COLLIN COUNTY MOBILITY PLAN

2014 UPDATE

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Prepared for

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Collin County Mobility Plan
2014 Update

Prepared under the direction of

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Executive Summary

The Collin County Mobility Plan (CCMP) is a comprehensive, multi-modal plan and guide for transportation systems and investments that will serve the mobility needs of county residents. Last updated in 2007, and adjusted in 2011, the CCMP requires a major update. The 2014 CCMP Update includes a county-wide system of roadways, transit facilities, and hike-and-bike-trails that are needed to meet the travel needs of the county. The purpose of the 2014 CCMP is to identify the transportation needs of area residents and businesses. It identifies the future transportation network that will be needed to serve projected population and employment growth and increased travel demand. The CCMP serves as a guide for major investment in improving transportation facilities and services. It identifies policies, programs and projects for implementation and continuing development, and it serves as a guide for local funding decisions.

Collin County is one of the 254 counties in the State of Texas, and is located in the north central region of the State of Texas. The county is a part of the Dallas-Fort Worth area (DFW Area). Collin County is bordered by Dallas County and Rockwall County on the south, Denton County on the west, Grayson County and Fannin County on the north, and Hunt County on the east.

According to the U.S. Census Bureau, Collin County has experienced dramatic growth in the past 35 years, with its population growing from 66,920 in 1970, to an estimated 808,830 in 2012. In 2013, the estimated county population grew to 854,778. Furthermore, the county population is projected to increase by 166 percent between 2000 and 2035, reaching more than 1.3 million people. Highway congestion is also forecast to increase dramatically in Collin County. According to North Central Texas Council of Governments (NCTCOG), drivers in Collin County will spend 415,198 vehicle hours in delay in 2030, a 206 percent increase compared to delay in 2013. Highway funding in Collin County is forecast to be insufficient to keep up with demand for construction needed to help reduce anticipated congestion. Region-wide, NCTCOG's Mobility 2035 – 2013 Update notes that the region will experience a $296.6 billion shortfall in transportation system component funding between now and 2035.

The Census Bureau reports that between 2010 and 2013, Collin County was the 33rd fastest growing county in the nation, with an annual population growth rate of 9.3 percent. The county is home to three of the fastest growing cities in the state (Frisco, McKinney and Allen), for cities with over 50,000 population. According to NCTCOG, the

region's Metropolitan Planning Organization, the county's population is projected to cross the one million mark well before 2025.

As the county population continues to grow, an increasing number of local residents will travel to employment sites within the county, rather than commuting to Dallas County (the county with the largest number of employers in the metropolitan area) or elsewhere. This high level of growth will place a great burden on the existing transportation system. Consequently, a comprehensive, cooperative, and continuing approach toward alleviating existing and projected mobility problems is the goal of NCTCOG's 2035 Regional Mobility Plan.

With continuing growth, Collin County faces the challenge of meeting the transportation needs of its citizens, in addition to maintaining and improving the serviceability of the county's transportation system. Further, delays due to accidents, construction, special events, and congestion affect the county's mobility and air quality. Moreover, Collin County is part of a designated air-quality "non-attainment" area for the pollutant ozone. Increased ozone levels and reduced air quality could lead to a reduction in the federal funding available for the county's transportation projects.

The study area for the 2014 Collin County Mobility Plan is shown in **Figure 1**. The incorporated areas for the municipalities are shaded on the study area map. The planning area for the CCMP includes all of Collin County. The municipalities within the county are responsible for the planning of their respective incorporated areas and extra-territorial jurisdictions. The CCMP provides continuity and coordination of planning between the municipalities and for the unincorporated areas outside the municipal jurisdictions.

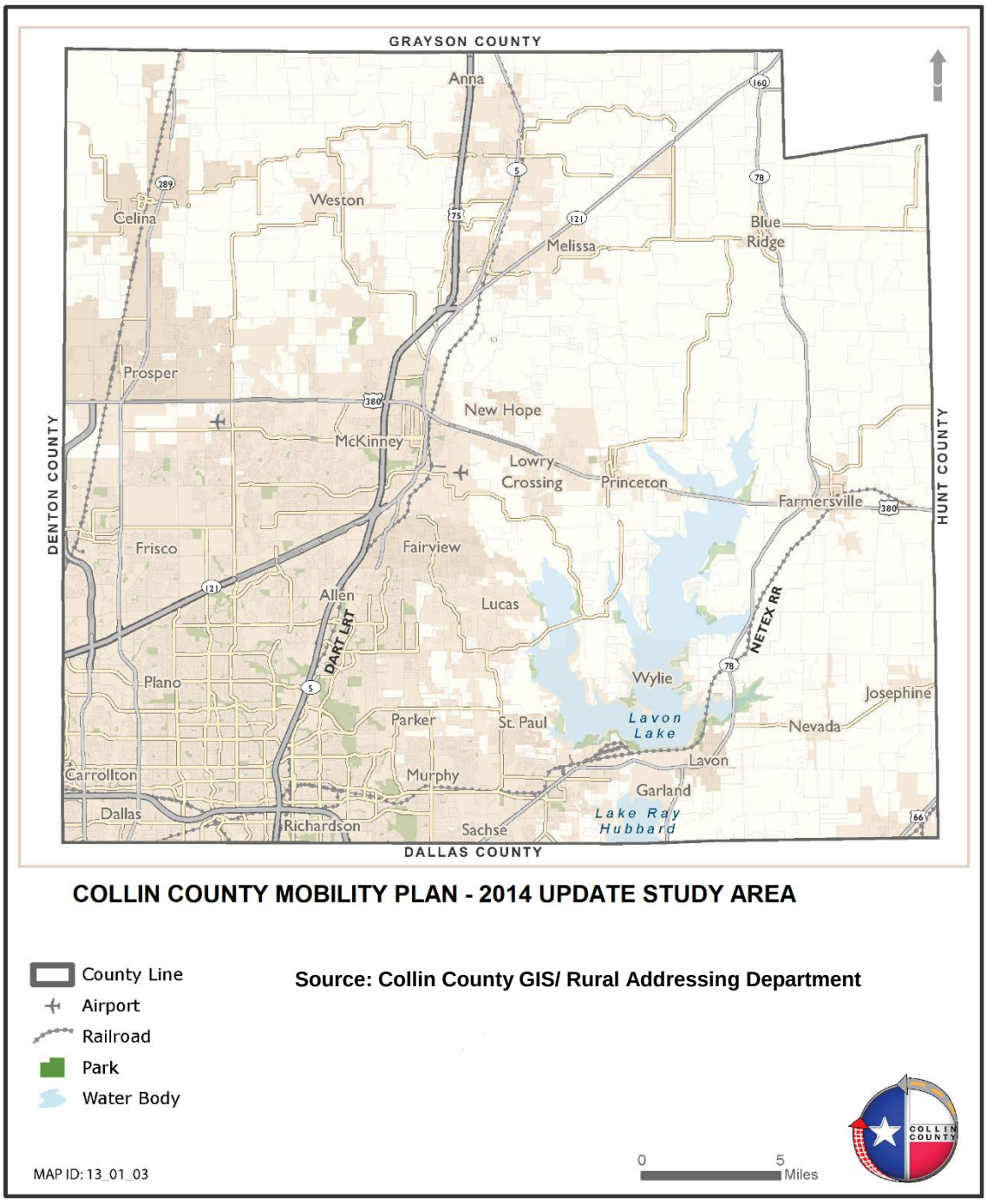


Figure 1: Collin County Study Area

The CCMP should be updated every five years to include the changing transportation needs of the county. Since the last plan update in 2007 and adjusted in 2011, the county has experienced faster population and employment growth than before. Many previously rural areas of the county have also undergone rapid “sub-urbanization”. The increased population and employment result in higher travel demand which warrants expansion of the transportation network in the county. The primary goal of this update is to extend the multi-modal transportation plan for the county through the year 2035. The CCMP is intended to identify future corridors and to support the acquisition of adequate rights-of-way on appropriate alignments and of sufficient width to allow the orderly and efficient expansion and improvement of the thoroughfare system to serve existing and future transportation needs.

The Collin County Planning Board acted as the steering committee for the 2014 CCMP Update, providing recommendations to the Collin County Commissioners Court. The final result and product of the study are two documents – the 2014 Collin County Mobility Plan Update report; which describes the policies, projects, funding, implementation aspects, and the goals and objectives of the CCMP; and the second product being the Thoroughfare and Transit Plan map; which shows the existing and proposed alignments, functional classifications of thoroughfares, and other transportation facilities.

The preparation of this update to the CCMP was a team effort by numerous agencies and organizations. Among these are the Collin County Commissioners Court, the Collin County Planning Board, and local municipal jurisdictions within the County. Coordinating agencies also included the North Texas Tollway Authority (NTTA), Dallas Area Rapid Transit (DART), Northeast Texas Rural Rail Transportation District, and the Texas Department of Transportation. The Collin County Engineering Department, the North Central Texas Council of Governments (NCTCOG), and the Jacobs team performed the planning and engineering services for the technical update of the CCMP. An intense public participation program was conducted to allow the opportunity for citizens to be involved in the planning process.

Jacobs Engineering Group Inc. was retained by Collin County to develop this update to the 2007 Collin County Mobility Plan. Jacobs was assisted in the CCMP Update process by other consultants including Freese and Nichols, Inc.; Alliance Transportation Group, Inc.; and Strategic Community Solutions, LLC. NCTCOG cooperated in the planning process by providing the regional travel demand model. Freese and Nichols developed the population

and employment forecasts for the interim year (2020), the horizon year (2035), and ultimate "build-out". Jacobs and Alliance Transportation Group used the regional travel demand model and the population and employment forecasts to calculate the future travel demand for Collin County.

An initial project kick-off meeting with county officials and staff was held on June 7, 2012 to discuss the overall strategy for the project. Thereafter, bi-monthly meetings were held with the Collin County Planning Board to coordinate and review the planning efforts.

The Jacobs team met with staff and official representatives of the municipalities within the county during the course of the project. A series of four community workshops were held in February 2013, at locations within each of the four Commissioners Court Precincts for obtaining input from interested citizens. The Jacobs team compiled relevant data pertaining to demographics, land use, transportation (including transit), and hike-and-bike trails from each of the jurisdictions. A workshop for municipalities to review the draft plan update was conducted on November 7, 2013. Subsequently, individual meetings with the municipalities were conducted upon request by the municipalities. Many of the municipalities were interviewed more than once to discuss certain complex issues. The incorporated areas and extraterritorial jurisdictions for each of the municipalities are shown in **Figure 2**.

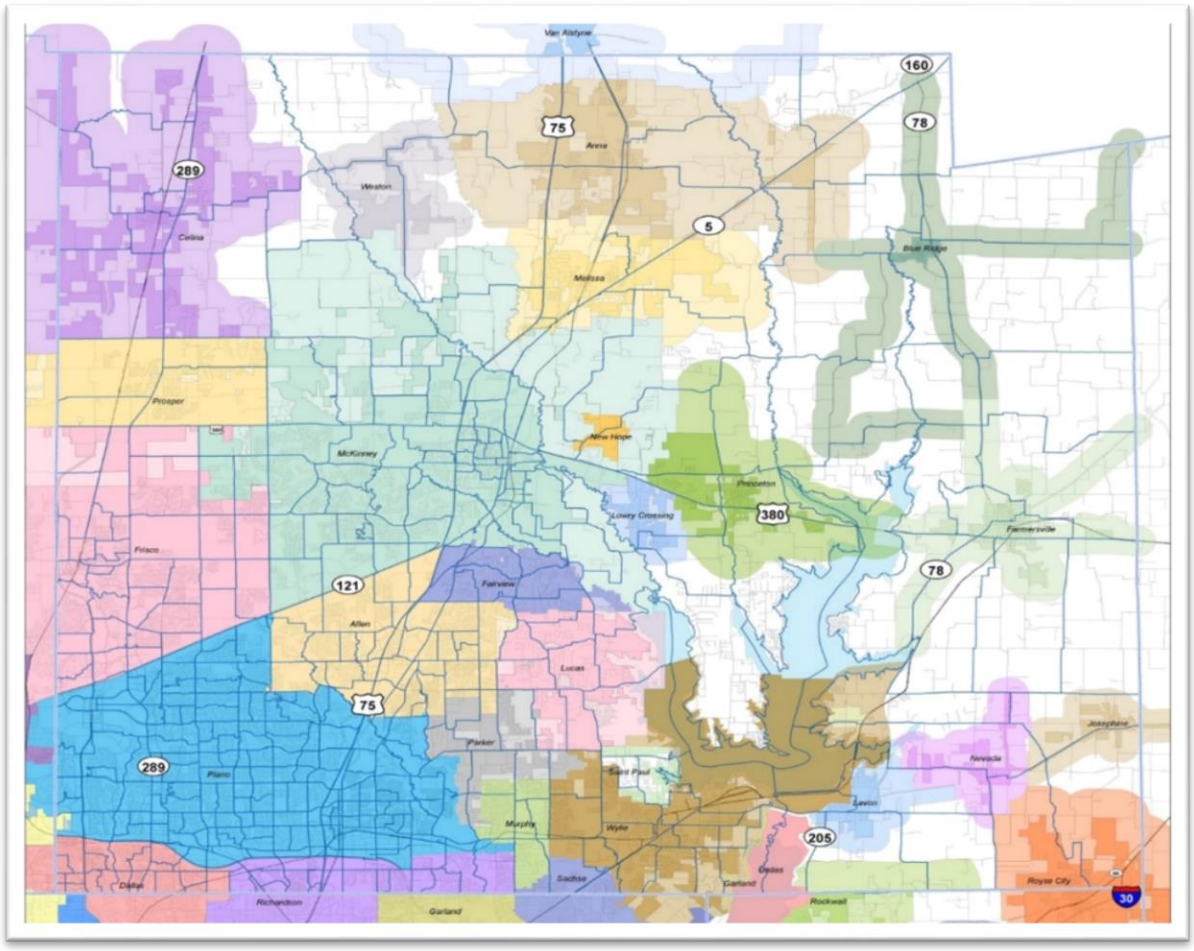


Figure 2: Collin County Municipalities, City Limits, and Extraterritorial Jurisdictions

A number of other agencies and organizations provided major input for the Collin County Mobility Plan 2014 Update. NCTCOG prepares the long range (20 years) regional transportation plans for the entire 'metropolitan' area, and also prepares the annual Unified Planning Work Program (UPWP), and Transportation Improvement Program (TIP) to guide the use of available Federal funding for transportation improvements, consistent with Federal requirements and guidelines. The Federal Aid Highway Program, administered by the Federal Highway Administration (FHWA) and the Texas Department of Transportation (TxDOT), is the major funding source for development of highways and many urban arterial improvements in Texas cities. The North Texas Tollway Authority (NTTA) is a political subdivision of the State of Texas, and is empowered to acquire, construct, maintain, repair, and operate turnpike projects. Dallas Area Rapid Transit Authority (DART) operates Light

Rail Transit (LRT), fixed route transit bus, and para-transit services within portions of Collin County. TAPS Public Transit operates on-demand curb-to-curb public transportation on weekdays for Collin County areas not included in the DART service area. In addition, TAPS provides fixed route bus service for the Cities of Allen and McKinney. TAPS also provides express service to certain cities including Allen, McKinney, and will be adding Wichita Falls. The Union Pacific and Burlington Northern Santa Fe Railroads own and operate freight rail lines that bisect the county. The Northeast Texas Rural Rail Transportation District (NETEX) owns the abandoned rail right-of-way that formerly provided freight rail access to southeast Collin County and for northeast Texas.

The updated Collin County Thoroughfare and Transit Plan is shown in **Figure 3**. This plan update identifies new wider and realigned thoroughfares, as well as transit facilities. The existing data was compiled from reports and documents published by these and many other organizations. The Jacobs team assembled existing Comprehensive Plans, Land Use Plans, and Transportation Plans available for the various local jurisdictions. For areas that did not have plans available, planning assumptions were used to develop the county-wide plan. These plans provided the basis for developing “ultimate” population and employment projections for the Collin County planning area.

Demographic estimates were developed for the base year (2012), and projections were developed for the interim year (2020), the horizon year (2035), and for “build-out”. The “build-out” projections reflect the population and employment that will occur if the various local jurisdictions “build-out” according to their existing adopted plans.

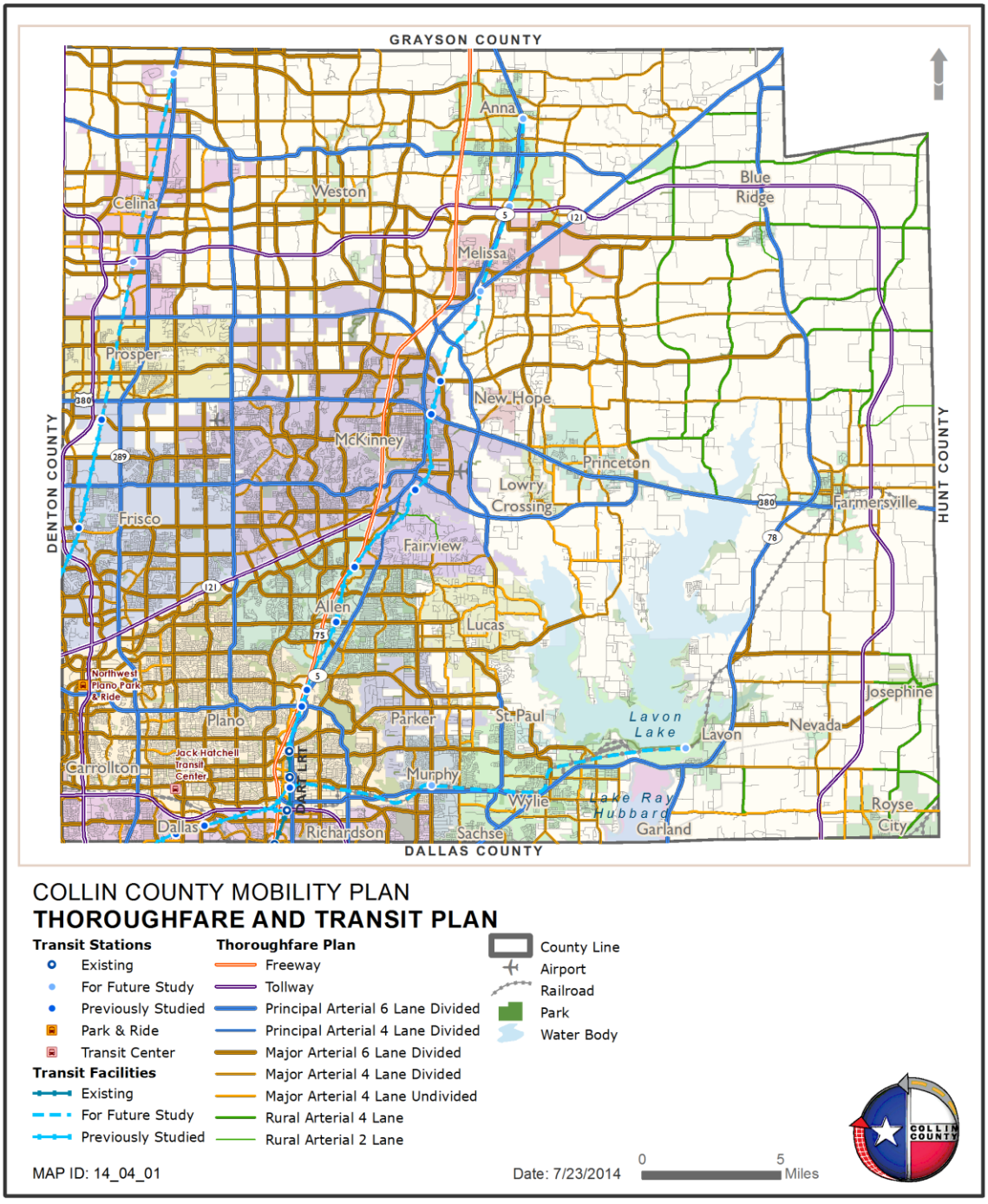


Figure 3: Collin County Thoroughfare and Transit Plan – 2014 Update

Cities in the southwestern portion of the county will reach “build-out” earlier than cities in the northeastern/eastern portion. As a whole, the county is projected to reach its “build-out” or ultimate population of approximately 2,088,000 people in approximately 2054. This would be 2.6 times the base (year 2012) population of approximately 808,830 residents. In 2013, the county estimated population increased to 854,778. The county will reach its “build-out” or ultimate employment with approximately 1,168,000 jobs within the county. This would be 3.6 times the base (year 2012) employment of 325,177 jobs.

The greatest concentration of population and employment will be located in the western portion of the county. This area extends throughout Plano, Dallas and Richardson; east to Murphy, Sachse, and Wylie; northward to Allen, Frisco, Fairview and McKinney; and continuing north to Prosper, Celina, Weston, Anna, and Melissa. This area reflects the county’s expanding urbanized area, with residential development consisting of a variety of housing types and densities and non-residential development ranging from retail to manufacturing.

In light of the updated demographic projections, future year 2020 and 2035 transportation networks were identified. Considering the life cycle of typical transportation improvement projects requires over ten years from inception to completion, the 2020 networks were created with the assumption that projects currently underway or already committed (in design or construction stages) will be in place by 2020. Further, the 2035 network was created based on increased travel demands for the projected 2035 population and employment growth. The 2020 and 2035 networks represent transportation needs expected to occur within those time frames, although all of the identified improvements may not be completed within the time horizons.

With the demographic projections and transportation networks available, a computer travel demand model (the Dallas – Fort Worth Regional Travel Model for the Expanded Area (DFX)) was used to determine how many trips will be generated, how these trips will be distributed across the study area, what mode of travel (auto, carpool, public transit etc.) travelers will use, and what routes trip makers will select (based on travel delay and other constraints) to reach their destination. The NCTCOG Travel Model Development Group performed initial model runs for year 2012 using the updated demographic projections prepared by the Jacobs team.

1. Introduction

Collin County is one of the 254 counties in the State of Texas, and is located in the northeastern part of the state and is shown in **Figure 4**. The county is a part of the Dallas - Fort Worth - Arlington Metropolitan Statistical Area (DFW Metroplex), comprised of Collin, Dallas, Delta, Denton, Ellis, Hunt, Johnson, Kaufman, Parker, Rockwell, Tarrant, and Wise counties. A current map of Collin County study area is shown in **Figure 5**.

Figure 4: Location of Collin County
Source: Collin County GIS/ Rural Addressing Department

Collin County was demarked from Fannin County on April 3, 1846, and named for Collin McKinney – one of the first settlers of the county, and a signer of the Texas Declaration of Independence. Like the county, the City of McKinney (the county seat) was named for Collin McKinney.

The first phase of development occurred during the early period of the county's history, from the 1840s to 1860s. An offer of land grants by the Peters colony attracted

settlers to the area in the early 1840s. The majority of the first settlers were farmers who lived near streams, and established small, family-operated farms. In 1860, the county's population was 9,264. Prior to 1870, lack of transportation facilities, limited markets, and the absence of mechanized farm-equipment restricted the agricultural production of the county.

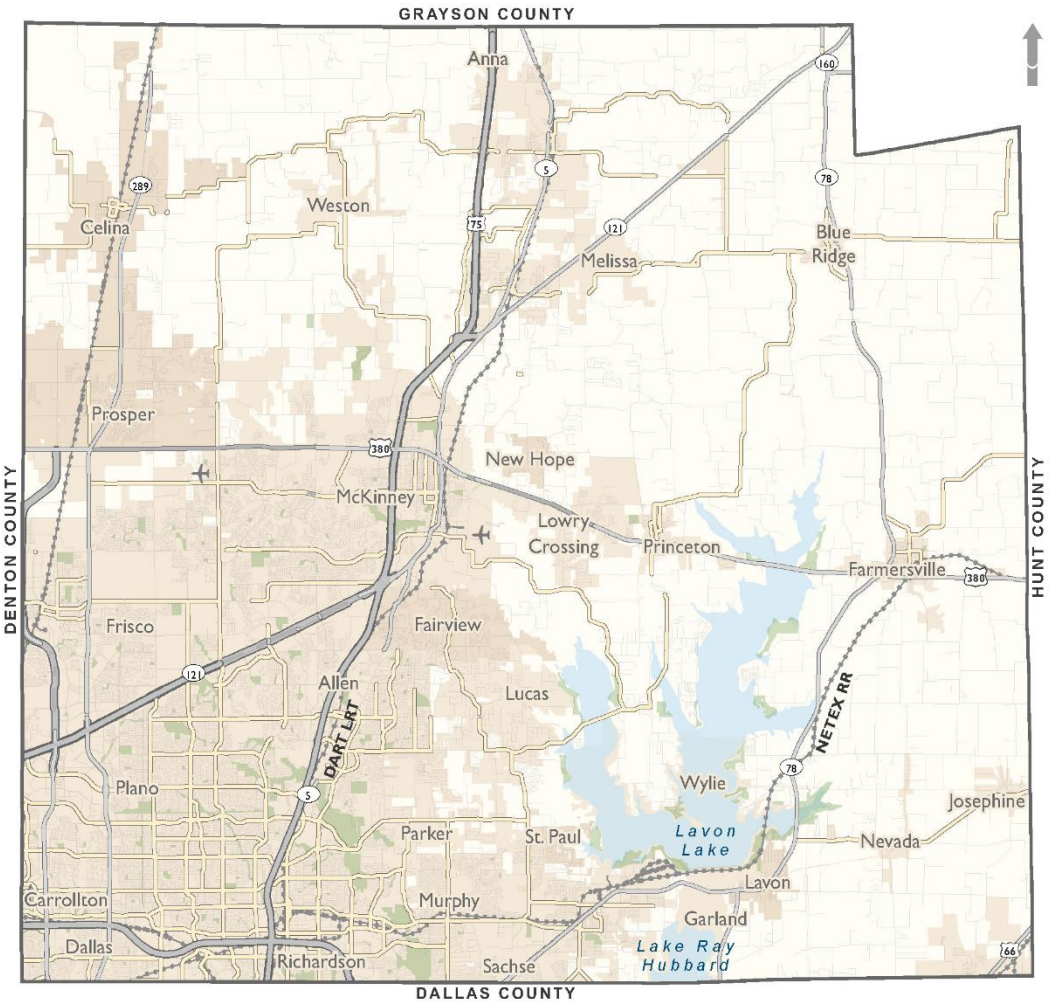


Figure 5: Collin County Study Area
Source: Collin County GIS/ Rural Addressing Department

The arrival of the railroads in the 1870s removed these obstacles and initiated a fifty-year period of economic growth. By 1890, six railroads crisscrossed the county, connecting farmers to markets throughout Texas. By 1920, the population of the county was now 49,609. New roads including SH 289 provided county residents easy access to Dallas, Fort Worth, and Waco.

Population declined during the next forty years. The drop in population was a result of the Great Depression, mechanization of farms, and employment opportunities outside the county. The county's economy recovered greatly during the 1950s. Then in 1960 the county had a population of 41,247. The economic growth between 1960 and 1980 accompanied comparable population growth. Collin County's population increased to 144,576 in 1980. By 1990, the county grew to 264,036, nearly double what it had been just a decade before. **Figure 6** shows Collin County's historic and projected population growth from the 1800s through the year 2030.

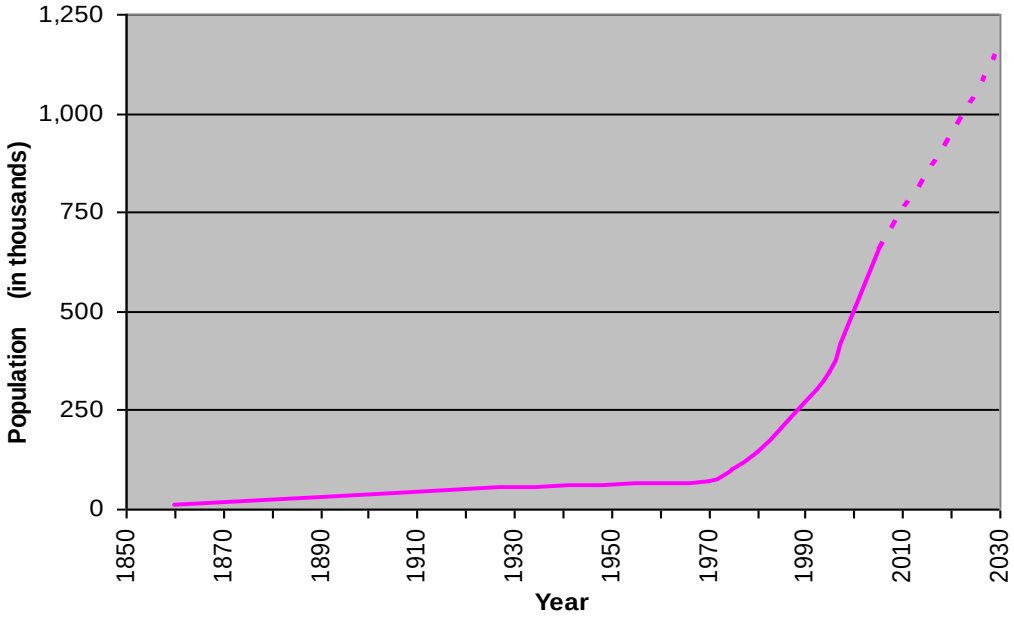


Figure 6: Collin County Population:
Historic (1850-2010) and Projected (2010 – 2030)
Source: United States Census Bureau

The U.S. Census Bureau reports that between 2010 and 2013, Collin County was the 33rd fastest growing county in the nation, with an annual population growth rate of 9.3 percent. The County is home to 3 of the fastest growing cities in the state (Frisco, McKinney and Allen), for cities with over 50,000 population. The county's population grew from 66,920 in 1970, to 491,675 by 2000. Estimated county population was 808,830 in 2012, and the county grew to an estimated 854,778 in 2013. From 2010 to 2012, Frisco and McKinney experienced annual population growth rates in excess of 9 percent, and Plano's growth rate was almost 5 percent. NCTCOG estimates that these high rates of growth will continue into

the future. Collin County's population is projected to increase by 166 percent between 2012 and 2035, reaching more than 1.3 million people.

Highway congestion is forecasted to increase dramatically in Collin County, posing many challenges for maintaining mobility. According to NCTCOG, 26.4 percent of all principal arterial lane miles in Collin County will experience Level of Service "F" during peak periods in 2035, a 45 percent increase compared to 2007. Level of Service definitions are provided in Appendix A. Collin County drivers will spend 327 percent more time stuck in traffic in 2035.

Highway funding for Collin County is forecast to be unable to keep up with demand for construction that is needed to help reduce anticipated congestion. NCTCOG's Mobility 2035 – 2013 Update notes that the region will experience a $296.6 billion shortfall in transportation system component funding between 2014 and 2035. The combination of continued rapid growth in travel demands and constrained funding for infrastructure improvements means that the region faces grave challenges in building to maintain adequate mobility.

As the county continues to grow, an increasing number of local residents will travel to employment sites within the county, whether to Dallas (the city with maximum employers in the DFW Area) or elsewhere. This high level of growth will place a great burden on the county's existing and future transportation system. With continuing growth, the county faces the challenge of meeting the transportation needs of its citizens, and maintaining or improving the serviceability of the county's transportation system with increased budget constraints.

In addition, delays due to accidents, construction, special events, and congestion will affect the county's mobility and air quality. Since Collin County is part of a designated "non-attainment" area for the pollutant ozone, increased ozone levels and impaired air quality can reduce federal funding available for transportation projects in the future. Consequently, a comprehensive, cooperative, and continuing approach toward alleviating existing and projected mobility problems is the goal of NCTCOG's Regional Mobility 2035 Plan.

Growth experienced through the entire DFW Area has resulted in major expansions to the North Texas Region transportation systems. Over the last several years, various entities, including the Texas Department of Transportation (TxDOT), the North Texas Tollway Authority (NTTA) and Dallas Area Rapid Transit (DART) have completed several

major transportation improvement projects. Major transportation improvements completed or under construction since the 2007 update of the Collin County Mobility Plan include the following projects:

- Dallas North Tollway Extension to SH 380;
- Collin County Outer Loop from US 75 to SH 121;
- FM 545 Alignment Study;
- 2007 Transportation Bond Projects included $236 million bond funding for 113 projects totaling 146 centerline miles and $485 million in project costs;
- Regional Toll Revenue Projects;
- Sam Rayburn Tollway - SH 121 including the US 75 Interchange;
- US 75 north of the SRT SH 121 (under construction);
- Widening of SH 78 from Wylie to FM 6;
- President George Bush Turnpike Eastern extension; and
- SH 380 Widening Project.

2. The Plan

The Collin County Mobility Plan (CCMP) is the officially adopted plan to identify the transportation needs of the county. The CCMP is adopted to guide transportation system improvements, including planned expansion of the highways and county roads, extension of transit service, and development of the hike-and-bike trail network. It provides the county with a guide to transportation choices to maintain the high-level quality of life in Collin County.

2.1. Goals of the Plan

The CCMP is based upon the following goals to guide transportation planning and investment:

- Adequately maintain existing transportation infrastructure through maintenance and rehabilitation programs;
- Build new elements of a balanced transportation system required to serve the increasing travel demand;
- Reduce congestion and improve traffic flow;
- Enhance the county's economic competitiveness; and
- Keep the CCMP and the Thoroughfare and Transit Plan updated.

In addressing these goals the CCMP mitigates adverse impacts on the county's natural environment and enhances the safety of the public. The development of the CCMP included collaboration with transportation officials in Collin County municipalities and other cities and counties of North Central Texas, and at the regional, state and federal levels, to develop effective transportation solutions.

2.2. Relationship with other Plans and Programs

The 2014 Collin County Mobility Plan Update ensures coordination among transportation planning efforts by various entities and jurisdictions in the county by drawing upon previous and currently on-going planning efforts. The 2014 CCMP Update provides a comprehensive guide to Collin County transportation plans. A number of government and non-government agencies manage various transportation and related services as well as the networks in any given area. These agencies may be authorized by federal, state, or

local laws to develop and manage various systems. Some of these systems are directly or indirectly related to transportation facilities. Many such agencies operate some of the transportation facilities and plan for their improvements.

As part of the development of the 2014 Collin County Mobility Plan Update, a wide range of previous planning studies were reviewed to ensure that the plan update would be consistent with adopted land use and transportation plans in Collin County. The plans and studies reviewed are described in the following paragraphs.

2.2.1. National Highway System

The National Highway System (NHS) is a 163,000-mile system of interconnected principal arterial routes of national importance. The NHS includes all Interstate Highway System segments, all strategic highways and their connectors, and any other urban or rural "Principal Arterials" that meet the goals of the NHS. By providing these essential linkages between different modes of transportation, the NHS creates a seamless network for the rapid movement of people and products across the nation.

2.2.2. Mobility 2035 Metropolitan Transportation Plan

The Regional Metropolitan Transportation Plan – Mobility 2035 (MTP) is a comprehensive, multi-modal blueprint for transportation systems and services aimed at meeting the mobility and financial needs of the DFW Area. The MTP, prepared by the NCTCOG, identifies most of the southern and western areas of the county as "areas of severe peak-period congestion", especially along US 75, Dallas North Tollway, President George Bush Turnpike, SH 121, and the Sam Rayburn Tollway.

2.2.3. Regional Thoroughfare Plan

The Regional Thoroughfare Plan (RTP) establishes a network that incorporates the primary features of each city's thoroughfare plans. Prepared by NCTCOG, the RTP identifies the ultimate system of arterials when the region is completely developed. City and county plans were incorporated where appropriate to indicate the future proposed thoroughfares that will carry traffic across multiple jurisdictions. The RTP gives neighboring communities an opportunity to see how individual roadway systems affect the entire region and not just one city.

2.2.4. Texas Metropolitan Mobility Plan

The Texas Metropolitan Mobility Plan (TMMP) was prepared in 2006 by NCTCOG to address a statewide initiative to quantify long-range needs within the larger metropolitan areas of the state. Unlike the region's long-range Metropolitan Transportation Plan, the CCMP is not constrained by anticipated revenues, and the plan focuses on the magnitude of unmet transportation needs for the region. The TMMP identified the most severe capacity deficiencies of the region which include the following corridors: US 75 corridor from Plano to I-635/ LBJ Freeway and SH 121/ Sam Rayburn Tollway from the US 75 North Central Expressway to Midway Road.

2.2.5. Collin County Public Transportation Plan

The Collin County Public Transportation Plan (CCPTP) was completed by NCTCOG in 2004, in response to a request for assistance by the City of Allen, City of Frisco, City of McKinney, and Collin County, to analyze demand for public transportation and providing recommendations, cost estimates, and an implementation schedule.

2.2.6. Collin County Transit Study

This 2006 study examined the feasibility of extending transit services within Collin County. NCTCOG conducted this study in cooperation with the City of Allen, City of Frisco, City of McKinney, and Collin County. Options for the extension of commuter rail and bus services to Allen, Frisco, and McKinney were evaluated. Potential rail transit expansion include extending the DART Red Line northward to McKinney and the construction of a commuter rail line northward from the SRT to Frisco. Potential bus services would provide service between major origin and destination points, such as transit terminals, retail centers, and employment centers.

2.2.7. Collin County 2003 Bond Program

The residents of Collin County approved a ballot measure in 2003, which approved the 2003 Collin County Bond Program. The 2003 Bond Program provided $142 million in bond funding for transportation improvements, including 65 projects totaling $291 million in project cost. The 2003 Bond Program projects created a majority of the transportation network for the county, including new roads, upgrades to existing roads and other transportation projects such as sidewalks, trails, or transit improvements to increase mobility in the Collin County area.

The 2003 Collin County Bond Program also included improvements for recreational facilities and parks. The 2003 Bond Program was preceded by the 1999 Collin County Bond Program, which resulted in 51 projects at a total project cost of $124 million.

2.2.8. Collin County 2007 Bond Program

The 2007 bond propositions were developed by citizen committees, which evaluated and determined viable projects for the program. Committee members were nominated by the Commissioners Court and included representatives from municipalities and unincorporated areas of the county. The committees were supported by engineers, architects, urban planners, and other specialists. The mission of the citizen committees was to make recommendations. A bond program was recommended and the voters approved the ballot measures in 2007. A list of road projects for inclusion in the bond election was developed based on traffic, population, and employment projections. An additional 66 projects were identified to be funded if additional monies were secured or made available from the “most critical” project list. The 2007 Bond Program consisted of three components – facilities, parks /open space, and transportation - with $76.3 million, $17 million, and $235.6 million in funding respectively. The 2007 Transportation Bond Projects included 113 projects totaling 146 centerline miles and $485 million in project costs, including contributions from the cities and TxDOT. In 2014, discretionary funds remaining from the 2007 Bond Program were being reprogramed to support other projects to address immediate needs.

2.2.9. Collin County Parks and Open Space Strategic Plan

The Parks and Open Space Strategic Plan is a guidebook for adding new parks and open space resources to the 7,400 acres of existing municipally owned parks and open spaces in Collin County. This plan was approved by Collin County in October of 2001. The recommendations within the Strategic Plan are intended to work with the jurisdictions that have park system plans (such as Allen, Frisco, McKinney, Plano, and Richardson), as well as those smaller communities who did not have park system plans (such as Josephine, Melissa, and Celina). The plan encourages coordination between all levels of government, as well as the partnering with private interests, non-profit entities, religious organizations, and citizen resources.

2.2.10. Collin County Regional Trails Master Plan

The Collin County Regional Trails Master Plan was developed by Collin County in 2012 to provide coordination and connectivity between cities and towns for the development of a county-wide trail system. The plan builds upon the planning efforts of the 31 cities and towns within the county and other regional studies, such as NCTCOG's Regional Veloweb and the Six Cities Trails Plan in Dallas and Collin Counties.

The key components of the Trails Master Plan are to define high-priority trail corridors that provide county-wide linkages and identify and address gaps between cities. The plan encourages corridor preservation and multi-jurisdictional implementation. The plan serves as a tool that gives guidance to Collin County for evaluating requests submitted as part of its County Parks and Open Space Project Funding Assistance Program. The County's Regional Trails Master Plan is shown in **Figure 7**.

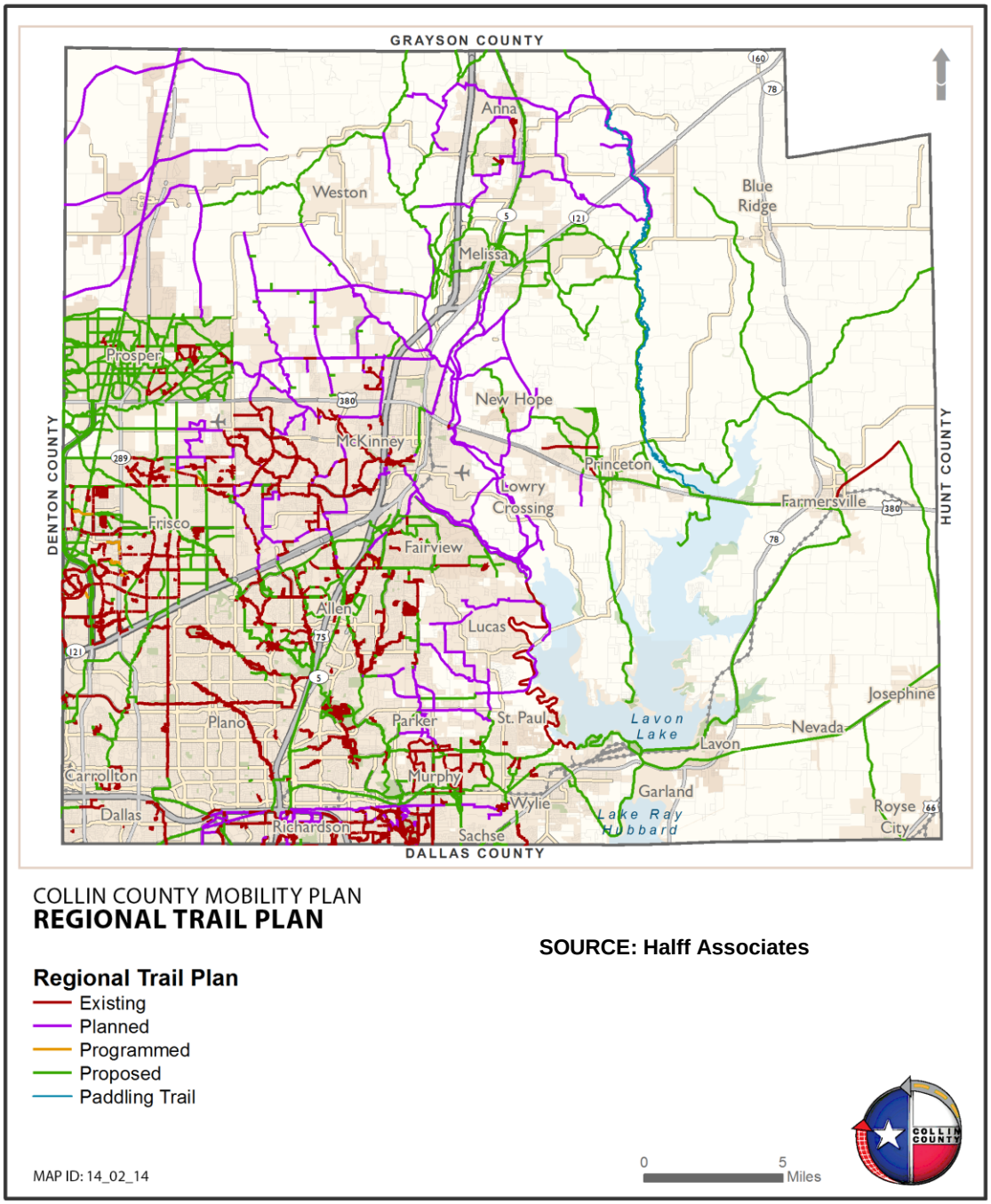


Figure 7: Collin County Regional Trails Master Plan

2.2.11. Municipal Comprehensive Plans and Thoroughfare Plans

Municipalities in Collin County have adopted comprehensive plans that will have significant impacts on transportation planning for the county. All of the adopted city plans were reviewed and incorporated into this CCMP update where appropriate and justifiable for regional importance and need based on future Level of Service. These plans are discussed in further detail under section 4.1.3

2.3. 2014 Collin County Mobility Plan Update

The Collin County Thoroughfare Plan was originally prepared and adopted in 1981. In 1998 the thoroughfare plan was revised and renamed as the Collin County Mobility Plan. In 2000, a comprehensive update of the CCMP was carried out. The plan was again updated in 2002 and 2007. In 2011, minor adjustments to the plan were approved by the County Commissioners Court.

The CCMP should be periodically updated to include the changing transportation needs of the county. Since the last update in 2007, the county experienced faster population and employment growth than before, and the previously under-developed areas of the county also began to experience rapid growth. The increased travel demands generated by population and employment growth warrant the expansion of the transportation network in the county.

As a result of the growth, the transportation agencies are undertaking a number of transportation improvement projects to limit the negative impact on the transportation system. The extension of the Dallas North Tollway and the President George Bush Turnpike are complete. Tolling of SH 121 by construction of the Sam Rayburn Tollway was completed in 2007. An initial segment of the Collin County Outer Loop was constructed as a two-lane road extending from SH 121 to US 75. Light rail transit service in Collin County is in the early planning stages. DART's Red Line currently extends to the Parker Road Station in north Plano.

The primary goal of the 2014 Collin County Mobility Plan Update is to develop a balanced multi-modal transportation plan for Collin County. The update extends the demographic and travel demand projection through the year 2035, and the Thoroughfare and Transit Plan represents needs through ultimate build-out. The updated plan reflects current development trends and anticipated future growth, and recommends innovative solutions to transportation needs. The objectives of the 2014 CCMP are to coordinate

thoroughfare planning among the municipalities within the county, and to ensure reservation of adequate rights-of-way on appropriate alignments and of sufficient width to allow the orderly and efficient expansion and improvement of the thoroughfare system to serve existing and future transportation needs.

The Collin County Planning Board acted as the Steering Committee for the 2014 CCMP Update. The Planning Board is made up of individuals appointed by the Collin County Commissioners Court; diversification of the board members was achieved through appointment of members from different areas across Collin County. A series of four community workshops were conducted in different geographic locations in February 2013. A county-wide community workshop was held on February 18, 2014. The Planning Board reviewed the draft plan, provided review comments, and recommended the updated plan to the Commissioners Court. The Collin County Commissioners Court held a public hearing on the proposed plan update on April 21, 2014, for the 2014 Collin County Mobility Plan Update. The CCMP Update was adopted by the Commissioners Court in August, 2014.

2.3.1. Scope

While other long range development plans look at foreseeable changes over a 10 or 20 year period, thoroughfare planning should consider an even longer range perspective. The 2014 CCMP Update was carried out to guide transportation, policy, and program development to and beyond the designated 2035 horizon year. The plan was developed to coordinate the integration among land use, growth, development patterns, and the needed transportation infrastructure. It required systematic analysis of transportation needs, long-range comprehensive planning, and identification of future improvements to serve Collin County's continuing growth and development.

An analysis was performed of potential mobility improvements for 2020 Level of Service (LOS) and the results are summarized in this section. The 2020 travel demand model was used to determine levels of congestion that would result if no improvements were made by 2020. Roadway segments with a predicted LOS F in 2020 were identified. These roadways were then reviewed to determine which have the capability to be improved (they are currently less than six lanes). Estimated costs of making improvements to widen the roadway segments were determined. Although the projections are for 2020, it is assumed that the improvements would not necessarily be completed by 2020. A more detailed description of the analysis is contained in **Appendix C**.

2.3.2. Plan Organization

To accommodate the projected growth in Collin County, a comprehensive multi-modal approach was deemed necessary. Therefore, the 2014 CCMP Update consists of three distinct plan elements:

1. **Thoroughfare Plan**, which includes the recommended road network, proposed alignments, functional classification of thoroughfares, and location of other transportation facilities. The Thoroughfare Plan is primarily used for the physical development of thoroughfares in the county.
2. **Transit Plan,** which includes the recommended transit network, proposed alignments for transit services (commuter or light rail, or bus), and location of transit terminals. It primarily deals with public transportation and transit facilities.
3. **Hike-and-Bike Trails Plan,** which is the Collin County Regional Trails Master Plan, includes the proposed alignment of pedestrian and bike trails.

The result and product of the study are two documents – a report that discusses the goals and objectives, policies, projects, funding, and implementation aspects of the plan, and the Thoroughfare and Transit Plan map that shows the proposed alignments and classification of the thoroughfares, and location of other transportation plan elements.

3. The Partners

The 2014 CCMP Update was a team effort of a number of agencies and organizations. Among these are the Collin County Commissioners Court, Collin County Planning Board, Collin County Engineering Department, local municipal jurisdictions within Collin County, and NCTCOG.

3.1. The County

The CCMP was updated while working closely with both county and city officials and staff to create a plan that emphasizes the interrelationships between land use, transportation issues, and other infrastructure extensions. The consultants selected by the county included: Jacobs Engineering Group Inc.; Freese and Nichols, Inc.; Alliance Transportation Group, Inc.; and Strategic Community Solutions, LLC (the Jacobs Team). An initial project kick-off meeting with county officials and staff was held on June 7, 2012, to discuss the overall strategy for the project. Thereafter, monthly meetings were held with the Planning Board appointed by the Commissioners Court to coordinate and review the efforts.

The Draft Mobility Plan 2014 Update was recommended by the Collin County Planning Board in April, 2014, and was presented to the County Commissioners Court for review and adoption in April of 2014. Subsequent to a Public Hearing, the Commissioners Court directed several revisions based upon their review, and the final plan was adopted in August, 2014.

3.2. The Cities

There are 30 incorporated jurisdictions in Collin County, many of which are completely contained within the county. **Table 1** lists the jurisdictions that are completely contained within Collin County. Some of the jurisdictions are NOT completely contained in the county, and have a part of their jurisdiction area in neighboring counties. **Table 2** lists these jurisdictions NOT completely contained within Collin County.

Table 1: Municipalities completely contained within Collin County

Jurisdiction	Jurisdiction
Allen	McKinney
Anna	Melissa
Blue Ridge	Murphy
Celina	Nevada
Fairview	New Hope
Farmersville	Parker
Lavon	Princeton
Lowry Crossing	Saint Paul
Lucas	Weston

Table 2: Municipalities NOT completely contained within Collin County

Jurisdiction	Jurisdiction
Carrollton	Prosper
Dallas	Richardson
Frisco	Royse City
Garland	Sachse
Josephine	Van Alstyne
Plano	Wylie

The Collin County Engineering Department staff and the Jacobs team provided a draft of the plan for review by the 30 municipal jurisdictions within the county during the course of the project. Individual meetings were conducted with the municipalities that responded with review comments and proposed changes inside their jurisdictions. Many of the jurisdictions were interviewed more than once to discuss certain complex issues. Most

of the meetings with municipalities were held during the later stages of the project when the Jacobs team had reviewed the municipal plans from each of the jurisdictions and prepared the initial draft of the updated county plan.

3.3. Transportation Agencies

A number of other agencies and organizations have a major influence on the transportation system in Collin County. Those entities are identified in the following paragraphs.

3.3.1. Metropolitan Planning Organization & North Central Texas Council of Governments

NCTCOG is a voluntary association of, by and for local governments, and was established to assist local governments in planning for common needs, cooperating for mutual benefit, and coordinating sound regional development. NCTCOG also serves as the Metropolitan Planning Organization for regional transportation planning in NCTCOG's described 16-county DFW Area including Collin County. As a member of NCTCOG, Collin County is represented on the Regional Transportation Council and NCTCOG Board.

The plans and programs of the NCTCOG facilitate the development, management, and operation of an integrated, inter-modal transportation system that enables safe, efficient and economical movement of both people and goods. NCTCOG prepared the long range (20 years) transportation plans for the entire DFW Area, and also prepared the annual Unified Planning Work Program (UPWP), and Transportation Improvement Program (TIP) to guide the use of available Federal funding for transportation improvements, consistent with Federal requirements and guidelines.

3.3.2. Texas Department of Transportation

The system of Interstate Highways, U.S. and State Highways, and other Federal Aid facilities, in an urban area comprises a substantial portion of the county's major street and highway system. The Texas Department of Transportation (TxDOT) constructs and maintains many of the thoroughfares in Collin County, as it does throughout the State of Texas.

The Federal Aid Highway Program, administered by the Federal Highway Administration (FHWA) and TxDOT, is the major funding source for development of highways and many urban arterial improvements in Texas counties and cities.

3.3.3. North Texas Tollway Authority

The North Texas Tollway Authority (NTTA) is a political subdivision of the State of Texas, and is empowered to acquire, construct, maintain, repair, and operate turnpike projects. NTTA has representatives from Collin, Denton, Dallas, and Tarrant counties, on its Board of Directors. NTTA operates the Dallas North Tollway (DNT), the President George Bush Turnpike (PGBT), and the Sam Rayburn Tollway (SRT).

3.3.4. Dallas Area Rapid Transit Authority

Dallas Area Rapid Transit Authority (DART) operates Light Rail Transit (LRT) and fixed route transit bus service within portions of the county. The Cities of Carrollton, Garland, Plano, and Richardson are the only member cities of DART in Collin County. DART is currently planning an extension of the LRT service along the North Central corridor, and the North cross-town corridor within the Cotton Belt Railroad right-of-way.

3.3.5. TAPS Public Transit

TAPS Public Transit operates fixed route and on-demand curb-to-curb public transportation for Collin County rural areas and for the Cities of Allen and McKinney. TAPS buses run Monday-Friday with the earliest available pickup time at 6:00am and the latest available pickup time at 5:30pm. TAPS does not provide on-demand/curb-to-curb service in Collin County on Saturday or Sunday. TAPS does provide city bus service and express service in the Cities of Allen and McKinney. TAPS vehicles are not allowed to pick up or deliver in Plano, except that TAPS Public Transit provides express commuter service from Allen, Sherman, and McKinney to DART's Parker Road Station in Plano.

3.3.6. Railroads

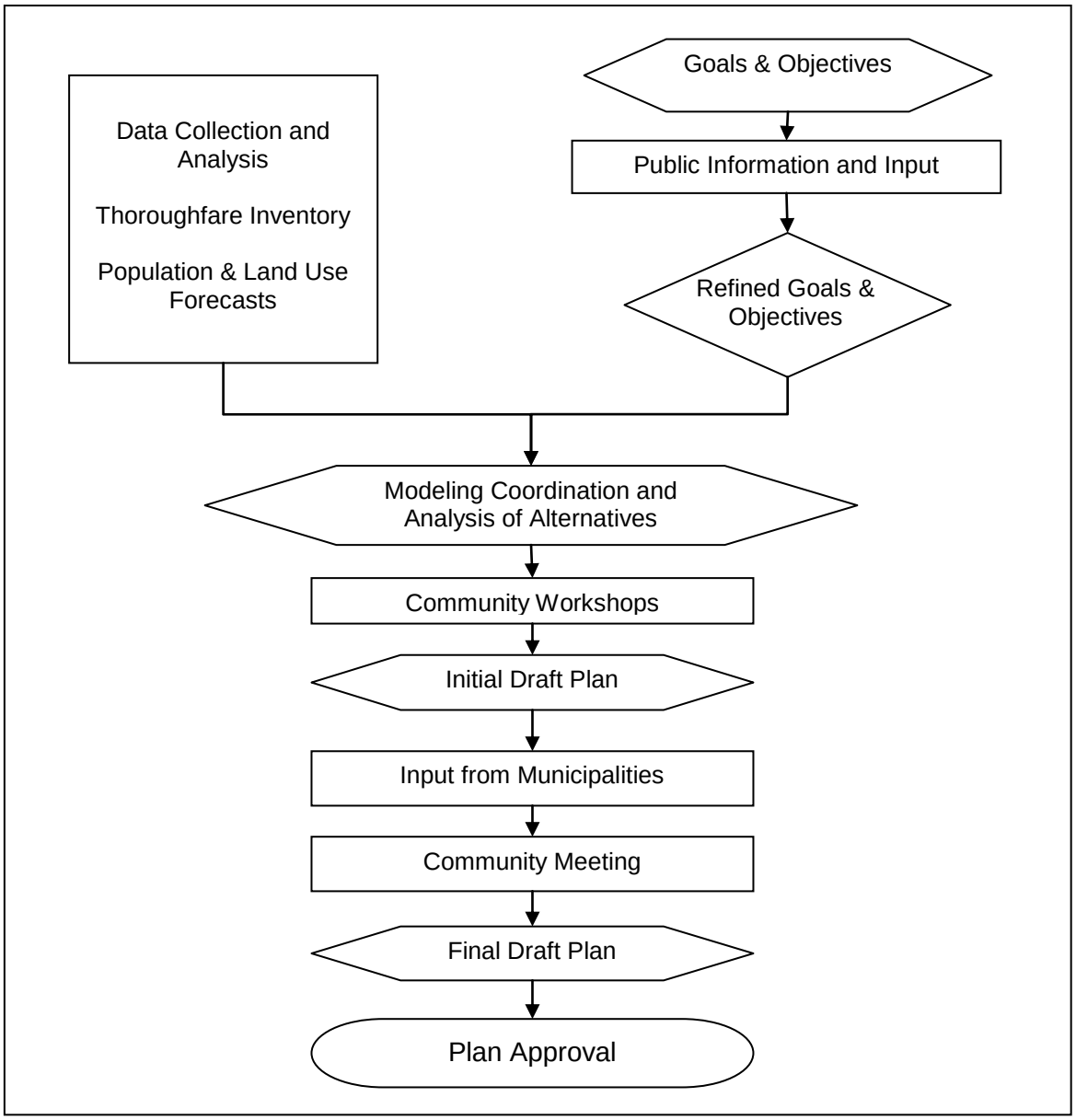
The Union Pacific and Burlington Northern Santa Fe Railroads own and operate rail lines that bisect the county. Collin County is a member county of the Northeast Texas Rural Rail District (NETEX). NETEX owns the Cotton Belt railroad right-of-way that once served southeast Collin County and northeast Texas.

4. The Planning Process

The process of updating the 2014 Collin County Mobility Plan Update was divided into three tasks, illustrated in **Figure 8**, and itemized below:

- Data Collection
- NCTCOG Model Coordination and Analysis
- Community Involvement and Citizen Participation

Figure 8: Collin County Mobility Plan Methodology



4.1. Data Collection

A large amount of data was collected, compiled, analyzed, and reviewed to guide the 2014 CCMP update process. The data collection activities are described in the following paragraphs.

4.1.1. Thoroughfare System Inventory

Existing data sets and models were compiled from previously published reports from sources including Collin County, municipalities within Collin County, Texas Department of Transportation (TxDOT), North Central Texas Council of Governments (NCTCOG), North Texas Tollway Authority (NTTA), Dallas Area Rapid Transit (DART), and U.S. Census Bureau. NCTCOG is responsible for the 2035 Regional Mobility Plan, which includes the adopted regional plan of freeways, tollways, regional arterials, rail transit, HOV lanes, and hike-and-bike trails. Adopted comprehensive plans and land use plans were obtained from the municipalities within Collin County. These existing plans provided the basis for developing population and employment projections. Thoroughfare Plans and the Regional Mobility Plan were utilized to develop the initial transportation model networks that were evaluated during the travel demand forecasting process. The existing roadway network is shown in **Figure 9**. The chronological development of the Collin County Thoroughfare Plan is illustrated in **Figures 10, 11, 12A, 12B,** and **13**.

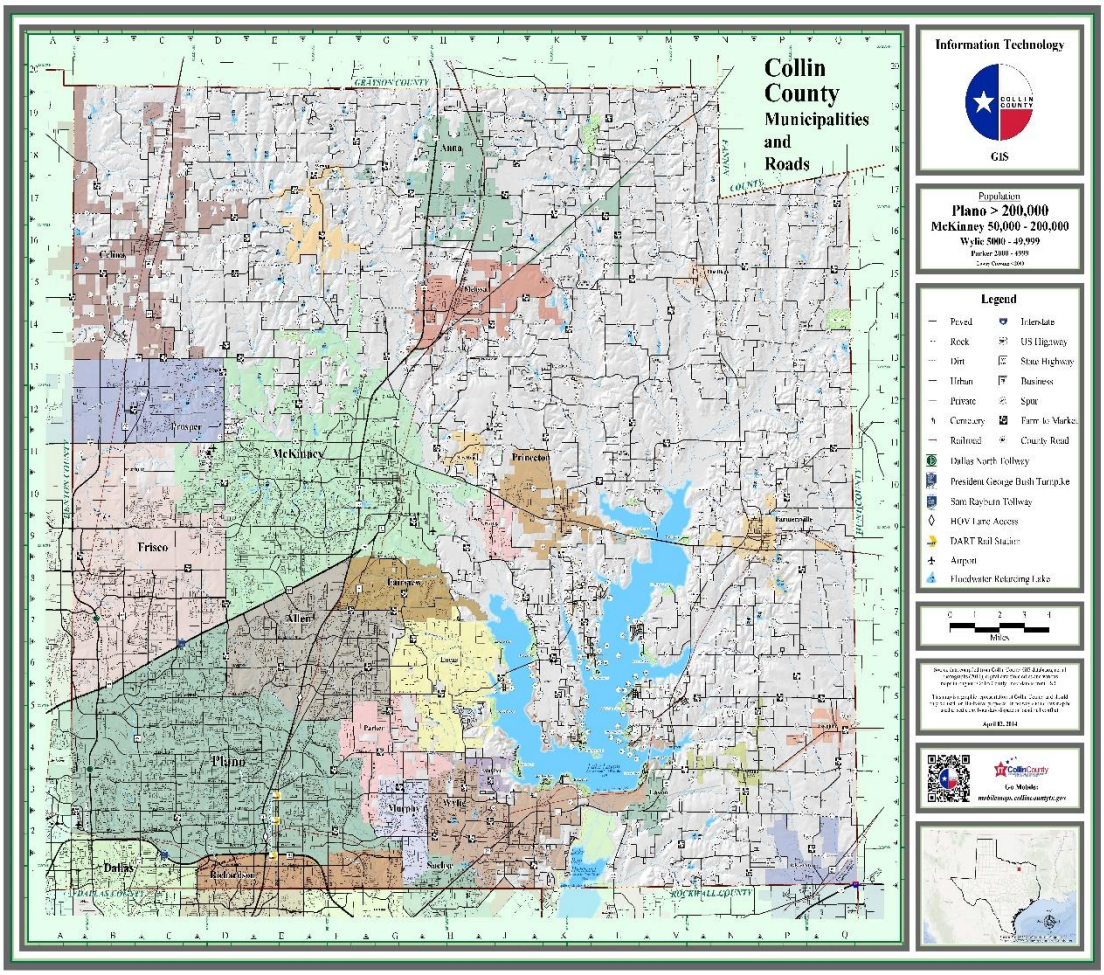


Figure 9: Collin County Existing Roadways
Source: Collin County Engineering Dept.

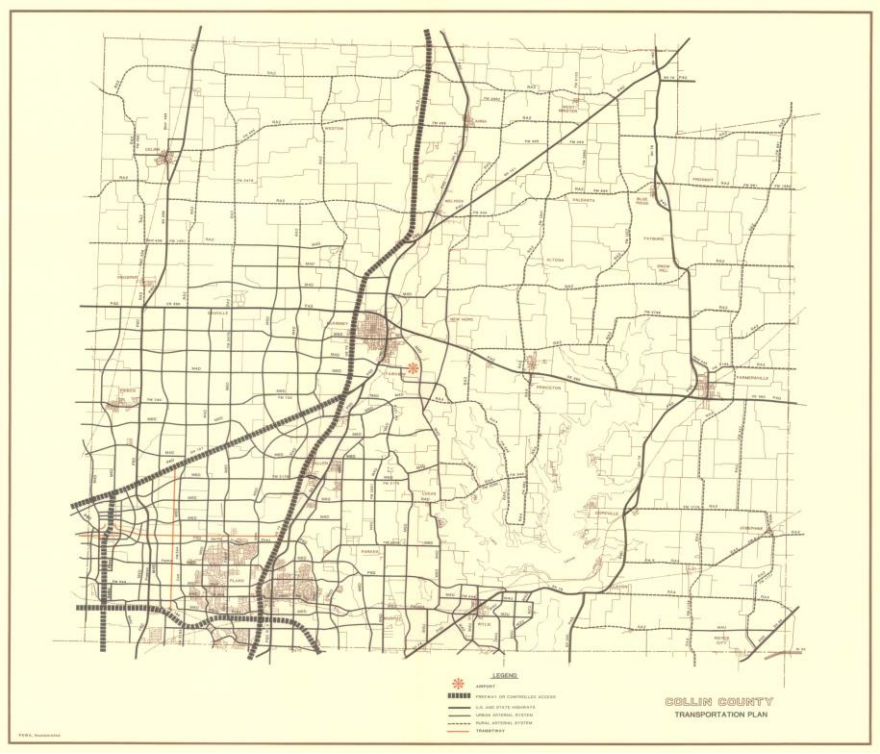


Figure 10: 1982 Collin County Thoroughfare Plan
Source: Collin County Engineering Dept.

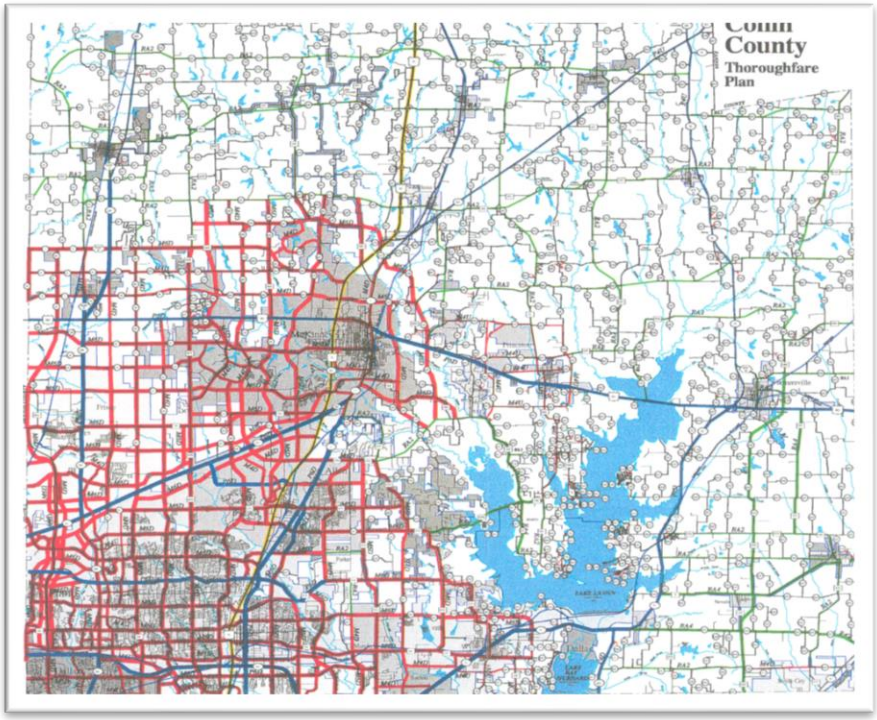


Figure 11: 1998 Collin County Thoroughfare Plan
Source: Collin County Engineering Dept.

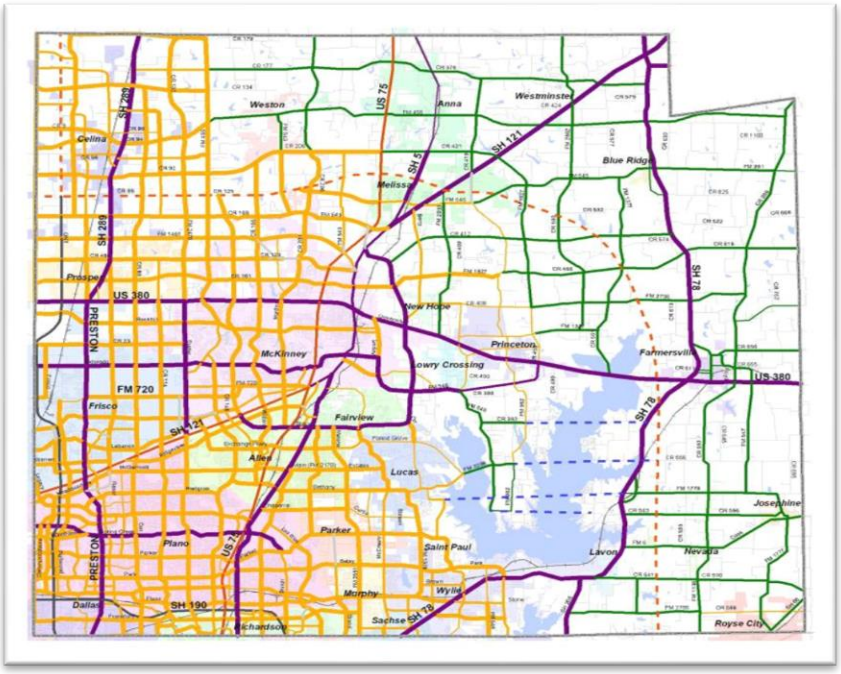


Figure 12 A: 2002 Collin County Thoroughfare Plan
Source: Collin County Engineering Dept.

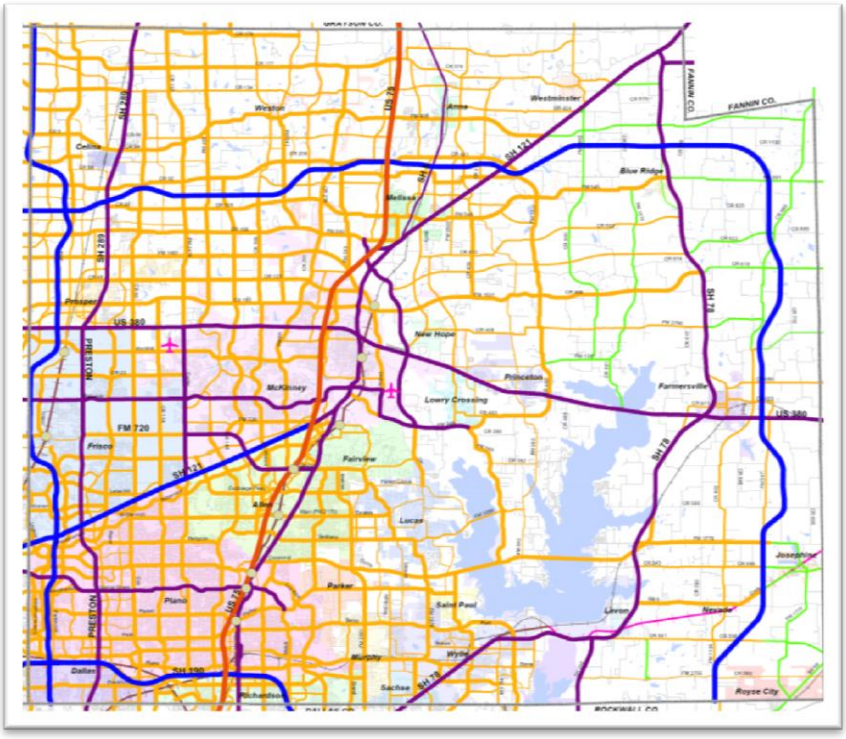


Figure 12 B: 2007 Collin County Thoroughfare Plan
Source: Collin County Engineering Dept.

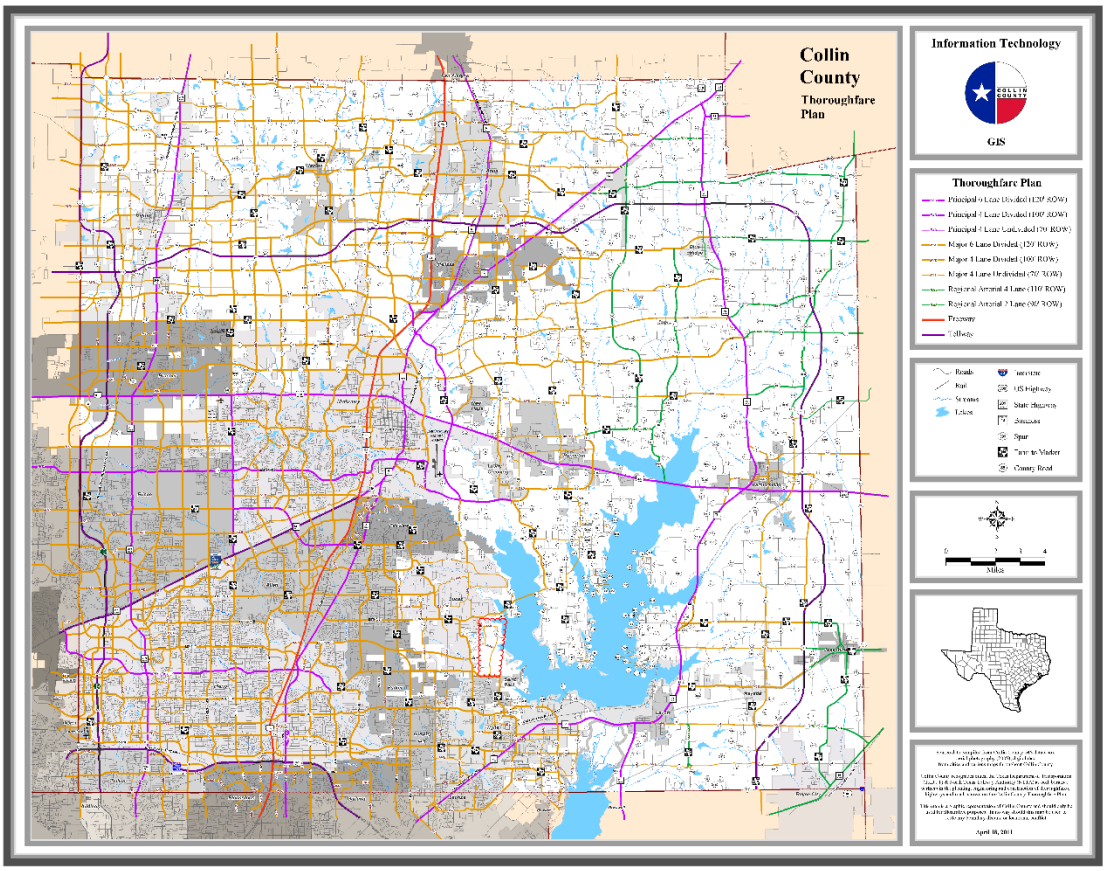


Figure 13: 2011 Collin County Thoroughfare and Transit Plan
Source: Collin County Engineering Dept.

4.1.2. Environmental Constraints

Environmental and physical constraints to thoroughfare development were recognized during preparation of the 2014 CCMP. The identified environmental constraints are shown in **Figure 14**. The existing physical constraints include:

- Topographic constraints such as steep slopes or abrupt changes in elevation;
- Railroad crossings requiring grade separations or at grade crossing protection, and thoroughfare improvements paralleling a railroad corridor involving right-of-way constraints;
- Existing development interfering with thoroughfare improvement in areas where right-of-way was insufficient when the property was originally platted, or where buildings were constructed with minimal setbacks from the right-of-way;

- Public parks and historic sites either interfere with conversion of parkland to other uses, or impact cultural resources, along with other public facilities;
- Major water bodies such as lakes, reservoirs, rivers, bayous, and creeks and their associated floodplain areas affecting thoroughfare alignment increasing the capital cost of thoroughfare improvements for necessary bridges, causeways or fill sections;
- Sensitive environmental areas such as wetlands, prime farmland, or critical habitat areas.

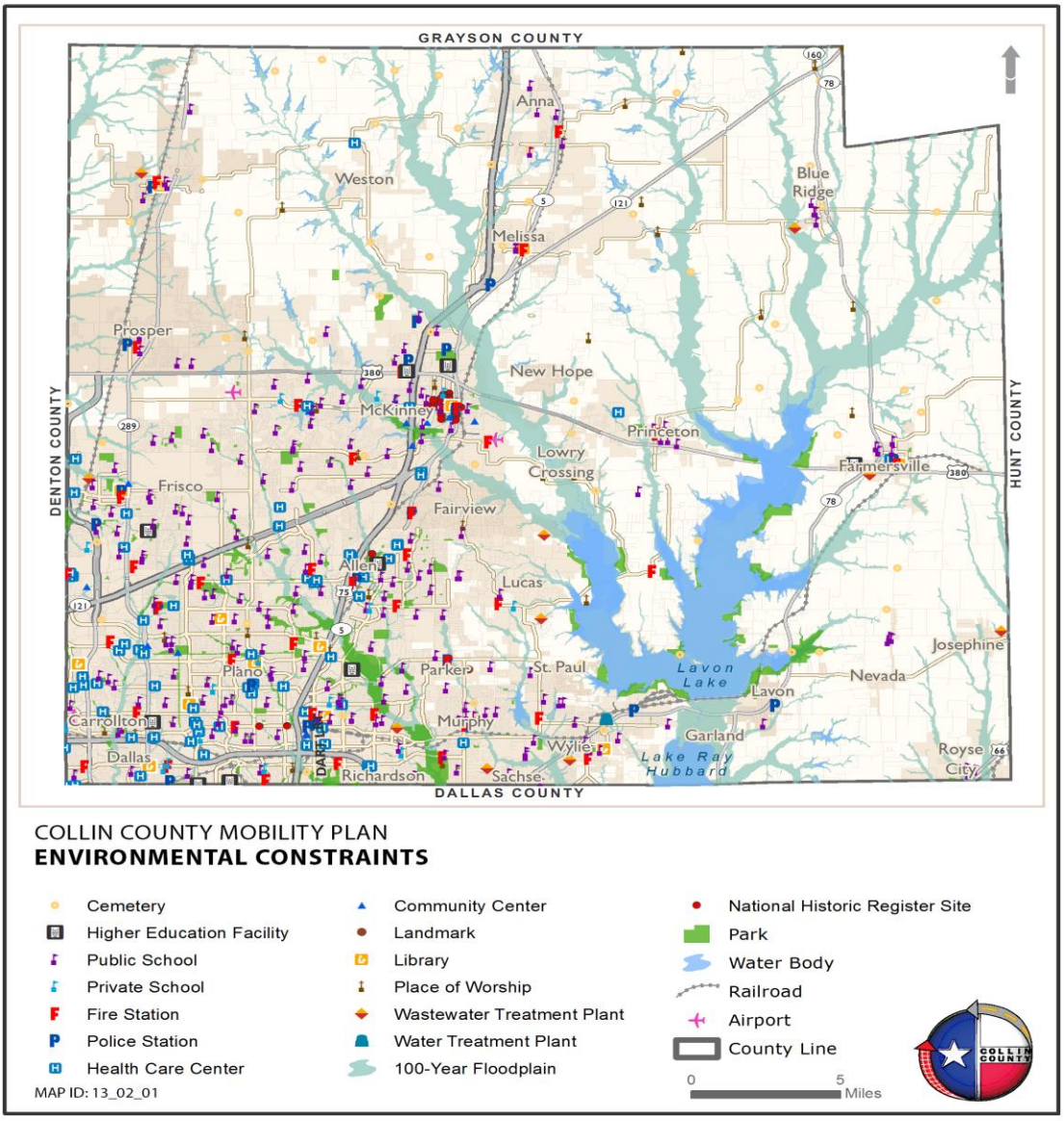


Figure 14: Environmental and Physical Constraints

4.1.3. City Land Use and Transportation Plans

Many Texas jurisdictions, including cities and incorporated towns within Collin County, have adopted plans for future land use and improvements to the transportation network within their corporate limits and extraterritorial jurisdiction (ETJ). Each local jurisdiction within the county with a population of 5,000 or more, as well as some of the smaller jurisdictions, has developed a Comprehensive Plan to guide further land use development activity, and a Thoroughfare Plan to serve the travel needs of area residents. Of the 30 jurisdictions in Collin County, at least 20 have adopted plans. The Jacobs team assembled the existing Comprehensive Plans, Land Use Plans, and Transportation Plans for the various local jurisdictions. **Table 3** lists all cities that made their plans available for review and consideration. For the cities that did not either have the data available or did not provide the data, reasonable planning assumptions were developed and incorporated into the database. The future land use plan assumes ultimate build out as identified in the cities' comprehensive plans, as shown in **Figure 15**.

Typically, the thoroughfare system map indicates whether the existing rights-of-way for thoroughfares have sufficient existing width or need to be widened, and shows the planned extensions of thoroughfares on new alignments where right-of-way needs to be acquired in the future. Thoroughfare Plans also include typical roadway cross sections (shown in section 7.1.2), indicating the desired number of lanes, right-of-way and pavement widths, and other dimensional criteria for city streets.

The principles of cross-county connectivity and coordinated planning are especially significant to the mobility planning process. Therefore, this 2014 CCMP Update has taken the thoroughfare plans adopted by municipalities into consideration. The adopted land use and transportation plans for the municipalities provided the basis for developing population and employment projections, as well as coordinating planned thoroughfares.

Table 3: Cities and Documents provided for Review

Municipality	Documents
Allen	Comprehensive Plan, Traffic Volumes
Anna	Land Use Plan
Carrollton	Comprehensive Plan
Celina	Comprehensive Plan
Dallas	Thoroughfare Plan
Fairview	Comprehensive Plan
Farmersville	Thoroughfare Plan, Future Land Use Plan
Frisco	Comprehensive Plan
Garland	Comprehensive Plan
Lucas	Comprehensive Plan
McKinney	Comprehensive Plan
Melissa	Transportation Plan
Murphy	Future Land Use
Nevada	Comprehensive Plan
Parker	Comprehensive Plan
Plano	Comprehensive Plan
Prosper	Master Thoroughfare Plan, Future Land Use Plan
Richardson	Comprehensive Plan
Sachse	Comprehensive Plan
Weston	Thoroughfare Plan
Wylie	Thoroughfare Plan

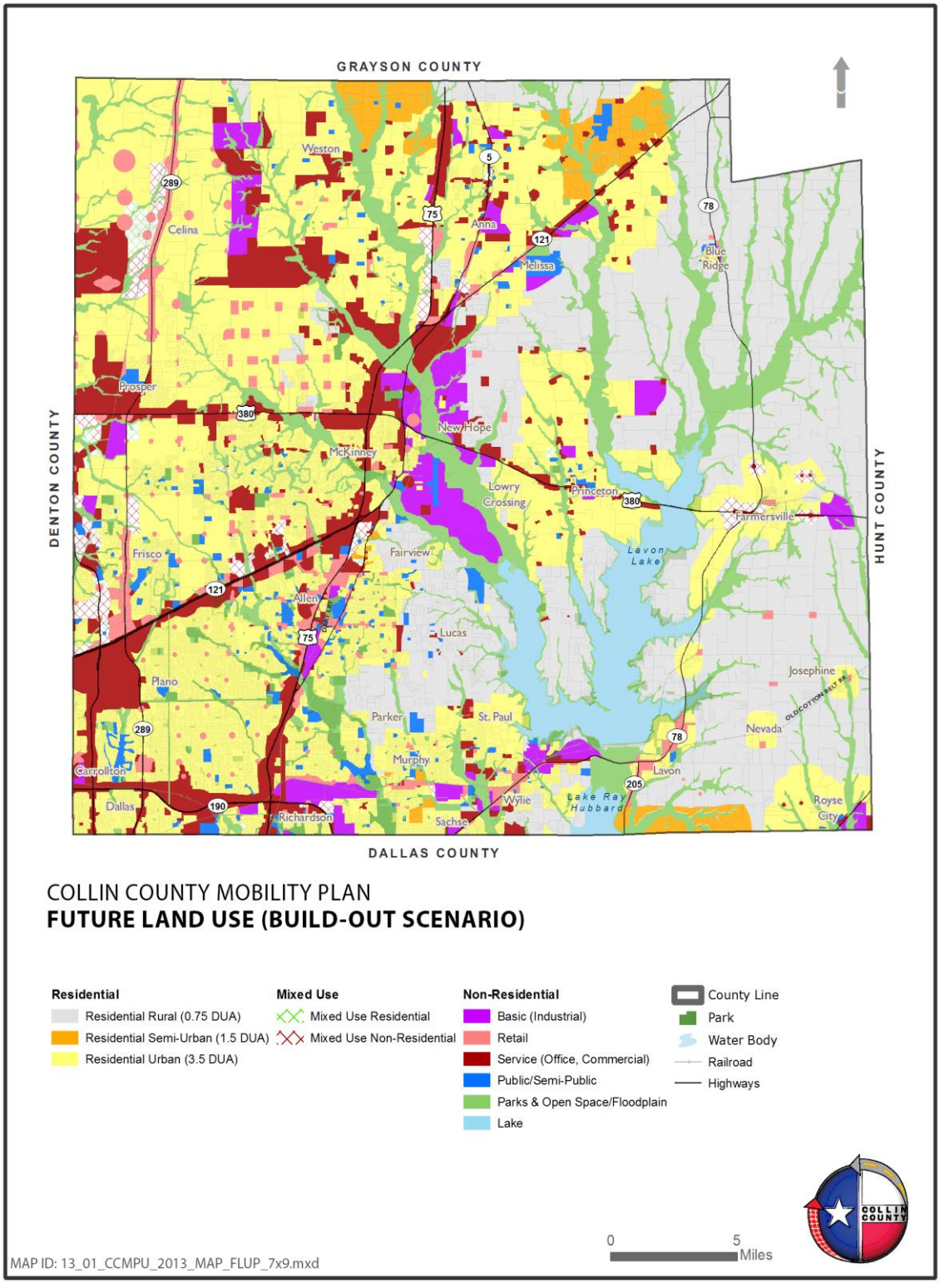


Figure 15: Collin County Future Land Use Plan Map (Build Out)

4.1.4. Demographic and Land Use Forecasts

For the purpose of the CCMP Update, population and employment projections were developed for the interim year (2020), the horizon year (2035), and the build-out scenario (estimated to be 2054). The build-out projections reflect the population and employment that will occur if the various local jurisdictions build-out according to their existing adopted plans.

A Traffic Survey Zone (TSZ) was used as the smallest geographical unit. A TSZ is a geographical area based on the geography, population size, land use, and transportation facilities. The TSZs are typically bounded by roadways or other natural features, such as lakes or streams. NCTCOG has divided the twelve-county DFW Area into 6,399 TSZs. Collin County consists of 453 of these TSZs, each of which was assigned to a city area or to the county. Boundaries of TSZs rarely follow city limits, so it was necessary to assign TSZs to a city area that comprises the dominant portion of each TSZ.

These combinations of TSZs are referred to as "City Areas" for purposes of this analysis. City Areas do not equate to the incorporated area of a municipality. A total of 438 TSZs were assigned to the City Areas and the remaining 15 TSZs were assigned to the county. **Figure 16** shows the geographic distribution of each of the 453 TSZs and the City Areas based on the TSZs in the county. The TSZs were assigned to the City Areas if they meet the following conditions:

1. A TSZ boundary coincided with, or exceeded beyond, a city boundary;
2. A TSZ boundary spanned more than one city. The TSZ was assigned to the City Area that comprised the greater portion of the TSZ;
3. A TSZ boundary more or less, if not exactly, followed a city boundary. Consequently, demographic values for some of the City Areas are either higher or lower than those for the city actual because of this effect.

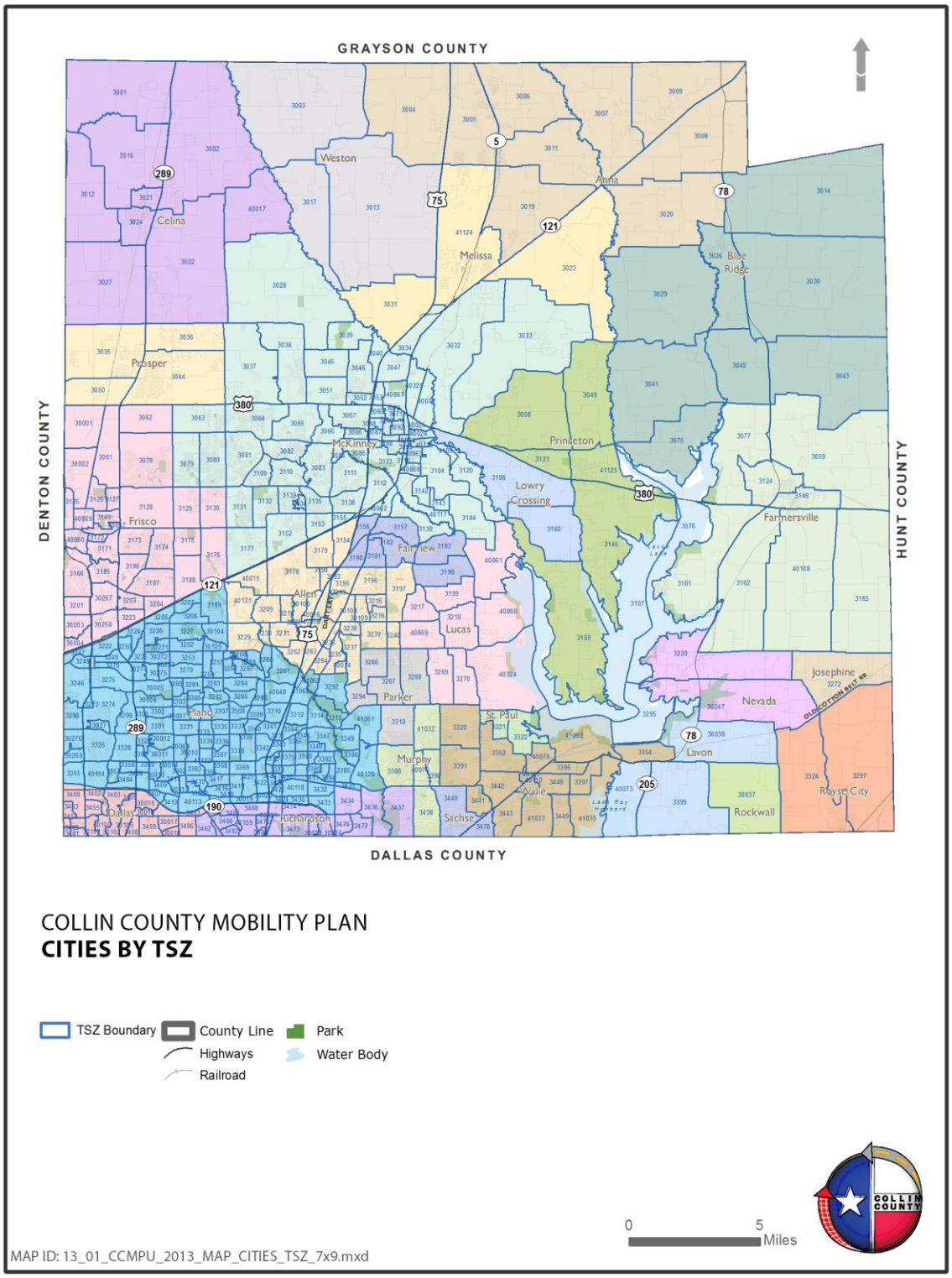


Figure 16: Collin County Traffic Survey Zones and City Areas
Note: TSZs are identified by number and City Areas are identified by color
Source: The North Central Texas Council of Governments

As part of the 2014 Collin County Mobility Plan Update, an accurate and updated estimate (control total) for Collin County's 2014 population and employment was required. Therefore, NCTCOG 2012 population and employment data was used as a starting or reference point. The NCTCOG 2012 data was reviewed for accuracy, and consequently updated to form the 2014 estimates for the 2014 CCMP. Specifically, using NCTCOG's aerials and visual site inspections (for selected properties), each TSZ and associated data were either confirmed or revised. Revisions to NCTCOG 2012 data were made on an as-needed basis using a detailed, parcel-by-parcel analysis in each TSZ. Additionally, Texas Work Force Commission data and U.S. Census (2010) data were used in establishing control totals.

Once the NCTCOG 2012 data was either confirmed or revised, comprehensive plans, future land use plans (FLUPs), and general planning assumptions were applied to vacant land to determine the build-out population and employment for each of the 453 TSZs. If density information was provided in a municipal comprehensive plan, then that density was used instead of the standards listed below. The following factors were used in calculating demographics:

- Density for Population
  - Urban – 3.50 Dwelling Units per Acre
  - Semi-Urban – 1.50 Dwelling Units per Acre
  - Rural – 0.75 Dwelling Units per Acre
- Density for Employment
  - Retail – 0.25 Floor Area Ratio (F.A.R.) – 350 S.F. per employee
  - Service – 0.25 F.A.R. – 450 S.F. per Employee
  - Basic – 0.10 F.A.R. – 1,000 S.F. per Employee
- Population (General)
  - A 10 percent reduction was applied to vacant residential land of 500 acres or greater to accommodate roads and other public and semi-public land uses.
- Population (Households)
  - A 93.4 percent occupancy rate was used to determine the amount of future households. However, if a City cited a different number, then the city's number was used. The 93.4 percent occupancy rate was reported in the 2005 U.S. Census for Collin County.
- Population (Persons)
  - The number of persons in each TSZ was calculated by using each TSZs person per household and multiplying by the number of households.

In order to project 2020 and 2035 population and employment, growth rates were determined for each TSZ based on the municipal comprehensive plans and observed growth patterns in each TSZ or city area. The complete listings of the 2020, 2035 and ultimate build-out population and employment figures for each of the TSZs are shown in **Figure 17**.

In general, Collin County is developing or growing from the southwest (e.g., Dallas, Plano, and Richardson) to the northeast/east portion of the county (e.g., Anna, Melissa, Blue Ridge, Farmersville, and Josephine). Furthermore, cities in the southwestern portion of the county will reach build-out earlier than cities in the northeastern/eastern portion. As a whole, the county is projected to reach its "build-out" or ultimate population of approximately 2,088,000 people in 2054. This would be 2.6 times the base year 2012 population of approximately 808,830. In 2013, the estimated population of Collin County was 854,788. The county will reach its build-out or ultimate employment in the year 2055 with approximately 1,168,000 jobs within the county. This would be 3.6 times the base year 2012 employment of 325,177.

The resulting population and employment projections are shown graphically in **Figure 17**. The population forecasts for 2012, 2020, 2035, and build-out are illustrated by the population density maps showing in **Figures 18, 19, 20A,** and **20B**. Each dot represents 250 residents.

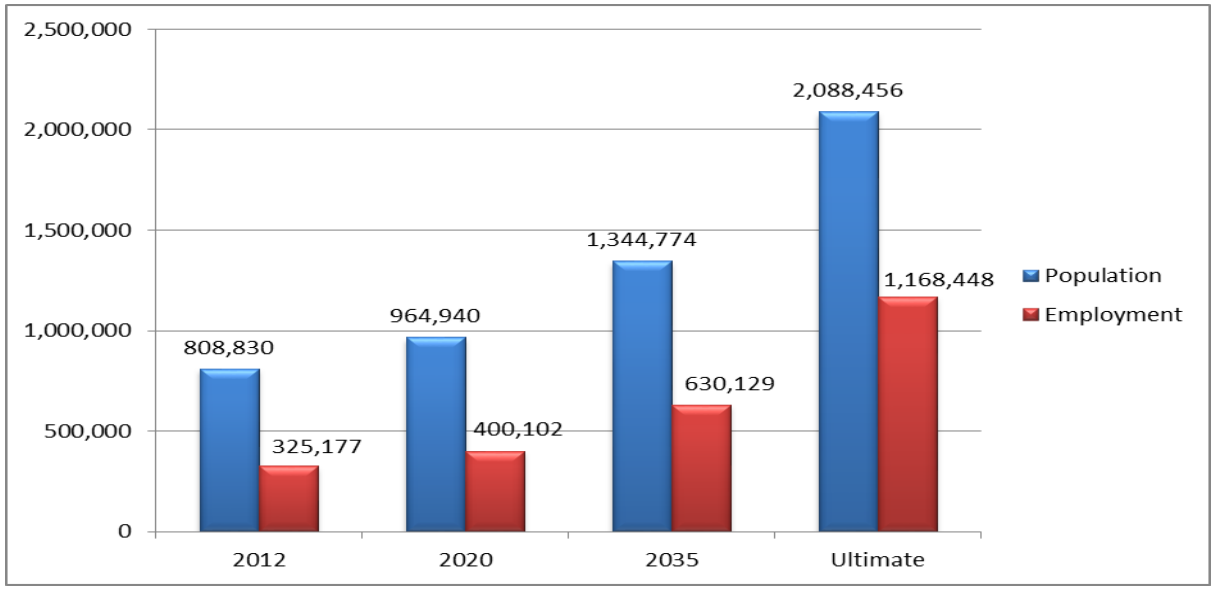


Figure 17: Collin County Population and Employment Forecasts

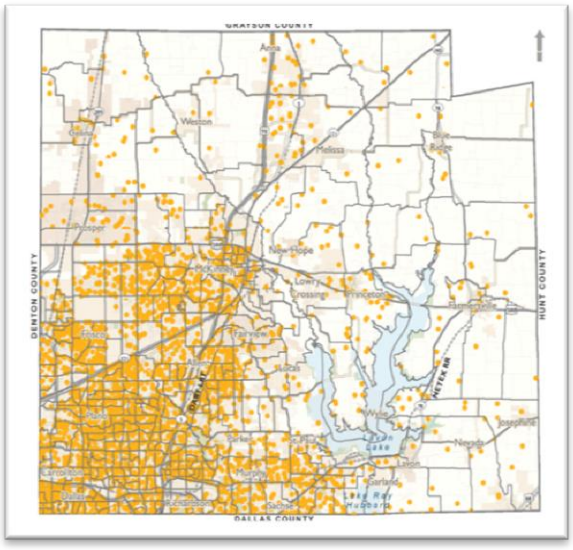


Figure 18: Collin County Population Estimate – 2012
(1 dot = 250 residents)
Source: Freese and Nichols, Inc.

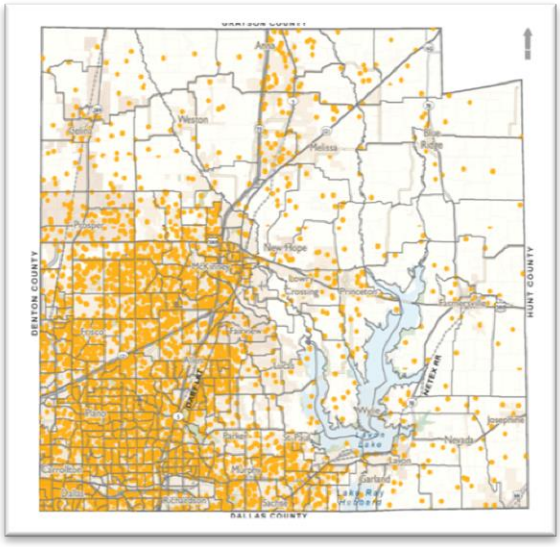


Figure 19: Collin County Population Estimate – 2020
(1 dot = 250 residents)
Source: Freese and Nichols, Inc.

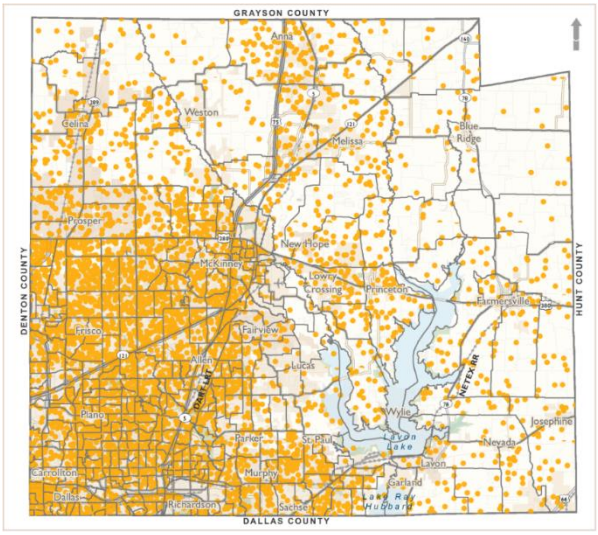


Figure 20 A: Collin County Population Estimate – 2035
(1 dot = 250 residents)
Source: Freese and Nichols, Inc.

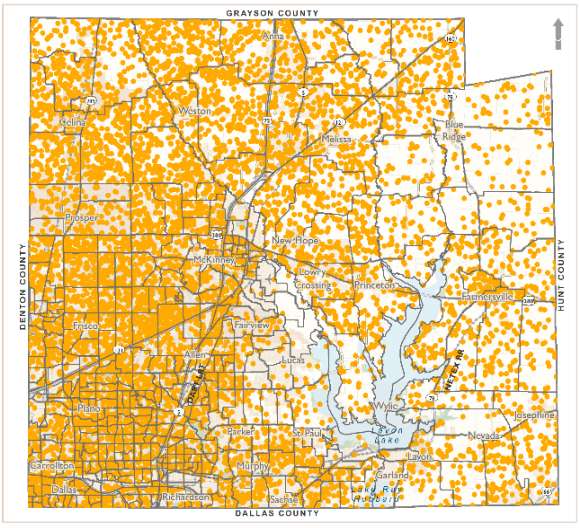


Figure 20 B: Collin County Population (Build-Out)
(1 dot = 250 residents)
Source: Freese and Nichols, Inc.

In some areas, particularly in the southwestern portion of the county, build-out may occur prior to 2025. In other areas, such as in the northeast, build-out may occur after 2025. For example, the City of Plano is projected to build-out within the next ten years. However, the Cities of Allen and Frisco are projected to build-out within the next 15 years, while the City of McKinney may not build-out for 25 years. The greatest concentration of population and employment will be located on the west side of the county. This area stretches from Plano northward to Celina and also includes the cities of Allen, Frisco, McKinney, and Wylie. This area reflects the county's urbanized area with residential development consisting of a variety of housing types and densities. Area non-residential development ranges from local retail to manufacturing.

The employment forecasts for 2012, 2020, 2035, and build-out are shown in **Figures 21, 22, 23A** and **23B.** Each dot represents 250 employees. The population and employment forecasts for city groups of TSZs are listed in **Tables 4** and **5**. The City Areas listed in these tables do not coincide with the incorporated areas of the respective municipalities. The City Areas are groupings of TSZs that roughly associate with the location of the cities. Consequently the population and employment projections for City Areas do not represent forecasts for each of the cities referenced in **Tables 4** and **5**.

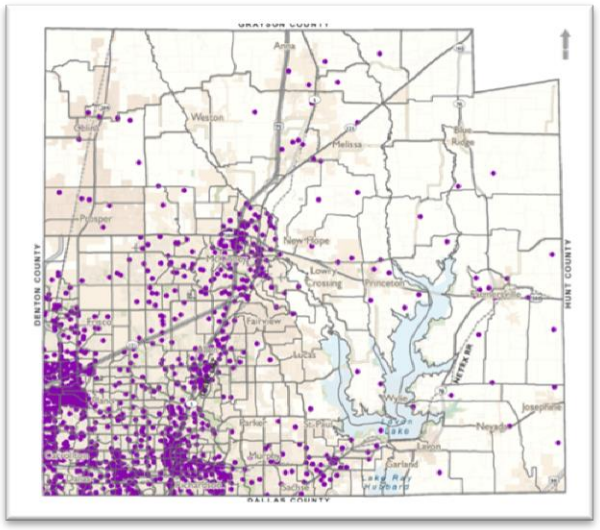


Figure 21: Collin County Employment Estimate – 2012
(1 dot = 250 employees)
Source: Freese and Nichols, Inc.

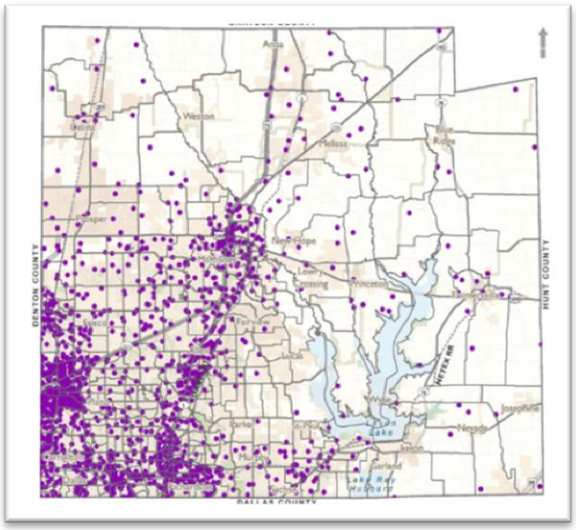


Figure 22: Collin County Employment Estimate – 2020
(1 dot = 250 employees)
Source: Freese and Nichols, Inc.

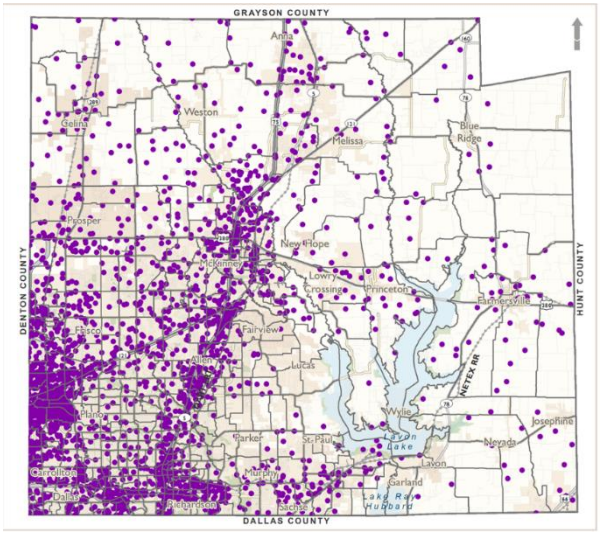


Figure 23 A: Collin County Employment Estimate – 2035
(1 dot = 250 employees)
Source: Freese and Nichols, Inc.

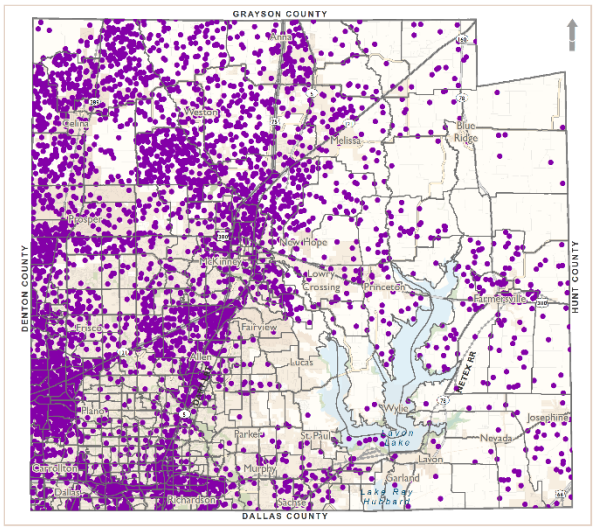


Figure 23 B: Collin County Employment (Build-Out)
(1 dot = 250 employees)
Source: Freese and Nichols, Inc.

Table 4: Collin County Population Projections for City Area Groupings of TSZs

Population					
City	**2012**	**2020**	**2035**	**CAGR**	**Ultimate**
Allen	78,950	87,506	94,781	**0.80%**	94,781
Anna	9,228	19,928	48,505	**7.48%**	146,017
Blue Ridge	4,144	4,849	14,372	**5.56%**	62,581
Carrollton	*Classified Under Plano*				
Celina	7,417	15,002	50,954	**8.74%**	189,199
Dallas	70,085	71,320	74,169	**0.25%**	74,169
Fairview	8,672	12,010	20,025	**3.71%**	20,025
Farmersville	6,625	8,660	29,808	**6.76%**	106,002
Frisco	70,723	105,501	183,592	**4.23%**	183,592
Garland	*Classified Under Richardson*				
Josephine	754	1,584	3,169	**6.44%**	6,338
Lavon	2,224	5,179	10,357	**6.92%**	20,715
Lowry Crossing	2,984	4,663	13,955	**6.94%**	23,146
Lucas	6,130	6,494	10,219	**2.25%**	13,406
McKinney	133,055	180,175	244,530	**2.68%**	350,279
Melissa	6,090	8,752	26,009	**6.52%**	71,793
Murphy	14,952	17,014	18,072	**0.83%**	18,072
Nevada	2,946	3,625	6,567	**3.55%**	11,770
New Hope	*Classified Under McKinney*				
Parker	6,604	7,316	12,417	**2.78%**	12,417
Plano	271,970	278,029	284,656	**0.20%**	284,656
Princeton	12,511	15,189	40,164	**5.20%**	78,304
Prosper	10,515	20,004	32,031	**4.96%**	35,058
Richardson	33,765	35,700	41,761	**0.93%**	45,151
Rockwall	656	1,133	2,834	**6.57%**	5,667
Royse City	2,060	2,735	10,226	**7.22%**	40,906
Sachse	4,477	5,110	6,227	**1.44%**	7,122
Saint Paul	1,856	1,965	2,400	**1.12%**	2,666
Van Alstyne	*Classified Under Anna*				
Weston	1,285	3,370	9,053	**8.86%**	127,026
Wylie	38,153	42,126	53,919	**1.52%**	57,599
Totals	**808,830**	**964,940**	**1,344,774**	**2.24%**	**2,088,456**
Compound Annual Growth Rates	Years 2012-2020			**2.230%**	
	Years 2020-2035			**2.237%**	

Note: City Areas are based on TSZ boundaries as described in Section 4.1.2

Source: Projections by Freese and Nichols updated for the 2014 Collin County Mobility Plan Update

Table 5: Collin County Employment Projections for City Area Groupings of TSZs

Employment					
City	**2012**	**2020**	**2035**	**CAGR**	**Ultimate**
Allen	21,076	27,320	47,171	**3.56%**	62,142
Anna	1,731	3,275	12,914	**9.13%**	48,899
Blue Ridge	1,274	1,444	3,263	**4.17%**	9,385
Carrollton	*Classified Under Plano*				
Celina	2,159	4,221	12,900	**8.08%**	136,411
Dallas	16,290	18,073	19,216	**0.72%**	19,216
Fairview	1,574	3,003	13,820	**9.91%**	13,820
Farmersville	2,772	3,092	9,225	**5.37%**	34,250
Frisco	33,488	51,576	92,322	**4.51%**	132,284
Garland	*Classified Under Richardson*				
Josephine	149	209	350	**3.78%**	450
Lavon	353	552	995	**4.61%**	2,270
Lowry Crossing	346	624	2,049	**8.04%**	4,031
Lucas	604	842	1,731	**4.68%**	2,605
McKinney	43,105	58,905	98,748	**3.67%**	246,487
Melissa	1,438	2,570	14,639	**10.62%**	28,284
Murphy	1,623	2,249	3,231	**3.04%**	3,231
Nevada	609	765	1,242	**3.15%**	1,888
New Hope	*Classified Under McKinney*				
Parker	499	513	561	**0.51%**	1,432
Plano	160,916	176,819	212,429	**1.21%**	230,533
Princeton	2,924	3,554	9,378	**5.20%**	19,570
Prosper	1,262	2,948	10,222	**9.52%**	34,996
Richardson	20,953	24,698	33,770	**2.10%**	39,362
Rockwall	89	89	89	**0.00%**	89
Royse City	416	472	2,672	**8.42%**	10,316
Sachse	1,395	2,022	4,732	**5.45%**	5,547
Saint Paul	113	113	113	**0.00%**	113
Van Alstyne	*Classified Under Anna*				
Weston	287	435	6,794	**14.75%**	64,366
Wylie	7,732	9,718	15,554	**3.09%**	16,468
Totals	**325,177**	**400,102**	**630,129**	**2.92%**	**1,168,448**
Compound Annual Growth Rates	Years 2012-2020			**2.626%**	
	Years 2020-2035			**3.074%**	

Note: City Areas are based on TSZ boundaries as described in Section 4.1.2

Source: Projections by Freese and Nichols updated for the 2014 Collin County Mobility Plan Update

4.2. Forecasting Process

4.2.1. The Travel Demand Forecasting Process

The travel demand forecasting process for the 2014 Collin County Mobility Plan Update was a collaborative effort between the Jacobs team and NCTCOG. The forecasting process used the Dallas-Fort Worth Regional Travel Model for the Expanded Area (DFX), customized to address the demographic and transportation NCTCOG model coordination and analysis.

Since the early 1960s, travel demand forecasting models have been used as a tool in the transportation decision making process. These models simulate existing and future traffic on the transportation network and measure the impact of possible changes or additions. The projected Levels of Service (LOS) for the Collin County thoroughfare networks in 2020 and 2035 are shown in **Figure 24A** and **Figure 24B** on the following pages. The basic steps in the travel demand forecasting process include the following four steps:

- Trip Generation
- Trip Distribution
- Mode Choice
- Traffic Assignment

In general, person trips are generated based on established relationships for trip-making activity; distributed between zones based on their relative attractiveness; converted to vehicle trips by adjusting for auto occupancy and transit ridership; and then assigned to the roadway network according to the shortest time path between each origin and destination, while taking into consideration the constraining effect of individual roadway capacities.

As a part of the modeling process for Collin County, traffic assignments were prepared for the interim year (2020), and the horizon year (2035).

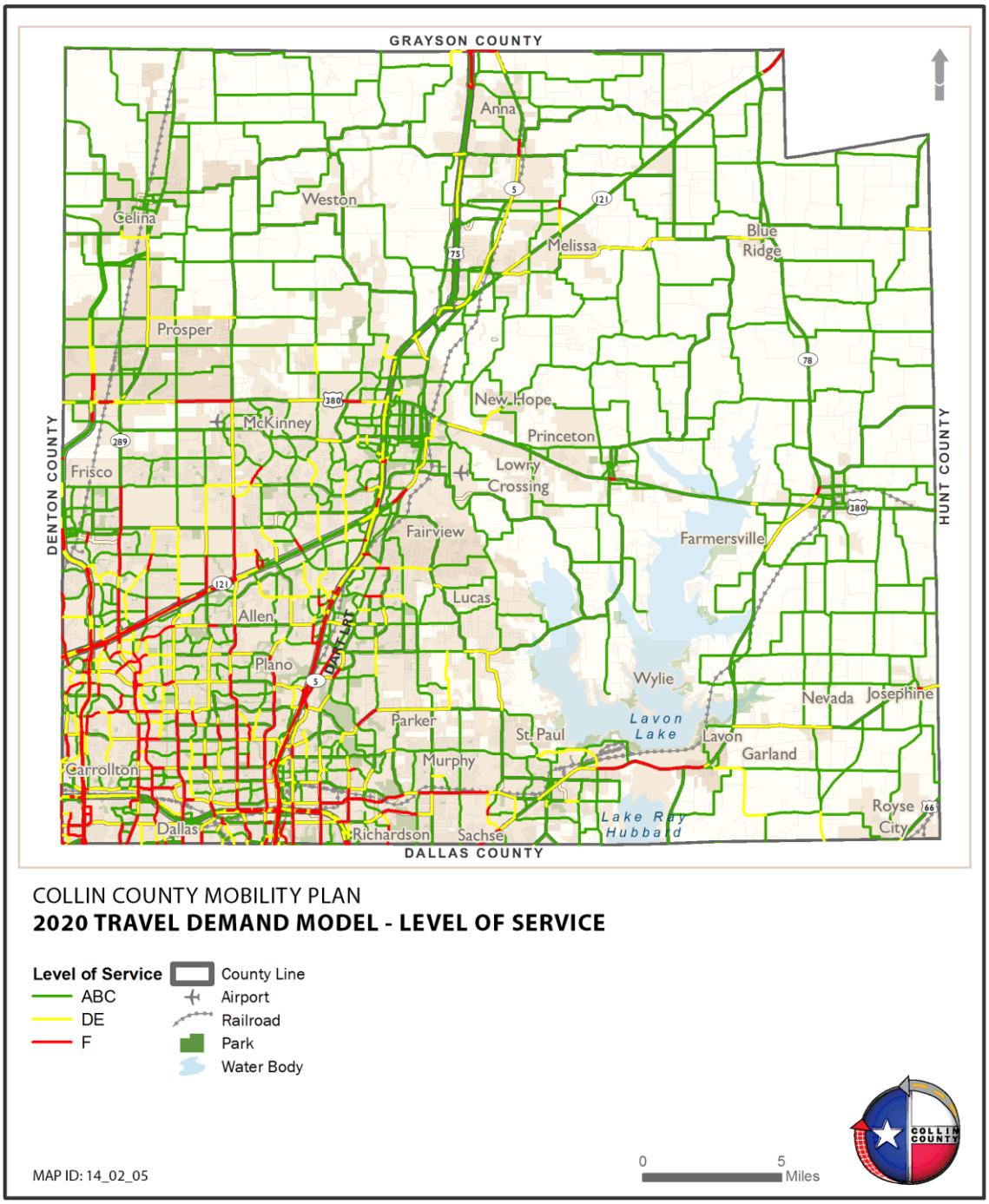


Figure 24A: 2020 Level of Service

Note:
Red segments identify roadways with LOS F
Yellow segments identify roadways with LOS D or E
Green segments identify roadways with LOS A, B, or C

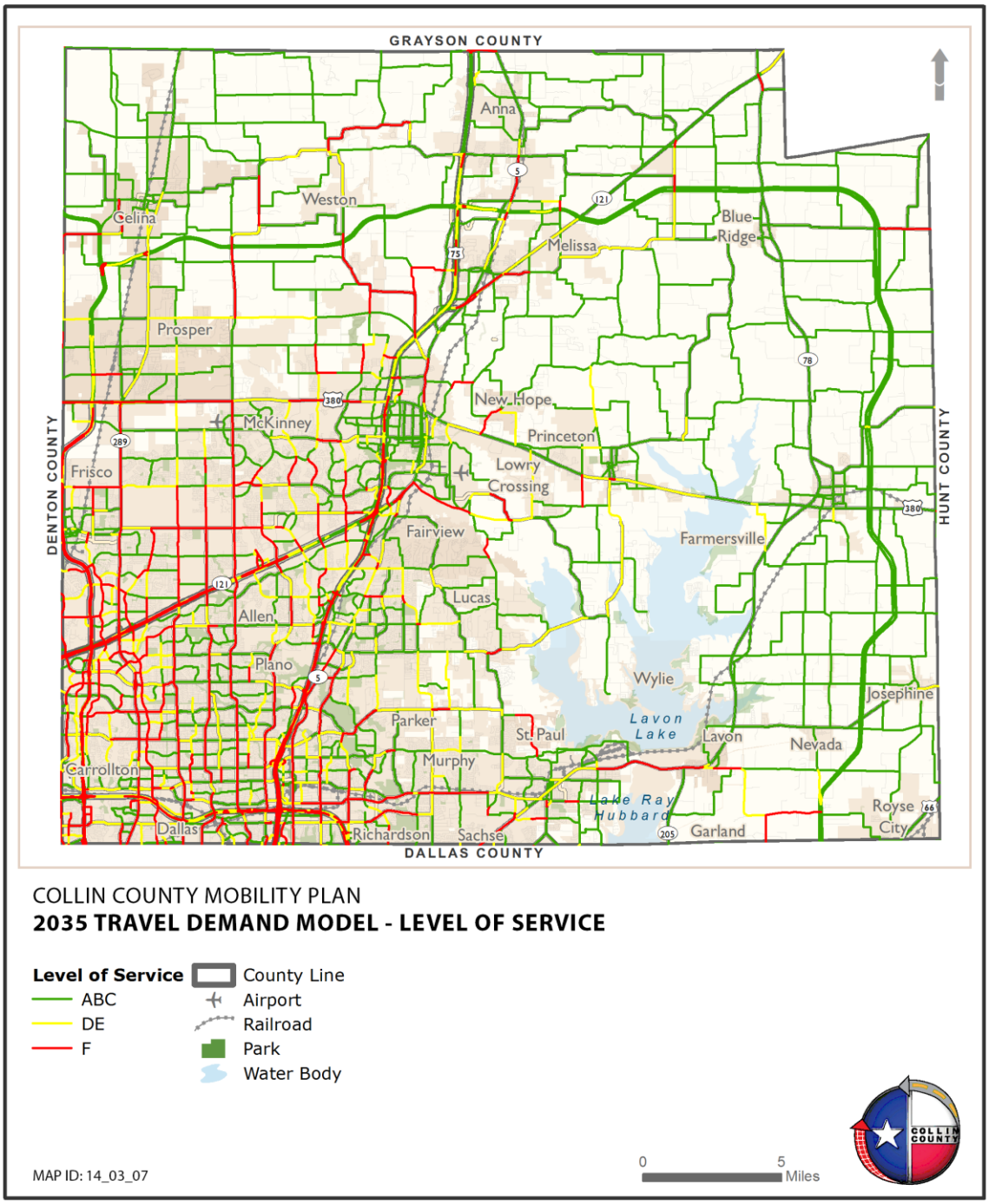


Figure 24B: 2035 Level of Service

Note:
Red segments identify roadways with LOS F
Yellow segments identify roadways with LOS D or E
Green segments identify roadways with LOS A, B, or C

4.2.2. Transportation Networks

The Dallas-Fort Worth Regional Travel Demand Model for the Expanded Area (DFX), developed by NCTCOG, was used for the forecasting process. The transportation networks within the model were verified and updated by the Jacobs team to include existing and funded projects. Traffic assignments were then performed by the Jacobs team for 2020 and 2035 using the updated transportation networks. The traffic assignments were based on:

1. The ultimate projections for population and employment within the County, as determined from the local Comprehensive Plans;
2. The currently projected ultimate population and employment for the DFW Area, as estimated by NCTCOG; and
3. The roadway and transit improvements recommended in NCTCOG's 2035 Regional Mobility Plan.

Following review of the resulting traffic volume projections, additional refinements were made to the model network in order to identify a transportation system that would sufficiently accommodate projected travel demand over the next 20-25 years. The resulting networks for 2020 and 2035 include the number of traffic lanes which are shown in **Figure 25A** and **Figure 25B**.

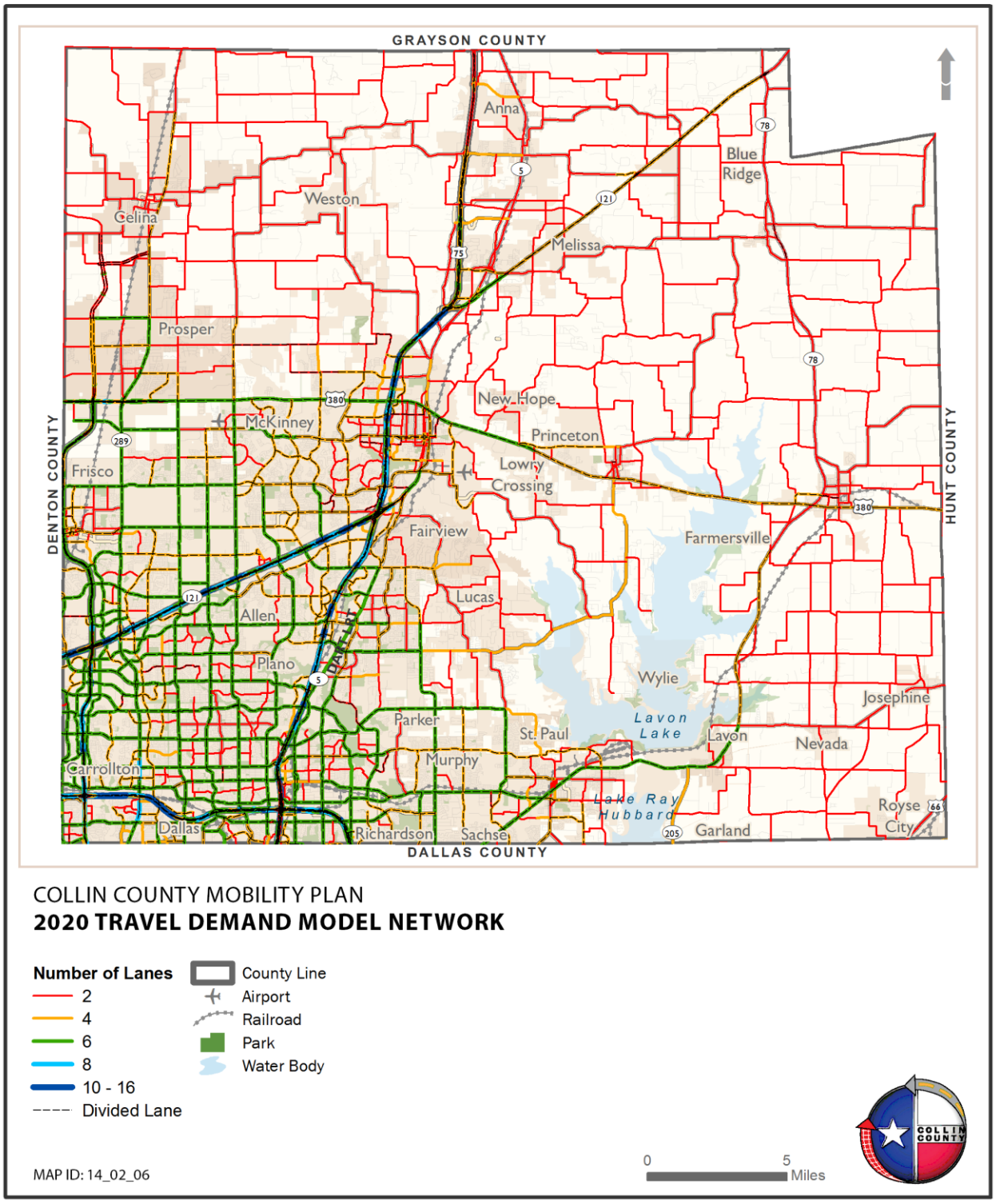


Figure 25A: 2020 Network Number of Lanes

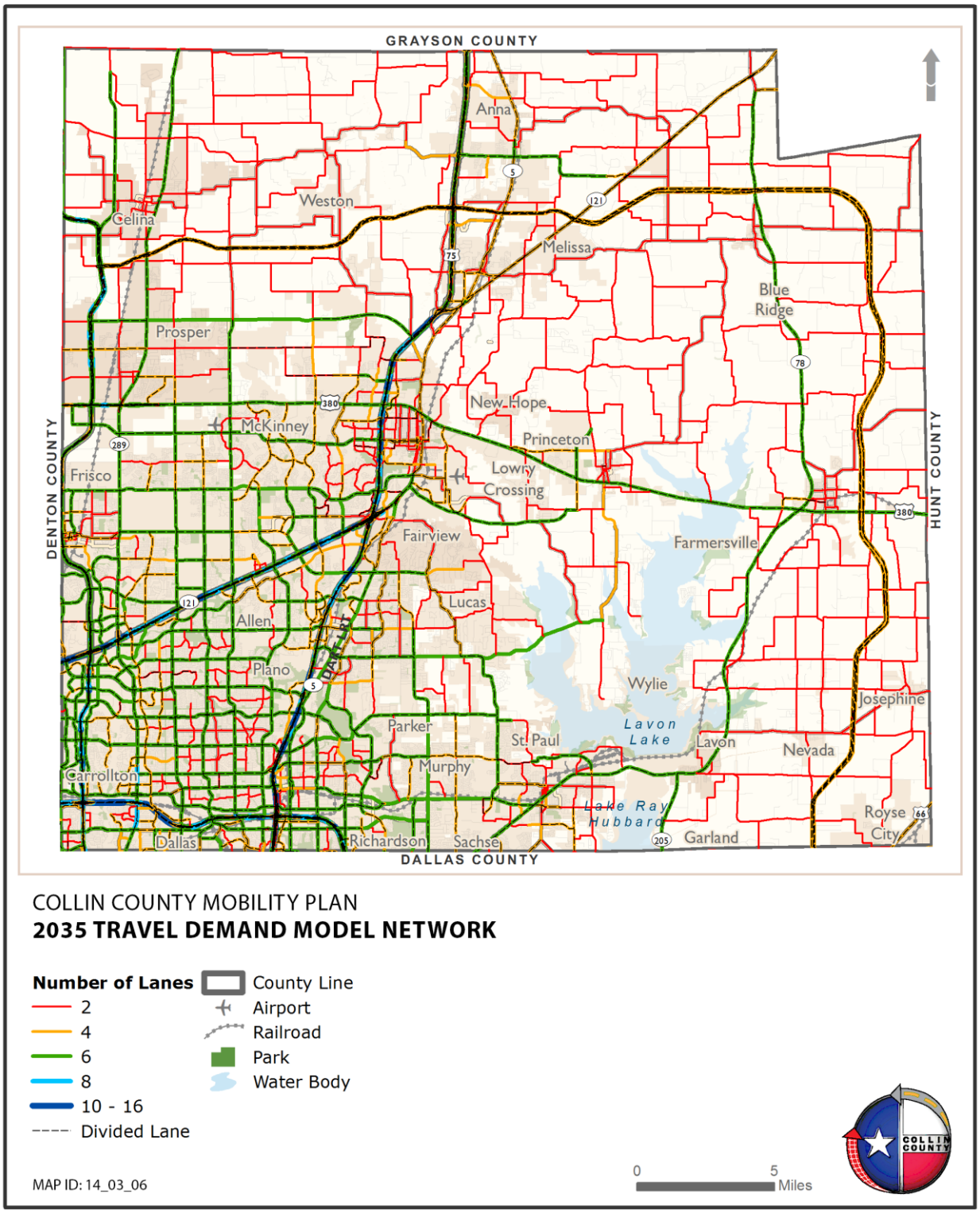


Figure 25B: 2035 Network Number of Lanes

4.2.3. Regional Travel Model

Travel models use input data consisting of demographic and employment variables combined with a detailed description of the transportation system to determine how many trips will be generated, how these trips will be distributed across the study area, what mode of travel (auto, carpool, transit, etc.) travelers will use, and what routes trip makers will select (based on travel delay and other constraints) to reach their destination.

DFX is a four-step trip-based travel demand model that covers approximately 105,000 square miles in the North Central Texas Region. The referenced modeling area includes the counties of Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise. To focus the travel model on Collin County and to customize the modal data and transportation system networks to address the assumptions being applied for the 2014 CCMP Update, revisions were made to the model input data and transportation system networks. These revisions included an update of the demographic and employment forecasts of anticipated growth in Collin County for the milestone years 2020 and 2035 as well as for full build out of the county. The data representing daily traffic volumes for 2012 and 2035 are shown in **Figure 26A** and **Figure 26B**.

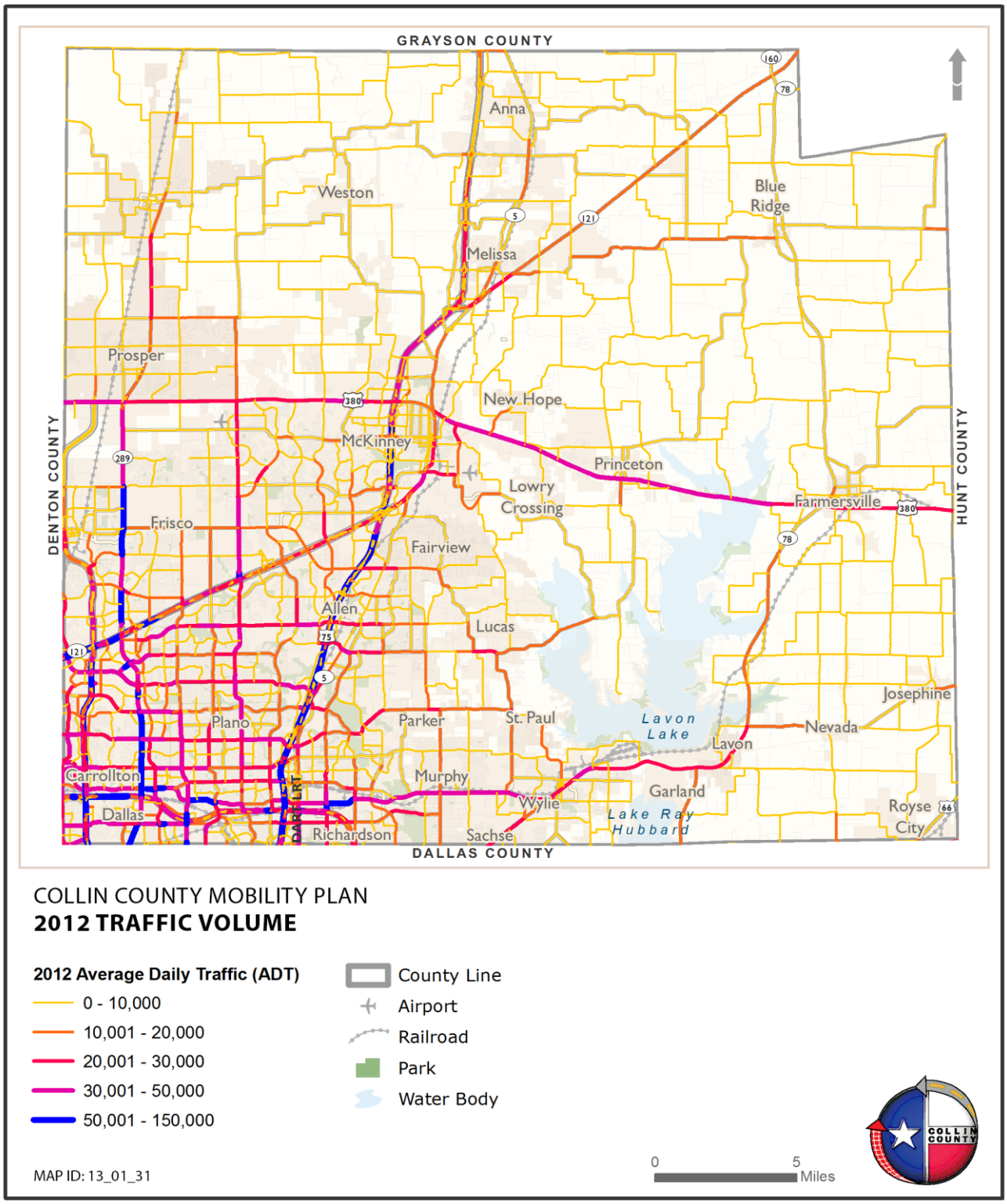


Figure 26A: 2012 Daily Traffic Volumes

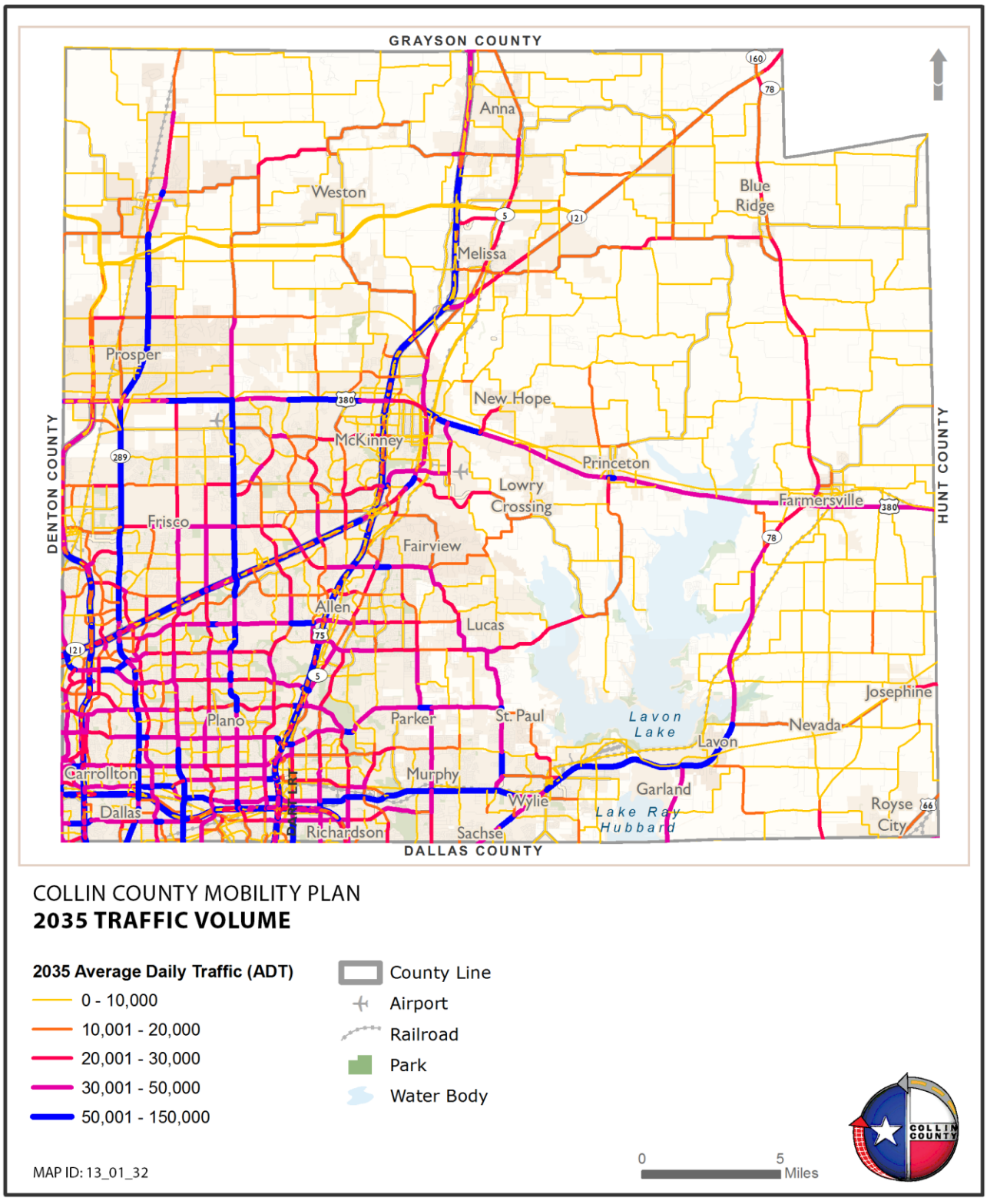


Figure 26B: 2035 Daily Traffic Volumes

NCTCOG highway networks were also modified to reflect committed and proposed roadway projects that were to be included in the CCMP Update, but were not included in the standard NCTCOG highway networks. These modified demographic inputs and highway network refinements were developed by the Jacobs team and provided to NCTCOG's Travel Model Development Group who coded the highway networks and performed the initial travel model runs using the adjusted demographics and network definition. The NCTCOG Travel Model Development Group performed initial model runs for three scenarios:

1. Scenario Number 1 is a 2020 analysis that applied the anticipated 2020 demographic and employment growth to a transportation network consisting of existing and committed projects. Committed projects are those that are under construction or are fully and irrevocably funded for construction and are expected to be operational by the 2020 analysis year.
2. Scenario Number 2 is a 2035 analysis that applied the anticipated 2035 demographics and employment growth to a transportation network consisting of all of the existing, committed, and proposed projects included in the NCTCOG 2035 Regional Mobility Plan.
3. Scenario Number 3 is a Build-Out analysis that applied the full build-out demographics to the transportation network representing the NCTCOG 2035 Regional Mobility Plan.

NCTCOG provided the results of these initial travel model runs to the Jacobs team for interpretation, analysis, and reporting. To make the travel forecast results useful within the context of the CCMP update, the Jacobs team used the initial runs performed by NCTCOG to develop a statistical profile of each scenario based on a set of selected measures-of-effectiveness derived from the travel model output.

In addition to compiling the statistical profile of each scenario, the Jacobs team used trip tables and networks provided by NCTCOG to perform additional travel model runs to identify capacity deficiencies of the existing and committed network. The deficiency analysis consisted of applying the 2035 demographics to various 2035 alternative networks.

The results of this analysis were then compared in terms of Level-of-Service on the transportation system to the statistical profile of the travel forecasts for a build scenario contained in the 2035 Regional Mobility Plan. By comparing the planned improvements against the alternative scenarios, the benefits achieved by the capacity improvements identified in the CCMP can be measured and evaluated.

The Jacobs team used the future travel demand model for year 2020 to analyze portions of the thoroughfare network with projected severe capacity deficiencies (Level of Service F) and to identify potential additional mobility improvement projects for inclusion in the 2014 CCMP Update.

The collaborative effort between the Jacobs team and the NCTCOG Travel Model Development Group to develop travel forecasts, statistical profiles, and comparative analysis of transportation system alternatives for the 2014 CCMP Update provides Collin County with the means to fully explore the various options being analyzed and to determine the best course of action to achieve community goals and optimize the county transportation-system.

4.3. Public Involvement

An intensive public participation program was conducted to provide opportunities for citizens and organizations to be involved in the planning process.

4.3.1. Collin County Planning Board

The Collin County Planning Board acted as the steering committee for the 2014 CCMP Update and provided recommendations to the Collin County Commissioners Court. Meetings were held with the Planning Board throughout the duration of the project to update members of the status and to receive guidance on the development of the 2014 CCMP Update.

4.3.2. Community Workshops

A series of four community workshop meetings for obtaining input from interested citizens were held in 2013, on February 19 (Plano), February 20 (Wylie), February 25 (Prosper), and February 26 (McKinney). These meetings occurred while the Jacobs team was compiling relevant data pertaining to demographics, land use, transportation (including transit), and hike-and-bike trails from each of the jurisdictions. The locations of the four workshop meetings were distributed geographically within each of the four County Commissioner districts.

Attendees at each of the Community Workshops received handouts that consisted of the meeting agenda, copy of the presentation, and a comment form questionnaire. During the Open House and prior to the meeting, attendees browsed boards showing the study area, 2011 Adopted Thoroughfare Plan; 2012, 2020 and 2030 employment density;

and 2012, 2020 and 2030 household population data. These workshops were designed to present to the citizens of Collin County the purpose and goals of the Collin County Mobility Plan Update and to gather input regarding major issues and concerns with the Collin County transportation network. A keypad polling survey of opinions about transportation issues, needs, and improvement opportunities was conducted as part of the workshops. Results of the workshops are summarized in **APPENDIX D**.

4.3.3. Meetings with Municipalities

The County Engineering staff and Jacobs consulting team met with staff and official representatives of 16, out of the total 30, municipalities in the county during the course of the project to go over each city's individualized thoroughfare and comprehensive plans as well as to discuss one-on-one the needs and concerns of the individual cities. The 16 cities the consulting team met with are:

- City of Allen
- City of Anna
- City of Celina
- City of Farmersville
- City of Fairview
- City of Frisco
- City of Lucas
- City of McKinney
- City of Melissa
- City of New Hope
- City of Parker
- City of Plano
- City of Princeton
- City of Prosper
- City of Richardson
- City of Wylie

Refinements requested by municipalities are shown in **Figures 27A** and **27B**. "Proposed Changes" are requests from cities or reconciliation with city thoroughfare plans. "Accepted Changes" are those that were incorporated into the CCMP as accepted changes. These include some changes initiated by Jacobs to resolve conflicts or to accommodate problems identified by travel demand model results.

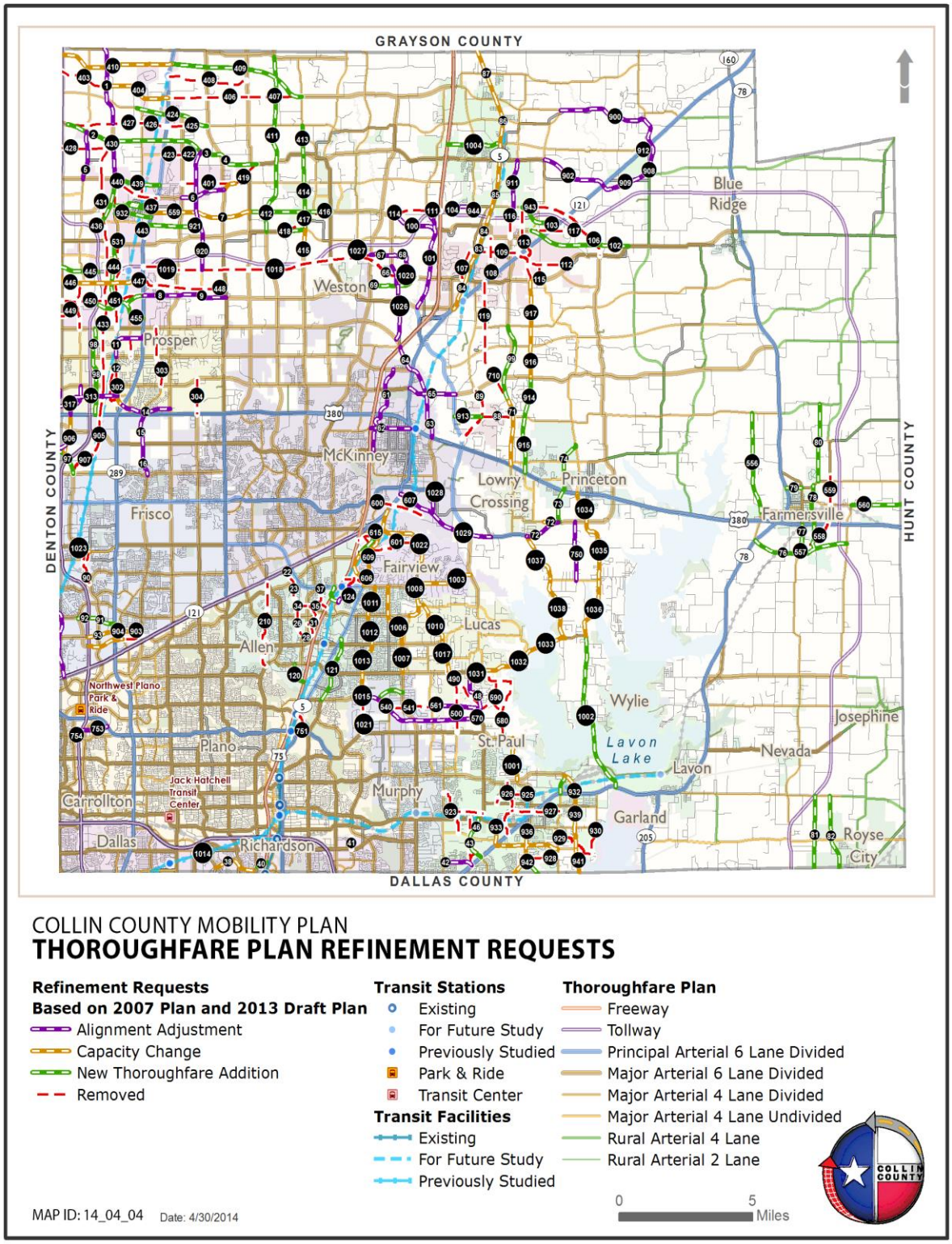


Figure 27A: Collin County Thoroughfare and Transit Plan – Proposed Changes

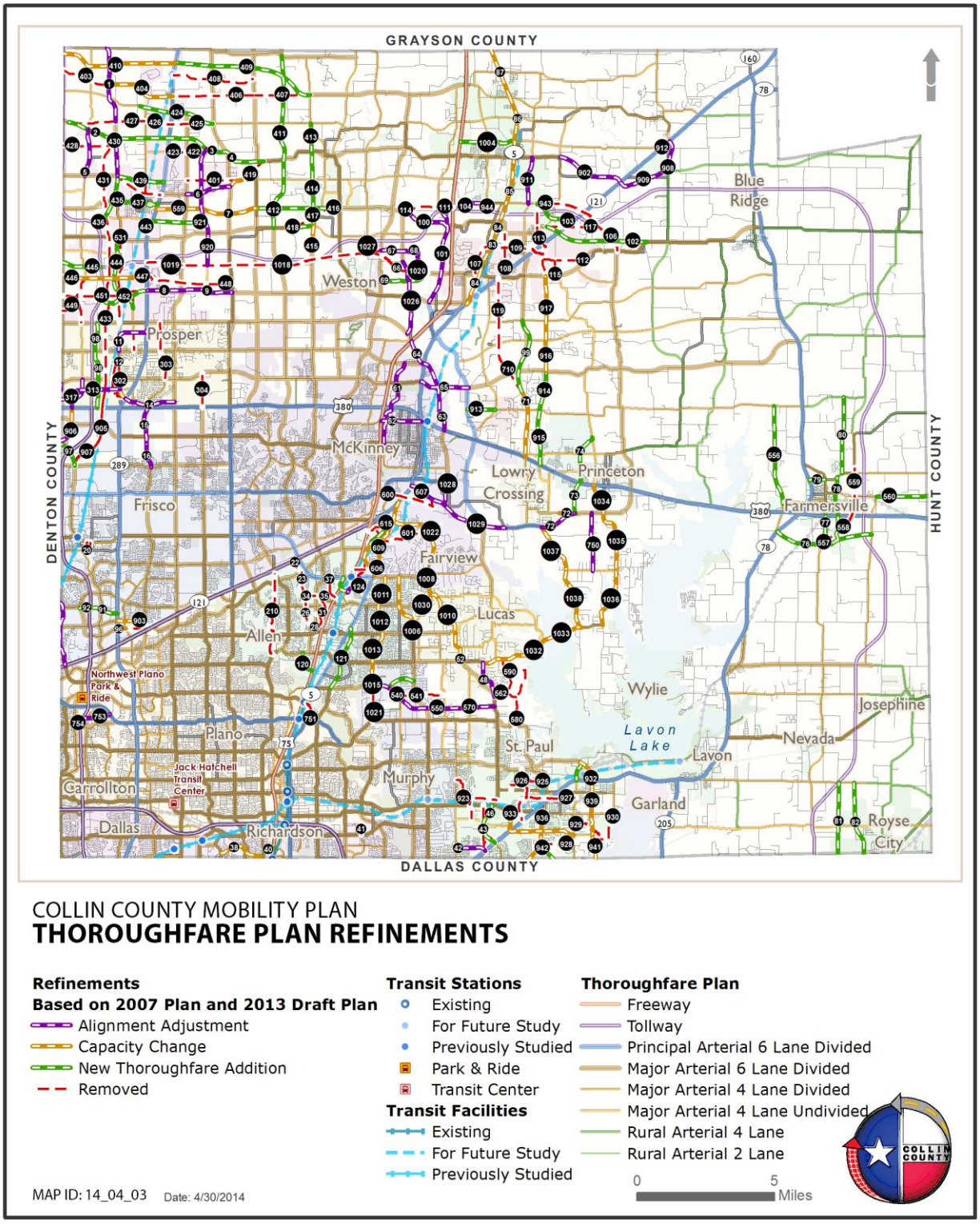


Figure 27B: Collin County Thoroughfare and Transit Plan – Accepted Changes

4.3.4. Community Meeting

The final public meeting for the 2014 CCMP Update was held on February 18, 2014, from 6:30 pm to 8:00 pm, at the Conference Center of the Collin County College Central Campus. Total attendance was approximately 85 persons, based on the sign-in sheets. The purpose of the meeting was to present to the public the Draft 2014 Thoroughfare and Transit Plan.

During the Open House and prior to starting the meeting, attendees viewed display boards showing the Collin County study area, the draft 2014 Thoroughfare and Transit Plan Update, and the 2011 Adopted Thoroughfare Plan. Dot density maps were used to display the Years 2012, 2020, and 2035 population and employment projections, with each dot representing 250 residents/ employees. Large plots of the draft 2014 Thoroughfare and Transit Plan Update were provided for attendees to review and make comments. Following the Open House was a presentation on the CCMP Update, with opportunity for attendees to make verbal comments and ask questions of a panel including the County Engineer and consultant project manager.

A Keypad Polling survey was conducted prior to concluding the meeting. Comments and questions regarding the draft thoroughfare were received and used to create the final thoroughfare plan. A record summarizing the public input received is provided in **APPENDIX D**.

4.3.5. Public Hearing

The Collin County Commissioners Court conducted a Public Hearing on April 21, 2014, prior to their considering adoption of the 2014 CCMP Update. Citizens had the opportunity to comment on the proposed plan during the Public Hearing.

4.3.6. Project Website

A special internet web site devoted to the 2014 Collin County Mobility Plan Update was established as a component of the Collin County website. The CCMP website, ***http://www.collincountytx.gov/mobility/Pages/mobility_plan.aspx***, was used to disseminate information and enhance communication about the development and results of the CCMP update. Draft copies of the thoroughfare plan, notice of meetings, copies of presentations, draft documents, and other products were incorporated in the website for review and comment. The website was also used to provide information about meetings and other pertinent information regarding the CCMP. The website has the versatility and flexibility to be useful to the county after adoption of the 2014 CCMP Update.

5. Existing Transportation System

5.1. Overview

Collin County is a fast-developing county in the DFW Area. The character of urbanized areas in the county varies considerably across its geographic sub-areas, but largely consists of well-established urban and suburban residential neighborhoods, as well as long-standing commercial developments. The county is steadily maturing beyond a once rural and suburban community into an active metropolitan area with urban characteristics. Redevelopment and infill plus new development in the north and north-eastern parts of the county offer future growth opportunities, as steady developments in the southern parts of the county continue.

5.1.1. Geography

According to the United States Census Bureau, Collin County has an area of 886 mi2 (2,294 km2). Of this area, 848 mi² (2,195 km²) of it (95.68%) is land and 38 mi² (99 km²) of it (4.32%) is water. The elevation ranges from 450 to 700 feet above mean sea level. Temperatures range from an average high of 96° F in July to an average low of 34° F in January. The East Fork of the Trinity River drains the western and central portions of the county, while the Elm Fork drains the eastern sections. Lake Lavon is a major water body and it provides drinking water to the Collin County and the DFW Area.

5.1.2. Subdivision Regulations

The Collin County Commissioners Court adopted the Collin County Subdivision Regulations to provide minimum standards for land subdivisions and developments, and to prevent substandard subdivisions in Collin County. The Subdivision Regulations provide for the safety, health and well-being of the general public. The regulations require subdivision construction standards for streets, drainage, water availability and sewage facilities conducive to a superior quality of life and maintainability without imposing a burden to the taxpayers.

5.1.3. Air Quality (Non-Attainment)

Ten of the twelve-county DFW Area has been designated “non-attainment” for the pollutant ozone by the U.S. Environmental Protection Agency. The air quality standard is designed to address the prolonged exposure to unhealthy air, and to ensure federal funds and approval of transportation activities which are consistent with regional air quality goals.

The non-attainment area has until December 31, 2018 to reach conformity of the federal air quality standards.

5.2. Land Use

The year 2012 Land Use statistics for Collin County are shown in **Table 6** and on the map shown in **Figure 28**. The land use for Collin County can be broken down into three main categories: business (16.5%), public (20%), and residential (63.5%).

Table 6: Collin County 2012 Land Use

Land Use	Acres	Land Use Percentage
Basic	19,585	3.5%
Mixed Use Non-Residential	7418	1.3%
Retail	15,858	2.8%
Service	50,724	8.9%
Business Use Totals	**93,585**	**16.5%**
Parks/ Open	80,805	14.3%
Public	9,550	1.7%
Lake	22,662	4.0%
Public Use Totals	**113,017**	**20.0%**
Mixed Use Residential	1,730	0.3%
Residential Rural	144,492	25.5%
Residential Semi-Urban	12,113	2.1%
Residential Urban	202,111	35.6%
Residential Use Totals	**360,446**	**63.5%**

Source: Freese and Nichols, Inc.

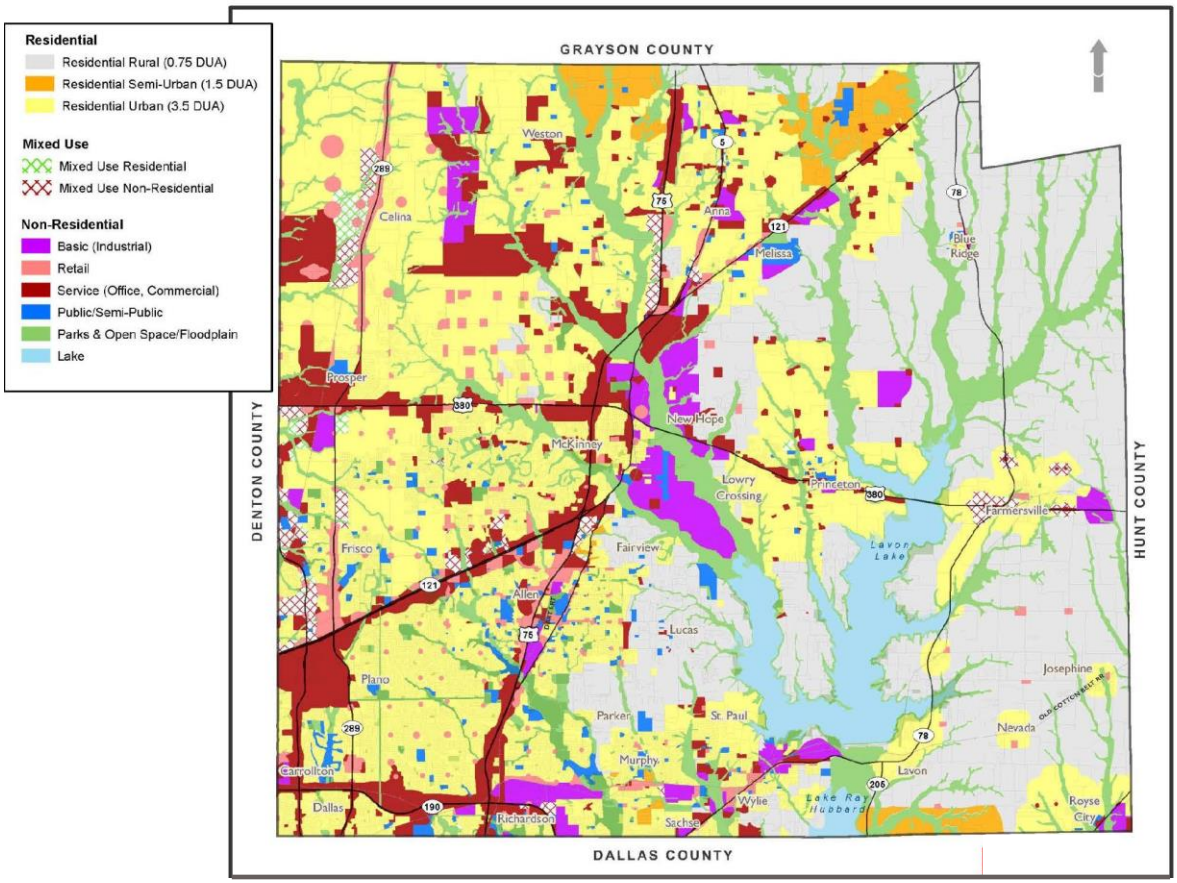


Figure 28: Collin County 2012 Land Use
Source: Freese and Nichols, Inc

5.3. Transportation

Collin County is served by a multi-modal transportation system which includes roads, transit, rail, aviation, bicycle, trail and pedestrian networks. The transportation system is an integrated network that serves urban and rural transportation needs for vehicular travel, goods movement, and pedestrian mobility.

5.3.1. Roadway Network

The Collin County roadway system is comprised of a network of major county-wide thoroughfares that provide for a multitude of routing alternatives in the heavily urbanized areas, which are located primarily in the southwest quadrant of the county. A network of two-lane primary and secondary state highways, Farm-to-Market highways, county roads, and local streets serves the rural areas.

The hierarchical roadway system serves the surface transportation needs and uses of areas within the county. The State Highway System provides the basic transportation network, while the Farm-to-Market highways provide access from agricultural land uses to

the major state routes. The county road system provides access to support urban development activity. The expansion of the roadway system has corresponded to the physical growth pattern of the county.

Collin County's major roadway infrastructure consists of the following facilities:

- **US Highway 75** – an eight-lane freeway facility with six-lane frontage roads extending from the Dallas / Collin County line to Spring Creek Parkway in Plano; a six-lane freeway facility with four-lane frontage roads from Spring Creek Parkway to the Sam Rayburn Tollway (SRT) in the City of McKinney; and a four-lane freeway facility with four-lane frontage roads from the SRT to the Collin / Grayson County line;
- **US Highway 380** – a five-lane roadway (bidirectional turn lane in middle) from the Denton / Collin County line to Custer Road; a six-lane divided roadway from Custer Road to Airport Road, east of McKinney; four-lane divided roadway from Airport Road to New Hope Road; five-lane roadway from New Hope Road east to the Collin County / Hunt County line;
- **SH 289 (Preston Road)** – a six-lane divided roadway from the Dallas / Collin County Line to CR 55 in Celina and a two-lane undivided roadway from CR 55 to the Collin / Grayson County Line;
- **SH 78** – a six-lane divided roadway from the Dallas / Collin County Line to FM 6 and a two-lane undivided roadway from FM 6 (under construction at the writing of this report) to the Collin County/Fannin County line;
- **President George Bush Turnpike (PGBT)** – an eight-lane divided facility through the southern portion of the County from Midway Road at the Denton County line to Shiloh Road at the Dallas County line with six-lane frontage roads from Coit Road to Alma Road, and from US 75/Central Expressway to Shiloh Road;
- **Dallas North Tollway (DNT)** – a six-lane divided facility with 4 to 6-lane frontage roads extending from the Dallas / Collin County Line to US 380, and a two-lane frontage road from US 380 to FM 428; and
- **Sam Rayburn Tollway (SRT)** – a six-lane divided facility from the Denton/Collin County line to the Dallas North Tollway (DNT), a four-lane

divided roadway from the DNT to Hillcrest Road, and a two-lane undivided section east of Hillcrest Road.

Since the mid-1990s, the county's pattern of urbanization has continued to radiate northward and eastward. The cities of Frisco, McKinney, Allen, Murphy, Plano, Prosper, Anna, Celina, and Wylie are some of the fastest growing communities within Collin County and Texas. Many roadway projects have been implemented throughout the county to address increasing traffic congestion problems. However, the rate of growth experienced by the quickly urbanizing areas has continued to generate traffic volumes that exceed the planned operating capacities for much of the county's major roadway network.

Since a thoroughfare plan guides the reservation of rights-of-way needed for the future development of long range transportation improvements, it has far reaching effects on the growth and development of the urbanized area.

5.3.2. Public Transportation and Transit Service

Several transit services are currently available to Collin County residents. These include the DART Light Rail, DART fixed-route, DART express bus routes, DART para-transit services, TAPS demand-responsive service, intercity bus services, and the TAPS Airport shuttle service.

5.3.2.1. DART

DART transit bus and para-transit services extend north from Dallas into southern Collin County. Presently, fixed routes and express routes serve county residents in DART member cities. Transit centers are located in both East and West Plano and in the southeast corner of the Parker Road / US 75 interchange. These centers facilitate route transfers as well as provide parking for the express services. The East Plano transit Center is located on Archerwood Road, North of Park Boulevard. The West Plano Transit Center is located on Coit Road, south of 15th Street.

Fixed-route bus service is provided on weekdays from approximately 6:00 a.m. to 10:00 p.m. with typical headways ranging from 30 minutes to one hour. Saturday service is only available to serve Collin Creek Mall. Sunday or holiday service is presently not provided. Express service is provided on weekdays during both the morning and evening peak periods. In addition to the fixed-route and express bus services, DART offers para-transit service to mobility impaired persons residing in its member cities in Collin County (Carrollton, Garland, Plano, Richardson, and Dallas). Lift-equipped vans are utilized to

provide this service. For those mobility-impaired persons wishing to ride fixed-route buses independently, travel training is available.

The Parker Road Station is the northernmost stop on the North Central light rail corridor, DART's Red Line. This light rail line connects downtown Plano to downtown Dallas and extends north to the Parker Road Station, which includes a light rail station, a bus transit center, and parking facilities. The third station located in Collin County is the Bush Turnpike Station.

5.3.2.2. TAPS

TAPS Public Transit operates on-demand curb-to-curb public transportation Monday through Friday for all of Collin County outside the DART service area. TAPS also provides fixed routes in McKinney and Allen every day. TAPS vehicles are not allowed to pick up or deliver in Plano, except that TAPS Public Transit provides express commuter service from Sherman and McKinney to DART's Parker Road Station in Plano.

5.3.2.3. Intercity Bus Service

Greyhound and other intercity bus carriers operate regularly scheduled bus services through Collin County. Greyhound provides service between Sherman and downtown Dallas with a stop in McKinney.

5.3.2.4. McKinney TAPS Airport Hop Shuttle

The McKinney Shuttle is primarily an airport shuttle service. The Airport Hop is a public transit shuttle to and from DFW or Love Field airport 7-days a week departing from and returning to Durant, Okla., Sherman, Texas or McKinney, Texas. Sometimes the Shuttle is utilized to provide an intermodal connection in coordination with TAPS or Greyhound.

5.3.3. Bicycles and Pedestrians

Biking and walking are a low-cost and effective means of transportation that are quiet, non-polluting, extremely energy-efficient, versatile, healthy, and fun. Bicycles also offer low-cost mobility to the non-driving public, including the young. In the United States, bicycles were a popular means of transportation in the pre-automobile age. As the automobile became more popular, bicycles lost their advantage as well as their place on the road. Now, as cities work to create balanced transportation systems, and to make streets a safe place for all modes of transportation, the bicycle is making a comeback.

A county-wide network of bicycle and pedestrian trails is proposed in the Collin County Regional Master Plan. Collin County has a trails plan utilizing the regional planning efforts of NCTCOG and the local planning efforts of individual communities. The Cities of Allen, Dallas, Frisco, McKinney, Plano and Wylie have each prepared independent bicycle and pedestrian trail plans. These communities are in various stages of the implementation process. The City of Plano has constructed 43.8 miles of trail, which is the largest amount of trails in the existing network. The Cities of Frisco and Wylie completed their respective plans in 2002 and 2003, and they are now in the initial phases of implementation.

A regional plan for a system of bicycle and pedestrian trails has been prepared by NCTCOG. This system, called the Veloweb, outlines a network of trails that link the urban sections of NCTCOG's planning area. The individual plans prepared by the Cities of Allen, Dallas, Frisco, McKinney, Plano, and Wylie have each been integrated into the Veloweb, and therefore, may ultimately become part of a much larger regional system.

The cities within Collin County are renowned for the quality and quantity of their trails. Currently there is approximately 1 mile of trail for every 2,900 people in the county. This places Collin County above the rest of Texas in regards to Trail Level of Service. There are currently 995 miles of existing and planned trails of various types in Collin County, of which about 269 miles exist today or are funded for implementation in the near future. **Figure 29A** displays the mileage and Level of Service for trails in Collin County.

Trail Mileage

Trail Type	Existing / Programmed	Planned / Proposed	Total
Hard Surface	228.4	656.0	884.4
Soft Surface	22.1	48.7	70.8
Equestrian	16.9	15.5	32.4
Mixed Surface	1.3	6.8	8.1
Total	268.7	727.0	995.7

	Existing Miles of Trails	Current Level of Service*	2040 Trail Needs to Maintain Current Level of Service**
Hard Surface	228.4	1 mile per 3,425 people	445.7 miles (deficit of 217.3 miles)
Soft Surface	22.1	1 mile per 35,400 people	43.1 miles (deficit of 21 miles)
Equestrian	16.9	1 mile per 46,292 people	32.9 miles (deficit of 16 miles)
Mixed Surface	1.3	1 mile per 601,801 people	***
Total	268.7	1 mile per 2,912 people	524.3 miles (deficit of 255.6 miles)

*Based on a 2010 Census Redistricting Data population of 782,341
**Based on a forecasted population of 1,526,634
***Because of the low number of existing miles of this facility type, future needs can not be accurately forecasted.
Source: US Census Bureau; North Central Texas Council of Governments 2040 Population Forecasts

Figure 29A: Collin County Hike & Bike Trail Mileage and Level of Service
Source: Collin County Regional Trails Plan, Halff Associates.

The Collin County Regional Trails Master Plan was developed to provide coordination and connectivity between cities and towns for the development of a county-wide trail system. The Trails Master Plan builds upon the planning efforts of the 30 cities and towns within the county and other regional studies, such as NCTCOG's Regional Veloweb and the Six Cities Trails Plan in Dallas and Collin Counties.

The plan defines high-priority trail corridors which facilitate cross-county linkages, identify gaps between cities, and encourage corridor preservation along with multi-jurisdictional implementation. The plan gives guidance to Collin County for evaluating requests submitted for the County Parks and Open Space Project Funding Assistance Program.

5.3.4. Airport System

Presently, there are eight general aviation airports in Collin County. These include one public airport (McKinney National Airport), two privately owned airports which are open to the public (Air Park Dallas and Aero Country), and seven privately owned airports which are not open to the public except for emergency use (Lavon North, JSI, Square Air, Mullins Landing, Baylie, Short Stop, and Bishop Landing). The three airports open to the public have runways with asphalt surfaces and lights, while the seven private airports have grass runway surfaces and do not have runway lighting. McKinney National is the only airport in the county with an FAA control tower. **Figure 29B** displays the location of the existing public use general aviation airports in Collin County.

McKinney National Airport is a general aviation reliever airport in the DFW Area with future commercial service goals. The airport is an air transportation center and economic engine for the North Dallas region facilitating general aviation, business aviation, and related services supported by an aggressive marketing program and aeronautical service, infrastructure and facility development. The City of McKinney and McKinney Airport Development Corporation are committed to expanding these aviation resources as the area continues to grow and prosper. The 7,000 foot runway permits the municipal airport to accommodate aircraft larger than those handled by a utility airport. As airspace becomes more congested for airports interior to the region, use of the McKinney National Airport can be expected to increase and be coupled with growth from personal and business operations conducted at the airport.

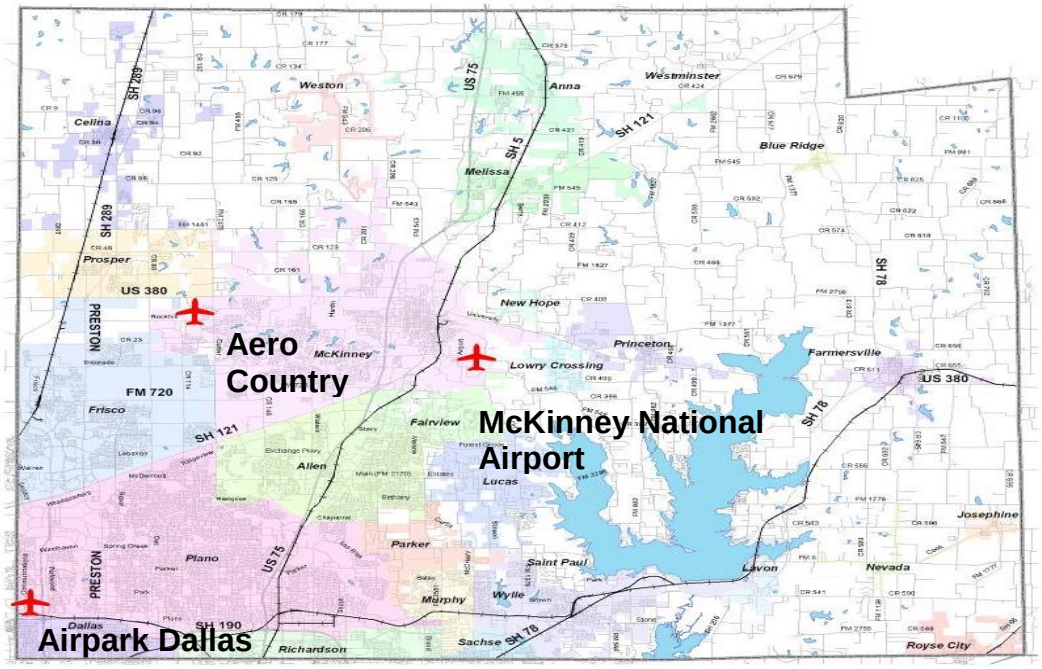


Figure 29B: Public Use General Aviation Airports in Collin County
Source: North Central Texas Council of Governments

5.3.5. Freight Movement

Goods movement is the lifeblood of the Texas economy, and specifically the DFW Area. The region represents one of the largest “inland ports” in the nation, where freight is moved, transferred, and distributed to destinations across the State, Nation, and around the World. The DFW Area has one of the most extensive surface and air transportation networks in the world, providing trade opportunities for the more than 600 motor / trucking carriers and almost 100 freight forwarders that operate out of the DFW Area.

5.3.5.1. Freight Rail

Collin County is served by three freight railroads – Union Pacific Railroad Company (UP), Burlington Northern Santa Fe Corporation (BNSF) and Kansas City Southern Railroad Company (KCS).

- UP operates two lines through Collin County: an east-west line from the City of Wylie to Greenville in Hunt County, and a north-south line through the City of Frisco connecting to the City of Sherman.
- BNSF operates a north-south line through the City of McKinney that connects to the City of Sherman.

- KCS operates an east-west line through the City of Wylie that connects to the City of Greenville in Hunt County and to the City of Denton.

The Northeast Texas Rural Rail Transportation District (NETEX) controls 65.6 miles of operational railroad and a railroad corridor totaling 88.8 miles in northeast Texas between the Titus-Franklin County line and Wylie. This line was originally the "C-branch" mainline of the St. Louis Southwestern Railway (Cotton Belt). The operator of the line is the Blacklands Railroad. NETEX is an established governmental subdivision of the State of Texas representing six contiguous counties across northeast Texas, overlapping the service area of TAMU-Commerce, including: Titus, Franklin, Hopkins, Delta, Hunt, & Collin Counties.

The District was formed in 1995 to save the former St. Louis Southwestern (Cotton Belt) Railway's Dallas Division, or "C-Branch," from abandonment and preserve rail service for current and future customers along the corridor and ensure the potential for long-range economic growth in the region. NETEX owns, some solely and some jointly, 65.6 miles of operational railroad plus 23.2 miles of right-of-way with rails removed for a total corridor length of 88.8 miles.

5.3.5.2. Truck

Major truck corridors within Collin County include US 75, US 380, and SH 78; truck traffic within these corridors range from 500 to 10,000 trucks per day according to the Freight Bottleneck Study by NCTCOG.

6. Recent Efforts

Several studies have been done to address the transportation needs of Collin County. These studies include such transit modes as commuter rail, light rail, tollways, new roadways, and freight rail. In addition, several projects have been completed since the last Collin County Mobility Plan update in 2007. These projects, as well as some prospective projects are described in this section.

6.1. Regional Rail Corridor Study

NCTCOG and its Regional Transportation Council (RTC), in partnership with DART, Denton County Transportation Authority (DCTA), and the Fort Worth Transportation Authority (FWTA) conducted a comprehensive Regional Rail Corridor Study (RRCS) in May 2003. The study focused on eight passenger rail corridors throughout the DFW Area. The RRCS effort included a review, inventory, and assessment of the transit needs for the eight rail corridors. The goal of the RRCS was to provide sound data and recommendations to decision makers regarding the DFW Area's transit needs. Study results refined recommendations for the Regional Mobility Plan. The results guided decisions regarding regional rail staging and implementation, and outlined financial and institutional structures for consideration by policy makers.

6.2. Dallas North Tollway Extension- 3, SRT to US 380

The extension of the Dallas North Tollway from the Sam Rayburn Tollway (SRT) to US 380 north of Frisco has been completed since the last CCMP Update in 2007. This extension provided three main lanes each way as a vital route from Frisco to Dallas.

6.3. Dallas North Tollway Extension- 4, US 380 to Grayson County Line

Planning is under way for an extension of the Dallas North Tollway from US 380 north to the Grayson County line. NTTA' s Board of Directors has adopted a 13.5 mile long alignment, and Collin County has built a two-lane roadway on the alignment, from US 380 to north of FM 428, so that drivers can begin using this corridor.

6.4. President George Bush Turnpike - Eastern Extension

The construction of the President George Bush Turnpike (PGBT) Eastern Extension from SH 78 east to IH 30 has been completed. The toll road passes through the Cities of Garland, Sachse and Rowlett and includes a one-mile long bridge over Dallas' Lake Ray Hubbard.

6.5. Sam Rayburn Tollway (SRT/ SH 121)

State Highway 121 runs from downtown Fort Worth, TX to Bonham, TX. SH 121 is very heavily traveled within Collin County, and has become an urban highway due to rapid growth of the County. NTTA and TxDOT have completed construction of a 26-mile facility through Collin and Denton Counties, including a small segment in Dallas County. The NTTA operates this facility as a tollway and has named it the Sam Rayburn Tollway (SRT). In Collin County the SRT stretches from the Collin County/Denton County line northeastward to US 75 in McKinney.

6.6. Collin County Outer Loop

Collin County Outer Loop is proposed to connect the future extension of DNT with SH 121, US 75, US 380, and on to IH 30 and other roadways in Rockwall County. This controlled access facility will provide the necessary east-west link in the county. The travel demand modeling performed as part of this 2014 CCMP Update projects the need for two main lanes in each direction and two frontage roads in each direction. The project to build two lanes along the alignment has been completed from US 75 eastward to SH 121. Additional segments should be developed as needed. Future updates of the CCMP should monitor the need for completion of the Outer Loop within Collin County.

6.7. US 75 Corridor Study

TxDOT is currently preparing a Corridor Study for the reconstruction and widening of US 75 from IH 635 to SH 121. This corridor is approximately 21.1 miles long and is within the cities of Dallas, Richardson, Plano, Allen and Fairview, and which are located within the Dallas and Collin Counties. The US 75 Corridor Study is scheduled for completion in November 2015. Viable alternatives are currently being evaluated. Additional public meetings are scheduled to be held in November 2014, and in September of 2015. Future modifications to the CCMP may need to be considered based on results of the corridor study.

6.8. Blacklands Corridor Study

At the time of completion of the CCMP, the North Central Texas Council of Governments (NCTCOG) was conducting a feasibility study of the Blacklands Corridor. The NCTCOG study is evaluating the need for a new transportation facility between Greenville in Hunt County and the President George Bush Turnpike in Dallas County. The study encompasses the area between IH 30 and US 380 and includes Wylie, Garland, Lavon,

Nevada and Josephine in Collin County. This study has considered a range of options for transportation improvements, including transportation system management (such as synchronization of traffic signals), bicycle and pedestrian facilities, freight rail, transit, full build-out of planned arterials, bottleneck improvements to IH 30, re-construction of IH 30 and a new highway/freeway/tollway. The study has concluded so far that the only alternative that has the potential to adequately address the projected growth in traffic in this corridor is the new highway/freeway/tollway alternative. A private sector proposal was introduced in 2013 for a tollway along the North East Rural Rail Transportation District (NETEX) right-of-way. NCTCOG has determined that the right-of-way is not suitable for a new roadway and is recommending that the right-of-way be preserved for a future passenger rail corridor and/or a pedestrian/bicycle facility. A specific route for a new roadway has not been determined. A public meeting will be held in the fall of 2014 and recommendations are planned for December, 2014. As the corridor is found to be feasible and the recommended alignment is determined, modifications may need to be considered to reflect the results of the corridor study.

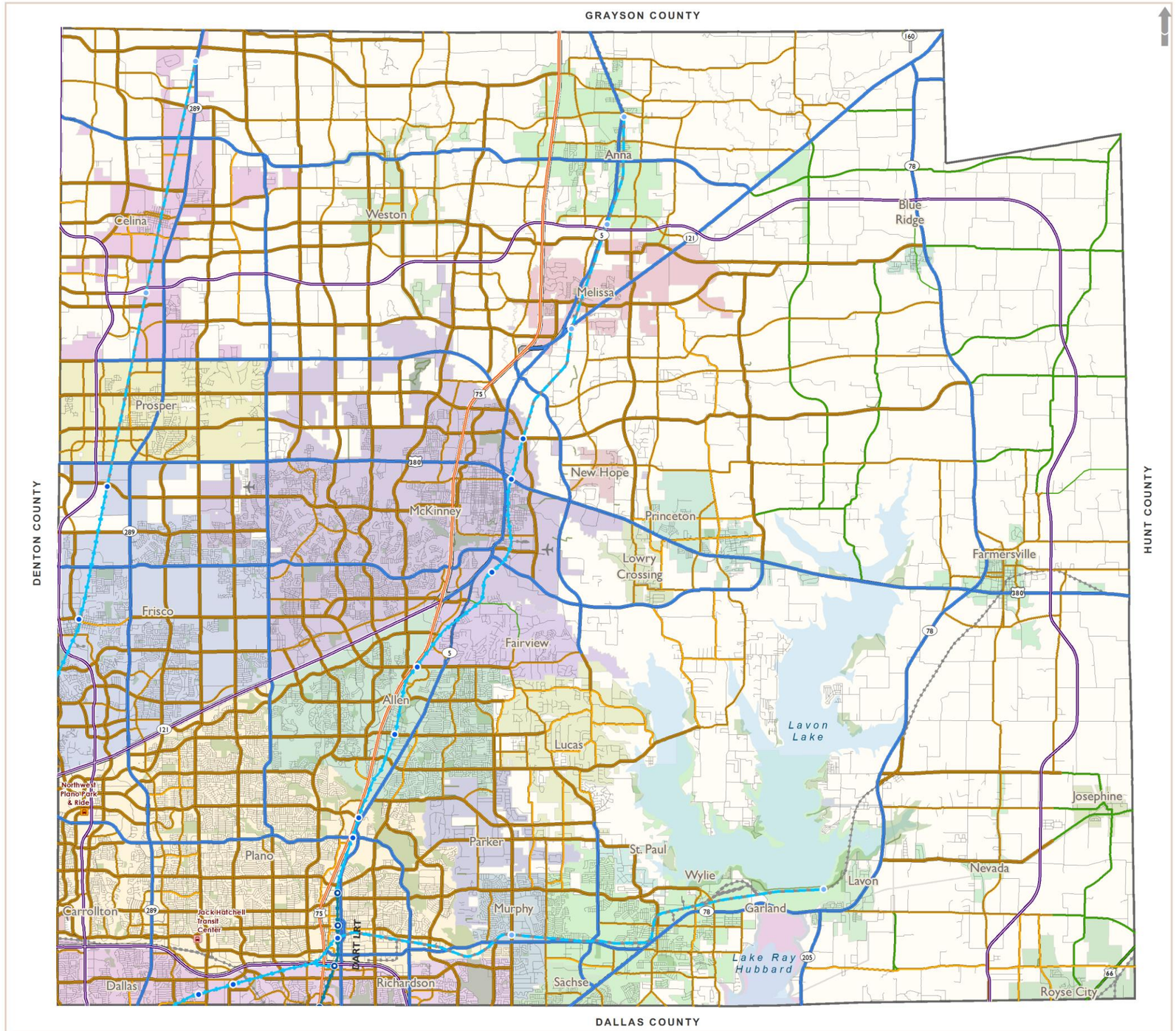
7. Recommendations

This section describes the recommended Thoroughfare and Transit Plan, along with planning standards and practices for keeping up with mobility needs in the future. The 2014 Collin County Mobility Plan influences transportation access and mobility, the desirability of areas as locations for development, and the pattern and density of land use. It recognizes the importance of the relationship between land use and transportation. Land use alone, to a large extent, determines the travel demand and the function of the transportation network in an area.

Design standards must accommodate the changing character of traffic and road function. The functional classification and context sensitive design of thoroughfares should be related to changing land uses and the extent of existing and future development. The updated Collin County Thoroughfare and Transit Plan is shown in **Figure 30**. The CCMP Update includes delineation of functional classes of existing and proposed major thoroughfares. The rationale for development of the 2014 CCMP Update includes the following considerations:

- Traffic service;
- System relationship;
- Network continuity;
- Land access;
- Growth potential;
- Multi-modal transportation;
- Development constraints;
- Maximizing use of the existing road network; and
- Community values.

The CCMP addresses not only the foreseeable transportation improvement needs over the next 25-year planning period, but also includes consideration of requirements for preservation of rights-of-way over a longer term. Right-of-way preservation function of the thoroughfare plan is an important consideration in subdivision platting. This is needed in order to avoid short-sighted development decisions, which overlook the opportunity to preserve future rights-of-way for the long-term development of the County's thoroughfare network.



COLLIN COUNTY MOBILITY PLAN

THOROUGHFARE AND TRANSIT PLAN

Transit Stations

- Existing
- For Future Study
- Previously Studied
- Park & Ride
- Transit Center

Transit Facilities

- Existing
- For Future Study
- Previously Studied

Thoroughfare Plan

- Freeway
- Tollway
- Principal Arterial 6 Lane Divided
- Principal Arterial 4 Lane Divided
- Major Arterial 6 Lane Divided
- Major Arterial 4 Lane Divided
- Major Arterial 4 Lane Undivided
- Rural Arterial 4 Lane
- Rural Arterial 2 Lane
- County Line
- Airport
- Railroad
- Park
- Water Body

0 7 Miles

MAP ID: 14_04_06 Date: 7/23/2014

FIGURE 30: Collin County Thoroughfare and Transit Plan

7.1. Thoroughfare Development

The following roadway functional classifications and design standards are intended to provide consistency, yet allow for local flexibility. The CCMP intends to standardize how roadways are characterized at the federal, state, and local levels.

7.1.1. Functionally Classified System of Thoroughfares

The various roadways in Collin County have been functionally classified according to the uses for which they are intended. These uses provide a balance between traffic movement and property access.

In general, freeways and tollways are designed to be high speed facilities with controlled access that serve very long trips and very high traffic volumes. Principal arterials are designed to serve moderate to long trips and moderate to high traffic volumes, but operate at lower travel speeds than freeways and tollways. Principal arterials are characterized by restricted, rather than prohibited, access. Major arterials are designed to serve trips of moderate length and moderate traffic volumes at lower average operating speeds with somewhat restricted access. Finally, rural arterials are designed to serve corridor movements through low density areas. Collectors and local streets comprise the local access portion of the roadway network, but are not classified as thoroughfares since they serve low volume, low speed trips of short distances, either for access within neighborhoods or connecting to nearby thoroughfares for longer trips.

The mentioned thoroughfare classifications have the following thoroughfare designations:

- **Freeways/Tollways** – A fully controlled access facility on expansive right-of-way serving traffic within an urban area and linking urban areas. Freeway/Tollways include Interstate Highways, urban freeways, and tollways.
- **Principal Arterial (P6D, P4D)** – Major arterial roadways which serve to interconnect county-wide roadways and link identifiable neighborhood areas with major activity centers improved to accommodate high-volume locations allowing for grade separations, curb and median access controls, and signal progression.

- **Major Arterial (M6D, M4D, M4U)** – Roadways which augment principal arterials with emphasis on the distribution of vehicles to higher and lower roadway classes and land access.
- **Rural Arterial (RA4, RA2)** – Roadways primarily in the rural areas of the county that augment minor arterials with emphasis on the distribution of vehicles to higher roadway classes and land access.

7.1.2. Roadway Typical Sections and Standards

Design and construction of the thoroughfare system should comply with recommended design standards, consistent with TxDOT design guidelines as well as criteria contained in county and city subdivision regulations. **Figures 31, 32**, and **33** show the typical sections for the CCMP functional classifications.

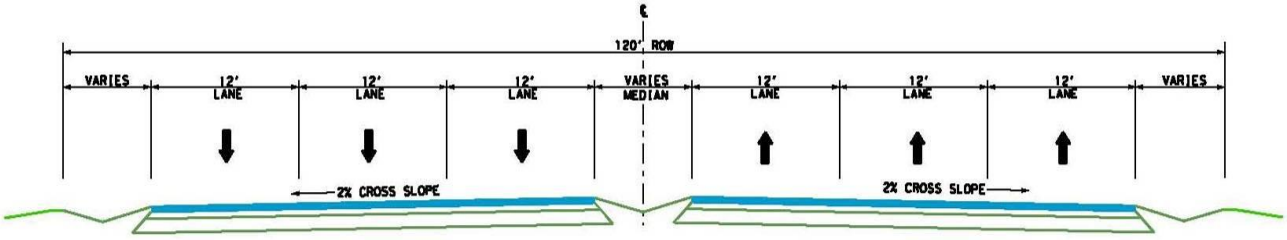


Figure 31: Typical Section – P6D and M6D Six-Lanes Divided with Median
Source: Collin County Engineering Department
Note: Not to scale

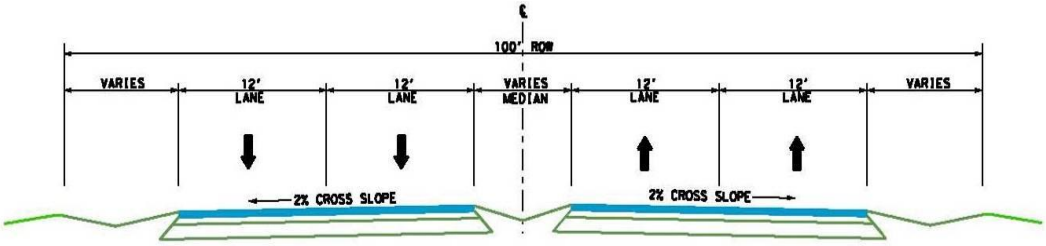


Figure 32: Typical Section – P4D and M4D Four-Lanes Divided with Median
Source: Collin County Engineering Department
Note: Not to scale

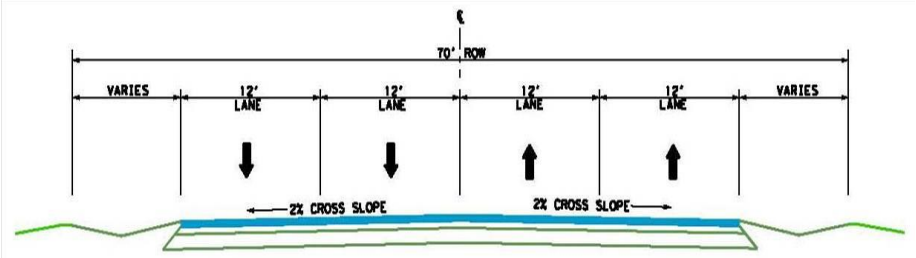


Figure 33: Typical Section – P4U and M4U Four Lanes Undivided
Source: Collin County Engineering Department
Note: Not to scale

7.1.3. Roadway Geometric Design Standards

Collin County establishes appropriate geometric design standards for each roadway classification, in addition to identifying and functionally classifying roadway improvements. The purpose of these standards is to ensure that each roadway type provides the intended roadway safety and Level of Service. These design standards comply with national and regional standards such as those published by the American Association of State Highway Officials (AASHTO) and NCTCOG.

Standards are provided for the following design elements for each roadway type:

1. Right -of-way width
2. Lane width
3. Median width
4. Parkway width
5. Design speed
6. Vertical grade
7. Stopping sight distance
8. Horizontal curvature
9. Vertical clearance, and
10. Lateral clearance.

Of particular importance to the Collin County Thoroughfare and Transit Plan are the recommended roadway right-of-way widths. These are a function of the typical cross-section for each roadway functional classification. A typical cross-section is comprised of pavement width, median width, and parkway width.

Pavement width varies according to the number of traffic lanes and the width of the lanes. Driving lane widths are typically 11-12 feet in urban areas. The width of medians varies according to the use for which the median is intended. For example, a median width of 14-16 feet will permit the construction of a 10-12 feet deceleration and storage lane for left-turning vehicles. A median width of 22 feet is needed to provide a full vehicle refuge for a passenger car in the median, while a 30 foot median width will accommodate dual left-turns at signalized intersections. When right-of-way is being preserved for future roadway widening, the additional width required for additional lanes is usually included in the median.

Parkways are the areas between the curb or pavement edge and the right-of-way line. They must be of sufficient width to accommodate non-traffic functions such as sidewalks and utilities. When rights-of-way permit, a wider parkway can be used to buffer the surrounding areas from the roadway. The typical width of a parkway in an urban area is 15 feet. However, larger parkways are generally required in rural areas to provide for paved shoulders, clear recovery zones, and drainage swales.

Table 7 displays the recommended geometric design standards for each thoroughfare type. It must be recognized that many of the thoroughfares are also thoroughfares on various city plans. While standards within a city are under the control of that city, in the case in which the county is providing funding for the development of a thoroughfare, any conflicting standards between the county and a city must be negotiated to the satisfaction of the two entities. The same is true for any county thoroughfares that are also State highways. It is recommended that Collin County follow the appropriate NCTCOG standards for elements of the CCMP that are not listed in this update.

The design standards should be tailored to meet the full range of circumstances occurring within the planning area, including land use, urban design, and valued community resources as well as mobility and access needs. For example additional rights of way should be acquired at roadway intersections in order to accommodate dual left turn lanes and right turn lanes. Standards should create an attractive environment for pedestrians along boulevards, downtown streets and squares, collector streets, and residential streets. Bikeways and sidewalks should be integrated into typical sections and design standards. Crossings of trails (bike and pedestrian) should be considered in the design of thoroughfares so that, when possible, thoroughfares do not become barriers to the continuity of trails. The CCMP standards for corridor and roadway design should ensure design sensitivity to a county-wide context as well as the corridor's features and surroundings.

- **Context Sensitive Design** - The design criteria embody the principles of Context Sensitive Design, i.e., to consider the total context within which future transportation improvements will exist. Context Sensitive Design means establishing roadway standards that relate not only to mobility and to access, but also to keeping streets and sidewalks in scale with development, making streets and trails connect, promoting transit-supportive densities, and including special standards for transit

oriented development. A typology of street types will be identified, each of which will be accompanied by a unique set of uses plus dimensional and design standards.

- **Access Management** - Access management is necessary to reduce interference and allow movement as the primary function of streets. Access control options range from full control of access for Interstates, State highways, and freeways, to controls over driveway spacing for arterials or other public streets. Traffic conflicts at the intersections of driveways with arterial streets create traffic congestion, increase delay, and reduce traffic safety. Arterial intersections with other public streets and driveway access points should be designed to limit speed differentials between turning vehicles and other traffic. The county should follow the access management policy of the State, or the nearest city, to provide consistency along the network of thoroughfares.

Table 7: Collin County Geometric Design Standards

	Functional Classification/Roadway Type*							
	P6 D	P4 D	P4 U	M6 D	M4 D	M4 U	RA 4	RA 2
Number of Traffic Lanes	6	4	4	6	4	4	4	2
Lane Widths (feet)	12	12	12	12	12	12	12	12
Right-of-way Widths (feet)	120	100	70	120	100	70	110	90
Design Speed (mph)	40-50			35-45			55-65	
Grade (percent)								
Maximum	6 %			7 %			6 %	
Minimum	0.5 %			0.5 %			0.5 %	
Stopping Site Distance (feet)	350-500			300-425			475-500	
Horizontal Curvature (degrees)	5.5-13.5			7.0-13.5			3.0-5.5	
Vertical Clearance (feet)	15			15			15	
Lateral Clearance (feet)	6			6			6	

Note: Median widths vary according to the use for which the median is intended.
A median width of 14 – 16 feet will permit the construction of a 10 – 12 feet deceleration and storage lane for left-turning vehicles.
A median width of 30 feet will accommodate dual left-turns at signalized intersections.
When right-of-way is being preserved for future roadway widening, the additional width required for the additional lanes is usually included in the median.
A parkway is the area between the curb or pavement edge and the edge of right-of-way. Typical parkway width in an urban area is 15 feet.

* See “Collin County Thoroughfare and Transit Plan, **Figure 30** for roadway types.

7.2. Public Transportation

Current plans and programs were reviewed for the future public transportation improvements planned by DART, TAPS, municipalities, and NCTCOG. Scheduled fixed route bus transportation is currently being provided by DART in Carrollton, Dallas, Garland, Plano and Richardson, and by TAPS in McKinney and Allen. On-demand transit service is currently being provided by both DART and TAPS. Based on demand, expansion of these services will be made by these agencies according to the feasibility.

The results of the travel demand modeling indicate that there are several major thoroughfares that will have demands far beyond their capacity by 2035 (some by 2020). Further study is needed to investigate opportunities for providing alternative forms of mobility that better matches the capacity with the demand. One of the options is the expansion of light rail or commuter rail transit, even though rail transit will not totally solve this problem. Planned extensions of light rail transit or commuter rail transit service connecting Collin County communities with Dallas and other parts of the DFW Area are shown as part of the CCMP.

The 2003 NCTCOG Regional Rail Corridor Study (RRCS) identified the need to extend rail transit services in Collin County beyond the DART service area along the Cotton Belt, Santa Fe and BSNF railroad corridors. The CCMP recommends planning for rail or rapid bus transit to extend much further north and east**,** as indicated on the Thoroughfare and Transit Plan map in Figure 30**,** due to the projected capacity limitations of the existing and proposed arterials. The current DART service area limits that organization from making the extensions, and this plan does not attempt to identify what organizations would be responsible for implementing the extensions. The identification of this need in the CCMP is not intended to imply that Collin County has or should have responsibility for the implementation.

Another option for evaluation is the potential for Bus Rapid Transit (BRT), which connects terminals with express bus or rapid bus service operating in dedicated lanes or shared lanes with high occupancy vehicles. It is recommended that the further study examine the use of dedicated lanes within arterial medians, along power-line easements, or other express bus routes for cross-town movement. These BRT routes should connect to rail or bus transit stations and transfer centers.

Lastly it is recommended that the transit entities consider carefully the information provided in this update regarding future employment centers. Especially since many of the

roadway facilities (freeways, tollways and arterials) are predicted to be overloaded in the future, it is important that transit corridors be developed to support the key employment centers in the county.

7.3. High Occupancy Vehicle Lanes

High occupancy vehicle (HOV) lanes currently are in use on US 75 as far north as Allen. HOV lanes provide travel time savings for express buses, carpools, vanpools, motorcycles, and any other motorized vehicles carrying at least two or more persons. Managed lanes are under construction along IH 635/LBJ Freeway, which may have future application along other freeway and tollway facilities. The further use of such lanes should be evaluated by further studies coinciding with the expansion of any freeway. The use of Managed lanes should be considered where appropriate.

7.4. Bicycle and Pedestrian

NCTCOG's Mobility 2035 Plan identifies a regional Veloweb consisting of a system of interconnected trails, recommended to be a minimum of 12 feet in width and grade separated from thoroughfares for safety. The Collin County Trails Master Plan completed in 2012, examines the potential for trails in the county and makes recommendations for implementation. Provisions of the Trails Master Plan are incorporated into this CCMP update insofar as they complement or are affected by the facilities addressed.

The inclusion of grade-separated crossings where possible along major thoroughfares or highways is of critical importance. Grade separated crossings at creeks, or where sufficient grade separation exists, should be considered along major thoroughfares and highways. It is critical to think long-term as bridges are built to last through the decades. In addition both the county and cities should consider trails when reviewing development plats in the same way that rights-of-way for thoroughfares are considered. Working with developers so that their plans provide connectivity to the overall trails plan, even between cities, will result in the optimum implementation of the Trails Master Plan.

7.5. Freight

NCTCOG conducted a Freight Bottleneck Study that looked at truck traffic movement throughout the DFW Area. Truck freight bottlenecks are most prevalent at the following locations:

- Intermodal connectors that have not been properly designed or maintained for heavy truck traffic;
- National highway safety corridors that lack sufficient capacity to handle freight and passenger movements safely and efficiently;
- Highway interchanges that lack “acceleration lanes” for freight vehicles;
- Industrial districts and related connectors that lack proper signage for out-of-town drivers;
- Corridors on which truck stops and other terminal locations cannot meet the demand for overnight truck parking; and
- Warehouse districts improperly situated close to residential uses.

Action steps to help reduce the truck bottleneck situation include:

- Pursue Intelligent Transportation Systems, capacity, safety, and geometric improvements on existing truck routes as part of IH 35E;
- Determine applicability of dedicated truck lanes and truck lane restrictions in the region;
- Review hazardous cargo routing system;
- Expand idle reduction technologies; and
- Expand the Intelligent Transportation Systems (ITS) network, specifically supporting truck movements.

7.6. Preservation and Rehabilitation of Pavements

Although this report does not deal with pavement maintenance, the age of the infrastructure in Collin County has brought into the transportation subject the impact that failing pavements can have on mobility. Therefore, this section has been added simply to bring attention and emphasis to the need of the various entities in Collin County that are responsible for pavements to development pavement management programs. These programs should be capable of predicting the need for maintenance and rehabilitation as well as estimating the cost. It is important that these entities utilize these programs and adequately fund the recommendations in order to prevent pavement failures from reducing traffic flow and, therefore, overall mobility.

7.7. Funding

The CCMP has been prepared for the benefit of the entire Collin County Community. The recommendations have not been made with the assumption that Collin County will fund all the recommendations. It is expected that decisions will be made by all the transportation agencies in the County as to what, if any, actions will be funded by each agency.

8. Implementation

This section describes the recommended programs and projects to implement the thoroughfare improvements and standards contained in Section 7. Implementation of the CCMP allows the transportation agencies in Collin County to keep pace with and facilitate desired growth and development patterns in the County. Implementation consists of several actions. First of all, adoption of the 2014 CCMP Update by the Commissioners Court directs action to be taken on the recommendations provided in Section 7. Most of those recommendations refer to policies and procedures that are already in effect as a result of previous CCMP Updates.

Secondly, the Collin County Thoroughfare and Transit Plan, updated by this study, allows the County to work with developers in the unincorporated areas to ensure that rights-of-way and alignments necessary for thoroughfares are provided. The cities were involved in review of the model runs and development of the Thoroughfare and Transit Plan. As a result, most of the cities agreed with the Thoroughfare and Transit Plan where it relates to their city. The cities, therefore, can consider updating their plans to work with developers for right-of-way dedication and alignments within new developments.

NCTCOG, TxDOT, NTTA, DART and TAPS can also use the demographic data and model runs as additional information about the travel demands in 2020, 2035 and beyond.

In addition to being useful for ongoing long-term planning, the CCMP may be of use to the County, the cities and TxDOT in the near term. Additional analysis was performed that provides information about critical travel demands in 2020 that should be useful in developing near-term capital improvement programs (from the present to about 2025). The projects resulting from this analysis are thoroughfares that are projected to be severely over-capacity (Level of Service F) by the 2020 travel demand model. Additionally, the thoroughfares are able to be expanded because they are currently less than six lanes. This analysis resulted in a list of potential improvement projects that would relieve congestion if implemented. Not all of the projects would likely be completed by 2020, but the needs were identified using the 2020 travel demand forecasts. Many of the projects are within the corporate limits of cities; therefore, implementation of these improvements will depend on decisions by both the County and cities about funding. Likewise, some of the projects are State-maintained roadways. In those cases implementation will depend on funding decisions by the State, County and possibly cities. **Table 8** lists the projects resulting from this 2020 analysis along with the estimated capital costs, while **Figure 34** shows the project locations.

Table 8: Projects to Improve 2020 Level-of-Service

NTTA-FUNDED Project	From	To	Improvement	Lane Miles	Total
Dallas North Tollway	Dallas Co Line	SH 121	Widen Mainline from 6 to 8 lanes	14.50	93,400,000
Dallas North Tollway Frn Rd	Warren Pkwy	SH 121	Widen 2 lanes to 3 lanes	0.44	3,000,000
Dallas North Tollway	Windhaven	Spring Creek Pkwy	add NB entrance and SB exit ramps	0.44	3,000,000
Dallas North Tollway [1]	FM 428	Denton Co Line	New 2 lane frontage road	1.99	12,900,000
Pres George Bush Turnpike	Denton Co Line	Dallas Co Line	Widen Mainline from 6 to 8 lanes	22.80	146,900,000
Sam Rayburn Tollway	Denton Co Line	Dallas North Tollway	Widen Mainline from 6 to 8 lanes	2.20	14,300,000
Sam Rayburn Tollway	Dallas North Tollway	US 75	Widen Mainline from 6 to 8 lanes	22.40	144,300,000
NTTA-Funded Total					**417,800,000**

TXDOT-FUNDED Project	From	To	Improvement	Lane Miles	Total
US 75	Collin County Loop	SH 121 (N)	Widen Mainline from 4 to 6 lanes	7.80	50,300,000
US 75	Throckmorton Rd	FM 455	Widen mainline 4 lanes to 6 lanes	4.05	26,100,000
TxDOT-Funded Total					**76,400,000**

UNFUNDED Project	From	To	Improvement	Lane Miles	Total	City [2] Y/N	State [3] Y/N	City/County
Dallas North Tollway Frn Rd	US 380	FM 428	Widen 2 lane road to 4 lanes frn rd	5.94	38,200,000	Y	N	Prosper
5th St/Parkwood Blvd	Stonebook Pkwy	Warren Pkwy	Widen 4 lanes to 6 lanes	4.58	9,700,000	Y	N	Frisco
5th St/Parkwood Blvd	Cotton Gin Rd	Stonebook Pkwy	Widen 2 lanes to 4 lanes	1.78	3,800,000	Y	N	Frisco
Alma Rd	Stacy Rd	Eldorado Pkwy	Widen 4 lanes to 6 lanes	3.04	6,500,000	Y	N	Allen
Alma Rd	Hedgcoxe Rd	Exchange Pkwy	Widen 4 lanes to 6 lanes	2.43	5,100,000	Y	N	Allen
Bethany Dr/Lucas Rd/ FM 1378	FM 982	FM 2551	Widen 2 lanes to 4 lanes (partially unfunded)	14.50	30,500,000	Y	N	Multi-juris./City
Coit Rd	Lebanon Rd	Main St/FM 3537	Widen 4 lanes to 6 lanes	5.08	10,700,000	Y	N	Frisco
Coit Rd.	FM 3537/Main St.	Panther Creek Pkwy	Widen 4 lanes to 6 lanes	5.04	10,700,000	Y	N	Frisco
Coit Rd.	Panther Creek Pkwy	US 380	Widen 4 lanes to 6 lanes	4.10	8,700,000	Y	N	Frisco
Cotton Gin Road	Library St	S 5th St	New 4 lanes	1.56	3,200,000	Y	N	Frisco
Chelsea Blvd/Hardin Rd	Stacy Rd	SH 121	Widen 2 lanes to 4 lanes	2.88	6,000,000	Y	N	Allen
FM 2478/Custer Rd	US 380	FM 1461	Widen 2 lanes to 4 lanes	6.06	12,700,000	Y	N	McKinney
FM 2514/Parker Rd	Springhill Estates	FM 2551	Widen 4 lanes to 6 lanes	4.30	9,200,000	Y	N	Parker
FM 2514/Parker Rd	FM 2551	FM 1378	Widen 4 lanes to 6 lanes	5.06	10,700,000	Y	N	Parker
FM 2514/Parker Rd	FM 1378	Park Blvd	Widen 2 lanes to 4 lanes	5.36	11,200,000	Y	N	Saint Paul
FM 2551/Murphy Rd.	FM 2514/Parker Rd	FM 2170	Widen 2 lanes to 6 lanes	13.84	29,100,000	Y	N	Allen
FM 455	Wild Rose	SH 121	Widen and realign 2 lanes to 4 lanes	1.46	3,100,000	N	N	County
FM 455	US 75	CR 286	Widen 2 lanes to 4 lanes	0.84	1,800,000	Y	N	Anna
FM 546	CR 317	SH 5	Widen 2 lanes to 4 lanes (unfunded from CR 317 to Airport Rd)	3.14	6,600,000	Y	N	McKinney
FM 982	FM 546	US 380	Widen 2 lanes to 4 lanes	10.82	22,700,000	N	N	County
Independence Pkwy	SH 121	Virginia Pkwy	Widen to 6 lanes (SH 121 to Eldorado Pkwy)	7.58	15,900,000	Y	N	Frisco
Lake Forest Dr	SH 121	Eldorado Pkwy	Widen 4 lanes to 6 lanes	2.26	4,700,000	Y	N	McKinney
Park Blvd	FM 1378	FM 2514	Widen 2 lanes to 4 lanes	2.64	5,600,000	Y	N	Wylie
Ridgeview Dr	Alma Rd	US 75	Widen 2 lanes to 4 lanes; + new 4 lanes	8.32	17,600,000	Y	N	Allen
SH 121	US 75	FM 545 (Melissa road)	Widen 2 and 4 lanes to 6 lanes (unfunded for 6 lanes)	8.74	18,300,000	N	Y	County
SH 121	FM 545 (Melissa Road)	SH 160	Widen 2 lanes to 4 lanes (unfunded from FM 455 to SH 160)	11.52	24,200,000	N	Y	County
SH 205	SH 78	Collin County Line	Widen 2 lanes to 4 lanes	6.16	12,900,000	N	Y	County
SH 5/Greenville Ave	Spur 399	FM 546/Industrial Blvd	Widen 4 lanes to 6 lanes	2.42	5,100,000	Y	Y	McKinney
SH 5/Greenville Ave	Fairview Ave (S)	Stacy Road	Widen 2 to 4 lanes	0.38	900,000	Y	Y	Fairview
SH 5/Greenville Ave	SH 121	Fairview Ave (S)	Widen 2 to 4 lanes	5.22	10,900,000	Y	Y	Fairview
SH 5	FM 455	CR 369	Widen lanes to 6 lanes	1.14	2,400,000	Y	Y	Anna
SH 5	Tennessee St.	FM 543	Widen 2 to 4 lanes	3.14	6,600,000	Y	Y	McKinney
SH 78	FM 6	CR 557	Widen 2 to 4 lanes	13.30	28,000,000	N	Y	County
Shiloh Rd	Parker Rd	14th St	Widen 4 lanes to 6 lanes	4.20	8,800,000	Y	N	Plano
Stonebrook Pkwy	Legacy Dr	Longhorn Trail	New 6 lanes divided	4.44	9,400,000	Y	N	Frisco
Woodbridge Pkwy	Hooper Rd	SH 78	Widen 2 lanes to 4 lanes and new 4 lanes	2.12	4,500,000	Y	N	Sachse
Windhaven Pkwy	Parkwood Blvd	Spring Creek Pkwy	Widen 4 lanes to 6 lanes	2.26	4,700,000	Y	N	Plano
US 380	Airport Dr	Bridgefrommer Rd	Widen 4 to 6 lanes	6.24	13,100,000	N	Y	County
Unfunded Total				193.89	433,800,000			

[1] NTTA plans to fund this segment after 2020. The travel demand model indicates it is needed by 2020.

[2] Project is totally or partially in city limits as of July, 2014.

[3] On State System

Note: Potential thoroughfare improvements were identified based upon a projected year 2020 Level of Service F for thoroughfares with less than six-lanes. Only unfunded portions of the projects are shown in the table.

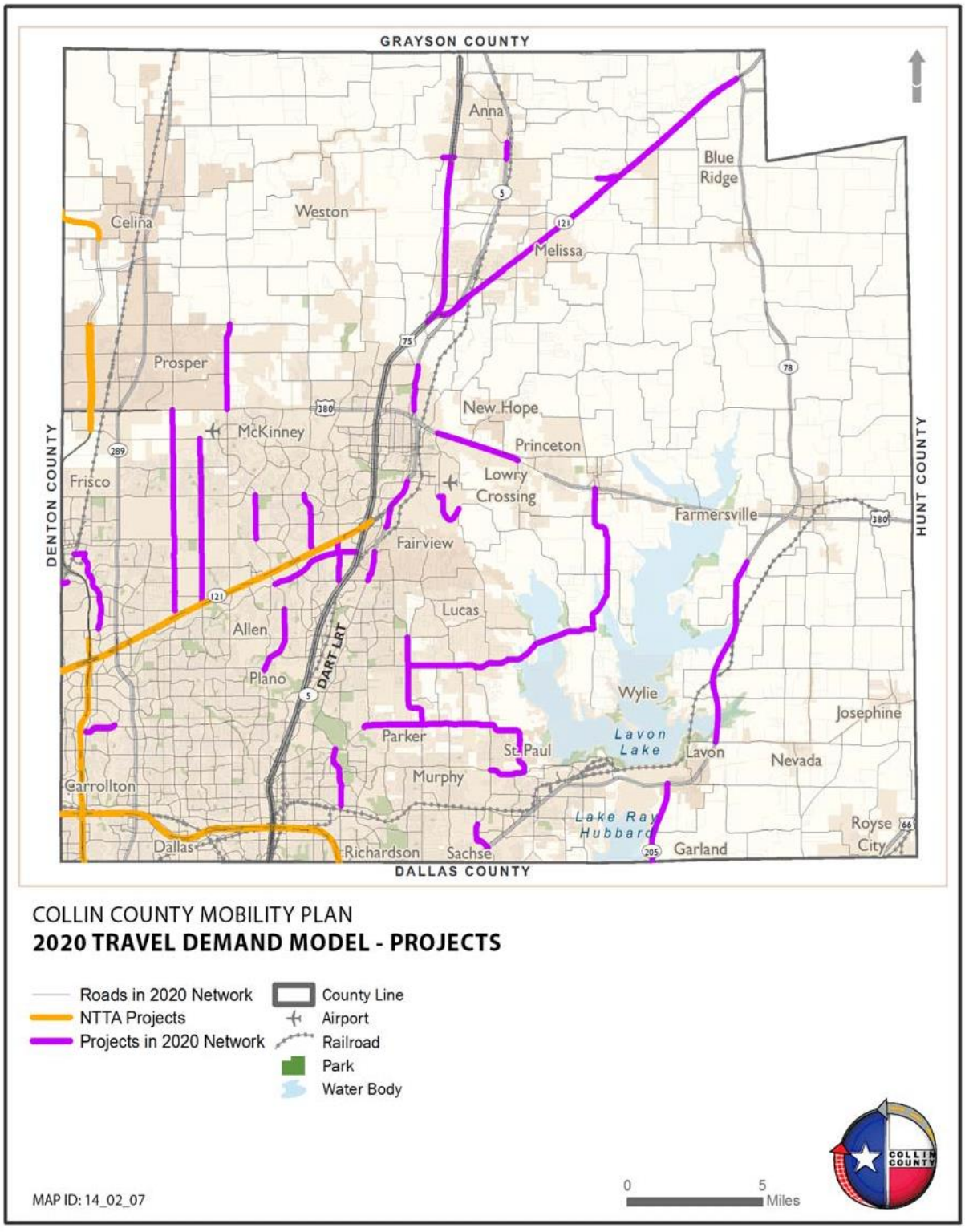


Figure 34: Projects to Improve 2020 Level of Service

8.1. Continuing Planning Process

Continuing planning is needed to address improvements required to reduce congestion and serve future transportation needs indicated in the 2014 CCMP Update. In keeping with State and Federal requirements, further study and public involvement will be necessary prior to the design and construction of improvements. The project-level study and design development process will address issues such as specific alignments, impacts on residents, environmental impacts, and project design and construction. This additional work on each project will require citizens, planners, and elected officials to continue to work together to assure that the transportation system for Collin County achieves the goals set forth in this 2014 CCMP Update.

As improvements are made, or additional information becomes available, modifications to the CCMP will be required. To facilitate this, it is recommended that the Collin County Planning Board conduct a workshop for city and state officials each year to review the implementation status of the Thoroughfare and Transit Plan. In addition, it is recommended that the demographic data and travel demand forecasts, used as a basis for developing the CCMP, be updated approximately every five years. The CCMP should be reviewed and revised to reflect the modifications, accordingly. These activities should include public review and comment, coordination with municipalities, and obtaining an approval from the Collin County Planning Board and Collin County Commissioners Court. Additional recommendations for continuing the planning process are:

- Update the CCMP every 5 years or as needed; this update should include the Collin County Thoroughfare and Transit Plan and Trails Master Plan when appropriate;
- Coordination with DART, TAPS, NCTCOG, NTTA, and TxDOT; and
- Monitor the need for improvement of the existing and new corridors.

8.2. Additional Studies Required

An observation that one can make when reviewing the elements of the CCMP is that there are many roadway segments in the 2035 Level of Service map that are projected to operate at a Level of Service F - basically “gridlock”. These projected deficiencies indicate it is not feasible to build enough roadway lane miles to relieve all future congestion. As

unacceptable as this may seem, it is a predictable result of continued growth of Collin County and the DFW Area. However, the scope of this study was limited to analyzing improvements within "traditional" standards. For example typical thoroughfares are limited to a maximum of six lanes with signalized at-grade intersections. The 2035 travel demand model (as well as the 2020 model) indicates that the traffic on many of the roadways will simply be more than the capacity of the roadways. Therefore, it is recommended that additional studies be conducted to identify innovative solutions to this "over-capacity" problem. Roadways that should be studied further are:

- US 380, west of Airport Rd in McKinney
- SH 78, between Wylie and Lavon
- Preston Rd/SH 289, from the south county line to US 380

Although other thoroughfares are also projected to operate at LOS F in 2035, the conclusions drawn from studies of these thoroughfares should provide transferable recommendations. These thoroughfares are State facilities and they are within various cities; therefore the studies will have to be done in cooperation with the cities, NCTCOG, and TxDOT.

There are also major portions of the various limited access highways, freeways, and tollways that are projected to operate at LOS F by 2035. Once again a cooperative effort among the appropriate transportation agencies in the County will be needed to study the potential for innovative transportation management options. Some progress is already being made in this area - TxDOT is currently studying the US 75 corridor for this very purpose.

There are several options that are possible solutions to these future capacity and congestion issues. Examples of options are discussed below:

- **Coordinated Signal Progression**. Signal progression is used on many thoroughfares in Collin County today. However, where it is not used, it is recommended that cities include this practice in their signal operations so that traffic flow is optimized. In addition, it is recommended that cities work closely together with each other, NCTCOG, and TxDOT to make sure that signal progression on thoroughfares continues through from one city to the next, not stopping at corporate limit lines. Since this is basically a city function, the county may be limited to encouraging the cities and others on this matter.

However, the county may be able to determine and provide some incentives to the cities.

- **Grade-Separated Intersections**. Intersections are the most significant impediment to good traffic flow. Separating the legs of an intersection vertically removes the need for signals for the "through" traffic and dramatically improves traffic flow. "Overpasses" are very unpopular with surrounding businesses and residents, so the likelihood of a city being willing to solve the problem using overpasses is low. An option that might be more palatable is the use of "underpasses". This eliminates the visual issue of a bridge being high above the surface, although it does not totally eliminate all the concerns that businesses have with grade-separated intersections.
- **Parallel Routes**. In most cases, adding another route parallel to or close to a congested thoroughfare is just not realistic. The surrounding land is already developed or there already are parallel roadways. However, it is worth testing each congested thoroughfare to see if there is a potential for either improvements to adjacent, parallel thoroughfares, or the development of a complete new thoroughfare. SH 78 is an example of a roadway that could possibly benefit from development of another roadway. There is enough undeveloped land south of SH 78 that could possibly accommodate a new roadway facility, and there is a utility corridor that might be used as well. More detailed study and cooperation with the city, landowners and utility company would be required to determine if this is feasible. There may be some opportunities for extension of rail transit on parallel routes beyond those addressed in this 2014 CCMP Update.

9. Conclusion

The development of the 2014 CCMP Update required a team effort among numerous agencies and organizations. Among these are the Collin County Commissioners Court, the Collin County Planning Board, the Collin County Engineering Department, the local municipal jurisdictions within the county, NCTCOG, DART, and the Jacobs team. During the plan development process, four principal tasks were undertaken and completed.

These tasks were as follows:

1. A comprehensive assessment of existing and projected levels of population and employment within the county;
2. Evaluation of the need for enhancements to the existing thoroughfare system
3. Multi-modal transportation improvements that will serve the needs of Collin County residents to the year 2035 and beyond; and
4. An analysis of projects for addressing 2020 needs.

This process has resulted in significant updates to the 2007 Collin County Mobility Plan relative to the recommended roadway, transit and bicycle/pedestrian trails improvements. However, it should be noted that the Plan Update process is dynamic. This 2014 CCMP Update will serve the transportation needs of area citizens and guide major transportation investments well into the future. It is recommended that this plan be reviewed and updated on a countywide basis every five years to respond to the changing conditions that will occur.

Appendices

Appendix A: Definitions

Appendix B: Demographic Projections

Appendix C: Projects to Improve 2020 Level-Of-Service

Appendix D: Summary of Meetings

APPENDIX A:

DEFINITIONS

Definitions

1. Acceleration Lane - A speed change lane for the purpose of enabling a vehicle entering a roadway to increase its speed to a rate at which it can more safely merge with through traffic.

- Average daily traffic (ADT) - The term used to describe the number of vehicles on a roadway segment during a non-holiday week day.
- Bike Lane- A lane devoted to non-motorized bicycles.
- Center Line - A line indicating the division of the pavement between traffic moving in opposite directions. It is not necessarily at the exact geometric center of the pavement.
- Control of Access - The condition where the right of owners or occupants of abutting land or other persons to access, light, air or view in connection with a highway is fully or partially controlled by public authority.
- Deceleration Lane - A speed change lane for the purpose of enabling a vehicle that is to make an exit turn from a roadway to slow to the safe speed on the curve ahead after it has left the main stream of faster-moving traffic.
- DOT – the State's department of transportation , such as Texas department of transportation (TxDOT)
- Design Capacity - The maximum number of vehicles that can pass over a given section of a lane or roadway in one direction on multi-lane highway (or in both directions on a two or three lane highway) during a specified time period while operating conditions are maintained corresponding to the selected or specified level of service.
- Design Speed - A speed selected for purposes of design and correlation of those features of a highway, such as curvature, super-elevation, and sight distance, upon which the safe operation of a vehicle is dependent.
- Divided Road - A directional roadway on which opposing traffic is separated by a median, either natural or structural.

- Free-flow Operating Speed - The operating speed of a passenger car over a section of highway during extremely low traffic densities.

- Frontage Road - A road contiguous to and generally paralleling an expressway, freeway, parkway, or through-street and so designed as to intercept, collect, and distribute traffic desiring to cross, enter, or leave such highway and which may furnish access to properly that otherwise would be isolated as a result of the controlled-access feature; sometimes called a service road or feeder road.
- Geometric Improvements - Improvements to roads such as widening, adding signals to intersections, or adding turning lanes. These are required to mitigate traffic impacts and maintain a required Level of Service (LOS).
- Grade Separation - A structure used to separate vertically two or more intersection roadways, thus permitting traffic on all roads to cross traffic on all other roads without interference.
- High Occupant Vehicle (HOV) - Any vehicle carrying two or more passengers. Many larger communities have HOV lanes on major highways that permit only HOVs to use them.
- Institute of Transportation Engineers (ITE) - Organization for professional transportation engineers. ITE publishes the Trip Generation Manual, which provides information on trip generation for land uses and building types. For instance, if an individual needs to know the number of trip ends (see definition below) produced by an industrial park, the report provides a trip rate based upon the size of the building. The report also divides the trip rate into peak hour rates, weekday rates, etc.
- Interchange - A system of interconnecting roadways in conjunction with one or more grade separations, providing for the interchange of traffic between two or more roadways or highways on different levels.
- Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) -This Congressional act requires states to develop a Statewide Transportation Plan and a Statewide Transportation Improvements Program (STIP) that identifies short-term project needs and priorities. It has also been a major source of funding for transportation planning

and encourages the linking of transportation and community planning. (See also TEA-21 below).

- Intersection Level of Service - This is a measure of the average delay experienced by each vehicle passing through an intersection. It can be measured for the vehicles making each directional turning movement, using each approach leg, or as a composite average value for all vehicles using the intersection. Similar to roadway level of service, it is reported with a letter grade designation ranging from A to F. A LOS A represents insignificant delay (less than 10 seconds per vehicle); LOS F represents significant waiting .This means more than 50 seconds per vehicle for intersections with non-existent or inadequate signals or more than 80 seconds per vehicle for intersections with signals.
- Level of Service (LOS) - A generalized measure of a street's operational characteristics. Six levels, ranging from "A" for light traffic flow "F" for congested traffic flow, are used.
- Link Volumes- The number of vehicles using a specific street segment. It is typically expressed as average daily traffic (ADT) or vehicle per peak hour (VPH).
- Linked Trip/Trip Chain- The sequence of grouping stops between the origin and ultimate destination. The intermediate stops made while in route to the ultimate destination are referred to as pass-by trips. The term is used in the evaluation of the operation of the accesses or driveways serving the uses at the intermediate stops.
- MAP 21 – the Federal law building on and modifying previous surface transportation laws; the Intermodal Surface Transportation Efficiency Act (ISTEA), the Transportation Equity Act for the 21st Century (TEA 21), and the Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU)
- Median- A physical divider separating lanes of traffic that typically are traveling in opposite directions. A median is often installed to prohibit unsafe turning movements. It can also be used to beautify a streetscape.
- MPO- Metropolitan Planning Organization. The agency which administers the federally required transportation planning processes in a metropolitan area. An MPO must be in place in every urbanized area with a population over 50,000, and is responsible for the 20-year long-range plan and the Transportation Improvement Program (TIP). The

MPO is the coordinating agency for grants, billings and policy-making for transportation.

- Modal Split - The proportion of total person-trips that uses each of the various modes of transportation, e.g. automobile, bus, carpool, transit.
- Mode of Travel - The means of travel, such as auto driver, vehicle passenger, mass transit passenger, or walking.
- Model - A mathematical formula that expresses the actions and interactions of the elements of a system in such a manner that the system may be evaluated under any given set of conditions (e.g. land use, economic, socioeconomic, and travel characteristics).
- Multi-modal - More than one mode of transportation in the same geographic area.
- Network - A system of roadway links and land use activity nodes (e.g. shopping centers, offices) which make up the transportation system; the skeleton of movement.
- NHS - National Highway System Network - A system of roadway links and land use activity nodes (e.g. shopping centers, offices) which make up the transportation system; the skeleton of movement.
- Operating Speed - The highest overall speed at which a driver can travel on a given highway under favorable weather conditions and under prevailing traffic conditions without at any time exceeding the safe speed as determined by the design speed on a section-by-section basis.
- Pavement - That part of a roadway having a constructed surface for the facilitation of vehicular movement.
- Peak Hour- The one hour period during which the roadway carries the greatest number of vehicles. Traffic impacts are typically evaluated during the morning and afternoon peak hours when the greatest number of motorists are traveling to and from work.
- Pedestrian LOS- Level of service for pedestrians can also be studied as part of a transportation or traffic analysis. This is less common. It is typically only an issue in larger urban areas. Exhibit 1 illustrates the congestion of a proposed pedestrian walkway LOS.

- Person Trip - A trip made by a person using any mode for any purpose.
- Platoon- A grouping of vehicles traveling in the same direction at the same approximate speed.
- Regional Transportation Plan (RTP) - The RTP is created by the Metropolitan Planning Organization (MPO) or the regional planning commission (see above).
- Reverse Commute - The travel from the city center to suburban locations, moving counter to the primary or major volume of traffic flow.
- Reversible Lane(s) - A lane(s) where traffic moves in one direction only during some period of time, then in the reverse direction during another period of time.
- Right-turn Lane - A traffic lane within the normal surfaced width of a roadway, or an auxiliary lane to the right of and adjacent to the through traffic lanes, reserved for right-turning vehicles at an intersection.
- Roadway - That portion of a road which is improved, designed, or ordinarily intended for vehicular use. Roadways are designed and built as divided, undivided, or one-way roads.
- Roadway Level of Service - This is a measure of roadway congestion ranging from LOS A--least congested--to LOS F--most congested. LOS is one of the most common terms used to describe how "good" or how "bad" traffic is projected to be. LOS serves as a benchmark to determine whether new development will comply with an existing LOS or if it will exceed the preferred or adopted LOS. As part of planning for new projects or developments, transportation professionals conduct a Traffic Impact Study (TIS). The TIS determines how specific streets and intersections will function with increased traffic volumes either with or without improvements. There are six levels of service letter grades typically recognized by transportation planners and engineers. They are as follows-

    a. Level of Service A: describes a condition of free flow, with low volumes and high speeds.

    b. Level of Service B: is the zone of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation.

c. Level of Service C: is the zone of mostly stable flow, but speeds and maneuverability are more closely constricted by the higher volumes.

d. Level of Service D: is a zone that approaches unstable flow, with tolerable operating speeds, however driving speed is considerably affected by changes in operating conditions.

e. Level of Service E: a zone that cannot be described by speed alone. Operating speeds are lower than in Level D, with volume at or near the capacity of the highway.

f. Level of Service F: is a zone in which the operating speeds are controlled by stop-and-go mechanisms, such as traffic lights. This is called forced flow operation. The stoppages disrupt the traffic flow so that the volume carried by the roadway falls below its capacity; without the stoppages, the volume of traffic on the roadway would be higher, or in other words, it would reach capacity.

It should be noted that LOS is a measure of a roadway segment's (zone's) efficiency at moving automobiles through the zone. By definition, it places a high emphasis on the free-flowing speeds of autos and does not give consideration to the comfort or safety other roadway users such bicyclists or pedestrians.

- SOV - Single Occupant Vehicle or one person per vehicle.
- Stacking - The process of vehicles forming a line or queue. If the stacking extends into the through-lanes, delays and unsafe conditions become prevalent.
- Street Cross-Section- A term used to describe the total number of lanes on a street. For instance, a street that has two lanes of north bound traffic, two lanes of southbound traffic, and a refuge lane is commonly referred to as a five-lane cross-section
- System Analysis - A method by which the transportation system may be studied to determine its effectiveness in meeting the objective of satisfying travel demand.
- TAZ- Transportation Analysis Zone. A geographic area that identifies land uses and associated trips that is used for making land use projections and performing traffic modeling.

- TEA 21- Transportation Equity Act of the 21st Century. TEA 21 was enacted June 9, 1998 as Public Law 105-178. TEA-21 authorizes and funds the Federal surface transportation programs for highways, highway safety, and transit for the 6-year period 1998-2003. The TEA 21 Restoration Act, enacted July 22, 1998, provided technical corrections to the original law. (See also ISTEA above).
- Traffic Calming- The process of designing streets or adding design elements to tame fast traffic and address unsafe traffic conditions. Design elements include, for example, speed humps, narrowed streets, added traffic circle. Good initial design and street layout can prevent the need to install traffic calming measures after the street is built.
- Traffic Control Device - Any sign, signal, marking, or device placed or erected for the purpose of regulating, warning, or guiding vehicular traffic and/or pedestrians.
- Traffic Impact Study (TIS) - A study conducted by a transportation professional using transportation modeling and analysis software to predict the volumes and associated impacts from traffic generated by a proposed land use or development project. The study analyzes the impacts to roads and intersections and includes recommendations for roadway improvements that may be needed to mitigate unsafe situations and comply with the regulations of the reviewing jurisdiction.
- Traffic Island - An island provided in the roadway to separate or direct streams of traffic, which includes both divisional and channelizing islands.
- Traffic Lane - A strip of roadway intended to accommodate a single line of moving vehicles.
- Traffic Model - A mathematical equation or graphical technique which is said to be able to simulate travel patterns, particularly those in urban areas.
- Traffic Sign - A traffic control device mounted on a fixed or portable support which conveys a specific message by means of words or symbols, and is officially erected for the purpose of regulating, warning, or guiding traffic.
- Travel Forecasting - A method used to predict the future travel patterns on particular roadways or between travel modes by using current counts, predictions of intensity and location of land uses, population growth and availability of transit alternatives.

- Trip - A one-directional movement which begins at the origin at the start time, ends at the destination at the arrival time, and is conducted for a specific purpose.
- Trip Distribution - The process by which the movement of trips between zones is estimated. The data for each distribution may be measured or be estimated by a growth factor process or by synthetic mode.
- Trip End - A trip origin or a trip destination.
- Trip Generation - The number of vehicular trips caused by or resulting from a particular land use activity.
- Turn Lane- A lane devoted to vehicles making a turning movement to go in a different direction. Turn lanes are necessary to ensure the free-flow of traffic in the through lanes by providing a separate area/lane for turning traffic to slow down and complete the turning maneuver without impeding the through traffic.
- Undivided Road - A road which has no directional separator, either natural or structural, separating traffic moving in opposite directions.
- Vehicle - Any component of wheeled traffic. Unless otherwise qualified, the term vehicle will normally apply to free-wheeled vehicles.
- VMT- Vehicle Miles Traveled. Increases in VMT from existing residents are occurring every year, contributing to added congestion on roadways.
- VPH- Vehicle per peak hour. This relates to Link Volumes (see above).
- Volume - The number of vehicles that pass over a given section of a lane or a roadway during a time period of one hour or more. Volume can be expressed in terms of daily traffic or annual traffic, as well as on an hourly basis.
- Volume-to-Capacity Ratio- Expressed as v/c, this is a measure of traffic demand on a facility (expressed as volume) compared to its traffic-carrying capacity. A v/c ratio of 0.7, for example, indicates that a traffic facility is operating at 70 percent of its capacity. In evaluating the performance of a roadway, v/c ratios should be considered together with the letter grade system, which is more of a qualitative assessment based heavily on speeds and travel time. With traffic moving at an acceptable rate of speed, roadways will perform at favorable Level of Service grades. However, even with an acceptable LOS grade, a v/c ratio may indicate that the same facility is operating at or

near full capacity (e.g., 0.95 to 0.99). Conversely, road segments operating at deficient levels of service (e.g., peak-hour LOS E and F) may have an acceptable v/c ratio in cases where the adjoining intersections are not operating efficiently (e.g., cycle lengths on the traffic signals are long or the signal progressions are poor). Consequently, a high v/c ratio does not always imply that a facility has more volume than it can handle nor does a deficient LOS grade necessarily indicate that there is insufficient roadway capacity available.

- Weaving - The process of exiting a site and merging across multiple lanes "with traffic" to reach an intersection and go in a different direction.

APPENDIX B:

DEMOGRAPHIC PROJECTIONS

Demographic Projections

Table A: County Build-Out Projections: Population (Persons)

County Build-Out Projection: Population		
Year	**Population**	**Compound Annual Growth Rate**
2012	808,830	2.230%
2015	864,168	2.230%
2020	964,940	2.237%
2025	1,077,829	2.237%
2030	1,203,925	2.237%
2035	1,344,774	2.237%
2040	1,502,100	2.237%
2045	1,677,832	2.237%
2050	1,874,124	2.237%
2054	2,047,566	2.237%
2055	2,093,379	2.237%
Note: Population Build-Out =	2,088,456	

Table B: County Build-Out Projections: Employment (Jobs within Collin County)

County Build-Out Projection: Employment		
Year	**Employment**	**Compound Annual Growth Rate**
2012	325,177	2.626%
2015	351,470	2.626%
2020	400,102	3.074%
2025	465,504	3.074%
2030	541,597	3.074%
2035	630,129	3.074%
2040	733,133	3.074%
2045	852,974	3.074%
2050	992,405	3.074%
2054	1,120,189	3.074%
2055	1,154,628	3.074%
2056	1,190,125	3.074%
Note: Employment Build-Out =	1,168,448	

Table C: City Estimates and Projections: Population (Persons)

Population					
City	**2012**	**2020**	**2035**	**CAGR**	**Ultimate**
Allen	78,950	87,506	94,781	**0.80%**	94,781
Anna	9,228	19,928	48,505	**7.48%**	146,017
Blue Ridge	4,144	4,849	14,372	**5.56%**	62,581
Carrollton	*Classified Under Plano*				
Celina	7,417	15,002	50,954	**8.74%**	189,199
Dallas	70,085	71,320	74,169	**0.25%**	74,169
Fairview	8,672	12,010	20,025	**3.71%**	20,025
Farmersville	6,625	8,660	29,808	**6.76%**	106,002
Frisco	70,723	105,501	183,592	**4.23%**	183,592
Garland	*Classified Under Richardson*				
Josephine	754	1,584	3,169	**6.44%**	6,338
Lavon	2,224	5,179	10,357	**6.92%**	20,715
Lowry Crossing	2,984	4,663	13,955	**6.94%**	23,146
Lucas	6,130	6,494	10,219	**2.25%**	13,406
McKinney	133,055	180,175	244,530	**2.68%**	350,279
Melissa	6,090	8,752	26,009	**6.52%**	71,793
Murphy	14,952	17,014	18,072	**0.83%**	18,072
Nevada	2,946	3,625	6,567	**3.55%**	11,770
New Hope	*Classified Under McKinney*				
Parker	6,604	7,316	12,417	**2.78%**	12,417
Plano	271,970	278,029	284,656	**0.20%**	284,656
Princeton	12,511	15,189	40,164	**5.20%**	78,304
Prosper	10,515	20,004	32,031	**4.96%**	35,058
Richardson	33,765	35,700	41,761	**0.93%**	45,151
Rockwall	656	1,133	2,834	**6.57%**	5,667
Royse City	2,060	2,735	10,226	**7.22%**	40,906
Sachse	4,477	5,110	6,227	**1.44%**	7,122
Saint Paul	1,856	1,965	2,400	**1.12%**	2,666
Van Alstyne	*Classified Under Anna*				
Weston	1,285	3,370	9,053	**8.86%**	127,026
Wylie	38,153	42,126	53,919	**1.52%**	57,599
Totals	**808,830**	**964,940**	**1,344,774**	**2.24%**	**2,088,456**
Compound Annual Growth Rates	Years 2012-2020			**2.230%**	
	Years 2020-2035			**2.237%**	

Table D: City Estimates and Projections: Employment (Jobs within Collin County)

Employment					
City	**2012**	**2020**	**2035**	**CAGR**	**Ultimate**
Allen	21,076	27,320	47,171	**3.56%**	62,142
Anna	1,731	3,275	12,914	**9.13%**	48,899
Blue Ridge	1,274	1,444	3,263	**4.17%**	9,385
Carrollton	*Classified Under Plano*				
Celina	2,159	4,221	12,900	**8.08%**	136,411
Dallas	16,290	18,073	19,216	**0.72%**	19,216
Fairview	1,574	3,003	13,820	**9.91%**	13,820
Farmersville	2,772	3,092	9,225	**5.37%**	34,250
Frisco	33,488	51,576	92,322	**4.51%**	132,284
Garland	*Classified Under Richardson*				
Josephine	149	209	350	**3.78%**	450
Lavon	353	552	995	**4.61%**	2,270
Lowry Crossing	346	624	2,049	**8.04%**	4,031
Lucas	604	842	1,731	**4.68%**	2,605
McKinney	43,105	58,905	98,748	**3.67%**	246,487
Melissa	1,438	2,570	14,639	**10.62%**	28,284
Murphy	1,623	2,249	3,231	**3.04%**	3,231
Nevada	609	765	1,242	**3.15%**	1,888
New Hope	*Classified Under McKinney*				
Parker	499	513	561	**0.51%**	1,432
Plano	160,916	176,819	212,429	**1.21%**	230,533
Princeton	2,924	3,554	9,378	**5.20%**	19,570
Prosper	1,262	2,948	10,222	**9.52%**	34,996
Richardson	20,953	24,698	33,770	**2.10%**	39,362
Rockwall	89	89	89	**0.00%**	89
Royse City	416	472	2,672	**8.42%**	10,316
Sachse	1,395	2,022	4,732	**5.45%**	5,547
Saint Paul	113	113	113	**0.00%**	113
Van Alstyne	*Classified Under Anna*				
Weston	287	435	6,794	**14.75%**	64,366
Wylie	7,732	9,718	15,554	**3.09%**	16,468
Totals	**325,177**	**400,102**	**630,129**	**2.92%**	**1,168,448**
Compound Annual Growth Rates	Years 2012-2020			**2.626%**	
	Years 2020-2035			**3.074%**	

APPENDIX C:

PROJECTS TO IMPROVE 2020 LEVEL-OF-SERVICE

Projects to Improve 2020 Level of Service

Summary

The demographic projections made for this study predict that the County will continue to grow at a rapid pace. The travel demand models, therefore, also predict a rapid increase in traffic on all roadways. The most "near-term" planning horizon in this study is 2020, so the results of the 2020 travel demand model were reviewed to determine the levels of congestion that would result at this point in time if no improvements were made. Roadway segments with a predicted level of service "F" (LOS F) in 2020 were identified. These roadways were then reviewed to determine which had the capacity to be improved (are less than six lanes). Cost estimates were made to get an idea of the cost involved in making improvements to reduce congestion as much as possible. Although the travel demand projections are for 2020, it is assumed that the improvements required would not necessarily be able to be completed by 2020. However, the estimates of cost are for 2020 to keep the analysis simple, especially since the estimates are "planning level" estimates with large contingencies. The improvement projects vary in their jurisdiction; whether they are under Collin County, TxDOT, NTTA, one of the cities, or a combination of these. It will be left to the various governmental entities involved in funding transportation to determine what the sources of funding for improvement projects will be. The roadways are shown in **Figure A**. The roadway segments are then identified in **Table E**.

Estimating Assumptions

- **Table E** provides the list of improvement projects that would reduce congestion based on the 2020 travel demand model projections. This table includes the NTTA-funded, TxDOT-funded and un-funded projects that could be completed in the 2020 – 2025 timeframe.
- Cost estimates were based on benchmarks provided by NCTCOG of $1.25 million/lane mile for arterials & street projects and $4.0 million/lane mile for highway improvements. These benchmarks were inflated to 2020 dollars using a 2.5% annual inflation rate and were calculated to be $1.5 million/lane mile for arterial & street improvements and $4.6 million/lane mile for highway projects. Project cost estimates include right-of-way and a 30% contingency.
- Cost data for DNT, PBGT, and SRT projects in Collin County were not

available. An estimate of costs was developed using the per lane mile highway benchmark of $4.6 million (2020$).

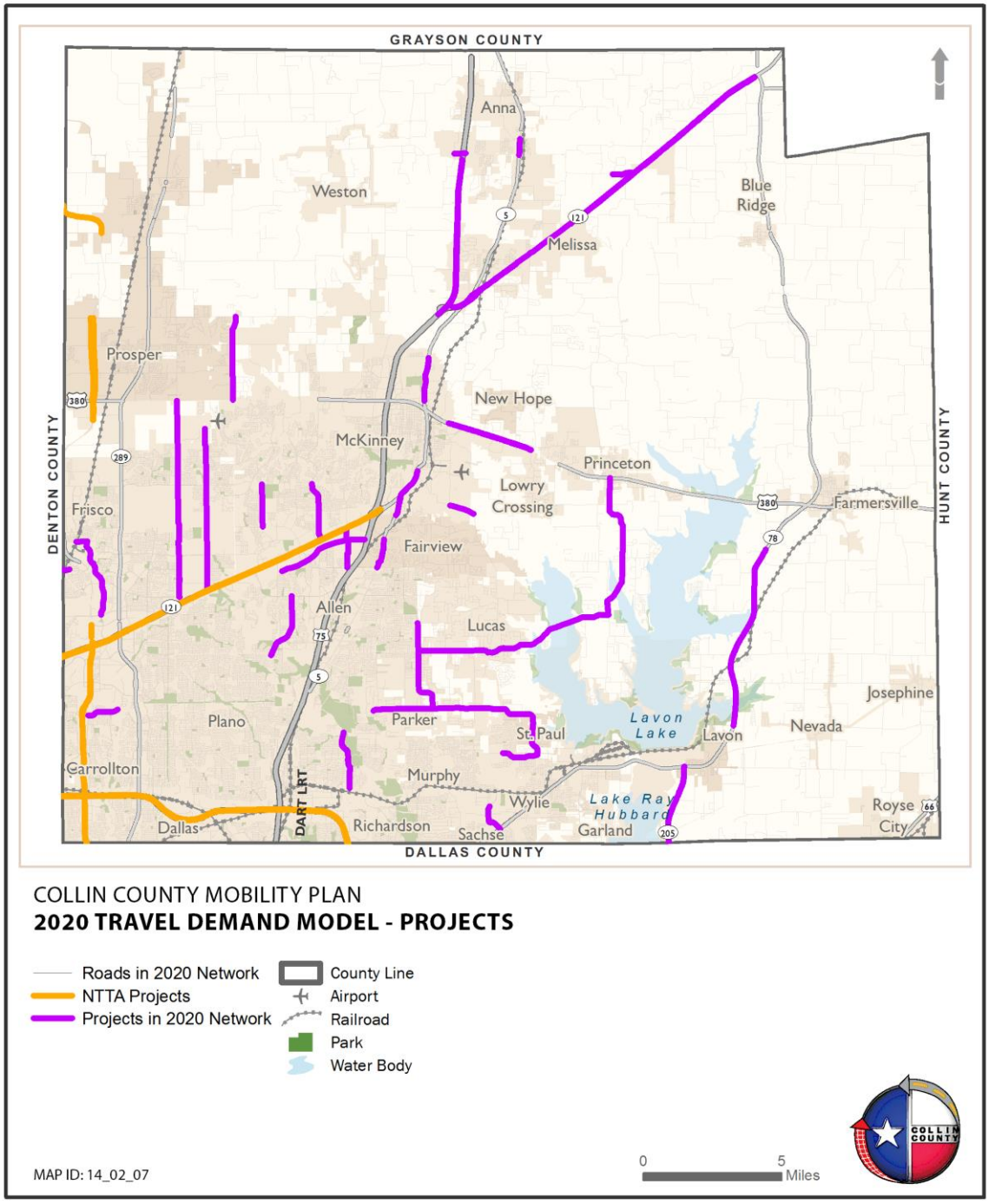


Figure A: Projects to Improve 2020 Level of Service

Table E: Projects to Improve 2020 Level of Service

NTTA-FUNDED Project	From	To	Improvement	Lane Miles	Total
Dallas North Tollway	Dallas Co Line	SH 121	Widen Mainline from 6 to 8 lanes	14.50	93,400,000
Dallas North Tollway Frn Rd	Warren Pkwy	SH 121	Widen 2 lanes to 3 lanes	0.44	3,000,000
Dallas North Tollway	Windhaven	Spring Creek Pkwy	add NB entrance and SB exit ramps	0.44	3,000,000
Dallas North Tollway [1]	FM 428	Denton Co Line	New 2 lane frontage road	1.99	12,900,000
Pres George Bush Turnpike	Denton Co Line	Dallas Co Line	Widen Mainline from 6 to 8 lanes	22.80	146,900,000
Sam Rayburn Tollway	Denton Co Line	Dallas North Tollway	Widen Mainline from 6 to 8 lanes	2.20	14,300,000
Sam Rayburn Tollway	Dallas North Tollway	US 75	Widen Mainline from 6 to 8 lanes	22.40	144,300,000
NTTA-Funded Total					**417,800,000**

TXDOT-FUNDED Project	From	To	Improvement	Lane Miles	Total
US 75	Collin County Loop	SH 121 (N)	Widen Mainline from 4 to 6 lanes	7.80	50,300,000
US 75	Throckmorton Rd	FM 455	Widen mainline 4 lanes to 6 lanes	4.05	26,100,000
TxDOT-Funded Total					**76,400,000**

UNFUNDED Project	From	To	Improvement	Lane Miles	Total	City [2] Y/N	State [3] Y/N	City/County
Dallas North Tollway Frn Rd	US 380	FM 428	Widen 2 lane road to 4 lanes frn rd	5.94	38,200,000	Y	N	Prosper
5th St/Parkwood Blvd	Stonebook Pkwy	Warren Pkwy	Widen 4 lanes to 6 lanes	4.58	9,700,000	Y	N	Frisco
5th St/Parkwood Blvd	Cotton Gin Rd	Stonebook Pkwy	Widen 2 lanes to 4 lanes	1.78	3,800,000	Y	N	Frisco
Alma Rd	Stacy Rd	Eldorado Pkwy	Widen 4 lanes to 6 lanes	3.04	6,500,000	Y	N	Allen
Alma Rd	Hedgcoxe Rd	Exchange Pkwy	Widen 4 lanes to 6 lanes	2.43	5,100,000	Y	N	Allen
Bethany Dr/Lucas Rd/ FM 1378	FM 982	FM 2551	Widen 2 lanes to 4 lanes (partially unfunded)	14.50	30,500,000	Y	N	Multi-juris./City
Coit Rd	Lebanon Rd	Main St/FM 3537	Widen 4 lanes to 6 lanes	5.08	10,700,000	Y	N	Frisco
Coit Rd.	FM 3537/Main St.	Panther Creek Pkwy	Widen 4 lanes to 6 lanes	5.04	10,700,000	Y	N	Frisco
Coit Rd.	Panther Creek Pkwy	US 380	Widen 4 lanes to 6 lanes	4.10	8,700,000	Y	N	Frisco
Cotton Gin Road	Library St	S 5th St	New 4 lanes	1.56	3,200,000	Y	N	Frisco
Chelsea Blvd/Hardin Rd	Stacy Rd	SH 121	Widen 2 lanes to 4 lanes	2.88	6,000,000	Y	N	Allen
FM 2478/Custer Rd	US 380	FM 1461	Widen 2 lanes to 4 lanes	6.06	12,700,000	Y	N	McKinney
FM 2514/Parker Rd	Springhill Estates	FM 2551	Widen 4 lanes to 6 lanes	4.30	9,200,000	Y	N	Parker
FM 2514/Parker Rd	FM 2551	FM 1378	Widen 4 lanes to 6 lanes	5.06	10,700,000	Y	N	Parker
FM 2514/Parker Rd	FM 1378	Park Blvd	Widen 2 lanes to 4 lanes	5.36	11,200,000	Y	N	Saint Paul
FM 2551/Murphy Rd.	FM 2514/Parker Rd	FM 2170	Widen 2 lanes to 6 lanes	13.84	29,100,000	Y	N	Allen
FM 455	Wild Rose	SH 121	Widen and realign 2 lanes to 4 lanes	1.46	3,100,000	N	N	County
FM 455	US 75	CR 286	Widen 2 lanes to 4 lanes	0.84	1,800,000	Y	N	Anna
FM 546	CR 317	SH 5	Widen 2 lanes to 4 lanes (unfunded from CR 317 to Airport Rd)	3.14	6,600,000	Y	N	McKinney
FM 982	FM 546	US 380	Widen 2 lanes to 4 lanes	10.82	22,700,000	N	N	County
Independence Pkwy	SH 121	Virginia Pkwy	Widen to 6 lanes (SH 121 to Eldorado Pkwy)	7.58	15,900,000	Y	N	Frisco
Lake Forest Dr	SH 121	Eldorado Pkwy	Widen 4 lanes to 6 lanes	2.26	4,700,000	Y	N	McKinney
Park Blvd	FM 1378	FM 2514	Widen 2 lanes to 4 lanes	2.64	5,600,000	Y	N	Wylie
Ridgeview Dr	Alma Rd	US 75	Widen 2 lanes to 4 lanes; + new 4 lanes	8.32	17,600,000	Y	N	Allen
SH 121	US 75	FM 545 (Melissa road)	Widen 2 and 4 lanes to 6 lanes (unfunded for 6 lanes)	8.74	18,300,000	N	Y	County
SH 121	FM 545 (Melissa Road)	SH 160	Widen 2 lanes to 4 lanes (unfunded from FM 455 to SH 160)	11.52	24,200,000	N	Y	County
SH 205	SH 78	Collin County Line	Widen 2 lanes to 4 lanes	6.16	12,900,000	N	Y	County
SH 5/Greenville Ave	Spur 399	FM 546/Industrial Blvd	Widen 4 lanes to 6 lanes	2.42	5,100,000	Y	Y	McKinney
SH 5/Greenville Ave	Fairview Ave (S)	Stacy Road	Widen 2 to 4 lanes	0.38	900,000	Y	Y	Fairview
SH 5/Greenville Ave	SH 121	Fairview Ave (S)	Widen 2 to 4 lanes	5.22	10,900,000	Y	Y	Fairview
SH 5	FM 455	CR 369	Widen lanes to 6 lanes	1.14	2,400,000	Y	Y	Anna
SH 5	Tennessee St.	FM 543	Widen 2 to 4 lanes	3.14	6,600,000	Y	Y	McKinney
SH 78	FM 6	CR 557	Widen 2 to 4 lanes	13.30	28,000,000	N	Y	County
Shiloh Rd	Parker Rd	14th St	Widen 4 lanes to 6 lanes	4.20	8,800,000	Y	N	Plano
Stonebrook Pkwy	Legacy Dr	Longhorn Trail	New 6 lanes divided	4.44	9,400,000	Y	N	Frisco
Woodbridge Pkwy	Hooper Rd	SH 78	Widen 2 lanes to 4 lanes and new 4 lanes	2.12	4,500,000	Y	N	Sachse
Windhaven Pkwy	Parkwood Blvd	Spring Creek Pkwy	Widen 4 lanes to 6 lanes	2.26	4,700,000	Y	N	Plano
US 380	Airport Dr	Bridgefrommer Rd	Widen 4 to 6 lanes	6.24	13,100,000	N	Y	County
Unfunded Total				193.89	433,800,000			

[1] **NTTA plans to fund this segment after 2020. The travel demand model indicates it is needed by 2020.**

[2] **Project is totally or partially in city limits as of July, 2014.**

[3] **On State System**

APPENDIX D:

SUMMARY OF MEETINGS

Summary of Meetings

FEBRUARY 2013 WORKSHOP

Community Workshops Summary Report

Collin County Mobility Plan – 2013 Update

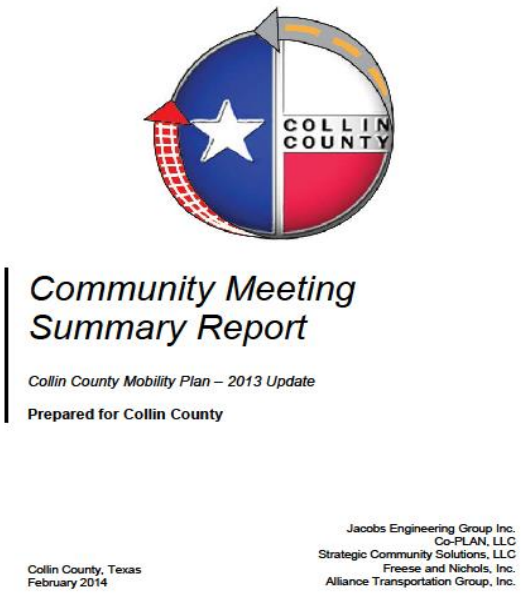
Prepared for Collin County

Collin County, Texas
February 2013

Jacobs Engineering Group Inc.
Co-PLAN, LLC
Strategic Community Solutions, LLC
Freese and Nichols, Inc.
Alliance Transportation Group, Inc.

NOTE: Inquire at the Collin County Engineering Office to review this report.

FEBRUARY 2014 WORKSHOP



NOTE: Inquire at the Collin County Engineering Office to review this report.

Collin County Department of Engineering
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McKinney, Texas 75071