Regional Tolling Analysis for the Dallas-Fort Worth Metropolitan Planning Area based on Mobility 2035 – 2013 Update

Prepared by:

North Central Texas Council of Governments

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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 benefit, 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 **238 members**, including 16 counties, 169 cities, 22 independent school districts, and 31 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 **6.5 million**, which is larger than 38 states.

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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 US Department of Transportation, Federal Highway Administration, and Federal Transit Administration.

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1.0 INTRODUCTION

The purpose of this document is to evaluate the effects of proposed expansion of the regional priced facility system in the Dallas-Fort Worth region based on the improvements included in *Mobility 2035: The Metropolitan Transportation Plan for North Central Texas – 2013 Update* (*Mobility 2035 – 2013 Update*). The implementation of the regional priced facility system has the potential to affect land-use, air quality, and environmental justice populations.

Potential effects from large, regional transportation projects are considered throughout the planning and development process from the long-range plan to construction. Assessing the impacts at the long-range, system-, and project-level provides a greater understanding of how a project may impact a community on a macro and micro level (see Table 1).

Table 1. Levels of Analysis

Analysis	Metropolitan Transportation Plan (*Mobility 2035 – 2013 Update*)	Regional Priced Facilities	National Environmental Policy Act (NEPA)
Scope	All projects proposed in Mobility 2035 – 2013 Update on a regional level	All new priced facilities proposed in Mobility 2035 – 2013 Update on a regional level	Project/corridor specific analysis
Results	Impacts on regional mobility and accessibility of proposed projects	Regional impacts on communities with the addition of all priced facilities	Localized impacts on a community due to the construction and operation of a project

The following sections provide the context of the existing and planned transportation system, and assess the potential effects. The study area for this analysis is the 12-county Dallas-Fort Worth metropolitan planning area (MPA) and includes Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties.

2.0 CONTEXT OF THE TRANSPORTATION SYSTEM

This section discusses the process for developing the regional transportation system in the Dallas-Fort Worth area as a function of demographics, funding, and performance.

2.1 METROPOLITAN TRANSPORTATION PLAN DEVELOPMENT

The North Central Texas Council of Governments (NCTCOG) serves as the metropolitan planning organization (MPO) for transportation for the Dallas-Fort Worth MPA. The Regional Transportation Council (RTC) is the independent transportation policy body of the MPO and is comprised of elected officials and appointed staff representing the counties, municipalities, and transportation providers [Dallas Area Rapid Transit (DART), the Fort Worth Transportation Authority (The T), Denton County Transportation Authority (DCTA), Texas Department of Transportation (TxDOT), North Texas Tollway Authority (NTTA), etc.] in the region. MPOs have the responsibility of developing and maintaining a metropolitan transportation plan (MTP). The MTP is a federally mandated plan. At a minimum, the MTP must be updated every four years in air quality nonattainment areas and must maintain a 20-year planning horizon. It identifies transportation needs; guides federal, state, and local transportation expenditures; and is the basis for project specific studies. The MTP is developed in coordination with the public, local governments, transit authorities, TxDOT, NTTA, Federal Highway Administration (FHWA), and Federal Transit Administration (FTA).

Federal transportation regulations require the MTP to be fiscally constrained; only projects that can be constructed under reasonable funding assumptions are contained in the multi-year plan.

The MTP must also meet other federal regulations for planning requirements and air quality. For example, the Clean Air Act Amendments (CAAA) requires that transportation plans for all nonattainment areas to be in conformity with the State Implementation Plan (SIP) for air quality to demonstrate that projects in the MTP and transportation improvement program meet air quality goals. Moreover, the Dallas-Fort Worth region is classified as a transportation management area (population over 200,000) so the MTP must include a congestion management process (CMP) to address congestion.

The development of the current MTP for Dallas-Fort Worth, *Mobility 2035 – 2013 Update,* was guided by the nine goals listed in Table 2. The goals, adopted by the RTC as part of the MTP, represent the Dallas-Fort Worth regional commitment to a comprehensive, cooperative, and continuous transportation planning process for a balanced transportation system by recognizing the evolving transportation and air quality needs of the region. *Mobility 2035 – 2013 Update* can be viewed at http://www.nctcog.org/trans/mtp/2013Update.asp.

Table 2. *Mobility 2035 – 2013 Update* Goals

Mobility	Quality of Life	System Sustainability	Implementation
• Improve the availability of transportation options for people and goods. • Support travel efficiency measures and system enhancements targeted at congestion reduction and management. • Assure all communities are provided access to the regional transportation system and the planning process.	• Preserve and enhance the natural environment, improve air quality, and promote active lifestyles. • Encourage livable communities which support sustainability and economic vitality.	• Ensure adequate maintenance and enhance the safety and reliability of the existing transportation system. • Pursue long-term sustainable revenue sources to address regional transportation system needs.	• Provide for timely project planning and implementation. • Develop cost-effective projects and programs aimed at reducing the costs associated with constructing, operating, and maintaining the regional transportation system.

Source: *Mobility 2035 - 2013 Update*, Chapter 1, June 2013

Mobility 2035 – 2013 Update was developed amidst growing concerns about increasing congestion, reduced air quality, and the lack of financial resources to fund many needed transportation projects and programs. To maximize the effective use of available funds, a prioritization process was followed to maximize the existing transportation system before investing strategically in infrastructure improvements (see Figure 1). This is done by first investing in the maintenance of the existing infrastructure and improving the management and operations of existing facilities; removing trips from the system; and improving land-use/transportation connections. Lastly, investments are identified in strategic infrastructure to induce a switch to transit and increased auto occupancy. Only after maximizing the operational capacity of the existing transportation system are additional capacity and/or new location projects such as toll roads or tax-supported highways considered.

Many issues are considered during the MTP development process, such as impacts to system safety and security, effects on environmental justice populations, and potential effects to the natural environment. This approach is consistent with the CMP requirements included in 23 Code of Federal Regulations (CFR) 500.109. This regulation requires a systematic process be included in the MTP to manage traffic congestion, provide information on transportation system performance, consider alternative strategies for alleviating congestion, and enhance the mobility of persons and goods to levels that meet state and local needs.

2.2 DEMOGRAPHICS

Historically, Texas has been one of the fastest growing states in the nation. The Dallas-Fort Worth region has become the fourth most populous area of the nation. According to the US Census Bureau, Texas added 4.3 million persons between 2000 and 2010, a 21 percent increase in population (see Table 3). By comparison, the US population grew by 27.3 million persons between 2000 and 2010, an increase of 10 percent. During this same time period, the Dallas-Fort Worth MPA grew to 6.4 million persons, a 23 percent increase in population since 2000. The Dallas-Fort Worth region has sustained a long period of population and economic growth because of three primary factors: a favorable business climate, attractive tax policies, and an abundance of available land. These conditions are expected to remain and the regional population is expected to be over 9.8 million people by 2035.

Table 3. Demographics

Area	1970	1980	1990	2000	2010	2035
Population						
12-County MPA	2,425,927[1]	3,030,053[1]	4,013,418[1]	5,197,317[1]	6,417,704[1]	9,833,378[2]
% Change		25%	32%	29%	23%	53%
State of Texas	11,196,730[1]	14,229,191[1]	16,986,510[1]	20,851,820[1]	25,145,561[1]	33,789,697[3]
% Change		27%	19%	23%	21%	34%
US	203,211,926[1]	226,545,805[1]	248,709,873[1]	281,421,906[1]	308,754,538[1]	389,531,000[4]
% Change		11%	10%	13%	10%	26%
% Minority						
12-County MPA	20%[1]	24%[1]	30%[1]	40%[1]	48%[1]	52%[3]
State of Texas	31%[1]	34%[1]	40%[1]	47%[1]	54%[1]	60%[3]
US	17%[1]	20%[1]	25%[1]	30%[1]	35%[1]	46%[4]
Median Household Income						
12-County MPA	$8,563[1]	$18,478[1]	$32,596[1]	$49,277[1]	$59,093[5]	na
% Change		114%	76%	51%	20%	
State of Texas	$8,490[1]	$16,708[1]	$27,016[1]	$39,927[1]	$48,286[5]	na
% Change		97%	62%	48%	21%	
US	$9,590[1]	$16,841[1]	$30,056[1]	$41,094[1]	$50,221[5]	na
% Change		76%	78%	40%	20%	
HHS Poverty Level (family of four)[8]	$3,800	$6,230	$12,700	$17,050	$22,050	na
% Poverty						
12-County MPA	12.1%[1]	10.4%[1]	11.6%[1]	10.8%[1]	11.8%[5]	na
State of Texas	14.6%[1]	14.7%[1]	17.7%[1]	15.4%[1]	17.1%[5]	na
US	10.7%[1]	12.4%[1]	12.8%[1]	12.4%[1]	14.3%[5]	na
Employment						
12-County MPA	1,191,902[6]	1,792,408[6]	2,534,340[6]	3,191,576[2]	4,045,726[2]	6,177,016[2]
State of Texas	3,625,000[7]	5,851,300[7]	7,101,300[7]	9,431,600[7]	10,353,200[7]	na
US	71,006,000[7]	90,528,000[7]	109,487,000[7]	131,785,000[7]	129,819,000[7]	na

Sources:
1. US Census 1970, 1980, 1990, 2000, 2010
2. NCTCOG 2040 Demographic Forecast
3. Texas State Data Center and Office of the State Demographer
4. US Census Bureau Population Projections
5. US Census Bureau Small Area Income and Poverty Estimates
6. Woods & Poole Economics, Inc., 2007
7. US Bureau of Labor and Statistics
8. US Department of Health and Human Services, Annual Statistical Supplement

As shown in Table 3, over time the minority population has grown at a higher rate than the overall population for the State of Texas and the US. Based on current trends in birth rates and migration patterns, this trend is expected to continue into the future. Historic census data shows the dramatic climb in the minority population since 1970. Based on the Texas State Data Center projections, non-white populations will be the majority of the overall regional population by the year 2020.

In 1970, the median household income for the MPA was below the US level and just slightly above the average for the State of Texas; however, the average income level was over twice the US Department of Health and Human Services (HHS) poverty guideline. From 1970 to 2010, the median income continued to rise and is higher than the levels for Texas and the US. During this same time, the poverty rate has fluctuated between 10.4 and 11.8 percent but was lower than state and national averages.

The dramatic growth that has occurred, and is projected to occur, will continue to have implications on mobility for the region. This could translate into congestion, negative air quality impacts, and an overall decrease in the quality of life unless appropriate improvements are made to the regional transportation system.

2.3 FUNDING

There are a number of revenue sources available to build and maintain the system; however, many revenue streams for transportation are restricted to certain uses – this means that only particular types of improvements can be funded with a given source. Some funding sources also require local matching money; due to the current economic situation local entities may be unable to provide the required monies.

2.3.1 Roadways

The primary source of surface transportation funding has historically been the federal Highway Trust Fund (HTF). The HTF is funded by federal taxes on motor fuels, trucks, and tires and is used to fund highway and transit projects. None of the funds collected through these federal taxes are dispersed from the HTF without congressional authorization through the passage of transportation legislation.

Changes in oil prices, the economy, US Environmental Protection Agency (EPA) mandated fuel efficiency increases, and an aging transportation infrastructure have all had major impacts on the HTF. Revenues have been down two percent annually since 1998 while spending has increased four percent annually since 1998. Most of the revenue coming into the account is not inflation protected and has not been increased since the early 1990s; therefore, the buying power has decreased substantially. The federal gasoline tax has been set at 18.4 cents per gallon of gasoline since 1993 and is not indexed for inflation. Between 1990 and 1997 increases to the gas tax were partially used for deficit reduction. The HTF is virtually depleted and Congress has put money into the account from the general fund since 2008 to keep it solvent.

Moving Ahead for Progress in the 21st Century (MAP-21) is the current funding and authorization bill that governs federal surface transportation spending. MAP-21 guaranteed states a minimum rate of return based on the federal motor fuels tax revenue collected. The disbursement formulas in MAP-21 yield varying rates of return to the states, with some states receiving a greater percentage of their contributions to the HTF in return. Other states, including Texas, are net donors to the HTF. On average, Texas receives 70.1 cents for every dollar paid into the HTF (see Table 4).

Table 4. Transportation Funding in Texas

Federal Gas Tax 18.4¢ per gallon	
Returned to Texas for Highways	70.1%
Returned to Texas for Transit	7.6%
Sent to Other States	22.3%
State Gas Tax 20.0¢ per gallon	
Public Education	24.5%
TxDOT	37.5%
Other Non-Transportation Uses (i.e., other state agencies)	27.5%
TxDOT Proposition 14 Debt Service	7.5%
State Comptroller Collection Expenses	3.0%

Source: TxDOT, March 2013

In addition to the federal gasoline tax, Texas has a state gasoline tax which has been set at 20 cents per gallon since 1991 and is not indexed for inflation. However, only 45 percent of state gasoline tax collected helps fund transportation projects (see Table 3). Compared to other states, Texas ranks 40th in the amount of state gasoline and excise tax charged per gallon (as of April 28, 2013). New York has the highest state tax at 50.5 cents per gallon and Alaska has the lowest (eight cents per gallon) with the national average at 30.6 cents per gallon.

Innovative funding tools were made available by Congress in Intermodal Surface Transportation Efficiency Act (ISTEA), Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), MAP-21, and the Texas State Legislature (House Bills 3588 and 2702). State legislation [including House Bill (HB) 3588 and HB 2702] have provided innovative tools for TxDOT, NTTA, and public-private partnerships through Comprehensive Development Agreements (CDAs) to finance, build, and operate tollways and managed facilities. The legislation also enables toll bonds, concession fees, and excess revenues to fund supplemental roadway projects that are either adjacent to those new corridors or of greatest need in the TxDOT districts where the corridors are constructed. Senate Bill 792 expanded the powers of local transportation authorities to develop toll projects and ensures Texas will continue to build needed roads. It also allowed TxDOT to issue $3 billion in bonds to borrow against future gas tax revenue. This provision allows TxDOT to use these bonds as toll equity for state toll roads.

Population increases and traffic demand have outpaced traditional funding sources (e.g., gas tax, vehicle registration). Additionally, more fuel-efficient vehicles have reduced the amount of gas tax collected. Challenged with modest transportation funding, relative to identified needs and growth, the Dallas-Fort Worth region has tried to optimize the use of limited transportation funds through innovative financing tools. By using the alternative funding mechanisms previously mentioned, much-needed transportation infrastructure can be implemented faster than if the region relied solely on traditional funding sources.

2.3.2 Transit

Transit is largely funded by the local sales taxes that are collected within the given service area of the transit authority. The sales tax varies among the three transit providers (DART, The T, and DCTA). Table 5 provides a current funding sources summary for transit providers in the region and the cities within the service area. In addition to funding through a one cent dedicated sales tax, DART has added limited express bus services to transit rail stations from the City of Mesquite and the City of Arlington (both non-member cities) through funding agreements that do not include a dedicated funding source.

Table 5. Dedicated Transit Funding Sources

Agency	Type of Funding Source	Amount	Service Area Cities
DART	Sales tax	1.000¢	Addison, Carrollton, Cockrell Hill, Dallas, Farmers Branch, Garland, Glenn Heights, Highland Park, Irving, Plano, Richardson, Rowlett, and University Park
The T	Sales tax	0.500¢	Blue Mound, Fort Worth, and Richland Hills
		0.375¢	Grapevine
DCTA	Sales tax	0.500¢	Denton, Highland Village, and Lewisville

Many of the large capital transit rail projects implemented by DART have received federal funding through the FTA. The FTA discretionary New Starts Program is the primary federal financial resource for supporting local transit guideway capital investments. However, this program is not formula-based. Individual projects must compete with other projects throughout the nation for limited funds. The New Starts Program is primarily funded through the HTF.

In addition to these three major transportation providers, smaller services are operated in the region:

- McKinney Avenue Transit Authority (MATA) – operates a downtown Dallas trolley line on a fixed track within the existing street.
- Las Colinas Area Personal Transit (APT) – operates a two-car system on a fixed guideway that serves the area's commercial businesses from 10:30 am to 2:00 pm Monday through Friday
- Texoma Area Paratransit System (TAPS) Public Transit – provides curb-to-curb public bus service that operates in Collin County (24 cities including rural Collin County) and Wise County (10 cities).

2.3.3 Other Modes

Funding for other transportation improvements like bicycle and pedestrian facilities and congestion management strategies could come from roadway, transit, and/or local funds. TxDOT published a memorandum in March 2011 outlining their commitment to proactively plan, design, and construct facilities to safely accommodate bicyclists and pedestrians.

2.3.4 Mobility 2035 – 2013 Update Selected Revenue Scenario

During the development of *Mobility 2035* three revenue scenarios (Status Quo, Statewide Enhanced, Statewide Enhanced + Local Option) were considered. These scenarios illustrated possible financial conditions for the regional transportation system based upon potential actions taken or not taken by the federal, state, or local governments. After evaluating historic trends, the current state of transportation funding, and the plausibility of future funding, the RTC selected the $101.1 billion Statewide Enhanced + Local Option scenario to represent the financially constrained revenue forecast for *Mobility 2035*. This scenario was over $44 billion less than the previous MTP, *Mobility 2030: The Metropolitan Transportation Plan for the Dallas-Fort Worth Area, 2009 Amendment*. *Mobility 2035 – 2013 Update* reduced the available revenue over the life of plan by an additional $2.4 billion. The reduction in funds (from $101.1 billion to $98.7 billion) represents a shorter time for the plan (two years less) and the completion of several projects.

The Statewide Enhanced + Local Option scenario assumes both the state and federal gas tax would be increased, state gas tax would be indexed to fuel efficiency, and local transportation funding initiatives would be implemented. Local funding initiatives could be project based, such as toll and managed lanes, or they could be tax or fee based, such as an increase in vehicle registration fees. The fees from the local revenue initiatives would only be assessed in the 12-county MPA and would be used to leverage additional funds for projects of high importance within the region.

2.4 TRANSPORTATION SYSTEM PERFORMANCE

Over the past 30 years, vehicle miles of travel (VMT) has continued to increase in the Dallas-Fort Worth area and across the US. Increased VMT is the result of several factors:

- Population and employment growth
- Increased automobile ownership
- Increased single-occupant vehicle travel
- Increased number and length of trips due to continued suburbanization

Based on data from *Urban Mobility Report* published by The Texas A&M Transportation Institute (TTI), Figure 2 shows the increase in daily VMT in the Dallas-Fort Worth urban area compared to public transportation miles-traveled, population, and annual congestion costs. Overall, daily VMT and congestion cost have increased faster than the population since 1982.

The *Urban Mobility Report* also ranks the level of traffic congestion occurring on highways in major metropolitan areas (as defined by the US Census Bureau). This ranking includes a travel time index. The travel time index is a ratio of travel time in the peak period to travel time at free flow conditions. In 2011, the travel time index for the Dallas-Fort Worth-Arlington urbanized area was 1.26 (i.e., a 20-minute free-flow trip takes 25.2 minutes in the peak period). This ranks Dallas-Fort Worth as the 10th most congested metropolitan area in the US with an estimated annual congestion cost of $3.58 billion in 2011.

There are a variety of quantifiable system performance measures provided from the NCTCOG Dallas-Fort Worth Expanded Regional Travel Model (DFX) that can be used to identify and measure the extent and duration of roadway traffic congestion. These performance measures were also used to evaluate system performance. Table 6 summarizes the roadway system performance for the existing 2013 system and proposed 2035 system. Despite a 45.1 percent increase in population and 43.9 percent increase in employment, the projects and programs listed in *Mobility 2035 – 2013 Update* would only result in a 13.8 percent increase in congestion levels compared to 2013 levels. Figures 3 and 4 show congestion levels in 2013, 2035 no build condition, and 2035 with *Mobility 2035 – 2013 Update* improvements.

Table 6. Regional Performance Summary

Performance Measure	2013	*Mobility 2035 – 2013 Update*
Population	6,778,201	9,833,378
Employment	4,292,516	6,177,016
Vehicle Miles of Travel per weekday	181,476,933	282,469,249
Hourly Capacity (Miles)	42,615,841	51,271,137
Vehicle Hours Spent in Delay (Daily)	1,164,213	2,518,324
Percent Increase in Travel Time Due to Congestion	32.1%	45.9%
Annual Cost of Congestion (Billions)	$4.7	$10.2

Source: *Mobility 2035 – 2013 Update*, Exhibit 7.1, June 2013

3.0 PLANNED TRANSPORTATION ACTIONS

As previously mentioned, *Mobility 2035 – 2013 Update* is a blueprint for transportation improvements in the Dallas-Fort Worth area through 2035. Figures 5 and 6 show the planned roadway (including priced facilities) and passenger rail systems for the region in 2035. Priced facilities are defined as roadway facilities that charge a toll for some or all vehicles to use the facility, and include toll roads, express/HOV (high occupancy vehicle), and tolled managed lanes. Table 7 shows a summary of the roadway and passenger rail system. Approximately 1,659 lane-miles of priced lanes would be added to the transportation system by 2035. In comparison, about 4,736 lane-miles of non-priced capacity would be added to the system with almost 16 percent of this new capacity being freeway mainlanes. The transit system (excluding bus service) would be expanded by almost 370 miles; a 252 percent increase.

Table 7. Summary of Transportation System

Function Classification	Lane-Miles			Percent Change	Percentage of Total Lane-Miles (2035)
	2013	2035	Difference		
Freeway	4,506	5,198	692	15.4%	9.8%
Major Arterial	6,798	8,462	1,664	24.5%	15.9%
Minor Arterial	12,457	13,725	1,268	10.2%	25.8%
Collector	18,162	18,239	77	0.4%	34.3%
Access Ramp	1,024	1,312	288	28.1%	2.5%
Frontage Road	3,015	3,900	885	29.4%	7.3%
HOV	138	0	-138	-100.0%	0.0%
Total Non-Priced Lanes	**46,100**	**50,836**	**4,736**	**10.5%**	**95.6%**
Tollway	657	1,628	970	147.8%	3.1%
Express/HOV and Tolled Managed	0	688	688	∞	1.3%
Total Priced Lanes	**657**	**2,316**	**1,659**	**252.5%**	**4.4%**
Grand Total	**46,757**	**53,152**	**6,395**	**13.7%**	**100.0%**
Mode	**Transit-Miles**			**Percent Change**	**Percentage of Total Miles (2035)**
	2013	**2035**	**Difference**		
Regional Rail	33.6	195.6	162.0	482.1%	38.1%
Light Rail	84.6	94.6	10.0	11.8%	18.4%
Light Rail (New Technology)	21.0	134.0	113.0	538.1%	26.1%
High Speed Rail	0.0	71.0	71.0	∞	13.8%
Streetcar	0.0	3.0	3.0	∞	0.6%
Bus Rapid Transit	7.0	13.8	6.8	97.1%	2.7%
Automated People Mover	0.0	2.0	2.0	∞	0.4%
Total	**146.2**	**514**	**367.8**	**251.6%**	**100.0%**

Source: NCTCOG, June 2013

The planned 290 miles of regional and light passenger rail and 113 miles of light rail (new technology) account for the majority of the improvements. Light rail is identified as transit along dedicated tracks and could run within a street system. The system is completely electrical with shorter intervals between trains (typically 10 to 20 minutes) and condensed station spacing (typically 0.5 to two miles). Light rail systems are typified by DART's existing light rail lines. Light rail (new technology) is a new "hybrid" type system that bridges the gap between commuter rail and light rail. Engines are either diesel, electrical, or both. Light rail (new technology) can run on dedicated track or share track on freight railroad corridors and may potentially run on both existing light rail and freight rail tracks. Light rail (new technology) has longer intervals between trains (typically 20 to 40 minutes) and spacing between stations (three to five miles). An example of a light rail (new technology) corridor is the proposed Cotton Belt Corridor.

In a rapidly growing region that has limited resources available to improve the existing transportation system, planning efforts have shifted from expansion to maintaining and operationally enhancing the existing system. The total cost of implementing the transportation improvements in *Mobility 2035 – 2013 Update* is estimated at $98.7 billion in year of expenditure (YOE) dollars. Table 8 shows the costs by component included in the MTP.

Table 8. Cost Estimate for *Mobility 2035 – 2013 Update*

MTP Component	Costs in YOE Dollars (Billions)	Percentage
Infrastructure Maintenance	$28.9	29.3%
Management and Operations Strategies	$4.8	4.9%
Growth, Development, and Land-Use Strategies	$3.9	4.0%
Public Transportation	$15.6	15.8%
Freeway, Tollway, Express/HOV, Tolled Managed Lanes, and Arterial System	$45.5	46.1%

Source: *Mobility 2035 – 2013 Update*, Exhibit 2.3, June 2013

3.1 ROADWAY SYSTEM

For the roadway system, the 2013 transportation network for the Dallas-Fort Worth region (calculated in lane-miles) consists of 46,757 lane-miles of roadways with freeways, tollways, and HOV lanes comprising 11.3 percent of the system (see Table 7). Of the total 2013 system, the freeway lanes account for 4,506 of the lane-miles (9.6 percent) and 657 of the lane-miles are tolled (approximately 1.4 percent). The anticipated 2035 transportation network for Dallas-Fort Worth would consist of approximately 53,152 lane-miles of roadways with freeway, tollway, express/HOV, and tolled managed lanes comprising 14.1 percent of the system. Of the total system in 2035, the freeway lanes account for 5,198 of the lane-miles (9.8 percent) and priced facilities (toll roads, express/HOV, and tolled managed lanes) account for approximately 2,316 additional lane-miles or 4.4 percent (see Figure 7).

Priced facilities are divided into three categories in *Mobility 2035 – 2013 Update*: tollways, express/HOV, and tolled managed lanes. Traditional tollways, such as the Dallas North Tollway, operate on a fixed schedule and fixed rate toll rate. Any roadway user will pay a set fixed rate that does not change by time of day or occupancy. Tollways do not offer discount tolls for HOV users nor does it try and maintain a target operational speed. Express/HOV lanes, such as the future IH 30 East HOV lanes, offer fixed toll rates but change by the time of day and occupancy. Express/HOV lanes will always offer a 100 percent discount to all HOV users and toll rates for single occupancy vehicles (SOV) would be set to maintain a speed of 50 mph though the lanes. Tolled managed lanes, such as the new LBJ Express TEXpress lanes, are separate lanes within a highway where the toll rate changes throughout the day based on congestion. Tolled managed lanes will offer a discount to HOV users only during peak periods and would guarantee a 50 mph speed through the lanes. Potential refunds to the tolled managed lane traveler (i.e., individual user) could occur if the 50 mph average is not maintained; however, rebates will not apply if speed reduction is out of the control of the operator. Table 9 details the comparison of the different priced facilities that would be in use during the region to 2035. For more information on the RTC policies governing these types of facilities, see Section 3.1.1.

Table 9. Comparison of Priced Facility Variations

Priced Facility Variation	Schedule	Price	HOV[1,2]	Speed Targets	Examples
Tollway	Fixed	Fixed	No Discount	None	DNT, PGBT
Express/HOV	Dynamic	Fixed	Free	50 mph	Future IH 30 East HOV
Tolled Managed	Dynamic	Dynamic	50% Discount (peak period only)[2]	50 mph guaranteed	TEXpress (LBJ), DFW Connector

Note: [1] HOV is considered 2+ occupancy. A 3+ occupancy is expected to be implemented on or before June 1, 2016 per current RTC policy
[2] The 50 percent discount for HOVs using tolled managed lanes would be phased out after the air quality attainment maintenance period.

The increase in the percentage of priced facilities is a reflection of the construction of several new location tollways and the addition of tolled managed lanes on existing freeways. Existing general purpose freeway lanes would not be converted to priced lanes and newly added general purpose lanes would not be tolled. Table 10 and Figures 5 and 7 show the major planned roadway projects included in *Mobility 2035 – 2013 Update*. For priced facilities, the type of tolling (fixed versus dynamic) is also noted. In addition to the projects listed in Table 10, the existing HOV lanes on US 75 south of the PGBT and IH 30 east of US 75 will transition to express/HOV lanes by 2035. Some roadway projects may change the current interim HOV lanes to express/HOV before the major project builds tolled managed lanes. This would most likely occur on projects projected to be completed closer to 2035. By 2035, dynamic scheduling would be used for the entire 688 lane-mile express/HOV and tolled managed lane system (29.7 percent of the priced facility system) or 1.3 percent of the total roadway system and most would include dynamic pricing (tolled managed lanes only).

Table 10. Planned Projects on Major Roadways

Location	County	Limits	Type of Improvement	Type of Tolling
2013 – 2018				
Chisholm Trail Parkway	Tarrant	IH 30 to FM 1187	New toll road	Fixed
Dallas North Tollway	Collin/ Dallas	Sam Rayburn Tollway (SH 121) to Royal Lane	Add toll lanes	Fixed
FM 2499	Tarrant	South of Gerault Road to SH 121	Add general purpose mainlanes	None
IH 30	Dallas	Sylvan Avenue to IH 35E	Add general purpose mainlanes and managed lanes	Dynamic
IH 30	Tarrant	SH 121 to Henderson Street	Add general purpose mainlanes	None
IH 30	Tarrant	Henderson Street to IH 35W	Reconstruct	None
IH 30 Dallas County	Dallas	SH 161 to Loop 12	Add general purpose mainlanes and managed lanes	Dynamic
IH 30 Dallas County	Dallas	Loop 12 to Sylvan Avenue	Reconstruct and add managed lanes	Dynamic
IH 35E	Dallas	IH 30 to 8th Street	Add general purpose mainlanes and managed lanes	Dynamic
IH 35E Ellis County	Ellis	US 77 (North of Waxahachie) to Bigham Road	Add general purpose mainlanes	None

Table 10. Planned Projects on Major Roadways (continued)

Location	County	Limits	Type of Improvement	Type of Tolling
2013 – 2018 (continued)				
IH 35E/IH 30	Dallas	IH 30 (West) to IH 30 (East)	Add general purpose mainlanes and managed lanes	Dynamic
IH 635	Dallas/ Tarrant	SH 121 to Royal Lane	Add general purpose mainlanes	None
IH 635	Dallas	Luna Road to US 75	Reconstruct and add managed lanes	Dynamic
IH 820 (Segment 1)	Tarrant	IH 35W to SH 121/SH 183	Add general purpose mainlanes and managed lanes	Dynamic
SH 114	Tarrant	Kimball Avenue to SH 121 (West)	Add general purpose mainlanes	None
SH 114	Tarrant	SH 121 (West) to east of International Parkway	Add general purpose mainlanes and managed lanes	Dynamic
SH 121 (Segment 2W)	Tarrant	IH 820 to SH 183	Reconstruct and add managed lanes	Dynamic
SH 121	Tarrant	FM 2499 to SH 360	Add general purpose mainlanes and managed lanes	Dynamic
SH 121	Tarrant	SH 360 to Hall Johnson Road	Reconstruct and add managed lanes	Dynamic
SH 161	Dallas	PGBT/Belt Line Road to SH 183	Reconstruct and add toll lanes	Fixed
SH 360	Tarrant	SH 121 to Stone Myers Parkway	Add general purpose mainlanes	None
US 67 Cleburne Bypass	Johnson	SH 174 to Spur 102 (East Bypass)	Add general purpose mainlanes	None
US 75 North Collin County	Collin	Collin County Outer Loop to SH 121 (South)	Add general purpose mainlanes	None
US 75 South Collin County	Collin	SH 121 (South) to Spring Creek Parkway	Add general purpose mainlanes	None
US 75 South Collin County	Collin	Spring Creek Parkway to PGBT	Reconstruct and add managed lanes	Dynamic
US 287 (Segment 2A)	Tarrant	IH 35W to IH 30	Reconstruct and add managed lanes	Dynamic
US 287 Ellis County	Ellis	Business US 287 to SH 34	Add general purpose mainlanes	None
2019 – 2028				
Collin County Outer Loop	Collin	Dallas North Tollway to SH 121	New toll road	Fixed
Dallas North Tollway	Collin	FM 121 to US 380	New toll road	Fixed
East Branch (SH 190)	Dallas/ Kaufman	IH 30/PGBT to IH 20/Loop 9	New toll road	Fixed
IH 20	Tarrant	IH 820 to Park Springs Boulevard	Reconstruct and add managed lanes	Dynamic
IH 30 Tarrant County	Tarrant	Cooper Street to PGBT – Western Extension (SH 161)	Add general purpose mainlanes and managed lanes	Dynamic
IH 35	Denton	US 380 to IH 35E/IH 35W	Add general purpose mainlanes and managed lanes	Dynamic
IH 35E	Dallas	8th Street to US 67	Add general purpose mainlanes and managed lanes	Dynamic
IH 35E	Dallas	IH 635 to Loop 12	Reconstruct and add managed lanes	Dynamic
IH 35E	Dallas/ Denton	IH 35E/IH 35W to IH 635	Add general purpose mainlanes and managed lanes	Dynamic
IH 35W (Segment 3A)	Tarrant	SH 183 to SH 121	Add general purpose mainlanes and managed lanes	Dynamic
IH 35W (Segment 3A)	Tarrant	SH 121 to IH 30	Reconstruct and add managed lanes	Dynamic
IH 35W (Segment 3B)	Tarrant	US 81/US 287 to IH 820	Add general purpose mainlanes and managed lanes	Dynamic

Table 10. Planned Projects on Major Roadways (continued)

Location	County	Limits	Type of Improvement	Type of Tolling
2019 – 2028 (continued)				
IH 35W (Segment 3C)	Denton/ Tarrant	Eagle Parkway to US 81/US 287	Add general purpose mainlanes and managed lanes	Dynamic
IH 820	Tarrant	Meadowbrook Drive to US 287	Add general purpose mainlanes	None
IH 820	Tarrant	US 287 to IH 20	Reconstruct and add managed lanes	Dynamic
IH 820	Tarrant	SH 121/SH 10 Interchange to Randol Mill Road	Add general purpose mainlanes	None
IH 820	Tarrant	SH 121/SH 183 Interchange to SH 121/SH 10 Interchange	Add general purpose mainlanes and managed lanes	Dynamic
PGBT	Collin/ Dallas/ Denton	IH 35E to SH 78	Add toll lanes	Fixed
Sam Rayburn Tollway (SH 121)	Collin	US 75 to Business SH 121 (West)	Add toll lanes	Fixed
S.M. Wright Parkway	Dallas	IH 45 to US 175/SH 310	Add general purpose mainlanes	None
SH 121	Tarrant	IH 820 to Handley Ederville Road	Reconstruct and add managed lanes	Dynamic
SH 161/SH 360 Toll Connector	Dallas/ Tarrant	SH 360/Sublett Road to PGBT – Western Extension (SH 161)	New toll road	Fixed
SH 170	Denton/ Tarrant	IH 35W to SH 114	New toll road	Fixed
SH 360	Tarrant	Brown Boulevard/Avenue K to IH 30	Reconstruct	None
SH 360	Tarrant	IH 30 to IH 20	Add general purpose mainlanes	None
Trinity Parkway	Dallas	IH 35E/SH 183 to SH 310	New toll road	Fixed
US 67	Dallas	IH 35E to FM 1382	Add general purpose mainlanes and managed lanes	Dynamic
US 287	Tarrant	Village Creek Road to IH 820 (US 287)	Reconstruct and add managed lanes	Dynamic
US 287	Tarrant	IH 20 to Sublett Road (US 287)	Reconstruct and add managed lanes	Dynamic
US 287 Ellis County	Ellis	SH 34 to IH 45	Add general purpose mainlanes	None
2029 – 2035				
Chisholm Trail Parkway	Johnson/ Tarrant	FM 1187 to US 67	New toll road	Fixed
IH 35E	Dallas	US 67 to IH 20	Add general purpose mainlanes and managed lanes	Dynamic
IH 635	Dallas	US 75 to IH 30	Add general purpose mainlanes and managed lanes	Dynamic
Loop 9	Dallas/ Ellis/ Kaufman	US 287 to IH 20	New toll road	Fixed
Loop 12	Dallas	IH 35E to SH 356	Add general purpose mainlanes and managed lanes	Dynamic
Loop 12	Dallas	SH 356 to Spur 408	Reconstruct and add managed lanes	Dynamic
PGBT	Dallas	IH 635 to Belt Line Road (Segment V)	Add toll lanes	Fixed
PGBT – Western Extension (SH 161)	Dallas	SH 183 to IH 20	Add toll lanes	Fixed
SH 114	Denton	FM 156 to IH 35W	Add general purpose mainlanes	None
SH 114	Dallas/ Tarrant	SH 121 to Rochelle Boulevard	Add general purpose mainlanes and managed lanes	Dynamic
SH 114	Dallas	Rochelle Boulevard to Loop 12	Reconstruct and add managed lanes	Dynamic

Table 10. Planned Projects on Major Roadways (continued)

Location	County	Limits	Type of Improvement	Type of Tolling
2029 – 2035 (continued)				
SH 114	Dallas	Loop 12 to SH 183	Add general purpose mainlanes and managed lanes	Dynamic
SH 121	Tarrant	Dallas County Line to FM 2499	Reconstruct and add managed lanes	Dynamic
SH 121 – Dallas County	Dallas	Business SH 121 (West) to Tarrant County Line	Reconstruct and add managed lanes	Dynamic
SH 170	Tarrant	US 81/US 287 to IH 35W	New arterial	None
SH 183 (Segment 2E)	Tarrant	SH 121 to SH 360	Reconstruct and add managed lanes	Dynamic
SH 183 (Segment 2E)	Dallas/ Tarrant	SH 360 to PGBT – Western Extension (SH 161)	Add general purpose mainlanes and managed lanes	Dynamic
SH 183 Dallas County	Dallas	SH 161/PGBT – Western Extension to Loop 12	Add general purpose mainlanes and managed lanes	Dynamic
SH 183 Dallas County	Dallas	Loop 12 to SH 114	Reconstruct and add managed lanes	Dynamic
SH 183 Dallas County	Dallas	SH 114 to Trinity Parkway	Add general purpose mainlanes and managed lanes	Dynamic
SH 183 Dallas County	Dallas	Trinity Parkway to IH 35E	Reconstruct and add managed lanes	Dynamic
SH 360 Toll Road	Ellis/ Tarrant	Sublett Road/Camp Wisdom Road to US 67	New toll road	Fixed
US 75 North Collin County	Collin	County Line Road to Collin County Outer Loop	Add general purpose mainlanes	None
US 175	Dallas	SH 310 to IH 20	Add general purpose mainlanes	None

Source: *Mobility 2035 – 2013 Update*, Appendix G, June 2013

Of the 81 projects listed in Table 10, 18 projects (22 percent) listed would add general purpose lanes only and 24 projects (30 percent) would add general purpose lanes and tolled managed lanes. Twenty projects (25 percent) would add only tolled managed lanes to a corridor but would reconstruct the existing non-priced general purpose lanes. Ten projects (12 percent) will construct new toll roads on new location and five projects (six percent) will widen existing toll roads. One project (one percent) will add toll lanes and reconstruct the existing non-priced general purpose lanes. The list also includes two reconstruction projects and one new arterial.

Tolled managed lanes are proposed as part of the expansion or rehabilitation of 44 existing non-priced roadway projects. Drivers will have the choice of paying a toll to use the tolled managed lanes or traveling on non-priced general purpose lanes or frontage roads. The tolls collected from the tolled managed lanes will help finance the expansion/rehabilitation and operation of existing roadways (including priced facilities) and transit facilities. Because of limited transportation funding, the rehabilitation and expansion of the existing facilities that include tolled managed lanes would likely not occur without the additional/proposed tolled managed lanes to help provide non-priced facility project financing.

In addition to the major roadway improvements, *Mobility 2035 – 2013 Update* identifies smaller, regionally significant roadway that include 191 major improvements (additions of lanes or new roadways) throughout the plan years. These improvements do not include any priced facilities and do not include any type of tolling element. Table 11 list these improvements.

Table 11. Planned Projects on Regional Significant Arterials

Location	County	Limits	Type of Improvement
2013 – 2018			
1st Street	Tarrant	Beach Street to Oakland Boulevard	Add arterial lanes
Academy Boulevard	Tarrant	Westpoint Boulevard to IH 30	Add new arterial
Beach Street	Tarrant	Timberland Boulevard to Golden Triangle Boulevard	Add arterial lanes/ Add new arterial
Belt Line Road	Dallas	Cedar Hill Road to FM 1382	Add arterial lanes
Belt Line Road	Dallas	Nokomis Road to Summers Street	Add arterial lanes
Belt Line Road	Dallas	Bluegrove Road to Main Street	Add arterial lanes
Belt Line Road	Dallas	Post Oak Road to Simonds Road	Add arterial lanes
Belt Line Road	Dallas	Lake June Road to Pioneer Road	Add arterial lanes
Belt Line Road/1st Street	Dallas	Abrams Road to Frances Way	Add arterial lanes
Belt Line Road/1st Street	Dallas	US 75 to Sherman Street	Add arterial lanes
Camp Wisdom Road	Dallas	FM 1382 to Robinson Road	Add arterial lanes
Carrier Parkway	Dallas	Crossland Boulevard to Westchester Parkway	Add arterial lanes
Central Expressway	Dallas	Pacific Avenue/Gaston Avenue to Commerce Street	Add arterial lanes
Central Expressway	Dallas	South of IH 30 to Grand Avenue at IH 45	Add arterial lanes
Clark Road	Dallas	Couch Lane to Wintergreen Road	Add arterial lanes
Corinth Street Viaduct	Dallas	Riverfront Boulevard to 8th Street	Add arterial lanes
Danieldale Road	Dallas	Duncanville/DeSoto city limits to Westmoreland Road	Add arterial lanes
Debbie lane	Tarrant	Matlock Road to Tabasco Trail	Add arterial lanes
East/West Connector	Tarrant	W Airfield Drive to 0.5 east of International Parkway (Dallas County Line)	Add new arterial
FM 1171	Denton	IH 35W to FM 2499	Add arterial lanes
FM 1187	Parker	IH 20 to Underwood Road	Add arterial lanes
FM 1187	Tarrant	Newt Patterson to BU 287P	Add arterial lanes
FM 1187	Tarrant	IH 35W to Oak Grove Road	Add arterial lanes
FM 1187	Tarrant	SH 121 to 0.1 miles west of BF 1187C	Add arterial lanes
FM 1378	Collin	FM 2514/Parker Road to FM 544	Add arterial lanes
FM 1378	Collin	Farmstead to Rock Ridge Road	Add arterial lanes
FM 1382	Dallas	Clark Road to Strauss Road	Add arterial lanes
FM 156	Denton/ Tarrant	SH 114 to Westport Parkway	Add arterial lanes
FM 1938/ Davis Boulevard	Tarrant	SH 114 to FM 1709	Add arterial lanes/ Add new arterial
FM 2181	Denton	FM 2499 to IH 35E	Add arterial lanes
FM 2181/Teasley Lane	Denton	FM 2181/Lillian Miller Parkway to FM 2499	Add arterial lanes
FM 2478	Collin	US 380 to Sam Rayburn Tollway (SH 121) frontage SB	Add arterial lanes
FM 2499	Denton	FM 2181 to IH 35E	Add arterial lanes/ Add new arterial
FM 423	Denton	US 380 to Sam Rayburn Tollway (SH 121)	Add arterial lanes
FM 720	Denton	FM 720/Eldorado Parkway to Eldorado west of Woodlake Road	Add arterial lanes
FM 740	Kaufman	Ranch Road to US 80	Add arterial lanes
FM 740	Rockwall	FM 1140 (N) to FM 1140 (S)	Add arterial lanes
Future FM 1187 – new SB lanes	Parker	Underwood Road to Old Annetta Road	Add new arterial
Granbury Road	Tarrant	Altamesa Boulevard to Appalachian Way	Add arterial lanes
Harry Hines Boulevard	Dallas	Forest Lane to Royal Lane	Add arterial lanes
Hemphill Street	Tarrant	Lancaster Avenue to Vickery Boulevard	Add new arterial
Kingswood Boulevard	Tarrant	Lynn Road to Lake Ridge Parkway	Add new arterial
Lake Ridge Parkway	Dallas/ Tarrant	IH 20 to Kingswood Boulevard	Add arterial lanes/ Add new arterial
Lemmon Avenue	Dallas	Bluffview Boulevard to University Boulevard	Add arterial lanes
Loop 288	Denton	IH 35 to US 380 (W)	Add new arterial
Loop 288	Denton	IH 35W to US 377	Add arterial lanes
MacArthur Boulevard	Dallas	Oakdale Road to Trinity Parkway/Hunter Ferrell	Add arterial lanes

Table 11. Planned Projects on Regional Significant Arterials (continued)

Location	County	Limits	Type of Improvement
2013 – 2018 (continued)			
Mansfield/Belt Line Road	Dallas	Anderson Road to Cedar Hill Road	Add arterial lanes
McLeroy Boulevard/Western Center Boulevard	Tarrant	BU 287P/Saginaw Boulevard to FM 156/Blue Mound Road	Add arterial lanes
Midway Road	Dallas	Belt Line Road to Spring Valley	Add arterial lanes
North Tarrant Parkway	Tarrant	Whitley/Bursey Road to FM 1938/Davis Boulevard	Add arterial lanes
Northwest Highway	Dallas	Plano Road/Lake Highlands Drive to SH 78/Garland Road	Add arterial lanes
Outer Loop staged facility	Collin/ Rockwall	SH 121 to IH 30	Add new arterial
Park Lane	Dallas	US 75 to Greenville Avenue	Add arterial lanes
Pearl Expressway	Dallas	Pearl Street to Pacific Avenue/Gaston Avenue	Add arterial lanes
Pearl Expressway	Dallas	Wood Street/Jackson Street to Canton Street	Add arterial lanes
Precinct Line Road	Tarrant	SH 10 to Randol Mill Road	Add arterial lanes
Randol Mill Road	Tarrant	IH 820 frontage NB to John T White Road N	Add arterial lanes
Randol Mill Road	Tarrant	Oakland Boulevard to Woodhaven Boulevard	Add arterial lanes
Riverfront Boulevard	Dallas	Corinth Street to Trinity Parkway	Add new arterial
Rosedale Street/BU 287P	Tarrant	IH 35W frontage NB to US 287	Add arterial lanes
Rowlett Road	Dallas	Belt Line Road/Broadway to Roan Road	Add arterial lanes
Rowlett Road	Dallas	Miller Road to Century Drive	Add arterial lanes
Royal Lane	Dallas	Riverside Drive to Luna Road	Add arterial lanes
Rufe Snow Road	Tarrant	100 feet south of Bear Creek Parkway to Rapp Road	Add arterial lanes
S.M. Wright Parkway	Dallas	Grand Avenue to Budd Street	Add arterial lanes / Add new arterial
SH 114	Denton	County Line Road (near Wise County Line) to FM 156	Add arterial lanes
SH 121	Collin	FM 455 to SH 5 (N)	Add arterial lanes
SH 171	Hood	US 377 to 0.2 miles east of Lancaster Street	Add arterial lanes
SH 171	Parker	Cleburne Avenue to IH 20	Add arterial lanes
SH 26	Tarrant	Pool Road to SH 114/Clover	Add arterial lanes
SH 276	Rockwall	SH 205 to FM 3549 (formerly FM 549)	Add arterial lanes
SH 289	Collin	FM 3537 to FM 1461	Add arterial lanes
SH 289	Collin	Lloyd Circle (Formerly Mapleshade) to Frankfort	Add arterial lanes
SH 289/Preston	Dallas	Northwest Highway/Loop 12 to Lovers Lane	Add arterial lanes
SH 34	Kaufman	0.88 miles south of SH 34 (future BU 34) to 2.6 miles SW of FM 2451 (Ellis County Line)	Add arterial lanes
SH 34 temp alignment	Kaufman	FM 1836 to SH 243	Add new arterial
SH 34 Terrell Bypass	Kaufman	High Street (Terrell) to Airport Road (SH 34 S)	Add new arterial
SH 356	Dallas	Wildwood Drive to Regal Row ramps	Add arterial lanes
SH 356	Dallas	Nursery Road to Irving Boulevard E/6th Street	Add arterial lanes
SH 356/Irving Boulevard	Dallas	West end of couplet to O'Conner Road	Add arterial lanes
SH 5/Greenville Avenue	Collin	Fairview Avenue to Stacy Road	Add arterial lanes
SH 78	Collin/ Dallas	FM 6 to Firewheel Parkway	Add arterial lanes
Shiloh Road	Collin	Park Boulevard to FM 544/14th Street	Add arterial lanes
Shiloh Road	Dallas	PGBT East Branch (SH 190) frontage EB to Kingsley Road	Add arterial lanes
Spur 348	Dallas	SH 114 to Riverside (Elm Fork Trinity River)	Add arterial lanes
Tom Braniff Drive	Dallas	0.3 miles north of SH 114 to SH 114	Add arterial lanes
US 287	Ellis	BU 287 west of Ennis to 0.6 miles west of Ensign Road	Add arterial lanes
US 377	Denton	Henrietta Creek Road to James Street	Add arterial lanes
US 377	Denton	Marshal Creek Road to Crawford Road	Add arterial lanes
US 377	Denton	FM 1830 to IH 35E	Add arterial lanes
US 377	Hood	FM 167 to FM 51	Add arterial lanes
US 377	Tarrant/ Parker	IH 20 to Winscott/Lakeway	Add arterial lanes

Table 11. Planned Projects on Regional Significant Arterials (continued)

Location	County	Limits	Type of Improvement
2013 – 2018 (continued)			
US 377 (future Cresson bypass)	Hood	US 377 (future BU 377 north of Cresson) to US 377 (future BU 377 south of Cresson)	Add new arterial
US 377/Whitley/ Elm/Charles couplet	Tarrant	Johnson Road to South of Bear Creek Parkway	Add arterial lanes
US 380	Collin/ Denton	FM 423 to 0.2 miles west of Hardin Boulevard	Add arterial lanes
US 380	Denton/ Wise	1.25 miles east of CR 4004 to Elm Street	Add arterial lanes
US 380	Wise	0.5 miles west of SH 101/SH 114 to 0.1 miles west of SH 101/SH 114	Add arterial lanes
US 380	Hunt	CR 2148 to US 69	Add arterial lanes
US 69	Hunt	0.2 miles southeast of BU 69 to FM 513	Add arterial lanes
Wichita Street/Oak Grove	Tarrant	IH 20 to Shelby Road	Add arterial lanes
2019 – 2028			
1st Street	Tarrant	Riverside Drive to Beach Street	Add arterial lanes
2nd Avenue	Dallas	Commerce Street to Robert Cullum Boulevard/Parry/SH 352	Add arterial lanes
Beach Street	Tarrant	SH 170 to Timberland Boulevard	Add arterial lanes
Beach Street	Tarrant	Vista Meadows Road to 1800 feet north of North Tarrant Parkway	Add arterial lanes/ Add new arterial
Belt Line Road	Dallas	Post Oak Road to IH 45/US 75 frontage NB	Add arterial lanes
Belt Line Road	Dallas	Denton Tap Road/Belt Line Road to MacArthur Boulevard	Add arterial lanes
Belt Line Road	Dallas	Conflans Road to Rock Island Road	Add arterial lanes
Belt Line Road	Dallas	South end of SH 183 bridge to Willow Creek Drive	Add arterial lanes
Bonds Ranch Road	Tarrant	FM 156 to Harmon	Add arterial lanes
BU 287P/Main Street	Tarrant	Dallas Street to Heritage Parkway	Add arterial lanes
BU 45/Kaufman Street	Ellis	Paris Street to IH 45	Add arterial lanes
California Crossing	Dallas	Luna Road to Wildwood Drive	Add arterial lanes
Campbell Road	Dallas	Campbell frontage EB/WB to Glenville Drive	Add arterial lanes
Campbell Road/Big Spring Road	Dallas	Jupiter Road to PGBT	Add arterial lanes
Central Expressway	Dallas	Marilla Street to IH 30 frontage WB	Add new arterial
Cheek Sparger Road	Tarrant	Murphy Drive to Heritage Road	Add arterial lanes
Cheek Sparger Road	Tarrant	SH 121 to FM 157	Add arterial lanes
Commerce Street	Dallas	Industrial Boulevard to IH 35E	Add arterial lanes
Danieldale Road	Dallas	Westmoreland Road to IH 35E frontage SB	Add arterial lanes
Debbie Lane	Tarrant	Tabasco Trail to SH 360	Add arterial lanes
Eldorado Parkway	Collin	Stonebridge Drive to SH 5	Add arterial lanes
Elm Street	Denton	Eagle Drive to Carroll Boulevard	Add arterial lanes
Elm Street/Locust Street couplet	Denton	IH 35E to Cowan Avenue	Add arterial lanes
FM 1120/Boat Club Drive	Tarrant	1 mile east of Harborview Drive to Bailey Boswell	Add arterial lanes
FM 1378	Collin	Lucas Branch Road to FM 2514/Parker Road	Add arterial lanes
FM 1378	Collin	Rock Ridge Road to FM 3286	Add arterial lanes
FM 455	Collin	US 75 frontage SB to SH 5	Add arterial lanes
FM 455	Denton	IH 35 to US 377	Add arterial lanes
FM 664	Ellis	IH 35E to Cockrell Hill Road/Ovilla Main Street	Add arterial lanes
FM 731	Johnson	Retta Road (Tarrant County Line) to SH 174	Add arterial lanes
FM 917	Johnson	Jessica Drive to BU 287P	Add arterial lanes
Golden Triangle Boulevard	Tarrant	Harmon to Harmon	Add new arterial
Harmon	Tarrant	Golden Triangle Boulevard to Golden Triangle Boulevard	Add arterial lanes
Loop 288	Denton	US 380 (W) to FM 2499	Add new arterial
MacArthur Boulevard	Dallas	IH 30 frontage EB to SH 180/Main Street	Add arterial lanes
Midway Road	Tarrant	US 377/Belknap Street to SH 121	Add arterial lanes

Table 11. Planned Projects on Regional Significant Arterials (continued)

Location	County	Limits	Type of Improvement
2019 – 2028 (continued)			
Mountain Creek Parkway	Dallas	Grady Niblo Road to IH 20 on/off ramps	Add arterial lanes
North Tarrant Parkway	Tarrant	IH 35W to US 377/Denton Highway	Add arterial lanes
Riverfront Boulevard	Dallas	Irving Boulevard to Continental Boulevard	Add arterial lanes
SH 121	Collin	1.33 miles north of SH 160 (Fannin County line) to FM 455	Add arterial lanes
SH 199	Parker	0.75 miles northwest of Goshen Road to Goshen Road/FM 51	Add arterial lanes
SH 205	Collin/ Rockwall	SH 78 to Olive Street	Add arterial lanes
SH 205	Rockwall	SH 276 to 0.36 miles SE of FM 548 (Kaufman County line)	Add arterial lanes
SH 26	Tarrant	IH 820 to Cheek Sparger	Add arterial lanes
SH 276	Rockwall	FM 3549 (formerly FM 549) to Sabine Circle (near Hunt County line)	Add arterial lanes
SH 289	Collin	BU 289 north of Celina to Grayson CR 60 (Grayson County line)	Add arterial lanes
SH 34	Ellis	2.6 miles southwest of FM 2451 (Kaufman County line) to FM 660	Add arterial lanes
SH 34/Lake Bardwell Drive	Ellis	FM 1183 to BU 45	Add arterial lanes
SH 342	Dallas	8^{th} Street to Loop 9	Add arterial lanes
SH 5	Collin	0.05 miles north of County Line Road (Grayson County line) to SH 121	Add arterial lanes
SH 5/McDonald Street	Collin	SH 121 to Tennessee	Add arterial lanes
SH 66	Collin/ Rockwall	East end of couplet to FM 2642 (near Hunt County line)	Add arterial lanes
SH 66	Rockwall	Fannin Street to John King Boulevard	Add arterial lanes
SH 78	Collin	FM 6 to 0.82 miles east of SH 160 (Fannin County line)	Add arterial lanes
Spur 348	Dallas	Riverside (Elm Fork Trinity River) to Luna Road	Add arterial lanes
Trinity Boulevard	Tarrant	Bell Spur to 0.25 miles west of Greenbelt Road	Add arterial lanes
US 287	Ellis	0.6 miles west of Ensign Road to IH 45	Add arterial lanes
US 377	Denton	BU 377 (south of Pilot Point) to FM 428	Add arterial lanes
US 380	Collin	CR 608 to CR 698 (Hunt County line)	Add arterial lanes
US 67	Johnson	Park Road 21 to US 67 Bypass	Add arterial lanes
US 77	Ellis	North of McMillan Street to 0.07 miles south of FM 66	Add arterial lanes
Weatherford Loop	Parker	IH 20 (W) to FM 51	Add new arterial
Wildwood Drive	Dallas	California Crossing to 0.3 miles north of SH 114	Add arterial lanes
Willow Springs Road	Tarrant	Blue Mound Road to US 287	Add arterial lanes
2029 – 2035			
Camp Wisdom Road	Dallas	FM 1382 to Clark Road	Add arterial lanes
Cheek Sparger Road	Tarrant	SH 26 to Murphy Drive	Add arterial lanes
Cooks Lane	Tarrant	Randol Mill Road to John T White Road	Add arterial lanes
Eldorado Parkway	Collin	FM 2478/Custer Road to Stonebridge Drive	Add arterial lanes
Eldorado Parkway	Denton	East end of Lake Bridge to FM 720	Add arterial lanes
Everman Parkway	Tarrant	Oak Grove Road to Race Street	Add arterial lanes
FM 1187	Tarrant	Aledo Road to SH 121	Add arterial lanes
FM 157	Johnson	Chambers Street to US 67	Add arterial lanes
Golden Triangle Boulevard	Tarrant	IH 35W to US 377	Add arterial lanes
Luna Road	Dallas	Spur 348 on/off ramps to Royal Lane	Add arterial lanes
MacArthur Boulevard	Dallas	Trinity Parkway to IH 30 frontage WB	Add arterial lanes
Mountain Creek Parkway	Dallas	Grady Niblo Road to Merrifield Road	Add arterial lanes
Mountain Creek Parkway/Illinois Avenue	Dallas	Merrifield Road to Loop 12 frontage NB (Spur 408)	Add arterial lanes
SH 170 staged facility	Tarrant	IH 35W to US 287	Add new arterial
SH 289	Collin	FM 1461 to BU 289 north of Celina	Add arterial lanes

Table 11. Planned Projects on Regional Significant Arterials (continued)

Location	County	Limits	Type of Improvement
2029 – 2035 (continued)			
SH 34	Ellis	FM 660 to IH 45	Add arterial lanes
SH 34	Hunt/ Kaufman	Traders Road to CR 319 Flowers Lane	Add arterial lanes
SH 34	Kaufman	SH 34 (future BU 34) to 0.88 miles south of SH 34 (future BU 34)	Add arterial lanes
SH 34 new alignment	Kaufman	SH 34 (south of Kaufman) to SH 34 (south of Terrell)	Add new arterial
SH 34/Lake Bardwell Drive	Ellis	IH 35E to FM 1183	Add arterial lanes
SH 66	Rockwall	John King Boulevard to East end of couplet	Add arterial lanes
US 377	Denton	Crawford Road to FM 1830	Add arterial lanes
US 380	Denton	US 377 to FM 423	Add arterial lanes
US 67	Ellis	1.25 miles east of FM 1157 (Johnson County Line) to US 287	Add arterial lanes
Weather Loop	Parker	FM 51 to IH 20 (E)	Add new arterial
Westport Parkway	Tarrant	FM 156 to IH 35W	Add arterial lanes

Source: Mobility 2035 – 2013 Update, Appendix E, June 2013

Separate from the major roadway improvements and the RSAs, *Mobility 2035 – 2013 Update* includes improvements to frontage roads throughout the region. These projects only included frontage road improvements and are not part of a larger mainlane project. The majority are programed to be constructed before 2018 with the remaining completed within the timeframe of the plan, 2035. These projects have no priced components to them. Table 12 outlines all the 21 frontage road improvements listed in *Mobility 2035 – 2013 Update*.

Table 12. Planned Frontage Road Improvements

Location	County	Limits	Type of Improvement
Dallas North Tollway	Collin	Warren Parkway to SH 121	Add frontage road lanes
IH 20 (Dallas)	Dallas	West of Haymarket Road to west of US 175	Add new frontage road
IH 20 (Dallas)	Dallas	West of Robinson Road to FM 1382 (frontage roads)	Add new frontage road
IH 20 (Dallas)	Dallas	North Main Street to Camp Wisdom	Add new frontage road
IH 20 (Terrell)	Kaufman	FM 148 to Spur 557	Add new frontage road
IH 20 (Weatherford)	Parker	Bowie Drive to FM 1884	Reconstruct frontage road
IH 20 (Weatherford)	Parker	Bankhead Highway to Lakeshore Drive	Add new frontage road
IH 30	Rockwall	At FM 3549	Reconstruct frontage road
IH 35E	Ellis	FM 566 to FM 308 (near Milford)	Add new frontage road
IH 35E	Dallas	Manana Drive to Royal Lane	Add new frontage road
IH 35E	Dallas	Lombardy Lane to Spur 482 (Storey Road)	Add new frontage road
IH 635	Dallas	0.55 miles west of Belt Line Road to Royal Lane	Add new frontage road
IH 635	Dallas	Skillman to Miller Road	Add new frontage road
IH 635	Dallas	Gross Road to US 80	Add new frontage road
SP 557	Kaufman	CR 305 to IH 20 (eastbound only)	Add new frontage road
US 175 (Crandall)	Kaufman	FM 148 to CR 4106	Add new frontage road
US 287 (Tarrant County)	Tarrant	Berry Street to Vaughn Boulevard	Add new frontage road
US 287 (Tarrant County)	Tarrant	Walnut Creek Drive to Broad Street	Add new frontage road
US 81/US 287 (Tarrant/ Wise County)	Tarrant/ Wise	FM 3479 to south of North Tarrant Parkway crossover	Add frontage road lanes
US 67 (Midlothian)	Ellis	Overlook Drive to 8th/9th Street	Add new frontage road
US 80 (Mesquite)	Dallas	IH 635 to North Galloway Avenue	Reconstruct frontage road

Source: Mobility 2035 – 2013 Update, Appendix E, June 2013

3.1.1 Toll Rates/Dynamic Pricing

The proposed roadway system for the Dallas-Fort Worth area includes priced facilities, where the driver is charged a fixed priced (toll or fee) to use the roadway. Current toll rates on the majority of toll roads operated by NTTA [i.e., Dallas North Tollway (DNT), the President George Bush Turnpike (PGBT), and the Sam Rayburn Tollway] for two-axle vehicles using a toll transponder [e.g., TxDOT TxTag® stickers, NTTA TollTag® (Dallas area), or Harris County Toll Road Authority (HCTRA)] is 16.2 cents per mile. Toll rates for two-axle vehicles with a transponder on Chisolm Trail Parkway from IH 30 to Altamesa Drive will be 18.5 cents per mile (in 2009 dollars), corresponding to approximately 20.6 cents per mile in 2014 (expected opening). Toll rates on Chisolm Trail Parkway from Altamesa Drive to US 67 will be consistent with tolls on the rest of the NTTA toll roads (14.5 cents per mile in 2009 dollars and 16.2 cents currently). Incremental toll rate increases are scheduled to occur every two years (odd years) on all NTTA toll facilities to account for inflation (with an assumed 2.75 percent annual increase), with the latest increase occurring on July 1, 2013. The NTTA Board of Directors sets the toll rates for all NTTA roadways.

TxTag®, TollTag®, and EZ TAG® transponders are accepted on all priced facility lanes. Toll charges are automatically deducted from a prepaid account when a priced facility is used. With a prepaid account, the driver must maintain sufficient funds in the account to cover incurred toll charges. Prepaid accounts can be replenished via credit card, debit card, cash, or check/money order. To help people with lower incomes have greater access to a prepaid account, both NTTA and TxDOT have reduced the initial deposit to $20 for infrequent users.

For vehicles without toll transponders, tolled facilities in the Dallas-Fort Worth use a video-based tolling system called ZipCash to identify and mail a bill to toll road users. This system uses high-speed cameras to record license plate images and sends billing invoices to registered vehicle owners. A premium is added to the transponder toll rate to cover the cost of this service, increasing the toll rate by 50 percent over the transponder rate, with a minimum of a 20 cent premium (in 2009 dollars, adjusted every odd year along with the base toll rates) at each toll gantry. For example, a $1.00 toll for toll transponder users would translate into a $1.50 ZipCash bill.

International Parkway is a toll road that runs through the Dallas-Fort Worth International Airport (DFWIA) and is operated by the airport. The toll cost to "pass-through" DFWIA is $2 per trip. Payments can be made at toll booths on either the north or south side of the airport with cash or credit. New automated booths can be used for those paying by credit, but manned booths can accept cash or credit. Vehicles with a transponder get a 50 percent discount and only pay $1 per trip.

With the adoption of Texas Transportation Code Section 372.053, as amended, Texas tolling entities may offer discounted or free tolls to Texas-registered vehicles with qualifying specialty license plates for Disabled Veterans, Purple Heart recipients, Medal of Honor recipients, and Legion of Valor recipients. The Texas legislature has the authority to authorize funds for the program, but no funds have been appropriated. Although no funds were appropriated, the three major toll entities in Texas (HCTRA, NTTA, and TxDOT) offer a veteran discount program.

For TxDOT-sponsored tollways and managed lane facilities, the RTC and TxDOT have developed Business Terms for TxDOT-Sponsored Toll Roads on State Highways (dated September 2006) which sets policies for toll rates and rate adjustments to maintain price consistency among the various toll projects (see Exhibit 6.23 in *Mobility 2035 – 2013 Update*).

These terms establish the maximum peak period toll rates (17 cents per mile in 2010 dollars) and require RTC approval for any changes.

The RTC toll rate policy for TxDOT sponsored toll roads on state highways calls for an inflation adjusted fixed rate of 14.5 cents per mile or variable rates of 12.5 cents per mile during off-peak periods and 17 cents per mile during peak periods on new toll facilities. Assuming a steady three percent inflation rate, a toll road with a rate of 15.3 cents per mile in 2010 would be adjusted to 19.5 cents per mile and 26.2 cents per mile in 2020 and 2030, respectively. This inflation factor is part of the modeling process and is based on the Consumer Price Index. As previously mentioned, the NTTA controls toll rate policies on existing facilities in its system and has established a toll rate increase schedule. Figure 8 shows these RTC and NTTA policies in both inflation adjusted and constant dollar terms.

In addition, the RTC and TxDOT have developed Business Terms for TxDOT-Sponsored Tolled Managed Lane Facilities (updated June 2013), which sets policies for dynamically priced tolls to maintain price consistency among the various tolled managed lane facilities (see Exhibit 6.24 in *Mobility 2035 – 2013 Update*). The term tolled managed lanes encompasses several types of lane management strategies, including vehicle occupancy and price based lane or facility management; which means, for example, that managed lanes could be variably priced according to occupancy, time of day, congestion level, or other factors. The RTC adopted this regional policy because it provides the ability to:

- Provide and manage additional capacity in the corridor
- Increase trip reliability for HOV and transit
- Potentially improve air quality through encouragement of increased vehicle occupancy and person movements
- Generate revenue to construct, operate, and maintain transportation system facilities

Tolled managed lanes are separate lanes within a highway that charge a toll but the cost varies based on time-of-day, vehicle occupancy, or other operational strategies. This type of pricing is also called value, congestion, or dynamic pricing. This pricing strategy establishes higher rates during the peak periods and lower rates during off-peak travel times. Peak toll rates would be set to maintain a minimum average speed of 50 miles per hour, thus offering motorists a reliable and congestion-free trip in exchange for the higher peak toll. This can encourage the use of toll facilities more during off-peak periods. These effects are anticipated to help improve peak period level of service (LOS), manage congestion, and improve regional air quality. Incentives to encourage HOV (two plus or three plus) usage in these lanes during peak traffic periods include a reduced (50 percent) toll rate. This reduced rate for HOV requires pre-registration as part of the HOV-declaration. Transit vehicles and certain other exempt vehicles (e.g., emergency response vehicles) would not be charged a toll, which would allow riders and users to take advantage of the reliability and predictability of tolled managed lanes. This can be an incentive to facilitate increased carpool/vanpool and transit usage. Commuters who travel on the tolled managed lanes will be able to benefit from faster and more reliable travel times through the use of value pricing.

To complement the future tolled managed lanes, express/HOV are another priced facility identified in *Mobility 2035 – 2013 Update*. Express/HOV lanes are those interim HOV lanes that do not have any planned construction in *Mobility 2035 – 2013 Update*. In December 2012, the RTC adopted a new policy to specifically address the operation of the express/HOV lane system (see Exhibit 6.25 in *Mobility 2035 – 2013 Update*). Additionally, on a case-by-case basis, some interim HOV lanes may be changed to express/HOV lanes prior to final construction of the tolled managed lanes within the corridor. Express/HOV lanes are similar to managed toll roads by utilizing a dynamic schedule, but using a fixed price. The fixed schedule of prices would periodically change to maintain an average minimum corridor speed of 50 mph. This fixed price schedule would be based upon the time of day with a higher rate during peak period hours and lower rates in off peak hours. HOV users would always be free, regardless of time of day, as well as transit and emergency vehicles. These lanes would be similar to operation of the tolled managed lanes and are expected to be seamless. The express/HOV system is another method to utilize the additional capacity the interim HOV lanes have while still maintaining the current offered services (a less congested travel corridor for HOV users).

Prior to construction, a detailed traffic and revenue study will be performed on each tolled managed lane facility. Toll rates will be determined on a facility-by-facility basis and would be established in accordance with the Business Terms for TxDOT-Sponsored Managed Lane Facilities as approved by the RTC. Per Senate Bill 792, TxDOT is required to release the financial information on a CDA project and conduct a public hearing to disclose the anticipated toll rates. To date, four CDA projects in north Texas have gone to financial close and have published rates per mile (see Table 13).

Table 13. CDA Anticipated Toll Rates (per mile)[1]

Project	Opening Year Rates			Future Rates		
	Year	Low	High	Year[3]	Low	High
DFW Connector[2]	2014	$0.16	$0.16	2029	$0.24	$0.24
IH 635	2015	$0.09	$0.53	2061	$0.38	$2.36
North Tarrant Express	2015	$0.09	$0.53	2061	$0.09	$0.78
IH 35E	2016	$0.09	$0.63	2033	$0.17	$0.77

Notes: [1] Rates are based on information reported in each corridor's Disclosure of Financial Information.
[2] DFW Connector is using fixed pricing. There was no calculated difference for low or high price.
[3.] The years listed comes directly from traffic and revenue studies completed by TxDOT for each project.

The RTC tolled managed lane policy sets up a two-phase process for implementing dynamic pricing on regional tolled managed lane facilities. The first phase lasts six months and would include a fixed-schedule fee depending on the time of day that would not exceed a toll rate of 75 cents per mile. During this phase the fee schedule will be evaluated and updated no less than once per month, but can be changed more frequently to meet the demand of the roadway based upon the schedule that is set by the operator. After the six months fixed-schedule pricing will be replaced with market-based dynamic pricing. The toll rate will be continually adjusted to ensure a minimum average corridor speed of 50 miles per hour. A "soft cap" will be established to limit the dynamic price to a maximum of 75 cents per mile, but the dynamic price will be allowed to exceed the cap temporarily if the managed lanes are very congested. The fixed and variable toll rates will differ depending on the corridor. Conceptual dynamic pricing is shown in Figure 9. Dynamic pricing systems continuously adjust and do not need to be recalibrated to account for inflation. The "soft cap" is permitted to grow by 2.75 percent per year to account for some growth in the maximum toll rate.

With dynamic pricing, tolls are continually adjusted according to traffic conditions to maintain a free-flowing level of traffic. Under this system, prices increase when the tolled lane(s) get relatively full and decrease when the tolled lane(s) get less full. The current price will be displayed on electronic signs prior to the beginning of the tolled section. Traffic measuring equipment will monitor speed and volume in the managed lanes every minute of the day. Depending on the measurements, the tolled managed lane price will stay the same, or they could increase or decrease by five cent increments no more frequently than every five minutes.

The price shown on the price sign at the entrance to the tolled managed lanes is what the user will pay even if it changes while the user is traveling on the tolled managed lanes. This system is more complex and less predictable than using a fixed-price table, but its flexibility helps to maintain the optimal traffic flow and volume. The Business Terms for TxDOT-Sponsored Managed Lane Facilities do allow a toll rate of 75 cents per mile during peak periods.

The Dallas-Fort Worth area continues to experience high growth and increasingly diverse travel characteristics, combined with a stronger desire to balance transportation needs with land development, energy consumption, air quality, and other environmental concerns. The strategy of managing major roadway capacity more efficiently will be essential. The capacity on all freeway, tollway, and HOV facilities is managed directly (through tolls) or indirectly (through law enforcement, crash response, and operational maintenance activities), with each facility type catering to a specific mix of users. Over time, travel behaviors have changed to a point where combinations of these facility types are warranted in the same corridors. This advanced tolled managed lane facility concept continues to be proposed because a properly operated facility would provide relatively congestion-free travel through auto occupancy and/or toll management approach. Such a concept enables new capacity to be implemented in a way that is both fiscally and environmentally responsible, allowing multiple user groups to experience congestion and travel time benefits simultaneously with greater reliability.

3.1.2 Interim HOV Facilities

The HOV facilities in operation today are considered part of an interim system and are based on the more traditional two plus occupancy requirement. Existing interim HOV facilities include IH 30 (East R.L. Thornton Freeway), IH 30 (Tom Landry Highway), IH 35E (Stemmons Freeway), IH 635 (LBJ Freeway), IH 35E/US 67 (South R.L. Thornton Freeway/Marvin D. Love Freeway), and US 75 (Central Expressway). To better manage the available capacity in these corridors and to promote reliability of the overall system, the existing interim HOV corridors would evolve, either all together simultaneously or separately over time depending on future RTC decisions, into either tolled managed lanes or an express/HOV lane. The existing interim HOV lanes will begin a transition into express/HOV lanes or tolled managed lanes over the next few years as permanent tolled managed lanes are opened to traffic along the DFW Connector (SH 114/SH 121), LBJ Express (IH 635 from IH 35E to US 75), and North Tarrant Express (IH 820/SH 121/SH 183) corridors. This transition would include a change in occupancy requirements from a two plus auto occupancy to a three plus auto occupancy requirement, which is scheduled to occur on or before June 1, 2016. In addition to occupancy requirements, additional management tools could be employed including time-of-day or dynamic pricing. However, these changes to the interim HOV lanes would require RTC action, which would only occur after an opportunity for public input and comment on any changes. The tolled managed lane and express/HOV concepts would be fully implemented system-wide before 2035 per *Mobility 2035 – 2013 Update*.

3.1.3 Additional RTC Policies on Tolling

The RTC has established several policies regarding tollways. First, the RTC continues to assert that no existing freeway lanes (non-HOV lanes) should be converted to toll lanes (Policy FT3-001). Existing free general lane capacity could only be tolled if the conversion process enacted by the Texas Legislature was followed [Texas Administration Code (TAC) title 43, Part 1, CH. 27, Subchapter B, Rule 27.14]. Second, the RTC adopted policy in August 2006 regarding excess revenue sharing, the purpose of which was to establish a framework for the allocation of future toll revenues from projects in the North Central Texas region (see Chapter 6 of *Mobility 2035 – 2013 Update*).

Excess toll revenue is defined as annual toll revenue after the annual debt service, and after annual reserve funds have been set aside to cover facility operational costs, anticipated preventative maintenance activities, assigned profit and related expenses for the CDA, and the expected cost of rehabilitation or reconstruction of the toll facility. For all TxDOT-sponsored toll facilities (and honoring all previous RTC agreements), this policy states:

- All excess revenue generated from individual toll projects shall remain in the TxDOT district in which that revenue-generating project is located.
- Excess revenue generated from individual toll projects shall be placed in county-specific accounts and prorated based on the residential county of all toll payers on all tollways.
- Projects funded with excess toll revenue should be selected in a cooperative TxDOT-RTC selection process which considers the desires of the cities and counties where the revenue-generating project is located.

This last item enables non-priced and transit facilities, either on or off of the state highway system, to be improved or reconstructed with excess toll revenue funds. Input from local governments will be considered in determining which projects should receive funding. These policies have reinforced the commitment of the North Central Texas region to construct a well-connected system of transportation improvements.

3.1.4 Excess Revenue Case Study

The first project to generate excess revenues was SH 121 in Collin and Denton Counties. In exchange for the opportunity to construct, operate, and maintain SH 121 mainlanes as a toll road for 52 years, the NTTA paid the North Texas region $3.2 billion. This money was used to establish the Regional Toll Revenue (RTR) program. Per the RTC policy, the RTR monies were allocated based on the residential county of the toll road users. The region has used these funds to stretch the limited federal and state transportation dollars available to the North Central Texas region. Following SH 121, SH 161/PGBT from IH 30 to IH 20 generated additional revenue. Similar to SH 121, the NTTA paid the North Texas region an upfront payment to construct, operate, and maintain this section of SH 161/PGBT. An additional $200 million was added to the RTR program for local project use with funds allocated by residential county of the toll road user.

Through a call for projects, entities in the region submitted project proposals for technical review and analysis. The projects submitted were reviewed by county-level RTR task force committees. Proposed projects ranged from off- and on-system highways, transit improvements, bike/pedestrian improvements, grade separations, intelligent transportation systems (ITS) implementation, bottleneck removals, interchanges, rail transit, new roadways, park and ride projects, and traffic signal improvement projects. Potential projects were evaluated relative to regional funding priorities (cost overruns on current commitments and projects impacted by federal rescissions) and emphasis areas [partnerships that leverage available funds, need for project, interjurisdictional projects, construction of an integrated transportation system (versus stand-alone projects), implementation of strategies identified in CMP, improvement of multiple transportation modes, consistency with MTP and conformity, and regional significance of facility]. Projects were then recommended to the RTC for review and approval. Approved projects were then submitted to the Texas Transportation Commission for review and approval. Table 14 lists the types of improvements and funding levels. The majority of the RTR funding has been allocated to roadway improvements and are on the state highway system.

Table 14. SH 121 RTR Projects

Type of Improvements	Funding	Percentage
Roadway		**87.8%**
Addition of Lanes	$2,213,288,649	60.4%
New Roadway	$670,668,442	18.3%
Grade Separation	$150,746,794	4.1%
Interchange	$96,841,258	2.6%
Intersection Improvement	$57,495,736	1.6%
Bottleneck Removal	$25,923,125	0.7%
Rehabilitation	$3,500,000	0.1%
Operational		**0.2%**
ITS	$8,562,429	0.2%
Traffic Signal Improvement	$1,128,000	0.0%
Transit		**7.8%**
Rail Transit	$267,073,000	7.3%
Park & Ride/Rail Station	$18,840,757	0.5%
Transit Operations Regional Coordination	$1,000,000	0.0%
Bicycle/Pedestrian		**1.4%**
Bike/Pedestrian	$49,549,514	1.4%
Other (e.g., studies, TIFIA payments)	$102,246,141	**2.8%**
Total	**$3,666,863,844**	**100.0%**

Additionally, RTR funds have also been lent to the state, counties, and cities to help accelerate certain projects at the discretion of the RTC. This is only possible when selected projects will not need funding right away. For example, sections of the IH 35E will not go to construction for several years. Instead of leaving the funds in the bank, the RTC can lend it out to other entities, as long as the other entities pay it back before it is needed on IH 35E. This process enables the region to leverage RTR funds to build more projects over time. Generally, loans are to be repaid with interest at the same rate RTR funds earn each month by the State Comptroller.

3.2 PUBLIC TRANSPORTATION

The RTC has long recognized that the region will not be able to solve its transportation problems by simply building more roads. Public transportation provides a way to move large amounts of people in a safe and efficient manner. Analysis shows that by 2035, over three million people will live within one mile of a transit stop or rail station and more than three million jobs will be located within one mile of a transit stop or rail station. As the region continues to grow, public transportation will be an increasingly attractive travel option. Increasing opportunities for and access to public transportation will improve quality of life for the residents of the region.

The Dallas-Fort Worth MPA is served by three major regional transit authorities (DART, The T, and DCTA). The 2013 transit network for the Dallas-Fort Worth region consists of 146 miles of light and commuter rail lines. The anticipated 2035 transit network for Dallas-Fort Worth would consist of approximately 514 miles of passenger rail (see Table 7 and Figure 6). Additionally, all three transit agencies would continue to provide fixed route service with buses.

- DART serves the City of Dallas along with 12 surrounding municipalities (Addison, Carrollton, Cockrell Hill, Farmers Branch, Garland, Glenn Heights, Highland Park, Irving, Plano, Richardson, Rowlett, and University Park). Currently, DART provides these communities with approximately 130 bus routes, 85 miles of light rail transit, and 75 freeway miles of HOV lanes. DART is currently operating pilot programs with the City of Mesquite and the City of Arlington/The T/UT Arlington for express buses from existing transit stations.
- The T serves three member cities (Fort Worth, Richland Hills, and Blue Mound) with 38 local and express bus routes. The T and DART jointly operate 35 miles of commuter rail transit [the Trinity Railway Express (TRE)], linking downtown Dallas and Fort Worth with stops in Richland Hills, Hurst, Dallas/Fort Worth International Airport, and Irving. The T is working with the City of Arlington, DART, and UT Arlington to provide transit service from the TRE CentrePort station to UT Arlington.
- The DCTA offers several services to the public in the Greater Lewisville and Denton area. These services include fixed route bus service in Denton and Lewisville, and a peak period curb service for the Cities of Highland Village and Lewisville. DCTA also operates the 21-mile commuter rail service (A-Train) from Denton to the DART Rail Carrollton Station.

Each of the three transit providers offer paratransit, a specialized, demand-response service for the mobility impaired who are unable to use local bus and/or train services. Paratransit is a pre-arranged, shared-ride service that provides curb-to-curb transportation throughout each of the three transit service areas. Numerous community organizations and agencies also receive federal grants to provide services to disabled and elderly populations. Additionally, Job Access/Reverse Commute and New Freedom Programs are two federal programs administered by NCTCOG to support enhanced public transportation services for low-income individuals and persons with disabilities.

3.3 MANAGEMENT AND OPERATIONS

As mentioned in Section 2.1, the prioritization process looks at improving operations and removing trips from the system without significant capital investment. The regional CMP incorporates several strategies to help address congestion:

- Active Transportation – Also known as bicycle and pedestrian, these modes offer additional transportation options to improve our existing transportation system efficiency and cost effectiveness through a variety of systematic enhancements, while providing benefits to all road and transit users. *Mobility 2035 – 2013 Update* has identified approximately $1.5 billion of potential funding for bicycle and pedestrian improvements. For example, the regional veloweb system would be expanded from the existing 237 miles to 1,728 miles by 2035. As mentioned in Section 2.3.3, TxDOT is committed to accommodating bicycle and pedestrian improvements in the construction of their facilities.
- Travel Demand Management (TDM) – TDM promotes strategies that reduce the demand for drive-alone travel on roadways thus allowing traffic to move more efficiently. Examples of strategies include rail and bus transit, ridesharing options like carpools and vanpools, and bicycling, which reduce the demand on the roadway capacity. *Mobility 2035 – 2013 Update* includes $507 million for TDM strategies.
- Transportation System Management (TSM) – Some examples of system management and operation improvements include traffic signal enhancements, removal of freeway and arterial bottlenecks, and ITS deployment. *Mobility 2035 – 2013 Update* includes $1.7 billion for non-ITS TSM strategies.

- ITS – ITS, a subset of TSM, integrates advanced communications technologies into transportation infrastructure and in vehicles to improve travel conditions on the transportation system. *Mobility 2035 – 2013 Update* estimates the capital costs for regional ITS implementation at $383 million with an annual operating cost of $39 million at full system implementation.
- Transportation safety and security – *Mobility 2035 – 2013 Update* includes various regional safety programs to help improve reliability, efficiency, and maintenance of the transportation system. *Mobility 2035 – 2013 Update* includes $405.7 million for safety and security strategies.

4.0 REGIONAL TOLL SYSTEM EFFECTS

The implementation of the regional toll system has the potential to affect land-use, air quality, and environmental justice populations. These topics are discussed in the following sections.

4.1 LAND-USE

Metropolitan areas have come under intense pressure to respond to federal mandates to link planning of land-use, transportation, and environmental quality from persons concerned about managing the side effects of growth such as sprawl, congestion, housing affordability, and loss of open space. However, in Texas, no one agency has jurisdiction over all three of these elements.

Though the RTC does not have authority over land-use, the RTC has taken a proactive approach to improving regional traffic congestion and air quality through its Sustainable Development Policy. Adopted in 2001, the policy provides basic development strategies to help meet financial constraints, provide transportation choice, and improve air quality. Although *Mobility 2035 – 2013 Update* and the RTC encourage these sustainable development practices, the local municipalities have direct jurisdiction over land-use, and public agencies such as DART, The T, TxDOT, and NTTA have jurisdiction over the regional transportation system. The RTC policy represents an opportunity to build upon local development patterns based on a desire for a greater variety of transportation options, mixed-use developments, and unique communities with a sense of place (see Chapter 4 of *Mobility 2035 – 2013 Update*). However, it should be noted that RTC has awarded over $100 million to sustainable development projects since 2001.

Through a regional effort called Vision North Texas, alternative growth visions (i.e., connected centers; return on investment; diverse, distinct communities; and green region) have been developed and analyzed as to their effect on travel demand. The four visioning alternatives show that changes in development patterns could make a substantial difference to reducing travel time, commuting patterns, congestion, delay, infrastructure need, and air quality emissions. The MTP summarizes these alternative growth visions as potential options municipalities could incorporate into their land-use policies to address regional transportation and environmental issues. None of these alternative growth visions was selected or adopted through NCTCOG Executive Board or RTC action or by *Mobility 2035 – 2013 Update*. The officially adopted NCTCOG *2040 Demographic Forecast* served as the basis for all travel demand modeling performed for *Mobility 2035 – 2013 Update*.

The future roadway network outlined in *Mobility 2035 – 2013 Update* was developed in response to the land-use changes and growth in the region predicted in the *2040 Demographic Forecast*. The proposed 2035 transportation system (including the priced facility network) may affect land-use by helping to enhance land development or redevelopment opportunities. However, the transportation system is only one factor in creating favorable land development conditions; other prerequisites for growth in the region include demand for new development, favorable local and regional economic conditions, adequate utilities, and supportive local land development regulations and policies.

4.2 AIR QUALITY

As shown in Table 7, the regional priced facility system would provide additional travel capacity to the roadway network, which would allow a greater flow of traffic throughout the region thereby decreasing the amount of cars traveling at lower speeds or idling conditions. This would result in less fuel combustion and lower emissions including mobile source air toxins, carbon monoxide, and ozone precursors. The *2013 Transportation Conformity* and its two supporting documents, *Mobility 2035 – 2013 Update* and *2013-2016 Transportation Improvement Program for North Central Texas*, assess transportation impacts to regional ozone and general regional air quality. The final result of the studies showed that the regional roadway network (including priced facilities) would show a decrease in nitrogen oxides and emissions of volatile organic compounds, which are both precursors to ozone.

4.3 ENVIRONMENTAL JUSTICE POPULATIONS

Nondiscrimination efforts are also considered during the development of the MTP, the regional tolling analysis, and during the NEPA process. These analyses were performed to ensure that minority and low-income populations do not bear disproportionately high and adverse human health or environmental effects resulting from the implementation of a transportation system. Nondiscrimination principles were incorporated throughout the development of *Mobility 2035 – 2013 Update.* This section analyzes potential impacts to environmental justice (protected) populations in terms of mobility and accessibility, transportation system performance, travel time, and origin and destination to ensure that beneficial and adverse effects are fairly distributed.

Section 4.3.1 provides a summary of the environmental justice analysis carried out for *Mobility 2035 – 2013 Update*. The MTP analysis uses an environmental justice index (EJI) to classify geographies into protected and non-protected environmental justice categories. Using the EJI, low-income and minority status were aggregated and analyzed together in an effort to examine the effects of recommendations in *Mobility 2035 – 2013 Update* on the protected population as a whole. Based on 2000 census data, three variables, including percent below poverty, percent minority, and persons per square mile, were used to classify block groups into protected (dense minority and/or low-income populations) and non-protected categories. This methodology was based on NCHRP Report 532 *Effective Methods for Environmental Justice Assessment* and helps better reflect the demographic and development patterns of the North Central Texas region.

Additional environmental justice analysis based specifically on the priced facilities plan components is covered in Sections 4.3.2 to 4.3.5. This analysis is conducted at the transportation survey zone (TSZ) level. Minority TSZs were identified based on the federal CEQ guidance document *Environmental Justice: Guidance Under the National Environmental Policy Act*. Based on this guidance, minority TSZs were identified where the minority population (any race/ethnicity except non-Hispanic white based on 2010 census redistricting data) of the TSZ exceeded 50 percent. The meaningfully greater threshold in the CEQ guidance was not used. The regional minority population average is 41.3 percent; therefore, twice this regional average is 82.6 percent so the lower (50 percent) threshold was used to ensure no minority populations were excluded in the analysis. A low-income TSZ was defined as having 50 percent or more of the TSZ population residing in a census block group where the 2009 median household income was below the 2009 poverty level of $22,050 established by HHS for a family of four. Income data was based 2005-2009 American Community Survey (ACS) data. TSZs are classified into four categories: non-environmental justice TSZs, minority alone TSZs, low-income alone TSZs, and both minority and low-income TSZs.

For the purposes of travel modeling, the MPA was divided into TSZs. There are 5,252 TSZs within the MPA. A total of 2,274 TSZs are considered environmental justice TSZs (111 low-income alone; 1,942 minority alone; 221 both low-income and minority). Figure 10 shows the TSZs that contain environmental justice populations. Throughout the environmental justice TSZ analysis, the totals relating to all 332 low-income TSZs are calculated by combining information for low-income alone TSZs and both low-income and minority TSZs. Similarly, the totals relating to all 2,163 minority TSZs are calculated by combining information for minority alone TSZs and both low-income and minority TSZs.

4.3.1 Mobility and Accessibility

Mobility is the potential for movement or the ability to travel from one place to another. Accessibility measures how well the transportation system provides access to locations and opportunities. Factors that impact accessibility include the cost in both time and dollars and the number of choices available to reach a location. Accessibility has a direct impact on quality of life. For this reason the performance characteristics focus on measuring accessibility versus mobility. As part of the regional commitment to providing a transportation system that is equally accessible and beneficial to all populations of the region, NCTCOG performed a system-level analysis during the development of *Mobility 2035 – 2013 Update* on the proposed transportation improvements included in the:

- 2035 build network (all *Mobility 2035 – 2013 Update* recommended roadway and transit facilities with year 2035 demographics from the *2040 Demographic Forecast*)
- 2035 full no build network (2013 roadway and transit facilities with year 2035 demographics from the *2040 Demographic Forecast*)

The following summarizes this analysis. Please see Chapter 3 and Appendix B of *Mobility 2035 – 2013 Update* for more discussion of the methodology and results for the MTP environmental justice analysis.

Table 15 shows the results of the analysis included in *Mobility 2035 – 2013 Update*. This analysis shows the 2035 build network would provide protected populations access to 26 percent more jobs accessible within 30 minutes by car and 76 percent more jobs accessible within 60 minutes by transit in the future when compared to the 2013 network. Non-protected populations would also experience a one percent increase in the number of jobs accessible within 30 minutes by auto and a 113 percent increase in the number of jobs within 60 minutes by transit compared to the 2013 network. In comparison to non-protected classes, these results show a 25 percent greater increase in access to jobs for protected classes by vehicles. For jobs accessible by transit, non-protected classes show a greater increase (37 percent more) than protected classes. This trend supports the additional transit improvements in *Mobility 2035 – 2013 Update*, as transit completes its initial build-out for the central region, future projects expand to the suburbs and rural areas, which have a higher non-protected class population. Roadway improvements have a greater benefit to protected classes, increasing their accessibility to jobs versus non-protected classes. For both auto travel and transit, protected populations have access to more jobs than non-protected populations.

Table 15. *Mobility 2035 – 2013 Update* Accessibility and Mobility Performance Measures

Measure	Protected			Non-Protected		
	2013 Network	2035 Build Network	2035 Full No Build Network	2013 Network	2035 Build Network	2035 Full No Build Network
Number of jobs accessible within 30 minutes by automobile*	981,839	1,238,172	867,244	554,399	557,689	363,927
Percent change from 2013 network	--	26%	-12%	--	1%	-34%
Number of jobs accessible within 60 minutes by transit*	1,500,158	2,643,513	1,847,516	863,602	1,836,797	937,488
Percent change from 2013 network	--	76%	23%	--	113%	9%
Percent of lane-miles congested	44%	54%	59%	41%	53%	63%
Percent change from 2013 network	--	23%	34%	--	29%	54%

Source: Mobility 2035 – 2013 Update, Chapter 3, June 2013
* The travel time threshold of 30 minutes by auto and 60 minutes by transit are based on regional travel patterns

Percent of lane-miles of congestion is another metric utilized in *Mobility 2035 – 2013 Update* to assess performance. The methodology to determine which roads are congested is based on peak hour capacity, lane miles of roadway, and the functional class. A full explanation plus the formula used to calculate this metric can be found in Appendix B: Social Considerations, pages B.20 to B.21. Under the 2013 network, the protected populations experience slightly more lanes-miles of congestion than the non-protected population and this trend will continue in the 2035 build network. However, congestion increases for the non-protected population will outpace the protected population in the 2035 full no build network resulting in greater percent lane-miles of congestion. This is a direct result of the population forecasts that indicate increased population density in the urban core where the concentration of protected populations is the greatest. While percent lane-miles of congestion increases for both the protected and non-protected populations in the 2035 build and 2035 full no build networks, in both instances the non-protected population sees a larger percentage increase.

4.3.2 Transportation System Performance

To specifically analyze the transportation effects of the priced facilities on environmental justice populations, regional traffic was modeled under the three transportation network conditions:

- 2013 network (2013 roadway and transit facilities with 2013 demographics)
- 2035 build network (all *Mobility 2035 – 2013 Update* recommended roadway and transit facilities with year 2035 demographics from the *2040 Demographic Forecast*)
- 2035 priced facilities no build network [all recommended transportation (roadway and transit) facilities in *Mobility 2035- 2013 Update* except proposed roadway facilities with any priced elements (built after 2013) with year 2035 demographics from the *2040 Demographic Forecast*]

The daily VMT on each roadway classification under the three conditions is shown in Table 16. In the 2013 network there are approximately 19.9 million trips per day on the roadway system. Freeway facilities, which comprise 9.6 (Table 7) percent of the total roadway lane-miles, carry 40.9 percent of the daily VMT. Priced (toll road) facilities carry 5.0 percent of all VMT.

Table 16. Daily Vehicle Miles Traveled

Roadway Classification	2013 Network		2035 Priced Facility No Build Network		2035 Build Network	
	Daily VMT	Percent	Daily VMT	Percent	Daily VMT	Percent
Freeways	74,213,833	40.9%	99,393,061	37.3%	106,618,321	37.9%
Toll Roads	9,053,608	5.0%	13,188,768	4.9%	19,019,327	6.8%
Major Arterials	34,498,570	19.0%	55,522,984	20.8%	55,450,162	19.7%
Minor Arterials	36,564,940	20.1%	54,729,288	20.5%	54,757,528	19.4%
Collectors	12,810,171	7.1%	20,775,163	7.8%	20,631,759	7.3%
Access Ramps	6,827,949	3.8%	9,815,020	3.7%	10,342,215	3.7%
Frontage Roads	6,741,676	3.7%	11,286,792	4.2%	11,142,796	4.0%
HOV	805,998	0.4%	776,656	0.3%	na	na
Express/HOV and Tolled Managed Lanes	na	na	1,173,854	0.4%	3,618,473	1.3%
Total Daily VMT	**181,516,746**	**100.0%**	**266,661,586**	**100.0%**	**281,580,581**	**100.0%**
Daily Total Trips	19,919,980		29,081,291		29,148,877	

Source: DFX runs for *Mobility 2035 – 2013 Update* (2013 and 2035 build networks) and 2035 priced facilities no build network run

Under the 2035 priced facilities no build network, the total number of daily trips increases to approximately 29.1 million because of projected population increases. Capacity constraints increased the proportion of VMT on priced facilities slightly (both toll roads, express/HOV, and tolled managed lanes) by 0.3 percent and decreased on freeways (including HOV lanes) by 3.7 percent in comparison to the existing 2013 network. All roadway classifications, except HOV, have a higher VMT under this condition than under the 2013 network.

The 2035 build network has over 29.1 million trips per day, over 67,000 more than under the 2035 priced facilities no build network because of improved transportation system performance. The combined proportion of VMT on freeways and priced facilities is 46.0 percent compared to 42.9 percent under the 2035 priced facilities no build network. The greater VMT on freeways and priced facilities under the 2035 build network would reduce the amount of VMT on major arterials, frontage roads, and collectors compared to the 2035 priced facilities no build network.

A comparison of the average loaded speed per roadway classification is shown in Table 17. The average loaded speed is the average speed a vehicle travels (including congestion delays) along a specific roadway classification and is calculated by dividing the total VMT by the total vehicle hours traveled. The results show that the 2035 build network would result in a slight increase in daily roadway speed for most roadway classifications compared to the 2035 priced facilities no build network. The average loaded speeds for the 2035 build network would be lower than the 2013 network because of the expected population increase of over 45 percent (see Table 6).

Table 17. Average Loaded Speed (mph)

Roadway Classification	2013 Network			2035 Priced Facility No Build Network			2035 Build Network		
	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily
Freeways	42.8	48.3	53.5	36.3	38.2	44.0	36.9	38.0	44.1
Toll Roads	41.2	42.0	46.8	27.1	31.9	39.5	31.7	36.3	43.4
Major Arterials	32.1	33.0	35.7	26.3	28.9	32.5	26.8	28.9	32.6
Minor Arterials	29.7	30.4	32.1	25.2	27.6	30.1	25.8	27.8	30.3
Collectors	24.2	24.7	26.0	20.2	21.7	23.7	20.3	21.6	23.6
Access Ramps	31.8	32.6	34.9	29.0	30.5	33.2	30.0	30.9	33.6
Frontage Roads	26.1	27.2	29.2	21.8	24.0	26.1	22.7	24.3	26.3
HOV Lanes	52.1	56.2	56.0	35.3	48.7	46.8	na	na	na
Express/HOV and Tolled Managed Lanes	na	na	na	57.7	58.2	57.2	49.2	54.5	54.0

Source: DFX runs for *Mobility 2035 – 2013 Update* (2013 and 2035 build networks) and 2035 priced facilities no build network run

Table 18 shows a comparison of the congestion levels during the morning peak period for the three analysis conditions. The morning peak period was used because it best represents travel to work; the evening peak period includes more discretionary travel. The 2035 build network and the 2035 priced facilities no build network show that, compared to the 2013 network, a lower percentage of lane-miles are at LOS A, B, and C for all roadway classifications except toll roads under the 2035 build network. Existing HOV lanes would be removed by 2035 and replaced with express/HOV and tolled managed lanes in the 2035 build network as stated in Section 3.1. In addition, the 2035 build network and the 2035 priced facilities no build network show that, compared to the 2013 network, more lane-miles are at LOS F for all roadway classifications except express/HOV and tolled managed lanes. Under the 2035 build network the overall proportion of lane-miles at LOS F is lower than the 2035 priced facilities no build network. Even implementing all the transportation system improvements in *Mobility 2035 – 2013 Update*, including the additional priced facilities, is not expected to accommodate the increased travel demand created by an increasing regional population without a degradation of LOS throughout the roadway network compared to the 2013 network.

Table 18. Morning Peak Period (6:30 am to 9:00 am) Level of Service for the MPA

Roadway Classification	2013 Network			2035 Priced Facility No Build Network			2035 Build Network		
	Lane-Miles	LOS	% by Class	Lane-Miles	LOS	% by Class	Lane-Miles	LOS	% by Class
Freeways	4,506	A-B-C	72.1%	4,897	A-B-C	62.1%	5,198	A-B-C	60.7%
		D-E	17.6%		D-E	20.3%		D-E	21.7%
		F	10.2%		F	17.6%		F	17.6%
Toll Roads	657	A-B-C	72.5%	781	A-B-C	66.3%	1,628	A-B-C	77.1%
		D-E	15.7%		D-E	10.6%		D-E	9.5%
		F	11.8%		F	23.1%		F	13.4%
Major Arterials	6,798	A-B-C	81.5%	8,463	A-B-C	67.3%	8,462	A-B-C	67.3%
		D-E	10.5%		D-E	13.3%		D-E	13.9%
		F	8.0%		F	19.4%		F	18.8%
Minor Arterials	12,457	A-B-C	90.5%	13,708	A-B-C	81.6%	13,725	A-B-C	82.1%
		D-E	5.5%		D-E	8.0%		D-E	8.3%
		F	4.0%		F	10.3%		F	9.6%
Collectors	18,162	A-B-C	97.1%	18,263	A-B-C	92.3%	18,239	A-B-C	92.6%
		D-E	1.8%		D-E	3.7%		D-E	3.7%
		F	1.1%		F	4.0%		F	3.7%
Access Ramps	1,024	A-B-C	85.1%	1,211	A-B-C	79.3%	1,312	A-B-C	79.1%
		D-E	6.0%		D-E	7.8%		D-E	8.3%
		F	8.9%		F	12.8%		F	12.6%
Frontage Roads	3,015	A-B-C	91.2%	3,699	A-B-C	85.9%	3,900	A-B-C	87.3%
		D-E	5.0%		D-E	6.3%		D-E	6.3%
		F	3.8%		F	7.8%		F	6.5%
HOV Lanes	138	A-B-C	86.4%	138	A-B-C	84.6%	na		
		D-E	7.5%		D-E	4.3%			
		F	6.1%		F	11.1%			
Express HOV and Tolled Managed Lanes	Na			197	A-B-C	99.1%	688	A-B-C	96.9%
					D-E	0.7%		D-E	1.0%
					F	0.2%		F	2.0%

Source: DFX runs for *Mobility 2035 – 2013 Update* (2013 and 2035 build networks) and 2035 priced facilities no build network run

4.3.3 Travel Time

A travel time comparison for environmental justice and non-environmental justice traffic survey zones (TSZ) was performed based on the 2013, 2035 build, and 2035 priced facilities no build networks previously described. The increase in average trip times expected for residents of both environmental justice and non-environmental justice TSZs was smaller (3.6 and 2.9 percent, respectively) under the 2035 build network than the 2035 priced facilities no build network. The reduced congestion and improved travel efficiency under the 2035 build network allows longer average trip lengths for residents of all TSZs when compared to the 2035 priced facility no build network. Based on the large increase in trip times in both 2035 networks, the average speed during the morning peak period is projected to decrease. The decrease in average travel speed for trips from all TSZs was between 6.6 and 8.6 percent smaller in the 2035 build network than in the 2035 priced facilities no build network. The results indicate that trips from both environmental justice and non-environmental justice TSZs receive travel benefits under the 2035 build network. Table 19 shows the changes in average travel time, trip length, and trip speed between morning peak period trips under the 2035 priced facilities no build and 2035 build networks as compared to 2013 network.

Table 19. Morning Peak Period (6:30 am to 9:00 am) Trip Characteristics (Roadway Users)

	All MPA TSZs	Environmental Justice Status		Environmental Justice TSZ Type		
		Non-Environmental Justice TSZs	Environmental Justice TSZs	Low-Income Alone	Minority Alone	Both Low-Income and Minority
Average Vehicle Trip Time (minutes)						
2013 Network	19.0	20.7	16.4	18.0	16.5	15.1
2035 Priced Facilities No Build Network	23.5	26.3	18.9	18.9	19.1	16.3
Percent Change from 2013	23.7%	27.1%	15.2%	5.0%	15.8%	7.9%
2035 Build Network	22.9	25.7	18.3	18.7	18.5	16.0
Percent Change from 2013	20.5%	24.2%	11.6%	3.9%	12.1%	6.0%
Average Vehicle Trip Length (miles)						
2013 Network	10.4	11.5	8.8	11.0	8.8	8.1
2035 Priced Facilities No Build Network	10.3	11.4	8.5	10.5	8.5	7.8
Percent Change from 2013	-1.0%	-0.9%	-3.4%	-4.5%	-3.4%	-3.7%
2035 Build Network	10.9	12.1	9.1	10.9	9.1	8.2
Percent Change from 2013	4.8%	5.2%	3.4%	-0.9%	3.4%	1.2%
Average Vehicle Trip Speed (mph) [including congestion and traffic control delays]						
2013 Network	32.8	33.3	32.2	36.7	32.0	32.2
2035 Priced Facilities No Build Network	26.3	26.0	27.0	33.3	26.7	28.7
Percent Change from 2013	-19.8%	-21.9%	-16.1%	-9.3%	-16.6%	-10.9%
2035 Build Network	28.6	28.2	29.8	35.0	29.5	30.8
Percent Change from 2013	-12.8%	-15.3%	-7.5%	-4.6%	-7.8%	-4.3%

Source: DFX runs for *Mobility 2035 – 2013 Update* (2013 and 2035 build networks) and 2035 priced facilities no build network run

Transit users from both environmental justice and non-environmental justice TSZs receive travel benefits from transit improvements included in *Mobility 2035 – 2013 Update*. Table 20 shows the total trips, average travel time, trip length, and trip speed for morning peak period transit trips under the 2013 network, 2035 priced facilities no build network, and 2035 build network. In all three conditions, trips from environmental justice TSZs are a majority of transit trips. The 2035 build network shows the longest average transit trip lengths and highest average speeds for all TSZs, so the number of jobs accessible by transit would probably be highest under this condition. The shorter trip distances and lower speeds for transit trips from environmental justice TSZs may reflect greater access to and use of transit bus service. Transit users from non-environmental justice TSZs may be more likely to use park and ride facilities or rail transit, resulting in longer (in both time and distance) transit trips at higher speeds.

Table 20. Morning Peak Period (6:30 am to 9:00 am) Trip Characteristics (Transit Users)

		Environmental Justice Status		Environmental Justice TSZ Type		
	All MPA TSZs	**Non-Environmental Justice TSZs**	**Environmental Justice TSZs**	**Low-Income Alone**	**Minority Alone**	**Both Low-Income and Minority**
Total Transit Trips						
2013 Network	109,418	40,167 36.7%	69,251 63.3%	853 0.8%	58,629 53.6%	9,769 8.9%
2035 Priced Facilities No Build Network	197,724	86,296	111,428	1,633	96,015	13,780
Percent Change from 2013	80.7%	114.8%	60.9%	91.4%	63.8%	41.1%
2035 Build Network	200,004	87,671	112,333	1,697	96,703	13,933
Percent Change from 2013	82.8%	118.3%	62.2%	98.9%	64.9%	42.6%
Average Trip Time (minutes) (in vehicle travel time)						
2013 Network	22.2	22.4	22.1	18.3	22.4	20.3
2035 Priced Facilities No Build Network	24.4	25.8	23.3	19.4	23.7	21.0
Percent Change From 2013	9.9%	15.2%	5.4%	6.0%	5.8%	3.4%
2035 Build Network	25.0	26.9	23.6	20.3	24.0	21.3
Percent Change from 2013	12.6%	20.1%	6.8%	10.9%	7.1%	4.9%
Average Trip Length (miles) (in vehicle travel time)						
2013 Network	10.1	11.6	9.3	7.8	9.6	7.7
2035 Priced Facilities No Build Network	12.7	14.8	11.0	9.5	11.4	8.5
Percent Change from 2013	25.7%	27.6%	18.3%	21.8%	18.8%	10.4%
2035 Build Network	13.5	16.0	11.6	10.5	11.9	9.2
Percent Change from 2013	33.7%	37.9%	24.7%	34.6%	24.0%	19.5%
Average Travel Speed (mph)						
2013 Network	27.3	31.1	25.2	25.6	25.7	22.8
2035 Priced Facilities No Build Network	31.2	34.4	28.3	29.4	28.9	24.3
Percent Change from 2013	14.3%	10.6%	12.3%	14.8%	12.5%	6.6%
2035 Build Network	32.4	35.7	29.5	31.0	29.8	25.9
Percent Change from 2013	18.7%	14.8%	17.1%	21.1%	16.0%	13.6%

Source: DFX runs for *Mobility 2035 – 2013 Update* (2013 and 2035 build networks) and 2035 priced facilities no build network run

The number of transit trips from low-income TSZs may under-represent the actual usage by low-income populations. On-board surveys conducted by DART in 2007 and FWTA in 2008 showed that 27.4 percent of transit users had an annual household income below $10,000 and 56.3 percent were in households with income below $25,000. Although zero car households account for only five percent of regional households, 60 percent of transit users have no car.

Much of the differential in the distribution in improvements to trip characteristics is a reflection of the urban nature of the environmental justice TSZs as shown in Table 21. The proportion of environmental justice TSZs located in urban areas (central business districts, outer business district, or urban residential) is 85.5 percent compared to 56.2 percent for non-environmental justice TSZs. Of the TSZs classified as low-income or both minority and low-income, 86.1 percent (286 of 332) are in urban areas or business districts.

Table 21. TSZ Area Types

Area Type	All MPA TSZs	Environmental Justice Status: Non-Environmental Justice TSZs	Environmental Justice Status: Environmental Justice TSZs	Environmental Justice TSZ Type: Low-Income Alone	Environmental Justice TSZ Type: Minority Alone	Environmental Justice TSZ Type: Both Low-Income and Minority
Central Business District	195	159	36	3	33	0
	3.7%	5.3%	1.6%	2.7%	1.7%	0.0%
Outer Business District	542	288	254	17	211	26
	10.3%	9.7%	11.2%	15.3%	10.9%	11.8%
Urban Residential	2,880	1,226	1,654	56	1,414	184
	54.8%	41.2%	72.7%	50.5%	72.8%	83.3%
Suburban Residential	905	635	270	15	245	10
	17.2%	21.3%	11.9%	13.5%	12.6%	4.5%
Rural	730	670	60	20	39	1
	13.9%	22.5%	2.6%	18.0%	2.0%	0.5%
Total	5,252	2,978	2,274	111	1,942	221

Source: DFX runs for *Mobility 2035 – 2013 Update* (2035 build network)

Table 22 shows how travel performance improvements for roadway users under the 2035 build network vary based on the land area type. The travel characteristics in suburban areas, where trip lengths and times start at a higher baseline, change by larger absolute and relative amounts than in the urban residential areas. Because the environmental justice TSZs are predominantly in urban residential areas, the change in average trip times and lengths are smaller than for non-environmental justice TSZs in both the 2035 build network and the 2035 priced facility no build network. Persons traveling to/from suburban and rural areas would see a larger relative degradation of service compared to the 2013 network in both the 2035 build network and 2035 priced facility no build network.

Table 22. Area Type Average Morning (6:30 am to 9:00 am) Peak Trip Characteristics

	Central Business District	Outer Business District	Urban Residential	Suburban Residential	Rural
Average Vehicle Trip Time (minutes)					
2013 Network	16.6	14.5	17.0	23.0	26.2
2035 Priced Facilities No Build Network	17.5	16.9	20.4	29.1	29.0
Percent Change from 2013	5.4%	16.6%	20.0%	26.5%	10.7%
2035 Build Network	17.4	16.7	19.7	28.3	28.6
Percent Change from 2013	4.8%	15.2%	15.9%	23.0%	9.2%
Average Vehicle Trip Length (miles)					
2013 Network	10.5	7.6	8.9	12.8	16.6
2035 Priced Facilities No Build Network	9.8	7.8	8.5	11.9	15.4
Percent Change from 2013	-6.7%	2.6%	-4.5%	-7.0%	-7.2%
2035 Build Network	10.3	8.3	9.1	12.6	16.0
Percent Change from 2013	-1.9%	9.2%	2.2%	-1.6%	-3.6%
Average Vehicle Trip Speed (mph) [including congestion and traffic control delays]					
2013 Network	38.0	31.4	31.4	33.4	38.0
2035 Priced Facilities No Build Network	33.6	27.7	25.0	24.5	31.9
Percent Change from 2013	-11.6%	-11.8%	-20.4%	-26.6%	-16.1%
2035 Build Network	35.5	29.8	27.7	26.7	33.6
Percent Change from 2013	-6.6%	-5.1%	-11.8%	-20.1%	-11.6%

Source: DFX runs for *Mobility 2035 – 2013 Update* (2013 and 2035 build networks) and 2035 priced facilities no build network run

4.3.4 Congestion Levels

The daily congestion levels within the MPA under the 2013, 2035 priced facilities no build, and 2035 build networks are shown in Table 23. This analysis shows the percentage of TSZs with no, light, moderate, and severe congestion based on environmental justice status. Both the 2035 build network and 2035 priced facility no build network show much higher congestion levels than the 2013 network. In general, the total percentage of TSZs with no or light congestion and the total percentage of TSZs with moderate to severe congestion is expected to be approximately the same for environmental justice and non-environmental justice TSZs. In all three network conditions environmental justice TSZs are projected to have fewer no congestion and severe congestion TSZs, but more light to moderate congestion TSZs than the non-environmental justice areas. The large differential between environmental justice and non-environmental justice TSZs that have no congestion is expected because most of the No Congestion TSZs are in rural areas where environmental justice communities are less common. Figures 4 and 11 show the congestion levels under the 2035 build network and 2035 priced facilities no build network, respectively.

Table 23. Environmental Justice TSZ Congestion Levels

Congestion Level	All MPA TSZs	Environmental Justice Status: Non-Environmental Justice TSZs	Environmental Justice Status: Environmental Justice TSZs	Environmental Justice TSZ Type: Low-Income Alone	Environmental Justice TSZ Type: Minority Alone	Environmental Justice TSZ Type: Both Low-Income and Minority
Total Number of TSZs	5,252	2,978	2,274	111	1,942	221
	Percentage of TSZs in the Environmental Justice category (within the same column)					
2013 Network						
No Congestion	13.2%	21.1%	2.9%	17.1%	2.3%	0.9%
Light Congestion	56.6%	48.7%	67.0%	34.2%	69.1%	65.2%
Moderate Congestion	22.1%	20.3%	24.4%	45.1%	22.5%	30.3%
Severe Congestion	8.1%	9.9%	5.7%	3.6%	6.1%	3.6%
2035 Priced Facilities No Build Network						
No Congestion	6.9%	11.1%	1.4%	15.3%	0.7%	0.0%
Light Congestion	34.6%	32.0%	38.1%	27.0%	39.1%	34.4%
Moderate Congestion	29.8%	26.9%	33.5%	29.8%	32.8%	42.5%
Severe Congestion	28.7%	30.0%	27.0%	27.9%	27.4%	23.1%
2035 Build Network						
No Congestion	7.3%	11.7%	1.5%	15.3%	0.9%	0.0%
Light Congestion	36.9%	33.1%	42.0%	27.9%	42.9%	40.7%
Moderate Congestion	29.4%	26.1%	33.6%	29.8%	32.9%	42.1%
Severe Congestion	26.4%	29.1%	22.9%	27.0%	23.3%	17.2%
Difference (2035 Build Network minus 2035 Priced Facilities No Build Network)						
No Congestion	0.4%	0.6%	0.1%	0.0%	0.2%	0.0%
Light Congestion	2.3%	1.1%	3.9%	0.9%	3.8%	6.3%
Moderate Congestion	-0.4%	-0.8%	0.1%	0.0%	0.1%	-0.4%
Severe Congestion	-2.3%	-0.9%	-4.1%	-0.9%	-4.1%	-5.9%

Source: DFX runs for *Mobility 2035 – 2013 Update* (2013 and 2035 build networks) and 2035 priced facilities no build network run
Note: Percentages may not sum to 100.0 percent due to rounding

Between the 2035 priced facilities no build network and the 2035 build network, the percentage of TSZs with moderate and severe congestion is projected to decrease by 0.4 percent and 2.3 percent, respectively. In general, congestion would be reduced for both environmental justice and non-environmental justice TSZs. The construction of additional facilities in the 2035 build network is projected to reduce the percentage of environmental justice TSZs with severe congestion by 4.1 percent.

4.3.5 Regional Origin-Destination Study

To further analyze the effects of the expansion of the priced facility network in the MPA, a regional origin-destination study of the morning peak period (6:30 am to 9:00 am) was performed to show how trips on priced facilities in the three networks are distributed based on the environmental justice status of TSZs. Figures 12 through 14 show the number of daily trips using priced facilities from environmental justices TSZs.

The origin-destination results for the 2013 network are shown in Table 24 and Figure 12. Almost all, 96.5 percent (2,195 of 2,274), environmental justice TSZs in the 2013 network generate at least one trip that utilizes a priced facility. The environmental justice TSZs generate a smaller portion of priced facility trips (35.2 percent) than would be expected based only on their share of the regional population (43.0 percent) or total vehicle trips (41.9 percent). A contributing factor to this difference is the average trip length and, as noted in Table 19, trips from environmental justice TSZs average 8.8 miles while trips from non-environmental justice TSZs average 11.5 miles in the 2013 network. For environmental justice TSZs, approximately 5.0 percent of trips would utilize tolled facilities in the 2013 network compared to 6.6 percent for non-environmental justice TSZs. This lower percentage of usage is likely a factor of the geographic location of existing toll roads relative to low-income and minority populations.

Table 24. Morning Peak Period (6:30 am to 9:00 am) Origin-Destination Results

Data of Interest	All MPA TSZs	Environmental Justice Status: Non-Environmental Justice TSZs	Environmental Justice Status: Environmental Justice TSZs	Environmental Justice TSZ Type: Low-Income Alone	Environmental Justice TSZ Type: Minority Alone	Environmental Justice TSZ Type: Both Low-Income and Minority
TSZs in the MPA	5,252	2,978 (56.7%)	2,274 (43.3%)	111 (2.1%)	1,942 (37.0%)	221 (4.2%)
2013 Population	6,778,201	3,862,580 (57.0%)	2,915,621 (43.0%)	70,191 (1.0%)	2,613,464 (38.6%)	231,996 (3.4%)
2035 Population	9,833,378	5,977,328 (60.8%)	3,856,050 (39.2%)	98,372 (1.0%)	3,462,607 (35.2%)	295,071 (3.0%)
TSZs Utilizing Priced Facilities (at least once per day)						
2013 Network	4,923 (93.7%)	2,728 (55.4%)	2,195 (44.6%)	87 (1.8%)	1,896 (38.5%)	212 (4.3%)
2035 Priced Facility No Build Network	5,096 (97.0%)	2,843 (55.8%)	2,253 (44.2%)	105 (2.1%)	1,930 (37.9%)	218 (4.3%)
2035 Build Network	5,184 (98.7%)	2,921 (56.3%)	2,263 (43.7%)	106 (2.0%)	1,937 (37.4%)	220 (4.2%)
Vehicle Trips Utilizing Priced Facilities from TSZs with any Priced Facility Trips						
2013 Network	193,257	125,322 (64.8%)	67,935 (35.2%)	1,678 (0.9%)	63,473 (32.8%)	2,784 (1.4%)
2035 Priced Facility No Build Network	303,587	211,302 (69.6%)	92,285 (30.4%)	3,809 (1.3%)	84,872 (28.0%)	3,604 (1.2%)
2035 Build Network	476,640	319,316 (67.0%)	157,324 (33.0%)	5,303 (1.1%)	144,394 (30.3%)	7,627 (1.6%)
Vehicle Trips on Entire Transportation Network from TSZs with any Priced Facility Trips						
2013 Network	3,273,568	1,902,424 (58.1%)	1,371,144 (41.9%)	41,079 (1.3%)	1,222,605 (37.3%)	107,461 (3.3%)
2035 Priced Facility No Build Network	4,816,738	2,974,797 (61.8%)	1,841,941 (38.2%)	62,529 (1.3%)	1,639,361 (34.0%)	140,051 (2.9%)
2035 Build Network	4,823,072	3,013,182 (62.0%)	1,849,169 (38.0%)	64,105 (1.3%)	1,644,695 (33.8%)	140,370 (2.9%)
Percent of Vehicle Trips (from TSZs with any Priced Facility Trips) Utilizing Priced Facilities						
2013 Network	5.9%	6.6%	5.0%	4.1%	5.2%	2.6%
2035 Priced Facility No Build Network	6.3%	7.1%	5.0%	6.1%	5.2%	2.6%
2035 Build Network	9.8%	10.6%	8.5%	8.3%	8.8%	5.4%

Source: DFX runs for *Mobility 2035 – 2013 Update* (2013 and 2035 build networks) and 2035 priced facilities no build network run

In the 2035 priced facilities no build network, 99.1 percent environmental justice TSZs (2,253 of 2,274) generate at least one trip that utilizes a priced facility (see Table 24 and Figure 13). The proportion of the regional population within environmental justice TSZs is projected to be 43.0 percent in 2013 and 39.2 percent in 2035. The environmental justice TSZ share of priced facility trips and total trips goes down between 2013 and 2035, but the percentage of priced facility trips decreases by a smaller amount (35.2 percent minus 33.4 percent equals 1.8 percent) than the proportion of the total population living in environmental justice TSZs (43.0 percent minus 39.2 percent equals 3.8 percent). A contributing factor to why 39.2 percent of the population (environmental justice population) only contributes 33.4 percent of the trips is because of the average trip length. As noted in Table 19, trips from environmental justice TSZs average 8.5 miles while non-environmental justice TSZs average 11.4 miles in the 2035 priced facilities no build network. Shorter trip lengths (as identified for environmental justice populations) are less likely to use priced facilities. For environmental justice TSZs, approximately 5.0 percent of trips would utilize tolled facilities in the 2035 priced facilities no build network compared to 7.1 percent for non-environmental justice TSZs.

In the 2035 build network, 99.5 percent environmental justice TSZs (2,263 of 2,274) generate at least one trip that utilizes a priced facility (see Table 24 and Figure 14). The environmental justice TSZ share of priced facility trips and total trips goes down between 2013 and 2035, but the percentage of priced facility trips decreases by a smaller amount (35.2 percent minus 33.0 percent equals 2.2 percent) than the proportion of the total population living in environmental justice TSZs (43.0 percent minus 39.2 percent equals 3.8 percent). These percentages are very similar to those on the 2035 priced facility no build network. A contributing factor to why 39.2 percent of the population (environmental justice population) only contributes 33.0 percent of the trips is because of the average trip length. As noted in Table 19, trips from environmental justice TSZs average 9.1 miles while non-environmental justice TSZs average 12.1 miles in the 2035 build network. Shorter trip lengths (as identified for environmental justice populations) are less likely to use priced facilities. For environmental justice TSZs, approximately 8.5 percent of trips would utilize tolled facilities in the 2035 build network compared to 10.6 percent for non-environmental justice TSZs.

Under the 2035 build network, slightly more TSZs (98.7 percent) would send trips to priced facilities than under the 2035 priced facility no build network (97.2 percent). As shown in Figures 12 and 13, existing toll roads are not adjacent to the majority of environmental justice TSZs, but proposed priced facilities would be built closer to environmental justice populations. This would increase accessibility to these roadway facilities as shown by the higher proportion of trips from environmental justice TSZs on priced facilities in the 2035 build network (8.5 percent) than in the 2035 priced facility no build network (6.3 percent).

The total number of trips on priced facilities in the 2035 build network is 476,640 during the morning peak period. This is 36 percent more than in the 2035 priced facility no build network and a 147 percent increase over the 2013 network. Similarly, the total trips on priced facilities from environmental justice TSZs in the 2035 build network is projected to be 157,324 during the morning peak period, an increase over the 2013 network and 2035 priced facility no build network of 132 percent and 35 percent, respectively. The 476,640 vehicle trips represents less than 10 percent of vehicle trips in the morning peak period; therefore, the majority of travel (over 90 percent) is occurring on non-priced facilities.

The potential impacts to low-income populations were evaluated because low-income populations would use a greater proportion of their income for transportation expenses. As shown in Table 24, of the 2,274 environmental justice TSZs, 332 TSZs (111 low-income alone plus 221 both low-income and minority TSZs) or 6.3 percent (332 of 5,252 total TSZs) are low-income. In the 2013 network, approximately 3.0 percent [from Table 24 (1,678 plus 2,784 divided by 41,079 plus 107,461)] of trips from these TSZs use priced facilities. In the 2035 priced facilities no build network, approximately 4.5 percent [from Table 24 (4,177 plus 5,028 divided by 62,529 plus 140,072)] of trips from these TSZs use priced facilities. Projections from the 2035 build network indicate that approximately 6.3 percent [also from Table 24 (5,303 plus 7,627 divided by 64,105 plus 140,370)] of trips from low-income TSZs would use priced facilities.

4.3.6 Annual Toll Cost

Based on survey data from existing toll roads collected by NTTA in the spring of 2011, the average trip length for travelers who used an NTTA facility was 26.5 miles, with an average distance traveled of 11.8 miles on NTTA facilities (45 percent of trip length). Due to survey tabulation assumptions, especially the removal of short distance trips from the sample, the trip lengths reported in this section are longer than those reported in Table 19. The trip length distribution used in the model is based on broader household survey data collected by NCTCOG. Because of these differences, the NTTA data provides an upper bound on projected priced facility trip lengths.

While precautions were taken to ensure that trip-lengths derived from the NTTA survey reflected the actual trip lengths of toll road users, some limitations associated with the survey should be noted. This survey mainly targeted automobile users and as a result the response rate from commercial truck drivers was just 0.3 percent, compared to the NTTA system-wide average toll transaction share for vehicles with more than two axles of more than 1.5 percent. To obtain a sufficient database to derive the values of time of the travelers, the survey excluded respondents with trip travel times less than ten minutes. Without this minimum travel time requirement, trip lengths derived from the survey would have been reduced. As the survey mainly targeted NTTA customers, the ratio of toll road users as percentage of all travelers may be higher among survey respondents than in the general population and although each demographic category had adequate representation in the survey responses, the ratio of demographic categories from the survey will not be the same as that in the US Census.

Using this information, the following is an estimated example of the cost that may be incurred by a vehicle using the regional priced facility system. If the average rate of 12.5, 14.5, and 17 cents a mile (the low, average, and high toll rates based upon the RTC Policy dated September 2006 is used, the potential cost can be illustrated using the following scenario. Assuming a vehicle would make 250 (five days a week for 50 weeks) round-trips per year based on a five-day work week with an average trip length of 23.6 miles (11.8 miles times two) on fixed price facilities, that vehicle would travel a total of 5,900 miles on the priced facility in one year.

Table 3 identified the median household income for the region at $59,093 and the HHS low-income at $22,050 for a family of four in 2009. The regional median household income is 2.7 times the income for a family at the low-income threshold. This shows that each dollar spent by a low-income family on goods and services (including tolls) is a much larger percentage of the total family income.

As shown in Table 25, for a vehicle charged the base tolling rate the annual toll cost would be approximately $737.50, $855.50, and $1,003.00 for toll rates of 12.5, 14.5, and 17 cents per mile, respectively. A vehicle using a priced facility with an annual household income equal to the median household income of the MPA ($59,093) would spend between 1.2 and 1.7 percent of the household income on tolls. A vehicle using a priced facility with an annual household income equal to the 2009 HHS low-income household threshold for a family of four ($22,050) would spend between 3.3 and 4.5 percent of the household income on tolls. Vehicles charged at the premium rate (50 percent increase over the base rate, see Section 3.1.1) would have an annual toll cost of $1,106.25, $1,283.25, and $1,504.50 for toll rates of 18.75, 21.75, and 25.5 cents per mile, respectively. These premium rates would amount to between 1.9 and 2.5

percent of the median annual household income and between 5.0 and 6.8 percent of a household at the year 2009 HHS low-income threshold.

Table 25. Annual Cost of Tolls

Toll Rate (per mile)	Annual Cost	Percent of Average MPA Household Income	Percent of HHS Low-Income Household Threshold (Year 2009)
Base Rate			
12.5 cents	$737.50	1.2%	3.3%
14.5 cents	$855.50	1.4%	3.9%
17.0 cents	$1,003.00	1.7%	4.5%
Premium Rate (50 percent increase over Base Rate)			
18.75 cents	$1,106.25	1.9%	5.0%
21.75 cents	$1,283.25	2.2%	5.8%
25.5 cents	$1,504.50	2.5%	6.8%

4.3.7 Transportation Benefits

While the previous sections focused on potential impacts from priced facilities within the regional transportation system, these facilities are also expected to provide benefits to system users. Benefits from the transportation system can be categorized into two forms: quality of life and economic. Quality of life benefits include the social benefits to persons within the Dallas-Fort Worth region. Economic benefits would be realized by many users of the regional transportation system (including private individuals, area businesses, and freight transporters) with the implementation of the planned improvements in *Mobility 2035 – 2013 Update*.

Quality of life is enhanced through various benefits within the proposed transportation network from *Mobility 2035 – 2013 Update* (see Chapter 7 of *Mobility 2035 – 2013 Update*). The transportation system, including priced facilities, increases the number of travel options available to transportation system users. These facilities serve as bus transit corridors, improving the performance of the on-road transit system. The planned priced facility projects help to manage congestion, improve air quality (and therefore health), improve travel time reliability, and improve safety compared to the no build and priced facility no build alternatives. By helping to reduce overall congestion levels, improvements to the overall transportation system, including priced facilities, also contributes to the economic vitality of the region.

The express/HOV lane system proposed in the North Texas region also provides a method for a reliable vehicle trip with a target speed of 50 mph through variable-rate tolling using a fixed pricing schedule. Managed tolled lanes take this step further by dynamically adjusting the toll cost to maintain a guaranteed 50 mph throughout the managed toll lanes. Although a toll is required for vehicle use, both buses and emergency service vehicles will be allowed to use these facilities without a toll payment. This free usage allows better and more reliable service from the bus transit system and emergency vehicles attempting to respond to calls. An increase in service for both bus and emergency vehicles improves the quality of life for those choosing to use or in need of those services, respectively.

As stated in Sections 3.1 and 3.1.4, the revenue from priced facilities will help to finance improvements/rehabilitation of both tolled (dynamic and fixed rate) and non-tolled facilities. This financing is also accelerating the funding for construction as compared to traditional tax-supported highway finance, thereby minimizing capital costs and making new transportation capacity (via transit, roadway, or other modes) available to the traveling public sooner.

Additionally, the RTC managed lane policy details excess revenue guidelines for tollways, express/HOV, and managed toll lane facilities (see Section 3.1.3). Upfront payments for toll road rights (such as SH 121 and SH 161 from the NTTA) and excess toll revenue that may be generated by any of the future regional express/HOV or managed tolled lane system would be funneled into the RTR fund. Various transportation agencies and local entities are allocated funds through the RTR program for specific projects within the region, allowing the implementation of transportation improvements in addition to those funded through traditional funding mechanisms (see Section 3.1.4).

5.0 INCOMPLETE OR UNAVAILABLE INFORMATION

The traffic analysis performance report, travel time comparison, and origin-destination studies were completed using the DFX. This application is developed and maintained by the NCTCOG Model Development Group and consists of a collection of software components implemented on the TransCAD® 5.0 platform. The DFX is a four-step trip-based travel demand model which models an approximately 10,000 square mile area in North Central Texas. The four steps of the modeling process are: trip generation, trip distribution, mode choice, and traffic assignment. The model was validated (for the year 2007) using a variety of user surveys and traffic counts to ensure that roadway traffic volume, transit usage, peak/off-peak period conditions, and roadway speeds are accurately reproduced by the model.

The DFX application was implemented to forecast travel demand within the MPA. It is not a social or economic prediction model, but it does incorporate some income data in the trip generation, mode choice, and transit trip assignment steps for home based work trips. Within each TSZ the total population, number of households, and number of jobs in several employment categories vary depending on the selected year of analysis and/or demographic scenario. The forecasted demographic datasets used in this analysis are derived from the NCTCOG *2040 Demographic Forecast*. Median income levels for each TSZ are included as primary demographic inputs, but they are held largely static (except for inflation adjustments) for all modeled years and scenarios because no reliable forecasts of changes in the geographic distribution of income levels are available. At no point in the modeling process is the race or ethnicity of transportation system users considered or documented.

The ratio of the median income of a TSZ to the regional median income is used to calculate the relative proportions of households that fall into the four modeled income quartiles. The ratio of population to the number of households is used to create a frequency distribution of household sizes ranging from one-person to six-, or more, person households. These two statistically derived distributions along with the area type (rural, suburban residential, urban residential, central business district, and outer business district) are used in trip generation calculations. The functions used to generate these statistical distributions were derived to be consistent with observed demographic characteristics within the Dallas-Fort Worth region, based on the 2000 decennial census data.

In the trip generation step of the travel model forecasting process, the socio-economic characteristics of each TSZ are used to determine the number of trips that will be generated by and attracted to each TSZ. Trip production rates are based on the 1996 Dallas-Fort Worth household survey conducted by NCTCOG. Trip attraction rates are based on a 1994 workplace survey conducted by NCTCOG. These rates do not vary between model years or demographic scenarios. The rates are used in conjunction with the socio-economic data to calculate the number of various types of trips to and from each TSZ.

The mode choice step uses income distribution and household size data to estimate the number of vehicles available to members of each household. The number of vehicles available, household income and type of trip are all factored into mode choice decisions. A series of nested multinomial logit models is applied to estimate the number of person trips from each TSZ that will use each of the five-modeled modes: drive alone, two-person carpool, three-person or more carpool, transit with walk access, and transit with vehicle access.

Each vehicle trip is classified by the purpose of the trip. Each vehicle trip of a given type is treated equally by the model, so the socio-economic factors that contributed to the creation of any given vehicle trip do not factor into the trip assignment step of the modeling process. Vehicle trips are assigned to the roadway network based on minimizing generalized travel costs (including per-mile travel costs, value of time, and tolls where applicable) for each trip. As currently implemented, the modeling process requires all vehicle trips to operate under the same value of time assumptions. No data to reliably estimate variations in the value of time based on socio-economic status is readily available. At the step in the modeling process where socio-economic variations in the value of time would need to be applied, some of the relevant socio-economic information is no longer tracked by the DFX application.

Based on these characteristics of the modeling process, the environmental justice analysis performed using the DFX should be understood to have the following limitations:

- Data limitations
  - The demographics for all forecast years were generated on a geographic scale that is not identical to the TSZ structure used in DFX. Transferring demographic data from US Census geographies and NCTCOG Research and Information Services traffic survey zones required the application of statistical techniques that reduce the reliability of categorizations based on race, ethnicity, and economic status at the TSZ level.
  - Race and ethnicity are based on 2010 census data. Income is based on the 2005-2009 ACS. Therefore, the data used does not reflect any changes to these factors.
  - Model-derived projections of socio-economic characteristics of vehicle trips have not been validated using any control data and should not be assumed to be accurate.
  - Demographic projections to 2035 assume the same distribution of income, race, and ethnicity and does not account for any potential shifts in population types across the region.
  - There is no available data about the race, ethnicity, and economic status of the users of priced facilities within the Dallas-Fort Worth region. The NCTCOG Transportation Department will be conducting a survey of the users of priced facilities in 2014 that will include questions about race, ethnicity, and economic status.

- Model limitations
  - Model inputs do not include race or ethnicity; therefore, the model cannot identify trips based on the race or ethnicity of an individual user.
  - Income quartiles are only used in the assignment of home-based work trips, which account for only 25 percent of trips. All other vehicle trips are not assigned based on income.
  - For the purposes of trip distribution, mode choice, and traffic assignment, all vehicle trips of the same type are treated identically. DFX, as implemented, is not capable of generating results that produce outputs that differentiate vehicle trips based on the economic characteristics of transportation system users.

- o The vehicle trip assignment process does not consider relative income differences or the differences in relative cost to potential users in the population when assigning vehicle trips. All vehicle trips operate under the same value of time assumptions.
- o DFX was not designed to model the socio-economic characteristics of each vehicle trip. Model-derived reproductions of socio-economic characteristics of vehicle trips have not been validated using any control data and should not be assumed to be accurate.
- o The DFX cannot replicate dynamic pricing.

6.0 SUMMARY OF ASSESSMENT AND DISCUSSION OF MITIGATION

Based on the environmental justice analysis conducted for *Mobility 2035 – 2013 Update* (summarized in Section 4.3.1), it was determined that the recommended transportation projects included in *Mobility 2035 – 2013 Update* do not have a highly adverse or disproportionate impact on protected populations. Overall, protected populations have access to more jobs than non-protected populations and congestion levels and travel times would be almost the same in the 2035 build network for the two groups. The RTC resolution (R13-04) approving *Mobility 2035 – 2013 Update* states the transportation recommendations included in the plan meet federal nondiscrimination and environmental justice requirements and have no disproportionate impacts on protected populations.

In addition, results from the performance reports prepared for the MPA showed a marginal increase in roadway speed and an improvement in LOS for the majority of the roadway classifications in the 2035 build network compared to the 2035 priced facilities no build network. Even under the 2035 build network for the MPA the roadway performance conditions for freeways and toll roads throughout the NCTCOG region would be degraded compared to the 2013 network due to the travel demand created by an increase of 53 percent in the regional population.

Although environmental justice populations would see an increase in out of pocket cost for priced facility usage under the 2035 build scenario, the growth in usage by protected populations is proportional to the increased usage by the entire MPA population as the priced system expands. Almost all environmental justice TSZs were identified by the DFX to potentially be sending trips along priced facilities in the 2013 network and 2035 build network. The median household income in the region is about 2.7 times the HHS low-income threshold (see Section 4.3.6), so each dollar expended for the use of priced facilities by low-income households is a greater proportion of the household budget. As shown in Table 7, over 74 percent (4,736 lane miles) of new roadway capacity would not be tolled. For populations (including environmental justice populations) who would choose to use non-priced facilities, the 2035 build network would provide a non-priced roadway network that would operate at better traffic conditions (slightly higher speeds and an improved LOS) on all roadways and an increased benefit over the 2035 priced facilities no build network.

The planned transit system is the same for both the 2035 build network and 2035 priced facility no build network. Current statutory requirements built into most transportation improvement funding mechanisms prohibit or limit the transfer of funds between modes, so eliminating priced facilities would not necessarily increase opportunities to invest in other types of improvements. As shown in Table 20, in the 2013 network 63.3 percent of transit users come from environmental justice TSZs. The total number of transit trips from environmental justice TSZs is expected to decrease in the 2035 priced facilities no build network to 60.9 percent and to 62.2 percent in the 2035 build network. This compares to the 34.4 and 34.9 percent increases in vehicle trips between the 2013 network and the 2035 priced facility no build and 2035 build networks, respectively, shown in Table 24. Improved roadway performance would lead to slightly longer distance and higher speed transit trips in the 2035 build network compared to the 2035 priced facility no build network.

Impacts to environmental justice populations were one of the several issues included and considered during the MTP planning process (see Section 4.3.1). All corridor planning and development activities are consistent with the MTP recommendations for congestion management and multimodal opportunities which benefit all segments of the population. The region will continue its efforts to work with all communities in the planning process to identify transportation challenges and explore and develop the appropriate strategies to respond to the issues. Specific strategies and projects would be developed through discussions with local governments and community representatives, as needed. Example strategies could include regional or targeted local programs and projects to:

- Improve availability and accessibility to alternate transportation options such as transit
- Provide discounted transit fares and tolls
- Offer HOV discounts on existing or future priced facilities
- Provide better accessibility to regional transportation systems
- Enhance community-level congestion management
- Promote sustainable development to help minimize VMT

Regardless of strategies that may be implemented, each transportation entity would require efforts to minimize impacts to environmental justice populations at the specific project level. TxDOT builds, maintains, and operates the majority of the major roadway system in the Dallas-Fort Worth Region, NTTA oversees construction and implementation of the majority of the toll roads throughout Dallas-Fort Worth, while the transit agencies focus on the passenger rail and bus systems, and NCTCOG directs its resources on future transportation system planning.

TxDOT follows numerous guidelines and regulations to assess potential impacts to environmental justice populations for specific projects. These guidance documents, such as FHWA Order 6640.23, discuss potential mitigation for environmental justice populations when impacts are determined. Both FHWA and TxDOT have procedures in place to ensure compliance with state and federal laws and regulations regarding project-specific impacts to environmental justice populations. Each roadway project that receives state and/or federal money is evaluated under NEPA or similar Texas requirements which include analysis for environmental justice populations and potential mitigation if an unfair distribution of benefits and/or a disproportionate high and adverse impact is identified. A summary of this RTA is included as part of project-specific analysis.

Similarly, the NTTA follows TxDOT and FHWA guidelines for its Title VI and environmental justice procedures. The NTTA policy in their environmental manual references the current TxDOT and FHWA policies for addressing potential impacts to environmental justice populations. This consistency extends to the inclusion of an environmental justice analysis in environmental documents as well as addressing any potential impacts and mitigation. Any mitigation would be addressed on a per project basis.

Transit agencies follow FTA guidelines for Title VI and environmental justice. The analysis that is included in FTA documents is similar to those that are required by FHWA for roadway analysis. Because transit systems have a greater propensity for utilization by environmental justice and Title VI populations, the analysis required by FTA is more robust. Similar to roadway projects, each independent transit project is assessed for environmental justice impacts and mitigation would be proposed if adverse and disproportionate impacts are identified. Mitigation would be tailored specifically to each project.

Additionally, NCTCOG is required to complete an entire Title VI analysis for each version of the metropolitan transportation plan. During the Title VI analysis, NCTCOG assess regional parameters on the entire future transportation system, created with inputs from the local transportation partners, on Title VI populations. Through the analysis, it is determined if the future transportation system would impact Title VI populations. If adverse and disproportionate impacts are identified, NCTCOG would implement procedures to mitigate for the impacts or change the future roadway network to prevent the impacts from occurring.

7.0 CONCLUSION

Based on these analyses, the Mobility 2035 – 2013 Update build network for the MPA, including future priced facilities, would not cause disproportionately high and adverse impacts on any minority or low-income populations as per Executive Order 12898 regarding environmental justice. Therefore, no regional mitigation measures are proposed at this time. This regional analysis is based on the most recent policies, programs, and projects included in *Mobility 2035 – 2013 Update*. Changes in tolling/managed lane policies could necessitate this regional tolling analysis be revised if, after a thorough review, the changes are of sufficient magnitude. These elements are subject to change in future MTPs. During the development of future MTPs, new analyses of the effects of pricing to environmental justice and protected classes would be conducted.

Mobility 2035 – 2013 Update and the regional transportation planning process provide ways to avoid and minimize potential impacts that could occur due to transportation projects. NCTCOG has performed an environmental justice and Title VI analysis, using the same demographic data that was used in the development of *Mobility 2035 – 2013 Update*, to ensure that no person is excluded from participation in, denied benefits of, or discriminated against in planning efforts, including the development of the MTP. This assures the MTP is consistent with Title VI of the Civil Rights Act of 1964 and Executive Order 12898 on environmental justice, as well as the Civil Rights Restoration Act of 1987.

Appendix A

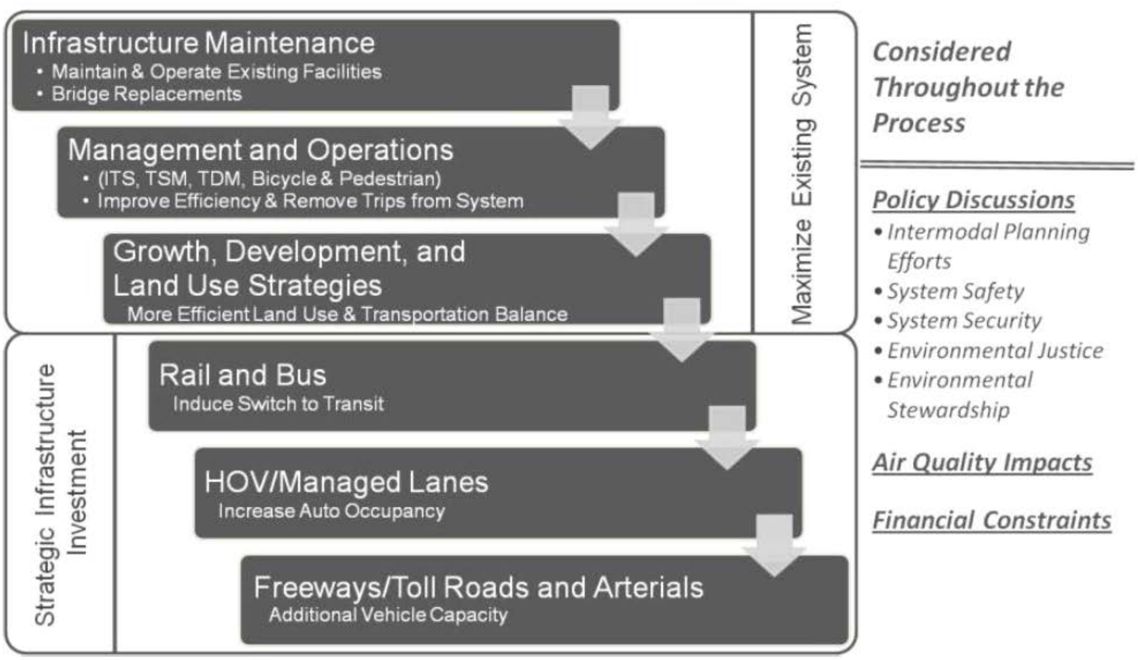
Figures

Exhibit 2.3: Mobility 2035 – 2013 Update Major Expenditures

Mobility 2035 – 2013 Update Expenditures	
Infrastructure Maintenance	$28.9
Management and Operations Strategies	$4.8
Growth, Development, and Land-Use Strategies	$3.9
Public Transportation	$15.6
Freeway, Tollway, Express/HOV, Tolled Managed Lanes, and Arterial System	$45.5
Total *(Actual $, Billions)*	***$98.7***

Values may not sum due to independent rounding

Exhibit 6.26: Prioritization of Improvements



Regional Tolling Analysis

for the Dallas-Fort Worth Metropolitan Planning Area based on *Mobility 2035 – 2013 Update*

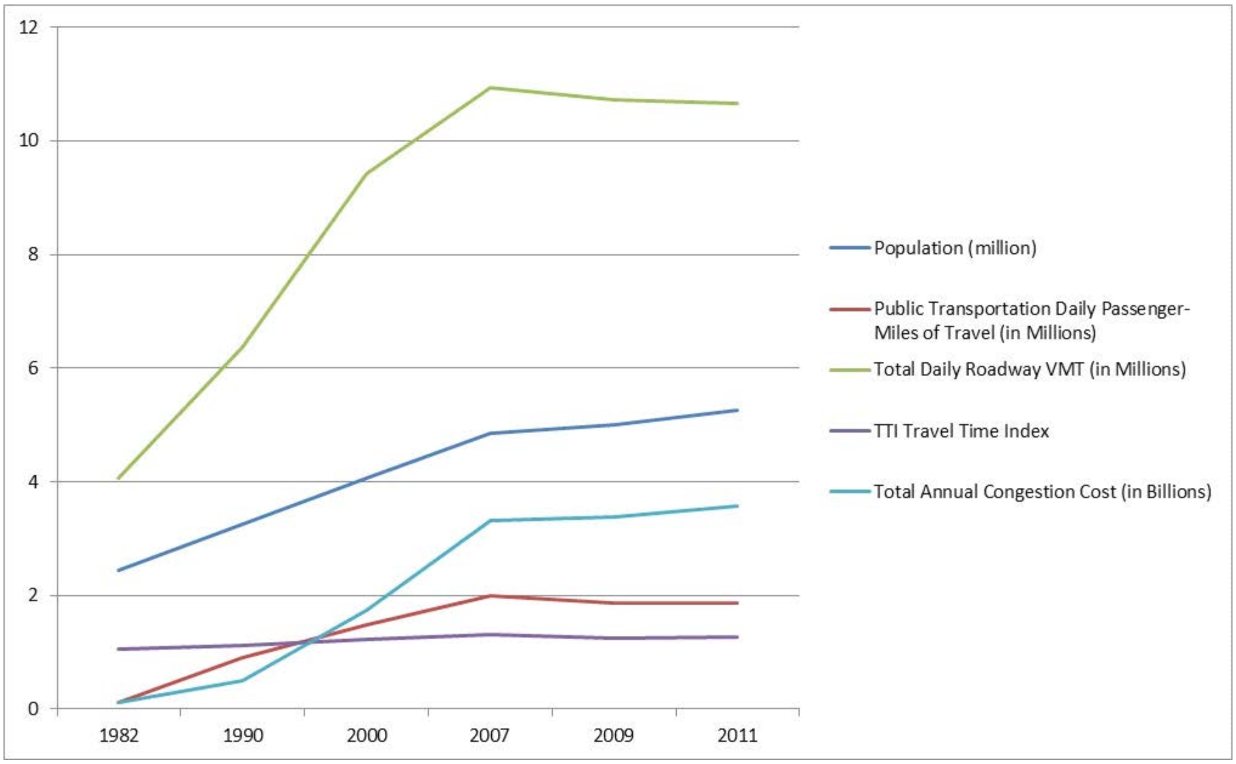
Figure 1

Mobility 2035 – 2013 Update

Prioritization of Improvements

North Central Texas Council of Governments *Date Created: July 2013*

Source: NCTCOG 2013



*Source: **The Mobility Data for Dallas-Fort Worth-Arlington TX**, Texas Transportation Institute 2013*

Regional Tolling Analysis

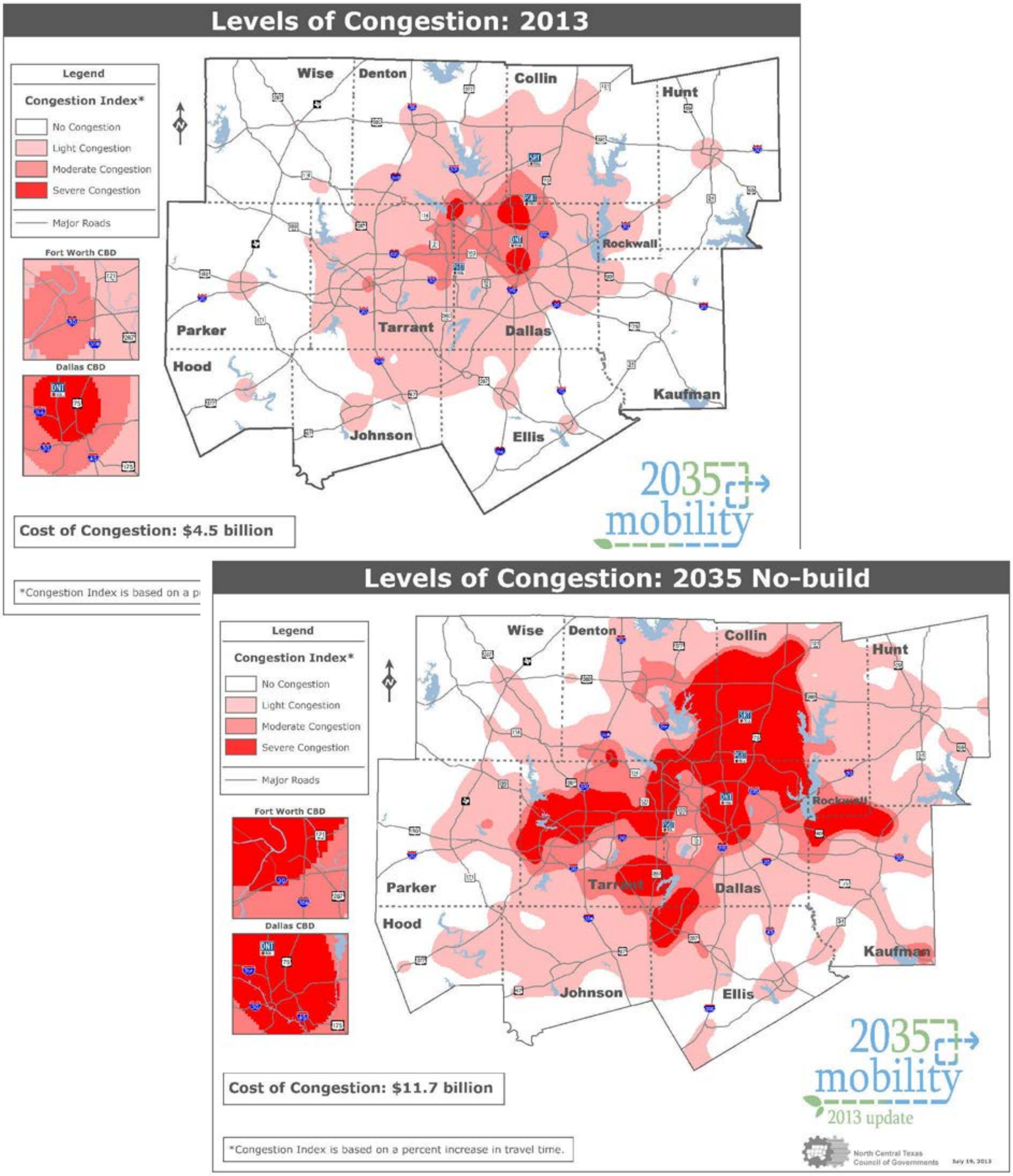
for the Dallas-Fort Worth Metropolitan Planning Area based on *Mobility 2035 – 2013 Update*

Figure 2

Texas Transportation Institute *Urban Mobility Report*

Transportation Trends 1982 - 2011

North Central Texas Council of Governments *Date Created: July 2013*



Regional Tolling Analysis

for the Dallas-Fort Worth Metropolitan Planning Area based on *Mobility 2035 – 2013 Update*

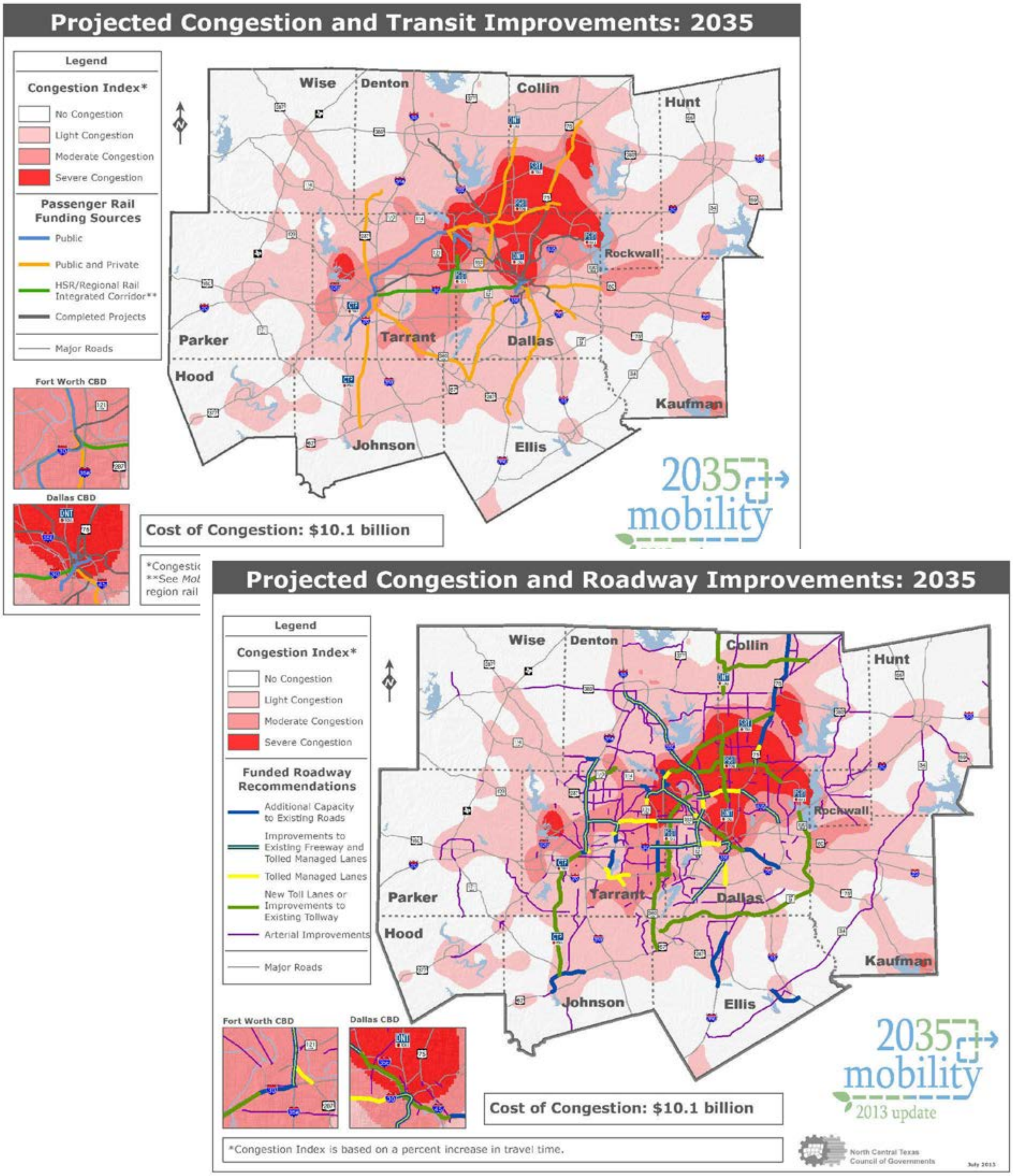
Figure 3

Mobility 2035 – 2013 Update

Congestion Levels: 2012 and 2035 Full No Build

North Central Texas Council of Governments *Date Created: July 2013*

Source: NCTCOG 2013



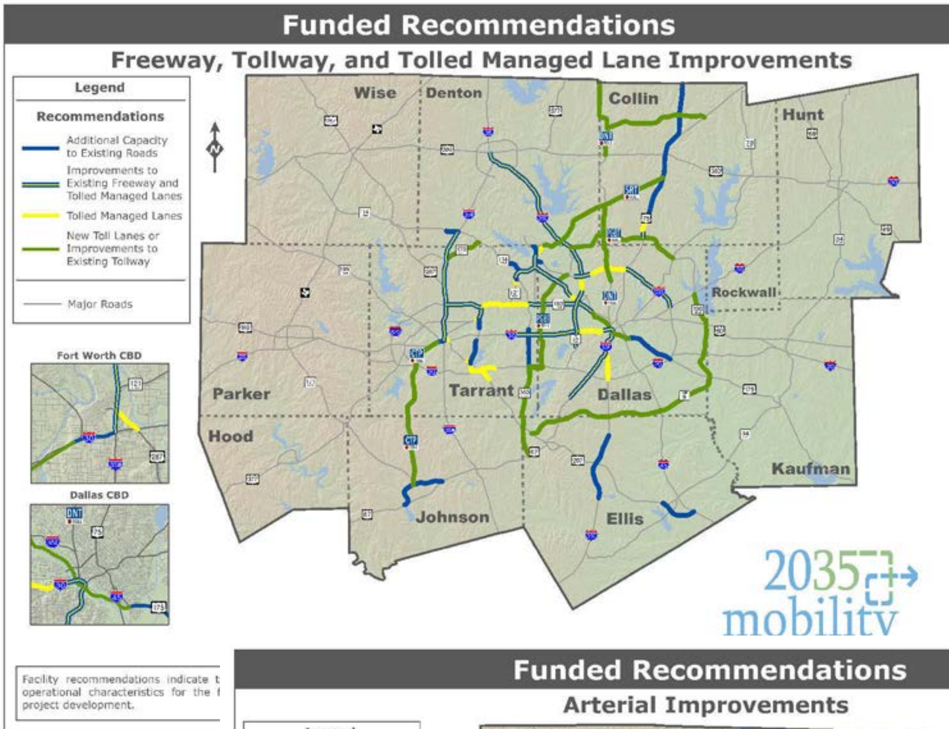
Regional Tolling Analysis

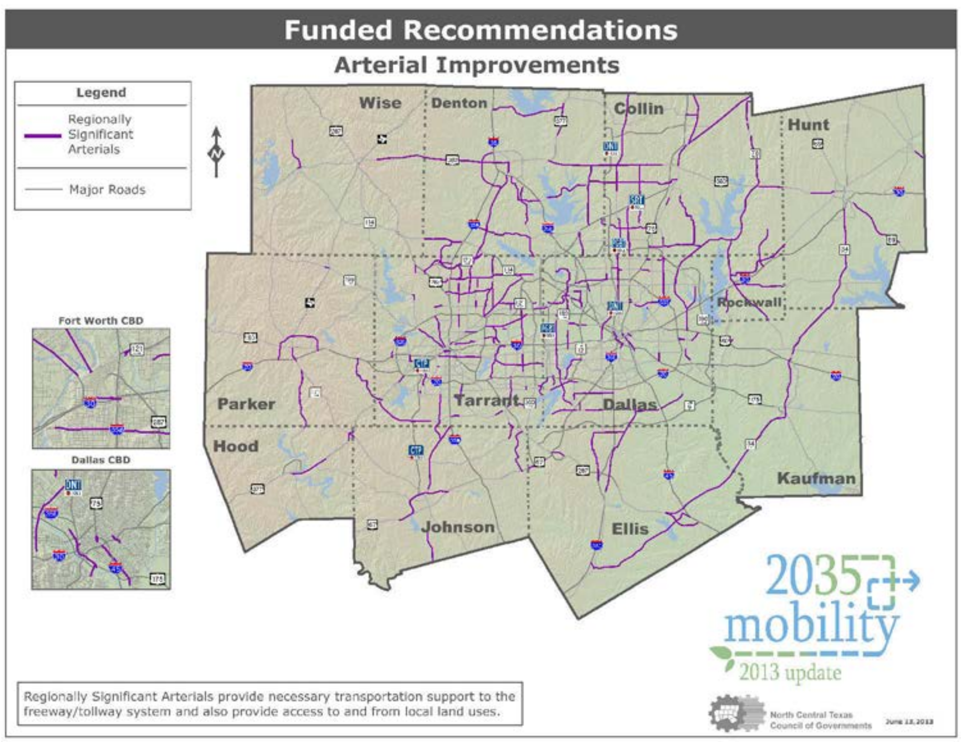
for the Dallas-Fort Worth Metropolitan Planning Area based on *Mobility 2035 – 2013 Update*

Figure 4
2035 Congestion Levels with
***Mobility 2035 – 2013 Update* Improvements**

North Central Texas Council of Governments *Date Created: July 2013*

Source: NCTCOG 2013





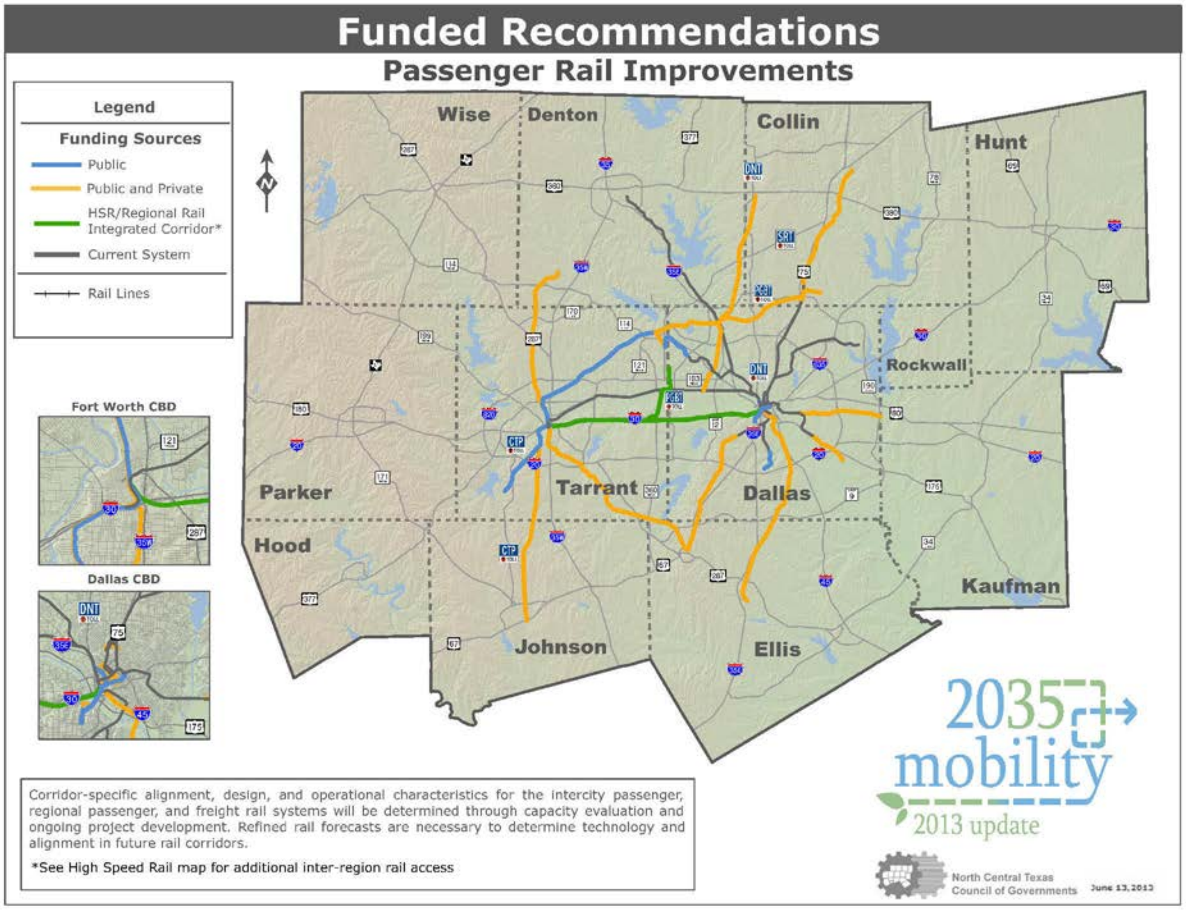
Regional Tolling Analysis

for the Dallas-Fort Worth Metropolitan Planning Area based on *Mobility 2035 – 2013 Update*

Figure 5
***Mobility 2035 – 2013 Update*:**
Funded Roadway Recommendations

North Central Texas Council of Governments *Date Created: July 2013*

Source: NCTCOG 2013



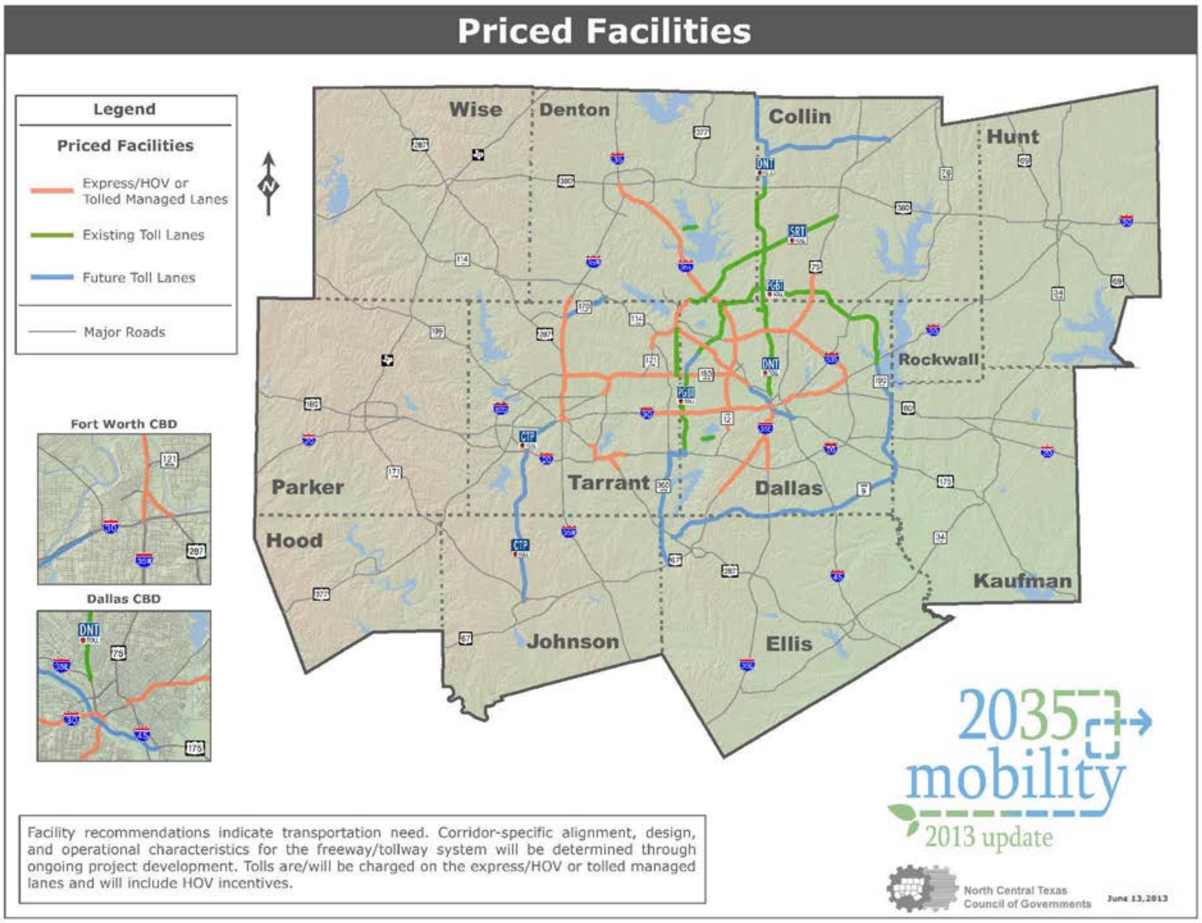
Regional Tolling Analysis

for the Dallas-Fort Worth Metropolitan Planning Area based on *Mobility 2035 – 2013 Update*

Figure 6
Mobility 2035 – 2013 Update
Funded Rail Recommendations

North Central Texas Council of Governments *Date Created: June 2013*

Source: NCTCOG 2013



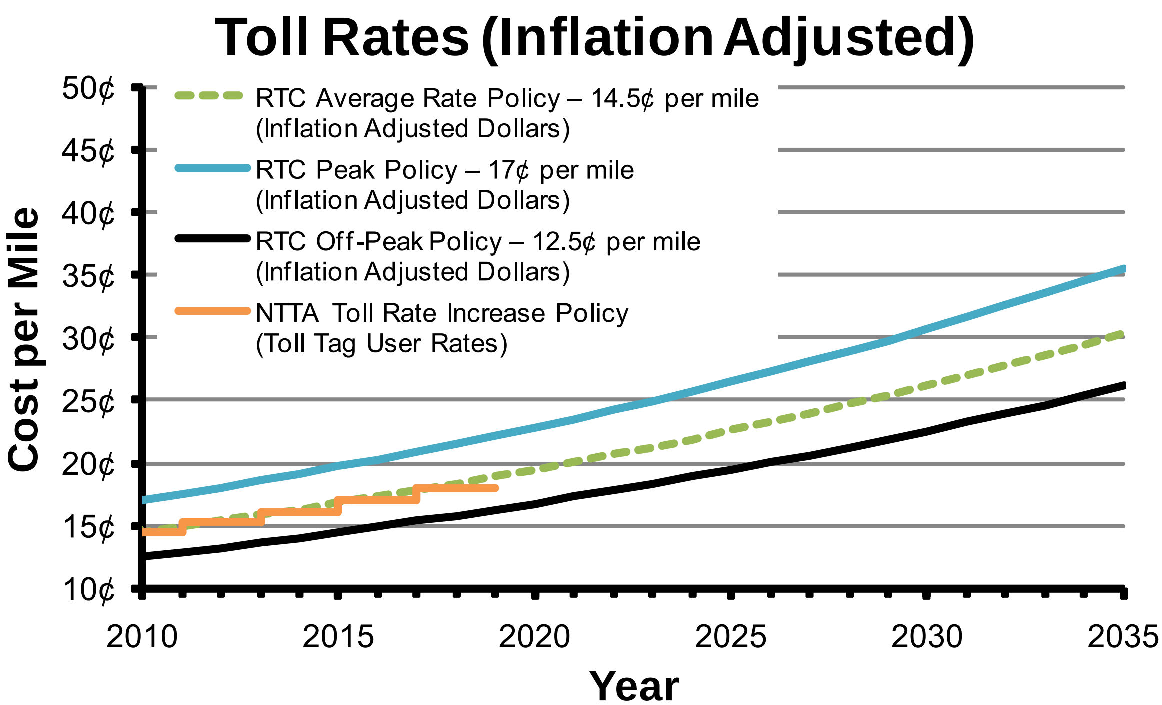
Regional Tolling Analysis

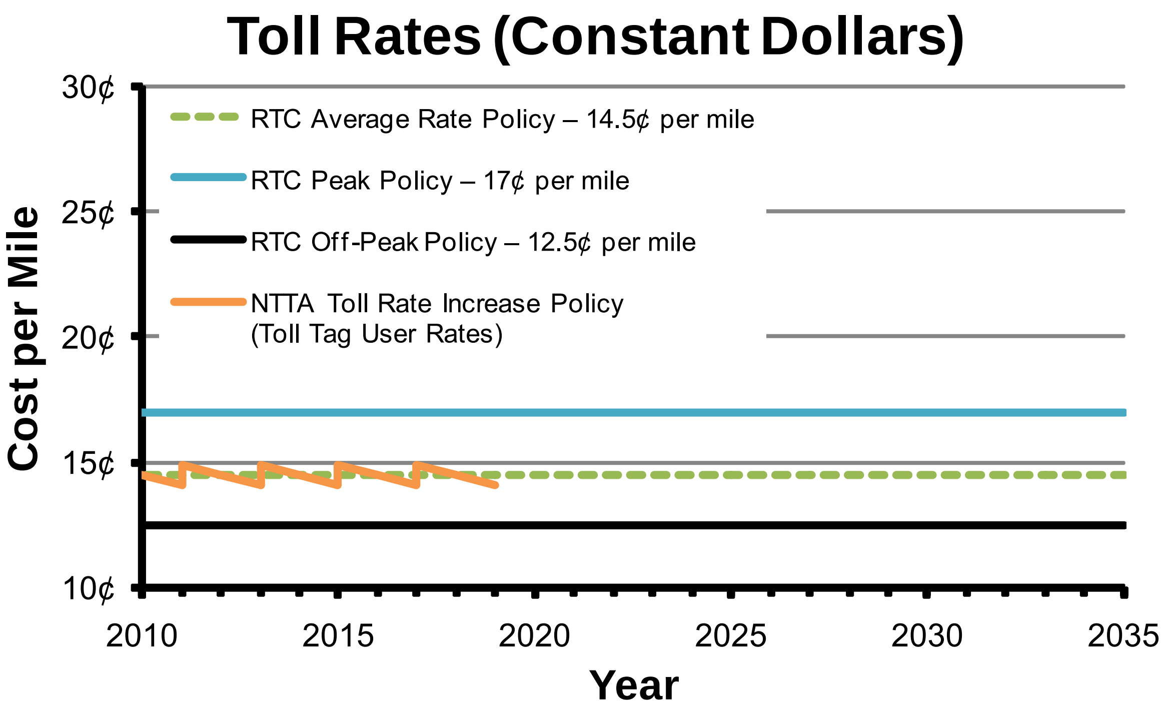
for the Dallas-Fort Worth Metropolitan Planning Area based on *Mobility 2035 – 2013 Update*

Figure 7
Mobility 2035 – 2013 Update
Priced Facilities

North Central Texas Council of Governments *Date Created: July 2013*

Source: NCTCOG 2013





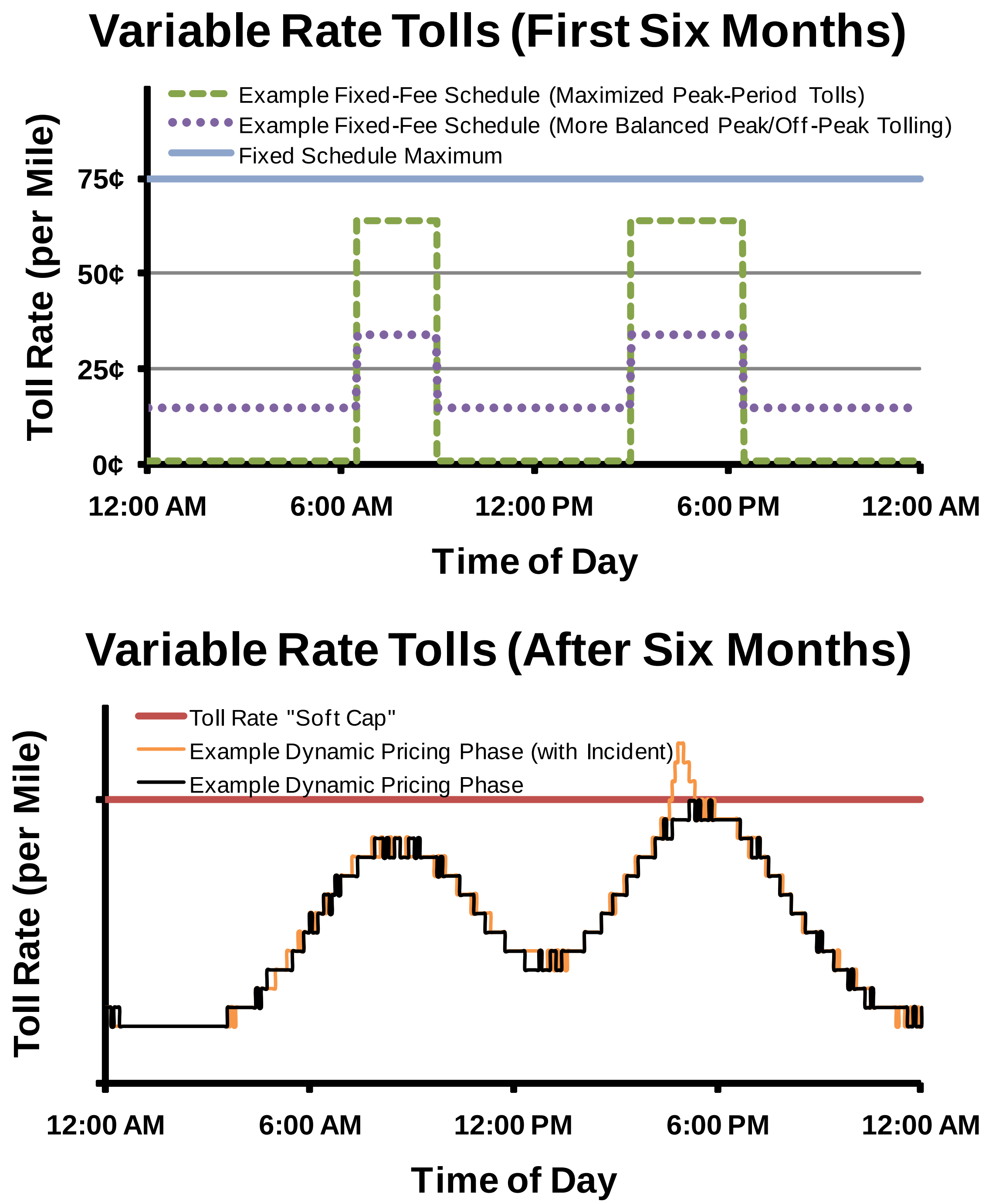
Regional Tolling Analysis

for the Dallas-Fort Worth Metropolitan Planning Area based on *Mobility 2035 – 2013 Update*

Figure 8
Toll Rate Inflation Adjustments

North Central Texas Council of Governments *Date Created: July 2013*

*Sources: **Business Terms for TxDOT-Sponsored Toll Roads on State Highways**, NCTCOG 2013; NTTA, 2011*



Regional Tolling Analysis

for the Dallas-Fort Worth Metropolitan Planning Area based on *Mobility 2035 – 2013 Update*

Figure 9
Example Variable Toll Rates

North Central Texas Council of Governments *Date Created: July 2013*

*Source: **Tolled Managed Lane Policies**, NCTCOG 2013*

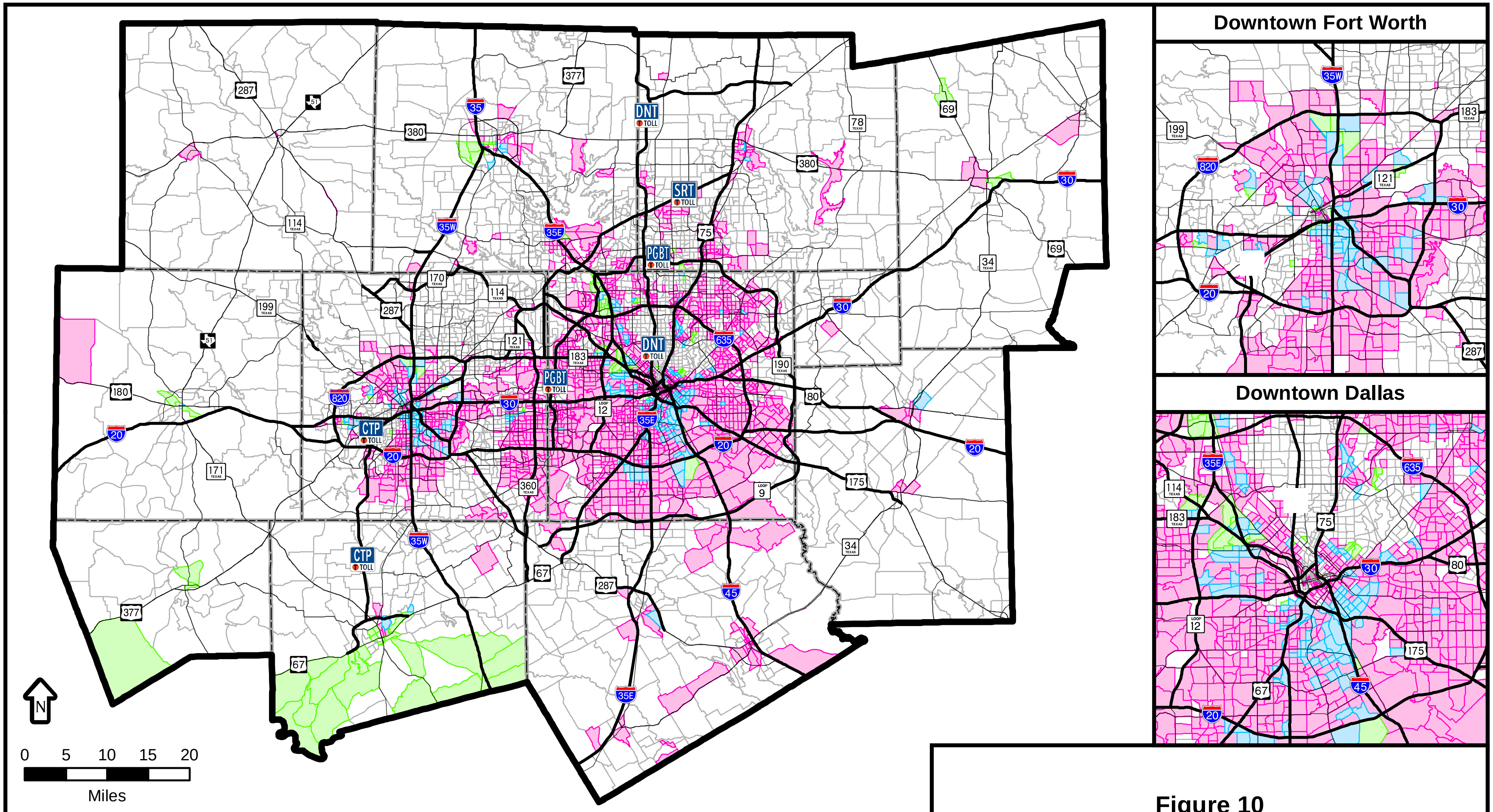


Figure 10
Environmental Justice Travel Survey Zones

Legend

Environmental Justice Travel Survey Zones
- Low-Income Alone (50 Percent or More)
- Minority Alone (50 Percent or More)
- Both Low-Income and Minority
- Non-Protected

Other Items
- Freeway/Tollway
- Major Arterial
- County Limits
- MPA Boundary

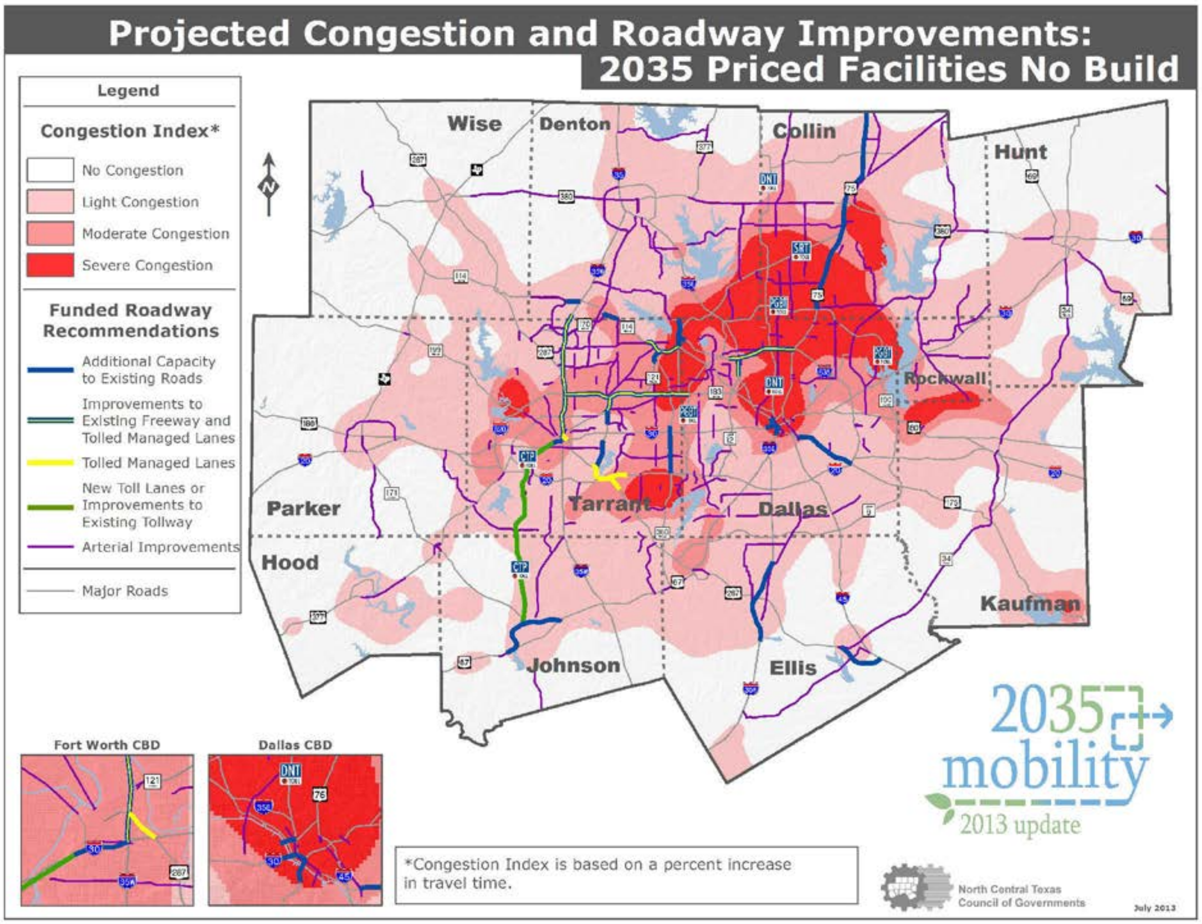
Regional Tolling Analysis

for the Dallas-Fort Worth MPA
based on *Mobility 2035 – 2013 Update*

Date Created: July 2013

North Central Texas
Council of Governments

Sources: NCTCOG 2013, 2010 US Census (Minority), 2005-2009 American Community Survey (2009 HHS Low-Income Threshold)

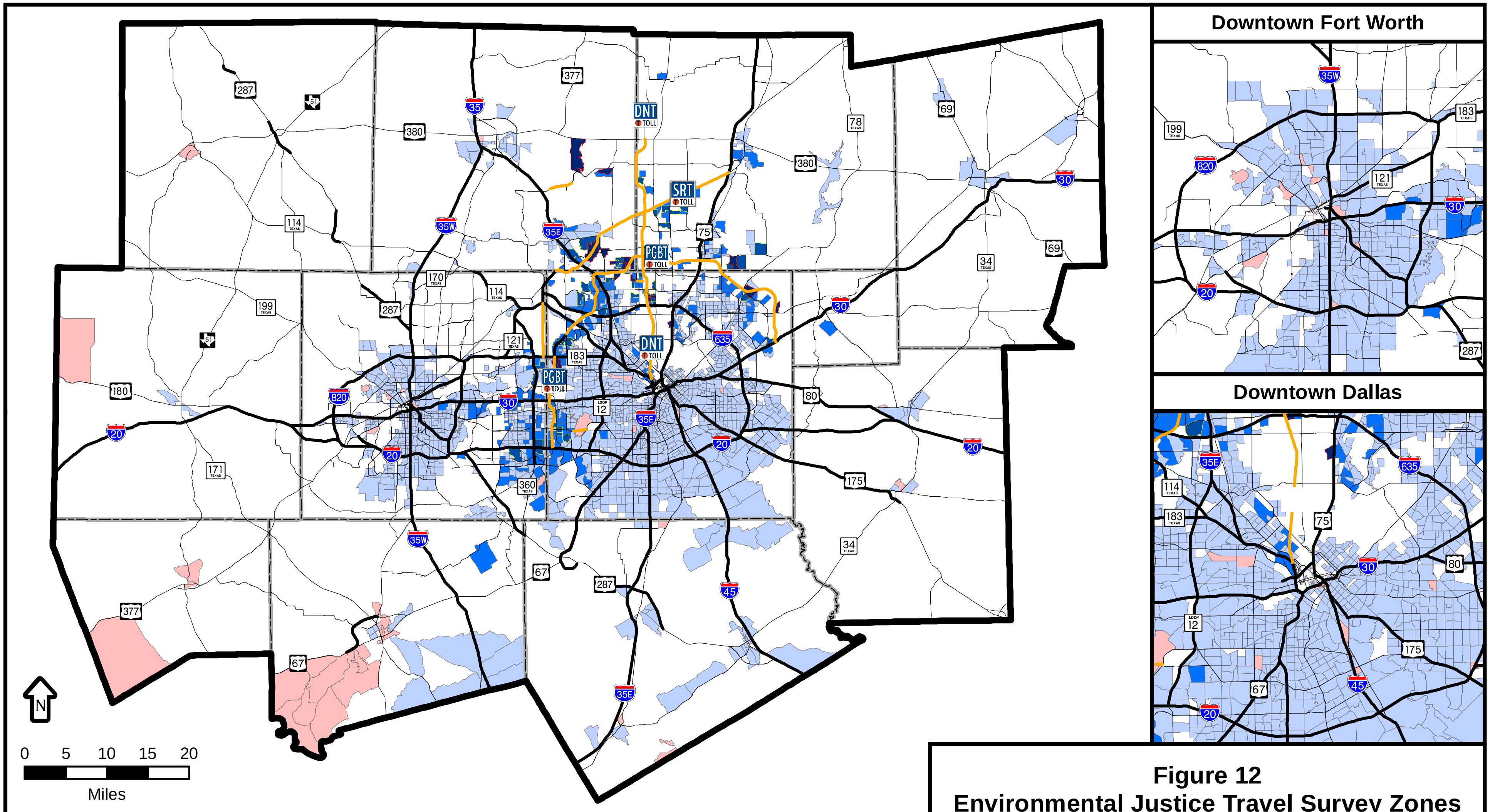


Regional Tolling Analysis
for the Dallas-Fort Worth Metropolitan Planning Area based on *Mobility 2035 – 2013 Update*

Figure 11
2035 Priced Facilities No Build Congestion Levels

North Central Texas Council of Governments *Date Created: July 2013*

Source: NCTCOG 2013



Legend

- Less than 1 Trip (79 TSZs, 18 Priced Facility Trips)
- 1 - 50 Trips (1,866 TSZs, 23,152 Priced Facility Trips)
- 51 - 150 Trips (254 TSZs, 21,398 Priced Facility Trips)
- 151 - 300 Trips (49 TSZs, 9,846 Priced Facility Trips)
- More than 300 Trips (26 TSZs, 13,538 Priced Facility Trips)
- Priced Facility
- Freeway
- Major Arterial
- County Limits
- MPA Boundary

Figure 12
Environmental Justice Travel Survey Zones
AM Period Priced Facility Trips on
2013 Network

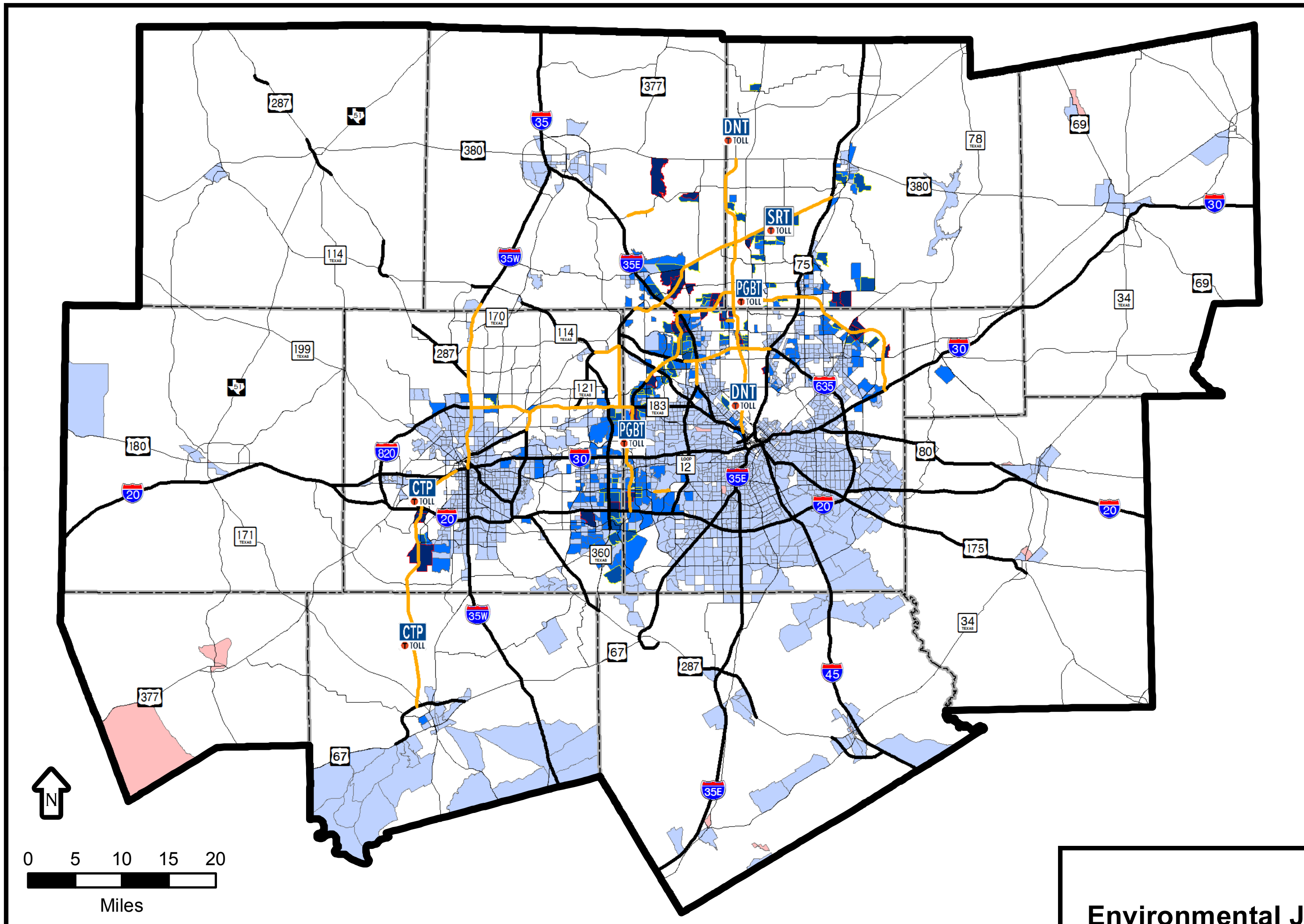
Regional Tolling Analysis

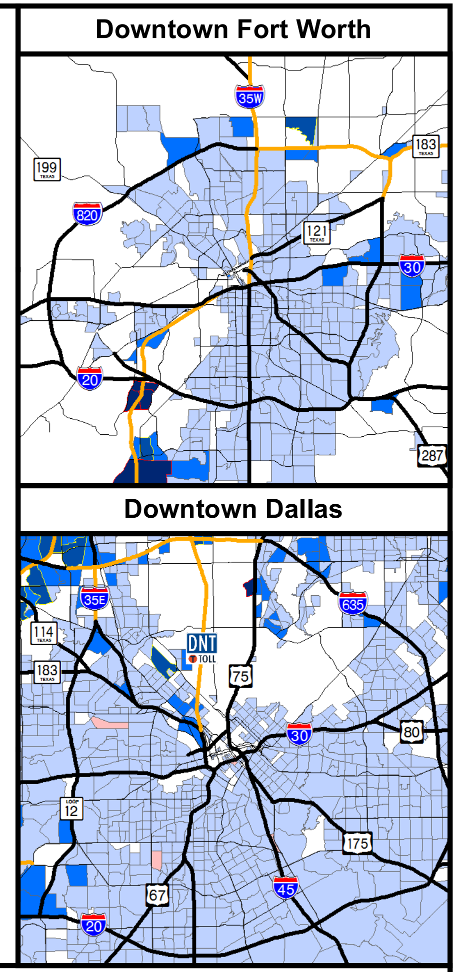
for the Dallas-Fort Worth MPA
based on *Mobility 2035 – 2013 Update*

Date Created: July 2013

North Central Texas
Council of Governments

Source: NCTCOG 2013





Legend

- Less than 1 Trip (21 TSZs, 5 Priced Facility Trips)
- 1 - 50 Trips (1,828 TSZs, 25,540 Priced Facility Trips)
- 51 - 150 Trips (291 TSZs, 24,197 Priced Facility Trips)
- 151 - 300 Trips (93 TSZs, 19,492 Priced Facility Trips)
- More than 300 Trips (41 TSZs, 23,056 Priced Facility Trips)
- Priced Facility
- Freeway
- Major Arterial
- County Limits
- MPA Boundary

Figure 13
Environmental Justice Travel Survey Zones
AM Period Priced Facility Trips on
2035 Priced Facility No Build Network

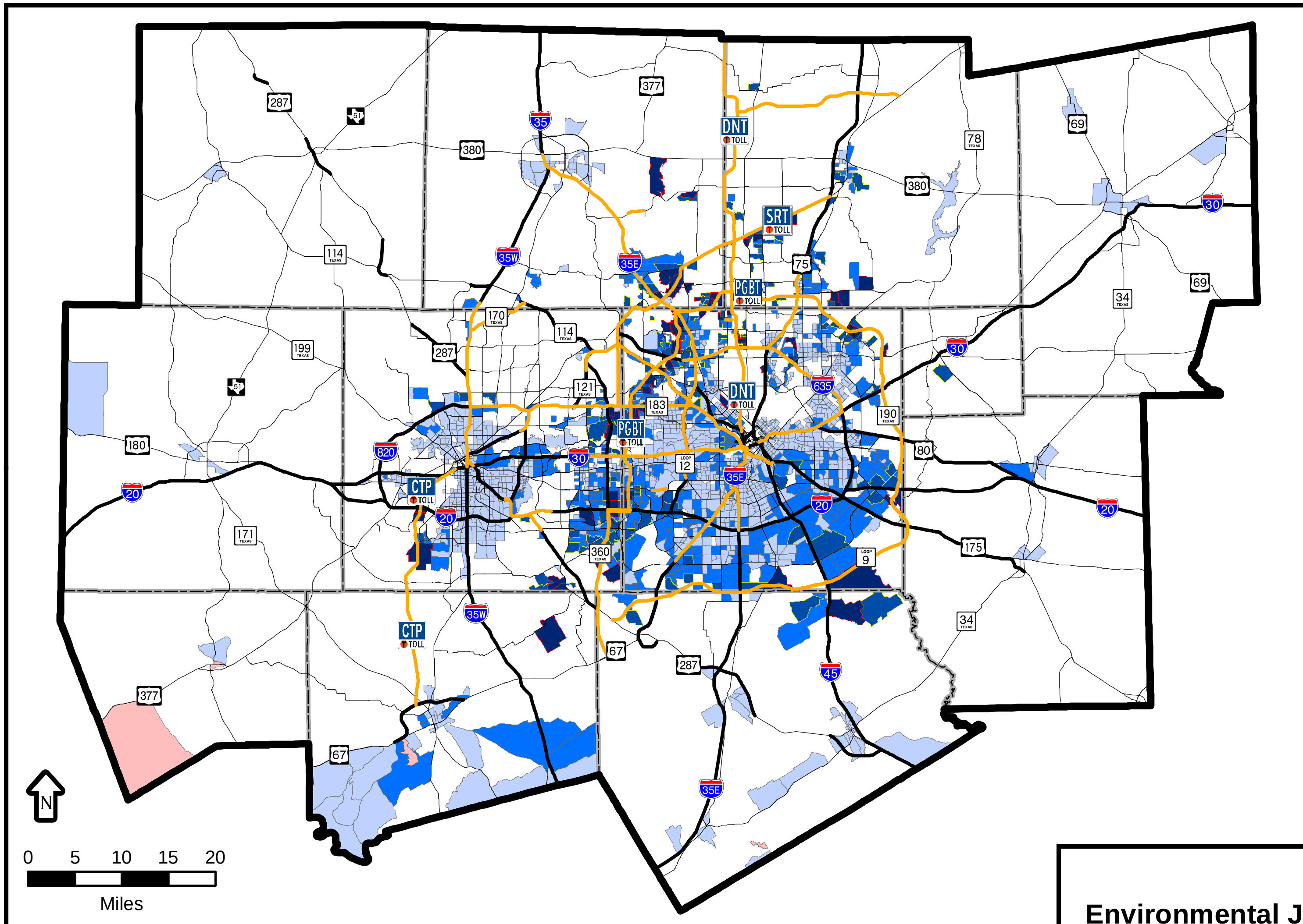
Regional Tolling Analysis

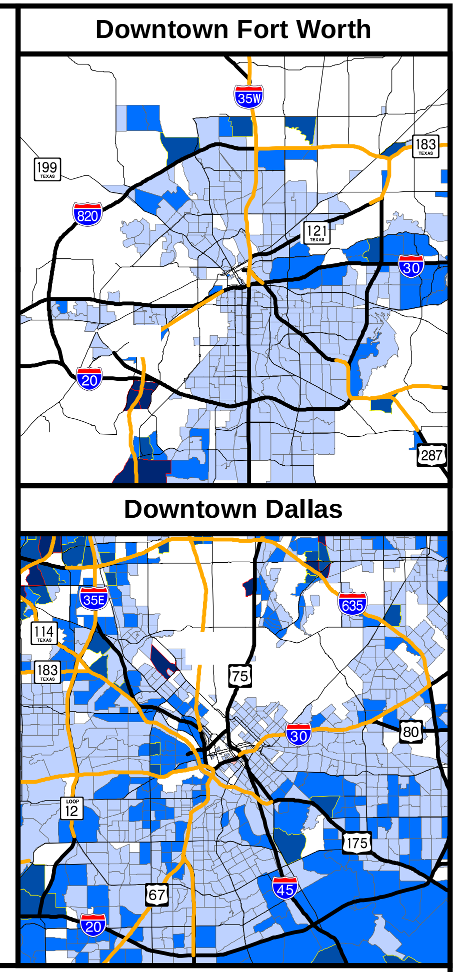
for the Dallas-Fort Worth MPA
based on *Mobility 2035 – 2013 Update*

Date Created: December 2013

North Central Texas Council of Governments

Source: NCTCOG 2013





Legend

- Less than 1 Trip (11 TSZs, 2 Priced Facility Trips)
- 1 - 50 Trips (1,411 TSZs, 30,530 Priced Facility Trips)
- 51 - 150 Trips (609 TSZs, 51,262 Priced Facility Trips)
- 151 - 300 Trips (167 TSZs, 35,135 Priced Facility Trips)
- More than 300 Trips (76 TSZs, 40,397 Priced Facility Trips)
- Priced Facility
- Freeway
- Major Arterial
- County Limits
- MPA Boundary

Figure 14
Environmental Justice Travel Survey Zones
AM Period Priced Facility Trips on
2035 Build Network

Regional Tolling Analysis

for the Dallas-Fort Worth MPA
based on *Mobility 2035 – 2013 Update*

Date Created: July 2013

North Central Texas Council of Governments

Source: NCTCOG 2013