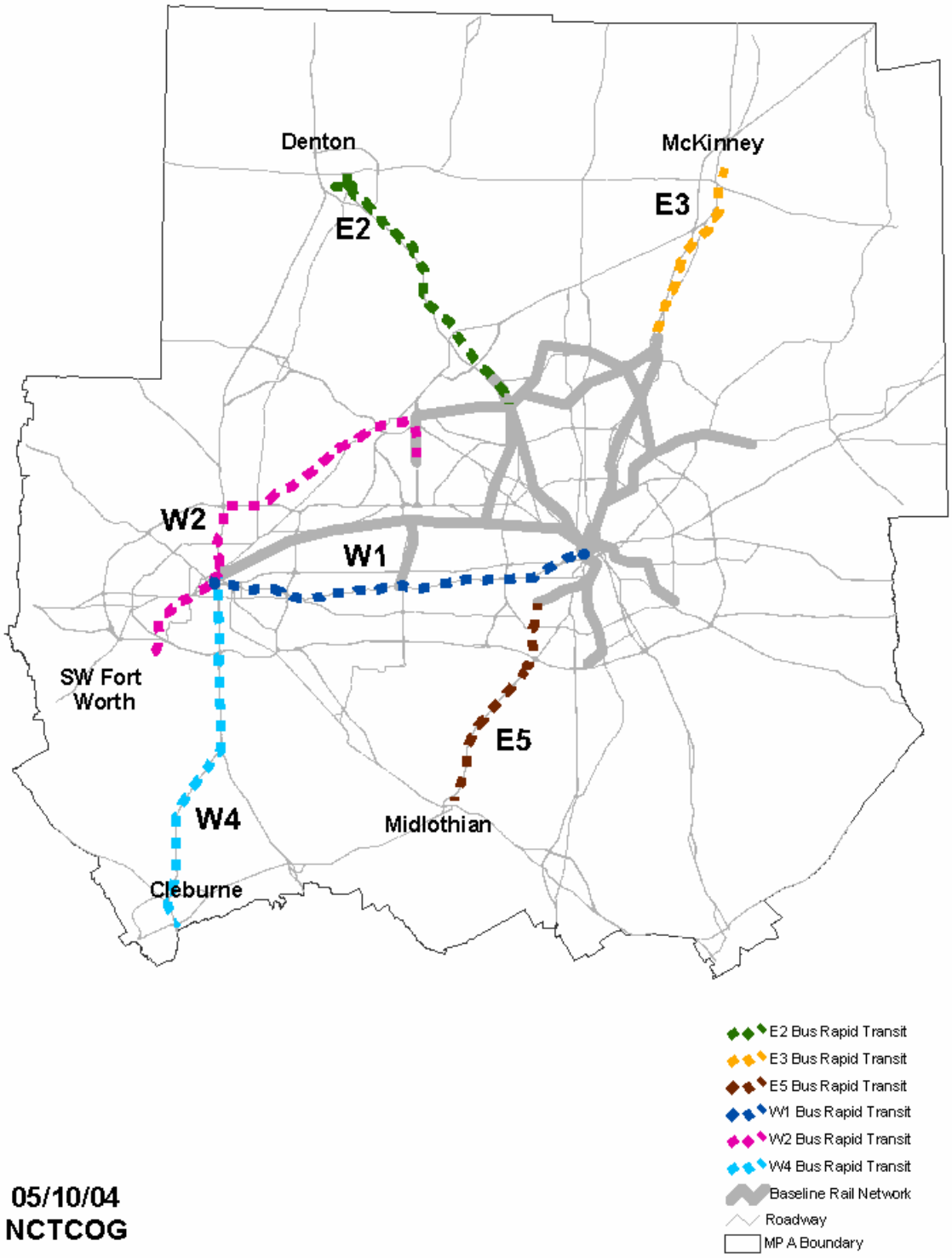


EXHIBIT II-15

REGIONAL RAIL CORRIDOR STUDY – BRT SYSTEM MODELING ALTERNATIVE



Final Recommended Model Alternative

The four rail system modeling alternatives and the BRT system modeling alternative system alternatives and the BRT system alternative were reviewed in order to identify the best option for each RRCS Corridor. The corridor specific ridership for each model alternative (regional rail, light rail, and bus rapid transit) was taken from the rail system or BRT system alternative with the highest average weekday corridor riders. The ridership was then used in the evaluation of each corridor/modal alternative using the performance indicators discussed earlier this chapter.

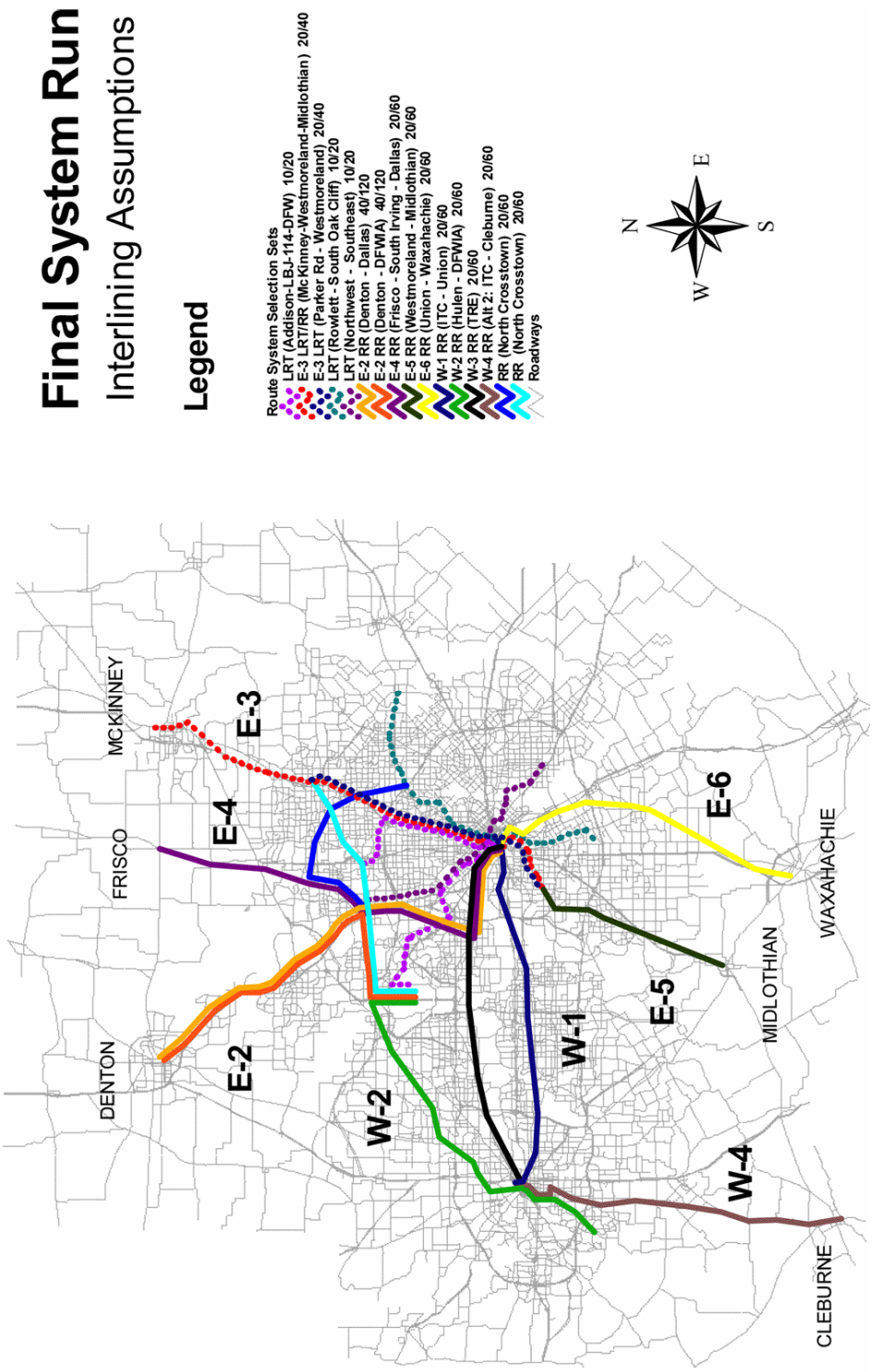
The resulting "score" from the performance indicators for each corridor and modal option was compared, and the best performer selected. For example, regional rail, light rail, and bus rapid transit were all evaluated for the E-2 Corridor. Regional rail was part of the Rail System Modeling Alternative 2 travel forecast, E-2 light rail was part of the Rail System Modeling Alternative 3 forecast and E-2 BRT was part of the BRT System Modeling Alternative forecast.

The set of indicator values for each option in each corridor can be found in the various presentations developed throughout the stages of the project, contained in the CD-ROM accompanying this document. Based on this evaluation, a final set of recommendations was developed, identifying one technology and operating scenario for each corridor. These were combined into a final complete regional rail system (no BRT options were recommended), the Final Run Recommended Modeling Alternative shown in Exhibit II-16.

Unlike the Rail System Modeling Alternatives for this effort, the Final Run Recommended Alternative included interlining of some of the RRCS Corridors with others in the background rail system of the Mobility 2025 – 2004 Update. Interlining occurs when a rail corridor connects with another in a manner that could allow for no-transfer/one seat service throughout both corridors. For example, Corridor E-2 was interlined along the BNSF Corridor and the TRE Corridor to allow one seat service from Denton to the Dallas CBD and vice versa (shown in light orange on the following map). In addition, E-2 was interlined with the eastern portion of the Cotton Belt Corridor to allow one seat service from Denton to Dallas/Fort Worth International Airport (shown in solid red on the following map). This interlining or one seat service is shown in Exhibit VIII-15 with separately colored lines along the corridors. Corridor E-3 was interlined from McKinney through downtown Dallas to the end of the West Oak Cliff line in southwest Dallas. Corridor E-4 was interlined along the BNSF and the TRE, providing one seat service from Frisco to the Dallas CBD.

EXHIBIT II-16

REGIONAL RAIL CORRIDOR STUDY
FINAL RUN RECOMMENDED ALTERNATIVE



Ridership Results

Exhibit II-17 presents average weekday ridership for each of the modal alternatives in the study. This information resulted from Rail System Alternatives 1 through 4 and the BRT System Alternative and was used to help identify the most reasonable options for each corridor for inclusion in the Final Run Recommended Alternative.

EXHIBIT II-17

AVERAGE 2030 WEEKDAY RIDERSHIP: MODEL ALTERNATIVES 1-4 AND BRT

Corridor	Regional Rail	Bus Rapid Transit	Light Rail
W-1	15,000	22,400	32,800
W-2	11,700	9,800	-
W-3	8,300	-	-
W-4	5,900	7,600	-
E-1	9,800	-	-
E-2	4,100	6,800	8,800
E-3	6,600	8,600	10,300
E-4	7,500	-	8,400
E-5	4,200	5,300	8,000
E-6	6,100	-	10,500

Source: NCTCOG-DFWRTM
Note: Ridership in this table comes from the travel forecasts for the Rail System Alternatives 1 through 4 and the BRT System Alternative under which the technology or mode performed the best, not from the Final Run Recommended Alternative.

Regional rail ridership values are included in this table for the TRE Corridor (E-1 and W-3) for comparison purposes only. As noted previously in this report, the TRE Corridor was not part of the detailed corridor evaluation. It is also important to note that the ridership included under the various technologies for each corridor comes from the Alternative under which that corridor performed the best from a ridership perspective (see Exhibit II-18). In some cases the Exhibit II-17 data is higher than the final ridership data because the combination of corridors included in each Rail System Alternative (Alternatives 1 through 4) attempted to isolate corridors from those nearby that could potentially compete for riders.

The Final Run Recommended Modeling Alternative ridership is shown in Exhibit VIII-18. The year 2007 and 2030 ridership is included, along with adjusted ridership. The year 2007 forecast was prepared to assist in recommendations for near- or long-term implementation needs (see Exhibit II-3 in Chapter II). This particular demographics scenario was partly chosen due to the availability of socio-economics and land use datasets and coded background networks. Analysis of demand and the respective costs under the staging horizon years helps to determine the impact of demographics growth on each of the alternatives. Consequently, it can lead to the identification of corridors that exhibit the highest potential for priority implementation. The results of the staging analysis are shown in Chapter II of this report, Exhibit II-3.

As mentioned previously, the Final Run Recommended Alternative included interlining of some of the RRCS Corridors with others in the background Mobility 2025 – 2004 Update rail network. In order to reflect the benefits this interlining provides, ridership in the interlined corridors (E-2, E-3, E-4) was reported differently.

It is assumed that interlining benefits are not reflected in station ridership data along a given corridor, the sum of which constitutes total corridor ridership. These adjustments were based on rail link gateway volumes at the terminus of each of these corridors. The rail link volumes for the Final Run Recommended Alternative for 2007 and 2030 are shown in Exhibit II-19 and Exhibit II-20. For example then, Exhibit II-20 shows 9,570 daily riders in the E-3 Corridor on the link just north of the DART system connections. This was rounded to 9,600 daily riders for use in the final performance indicator summary for the RRCS effort and is reported as the E-3 Corridor ridership in Exhibit II-18.

EXHIBIT II-18

AVERAGE 2007 AND 2030 DAILY REGIONAL RAIL RIDERSHIP IN THE FINAL RUN RECOMMNEDED MODELING ALTERNATIVE

Corridor	2007 Ridership	2030 Ridership	2030 Ridership Adjusted
W-1	9,900	11,600	11,600
W-2	7,900	9,400	9,400
W-3	7,400	8,300	8,300
W-4	3,300	5,000	5,000
E-2	4,300	5,700	6,200*
E-3	5,000	7,100	9,600*
E-4	3,000	5,500	6,500*
E-5	2,100	3,200	3,200
E-6	2,700	4,000	4,000

* Adjusted ridership
Source: NCTCOG-DFWRTM

EXHIBIT II-19

YEAR 2007 LINK VOLUME MAP

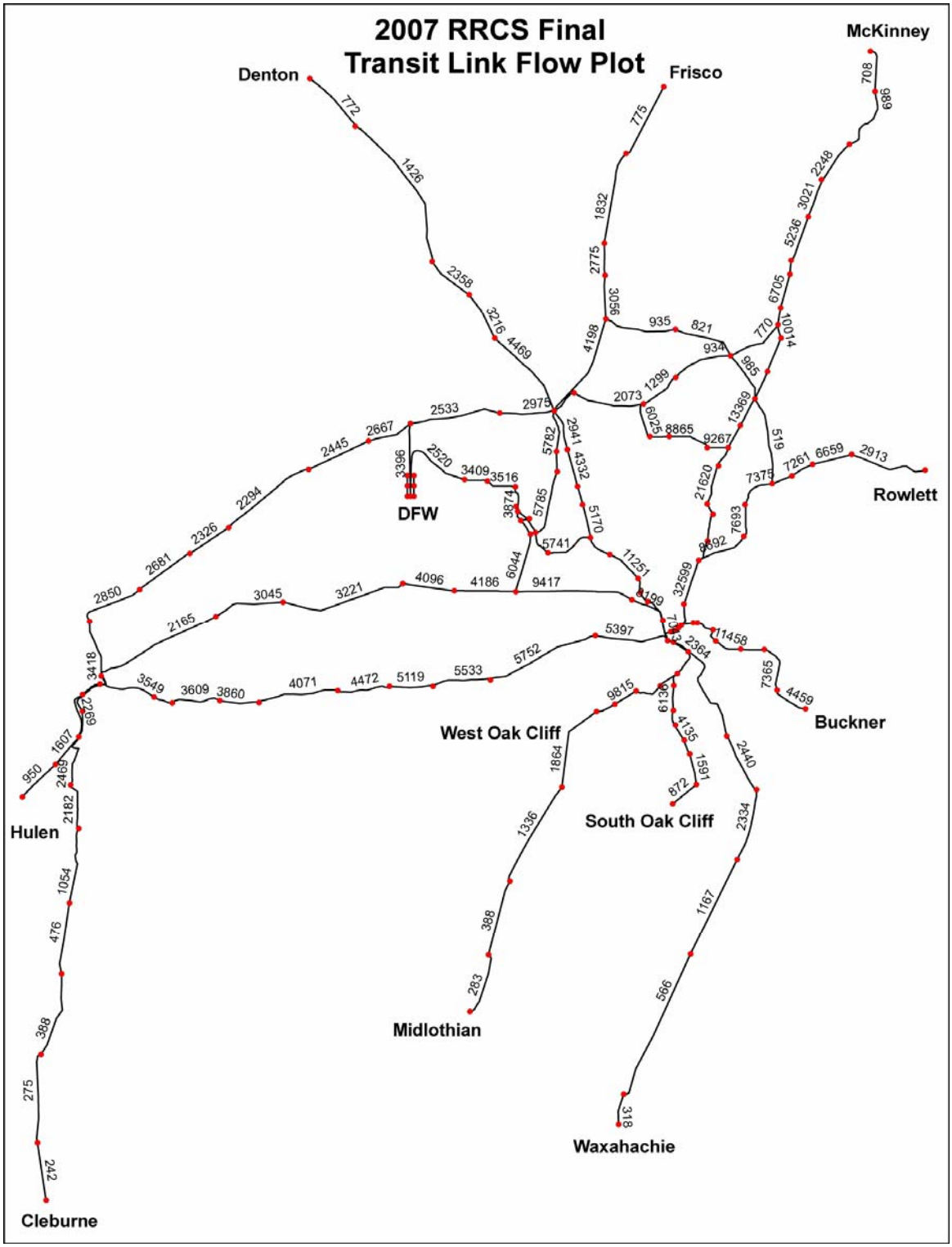
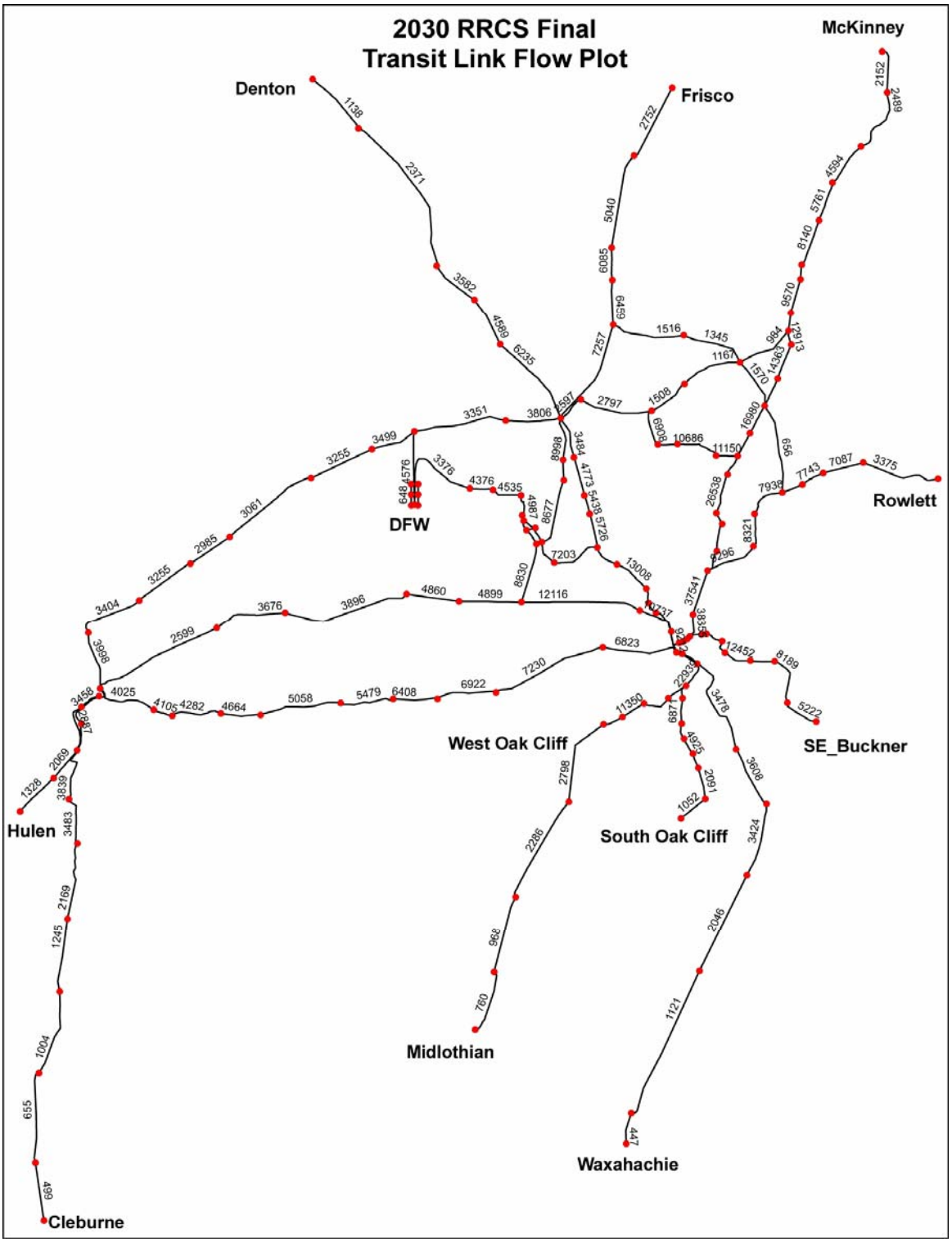


EXHIBIT II-18

YEAR 2030 LINK VOLUME MAP



Analysis of patronage forecasts also entailed detailed reviews of projected passenger boardings and alightings at each station. Station access forecasts by walk, auto, and feeder bus were checked for accuracy and reasonableness. Such detailed scrutiny of data ensures the identification of potential coding errors and helps with the equilibration of feeder bus supply at each station. Corridor line ridership is the sum of demand at stations along a given line. Exhibit II-21 and Exhibit II-22 present ridership by station for eastern and western corridors, respectively.

It is important to note; however, when referring to the station activity in the previous exhibits that the final line ridership for Corridors E-2, E-3 and E-4 does not match that shown in Exhibit II-20 as the adjustment for interlining benefits for relevant corridors was only done for the total corridor riders, not station by station.

EXHIBIT II-19

EASTERN CORRIDORS BOARDINGS BY STATION

Corridor	Stations	Regional Rail Boardings	
		2007	2030
E-2	Downtown Denton	390	570
	Medical Center	570	960
	Lewisville North/FM407	580	750
	Lewisville CBD	590	680
	Lewisville South	1,190	1,440
	Downtown Carrollton/Belt Line	1,010	1,340
	Line Ridership	**4,330**	**5,740**
E-3	McKinney Central LRT/RR	250	382
	McKinney North	350	1,076
	Fairview/FM1378	760	1,233
	Stacy	440	696
	FM2170	1,300	1,565
	Legacy Drive	250	237
	Spring Creek	680	757
	Parker Road	920	1,139
	Line Ridership	**4,950**	**7,085**
E-4	Frisco North	390	1,400
	Frisco CBD/FM 720	550	1,200
	South Frisco	490	570
	Hebron	670	900
	Windhaven/Austin	190	300
	Downtown Carrollton/Belt Line	730	1,200
	Line Ridership	**3,020**	**5,570**
E-5	Westmoreland	932	1,399
	Camp Wisdom/Main	498	582
	Cedar Hill CBD	494	695
	Cedar Hill/Midlothian/Lo	55	109
	Midlothian Central	142	380
	Line Ridership	**2,121**	**3,165**
E-6	Union Station	1,180	1,740
	Loop12/Walton Walker	190	250
	IH-20/Langdon	90	*140*
	Lancaster CBD	640	780
	Red Oak	320	500
	Waxahachie/287	160	400
	Waxahachie CBD	160	220
	Line Ridership	**2,740**	**4,030**

Source: NCTCOG-DFWRTM-Final Run Recommended Alternative

EXHIBIT II-20

WESTERN CORRIDORS BOARDINGS BY STATION

Corridor	Stations	Regional Rail Boardings	
		2007	2030
W-1	ITC Terminal	1,780	2,010
	Texas Wesleyan	410	430
	Oakland/Rosedale	730	770
	Handley/SH180	440	510
	Cooks Lane	750	1,000
	Arlington UTA Center	690	710
	SH 360	1,190	1,400
	Grand Prairie	480	530
	NAS	280	340
	Westmoreland	460	540
	Union Station	2,700	3,400
	Line Ridership	**9,910**	**11,640**
W-2	North DFW	460	570
	Grapevine Main	390	450
	Colleyville	170	200
	DFW 13th Station	930	1,250
	Main/Davis	480	520
	Loop 820/North Richland Hills	530	570
	Beach/Meacham	380	490
	Stockyard/28th	550	630
	ITC Terminal	1,700	1,920
	T&P Building	340	380
	Medical (Penn/Summit)	560	630
	Berry/TCU	520	620
	Seminary	440	500
	Hulen	480	670
	Line Ridership	**7,930**	**9,400**
W-4	ITC Terminal	980	1,440
	T&P Building	340	470
	Medical	300	350
	Berry/TCU	150	220
	IH 820/McCart	290	380
	Sycamore School Rd	680	890
	Crowley Main St.	320	520
	Joshua	70	200
	Cleburne North	30	120
	Cleburne Intermodal Terminal	120	250
	Burleson	50	130
	Line Ridership	**3,330**	**4,970**

Source: NCTCOG-DFWRTM-Final Run Recommended Alternative

PERFORMANCE EVALUATION

Exhibit II-23 includes a summary of the performance for each corridor, based on the final recommendations for the project and using the performance indicators presented earlier in this chapter. Interim versions of this table are contained in the accompanying CD-ROM, as part of the various presentations that were offered to the Policy/Technical Committees throughout the project.

EXHIBIT II-21

PERFORMANCE SUMMARY BY CORRIDOR

Evaluation Criteria	E-2 Regional Rail	Score	E-3 Regional Rail	Score	E-3 Light Rail	Score	E-4 Regional Rail	Score	E-5 Regional Rail	Score	E-6 Regional Rail	Score	W-1 Regional Rail	Score	W-2 Regional Rail	Score	W-4 Regional Rail	Score
Performance Benchmark (Annual cost per annual rider) (see pg. VIII-15)	$10.37	5	$6.75	5	$8.90	4	$7.50	4	$14.55	4	$17.98	4	$10.40	5	$10.62	5	$12.49	5
Total Daily Ridership Forecast	6,200	4	9,600	4	9,600	4	6,500	3	3200	2	4,000	3	11,600	5	9,400	4	5,000	3
One-way Trip Time (minutes)	39	5	28	5	33	4	33	5	32	5	53	5	47	3	61	2	52	3
Estimated Capital Cost (millions)	$238.60	5	$234.70	5	$312.80	4	$161.40	5	$169.50	5	$265.70	4	$434.9M	3	$366.10	3	$229.6M	3
Estimated annual O&M Cost (millions)	$11.50	4	$7.40	4	$11.00	3	$9.40	5	$9.10	4	$13.80	5	$15.6M	3	$21.2M	2	$15.0M	3
Local Authority and Funding	DCTA org. exists and funding is available.	5	None	1	None	1	None	1	None	1	None	1	None	1	None	1	None	1
Community Acceptance	Community has approved sales tax to fund regional rail type system	5	Community may be open to acceptance of regional rail type service.	3	Community may be open to acceptance of light rail.	3	Community may be open to acceptance of regional rail type service.	3	Community may be open to acceptance of regional rail type service.	3	Community may be open to acceptance of regional rail type service.	3	Community is open to acceptance of regional rail service.	4	Communities are open to acceptance of regional rail service.	5	Communities are open to acceptance of regional rail type service.	5
Ease of Implementation	Right-of-way is owned and controlled by Denton County and DART. Relocation of trail will be necessary before track can be constructed.	4	DART owns right-of-way and controls local freight operations.	5	Light rail requires separate tracks or FRA approved time separation.	4	Use of right-of-way must be negotiated with the BNSF.	4	Use of right-of-way must be negotiated with the BNSF.	4	Use of right-of-way must be negotiated with the BNSF and the UP. Flyover of the UP will be required at Forest Avenue.	2	UPRR owns ROW and Tower 55 congestion restricts capacity.	1	DART and FW&W own ROW.	4	BNSF and FW&W own ROW.	4

Evaluation Criteria	E-2 Regional Rail	Score	E-3 Regional Rail	Score	E-3 Light Rail	Score	E-4 Regional Rail	Score	E-5 Regional Rail	Score	E-6 Regional Rail	Score	W-1 Regional Rail	Score	W-2 Regional Rail	Score	W-4 Regional Rail	Score
Connectivity with Existing and Planned Transit Operations	Regional rail will require transfer to DART at Carrollton for some route choices.	3	Regional rail will require transfer to DART at Plano.	2	Light rail allows interlining with DART in Plano without transfers.	5	Regional rail will require transfer to DART at Carrollton for some route choices.	4	Regional rail will require transfer to DART at Westmore-land.	4	Regional rail will access Dallas Union Station and could be interlined with the TRE if practical.	4	Regional rail allows interlining with TRE and DART LRT, and transfers to buses.	5	Regional rail allows interlining with TRE, transfers with The T, and connects to DFW APM.	5	Regional rail allows interlining with TRE and transfers with The T.	4
Compatibility with Freight Railroad Operations	Compliant regional rail is compatible with local freight operations.	5	Compliant regional rail is compatible with local freight operations.	5	Not compatible with freight operations unless time separated and FRA waiver approved.	2	Regional rail equipment is compatible.	3	Regional rail equipment is compatible.	4	Regional rail equipment will have to be compliant to be compatible.	4	Compliant regional rail is compatible with freight RR operations.	4	Compliant regional rail is compatible with freight railroad operations.	5	Compliant regional rail is compatible with freight railroad operations.	4
Serves Area of Unmet Mobility Need	Roadway capacity deficiency moderately severe	2	Serves area of the most severe capacity deficiency	5	Serves area of the most severe capacity deficiency	5	Serves area of severe capacity deficiency	4	Roadway capacity deficiency not severe	1	Roadway capacity deficiency not severe	1	Roadway capacity deficiency low to moderately severe	2	Roadway capacity deficiency low to moderately severe	2	Roadway capacity deficiency low to moderately severe	2
Impact Upon Adjacent Highways and Air Quality (see pg. III-1 for explanation)	Benefit to adjacent highway is equivalent to 1-lane in each direction	4	Benefit to adjacent highway is equivalent to 1-lane in each direction.	4	Benefit to adjacent highway is equivalent to 1-lane in each direction.	4	Benefit to adjacent highway is equivalent to 1-lane in each direction.	4	Benefit to adjacent highway is equivalent to 1-lane in each direction	4	Benefit to adjacent highway is equivalent to 1-lane in each direction	4	Transit benefit to highway is equivalent to 2-lanes in each direction on adjacent freeway.	5	Transit benefit to highway is equivalent to 1-lane in each direction on the adjacent freeway.	4	Transit benefit to highway is equivalent to 1-lane in each direction on the adjacent freeway.	4
Transit Oriented Development Potential	TOD potential exists.	2	TOD potential exists.	2	TOD potential exists.	2	TOD potential exists.	2	TOD potential exists but is likely to develop slowly as on TRE.	2	TOD potential exists but is likely to develop slowly as on TRE.	2	TOD potential exists but is likely to develop slowly as on TRE.	3	TOD potential exists but is likely to develop slowly as on TRE.	3	TOD potential exists but is likely to develop slowly as on TRE.	3
TOTAL SCORE		**53**		**50**		**47**		**46**		**43**		**42**		**44**		**45**		**44**

The following section describes the performance of each corridor, relating the various indicators to the overall score received. This same information is shown in tabular form in Exhibit II-21. The order in which they are listed is not significant.

E-2 – Denton Line Corridor-Regional Rail

The E-2 Corridor scored the highest of all corridors included in the evaluation, with a total of 53 points. The Performance Benchmark was $10.37 (score = 5 points), based on a total daily ridership forecast of 6,200 daily riders (score = 4 points) and an estimated annual operating and maintenance cost of $11.5 million (score = 4 points). The total capital cost for the development of regional rail in this corridor was estimated to be $238.60 million (score = 5 points). Estimated trip time to travel one-way the length of the corridor is 39 minutes (score = 5). The project has the advantage of the existence of a local authority, with the Denton County Transportation Authority being in place to develop and financially support the project (score = 5 points). Community Acceptance is clear by the presence of the transportation authority (score = 5 points). The right-of-way is owned and controlled by DART and the City of Denton, making implementation relatively straightforward, but there is a bicycle/pedestrian trail in a portion of the corridor that will have to be relocated (score = 4 points). Use of Federal Railroad Administration (FRA) compliant regional rail technology in the corridor will require a transfer to the DART system at Carrollton to access other transit options in the region (score = 3 points), but is compatible with local freight operations (score = 5 points). The roadway capacity deficiency in the parallel corridor is moderately severe, so the E-2 regional rail implementation would moderately assist with unmet mobility needs (score = 2 points). However, the ridership projections for the corridor are equivalent to one lane of vehicular

traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development potential exists (score = 2 points).

E-3 – McKinney Line Corridor – Regional Rail/Light Rail (Intermediate Light Rail)

The E-3 Corridor was considered as both a Regional Rail Corridor and an Intermediate Light Rail Corridor. Given the presence of DART Light Rail to Plano, the ability to extend a single track Light Rail line north to McKinney was considered feasible. This corridor scored well under both technology scenarios, with a total of 50 points for Regional Rail and 47 points for Light Rail.

The regional rail performance benchmark was $6.75 (score = 5 points), based on a total daily ridership forecast of 9,600 daily riders (score = 4 points) and an estimated annual operating and maintenance cost of $7.4 million (score = 4 points). The total capital cost for the development of regional rail in this corridor was estimated to be $234.70 million (score = 5 points). Estimated trip time to travel the length of the corridor is 28 minutes (score = 5 points). The project has no existing transit authority or funding designated for it at this time (score = 1 point), but the surrounding community may be open to accepting a regional rail type of service (score = 3 points). The right-of-way is owned and controlled by DART, making implementation relatively straightforward (score = 5 points). Use of Federal Railroad Administration (FRA) compliant regional rail technology in the corridor will require a transfer to the DART system at Plano in order to access other transit options in the region (score = 2 points), but is compatible with local freight operations (score = 5 points). The roadway capacity deficiency in the parallel corridor is severe, so the E-3 regional rail implementation would assist with unmet mobility needs (score = 5 points). The ridership projections for the corridor are equivalent to one lane of

vehicular traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development potential exists (score = 2 points).

The light rail performance benchmark was $8.90 (score = 4 points), based on a total daily ridership forecast of 9,600 daily riders (score = 4 points) and an estimated annual operating and maintenance cost of $11 million (score = 3 points). The total capital cost for the development of a single track light rail operation in this corridor was estimated to be $312.8 million (score = 4 points). Estimated trip time to travel the length of the corridor via light rail is 33 minutes (score = 4 points). The project has no existing transit authority or funding designated for it at this time (score = 1 point), but the surrounding community may be open to accepting a light rail type of service (score = 3 points). Light rail requires separate tracks or FRA approved time separation (score = 4 points), but would allow for interlining with the DART system without any transfer required (score = 5 points). Light rail would not be compatible with freight operations in the corridor unless time separated and FRA waiver approved (score = 2 points). The roadway capacity deficiency in the parallel corridor is severe, so the E-3 light rail implementation would assist with unmet mobility needs (score = 5 points). The ridership projections for the corridor are equivalent to one lane of vehicular traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development potential exists (score = 2 points).

The final recommendation for the E-3 corridor was a combination of characteristics of both regional rail and light rail designated “Intermediate Light Rail.” The station spacing suggested in the more rural sections of the corridor was more akin to regional rail spacing, with closer station spacing (more like light rail service) closer to the DART

system. Initially mostly single track construction, with passing sidings, is also recommended. Provisions for future double track construction is suggested for consideration as implementation of service is pursued.

E-4 – Frisco Line

The E-4 Corridor scored 46 points in the overall evaluation. The Performance Benchmark was $7.50 (score = 4 points), based on a total daily ridership forecast of 6,500 riders (score = 3 points). The costs for the corridor include an estimated annual operating and maintenance cost of $9.40 million (score = 5 points) and total capital cost for regional rail development of $161.40 million (score = 5 points). Estimated trip time to travel one way, the length of the corridor is 33 minutes (score = 5 points). The project has no existing transit authority or funding designated for it at this time (score = 1 point), but the community may be open to a regional rail service (score = 3 points). The right-of-way must be negotiated with the BNSF Railroad (score = 4 points). Use of Federal Railroad Administration (FRA) compliant regional rail technology in the corridor will require a transfer to the DART system at Carrollton in order to access other transit options in the region (score = 4 points), but is compatible with local freight operations (score = 3 points). The roadway capacity deficiency in the parallel corridor is severe, so the E-4 regional rail implementation would assist with unmet mobility needs (score = 4 points). The ridership projections for the corridor are equivalent to one lane of vehicular traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development potential exists (score = 2 points).

E-5 – Midlothian Line

The E-5 Corridor scored 43 points in the overall evaluation. The Performance Benchmark was $14.55 (score = 4 points), based on a total daily ridership forecast of 3,200 daily riders (score = 2 points). The costs for the corridor include an annual operating and maintenance cost of $9.10 million (score = 4 points) and a total capital cost for development of regional rail in this corridor of $169.50 million (score = 5 points). Estimated trip time to travel one way, the length of the corridor is 32 minutes (score = 5 points). The project has no existing transit authority or funding designated for it at this time (score = 1 point), but the community may be open to a regional rail service (score = 3 points). The right-of-way must be negotiated with the BNSF Railroad (score = 4 points). Use of Federal Railroad Administration (FRA) compliant regional rail technology in the corridor will require a transfer to the DART system at Westmoreland in order to access other transit options in the region (score = 4 points), but is compatible with local freight operations (score = 4 points). The roadway capacity deficiency in the parallel corridor is not severe (score = 1 point), but the ridership projections equal one lane of vehicular traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development exists, but would most likely come along slowly (score = 2 points).

E-6 – Waxahachie Line

The E-6 Corridor scored 42 points in the overall evaluation. The Performance Benchmark was $17.98 (score = 4 points), based on a total daily ridership forecast of 4,000 daily riders (score = 3 points). The costs for the corridor include an annual operating and maintenance cost of $13.80 million (score = 5 points) and a total capital cost for development of regional rail in this corridor of $265.70 million (score = 4 points).

Estimated trip time to travel one way, the length of the corridor is 53 minutes (score = 5 points). The project has no existing transit authority or funding designated for it at this time (score = 1 point), but the community may be open to a regional rail service (score = 3 points). Use of the right-of-way must be negotiated with the BNSF and the UP Railroads and a flyover rail to rail connection will be required of the UP at Forest Avenue in Dallas (score = 2). Use of Federal Railroad Administration (FRA) compliant regional rail technology in the corridor will make it compatible with freight operations (score = 4) and require a transfer to the DART system at Union Station for light rail access, but could allow for an interlined operation with the Trinity Railway Express (score = 4 points). The roadway capacity deficiency in the parallel corridor is not severe (score = 1 point), but the ridership projections equal one lane of vehicular traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development exists, but would most likely come along slowly (score = 2 points).

W-1 - UP Mainline

The W-1 Corridor scored 44 points in the overall evaluation. The Performance Benchmark was $10.40 (score = 5 points), based on a total daily ridership forecast of 11,600 daily riders (score = 5 points). The costs for the corridor include an annual operating and maintenance cost of $15.6 million (score = 3 points) and a total capital cost for development of regional rail in this corridor of $434.9 million (score = 3 points). Estimated trip time to travel one way, the length of the corridor is 47 minutes (score = 3 points). The project has local authority involvement on the east and west ends and the community is open to a regional rail service (score = 4 points), but has no existing transit authority or funding designated for it at this time (score = 1 point). Use of the right-of-way must be negotiated with the UP Railroad and the Tower 55 congestion in Fort Worth

will restrict capacity (score = 1 point). Use of Federal Railroad Administration (FRA) compliant regional rail technology in the corridor will make it compatible with freight operations (score = 4 points) and require a transfer to the DART system at Union Station for light rail access, but could allow for an interlined operation with the Trinity Railway Express (score = 5 points). The roadway capacity deficiency in the parallel corridor is moderately severe (score = 2 points), but the ridership projections are equivalent to two lanes of vehicular traffic in each direction. This provides a good air quality benefit (score = 5 points). Some transit oriented development exists in the corridor (score = 3 points).

W-2 – Hulen/DFWIA Line

The W-2 Corridor scored 45 points in the overall evaluation. The Performance Benchmark was $10.62 (score = 5 points), based on a total daily ridership forecast of 9,400 daily riders (score = 4 points). The costs for the corridor include an annual operating and maintenance cost of $21.2 million (score = 2 points) and a total capital cost for development of regional rail in this corridor of $366.1 million (score = 3 points). Estimated trip time to travel one way, the length of the corridor is 61 minutes (score = 2 points). The project has local authority involvement on the western end of the corridor and the communities along the rest of the corridor appear to be open to a regional rail service (score = 5 points), but has no existing transit authority or funding designated for it at this time other than in Fort Worth (score=1 point). The right-of-way is owned by DART and the FW&W Railroad (score = 4 points), so use of the corridor is negotiable. Use of FRA compliant regional rail technology in the corridor will make it compatible with freight operations (score = 5 points) and allow for interlining with Trinity Rail Express, along with other connections with The T in Fort Worth and the Dallas/Fort Worth International Airport on the eastern end (score = 5 points). The roadway capacity

deficiency in the parallel corridors is moderately severe (score = 2 points) and the ridership generated is equivalent to one lane of vehicular traffic in each direction. This provides a good benefit to air quality (score = 4 points). Transit oriented development is likely to develop slowly in this corridor, as it has in the Trinity Railway Express corridor (score = 3 points).

W-4 – Cleburne Line

The W-4 Corridor scored 44 points in the overall evaluation. The Performance Benchmark was $12.49 (score = 5 points), based on a total daily ridership forecast of 5,000 daily riders (score = 3 points). The costs for the corridor include an annual operating and maintenance cost of $15.0 million (score = 3 points) and a total capital cost for development of regional rail in this corridor of $229.6 million (score = 3 points). Estimated trip time to travel one way, the length of the corridor is 52 minutes (score = 3 points). The project has local authority involvement on the northern end of the corridor and the communities along the rest of the corridor appear to be open to regional rail service (score = 5 points), but has no existing transit authority or funding designated for it at this time (score = 1 point). The right-of-way must be negotiated with the BNSF and FW&W railroads (score = 4 points). Use of FRA compliant regional rail technology in the corridor will make it compatible with freight operations (score = 4 points) and allow for interlining with Trinity Railway Express (score = 4 points). The roadway capacity deficiency in the parallel corridor is moderately severe (score = 2 points) and the ridership generated is equivalent to one lane of vehicular traffic in each direction. This provides a good benefit to air quality (score = 4 points). Transit oriented development is likely to develop slowly in this corridor, as it has in the Trinity Railway Express corridor (score = 3 points).

Summary by Corridor

	CORRIDOR COST ($MILLIONS)							
COST ELEMENT	E-2	E-3	E-4	E-5	E-6	W-1	W-2	W-4
Site work and Urban Design	$33.208	$10.969	$14.385	$12.544	$21.511	$48.259	$29.714	$32.257
Trackwork	$40.250	$28.700	$24.570	$21.280	$33.145	$56.105	$71.148	$45.024
Structures	$10.278	$4.067	$2.954	$2.016	$32.256	$36.218	$46.806	$6.434
Stations	$22.750	$35.280	$22.750	$26.950	$24.570	$37.590	$42.210	$39.900
LRT Electrification System	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
Signal System	$40.698	$30.114	$38.850	$34.314	$56.784	$52.802	$60.446	$25.586
Right-of-Way	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
Utilities	$6.300	$4.564	$5.460	$5.264	$8.596	$8.800	$10.074	$8.389
Crossings / Roadway	$19.740	$9.030	$11.970	$11.130	$16.800	$126.280	$49.700	$15.960
Special Conditions	$1.400	$0.000	$1.400	$0.000	$0.000	$12.880	$0.000	$0.000
Vehicles	$64.000	$112.000	$56.000	$56.000	$72.000	$56.000	$56.000	$56.000
Total Capital Cost	$238.624	$234.724	$178.339	$169.498	$265.662	$434.935	$366.098	$229.551

III. E-1 – TRINITY RAILWAY EXPRESS (EAST) CORRIDOR CONSIDERATIONS

CORRIDOR DESCRIPTION

Rail Corridor E-1 is one of ten rail corridors in the Dallas-Fort Worth area included in the initial scope of work of the Regional Rail Corridor Study. Corridor E-1, along with Corridor W-3, make up the Trinity Railway Express Line that runs between Dallas and Fort Worth.

Because the TRE is in operation as a regional rail service and is actively managed by two of the areas transit authorities, the TRE corridor was examined preliminarily but was not examined at length. Further, the TRE was separately pursuing inclusion of improvement projects in the NCTCOG/RTC Partnership Program #2. Thus, the NCTCOG RRCS Project Manager determined that it would not be necessary to study the TRE corridor. However, TRE service was reviewed as background for the study and to serve as a baseline for passenger rail service expectations and capital and operating costs.

Additionally, TRE's capital improvement plan for the upcoming years was reviewed with TRE for any operating impact on the RRCS study, as well as to reconcile the RRCS capital cost estimates.

Additional information about the TRE line may be found in the Trinity Railway Express Service and Improvement Plans section in the report Regional Rail Corridor Study – Study Report, in Chapter VI – Issue Identification. A summary of the planned improvements follows.

TRE CAPITAL IMPROVEMENT PLAN

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
TARRANT COUNTY PROJECTS									
T-1	Hurst Siding Extension	Extends existing siding approximately 264 feet to the west and 1,320 feet to the east. Replaces existing switches at either end of the project with new switches and associated signal apparatus. Reconstruct Norwood Road grade crossing and install new four-quadrant gate protection system. Signalization to be installed to accommodate 79 mph service.	2005	$2,800,000				Project is under design and to be bid out by the FWTA in FY 2005. Project is fully funded. Replacement of switches is critical to allow for faster and safer passenger and freight train meets at the Hurst Siding.	A 1, 3, 4 B 1, 2, 3, 4 D 1, 2
	Construction Subtotal			$2,800,000					
	Project Total			$2,800,000	$2,240,000	$560,000	$0	80% CMAQ funded	
T-2	Minnis Drive to Handley-Ederville Road (Richland Hills Station) Double Track	Includes double tracking through station and all the way to Minnis. Replaces and raises overpass at Midway-Big Fossil to eliminate bridge strikes by trucks.	2006	$5,900,000				This project is necessary to be able to achieve 30-minute headways between Fort Worth and Dallas. Repetitive strikes by road traffic on TRE bridge - current clearance - 11' 6". This project was funded in FY 2005 by the T in the total amount of $6,800,000.	A 1, 2, 3, 4 B 1, 2, 3, 4 C 1
	Escalation, Contingency and Soft Costs Total			$2,664,853				See separate calculation.	
	Construction Subtotal			$8,564,853					
		Minnis Drive	2006	$234,000				Upgrade to Quad Gates	D 1, 2, 3
		Handley-Ederville Road	2006	$339,000				Upgrade to Quad Gates. Install Remote Crossing Start System	D 1, 2, 3
	Grade Crossings Subtotal			$573,000					
	Project Total			$9,137,853	$7,310,282	$1,827,571	$0	FWTA Funding Sources TBD - assume 80% Federal Funding. Quad gate funding to come from NTCOG Partnership 2 Funding	
T-3	Power cross-over at ITC	Install signals and power switch crossover from shared track at Ninth Street as a new control point.	2006	$800,000				Needed to achieve 30-minute headways out of Fort Worth.	C 1 F 3, 4
	Construction Subtotal			$800,000					
	Project Total			$800,000	$640,000	$160,000	$0	FWTA Funding Sources TBD - assume 80% Federal Funding	
T-4	Handley-Ederville Road (Richland Hills Station) to West Hurst Double Track	New siding with six bridges	2008	$13,300,000				Next segment in process of Tarrant County double tracking with immediate headway reduction benefit.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$7,100,072				See separate calculation.	
	Construction Subtotal			$20,400,072					
		Precinct Line Road		$282,000				This crossing was not included in the original RCRPP because of the unknown status of City of Fort Worth project, which will widen existing 2 lane road south of RR and connect to existing 4 lane road north of tracks. Fort Worth project should include construction of 4 lane RR grade crossing. This project will upgrade the crossing to Quad Gates.	D 1, 2, 3
	Grade Crossing Subtotal			$282,000					

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
	Project Total			$20,682,072	$16,545,658	$4,136,414	$0	FWTA Funding Sources TBD - assume 80% Federal Funding. Quad gate funding to come from NTCOG Partnership 2 Funding	
T-5	Dalwor Junction to East Sylvania Double Track		2009	$8,500,000				Connect to existing double track at W. Sylvania new double track to Dalwor Junction. New bridge at West Fork - rehab existing bridge which will soon need work. Will not be able to double track beyond this location to West into ITC and T&P Stations because of physical limitations and not required for operational purposes at this time.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$4,537,640				See separate calculation.	
	Construction Subtotal			$13,037,640					
		Judkins Street (South)	2009	$235,000				Upgrade to Quad Gates	D 1, 2, 3
		Galvez Avenue	2005	$30,000				Close Road. Install barricades, remove existing signals	A 3
		Riverside Drive	2009	$384,000				Upgrade to Quad Gates. Resurface. Existing median with 4 gates.	D 1, 2, 3
		Beach Street	2009	$468,073				Upgrade to Quad Gates. Resurface. Existing median with 4 gates.	D 1, 2, 3
	Grade Crossings Subtotal			$1,117,073					
	Project Total			$14,154,713	$11,323,770	$2,830,943	$0	FWTA Funding Sources TBD - assume 80% Federal Funding. Quad gate funding to come from NTCOG Partnership 2 Funding	
T-6	East Sylvania to Minnis Drive Double Track	New siding with three bridges	2010	$9,400,000				Third follow-on segment in process of double tracking.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$5,404,295				See separate calculation.	
	Construction Subtotal			$14,804,295					
		Haltom Road	2010	$338,233				Upgrade to Quad Gates. Resurface	D 1, 2, 3
		Elliot Reeder Road	2010	$338,233				Upgrade to Quad Gates. Resurface	D 1, 2, 3
		Carson Road	2010	$349,513				Upgrade to Quad Gates. Resurface	D 1, 2, 3
	Grade Crossings Subtotal			$1,025,979					
	Project Total			$15,830,274	$12,664,219	$3,166,055	$0	FWTA Funding Sources TBD - assume 80% Federal Funding. Quad gate funding to come from NTCOG Partnership 2 Funding	
T-7	Hurst to East Tarrant Double Track	New siding with two bridges	2012	$10,900,000				Follow-on segment in process of double tracking.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$7,452,494				See separate calculation.	
	Construction Subtotal			$18,352,494				FWTA Funding Sources TBD	
		Norwood Drive						To be completed in FY 05 under separate grant/project/contract - See Hurst Siding Extension - T-1.	
		Bell Spur Road	2012	$232,000				Upgrade to Quad Gates. Resurface	D 1, 2, 3
		Greenbelt road	2005	$30,000				Close Road. Install barricades, remove existing signals	A 3
		MotoCross	2012	$365,000				Upgrade to Quad Gates. Resurface. Possibility to close??	D 1, 2, 3 (A 3)
		Mosier Valley	2012	$377,375				Upgrade to Quad Gates. Resurface	D 1, 2, 3
		Calloway Cemetery	2012	$683,000				Upgrade to Quad Gates. Resurface	D 1, 2, 3

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
		Tarrant Main Street	2012	$292,000				Upgrade to Quad Gates	D 1, 2, 3
	Grade Crossings Subtotal			$1,979,375					
	Project Total			$20,331,869	$16,265,495	$4,066,374	$0	FWTA Funding Sources TBD - assume 80% Federal Funding. Quad gate funding to come from NTCOG Partnership 2 Funding	
T-8	East Tarrant to West CentrePort/DFW Station (Highway 360) Double Track	See "comments".	2014	$3,700,000				Last double track segment in Tarrant County. If available and to reduce costs, use existing bridge over Stemmons to go over Highway 360 and then connect new double track west of CentrePort with current double track at East Tarrant. According to COG, TxDOT has no current plans to widen 360 under TRE at this location.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$2,800,000				See separate calculation.	
	Construction Subtotal			$6,500,000				FWTA Funding Sources TBD	
	Project Total			$6,500,000					
TARRANT COUNTY PROJECTS									
	Escalation, Contingency and Soft Costs Total	$29,959,354							
	Construction Subtotals	$85,259,354							
	Grade Crossing Subtotals	$4,977,427	NOTE: Not every Project includes grade crossings						
	Project Totals	$90,236,781							
	Federal Funding	$66,989,425							
	FWTA Funding	$16,747,356							
	DART Funding	$0							
DALLAS COUNTY PROJECTS									
D-1	Lisa-Perkins Double Track Project	New siding with new bridge, replace existing bridge with new bridge, reconstruct Market Center Blvd Grade Crossing	2005	$4,900,000				Project under design, IFB expected to be released April 2005. 12 month construction period. Soft costs included in budget. Project completion will result in elimination of current 30 MPH speed restriction at Market Center Blvd and allow speed on the double track between Medical/Market Center Station and North Junction near Union Station at 59 MPH - definite service enhancement.	A 1, 2, 3, 4 B 1, 2, 3, 4 D 1, 2, 3
	Construction Subtotal			$4,900,000					
	Project Total			$4,900,000	$2,363,000	$0	$2,537,000		
D-2	Beltline Grade Separation Project	New siding from Gilbert Road to Rogers Road on aerial structure. Existing mainline track to be replaced with duplicate aerial structure.	2006	$40,000,000				Complicated funding project with TXDOT, FTA, City of Irving and DART funds involved. Project under design. IFB expected to be released in summer 2005. 36 month construction period. Soft costs included in this estimate. Completion of the project will allow 79 MPH service from West Irving Station to Rogers Road, a distance of 2.4 miles.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Construction Subtotal			$38,892,882					
		Gilbert Road	2007	$250,000				Upgrade to Quad Gates. Included in Beltline Grade Separation Project.	D 1, 2, 3
		Irby Lane	2008	$235,000				Upgrade to Quad Gates. Implement Traffic Preemption. Included in Beltline Grade Separation Project.	D 1, 2, 3
		Rogers Road	2008	$204,000				Upgrade to Quad Gates. Implement Traffic Preemption. Included in Beltline	D 1, 2, 3

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
								Grade Separation Project.	
		MacArthur Blvd.	2008	$435,000				Upgrade to Quad Gates. Implement Traffic Preemption. Included in Beltline Grade Separation Project.	D 1, 2, 3
	Grade Crossings Subtotal			$1,124,000					
	Project Total			$40,016,882	$34,415,593	$0	$5,601,289	NOTE: This estimate based on project estimate of January 20, 2005. Final funding sources TBD after final budget agreed upon and participation negotiated among parties involved. $28,788,000 is in DART Financial Plan.	
D-3	West Mockingbird/Regal Row Double Track Project	Connect double track near Regal Row Bridge with West Mockingbird double track. Replace Brookhollow B switch and power new switch. Replace two switches on mainline and relocate switch from Main 2 to freight lead.	2006	$2,500,000				Work originally intended to be done as part of LRT relocation of freight from Dallas Junction. Connection of double track put on hold until those funding issues could be resolved. Completion of project will result in 79 MPH double track service between the South Irving Station and the Stemmons Freeway overpass, a distance of approximately 4.6 miles.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$1,129,175				See separate calculation.	
	Construction Subtotal			$3,629,175					
	Project Total			$3,629,175	$2,080,000	$0	$1,549,175	Federal funds are excess CMAQ funds from Elm Fork Bridge Project.	
D-4	Valley View to W. Irving Station Double Track	Add second track as a complement to the CentrePort/DFW Station Double Tracking	2006	$3,700,000				If not funded as part of CentrePort/DFW Airport (Dorothy Sink) to Valley View Project, this would be the cost. Cost assumes quad gates to be at Valley View and Irving Yard Way. Actual double tracking from Valley View across new bridge (already owned by TRE) at Bear Creek and tie-in to Main 2 line at W. Irving. Upon completion of this project and the CentrePort Project (see J-1 below) and the Beltline Grade Separation Project (see D-2 above), 79 MPH service will be available between the CentrePort/DFW Airport Station and Rogers Road, a distance of 5.3 miles.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$1,700,000				See separate calculation.	
	Construction Subtotal			$5,400,000	$4,320,000	$0	$1,080,000		
		Valley View Lane	2006	$480,000				Upgrade to Quad Gates. Install constant warning time device, improve crossing surface.	D 1, 2, 3
		Irving Yard Way	2006	$239,000				Upgrade to Quad Gates	D 1, 2, 3
	Grade Crossing Subtotals			$719,000	$575,200	$0	$143,800		
	Project Total			$6,119,000	$4,895,200	$0	$1,223,800	NTCOG Partnership 2 Funding	
D-5	Passenger Information System	Project to provide message signs and station communications at Dallas County stations	2006	$3,000,000				Message signs/related communication system needed for Dallas. County stations compatible with Tarrant County stations' system.	E 1, 2
	Project Total			$3,000,000	$2,400,000	$0	$600,000	NTCOG Partnership 2 Funding	
D-6	TRE Track Upgrade Medical & Market Center Area	Track Upgrade Medical & Market Ctr Area	2007	$4,000,000				Track reconstruction and upgrade, signals and crossover - West to East Perkins and Lisa to Turtle Creek. Project will replace track on tight curve between Lisa and Turtle Creek bridge and realign track through Medical Market Center station.	A 1, 3
	Construction Subtotal			$4,000,000					

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
	Project Total			$4,000,000	$3,200,000	$0	$800,000	NTCOG Partnership 2 Funding	
D-7	UP/AMTRAK Connection West of Union Station	See "comments".	2007	$2,000,000				Project will address significant operational impact caused by Amtrak trains leaving and entering Union Station via UP tracks, which are under control of UP dispatch. If delayed in clearing switch, causes delays in TRE passenger on-time service both east and west bound. NOTE: Staff is currently examining project to determine if it can be accelerated and completed less expensively.	A 1 E 3
	Construction Subtotal			$2,000,000					
	Project Total			$2,000,000	$1,600,000	$0	$400,000	NTCOG Partnership 2 Funding	
D-8	Union Station Track Upgrades	Union Station to North Junction	2007	$500,000				Improve ride quality and reduce maintenance from Union Station to North Junction by replacing rail with new 136# rail and concrete ties.	
	Project Total			$500,000	$400,000	$0	$100,000	NTCOG Partnership 2 Funding	
D-9	Rogers Road to South Irving Station Double Track	Add double track between S. Irving Station and double track west of Rogers Road.	2010	$10,220,000				This project will complete double tracking between Rogers Road and the S. Irving Station. Project timing will be dependent upon City of Irving and TXDOT plans at MacArthur Road intersection and Irving Blvd overpass.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$5,900,000				See separate calculation.	
	Construction Subtotal			$16,120,000					
	Project Total			$16,120,000				Funding TBD - not funded in Financial Plan	
	Project Total			$16,120,000				Funding TBD - not funded in Financial Plan	
D-10	East Mockingbird to West Perkins Double Track	Adds double track - see Comments	2012	Unk				Not included as part of this project list because beyond time frame established. Implementation of this project is contingent upon TxDOT funding and construction of Project Pegasus. Would involve replacement of existing TRE bridges over Stemmon Freeway, Old Channel of the Trinity River, Knight's Creek and Inwood Road.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Construction Subtotal								
	Project Total							Funding TBD - not funded in Financial Plan.	
DALLAS COUNTY PROJECTS									
	Escalation, Contingency and Soft Costs Total	$8,729,175							
	Construction Subtotals	$74,942,057							
	Grade Crossing Subtotals	$1,843,000	NOTE: Not every Project includes grade crossings						
	Project Totals	$80,285,057							
	Federal Funding	$51,353,793	NOTE: Not every Project includes grade crossings						
	FWTA Funding	$0							
	DART Funding	$12,811,264							
JOINT DART AND T PROJECTS									
J-1	CentrePort/DFW Station to Valley View Double Track	See "comments".	2006	$22,500,000				AKA "Dorothy Sink" problem. Project will include double tracking from east of Highway 360 overpass through CentrePort/DFW Station to immediately west of Valley View Lane. Explore extending project across Valley View and Irving Yard Way to current double track at West Irving. This project (to Valley View) is currently under design by FWTA. DART to share in local construction cost match: FWTA to fund design.	A 1, 2, 3, 4 B 1, 2, 3, 4

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
	Construction Subtotal			$22,500,000					
	Project Total			$22,500,000	$18,000,000	$2,250,000	$2,250,000	NTCOG Partnership 2 Funding	
J-2	TRE Train Set Phase I	2 remanufactured locomotives, 3 new bi-level coaches, 1 bi-level cab car	2005	$13,000,000				Procurement process under way: single source for locomotives and utilization of option under New Mexico procurement for Bi-level equipment with Bombardier.	F 1, 3
	Project Total			$13,000,000	$10,400,000	$1,300,000	$1,300,000	Funded in Grant	
J-3	Homeland Security Projects	Risk Assessment, Irving Yard Upgrades, cameras in Tarrant County and unknown projects in Dallas County	2005	$795,000					
	Project Total			$795,000	$795,000	$0	$0	Homeland Security funding through State - 100% funding	
J-4	Corridor Station Enhancements	Shelter improvements at stations. Addition of safety and security elements.	2006	$1,500,000				Provide some level of shelter protection at TRE Stations. 10 stations @ $75,000 each. Estimate will be refined in FY 2005. Enhance safety and security at DART TRE stations.	E 1, 2, 3
	Project Total			$1,500,000	$1,200,000	$150,000	$150,000	$600,000 from NTCOG Partnership 2 Funding for DART Federal Share. FWTA Federal Share to be determined.	
J-5	Train Dispatching Control System		2006	$750,000				Will make TRE dispatching system completely independent of BNSF system. That was the intent of initial agreements and BN is now pushing for this to happen. COG interest could be expandability to other corridors easily if warranted in the future.	F 3
	Project Total			$750,000	$600,000	$75,000	$75,000	$300,000 from NTCOG Partnership 2 Funding for DART Federal Share. FWTA Federal Share to be determined.	
J-6	TRE Planning/Design/Construction Management Services	See "comments".	2006 2007 2008		$1,160,000 $1,000,000 $840,000			This miscellaneous design contract with identified tasks will help identify proper prioritization of projects, provide conceptual design and project estimates, support in federal funding issues, final design on specific projects and construction management services during construction. Will also provide support to DART and FWTA on railroad related issues on other corridors where commuter rail may operate. Calculated at estimate of $1,000,000 per year	F 4
	Project Total			$3,000,000				Financing sources TBD - not in Financial Plan.	
J-7	Locomotive Overhaul	Mid-life overhaul	2007	$2,000,000				Original 4 locomotives that were "rehabbed" by Amtrak and put into service. The estimate is based on 2004 dollars.	F 2
	Project Total			$2,000,000	$1,600,000	$200,000	$200,000	$800,000 from NTCOG Partnership 2 Funding for DART Federal Share. FWTA Federal Share to be determined.	
J-8	Bi-Level Fleet Overhaul	Mid-life overhaul	2007- 2008	$6,250,000				Original 10 bi-level cars rehabbed by Amtrak. The estimate is based on 2004 dollars.	
	Project Total			$6,250,000	$5,000,000	$625,000	$625,000	$2,500,000 from NTCOG Partnership 2 Funding for DART Federal Share. FWTA Federal Share to be determined.	
J-9	TRE Train Set Phase II	6 new bi-level coaches, 1 bi-level cab car	2008	$20,000,000				6 new bi-level coaches, 1 new bi-level cab car required to provide current/expanded service during mid-life overhaul of bi-level fleet and ultimate replacement of remainder of RDC fleet. Total cost is $20,000,000 in 2004 dollars - DART and T share is 10% ($1,000,000) each per ILA, remainder by CMAQ.	F 1, 3
	Project Total			$20,000,000	$18,000,000	$2,000,000	$2,000,000	$9,000,000 from NTCOG Partnership 2 Funding for DART Federal Share. FWTA Federal Share to be determined.	
JOINT DART AND T PROJECTS									
	Construction Subtotals	$22,500,000							

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
	Project Totals	$69,795,000							
	Federal Funding	$55,595,000							
	FWTA Funding	$6,600,000							
	DART Funding	$6,600,000							
TOTAL COMBINED PROJECTS									
	Escalation, Contingency and Soft Costs Total	$38,688,529							
	Construction Subtotals	$182,701,411							
	Grade Crossing Subtotals	$6,820,427	NOTE: Not every Project includes grade crossings						
	Project Totals	$240,316,838							
	Federal Funding	$173,938,218							
	FWTA Funding	$23,347,356							
	DART Funding	$19,411,264							

DART at Dallas Union Station

Commuter Rail Platform at Dallas Union Station

RDC's at Dallas Union Station

MP 644.3 Dallas Union Station Looking West at JFK Jct, note light rail at right

MP 644.4 JFK Jct

MP 643.9 North Jct

Mp 642.9 New Arena Station under construction in distance

New Arena Station under construction in distance

MP 642.7 Temporary Victory Station

MP 642.6 bridge at Dallas Jct.

MP 642.5 Ramps are for Dallas North Tollway

Near MP 642.3

MP 641.9 Lisa

MP 641.7 crossing is (to be determined)

MP 641.6 Bridge over Market Center Blvd

MP 641.1 Medical Market Center Station

MP 640.6 West Perkins (West end of Medical Market Center Station siding)

Near MP 640.4 Bridge over Inwood Road

Near MP 640.3

MP 640.2 Original Bridge over Old Fork of Trinity River

Near MP 640.0 Bridge over Stemmons Freeway

MP 638.1 Mockingbird Yard. Mockingbird Lane under tracks

MP 637.7 West end of Mockingbird Yard and Norwood Road crossing

Near MP 636.7 Wildwood Dr. crossing in distance

Near MP 636.5 Wildwood Dr. crossing, Loop 12 overpass in distance

Near MP 635.8 EC Jct, Lloop 12 overpass in distance

Near MP 636.0 Irving Height Dr crossing

MP 635.5 Nursery Rd crossing

MP 635.0 Britain Rd crossing

MP 634.8 S Irving Station

MP 634.5 West end of South Irving Station

MP 634.4 WC Junction ,Sowers Rd crossing in distance

MP 634.2

MP 633.9 HWY 356 overpass and McArthur Blvd crossing

MP 633.0 Story Rd crossing

MP 632.3 Briery Rd crossing

MP 632.0 Beltline Rd crossing

MP 631.5 Gilbert Rd crossing

MP 631.4 West Irving Station

MP 630.8 Bear Creek Bridge and East end of TRE Irving Yard

MP 630.6 East end of TRE Irving Yard

MP 630.5 TRE Irving Yard

MP 630.1 Irving Yard Way crossing

MP 629.9 Valley View Lane

Near MP 629.5 new Trinity Rd Overpass is approximate Dallas/Tarrant County Line

Near MP 629 Dorothy Sink (10 MPH speed limit) fill over removed trestle

MP 628.5 Centreport Station

MP 628.2 HWY 360 Underpass

Mp 627.2 Tarrant siding and Tarrant Main crossing

MP 622.6 Hurst Bell Station

MP 622.6 Hurst Bell Station and Bell Spur Rd crossing

MP 618.5 Richland Hills Station and Handley Ederville crossing

MP 614.2 Sylvania siding and Beach St crossing

MP 612.4 Steel truss bridge over West Fork of Trinity River

MP 612.2 Dalwor Jct

MP 611.9 6th St Jct

MP 611.6 7th St overpass

MP 611.5 8th St crossing

MP 610.8 Ex AT&SF Depot at right

MP 610.7 Tower 55 under HWY 30

MP 610.5 T&P Depot in Fort Worth

Ft Worth T&P depot

MP 611.4 ITC Station In fort Worth Looking East

MP 611.4 9th Street crossing Looking East

MP 611.9 6th Street Jct. Looking East

MP 612.2 Dalwor Jct. Looking East

MP 612.4 Trinity River Bridge Looking East

MP 621.7 Hurst Siding and Norwood Dr crossing Looking East

MP 622.0 Hurst Siding

MP 628.6 Dorothy Sink Looking East

MP 628.7 Dorothy Sink

MP 630.5 TRE Trinity Yard

Mp 630.5 TRE Trinity Yard

Mp 630.8 West Irving Station in distance Looking East

MP 631.4 W Irving Station Looking East

Near MP 633.5 in Irving

MP 637.0 New bridge over Elm Fork of Trinity River

MP 637.0 New bridge over Elm Fork of Trinity River

MP 637.5 East end of Mockingbird Yard Looking East

MP 638.0 Mockingbird Yard Looking East

MP 639.9 Old Channel Bridge

MP 641.9 Lisa Looking East

MP 642.2 East of Dallas Jct

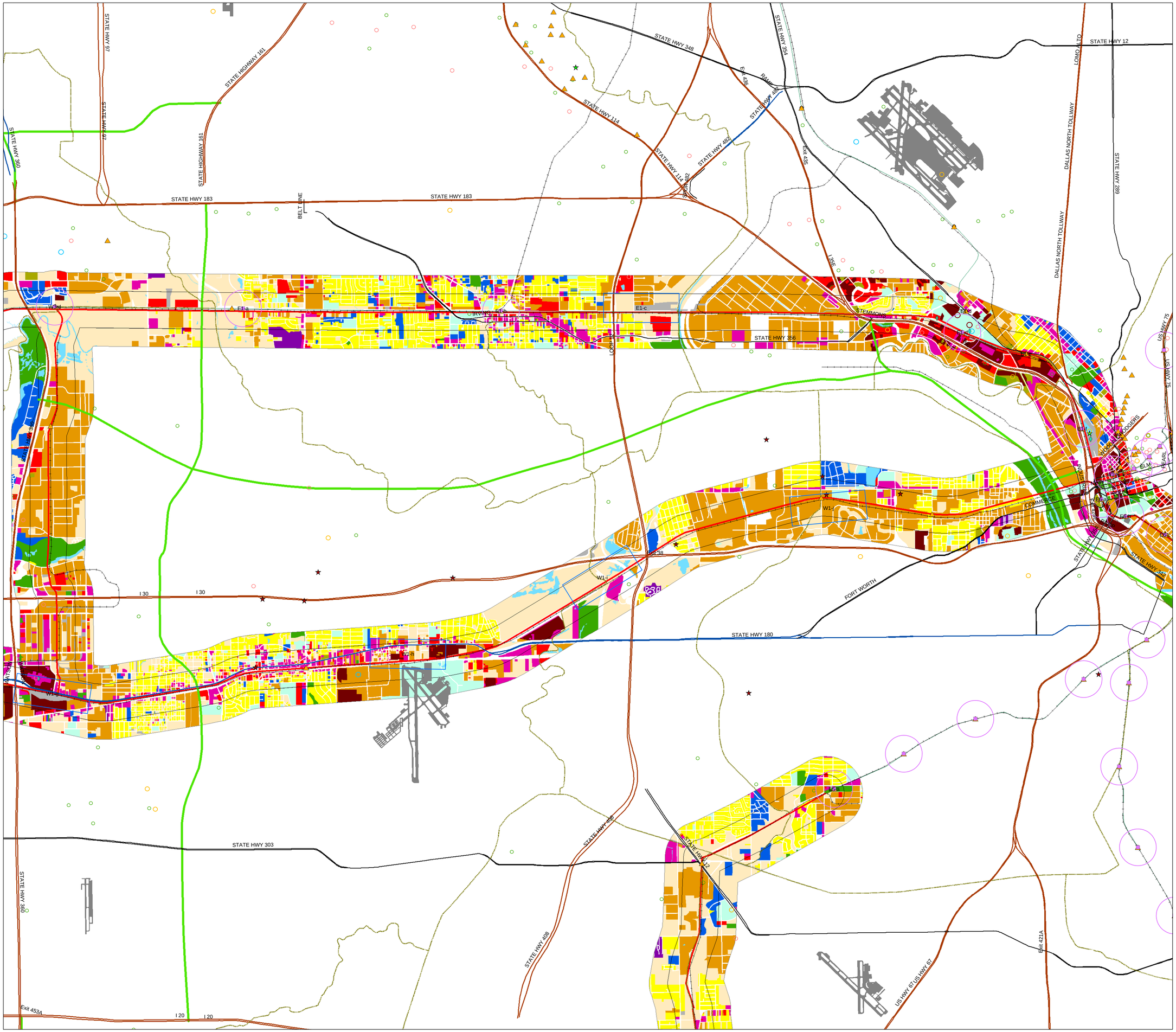
MP 642.3 AA Arena and Downtown Dallas

MP 642.6 New AA Arena Station under Construction in distance

MP 642.7 Temporary Victory Station

MP 644.1 Just West of North Jct.

Baseline Land Use Study: Corridor E-1



Legend

- Possible Station Location
- Existing Rail Station
- Existing Rail Station 1/4 mile buffer
- Mobility 2025 Rail Station
- New Stations Existing by 2008
- Fort Worth Trolley Stops
- 250 - 670
- 670 - 1450
- 1450 - 2750
- 2750 - 6250
- 6250 +
- Clide Award Winner
- JV Project - Selected
- JV Project - Not Selected
- Special Generator
- Amtrak stations
- Airport
- Veloweb
- Railroad
- Fort Worth Trolley Line
- Rail Lines Existing by 2008
- Primary Highway
- Secondary Highway
- Major Arterial
- Proposed Freeways and Tollroads
- Regional Rail Corridor

Regional Rail Corridor Buffer

Buffer Distance

- 0.00 - 0.25
- 0.25 - 0.50

- Single-family
- Multi-family
- Retail
- Office
- Vacant
- Park and Recreation
- Industrial
- Parking
- Institutional
- Hotel/Motel
- Utilities
- Mobile Homes
- Water
- Landfill
- Under Construction

E-1 Trinity Railway Express
begins in Fort Worth, East through Irving, ends in Dallas, 15 miles in length

Potential Station Zone: 1/2 mile wide linear area of variable length based on the area of interest

Area of Interest	Station Status	County	Jurisdiction w/in walking distance of station	Characteristics of Interest	Development Type	Development Style	Future Land Use (comprehensive plan)	Zoning (of vacant land)	Other Comments
E1-a	Existing	Dallas	Irving, Grand Prairie	**Station:** West Irving TRE station **Infill Opportunities:** adequate for infill development, existing single-family **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Partially within the 500 year floodplain - opportunity for green space. Partially outside floodplain.	Infill-other development or greenfield development	hybrid			
E1-b	Existing	Dallas	Irving	**Station:** South Irving TRE station **Infill Opportunities:** mixture of uses (retail, office, single-family, institutional, industrial), possiblity for small infill projects **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Majority is outside floodplain.	Infill-other development	hybrid			
E1-c	Proposed	Dallas	Irving, Dallas	**Employment within walking distance of the site:** N/A **Current land uses:** office, utilities, industrial **Vacant land:** possibly adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, state hwy 12, proximate to state hwy 356 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space.	Infill-other development	hybrid			
E1-d	Existing, Existing by 2008	Dallas	Dallas	**Station:** Medical Market Center TRE station, Parkland station **Infill Opportunities:** built up - no infill opportunities, institutional, office **Flood zone:** Partially within the 500 year floodplain - opportunity for green space. Partially outside floodplain.	Infill-other development	hybrid			
E1-e	Existing by 2008	Dallas	Dallas	**Station:** Market Center/Oaklawn station **Infill Opportunities:** built up - no good infill opportunities, single-family, industrial, retail **Flood zone:** Partially within the 500 year floodplain - opportunity for green space. Partially outside floodplain.	Infill-other development	hybrid			
E1-f	Existing	Dallas	Dallas	**Station:** Victory Station **Infill Opportunities:** mostly built up, small amount of vacant land, utilities, industrial **Flood zone:** Partially within the 500 year floodplain - opportunity for green space. Partially outside floodplain.	Infill-other development	pedestrian oriented development			

IV. E-2 – DENTON LINE CORRIDOR CONSIDERATIONS

CORRIDOR DESCRIPTION

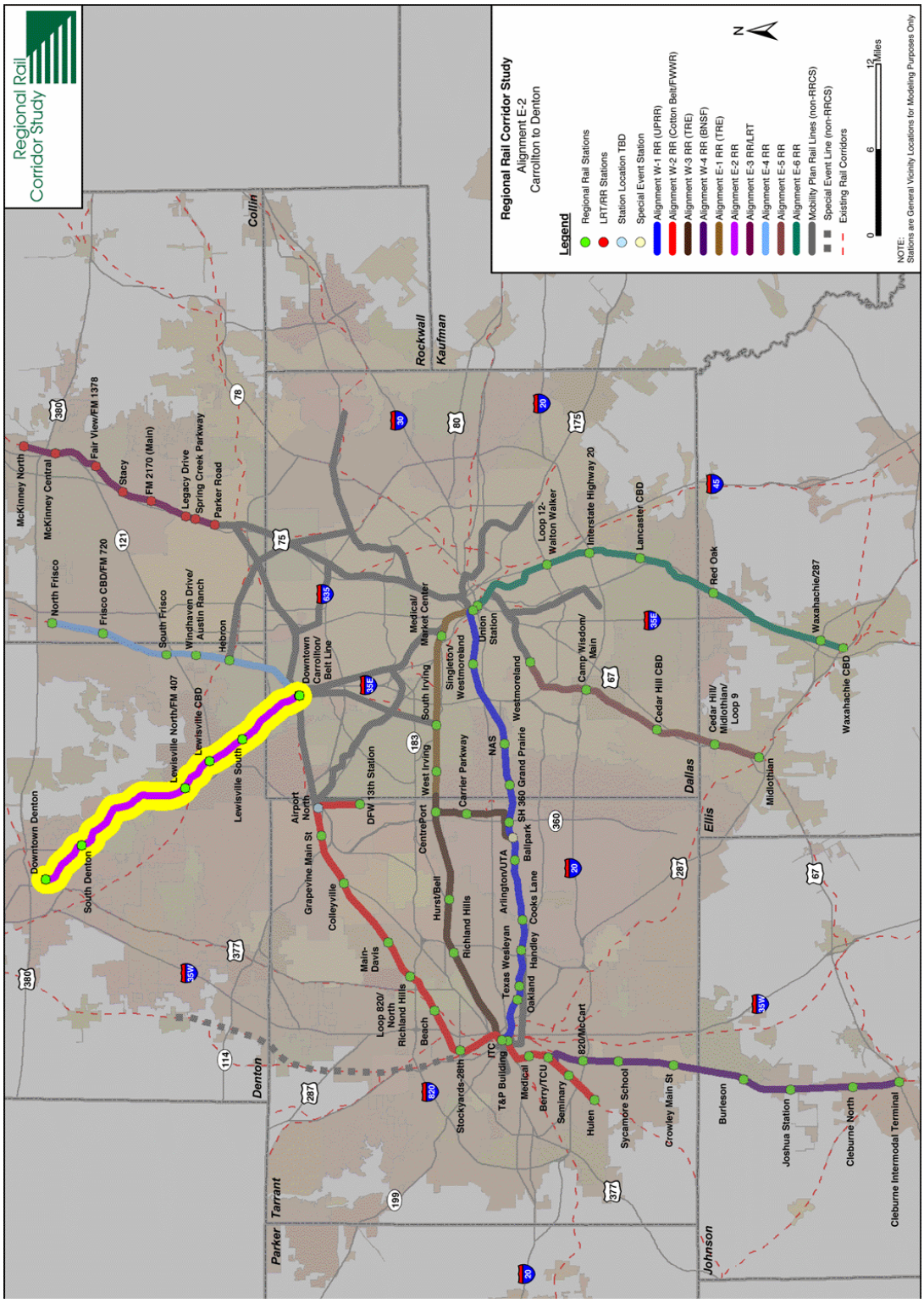
Rail Corridor E-2 was one of eight freight rail corridors in the Dallas-Fort Worth area evaluated for the feasibility of implementing commuter rail, light rail, or other form of transit service.

Corridor E-2 is a former MKT rail corridor, briefly owned by the UP Railroad and now owned by DART and the City of Denton. It extends between Carrollton and Denton, a distance of 22.9 route miles. Of the 22.9 miles, 13.7 miles between Carrollton and Lake Dallas are in operation and 9.2 miles between Lake Dallas and Denton have had the track removed and been converted to the Denton Branch Rail Trail. (See Exhibit IV-1 which shows the corridor location.)

The City of Denton owns the trail right-of-way between Denton and Lake Dallas and DART owns the rights to replace the track and operate rail service. DART owns the right-of-way between Lake Dallas and Carrollton. The right-of-way is consistently 100 feet or less in width.

EXHIBIT IV-1

E-2 CORRIDOR LOCATION MAP



A shortline railroad, the Dallas Garland & Northeastern Railroad (DGNO), operates one round trip local train per day, Monday through Friday, between Carrollton and Lake Dallas. The current maximum operating speed limit is 10 mph due to track conditions. The line is not signaled and is operated as “Other than Main Track” (OMT).

Existing Track Conditions

The trail segment of the line between Denton and Lake Dallas consists of a smooth trail surface with no track or track components remaining. The nine railroad bridges on this segment of the line have been converted for trail use by improvements to the surface and safety railings. The bridges in this segment will require rehabilitation and strengthening before trains can be operated over them. There are also three culverts on the trail portion of the line. One is a 9-foot by 80-foot concrete arch culvert (located at milepost 722.0) and the other two are 5-foot by 6-foot reinforced concrete box culverts (located together at milepost 723.1). In many locations, drainage will not be satisfactory for railroad track and will have to be improved. Vegetation should also be removed and controlled if railroad track is re-installed.

The portion of the line between Carrollton and Lake Dallas consists of a single main track with 85-pound and 90-pound rail and timber ties. The rail and most of the ties are in poor to bad condition. Many lengths of rail have obviously been re-laid from curves as the rails retain the curve even though they are located in tangent track. Many ties are broken or are near the end of their service life with questionable spike and gauge holding ability. In some locations, the track gauge, surface, alignment, and condition of the rail and ties are borderline with respect to meeting the minimum Class 1 FRA track

safety standards. The gross weight of cars operating over the line is restricted to 117 tons, unless proper authorization is received for heavier loads.

There are three sidings on the line, but their use is primarily for switching industries, as they are less than 0.2-mile in length. The approximate mid-point of each siding is located at milepost 736.16, 736.4, and 742.1. There are ten industrial spur tracks on the line. There are ten industrial spur tracks located on the E-2 corridor as presented in Exhibit IV-2.

EXHIBIT IV-2

E-2 INDUTRIAL SPUR TRACK LOCATIONS

Owner	**Location**
Coors	MP 729.9
Golden Distributing	MP 730.0
Builders First Choice	MP 735.9
Andes Metal	MP 736.9
Inca Metal	MP 737.1
Vanguard	MP 742.3
Elm Fork Water Treatment and Deseret Grain	MP 743.0
Rhodes Printing	MP 743.8
Vinylex Plastic	MP 744.3
Boral Brick	MP 744.4

There are three railroad/railroad crossings on the corridor. Two of the crossings are in Carrollton with the BNSF and the UP. The third crossing is grade-separated with the KCS crossing over the E-2 line near Cowan Street. There are no intermodal or rail/truck transfer facilities on the corridor.

The operating portion of the line is not signaled except for the at-grade railroad crossings of the BNSF and the UP in Carrollton.

Drainage is essentially non-existent along many portions of the line between Lake Dallas and Carrollton and should be improved. Vegetation also exists in the track area and in bridge and culvert channels. A fact sheet summarizing the existing conditions and issues for the E-2 corridor is shown in Exhibit IV-3.

EXHIBIT IV-3

E-2 CORRIDOR FACT SHEET

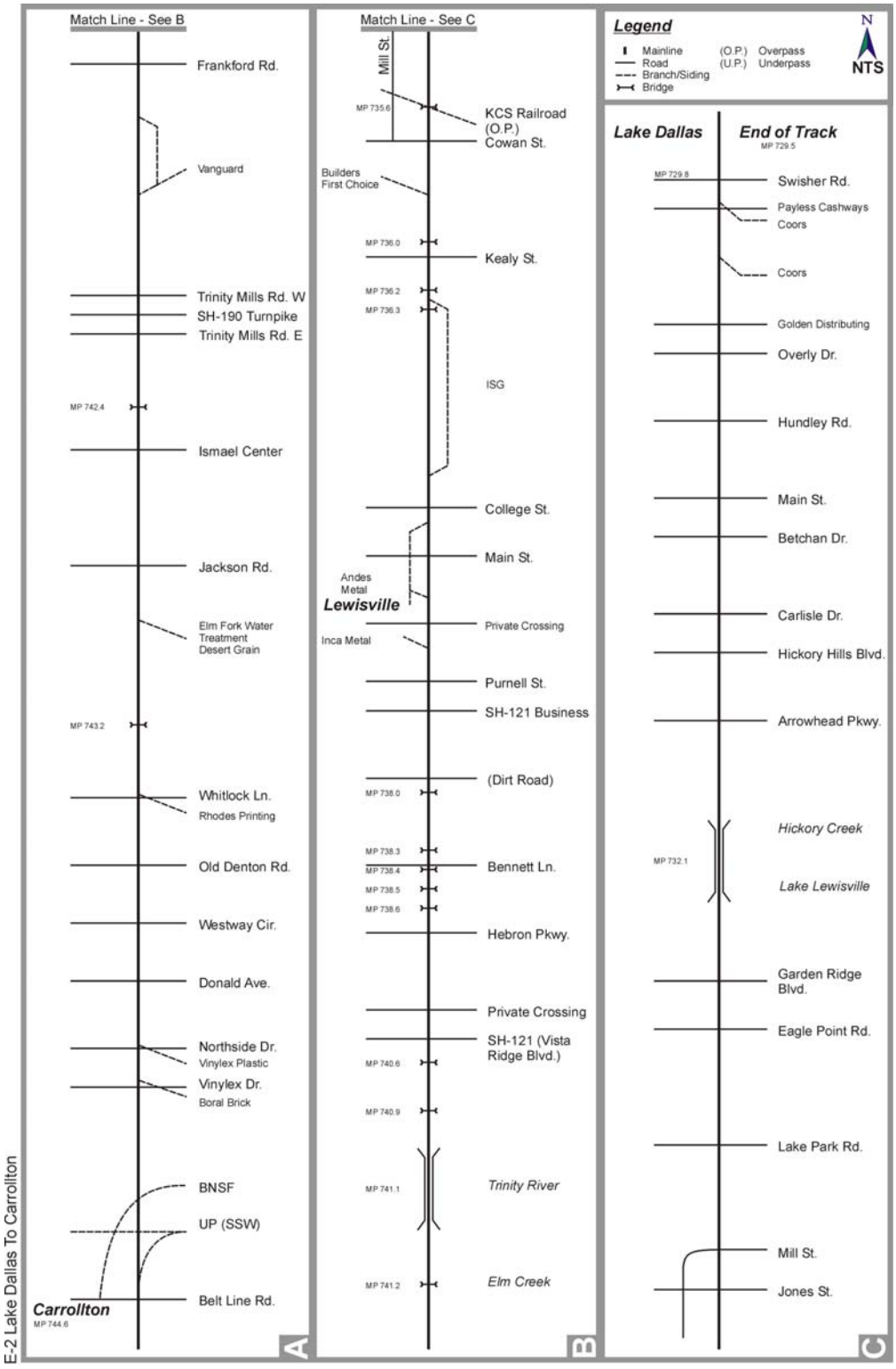
Owner(s) of the line	DART
Operator(s) of the line	DGNO
Trackage rights	DGNO (between Carrollton and Lake Dallas, 13.7 miles).
Length of the corridor	22.9 Miles (9.2 miles is Denton Branch Rail Trail).
Average trains per weekday	Two local switching trains.
Track summary	▪ Single main track. ▪ 10 mph maximum speed. ▪ No passing sidings and no railroad signaling.
Railroad crossings	▪ Thirty-eight (38) at-grade highway/railroad crossings. ▪ Three (3) grade-separated highway/railroad crossings. ▪ Two (2) at-grade railroad/railroad crossings.
Jurisdictions	▪ Denton, Corinth, Lake Dallas, Hickory Creek, Lewisville, and Carrollton.
Industrial sidings	▪ 10 total.
Corridor issues	▪ All new track for entire corridor. ▪ Replace bridges on Trail portion between Denton and Lake Dallas. ▪ Additional study needed to determine actual condition of Lake Lewisville and Trinity River bridges. ▪ Need to add CTC signal system.

Schematic of the Corridor

Exhibit IV-4 shows a schematic diagram of the Lake Dallas to Carrollton segment.

EXHIBIT IV-4

E-2 CORRIDOR SCHEMATIC



Detailed Information

This section contains detailed information for the bridges and railroad/highway grade crossings and overpasses located along the 22.9 miles of Corridor E-2 between Denton and Carrollton.

There are 13 former railroad/highway at-grade crossings and one highway overpass in the 9.2 miles of the Denton Branch Rail Trail segment of the line. Exhibit IV-5 contains a listing of these for the E-2 corridor. There are a total of 38 railroad/highway at-grade crossings in the 13.7 miles between Carrollton and Lake Dallas. Of the 38 at-grade crossings, 31 are public crossings and seven are private crossings. There are also five highway overpasses and one railroad overpass located on the line. All of the crossing equipment and surfaces will have to be replaced on the segment between Denton and Lake Dallas. Several of the crossing surfaces and crossbucks will have to be replaced on the segment between Lake Dallas and Carrollton.

EXHIBIT IV-5

RAIL/HIGHWAY CROSSINGS AND OVER/UNDER PASSES

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
Denton to Lake Dallas (trail use)				
721.5	Hickory Street	Public	None	Not Available
722.1	Morse Street	Public	None	N/A
722.3	Duncan Street	Public	None	N/A
Unmarked	Shady Oaks	Public	None	N/A
722.8	Colorado Blvd	Public	None	N/A
724.3	Loop 228	Public	None	N/A
724.5	Brinker Road	Public	None	N/A
Unmarked	Private Crossing	Private	None	N/A
Unmarked	Mayhill Road	Public	None	N/A
725.8	Pockrus Paige	Public	None	N/A
726.7	Lakeview Blvd	Public	None	N/A
726.8	Shady Shores Rd/Hwy77	Public	None	N/A
Unmarked	Corinth Street	Public	None	N/A
Unmarked	Walton Road	Public	None	N/A
Unmarked	Highway 460	Public	Overpass but will be rebuilt to at-grade crossing	
728.5	Quail Run Road	Public	None	N/A
728.7	Dobbs Road	Public	None	N/A
729.5	Burl Street	Public	None	N/A
Lake Dallas to Carrollton				
729.8	Swisher Road	Public	Crossbucks	414698D
729.9	Payless Cashways	Private	Crossbucks	414056P
730.1	Golden Distributing	Private	Crossbucks	414699K
730.2	Overly Drive	Public	Crossbucks	414057W
730.5	Hundley Road	Public	Lights/Bells/Gates	414700C
730.7	Main Street	Public	Crossbucks	414701J
730.8	Betchan Drive	Public	Crossbucks	414702R
731.1	Carlisle Drive	Public	Crossbucks	414704E
731.2	Hickory Hills Blvd	Public	Crossbucks	414014D
731.4	Arrowhead Parkway	Public	Crossbucks	414705L
733.3	Garden Ridge Blvd	Public	Overpass	414706T
733.5	Eagle Point Road	Public	Crossbuck/Stop Sign	414707A
734.3	Lake Park Road	Public	Lights/Bells/Gates	414708G
735.1	Mill Street	Public	Lights/Bells/Gates	414710H
735.3	Jones Street	Public	Crossbucks	414711P
735.5	Kansas City Southern	Railroad	Overpass	N/A
735.5	Cowan Street	Public	Crossbucks	414712W
736.1	Kealy Street	Public	Crossbucks	414713D
736.6	College Street	Public	Crossbucks	414714K
736.7	Main Street	Public	Lights/Bells/Gates	414715S
737.0	Andes Metals	Private	Crossbucks	414770S
737.1	Purnell Street	Public	Crossbucks	414716Y

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
737.3	SH-121 Business	Public	Lights/Bells/Gates	414717F
737.6	Un-named Road	Public	Crossbucks	414719U
738.3	Bennett Lane	Public	Crossbucks	414720N
739.5	Hebron Parkway	Public	Lights/Bells/Gates	414060E
740.1	Dallas Nursery	Private	Crossbucks	414722C
740.3	SH-121 (WB Vista Ridge)	Public	Overpass	TBD
740.3	SH-121 (EB Vista Ridge)	Public	Overpass	TBD
741.8	Frankford Road	Public	Lights/Bells/Gates	TBD
742.3	Dirt Road	Private	No Signage	TBD
742.4	SH-190 Turnpike (EB)	Public	Overpass	411962Y
742.4	SH-190 Turnpike (WB)	Public	Overpass	411963F
742.4	Trinity Mills Road-W	Public	Lights/Bells/Gates	415883B
742.4	Old Trinity Mills Road-E	Private	Lights/Bells/Gates	414726E
742.8	Ismael Center	Public	Crossbucks	TBD
743.0	Jackson Road	Public	Crossbucks	414727L
743.6	Whitlock Lane	Public	Lights/Bells/Gates	414729A
743.8	Old Denton Road	Public	Lights/Bells/Gates	414052M
743.9	Westway Circle	Public	Crossbucks	414059K
744.0	Donald Avenue	Public	Crossbucks	414730U
744.2	Northside Drive	Public	Crossbucks	414731B
744.3	Vinylex Drive	Public	Crossbucks	414732H
744.4	Boral Brick	Private	Crossbucks	414024J

Source: URS Corp. 2003

A total of 18 bridges and one reinforced concrete box culvert are located along the 13.7 miles between Carrollton and Lake Dallas. Exhibit IV-6 contains a listing of these for the E-2 corridor. Of the 18 bridges, 15 are open deck, timber pile trestles. The 301-foot long bridge over the Trinity River consists of a 175-foot steel truss with open deck timber ties and a 126-foot open deck timber pile trestle. Several of the ties and other timbers in the trestle portion will need to be repaired or replaced. The 1,020-foot long bridge at Lake Lewisville/Hickory Creek is a steel plate girder type with timber ties and open deck. Some of the ties on this bridge will need to be replaced. Most of the timber pile trestles have abutment, stringer, crosstie, and other timbers that will need to be repaired or replaced. The new concrete and steel bridge under SH-190 at MP 742.4 is in perfect condition.

EXHIBIT IV-6

RAILROAD BRIDGES AND CULVERTS

Milepost	Bridge Type	Length	Remarks
Denton to Lake Dallas (trail use)			
722.0	Concrete arch culvert	9’ x 80’	
722.7	Timber pile trestle	42’	
723.1	Two reinforced concrete box culverts	5’ x 6’ each	
723.9	Overhead viaduct, concrete	Unknown	Loop-228
725.0	Timber pile trestle	42’	
725.6	Timber pile trestle	28’	
726.3	Timber pile trestle	15’	
726.5	Timber pile trestle	54’	
728.1	Timber pile trestle	43’	
728.4	Timber pile trestle	28’	
729.2	Timber pile trestle	14’	
729.5	Timber pile trestle	56’	
732.1	Steel plate girder, open deck, 12 span	1020’	Hickory Creek/ Lake Lewisville
735.6	Reinforced concrete box culvert	6’ x 24’	
736.0	Timber pile trestle, open deck, 2 span	26’	
736.2	Timber pile trestle, open deck, 3 span	84’	
736.3	Timber pile trestle, open deck, 3 span	42’	
738.0	Steel / timber pile trestle, open deck, 4 span	60’	
738.3	Timber pile trestle, open deck, 3 span	39’	
738.4	Timber pile trestle, open deck, 3 span	39’	
738.5	Timber pile trestle, open deck, 3 span	42’	
738.6	Timber pile trestle, open deck, 3 span	42’	
739.9	Timber pile trestle, open deck, 3 span	39’	
740.2	Timber pile trestle, open deck, 9 span	117’	
740.6	Timber pile trestle, open deck, 4 span	56’	
740.9.1	Steel pile trestle, steel beam, 4 span, open deck	80’	
741.1	Steel truss, open deck	175’	Trinity River
	Timber pile trestle, open deck, 9 span	126’	Trinity River
741.2	Timber pile trestle, open deck, 8 span	104’	Elm Creek
742.4	Concrete with steel, ballasted deck, 4 span	112’	New bridge under SH-190
743.2	Timber pile trestle, open deck	14’	

Source: URS Corp. 2003

Photos Taken in the Corridor

During the hi-rail and automobile inspections of the Denton to Carrollton corridor, photographs were taken of various features and conditions along the line. Photographs were taken of as many of the bridges, highway crossings, overpasses, underpasses, sidings, track conditions, special conditions or constraints, and general right-of-way conditions and features as possible. The photographs taken along the E-2 Corridor between Denton and Carrollton are included at the end of this chapter.

Existing Land Use

A baseline land use survey was conducted by NCTCOG staff at the onset of the Regional Rail Corridor Study. The major focus of this study was to help locate specific areas along the corridors that possess characteristics that could support the development of a rail station and/or transit-oriented development. Baseline land use maps and the associated station location information for the corridor may be found following the corridor photographs.

Infrastructure Issues and Constraints

A number of infrastructure issues and constraints would need to be addressed in order to establish regional rail passenger service within this corridor. Identified infrastructure constraints include the following considerations:

- The track and the at-grade highway/railroad crossings will need to be replaced over the 9.2 miles that have been converted to the Denton Branch Rail Trail. Passing tracks will be required at stations and other convenient locations. Future installation of double track should not be precluded. The bridges on the trail segment will either need to be replaced or rebuilt to safely accommodate the

weight of passenger equipment. Drainage improvements and vegetation control will also be required. Relocation and retention of the trail should be considered.

- The track will need to be replaced over the 13.7 miles of line between Lake Dallas and Carrollton due to the poor condition of the rail, ties, and drainage. Passing tracks will be required at stations and other convenient locations. Turnouts located in the main track that serve industrial tracks will have to be replaced when the main track is replaced. Future installation of double track should not be precluded. The bridges on this portion of the line may either have to be replaced or rebuilt to eliminate the weight restriction currently imposed on the line. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of auto traffic will have to be improved with the installation of warning devices such as lights, bells, and gates. Drainage improvements and vegetation control will also be required along this portion of the line.
- Centralized Traffic Control (CTC) will be required over the entire corridor if maximum train speed is to exceed 59 mph. The installation of CTC should include provisions for bi-directional running, electric switch locks on all turnouts located in main track, and interlockings at the UP and BNSF railroad crossings in Carrollton. It should be dispatched from a local control point such as an existing TRE or DART facility.
- The Denton Branch Rail Trail should be retained within the right-of-way.
- The location of the new station in Denton must be determined with consideration for the UP freight traffic. If the Denton station is located north of the UP main line, the commuter rail or transit alignment will need to be grade separated over the UP.
- Compatibility with existing transit modes (i.e. DART light rail) is an issue in Carrollton, especially for the use and layout of the Belt Line Station in Carrollton,

the at-grade BNSF and UP railroad crossings, and continuity of travel between Carrollton and Dallas.

DEFINITION OF FEASIBLE ALTERNATIVES

The Regional Rail Corridor Study considered three primary types of options for the rail corridors under study. As outlined in the Vehicle Technology Section of this report, regional rail, light rail, and bus rapid transit were the primary modes or options considered for development in the corridors in question. A screening process took place for each corridor to determine if all three options were reasonable or if a subset was more appropriate. A detailed explanation of this process is contained in Chapter I – Corridor Description and Evaluation. The discussion of options pertinent to corridor E-2 follows.

Description of Modal Alternatives in Corridor E-2

Regional Rail

The regional rail alternative would provide regional rail passenger service along the MKT right-of-way between downtown Carrollton and downtown Denton. Passing tracks would be required at stations and other convenient locations. Train control and signal systems would be upgraded where necessary. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of automotive traffic will have to be improved with the installation of warning devices such as lights, bells, and gates. Approximately six regional rail passenger stations would be constructed along the E-2 Corridor between the downtown Carrollton Station at Belt Line and the downtown Denton Station. Exhibit IV-7 contains the basic assumptions for stations, feeder bus access, and park-and-ride

locations that were evaluated for this modal alternative. Exhibit IV-8 shows the E-2 Corridor Regional Rail Alternative.

EXHIBIT IV-7

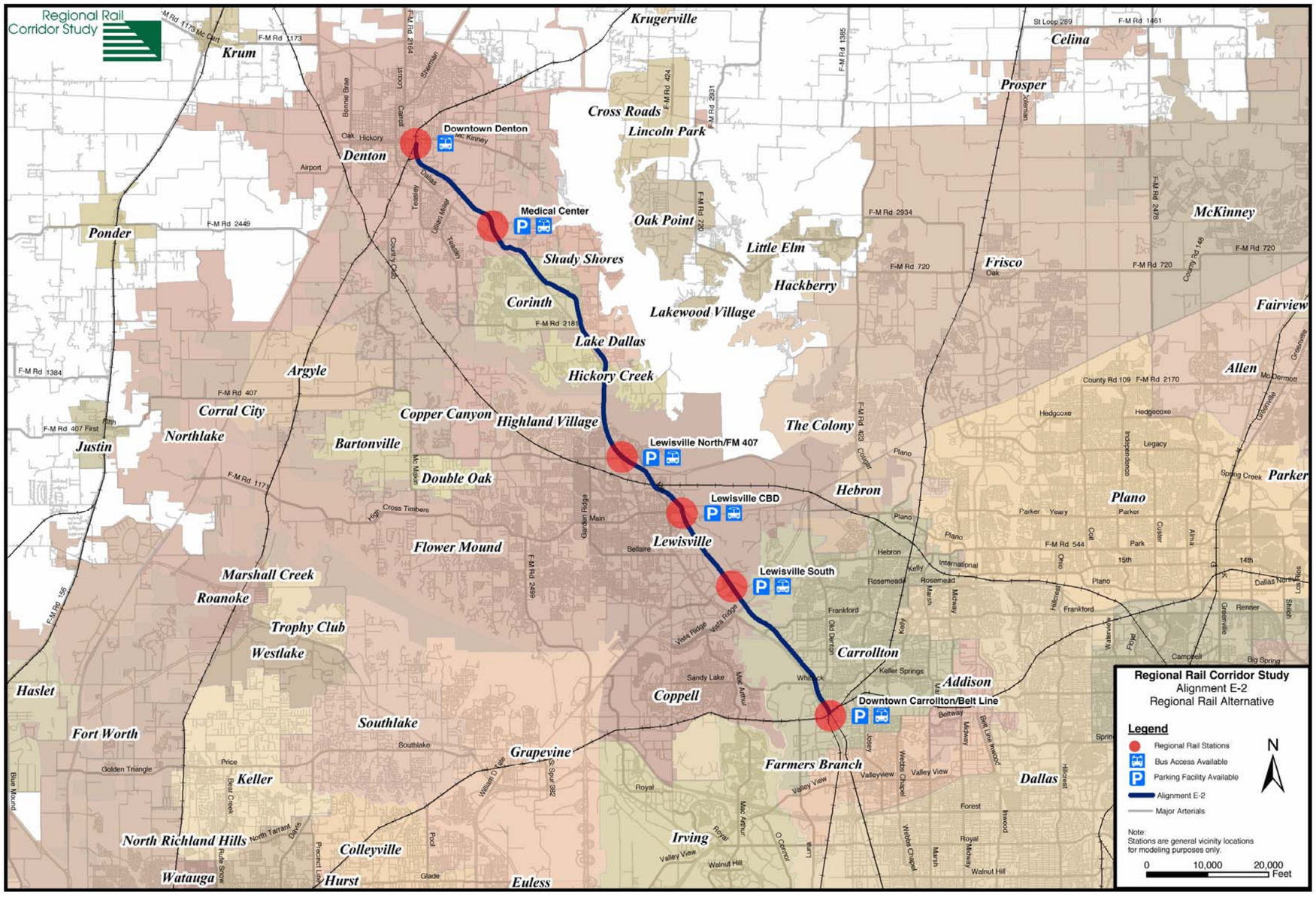
REGIONAL RAIL SERVICE ASSUMPTIONS

Regional Rail (headways = 20 minutes/60 minutes)		
Stations*	**DCTA Bus**	**Park-and-Ride**
Downtown Denton	Yes	No
South Denton	Yes	Yes
Lewisville North	Yes	Yes
Lewisville CBD	Yes	Yes
Lewisville South	Yes	Yes
Belt Line Rd/Downtown Carrollton	DART NW-SE Transfer	

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT IV-8

REGIONAL RAIL ALTERNATIVE FOR THE E-2 CORRIDOR



Light Rail

The light rail alternative would provide light rail transit (LRT) service within the E-2 Corridor. A LRT line would be constructed as an extension of DART's planned NW Corridor LRT along the MKT right-of-way, generally paralleling I-35E between downtown Carrollton and downtown Denton. New track would be constructed either at-grade or elevated in constrained areas. Approximately ten LRT passenger stations would be constructed along the E-2 Corridor between Carrollton and the downtown Denton Station. The locations of new stations must be determined in later phases of project development. Exhibit IV-9 contains the basic assumptions for stations, feeder bus access and park-and-ride locations that were evaluated for the LRT modal alternative. Exhibit IV-10 shows the E-2 Corridor Light Rail Alternative.

EXHIBIT IV-9

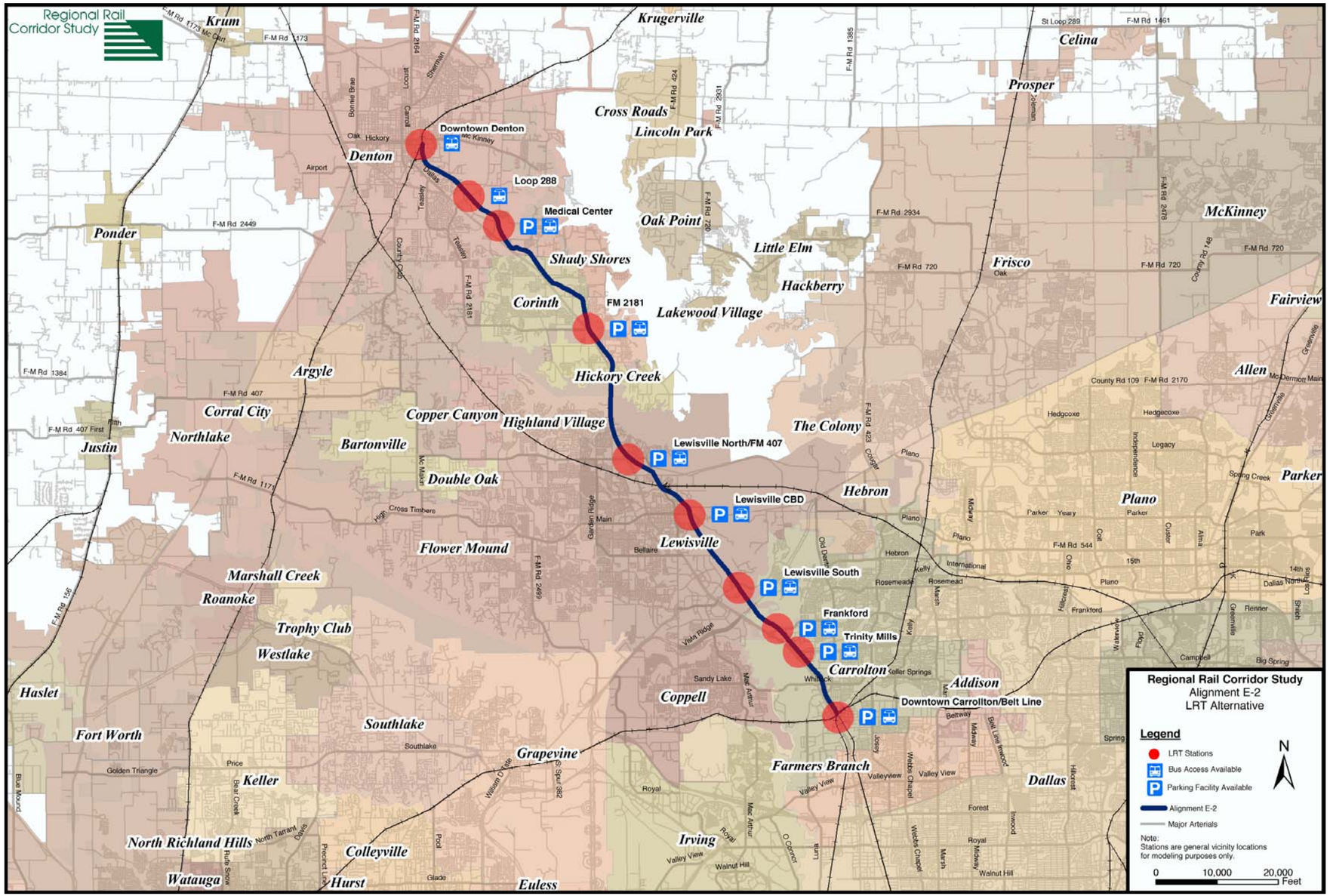
LIGHT RAIL SERVICE ASSUPTIONS

Light Rail (headways = 10 minutes/20 minutes)		
Stations*	**DCTA Bus**	**Park-and-Ride**
Downtown Denton	Yes	No
Loop 288	Yes	Yes
South Denton	Yes	Yes
FM 2181	Yes	Yes
Lewisville North	Yes	Yes
Lewisville CBD	Yes	Yes
Lewisville South	Yes	Yes
Frankford	Yes (DART)	Yes (DART)
Trinity Mills	Yes (DART)	Yes (DART)
Belt Line Rd/Downtown Carrollton	Interlined with NW-SE	

* Station locations, feeder bus, and park-and–ride designations are all approximate and would be refined in later phases of study.

EXHIBIT IV-10

LIGHT RAIL ALTERNATIVE FOR THE E-2 CORRIDOR



Bus Rapid Transit

The bus rapid transit (BRT) alternative would provide express bus service operating along a fixed guideway located within the MKT right-of-way between downtown Carrollton and downtown Denton. The BRT service would operate within the roadway in mixed traffic approaching downtown Denton. Short segments of the BRT line could operate within the roadway in mixed traffic within downtown Carrollton and downtown Denton. Approximately ten BRT passenger stations would be constructed along the E-2 Corridor between the downtown Carrollton station and the downtown Denton station. The locations of new stations must be determined in later phases of project development. Exhibit IV-11 contains the basic assumptions for stations, feeder bus access and park-and-ride locations that were evaluated for the E-2 BRT modal alternative. Exhibit IV-12 shows the E-2 Bus Rapid Transit Alternative. Exhibit IV-13 depicts a plausible circulation of the vehicles in mixed traffic in and near downtown Denton. Implementing BRT on I-35E in a HOV lane was dismissed because it is likely too late to get two BRT lanes into the current improvement plans and the project could not be completed in a timely manner.

EXHIBIT IV-11

BUS RAPID TRANSIT SERVICE ASSUMPTIONS

Bus Rapid Transit (headways = 10 minutes/15 minutes)		
Station*	**DCTA Bus**	**Park-and-Ride**
Downtown Denton	Yes	No
Loop 288	Yes	No
South Denton	Yes	Yes
FM 2181	Yes	Yes
Lewisville North	Yes	Yes
Lewisville CBD	Yes	Yes
Lewisville South	Yes	Yes
Frankford	Yes (DART)	Yes (DART)
Trinity Mills	Yes (DART)	Yes (DART)
Belt Line Rd/Downtown Carrollton	Yes (DART)	Yes (DART)

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT IV-12

BUS RAPID TRANSIT ALTERNATIVE FOR THE E-2 CORRIDOR

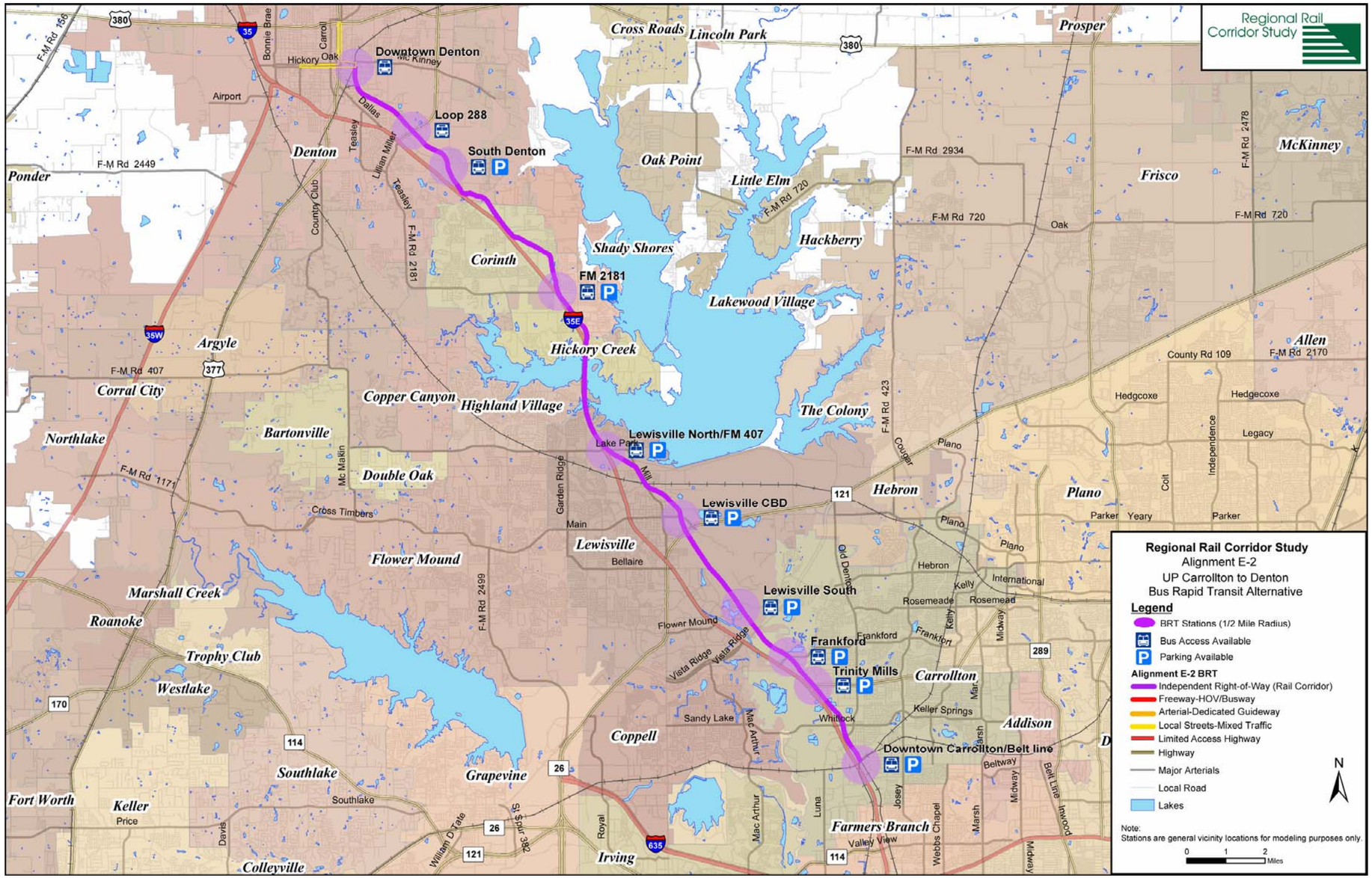
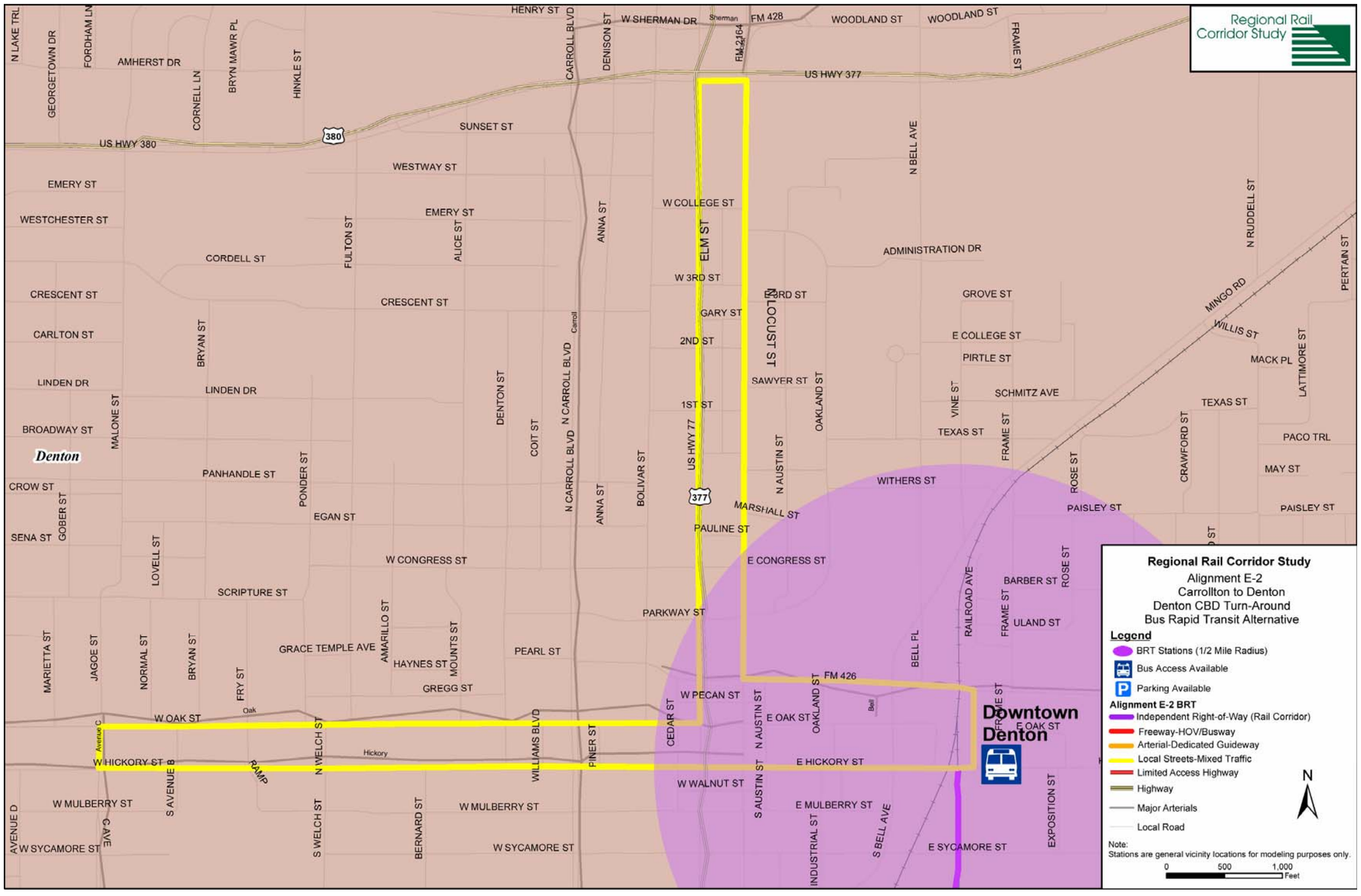


EXHIBIT IV-13

END OF LINE FOR BUS RAPID TRANSIT ALTERNATIVE IN DENTON



EVALUATION OF ALTERNATIVES

Three different modal alternatives were evaluated for this corridor:

- Regional Rail with Transfer
- Light Rail without Transfer
- Bus Rapid Transit

In addition to the assumptions pertaining to different technologies and operating characteristics (station locations, headways, operating speeds, and supply of feeder buses at stations), the relationship of the E-2 Corridor to the others in the regional system was also considered.

One of the key evaluation or performance indicators used projected 2030 average weekday ridership. The complete list of performance indicators is found in Chapter II Corridor Description and Evaluation. In order to streamline the development of travel forecasts for the Regional Rail Corridor Study, the various modal alternatives containing regional or light rail for each corridor were combined into a series of rail system alternatives for forecasting. Several of the corridors also serve travel markets that interact or compete with each other, so it was important to design the system forecasts to minimize this interrelationship as much as possible. Travel demand forecasts for four rail system alternatives were developed initially, along with BRT system alternative maps showing these systems alternatives, along with descriptions of exactly which of the RRCS rail corridors were contained in each rail BRT system alternative can be found in Chapter II. Ridership summaries for these system alternatives are also contained in Chapter II of the report. More specific E-2 corridor information is in the following section.

Ridership Summary

Exhibit IV-14 presents projected average weekday ridership resulting from each of the systems alternatives for the E-2 Corridor, (see Chapter II for complete description). In Rail System Modeling Alternative 2, the E-2 Corridor was tested as a regional rail line from Denton to Dallas, with a transfer to DART's Northwest LRT line at the Belt Line Road Station. Rail System Modeling Alternative 3 assumed the extension of DART's Northwest Corridor LRT all the way up to Denton. For comparison purposes, reported ridership for this alternative is only for the portion of the line between Belt Line Road in Carrollton to the terminus in Denton. The BRT System Modeling Alternative included BRT in the E-2 right-of-way, with a transfer point for the BRT service at DART's Northwest Corridor – Belt Line Road Station.

As explained in Chapter II, the ridership resulting from the Rail System Modeling Alternatives was used to compare the performance of the modal alternatives for a corridor. The best performing option, which for E-2 would be either regional rail, light rail, or BRT, was then the recommendation for the corridor and, consequently, included in the Final Run Recommended Modeling Alternative. Exhibit IV-15 shows the ridership from the Final Run Recommended Modeling Alternative as well.

In order to optimize the performance of the E-2 Corridor in the rail system developed for the Final Run Recommended Modeling Alternative, the regional rail line from Denton was interlined along the Cotton Belt Corridor to provide direct service to DFW International Airport and interlined along the Burlington Northern/Santa Fe Corridor to the Trinity Railway Express Corridor to provide direct service to the Dallas CBD. Their routes are shown in orange and yellow in Exhibit IV-15.

It should be noted that the 2030 ridership for this corridor was adjusted upward to reflect ridership gains resulting from the interlining of the proposed line with other rail lines in the network. It is assumed that interlining benefits are not reflected in station ridership data along a given corridor, the sum of which constitutes total corridor ridership. This adjustment was based on rail link gateway volumes at the terminus of the corridor. (See Chapter II for additional explanation.)

To properly stage the recommended alternative, corridor ridership was also generated for the year 2007, measuring the impact of demographics growth on the proposed alternative. The process leads to the identification of corridors worthy of priority implementation.

EXHIBIT IV-14

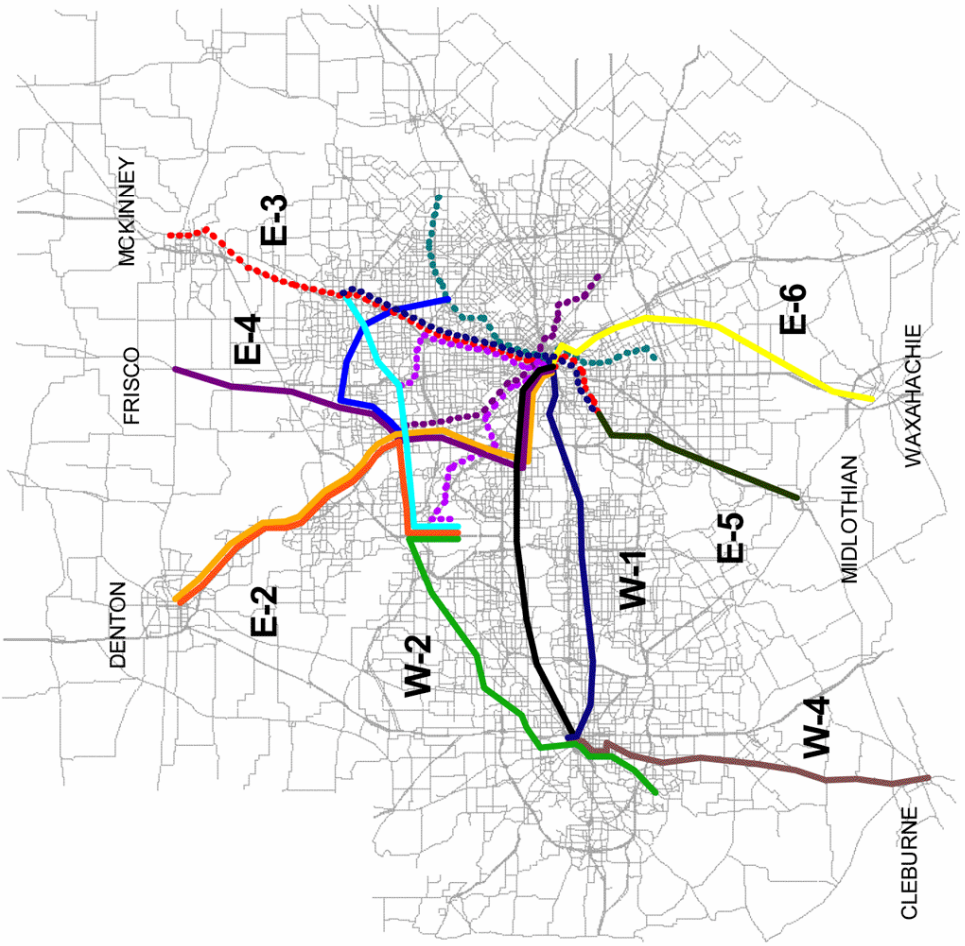
E-2 CORRIDOR RIDERSHIP

Travel Forecast	Technology	Average Weekday Ridership
Rail System Alternative 2	Regional rail (with transfer)	4,100
Rail System Alternative 3	Light rail transit (without transfer)	8,800
BRT System Alternative	Bus rapid transit (with transfer)	6,600
Final (2007)	*Regional rail (to Dallas and DFW Airport)*	*4,300**
Final (2030)	*Regional rail (to Dallas and DFW Airport)*	*5,700**
Final (2030 Adjusted)	*Regional rail (to Dallas and DFW Airport)*	*6,200***

*Recommended alternative
**Ridership adjusted to account for interlining of lines
Source: NCTCOG DFWRTM

EXHIBIT IV-15

REGIONAL RAIL CORRIDOR STUDY – FINAL RUN RECOMMENDED ALTERNATIVE



An important step in transit ridership analysis involves detailed reviews of projected passenger boardings and alightings at each station. Station riders by mode of access (such as, walk, auto, feeder bus, and where applicable, transfers from other rail lines) were reviewed for accuracy and reasonableness. Shortcomings in network design as well as some coding errors can be identified as part of this review. Exhibit IV-16 presents 2007 and 2030 ridership by station for the Final Run Recommended Alternative. Corridor line ridership is the sum of demand at stations along a given line, except for where corridor line ridership has been adjusted to account for interlining.

EXHIBIT IV-16

FINAL RUN RECOMMENDED ALTERNATIVE BOARDINGS BY STATION

Corridor	Stations	Regional Rail Boardings	
		2007	2030
E-2	Downtown Denton	390	570
	South Denton	570	960
	Lewisville North/FM-407	580	750
	Lewisville CBD	590	680
	Lewisville South	1,190	1,440
	Downtown Carrollton/Belt Line	1,010	1,340
	Line Ridership	**4,330**	**5,740**

Source: NCTCOG DFWRTM

Performance Evaluation

Each RRCS modal alternative considered was evaluated with a set of performance indicators. The corridors were scored based upon a five-point system with five indicating a good score and one indicating a bad score. The individual criteria scores were then added to reflect a total score for each alternative, including a performance benchmark representing the overall cost effectiveness of each option. Exhibit IV-17 contains a summary of the final performance of the E-2 Corridor. The RRCS Performance Benchmark was created to normalize the evaluation of each of the corridors with varying

lengths, costs, and ridership. It is a "cost effectiveness" measure using annualized capital cost, annualized operating cost, and annualized ridership producing a necessary calculation of annual cost per rider. It is very similar to the original FTA cost effectiveness index (CEI). The revised CEI used by FTA in the most recent New Starts Program evaluation includes additional considerations for travel time savings and user benefits.

EXHIBIT IV-17

PERFORMANCE SUMMARY FOR E-2 CORRIDOR

Evaluation Criteria	E-2 Regional Rail	Score
Performance benchmark (annual cost per annual rider)	$10.37	5
Total daily ridership forecast	6,200	4
One-way trip time (minutes)	39	5
Estimated capital cost (millions)	$238.60	5
Estimated annual O&M cost (millions)	$11.50	4
Local authority and funding	Denton County Transportation Authority exists and funding is available.	5
Community acceptance	Community has approved sales tax to fund regional rail type system.	5
Ease of implementation	Right-of-way is owned and controlled by the City of Denton and DART; relocation of trail will be necessary before track can be constructed.	4
Connectivity with existing and planned transit operations	Regional rail will require transfer to DART at Carrollton for some route choices.	3
Compatibility with freight railroad operations	Compliant regional rail equipment is compatible with local freight operations.	5
Serves area of unmet mobility need	Roadway capacity deficiency moderately severe.	2
Impact upon adjacent highways and air quality	Benefit to adjacent highway is equivalent to one-lane in each direction.	4
Transit oriented development potential	TOD potential exists.	2
TOTAL SCORE		**53**

The E-2 Corridor scored the highest of all RRCS corridors evaluated, with a total of 53 points. The Performance Benchmark was $10.37 (score = 5 points), based on a total daily ridership forecast of 6,200 daily riders (score = 4 points) and an estimated annual operating and maintenance cost of $11.5 million (score = 4 points). The total capital cost for the development of regional rail in this corridor was estimated to be $238.6 million (score = 5 points). Estimated trip time to travel one way, the length of the corridor is 39 minutes (score = 5). The project has the advantage of the existence of a local authority, with the Denton County Transportation Authority in place to develop and financially support the project (score = 5 points). The right-of-way is owned and controlled by DART and the City of Denton, making implementation relatively straight forward, but there is a bicycle/pedestrian trail in a portion of the corridor that will have to be relocated (score = 4 points). Use of Federal Railroad Administration (FRA) compliant regional rail technology in the corridor will require a transfer to the DART system at Carrollton in order to access other transit options in the region (score = 3 points), but is compatible with local freight operations (score = 5 points). The roadway capacity deficiency in the parallel corridor is moderately severe, so the E-2 regional rail implementation would moderately assist with unmet mobility needs (score = 2 points). However, the ridership projections for the corridor are equivalent to one lane of vehicular traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development potential exists (score = 2 points).

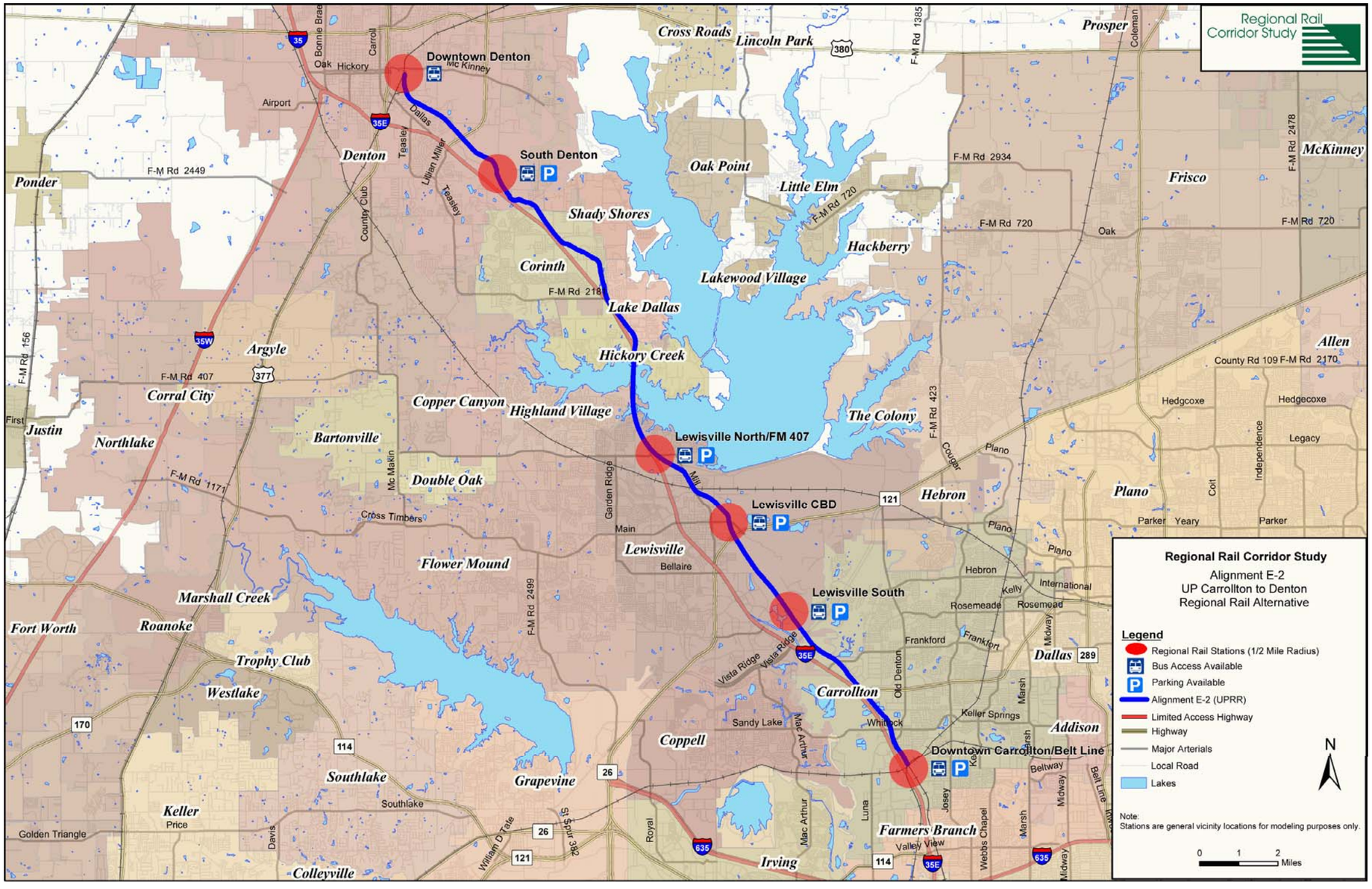
CORRIDOR RECOMMENDATIONS

The final recommendation is regional rail for the E-2 Corridor, as shown in Exhibit IV-18. Regional rail would be operating from downtown Denton to the DART LRT station at Belt Line Road, with potential interlining to Dallas-Fort Worth International Airport along the

Cotton Belt Corridor and to downtown Dallas along the Burlington Northern/Trinity Railway Express combination shown in Exhibit IV-18. The station locations shown in the map below are for planning purposes only and would be refined as a more detailed Alternatives Analysis study of the corridor is conducted. The E-2 Corridor had the highest score, resulting from the Performance Indicator Analysis, of any of the RRCS corridors. The 2007 ridership estimates were high enough to indicate the need for near-term (5-10 years) rail development in the corridor. The Denton County Transportation Authority began work on an Alternatives Analysis (AA) of the corridor in late 2004. The RRCS results served as the starting point for the AA.

EXHIBIT IV-18

FINAL RECOMMENDATION FOR THE E-2 CORRIDOR



Denton looking SE, trail at left past poles

Denton end of trail

Looking SE, location in Denton

Denton looking NW from trail

Morse Street looking NW

Morse Street looking SE

Kerley Street looking SE with Shady Oaks Drive in distance

Looking NW from Shady Oaks Dr. and Kerley Street

Looking SE from loop 288 overpass

Looking NW from loop 288 overpass

Looking SE from Edwards Street

Looking NW from Pockrus Paige

Looking SE from Shady Shores Rd/Old hwy 77

Looking NW from Shady Shores Rd/ Old Hwy 77

Looking NW from Shady Shores Rd

Looking North from FM 2181/Swisher Rd

Looking NW from Burl Street

Looking SE from Burl St

Bridge SE of Burl St Looking NW

Looking NW from Bridge near Burl Street

Looking SE from Bridge near Burl Street

Milepost 729.8 - Hi-rail vehicle southbound at Swisher Road

Milepost 730.0 – Looking south. Spur track to Golden Distributing at left

MP 731.3 Looking south with I-35E, Stemmons Freeway at right

MP 732.1 – Bridge (1020’ long) across Lake Louisville with I-35E to right

MP 734 area – Right-of-way is 100 feet wide and includes the large billboards

MP 734.8 – Approaching residential units on left

MP 735.0 – Approaching Mill Street

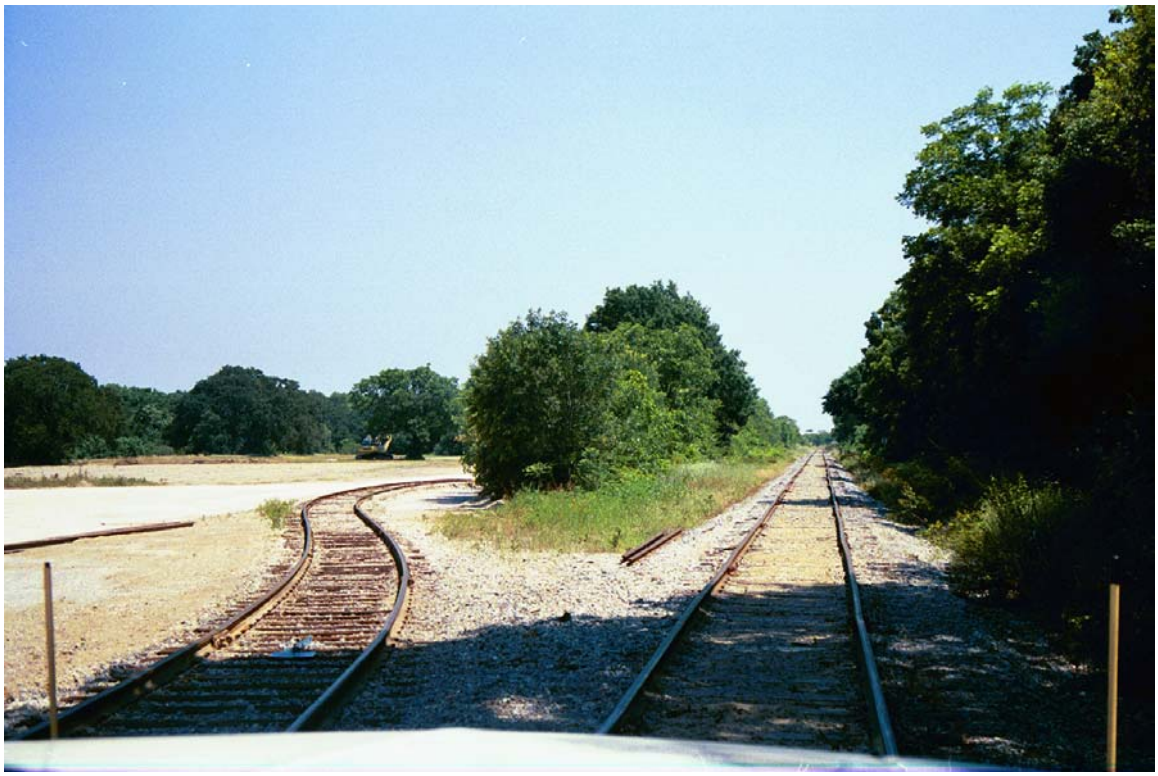
MP 735.4 – Looking south at KCS Railroad bridge

MP 735.6 – Looking northwest at KCS Bridge with Cowan Street in foreground

MP 735.6 – Looking south from previous photo near KCS bridge and Cowan Street

MP 735.9 – Spur track to Builders First Choice industry

MP 736.2 – Approaching 84’ long bridge and ISG industrial siding



MP 736.2 – Looking south with ISG siding at left

MP 736.3 – Bridge is 42’ in length. Note very poor track conditions

MP 736.5 – South end of ISG siding with College Street in distance. Note kink in rail at right

MP 736.6 – siding to right serves Andes Metal in distance

MP 736.9 – South end of siding serving Andes Metal with private road crossing in distance. Note poor track condition.

MP 737.1 – Spur track to right serves Inca Metal. Purnell Street and SH-121 in distance.

MP 737.4 – South of SH-121 with Railroad Street at left

MP 737.5 – South of SH-121 with Railroad Street at left

MP 738.0 – Traveling south with 60’ long bridge in foreground

MP 738.3 – Note poor track condition. Bridge is one of four within 0.3-mile and is 39’ in length. Bennett Lane is in distance.

MP 738.4 – Bridge is 39’ in length

MP 738.5 – Bridge is 42’ in length

MP 738.6 – Fourth bridge within 0.3-mile is 42’ in length

MP 739.0 – Looking south with Railroad Street at left

MP 739.2 – Looking south approximately one-half-mile north of Hebron Parkway with apartments at right

MP 739.5 – Hebron Parkway crossing

MP 740.1 – Looking south at SH-121 / Vista Ridge overpass in distance

MP 740.2 – SH-121 overpass with 117’ long bridge in foreground

MP 740.5 – South of SH-121. Note poor track condition.

MP 740.6 – Bridge is 56’ in length

MP 740.9 – Bridge in foreground is 80’ in length. Bridge in distance is over the Trinity River.

MP 741.1 – Looking south at Trinity River Bridge

MP 741.1 – Trinity River Bridge consists of 175’ long steel truss and 126’ long timber pile trestle

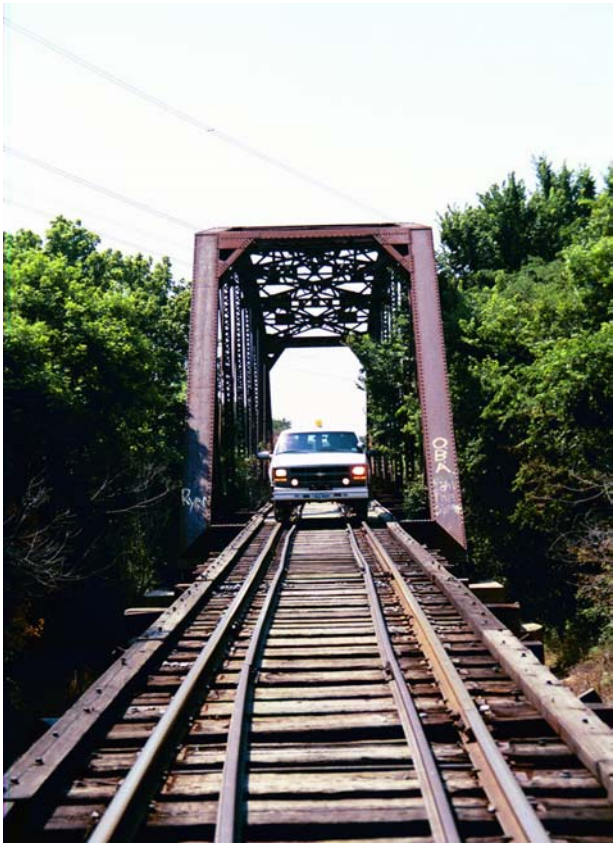
MP 741.1 - Trinity River Bridge

MP – 741.1 Trinity River looking west from railroad bridge

MP 741.1 First set of burned ties on Trinity River Bridge

MP 741.1 – Second set of burned ties on Trinity River Bridge

MP 741.1 south end of Trinity River Bridge, looking north



MP 741.1 – Trinity River Bridge, looking north

MP 741.2 – Bridge over Elm Creek is 104’ in length and is just south of the Trinity River Bridge.

MP 741.8 – Frankfort Road crossing looking south.

MP 741.8 - Frankfort Road crossing looking south. Potential passenger rail station site in southeast quadrant.

MP 741.9 - Approaching SH-190, President George Bush Turnpike.

MP 742.1 – Siding and spur track to Vanguard with SH-190 in distance.

MP 742.3 - South end of siding and private road at Vanguard industry. SH-190 overpass.

MP 742.4 – Trinity Mills Road crossing adjacent to SH-190 overpass.

MP 742.4 – Bridge under SH-190 overpass is 112 feet in length. Old Trinity Road is in distance.

MP 742.4 - New bridge under SH-190 overpass

MP 742.4 – New bridge under SH-190 overpass

MP 742.4 – Old Trinity Road. Note curves in track resulting from new bridge alignment.

MP 742.9 – Jackson Road with spur track to Elm Fork Water Treatment Plant and Deseret Grain.

MP 743.2 – Timber culvert is 14 feet long with open deck

MP 743.5 – Whitlock Lane in distance. Note lack of drainage along track.

MP 743.8 – Old Denton Road with Westway Circle and Donald Avenue in distance.

MP 744.2 – Northside Drive and spur track to Vinylex Plastics

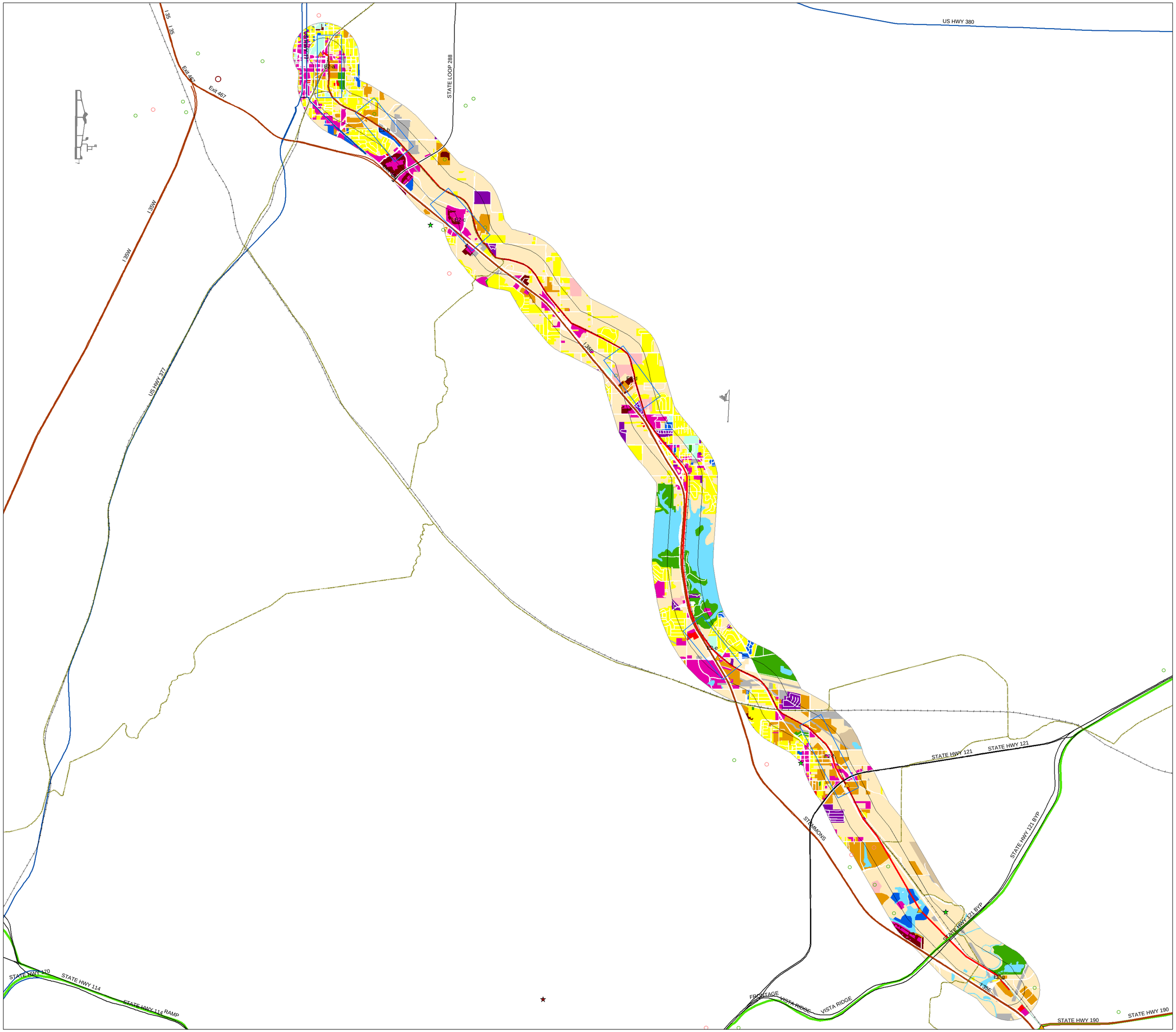
MP 744.3 – Vinylex Drive is a private crossing

MP 744.35 – Private road crossing and spur track to Boral Brick

MP 744.4 – Bridge in Carrollton is 130 feet in length

MP 744.8 – BNSF crossing with Carrollton Depot at left

Baseline Land Use Study: Corridor E-2



Legend

- Possible Station Location
- Existing Rail Station
- Existing Rail Station 1/4 mile buffer
- Mobility 2025 Rail Station
- New Stations Existing by 2008
- Fort Worth Trolley Stops
- 250 - 670
- 670 - 1450
- 1450 - 2750
- 2750 - 6250
- 6250 +
- Clide Award Winner
- JV Project - Selected
- JV Project - Not Selected
- Special Generator
- Amtrak stations
- Airport
- Veloweb
- Railroad
- Fort Worth Trolley Line
- Rail Lines Existing by 2008
- Primary Highway
- Secondary Highway
- Major Arterial
- Proposed Freeways and Tollroads
- Regional Rail Corridor

Regional Rail Corridor Buffer

Buffer Distance

- 0.00 - 0.25
- 0.25 - 0.50

- Single-family
- Multi-family
- Retail
- Office
- Vacant
- Park and Recreation
- Industrial
- Parking
- Institutional
- Hotel/Motel
- Utilities
- Mobile Homes
- Water
- Landfill
- Under Construction

E-2 Union Pacific
begins in Carrollton, through Lewisville, Hickory Creek, Lake Dallas, Corinth, ends in Denton, 20 miles in length

Potential Station Zone: 1/2 mile wide linear area of variable length based on the area of interest

Area of Interest	Station Status	County	Jurisdiction w/in walking distance of station	Characteristics of Interest	Development Type	Development Style	Future Land Use (comprehensive plan)	Zoning (of vacant land)	Other Comments
E2-a	Proposed	Denton	Denton	**Employment within walking distance of the site:** N/A **Current land uses:** retail, industrial, single-family, institutional, park space, office **Vacant land: inadequate for a station and transit oriented development** **Located within walking distance:** N/A **Site accessible via:** US hwy 77, regional veloweb, UP Railroad **Flood zone:** Almost entirely in the 100 or 500 year floodplain. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	pedestrian oriented development		Regional Center Commercial Downtown	Difficult to locate a station here.
E2-b	Proposed	Denton	Denton	**Employment within walking distance of the site:** Infinity Partners (300) **Current land uses:** industrial, multi-family, single-family, park space, retail, utilities **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, state loop 288, US hwy 77, US hwy I35E **Flood zone:** Partially within the 100 year floodplain - opportunity for green space.	Infill-other development or greenfield development	hybrid	Regional Mixed Use Center	Regional Center Commercial Downtown	
E2-c	Proposed	Denton	Denton	**Employment within walking distance of the site:** Andrew Corp (250) **Current land uses:** retail **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** Unicorn Lake joint venture project **Site accessible via:** US hwy I35E, regional veloweb **Flood zone:** Partially within the 100 year floodplain - opportunity for green space.	Infill-other development or greenfield development	hybrid	Regional Mixed Use Center	Regional Center Commercial Downtown	
E2-d	Proposed	Denton	Corinth	**Employment within walking distance of the site:** Boing Defense Electronics (1420) **Current land uses:** industrial, single-family, under construction **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** US hwy I35E **Flood zone:** Partially within the 100 year floodplain - opportunity for green space.	Infill-other development or greenfield development	hybrid			
E2-e	Proposed	Denton	Lewisville	**Employment within walking distance of the site:** N/A **Current land uses:** retail, institutional, industrial, single-family, office **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** US hwy I35E **Flood zone:** outside of floodplain Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid			

E2-f	Proposed	Denton	Lewisville	**Employment within walking distance of the site:** N/A **Current land uses:** industrial, retail, utilities **Vacant land:** possibly enough for station and transit oriented development **Located within walking distance:** Old Town Lewisville joint venture project **Site accessible via:** State hwy 121 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid			
E2-g	Existing by 2008	Denton	Carrollton	**Station:** Frankford Station, DART **Infill Opportunities:** adequate for infill development, existing industrial, water **Flood zone:** Completely within the 100 year floodplain - opportunity for green space.	Infill-other development or greenfield development	hybrid			Light rail ends and commuter rail begins, going north

EASTERN CORRIDOR COST ANAYLSIS (E-2)

REGIONAL RAIL CORRIDOR STUDY											
North Central Texas Council of Governments									Link Number:	E-2	
Parametric Cost Estimate									Link Description:	Denton	
									Start Sta:	722.1	
									End Sta:	744.6	
		E-2 Denton to Carrollton		Regional Rail				Light Rail		Link Length:	22.5	
Description			**Unit**	**Unit Cost**	**Quantity**	**Cost**	**Subtotals**	**Unit Cost**	**Quantity**	**Cost**	**Subtotals**	**Remarks**
Site Work & Urban Design												
	Earthwork, 1 Track, Major		MI	$1,500,000								
	Earthwork, 1 Track, Basic		MI	$500,000								
	Earthwork, 2 Tracks, Major		MI	$2,500,000				$3,500,000				
	Earthwork, 2 Tracks, Basic		MI	$750,000	1.1	$825,000						
	Earthwork, Reconstruct Existing Track		MI	$100,000	21.4	$2,140,000						
	Urban Design/Signage/Landscaping		MI	$250,000	22.5	$5,625,000		$750,000				
	Environmental Mitigation (Includes noise and vibration)		MI	$100,000	22.5	$2,250,000		$100,000				
	Relocate Hike/Bike Trail		MI	$1,400,000	9.2	$12,880,000		$1,400,000				
		Subtotal					**$23,720,000**					
Trackwork												
	New Track, 136# CWR		MI	$1,000,000	23.6	$23,600,000		$1,850,000				
	Upgrade Track to Class 4		MI	$500,000								
	Paved Embedded Track (Double)		MI	$4,000,000				$5,600,000				
	New Single Track #1 Relay Rail		MI	$800,000								
	New Turnout #10		EA	$125,000	14	$1,750,000		$125,000				
	New Turnout #15		EA	$200,000	1	$200,000		$200,000				
	New Turnout #24		EA	$250,000	12	$3,000,000		$250,000				
	Rebuild Turnout or Diamond		EA	$75,000								
	New Railroad Diamond Crossing		EA	$200,000	1	$200,000						
		Subtotal					**$28,750,000**					
Structures												
	Elevated Track (railroad over railroad)		TF	$6,500				$10,000				
	Tunnel		TF	$10,000				$10,000				
	New Bridge (Minor)		TF	$4,500	322	$1,449,000		$4,500				
	New Bridge (Major)		TF	$6,500				$6,500				
	Reconstruct Existing Bridge		TF	$2,500	2,105	$5,262,500		$2,500				
	Retaining Wall (0 FT - 10 FT High)		TF	$175				$175				
	Retaining Wall (10 FT - 20 FT High)		TF	$525				$525				
	New Culvert		EA	$10,000	36	$360,000		$10,000				4/mile
	Rehabilitate Culvert		EA	$5,000	54	$270,000		$5,000				4/mile
		Subtotal					**$7,341,500**					
Stations												
	At-grade Station		EA	$650,000	5	$3,250,000		$2,800,000				
	Aerial Station (LRT)		EA					$4,600,000				Carrollton
	Depressed Station (LRT)		EA					$15,000,000				
	Parking Spaces/Surface Lot		EA	$4,000	2,500	$10,000,000		$4,000				avg=500/station
	Service and Layover Facility		EA	$2,000,000	1	$2,000,000		$5,000,000				
	Central Maintenance Facility Contribution		EA	$1,000,000	1	$1,000,000		$2,000,000				
		Subtotal					**$16,250,000**					
Traction Electrification System (LRT)			MI					$1,600,000				
		Subtotal										
Signal System												
	Communications System (LRT)		MI					$1,100,000				
	New Railroad Interlocking		EA	$1,500,000								
	Modify Railroad Interlocking		EA	$750,000	1	$750,000						
	New CTC or LRT Signaling System		MI	$1,200,000	23.6	$28,320,000		$2,300,000				
	Upgrade Railroad Signal System		MI	$600,000								
		Subtotal					**$29,070,000**					
R.O.W. & Y Junction												
	R.O.W. Allowance		AC									
Utilities												
	Utilities Allowance		MI	$200,000	22.5	$4,500,000	**$4,500,000**	$400,000				
Crossings / Roadway												
	Minor Street At-grade (Gates & Warning Devices)		EA	$150,000	7	$1,050,000		$150,000				
	Minor Street At-grade (w/ Quad Gates System & Warning Devices		EA	$250,000	27	$6,750,000		$250,000				
	Major Street At-grade (w/ Quad Gates System & Warning Devices		EA	$450,000	14	$6,300,000		$450,000				
	Reconstruct Existing Roadway Bridge		EA	$1,000,000				$1,000,000				
	Reconstruct Existing Roadway		SY	$40				$40				
	Construct New Roadway		SY	$80				$80				
	Highway/Railroad Grade Separation		EA	$8,000,000				$8,000,000				
		Subtotal					**$14,100,000**					
Special Conditions												
	Contribution for Regional Rail at Carrollton Station		EA	$1,000,000	1	$1,000,000						
		Subtotal					**$1,000,000**					
		Subtotal A					**$124,731,500**					
	MIS Level Design Contingency (% of A)		15%				$18,709,725	30%				
	Construction Contingency (% of A)		10%				$12,473,150	10%				
	Add-on Allowance (Eng., CM, etc) (% of A)		15%				$18,709,725	30%				
Rail Vehicle Train Sets (actual without contingencies)			Train Set	$8,000,000	8	$64,000,000	**$64,000,000**	$9,000,000				
		Grand Total					**$238,624,100**					
NOTE:	1. Unit Costs are expressed in present value dollars.											
	2. Retaining Wall Unit Cost is for one side only.											
	3. Cost estimate excludes ROW costs.											

Annualized Cost Estimate (E-2)

Regional Rail Corridor:	**E-2**	**Denton to Carrollton**						Regional Rail Corridor:	E-2	Denton to Carrollton
Annualized Capital Cost		Daily Riders:	6,200		0			Cost Category Summary		
		Annualized Riders:	1,922,000		0					
			Regional Rail	Regional Rail	Light Rail	Light Rail			Regional Rail	Light Rail
	Useful	Annualization	Total Cost ($mil)	Annualized	Total Cost ($mil)	Annualized			Total Cost ($mil)	Total Cost ($mil)
Cost Category	Life (yr)	Factor	(Incl. Contingency)	Cost ($mil)	(Incl. Contingency)	Cost ($mil)		Cost Category	(Incl. Contingency)	(Incl. Contingency)
Site work and Urban Design	100	0.070	$33.208	$2.325	$0.000	$0.000		Site work and Urban Design	$39.508	$0.000
Trackwork	30	0.081	$40.250	$3.260	$0.000	$0.000		Trackwork	$40.250	$0.000
Structures	30	0.081	$10.278	$0.833	$0.000	$0.000		Structures	$10.278	$0.000
Stations	20	0.094	$22.750	$2.139	$0.000	$0.000		Stations	$22.750	$0.000
LRT Electrification System	30	0.081	$0.000	$0.000	$0.000	$0.000		LRT Electrification System	$0.000	$0.000
Signal System	30	0.081	$40.698	$3.297	$0.000	$0.000		Signal System	Incl with Crossings/Roadway	
Right-of-Way	100	0.070	$0.000	$0.000	$0.000	$0.000		Right-of-Way	Not Applicable	
Utilities	20	0.094	$6.300	$0.592	$0.000	$0.000		Utilities	Incl with Site Work & Urban Design	
Crossings / Roadway	20	0.094	$19.740	$1.856	$0.000	$0.000		Crossings / Roadway	$60.438	$0.000
Special Conditions	20	0.094	$1.400	$0.132	$0.000	$0.000		Other	$1.400	$0.000
Vehicles	25	0.086	$64.000	$5.504	$0.000	$0.000		Vehicles	$64.000	$0.000
Total			$238.624	**$19.936**	$0.000	**$0.000**		Total	$238.624	$0.000
Performance Benchmark				**10.37**		**#DIV/0!**				
Notes:										
1. Annualized Riders = Daily Riders times 310 days per year.										
2. Performance Benchmark = Annualized Cost divided by Annualized Riders.										

V. E-3 – MCKINNEY LINE CORRIDOR CONSIDERATIONS

CORRIDOR DESCRIPTION

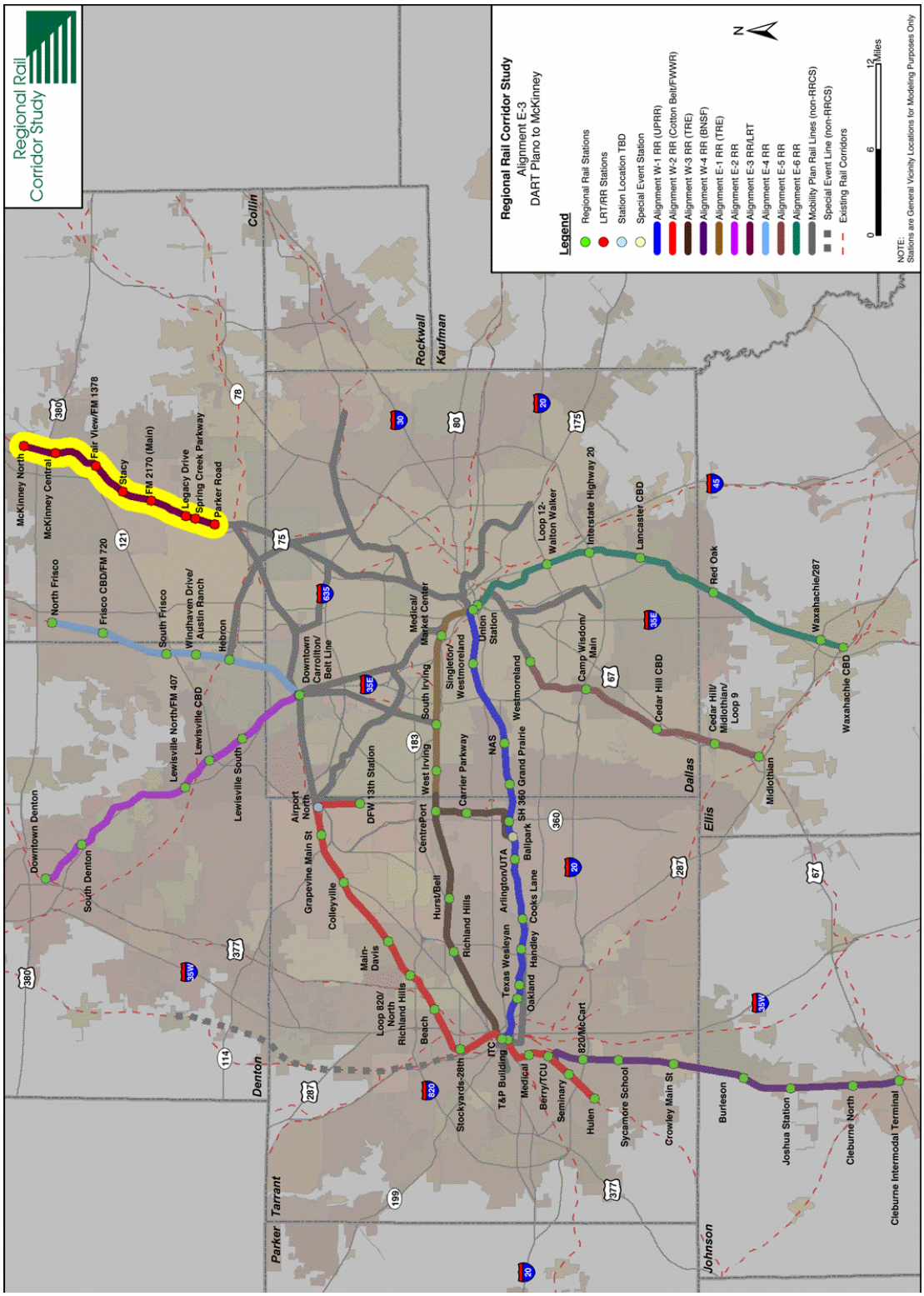
Rail Corridor E-3 between Plano and McKinney is one of eight rail corridors in the Dallas-Fort Worth area studied by for the feasibility of implementing commuter rail, light rail, or other forms of transit service.

The right-of-way is a former Union Pacific Railroad line that extends between Plano and McKinney, a distance of approximately 16.3 route miles. Exhibit V-1 contains a corridor location map. DART owns the entire right-of-way. The right-of-way is consistently 100 feet in width north of Plano. Through Plano, the right-of-way is 40 feet to 60 feet in width. The Dallas Garland and & Northeastern (DGNO) short-line railroad has trackage rights between Stacy Road (FM2786) and Sherman. The segment of track between the former SSW line in Plano and Stacy Road, a distance of approximately 8.4 miles, has not been in operation for five or six years.

The current maximum operating speed limit is 10 mph. The line is not equipped with a railroad signal system and is operated under yard limit rules. The DGNO essentially operates one round trip train per day on weekdays to serve local industries.

EXHIBIT V-1

E-3 CORRIDOR LOCATION MAP



Existing Track Conditions

The E-3 Plano to McKinney rail corridor consists of a single main track with one short (1,550') siding located in McKinney.

The track consists of 90-pound rail on timber ties. All of the rail should be replaced before passenger service is operated over the track. The ties in the 8.4 miles between Plano and Stacy Road that is not being operated are in poor condition and also should be replaced. Most of the ties in the portion of track that is being operated are also in poor condition.

There are three industrial tracks located on the E-3 corridor in McKinney. None of the three industries were identified by company name.

There are no intermodal facilities or other rail/truck transfer facilities on the Plano to McKinney rail corridor. The railroad depot still exists in Allen and is located between McDermott Drive and Belmont and is in excellent condition. The current owner or user was not identified.

A total of 16 bridges are located along the 16.3 miles between Plano and McKinney. Of the 16 bridges, 8 are timber pile trestles, 7 are steel deck or through plate girder bridges, and 1 is a pre-stressed concrete bridge. Of the bridges seen, the bridges in the non-operating portion are in poor condition and the bridges in the operating portion are in fair condition.

There are 31 railroad/highway at-grade crossings or highway grade separations in the 16.3 miles of the E-3 corridor between Plano and McKinney. Of the 31 at-grade

crossings, 27 are at-grade public crossings and 4 are grade-separated overpasses or underpasses. The crossing equipment and surfaces for the at-grade crossings are in fair to good condition even along the portion that is not being operated. A detailed list of the railroad/highway grade crossings and overpasses is provided in the following section.

A fact sheet summarizing the existing conditions and issues for the E-3 corridor is shown in Exhibit V-2.

EXHIBIT V-2

E-3 CORRIDOR FACT SHEET

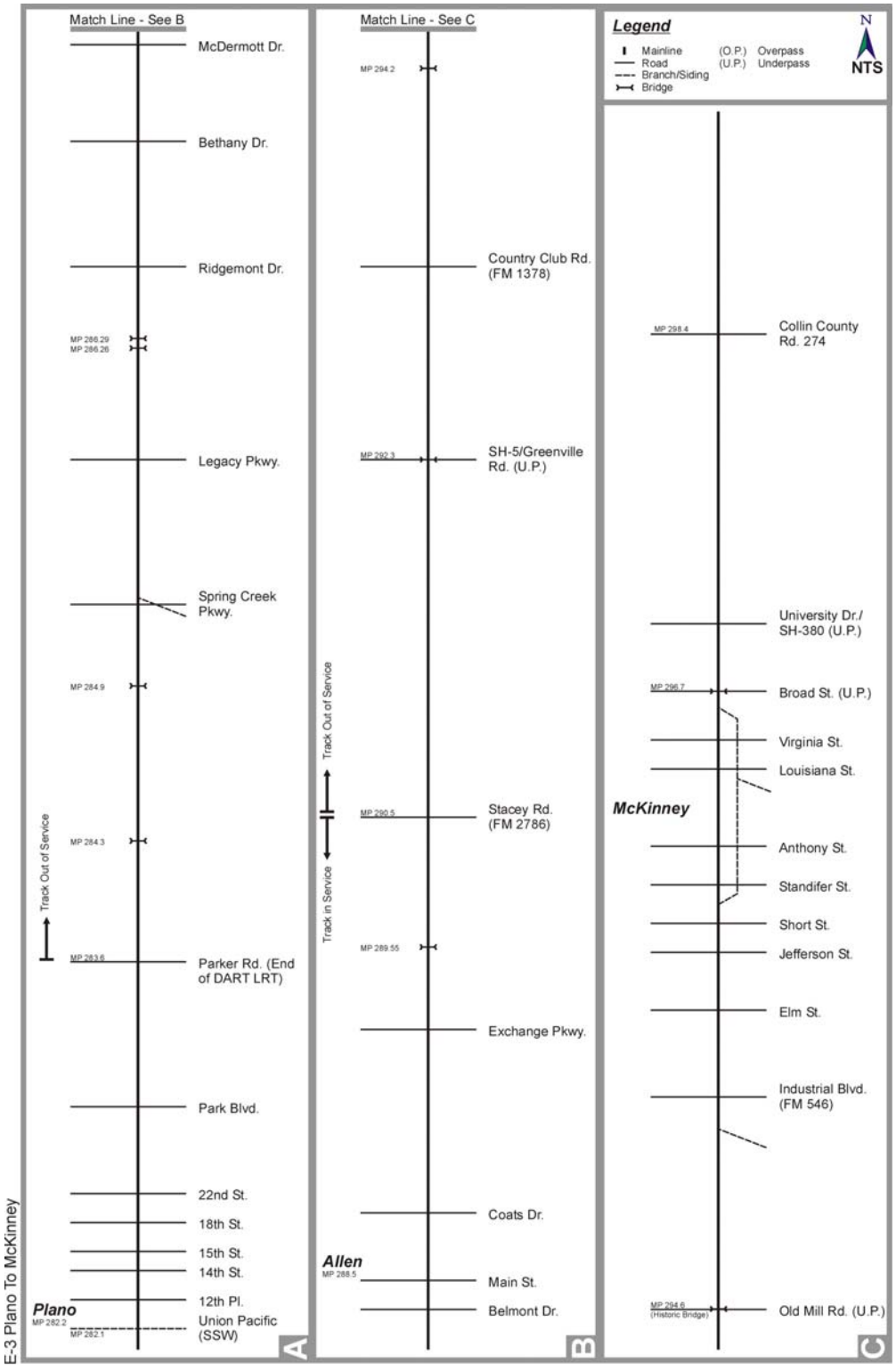
Owner(s) of the line	DART
Operator(s) of the line	DART/DGNO
Trackage rights	None
Length of the corridor	16.3 Miles
Average trains per weekday	Two local switching.
Track summary	▪ Single track with one siding in McKinney. No railroad signaling. Operated as yard limits with maximum speed of 10 mph. No service between Plano and approximately MP 290.5 (about 8 miles).
Railroad crossings	▪ Twenty-eight (28) at-grade highway/railroad crossings. ▪ Four (4) grade-separated highway/railroad crossings. ▪ One (1) at-grade railroad/railroad crossings.
Jurisdictions	▪ Plano, Allen, Fairview, and McKinney.
Industrial sidings	▪ Four
Corridor issues	▪ All new track and rehabilitation of all bridges. ▪ Issue of ending commuter rail service at DART station at Parker Road or connecting to SSW (UP) track. ▪ Need to add CTC signal system.

Schematic of the Corridor

Exhibit V-3 shows a schematic diagram of the Plano to McKinney rail corridor.

EXHIBIT V-3

E-3 CORRIDOR SCHEMATIC



Detailed Information

This section contains detailed information for the bridges and railroad/highway grade crossings and overpasses located along the 16.3 miles of Corridor E-3 between Plano and McKinney. Exhibit V-4 shows the rail/highway crossings and Exhibit V-5 shows the railroad bridges and culverts.

EXHIBIT V-4

RAIL/HIGHWAY CROSSINGS AND OVER/UNDER PASSES

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
282.2	12th Street	Public	Lights/Bells/Gates	763410F
282.3	14th Street	Public	Lights/Bells/Gates	763409L
282.4	15th Street	Public	Lights/Bells/Gates	763406S
282.7	18th Street	Public	Lights/Bells/Gates	763403V
283.0	22nd Street	Public	Lights/Bells/Gates	763402N
283.2	Park Boulevard	Public	Lights/Bells/Gates	763528V
283.6	Parker Road	Public	Lights/Bells/Gates	763401G
285.1	Spring Creek Parkway	Public	Lights/Bells/Gates	763399H
285.8	Legacy Drive	Public	Flashers	748325D
286.8	Ridgemont Drive	Public	Stop signs	763398B
287.6	Bethany Drive	Public	Flashers	763397U
288.3	McDermott Drive	Public	Flashers	912034N
288.4	Belmont	Public	Lights/Bells/Gates	763396M
288.5	Main Street (FM2170)	Public	Lights/Bells/Gates	763395F
288.8	Coats Drive	Public	Lights/Bells/Gates	763394Y
289.4	Exchange Parkway	Public	Lights/Bells/Gates	748323P
290.5	Stacy Road (FM 2786)	Public	Lights/Bells/Gates	763393S
282.3	SH-5	Public	Underpass	763390W
293.2	Country Club Road	Public	Flashers	763389C
294.6	Old Mill Road	Public	Underpass	763388V
295.0	Industrial Blvd (FM 546)	Public	Lights/Bells/Gates	763387N
295.5	Elm Street	Public	Lights/Bells/Gates	763386G
295.8	Jefferson Street	Public	Crossbucks	763385A
295.9	Short Street	Public	Lights/Bells/Gates	763384T
296.0	Standifer Street	Public	Lights/Bells/Gates	763383L
296.1	Anthony Street	Public	Lights/Bells/Gates	763382E
296.3	Louisiana Street	Public	Lights/Bells/Gates	763381X
296.4	Virginia Street	Public	Lights/Bells/Gates	763380R
296.7	Broad Street	Public	Underpass	763379W
297.1	University Dr (SH-380)	Public	Underpass	765332H
298.4	Collin County Road 274	Public	Crossbucks	765331B

Source: URS Corp. 2003

EXHIBIT V-5

RAILROAD BRIDGES AND CULVERTS

Milepost	Bridge Type	Length	Remarks
284.3	Pre-stressed concrete, open deck	60’	
284.9	Timber pile trestle, open deck	45’	
286.26	Steel plate girder, open deck	25’	
286.29	60’ steel deck plate girder, 99’ timber pile trestle, 60’ steel deck plate girder, open deck	219’	Rowlett Creek
289.55	15’ timber pile trestle, 60’ steel deck plate girder, and 45’ timber pile trestle, open deck	120’	Cottonwood Creek
292.3	Steel through plate girder, open deck	30’	Over SH-5
294.2	77’ steel deck plate girder, 99’ timber pile trestle, 120’ steel deck plate girder, 131’ timber pile trestle, open deck	427’	Wilson Creek
294.6	Timber pile trestle, open deck	45’	Old Mill Road, historic bridge
296.7	Timber pile trestle, open deck	45’	Broad Street

Source: URS Corp. 2003

Photos Taken in the Corridor

During the physical inspection of the E-3 Corridor, photographs were taken of various features and conditions along the line. Photographs were taken of as many of the bridges, highway crossings, overpasses, underpasses, sidings, track conditions, special conditions or constraints, and general right-of-way conditions and features as possible. The photographs taken along the E-3 Corridor between Plano and McKinney are included at the end of this chapter.

Existing Land Use

A baseline land use survey was conducted by NCTCOG staff at the onset of the Regional Rail Corridor Study. The major focus of this study was to help locate specific areas along the corridors that possess characteristics that could support the

development of a rail station and/or transit-oriented development. Baseline land use maps and the associated station location information for the corridor may be found following the corridor photographs.

INFRASTRUCTURE CONSTRAINTS

A number of infrastructure issues and constraints should be addressed in order to establish regional rail passenger service within this corridor. Identified infrastructure constraints include the following considerations:

- The track should be replaced along the entire corridor due to the poor condition of the rail, ties, and ballast. Passing tracks will be required at stations and other convenient locations. Turnouts located in the main track that serve industrial tracks will have to be replaced when the main track is replaced. Future installation of double track should not be precluded. The bridges on the line may either have to be replaced or rebuilt. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of auto traffic should be improved with the installation of warning devices such as lights, bells, and gates. Drainage improvements and vegetation control will also be required along the line.
- Centralized Traffic Control (CTC) will be required over the entire corridor if maximum train speed is to exceed 59 mph. The installation of CTC should include provisions for bi-directional running, electric switch locks on all turnouts located in main track, and should be dispatched from a local control point such as an existing TRE or DART facility.
- Compatibility with the existing DART light rail system ending at Parker Road in Plano is an issue relative to the selection of the transit technology for the corridor.

DEFINITION OF FEASIBLE ALTERNATIVES

The study considered three primary types of options for the rail corridors under study. Regional rail, light rail, and bus rapid transit were the primary modes or options considered for development in the corridors. A screening process took place for each corridor to determine if all three options were reasonable or if a subset was more appropriate. The discussion of options pertinent to each Corridor E-3 follows.

Description of Modal Alternatives in Corridor E-3

Regional Rail

The regional rail alternative would provide regional rail passenger service along the DART line between Plano and McKinney. Passing tracks would be constructed where required at stations and other convenient locations. Train control and signal systems would be upgraded. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of automotive traffic will have to be improved with the installation of warning devices such as lights, bells, and gates. Approximately four regional rail passenger stations would be constructed along the E-3 Corridor between the DART LRT Station at Parker Road and downtown McKinney. Exhibit V-6 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for this modal alternative. Exhibit V-7 shows the Regional Rail Alternative for the E-3 Corridor.

EXHIBIT V-6

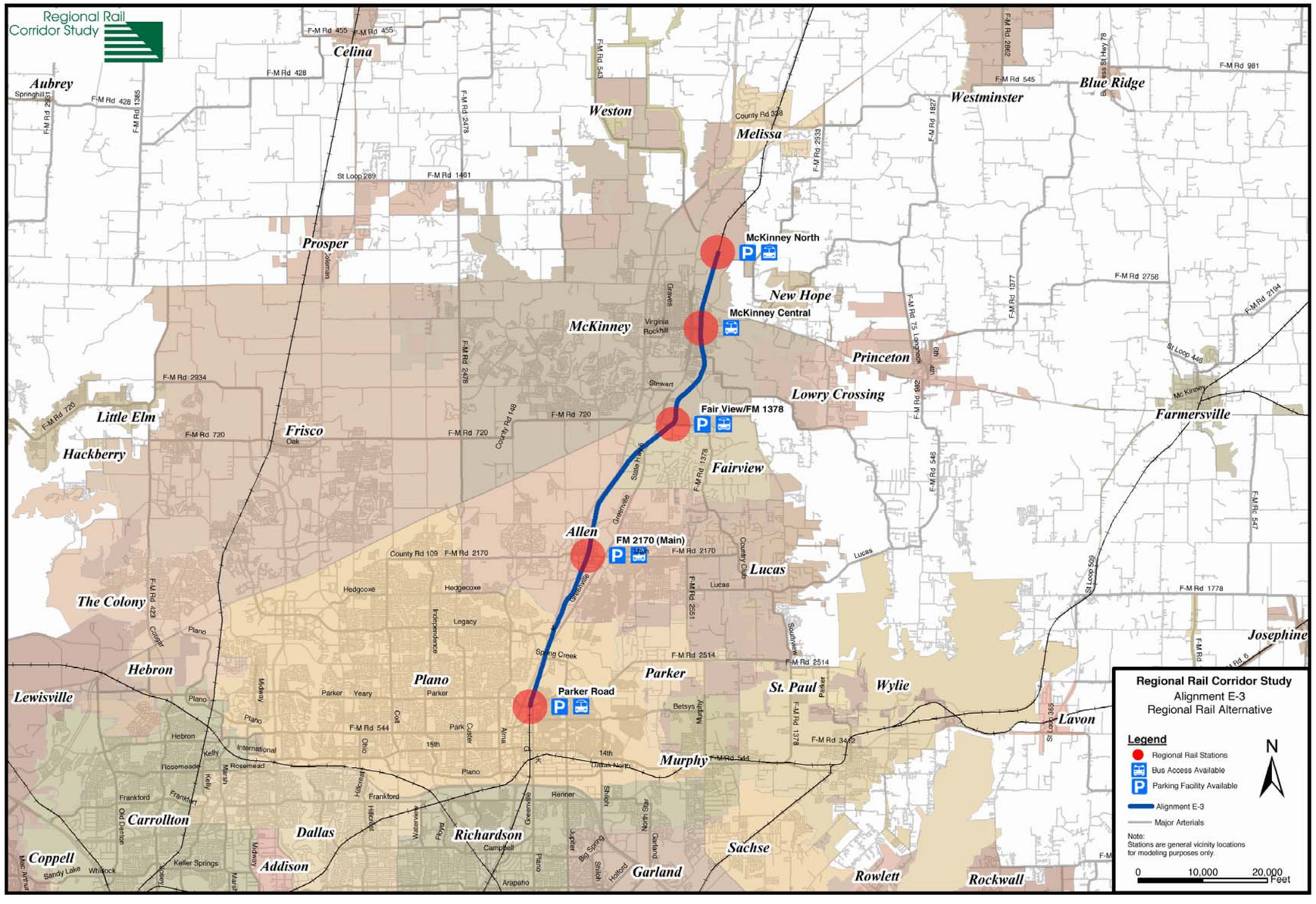
REGIONAL RAIL SERVICE ASSUMPTIONS

Regional Rail (headways = 20 minutes/60 minutes)		
Stations*	**Local Bus**	**Park-and-Ride**
Parker Road	Yes	Yes
FM 2170 (Main)	Yes	Yes
Fairview/FM 1378	Yes	Yes
McKinney Central	Yes	No
McKinney North	Yes	Yes

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT V-7

REGIONAL RAIL ALTERNATIVE FOR THE E-3 CORRIDOR



Light Rail

The light rail alternative would provide light rail transit (LRT) service within the E-3 Corridor. A LRT line would be constructed along the DART right-of-way, extending from the existing DART Red Line, beginning at Parker Road and heading north to McKinney. New track would be constructed along with one passing siding at McKinney. Approximately seven LRT passenger stations would be constructed along the E-3 Corridor between Parker Road Station and McKinney. The specific locations of new stations must be determined in later phases of project development. Exhibit V-8 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for the LRT modal alternative. Exhibit V-9 shows the Light Rail Alternative for the E-3 Corridor.

EXHIBIT V-8

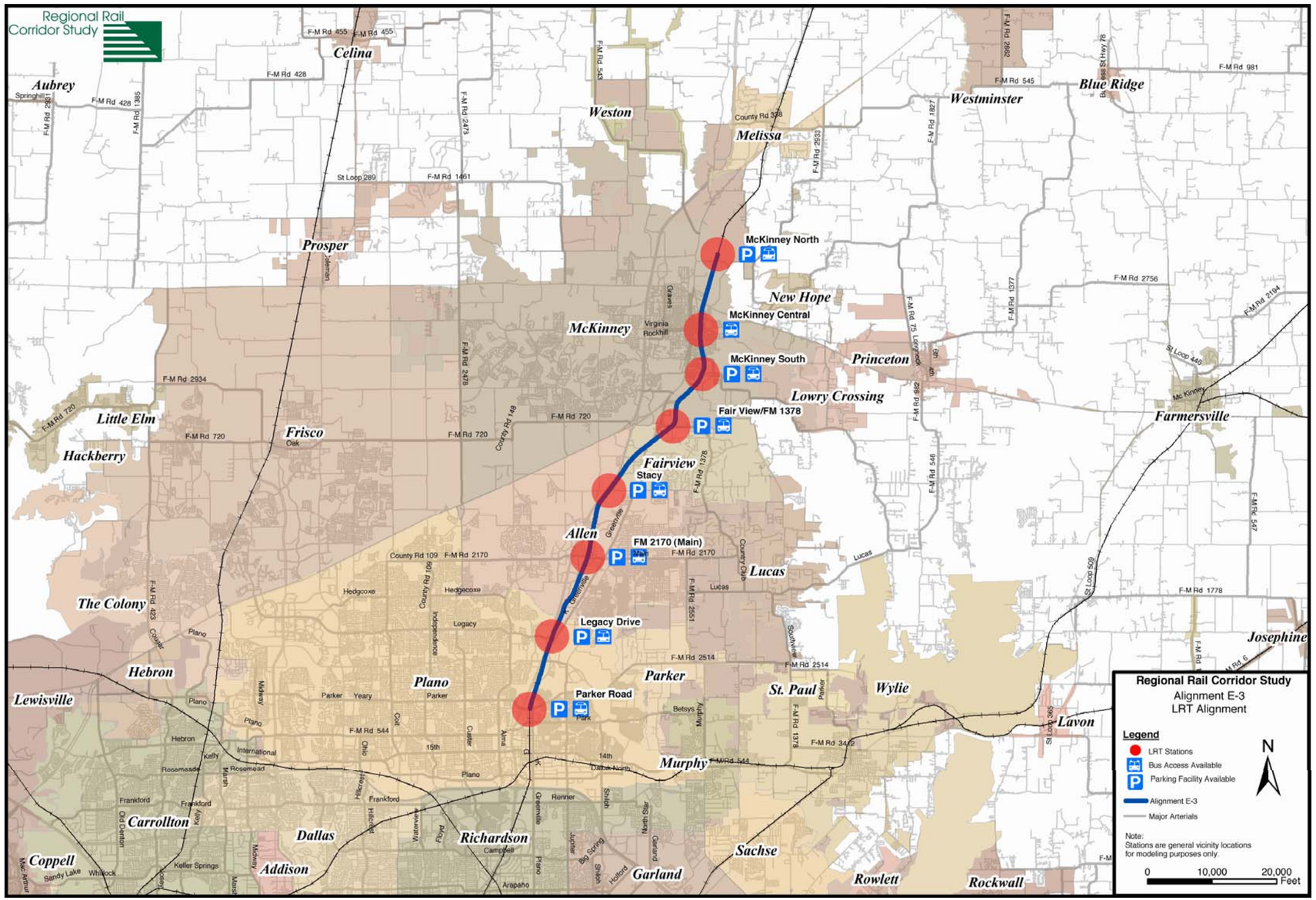
LIGHT RAIL SERVICE ASSUMPTIONS

Light Rail (headways = 10 minutes/20 minutes)		
Stations*	**Local Bus**	**Park-and-Ride**
Parker Road	Yes	Yes
Legacy Drive	Yes	Yes
FM 2170 (Main)	Yes	Yes
Stacey	Yes	Yes
Fairview/FM 1378	Yes	Yes
McKinney South	Yes	Yes
McKinney Central	Yes	No
McKinney North	Yes	Yes

* Station locations, feeder bus, and park-and–ride designations are all approximate and would be refined in later phases of study.

EXHIBIT V-9

LIGHT RAIL ALTERNATIVE FOR THE E-3 CORRIDOR



Bus Rapid Transit

The Bus Rapid Transit (BRT) alternative would provide express bus service operating within a fixed guideway located within the DART owned right-of-way between Plano and McKinney. The BRT service would operate within the roadway in mixed traffic approaching Plano and approaching McKinney. Approximately eight BRT passenger stations would be constructed along the E-3 Corridor between the Parker Road DART LRT Station and downtown McKinney. The specific locations of new stations must be determined in later phases of project development. Exhibit V-10 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for the E-3 BRT modal alternative. Exhibit V-11 shows the Bus Rapid Transit Alternative for the E-3 Corridor.

EXHIBIT V-10

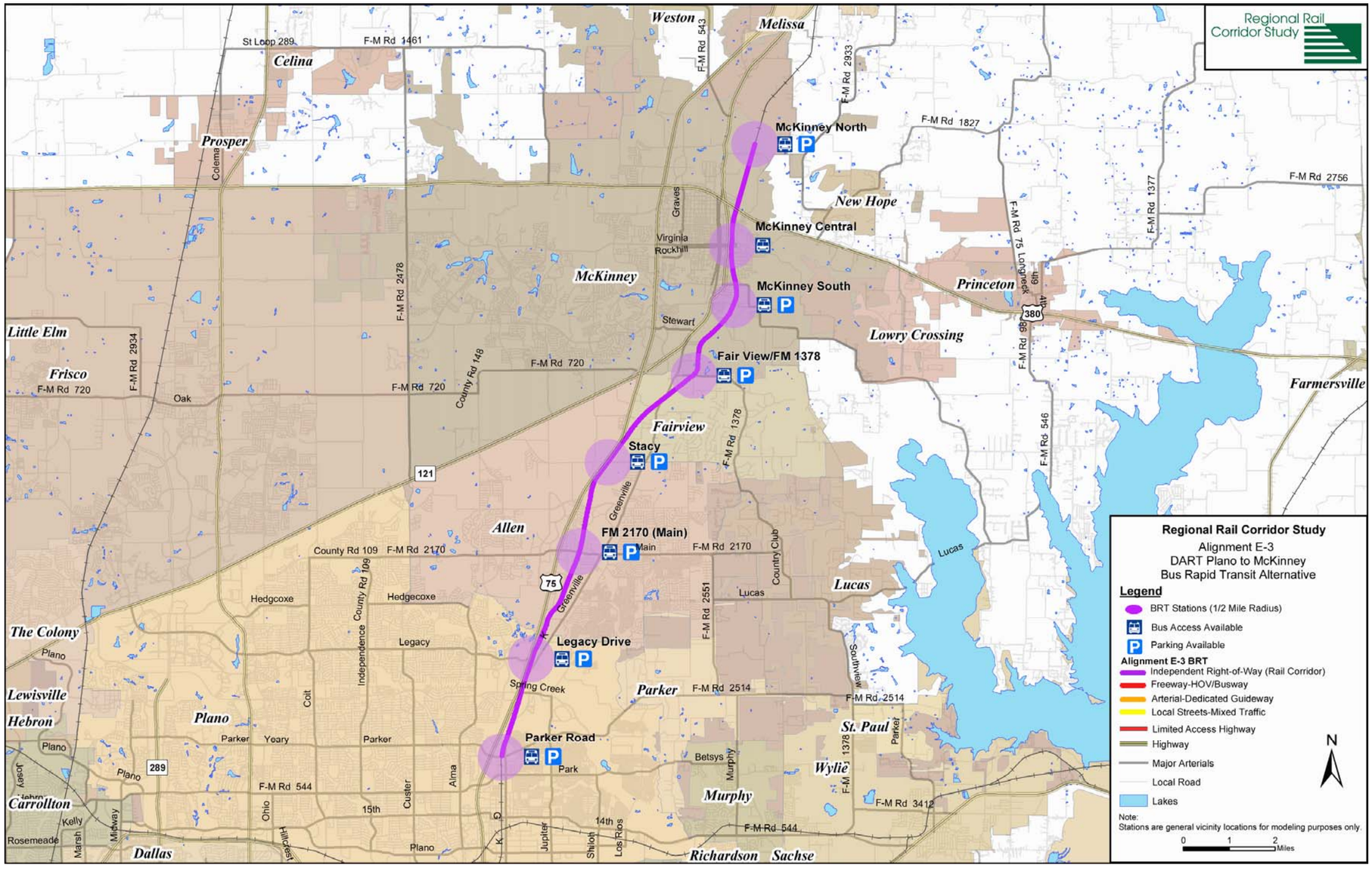
BUS RAPID TRANSIT SERVICE ASSUMPTIONS

Bus Rapid Transit (headways = 10 minutes/15 minutes)		
Station*	**Local Bus**	**Park-and-Ride**
Parker Road	Yes	Yes
Legacy Drive	Yes	Yes
FM-2170 (Main)	Yes	Yes
Stacey	Yes	Yes
Fairview/FM 1378	Yes	Yes
McKinney South	Yes	Yes
McKinney Central	Yes	No
McKinney North	Yes	Yes

* Station locations, feeder bus, and park-and–ride designations are all approximate and would be refined in later phases of study.

EXHIBIT V-11

BUS RAPID TRANSIT ALTERNATIVE FOR THE E-3 CORRIDOR



EVALUATION OF ALTERNATIVES

Three different modal alternatives were evaluated for this corridor:

- Regional Rail with Transfer
- Light Rail without Transfer
- Bus Rapid Transit

In addition to the assumptions pertaining to different technologies and operating characteristics (such as, station locations, headways, operating speeds, and supply of feeder buses at stations), the relationship of the E-3 Corridor to the others in the regional system was also considered.

One of the key evaluation or performance indicators used projected 2030 average weekday ridership. The complete list of performance indicators is found in Chapter II – Corridor Description and Evaluation. In order to streamline the development of travel forecasts for the Regional Rail Corridor Study, the various modal alternatives containing regional or light rail for each corridor were combined into a series of rail system alternatives for forecasting. Several of the corridors also serve travel markets that interact or compete with each other, so it was important to design the system forecasts to minimize this interrelationship as much as possible. Travel demand forecasts for four rail system alternatives were developed initially, along with BRT system alternative maps showing these systems alternatives. These and descriptions of exactly which of the RRCS rail corridor were contained in each rail BRT system alternative can be found in Chapter II. Ridership summaries for these system alternatives are also contained in Chapter II of the report and, more specifically to the E-3 corridor in the following section.

Ridership Summary

Exhibit V-12 presents projected average weekday ridership resulting from each of the system alternative for the E-3 Corridor. (See Chapter II for a complete discussion.) In Rail System Alternative 2, the E-3 Corridor was tested as a regional rail line from McKinney to Dallas, with a transfer to DART's Red Line in Plano. Rail System Alternative 3 assumed the extension of DART's Red Line all the way to McKinney. For comparison purposes, reported ridership for this alternative is for the portion of the line between Red Line's terminus in Plano and the terminus in McKinney. The BRT System Alternative included BRT in the E-3 right-of-way, with a transfer point at DART's Red Line in Plano.

As explained in Chapter II, the ridership resulting from the Rail System Alternatives was used to compare the performance of the modal alternatives for a corridor. The best performing option, which for E-3 would be either regional rail, light rail or BRT, was then the recommendation for the corridor and, consequently, included in the Final Run Recommended Alternative. Exhibit V-13 shows the ridership from the Final Run Recommended Alternative as well.

In order to optimize the performance of the E-3 Corridor in the rail system developed for the Final Run Recommended Alternative, the regional rail/intermediate light rail line from McKinney was interlined along the DART Red Line from Parker Road in Plano to the Westmoreland Station. That route is shown in red in Exhibit V-13.

It should be noted that the 2030 ridership for this corridor was adjusted upward to reflect ridership gains resulting from the interlining of the proposed alternative with the North

Central LRT line. It is assumed that interlining benefits are not reflected in station ridership data along a given corridor, the sum of which constitutes total corridor ridership. This adjustment was based on rail link gateway volume at the terminus of this corridor. (See Chapter II for additional explanation.)

To properly stage the recommended alternative, corridor ridership was also generated for the year 2007, measuring the impact of demographics growth on the proposed alternative. The process leads to the identification of corridors worthy of priority implementation.

EXHIBIT V-12

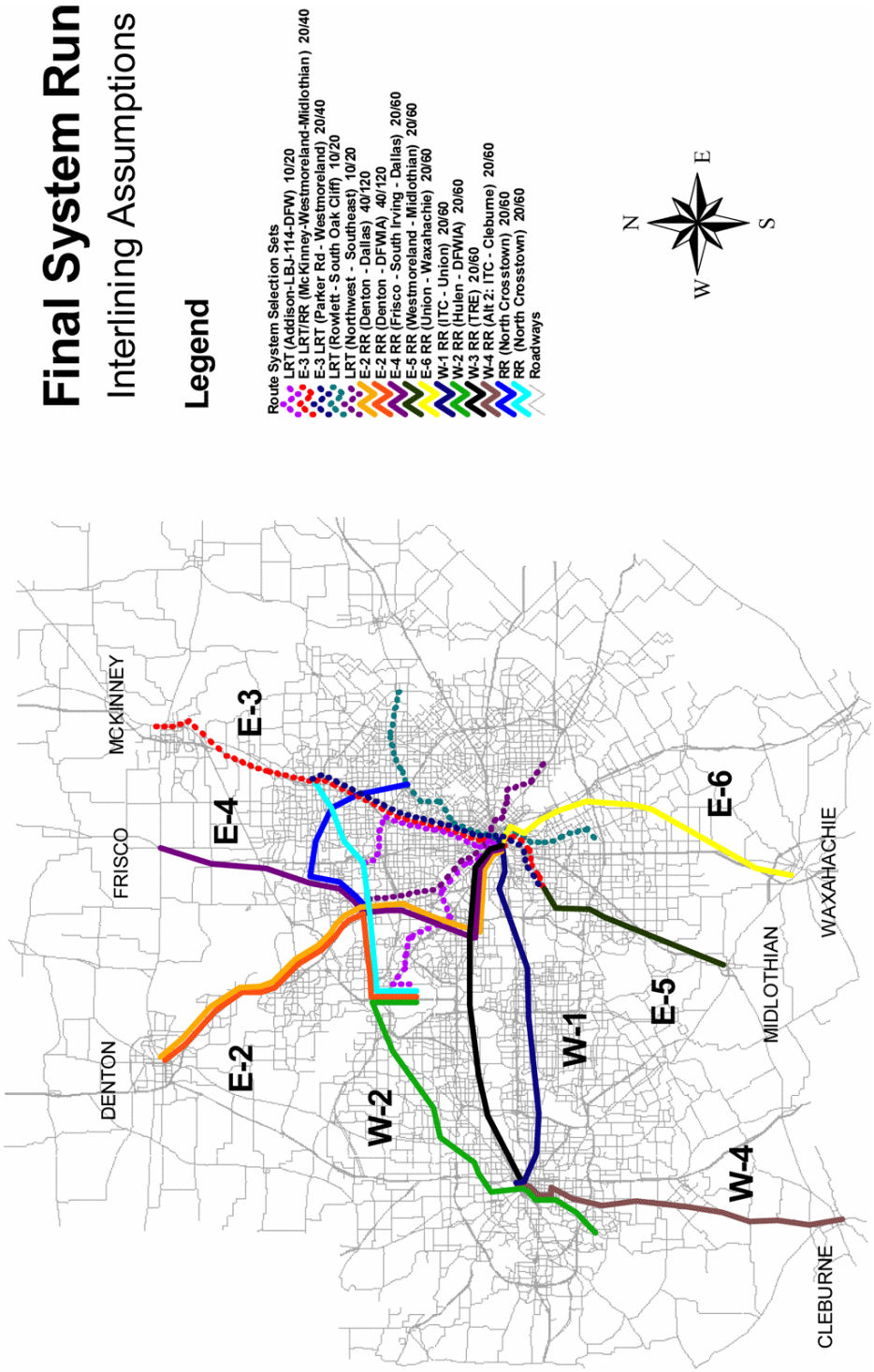
E-3 CORRIDOR RIDERSHIP

Travel Forecast	Technology	Average Weekday Ridership
Rail System Alternative 2	Regional rail with transfer	6,600
Rail System Alternative 3	Light rail without transfer	10,300
BRT System Alternative	Bus rapid transit with transfer	8,400
Final (2007)	*Intermediate capacity LRT****	*5,000**
Final (2030)	*Intermediate capacity LRT****	*7,100**
Final (2030 Adjusted)	*Intermediate capacity LRT****	*9,600***

*Recommended alternative
**Ridership adjusted to account for interlining of lines
***Intermediate Capacity Light Rail refers to a single track LRT implementation with occasional passing sidings. The ridership did not warrant full dual track LRT.

EXHIBIT V-13

REGIONAL RAIL CORRIDOR STUDY – FINAL RUN RECOMMENDED ALTERNATIVE



An important step in transit ridership analysis involves detailed reviews of projected passenger boardings and alightings at each station. Station riders by mode of access (i.e., walk, auto, feeder bus, and where applicable, transfers from other rail lines) were reviewed for accuracy and reasonableness. Shortcomings in network design as well as some coding errors can be identified as part of this review. Exhibit V-14 presents 2007 and 2030 ridership by station for the Final Run Recommended Alternative. Corridor line ridership is the sum of demand at stations along a given line, except for where corridor line ridership has been adjusted to account for interlining.

EXHIBIT V-14

RECOMMENDED ALTERNATIVE BOARDINGS BY STATION

Corridor	Stations	Regional Rail Boardings	
		2007	2030
E-3	McKinney Central LRT/RR	250	382
	McKinney North	350	1,076
	Fairview/FM1378	760	1,233
	Stacy	440	696
	FM2170	1,300	1,565
	Legacy Drive	250	237
	Spring Creek	680	757
	Parker Road	920	1,139
	Line Ridership	**4,950**	**7,085**

Source: NCTCOG-DFWRTM-Final Run Recommended Alternative

Performance Evaluation

Each modal alternative considered for the Regional Rail Corridor Study was evaluated with a set of performance indicators. The corridors were scored based upon a five-point system with five indicating a good score and one indicating a bad score. The individual criteria scores were then added to reflect a total score for each alternative, including a performance benchmark representing the overall cost effectiveness of each option. Exhibit V-15 contains a summary of the final performance of the E-3 Corridor.

EXHIBIT V-15

PERFORMANCE SUMMARY FOR E-3 CORRIDOR

Evaluation Criteria	E-3 Light Rail	Score
Performance benchmark (annual cost per annual rider)	$8.90	4
Total daily ridership forecast	9,600	4
One-way trip time (minutes)	33	4
Estimated capital cost (millions)	$312.80	4
Estimated annual O&M Cost (millions)	$11.00	3
Local authority and funding	None	1
Community acceptance	Community may be open to acceptance of light rail.	3
Ease of implementation	Light rail requires separate tracks or FRA-approved time separation.	4
Connectivity with existing and planned transit operations	Light rail allows interlining with DART in Plano without transfers.	5
Compatibility with freight railroad operations	Not compatible with freight operations unless time-separated and FRA waiver approved.	2
Serves area of unmet mobility need	Serves area of the most severe capacity deficiency	5
Impact upon adjacent highways and air quality	Benefit to adjacent highway is equivalent to one lane in each direction.	4
Transit oriented development potential	TOD potential exists.	2
TOTAL SCORE		**47**

The E-3 Corridor was considered for both regional rail service and intermediate capacity light rail service. Given the presence of DART light rail to Plano, the ability to extend a single track light rail line north to McKinney was considered feasible. This corridor scored well under both technology scenarios, with a total of 50 points for regional rail and 47 points for light rail.

The regional rail performance benchmark was $6.75 (score = 5 points), based on a total daily ridership forecast of 9,600 daily riders (score = 4 points) and an estimated annual operating and maintenance cost of $7.4 million (score = 4 points). The total capital cost

for the development of regional rail in this corridor was estimated to be $234.70 million (score = 5 points). Estimated trip time to travel the length of the corridor is 28 minutes (score =5 points). The project has no existing transit authority or funding designated for it at this time (score = 1 point), but the surrounding community may be open to accepting a regional rail type of service (score = 3 points). The right-of-way is owned and controlled by DART, making implementation relatively straight forward (score = 5 points). Use of Federal Railroad Administration (FRA) compliant regional rail technology in the corridor will require a transfer to the DART system at Plano in order to access other transit options in the region (score = 2 points), but is compatible with local freight operations (score = 5 points). The roadway capacity deficiency in the parallel corridor is severe, so the E-3 regional rail implementation would assist with unmet mobility needs (score = 5 points). The ridership projections for the corridor are equivalent to one lane of vehicular traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development potential exists (score = 2 points).

The Light Rail Performance Benchmark was $8.90 (score = 4 points), based on a total daily ridership forecast of 9,600 daily riders (score = 4 points) and an estimated annual operating and maintenance cost of $11 million (score = 3 points). The total capital cost for the development of a single track light rail operation in this corridor was estimated to be $312.8 million (score = 4 points). Estimated trip time to travel the length of the corridor via light rail is 33 minutes (score = 4 points). The project has no existing transit authority or funding designated for it at this time (score = 1 point), but the surrounding community may be open to accepting a light rail type of service (score = 3 points). Light rail requires separate tracks or FRA approved time separation (score = 4 points), but would allow for interlining with the DART system without any transfer required (score = 5

points). Light rail would not be compatible with freight operations in the corridor unless time-separated and a FRA waiver is approved (score = 2 points). The roadway capacity deficiency in the parallel corridor is severe, so the E-3 light rail implementation would assist with unmet mobility needs (score = 5 points). The ridership projections for the corridor are equivalent to one lane of vehicular traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development potential exists (score = 2 points).

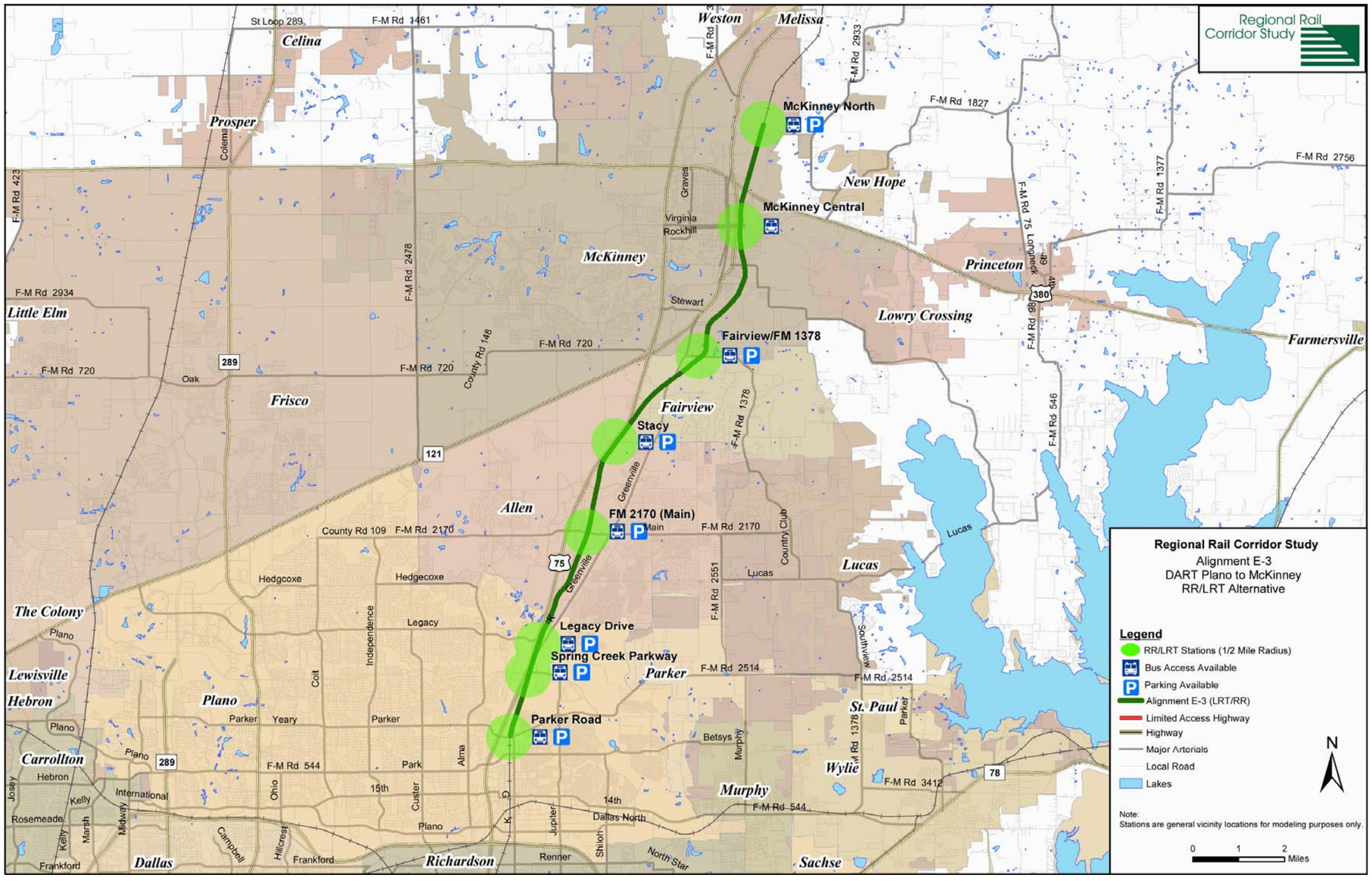
CORRIDOR RECOMMENDATIONS

The final recommendation for the E-3 Corridor is shown in Exhibit V-16. A non-compliant, yet LRT-compatible vehicle operating from downtown McKinney to downtown Dallas along the DART Red Line operation is recommended. The station locations shown in the map of the recommendation are for planning purposes only and would be refined as a more detailed Alternatives Analysis study of the corridor is conducted.

The E-3 Corridor was the second highest scoring corridor in the performance indicator analysis, with the regional rail alternative scoring better than the intermediate capacity light rail. The 2007 ridership estimates were high enough to indicate the need for near term (5-10 years) rail development in the corridor. The decision to extend some sort of light rail service or implement regional rail service that could potentially interface with the DART LRT operation should be resolved in a future alternatives analysis of the corridor.

EXHIBIT V-16

FINAL RECOMMENDATION FOR THE E-3 CORRIDOR



Dart Looking South from 14th Street toward overpass over Cotton Belt

Dart over Cotton Belt in Plano

Dart over Cotton Belt in Plano

Looking North from Park Blvd. At Dart LRT Station in Plano

Plano Looking south at end of LRT at Parker Rd

Looking North from Parker Rd

Plano Looking South at end of DART LRT from Parker Rd

Looking North along K Ave.

Rowlett Creek Bridge

South of Spring Creek Parkway, Track out of service

Track out of service just South of Spring Creek Parkway

US 75 overpass and Spring Greek Parkway looking West

Looking North from Legacy Dr

Looking South from Legacy Dr

Looking South from Ridgemont

Looking North from Ridgemont

Looking North between Ridgemont and Bethany Dr

Looking North between Ridgemont and Bethany Dr

Looking South from Bethany Dr

Looking North from Bethany Dr

Looking east from McDermott Dr crossing (near Austin at right)

Looking South from McDermott Dr in Allen

Allen Depot Looking North from McDermott Dr

Looking North from private crossing at Ash Street in Allen

Looking South from Private crossing at Ash Street in Allen

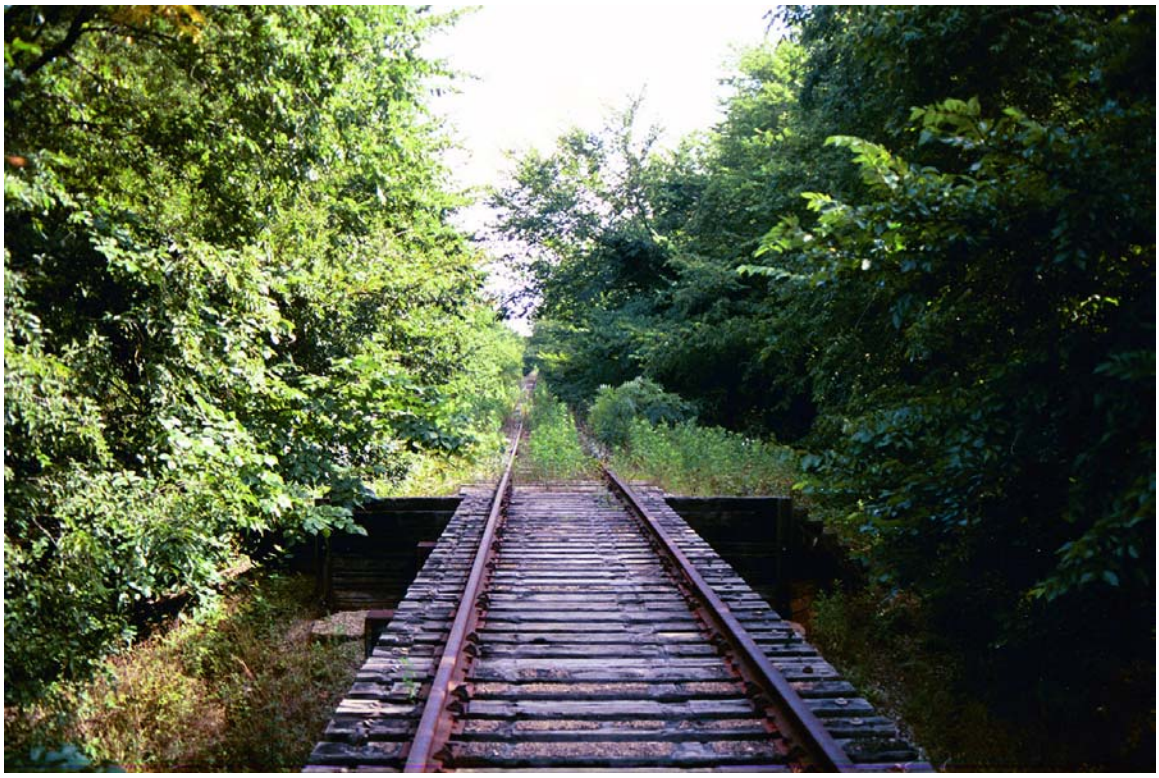
Looking North from Exchange Parkway

Bridge at Cottonwood Creek looking North

Bridge at Cottonwood Creek Looking North

Cottonwood Creek Bridge Looking North

Cottonwood Creek bridge Looking North



Cottonwood Creek Bridge Looking North

Cottonwood Creek Bridge Looking South

Looking South from Stacy Rd

Looking North from Stacy Rd

Texas State HWY 5 under railroad Looking NW

Country Club Rd Looking East

Country Club Rd Looking South

Country Club Rd Looking North

Old Mills Rd Historic Overpass (leads to land fill site) Looking West

Industrial Blvd. Looking West

Looking north from Industrial Blvd.

Looking South from Industrial Blvd.

Elm crossing in McKinney Looking East

Looking South from Elm in McKinney

Jefferson crossing in McKinney Looking East

Rockwall & Short Looking North

Anthony St Looking North

Just North of Anthony St

Louisiana St crossing Looking North

Looking South from Virginia St

Virginia St Looking West

Looking North from Virginia St, Potential Station Site

Broad St Looking NE Under railroad

University Dr underpass Looking West, Potential end point for initial commuter rail service

Collin County Rd 278

Collin County Rd 278 Looking South

Collin County Rd 278 Looking North

Collin County Rd 339

Collin County Rd 339 looking south

Melissa at East 545 Road looking south

Looking north from Santa Fe in Melissa

Looking south from Santa Fe in Melissa

Private crossing to cement plant between Melissa and Anna

Private crossing (was to a raceway which did not happen) between Melissa and Anna

East 455 Rd crossing in Anna

Looking north from 4th St in Anna

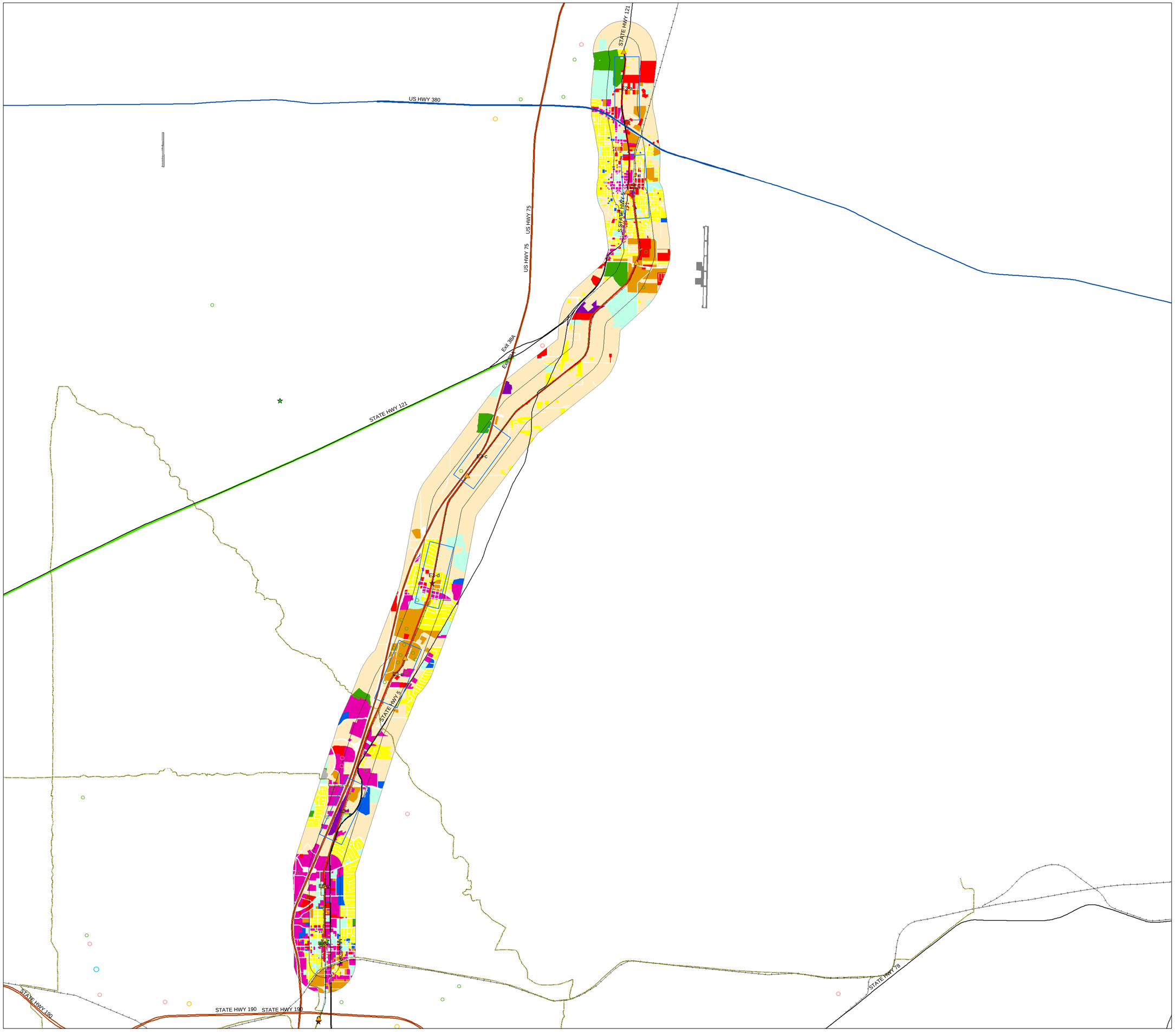
Looking north at 4th St crossing in distance in Anna

East 121 crossing in Van Alstyne

Stephens crossing looking north in Van Alstyne

East 121 crossing looking south in van Alstyne

Baseline Land Use Study: Corridor E-3



Legend

- Possible Station Location
- Existing Rail Station
- Existing Rail Station 1/4 mile buffer
- Mobility 2025 Rail Station
- New Stations Existing by 2008
- Fort Worth Trolley Stops
- 250 - 670
- 670 - 1450
- 1450 - 2750
- 2750 - 6250
- 6250 +
- Clide Award Winner
- JV Project - Selected
- JV Project - Not Selected
- Special Generator
- Amtrak stations
- Airport
- Veloweb
- Railroad
- Fort Worth Trolley Line
- Rail Lines Existing by 2008
- Primary Highway
- Secondary Highway
- Major Arterial
- Proposed Freeways and Tollroads
- Regional Rail Corridor

Regional Rail Corridor Buffer

Buffer Distance

- 0.00 - 0.25
- 0.25 - 0.50
- Single-family
- Multi-family
- Retail
- Office
- Vacant
- Park and Recreation
- Industrial
- Parking
- Institutional
- Hotel/Motel
- Utilities
- Mobile Homes
- Water
- Landfill
- Under Construction

E-3 Dallas Area Rapid Transit
begins in Plano, through Allen, Fairview, ends in McKinney, 16 miles in length

Potential Station Zone: 1/2 mile wide linear area of variable length based on the area of interest

Area of Interest	Station Status	County	Jurisdiction w/in walking distance of station	Characteristics of Interest	Development Type	Development Style	Future Land Use (comprehensive plan)	Zoning (of vacant land)	Other Comments
E3-a	Proposed	Collin	McKinney	**Employment within walking distance of the site:** Fisher Controls Intl. (358) **Current land uses:** office, park space, industrial, retail **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** US hwy 380 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development or greenfield development	hybrid			
E3-b	Proposed	Collin	McKinney	**Employment within walking distance of the site:** Collin County (1290) **Current land uses:** office, single-family, retail **Vacant land: inadequate for a station and transit oriented development** **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, US hwy 121 **Flood zone:** outside of floodplain Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid	Planned Development		
E3-c	Proposed	Collin	Fairview, Allen	**Employment within walking distance of the site:** Allen Premium Outlets (600) **Current land uses:** none **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, US hwy 75 **Flood zone:** Almost entirely outside of floodplain. Site was modeled for a station in the Mobility 2025 Plan	Greenfield development	hybrid		commercial	Outlets are on wrong side of the hwy
E3-d	Proposed	Collin	Allen	**Employment within walking distance of the site:** City of Allen (420) **Current land uses:** retail, office, single-family, institutional **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** Allen CBD Redevelopment joint venture project (not selected) **Site accessible via:** regional veloweb **Flood zone:** Almost entirely outside of floodplain.	Infill-other development or greenfield development	hybrid	LDR, park, medical office/supply, institutional/office, church, office/retail, residential/retail	single family residential community facilities	
E3-e	Proposed	Collin	Allen, Plano	**Employment within walking distance of the site:** Daisytek International (350), Quest (320), Alcatel (338), RCL Enterprises (307), Hit Entertainment (250), Dey Labratories (300), Sage Telecom (290), Metro-Optix (250), Mykrolis (250), Experian (800) **Current land uses:** retail, industrial **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, US hwy 75, state hwy 5 **Flood zone:** outside of floodplain Site was modeled for a station in the Mobility 2025 Plan	Infill-other development or greenfield development	hybrid		light industrial, garden office, office, community facility, corridor commercial	

E3-f	Proposed	Collin	Plano	**Employment within walking distance of the site:** Fujitsu (400), Walmart (250), Costco (280), Texas Instruments Inc. (800) **Current land uses:** retail, industrial, single-family, institutional **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, US hwy 75, state hwy 5 **Flood zone:** Partially within the 500 year floodplain - opportunity for green space.	Infill-other development or greenfield development	hybrid		corridor commercial	
E3-g	Existing by 2008	Collin	Plano	**Station:** Parker Road station **Infill Opportunities:** no vacant land for infill development, retail, institutional, on regional veloweb **Flood zone:** outside of floodplain	Infill-other development	hybrid			
E3-h	Existing by 2008	Collin	Plano	**Station:** Downtown Plano station **Infill Opportunities:** no vacant land for infill development, single-family, institutional, retail, on regional veloweb **Flood zone:** outside of floodplain	Infill-other development	hybrid			

EASTERN CORRIDOR COST ANAYLSIS (E-3)

REGIONAL RAIL CORRIDOR STUDY													
North Central Texas Council of Governments											**Link Number:**	**E-3**	
Parametric Cost Estimate											**Link Description:**	**McKinney**	
											Start Sta:		
											End Sta:		
		E-3 Plano to McKinney		**Regional Rail**				**Intermediate Light Rail**			**Link Length:**	**16.3**	
Description			**Unit**	**Unit Cost**	**Quantity**	**Cost**	**Subtotals**	**Unit Cost**	**Quantity**	**Cost**	**Subtotals**		**Remarks**
Site Work & Urban Design													
	Earthwork, 1 Track, Major		MI	$1,500,000									
	Earthwork, 1 Track, Basic		MI	$500,000	1.0	$500,000		$500,000	1.0	$500,000			
	Earthwork, 2 Tracks, Major		MI	$2,500,000				$3,500,000					
	Earthwork, 2 Tracks, Basic		MI	$750,000									
	Earthwork, Reconstruct Existing Track		MI	$100,000	16.3	$1,630,000		$100,000	16.3	$1,630,000			
	Urban Design/Signage/Landscaping		MI	$250,000	16.3	$4,075,000		$250,000	16.3	$4,075,000			
	Environmental Mitigation (Includes noise and vibration)		MI	$100,000	16.3	$1,630,000		$100,000	16.3	$1,630,000			
	Relocate Hike/Bike Trail		MI	$1,400,000				$1,400,000					
		Subtotal					**$7,835,000**				**$7,835,000**		
Trackwork													
	New Track, 136# CWR		MI	$1,000,000	17.3	$17,300,000		$1,000,000	17.3	$17,300,000			
	Upgrade Track to Class 4		MI	$500,000									
	Paved Embedded Track (Double)		MI	$4,000,000				$5,600,000					
	New Single Track #1 Relay Rail		MI	$800,000									
	New Turnout #10		EA	$125,000	4	$500,000		$125,000	16	$2,000,000			
	New Turnout #15		EA	$200,000	1	$200,000		$200,000					
	New Turnout #24		EA	$250,000	10	$2,500,000		$250,000					
	Rebuild Turnout or Diamond		EA	$75,000									
	New Railroad Diamond Crossing		EA	$200,000									
		Subtotal					**$20,500,000**				**$19,300,000**		
Structures													
	Elevated Track (railroad over railroad)		TF	$6,500				$10,000					
	Tunnel		TF	$10,000				$10,000					
	New Bridge (Minor)		TF	$4,500				$4,500					
	New Bridge (Major)		TF	$6,500				$6,500					
	Reconstruct Existing Bridge		TF	$2,500	1,016	$2,540,000		$2,500	1,016	$2,540,000			
	Retaining Wall (0 FT - 10 FT High)		TF	$175				$175					
	Retaining Wall (10 FT - 20 FT High)		TF	$525				$525					
	New Culvert		EA	$10,000	4	$40,000		$10,000	4	$40,000			4/mile
	Rehabilitate Culvert		EA	$5,000	65	$325,000		$5,000	65	$325,000			4/mile
		Subtotal					**$2,905,000**				**$2,905,000**		
Stations													
	At-grade Station		EA	$650,000	8	$5,200,000		$650,000	8	$5,200,000			
	Aerial Station (LRT)		EA					$4,600,000					
	Depressed Station (LRT)		EA					$15,000,000					
	Parking Spaces/Surface Lot		EA	$4,000	3,500	$14,000,000		$4,000	3,500	$14,000,000			avg=500/station
	Service and Layover Facility		EA	$5,000,000	1	$5,000,000		$5,000,000	1	$5,000,000			
	Central Maintenance Facility Contribution		EA	$1,000,000	1	$1,000,000		$2,000,000	1	$2,000,000			
		Subtotal					**$25,200,000**				**$26,200,000**		
Traction Electrification System (LRT)			MI					$1,600,000	17.3	$27,680,000			
		Subtotal									**$27,680,000**		
Signal System													
	Communications System (LRT)		MI					$1,100,000					
	New Railroad Interlocking		EA	$1,500,000									
	Modify Railroad Interlocking		EA	$750,000	1	$750,000							
	New CTC or LRT Signaling System		MI	$1,200,000	17.3	$20,760,000		$2,300,000	17.3	$39,790,000			
	Upgrade Railroad Signal System		MI	$600,000									
		Subtotal					**$21,510,000**				**$39,790,000**		
R.O.W. & Y Junction													
	R.O.W. Allowance		AC										
Utilities													
	Utilities Allowance		MI	$200,000	16.3	$3,260,000	**$3,260,000**	$200,000	16.3	$3,260,000	**$3,260,000**		
Crossings / Roadway													
	Minor Street At-grade (Gates & Warning Devices)		EA	$150,000	3	$450,000		$150,000	3	$450,000			
	Minor Street At-grade (w/ Quad Gates System & Warning Devices		EA	$250,000	15	$3,750,000		$250,000	15	$3,750,000			
	Major Street At-grade (w/ Quad Gates System & Warning Devices		EA	$450,000	5	$2,250,000		$450,000	5	$2,250,000			
	Reconstruct Existing Roadway Bridge		EA	$1,000,000				$1,000,000					
	Reconstruct Existing Roadway		SY	$40				$40					
	Construct New Roadway		SY	$80				$80					
	Highway/Railroad Grade Separation		EA	$8,000,000				$8,000,000					
		Subtotal					**$6,450,000**				**$6,450,000**		
Special Conditions													
		Subtotal											
		Subtotal A					**$87,660,000**				**$133,420,000**		
	MIS Level Design Contingency (% of A)		15%				$13,149,000	15%			$20,013,000		
	Construction Contingency (% of A)		10%				$8,766,000	10%			$13,342,000		
	Add-on Allowance (Eng., CM, etc) (% of A)		15%				$13,149,000	15%			$20,013,000		
Rail Vehicle Train Sets (actual without contingencies)			Train Set	$8,000,000	14	$112,000,000	**$112,000,000**	$9,000,000	14	$126,000,000	**$126,000,000**		
		Grand Total					**$234,724,000**				**$312,788,000**		
NOTE:	1. Unit Costs are expressed in present value dollars.												
	2. Retaining Wall Unit Cost is for one side only.												
	3. Cost estimate excludes ROW costs.												

Annualized Cost Estimate (E-3)

Regional Rail Corridor:	**E-3**	**Plano to McKinney**					Regional Rail Corridor:	E-3	Plano to McKinney
Annualized Capital Cost		Daily Riders:	9,600		9,600		Cost Category Summary		
		Annualized Riders:	2,976,000		2,976,000				
			Regional Rail	Regional Rail	Light Rail	Light Rail		Regional Rail	Light Rail
	Useful	Annualization	Total Cost ($mil)	Annualized	Total Cost ($mil)	Annualized		Total Cost ($mil)	Total Cost ($mil)
Cost Category	Life (yr)	Factor	(Incl. Contingency)	Cost ($mil)	(Incl. Contingency)	Cost ($mil)	Cost Category	(Incl. Contingency)	(Incl. Contingency)
Site work and Urban Design	100	0.070	$10.969	$0.768	$10.969	$0.768	Site work and Urban Design	$15.533	$15.533
Trackwork	30	0.081	$28.700	$2.325	$27.020	$2.189	Trackwork	$28.700	$27.020
Structures	30	0.081	$4.067	$0.329	$4.067	$0.329	Structures	$4.067	$4.067
Stations	20	0.094	$35.280	$3.316	$36.680	$3.448	Stations	$35.280	$36.680
LRT Electrification System	30	0.081	$0.000	$0.000	$38.752	$3.139	LRT Electrification System	$0.000	$38.752
Signal System	30	0.081	$30.114	$2.439	$55.706	$4.512	Signal System	Incl with Crossings/Roadway	
Right-of-Way	100	0.070	$0.000	$0.000	$0.000	$0.000	Right-of-Way	Not Applicable	
Utilities	20	0.094	$4.564	$0.429	$4.564	$0.429	Utilities	Incl with Site Work & Urban Design	
Crossings / Roadway	20	0.094	$9.030	$0.849	$9.030	$0.849	Crossings / Roadway	$39.144	$64.736
Special Conditions	20	0.094	$0.000	$0.000	$0.000	$0.000	Other	$0.000	$0.000
Vehicles	25	0.086	$112.000	$9.632	$126.000	$10.836	Vehicles	$112.000	$126.000
Total			$234.724	**$20.087**	$312.788	**$26.499**	Total	$234.724	$312.788
Performance Benchmark				**6.75**		**8.90**			

Notes:
1. Annualized Riders = Daily Riders times 310 days per year.
2. Performance Benchmark = Annualized Cost divided by Annualized Riders.

VI. E-4 – FRISCO LINE CORRIDOR CONSIDERATIONS

CORRIDOR DESCRIPTION

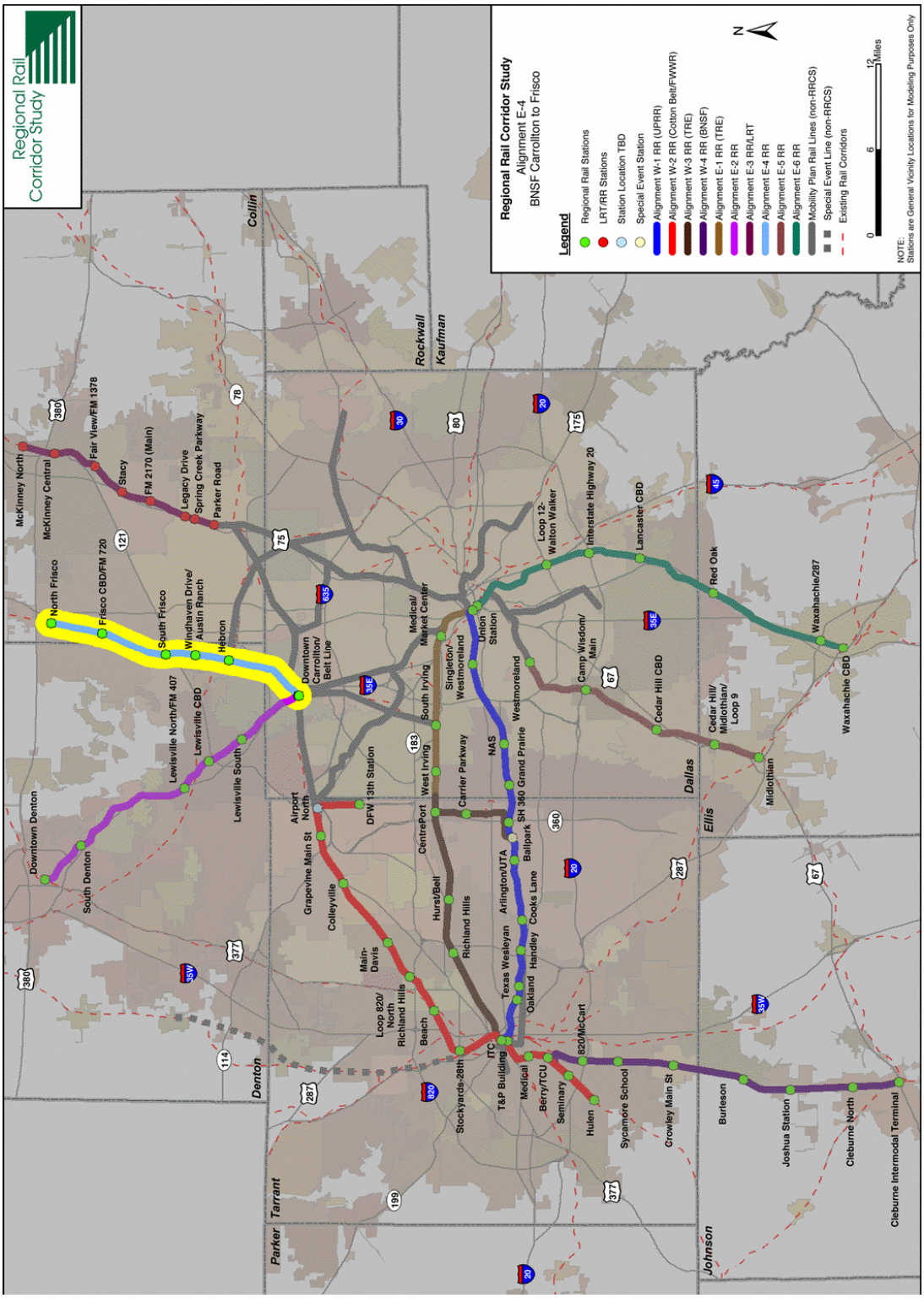
Corridor E-4 was one of eight existing freight rail corridors in the Dallas-Fort Worth area studied for the feasibility of implementing commuter rail, light rail, or other forms of transit service.

Corridor E-4 is a Burlington Northern and Santa Fe Railway (BNSF) line that extends between Carrollton and Frisco, a distance of approximately 19.5 route miles. Exhibit VI-1 shows the corridor location in relation to the entire system. The BNSF owns all of the right-of-way along the E-4 Corridor. The right-of-way is consistently 100 feet in width with some locations being as much as 300 feet in width.

The current maximum operating speed limit is 49 mph for freight trains. The line is not equipped with a railroad signal system and is operated under Track Warrant Control (TWC) rules. Approximately 12 to 14 freight trains operate over the line each day. About one-half of the trains operated are unit rock trains.

EXHIBIT VI-1

E-4 CORRIDOR LOCATION MAP



Existing Track Conditions

The E-4 Carrollton to Frisco rail corridor consists of a single main track with one 6,258-foot long passing siding located at Hebron (located between Parker Road and SH-121) and an interchange/connecting siding with the DGNO at Bliss (located just northeast of Carrollton).

The track consists mostly of 115-pound and 132-pound rail on timber ties. All of the rail will need ultrasonic inspection before passenger service can be operated over the track. There are four industrial spur tracks located on the E-4 corridor as presented in Exhibit VI-2.

EXHIBIT VI-2

E-4 INDUSTRIAL SPUR TRACK LOCATIONS

Owner	Location
TXI at Camey	MP 690.3
Martin Marietta	MP 686.0
Unidentified grain elevator	MP 685.6
Unidentified lumber distributor	MP 685.4

There are no intermodal facilities or other rail/truck transfer facilities in the E-4, Carrollton to Frisco, rail corridor. A fact sheet summarizing the existing conditions and issues for the E-4 corridor is shown in Exhibit VI-3.

EXHIBIT VI-3

E-4 CORRIDOR FACT SHEET

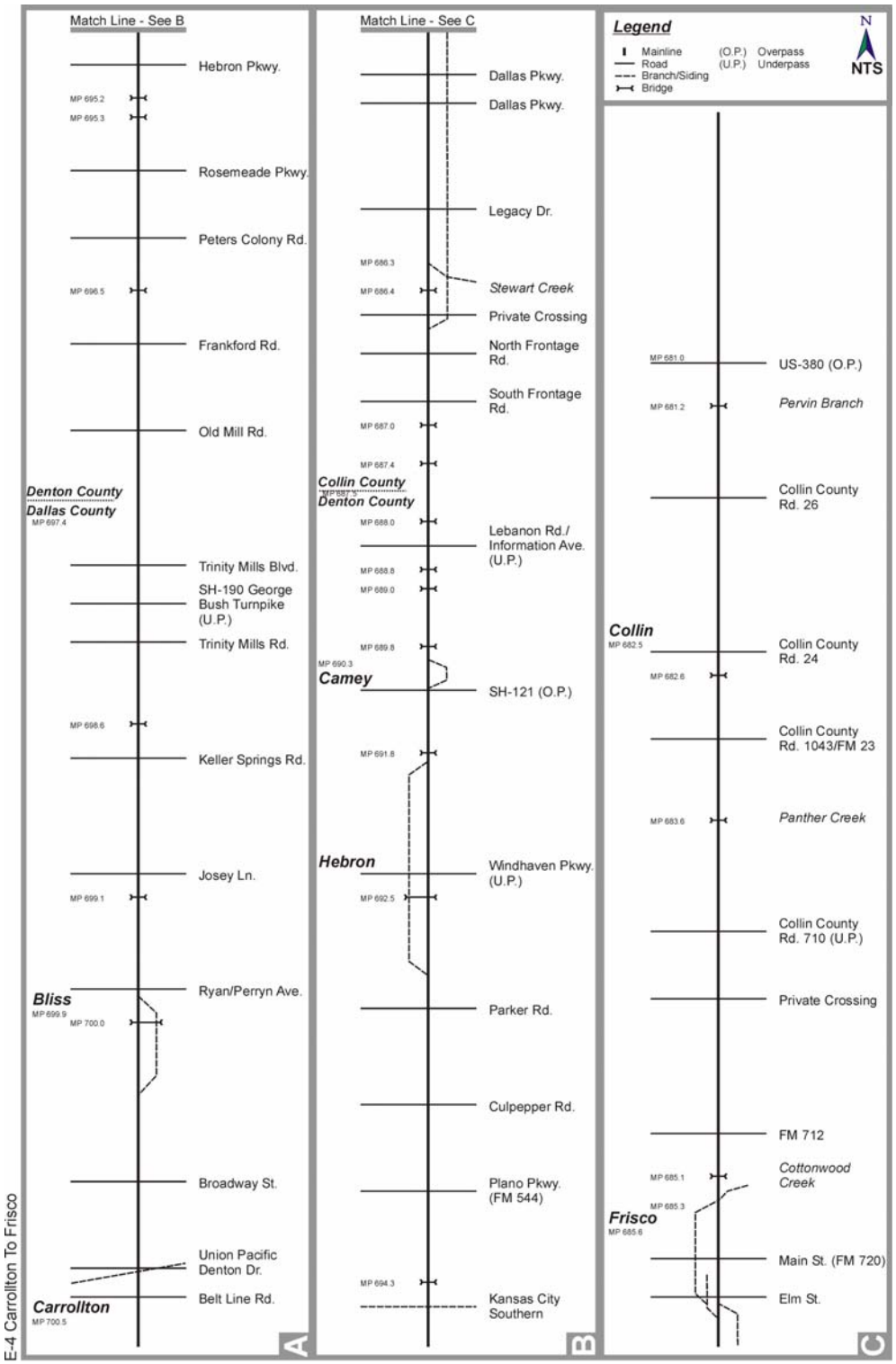
Owner(s) of the line	BNSF
Operator(s) of the line	BNSF
Trackage rights	None
Length of the corridor	19.5 miles
Average trains per weekday	12 to 14 (approximately half are rock trains)
Track summary	▪ Single track with one siding at Hebron. ▪ No railroad signaling. ▪ Maximum speed is 48 mph.
Railroad crossings	▪ Twenty-six (26) at-grade highway/railroad crossings. ▪ Six (6) grade-separated highway/railroad crossings. ▪ Two (2) at-grade railroad/railroad crossings and one (1) over-crossing.
Jurisdictions	▪ Carrollton, through The Colony, ends in Frisco.
Industrial sidings	▪ Six
Corridor issues	▪ Upscale homes along tracks in Frisco. ▪ Need to add CTC signal system.

Schematic of the Corridor

A schematic diagram of the E-4 Corridor may be found in Exhibit VI-4.

EXHIBIT VI-4

E-4 CORRIDOR SCHEMATIC



Detailed Information

This section contains detailed information for the bridges, culverts, and railroad/highway grade crossings and grade separations located along the 19.5 miles of the E-4 corridor between Carrollton and Frisco.

There are three railroad/railroad crossings in the E-4 corridor. The two at-grade railroad/railroad crossings are located in Carrollton and are both crossings of the BNSF with the Union Pacific Railroad. The other railroad crossing is a grade-separated crossing with the Kansas City Southern Railroad over the BNSF at MP 694.4 located between Hebron Parkway and Plano Parkway.

There are a total of 32 railroad/highway at-grade crossings and highway grade separations in the 19.5 miles of the E-4 corridor between Carrollton and Frisco. Of the 32 crossings, 24 are at-grade public crossings, 2 are private crossings, and 6 are grade-separated overpasses or underpasses. The crossing equipment and surfaces for the at-grade crossings are in good condition. A detailed listing of the railroad/highway grade crossings and overpasses/underpasses is provided in Exhibit VI-5.

EXHIBIT VI-5

RAIL/HIGHWAY CROSSINGS AND OVER/UNDER PASSES

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
700.1	Belt Line Road	Public	Lights/Bells/Gates	TBD
700.2	Broadway Street	Public	Lights/Bells/Gates	TBD
700.3	Denton Drive	Public	Lights/Bells/Gates	627149T
699.5	Ryan / Perry	Public	Lights/Bells/Gates	672148L
699.0	Josey Lane	Public	Lights/Bells/Gates	672147E
698.7	Keller Springs Road	Public	Lights/Bells/Gates	669526B
697.7	Trinity Mills Road	Public	Lights/Bells/Gates	669376V
697.6	SH-190 (George Bush Tollway)	Public	Underpass	65113V
697.5	Trinity Mills Boulevard	Public	Lights/Bells/Gates	675114C
697.3	Old Mill Road	Public	Lights/Bells/Gates	672146X
696.7	Frankford Road	Public	Flashers	669511L
696.2	Eters Colony Road	Public	Lights/Bells/Gates	673388W
695.7	Rosemeade Parkway	Public	Lights/Bells/Gates	672145R
694.8	Hebron Parkway	Public	Lights/Bells/Gates	672144J
693.8	Plano Pkway (FM 544)	Public	Lights/Bells/Gates	672142V
693.6	Culpepper Road	Public	Lights/Bells/Gates	672141N
693.4	Parker Road	Public	Lights/Bells/Gates	TBD
692.5	Windhaven Parkway	Public	Underpass	675115J
690.9	SH-121	Public	Overpass	672139M
688.5	Information Avenue	Public	Underpass	672136S
686.8	South Frontage Road	Public	Lights/Bells/Gates	675184S
686.7	North Frontage Road	Public	Lights/Bells/Gates	675183K
686.5	Private crossing	Private	Stop signs	TBD
685.8	Elm Street	Public	Crossbucks	672133W
685.7	FM 720	Public	Lights/Bells/Gates	672132P
684.9	County Road (FM 712)	Public	Crossbucks & Stop signs	672131H
684.4	Private Crossing	Private	Stop signs	672130B
683.7	Collin County Road 710	Public	Underpass	672128A
683.0	Collin County Road 23	Public	Crossbucks	672127T
682.5	Collin County Road 24	Public	Crossbucks	672126L
681.5	Collin County Road 26	Public	Crossbucks	672125E
681.0	US-380	Public	Overpass	672124X

Source: URS Corp. 2003

A total of 23 bridges and 48 culverts are located along the 19.5 miles between Carrollton and Frisco. Of the 23 bridges, 5 are timber pile trestles, 4 are steel bridges, 13 are concrete bridges, and 1 bridge over County Road 710 is unidentified as to its construction. Of the bridges seen, the bridges are in good condition. A detailed list of the bridges and culverts are provided in Exhibit VI-6.

EXHIBIT VI-6

RAILROAD BRIDGES AND CULVERTS

Milepost	Bridge Type	Length	Remarks
700.0	Concrete box girder, 2 spans at 96' each, ballasted deck, 2 tracks	192'	Located at Bliss
699.4	Corrugated metal pipe	36" x 52'	
699.1	Steel through plate girder, ballasted deck	186'	
698.9	Corrugated metal pipe	24" x 44'	
698.6	Concrete box girder, ballasted deck	137'	
698.3	Corrugated metal pipe	24" x 30'	
698.1	Corrugated metal pipe	102" x 56'	
697.6	Concrete box girder, ballasted deck	Unknown	Over SH-190 (George Bush Tollway)
697.1	Concrete arch culvert	6' x 6' x 48'	
696.5	Timber pile trestle, open deck	138'	
695.7	Corrugated metal pipe	24"	
695.6	Corrugated metal pipe	24" x 36'	
695.3	Steel I-beam, concrete abutments, open deck	54'	
695.2	Concrete box girder, ballasted deck	56'	
694.6	Corrugated metal pipe	24" x 48'	
694.5	Corrugated metal pipe	24" x 50'	
694.3	Timber pile trestle, open deck	42"	
694.1	Corrugated metal pipe	36" x 36'	
693.8	Corrugated metal pipe	36" x 36'	
693.4	Corrugated metal pipe	60" x 76'	
693.2	Cast iron pipe	34" x 60'	
693.1	Concrete arch culvert	20'x17'x60'	
693.0	Corrugated metal pipe	24" x 43'	
692.9	Corrugated metal pipe	36" x 58'	
692.8	Corrugated metal pipe	36" x 52'	
692.7	Corrugated metal pipe	24" x 56'	
692.6	Corrugated metal pipe	36" x 72'	
692.5	Steel I-beam through girder, concrete abutments, ballasted deck, two tracks	Unknown	Over Windhaven Parkway

Milepost	Bridge Type	Length	Remarks
692.4	Multi-plate pipe	84” x 54’	
692.3	Corrugated metal pipe	24” x 46’	
692.2	Concrete box culvert	6’ x 6’ x 47’	
692.0	Corrugated metal pipe	30” x 84’	
691.8	Concrete box girder, ballasted deck, four spans at 28’ each	112’	
691.4	Corrugated metal pipe	78”	
691.1	Corrugated metal pipe	48” x 40’	
689.8	Concrete I-girder, ballasted deck	125’	
689.5	Vitrified concrete pipe	25” x 42’	
689.4	Corrugated metal pipe	24” x 48’	
689.3	Reinforced concrete pipe	36” x 17’	
689.0	Concrete box girder, ballasted deck	41’	
688.8	Concrete I-girder, ballasted deck	82’	
688.5	Concrete box girder, ballasted deck	Unknown	Over Information Avenue
688.0	Concrete box girder, ballasted deck	Unknown	
687.8	Concrete box culvert	4’ x 4’ x 60’	
687.4	Concrete box girder, ballasted deck	125’	
687.0	Timber pile trestle, open deck	51’	
686.8	Multi-plate pipe	78”	
686.8	Corrugated metal pipe	60”	
686.4	Concrete box girder, ballasted deck	193’	Stewart Creek
685.8	Cast iron pipe	8” x 40’	
685.6	Reinforced concrete pipe	48”	
685.1	Timber pile trestle, open deck	69’	Cottonwood Creek
684.9	Cast iron pipe	24” x 22’	
684.9	Cast iron pipe	36” x 24’	
684.8	Two 24” Vitrified concrete pipe with 24” corrugated metal pipe extension		
684.6	Corrugated metal pipe	66” x 80’	
684.1	Corrugated metal pipe	24” x 36’	
683.7	Unknown	Unknown	Over Collin County Rd 710
683.6	Timber pile trestle, open deck	340’	Panther Creek
683.1	Cast iron pipe	36” x 20’	
682.6	Concrete deck, two spans	56’	South of County Road 24
682.5	Corrugated metal pipe	72” x 66’	
681.9	Corrugated metal pipe	72” x 66’	
681.2	Steel I-beam	84’	South of US-380

Source: URS Corp. 2003

Photos Taken in the Corridor

During the physical inspection of the E-4 Corridor, photographs were taken of various features and conditions along the line. Photographs were taken of as many of the bridges, highway crossings, overpasses, underpasses, sidings, track conditions, special conditions or constraints, and general right-of-way conditions and features as possible. The photographs taken along the corridor are included at the end of this chapter.

Existing Land Use

A baseline land use survey was conducted by NCTCOG staff at the onset of the Regional Rail Corridor Study. The major focus of this study was to help locate specific areas along the corridors that possess characteristics that could support the development of a rail station and/or transit-oriented development. Baseline land use maps and the associated station location information for the corridor may be found following the corridor photographs.

INFRASTRUCTURE CONSTRAINTS

A number of infrastructure issues and constraints should be addressed in order to establish regional rail passenger service within this corridor. Identified infrastructure constraints include the following considerations:

- The track should be replaced along the entire corridor due to the poor condition of the rail, ties and ballast. Passing tracks will be required at stations and other convenient locations. Turnouts located in the main track that serve industrial tracks should be upgraded when the main track is upgraded. Future installation of double track should not be precluded. The bridges on the line are in good condition with several being relatively new. Highway/railroad at-grade crossings

with minimal crossing protection will have to be improved with the installation of warning devices such as lights, bells, and gates, with train speed predictors. Existing crossings with high volumes of auto traffic should be improved with four quadrant gates, median dividers, and train speed predictors.

- Centralized Traffic Control (CTC) will be required over the entire corridor if maximum train speed is to exceed 59 mph. The installation of CTC should include provisions for bi-directional running, electric switch locks on all turnouts located in main track, and should be dispatched from a local control point such as an existing TRE or DART facility.
- Compatibility with the existing DART light rail system is an issue in Carrollton, the at-grade BNSF and UP railroad crossings, and continuity of travel between Carrollton and Dallas.
- Noise mitigation may be of concern to residents in the newer developments in Frisco due to the proximity of the new homes to the railroad track.

DEFINITION OF FEASIBLE ALTERNATIVES

The Regional Rail Corridor Study considered three primary types of options for the rail corridors under study. Regional rail, light rail, and bus rapid transit were the primary modes or options considered. A screening process took place for each corridor to determine if all three options were reasonable or if a subset was more appropriate. The discussion of options pertinent to Corridor E-4 follows.

Description of Modal Alternatives in Corridor E-4

Regional Rail

The regional rail alternative would provide regional rail passenger service along the BNSF Corridor between Carrollton and Frisco. Passing tracks would be required at stations and other convenient locations. Train control and signal systems would be upgraded. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of automotive traffic will have to be improved with the installation of warning devices such as lights, bells, and gates. Five regional rail passenger stations would be constructed along the E-4 Corridor between the Carrollton Intermodal Center at Belt Line Road and Frisco. The locations of new stations must be determined with consideration for the BNSF freight traffic. Exhibit VI-7 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for this modal alternative. Exhibit VI-8 shows the Regional Rail Alternative for the E-4 Corridor.

EXHIBIT VI-7

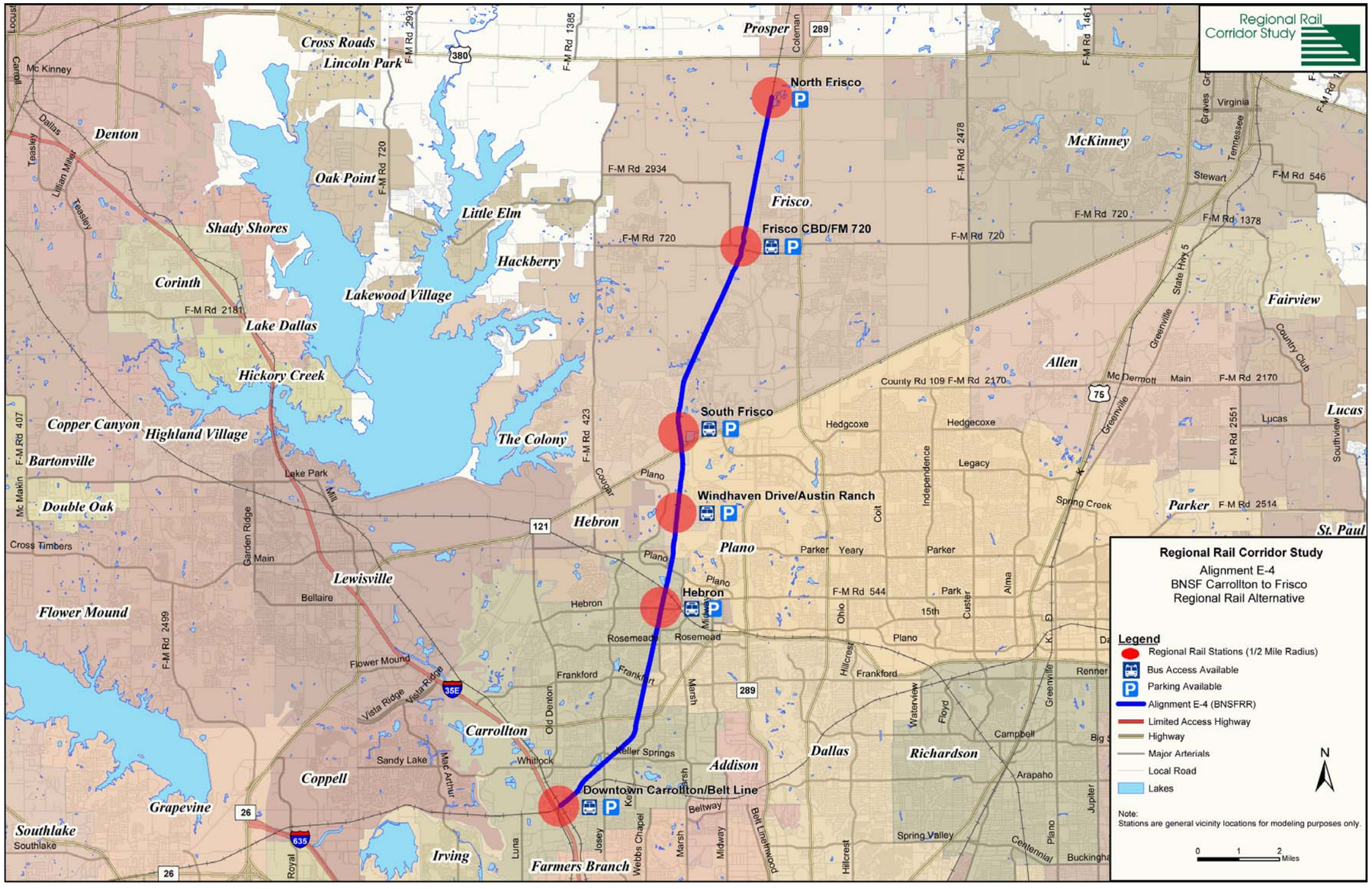
REGIONAL RAIL SERVICE ASSUMPTIONS

Regional Rail (headways = 20 minutes/60 minutes)		
Stations*	**Local Bus**	**Park-and-Ride**
Downtown Carrollton / Belt Line	Yes	Yes
Hebron	Yes	Yes
Windhaven Drive / Austin Ranch	Yes	Yes
South Frisco	Yes	Yes
Frisco CBD / FM 720	Yes	Yes
North Frisco	No	Yes

* Station locations, feeder bus and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT VI-8

REGIONAL RAIL ALTERNATIVE FOR THE E-4 CORRIDOR



Light Rail

The light rail alternative would provide light rail transit (LRT) service within the E-4 Corridor. A LRT line would be constructed along the BNSF Corridor between Carrollton and Frisco, interlining with the DART Northwest LRT line at the Carrollton Intermodal Center at Belt Line Road. New track would be constructed at-grade within the railroad right-of-way. Six additional LRT passenger stations would be constructed along the E-4 Corridor between the Intermodal Center at Belt Line Road and Frisco. The exact locations of new stations must be determined in later phases of project development. Exhibit VI-9 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for LRT Modal Alternative. Exhibit VI-10 shows the Light Rail Alternative for the E-4 Corridor.

EXHIBIT VI-9

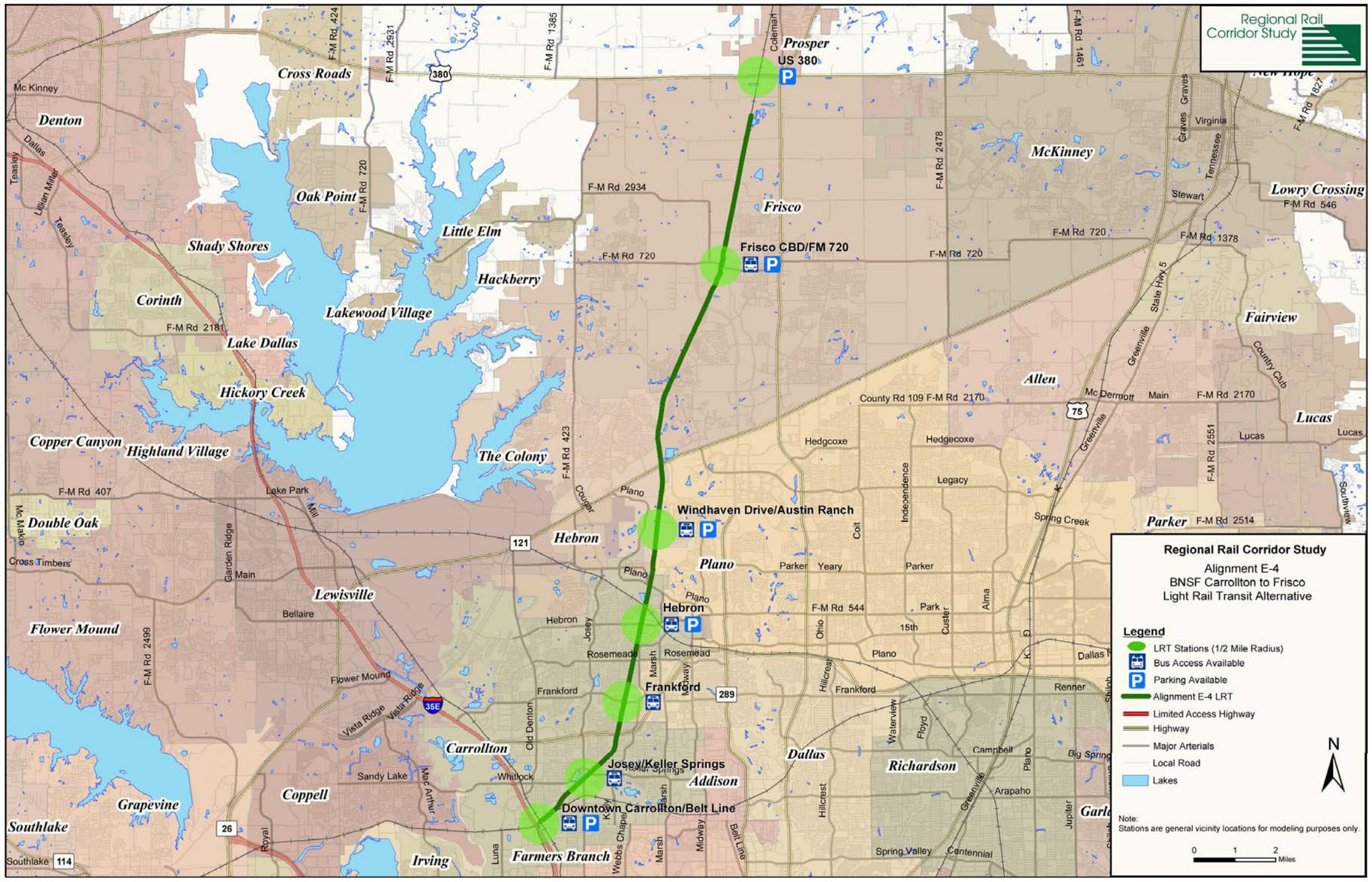
LIGHT RAIL SERVICE ASSUPTIONS

Light Rail (headways = 10 minutes/20 minutes)		
Stations*	**Local Bus**	**Park-and-Ride**
Downtown Carrollton/Belt Line	Yes	Yes
Josey/Keller Springs	Yes	No
Frankford	Yes	No
Hebron	Yes	Yes
Windhaven Drive/Austin Ranch	Yes	Yes
Frisco CBD/FM 720	Yes	Yes
US 380	No	Yes

* Station locations, feeder bus and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT VI-10

LIGHT RAIL ALTERNATIVE FOR THE E-4 CORRIDOR



Bus Rapid Transit

Bus rapid transit was not considered a viable alternative for the E-4 Corridor because of the presence of freight rail traffic currently utilizing the existing BNSF tracks within the corridor. In addition, there were no parallel streets or highways to offer an alternative to the rail right-of-way.

EVALUATION OF ALTERNATIVES

Two different modal alternatives were evaluated for this corridor:

- Regional rail with transfer
- Light rail without transfer

In addition to the assumptions pertaining to different technologies and operating characteristics (station locations, headways, operating speeds, and supply of feeder buses at stations), the relationship of the E-4 Corridor to the others in the regional system was also considered.

One of the key evaluation or performance indicators used projected 2030 average weekday ridership. The complete list of performance indicator is found in Chapter II – Corridor Description and Evaluation. In order to streamline the development of travel forecasts for the Regional Rail Corridor Study, the various modal alternatives containing regional or light rail for each corridor were combined into a series of rail system alternatives for forecasting. Several of the corridors also serve travel markets that interact or compete with each other, so it was important to design the system forecasts to minimize this interrelationship as much as possible. Travel demand forecasts for four rail system alternatives were developed initially, along with BRT system alternative maps

showing these system alternatives. Ridership summaries for these system alternatives are also contained in Chapter II of this report.

Ridership Summary

In order to optimize the performance of the E-4 Corridor in the rail system developed for the Final Run Recommended Alternative the regional rail line from Frisco was interlined along the Burlington Northern/Santa Fe Corridor to the Trinity Railway Express Corridor to provide direct service to the Dallas CBD. This route is shown in purple in Exhibit VI-11.

Exhibit VI-12 presents projected average weekday ridership resulting from each of the rail system alternatives for the E-4 Corridor (see Chapter II for a complete description). In Rail System Alternative 1, the E-4 Corridor was tested as a regional rail line from Frisco to Dallas, with a transfer to DART's Northwest LRT line at Beltline Road in Carrollton. Rail System Alternative 4 assumed a light rail line interlining with DART's Northwest LRT line, providing service from Frisco to Dallas CBD and beyond. Reported ridership for this alternative is for the portion of the line between Belt Line Station and the line's terminus in Frisco.

As explained in Chapter II, the ridership resulting from the Rail System Alternatives was used to compare the performance of the modal alternatives for each corridor. The best performing option, which for E-4 would be either regional rail or light rail, was then the recommendation for the corridor and, consequently, included in the Final Run Recommended Alternative. Exhibit VI-11 shows the ridership from the Final Run Recommended Alternative as well.

EXHIBIT VI-11

REGIONAL RAIL CORRIDOR STUDY – FINAL RUN RECOMMENDED ALTERNATIVE

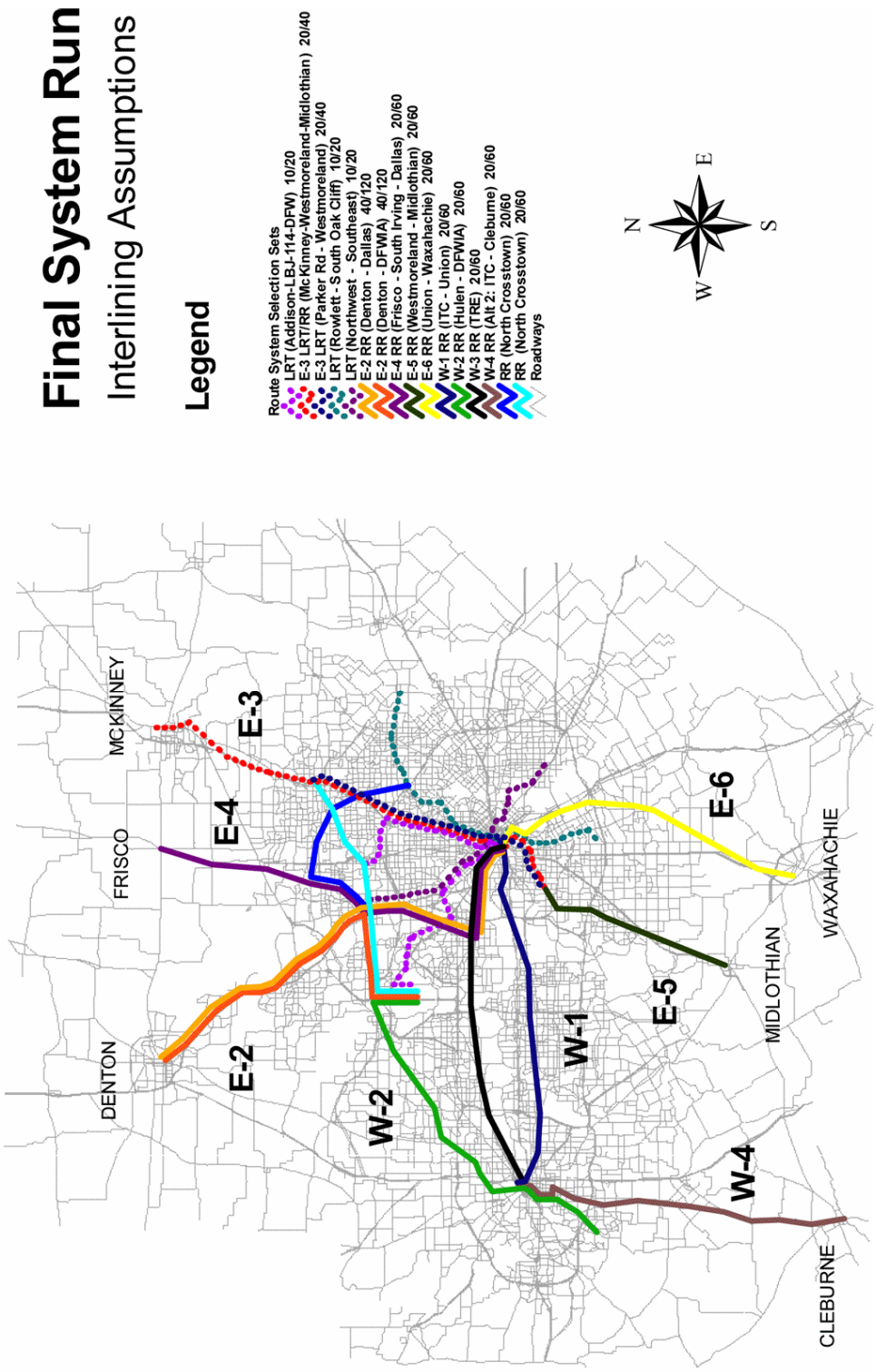


EXHIBIT VI-12

E-4 CORRIDOR RIDERSHIP

Travel Forecast	Technology	Average Weekday Ridership
Rail System Alternative 1	Regional rail with transfer	7,600
Rail System Alternative 4	Light rail transit without transfer	8,400
Final (2007)	*Regional rail – interlined to Dallas*	*3,000**
Final (2030)	*Regional rail - interlined to Dallas*	*5,500**
Final (2030 Adjusted)	*Regional rail - interlined to Dallas*	*6,500***

*Recommended alternative
**Ridership adjusted to account for interlining of lines

It should be noted, that the 2030 ridership for this corridor was adjusted upward in order to reflect ridership gains resulting from the interlining of the proposed line in this corridor with other rail lines in the background network. It is assumed that interlining benefits are not reflected in station ridership data along a given corridor, the sum of which constitutes total corridor ridership. This adjustment was based on rail link gateway volumes at the terminus of the corridor. (See Chapter II for additional explanation.)

To properly stage the recommended alternative, corridor ridership was also generated for the year 2007, measuring the impact of demographics growth on the proposed alternative. The process leads to the identification of corridors worthy of priority implementation.

An important step in transit ridership analysis involves detailed reviews of projected passenger boardings and alightings at each station. Station riders by mode of access (walk, auto, feeder bus, and where applicable, transfers from other rail lines) were reviewed for accuracy and reasonableness. Shortcomings in network design as well as

some coding errors can be identified as part of this review. Exhibit VI-13 presents 2007 and 2030 ridership by station for the Final Run Recommended Alternative. Corridor line ridership is the sum of demand at stations along a given line, except for where corridor line ridership has been adjusted to account for interlining.

EXHIBIT VI-13

FINAL RUN RECOMMENDED ALTERNATIVE BOARDINGS BY STATION

Corridor	Stations	Regional Rail Boardings	
		2007	2030
E-4	Frisco North	390	1,400
	Frisco CBD/FM 720	550	1,200
	South Frisco	490	570
	Hebron	670	900
	Windhaven/Austin	190	300
	Downtown Carrollton/Belt Line	730	1,200
	Line Ridership	**3,020**	**5,570**

Source: NCTCOG-DFWRTM

Performance Evaluation

Each modal alternative considered for the Regional Rail Corridor Study was evaluated with a set of performance indicators. The corridors were scored based upon a five point system with five indicating a good score and one indicating a bad score. The individual criteria scores were then added to reflect a total score for each alternative, including a performance benchmark representing the overall cost effectiveness of each option. Exhibit VI-14 contains a summary of the final performance of the E-4 Corridor.

EXHIBIT VI-14

PERFORMANCE SUMMARY FOR CORRIDOR E-4

Evaluation Criteria	E-4 Regional Rail	Score
Performance benchmark (annual cost per annual rider)	$7.50	4
Total daily ridership forecast	6,500	3
One-way trip time (minutes)	33	5
Estimated capital cost (millions)	$161.4	5
Estimated annual O&M cost (millions)	$9.40	5
Local authority and funding	None	1
Community acceptance	Community may be open to acceptance of regional rail type service.	3
Ease of implementation	Use of right-of-way must be negotiated with the BNSF.	4
Connectivity with existing and planned transit operations	Regional rail will require transfer to DART at Carrollton for some route choices.	4
Compatibility with freight railroad operations	Regional rail equipment is compatible.	3
Serves area of unmet mobility need	Serves area of severe capacity deficiency	4
Impact upon adjacent highways and air quality	Benefit to adjacent highway is equivalent to one lane in each direction.	4
Transit oriented development potential	TOD potential exists.	2
TOTAL SCORE		**46**

The E-4 Corridor scored 46 points in the overall evaluation. The performance benchmark was $7.50 (score = 4 points), based on a total daily ridership forecast of 6,500 riders (score = 3 points). The costs for the corridor include an estimated annual operating and maintenance cost of $9.40 million (score = 5 points) and total capital cost for regional rail development of $161.4 million (score = 5 points). Estimated trip time to travel one way, the length of the corridor is 33 minutes (score = 5 points). The project has no existing transit authority or funding designated for it at this time (score = 1 point), but the community may be open to a regional rail service (score = 3 points). The right-of-way must be negotiated with the BNSF Railroad (score = 4 points). Use of Federal

Railroad Administration (FRA) compliant regional rail technology in the corridor will require a transfer to the DART system at Carrollton in order to access other transit options in the region (score = 4 points), but is compatible with local freight operations (score = 3 points). The roadway capacity deficiency in the parallel corridor is severe, so the E-4 regional rail implementation would assist with unmet mobility needs (score = 4 points). The ridership projections for the corridor are equivalent to one lane of vehicular traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development potential exists (score = 2 points).

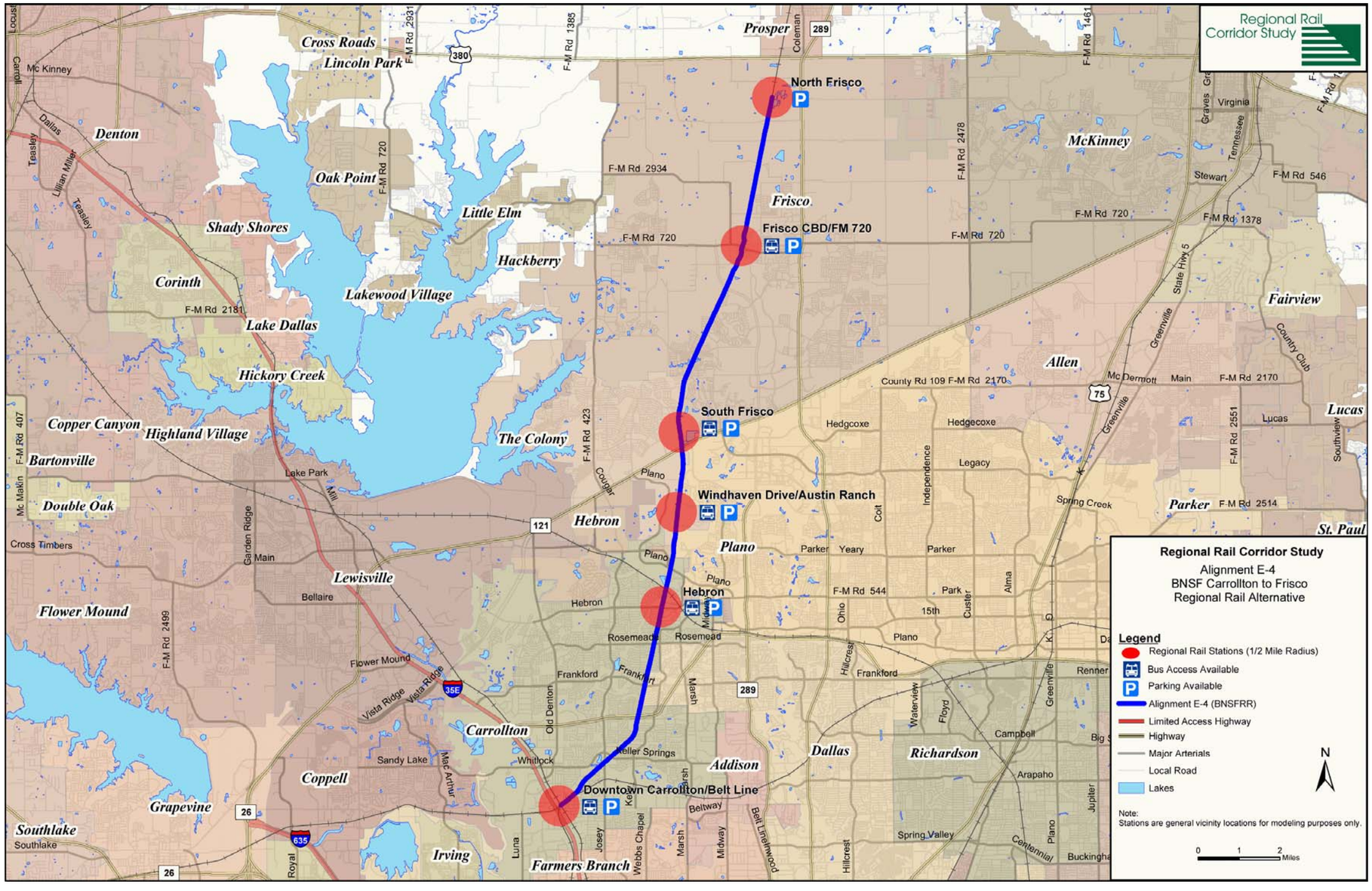
CORRIDOR RECOMMENDATIONS

The final recommendation for the E-4 Corridor is shown in Exhibit VI-15. Regional rail operating from Frisco to the DART LRT station at the Carrollton Intermodal Center at Belt Line Road is shown, with potential interlining to downtown Dallas along the Burlington Northern/Trinity Railway Express combination shown in Exhibit VI-15. The station locations shown in Exhibit VI-15 are for planning purposes only and would be refined as a more detailed Alternatives Analysis study of the corridor is conducted.

The E-4 Corridor was in the top range of corridor scores, when compared to all of the corridors. The 2007 ridership estimates were high enough to indicate the need for near term (5-10 years) rail development in the corridor. The decision to implement regional rail service in this corridor should be part of a future corridor Alternatives Analysis.

EXHIBIT VI-15

FINAL RECOMMENDATION FOR THE E–4 CORRIDOR



Looking North near MP 700.1

Looking North near MP 700.2

MP 700.0 Looking North

MP 699.5 Ryan Rd

MP 698.6

MP 698.0

MP 697.6 Trinity Mills Rd With George Bush Turnpike under bridge

MP 697.2 Old Mills Rd

MP 696.7 Fankford Rd

MP 696.5

MP 696.0

MP 695.7 Rosemeade Parkway

MP 695.35

MP 695.3

MP 695.2

MP 695.0

MP 694.8 Hebron Parkway

MP 694.4 KCS over BNSF

MP 694.3

MP 694.0

MP 693.4 Parker Rd

MP 693.2 South end of Hebron Siding

MP 693.0 Hebron Siding at right

MP 692.5 over Windhaven Parkway

MP 692 North end of Hebron Siding

MP 691.8

MP 690.9 HWY 121 Overpass

MP 690.8 South end of Camey Siding

MP 690.3 Camey

MP 690.0

MP 689.8

MP 689.0

MP 688.8

MP 688.5 Bridge over County Rd

MP 688.0

MP 687.4

MP 687.0

Looking North at South Frontage Rd and North Frontage Rd (MP 686.8 & 686.7 respectively)

MP 686.4 Looking North at Stewart Creek Bridge

MP 686.3 Looking North toward Frisco

MP 686.0 near Frisco

MP 686.1 near Frisco

MP 685.6 Frisco Looking North

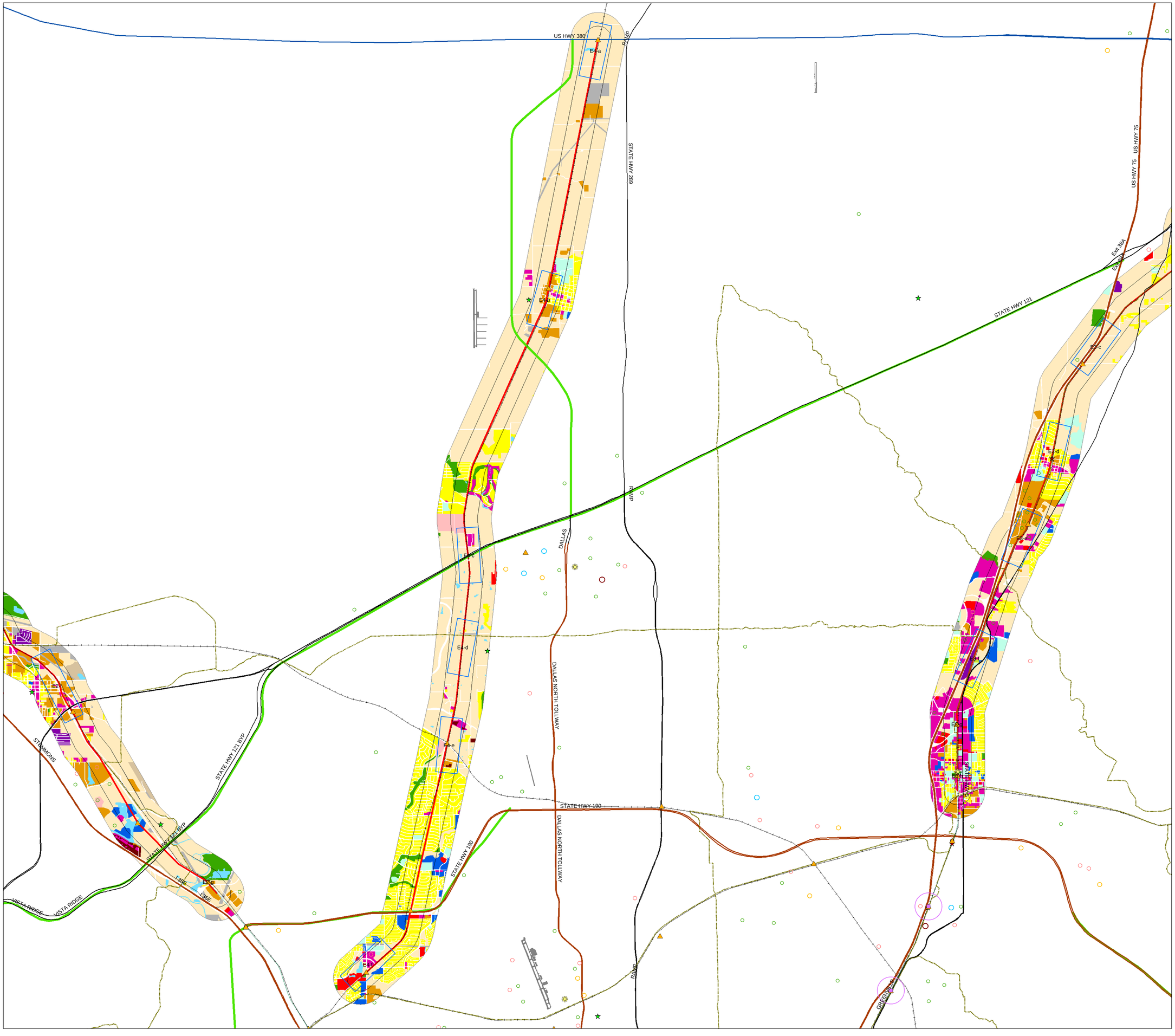
MP 685.2 Looking North

Cottonwood Creek in Frisco

MP 681.0 BNSF Frisco Line Looking North from US 380 overpass

BNSF Frisco Line Looking South US 380 overpass

Baseline Land Use Study: Corridor E-4



Legend

- Possible Station Location
- Existing Rail Station
- Existing Rail Station 1/4 mile buffer
- Mobility 2025 Rail Station
- New Stations Existing by 2008
- Fort Worth Trolley Stops
- 250 - 670
- 670 - 1450
- 1450 - 2750
- 2750 - 6250
- 6250 +
- Clide Award Winner
- JV Project - Selected
- JV Project - Not Selected
- Special Generator
- Amtrak stations
- Airport
- Veloweb
- Railroad
- Fort Worth Trolley Line
- Rail Lines Existing by 2008
- Primary Highway
- Secondary Highway
- Major Arterial
- Proposed Freeways and Tollroads
- Regional Rail Corridor

Regional Rail Corridor Buffer

Buffer Distance

- 0.00 - 0.25
- 0.25 - 0.50

Land Use

- Single-family
- Multi-family
- Retail
- Office
- Vacant
- Park and Recreation
- Industrial
- Parking
- Institutional
- Hotel/Motel
- Utilities
- Mobile Homes
- Water
- Landfill
- Under Construction

E-4 Burlington Northern Santa Fe
begins in Carrollton, through The Colony, ends in Frisco, 19 miles in length

Potential Station Zone: 1/2 mile wide linear area of variable length based on the area of interest

Area of Interest	Station Status	County	Jurisdiction w/in walking distance of station	Characteristics of Interest	Development Type	Development Style	Future Land Use (comprehensive plan)	Zoning (of vacant land)	Other Comments
E4-a	Proposed	Collin	Frisco, Prosper	**Employment within walking distance of the site:** N/A **Current land uses:** N/A **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** US hwy 380, state hwy 289 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Greenfield development	hybrid			
E4-b	Proposed	Collin	Frisco	**Employment within walking distance of the site:** N/A **Current land uses:** single-family, industrial, institutional **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** Frisco Square joint venture project **Site accessible via:** state hwy 289, proximate to a Regional Thoroughfare Plan proposed freeway **Flood zone:** outside of floodplain Site was modeled for a station in the Mobility 2025 Plan	Infill-other development or greenfield development	hybrid			
E4-c	Proposed	Denton	Plano, The Colony, Frisco	**Employment within walking distance of the site:** N/A **Current land uses:** retail, under construction **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** state hwy 121 **Flood zone:** outside of floodplain	Greenfield development	hybrid		agricultural, commercial employment	
E4-d	Proposed	Denton	The Colony, Plano	**Employment within walking distance of the site:** N/A **Current land uses:** utilities **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** Austin Ranch joint venture project **Site accessible via:** regional veloweb **Flood zone:** Partially within the 100 year floodplain - opportunity for green space.	Greenfield development	hybrid		corridor commercial	
E4-e	Proposed	Denton	Carrollton	**Employment within walking distance of the site:** N/A **Current land uses:** single-family, industrial, retail, under construction **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** proximate to state hwy 190, KCS Railroad **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development or greenfield development	hybrid			

E4-f	Proposed	Dallas	Carrollton	**Employment within walking distance of the site:** City of Carrollton (950) **Current land uses:** office, retail, single-family, institutional **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, state hwy 190 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid			

EASTERN CORRIDOR COST ANAYLSIS (E-4)

REGIONAL RAIL CORRIDOR STUDY												
North Central Texas Council of Governments										Link Number:	E-4	
Parametric Cost Estimate										Link Description:	Frisco	
										Start Sta:		
										End Sta:		
		E-4 Carrollton to Frisco		Regional Rail				Light Rail		Link Length:	19.5	
Description			Unit	Unit Cost	Quantity	Cost	Subtotals	Unit Cost	Quantity	Cost	Subtotals	Remarks
Site Work & Urban Design												
	Earthwork, 1 Track, Major		MI	$1,500,000		$0						
	Earthwork, 1 Track, Basic		MI	$500,000	3.0	$1,500,000						
	Earthwork, 2 Tracks, Major		MI	$2,500,000		$0		$3,500,000		$0		
	Earthwork, 2 Tracks, Basic		MI	$750,000		$0						
	Earthwork, Reconstruct Existing Track		MI	$100,000	19.5	$1,950,000						
	Urban Design/Signage/Landscaping		MI	$250,000	19.5	$4,875,000		$750,000		$0		
	Environmental Mitigation (Includes noise and vibration)		MI	$100,000	19.5	$1,950,000		$100,000		$0		
	Relocate Hike/Bike Trail		MI	$1,400,000		$0		$1,400,000		$0		
		Subtotal					**$10,275,000**				**$0**	
Trackwork												
	New Track, 136# CWR		MI	$1,000,000	3.0	$3,000,000		$1,850,000		$0		
	Upgrade Track to Class 4		MI	$500,000	19.5	$9,750,000						
	Paved Embedded Track (Double)		MI	$4,000,000		$0		$5,600,000		$0		
	New Single Track #1 Relay Rail		MI	$800,000		$0						
	New Turnout #10		EA	$125,000		$0		$125,000		$0		
	New Turnout #15		EA	$200,000	6	$1,200,000		$200,000		$0		
	New Turnout #24		EA	$250,000	10	$2,500,000		$250,000		$0		
	Rebuild Turnout or Diamond		EA	$75,000	12	$900,000						
	New Railroad Diamond Crossing		EA	$200,000	1	$200,000						
		Subtotal					**$17,550,000**				**$0**	
Structures												
	Elevated Track (railroad over railroad)		TF	$6,500		$0		$10,000		$0		
	Tunnel		TF	$10,000		$0		$10,000		$0		
	New Bridge (Minor)		TF	$4,500		$0		$4,500		$0		
	New Bridge (Major)		TF	$6,500		$0		$6,500		$0		
	Reconstruct Existing Bridge		TF	$2,500	640	$1,600,000		$2,500		$0		
	Retaining Wall (0 FT - 10 FT High)		TF	$175		$0		$175		$0		
	Retaining Wall (10 FT - 20 FT High)		TF	$525		$0		$525		$0		
	New Culvert		EA	$10,000	12	$120,000		$10,000		$0		4/mile
	Rehabilitate Culvert		EA	$5,000	78	$390,000		$5,000		$0		4/mile
		Subtotal					**$2,110,000**				**$0**	
Stations												
	At-grade Station		EA	$650,000	5	$3,250,000		$2,800,000		$0		
	Aerial Station (LRT)		EA			$0		$4,600,000		$0		Carrollton
	Depressed Station (LRT)		EA			$0		$15,000,000		$0		
	Parking Spaces/Surface Lot		EA	$4,000	2,500	$10,000,000		$4,000		$0		avg=500/station
	Service and Layover Facility		EA	$2,000,000	1	$2,000,000		$5,000,000		$0		
	Central Maintenance Facility Contribution		EA	$1,000,000	1	$1,000,000		$2,000,000		$0		
		Subtotal					**$16,250,000**				**$0**	
Traction Electrification System (LRT)			MI			$0	**$0**	$1,600,000		$0	**$0**	
		Subtotal										
Signal System												
	Communications System (LRT)		MI			$0		$1,100,000		$0		
	New Railroad Interlocking		EA	$1,500,000		$0						
	Modify Railroad Interlocking		EA	$750,000	1	$750,000						
	New CTC or LRT Signaling System		MI	$1,200,000	22.5	$27,000,000		$2,300,000		$0		
	Upgrade Railroad Signal System		MI	$600,000		$0						
		Subtotal					**$27,750,000**				**$0**	
R.O.W. & Y Junction												
	R.O.W. Allowance		AC			$0	**$0**				**$0**	
Utilities												
	Utilities Allowance		MI	$200,000	19.5	$3,900,000	**$3,900,000**	$400,000		$0	**$0**	
Crossings / Roadway												
	Minor Street At-grade (Gates & Warning Devices)		EA	$150,000	2	$300,000		$150,000		$0		
	Minor Street At-grade (w/ Quad Gates System & Warning Devices		EA	$250,000	6	$1,500,000		$250,000		$0		
	Major Street At-grade (w/ Quad Gates System & Warning Devices		EA	$450,000	15	$6,750,000		$450,000		$0		
	Reconstruct Existing Roadway Bridge		EA	$1,000,000		$0		$1,000,000		$0		
	Reconstruct Existing Roadway		SY	$40		$0		$40		$0		
	Construct New Roadway		SY	$80		$0		$80		$0		
	Highway/Railroad Grade Separation		EA	$8,000,000		$0		$8,000,000		$0		
		Subtotal					**$8,550,000**				**$0**	
Special Conditions												
	Contribution for Regional Rail at Carrollton Station		EA	$1,000,000	1	$1,000,000				**$0**		
						$0				**$0**		
						$0				**$0**		
		Subtotal					**$1,000,000**				**$0**	
		Subtotal A					**$87,385,000**				**$0**	
	MIS Level Design Contingency (% of A)		15%				$13,107,750	30%		$0	$0	
	Construction Contingency (% of A)		10%				$8,738,500	10%		$0	$0	
	Add-on Allowance (Eng., CM, etc) (% of A)		15%				$13,107,750	30%		$0	$0	
Rail Vehicle Train Sets (actual without contingencies)			Train Set	$8,000,000	7	$56,000,000	**$56,000,000**	$9,000,000		$0	**$0**	
		Grand Total					**$178,339,000**				**$0**	
NOTE:	1. Unit Costs are expressed in present value dollars.											
	2. Retaining Wall Unit Cost is for one side only.											
	3. Cost estimate excludes ROW costs.											

Annualized Cost Estimate (E-4)

Regional Rail Corridor:	**E-4**	**Carrollton to Frisco**					Regional Rail Corridor:	E-4	Carrollton to Frisco
Annualized Capital Cost		Daily Riders:	6,500		0		Cost Category Summary		
		Annualized Riders:	2,015,000		0				
			Regional Rail	Regional Rail	Light Rail	Light Rail		Regional Rail	Light Rail
	Useful	Annualization	Total Cost ($mil)	Annualized	Total Cost ($mil)	Annualized		Total Cost ($mil)	Total Cost ($mil)
Cost Category	Life (yr)	Factor	(Incl. Contingency)	Cost ($mil)	(Incl. Contingency)	Cost ($mil)	Cost Category	(Incl. Contingency)	(Incl. Contingency)
Site work and Urban Design	100	0.070	$14.385	$1.007	$0.000	$0.000	Site work and Urban Design	$19.845	$0.000
Trackwork	30	0.081	$24.570	$1.990	$0.000	$0.000	Trackwork	$24.570	$0.000
Structures	30	0.081	$2.954	$0.239	$0.000	$0.000	Structures	$2.954	$0.000
Stations	20	0.094	$22.750	$2.139	$0.000	$0.000	Stations	$22.750	$0.000
LRT Electrification System	30	0.081	$0.000	$0.000	$0.000	$0.000	LRT Electrification System	$0.000	$0.000
Signal System	30	0.081	$38.850	$3.147	$0.000	$0.000	Signal System	Incl with Crossings/Roadway	
Right-of-Way	100	0.070	$0.000	$0.000	$0.000	$0.000	Right-of-Way	Not Applicable	
Utilities	20	0.094	$5.460	$0.513	$0.000	$0.000	Utilities	Incl with Site Work & Urban Design	
Crossings / Roadway	20	0.094	$11.970	$1.125	$0.000	$0.000	Crossings / Roadway	$50.820	$0.000
Special Conditions	20	0.094	$1.400	$0.132	$0.000	$0.000	Other	$1.400	$0.000
Vehicles	25	0.086	$56.000	$4.816	$0.000	$0.000	Vehicles	$56.000	$0.000
Total			$178.339	**$15.108**	$0.000	**$0.000**	Total	$178.339	$0.000
Performance Benchmark				**7.50**		**#DIV/0!**			
Notes:									
1. Annualized Riders = Daily Riders times 310 days per year.									
2. Performance Benchmark = Annualized Cost divided by Annualized Riders.									

VII. E-5 – MIDLOTHIAN LINE CORRIDOR CONSIDERATIONS

CORRIDOR DESCRIPTION

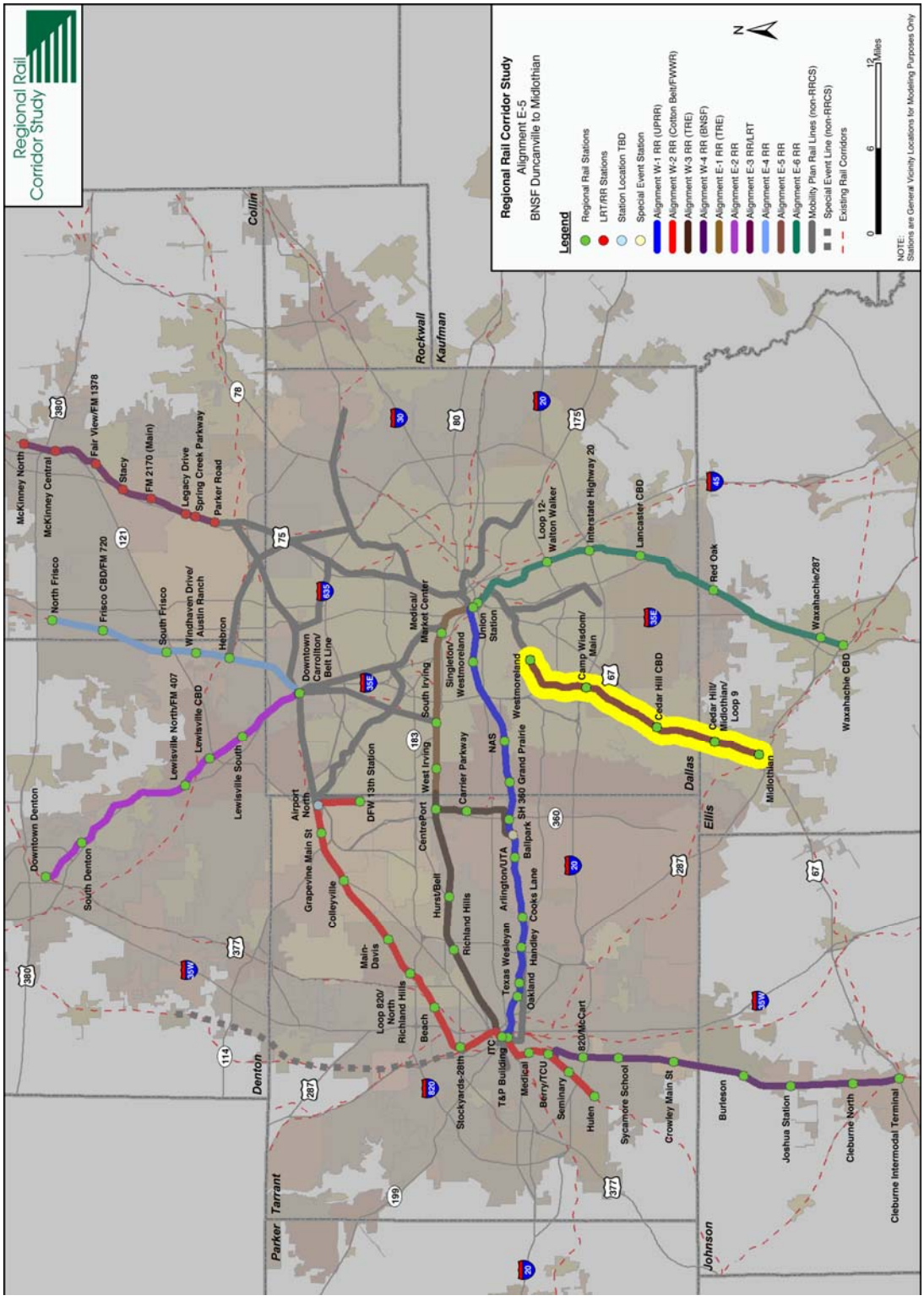
Corridor E-5 is one of eight existing freight rail corridors in the Dallas-Fort Worth area studied for the feasibility of implementing commuter rail, light rail, or other form of transit service.

Corridor E-5 is a Burlington Northern and Santa Fe Railway (BNSF) line that extends from Midlothian north to the DART light rail station at Westmoreland Road in Dallas, a distance of approximately 18.8 route miles. Exhibit VII-1 is a corridor location map highlighting the E-5 corridor. BNSF owns all of the right-of-way along the E-5 Corridor. DART has LRT operating rights between the Westmoreland Station and Duncanville. The right-of-way is typically 100 feet in width.

The current maximum operating speed limit is 20 mph. The line is not equipped with a railroad signal system and is operated under Track Warrant Control (TWC) rules. Approximately four local freight trains operate over the line each day.

EXHIBIT VII-1

E-5 CORRIDOR LOCATION MAP



Existing Track Conditions

The E-5 Corridor consists of a single main track with four passing/industrial sidings located at Midlothian, Duncanville, Red Bird Industrial Park, and Hale.

The track consists mostly of 119-pound continuous welded rail on timber ties. The rail is essentially in good condition. Many of the ties are in fair to poor condition. The track should be upgraded and all of the rail will need ultrasonic inspection or a continuous search for internal rail defects before passenger service can be operated over the track. There are 16 industrial tracks located on the E-5 corridor as presented in Exhibit VII-2.

EXHIBIT VII-2

E-5 INDUSTRIAL SPUR TRACK LOCATIONS

Owner	Location
Unidentified	MP 26.9
Automobile transfer facility and coal-fired power plant	MP 27.5 to MP 28.5
Cement plant	MP 29.3
Unidentified	MP 32.1
Unidentified	MP 34.6
Unidentified	MP 40.1
Unidentified	MP 40.9
84 Lumber	MP 41.3
Unidentified	MP 42.2
Lumber Yard	MP 42.8
Unidentified	MP 43.4
Unidentified	MP 45.7

A fact sheet summarizing the existing conditions and issues for the E-5 corridor is shown in Exhibit VII-3.

EXHIBIT VII-3

E-5 CORRIDOR FACT SHEET

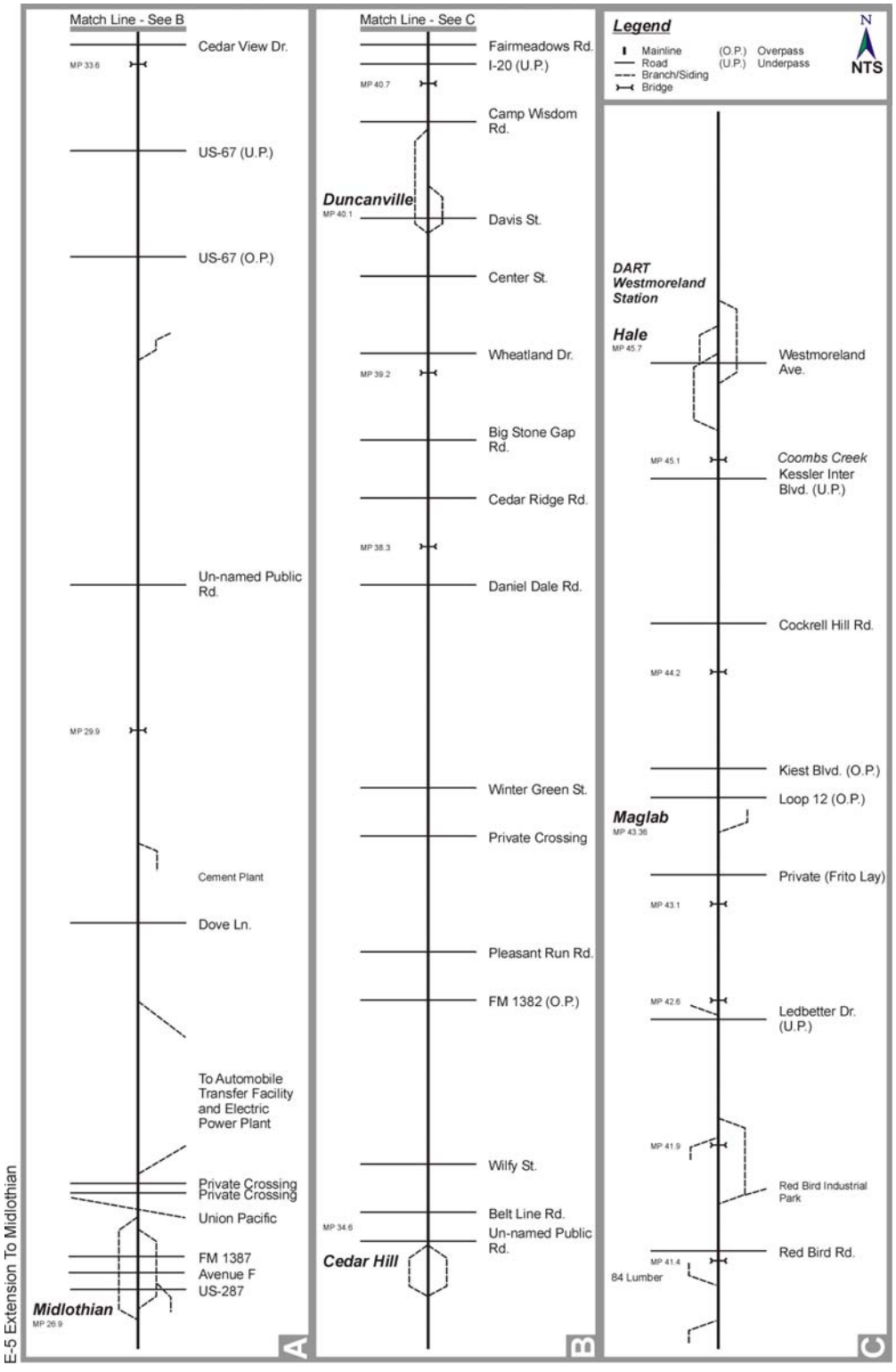
Owner(s) of the line	BNSF
Operator(s) of the line	BNSF
Trackage rights	DART has LRT rights between DART Westmoreland Station and Duncanville.
Length of the corridor	18.8 miles
Average trains per weekday	4 local
Track summary	▪ Single track without passing sidings (except at industries). ▪ No railroad signaling. ▪ Maximum speed is 20 mph.
Railroad crossings	▪ Twenty-five (25) at-grade highway/railroad crossings. ▪ Eight (8) grade-separated highway/railroad crossings. ▪ One (1) at-grade railroad/railroad crossing.
Jurisdictions	▪ Midlothian, through Cedar Hill, Duncanville, ends in Dallas.
Industrial sidings	▪ Sixteen including auto facility, coal-fired power plant, cement plant near Midlothian and Cedar Hill Industrial Park.
Corridor issues	▪ Track to be upgraded for higher speeds. ▪ Need to add CTC signal system. ▪ Communities along the line appear to be sparsely populated.

Schematic of the Corridor

Exhibit VII-4 shows a schematic diagram of the Extension to Midlothian rail corridor.

EXHIBIT VII-4

E-5 CORRIDOR SCHEMATIC



Detailed Information

This section contains detailed information for the bridges, culverts, and railroad/highway grade crossings and grade separations located along the 18.8 miles of the E-5 corridor. There is one at-grade railroad/railroad crossing with the UP that is located in Midlothian.

There is one rail/truck transfer facility in the E-5 rail corridor. The facility is an automobile rail to truck transfer facility located less than one mile north of Midlothian. The automobile facility is served by the Texas Central Business Lines Railroad (TCB), a local industrial operation.

There are a total of 34 railroad/highway at-grade crossings and highway grade separations in the 18.8 miles of the E-5 corridor between Midlothian and Westmoreland Road. Of the 34 crossings, 22 are public at-grade crossings, 4 are private crossings, and 8 are grade-separated overpasses or underpasses. The crossing equipment and surfaces for the at-grade crossings are in good condition. A detailed list of the railroad/highway grade crossings and overpasses/underpasses is provided in Exhibit VII-5.

EXHIBIT VII-5

RAIL/HIGHWAY CROSSINGS AND OVER/UNDER PASSES

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
26.9	US-287	Public	Lights/bells/gates	21901F
26.95	Avenue F	Public	Crossbucks	21902M
27.05	FM 1387	Public	Crossbucks	21903U
27.4	Private crossing	Private	Crossbucks	21904B
27.5	Private crossing	Private	Crossbucks	21761F
29.0	Dove Lane	Public	Crossbucks	21906P
30.5	Un-named public road	Public	Crossbucks	21907W
32.6	US-67	Public	Overpass	21909K
33.7	US-67	Public	Underpass	21910E
33.9	Cedar View Drive	Public	Crossbucks	21911L
34.6	Un-named public road	Public	Crossbucks	21912T
34.7	Belt Line Road	Public	Lights/bells/gates	21913A
34.9	Wilfy Street	Public	Lights/bells/gates	21914G
35.7	FM 1382	Public	Overpass	21915M
35.9	Pleasant Run Road	Public	Lights/bells/gates	21916V
36.6	Private crossing	Private	None	21917C
36.8	Wintergreen Street	Public	Lights/bells/gates	21918J
38.2	Danieldale Road	Public	Lights/bells/gates	21066H
38.5	Cedar Ridge Road	Public	Lights/bells/gates	21773A
38.9	Big Stone Gap Road	Public	Lights/bells/gates	21919R
39.3	Wheatland Drive	Public	Lights/bells/gates	21921S
39.8	Center Street	Public	Lights/bells/gates	21922Y
40.0	Davis Street	Public	Lights/bells/gates	21923F
40.5	Camp Wisdom Road	Public	Lights/bells/gates	21924M
40.8	I-20	Public	Underpass	21925U
40.9	Fair Meadows Road	Public	Lights/bells/gates	21926B
41.4	Red Bird Road	Public	Lights/bells/gates	21927H
42.6	Ledbetter Drive	Public	Underpass	21938V
43.2	Private (Frito Lay)	Private	Lights/bells/gates	21776V
43.5	Loop 12	Public	Overpass	21939C
43.6	Kiest Boulevard	Public	Overpass	21940W
44.4	Cockrell Hill Road	Public	Lights/bells/gates	21941D
45.0	Kessler Boulevard	Public	Underpass	21942K
45.5	Westmoreland Avenue	Public	Lights/bells/gates	21943S

Source: URS Corp. 2003

A total of 11 bridges and 45 culverts are located along the 18.8 miles between Midlothian and Westmoreland Road in Dallas. Of the 11 bridges, 6 are timber pile trestles and 5 are concrete bridges. The bridges are in good condition. A detailed list of the bridges and culverts are provided in Exhibit VII-6.

EXHIBIT VII-6

RAILROAD BRIDGES AND CULVERTS

Milepost	Bridge Type	Length	Remarks
27.6	Timber box culvert	4’ x 4’ x 51’	Double culvert
29.5	Cast iron pipe	36” x 30’	
29.9	Timber pile trestle, open deck	42’	
30.4	Steel plate pipe	93”x64”x50’	
31.1	Timber box culvert	6.5’x6’x40’	
31.4	Concrete box culvert	8’ x 5’ x 22’	
32.3	Cast iron pipe	42” x 36’	
32.4	Corrugated metal pipe	72” x 42’	
32.5	Timber box culvert	2’ x 2’ x 30’	
32.7	Brick arch culvert	10’x5’x43’	
32.9	Timber box culvert	2’ x 2’ x 33’	
33.0	Reinforced concrete pipe	36” x 32’	
33.5	Cast metal pipe	72” x 113’	Triple culvert
33.6	Concrete box girder ballasted deck	Unknown	Over US-67
33.7	Reinforced concrete pipe	27” x 40’	Double culvert
34.3	Cast iron pipe	24” x 24’	
35.2	Reinforced concrete box	8’x10’x42’	
35.4	Timber box culvert	4’ x 6’ x 44’	
35.8	Reinforced concrete box	6’ x 4’ x 42’	
36.0	Cast iron pipe	42” x 24’	
36.2	Timber box culvert	2’ x 2’ x 30’	
36.4	Concrete box culvert	5’ x 4’ x 70’	
36.8	Timber box culvert	3’ x 3’ x 35’	
36.86	Timber box culvert	2’ x 1’ x 20’	
36.9	Cast iron pipe	36” x 24’	North of Wintergreen
37.2	Cast iron pipe	24” x 24’	
37.8	Cast iron pipe	18” x 36’	
38.0	Cast iron pipe	18” x 36’	
38.3	Concrete box girder, ballasted deck	130’	
38.6	Cast iron pipe	42” x 42’	
38.6	Cast iron pipe	48” x 42’	
39.2	Timber pile trestle, open deck	112’	South of Wheatland Dr.
39.4	Vitrified pipe	24” x 18’	
39.4	Cast iron pipe	24” x 12’	
40.2	Cast iron pipe	36” x 36’	Double culvert
40.5	Cast metal pipe	36” x 80’	

Milepost	Bridge Type	Length	Remarks
40.6	Timber box culvert	4’ x 4’ x 45’	Double culvert
40.7	Concrete box girder, ballasted deck	Unknown	Over I-20
41.4	Timber trestle, ballasted deck	10’	South side of Red Bird Rd.
41.7	Timber box culvert	3’ x 2’ x 27’	
41.9	Timber trestle, open deck	70’	
42.6	Concrete box girder, ballasted deck	100’	Over Ledbetter Drive
42.8	Cast iron pipe	30” x 24’	
42.9	Timber box culvert	3’ x 4’ x 29’	
43.1	Timber pile trestle, open deck	76’	South of Frito Lay
43.7	Cast iron pipe	30” x 36’	
43.8	Cast iron pipe	24” x 24’	
43.9	Cast iron pipe	24” x 24’	
44.0	Cast iron pipe	30” x 24’	
44.2	Concrete box girder, ballasted deck	89’	
44.3	Cast iron pipe	42” x 30’	Triple culvert
44.5	Cast iron pipe	30” x 24’	
44.6	Concrete box culvert	10’x10’x54’	
44.7	Cast iron pipe	30” x 24’	
45.1	Timber pile trestle, open deck	Unknown	Coombs Creek
45.5	Cast iron pipe	36” x 57’	

Source: URS Corp. 2003

Photos Taken in the Corridor

During the physical inspection of the E-5 Corridor, photographs were taken of various features and conditions along the line. Photographs were taken of as many of the bridges, highway crossings, overpasses, underpasses, sidings, track conditions, special conditions or constraints, and general right-of-way conditions and features as possible. The photographs taken along the E-5 Corridor between Midlothian and Westmoreland Road in Dallas may be found at the end of this chapter.

Existing Land Use

A baseline land use survey was conducted by NCTCOG staff at the onset of the Regional Rail Corridor Study. The major focus of this study was to help locate specific areas along the Regional Rail Corridors that possess characteristics that could support the development of a rail station and/or transit-oriented development. Baseline land use

maps and the associated station location information for the corridor may be found following the corridor photographs.

INFRASTRUCTURE CONSTRAINTS

A number of infrastructure issues and constraints should be addressed in order to establish regional rail passenger service within this corridor. Identified infrastructure constraints include the following considerations:

- The track will need to be upgraded if maximum train speed is to exceed 59 mph. Passing tracks will be required at stations and other convenient locations. Turnouts located in the main track that serve industrial tracks will have to be upgraded when the main track is upgraded. Future installation of double track should not be precluded. The bridges on the line are in good condition. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of auto traffic will have to be improved with the installation of warning devices such as lights, bells, and gates. Existing crossings with lights, bells and gates warning devices will need train detection circuitry modifications if train speeds are increased.
- Centralized Traffic Control (CTC) will be required over the entire corridor if maximum train speed is to exceed 59 mph. The installation of CTC should include provisions for bi-directional running, electric switch locks on all turnouts located in main track, and be dispatched from a local control point such as an existing TRE or DART facility.
- Compatibility with the existing DART light rail system ending at Westmoreland will need to be considered relative to technology selection.

- The automobile transfer facility located just north of Midlothian does not directly interface with passenger service operating in the BNSF right-of-way because it is located outside of the BNSF property and is served by local freight trains that can operate either at night or during off-peak passenger service headways.
- Population density along the corridor is sparse compared to some of the other corridors being studied.

DEFINITION OF FEASIBLE ALTERNATIVES

The Regional Rail Corridor Study considered three primary types of options for the rail corridors. Regional rail, light rail, and bus rapid transit were the primary modes or options considered for development in the corridors. A screening process took place for each corridor to determine if all three options were reasonable or if a subset was more appropriate. The discussion of options pertinent to Corridor E-5 follows.

Description of Modal Alternatives in Corridor E-5

Regional Rail

The regional rail alternative would provide regional rail passenger service along the BNSF rail line between Midlothian and Westmoreland. Passing tracks would be required at stations and other convenient locations. Train control and signal systems would be upgraded. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of automotive traffic will have to be improved with the installation of warning devices such as lights, bells, and gates. Four regional rail passenger stations would be constructed along the E-5 Corridor between the DART LRT Station at Westmoreland and Midlothian. The locations of new stations must be determined with consideration for the BNSF freight traffic. Exhibit VII-7 contains the basic assumptions

for stations, feeder bus access, and park-and-ride locations that were evaluated for this modal alternative. Exhibit VII-8 shows the Regional Rail Alternative for the E-5 Corridor.

EXHIBIT VII-7

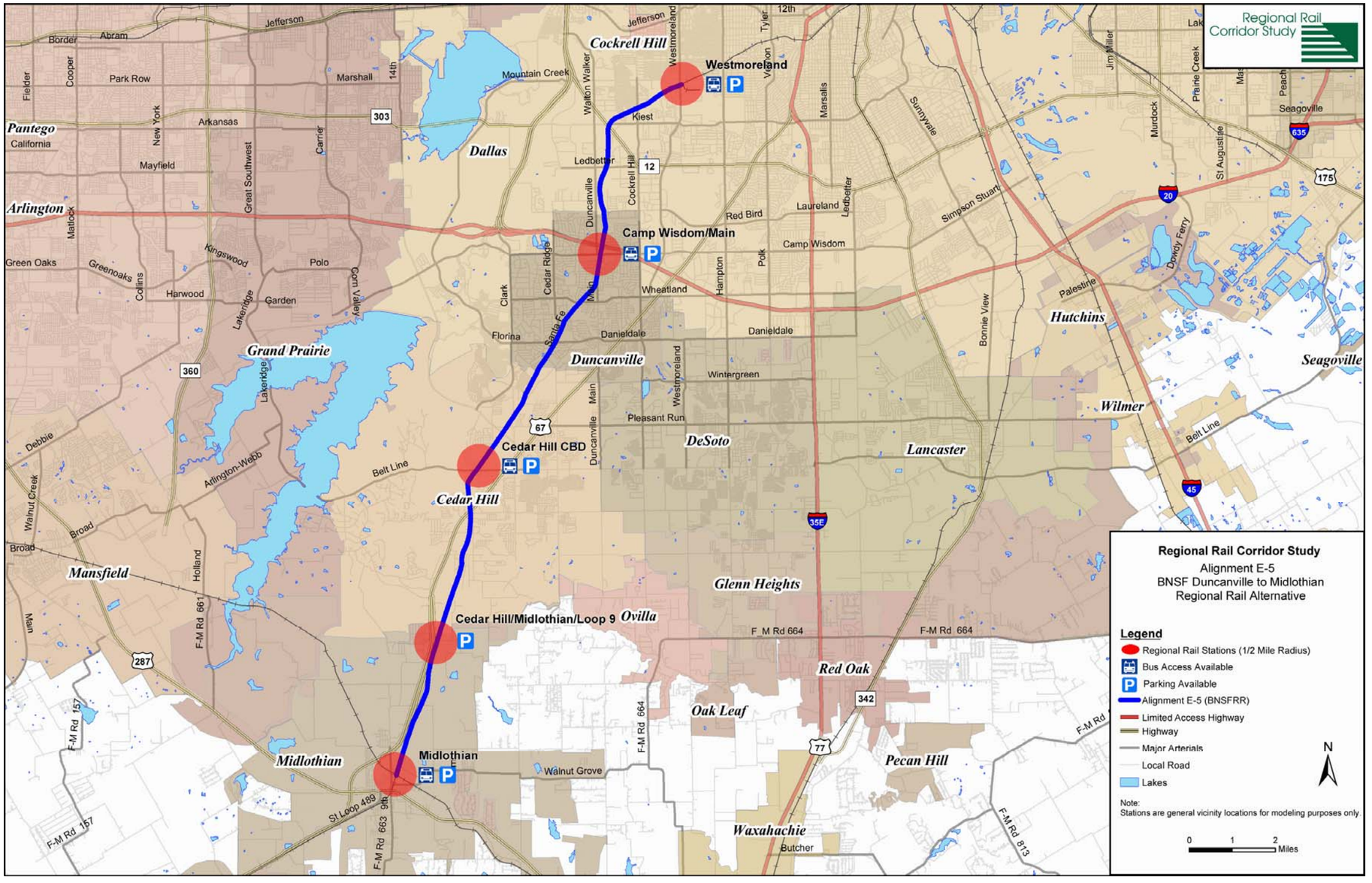
REGIONAL RAIL SERVICE ASSUMPTIONS

Regional Rail (headways = 20 minutes/60 minutes)		
Stations*	**Local Bus**	**Park-and-Ride**
Midlothian	Yes	Yes
Cedar Hill/Midlothian/Loop 9	No	Yes
Cedar Hill CBD	Yes	Yes
Camp Wisdom/Main	Yes	Yes
Westmoreland	Yes	Yes

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT VII-8

REGIONAL RAIL ALTERNATIVE FOR THE E-5 CORRIDOR



Light Rail

The light rail alternative would provide light rail transit (LRT) service within the E-5 Corridor. A LRT line would be constructed along BNSF right-of-way, between Midlothian and Cockrell Hill. The new LRT line would begin at DART's existing LRT line at the Westmoreland Station in southwest Dallas. Six LRT passenger stations would be constructed along the E-5 Corridor between Westmoreland Station and Midlothian. The exact locations of stations would be determined in later phases of project development. Exhibit VII-9 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for the LRT Modal Alternative. Exhibit VII-10 shows the light rail alternative for the E-5 Corridor.

EXHIBIT VII-9

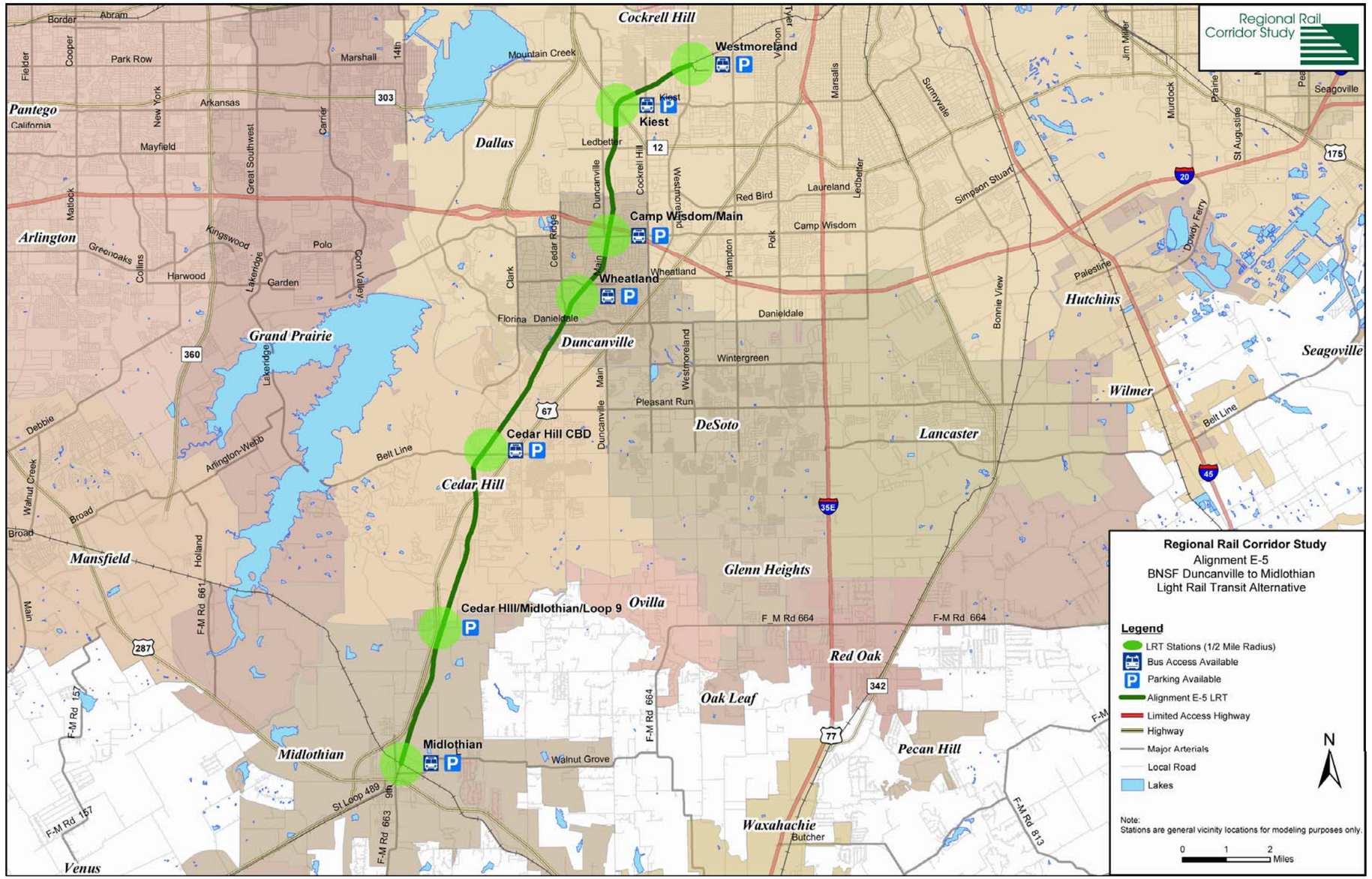
LIGHT RAIL SERVICE ASSUMPTIONS

Light Rail (headways = 10 minutes/20 minutes)		
Stations*	**Local Bus**	**Park-and-Ride**
Midlothian	Yes	Yes
Cedar Hill/Midlothian/Loop 9	No	Yes
Cedar Hill CBD	Yes	Yes
Wheatland	Yes	Yes
Camp Wisdom/Main	Yes	Yes
Kiest	Yes	Yes
Westmoreland	Yes	Yes

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT VII-10

LIGHT RAIL ALTERNATIVE FOR THE E-5 CORRIDOR



Bus Rapid Transit

The Bus Rapid Transit (BRT) alternative would provide express bus service operating along a fixed guideway located within the right-of-way of U.S. Highway 67, Cockrell Hill Road, Wheatland Drive, and Westmoreland Avenue, a distance of approximately 18 miles between Midlothian and Dallas. The BRT service would operate within the roadway in mixed traffic approaching Midlothian and approaching the northern end of the line. Five BRT passenger stations would be constructed along the E-5 Corridor between the DART LRT station at Westmoreland and Midlothian. The exact locations of new stations would be determined in later phases of project development. Exhibit VII-11 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for the E-5 BRT Modal Alternative. Exhibit VII-12 shows the Bus Rapid Transit Alternative for the E-5 Corridor.

EXHIBIT VII-11

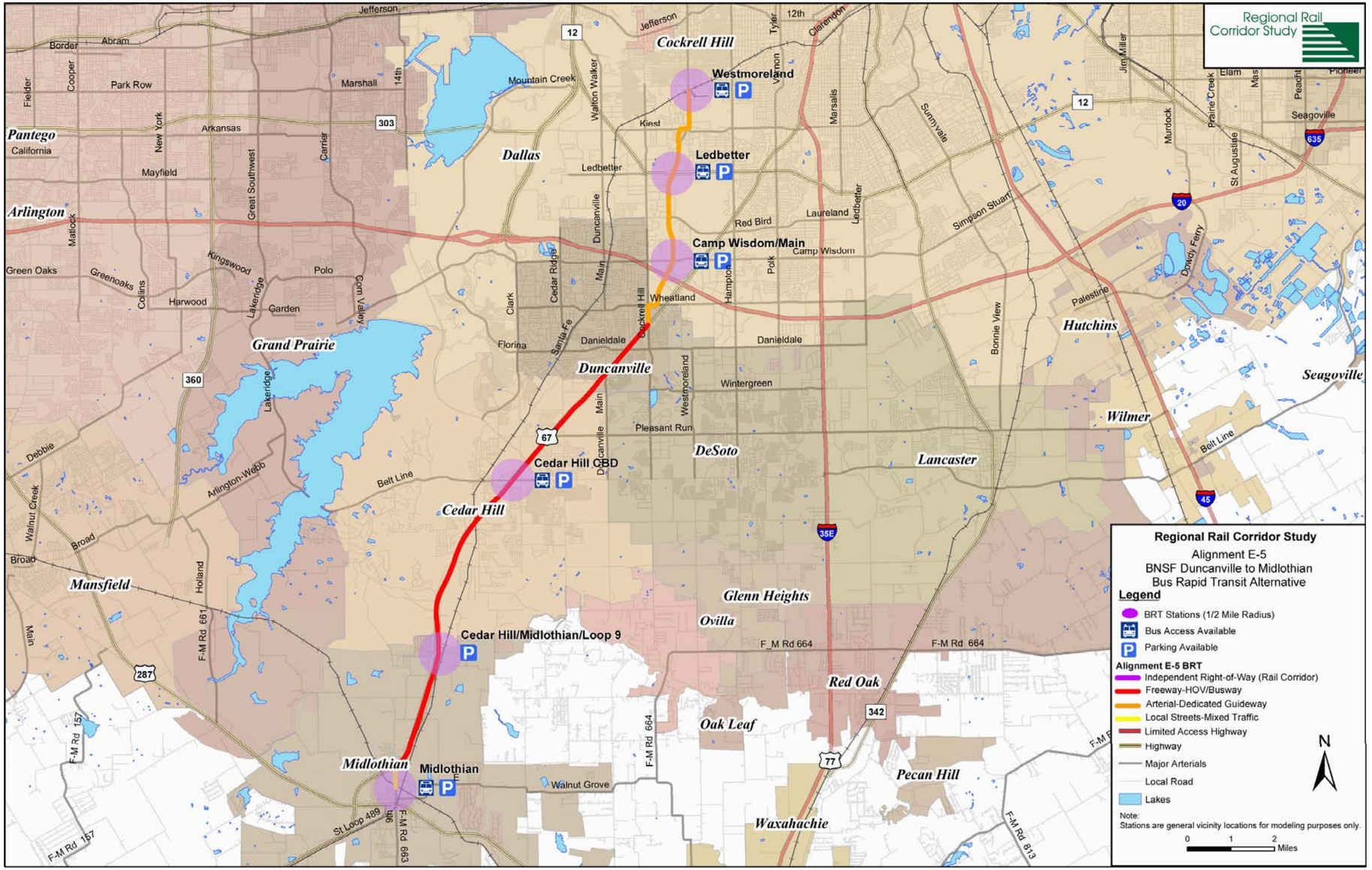
BUS RAPID TRANSIT SERVICE ASSUMPTIONS

Bus Rapid Transit (headways = 10 minutes/15 minutes)		
Station*	**Local Bus**	**Park-and-Ride**
Midlothian	Yes	Yes
Cedar Hill/Midlothian/Loop 9	No	Yes
Cedar Hill CBD	Yes	Yes
Camp Wisdom/Main	Yes	Yes
Ledbetter	Yes	Yes
Westmoreland	Yes	Yes

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT VII-12

BUS RAPID TRANSIT ALTERNATIVE FOR THE E-5 CORRIDOR



EVALUATION OF ALTERNATIVES

Three different alternatives were evaluated for this corridor:

- Regional rail with transfer
- Light rail without transfer
- Bus rapid transit

In addition to the assumptions pertaining to different technologies and operating characteristics (station locations, headways, operating speeds, and supply of feeder buses at stations), the relationship of the E-5 Corridor to the others in the regional system was also considered.

One of the key evaluation or performance indicators used projected 2030 average weekday ridership. The complete list of performance indicators is found in Chapter II – Corridor Description and Evaluation. In order to streamline the development of travel forecasts for the Regional Rail Corridor Study, the various modal alternatives containing regional or light rail for each corridor were combined into a series of rail system alternatives for forecasting. Several of the corridors also serve travel markets that interact or compete with each other, so it was important to design the system forecasts to minimize this interrelationship as much as possible. Travel demand forecasts for four rail system alternatives were developed initially, along with BRT system alternative maps showing these systems alternatives. Ridership summaries for these system alternatives are also contained in Chapter II of the report and, more specifically to the E-5 corridor, in the following section.

Ridership Summary

Exhibit VII-13 presents projected average weekday ridership resulting from each of the system alternatives for the E-5 Corridor. (See Chapter II for a complete discussion.) In Rail System Alternative 2, the E-5 Corridor was tested as a regional rail line from Midlothian to Dallas, with a transfer to DART's West Oak Cliff line at the Westmoreland station. Rail System Alternative 4 assumed a light rail line interlined with DART's West Oak Cliff and North Central LRT lines. Reported ridership for this alternative is for the portion of the line between the station at Westmoreland and the line's terminus in Midlothian for all alternatives.

As explained in Chapter II, the ridership resulting from the Rail System Alternatives was used to compare the performance of the modal alternatives within each corridor. The best performing option, which for E-5 would be regional rail, light rail, or BRT, was then the recommendation for the corridor and, consequently, included in the Final Run Recommended Alternative. Exhibit VII-14 shows the ridership from the Final Run Recommended Alternative as well. Because regional rail was the best performing option for the E-5 corridor, and the equipment for that service would not be compatible with DART service north of Westmoreland, the final model assume no interlining north of Westmoreland.

To properly stage the recommended alternative, corridor ridership was also generated for the year 2007, measuring the impact of demographics growth on the proposed alternative. The process leads to the identification of corridors worthy of priority implementation.

EXHIBIT VII-13

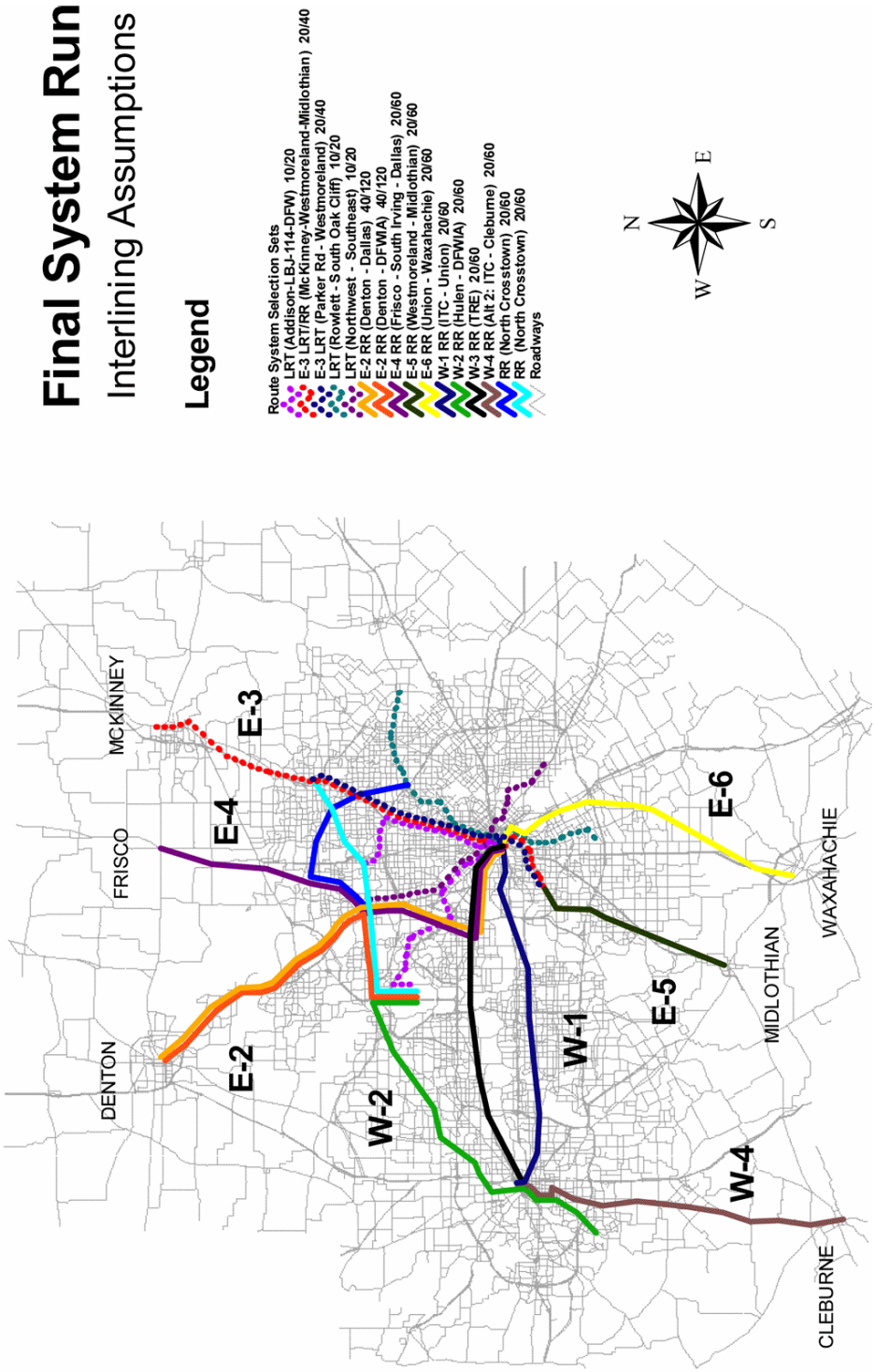
E-5 CORRIDOR RIDERSHIP

Travel Forecast	Technology	Average Weekday Ridership
Rail System Alternative 2	Regional rail with transfer	4,200
Rail System Alternative 4	Light rail transit without transfer	8,000
BRT System Alternative	Bus rapid transit	5,100
Final (2007)	*Regional rail*	*2,100**
Final (2030)	*Regional rail*	*3,200**

*Recommended alternative

EXHIBIT VII-14

REGIONAL RAIL CORRIDOR STUDY – FINAL RUN RECOMMNEDED ALTERNATIVE



An important step in transit ridership analysis involves detailed reviews of projected passenger boardings and alightings at each station. Station riders by mode of access (i.e., walk, auto, feeder bus, and where applicable, transfers from other rail lines) were reviewed for accuracy and reasonableness. Shortcomings in network design as well as some coding errors can be identified as part of this review. Exhibit VII-15 presents 2007 and 2030 ridership by station for the Final Run Recommended Alternative. Corridor line ridership is the sum of demand at stations along a given line, except for where corridor line ridership has been adjusted to account for interlining.

EXHIBIT VII-15

FINAL RUN RECOMMENDED ALTERNATIVE BOARDINGS BY STATION

Corridor	Stations	Regional Rail Boardings	
		2007	2030
E-5	Westmoreland	932	1,399
	Camp Wisdom/Main	498	582
	Cedar Hill CBD	494	695
	Cedar Hill/Midlothian/Loop 9	55	109
	Midlothian Central	142	380
	Line Ridership	**2,121**	**3,165**

Source: NCTCOG-DFWRTM

Performance Evaluation

Each modal alternative considered for the Regional Rail Corridor Study was evaluated with a set of performance indicators. The corridors were scored based upon a five point system with five indicating a good score and one indicating a bad score. The individual criteria scores were then added to reflect a total score for each alternative, including a performance benchmark representing the overall cost effectiveness of each option. Exhibit VII-16 contains a summary of the final performance of the E-5 Corridor.

EXHIBIT VII-16

PERFORMANCE SUMMARY FOR E-5 CORRIDOR

Evaluation Criteria	E-5 Regional Rail	Score
Performance benchmark (annual cost per annual rider)	$14.55	4
Total daily ridership forecast	3,200	2
One-way trip time (minutes)	32	5
Estimated capital cost (millions)	$169.5	5
Estimated annual O&M cost (millions)	$9.10	4
Local authority and funding	None	1
Community acceptance	Community may be open to acceptance of regional rail type service.	3
Ease of implementation	Use of right-of-way must be negotiated with the BNSF.	4
Connectivity with existing and planned transit operations	Regional rail will require transfer to DART LRT at Westmoreland.	4
Compatibility with freight railroad operations	Regional rail equipment is compatible.	4
Serves area of unmet mobility need	Roadway capacity deficiency not severe.	1
Impact upon adjacent highways and air quality	Benefit to adjacent highway is equivalent to one lane in each direction.	4
Transit oriented development potential	TOD potential exists but is likely to develop slowly as on TRE.	2
TOTAL SCORE		**43**

The E-5 Corridor scored 43 points in the overall evaluation. The performance benchmark was $14.55 (score = 4 points), based on a total daily ridership forecast of 3,200 daily riders (score = 2 points). The costs for the corridor include an annual operating and maintenance cost of $9.10 million (score = 4 points) and a total capital cost for development of regional rail in this corridor of $169.5 million (score = 5 points). Estimated trip time to travel one way, the length of the corridor is 32 minutes (score = 5 points). The project has no existing transit authority or funding designated for it at this time (score = 1 point), but the community may be open to a regional rail service (score = 3 points). The right-of-way must be negotiated with the BNSF Railroad (score = 4 points). Use of Federal Railroad Administration (FRA) compliant regional rail technology

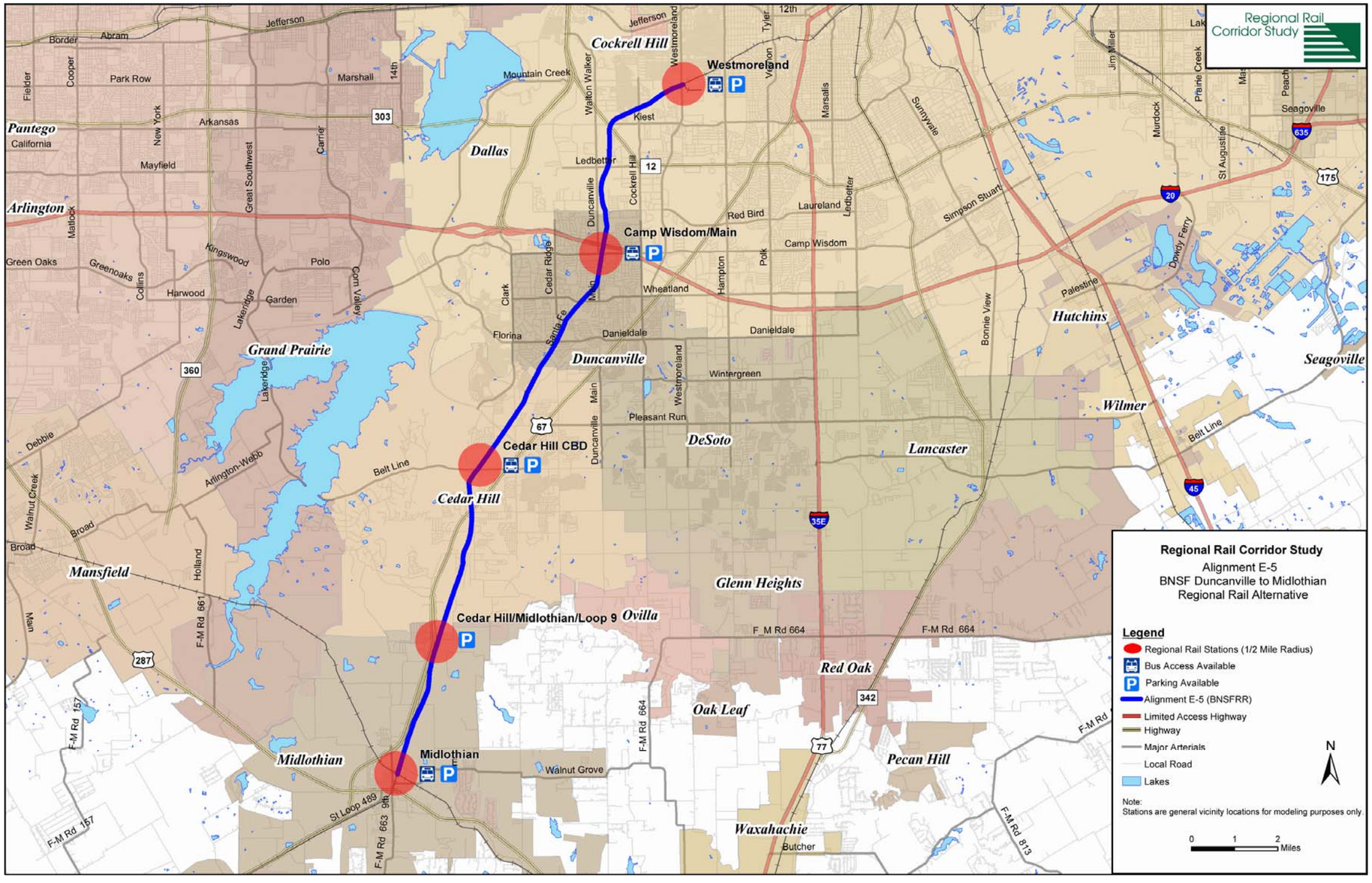
in the corridor will require a transfer to the DART system at Westmoreland in order to access other transit options in the region (score = 4 points), but is compatible with local freight operations (score = 4 points). The roadway capacity deficiency in the parallel corridor is not severe (score = 1 point), but the ridership projections equal one lane of vehicular traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development exists, but would most likely come along slowly (score = 2 points).

CORRIDOR RECOMMENDATIONS

The final recommendation for the E-5 Corridor is shown in Exhibit VII-17. Regional rail service from the DART LRT Station at Westmoreland to downtown Midlothian is recommended. The station locations shown in the map below are for planning purposes only and would be refined as a more detailed Alternatives Analysis study of the corridor is conducted.

EXHIBIT VII-17

FINAL RECOMMENDATION FOR THE E-5 CORRIDOR



MP 26.9 F Avenue in Midlothian looking north

MP 27.0 Midlothian at FM 1387 crossing

MP 27.3 SP crossing (now UP) of BNSF

MP 27.5 Private crossing auto facility at right

MP 27.6 Private crossing

MP 28.0

MP 28.2

MP 28.6 Private crossing not complete

MP 28.8 Spur at north end of auto facility

MP 29.0 Dove Lane

MP 29.4 Spur from cement plant

MP 29.9

MP 30.0

MP 30.6 Public crossing

MP 31.0

MP 31.8

MP 32.0

MP 32.5 US HWY 67 overpass in distance

MP 33.0

MP 33.4

MP 33.7 Bridge over US HWY 67

MP 33.9 Cedar View Dr

MP 34.0

MP 34.6 Cedar Hill Belt Line Rd crossing in distance

MP 34.9 Wilfy St crossing

MP 35.4 New crossing between Wilfy St and FM 1382 overpass

MP 35.5 FM 1382 overpass in distance

MP 35.9 Pleasant Run Rd

MP 36.0

MP 36.6 Private crossing

MP 36.8 Winter Green Street

MP 37.0

MP 37.5

MP 38.0 Daniel Dale Rd in Distance

MP 38.4 Cedar Ridge Dr in distance

MP 38.5 Cedar Ridge Dr in distance

MP 38.9 Big Stone Gap Rd

MP 39.1 Wheatland Dr in distance

MP 39.2 and Wheatland Dr crossing

MP 39.8 Center Street

MP 40.0 Davis St crossing and south end of Duncanville siding

MP 40.1 Davis Street in Duncanville

MP 40.4 north end of Duncanville siding

MP 40.6 Camp Wisdom Rd

MP 40.7 Bridge over I-20 with Red Bird Rd in distance

MP 40.9 Fairmeadows Rd

MP 41.0

MP 41.5

MP 41.6

MP 41.9

MP 42.2 Red Bird Industrial Park

MP 42.4 Red Bird Industrial Park

MP 42.5 Red Bird

MP 42.6 Bridge over Ledbetter Drive

MP 42.8 at Red Bird

MP 43.1 Frito Lay Plant in distance

MP 43.3 Frito Lay Plant at Maglab

MP 43.4 Frito Lay Plant at Maglab, HWY Loop 12 overpass in distance

MP 43.7 HWY Loop 12 overpass

MP 44.0

MP 44.2 Cockrell Hill Rd in distance

MP 44.4 Cockrell Hill Rd

MP 45.2 at Hale bridge over Coombs Creek

MP 45.7 at Hale

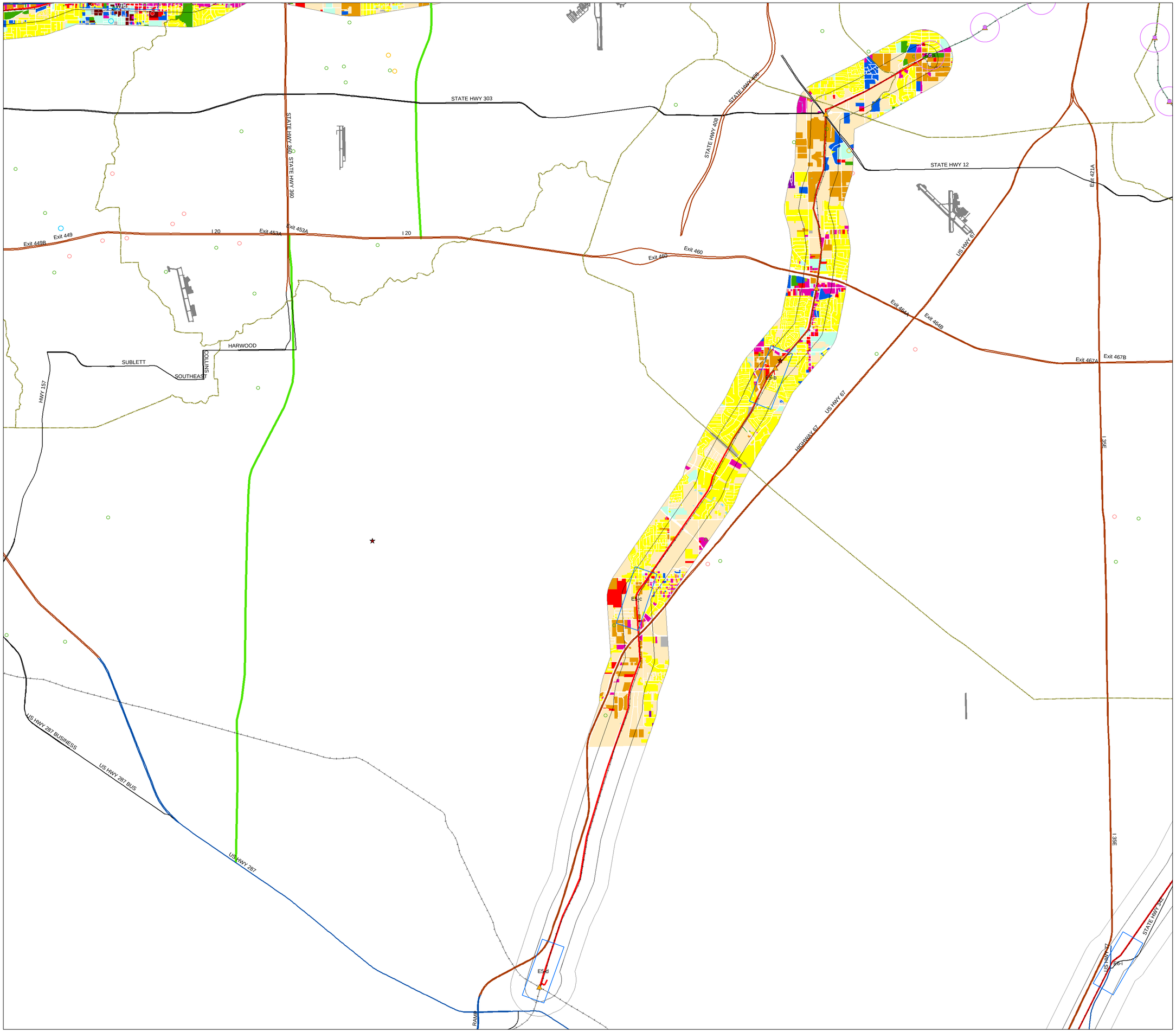
MP 45.5 at Hale with Westmoreland Rd in distance

Tight “S” curve next to DART Westmoreland Station

Tight “S” curve next to DART Westmoreland Station

DART Westmoreland Station at end of line

Baseline Land Use Study: Corridor E-5



Legend

- Possible Station Location
- Existing Rail Station
- Existing Rail Station 1/4 mile buffer
- Mobility 2025 Rail Station
- New Stations Existing by 2008
- Fort Worth Trolley Stops
- 250 - 670
- 670 - 1450
- 1450 - 2750
- 2750 - 6250
- 6250 +
- Clide Award Winner
- JV Project - Selected
- JV Project - Not Selected
- Special Generator
- Amtrak stations
- Airport
- Veloweb
- Railroad
- Fort Worth Trolley Line
- Rail Lines Existing by 2008
- Primary Highway
- Secondary Highway
- Major Arterial
- Proposed Freeways and Tollroads
- Regional Rail Corridor

Regional Rail Corridor Buffer

Buffer Distance

- 0.00 - 0.25
- 0.25 - 0.50

- Single-family
- Multi-family
- Retail
- Office
- Vacant
- Park and Recreation
- Industrial
- Parking
- Institutional
- Hotel/Motel
- Utilities
- Mobile Homes
- Water
- Landfill
- Under Construction

E-5 Burlington Northern Santa Fe
begins in Midlothian, through Cedar Hill, Duncanville, ends in Dallas, 18 miles in length

Potential Station Zone: 1/2 mile wide linear area of variable length based on the area of interest

Area of Interest	Station Status	County	Jurisdiction w/in walking distance of station	Characteristics of Interest	Development Type	Development Style	Future Land Use (comprehensive plan)	Zoning (of vacant land)	Other Comments
E5-a	Existing	Dallas	Dallas	**Station:** Westmoreland station **Infill Opportunities:** built up - no infill opportunities, single-family, industrial, green space **Flood zone:** outside of floodplain	Infill-other development	pedestrian oriented development			
E5-b	Proposed	Dallas	Duncanville	**Employment within walking distance of the site:** Texwood Industries Inc (1820) **Current land uses:** office, industrial, retail **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** Duncanville Commuter Rail joint venture project (not selected) **Site accessible via:** proximate to I20 and US hwy 67 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid			
E5-c	Proposed	Dallas	Cedar Hill	**Employment within walking distance of the site: Quality Doors (500)** **Current land uses:** industrial, single-family, retail **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** N/A **Site accessible via:** US hwy 67 **Flood zone:** outside of floodplain	Infill-other development or greenfield development	hybrid			
E5-d	Proposed	Dallas	Midlothian	**Employment within walking distance of the site:** N/A **Current land uses:** N/A **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** N/A **Site accessible via:** US hwy 67, US hwy 287, UP railroad **Flood zone:** no information Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid			

EASTERN CORRIDOR COST ANAYLSIS (E-5)

REGIONAL RAIL CORRIDOR STUDY													
North Central Texas Council of Governments											**Link Number:**	**E-5**	
Parametric Cost Estimate											**Link Description:**	**Midlothian**	
											Start Sta:		
											End Sta:		
		E-5 Extension to Midlothian		**Regional Rail**				**Light Rail**			**Link Length:**	**18.8**	
Description			**Unit**	**Unit Cost**	**Quantity**	**Cost**	**Subtotals**	**Unit Cost**	**Quantity**	**Cost**	**Subtotals**		**Remarks**
Site Work & Urban Design													
	Earthwork, 1 Track, Major		MI	$1,500,000		$0							
	Earthwork, 1 Track, Basic		MI	$500,000	1.0	$500,000							
	Earthwork, 2 Tracks, Major		MI	$2,500,000		$0		$3,500,000		$0			
	Earthwork, 2 Tracks, Basic		MI	$750,000		$0							
	Earthwork, Reconstruct Existing Track		MI	$100,000	18.8	$1,880,000							
	Urban Design/Signage/Landscaping		MI	$250,000	18.8	$4,700,000		$750,000		$0			
	Environmental Mitigation (Includes noise and vibration)		MI	$100,000	18.8	$1,880,000		$100,000		$0			
	Relocate Hike/Bike Trail		MI	$1,400,000		$0		$1,400,000		$0			
		Subtotal					**$8,960,000**					**$0**	
Trackwork													
	New Track, 136# CWR		MI	$1,000,000	1.0	$1,000,000		$1,850,000		$0			
	Upgrade Track to Class 4		MI	$500,000	18.8	$9,400,000							
	Paved Embedded Track (Double)		MI	$4,000,000		$0		$5,600,000		$0			
	New Single Track #1 Relay Rail		MI	$800,000		$0							
	New Turnout #10		EA	$125,000		$0		$125,000		$0			
	New Turnout #15		EA	$200,000		$0		$200,000		$0			
	New Turnout #24		EA	$250,000	10	$2,500,000		$250,000		$0			
	Rebuild Turnout or Diamond		EA	$75,000	28	$2,100,000							
	New Railroad Diamond Crossing		EA	$200,000	1	$200,000							
		Subtotal					**$15,200,000**					**$0**	
Structures													
	Elevated Track (railroad over railroad)		TF	$6,500		$0		$10,000		$0			
	Tunnel		TF	$10,000		$0		$10,000		$0			
	New Bridge (Minor)		TF	$4,500		$0		$4,500		$0			
	New Bridge (Major)		TF	$6,500		$0		$6,500		$0			
	Reconstruct Existing Bridge		TF	$2,500	410	$1,025,000		$2,500		$0			
	Retaining Wall (0 FT - 10 FT High)		TF	$175		$0		$175		$0			
	Retaining Wall (10 FT - 20 FT High)		TF	$525		$0		$525		$0			
	New Culvert		EA	$10,000	4	$40,000		$10,000		$0			4/mile
	Rehabilitate Culvert		EA	$5,000	75	$375,000		$5,000		$0			4/mile
		Subtotal					**$1,440,000**					**$0**	
Stations													
	At-grade Station		EA	$650,000	5	$3,250,000		$2,800,000		$0			
	Aerial Station (LRT)		EA			$0		$4,600,000		$0			
	Depressed Station (LRT)		EA			$0		$15,000,000		$0			
	Parking Spaces/Surface Lot		EA	$4,000	2,500	$10,000,000		$4,000		$0			avg=500/station
	Service and Layover Facility		EA	$5,000,000	1	$5,000,000		$5,000,000		$0			
	Central Maintenance Facility Contribution		EA	$1,000,000	1	$1,000,000		$2,000,000		$0			
		Subtotal					**$19,250,000**					**$0**	
Traction Electrification System (LRT)			MI			$0	**$0**	$1,600,000		$0	**$0**		
		Subtotal											
Signal System													
	Communications System (LRT)		MI			$0		$1,100,000		$0			
	New Railroad Interlocking		EA	$1,500,000		$0							
	Modify Railroad Interlocking		EA	$750,000	1	$750,000							
	New CTC or LRT Signaling System		MI	$1,200,000	19.8	$23,760,000		$2,300,000		$0			
	Upgrade Railroad Signal System		MI	$600,000		$0							
		Subtotal					**$24,510,000**					**$0**	
R.O.W. & Y Junction													
	R.O.W. Allowance		AC			$0	**$0**					**$0**	
Utilities													
	Utilities Allowance		MI	$200,000	18.8	$3,760,000	**$3,760,000**	$400,000		$0	**$0**		
Crossings / Roadway													
	Minor Street At-grade (Gates & Warning Devices)		EA	$150,000	4	$600,000		$150,000		$0			
	Minor Street At-grade (w/ Quad Gates System & Warning Devices		EA	$250,000	6	$1,500,000		$250,000		$0			
	Major Street At-grade (w/ Quad Gates System & Warning Devices		EA	$450,000	13	$5,850,000		$450,000		$0			
	Reconstruct Existing Roadway Bridge		EA	$1,000,000		$0		$1,000,000		$0			
	Reconstruct Existing Roadway		SY	$40		$0		$40		$0			
	Construct New Roadway		SY	$80		$0		$80		$0			
	Highway/Railroad Grade Separation		EA	$8,000,000		$0		$8,000,000		$0			
		Subtotal					**$7,950,000**					**$0**	
Special Conditions													
						$0				$0			
						$0				$0			
						$0				$0			
		Subtotal					**$0**					**$0**	
		Subtotal A					**$81,070,000**					**$0**	
	MIS Level Design Contingency (% of A)		15%				$12,160,500	30%				$0	
	Construction Contingency (% of A)		10%				$8,107,000	10%				$0	
	Add-on Allowance (Eng., CM, etc) (% of A)		15%				$12,160,500	30%				$0	
Rail Vehicle Train Sets (actual without contingencies)			Train Set	$8,000,000	7	$56,000,000	**$56,000,000**	$9,000,000		$0	**$0**		
		Grand Total					**$169,498,000**					**$0**	
NOTE:	1. Unit Costs are expressed in present value dollars.												
	2. Retaining Wall Unit Cost is for one side only.												
	3. Cost estimate excludes ROW costs.												

Annualized Cost Estimate (E-5)

Regional Rail Corridor:	**E-5**	**Extension to Midlothian**					Regional Rail Corridor:	E-5	Extension to Midlothia
Annualized Capital Cost		Daily Riders:	3,200		0		Cost Category Summary		
		Annualized Riders:	992,000		0				
			Regional Rail	Regional Rail	Light Rail	Light Rail		Regional Rail	Light Rail
	Useful	Annualization	Total Cost ($mil)	Annualized	Total Cost ($mil)	Annualized		Total Cost ($mil)	Total Cost ($mil)
Cost Category	Life (yr)	Factor	(Incl. Contingency)	Cost ($mil)	(Incl. Contingency)	Cost ($mil)	Cost Category	(Incl. Contingency)	(Incl. Contingency)
Site work and Urban Design	100	0.070	$12.544	$0.878	$0.000	$0.000	Site work and Urban Design	$17.808	$0.000
Trackwork	30	0.081	$21.280	$1.724	$0.000	$0.000	Trackwork	$21.280	$0.000
Structures	30	0.081	$2.016	$0.163	$0.000	$0.000	Structures	$2.016	$0.000
Stations	20	0.094	$26.950	$2.533	$0.000	$0.000	Stations	$26.950	$0.000
LRT Electrification System	30	0.081	$0.000	$0.000	$0.000	$0.000	LRT Electrification System	$0.000	$0.000
Signal System	30	0.081	$34.314	$2.779	$0.000	$0.000	Signal System	Incl with Crossings/Roadway	
Right-of-Way	100	0.070	$0.000	$0.000	$0.000	$0.000	Right-of-Way	Not Applicable	
Utilities	20	0.094	$5.264	$0.495	$0.000	$0.000	Utilities	Incl with Site Work & Urban Design	
Crossings / Roadway	20	0.094	$11.130	$1.046	$0.000	$0.000	Crossings / Roadway	$45.444	$0.000
Special Conditions	20	0.094	$0.000	$0.000	$0.000	$0.000	Other	$0.000	$0.000
Vehicles	25	0.086	$56.000	$4.816	$0.000	$0.000	Vehicles	$56.000	$0.000
Total			$169.498	**$14.435**	$0.000	**$0.000**	Total	$169.498	$0.000
Performance Benchmark				**14.55**		**#DIV/0!**			
Notes:									
1. Annualized Riders = Daily Riders times 310 days per year.									
2. Performance Benchmark = Annualized Cost divided by Annualized Riders.									

VIII. E-6 – WAXAHACHIE LINE CORRIDOR CONSIDERATIONS

CORRIDOR DESCRIPTION

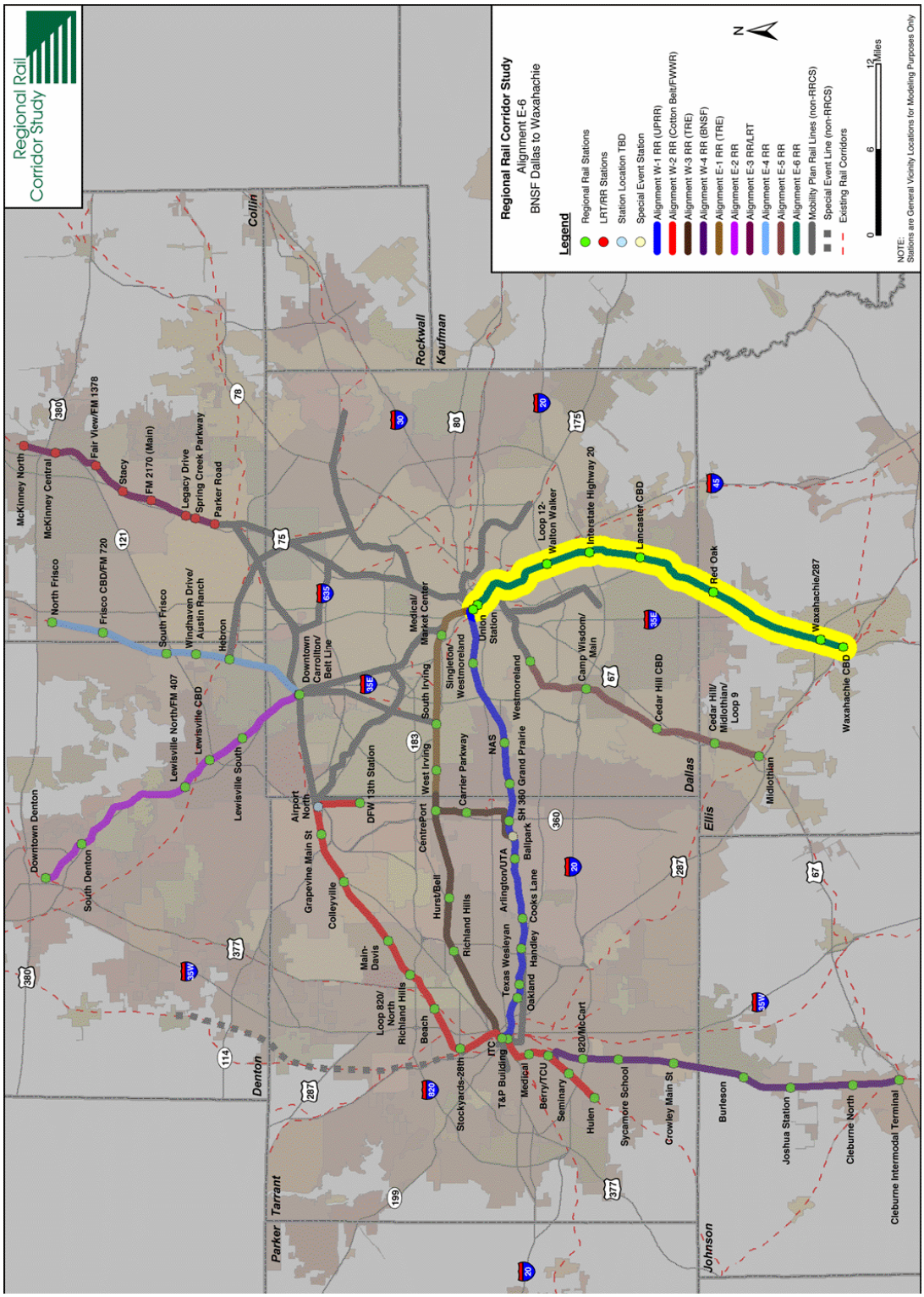
Rail Corridor E-6 is one of eight freight rail corridors studied for the feasibility of implementing commuter rail, light rail, or other form of transit service.

Corridor E-6 is a Burlington Northern and Santa Fe Railway (BNSF) line that extends between Dallas and Waxahachie, a distance of approximately 30.7 route miles. Exhibit VIII-1 contains a corridor location map. BNSF owns all of the right-of-way along the E-6 Corridor except for the 2.4 miles between Dallas Union Station and Forest Avenue in Dallas. Between Union Station and Forest Avenue, the Union Pacific Railroad owns and dispatches the track. Union Pacific also has trackage rights to serve local industries. The right-of-way is typically 100 feet in width.

The current maximum operating speed limit is 40 mph for freight trains. The line is equipped with Automatic Block Signals (ABS) and is operated under Track Warrant Control (TWC) rules. A bridge and equipment weight restriction of a maximum gross weight per car of 143 tons is in effect over the corridor. Approximately four BNSF freight trains and two UP local trains operate over the line each day.

EXHIBIT VIII-1

E-6 CORRIDOR LOCATION MAP



Existing Track Conditions

The E-6 Dallas to Waxahachie rail corridor consists of a single main track with three passing/industrial sidings located at Lancaster, Sterret, and Waxahachie.

The track consists mostly of 115-pound and 136-pound continuous welded rail on timber ties. The rail is essentially in good condition. Most of the ties are in fair to good condition. All of the rail will need ultrasonic inspection or a continuous search for internal rail defects before passenger service can be operated over the track. There are 24 industrial spur tracks located on the E-2 corridor as presented in Exhibit VIII-2.

EXHIBIT VIII-2

E-6 INDUTRIAL SPUR TRACK LOCATIONS

Owner	**Location**
Occidental Chemical	MP 769.6
Unidentified	MP 770.8
Unidentified	MP 780.2
Unidentified	MP 781.0
Unidentified	MP 781.9
Unidentified	MP 788.1
Magna Blend	MP 791.1
Laroche Industries	MP 795.5
AEP	MP 795.6
Rockten	MP 795.7
Georgia Pacific and TexCorr	MP 792.1
Unidentified	MP 792.9
Owens Corning	MP 793.2 to MP 793.9
Armaglass	MP 794.5
Armaglass	MP 794.8
Phillips Petroleum	MP 795.2

A fact sheet summarizing the existing conditions and issues for the E-6 corridor is shown in Exhibit VIII-3.

EXHIBIT VIII-3

E-6 CORRIDOR FACT SHEET

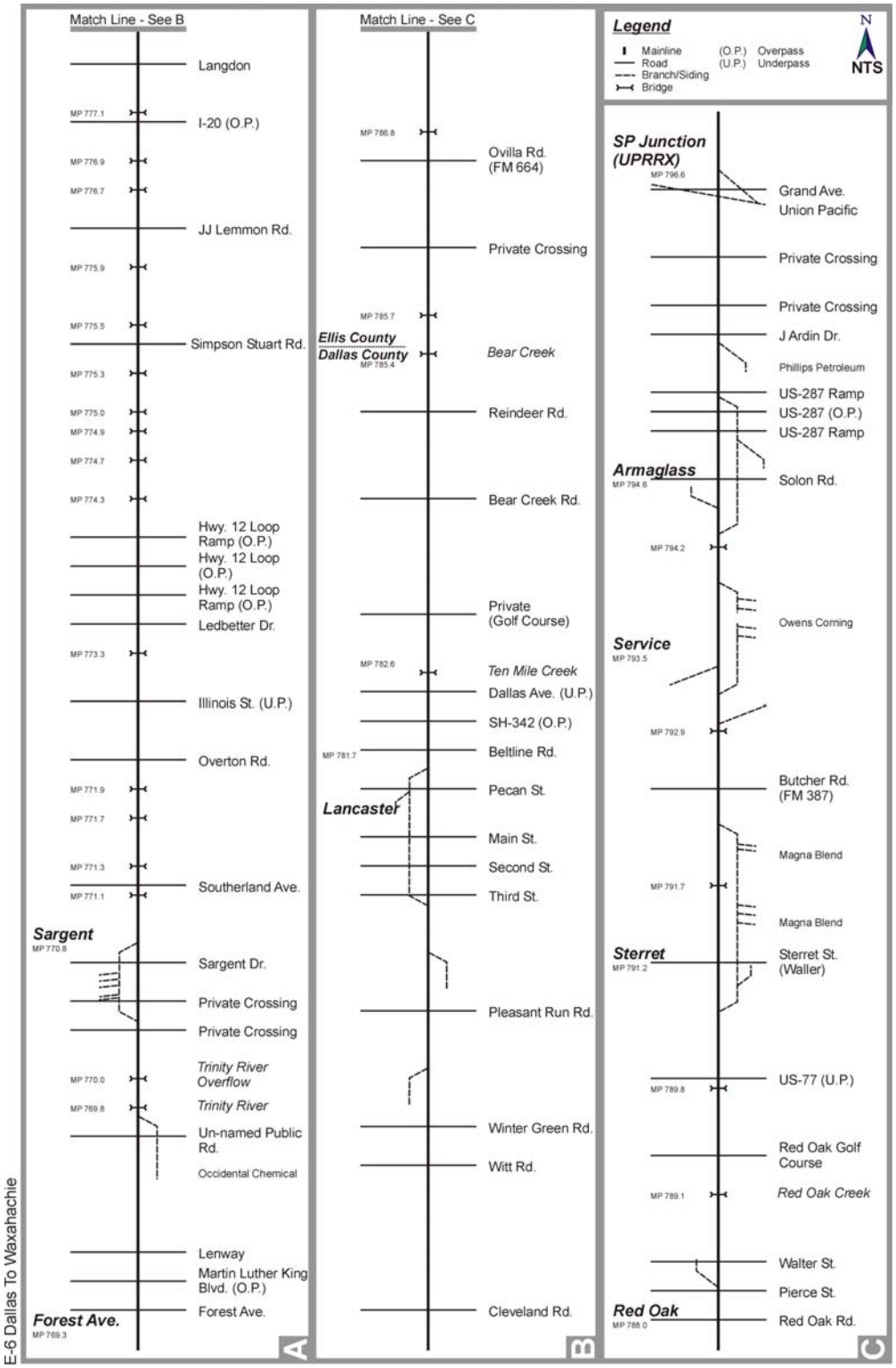
Owner(s) of the line	BNSF
Operator(s) of the line	BNSF
Trackage rights	UP
Length of the corridor	30.7 Miles
Average trains per weekday	6
Track summary	▪ Single track with passing sidings at Lancaster, Sterret, and Armaglass. ▪ Automatic Block Signal (ABS) system with maximum freight speed of 40 mph and passenger speed of 60 mph.
Railroad crossings	▪ Thirty-nine (39) at-grade highway/railroad crossings. ▪ Ten (10) grade-separated highway/railroad crossings. ▪ Two (2) at-grade railroad/railroad crossings.
Jurisdictions	▪ Waxahachie, through Red Oak, Lancaster, ends in Dallas.
Industrial sidings	▪ 24 with several at Sargent, Sterret, Service, and Armaglass.
Corridor issues	▪ Communities along the line appear to be sparsely populated. ▪ BNSF/UP at-grade railroad crossing at Forest Avenue is a bottleneck for commuter rail operations. ▪ BNSF/UP at-grade railroad crossing near Grand Avenue is a bottleneck for commuter rail operations.

Schematic of the Corridor

Exhibit VIII-4 shows a schematic diagram of the Dallas to Waxahachie rail corridor.

EXHIBIT VIII-4

E-6 CORRIDOR SCHEMATIC



Detailed Information

This section contains detailed information for the bridges, culverts, and railroad/highway grade crossings and grade separations located along the 30.7 miles of the E-6 Dallas to Waxahachie Rail Corridor.

There are two at-grade railroad/railroad crossings with the UP that are located near Forest Avenue in Dallas and at East Grand at SP Junction located about two miles north of Waxahachie. The passenger rail service should be grade-separated over the UP at Forest Avenue. There are no rail / truck transfer facilities in the corridor.

There are a total of 49 railroad/highway at-grade crossings and highway grade separations in the 30.7 miles of the E-6 corridor between Dallas and Waxahachie. Of the 49 crossings, 33 are public at-grade crossings, 6 are private crossings, and 10 are grade-separated overpasses or underpasses. The crossing equipment and surfaces for the at-grade crossings are in good condition. A detailed list of the railroad/highway grade crossings and overpasses/underpasses are provided in Exhibit VIII-5.

EXHIBIT VIII-5

RAIL/HIGHWAY CROSSINGS AND OVER/UNDER PASSES

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
768.4	Forest Avenue	Public	Crossbucks	TBD
768.6	Martin Luther King Blvd.	Public	Overpass	TBD
768.8	Lenway	Public	Crossbucks	TBD
769.6	Un-named public road	Public	Crossbucks	TBD
770.4	Private crossing	Private	Crossbucks	415300M
770.5	Private crossing	Private	Crossbucks	TBD
770.8	Sargent Drive	Public	Crossbucks	415305W
771.1	Southerland Avenue	Public	Lights/bells/gates	415306D
772.1	Overton Road	Public	Lights/bells/gates	TBD
772.9	Illinois Street	Public	Underpass	415308S
773.7	Ledbetter Drive	Public	Lights/bells/gates	415309Y
773.87	Loop 12 ramp	Public	Overpass	415310T
773.89	Loop 12	Public	Overpass	415310T
773.92	Loop 12 ramp	Public	Overpass	415310T
775.4	Simpson Stuart Road	Public	Lights/bells/gates	415311A
776.6	JJ Lemmon Road	Public	Lights/bells/gates	415312G
777.1	I-20	Public	Overpass	415313N
777.4	Langdon	Public	Lights/bells/gates	415314V
778.2	Cleveland Road	Public	Crossbucks	415315C
779.5	Witt Road	Public	Crossbucks	415317R
779.8	Wintergreen Road	Public	Lights/bells/gates	415318X
780.8	Pleasant Run Road	Public	Lights/bells/gates	415319E
781.5	Third Street	Public	Crossbucks	TBD
781.6	Second Street	Public	Lights/bells/gates	415321S
781.7	Main Street	Public	Lights/bells/gates	415322M
782.0	Pecan Street	Public	Lights/bells/gates	415324B
782.2	Belt Line Road	Public	Lights/bells/gates	TBD
782.3	SH-342	Public	Overpass	TBD
782.5	Dallas Avenue	Public	Underpass	415325H
783.1	Private (Golf Course)	Private	Crossbucks/stop signs	TBD
784.4	Bear Creek Road	Public	Lights/bells/gates	415328D
784.9	Reindeer Road	Public	Crossbucks	415329K
786.1	Private crossing	Private	Stop signs	415330E
786.6	Ovilla Road (FM 664)	Public	Lights/bells/gates	415331L
787.7	Red Oak Road	Public	Lights/bells/gates	TBD
788.0	Pierce Street	Public	Lights/bells/gates	415334G
788.2	Water Street	Public	Lights/bells/gates	415335N
789.4	Red Oak Golf Course	Public	Crossbucks	415336V
789.9	US-77	Public	Underpass	415337C
791.2	Sterret Street	Public	Crossbucks	415338J
792.2	Butcher Road (FM 387)	Public	Lights/bells/gates	415379N
794.7	Solon Road	Public	Lights/bells/gates	415343F
794.91	US-287 ramp	Public	Flashers	4158714G

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
794.96	US-287	Public	Overpass	415344M
795.0	US-287 ramp	Public	Flashers	415875N
795.4	J Arden Drive	Public	Lights/bells/gates	415345U
795.9	Private crossing	Private	Stop signs	415346B
796.4	Private crossing	Private	Stop signs	415347H
796.6	Grand Avenue	Public	Lights/bells/gates	415348P

Source: URS Corp. 2003

A total of 33 bridges and five culverts are located along the corridor between Dallas and Waxahachie. Of the 33 bridges, 17 are timber pile trestles, 7 are steel bridges, and 9 are concrete bridges. The bridges are in good condition. A detailed list of the bridges and culverts are provided in Exhibit VIII-6.

EXHIBIT VIII-6

RAILROAD BRIDGES AND CULVERTS

Milepost	Bridge Type	Length	Remarks
769.3	Concrete arch culvert	7’ x12’	Double culvert
769.8	Steel truss, open deck	200’	Trinity River
770.0	Timber pile trestle, open deck	1218’	Trinity River overflow
771.1	Concrete box girder, ballasted deck, two spans	56’	
771.3	Concrete box girder, ballasted deck	28’	
771.7	Timber pile trestle, open deck, four spans	56’	
771.9	Timber pile trestle, open deck, three spans	42’	
772.3	Concrete arch culvert	12’ x 50’	
772.9	Steel beam, four spans, 1=45’, 2=48’, 1=45’	186’	Over Illinois Street
773.3	Concrete trestle, three spans	60’	
774.3	Timber pile trestle, open deck, six spans	84’	
774.7	Timber pile trestle, open deck, six spans	84’	
774.9	Timber pile trestle, open deck, six spans	84’	
775.0	Timber pile trestle, open deck, 11 spans	154’	
775.3	Timber pile trestle, open deck, six spans	84’	
775.5	Concrete box girder, ballasted deck	154’	
775.9	Concrete box girder, ballasted deck	42’	
776.7	Timber pile trestle, open deck, six spans	84’	
776.9	Timber pile trestle, open deck, six spans plus 60’ steel plate girder	144’	
777.1	Timber pile trestle and steel through plate girder, open deck	Unknown	North of I-20 Overpass
778.6	Concrete arch culvert	38’ x 75’	
779.3	Concrete arch culvert	8’ x 47’	
781.3	Cast metal pipe	12’ x 78’	
782.5	Concrete box girder	28’	Over Dallas Avenue
782.6	Concrete box girder, 196’, ballasted deck and 125’ steel truss, open deck	321’	Ten Mile Creek
785.4	Timber pile trestle, open deck, 12 spans	168’	Bear Creek
785.7	Timber pile trestle, open deck, nine spans	108’	
786.8	Timber pile trestle, open deck, two spans	28’	

Milepost	Bridge Type	Length	Remarks
789.1	Concrete slab, 56', ballasted deck and 102' steel arch truss, open deck	158'	Red Oak Creek
789.8	Concrete slab, six span=96', ballasted deck with 2-24' and 1-96' steel through plate girders, ballasted deck	240'	Over Highway 77
791.7	Timber pile trestle, open deck six spans	84'	
792.9	Timber pile trestle, open deck 10 spans	140'	
794.2	Timber pile trestle, open deck four spans	52'	

Source: URS Corp. 2003

Photos Taken in the Corridor

During the physical inspection of the E-6 Dallas to Waxahachie Rail Corridor, photographs were taken of various features and conditions along the line. Photographs were taken of as many of the bridges, highway crossings, overpasses, underpasses, sidings, track conditions, special conditions or constraints, and general right-of-way conditions and features as possible. The photographs taken along the E-6 Corridor between Forest Avenue in Dallas and Waxahachie may be found at the end of this chapter.

Existing Land Use

A baseline land use survey was conducted by NCTCOG staff at the onset of the Regional Rail Corridor Study. The major focus of this study was to help locate specific areas along the Regional Rail Corridors that possess characteristics that could support the development of a rail station and/or transit-oriented development. Baseline land use maps and the associated station location information for the corridor is included following the corridor photographs.

INFRASTRUCTURE CONSTRAINTS

A number of infrastructure issues and constraints should be addressed in order to establish regional rail passenger service within this corridor. Identified infrastructure constraints include the following considerations:

- The track should be upgraded if maximum train speed is to exceed 40 mph. Passing tracks will be required at stations and other convenient locations. Turnouts located in the main track that serve industrial tracks will have to be upgraded when the main track is upgraded. Future installation of double track should not be precluded. The bridges on the line are in good condition. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of auto traffic will have to be improved with the installation of warning devices such as lights, bells, and gates. Existing crossings with lights, bells, and gates warning devices will need train detection circuitry modifications if train speeds are increased.
- BNSF may insist that the existing ABS signaling system be replaced with CTC if passenger rail service is operated over the line. If required, the installation of CTC should include provisions for bi-directional running and electric switch locks on all turnouts located in the main track.
- The UP ownership of the track between Dallas Union Station, the UP/BNSF at-grade railroad crossing at Forest Avenue in Dallas, and the volume of freight train traffic will very likely interfere with passenger rail operation. There is insufficient room to grade separate the UP/BNSF crossing as Dallas Union Station is only 2.4 miles away from Forrest Avenue. An alternative solution should be found if this issue is to be resolved.

- The two at-grade railroad crossings of the UP and the BNSF in Waxahachie may represent a potential bottleneck or reliability issue if passsener rail service is operated beyond Grand Avenue because insufficient distance exists for grade-separating.
- Population density along the corridor is sparse, compared to other corridors being studied.

DEFINITION OF FEASIBLE ALTERNATIVES

The Regional Rail Corridor Study considered three primary types of options for the rail corridors under study. Regional rail, light rail, and bus rapid transit were the primary modes or options considered for development. A screening process took place for each corridor to determine if all three options were reasonable or if a subset was more appropriate. The discussion of options pertinent to Corridor E-6 follows.

Description of Modal Alternatives in Corridor E-6

Regional Rail

The Regional Rail Alternative would provide regional rail passenger service along the BNSF rail line between downtown Dallas and Waxahachie. Passing tracks would be required at stations and other convenient locations. Train control and signal systems would be upgraded. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of automotive traffic will have to be improved with the installation of warning devices such as lights, bells, and gates. Six regional rail passenger stations would be constructed along the E-6 Corridor. The final locations of new stations must be determined with consideration for the UP freight traffic. Exhibit VIII-7 contains the basic assumptions for stations, feeder bus access, and park-and-ride

locations that were evaluated for this Modal Alternative. Exhibit VIII-8 shows the Regional Rail Alternative for the E-6 Corridor

EXHIBIT VIII-7

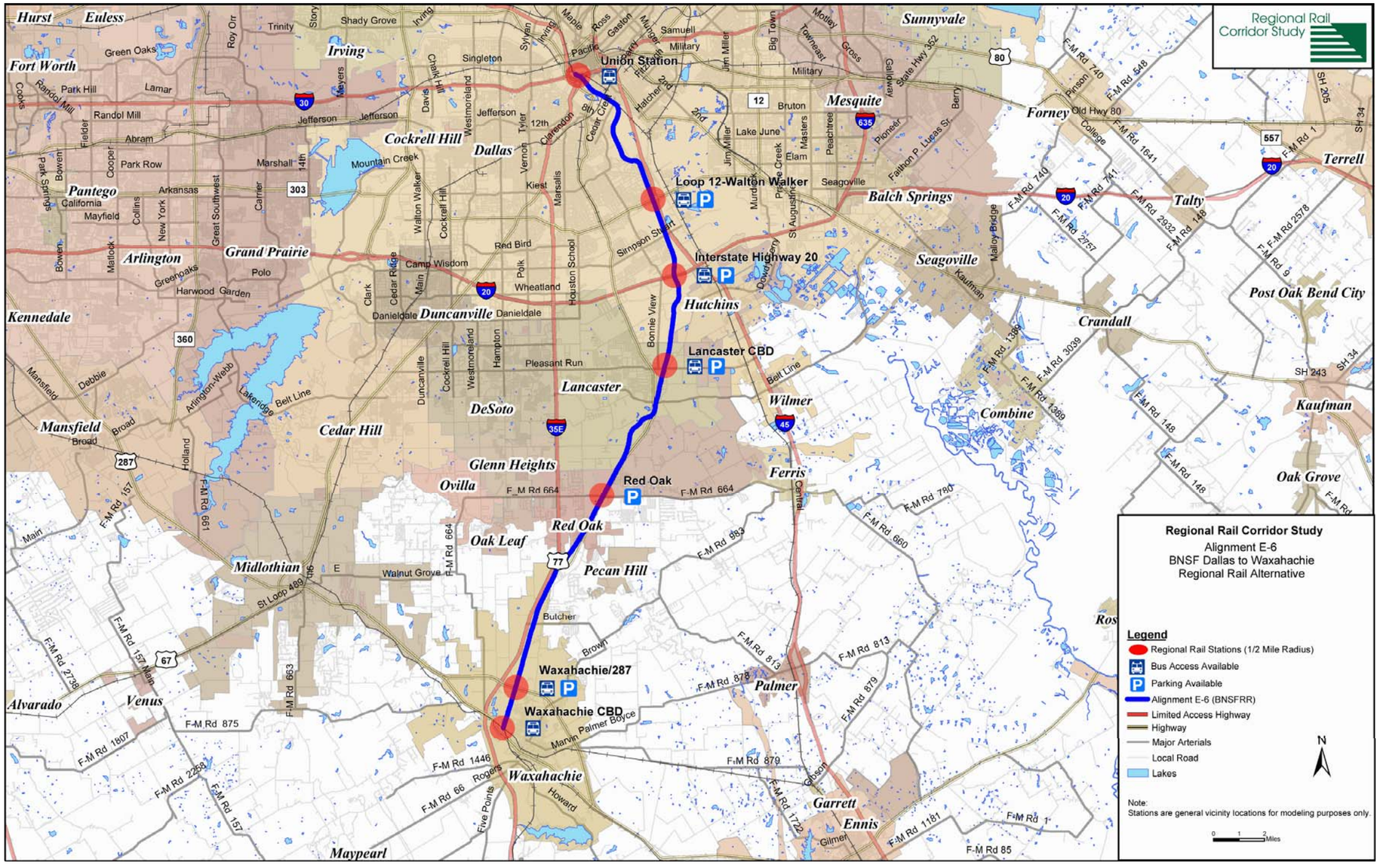
REGIONAL RAIL SERVICE ASSUMPTIONS

Regional Rail (headways = 20 minutes/60 minutes)		
Stations*	**Local Bus**	**Park-and-Ride**
Waxahachie CBD	Yes	No
Waxahachie/287	Yes	Yes
Red Oak	No	Yes
Lancaster CBD	Yes	Yes
Interstate Highway 20	Yes	Yes
Loop 12/Walton Walker	Yes	Yes
Union Station	Yes	No

* Station locations, feeder bus and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT VIII-8

REGIONAL RAIL ALTERNATIVE FOR THE E-6 CORRIDOR



Light Rail

The light rail alternative would provide light rail transit (LRT) service within the E-6 Corridor. A LRT line would be constructed along the BNSF right-of-way, generally paralleling the existing freight track. The new LRT line would begin at DART's existing LRT Union Station in downtown Dallas. New track would be constructed either at-grade within the rail right-of-way or elevated in constrained areas. Nine LRT passenger stations would be constructed along the E-6 Corridor between Dallas Union Station and Waxahachie. The exact locations of new stations must be determined in later phases of project development. Exhibit VIII-9 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for the LRT modal alternative. Exhibit VIII-10 shows the E-6 Light Rail Alternative for the corridor.

EXHIBIT VIII-9

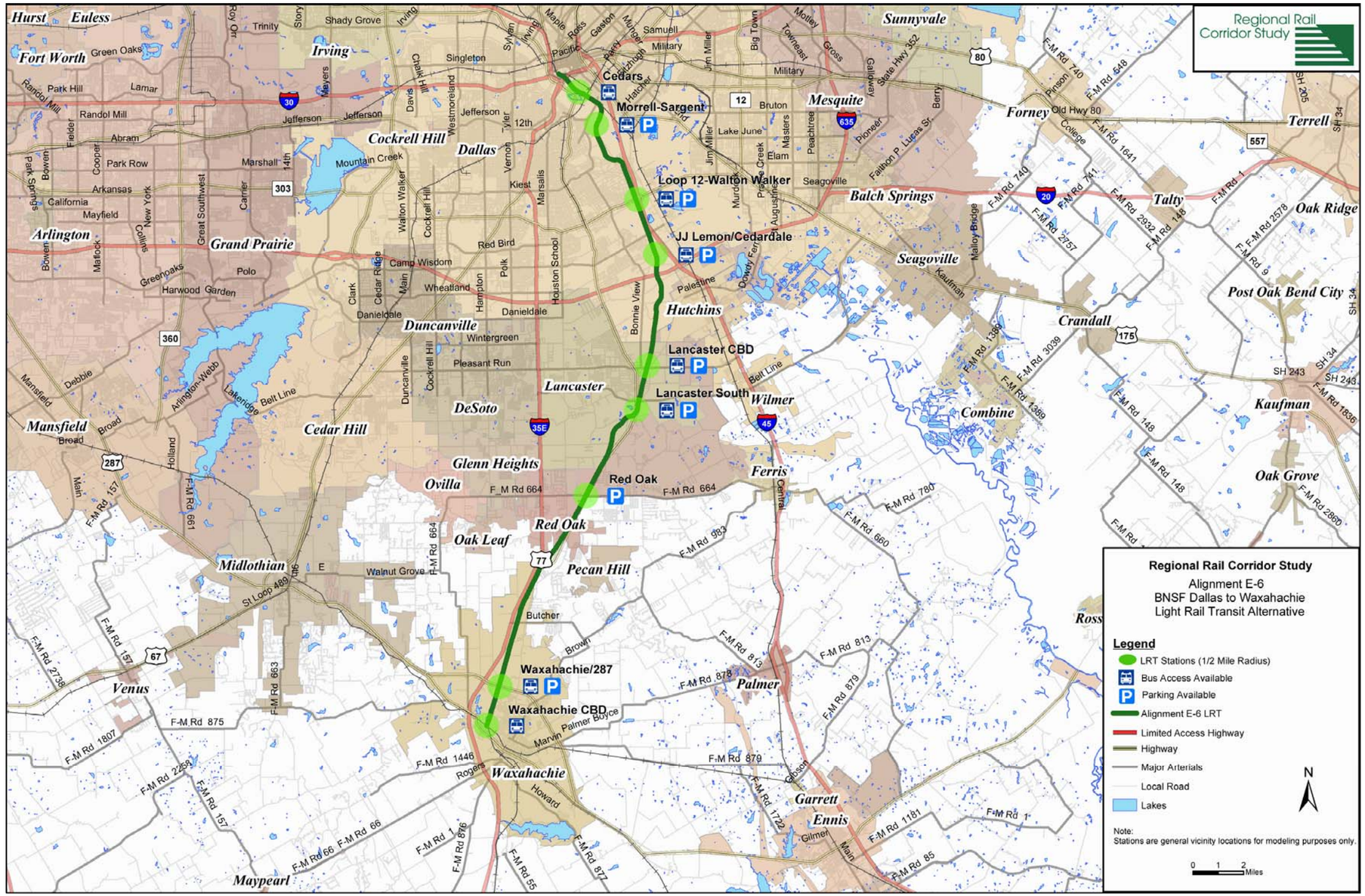
LIGHT RAIL SERVICE ASSUPTIONS

Light Rail (headways = 10 minutes/20 minutes)		
Stations*	**Local Bus**	**Park-and-Ride**
Waxahachie CBD	Yes	No
Waxahachie/287	Yes	Yes
Red Oak	No	Yes
Lancaster South	Yes	Yes
Lancaster CBD	Yes	Yes
JJ Lemon/Cedardale	Yes	Yes
Loop 12/Walton Walker	Yes	Yes
Morrell Sargent	Yes	Yes
Cedars	Yes	No

* Station locations, feeder bus and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT VIII-10

LIGHT RAIL ALTERNATIVE FOR THE E-6 CORRIDOR



Bus Rapid Transit

Bus rapid transit is not considered a viable alternative for the E-6 corridor because of the presence of freight rail traffic currently utilizing the existing BNSF tracks within the corridor and the lack of any parallel highway or street system.

EVALUATION OF ALTERNATIVES

Two different modal alternatives were evaluated for this corridor:

- Regional rail with transfer
- Light rail with transfer

In addition to the assumptions pertaining to different technologies and operating characteristics (station locations, headways, operating speeds, and supply of feeder buses at stations), the relationship of the E-6 Corridor to the others in the regional system was also considered.

One of the key evaluation or performance indicators used projected 2030 average weekday ridership. The complete list of performance indicators is found in Chapter II – Corridor Description and Evaluation. In order to streamline the development of travel forecasts for the Regional Rail Corridor Study, the various modal alternatives containing regional or light rail for each corridor were combined into a series of rail system alternatives for forecasting. Several of the corridors also serve travel markets that interact or compete with each other, so it was important to design the system forecasts to minimize this interrelationship as much as possible. Travel demand forecasts for four rail system alternatives were developed initially, along with BRT system alternative maps showing these systems alternatives. Ridership summaries for these system alternatives

are also contained in Chapter II and, more specifically to the E-6 corridor in the following section.

Ridership Summary

Exhibit VIII-11 presents projected average weekday ridership resulting from each of the system alternatives for the E-6 Corridor. (See Chapter II for a complete discussion.) In Rail System Model Alternative 1, the E-6 Corridor was tested as a regional rail line from Waxahachie to downtown Dallas, with a transfer point at Union Station. Rail System Model Alternative 3 assumed a light rail line along the same alignment.

As explained in Chapter II, the ridership resulting from the Rail System Model Alternatives was used to compare the performance of the modal alternatives for a corridor. The best performing option, which for E-6 would be either regional rail or light rail, was then the recommendation for the corridor and, consequently, included in the Final Run Recommended Model Alternative. Exhibit VIII-12 shows the ridership from the final model run. Because regional rail was the best performing option for the E-6 corridor, and the equipment for that service would not be compatible with DART LRT service north of Union Station, the final model assume no interlining with the DART LRT system. However, access is available to other regional rail (TRE) or the entire DART LRT system at that location. Interlining assumptions for the final model run are depicted in Exhibit VIII-12.

EXHIBIT VIII-11

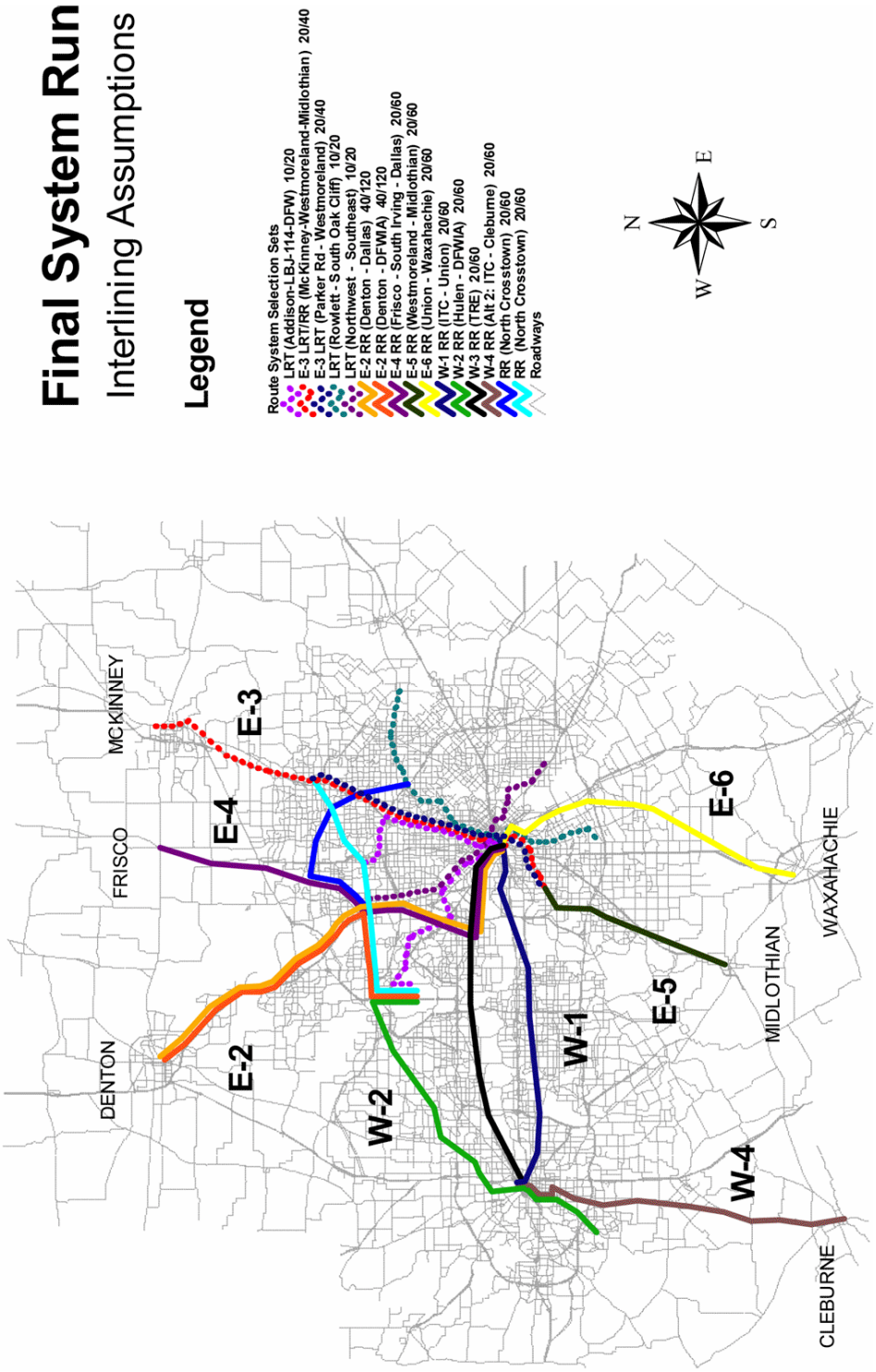
E-6 CORRIDOR RIDERSHIP

Travel Forecast	Technology	Average Weekday Ridership
Rail System Alternative 1	Regional rail	6,100
Rail System Alternative 3	Light rail transit	10,500
Final (2007)	*Regional rail*	*2,700**
Final (2030)	*Regional rail*	*4,000**

*Recommended alternative

EXHIBIT VIII-12

REGIONAL RAIL CORRIDOR STUDY – FINAL RUN RECOMMENDED ALTERNATIVE



To properly stage the recommended alternative, corridor ridership was also generated for the year 2007, measuring the impact of demographics growth on the proposed alternative. The process leads to the identification of corridors worthy of priority implementation.

An important step in transit ridership analysis involves detailed reviews of projected passenger boardings and alightings at each station. Station riders by mode of access (walk, auto, feeder bus, and where applicable, transfers from other rail lines) were reviewed for accuracy and reasonableness. The main outcome of this analysis is the equilibration of feeder bus supply at each station. Shortcomings in network design as well as some coding errors can be identified by doing this analysis. Exhibit VIII-13 presents 2007 and 2030 ridership by station for the final alternative. Corridor line ridership is the sum of demand at stations along a given line, except for where corridor line ridership has been adjusted to account for interlining.

EXHIBIT VIII-13

FINAL RUN RECOMMENDED ALTERNATIVE BOARDINGS BY STATION

Corridor	Stations	Regional Rail Boardings	
		2007	**2030**
E-6	Union Station	1,180	1,740
	Loop12/Walton Walker	190	250
	IH-20	90	*140*
	Lancaster CBD	640	780
	Red Oak	320	500
	Waxahachie/287	160	400
	Waxahachie CBD	160	220
	Line Ridership	**2,740**	**4,030**

Source: NCTCOG-DFWRTM

Performance Evaluation

Each modal alternative considered for the Regional Rail Corridor Study was evaluated with a set of performance indicators. The corridors were scored based upon a five point system with five indicating a good score and one indicating a bad score. The individual criteria scores were then added to reflect a total score for each alternative, including a performance benchmark representing the overall cost effectiveness of each option. Exhibit VIII-14 contains a summary of the final performance of corridor.

EXHIBIT VIII-14

PERFORMANCE SUMMARY FOR E-6 CORRIDOR

Evaluation Criteria	E-6 Regional Rail	Score
Performance benchmark (Annual cost per annual rider)	$17.98	4
Total daily ridership forecast	4,000	3
One-way trip time (minutes)	53	5
Estimated capital cost (millions)	$265.70	4
Estimated annual O&M cost (millions)	$13.80	5
Local authority and funding	None	1
Community acceptance	Community may be open to acceptance of regional rail type service.	3
Ease of implementation	Use of right-of-way must be negotiated with the BNSF and the UP. Flyover of the UP will be required at Forest Avenue.	2
Connectivity with existing and planned transit operations	Regional rail will access Dallas Union Station and could be interlined with the TRE if practical.	4
Compatibility with freight railroad operations	Regional rail equipment will have to be compliant to be compatible.	4
Serves area of unmet mobility need	Roadway capacity deficiency not severe.	1
Impact upon adjacent highways and air quality	Benefit to adjacent highway is equivalent to one lane in each direction.	4
Transit oriented development potential	TOD potential exists but is likely to develop slowly as on TRE.	2
TOTAL SCORE		**42**

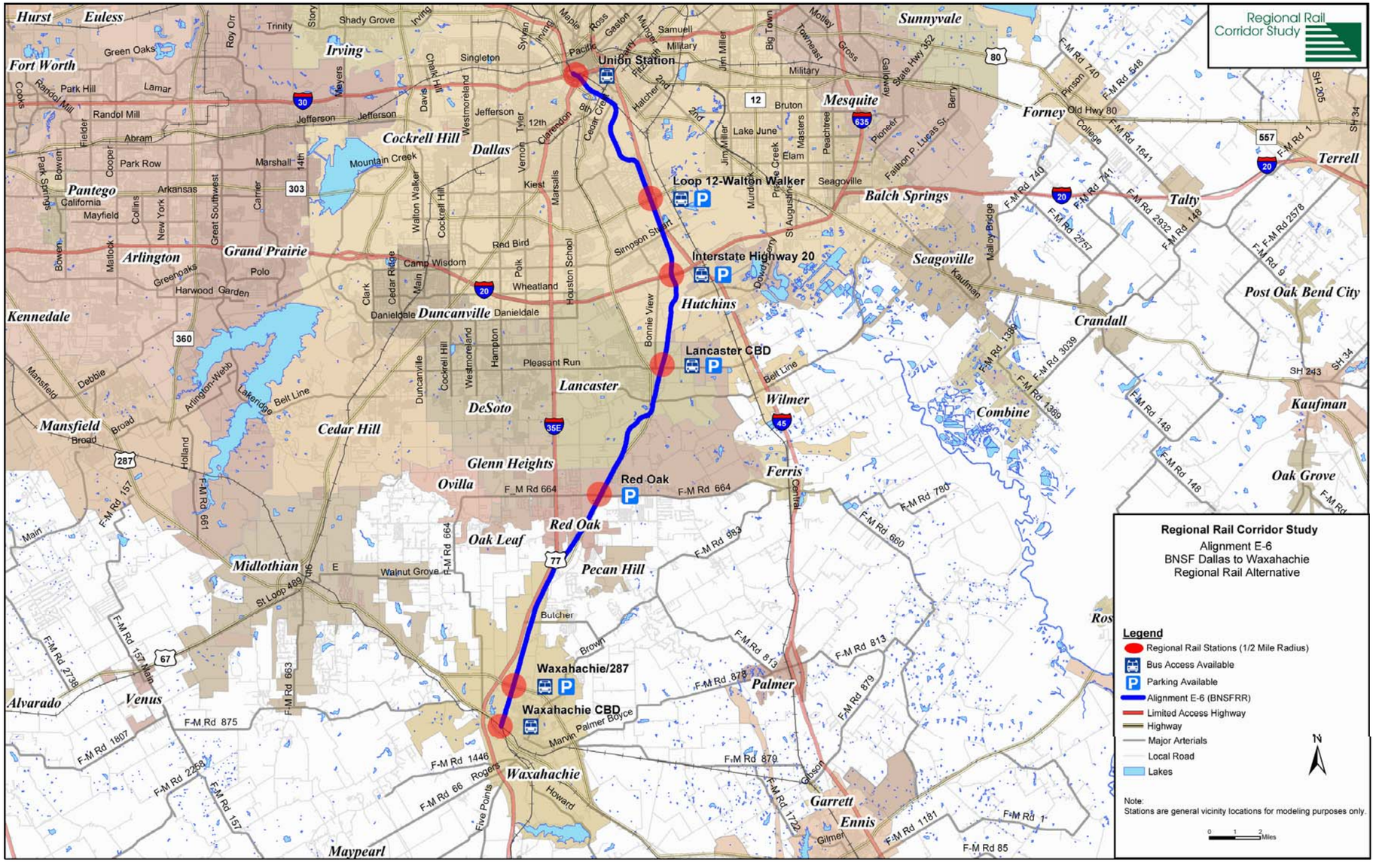
The E-6 Corridor scored 42 points in the overall evaluation. The performance benchmark was $17.98 (score = 4 points), based on a total daily ridership forecast of 4,000 daily riders (score = 3 points). The costs for the corridor include an annual operating and maintenance cost of $13.80 million (score = 5 points) and a total capital cost for development of regional rail in this corridor of $265.70 million (score = 4 points). Estimated trip time to travel one way, the length of the corridor is 53 minutes (score = 5 points). The project has no existing transit authority or funding designated for it at this time (score = 1 point), but the community may be open to a regional rail service (score = 3 points). Use of the right-of-way must be negotiated with the BNSF and the UP Railroads and a flyover rail to rail connection of the UP will be required at Forest Avenue (score = 2). Use of Federal Railroad Administration (FRA) compliant regional rail technology in the corridor will make it compatible with freight operations (score = 4) and require a transfer to the DART system at Union Station for light rail access, but could allow for an interlined operation with the Trinity Railway Express (score = 4 points). The roadway capacity deficiency in the parallel corridor is not severe (score = 1 point), but the ridership projections equal one lane of vehicular traffic in each direction, thereby aiding air quality efforts in the region (score = 4 points). Some transit oriented development exists, but would most likely come along slowly (score = 2 points).

CORRIDOR RECOMMENDATIONS

The final recommendation for the E-6 Corridor is shown in Exhibit VIII-15. Regional rail operating from downtown Dallas Union Station to Waxahachie is recommended. The station locations shown in the map below are for planning purposes only and would be refined as a more detailed Alternatives Analysis study of the corridor is conducted.

EXHIBIT VIII-15

FINAL RECOMMENDATION FOR THE E-6 CORRIDOR



MP 769.7

MP 769.8 Trinity River

MP 770.0 Trinity River

MP 770.4 Private Crossing

MP 771.1 Southerland Arena

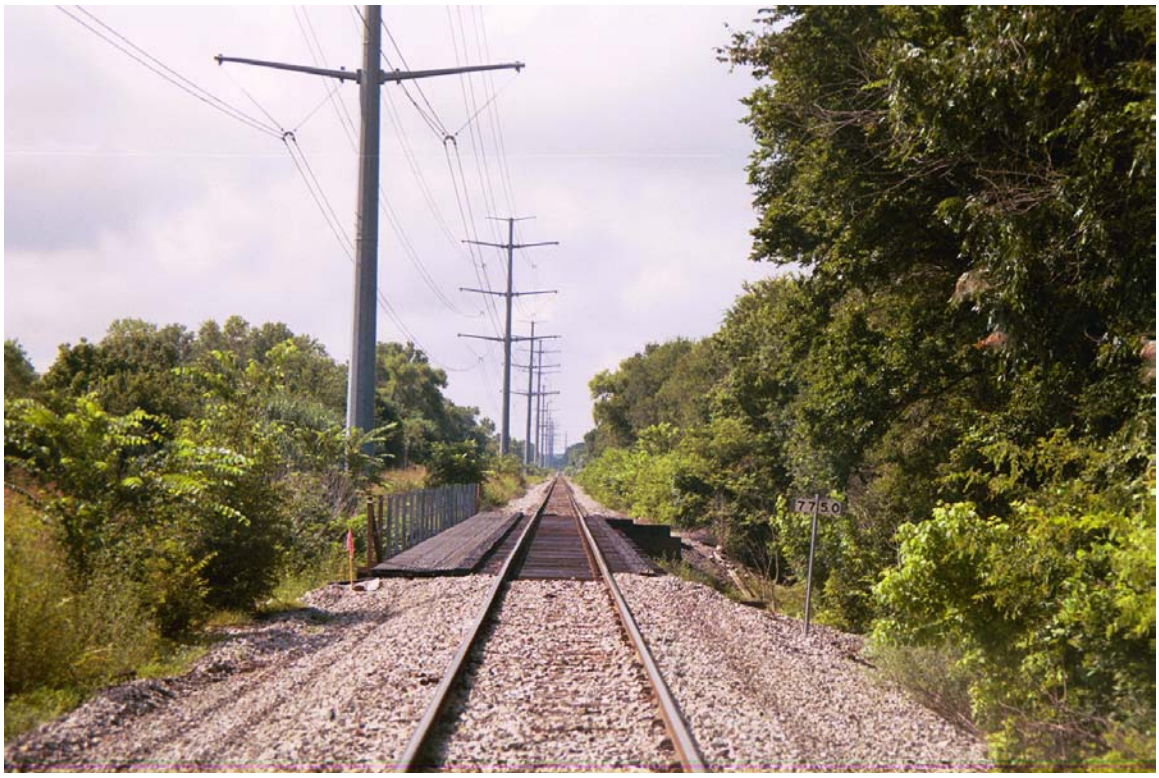
MP 771.9

MP 772.1 Overton Rd

MP 773.4 HWY 12 Loop overpass in distance

MP 773.7 Ledbetter Dr and HWY 12 Loop overpass

MP 774.7



MP 775.0

MP 775.27 Simpson Stuart Rd in Distance

MP 775.5

MP 776.6 J J Lemmon Rd

MP 777.1 I-20 overpass

MP 777.3 Langdon crossing in distance note poor sight distance

MP 777.5

MP 778.2 Cleveland Rd

MP 779.0

MP 779.5 Witt Rd

MP 779.87 Wintergreen Rd

MP 780.0

MP 780.9 Just North of Lancaster at Pleasant Run Rd crossing

MP 781.0 South end of grain elevator spur

MP 781.3 West Lancaster North end of Lancaster Siding

MP 781.6 Lancaster Second Street with Main St in distance

MP 782.1 (East Lancaster) South end of Lancaster siding with Beltline Rd and HWY 342 overpass in distance

MP 782.6 Ten Mile Creek

MP 783.0

MP 783.1 Private crossing for golf course

MP 784.0

MP 784.3 Bear Creek Rd

MP 784.7

MP 785.0

MP 785.4 Bear Creek

MP 785.7

MP 786. Private crossing in distance

MP 786.6 Ovilla Rd

MP 787.0

MP 787.7 Red Oak Rd

MP 788.0 Pierce St with Water St in distance

MP 788.1 Water St

MP 788.8

MP 789.0 Red Oak Creek bridge in distance

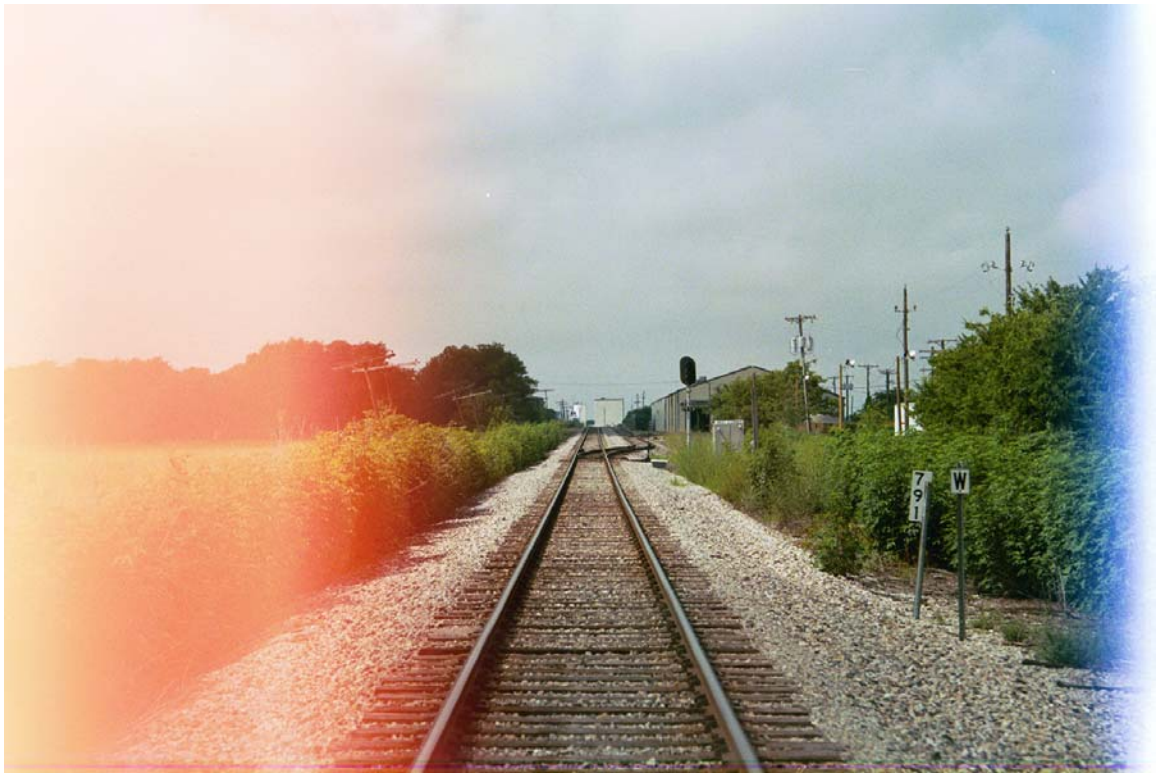
MP 789.1 Red Oak Creek bridge

MP 789.4 Public crossing for golf course

MP 789.8 with bridge over HWY 77 in distance

MP 790.2

MP 790.9 Just North of Sterret



MP 791.0 Sterret

MP 792.9 North of Service

MP 793.2 North end of Service siding

MP 793.9 South end of Service

MP 794.0 between Service and Armaglass

MP 794.2 North end of Armaglass siding

MP 794.5 Armaglass

MP 794.7 Solon crossing with HWY 287 overpass in distance

MP 794.9 HWY 287 overpass and access ramps on each side

MP 795.2

MP 795.4 J Ardin Drive

MP 795.9 Private crossing

MP 796.0

MP 796.4 Private crossing

MP 796.6 SP Jct (UP crossing)

MP 796.6 East Grand crossing at UPRRX

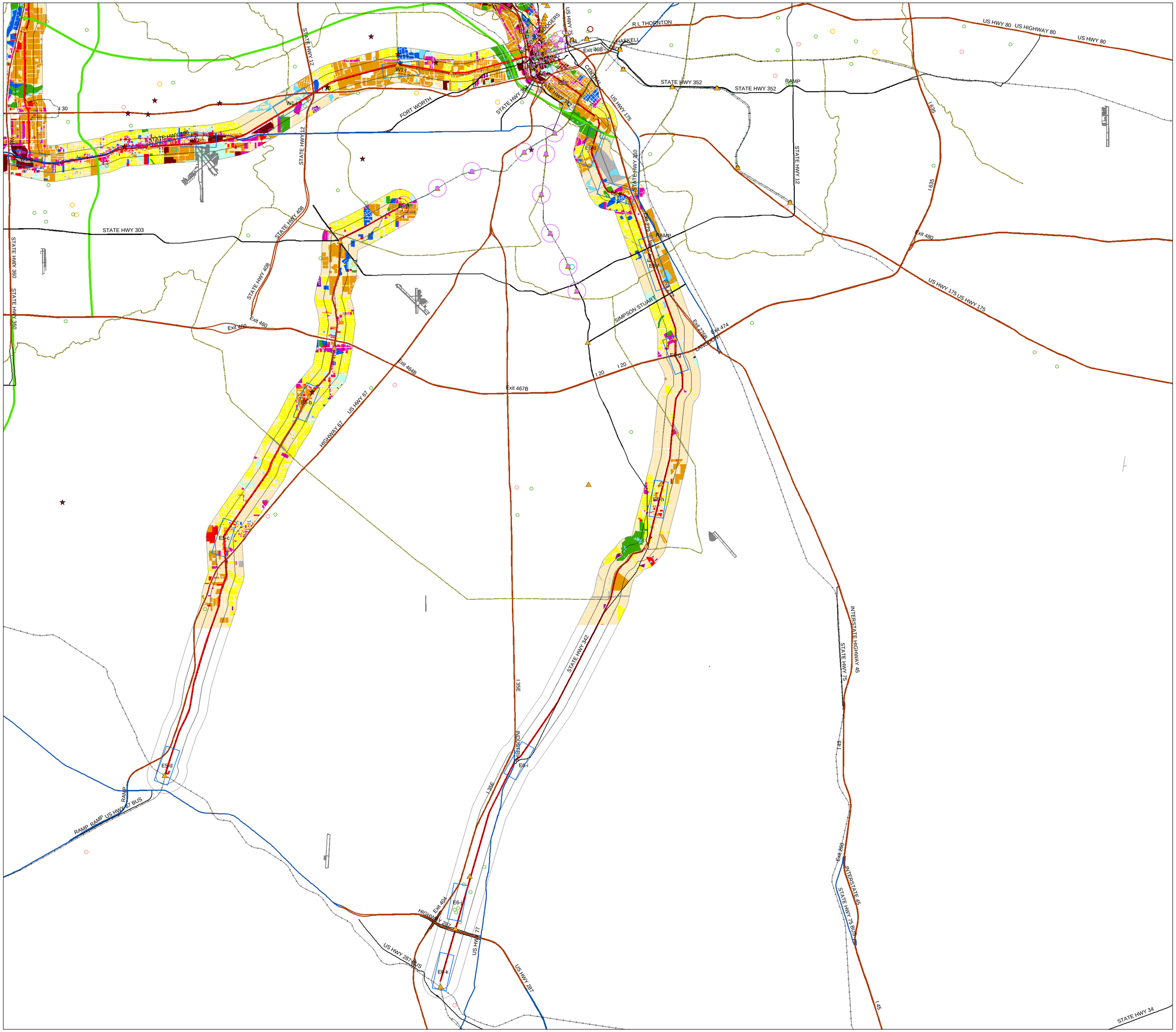
MP 796.6 Looking North at UP crossing from East Grand

MP 797.0 East Main (HWY 287) crossing

MP 797.2 East Jefferson crossing

NP 797.5 Harkins crossing on curve

Baseline Land Use Study: Corridor E-6



Legend

- Possible Station Location
- Existing Rail Station
- Existing Rail Station 1/4 mile buffer
- Mobility 2025 Rail Station
- New Stations Existing by 2008
- Fort Worth Trolley Stops
- 250 - 670
- 670 - 1450
- 1450 - 2750
- 2750 - 6250
- 6250 +
- Clide Award Winner
- JV Project - Selected
- JV Project - Not Selected
- Special Generator
- Amtrak stations
- Airport
- Veloweb
- Railroad
- Fort Worth Trolley Line
- Rail Lines Existing by 2008
- Primary Highway
- Secondary Highway
- Major Arterial
- Proposed Freeways and Tollroads
- Regional Rail Corridor

Regional Rail Corridor Buffer

Buffer Distance

- 0.00 - 0.25
- 0.25 - 0.50

Single-family
Multi-family
Retail
Office
Vacant
Park and Recreation
Industrial
Parking
Institutional
Hotel/Motel
Utilities
Mobile Homes
Water
Landfill
Under Construction

E-6 Burlington Northern Santa Fe
begins in Waxahachie, through Red Oak, Lancaster, ends in Dallas, 30 miles in length

Potential Station Zone: 1/2 mile wide linear area of variable length based on the area of interest

Area of Interest	Station Status	County	Jurisdiction w/in walking distance of station	Characteristics of Interest	Development Type	Development Style	Future Land Use (comprehensive plan)	Zoning (of vacant land)	Other Comments
E6-a	Existing	Dallas	Dallas	**Station:** Union station **Infill Opportunities:** built up - no infill opportunities, **Flood zone:** Partially within 500 year floodplain - opportunity for green space. Partially outside floodplain.	Infill-other development	pedestrian oriented development			
E6-b	Existing	?	?	**Station:** Convention Center station **Infill Opportunities:** built up - no infill opportunities **Flood zone:** Partially within 500 year floodplain - opportunity for green space. Partially outside floodplain.	Infill-other development	pedestrian oriented development			
E6-c	Existing	?	?	**Station:** Cedars station **Infill Opportunities:** built up - no infill opportunities, all industrial **Flood zone:** outside of floodplain	Infill-other development	pedestrian oriented development			
E6-d	Proposed	Dallas	Dallas	**Employment within walking distance of the site:** N/A **Current land uses:** park space, industrial, utilities, single-family **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** N/A **Site accessible via:** regional veloweb, hwy I45, Regional Thoroughfare Plan proposed freeway **Flood zone:** Almost completely within the 100 or 500 year floodplain. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid			Reconsider this location.
E6-e	Proposed	Dallas	Dallas	**Employment within walking distance of the site:** none **Current land uses:** retail, industrial, multi-family, park space **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** N/A **Site accessible via:** hwy I45, state hwy 310 **Flood zone:** Partially within 100 and 500 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid			
E6-f	Proposed	Dallas	Dallas	**Employment within walking distance of the site:** N/A **Current land uses:** industrial **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** N/A **Site accessible via:** regional veloweb, state hwy 12, state hwy 312, hwy I45 **Flood zone:** Half of area is within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Greenfield development	hybrid			

E6-g	Proposed	Dallas	Dallas	**Employment within walking distance of the site:** N/A **Current land uses:** retail, single-family **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** N/A **Site accessible via:** hwy I20 **Flood zone:** Half of area is within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Greenfield development	hybrid			
E6-h	Proposed	Dallas	Lancaster	**Employment within walking distance of the site:** Brass Craft Western (360) **Current land uses:** single-family, institutional **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** N/A **Site accessible via:** regional veloweb **Flood zone:** Partially within 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development or greenfield development	hybrid	light industrial or low density residential	IP, MU-2,I,PD or B,R-1,R-2	
E6-I	Proposed	Ellis	Redoak, Waxahachie	**Employment within walking distance of the site:** N/A **Current land uses:** N/A **Vacant land:** N/A **Located within walking distance:** N/A **Site accessible via:** US hwy I35, US hwy 77, state hwy 342 **Flood zone:** no information	Greenfield development	hybrid			
E6-j	Proposed	Ellis	Waxahachie	**Employment within walking distance of the site:** Owens-Corning Fiberglass (500), Raco Interior Products (250), US Aluminum (300), International Extrusion (350), Dart Container Corporation (430) **Current land uses:** N/A **Vacant land:** N/A **Located within walking distance:** N/A **Site accessible via:** US hwy I35E, US hwy 287, US hwy 77 **Flood zone:** no information Site was modeled for a station in the Mobility 2025 Plan	Greenfield development	hybrid			
E6-k	Proposed	Ellis	Waxahachie	**Employment within walking distance of the site:** N/A **Current land use:** N/A **Vacant land:** N/A **Located within walking distance:** N/A **Site accessible via:** US hwy I35E, US hwy 287, US hwy 77 **Flood zone:** no information Site was modeled for a station in the Mobility 2025 Plan	Infill-other development or greenfield development	hybrid			

EASTERN CORRIDOR COST ANAYLSIS (E-6)

REGIONAL RAIL CORRIDOR STUDY											
North Central Texas Council of Governments									Link Number:	E-6	
Parametric Cost Estimate									Link Description:	Waxahachie	
									Start Sta:		
									End Sta:		
		E-6 Dallas to Waxahachie		Regional Rail				Light Rail		Link Length:	30.7	
Description			**Unit**	**Unit Cost**	**Quantity**	**Cost**	**Subtotals**	**Unit Cost**	**Quantity**	**Cost**	**Subtotals**	**Remarks**
Site Work & Urban Design												
	Earthwork, 1 Track, Major		MI	$1,500,000		$0						
	Earthwork, 1 Track, Basic		MI	$500,000	3.1	$1,550,000						
	Earthwork, 2 Tracks, Major		MI	$2,500,000		$0		$3,500,000		$0		
	Earthwork, 2 Tracks, Basic		MI	$750,000		$0						
	Earthwork, Reconstruct Existing Track		MI	$100,000	30.7	$3,070,000						
	Urban Design/Signage/Landscaping		MI	$250,000	30.7	$7,675,000		$750,000		$0		
	Environmental Mitigation (Includes noise and vibration)		MI	$100,000	30.7	$3,070,000		$100,000		$0		
	Relocate Hike/Bike Trail		MI	$1,400,000		$0		$1,400,000		$0		
		Subtotal					**$15,365,000**				**$0**	
Trackwork												
	New Track, 136# CWR		MI	$1,000,000	3.1	$3,100,000		$1,850,000		$0		
	Upgrade Track to Class 4		MI	$500,000	30.7	$15,350,000						
	Paved Embedded Track (Double)		MI	$4,000,000		$0		$5,600,000		$0		
	New Single Track #1 Relay Rail		MI	$800,000		$0						
	New Turnout #10		EA	$125,000		$0		$125,000		$0		
	New Turnout #15		EA	$200,000	4	$800,000		$200,000		$0		
	New Turnout #24		EA	$250,000	12	$3,000,000		$250,000		$0		
	Rebuild Turnout or Diamond		EA	$75,000	19	$1,425,000						
	New Railroad Diamond Crossing		EA	$200,000		$0						
		Subtotal					**$23,675,000**				**$0**	
Structures												
	Elevated Track (railroad over railroad)		TF	$6,500	2,200	$14,300,000		$10,000		$0		
	Tunnel		TF	$10,000		$0		$10,000		$0		
	New Bridge (Minor)		TF	$4,500		$0		$4,500		$0		
	New Bridge (Major)		TF	$6,500		$0		$6,500		$0		
	Reconstruct Existing Bridge		TF	$2,500	2,756	$6,890,000		$2,500		$0		
	Retaining Wall (0 FT - 10 FT High)		TF	$175	1,600	$280,000		$175		$0		
	Retaining Wall (10 FT - 20 FT High)		TF	$525	1,600	$840,000		$525		$0		
	New Culvert		EA	$10,000	12	$120,000		$10,000		$0		4/mile
	Rehabilitate Culvert		EA	$5,000	122	$610,000		$5,000		$0		4/mile
		Subtotal					**$23,040,000**				**$0**	
Stations												
	At-grade Station		EA	$650,000	7	$4,550,000		$2,800,000		$0		
	Aerial Station (LRT)		EA			$0		$4,600,000		$0		
	Depressed Station (LRT)		EA			$0		$15,000,000		$0		
	Parking Spaces/Surface Lot		EA	$4,000	2,500	$10,000,000		$4,000		$0		avg=500/station
	Service and Layover Facility		EA	$2,000,000	1	$2,000,000		$5,000,000		$0		
	Central Maintenance Facility Contribution		EA	$1,000,000	1	$1,000,000		$2,000,000		$0		
		Subtotal					**$17,550,000**				**$0**	
Traction Electrification System (LRT)			MI			$0		$1,600,000		$0	**$0**	
		Subtotal										
Signal System												
	Communications System (LRT)		MI			$0		$1,100,000		$0		
	New Railroad Interlocking		EA	$1,500,000		$0						
	Modify Railroad Interlocking		EA	$750,000		$0						
	New CTC or LRT Signaling System		MI	$1,200,000	33.8	$40,560,000		$2,300,000		$0		
	Upgrade Railroad Signal System		MI	$600,000		$0						
		Subtotal					**$40,560,000**				**$0**	
R.O.W. & Y Junction												
	R.O.W. Allowance		AC			$0	**$0**				**$0**	
Utilities												
	Utilities Allowance		MI	$200,000	30.7	$6,140,000	**$6,140,000**	$400,000		$0	**$0**	
Crossings / Roadway												
	Minor Street At-grade (Gates & Warning Devices)		EA	$150,000	6	$900,000		$150,000		$0		
	Minor Street At-grade (w/ Quad Gates System & Warning Devices		EA	$250,000	12	$3,000,000		$250,000		$0		
	Major Street At-grade (w/ Quad Gates System & Warning Devices		EA	$450,000	18	$8,100,000		$450,000		$0		
	Reconstruct Existing Roadway Bridge		EA	$1,000,000		$0		$1,000,000		$0		
	Reconstruct Existing Roadway		SY	$40		$0		$40		$0		
	Construct New Roadway		SY	$80		$0		$80		$0		
	Highway/Railroad Grade Separation		EA	$8,000,000		$0		$8,000,000		$0		
		Subtotal					**$12,000,000**				**$0**	
Special Conditions												
						$0				$0		
						$0				$0		
						$0				$0		
		Subtotal					**$0**				**$0**	
		Subtotal A					**$138,330,000**				**$0**	
	MIS Level Design Contingency (% of A)		15%				$20,749,500	30%			$0	
	Construction Contingency (% of A)		10%				$13,833,000	10%			$0	
	Add-on Allowance (Eng., CM, etc) (% of A)		15%				$20,749,500	30%			$0	
Rail Vehicle Train Sets (actual without contingencies)			Train Set	$8,000,000	9	$72,000,000	**$72,000,000**	$9,000,000		$0	**$0**	
		Grand Total					**$265,662,000**				**$0**	
NOTE:	1. Unit Costs are expressed in present value dollars.											
	2. Retaining Wall Unit Cost is for one side only.											
	3. Cost estimate excludes ROW costs.											

Annualized Cost Estimate (E-6)

Regional Rail Corridor:	**E-6**	**Dallas to Waxahachie**						Regional Rail Corridor:	E-6	Dallas to Waxahachie
Annualized Capital Cost		Daily Riders:	4,000		0			Cost Category Summary		
		Annualized Riders:	1,240,000		0					
			Regional Rail	Regional Rail	Light Rail	Light Rail			Regional Rail	Light Rail
	Useful	Annualization	Total Cost ($mil)	Annualized	Total Cost ($mil)	Annualized			Total Cost ($mil)	Total Cost ($mil)
Cost Category	Life (yr)	Factor	(Incl. Contingency)	Cost ($mil)	(Incl. Contingency)	Cost ($mil)		Cost Category	(Incl. Contingency)	(Incl. Contingency)
Site work and Urban Design	100	0.070	$21.511	$1.506	$0.000	$0.000		Site work and Urban Design	$30.107	$0.000
Trackwork	30	0.081	$33.145	$2.685	$0.000	$0.000		Trackwork	$33.145	$0.000
Structures	30	0.081	$32.256	$2.613	$0.000	$0.000		Structures	$32.256	$0.000
Stations	20	0.094	$24.570	$2.310	$0.000	$0.000		Stations	$24.570	$0.000
LRT Electrification System	30	0.081	$0.000	$0.000	$0.000	$0.000		LRT Electrification System	$0.000	$0.000
Signal System	30	0.081	$56.784	$4.600	$0.000	$0.000		Signal System	Incl with Crossings/Roadway	
Right-of-Way	100	0.070	$0.000	$0.000	$0.000	$0.000		Right-of-Way	Not Applicable	
Utilities	20	0.094	$8.596	$0.808	$0.000	$0.000		Utilities	Incl with Site Work & Urban Design	
Crossings / Roadway	20	0.094	$16.800	$1.579	$0.000	$0.000		Crossings / Roadway	$73.584	$0.000
Special Conditions	20	0.094	$0.000	$0.000	$0.000	$0.000		Other	$0.000	$0.000
Vehicles	25	0.086	$72.000	$6.192	$0.000	$0.000		Vehicles	$72.000	$0.000
Total			$265.662	**$22.292**	$0.000	**$0.000**		Total	$265.662	$0.000
Performance Benchmark				**17.98**		**#DIV/0!**				
Notes:										
1. Annualized Riders = Daily Riders times 310 days per year.										
2. Performance Benchmark = Annualized Cost divided by Annualized Riders.										

IX. W-1 – UNION PACIFIC MAINLINE CORRIDOR CONSIDERATIONS

CORRIDOR DESCRIPTION

Rail Corridor W-1 was one of eight freight rail corridors in the Dallas-Fort Worth area studied for the feasibility of implementing commuter rail, light rail, or other forms of transit services. Corridor W-1 is a Union Pacific line that extends 37 miles from the T&P Terminal in Downtown Fort Worth to Union Station in downtown Dallas. The corridor location is shown on a map in Exhibit IX-1.

Existing Track Conditions

The Union Pacific Mainline between downtown Fort Worth and downtown Dallas is a Class I rail line that carries a high volume of freight rail traffic, currently carrying approximately 30 trains per day. The Union Pacific Railroad owns all of the right-of-way along the W-1 corridor. The railroad right-of-way is typically 100 feet in width. The Burlington Northern Santa Fe has trackage rights for shared use of the mainline under agreement with the Union Pacific Railroad. The mainline is double tracked throughout the entire corridor, with Centralized Train Control (CTC) signaling and a maximum operating speed of 60 mph.

A fact sheet summarizing the existing conditions and issues for the W-1 corridor is shown in Exhibit IX-2.

EXHIBIT IX-1

W-1 CORRIDOR LOCATION MAP

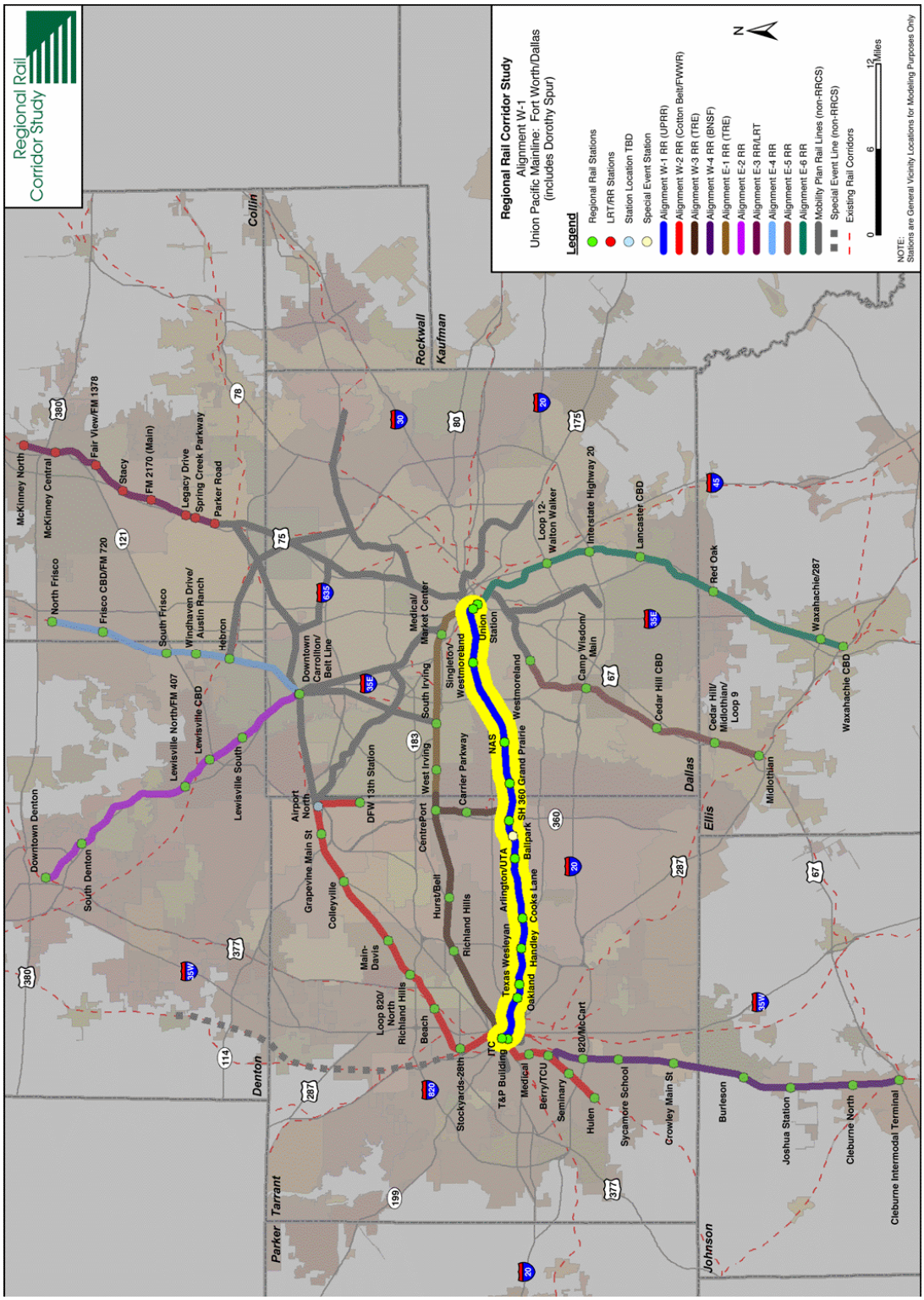


EXHIBIT IX-2

W-1 CORRIDOR FACT SHEET

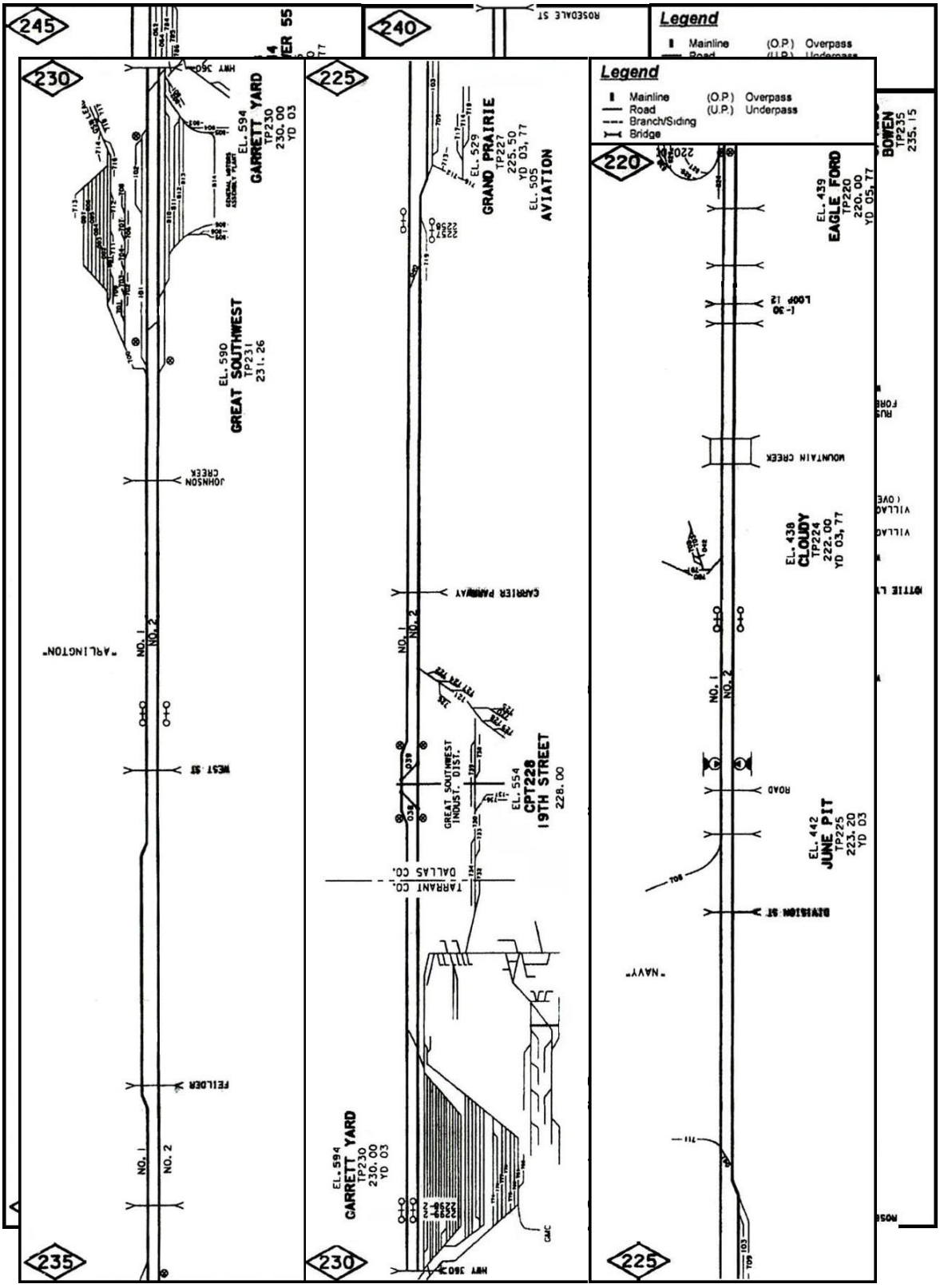
Owner(s) of the line	UPRR
Operator(s) of the line	UPRR
Trackage rights	BNSF
Length of the corridor	37 Miles
Average trains per weekday	30
Track summary	▪ Double tracks with Centralized Traffic Control Signaling. ▪ Maximum operating speed is 60 mph. ▪ Garrett Yard (auto facility) is located near Hwy. 360 in Arlington. ▪ Centennial Yard is located in Fort Worth.
Railroad crossings	▪ Thirty-five (35) at-grade highway/railroad crossings. ▪ Twenty-eight (28) grade-separated highway/railroad crossings.
Jurisdictions	▪ Cities of Fort Worth, Arlington, Grand Prairie, Arlington, and Dallas. ▪ Tarrant and Dallas Counties.
Industrial sidings	▪ Pioneer Paper; Pioneer South Central Inc., General Motors, Great Industrial Southwest District.
Corridor issues	▪ High volume freight traffic. ▪ Tower 55 congestion. ▪ Planned new intermodal terminal location to be determined. ▪ Capacity of Fort Worth T&P Station and Dallas Union Station limited by existing rail activity.

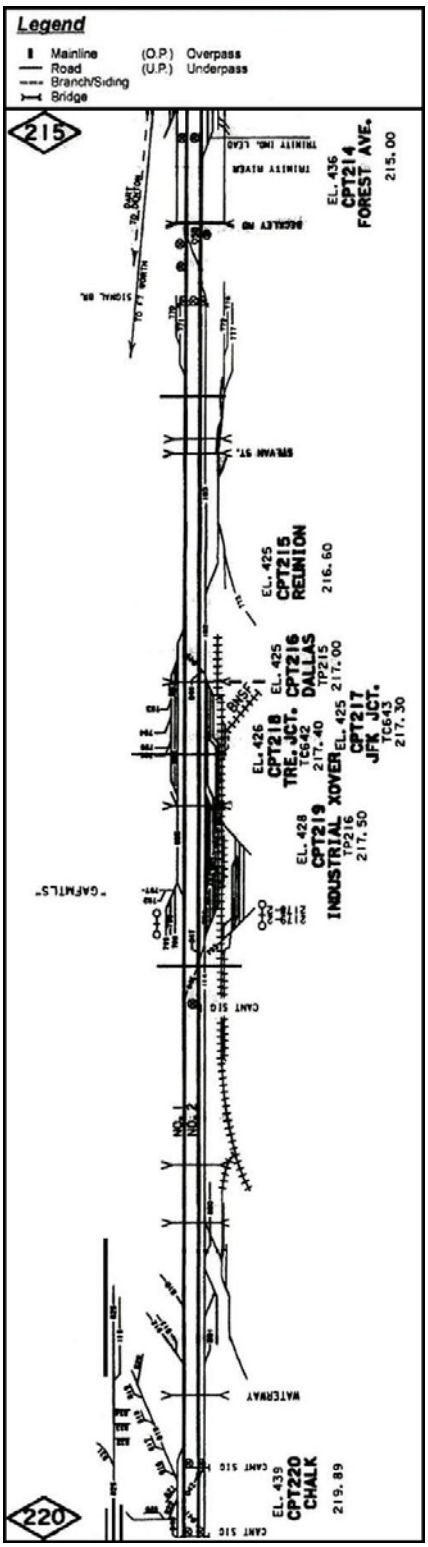
Schematic of the Corridor

A schematic diagram of the existing rail line in the W-1 Corridor is shown in Exhibit IX-3.

EXHIBIT IX-3

W-1 CORRIDOR SCHEMATIC




Legend
Mainline
Road
Branch/Siding
Bridge
(O.P.) Overpass
(U.P.) Underpass
215
220
EL. 436
CPT214
FOREST AVE.
215.00
EL. 425
CPT215
REUNION
216.60
EL. 425
CPT216
DALLAS
TP215
217.00
EL. 426
CPT218
TRE. JCT.
TC642
217.40
EL. 425
XOVER
CPT217
JFK JCT.
TC643
217.30
EL. 428
CPT219
INDUSTRIAL
TP216
217.50
EL. 439
CPT220
CHALK
219.89
TRINITY RIVER
TRINITY IND. LEAD
BECKLEY RD
SYLVAN ST.
WATERWAY
CANT SIG
NO. 1
NO. 2

DETAILED INFORMATION

This section contains detail information for the bridges and railroad/highway grade crossings and overpasses located along the W-1 Union Pacific Corridor. Tables containing the information are provided on the following pages.

There are 35 at-grade roadway/railroad crossings and 28 grade separated over/underpasses along the W-1 Corridor between Union Station in downtown Dallas and the T&P Terminal in downtown Fort Worth. Existing railroad/highway grade crossings and overpasses are listed in Exhibit IX-4.

EXHIBIT IX-4

RAIL/HIGHWAY CROSSINGS AND OVER/UNDER PASSES

Milepost	Highway/Street	Public/ Private	Warning Devices	DOT Number
214.80	I-35/Stemmons Expressway	Public	Railroad overpass	794884B
214.90	Industrial Boulevard	Public	Railroad overpass	794885H
215.00	Canada Drive	Public	Railroad overpass	794908M
216.20	Sylvan Street	Public	Railroad overpass	794909U
216.8	Vilbig Road	Public	Gates/lights/bells/ advanced warning	794921B
217.0	Unknown	Public	Roadway overpass	
217.43	Hampton Road	Public	Roadway overpass	794923P
217.95	Manila Road	Public	Gates/lights/bells/ advanced warning	794925D
218.45	Westmoreland	Public	Gates/lights/bells/ advanced warning	794926K
218.95	Norwich	Public	Cantilever/gates/lights/ bells/advanced warning	794927S
220.2	Chalk Hill Road	Public	Gates/lights/bells	794929F
221.0	I-30	Public	Railroad overpass	794940P
221.0	Loop 12	Public	Roadway overpass	794940F
223.5	Division Street	Public	Railroad overpass	794944H
224.55	Bagdad Road	Public	Gates/lights/bells/ advanced warning	794946W
225.55	S.E. 14th	Public	Gates/lights/bells/ advanced warning	794951T
225.85	S.E. 9th Street	Public	Gates/lights/bells/ advanced warning	848276K
225.95	S.E. 8th Street	Public	Gates/lights/bells/	794952A

Milepost	Highway/Street	Public/ Private	Warning Devices	DOT Number
			advanced warning	
226.15	S.E. 5th Street	Public	Gates/lights/bells/ advanced warning	7949536
226.47	Center Street	Public	Gates/lights/bells/ advanced warning	794954N
226.57	S.W.2nd Street	Public	Gates/lights/bells/ advanced warning	794955V
226.78	S.W. 5th Street	Public	Gates/lights/bells/ advanced warning	794956C
227.20	Carrier Parkway	Public	Railroad overpass	794957J
227.65	S.W. 14th Street	Public	Gates/lights/bells/ cantilever/advanced warning	794958R
228.00	S.W. 19th Street	Public	Gates/lights/bells/ cantilever/advanced warning	794960S
228.40	S.W. 23rd Street	Public	Gates/lights/bells/ advanced warning	794961Y
228.99	Great S.W. Parkway	Public	Gates/lights/bells/ cantilever/advanced warning	794971E
230.00	State Highway 360	Public	Railroad overpass	794972L
231.26	Stadium Drive	Public	Gates/lights/bells/ advanced warning	794974A
232.10	Collins Street	Public	Gates/lights/bells/ advanced warning	794975G
232.45	East Street	Public	Gates/lights/advanced warning	794976N
232.60	Mesquite Street	Public	Gates/lights/bells/ advanced warning	794977V
232.67	North Center Street	Public	Gates/lights/bells/ advanced warning	794978C
232.90	West Street	Public	Gates/lights/bells/ advanced warning	794979J
233.10	Cooper Street	Public	Cantilever/gates/lights/ bells/advanced warning	794980D
233.62	Davis Drive	Public	Gates/lights/bells/ advanced warning	794981K
234.20	Fielder Road	Public	Roadway overpass	794983Y
235.15	Bowen Road	Public	Gates/lights/bells/ advanced warning	794984F
236.27	Forest Edge	Public	Railroad overpass	794985M
236.56	Private Crossing	Private	Crossbucks/lights	794986U
237.00	Dottie Lynn Parkway	Public	Roadway overpass	748556L
237.65	Private Crossing	Private	Crossbucks/lights	794987B
239.25	Handley Drive	Public	Gates/lights/bells/ advanced warning	794989P

Milepost	Highway/Street	Public/ Private	Warning Devices	DOT Number
239.32	Forest Avenue	Public	Gates/lights/bells/ advanced warning	794990J
239.40	Erie	Public	Gates/lights/bells/ advanced warning	794991R

Source: Carter & Burgess, Inc. 2003

There are 49 bridges and culverts along the W-1 Corridor between Union Station in downtown Dallas and the T&P Terminal in downtown Fort Worth. Existing rail bridges and culverts in the W-1 Corridor are listed in Exhibit IX-5.

EXHIBIT IX-5

RAILROAD BRIDGES AND CULVERTS

Milepost	Bridge Type	Length	Remarks
214.80	Through plate girder	268’	I-35/Stemmons Freeway
214.90	Deck plate girder	176’	Industrial Boulevard
215.20	12-Deck plate girder/open deck 1-Through Truss Riveted/open deck 19-Deck plate girder/open deck	700’ 200’ 1,120’	Trinity River
215.40	Deck plate girder/open deck	90’	Beckley Road
216.15	6’ Concrete pipe 6’x6’ Concrete Box Culvert		
216.20	Reinforced Concrete Slab	70’	Sylvan Street
217.00	OH Viaduct		
217.43	OH Viaduct		Hampton Road
218.70	6’x7’ Concrete Box Culvert 10’x7’ SPPA Arch		
218.90	6’x4’ Concrete Box Culvert		
219.50	Reinforced Concrete slab	47’	Waterway
220.27	6’x6’ Concrete Box Culvert		
220.67	7’x10’ Concrete Box Culvert		
221.00	Prestressed concrete I-Beam Dual OH Viaduct	315’ Underpass	I-30/Loop12
221.08	6’x6’ Concrete Box Culvert		
221.60	Prestressed Concrete Tee Deck plate girder/open deck Prestressed Concrete Tee Prestressed Concrete Tee Deck plate girder/open deck Prestressed Concrete Tee	1175.2’ 1170.3’	Mountain Creek
223.00	Prestressed Concrete Box	320’	

Milepost	Bridge Type	Length	Remarks
	Prestressed Concrete Box	318’	
223.18	7’x9’ Concrete Box Culvert		
223.50	Through plate girder/open deck	72’	Division Street
230.00	Prestressed Concrete Box Timber Stringers Deck Plate Girder	40’ 33’ 112’	Underpass
227.20	Steel-beam span continuous	124’	Carrier Parkway (Underpass)
230.00	Pre-stressed concrete box, deck plate girder, timber stringers	40’, 112’, 23’	SH- 360 (Underpass)
231.70	Reinforced concrete tee, reinforced concrete tee	120’, 118’	Johnson Creek
232.90	Reinforced concrete slab	39’	West Street
234.20	OH viaduct		Fielder Road
234.69	4.3’x 2.6’ CMP arch		
235.56	4’ concrete pipe		
235.77	5’ CMP		
235.78	11.5’ structural plate pipe		
236.20	Timber stringers, timber stringers	111’,110’	Waterway
236.27	Underpass		Forest Edge
236.30	Reinforced concrete tee, reinforced concrete tee	180’, 181’	Rush Creek
236.70	Prestressed concrete tee	154’	Village Creek (overflow)
236.80	Through plate girder / open deck	124’	Village Creek
236.90	Pre-stressed concrete box, pre-stressed concrete box	23’, 96’	Waterway
237.00	OH viaduct		Dottie Lynn Parkway
237.40	Reinforced concrete tee	76’	Waterway
238.90	4.3’ concrete pipe		
239.10	4’ CMP		
239.50	6’ x 5’ concrete box culvert		
239.70	Steel-beam span continuous, deck plate girder, steel-beam span continuous	69’, 127’, 69’	I-820
240.00	Deck plate girder	126’	Rosedale Street
242.28	24’ concrete pipe		
242.80	Reinforced concrete slab	63’	N. Collard Street
243.30	Reinforced concrete slab, steel-beam span continuous, reinforced concrete slab	8’, 39’, 8’	Conner Avenue
243.60	Steel-beam span continuous	128’	Beach Street
244.00	Deck truss riveted/open deck, deck truss riveted / open deck	98’ 90’	Sycamore Creek
244.40	Reinforced concrete slab	56’	Riverside Drive
244.50	Steel-beam span continuous	156’	US-287

Source: Carter & Burgess, Inc. 2003

Photos Taken in the Corridor

During the automobile inspections of the W-1 Corridor, photographs were taken of various features and conditions along the line. Photographs were taken of as many of the bridges, highway crossings, overpasses, underpasses, sidings, track conditions, special conditions or constraints, and general right-of-way conditions and features as possible. The photographs taken along the W-1 Corridor between Dallas and Fort Worth are included at the end of this chapter.

Existing Land Use

A baseline land use survey was conducted by NCTCOG staff at the onset of the Regional Rail Corridor Study. The major focus of this study was to help locate specific areas along the Regional Rail Corridors that possess characteristics that could support the development of a rail station and/or transit-oriented development. Baseline land use shows the existing land use for the W-1 corridor. Possible station locations are also shown on the map. Land use maps can be found at the end of this chapter following the photographs.

Infrastructure Constraints

The UPRR Mainline and the BNSF Mainline intersect at Tower 55, located at MP 245.7 on the UP, just southeast of downtown Fort Worth. Tower 55 is one of the busiest railroad intersections in the United States, with rail traffic volume upwards of 100 trains daily. The Tower 55 railroad intersection is a major bottleneck that must be resolved in order to accommodate current and future rail traffic for both the UP and BNSF Railroads. Relieving the rail traffic congestion at Tower 55 is a larger issue than this Regional Rail Corridor Study and will be addressed through a separate study.

The physical capacity of Dallas Union Station and the Fort Worth Intermodal Transportation Center and T&P Terminal to accommodate additional regional/commuter rail passenger trains will pose a constraint to future addition of regional rail service utilizing the terminal. Potential improvements to increase the terminal capacity will be to be analyzed in further phases of planning.

Operational Constraints

The operational capacity of the Union Pacific Mainline to carry the current and projected future volumes of freight rail traffic is an important consideration in the W-1 corridor. Adding a third parallel track throughout the length of the corridor would enhance the capacity to accommodate both freight and regional/commuter rail passenger trains.

DEFINITION OF FEASIBLE ALTERNATIVES

The Regional Rail Corridor Study considered three primary types of options for the rail corridors under study. Regional rail, light rail, and bus rapid transit were the primary modes or options considered for development. A screening process took place for each corridor to determine if all three options were reasonable or if a subset was more appropriate. The discussion of options pertinent to Corridor W-1 follows.

Description of Modal Alternatives in W-1 Corridor

Regional Rail

The W-1 Regional Rail Alternative would provide regional rail passenger service along the UP Mainline between downtown Fort Worth and downtown Dallas. A third continuous parallel track would be added to the existing double track within the corridor. Passing tracks would be required at stations and other convenient locations. Train

control and signal systems would be upgraded. The existing bridges and culverts may have to be extended, replaced, or rebuilt to accommodate the parallel third track. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of automotive traffic will have to be improved with the installation of warning devices such as lights, bells, and gates. Approximately nine regional rail passenger stations would be constructed along the W-1 Corridor between Dallas Union Station and the Fort Worth Intermodal Transportation Center. A special-events station could also be constructed to serve the Ameriquest Ballpark, Six Flags Over Texas, and the future Cowboy Stadium in Arlington. The exact locations of new stations must be determined with consideration for the UP freight traffic. Exhibit IX-6 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for this modal alternative. Exhibit IX-7 shows the regional rail alternative for the W-1 Corridor.

EXHIBIT IX-6

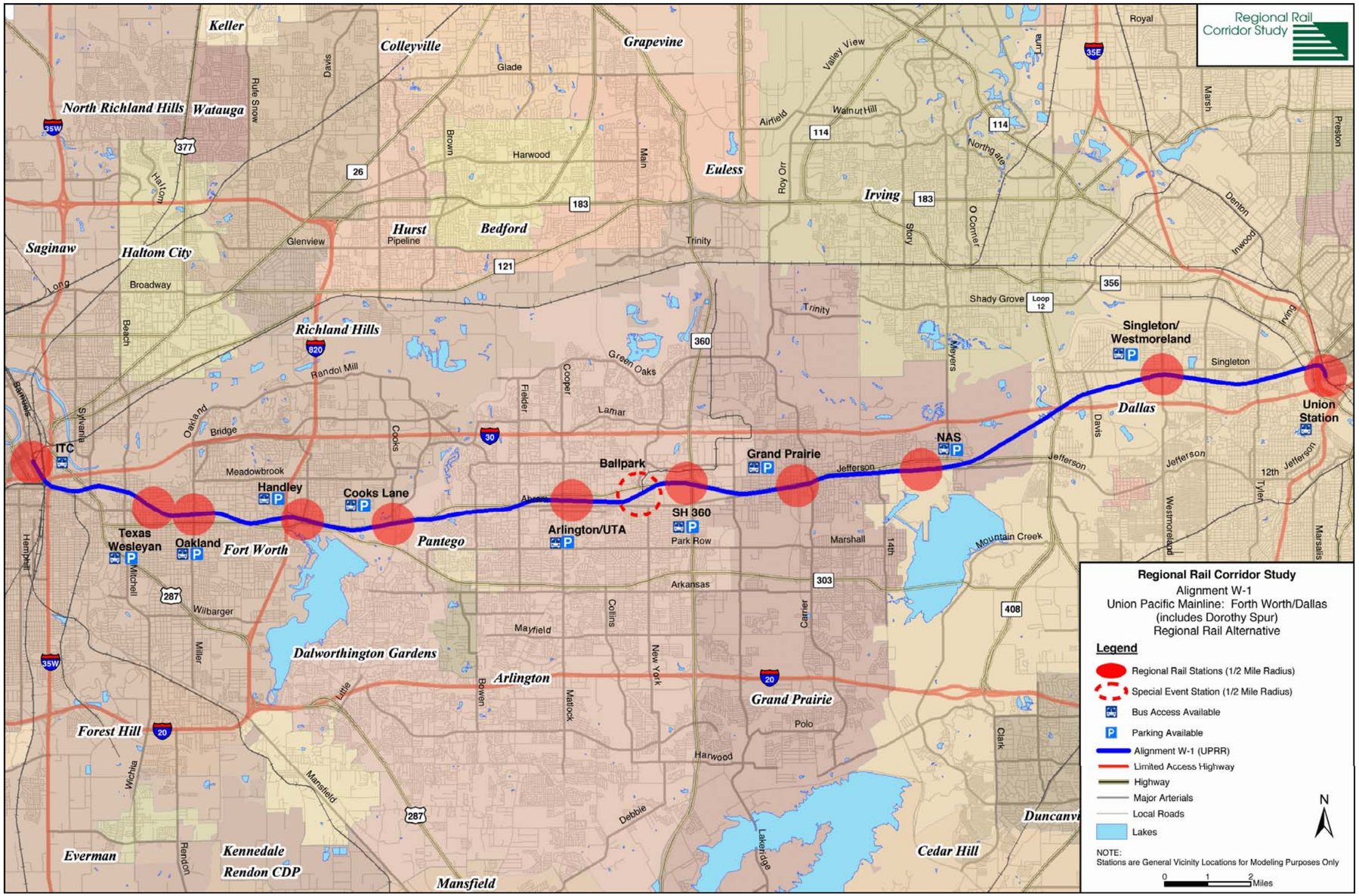
REGIONAL RAIL SERVICE ASSUPTIONS

Regional Rail (headways = 20/60)		
Stations*	**Local Bus**	**Park-and-Ride**
Intermodal Transportation Center	Yes	No
Texas Wesleyan	Yes	Yes
Oakland	Yes	Yes
Handley	Yes	Yes
Cooks Lane	Yes	Yes
Arlington / UTA Center	Yes	Yes
SH 360	Yes	Yes
Grand Prairie	Yes	Yes
Naval Air Station	Yes	Yes
Westmoreland	Yes	No
Union Station	Yes	No

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT IX-7

REGIONAL RAIL ALTERNATIVE FOR W-1 CORRIDOR



Light Rail

The light rail alternative would provide light rail transit (LRT) service within the W-1 Corridor. A LRT line would be constructed along the SH-180 right-of-way, generally paralleling the UP Mainline between Dallas and Fort Worth. The new LRT line would begin at DART's existing LRT line at the Westmoreland Station in southwest Dallas. New track would be constructed either at-grade within the highway right-of-way or elevated in constrained areas such as through Oak Cliff, downtown Grand Prairie, Arlington, and approaching the Intermodal Transportation Center in downtown Fort Worth. Approximately 19 LRT passenger stations would be constructed along the W-1 Corridor between Westmoreland Station and the Fort Worth Intermodal Transportation Center. The exact locations of new stations must be determined in later phases of project development. Exhibit IX-8 contains the basic assumptions for stations, feeder bus access, and park-and ride locations that were evaluated for the LRT modal alternative. Exhibit IX-9 shows the W-1 Light Rail Alternative.

EXHIBIT IX-8

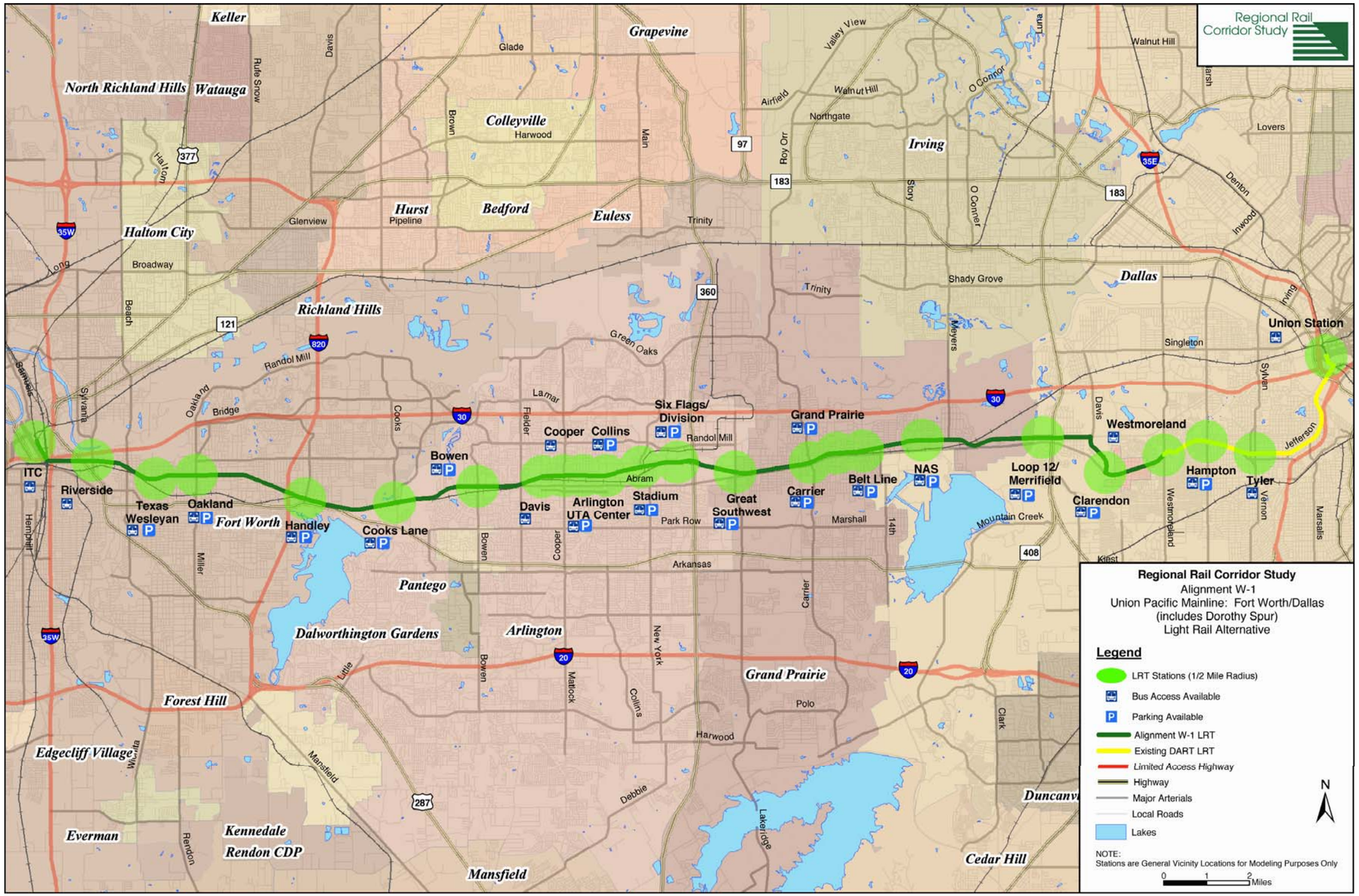
LIGHT RAIL SERVICE ASSUPMTIONS

Light Rail (headways = 10 minutes/20 minutes)		
Stations*	**Local Bus**	**Park-and-Ride**
Intermodal Transportation Center	Yes	No
Riverside	Yes	Yes
Texas Wesleyan	Yes	Yes
Oakland	Yes	Yes
Handley	Yes	Yes
Cooks Lane	Yes	Yes
Bowen	Yes	Yes
Davis	Yes	No
Cooper	Yes	No
Arlington/UTA Center	Yes	Yes
Collins	Yes	Yes
Stadium	Yes	Yes
Six Flags/Division	Yes	Yes
Great Southwest	Yes	Yes
Carrier	Yes	Yes
Grand Prairie	Yes	Yes
Belt Line Road	Yes	Yes
Naval Air Station	Yes	Yes
Loop 12/Merrifield	Yes	Yes
Clarendon	Yes	Yes
Westmoreland	Yes	No
Tyler	Yes	No
Union Station	Yes	No

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT IX-9

LIGHT RAIL ALTERNATIVE FOR W-1 CORRIDOR



Bus Rapid Transit

The bus rapid transit (BRT) alternative would provide express bus service operating along a fixed guideway located within the right-of-way of SH-180 between downtown Dallas and downtown Fort Worth. The BRT service would operate within the roadway in mixed traffic approaching downtown Dallas and approaching downtown Fort Worth. Short segments of the BRT line might also operated within the roadway in mixed traffic within downtown Grand Prairie and Arlington. Approximately 22 BRT passenger stations would be constructed along the W-1 Corridor between the downtown Dallas DART Transfer Center and the Intermodal Transportation Center in downtown Fort Worth. The exact locations of new stations must be determined in later phases of project development. Exhibit IX-10 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for the W-1 BRT Alternative. Exhibit IX-11 shows the W-1 Bus Rapid Transit Alternative.

EXHIBIT IX-10

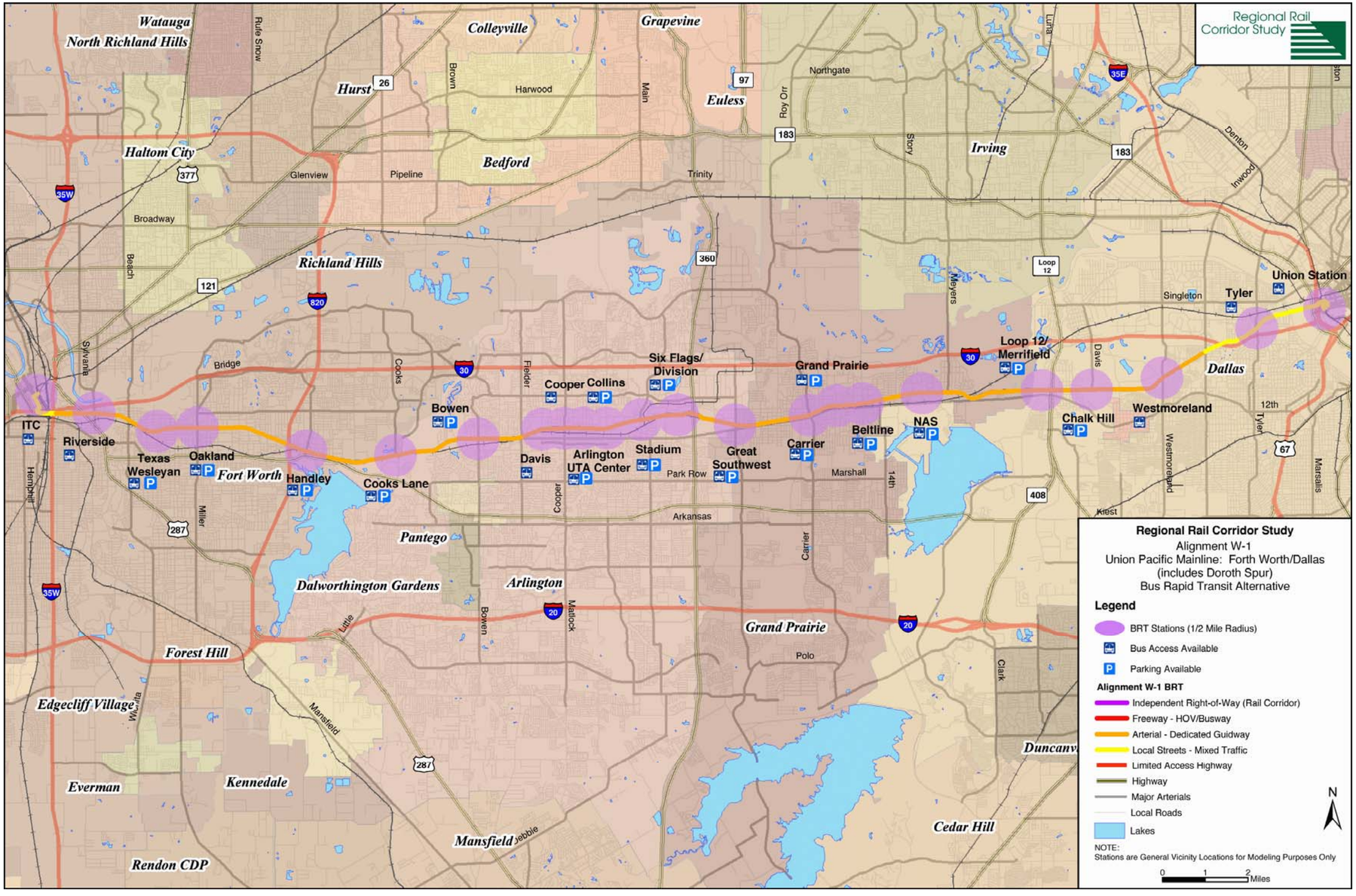
BUS RAPID TRANSIT SERVICE ASSUMPTIONS

BRT (headways = 10/15)		
Stations*	**Local Bus**	**Park-and-Ride**
Intermodal Transportation Center	Yes	No
Riverside	Yes	Yes
Texas Wesleyan	Yes	Yes
Oakland	Yes	Yes
Handley	Yes	Yes
Cooks Lane	Yes	Yes
Bowen	Yes	Yes
Davis	Yes	No
Cooper	Yes	No
Arlington/UTA Center	Yes	Yes
Collins	Yes	Yes
Stadium	Yes	Yes
Six Flags/Division	Yes	Yes
Great Southwest	Yes	Yes
Carrier	Yes	Yes
Grand Prairie	Yes	Yes
Beltline	Yes	Yes
NAS	Yes	Yes
Loop 12/Merrifield	Yes	Yes
Chalk Hill	Yes	Yes
Westmoreland	Yes	No
Tyler	Yes	No
Union Station	Yes	No

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT IX-11

BUS RAPID TRANSIT ALTERNATIVE FOR W-1 CORRIDOR



EVALUATION OF FEASIBLE ALTERNATIVES

Three different modal alternatives were evaluated for this corridor:

- Regional rail
- Light rail
- Bus rapid transit

In addition to the assumptions related to different technologies and operating characteristics (station locations, headways, operating speeds, and supply of feeder buses at stations), the relationships of the W-1 corridor to the others in the regional system were also considered.

One of the key evaluation or performance indicators used projected 2030 average weekday ridership. The complete list of performance indicators is found in Chapter II – Corridor Description and Evaluation. In order to streamline the development of travel forecasts for the Regional Rail Corridor Study, the various modal alternatives containing regional or light rail for each corridor were combined into a series of rail system modeling alternatives for forecasting. Several of the corridors also serve travel markets that interact or compete with each other, so it was important to design the system forecasts to minimize this interrelationship as much as possible. Travel demand forecasts for four rail system alternatives were developed initially, along with BRT system alternative maps showing these systems alternatives.

Ridership Summary

Exhibit IX-12 presents projected average weekday ridership resulting from each of the system alternatives for the W-1 Corridor. (See Chapter II for a complete discussion.) In

Rail Systems Modeling Alternative 2, the W-1 Corridor was tested as a regional rail line from the Fort Worth ITC to Dallas Union Station. Rail System Modeling Alternative 3 assumed LRT in the SH-180 right-of-way, parallel to the UP main line, from the Westmoreland Station on DART's West Oak Cliff line to the Fort Worth ITC. The BRT System Alternative included BRT in the SH-180 right-of-way, from downtown Dallas to downtown Fort Worth

As explained in Chapter II, the ridership resulting from the rail system modeling alternatives was used to compare the performance of the modal alternatives within a single corridor. The best performing option, which for W-1 would be either regional rail, light rail, or BRT, was then the recommendation for the corridor and, consequently, included in the final model run for the system. Exhibit IX-13 shows the ridership from the Final Run Recommended Alternative as well.

To properly stage the recommended alternative, corridor ridership was also generated for the year 2007, measuring the impact of demographics growth on the proposed alternative. The process leads to the identification of corridors worthy of priority implementation

EXHIBIT IX-12

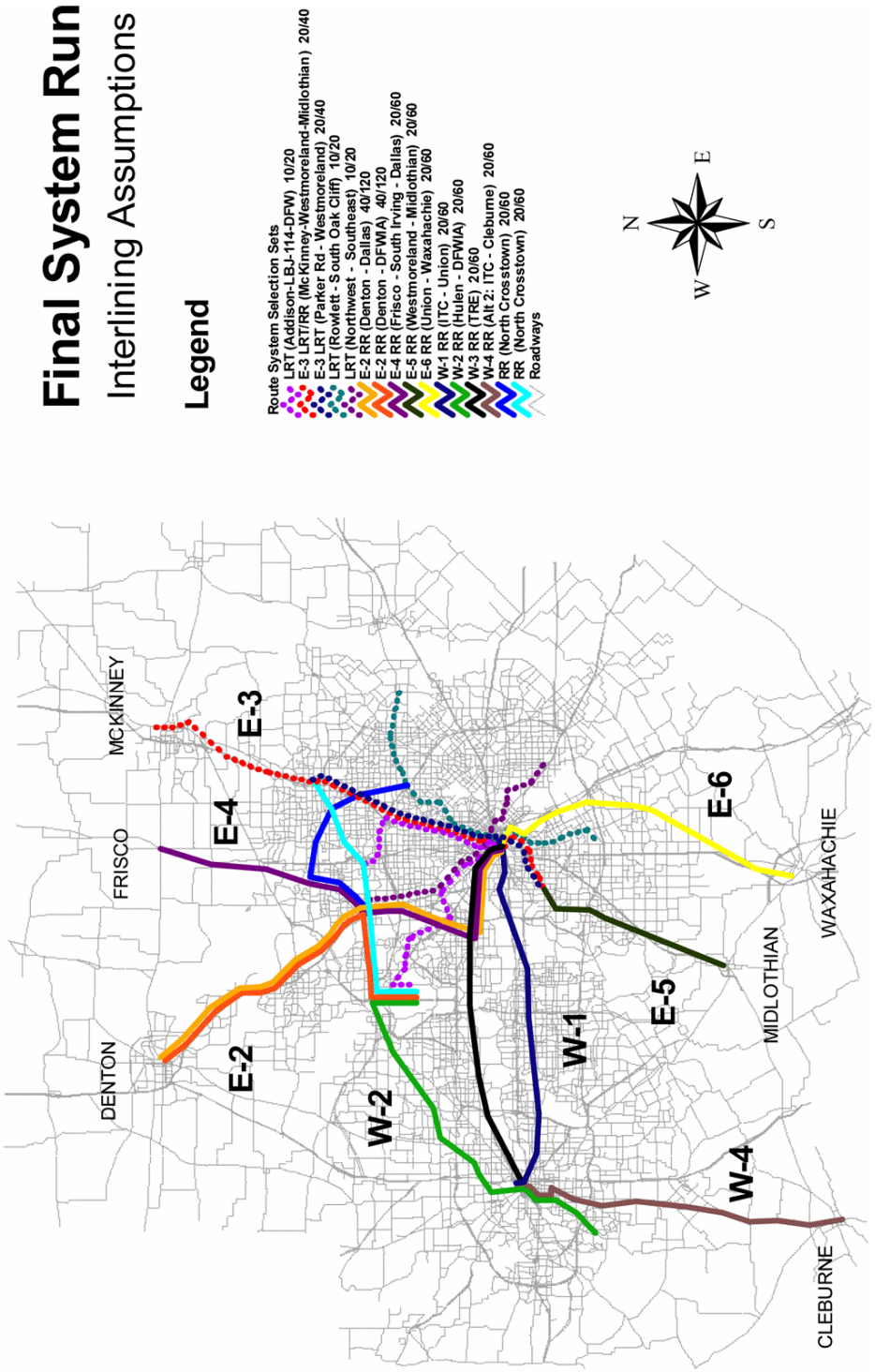
W-1 CORRIDOR RIDERSHIP

Travel Forecast	Technology	Average Weekday Ridership
Rail System Alternative 2	Regional rail	15,000
Rail System Alternative 3	Bus rapid transit	21,200
BRT System Alternative	Light rail transit	32,800
Final (2007)	*Regional rail*	*9,900**
Final (2003)	*Regional rail*	*11,600**

*Recommended alternative
Source: NCTCOG –DFWRTM

EXHIBIT IX-13

REGIONAL RAIL CORRIDOR STUDY – FINAL RUN RECOMMENDED ALTERNATIVE



An important step in transit ridership analysis involves detailed reviews of projected passenger boardings and alightings at each station. Station riders by mode of access (such as, walk, auto, feeder bus, and where applicable, transfers from other rail lines) were reviewed for accuracy and reasonableness. Shortcomings in network design as well as some coding errors can be identified as part of this review. Exhibit IX-14 presents 2007 and 2030 ridership by station for the Final Run Recommended Alternative. Corridor line ridership is the sum of demand at stations along a given line.

EXHIBIT IX-14

FINAL RUN RECOMMENDED ALTERNATIVE BOARDINGS BY STATION

Corridor	Stations	Regional Rail Boardings	
		2007	2030
W-1	ITC Terminal	1,780	2,010
	Texas Wesleyan	410	430
	Oakland/Rosedale	730	770
	Handley/SH-180	440	510
	Cooks Lane	750	1,000
	Arlington/UTA Center	690	710
	SH 360	1,190	1,400
	Grand Prairie	480	530
	Naval Air Station	280	340
	Westmoreland	460	540
	Union Station	2,700	3,400
	Line Ridership	**9,910**	**11,640**

Source: NCTCOG-DFWRTM-Final Run Recommended Alternative

Performance Evaluation

Each modal alternative considered for the Regional Rail Corridor Study was evaluated with a set of performance indicators. The corridors were scored based upon a five-point system with five indicating a good score and one indicating a bad score. The individual criteria scores were then added to reflect a total score for each alternative, including a performance benchmark representing the overall cost effectiveness of each option. Exhibit IX-15 contains a summary of the final performance of the W-1 Corridor. The

performance benchmark was created for the Regional Rail Corridor Study to normalize the evaluation of each of the corridors with varying lengths, costs, and ridership. It is a "cost effectiveness" measure using annualized capital cost, annualized operating cost, and annualized ridership producing a necessary calculation of annual cost per rider. It is very similar to the original FTA cost effectiveness index (CEI). The revised CEI used by FTA in the most recent New Starts Program evaluation includes additional considerations for travel time surveys and user benefits.

EXHIBIT IX-15

PERFORMANCE SUMMARY FOR W-1 CORRIDOR

Evaluation Criteria	W-1 Regional Rail	Score
Performance benchmark (annual cost per annual rider)	$10.40	5
Total daily ridership forecast	11,600	5
One-way trip time (minutes)	47	3
Estimated capital cost (millions)	$434.9M	3
Estimated annual O&M cost (millions)	$15.6M	3
Local authority and funding	None	1
Community acceptance	Community is open to acceptance of regional rail service.	4
Ease of implementation	UPRR owns ROW and Tower 55 congestion restricts capacity.	1
Connectivity with existing and planned transit operations	Regional rail allows interlining with TRE and DART LRT, and transfers to buses.	5
Compatibility with freight railroad operations	Compliant regional rail is compatible with freight railroad operations.	4
Serves area of unmet mobility need	Roadway capacity deficiency is low to moderately severe.	2
Impact upon adjacent highways and air quality	Transit benefit to highway is equivalent to two lanes in each direction on adjacent freeway.	5
Transit oriented development potential	TOD potential exists but is likely to develop slowly as on TRE.	3
TOTAL SCORE		**44**

The W-1 Corridor scored 44 points in the overall evaluation. The performance benchmark was $10.40 (score = 5 points), based on a total daily ridership forecast of 11,600 daily riders (score = 5 points). The costs for the corridor include an annual operating and maintenance cost of $15.6 million (score = 3 points) and a total capital cost for development of regional rail in this corridor of $434.9 million (score = 3 points). Estimated trip time to travel one way, the length of the corridor is 47 minutes (score = 3 points). The project has local authority involvement on the east and west ends and the community is open to a regional rail service (score = 4 points), but has no existing transit authority or funding designated for it at this time (score = 1 point). Use of the right-of-way must be negotiated with the UP Railroad and the Tower 55 congestion in Fort Worth will restrict capacity (score = 1 point). Use of Federal Railroad Administration (FRA) compliant regional rail technology in the corridor will make it compatible with freight operations (score = 4 points) and require a transfer to the DART system at Union Station for light rail access, but could allow for an interlined operation with the Trinity Railway Express (score = 5 points). The roadway capacity deficiency in the parallel corridor is moderately severe (score = 2 points), with the ridership projections equivalent to two lanes of vehicular traffic in each direction. This provides a good air quality benefit (score = 5 points). Some transit oriented development exists in the corridor (score = 3 points).

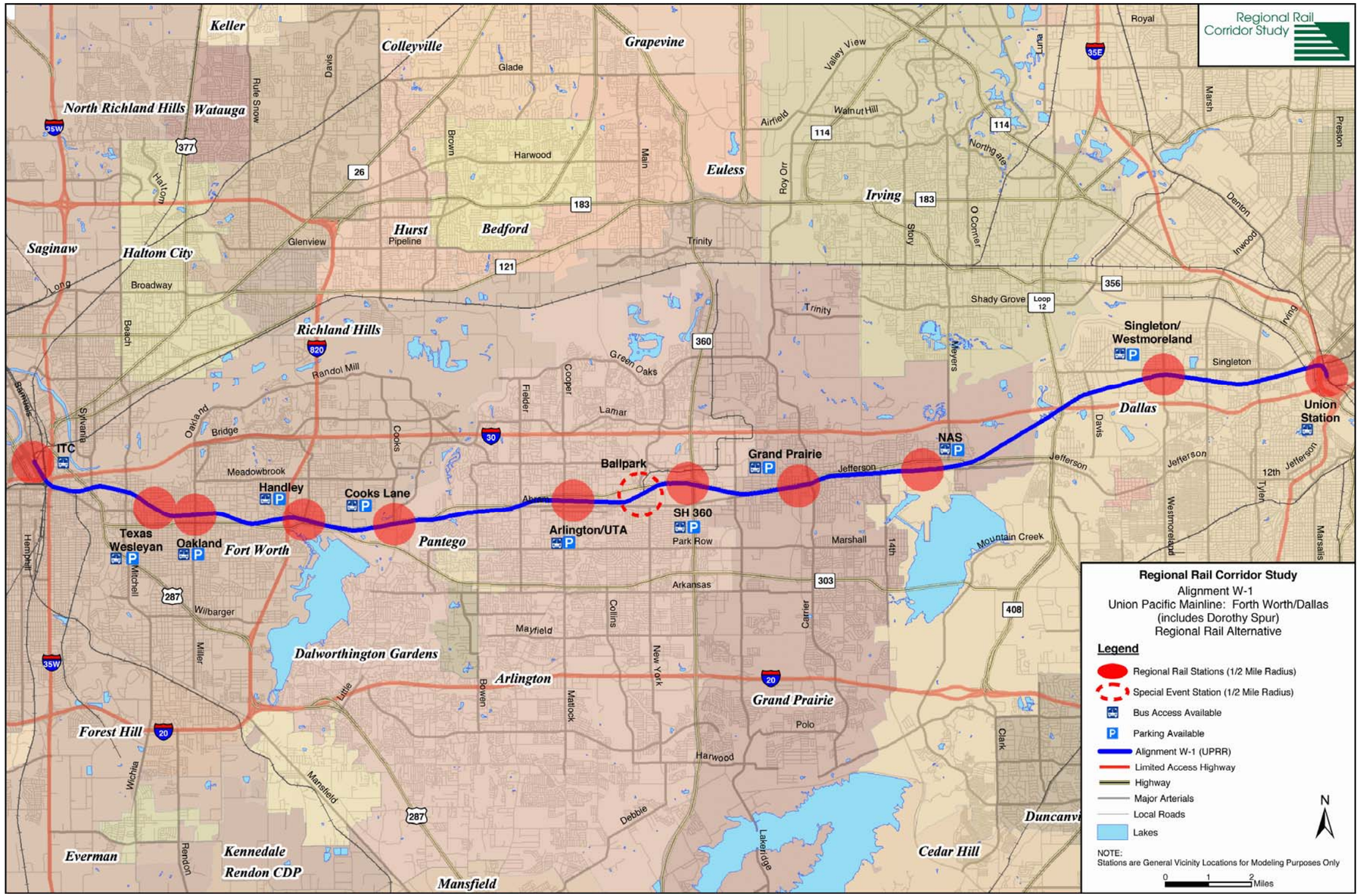
CORRIDOR RECOMMENDATIONS

The final recommendation for the W-1 Corridor – regional rail operating from downtown Dallas Union Station to Downtown Fort Worth ITC Terminal – is shown in Exhibit IX-16. The station locations shown in the map below are for planning purposes only and would be refined as a more detailed Alternatives Analysis study of the corridor is conducted. The W-1Corridor scored mid level in the performance indicator analysis, when compared

to the other RRCS corridor. The 2007 ridership estimates were high enough to indicate the need for near term (5-10 years) rail development in the corridor. However, the implementation issues related to the freight activity and private ownership of the corridor must be addressed early in any ensuing consideration of rail development in the corridor, along with the capacity constraint presented by Tower 55.

EXHIBIT IX-16

FINAL RECOMMENDATION FOR THE W-1 CORRIDOR



W-1: UNION PACIFIC MAINLINE:

DOROTHY SPUR FROM UPRR TO TRE

PHOTOGRAPHS

Looking east at railroad bridge over Division St. E

Looking west at Six Flags Drive

Looking West at 106th St.

Looking west at 109th St.

Looking south at Randol Mill Rd.

Looking north at Avenue E

Looking east at 111th St.

Looking east at Great Southwest Parkway

Looking north at Avenue H

Looking south at railroad over IH 30

Looking east at Great Southwest Parkway

Looking east 113th

Looking east at 111th St.

Looking north at Avenue J East

Looking north at railroad bridge over Johnson Creek

Looking north at Avenue K East

Looking north at Fountain Parkway

Looking north at North Carrier Parkway W.

Looking north at Post & Paddock Rd.

W-1: UNION PACIFIC MAINLINE:

FORT WORTH / DALLAS (INCLUDES DOROTHY SPUR)

PHOTOGRAPHS

Looking South at north railroad bridge elevation on Riverside Dr.

Looking NE at railroad bridge over Beach St.

Looking NE at Oakland/Miller

Looking NE at Tierney

Looking at Handley Rd.

Looking East at Green Oaks

Looking East at Bowen

Looking East at Davis

Looking East at Center St.

Looking East at Mesquite St.

Looking East at Collins

Looking East at Stadium

Looking South at north railroad bridge elevation at Hwy 360

Looking East at Great Southwest Parkway

Looking West at Arlington Yard

Looking East at 23rd St.

Looking North at south railroad bridge elevation on Carrier St.

Looking East at SE 9th St.

Looking South at north railroad bridge elevation at Sand Pit

Looking North at south railroad bridge elevation over Loop 12

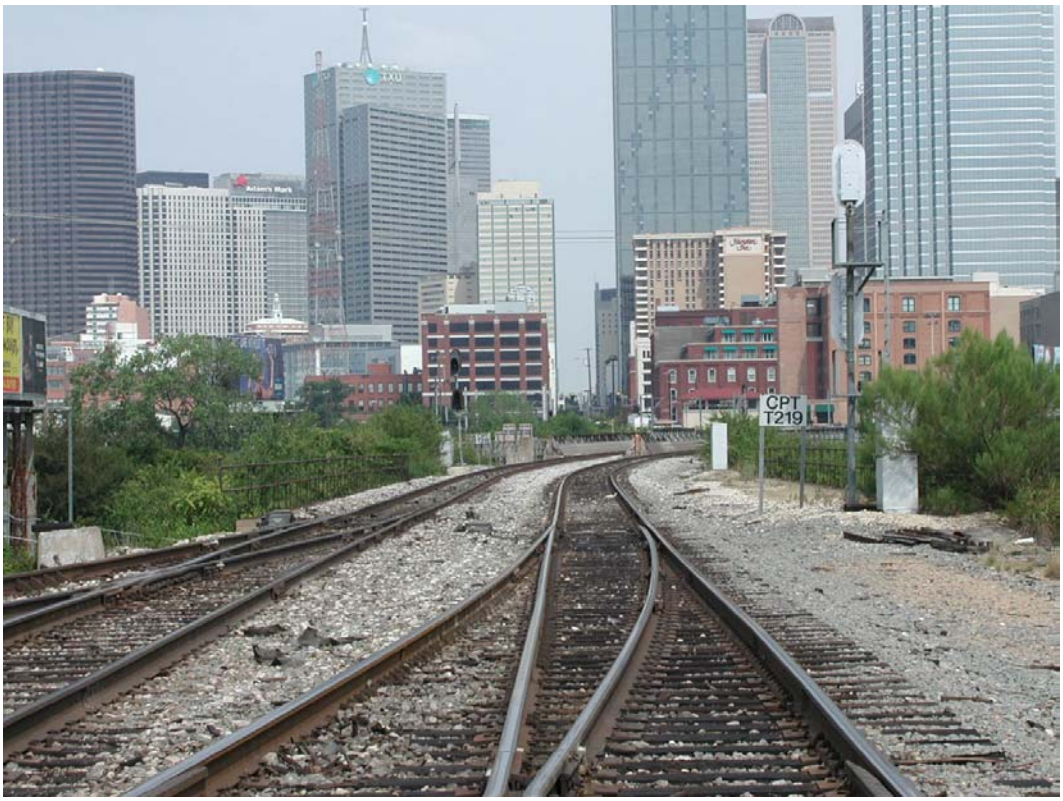
Looking East at Chalk Hill

Looking East at Westmoreland

Looking South at Hampton Rd. Overpass

Looking South at north railroad bridge elevation over Sylvan

Looking South at north railroad bridge elevation over Beckley

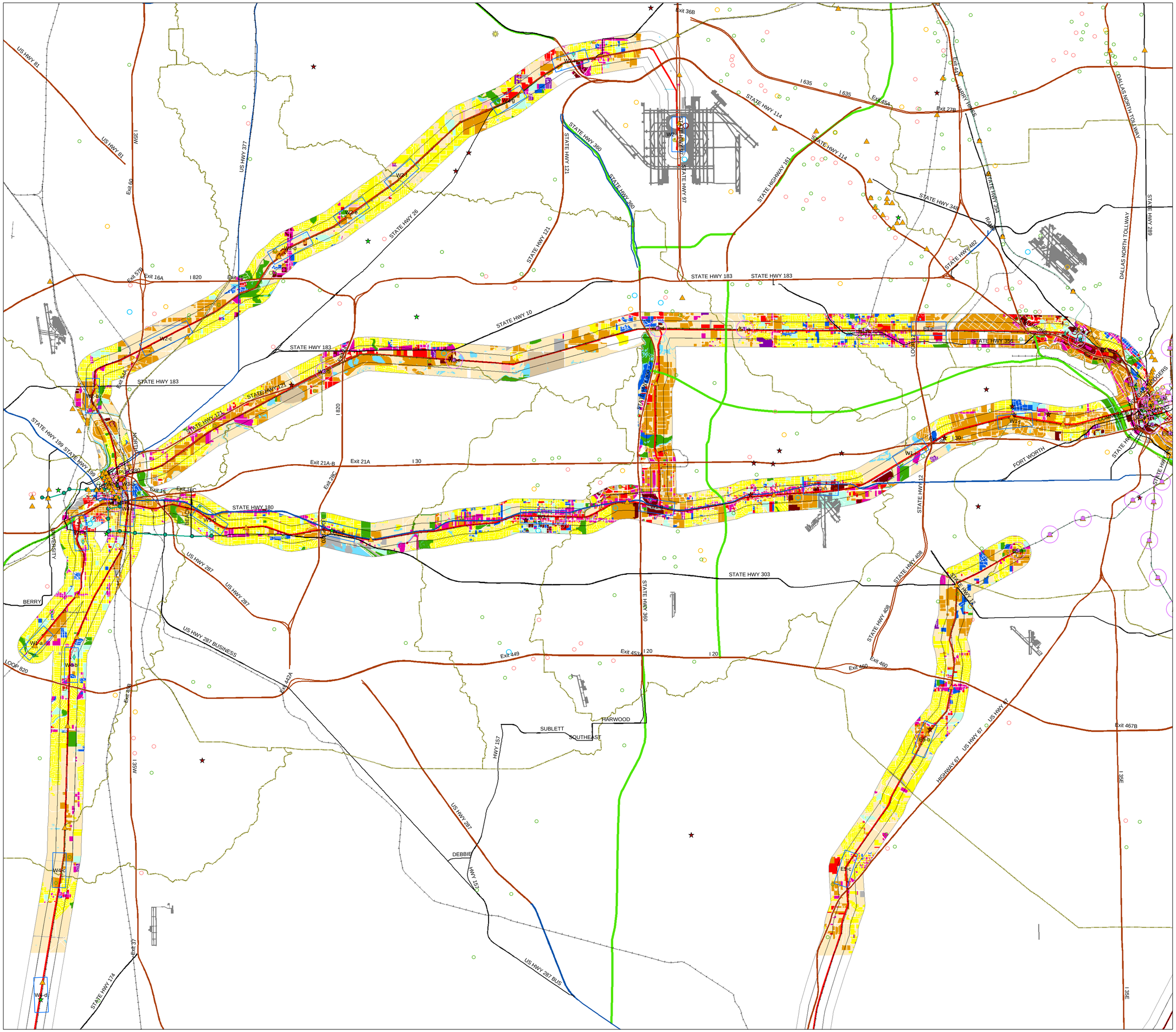


Looking East at railroad bridge elevation over Industrial

Looking West at railroad bridge elevation over Trinity River

Looking East at west railroad bridge elevation over Elm, Main & Commerce

Baseline Land Use Study: Corridor W-1



Legend

- Possible Station Location
- Existing Rail Station
- Existing Rail Station 1/4 mile buffer
- Mobility 2025 Rail Station
- New Stations Existing by 2008
- Fort Worth Trolley Stops
- 250 - 670
- 670 - 1450
- 1450 - 2750
- 2750 - 6250
- 6250 +
- Clide Award Winner
- JV Project - Selected
- JV Project - Not Selected
- Special Generator
- Amtrak stations
- Airport
- Veloweb
- Railroad
- Fort Worth Trolley Line
- Rail Lines Existing by 2008
- Primary Highway
- Secondary Highway
- Major Arterial
- Proposed Freeways and Tollroads
- Regional Rail Corridor

Regional Rail Corridor Buffer

Buffer Distance

- 0.00 - 0.25
- 0.25 - 0.50

Single-family

- Multi-family
- Retail
- Office
- Vacant
- Park and Recreation
- Industrial
- Parking
- Institutional
- Hotel/Motel
- Utilities
- Mobile Homes
- Water
- Landfill
- Under Construction

W-1 Union Pacific
begins in Fort Worth, east through Arlington, Grand Prairie, ends in Dallas, 31 miles in length

Potential Station Zone: 1/2 mile wide linear area of variable length based on the area of interest

Area of Interest	Station Status	County	Jurisdiction w/in walking distance of station	Characteristics of Interest	Development Type	Development Style	Future Land Use (comprehensive plan)	Zoning (of vacant land)	Other Comments
W1-a	Proposed	Tarrant	Fort Worth	**Employment within walking distance of the site:** N/A **Current land uses:** single-family, park space, institutional, industrial **Vacant land:** inadequate for a station and transit oriented development **Located within walking distance:** N/A **Site accessible via:** N/A **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	pedestrian oriented development	single-family residential	AR, A-5,A-7.5,A-10	
W1-b	Proposed	Tarrant	Fort Worth	**Employment within walking distance of the site:** proximate to John Peter Smith Hospital (2670), Plaza Medical Center (1020), Baylor All-Saints Medical Center (1680), Columbia Plaza Medical Center, All-Saints Episcopal Hospital **Current land uses:** institutional, retail, office, single-family **Vacant land: inadequate for a station and transit oriented development** **Located proximate to:** Magnolia Village joint venture project **Site accessible via:** state hwy 303, I30 **Flood zone:** outside of the floodplain Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	pedestrian oriented development	mixed-use growth center	MU-1,MU-2	
W1-c	Existing	Tarrant	Fort Worth	**Station:** T&P station **Infill Opportunities:** no vacant land, large industrial area that could possibly become infill development **Flood zone:** outside of floodplain	Infill-other development	pedestrian oriented development	mixed-use growth center	MU-1,MU-2	
W1-d	Proposed	Tarrant	Fort Worth	**Employment within walking distance of the site:** Texas Wesleyan University (325) **Current land uses:** industrial, single-family, institutional, retail **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** Texas Weslyan University **Site accessible via:** state hwy 180 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space.	Infill-other development	pedestrian oriented development	light industrial		
W1-e	Proposed	Tarrant	Fort Worth, Arlington	**Employment within walking distance of the site:** Fort Worth Transit Authority(640), Williamson-Dickie Manufacturing Company (500) **Current land uses:** utilities, industrial, single-family, retail, institutional **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** Handley joint venture project **Site accessible via:** state hwy 180, loop 820, state hwy 303 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	pedestrian oriented development	infrastructure or light industrial	N/A or IP, MU-2,I,PD	

W1-f	Proposed	Tarrant	Arlington	**Employment within walking distance of the site:** Arlington Polics Department (440), US Postal Service (650), Chase Bank (800) **Current land uses:** utilities, retail, single-family, industrial, office, park space, institutional **Vacant land:** possibly adequate for station and transit oriented development **Located within walking distance:** Arlington CBD/TOD joint venture project (not selected), University of Texas at Arlington **Site accessible via:** regional veloweb, state hwy 180 **Flood zone:** outside of the floodplain	Infill-other development	pedestrian oriented development			
W1-g	Proposed	Tarrant	Arlington, Grand Prairie	**Employment within walking distance of the site:** Six Flags Mall (860) **Current land uses:** utilities, industrial, parking, retail **Vacant land: inadequate for a station and transit oriented development**, existing parking could possibly be used **Located within walking distance:** N/A **Site accessible via:** state hwy 360, state hwy 180 **Flood zone:** outside of the floodplain	Infill-other development	pedestrian oriented development			
W1-h	Proposed	Dallas	Grand Prairie, Dallas	**Employment within walking distance of the site:** Millenium Dallas Airport, Vought (3630) **Current land uses:** institutional, airport, retail, industrial, office, parking **Vacant land:** possibly adequate for station and transit oriented development **Located within walking distance:** N/A **Site accessible via:** state hwy 180 **Flood zone:** outside of the floodplain	Infill-other development	pedestrian oriented development			
W1-I	Proposed	Dallas	Grand Prairie, Dallas	**Employment within walking distance of the site:** Watkins Motor Lines (500) **Current land uses:** retail, park space **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** N/A **Site accessible via:** state hwy 408, hwy I30 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space.	Infill-other development	hybrid			Station must be on south side of corridor.
W1-j	Proposed	Dallas	Dallas	**Employment within walking distance of the site:** N/A **Current land uses:** industrial, institutional **Vacant land: inadequate for a station and transit oriented development**, industrial could possibly be used **Located with in walking distance:** RSR Smelter joint venture project (not selected), Goodwill Industries joint venture project (not selected) **Site accessible via:** regional veloweb **Flood zone:** Partially within the 500 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	pedestrian oriented development			
W1-k	Existing	Dallas	Dallas	**Station:** West End station **Infill Opportunities:** built up, no vacant land available **Flood zone:** Partially within the 500 year floodplain - opportunity for green space. Partially outside of floodplain.	Infill-other development	pedestrian oriented development			

WESTERN CORRIDOR COST ANALYSIS (W-1)

REGIONAL RAIL CORRIDOR STUDY									**Alignment W-1**			
North Central Texas Council of Governments									**Link Number:**	**Summary**		
Parametric Cost Estimate									**Link Description:**			
									Start Sta:			
									End Sta:			
			Regional Rail				**Light Rail**		**Link Length:**	**165,991**		**31.44**
Description	**Unit**	**Unit Cost**	**Quantity**	**Cost**	**Subtotals**		**Unit Cost**	**Quantity**	**Cost**	**Subtotals**	**Remarks**	
Site Work & Urban Design												
Earthwork, 1 Track, Major	MI	$1,500,000	7.43	$11,145,000								
Earthwork, 1 Track, Basic	MI	$500,000	24.65	$12,325,000								
Earthwork, 2 Tracks, Major	MI	$2,500,000					$3,500,000					
Earthwork, 2 Tracks, Basic	MI	$750,000										
Earthwork, Reconstruct Existing Track	MI	$100,000										
Urban Design/Signage/Landscaping	MI	$250,000	31.43	$7,857,500			$750,000					
Environmental Mitigation (Includes noise and vibration)	MI	$100,000	31.43	$3,143,000			$100,000					
Relocate Hike/Bike Trail	MI	$1,400,000					$1,400,000					
Subtotal					**$34,470,500**							
Trackwork												
New Track, 136# CWR	MI	$1,000,000	32.95	$32,950,000			$1,850,000					
Upgrade Track to Class 4	MI	$500,000										
Paved Embedded Track (Double)	MI	$4,000,000					$5,600,000					
New Single Track #1 Relay Rail	MI	$800,000										
New Turnout #10	EA	$125,000	25.00	$3,125,000			$125,000					
New Turnout #15	EA	$200,000					$200,000					
New Turnout #24	EA	$250,000	16.00	$4,000,000			$250,000					
Rebuild Turnout or Diamond	EA	$75,000										
New Railroad Diamond Crossing	EA	$200,000										
Subtotal					**$40,075,000**							
Structures												
Elevated Track	TF	$3,000	4600.00	$13,800,000			$3,000					
Tunnel	TF	$10,000					$10,000					
New Bridge (Minor)	TF	$4,500	190.00	$855,000			$4,500					
New Bridge (Major)	TF	$6,500	1530.00	$9,945,000			$6,500					
Reconstruct Existing Bridge	TF	$2,500					$2,500					
Retaining Wall (0 FT - 10 FT High)	TF	$175					$175					
Retaining Wall (10 FT - 20 FT High)	TF	$525					$525					
New Culvert	EA	$10,000	127.00	$1,270,000			$10,000					
Rehabilitate Culvert	EA	$5,000					$5,000					
Subtotal					**$25,870,000**							
Stations												
At-grade Station	EA	$650,000	9.00	$5,850,000			$2,800,000					
Aerial Station (LRT)	EA						$4,600,000					
Depressed Station (LRT)	EA						$15,000,000					
Parking Spaces/Surface Lot	EA	$4,000	4500.00	$18,000,000			$4,000					
Service and Layover Facility	EA	$2,000,000	1.00	$2,000,000			$50,000					
Central Maintenance Facility Contribution	EA	$1,000,000	1.00	$1,000,000			$2,000,000					
Subtotal					**$26,850,000**							
Traction Electrification System (LRT)	MI						$1,600,000					
Signal System												
Communications System (LRT)	MI						$1,100,000					
New Railroad Interlocking	EA	$1,500,000										
Modify Railroad Interlocking	MI	$750,000										
New CTC/LRT Signaling System	MI	$1,200,000	31.43	$37,716,000			$2,300,000					
Upgrade Railroad Signal System	MI	$600,000										
Subtotal					**$37,716,000**							
R.O.W. & Y Junction												
R.O.W. Allowance	ACRES											
Utilities												
Utilities Allowance	MI	$200,000	31.43	$6,286,000	**$6,286,000**		$400,000					
Crossings / Roadway												
Minor Street At-grade (Gates & Warning Devices)	EA	$150,000	2.00	$300,000			$150,000					
Minor Street At-grade (w/ Quad Gates System & Warning Devices	EA	$250,000	18.00	$4,500,000			$250,000					
Major Street At-grade (Gates & Warning Devices)	EA	$450,000	12.00	$5,400,000			$450,000					
Reconstruct Existing Roadway Bridge	EA	$1,000,000					$1,000,000					
Reconstruct Existing Roadway	SY	$40					$40					
Construct New Roadway	SY	$80					$80					
Highway/Railroad Grade Separation	EA	$8,000,000	10.00	$80,000,000			$8,000,000					
Subtotal					**$90,200,000**							
Special Conditions												
Retaining Wall (0 ft - 60 ft High)	TF	$1,050	8000	$8,400,000								
Pedestrian Bridge	EA	$100,000	8	$800,000								
Subtotal					**$9,200,000**							
Subtotal W-1					**$270,667,500**							
MIS Level Design Contingency (15% of W-1)	15%				$40,600,125							
Construction Contingency (10% of W-1)	10%				$27,066,750							
Add-on W-1 Allowance (Eng., CM, etc) (15% of W-1)	15%				$40,600,125							
Rail Vehicle Train Sets (actual without contingencies)	Train Set	$8,000,000	7	$56,000,000	$56,000,000		$9,000,000					
Grand Total W-1					**$434,934,500**							
Cost per Mile					**$13,834,811**							

NOTE:
1. Unit Costs are expressed in present value dollars.
2. Retaining Wall Unit Cost is for one side only.
3. Cost estimate excludes ROW costs.

Annualized Cost Estimate (W-1)

Regional Rail Corridor:	**W-1**	**UPRR from ITC to Union Station**					Regional Rail Corridor:	W-1	UPRR from ITC to Union Station
Annualized Capital Cost		Daily Riders:	11,600		0		Cost Category Summary		
		Annualized Riders:	3,596,000		0				
			Regional Rail	Regional Rail	Light Rail	Light Rail		Regional Rail	Light Rail
	Useful	Annualization	Total Cost ($mil)	Annualized	Total Cost ($mil)	Annualized		Total Cost ($mil)	Total Cost ($mil)
Cost Category	Life (yr)	Factor	(Incl. Contingency)	Cost ($mil)	(Incl. Contingency)	Cost ($mil)	Cost Category	(Incl. Contingency)	(Incl. Contingency)
Site work and Urban Design	100	0.070	$48.259	$3.378	$0.000	$0.000	Site work and Urban Design	$57.059	$0.000
					(Not Applicable for this corridor)				
Trackwork	30	0.081	$56.105	$4.545	$0.000	$0.000	Trackwork	$56.105	$0.000
Structures	30	0.081	$36.218	$2.934	$0.000	$0.000	Structures	$36.218	$0.000
Stations	20	0.094	$37.590	$3.533	$0.000	$0.000	Stations	$37.590	$0.000
LRT Electrification System	30	0.081	$0.000	$0.000	$0.000	$0.000	LRT Electrification System	$0.000	$0.000
Signal System	30	0.081	$52.802	$4.277	$0.000	$0.000	Signal System	Incl with Crossings/Roadway	
Right-of-Way	100	0.070	$0.000	$0.000	$0.000	$0.000	Right-of-Way	Not Applicable	
Utilities	20	0.094	$8.800	$0.827	$0.000	$0.000	Utilities	Incl with Site Work & Urban Design	
Crossings / Roadway	20	0.094	$126.280	$11.870	$0.000	$0.000	Crossings / Roadway	$179.082	$0.000
Special Conditions	20	0.094	$12.880	$1.211	$0.000	$0.000	Other	$12.880	$0.000
Vehicles	25	0.086	$56.000	$4.816	$0.000	$0.000	Vehicles	$56.000	$0.000
Total			$434.935	**$37.391**	$0.000	**$0.000**	Total	$434.935	$0.000
Performance Benchmark				**10.40**					
Notes:									
1. Annualized Riders = Daily Riders times 310 days per year.									
2. Performance Benchmark = Annualized Cost divided by Annualized Riders.									

X. W-2 – HULEN/DFWIA LINE CORRIDOR CONSIDERATIONS

CORRIDOR DESCRIPTION

Rail Corridor W-2 is one of the freight rail corridors in the Dallas-Fort Worth studied for the feasibility of implementing commuter rail, light rail, or other form of fixed guideway transit service.

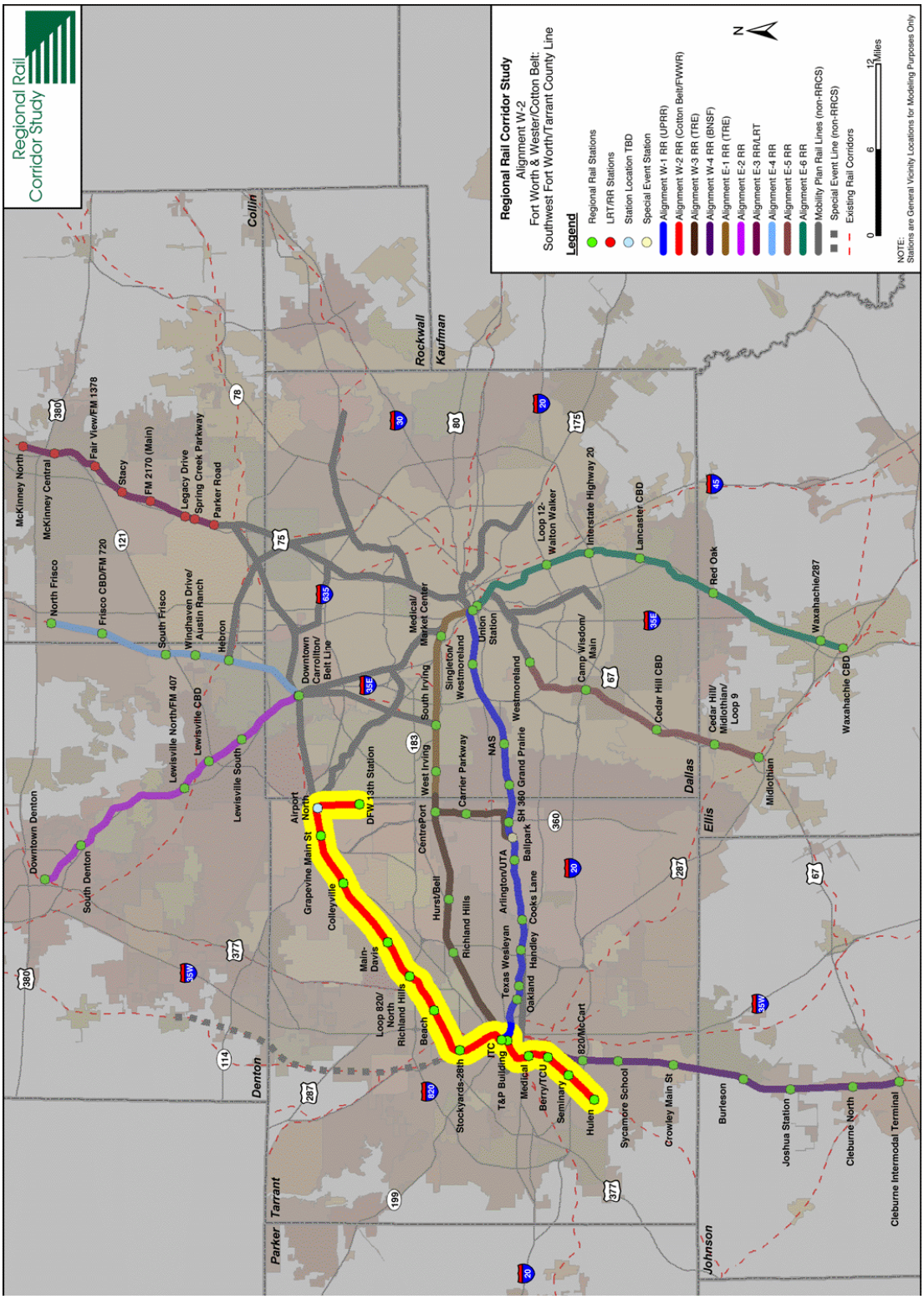
Corridor W-2 consists of approximately 26 miles of the Cotton Belt Line from Dallas-Fort Worth International Airport (DFWIA) (MP 610.0) to Fort Worth (MP 632.0) and approximately 6 miles of the Southwest Extension from Fort Worth to Hulen Street. The corridor location is shown on a map in Exhibit X-1.

An inspection of the Cotton Belt from State Highway 121 to Fort Worth was performed on August 26, 2003, and an inspection of the Southwest Extension was performed on September 18, 2003. The inspection of both lines was done by automobile with primary consideration given to road crossings and other accessible locations. The Cotton Belt track was also inspected by riding the Tarantula Excursion Train on August 30, 2003, from the Tarantula Train Depot in Grapevine to the Fort Worth Stockyards.

DART owns the Cotton Belt right-of-way from DFWIA to Tower 60 in Fort Worth. DART leases the track to the Fort Worth and Western Railroad and the City of Grapevine has trackage rights for the Tarantula excursion train operating on the track between Grapevine Station and the Fort Worth Stockyards. The maximum operating speed over the Cotton Belt is 25 mph and the train traffic is controlled by track warrants.

EXHIBIT X-1

W-2 CORRIDOR LOCATION MAP



The Burlington Northern Santa Fe and the Fort Worth and Western Railroad own the right-of-way for the Southwest Extension.

The Tarantula excursion train operates two trains per day over the Cotton Belt from the Tarantula Train Depot in Grapevine to the Fort Worth Stockyards. The Fort Worth and Western Railroad operates an average of three freight trains per week over the Cotton Belt.

The Cotton Belt Hike and Bike Trail runs parallel to the railroad beginning at Ball Street and ending at Brumlow. The Colleyville Trail runs parallel to the railroad and begins at Pleasant Run Road. The Colleyville Trail runs to Main Street in North Richland Hills.

Existing Track Conditions

The rail on the Cotton Belt and the Southwest Extension varies from 85-pound to 115-pound and is single track. The track surface and alignment on the Cotton Belt is in good condition from the SH-121 Overpass to the Tarantula Train Depot in Grapevine. The track shows signs of deterioration from the depot to Fort Worth. The ties are in need of replacement. The track surface and alignment on the Southwest Extension is in poor to fair condition. There are places along the route where weeds have grown through the ballast section. The ties are in poor condition and will require replacement. The track and the railroad bridge over Rosedale Boulevard has been removed from south of Mistletoe Boulevard to the UPRR track.

There are industrial sidings along the Cotton Belt located at Grapevine, Hodge Yard, and Fort Worth. There are no sidings along the Southwest Extension.

During the course of the Regional Rail Corridor Study, the Union Pacific Railroad upgraded the existing track and constructed a second parallel track along the Cotton Belt from Old Denton Road to Deen Street (west of Hodge Yard). This is a joint effort between the Burlington Northern Santa Fe and Union Pacific Railroads to provide directional traffic along the route.

A fact sheet summarizing the existing conditions and issues for the W-2 corridor is shown in Exhibit X-2.

EXHIBIT X-2

W-2 CORRIDOR FACT SHEET

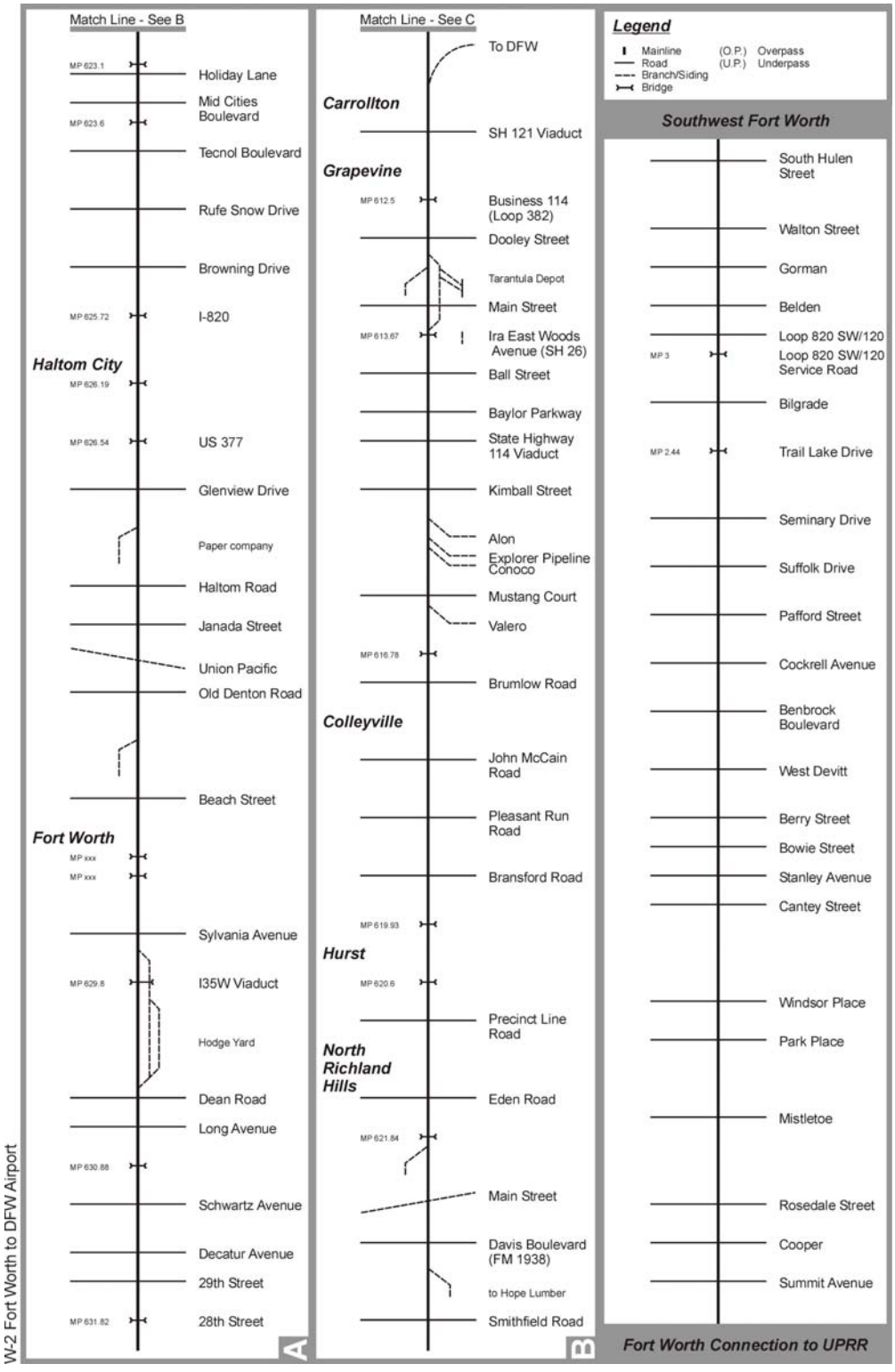
Owner(s) of the line	DART
Operator(s) of the line	Fort Worth & Western Railroad
Trackage rights	Fort Worth & Western Railroad
Length of the corridor	32 Miles including Fort Worth Southwest Extension
Average trains per weekday	Two passenger trains daily; freight trains average three per week
Track summary	▪ Single track, speed varies between 10 mph and 25 mph. ▪ Train traffic control by track warrant. ▪ Hodge Yard is located in Fort Worth. ▪ Grapevine Station is located in Grapevine on Main Street.
Railroad crossings	▪ Thirty-six (36) at-grade highway/railroad crossings ▪ Eight (8) grade-separated highway/railroad crossings
Jurisdictions	▪ Cities of Grapevine, Colleyville, Hurst, North Richland Hills, and Fort Worth ▪ Tarrant County
Industrial sidings	▪ Grapevine, Hodge, Fort Worth
Corridor issues	▪ UPPR crossing diamond located at MP 627.72; UPPR is upgrading the existing DART track from MP 627.73 to MP 630.60 (Deen Road). This is a joint effort between UPRR and BNSF for directional running with northbound trains on UP and southbound trains on BNSF. ▪ Existing timber trestle bridges are in need of repair/replacement. ▪ Capacity of Fort Worth T&P Station limited by existing rail activity. ▪ Existing track in poor condition. ▪ Southwest extension should extend to Hulen Street in Fort Worth.

Schematic of the Corridor

A schematic diagram of the existing rail line in the W-2 Corridor is shown in Exhibit X-3.

EXHIBIT X-3

W-2 CORRIDOR SCHEMATIC



Detailed Information

This section contains detailed information for the bridges and railroad/highway grade crossings and overpasses located along the W-2 Cotton Belt and Southwest Extension Corridor. Tables containing the information are provided on the following pages.

Existing railroad/highway grade crossings and overpasses are listed in Exhibit X-4. There is an at-grade railroad crossing with Union Pacific Railroad east of Old Denton Road. There are no railroad crossings along the Southwest Extension.

EXHIBIT X-4

RAIL/HIGHWAY CROSSINGS AND OVER/UNDER PASSES

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
Fort Worth & Western/Cotton Belt Line				
611.67	SH-121	Public	Roadway overpass	789740L
612.50	Business SH-114 (Loop 382)	Public	Railroad overpass	789743G
613.20	Dooley Street	Public	Stop sign/lights/bells/ gates/advanced warning	789742A
613.50	Main Street	Public	Lights/bells/gates/ advanced warning	789741T
613.67	Ira E. Woods Avenue (SH-26)	Public	Lights/bells/gates/ advanced warning	
613.90	Ball Street	Public	Lights/bells/gates/ advanced warning	789739S
614.32	Baylor Parkway	Public	Cantilever/lights/gates/ bells/advanced warning	900256N
614.43	SH-114	Public	Roadway overpass	789737D
615.23	Kimball Street	Public	Lights/bells/gates/ advanced warning	
615.71	Alon	Private	Crossbucks	789736W
615.88	Explorer Pipeline	Private	Crossbucks	
616.00	Conoco	Private	Crossbucks	
616.20	Mustang Court	Public	Lights/bells/gates/ advanced warning	
616.25	Valero	Private	Emergency gated entrance, lights/bells/gates	789735P
617.00	Brumlow Road	Public	Lights/bells/gates/ advanced warning	789734H
617.60	John McCain Road	Public	Stop sign/crossbucks	789733B

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
618.60	Pleasant Run Road	Public	Lights/bells/gates/ advanced warning	789730F
619.10	Bransford Road	Public	Lights/bells/gates/ advanced warning	789729L
620.80	Precinct Line Road	Public	Cantilever/lights/bells/ gates/advanced warning	789727X
621.60	Eden Road	Public	Lights/bells/gates	789726R
622.31	Main Street	Public	Lights/bells/gates/ advanced warning	789732U
622.48	Davis Boulevard (FM-1938)	Public	Cantilever/gates/bells/ advanced warning	789724C
622.85	Smithfield Road	Public	Lights/bells/gates/ advanced warning	789722N
623.15	Holiday Lane	Public	Lights/bells/gates/ advanced warning	
623.33	Mid Cities Boulevard	Public	Lights/bells/gates/ advanced warning	788743D
623.85	Tecnol Boulevard	Public	Cantilever/lights/bells/ gates	900257V
624.50	Rufe Snow Drive	Public	Lights/bells/gates/ advanced warning	789561V
624.95	Browning Drive	Public	Lights/bells/gates/ advanced warning	790197G
625.72	I-820	Public	Railroad overpass	789560N
626.54	US-377	Public	Railroad overpass	789559U
626.77	Glenview Drive	Public	Lights/bells/gates/ advanced warning	788909F
627.19	Haltom Road	Public	Cantilever/lights/bells/ advanced warning	789558M
627.39	Janada Street	Public	Cantilever/lights/bells/ advanced warning	789557F
627.80	Old Denton Road	Public	Lights/bells/gates/ advanced warning	789556Y
628.40	Beach Street	Public	Lights/bells/gates/ advanced warning	789554K
629.50	Sylvania Avenue	Public	Lights/bells/gates/ advanced warning	789552W
629.80	I-35W	Public	Roadway overpass	789553D
630.60	Deen Road	Public	Lights/crossbucks	789549N
630.75	Long Avenue	Public	Roadway overpass	789550H
630.99	Schwartz Avenue	Public	Lights/crossbucks	789547A
631.40	Decatur Avenue	Public	Lights/bells/gates/ advanced warning	789546T
631.60	29th Street	Public	Lights/crossbucks/ advanced warning	789544E
631.82	28th Street	Public	Railroad overpass	789545L

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
Southwest Extension				
4.55	Hulen Street South	Public	Cantilever/lights/bells/ gates/advanced warning	
3.73	Walton Street		Lights/bells/gates/ advanced warning	
3.45	Gorman	Public	Cantilever/lights/bells/ advanced warning	020853P
3.17	Belden	Public	Cantilever/lights/bells/ gates/advanced warning	020850U
	Loop 820 SW/120	Public	Roadway overpass	
	Loop 820 SW/120 Service Road	Public	Railroad overpass	
2.70	Billgrade	Public	Lights/bells/gates/ advanced warning	020848T
2.44	Trail Lake Drive	Public	Railroad overpass	
2.07	Seminary Drive	Public	Lights/bells/gates/ advanced warning	020846E
1.72	Suffolk Drive	Public	Lights/bells/gates/ advanced warning	020845X
1.42	Pafford Street	Public	Lights/bells	020844R
0.23	Cockrell Avenue	Public	Crossbucks/advanced warning	020840N
0.31	Benbrook Boulevard	Public	Lights/bells/gates/ advanced warning	672185N
0.54	West Devitt Street	Public	Lights/bells/gates/ advanced warning	672184G
0.70	Berry Street	Public	Cantilever/lights/bells/ advanced warning	672183A
0.80	Bowie Street	Public	Crossbucks/advanced warning	672182T
	Stanley Avenue	Public	Crossbucks/advanced warning	672181L
0.90	Cantey Street	Public	Lights/bells/gates/ advanced warning	914203F
1.95	Windsor Place (three tracks)	Public	Lights/bells/gates/ advanced warning	672914D
740.5	Park Place – East Crossing	Public	Lights/bells/gates/ advanced warning	672917Y
740.5	Park Place – West Crossing	Public	Lights/bells/gates/ advanced warning	672918F
740.0	Mistletoe – East Crossing	Public	Track removed	672919M
740.03	Mistletoe – West Crossing	Public	Lights/bells/gates/ advanced warning	672920G
	Rosedale Street – West Track	Public	Roadway overpass	

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
	Rosedale Street – East Track	Public	Railroad overpass – track removed	
2.6	Vickery Boulevard	Public	Cantilever/lights/bells/ advanced warning	972922V

Source: Corridor inspections performed August 26, 2003 and September 18, 2003 by Carter-Burgess

There are 36 at-grade highway/railroad crossings along the Cotton Belt and at-grade crossings along the Southwest Extension. The timber, asphalt, and rubber crossings on the Cotton Belt and Southwest Extension are in poor condition and will require replacement. The concrete crossings are in good condition.

There are five roadway overpasses along the Cotton Belt and one roadway overpass along the Southwest Extension.

Existing rail bridges in the W-2 Corridor are listed in Exhibit X-5. There are 16 railroad bridges along the Cotton Belt and two railroad bridges along the Southwest Extension. The existing timber bridges on both the Cotton Belt and the Southwest Extension will require a thorough inspection and may require repair or replacement.

EXHIBIT X-5

RAILROAD BRIDGES AND CULVERTS

Milepost	Bridge Type	Length	Remarks
611.67	Overhead viaduct	Unknown	SH-121
612.50	Thru-truss	120+/-	Bus. SH-114/Loop 382
613.67	Thru plate girder	73’	Hudgins Street
614.43	Dual overhead viaduct	Unknown	SH-114
616.78	Open deck trestle	176’	
619.93	Open deck trestle	82’	
620.6	Open deck trestle	138’	
621.84	Ballast deck trestle	65’	
623.10	Open deck trestle	55’	
623.60	Open deck trestle	69’	
625.72	Deck plate girder	2-45’ 1-144’	I-820
626.19	Deck plate girder, concrete ballast deck	1-144’ 1-211’ 1-100’ 2-50’	
626.54	Thru plate girder	68’	US- 377
628.82	Open deck trestle	68’	
629.00	Open deck trestle	178’	
629.80	Overhead viaduct	Unknown	I-35
630.88	Deck plate girder	34’	
631.82		57’	28th Street
Southwest Extension			
3.0	Concrete bridge	55’	Loop I-820/I-20 Service Road
2.44	Steel beam, timber approaches	110’	Trail Lake Drive
0.7	Open deck trestle	3 Spans	
739.9	Open deck trestle	5 Spans	
740.1	Open deck trestle	3 Spans	
740.2	Open deck trestle	3 Spans	

Source: Corridor inspections performed on August 26, 2003 and September 18, 2003 by Carter-Burgess.

Photos Taken in the Corridor

During the automobile inspections of the W-2 Corridor, photographs were taken of various features and conditions along the line. Photographs were taken of as many of the bridges, highway crossings, overpasses, underpasses, sidings, track conditions, special conditions or constraints, and general right-of-way conditions and features as possible. The photographs taken along the W-2 Corridor between the Dallas-Fort Worth International Airport and Fort Worth may be found at the end of this chapter.

Existing Land Use

A baseline land use survey was conducted by NCTCOG staff at the onset of the Regional Rail Corridor Study. The major focus of this study was to help locate specific areas along the Regional Rail Corridors that possess characteristics that could support the development of a rail station and/or transit-oriented development. The baseline land use map and the associated station location information for the corridor may be found following the corridor photographs.

Infrastructure Constraints

A number of significant infrastructure issues must be resolved in order to establish regional rail passenger service within this corridor. Identified infrastructure constraints include the following considerations:

- East of MP 637.73, the existing Cotton Belt track is in poor condition and will need to be rehabilitated.
- The existing FW&W track along the Southwest Extension will need to be upgraded.

- The UPPR crosses the Cotton Belt at a crossing diamond located at MP 627.73. The railroad crossing is planned to be grade separated whenever passenger rail service is introduced on the Cotton Belt line.
- Timber trestle railroad bridges located along the existing Cotton Belt track are generally in need of repair/replacement.
- The existing hike and bike trails located along portions of the Cotton Belt right-of-way would remain in the corridor but may require relocation of some segments and access modifications to separate pedestrians from train traffic.

DFW International Airport access will be needed between the Cotton Belt line and the 13th Station for the SkyLink automated people mover connecting DFW Terminals A, B, C E, and D, and future Terminal F. Rail access planning for the Dallas/Fort Worth International Airport identified a variety of rail options to and through the airport. The Dallas/Fort Worth International Airport Rail Planning and Implementation Study was undertaken in 2001, to identify the best approach for serving DFWIA and capitalizing on the regional access that could also be gained through appropriate connections to and through the facility. As part of the Regional Rail Corridor Study, this effort was reviewed for relevant outcomes for the rail study, along with stakeholder perspectives at the time the RRCS work began.

Operational Constraints

During the course of this study, the Union Pacific Railroad (UPRR) upgraded the existing DART track from MP 627.73 to MP 630.60 (Deen Road) as a joint effort between UPRR and BNSF to accommodate directional running of freight rail traffic with northbound trains on UP and southbound trains on BNSF.

The operational capacity of Fort Worth Intermodal Transportation Center and the T&P Station is limited by existing rail facilities and activity including Trinity Railway Express and AMTRAK service.

DEFINITION OF FEASIBLE ALTERNATIVES

The Regional Rail Corridor Study considered three primary types of options for the rail corridors. Regional rail, light rail, and bus rapid transit were the primary modes or options considered for development in the corridors in question. A screening process took place for each corridor to determine if all three options were reasonable or if a subset was more appropriate. The discussion of options pertinent to Corridor W-2 follows.

Description of Modal Alternatives in Corridor W-2

Regional Rail

The regional rail alternative would provide regional rail passenger service along the Cotton Belt between DFWIA and downtown Fort Worth, and from downtown Fort Worth to Hulen Street along the Southwest Extension.

Regional Rail passenger stations will be constructed at the approximate locations shown along the alignment. Stations will include commuter parking, passenger drop off and pick up areas, and convenient connection to other transit service.

New track will need to be constructed for access to the 13th Station at DFW International Airport, along right-of-way located within airport property. The existing track will need to be replaced along the corridor between DFWIA and Tower 60 in Fort Worth, and along

the Southwest Extension due to the poor to fair condition of the rail, ties, and ballast. Passing tracks will be required at stations and other convenient locations. Future installation of double track should not be precluded. Turnouts located in the main track that serve industrial tracks will have to be replaced when the main track is replaced. The existing timber trestle bridges on the line may need to be replaced or rebuilt. The intersection of the UP and Cotton Belt rail lines at MP 627.73 will need to be grade-separated. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of automotive traffic will have to be improved with the installation of warning devices such as lights, bells, and gates. Drainage improvements and vegetation control will also be required along the line. Exhibit X-6 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for this modal alternative. Exhibit X-7 shows the W-2 Regional Rail Alternative.

EXHIBIT X-6

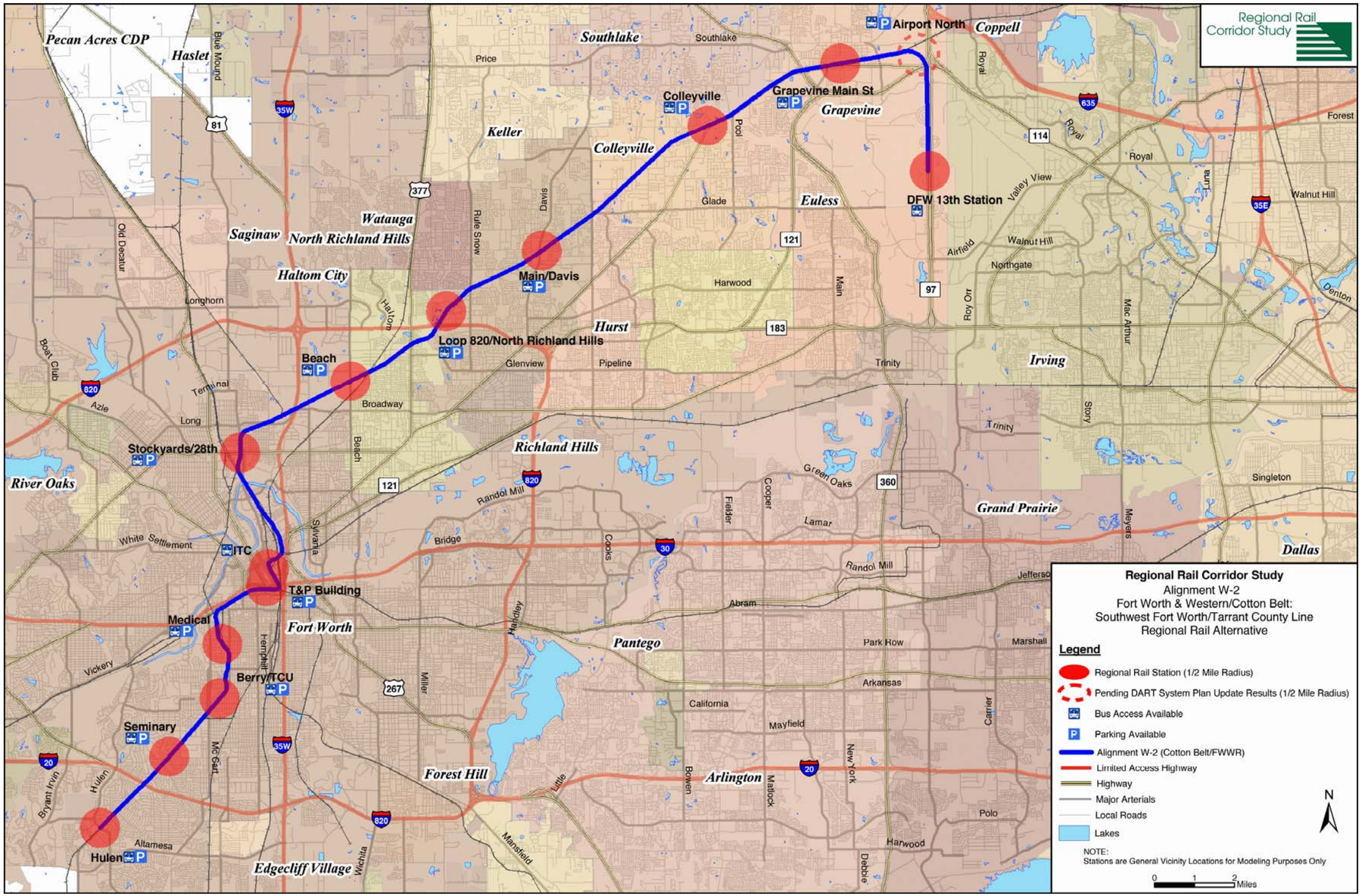
REGIONAL RAIL SERVICE ASSUMPTIONS

Regional Rail (headways = 20 minutes/60 minutes)		
Stations*	**Bus**	**Park-and-Ride**
Hulen	Yes	Yes
Seminary	Yes	Yes
Berry/TCU	Yes	Yes
Medical	Yes	Yes
T & P Building	Yes	Yes
ITC	Yes	No
Stockyards/28th	Yes	Yes
Beach	Yes	Yes
Loop I-820/North Richland Hills	Yes	Yes
Main/Davis	Yes	Yes
Colleyville	Yes	Yes
Grapevine Main Street	Yes	Yes
DFW 13th Station	Yes	No

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT X-7

REGIONAL RAIL ALTERNATIVE FOR W-2 CORRIDOR



Light Rail

Light rail is not considered a viable alternative for the W-2 corridor because of the presence of freight rail traffic and the Tarantula passenger excursion train currently utilizing the existing FW&W and Cotton Belt tracks within the corridor.

Bus Rapid Transit

Bus rapid transit (BRT) in the W-2 Corridor would begin at DFW Airport in extensive Airport right-of-way; it would then transition to the Cottonbelt right-of-way to Loop I-820/ Industrial Boulevard. The BRT would then utilize the planned Loop I-820 and I-35W high occupancy vehicle (HOV) lane into downtown Fort Worth. Leaving downtown Fort Worth along I-30 right-of-way and Southwest Parkway to Hulen Street. SH-121 and SH-183 were dismissed from BRT consideration because it was likely too late to get two BRT lanes into the ongoing Texas Department of Transportation (TxDOT) improvement plan.

Bus rapid transit service in the W-2 Corridor would include separate bus lanes within the highway right-of-way along Loop I-820/Industrial, a separate bus guideway with the rail right-of-way, clean fuel, low-floor buses with a distinct “brand” identity; prepaid fares; frequent limited-stop service; some grade separations; and transit priority signals for at-grade intersections. Within the downtown area of Fort Worth, buses would operate in the streets in mixed traffic. Other enhancements would include an advanced dispatch system; real time bus arrival and information systems; enhanced bus stops and stations at numerous locations along the corridor; and convenient connections to other transit services. Exhibit X-8 contains the basic assumptions for stations, feeder bus access, and Park-and-Ride locations that were evaluated for this modal alternative. Exhibit X-9 shows the Bus Rapid Transit Alternative for the W-2 Corridor.

EXHIBIT X-8

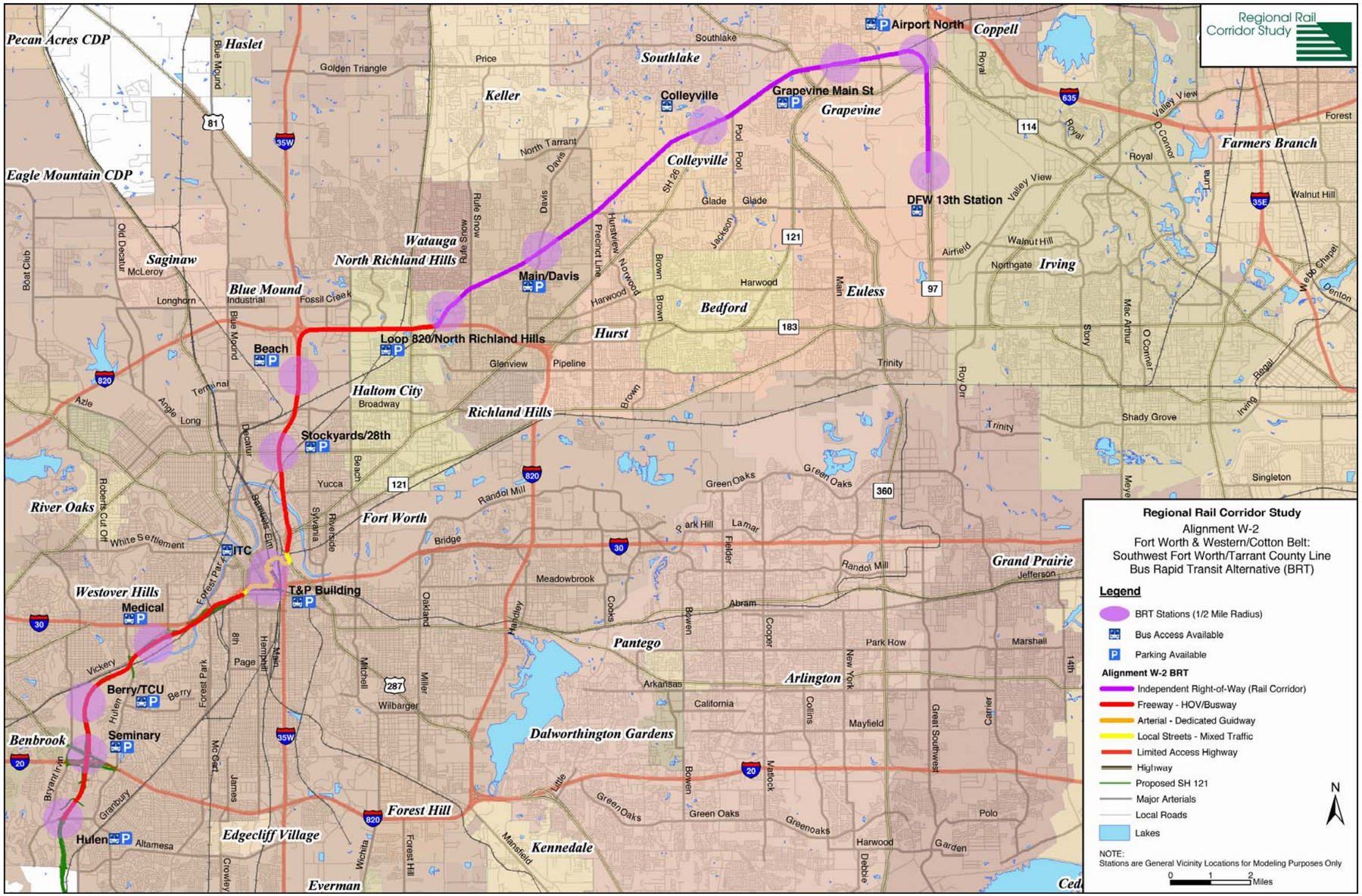
BUS RAPID TRANSIT SERVICE ASSUMPTIONS

Bus Rapid Transit (headways = 10 minutes/15 minutes)		
Stations*	**Bus**	**Park-and-Ride**
Hulen	Yes	Yes
Seminary	Yes	Yes
Berry/TCU	Yes	Yes
Medical	Yes	Yes
T & P Building	Yes	Yes
Intermodal Transportation Center	Yes	No
Stockyards/28th	Yes	Yes
Beach	Yes	Yes
Loop I-820/North Richland Hills	Yes	Yes
Main/Davis	Yes	Yes
Colleyville	Yes	No
Grapevine Main Street	Yes	Yes
Airport North	Yes	Yes
DFW 13th Station	Yes	No

* Station locations, feeder bus and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT X-9

BUS RAPID TRANSIT ALTERNATIVE FOR W-2 CORRIDOR



EVALUATION OF ALTERNATIVES

Four different modal alternatives were evaluated for this corridor:

- Regional rail: DFWIA to Fort Worth CBD
- Regional rail: DFWIA to Southwest Fort Worth
- Regional rail: Fort Worth CBD to Southwest Fort Worth
- Bus rapid transit: DFWIA to Fort Worth CBD

In addition to the assumptions related to different technologies and operating characteristics (station locations, headways, operating speeds, and supply of feeder buses at stations), the relationship of the W-2 Corridor to the others in the regional system was also considered.

One of the key evaluation or performance indicators used projected 2030 average weekday ridership. The complete list of performance indicator is found in Chapter II – Corridor Description and Evaluation. In order to streamline the development of travel forecasts for the Regional Rail Corridor Study, the various modal alternatives containing regional or light rail for each corridor were combined into a series of rail system modeling alternatives for forecasting. Several of the corridors also serve travel markets that interact or compete with each other, so it was important to design the system forecasts to minimize this interrelationship as much as possible. Travel demand forecasts for four rail system alternatives were developed initially, along with BRT system alternative maps showing these systems alternatives. Ridership summaries for these system alternatives are also contained in Chapter II of this report and, more specifically to the W-2 corridor in the following section.

Ridership Summary

Exhibit X-10 presents projected average weekday ridership resulting from each of the system alternatives for the W-2 Corridor. (See Chapter II for a complete discussion.)

In Rail System Modeling Alternative 1, the W-2 Corridor was tested as a regional rail line from DFWIA to the Fort Worth CBD. Rail System Modeling Alternative 3 assumed regional rail in the W-2 Corridor and extended or interlined the service down to Hulen Street in Southwest Fort Worth. Rail System Modeling Alternative 4 assumed only the Fort Worth CBD to southwest Fort Worth regional rail operation. The BRT System Modeling Alternative included BRT along a combination of the W-2 Corridor and various freeway/HOV and arterial facilities.

As explained in Chapter II, the ridership resulting from the rail system alternatives was used to compare the performance of the modal alternatives within a corridor. The best performing option, which for W-4 would be either regional rail or BRT, was then the recommendation for the corridor and, consequently, included in the Final Run Recommended Alternative. Exhibit X-11 shows the ridership from the Final Run Recommended Alternative as well.

To properly stage the recommended alternative, corridor ridership was also generated for the year 2007, measuring the impact of demographics growth on the proposed alternative. The process leads to the identification of corridors worthy of priority implementation.

EXHIBIT X-10

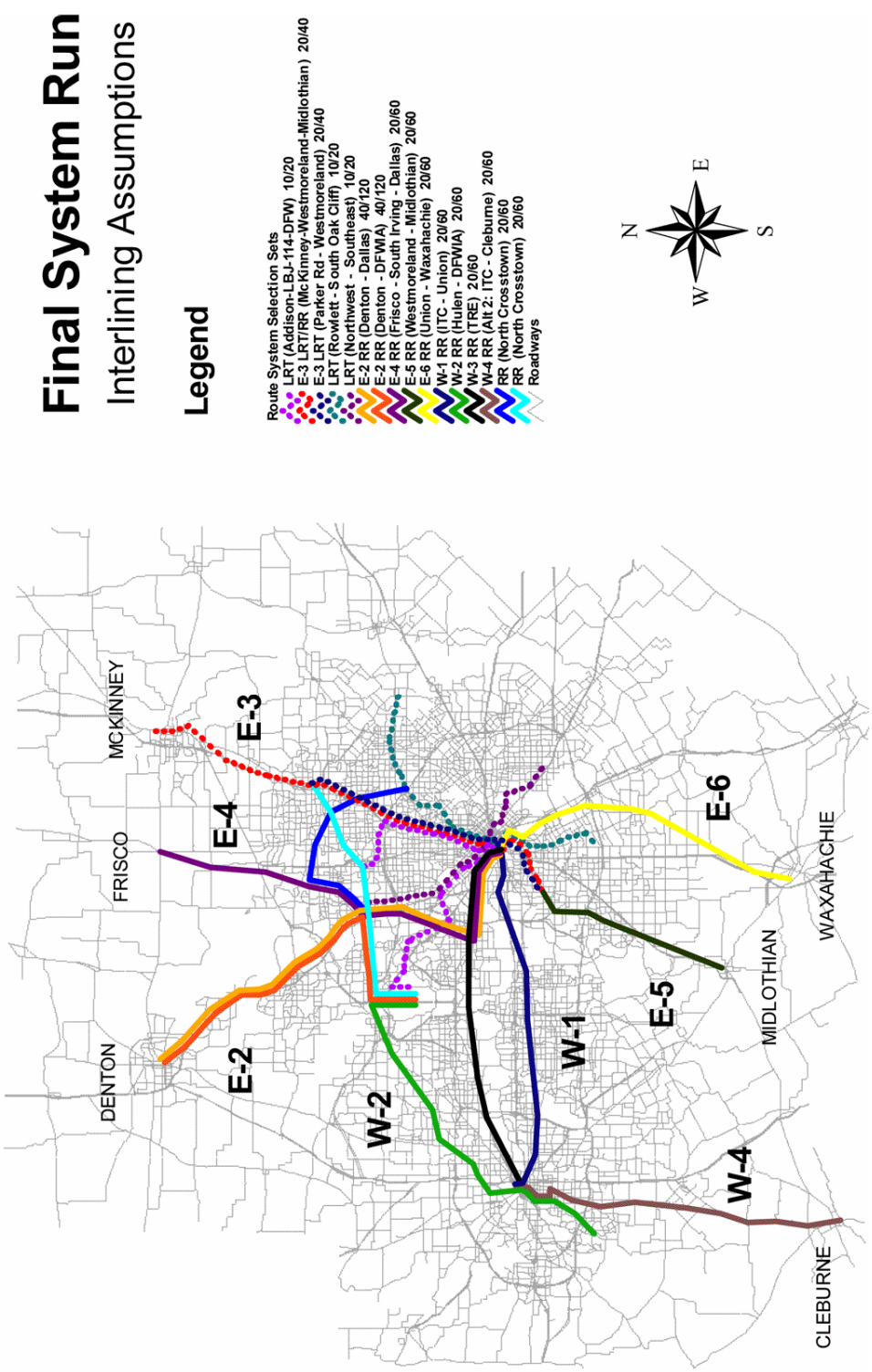
W-2 CORRIDOR RIDERSHIP

Travel Forecast	Alignment	Technology	Average Weekday Ridership
Rail System Alternative 1	DFW Airport-Fort Worth CBD	Regional rail	5,300
Rail System Alternative 3	DFW Airport-SW Fort Worth	Regional rail	11,700
Rail System Alternative 4	Fort Worth CBD-SW Fort Worth	Regional rail	7,500
BRT System Alternative	DFW Airport-SW Fort Worth	BRT	9,400
Final (2007)	*DFW Airport-SW Fort Worth*	*Regional rail*	*7,900**
Final 2030)	*DFW Airport-SW Fort Worth*	*Regional rail*	*9,400**

*Recommended alternative
Source: NCTCOG-DFWRTM

EXHIBIT X-11

REGIONAL RAIL CORRIDOR STUDY – FINAL RUN RECOMMENDED ALTERNATIVE



An important step in transit ridership analysis involves detailed reviews of projected passenger boardings and alightings at each station. Station riders by mode of access (walk, auto, feeder bus, and where applicable, transfers from other rail lines) were reviewed for accuracy and reasonableness. Shortcomings in network design as well as some coding errors can be identified as part of this analysis. Exhibit X-12 presents 2007 and 2030 ridership by station for the Final Run Recommended Alternative. Corridor line ridership is the sum of demand at stations along a given line.

EXHIBIT X-12

FINAL RUN RECOMMENDED ALTERNATIVE BOARDINGS BY STATION

Corridor	Stations	Regional Rail Boardings	
		2007	2030
W-2	North DFW	460	570
	Grapevine Main	390	450
	Colleyville	170	200
	DFW 13th Station	930	1,250
	Main/Davis	480	520
	Loop I-820/North Richland Hills	530	570
	Beach/Meacham	380	490
	Stockyard/28th	550	630
	ITC Terminal	1,700	1,920
	T&P Building	340	380
	Medical (Pennsylvania/Summit)	560	630
	Berry/TCU	520	620
	Seminary	440	500
	Hulen	480	670
	Line Ridership	**7,930**	**9,400**

Source: NCTCOG-DFWRTM

Performance Evaluation

Each modal alternative considered for the Regional Rail Corridor Study was evaluated with a set of performance indicators. The corridors were scored based upon a five-point system with five indicating a good score and one indicating a bad score. The individual criteria scores were then added to reflect a total score for each alternative, including a

performance benchmark representing the overall cost effectiveness of each option. Exhibit X-13 contains a summary of the final performance of the W-2 Corridor. The performance benchmark was created for the Regional Rail Corridor Study to normalize the evaluation of each of the corridors with varying lengths, costs and ridership. It is a "cost effectiveness" measure using annualized capital cost, annualized operating cost, and annualized ridership producing a necessary calculation of annual cost per rider. It is very similar to the original FTA cost effectiveness index (CEI). The revised CEI used by FTA in the most recent New Starts Program evaluation includes additional considerations for travel time surveys and user benefits.

EXHIBIT X-13

PERFORMANCE SUMMARY FOR W-2 CORRIDOR

Evaluation Criteria	W-4 Regional Rail	Score
Performance benchmark (annual cost per annual rider)	$12.49	5
Total daily ridership forecast	5,000	3
One-way trip time (minutes)	52	3
Estimated capital cost (millions)	$229.6M	3
Estimated annual O&M cost (millions)	$15.0M	3
Local authority and funding	None	1
Community acceptance	Communities are open to acceptance of regional rail type service.	5
Ease of implementation	BNSF and FW&W own right-of-way.	4
Connectivity with existing and planned transit operations	Regional rail allows interlining with TRE and transfers with the T.	4
Compatibility with freight railroad operations	Compliant regional rail is compatible with freight railroad operations.	4
Serves area of unmet mobility need	Roadway capacity deficiency low to moderately severe.	2
Impact upon adjacent highways and air quality	Transit benefit to highway is equivalent to one lane in each direction on the adjacent freeway.	4
Transit oriented development potential	TOD potential exists but is likely to develop slowly as on TRE.	3
TOTAL SCORE		**44**

The W-2 Corridor scored 45 points in the overall evaluation. The performance benchmark was $10.62 (score = 5 points), based on a total daily ridership forecast of 9,400 daily riders (score = 4 points). The costs for the corridor include an annual operating and maintenance cost of $21.2 million (score = 2 points) and a total capital cost for development of regional rail in this corridor of $366.1 million (score = 3 points). Estimated trip time to travel one way, the length of the corridor is 61 minutes (score = 2 points). The project has local authority involvement on the western end of the corridor and the communities along the rest of the corridor appear to be open to a regional rail

service (score = 5 points), but has no existing transit authority or funding is designated for it at this time (score = 1 point). The right-of-way is owned by DART and the FW&W Railroad (score = 4 points), so use of the corridor is negotiable. Use of FRA compliant regional rail technology in the corridor will make it compatible with freight operations (score = 5 points) and allow for interlining with Trinity Rail Express, along with other connections with the T in Fort Worth and the Dallas/Fort Worth International airport on the eastern end (score = 5 points). The roadway capacity deficiency in the parallel corridors is moderately severe (score = 2 points) and the ridership generated is equivalent to one lane of vehicular traffic in each direction. This provides a good benefit to air quality (score = 4 points). Transit oriented development is likely to develop slowly in this corridor, as has been shown in the Trinity Railway Express corridor (score = 3 points).

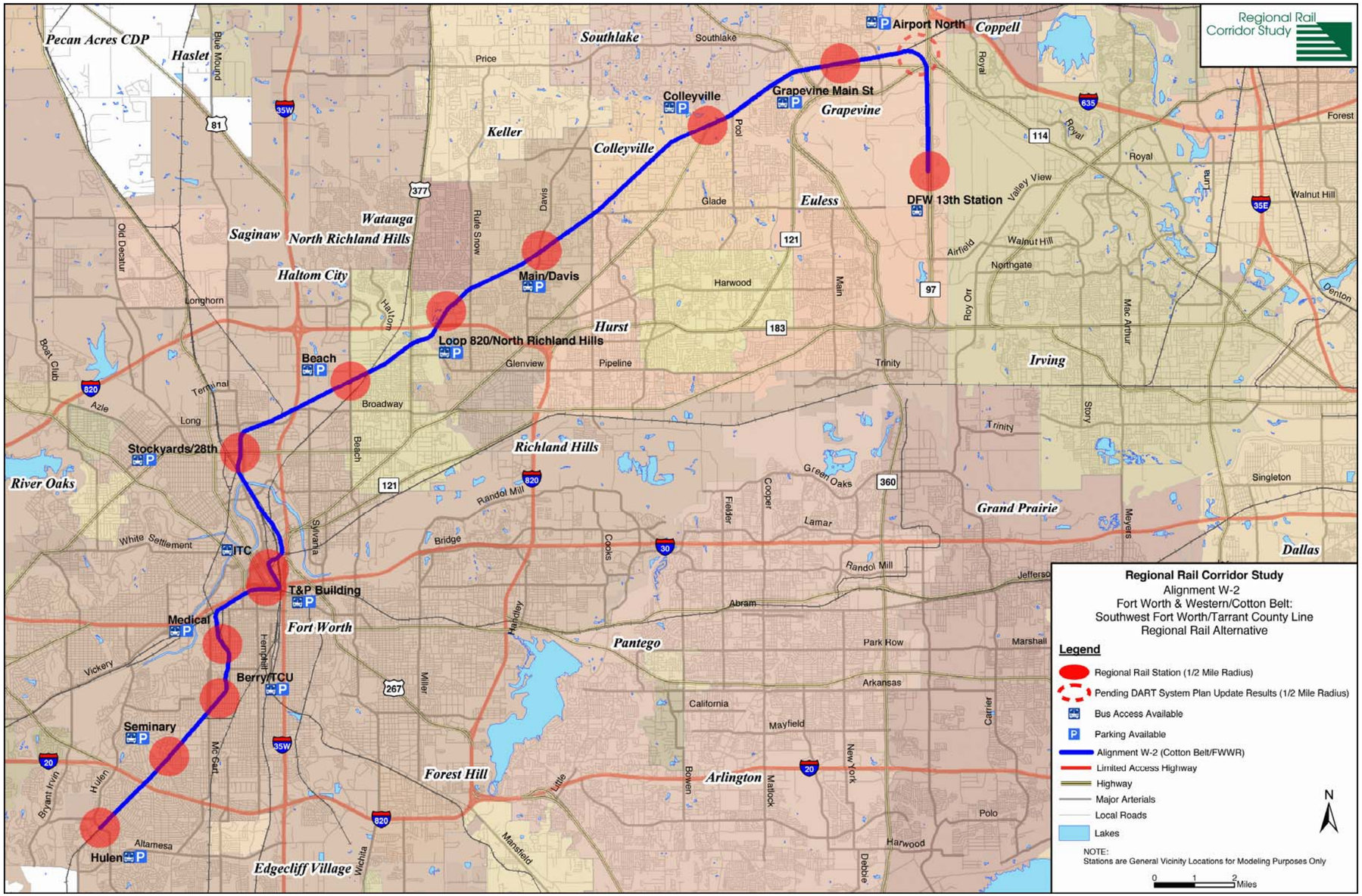
CORRIDOR RECOMMENDATIONS

The final recommendation for the W-2 Corridor is shown in Exhibit X-14. The recommendation is for a regional rail operation from DFW Airport along the Cottonbelt Corridor to downtown Fort Worth and then on into southwest Fort Worth to Hulen. The station locations shown on the map are for planning purposes only and would be refined as a more detailed alternative analysis study of the corridor is conducted.

The W-2 Corridor was one of the top scoring corridors from the performance indicator analysis. The 2007 ridership estimates were high enough to indicate the need for near-term (5-10 years) rail development in the corridor. The decision to implement regional rail in this corridor should be part of a future Alternatives Analysis.

EXHIBIT X-14

FINAL RECOMMENDATION FOR THE W-2 CORRIDOR



W-2: FORT WORTH & WESTERN/COTTON BELT:

SOUTHWEST FORT WORTH/TARRANT COUNTY LINE

PHOTOGRAPHS

Looking East from Hwy. 121 Bridge

Looking North at Railroad Bridge over Business 114 (Loop 382)

Looking East at Bridge over Business 114 (Loop 382)

Looking West at Dooley Street

Looking North at 48" CMP 100' west of Dooley St.

Looking West at Main St. - Grapevine

Looking North at Main St. in Grapevine

Looking East at RR over Hudgins St.

Looking east at Main St. & terminal - Grapevine

Looking West at Ball St.

Looking East at Ira E. Woods Ave.

Looking East at Hwy. 114 Overpass

Looking East at "Alon USA" Private Crossing

Looking West at "Explorer Pipeline" Private Crossing

Looking West at Mustang

Looking West at Brumlow

Looking North at Big Bear Creek Bridge

Looking West at Big Bear Creek Bridge

Looking West at Big Bear Creek Bridge

Looking West at John McCain Rd.

Concrete Culvert – Between John McCain & Pleasant Run

Looking West at Pleasant Run

Colleyville Trail at Pleasant Run

Looking West at Bransford

Looking East at Bear Creek Bridge – MP 17.5

Looking East at Precinct Line

Looking East at Eden

Turnout at MP 14.8

Br. 621.84

Looking West at Main Street – North Richland Hills

Looking West at Davis Blvd.

Looking West at Smithfield

Br. 623.10 (14.8) – East of Holiday

Br. 623.10 (14.8) – East of Holiday

Looking West at Holiday Crossing

Br. 14.5 – West of Holiday

Looking west at Mid-Cities Blvd.

Looking east at Technol

Looking east at Rufesnow Dr.

Looking west at Browning

Looking south at Loop 820 (Railroad Overpass)

Looking south at Loop 820 Railroad Overpass

Fossil Creek Bridge

Looking southwest at Br. Over Hwy. 377

Looking west at Br. Over Hwy. 377

Looking west at Glenview Drive

Looking east at UPRR & Cotton Belt Crossing Frog

Looking west at Old Denton Rd.

Looking east at Beach St.

Looking east at Little Fossil Creek Bridge (East Track Crossing)

Looking east at Little Fossil Creek Bridge (West Track Crossing)

Looking east at Sylvania Ave.

Looking east at 35W

Looking east at Hodge Yard

Looking east at Deen Rd.

Looking east at Long Avenue

Railroad Bridge west of Long Avenue

Looking east at 29th St.

Railroad Bridge Between 28th St. and BNSF/Cotton Belt Crossing

Looking east at BNSF/Cotton Belt Crossing

W-2: FORT WORTH & WESTERN/COTTON BELT:

SOUTHWEST FORT WORTH/TARRANT COUNTY LINE

SOUTHWEST EXTENSION FROM

HULEN TO FORT WORTH

PHOTOGRAPHS

Looking North at Hulen St.

Looking North at Walton St.

Looking North at Gorman

Railroad Bridge over Loop 820 SW/I 20 Service Road

Looking North at Bilgrade

Looking East at Railroad Bridge over Trail Lake Dr.

Looking Northwest at Seminary

Looking South at Pafford

Looking North at Cockrell

Looking North at Benbrook

Looking North at W. Devitt

Looking North at Berry St.

Looking North at Bowie & Stanley Intersection

Looking North at Cantey St.

Looking North at Arlington W.

Looking North at Park Place

Looking North at Mistletoe

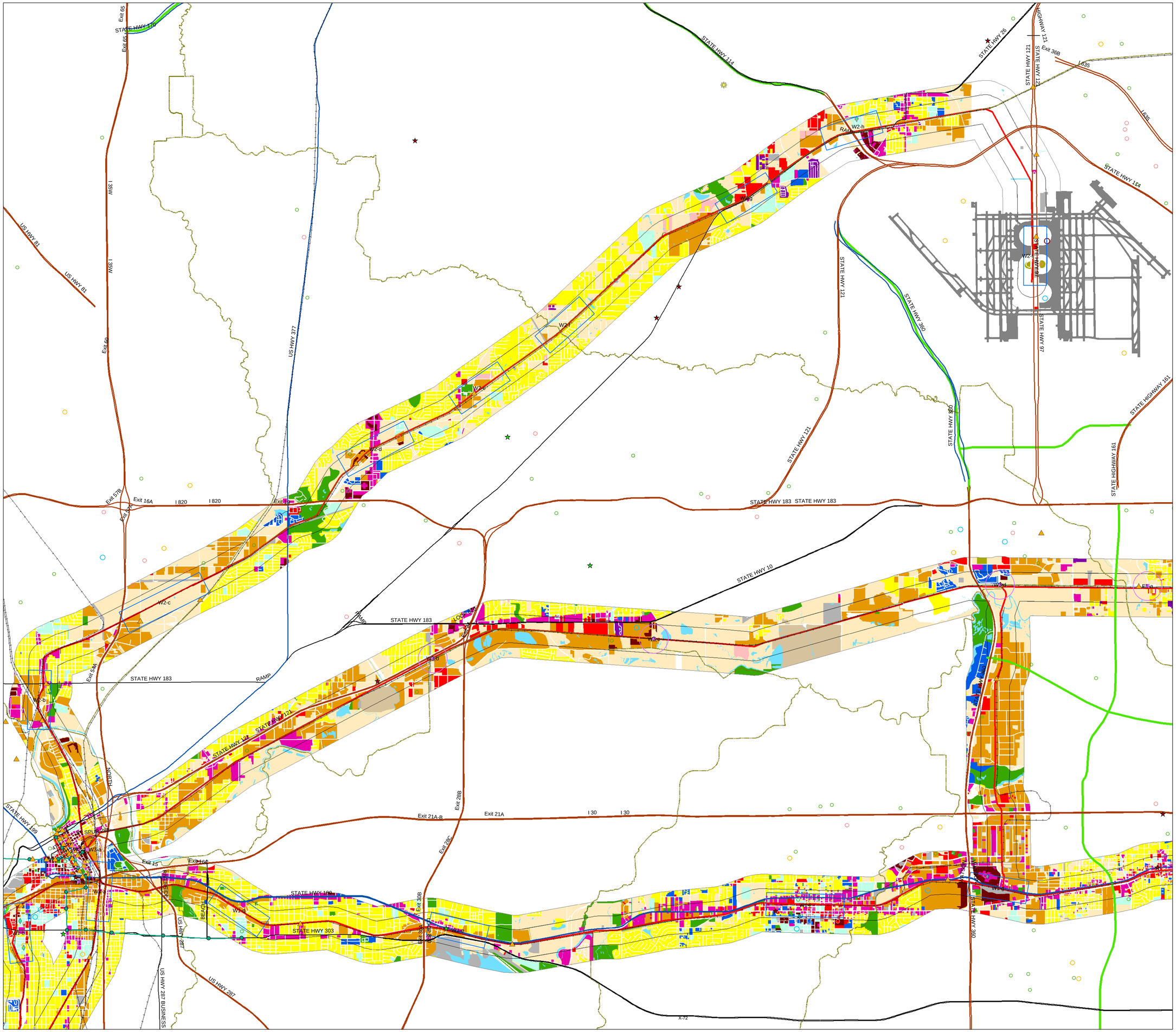
Looking North at Rosedale Overpass

Looking North at Mistletoe (Track Removed)

Looking East at former location of Railroad Bridge over Rosedale

Looking North at Cooper (Track removed)

Baseline Land Use Study: Corridor W-2



Legend

- Possible Station Location
- Existing Rail Station
- Existing Rail Station 1/4 mile buffer
- Mobility 2025 Rail Station
- New Stations Existing by 2008
- Fort Worth Trolley Stops
- 250 - 670
- 670 - 1450
- 1450 - 2750
- 2750 - 6250
- 6250 +
- Clide Award Winner
- JV Project - Selected
- JV Project - Not Selected
- Special Generator
- Amtrak stations
- Airport
- Veloweb
- Railroad
- Fort Worth Trolley Line
- Rail Lines Existing by 2008
- Primary Highway
- Secondary Highway
- Major Arterial
- Proposed Freeways and Tollroads
- Regional Rail Corridor

Regional Rail Corridor Buffer

Buffer Distance

- 0.00 - 0.25
- 0.25 - 0.50
- Single-family
- Multi-family
- Retail
- Office
- Vacant
- Park and Recreation
- Industrial
- Parking
- Institutional
- Hotel/Motel
- Utilities
- Mobile Homes
- Water
- Landfill
- Under Construction

W-2 Fort Worth & Western/Cotton Belt
begins in Fort Worth, through Haltom City, North Richland Hills, Colleyville, ends in Grapevine, 26 miles in length

Potential Station Zone: 1/2 mile wide linear area of variable length based on the area of interest

Area of Interest	Station Status	County	Jurisdiction w/in walking distance of station	Characteristics of Interest	Development Type	Development Style	Future Land Use (comprehensive plan)	Zoning (of vacant land)	Other Comments
W2-a	Existing	Tarrant	Fort Worth	**Station:** ITC Terminal **Infill Opportunities:** built up, no vacant land available **Flood zone:** outside of floodplain	Infill-other development	pedestrian oriented development	mixed-use growth center	MU-1,MU-2	
W2-b	Proposed	Tarrant	Fort Worth	**Employment within walking distance of the site:** United Parcel Service Inc. (900) **Current land uses:** retail, industrial, single-family **Vacant land:** possibly adequate for a station **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, proximate to US hwy I35W, FWWR, UP railroad, BNSF railroad **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid	light industrial or single-family residential	IP, MU-2,I,PD or AR, A-5,A-7.5,A-10	
W2-c	Proposed	Tarrant	Fort Worth, Haltom City	**Employment within walking distance of the site:** N/A **Current land uses:** industrial **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, proximate to US hwy I35W, UP Railroad **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Greenfield development	hybrid	industrial growth center	all commercial and industrial	
W2-d	Proposed	Tarrant	North Richland Hills, Watauga, Haltom City	**Employment within walking distance of the site:** Doskocil Food Service (300), Sam's Club (250), Tecnol Medical Products Inc. (710) **Current land uses:** retail, industrial, park space, multi-family, institutional **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, proximate to US hwy 377, proximate to loop 820 **Flood zone:** outside of the floodplain Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid			
W2-e	Proposed	Tarrant	North Richland Hills	**Employment within walking distance of the site:** N/A **Current land uses:** industrial, park space, retail, under construction, single-family **Vacant land:** adequate for station and transit oriented development **Located proximate to:** NRH Hometown joint venture project **Site accessible via:** regional veloweb, **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid			

W2-f	Proposed	Tarrant	Colleyville, North Richland Hills, Hurst	**Employment within walking distance of the site:** N/A **Current land uses:** single family **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb **Flood zone:** Partially within the 100 year floodplain - opportunity for green space.	Greenfield development	hybrid	probably single-family residential	residential	
W2-g	Proposed	Tarrant	Southlake, Grapevine, Colleyville	**Employment within walking distance of the site:** N/A **Current land uses:** office, park space, single family, industrial, institutional **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, state hwy 26 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid		light industrial	
W2-h	Proposed	Tarrant	Southlake, Grapevine	**Employment within walking distance of the site:** Baylor Medical Center at Grapevine (880) **Current land uses:** single-family, parking, retail, institutional, industrial **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb, state hwy 114, proximate to state hwy 121 **Flood zone:** outside of the floodplain	Infill-other development	hybrid			
W2-I	Proposed	Tarrant	Grapevine	**Employment within walking distance of the site:** DFW airport, Hyatt Regency DFW East (880) **Current land uses:** airport **Vacant land:** N/A **Located with in walking distance:** N/A **Site accessible via:** state hwy 97 **Flood zone:** outside of the floodplain Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	hybrid	airport		

WESTERN CORRIDOR COST ANALYSIS (W-2)

REGIONAL RAIL CORRIDOR STUDY									**Alignment W-2**			
North Central Texas Council of Governments									**Link Number:**	**Summary**		
Parametric Cost Estimate									**Link Description:**			
									Start Sta:			
									End Sta:			
			Regional Rail				**Light Rail**		**Link Length:**	**189,980**	**35.98**	
Description	**Unit**	**Unit Cost**	**Quantity**	**Cost**	**Subtotals**		**Unit Cost**	**Quantity**	**Cost**	**Subtotals**	**Remarks**	
Site Work & Urban Design												
Earthwork, 1 Track, Major	MI	$1,500,000	1.64	$2,460,000								
Earthwork, 1 Track, Basic	MI	$500,000	6.27	$3,135,000								
Earthwork, 2 Tracks, Major	MI	$2,500,000					$3,500,000					
Earthwork, 2 Tracks, Basic	MI	$750,000										
Earthwork, Reconstruct Existing Track	MI	$100,000	30.36	$3,036,000								
Urban Design/Signage/Landscaping	MI	$250,000	35.98	$8,995,000			$750,000					
Environmental Mitigation (Includes noise and vibration)	MI	$100,000	35.98	$3,598,000			$100,000					
Relocate Hike/Bike Trail	MI	$1,400,000					$1,400,000					
Subtotal					**$21,224,000**							
Trackwork												
New Track, 136# CWR	MI	$1,000,000	40.77	$40,770,000			$1,850,000					
Upgrade Track to Class 4	MI	$500,000										
Paved Embedded Track (Double)	MI	$4,000,000					$5,600,000					
New Single Track #1 Relay Rail	MI	$800,000										
New Turnout #10	EA	$125,000	22.00	$2,750,000			$125,000					
New Turnout #15	EA	$200,000	1.00	$200,000			$200,000					
New Turnout #24	EA	$250,000	26.00	$6,500,000			$250,000					
Rebuild Turnout or Diamond	EA	$75,000										
New Railroad Diamond Crossing	EA	$200,000	3.00	$600,000								
Subtotal					**$50,820,000**							
Structures												
Elevated Track	TF	$3,000	8657.00	$25,971,000			$3,000					
Tunnel	TF	$10,000					$10,000					
New Bridge (Minor)	TF	$4,500	447.00	$2,011,500			$4,500					
New Bridge (Major)	TF	$6,500	100.00	$650,000			$6,500					
Reconstruct Existing Bridge	TF	$2,500	350.00	$875,000			$2,500					
Retaining Wall (0 FT - 10 FT High)	TF	$175	4329.00	$757,575			$175					
Retaining Wall (10 FT - 20 FT High)	TF	$525	4329.00	$2,272,725			$525					
New Culvert	EA	$10,000	29.00	$290,000			$10,000					
Rehabilitate Culvert	EA	$5,000	121.00	$605,000			$5,000					
Subtotal					**$33,432,800**							
Stations												
At-grade Station	EA	$650,000	11.00	$7,150,000			$2,800,000					
Aerial Station (LRT)	EA						$4,600,000					
Depressed Station (LRT)	EA						$15,000,000					
Parking Spaces/Surface Lot	EA	$4,000	5000.00	$20,000,000			$4,000					
Service and Layover Facility	EA	$2,000,000	1.00	$2,000,000			$50,000					
Central Maintenance Facility Contribution	EA	$1,000,000	1.00	$1,000,000			$2,000,000					
Subtotal					**$30,150,000**							
Traction Electrification System (LRT)	MI						$1,600,000					
Signal System												
Communications System (LRT)	MI						$1,100,000					
New Railroad Interlocking	EA	$1,500,000										
Modify Railroad Interlocking	MI	$750,000										
New CTC/LRT Signaling System	MI	$1,200,000	35.98	$43,176,000			$2,300,000					
Upgrade Railroad Signal System	MI	$600,000										
Subtotal					**$43,176,000**							
R.O.W. & Y Junction												
R.O.W. Allowance	ACRES											
Utilities												
Utilities Allowance	MI	$200,000	35.98	$7,196,000	**$7,196,000**		$400,000					
Crossings / Roadway												
Minor Street At-grade (Gates & Warning Devices)	EA	$150,000	5.00	$750,000			$150,000					
Minor Street At-grade (w/ Quad Gates System & Warning Devices	EA	$250,000	48.00	$12,000,000			$250,000					
Major Street At-grade (Gates & Warning Devices)	EA	$450,000	15.00	$6,750,000			$450,000					
Reconstruct Existing Roadway Bridge	EA	$1,000,000					$1,000,000					
Reconstruct Existing Roadway	SY	$40					$40					
Construct New Roadway	SY	$80					$80					
Highway/Railroad Grade Separation	EA	$8,000,000	2.00	$16,000,000			$8,000,000					
Subtotal					**$35,500,000**							
Special Conditions												
Subtotal												
Subtotal W-2					**$221,498,800**							
MIS Level Design Contingency (15% of W-2)	15%				$33,224,820							
Construction Contingency (10% of W-2)	10%				$22,149,880							
Add-on W-2 Allowance (Eng., CM, etc) (15% of W-2)	15%				$33,224,820							
Rail Vehicle Train Sets (actual without contingencies)	EA	$8,000,000	7	$56,000,000	$56,000,000		$9,000,000					
Grand Total W-2					**$366,098,320**							
Cost per Mile					**$10,174,751**							
NOTE: 1. Unit Costs are expressed in present value dollars.												
2. Retaining Wall Unit Cost is for one side only.												
3. Cost estimate excludes ROW costs.												

Annualized Cost Estimate (W-2)

Regional Rail Corridor:	**W-2**							Regional Rail Corridor:	W-2	
Annualized Capital Cost		Daily Riders:	9,400		0			Cost Category Summary		
		Annualized Riders:	2,914,000		0					
			Regional Rail	Regional Rail	Light Rail	Light Rail			Regional Rail	Light Rail
	Useful	Annualization	Total Cost ($mil)	Annualized	Total Cost ($mil)	Annualized			Total Cost ($mil)	Total Cost ($mil)
Cost Category	Life (yr)	Factor	(Incl. Contingency)	Cost ($mil)	(Incl. Contingency)	Cost ($mil)		Cost Category	(Incl. Contingency)	(Incl. Contingency)
Site work and Urban Design	100	0.070	$29.714	$2.080	$0.000	$0.000		Site work and Urban Design	$39.788	$0.000
					(Not Applicable for this corridor)					
Trackwork	30	0.081	$71.148	$5.763	$0.000	$0.000		Trackwork	$71.148	$0.000
Structures	30	0.081	$46.806	$3.791	$0.000	$0.000		Structures	$46.806	$0.000
Stations	20	0.094	$42.210	$3.968	$0.000	$0.000		Stations	$42.210	$0.000
LRT Electrification System	30	0.081	$0.000	$0.000	$0.000	$0.000		LRT Electrification System	$0.000	$0.000
Signal System	30	0.081	$60.446	$4.896	$0.000	$0.000		Signal System	Incl with Crossings/Roadway	
Right-of-Way	100	0.070	$0.000	$0.000	$0.000	$0.000		Right-of-Way	Not Applicable	
Utilities	20	0.094	$10.074	$0.947	$0.000	$0.000		Utilities	Incl with Site Work & Urban Design	
Crossings / Roadway	20	0.094	$49.700	$4.672	$0.000	$0.000		Crossings / Roadway	$110.146	$0.000
Special Conditions	20	0.094	$0.000	$0.000	$0.000	$0.000		Other	$0.000	$0.000
Vehicles	25	0.086	$56.000	$4.816	$0.000	$0.000		Vehicles	$56.000	$0.000
Total			$366.098	**$30.933**	$0.000	**$0.000**		Total	$366.098	$0.000
Performance Benchmark				**10.62**						
Notes:										
1. Annualized Riders = Daily Riders times 310 days per year.										
2. Performance Benchmark = Annualized Cost divided by Annualized Riders.										

XI. W-3 – TRINITY RAILWAY EXPRESS (WEST) CORRIDOR CONSIDERATIONS

CORRIDOR DESCRIPTION

Rail Corridor W-3 is one of the ten rail corridors in the Dallas-Fort Worth area included in the initial scope of work of the Regional Rail Corridor Study. Corridor W-3, along with Corridor E-1, make up the Trinity Railway Express Line that runs between Dallas and Fort Worth.

Because the TRE is in operation as a regional rail service and is actively managed by two of the areas transit authorities, the TRE corridor was examined preliminarily but was not examined at length. Further, the TRE was separately pursuing inclusion of improvement projects in the NCTCOG/RTC Partnership Program #2. Thus, the NCTCOG RRCS Project Manager determined that it would not be necessary to study the TRE corridor. However, TRE service was reviewed as background for the study and to serve as a baseline for passenger rail service expectations and capital and operating costs.

Additionally, TRE's capital improvement plan for the upcoming years was reviewed with TRE for any operating impact on the RRCS study, as well as to reconcile the RRCS capital cost estimates.

Additional information about the TRE line may be found in the Trinity Railway Express Service and Improvement Plans section in the report Regional Rail Corridor Study – Study Report, in Chapter VI – Issue Identification. The proposed TRE Capital Improvement Plan follows.

TRE CAPITAL IMPROVEMENT PLAN

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
TARRANT COUNTY PROJECTS									
T-1	Hurst Siding Extension	Extends existing siding approximately 264 feet to the west and 1,320 feet to the east. Replaces existing switches at either end of the project with new switches and associated signal apparatus. Reconstruct Norwood Road grade crossing and install new four-quadrant gate protection system. Signalization to be installed to accommodate 79 mph service.	2005	$2,800,000				Project is under design and to be bid out by the FWTA in FY 2005. Project is fully funded. Replacement of switches is critical to allow for faster and safer passenger and freight train meets at the Hurst Siding.	A 1, 3, 4 B 1, 2, 3, 4 D 1, 2
	Construction Subtotal			$2,800,000					
	Project Total			$2,800,000	$2,240,000	$560,000	$0	80% CMAQ funded	
T-2	Minnis Drive to Handley-Ederville Road (Richland Hills Station) Double Track	Includes double tracking through station and all the way to Minnis. Replaces and raises overpass at Midway-Big Fossil to eliminate bridge strikes by trucks.	2006	$5,900,000				This project is necessary to be able to achieve 30-minute headways between Fort Worth and Dallas. Repetitive strikes by road traffic on TRE bridge - current clearance - 11' 6". This project was funded in FY 2005 by the T in the total amount of $6,800,000.	A 1, 2, 3, 4 B 1, 2, 3, 4 C 1
	Escalation, Contingency and Soft Costs Total			$2,664,853				See separate calculation.	
	Construction Subtotal			$8,564,853					
		Minnis Drive	2006	$234,000				Upgrade to Quad Gates	D 1, 2, 3
		Handley-Ederville Road	2006	$339,000				Upgrade to Quad Gates. Install Remote Crossing Start System	D 1, 2, 3
	Grade Crossings Subtotal			$573,000					
	Project Total			$9,137,853	$7,310,282	$1,827,571	$0	FWTA Funding Sources TBD - assume 80% Federal Funding. Quad gate funding to come from NTCOG Partnership 2 Funding	
T-3	Power cross-over at ITC	Install signals and power switch crossover from shared track at Ninth Street as a new control point.	2006	$800,000				Needed to achieve 30-minute headways out of Fort Worth.	C 1 F 3, 4
	Construction Subtotal			$800,000					
	Project Total			$800,000	$640,000	$160,000	$0	FWTA Funding Sources TBD - assume 80% Federal Funding	
T-4	Handley-Ederville Road (Richland Hills Station) to West Hurst Double Track	New siding with six bridges	2008	$13,300,000				Next segment in process of Tarrant County double tracking with immediate headway reduction benefit.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$7,100,072				See separate calculation.	
	Construction Subtotal			$20,400,072					
		Precinct Line Road		$282,000				This crossing was not included in the original RCRPP because of the unknown status of City of Fort Worth project, which will widen existing 2 lane road south of RR and connect to existing 4 lane road north of tracks. Fort Worth project should include construction of 4 lane RR grade crossing. This project will upgrade the crossing to Quad Gates.	D 1, 2, 3
	Grade Crossing Subtotal			$282,000					

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
	Project Total			$20,682,072	$16,545,658	$4,136,414	$0	FWTA Funding Sources TBD - assume 80% Federal Funding. Quad gate funding to come from NTCOG Partnership 2 Funding	
T-5	Dalwor Junction to East Sylvania Double Track		2009	$8,500,000				Connect to existing double track at W. Sylvania new double track to Dalwor Junction. New bridge at West Fork - rehab existing bridge which will soon need work. Will not be able to double track beyond this location to West into ITC and T&P Stations because of physical limitations and not required for operational purposes at this time.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$4,537,640				See separate calculation.	
	Construction Subtotal			$13,037,640					
		Judkins Street (South)	2009	$235,000				Upgrade to Quad Gates	D 1, 2, 3
		Galvez Avenue	2005	$30,000				Close Road. Install barricades, remove existing signals	A 3
		Riverside Drive	2009	$384,000				Upgrade to Quad Gates. Resurface. Existing median with 4 gates.	D 1, 2, 3
		Beach Street	2009	$468,073				Upgrade to Quad Gates. Resurface. Existing median with 4 gates.	D 1, 2, 3
	Grade Crossings Subtotal			$1,117,073					
	Project Total			$14,154,713	$11,323,770	$2,830,943	$0	FWTA Funding Sources TBD - assume 80% Federal Funding. Quad gate funding to come from NTCOG Partnership 2 Funding	
T-6	East Sylvania to Minnis Drive Double Track	New siding with three bridges	2010	$9,400,000				Third follow-on segment in process of double tracking.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$5,404,295				See separate calculation.	
	Construction Subtotal			$14,804,295					
		Haltom Road	2010	$338,233				Upgrade to Quad Gates. Resurface	D 1, 2, 3
		Elliot Reeder Road	2010	$338,233				Upgrade to Quad Gates. Resurface	D 1, 2, 3
		Carson Road	2010	$349,513				Upgrade to Quad Gates. Resurface	D 1, 2, 3
	Grade Crossings Subtotal			$1,025,979					
	Project Total			$15,830,274	$12,664,219	$3,166,055	$0	FWTA Funding Sources TBD - assume 80% Federal Funding. Quad gate funding to come from NTCOG Partnership 2 Funding	
T-7	Hurst to East Tarrant Double Track	New siding with two bridges	2012	$10,900,000				Follow-on segment in process of double tracking.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$7,452,494				See separate calculation.	
	Construction Subtotal			$18,352,494				FWTA Funding Sources TBD	
		Norwood Drive						To be completed in FY 05 under separate grant/project/contract - See Hurst Siding Extension - T-1.	
		Bell Spur Road	2012	$232,000				Upgrade to Quad Gates. Resurface	D 1, 2, 3
		Greenbelt road	2005	$30,000				Close Road. Install barricades, remove existing signals	A 3
		MotoCross	2012	$365,000				Upgrade to Quad Gates. Resurface. Possibility to close??	D 1, 2, 3 (A 3)
		Mosier Valley	2012	$377,375				Upgrade to Quad Gates. Resurface	D 1, 2, 3
		Calloway Cemetery	2012	$683,000				Upgrade to Quad Gates. Resurface	D 1, 2, 3

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
		Tarrant Main Street	2012	$292,000				Upgrade to Quad Gates	D 1, 2, 3
	Grade Crossings Subtotal			$1,979,375					
	Project Total			$20,331,869	$16,265,495	$4,066,374	$0	FWTA Funding Sources TBD - assume 80% Federal Funding. Quad gate funding to come from NTCOG Partnership 2 Funding	
T-8	East Tarrant to West CentrePort/DFW Station (Highway 360) Double Track	See "comments".	2014	$3,700,000				Last double track segment in Tarrant County. If available and to reduce costs, use existing bridge over Stemmons to go over Highway 360 and then connect new double track west of CentrePort with current double track at East Tarrant. According to COG, TxDOT has no current plans to widen 360 under TRE at this location.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$2,800,000				See separate calculation.	
	Construction Subtotal			$6,500,000				FWTA Funding Sources TBD	
	Project Total			$6,500,000					
TARRANT COUNTY PROJECTS									
	Escalation, Contingency and Soft Costs Total	$29,959,354							
	Construction Subtotals	$85,259,354							
	Grade Crossing Subtotals	$4,977,427	NOTE: Not every Project includes grade crossings						
	Project Totals	$90,236,781							
	Federal Funding	$66,989,425							
	FWTA Funding	$16,747,356							
	DART Funding	$0							
DALLAS COUNTY PROJECTS									
D-1	Lisa-Perkins Double Track Project	New siding with new bridge, replace existing bridge with new bridge, reconstruct Market Center Blvd Grade Crossing	2005	$4,900,000				Project under design, IFB expected to be released April 2005. 12 month construction period. Soft costs included in budget. Project completion will result in elimination of current 30 MPH speed restriction at Market Center Blvd and allow speed on the double track between Medical/Market Center Station and North Junction near Union Station at 59 MPH - definite service enhancement.	A 1, 2, 3, 4 B 1, 2, 3, 4 D 1, 2, 3
	Construction Subtotal			$4,900,000					
	Project Total			$4,900,000	$2,363,000	$0	$2,537,000		
D-2	Beltline Grade Separation Project	New siding from Gilbert Road to Rogers Road on aerial structure. Existing mainline track to be replaced with duplicate aerial structure.	2006	$40,000,000				Complicated funding project with TXDOT, FTA, City of Irving and DART funds involved. Project under design. IFB expected to be released in summer 2005. 36 month construction period. Soft costs included in this estimate. Completion of the project will allow 79 MPH service from West Irving Station to Rogers Road, a distance of 2.4 miles.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Construction Subtotal			$38,892,882					
		Gilbert Road	2007	$250,000				Upgrade to Quad Gates. Included in Beltline Grade Separation Project.	D 1, 2, 3
		Irby Lane	2008	$235,000				Upgrade to Quad Gates. Implement Traffic Preemption. Included in Beltline Grade Separation Project.	D 1, 2, 3
		Rogers Road	2008	$204,000				Upgrade to Quad Gates. Implement Traffic Preemption. Included in Beltline	D 1, 2, 3

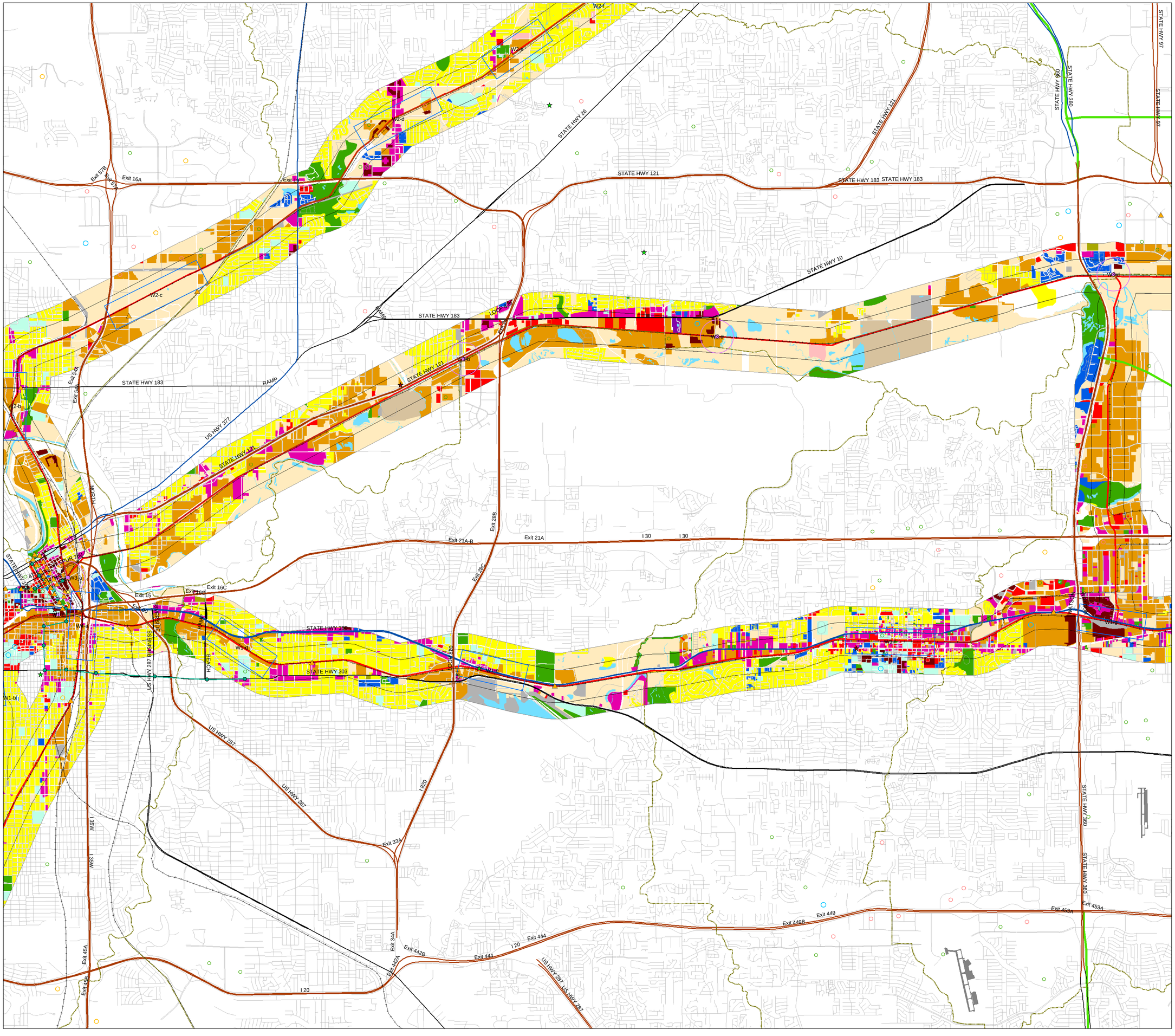
TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
								Grade Separation Project.	
		MacArthur Blvd.	2008	$435,000				Upgrade to Quad Gates. Implement Traffic Preemption. Included in Beltline Grade Separation Project.	D 1, 2, 3
	Grade Crossings Subtotal			$1,124,000					
	Project Total			$40,016,882	$34,415,593	$0	$5,601,289	NOTE: This estimate based on project estimate of January 20, 2005. Final funding sources TBD after final budget agreed upon and participation negotiated among parties involved. $28,788,000 is in DART Financial Plan.	
D-3	West Mockingbird/Regal Row Double Track Project	Connect double track near Regal Row Bridge with West Mockingbird double track. Replace Brookhollow B switch and power new switch. Replace two switches on mainline and relocate switch from Main 2 to freight lead.	2006	$2,500,000				Work originally intended to be done as part of LRT relocation of freight from Dallas Junction. Connection of double track put on hold until those funding issues could be resolved. Completion of project will result in 79 MPH double track service between the South Irving Station and the Stemmons Freeway overpass, a distance of approximately 4.6 miles.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$1,129,175				See separate calculation.	
	Construction Subtotal			$3,629,175					
	Project Total			$3,629,175	$2,080,000	$0	$1,549,175	Federal funds are excess CMAQ funds from Elm Fork Bridge Project.	
D-4	Valley View to W. Irving Station Double Track	Add second track as a complement to the CentrePort/DFW Station Double Tracking	2006	$3,700,000				If not funded as part of CentrePort/DFW Airport (Dorothy Sink) to Valley View Project, this would be the cost. Cost assumes quad gates to be at Valley View and Irving Yard Way. Actual double tracking from Valley View across new bridge (already owned by TRE) at Bear Creek and tie-in to Main 2 line at W. Irving. Upon completion of this project and the CentrePort Project (see J-1 below) and the Beltline Grade Separation Project (see D-2 above), 79 MPH service will be available between the CentrePort/DFW Airport Station and Rogers Road, a distance of 5.3 miles.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$1,700,000				See separate calculation.	
	Construction Subtotal			$5,400,000	$4,320,000	$0	$1,080,000		
		Valley View Lane	2006	$480,000				Upgrade to Quad Gates. Install constant warning time device, improve crossing surface.	D 1, 2, 3
		Irving Yard Way	2006	$239,000				Upgrade to Quad Gates	D 1, 2, 3
	Grade Crossing Subtotals			$719,000	$575,200	$0	$143,800		
	Project Total			$6,119,000	$4,895,200	$0	$1,223,800	NTCOG Partnership 2 Funding	
D-5	Passenger Information System	Project to provide message signs and station communications at Dallas County stations	2006	$3,000,000				Message signs/related communication system needed for Dallas. County stations compatible with Tarrant County stations' system.	E 1, 2
	Project Total			$3,000,000	$2,400,000	$0	$600,000	NTCOG Partnership 2 Funding	
D-6	TRE Track Upgrade Medical & Market Center Area	Track Upgrade Medical & Market Ctr Area	2007	$4,000,000				Track reconstruction and upgrade, signals and crossover - West to East Perkins and Lisa to Turtle Creek. Project will replace track on tight curve between Lisa and Turtle Creek bridge and realign track through Medical Market Center station.	A 1, 3
	Construction Subtotal			$4,000,000					

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
	Project Total			$4,000,000	$3,200,000	$0	$800,000	NTCOG Partnership 2 Funding	
D-7	UP/AMTRAK Connection West of Union Station	See "comments".	2007	$2,000,000				Project will address significant operational impact caused by Amtrak trains leaving and entering Union Station via UP tracks, which are under control of UP dispatch. If delayed in clearing switch, causes delays in TRE passenger on-time service both east and west bound. NOTE: Staff is currently examining project to determine if it can be accelerated and completed less expensively.	A 1 E 3
	Construction Subtotal			$2,000,000					
	Project Total			$2,000,000	$1,600,000	$0	$400,000	NTCOG Partnership 2 Funding	
D-8	Union Station Track Upgrades	Union Station to North Junction	2007	$500,000				Improve ride quality and reduce maintenance from Union Station to North Junction by replacing rail with new 136# rail and concrete ties.	
	Project Total			$500,000	$400,000	$0	$100,000	NTCOG Partnership 2 Funding	
D-9	Rogers Road to South Irving Station Double Track	Add double track between S. Irving Station and double track west of Rogers Road.	2010	$10,220,000				This project will complete double tracking between Rogers Road and the S. Irving Station. Project timing will be dependent upon City of Irving and TXDOT plans at MacArthur Road intersection and Irving Blvd overpass.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Escalation, Contingency and Soft Costs Total			$5,900,000				See separate calculation.	
	Construction Subtotal			$16,120,000					
	Project Total			$16,120,000				Funding TBD - not funded in Financial Plan	
	Project Total			$16,120,000				Funding TBD - not funded in Financial Plan	
D-10	East Mockingbird to West Perkins Double Track	Adds double track - see Comments	2012	Unk				Not included as part of this project list because beyond time frame established. Implementation of this project is contingent upon TxDOT funding and construction of Project Pegasus. Would involve replacement of existing TRE bridges over Stemmon Freeway, Old Channel of the Trinity River, Knight's Creek and Inwood Road.	A 1, 2, 3, 4 B 1, 2, 3, 4
	Construction Subtotal								
	Project Total							Funding TBD - not funded in Financial Plan.	
DALLAS COUNTY PROJECTS									
	Escalation, Contingency and Soft Costs Total	$8,729,175							
	Construction Subtotals	$74,942,057							
	Grade Crossing Subtotals	$1,843,000	NOTE: Not every Project includes grade crossings						
	Project Totals	$80,285,057							
	Federal Funding	$51,353,793	NOTE: Not every Project includes grade crossings						
	FWTA Funding	$0							
	DART Funding	$12,811,264							
JOINT DART AND T PROJECTS									
J-1	CentrePort/DFW Station to Valley View Double Track	See "comments".	2006	$22,500,000				AKA "Dorothy Sink" problem. Project will include double tracking from east of Highway 360 overpass through CentrePort/DFW Station to immediately west of Valley View Lane. Explore extending project across Valley View and Irving Yard Way to current double track at West Irving. This project (to Valley View) is currently under design by FWTA. DART to share in local construction cost match: FWTA to fund design.	A 1, 2, 3, 4 B 1, 2, 3, 4

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
	Construction Subtotal			$22,500,000					
	Project Total			$22,500,000	$18,000,000	$2,250,000	$2,250,000	NTCOG Partnership 2 Funding	
J-2	TRE Train Set Phase I	2 remanufactured locomotives, 3 new bi-level coaches, 1 bi-level cab car	2005	$13,000,000				Procurement process under way: single source for locomotives and utilization of option under New Mexico procurement for Bi-level equipment with Bombardier.	F 1, 3
	Project Total			$13,000,000	$10,400,000	$1,300,000	$1,300,000	Funded in Grant	
J-3	Homeland Security Projects	Risk Assessment, Irving Yard Upgrades, cameras in Tarrant County and unknown projects in Dallas County	2005	$795,000					
	Project Total			$795,000	$795,000	$0	$0	Homeland Security funding through State - 100% funding	
J-4	Corridor Station Enhancements	Shelter improvements at stations. Addition of safety and security elements.	2006	$1,500,000				Provide some level of shelter protection at TRE Stations. 10 stations @ $75,000 each. Estimate will be refined in FY 2005. Enhance safety and security at DART TRE stations.	E 1, 2, 3
	Project Total			$1,500,000	$1,200,000	$150,000	$150,000	$600,000 from NTCOG Partnership 2 Funding for DART Federal Share. FWTA Federal Share to be determined.	
J-5	Train Dispatching Control System		2006	$750,000				Will make TRE dispatching system completely independent of BNSF system. That was the intent of initial agreements and BN is now pushing for this to happen. COG interest could be expandability to other corridors easily if warranted in the future.	F 3
	Project Total			$750,000	$600,000	$75,000	$75,000	$300,000 from NTCOG Partnership 2 Funding for DART Federal Share. FWTA Federal Share to be determined.	
J-6	TRE Planning/Design/Construction Management Services	See "comments".	2006 2007 2008		$1,160,000 $1,000,000 $840,000			This miscellaneous design contract with identified tasks will help identify proper prioritization of projects, provide conceptual design and project estimates, support in federal funding issues, final design on specific projects and construction management services during construction. Will also provide support to DART and FWTA on railroad related issues on other corridors where commuter rail may operate. Calculated at estimate of $1,000,000 per year	F 4
	Project Total			$3,000,000				Financing sources TBD - not in Financial Plan.	
J-7	Locomotive Overhaul	Mid-life overhaul	2007	$2,000,000				Original 4 locomotives that were "rehabbed" by Amtrak and put into service. The estimate is based on 2004 dollars.	F 2
	Project Total			$2,000,000	$1,600,000	$200,000	$200,000	$800,000 from NTCOG Partnership 2 Funding for DART Federal Share. FWTA Federal Share to be determined.	
J-8	Bi-Level Fleet Overhaul	Mid-life overhaul	2007- 2008	$6,250,000				Original 10 bi-level cars rehabbed by Amtrak. The estimate is based on 2004 dollars.	
	Project Total			$6,250,000	$5,000,000	$625,000	$625,000	$2,500,000 from NTCOG Partnership 2 Funding for DART Federal Share. FWTA Federal Share to be determined.	
J-9	TRE Train Set Phase II	6 new bi-level coaches, 1 bi-level cab car	2008	$20,000,000				6 new bi-level coaches, 1 new bi-level cab car required to provide current/expanded service during mid-life overhaul of bi-level fleet and ultimate replacement of remainder of RDC fleet. Total cost is $20,000,000 in 2004 dollars - DART and T share is 10% ($1,000,000) each per ILA, remainder by CMAQ.	F 1, 3
	Project Total			$20,000,000	$18,000,000	$2,000,000	$2,000,000	$9,000,000 from NTCOG Partnership 2 Funding for DART Federal Share. FWTA Federal Share to be determined.	
JOINT DART AND T PROJECTS									
	Construction Subtotals	$22,500,000							

TRE/ Authority Priority	Project Name	Project Description	Project FY	Estimated Project Cost	Federal/ Other Funding	FWTA Funding	DART Funding	Comments	Strategic Assumptions
	Project Totals	$69,795,000							
	Federal Funding	$55,595,000							
	FWTA Funding	$6,600,000							
	DART Funding	$6,600,000							
TOTAL COMBINED PROJECTS									
	Escalation, Contingency and Soft Costs Total	$38,688,529							
	Construction Subtotals	$182,701,411							
	Grade Crossing Subtotals	$6,820,427	NOTE: Not every Project includes grade crossings						
	Project Totals	$240,316,838							
	Federal Funding	$173,938,218							
	FWTA Funding	$23,347,356							
	DART Funding	$19,411,264							

Baseline Land Use Study: Corridor W-3



Legend

- Possible Station Location
- Existing Rail Station
- Existing Rail Station 1/4 mile buffer
- Mobility 2025 Rail Station
- New Stations Existing by 2008
- Fort Worth Trolley Stops
- 250 - 670
- 670 - 1450
- 1450 - 2750
- 2750 - 6250
- 6250 +
- Clide Award Winner
- JV Project - Selected
- JV Project - Not Selected
- Special Generator
- Amtrak stations
- Airport
- Veloweb
- Railroad
- Fort Worth Trolley Line
- Rail Lines Existing by 2008
- Primary Highway
- Secondary Highway
- Major Arterial
- Proposed Freeways and Tollroads
- Minor Arterial
- Regional Rail Corridor

Regional Rail Corridor Buffer

Buffer Distance

- 0.00 - 0.25
- 0.25 - 0.50

Land Use

- Single-family
- Multi-family
- Retail
- Office
- Vacant
- Park and Recreation
- Industrial
- Parking
- Institutional
- Hotel/Motel
- Utilities
- Mobile Homes
- Water
- Landfill
- Under Construction

W-3 Trinity Railway Express
begins in Fort Worth, through Haltom City, Richland Hills, Hurst, Arlington, ends in Fort Worth, 17 miles in length

Potential Station Zone: 1/2 mile wide linear area of variable length based on the area of interest

Area of Interest	Station Status	County	Jurisdiction w/in walking distance of station	Characteristics of Interest	Development Type	Development Style	Future Land Use (comprehensive plan)	Zoning (of vacant land)	Other Comments
W3-a	Existing	Tarrant	Fort Worth	**Station:** ITC Terminal **Infill Opportunities:** built up, no vacant land available **Flood zone:** outside of floodplain	Infill-other development	pedestrian oriented development	mixed-use growth center	MU-1,MU-2	
W3-b	Existing	Tarrant	Richland Hills, Fort Worth, Hurst	**Station:** Richland Hills TRE station **Infill Opportunities:** Proximate to vacant land available for infill development, industrial area, low land will be expensive to develop, on regional veloweb **Flood zone:** outside of floodplain	Infill-other development	hybrid	industrial growth center	all commercial and industrial	
W3-c	Existing	Tarrant	Fort Worth, Hurst	**Station:** Hurst-Bell TRE station **Infill Opportunities:** Vacant land available for infill development, industrial, water, on regional veloweb **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Partially outside floodplain.	Greenfield development	hybrid	light industrial	IP, MU-2,I,PD	
W3-d	Existing	Tarrant	Fort Worth, Grand Prairie, Arlington	**Station:** Centerport TRE station **Infill Opportunities:** Vacant land available for infill development, existing multi-family, on regional veloweb **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Partially outside floodplain.	Greenfield development	hybrid	mixed-use growth center	MU-1,MU-2	

XII. W-4 – CLEBURNE LINE CORRIDOR CONSIDERATIONS

CORRIDOR DESCRIPTION

Rail Corridor W-4 is one of eight rail corridors studied for the feasibility of implementing commuter rail, light rail, or other form of fixed guideway transit service.

Corridor W-4 is a 29-mile corridor extending from the Intermodal Transportation Center and T&P Terminal in Downtown Fort Worth south, paralleling the Burlington Northern Santa Fe (BNSF) main line to the communities of Crowley, Burleson, Joshua, and Cleburne. The corridor also parallels the highway alignments of Interstate Highway 35 (I-35), State Highway 174 (SH-174), and the planned Southwest Parkway.

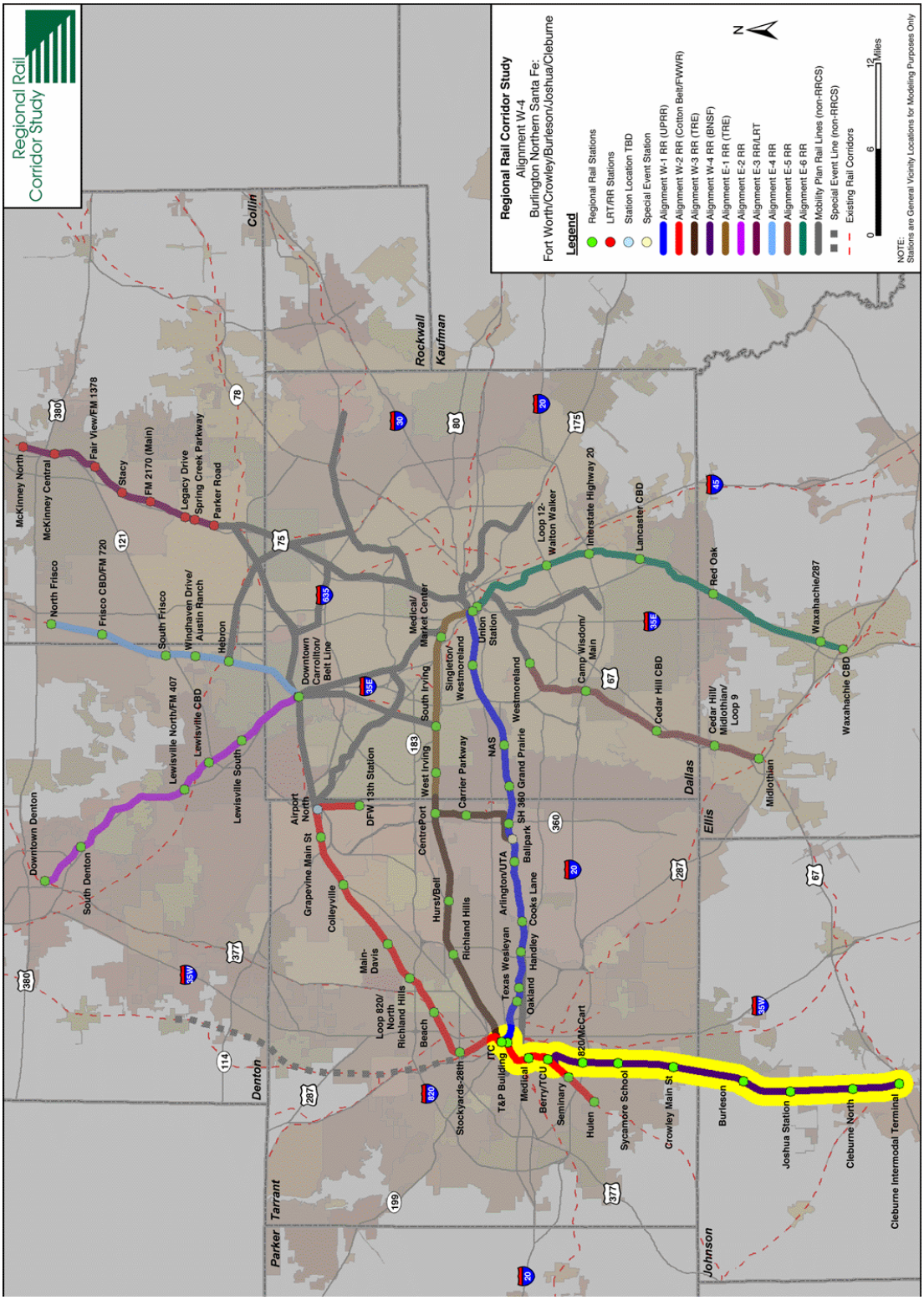
An inspection of the BNSF corridor from Fort Worth to Cleburne was performed on August 29, 2003. The inspection was done by automobile with primary consideration given to railroad-roadway grade crossings, grade separations, bridges, and other accessible locations.

The BNSF owns the railroad right-of-way from Milepost (MP) 344.86 to MP 319 and beyond. The Union Pacific Railroad (UP) owns the right-of-way from MP 344.38 to MP 344.86 and the BNSF has trackage rights to also operate over this section.

The W-4 corridor extends from the T&P Terminal in downtown Fort Worth south to the communities of Crowley, Burleson, Joshua, and Cleburne. The corridor location is shown on a map in Exhibit XII-1.

EXHIBIT XII-1

W-4 CORRIDOR LOCATION MAP



Existing Track Conditions

A fact sheet summarizing the existing conditions and issues for the W-4 corridor is shown in Exhibit XII-2.

EXHIBIT XII-2

W-4 CORRIDOR FACT SHEET

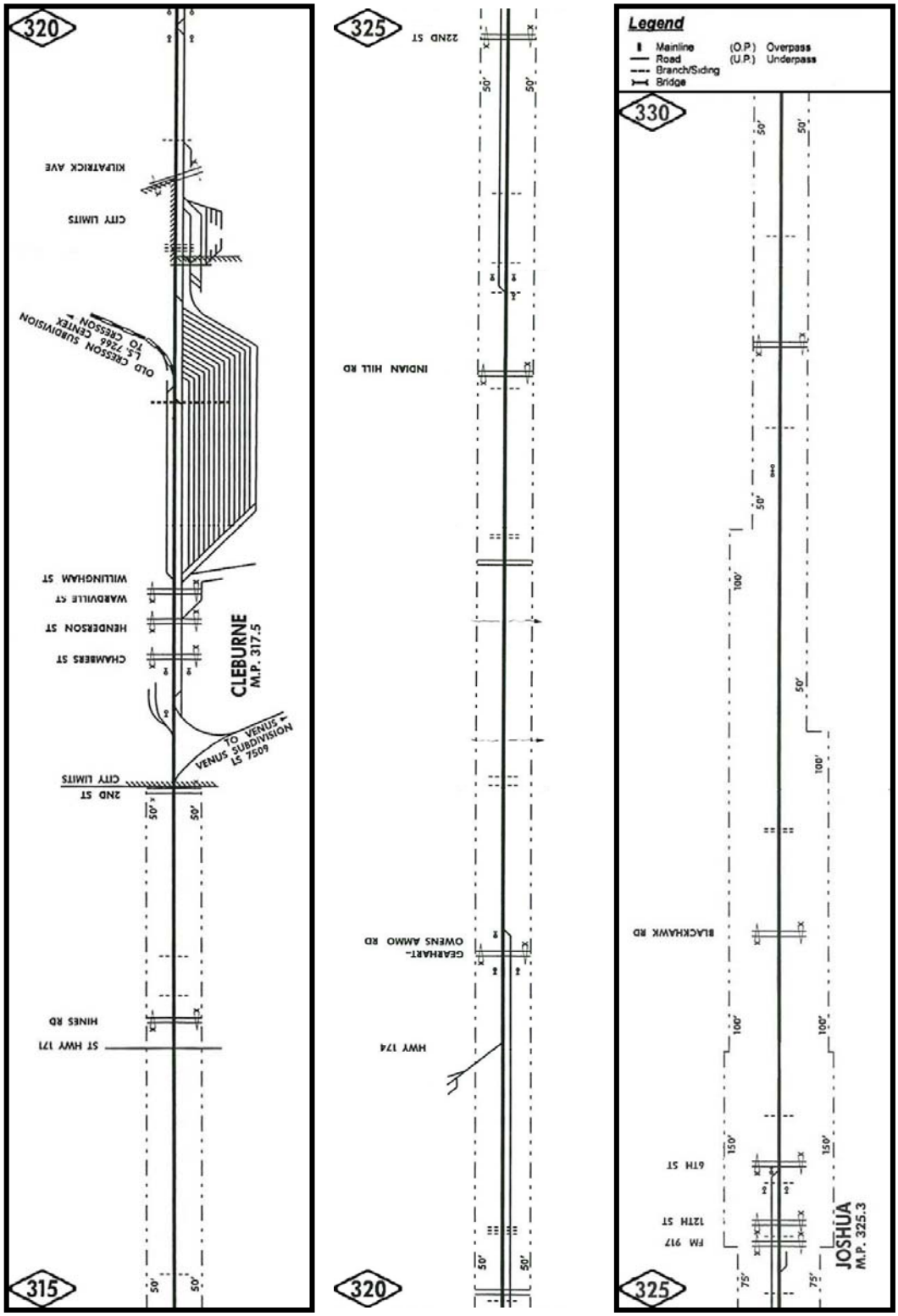
Owner(s) of the line	BNSF
Operator(s) of the line	BNSF
Trackage rights	BNSF operates over UP MP 344.38 to MP 344.86
Length of the corridor	29 Miles
Average trains per weekday	Approximately 27 freight trains.
Track summary	▪ Single track with passing tracks at Cleburne, Joshua, Crowley, Burleson, and Fort Worth. ▪ Maximum operating speed is 79 mph. ▪ BNSF has yards at Cleburne and Fort Worth. ▪ Track is controlled by Centralized Traffic Control signaling.
Railroad crossings	▪ Thirty-one (31) at-grade highway/railroad crossings. ▪ Twelve (12) grade-separated highway / railroad crossings.
Jurisdictions	▪ Cities of Cleburne, Joshua, Crowley, Burleson, and Fort Worth. ▪ Tarrant and Johnson Counties.
Industrial sidings	▪ Johns Manville Products, Rubbermaid
Corridor issues	▪ Hampton Road overpass was under construction at approximate MP 332.0. ▪ Sycamore Strip Airport is located at approximate MP 336.0. ▪ BNSF Main Line from Temple to Fort Worth. ▪ Carries a high volume of freight traffic.

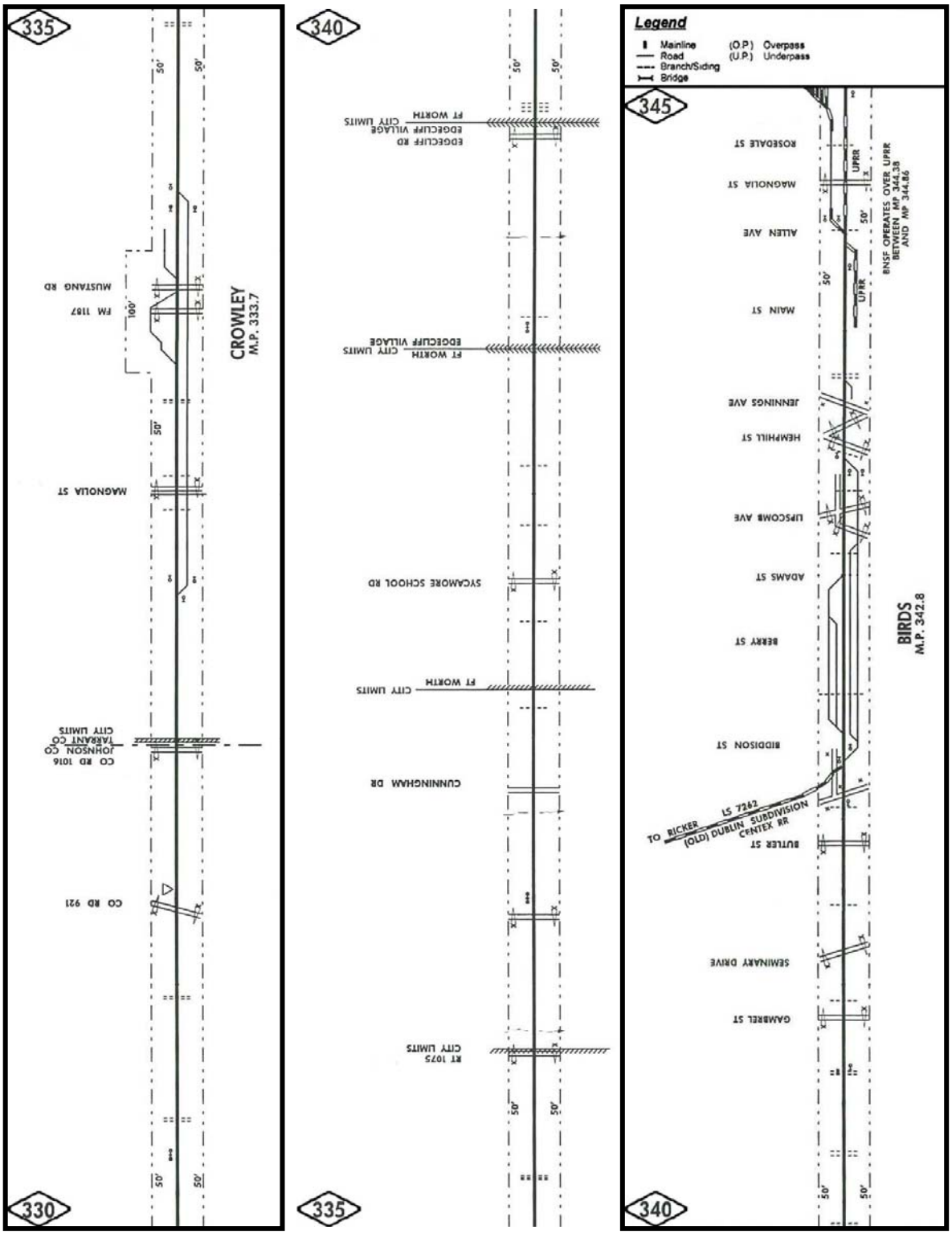
Schematic of the Corridor

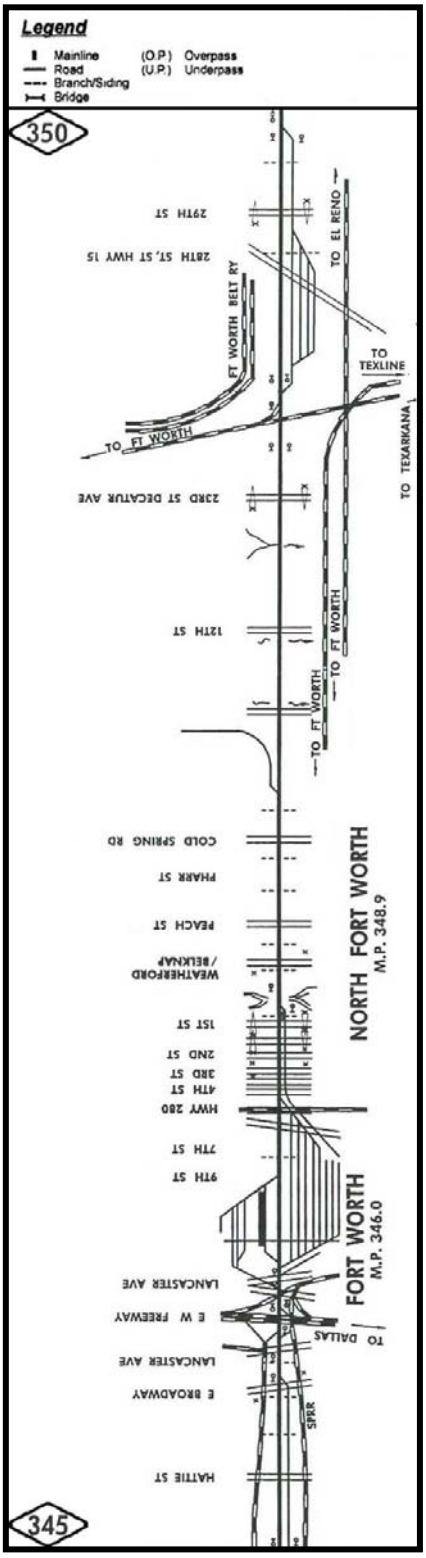
A schematic diagram of the existing rail line in the W-4 Corridor is shown Exhibit XII-3.

EXHIBIT XII-3

W-4 CORRIDOR SCHEMATIC




335
340
345
330
335
340
Legend
Mainline
Road
Branch/Siding
Bridge
(O.P.) Overpass
(U.P.) Underpass
CROWLEY
M.P. 333.7
BIRDS
M.P. 342.8
MUSTANG RD
FM 1187
MAGNOLIA ST
CO RD 1016
JOHNSON CO
TARRANT CO
CITY LIMITS
CO RD 921
FT WORTH
CITY LIMITS
EDGECLIFF VILLAGE
EDGECLIFF RD
SYCAMORE SCHOOL RD
CUNNINGHAM DR
RT 1075
ROSEDALE ST
MAGNOLIA ST
ALLEN AVE
MAIN ST
JENNINGS AVE
HEMPHILL ST
LIPSCOMB AVE
ADAMS ST
BERRY ST
BIDDISON ST
BUTLER ST
SEMINARY DRIVE
GAMBREL ST
UPRR
BNSF OPERATES OVER UPRR
BETWEEN MP 344.38
AND MP 344.86
TO RICKER
LS 7262
(OLD) DUBLIN SUBDIVISION
CENTEX RR


Legend
Mainline
Road
Branch/Siding
Bridge
(O.P.) Overpass
(U.P.) Underpass
350
29TH ST
28TH ST, ST HWY 15
FT WORTH BELT RY
TO EL RENO
TO TEXLINE
TO TEXARKANA
TO FT WORTH
23RD ST DECATUR AVE
12TH ST
TO FT WORTH
TO FT WORTH
COLD SPRING RD
PHARR ST
PEACH ST
WEATHERFORD /BELKNAP
1ST ST
2ND ST
3RD ST
4TH ST
HWY 280
7TH ST
9TH ST
NORTH FORT WORTH
M.P. 348.9
FORT WORTH
M.P. 346.0
LANCASTER AVE
E W FREEWAY
TO DALLAS
LANCASTER AVE
E BROADWAY
SPUR
HATTIE ST
345

DETAILED INFORMATION

This section contains detailed information for the bridges and railroad/highway grade crossings and overpasses located along the W-4 Corridor.

There are 31 at-grade roadway-railroad crossings and 12 grade-separated over/underpasses along the W-4 Corridor between Cleburne and the T&P Terminal in downtown Fort Worth. Existing railroad/highway grade crossings and overpasses are listed in Exhibit XII-4.

EXHIBIT XII-4

RAIL/HIGHWAY CROSSINGS AND OVER/UNDER PASSES

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
319.32	Kirkpatrick Street	Public	Gates/lights/bells/ advanced warning	020442J
320.05	CR 700	Public	Gates/lights/bells	020443R
319.9	US-67	Public	Roadway overpass	
320.6	SH- 174	Public	Roadway overpass	020445E
321.37	Vaughn Road	Public	Gates/lights/bells/ advanced warning	020448A
322.28	CR-903	Public	Gates/lights/bells/ advanced warning	020449G
323.59	Indian Hill Road	Public	Gates/lights/bells/ advanced warning	020450B
324.89	22nd Street	Public	Gates/lights/bells	020451H
325.28	14th Street	Public	Gates/lights/bells/ advanced warning	020452P
325.35	12th Street	Public	Gates/lights/bells	020453W
325.57	6th Street	Public	Gates/lights/bells	020454D
326.46	Black Hawk Road	Public	Gates/lights/bells	020455K
328.70	CR-1021	Public	Gates/lights/bells	020457Y
331.3	CR-921	Public	Gates/lights/bells	020460G
331.95	CR-1016	Public	Gates/lights/bells	020461N
Hampton Road under construction – bridge over railroad				
333.75	FM-1187	Public	Gates/lights/bells/ advanced warning	020464J
333.05	Magnolia Street	Public	Gates/lights/bells	020463C
333.89	Mustang	Public	Gates/lights/bells	020465R
334.3	Industrial Road	Public	Roadway overpass	Unknown
335.71	CR-1075	Public	Gates/lights/bells/ advanced warning	020466X

Milepost	Highway	Public/ Private	Warning Devices	DOT Number
336.25	Risinger Street	Public	Gates/lights/bells	020467E
336.76	Cunningham	Public	Crossbucks	20468L
337.64	Sycamore School Road	Public	Gates/lights/bells/ cantilever/advanced warning	204697
338.61	Alta Mesa Boulevard	Public	Roadway overpass	206626J
339.5	Edgecliff Drive	Public	Gates/lights/bells/ advanced warning	020470M
339.9	Loop I-820	Public	Roadway overpass	020471U
340.88	Gambrel	Public	Gates/lights/bells/ advanced warning	20477K
340.10	Seminary Drive	Public	Gates/lights/bells/ advanced warning	20478S
341.87	Butler Street	Public	Gates/lights/bells/ advanced warning	020479Y
342.13	Biddison	Public	Gates/lights/bells/ advanced warning	020480T
342.7	West Berry Street	Public	Railroad overpass	020482G
343.0	West Lowden	Public	Railroad overpass	020483M
343.23	Lipscomb	Public	Gates/lights/bells/ advanced warning	020484V
343.27	Capps	Public	Gates/lights/bells/ advanced warning	020485C
343.52	Hemphill	Public	Gates/lights/bells/ advanced warning	020486J
343.55	Page	Public	Gates/lights/bells	020487R
343.72	Jennings	Public	Crossbucks/lights	020488X
344.1	Main Street	Public	Railroad overpass	20489E
344.3	Allen Avenue	Public	Railroad overpass	20490X
344.9	Magnolia	Public	Gates/lights/bells/ advanced warning	20491F
344.8	Rosedale Street	Public	Railroad overpass	20492M
345.12	Hattie Street	Public	Roadway overpass	20494B
345.41	Broadway	Closed	None	Old 20495H
345.51	Vickery	Public	Railroad overpass	20496P

Source: Carter & Burgess Inc. 2003

Existing rail bridges in the W-4 Corridor are listed in Exhibit XII-5. There are 57 railroad bridges and culverts along the BNSF between Cleburne and the T&P Terminal in downtown Fort Worth.

EXHIBIT XII-5

RAILROAD BRIDGES AND CULVERTS

Milepost	Bridge Type	Length	Remarks
319.9	Overhead viaduct	Unknown	US-67
320.0	36” concrete box	24’	
320.3	3- 8’ x 8’ reinforced concrete box	40’	
320.6	Overhead viaduct	451’	US-175
322.03	24” concrete pipe	40’	
322.04	24” concrete pipe	40’	
322.2	I-Beam, ballast deck, concrete abutments	80’	
322.6	I-Beam, ballast deck, concrete abutment & piers	90’	
323.0	Double 6’ x 4’ concrete box	26’	
323.6	24” cast iron pipe	24’	
323.8	4’ x 6’ reinforced concrete box culvert	22’	
324.0	48” cast iron pipe	44’	
324.3	9’ x 5’ concrete box	41’	
325.1	36” cast iron pipe	64’	
325.3	24” cast iron pipe	102’	
325.5	24” cast iron pipe	48’	
326.8	Double 48” cast iron pipe	60’	
327.99	2 – deck girder; ballast deck	32’	
328.4	6’ x 5’ concrete box	26’	
329.1	6.5 x 3.5 reinforced concrete box	20’	
330.0	Ballast deck girder	64’	
330.5	Double 6’ x 4’ concrete arch	37.5	
330.9	Double 48” cast iron pipe	36’	
331.9	Ballast deck I – beam	30’	
332.55	Ballast deck girder	48’	
332.9	5’ x 6’ reinforced concrete box	40’	
333.1	24” cast iron pipe	56’	
333.4	12’ x 4’ masonry arch	39’	
334.33	Ballast deck girder	48’	
335.0	2’ x 2’ concrete pipe	26’	
335.2	Triple 48” cast iron pipe	42’	
335.8	Ballast deck I-beam	30’	
336.69	Ballast deck T- rail	56’	Harris Creek
337.5	8’ x 5’ masonry arch	26’	
337.9	30” concrete pipe	24’	
338.1	6’ x 6’ reinforced concrete box	23’	
338.6	Concrete beam overpass	68’	Alta Mesa Road
338.7	36” cast iron pipe	30’	
339.04	Ballast deck girder	48’	
339.6	Triple 48” cast iron pipe	48’	
339.9	Concrete beam overpass	362.5’	Loop I-820

Milepost	Bridge Type	Length	Remarks
340.0	Double 42” cast iron pipe	42’	
340.3	Double 42” cast iron pipe	61’	
340.6	Double 48” cast iron pipe	54’	
341.5	48” cast iron pipe	58’	
342.0	30” cast iron pipe	36’	
342.5	24” reinforced concrete box	88’	
343.0	Reinforced concrete	60’	Adams Street
343.1	30” cast iron pipe	102’	
343.5	18” concrete pipe	77’	
343.8	Double 36” concrete pipes	32.5’	
344.1	Overhead viaduct	Unknown	Allen Avenue
344.4	42” cast iron pipe 36” extension	36’ 26’	
344.78	12’ x 6’ masonry arch	57’	
344.785	Ballast deck pile trestle	105.5	Rosedale Street
345.12	Roadway overpass	Unknown	Hattie Street
345.51	Plate girder on concrete	Unknown	Vickery Street

Source: Carter & Burgess Inc. 2003

Photos Taken in the Corridor

During the automobile inspections of the W-4 Corridor photographs were taken of various features and conditions along the line. Photographs were taken of as many of the bridges, highway crossings, overpasses, underpasses, sidings, track conditions, special conditions or constraints and general right-of-way conditions and features as possible. The photographs taken along the W-4 Corridor between Cleburne and Fort Worth are included at the end of this chapter.

Existing Land Use

A baseline land use survey was conducted by NCTCOG staff at the onset of the Regional Rail Corridor Study. The major focus of this study was to help locate specific areas along the Regional Rail Corridors that possess characteristics that could support the development of a rail station and/or transit-oriented development. Baseline land use

maps and the associated station location information for the corridor may be found following the corridor photographs in this chapter.

INFRASTRUCTURE AND CONSTRAINTS

A number of significant infrastructure issues should be resolved in order to establish regional rail passenger service within this corridor. Identified infrastructure constraints include the following considerations:

- The UP Main Line and the BNSF Main Line intersect at Tower 55, located at MP 245.7 on the UP, just southeast of downtown Fort Worth. Tower 55 is one of the busiest railroad intersections in the United States, with rail traffic volume upwards of 100 trains daily. The Tower 55 railroad intersection is a major bottleneck that must be resolved in order to accommodate current and future rail traffic for both the UP and BNSF Railroads. Relieving the rail traffic congestion at Tower 55 is a larger issue than this Regional Rail Corridor Study that will be addressed through a separate study.
- The physical capacity of the Fort Worth Intermodal Transportation Center and T&P Terminal to accommodate additional regional/commuter rail passenger trains may pose a constraint to future addition of regional rail service utilizing the terminal. Potential improvements to increase the terminal capacity will be to be analyzed in further phases of planning.

Operational Constraints

The operational capacity of the Fort Worth Intermodal Transportation Center and the T&P Station is limited by existing rail facilities and activity including Trinity Railway Express and AMTRAK service.

DEFINITION OF FEASIBLE ALTERNATIVES

The Regional Rail Corridor Study considered three primary types of options for the rail corridors under study. Regional rail, light rail, and bus rapid transit were the primary modes or options considered for development in the corridors in question. A screening process took place for each corridor to determine if all three options were reasonable or if a subset was more appropriate. The discussion of options pertinent to corridor W-4 follows.

Description of Modal Alternatives in Corridor W-4

Regional Rail

The regional rail alternative would provide regional rail passenger service along the BNSF rail line from downtown Fort Worth to Cleburne.

Regional rail passenger stations will be constructed at the approximate locations shown along the alignment. Stations will include commuter parking, passenger drop off and pick up area, and convenient connection to other transit service.

A continuous parallel track will need to be constructed along the existing BNSF alignment providing double track throughout the corridor. Passing tracks will be required at stations and other convenient locations. Turnouts will be located in the main track to serve industrial spurs. Highway/railroad at-grade crossings with minimal crossing protection but high volumes of automotive traffic will have to be improved with the installation of warning devices such as lights, bells, and gates. Drainage improvements and vegetation control will also be required along the line. Exhibit XII-6 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were

evaluated for this modal alternative. Exhibit XII-7 shows the Regional Rail Alternative for the W-4 Corridor.

EXHIBIT XII-6

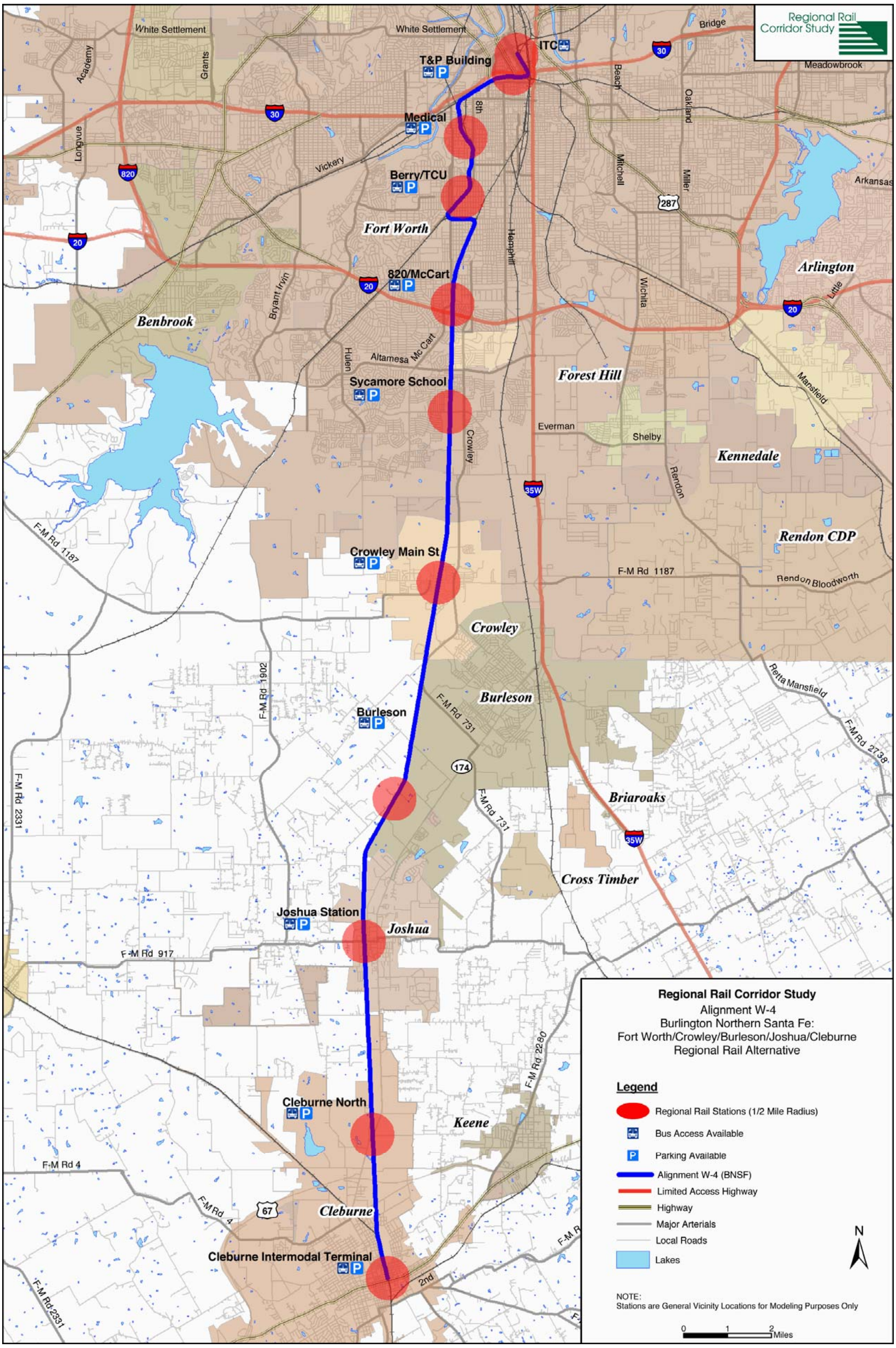
REGIONAL RAIL SERVICE ASSUMPTIONS

Regional Rail (headways = 20 minutes/60 minutes)		
Stations*	**Local Bus**	**Park-and-Ride**
ITC	Yes	No
T&P Building	Yes	Yes
Medical	Yes	Yes
Berry/TCU	Yes	Yes
820/McCart	Yes	Yes
Sycamore School	Yes	Yes
Crowley Main Street	Yes	Yes
Burleson	Yes	Yes
Joshua Station	Yes	Yes
Cleburne North	Yes	Yes
Cleburne Intermodal Terminal	Yes	Yes

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT XII-7

REGIONAL RAIL ALTERNATIVE FOR W-4 CORRIDOR



Light Rail

Light rail is not considered a viable alternative for the W-4 corridor because of the presence of freight rail traffic currently utilizing the existing BNSF tracks within the corridor.

Bus Rapid Transit

BRT was considered between Fort Worth and Burleson in the right-of-way of IH35W and US174. Separation requirements between the BRT and the active BNSF freight track preclude consideration of BRT in the BNSF railroad right-of-way in this corridor. The BRT is proposed to operate in shared high occupancy vehicle (HOV) lanes in the median of I-35W. The HOV lanes on I-35W will consist of one lane in each direction with a loading/unloading lane in each direction at each station. In addition to the BRT buses, automobiles with at least two or three persons would be allowed in the HOV lanes. BRT service in the W-4 Corridor would include separate bus lanes within the highway right-of-way along I-35W and SH-174. The service would utilize clean fuel, low-floor buses with a distinct “brand” identity; prepaid fares; frequent limited-stop scheduling; some grade separations; and transit priority signals for at-grade intersections. Buses would operate in the streets in mixed traffic in the downtown areas of Fort Worth and Cleburne. Other enhancements should include an advanced dispatch system; real time bus arrival and information systems; enhanced bus stops and stations at numerous locations along the corridor; and convenient connections to other transit services. Exhibit XII-8 contains the basic assumptions for stations, feeder bus access, and park-and-ride locations that were evaluated for the W-4 BRT modal alternative. Exhibit XII-9 shows the W-5 Bus Rapid Transit Alternative.

EXHIBIT XII-8

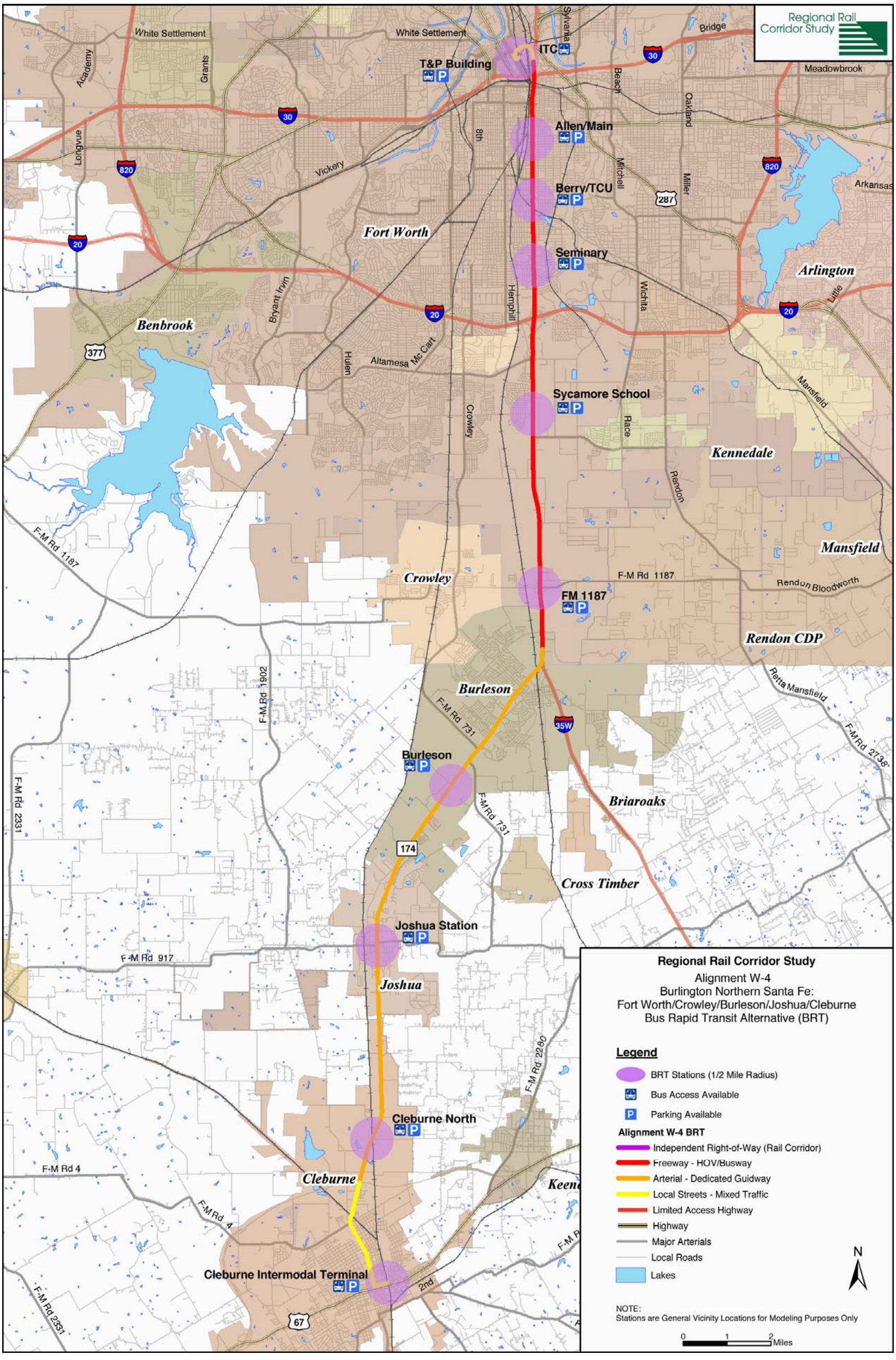
BUS RAPID TRANSIT SERVICE ASSUMPTIONS

Regional Rail (headways = 10 minutes/15 minutes)		
Stations*	**Local Bus**	**Park-and-Ride**
ITC	YES	NO
T & P Building	YES	YES
Allen/Main	YES	YES
Berry/TCU	YES	YES
Seminary	YES	YES
Sycamore School	YES	YES
FM 1187	YES	YES
Burleson	YES	YES
Joshua Station	YES	YES
Cleburne North	YES	YES
Cleburne Intermodal Terminal	YES	YES

* Station locations, feeder bus, and park-and-ride designations are all approximate and would be refined in later phases of study.

EXHIBIT XII-9

BUS RAPID TRANSIT ALTERNATIVE FOR W-4 CORRIDOR



EVALUATION OF ALTERNATIVES

Three different modal alternatives were evaluated for this corridor:

- Regional Rail: No T & P
- Regional Rail: With T & P
- Bus Rapid Transit

In addition to the assumptions related to different technologies and operating characteristics (station locations, headways, operating speeds, and supply of feeder buses at stations) the relationship of the W-4 Corridor to the others in the regional system was also considered.

One of the key evaluation or performance indicators used projected 2030 average weekday ridership. The complete list of performance indicators is found in Chapter II – Corridor Description and Evaluation. In order to streamline the development of travel forecasts for the Regional Rail Corridor Study, the various modal alternatives containing regional or light rail for each corridor were combined into a series of rail system alternatives for forecasting. Several of the corridors also serve travel markets that interact or compete with each other, so it was important to design the system forecasts to minimize this interrelationship as much as possible. Travel demand forecasts for four rail system alternatives were developed initially, along with BRT system alternative maps showing these systems alternatives, are contained in Chapter II of the report.

Ridership Summary

Exhibit XII-10 presents projected average weekday ridership resulting form each of the system alternatives for the W-4 Corridor. (See Chapter II for a complete discussion.) In

Rail System Modeling Alternative 1, the W-4 Corridor was tested as a regional rail line from the ITC in downtown Fort Worth to Cleburne. In Rail System Modeling Alternative 2, the W-4 Corridor was tested again as a regional rail line, but the alignment was altered in and around downtown Fort Worth to accommodate a stop at both the ITC and the T & P Building. The BRT system alternatives included BRT from the ITC in downtown Fort Worth to Cleburne, using HOV lanes in the I-35W Corridor.

To properly stage the recommended alternative, corridor ridership was also generated for the year 2007, measuring the impact of demographics growth on the proposed alternative. The process leads to the identification of corridors worthy of priority implementation.

As explained in Chapter II, the ridership resulting from the rail system modeling alternatives was used to compare the performance of the modal alternatives for a corridor. The best performing option, which for W-4 would be either regional rail or BRT, was then the recommendation for the corridor and, consequently, included in the Final Run Recommended Alternative. Exhibit XII-11 shows the ridership from the Final Run Recommended Alternative as well.

EXHIBIT XII-10

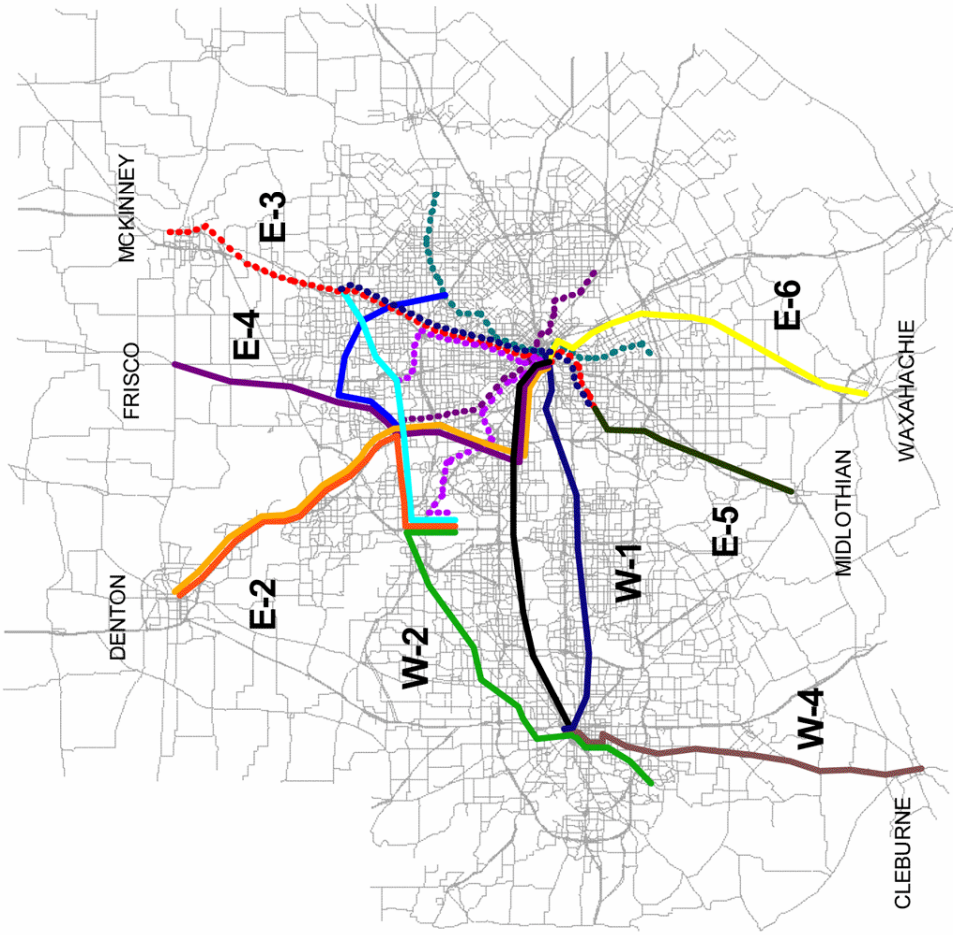
2030 CORRIDOR RIDERSHIP

Travel Forecast	Technology	Average Weekday Ridership
Rail System Alternative 1	Regional rail	6,400
Rail System Alternative 2	Regional rail	5,900
BRT System Alternative	Bus rapid transit	7,200
Final (2007)	*Regional rail*	*3,300**
Final (2030)	*Regional rail*	*5,000**

*Recommended alternative
Source: NCTCOG DFW RTM

EXHIBIT XII-11

REGIONAL RAIL CORRIDOR STUDY - FINAL RUN RECOMMENDED ALTERNATIVE



An important step in transit ridership analysis involves detailed reviews of projected passenger boardings and alightings at each station. Station riders by mode of access (walk, auto, feeder bus, and where applicable, transfers from other rail lines) were reviewed for accuracy and reasonableness. Shortcomings in network design as well as some coding errors can be identified as part of this review. Exhibit XII-12 presents 2007 and 2030 ridership by station for the Final Run Recommended Alternative. Corridor line ridership is the sum of demand at stations along a given line.

EXHIBIT XII-12

FINAL RUN RECOMMENDED ALTERNATIVE BOARDINGS BY STATION

Corridor	Stations	Regional Rail Boardings	
		2007	2030
W-4	ITC Terminal	980	1,440
	T & P Building	340	470
	Medical	300	350
	Berry/TCU	150	220
	820/McCart	290	380
	Sycamore School	680	890
	Crowley Main Street	320	520
	Joshua Station	70	200
	Burleson	50	130
	Cleburne North	30	120
	Cleburne Intermodal Terminal	120	250
	Line Ridership	**3,330**	**4,970**

Source: NCTCOG-DFWRTM-Final Run Recommended Alternative

Performance Evaluation

Each modal alternative considered for the Regional Rail Corridor Study was evaluated with a set of performance indicators. The corridors were scored based upon a five-point system with five indicating a good score and one indicating a bad score. The individual criteria scores were then added to reflect a total score for each alternative, including a performance benchmark representing the overall cost effectiveness of each option.

Exhibit XII-13 contains a summary of the final performance of the W-4 Corridor. The performance benchmark was created for the Regional Rail Corridor Study to normalize the evaluation of each of the corridors with varying lengths, costs and ridership. It is a "cost effectiveness" measure using annualized capital cost, annualized operating cost, and annualized ridership producing a necessary calculation of annual cost per rider. It is very similar to the original FTA cost effectiveness index (CEI). The revised CEI used by FTA in the most recent New Starts Program evaluation includes additional considerations for travel time surveys and user benefits.

EXHIBIT XII-13

PERFORMANCE SUMMARY FOR W-4 CORRIDOR

Evaluation Criteria	W-4 Regional Rail	Score
Performance benchmark (annual cost per annual rider)	$12.49	5
Total daily ridership forecast	5,000	3
One-way trip time (minutes)	52	3
Estimated capital cost (millions)	$229.6M	3
Estimated annual O&M cost (millions)	$15.0M	3
Local authority and funding	None	1
Community acceptance	Communities are open to acceptance of regional rail type service.	5
Ease of implementation	BNSF and FW&W own right-of-way.	4
Connectivity with existing and planned transit operations	Regional rail allows interlining with TRE and transfers with the T.	4
Compatibility with freight railroad operations	Compliant regional rail is compatible with freight railroad operations.	4
Serves area of unmet mobility need	Roadway capacity deficiency low to moderately severe.	2
Impact upon adjacent highways and air quality	Transit benefit to highway is equivalent to one lane in each direction on the adjacent freeway.	4
Transit oriented development potential	TOD potential exists but is likely to develop slowly as on TRE.	3
TOTAL SCORE		**44**

The W-4 Corridor scored 44 points in the overall evaluation. The performance benchmark was $12.49 (score = 5 points), based on a total daily ridership forecast of 5,000 daily riders (score = 3 points). The costs for the corridor include an annual operating and maintenance cost of $15.0 million (score = 3 points) and a total capital cost for development of regional rail in this corridor of $229.6 million (score = 3 points). Estimated trip time to travel one way, the length of the corridor is 52 minutes (score = 3 points). The project has local authority involvement on the northern end of the corridor and the communities along the rest of the corridor appear to be open to regional rail service (score = 5 points), but has no existing transit authority or funding designated for it at this time (score = 1 point). The right-of-way must be negotiated with the BNSF and FW&W railroads (score = 4 points). Use of FRA-compliant regional rail technology in the corridor will make it compatible with freight operations (score = 4 points) and allow for interlining with Trinity Railway Express (score = 4 points). The roadway capacity deficiency in the parallel corridor is moderately severe (score = 2 points) and the ridership generated is equivalent to one lane of vehicular traffic in each direction. This provides a good benefit to air quality (score = 4 points). Transit oriented development is likely to develop slowly in this corridor, as has been shown in the Trinity Railway Express corridor (score = 3 points).

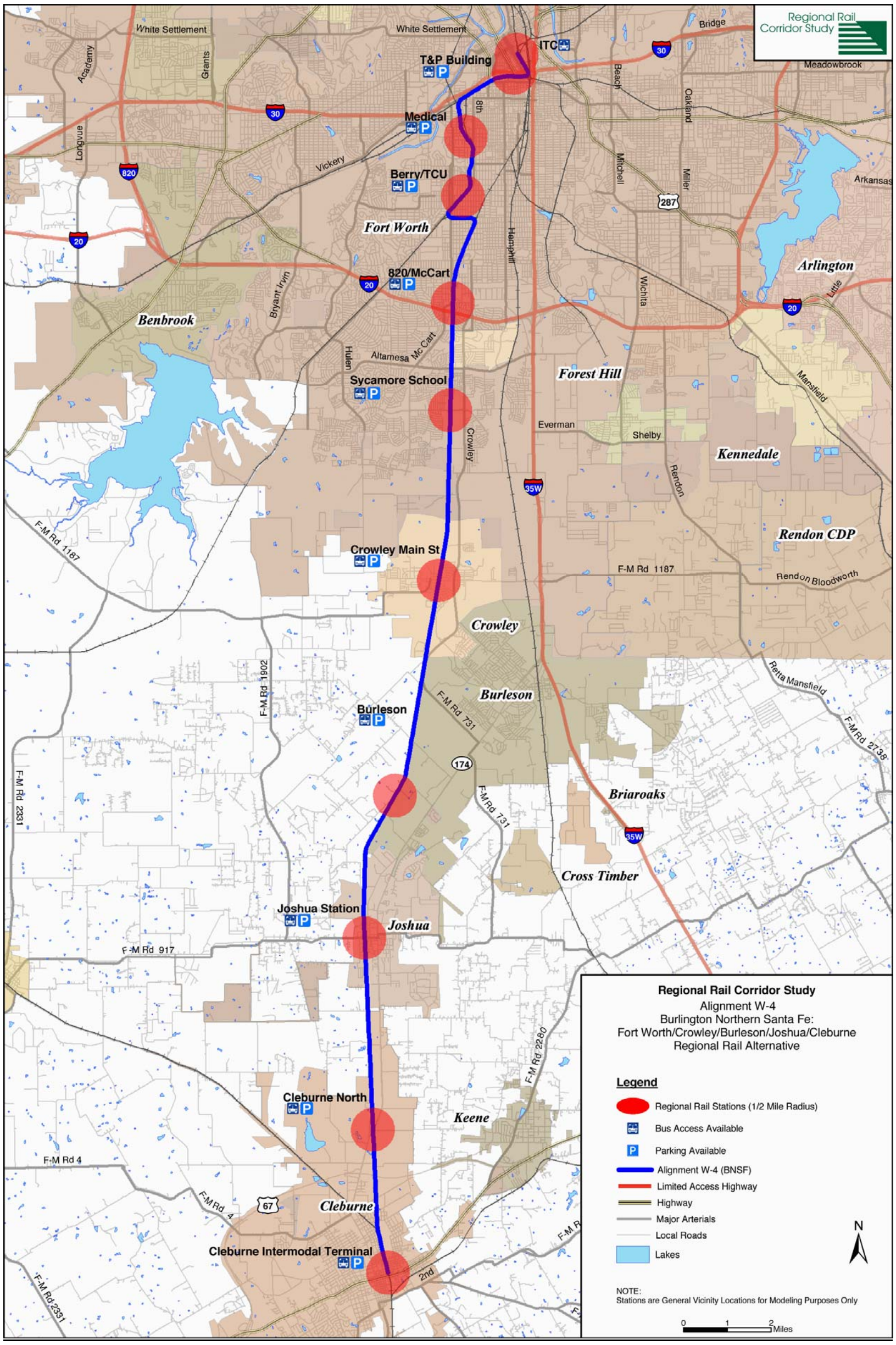
CORRIDOR RECOMMENDATIONS

The final recommendation for the W-4 Corridor is shown in Exhibit XII-14. The service would be regional rail operating from downtown Fort Worth to Cleburne. The station locations shown in the map are for planning purposes only and would be refined as a more detailed Alternatives Analysis study of the corridor is conducted.

The W-4 Corridor was in the mid-range of scores resulting from the performance indicator analysis, as compared to the other RRCS corridors. The 2007 ridership estimates were reasonably high, indicating a need for potential near-term (5-10 years) rail service north of Sycamore School Road, with phased service to the south. The decision to implement regional rail in this corridor should be part of a future Alternatives Analysis.

EXHIBIT XII-14

FINAL RECOMMENDATION FOR THE W-4 CORRIDOR



W-4: BURLINGTON NORTHERN SANTE FE:

FORT WORTH/CROWLEY/BURLESON/JOSHUA/ CLEBURNE

PHOTOGRAPHS

Looking North on Wardville St.

Looking West at Henderson Bridge

Looking West at Willingham

Looking West at Kirpatrick

Looking East at Hwy 67

Looking West at CR700

Looking West at Vaughn

Looking West at CR903

Looking South on bridge at MP 322.6

Looking at the west elevation of bridge at MP 322.6

Looking South at Indian Hills Rd.

Looking South at 22nd St.

Looking South at 14th St.

Looking South at 12th St.

Looking South at 6th St.

Looking South at Blackhawk.

Looking South at CR1021

Looking East at bridge at MP 330.0

Looking South at CR921

Looking South at CR1016

Construction of bridge over railroad at Hampton

Looking South at FM 1187

Looking at Masonry Arch bridge

Looking South at Magnolie

Looking South at Mustang

Looking South at CR 1075

Looking South at Risinger

Looking South at Cunningham

Looking at west bridge elevation on MP 336.7

Looking South at Sycamore School Rd.

Looking North at Altamesa Blvd. Overpass

Looking South at Edgecliff

Looking South at Gambrel

Looking South at Seminary

Looking South at Butler St.

Looking South at Biddison

Looking at west bridge elevation of West Berry

Looking at east bridge elevation of West Louden

Looking South at Lipscomb

Looking South at Capps

Looking South at Hemphill & Page

Looking South at Jennings

Looking North at bridge MP 344.1 & 344.3

Looking South at Magnolia

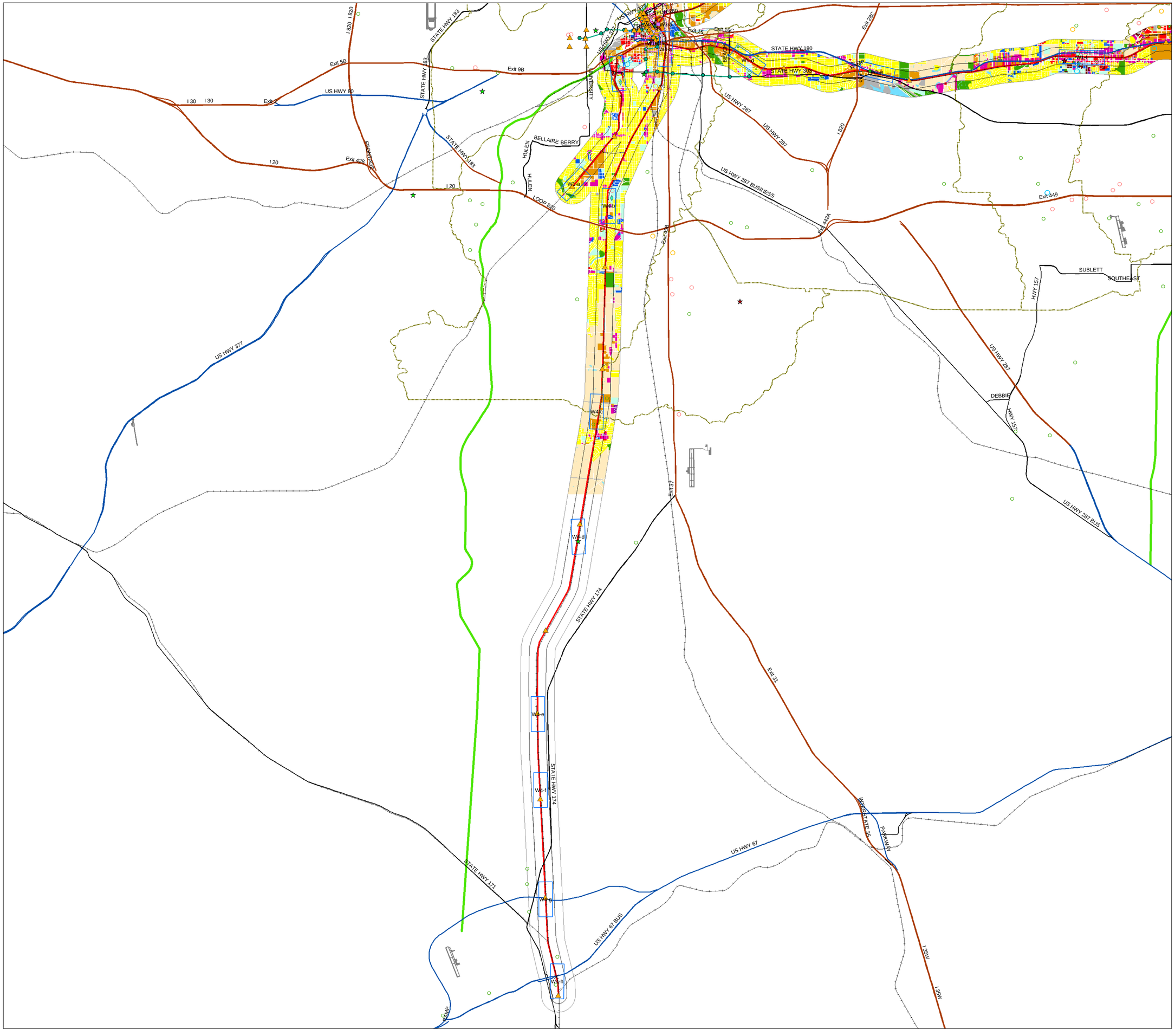
Looking at west railroad bridge elevation at Rosedale

Looking North at Hattie

Looking East on Broadway

Looking at west railroad bridge elevation on Vickery

Baseline Land Use Study: Corridor W-4



Legend

- Possible Station Location
- Existing Rail Station
- Existing Rail Station 1/4 mile buffer
- Mobility 2025 Rail Station
- New Stations Existing by 2008
- Fort Worth Trolley Stops
- 250 - 670
- 670 - 1450
- 1450 - 2750
- 2750 - 6250
- 6250 +
- Clide Award Winner
- JV Project - Selected
- JV Project - Not Selected
- Special Generator
- Amtrak stations
- Airport
- Veloweb
- Railroad
- Fort Worth Trolley Line
- Rail Lines Existing by 2008
- Primary Highway
- Secondary Highway
- Major Arterial
- Proposed Freeways and Tollroads
- Regional Rail Corridor

Regional Rail Corridor Buffer

Buffer Distance

- 0.00 - 0.25
- 0.25 - 0.50
- Single-family
- Multi-family
- Retail
- Office
- Vacant
- Park and Recreation
- Industrial
- Parking
- Institutional
- Hotel/Motel
- Utilities
- Mobile Homes
- Water
- Landfill
- Under Construction

W-4 Burlington Northern Santa Fe
begins in Cleburne, north through Joshua, Burleson, Crowely, ends in Fort Worth, 29 miles in length

Potential Station Zone: 1/2 mile wide linear area of variable length based on the area of interest

Area of Interest	Station Status	County	Jurisdiction w/in walking distance of station	Characteristics of Interest	Development Type	Development Style	Future Land Use (comprehensive plan)	Zoning (of vacant land)	
W4-a	Proposed	Tarrant	Fort Worth	**Employment within walking distance of the site:** N/A **Current land uses:** single-family, industrial, retail, T&P station-TRE line **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** I30, US hwy 287, state hwy 180, I35W **Flood zone:** outside of floodplain Site was modeled for a station in the Mobility 2025 Plan	Infill-other development	pedestrian oriented development	mixed-use growth center	MU-1,MU-2	
W4-b	Proposed	Tarrant	Fort Worth	**Employment within walking distance of the site:** Texas Dept. of Transportation (430), Southwestern Baptist Theological Seminary (840) **Current land uses:** single-family, institutional, multi-family, retail **Vacant land:** possibly adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** hwy I20 **Flood zone:** outside of floodplain	Infill-other development	pedestrian oriented development	single-family residential	AR, A-5,A-7.5,A-10	
W4-c	Proposed	Tarrant	Crowley	**Employment within walking distance of the site:** Harbison-Fischer Manufacturing (300), Aztec Inc. (400) **Current land uses:** single-family, industrial **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** regional veloweb **Flood zone:** Partially within the 100 year floodplain - opportunity for green space.	Greenfield development	hybrid			
W4-d	Proposed	Johnson	Burleson	**Employment within walking distance of the site:** N/A **Current land uses:** no land use coverage, but orthophoto shows vacant land **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** Burleson joint venture project **Site accessible via:** N/A **Flood zone:** outside of floodplain Site was modeled for a station in the Mobility 2025 Plan	Greenfield development	pedestrian oriented development			
W4-e	Proposed	Johnson	?	**Employment within walking distance of the site:** N/A **Current land uses: no land use coverage, but** orthophoto shows low density single-family and vacant land **Vacant land:** adequate for station and transit oriented development **Located within walking distance:** **Site accessible via:** proximate to state hwy 174 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space.	Greenfield development	hybrid			

W4-f	Proposed	Johnson	Cleburne	**Employment within walking distance of the site:** N/A **Current land uses:** N/A **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** proximate to state hwy 174 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Greenfield development	hybrid			
W4-g	Proposed	Johnson	Cleburne	**Employment within walking distance of the site:** none **Current land uses: no land use coverage, but orthophoto shows** vacant land **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** US hwy 67, state hwy 174 **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Greenfield development	hybrid			
W4-h	Proposed	Johnson	Cleburne	**Employment within walking distance of the site:** Gunderson Southwest (250), Rangaire (250) **Current land uses:** Amtrak station **Vacant land:** adequate for station and transit oriented development **Located with in walking distance:** N/A **Site accessible via:** US hwy 67 Bus, state hwy 174, BNSF railroad **Flood zone:** Partially within the 100 year floodplain - opportunity for green space. Site was modeled for a station in the Mobility 2025 Plan	Infill-other development or greenfield development	hybrid			

WESTERN CORRIDOR COST ANALYSIS (W-4)

REGIONAL RAIL CORRIDOR STUDY										Alignment W-4	Option 1	FW&W Bypass
North Central Texas Council of Governments										Link Number:	Summary	
Parametric Cost Estimate										Link Description:		
										Start Sta:		
										End Sta:		
			Regional Rail				Light Rail			Link Length:	160,844	
Description		Unit	Unit Cost	Quantity	Cost	Subtotals	Unit Cost	Quantity	Cost	Subtotals		Remarks
Site Work & Urban Design												
	Earthwork, 1 Track, Major	MI	$1,500,000									
	Earthwork, 1 Track, Basic	MI	$500,000	24.76	$12,380,000							
	Earthwork, 2 Tracks, Major	MI	$2,500,000				$3,500,000					
	Earthwork, 2 Tracks, Basic	MI	$750,000									
	Earthwork, Reconstruct Existing Track	MI	$100,000									
	Urban Design/Signage/Landscaping	MI	$250,000	30.46	$7,615,000		$750,000					
	Environmental Mitigation (Includes noise and vibration)	MI	$100,000	30.46	$3,046,000		$100,000					
	Relocate Hike/Bike Trail	MI	$1,400,000				$1,400,000					
	Subtotal					**$23,041,000**						
Trackwork												
	New Track, 136# CWR	MI	$1,000,000	30.46	$30,460,000		$1,850,000					
	Upgrade Track to Class 4	MI	$500,000									
	Paved Embedded Track (Double)	MI	$4,000,000				$5,600,000					
	New Single Track #1 Relay Rail	MI	$800,000									
	New Turnout #10	EA	$125,000				$125,000					
	New Turnout #15	EA	$200,000	1.00	$200,000		$200,000					
	New Turnout #24	EA	$250,000	6.00	$1,500,000		$250,000					
	Rebuild Turnout or Diamond	EA	$75,000									
	New Railroad Diamond Crossing	EA	$200,000									
	Subtotal					**$32,160,000**						
Structures												
	Elevated Track	TF	$3,000				$3,000					
	Tunnel	TF	$10,000				$10,000					
	New Bridge (Minor)	TF	$4,500				$4,500					
	New Bridge (Major)	TF	$6,500	614.00	$3,991,000		$6,500					
	Reconstruct Existing Bridge	TF	$2,500				$2,500					
	Retaining Wall (0 FT - 10 FT High)	TF	$175				$175					
	Retaining Wall (10 FT - 20 FT High)	TF	$525				$525					
	New Culvert	EA	$10,000	57.00	$570,000		$10,000					
	Rehabilitate Culvert	EA	$5,000	7.00	$35,000		$5,000					
	Subtotal					**$4,596,000**						
Stations												
	At-grade Station	EA	$650,000	10.00	$6,500,000		$2,800,000					
	Aerial Station (LRT)	EA					$4,600,000					
	Depressed Station (LRT)	EA					$15,000,000					
	Parking Spaces/Surface Lot	EA	$4,000	5000.00	$20,000,000		$4,000					
	Service and Layover Facility	EA	$2,000,000	1.00	$2,000,000		$50,000					
	Central Maintenance Facility Contribution	EA	$1,000,000	1.00			$2,000,000					
	Subtotal					**$28,500,000**						
Traction Electrification System (LRT)		MI					$1,600,000					
Signal System												
	Communications System (LRT)	MI					$1,100,000					
	New Railroad Interlocking	EA	$1,500,000									
	Modify Railroad Interlocking	MI	$750,000									
	New CTC/LRT Signaling System	MI	$1,200,000				$2,300,000					
	Upgrade Railroad Signal System	MI	$600,000	30.46	$18,276,000							
	Subtotal					**$18,276,000**						
R.O.W. & Y Junction												
	R.O.W. Allowance	ACRES										
Utilities												
	Utilities Allowance	MI	$200,000	29.96	$5,992,000	**$5,992,000**	$400,000					
Crossings / Roadway												
	Minor Street At-grade (Gates & Warning Devices)	EA	$150,000	5.00	$750,000		$150,000					
	Minor Street At-grade (w/ Quad Gates System & Warning Devices	EA	$250,000	39.00	$9,750,000		$250,000					
	Major Street At-grade (Gates & Warning Devices)	EA	$450,000	2.00	$900,000		$450,000					
	Reconstruct Existing Roadway Bridge	EA	$1,000,000				$1,000,000					
	Reconstruct Existing Roadway	SY	$40				$40					
	Construct New Roadway	SY	$80				$80					
	Highway/Railroad Grade Separation	EA	$8,000,000				$8,000,000					
	Subtotal					**$11,400,000**						
Special Conditions												
	Property Damages	LS	$1,500,000									
	Subtotal											
	Subtotal W-4					**$123,965,000**						
	MIS Level Design Contingency (15% of W-4)	15%				$18,594,750						
	Construction Contingency (10% of W-4)	10%				$12,396,500						
	Add-on Allowance (Eng., CM, etc) (15% of W-4)	15%				$18,594,750						
Rail Vehicle Train Sets (actual without contingencies)		EA	$8,000,000	7.00	$56,000,000	$56,000,000	$9,000,000					
	Grand Total W-4					**$229,551,000**						
	Cost per Mile					**$7,535,434**						
NOTE:	1. Unit Costs are expressed in present value dollars.											
	2. Retaining Wall Unit Cost is for one side only.											
	3. Cost estimate excludes ROW costs.											

Annualized Cost Estimate (W-4)

Regional Rail Corridor:	**W-4**	**Option 1**	**FW&W Bypass**					Regional Rail Corridor:	W-4	Option 1
Annualized Capital Cost		Daily Riders:	5,000		0			Cost Category Summary		
		Annualized Riders:	1,550,000		0					
			Regional Rail	Regional Rail	Light Rail	Light Rail			Regional Rail	Light Rail
	Useful	Annualization	Total Cost ($mil)	Annualized	Total Cost ($mil)	Annualized			Total Cost ($mil)	Total Cost ($mil)
Cost Category	Life (yr)	Factor	(Incl. Contingency)	Cost ($mil)	(Incl. Contingency)	Cost ($mil)		Cost Category	(Incl. Contingency)	(Incl. Contingency)
Site work and Urban Design	100	0.070	$32.257	$2.258	$0.000	$0.000		Site work and Urban Design	$40.646	$0.000
					(Not Applicable for this corridor)					
Trackwork	30	0.081	$45.024	$3.647	$0.000	$0.000		Trackwork	$45.024	$0.000
Structures	30	0.081	$6.434	$0.521	$0.000	$0.000		Structures	$6.434	$0.000
Stations	20	0.094	$39.900	$3.751	$0.000	$0.000		Stations	$39.900	$0.000
LRT Electrification System	30	0.081	$0.000	$0.000	$0.000	$0.000		LRT Electrification System	$0.000	$0.000
Signal System	30	0.081	$25.586	$2.072	$0.000	$0.000		Signal System	Incl with Crossings/Roadway	
Right-of-Way	100	0.070	$0.000	$0.000	$0.000	$0.000		Right-of-Way	Not Applicable	
Utilities	20	0.094	$8.389	$0.789	$0.000	$0.000		Utilities	Incl with Site Work & Urban Design	
Crossings / Roadway	20	0.094	$15.960	$1.500	$0.000	$0.000		Crossings / Roadway	$41.546	$0.000
Special Conditions	20	0.094	$0.000	$0.000	$0.000	$0.000		Other	$0.000	$0.000
Vehicles	25	0.086	$56.000	$4.816	$0.000	$0.000		Vehicles	$56.000	$0.000
Total			$229.551	**$19.354**	$0.000	**$0.000**		Total	$229.551	$0.000
Performance Benchmark				**12.49**						
Notes:										
1. Annualized Riders = Daily Riders times 310 days per year.										
2. Performance Benchmark = Annualized Cost divided by Annualized Riders.										

GLOSSARY OF TERMS

ABS – Automatic Block Signals. A railroad operation where the movement of trains through designated blocks is governed by automatic block signals activated by the presence of trains.

AMT – Amtrak (National Railroad Passenger Corporation).

BNSF – Burlington Northern and Santa Fe Railway Company.

Consist – The composition of the complete train excluding the locomotive. The cars in a train.

Cotton Belt – See SSW.

Crosstie or Tie – The crosswise member of the track structure that holds and supports the rails of a track.

CTC – Centralized Traffic Control. A railroad operation where the movement of trains is directed by signals controlled from a designated central point.

DART – Dallas Area Rapid Transit.

DCTA – Denton County Transportation Authority.

DGNO – Dallas Garland & Northeastern Railroad, Inc.

DMU – Diesel Multiple Unit. A self-propelled passenger car used in commuter, regional, or intercity rail service and equipped with its own diesel power plant(s). Can be operated in multiples, with several cars controlled from the lead car. DMU's are essentially the revival of the RDC.

FRA – Federal Railroad Administration. A modal agency of the U. S. Department of Transportation with jurisdiction over matters of railroad safety and research.

FRA Track Safety Standards – Track safety standards for Classes 1-5 are established by 49 CFR Park 213, Subpart 8F. Class 1 has a **maximum** speed of 10 mph for freight and 15 mph for passenger traffic.

Frog – A track structure used at the intersection of two running rails in a turnout to provide support for wheels and passageways for their flanges, thus permitting wheels on either rail to cross the other.

FWWR – Fort Worth and Western Railroad. Also operates Tarantula steam-powered excursion train.

Hi-rail – A truck or automobile with retractable flanged wheels so it may be used either on the highway or the railroad track.

Interlocking – A point on a railroad line where one or more routes converge or cross, requiring that signals displayed to trains are interlocked to avoid conflicts in the movement of trains using those routes.

Jct – Junction. A point where two railroad lines meet, usually with provision for operating trains from one line to the other.

KCS – Kansas City Southern Railroad.

Main Line or Main Track – The primary or most heavily used track of a railroad extending through yards and between stations of a major route.

MP – Milepost. A post or marker along a railroad right-of-way indicating the distance in miles to or from a given point.

OMT – Other Than Main Track. Secondary or branchline trackage not on a major route of a railroad over which trains are operated at restricted speed.

Push-pull – A passenger train consist that can be controlled from either the locomotive or a cab control car at the opposite end of the consist. When in the pull mode, the locomotive is pulling the consist; in the push mode, the locomotive is pushing the consist.

Rail Weight or Rail Section – The weight, in pounds, of a three-foot section of new rail, as for example, 115# rail (115 pounds per yard of length) and 136# rail (136 pounds per yard of length).

RDC – Rail Diesel Car. A self-propelled passenger car used in commuter or intercity rail service and equipped with its own diesel power plant. Can be operated in multiple(s),

with several cars controlled from the lead car. RDC's were manufactured by the Budd Company in the 1950's and early 1960's.

Siding or Passing Track – A track auxiliary to the main line for meeting or passing trains.

Spur Track – A track extending out from a main line or a siding, usually used for rail service to a customer's facility.

SSW – St. Louis Southwestern Railroad, also known as the Cotton Belt, now part of the Union Pacific Railroad Company.

Tie or Crosstie – The crosswise member of the track structure that holds and supports the rails of a track.

Trackage Rights – The right of one carrier to use track owned by another carrier pursuant to an agreement between them.

TRE – Trinity Railway Express (owned by Dallas Area Rapid Transit and Fort Worth Transportation Authority).

Turnout – A track arrangement (that includes a switch, rails, and a frog) that permits a diverging route from one track to another track.

TWC – Track Warrant Control. A railroad operation where the movement of trains through designated sections, or limits, of track is governed by verbal instructions issued

from a designated central point that are written and verified by a designated member of a train or maintenance crew.

Ultrasonic Inspection – A method of inspection for internal defects in rail using ultrasonic sound waves and electronic measuring equipment. Other means of providing a continuous search for internal defects in rail may also be used.

UP – Union Pacific Railroad Company.

Yard – A system of auxiliary tracks used for classifying, assembling, storing, and / or repairing railroad cars and equipment.

Yard Limit – Designated limits for a yard within which train and other movements are made at restricted speed and controlled locally rather than from a central point.