Lincoln MPO 2040

Long Range Transportation Plan Update

Technical Report

LINCOLN MPO
METROPOLITAN PLANNING ORGANIZATION

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September 2016

Draft

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1. Introduction

Planning Area

The Lincoln Metropolitan Planning Organization (MPO) Long Range Transportation Plan (LRTP) covers the transportation systems of the jurisdictions located within the Lincoln Metropolitan Planning Area (MPA), which encompasses all of Lancaster County, Nebraska. The LRTP reflects the interdependent nature of the metropolitan area's multimodal transportation system by addressing the region's roadway, transit, freight, bicycle, and pedestrian modes in a combined effort.

The 2040 Future Service Limit, shown on **Figure 1**, represents the 125-square-mile area where urban services are and annexation into the City of Lincoln is anticipated within the time horizon of the LRTP (2040). While the LRTP covers the entire Lincoln MPA, it includes more detailed transportation planning for area within the Future Service Limit.

Compliance with Federal Regulations

The Lincoln LRTP has been prepared under the direction of the Lincoln MPO in accordance with federal, state, and local transportation planning guidelines and policies. The LRTP addresses both the long range transportation needs of the City of Lincoln and Lancaster County and the federal requirements for preparing a Long Range Transportation Plan as specified in the Fixing America's Surface Transportation (FAST) Act, the current federal transportation funding and policy bill.

Performance-Based Planning

Performance-based planning is a strategic approach to transportation planning that analyzes data to determine how effectively transportation investments are working toward achieving the identified transportation goals. The FAST Act emphasizes performance-based planning, establishes performance measures and targets, and identifies seven national goals that states and MPOs are to work toward. Agencies seeking federal funds will demonstrate their progress toward achieving local and national goals. States and MPOs that do not demonstrate adequate progress toward achieving the goals will be required to take corrective action.

The seven national goals included in the FAST Act relate to safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and project delivery delays.

Performance-based planning is a new federal requirement since the adoption of the previous Lincoln MPO LRTP in 2011. Therefore, this LRTP Update incorporates performance measures (detailed in **Chapter 5**) that relate to local and national goals.

Fiscally Constrained Plan

Federal regulations require MPO LRTPs to be fiscally constrained; that is, an LRTP must include sufficient financial information to confirm that projects in the document can be implemented using committed or available revenue sources. The Lincoln LRTP fiscally constrained plan used a transparent evaluation process that considers the potential for transportation projects to contribute to the region's transportation goals and performance targets, in combination with revenue forecasts through 2040. The LRTP also includes an illustrative plan documenting the region's transportation needs beyond those that are reasonably expected to be funded by 2040.

The LRTP is important because it guides investment of federal, state, and local transportation funds. It reflects the community's vision for the future transportation system and includes strategies, projects, and funding allocations to realize that vision.

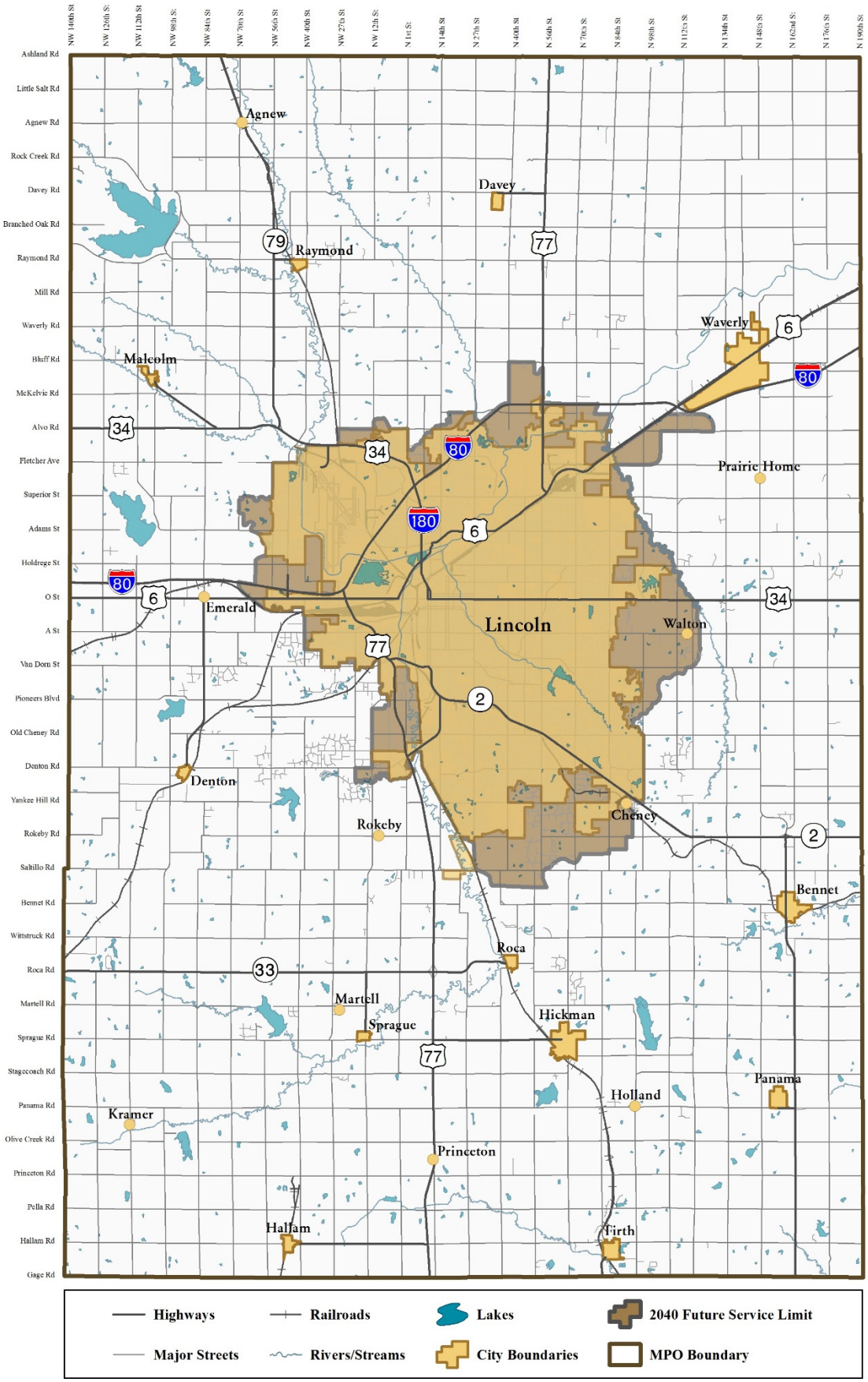


Figure 1. Lincoln Metropolitan Planning Area

Plan Update Process

Relationship to Comprehensive Plan

The Lincoln LRTP has been developed in coordination with the update of the *City of Lincoln-Lancaster County Comprehensive Plan*. The Comprehensive Plan contains an assessment of historic growth, past and forecast socioeconomic data, land use alternatives, and the development of a preferred plan. Developing the LRTP alongside the Comprehensive Plan allows an integrated land use and transportation planning approach that offers a direct link between the two planning activities. The Comprehensive Plan land use plan and population and employment forecasts form the basis for the future travel demand contemplated in this LRTP.

Integration of Modal Plans

The Lincoln MPO LRTP integrates mode-specific master plans and other transportation-focused plans to fully address the pedestrian, bicycle, transit, rail, and roadway needs. Plans incorporated into the LRTP include:

- Lincoln Transit Development Plan, April 2016
- Lincoln MPO Bicycle and Pedestrian Capital Plan, May 2013
- Lincoln Travel Options Strategy, December 2013
- Congestion Management Process, September 2009

Contributing Agencies and Committees

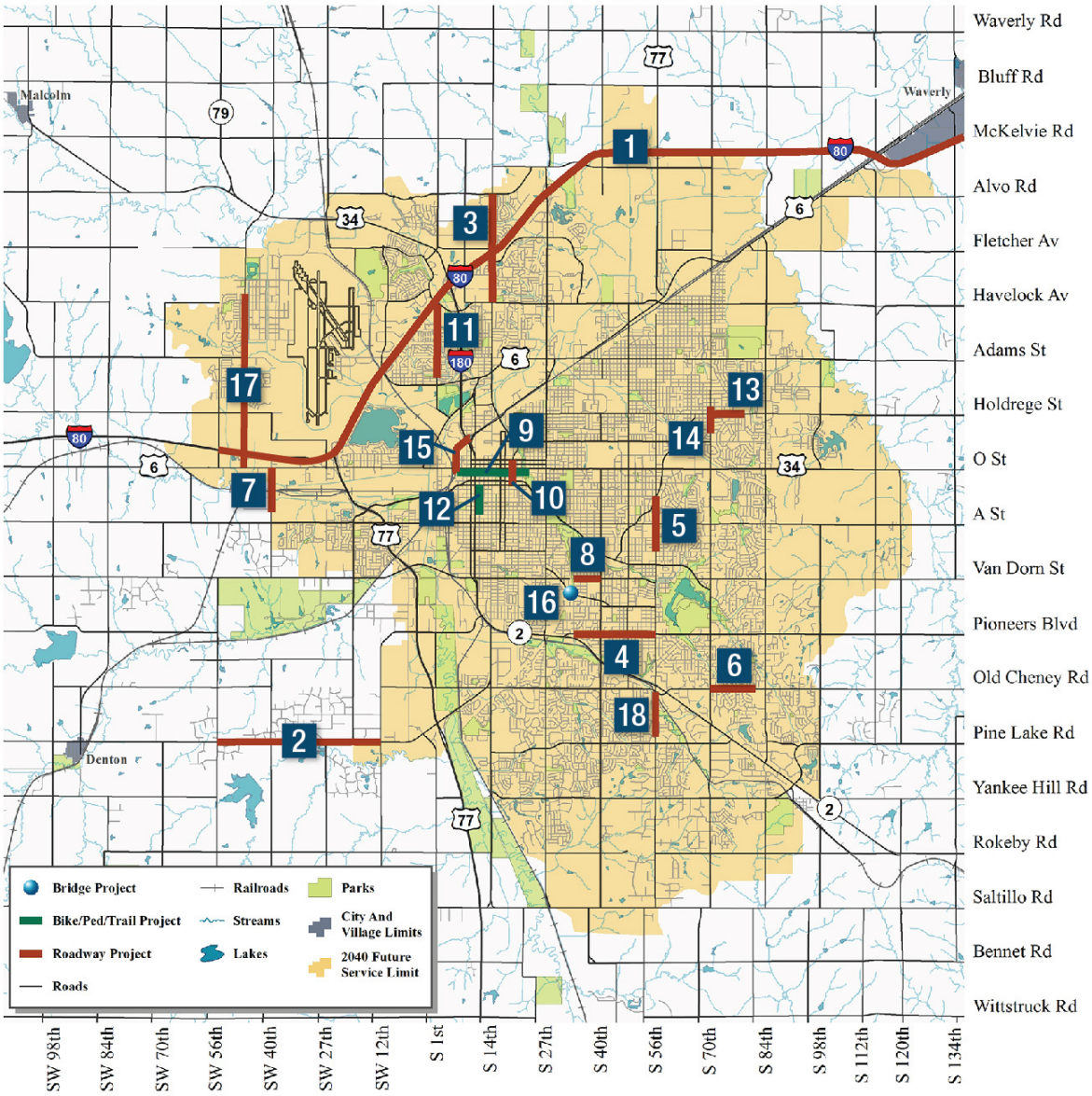
The FAST Act requires that the MPO establish a cooperative planning process in consultation with other agencies, including federal, state, and local agencies; transit and human service providers; and other interested parties. In addition to outreach to the general public (as described in **Chapter 2**), this LRTP planning process has been completed in coordination with the following entities:

- Lincoln-Lancaster County Planning Department
- Lincoln Public Works and Utilities Department: Engineering, StarTran
- Lancaster County Engineer's Office
- Lincoln Parks & Recreation Department
- Lincoln-Lancaster County Health Department
- Lincoln Urban Development Department
- Nebraska Department of Roads (NDOR)
- Federal Highway Administration (FHWA)
- Federal Transit Administration

The contents of this LRTP have been developed over a year-long process in close coordination with the LRTP Oversight Planning Committee (composed of representatives from the above listed entities) and the Lincoln/Lancaster County Planning Commission. At key milestones and decision points in the planning process, the LRTP was presented and discussed with the MPO Technical Committee and the MPO Officials Committee. **Appendix A** includes a complete list of committee meetings.

Completed Projects

Transportation planning helps the region set a vision for the transportation system and establish funding priorities. The last Lincoln MPO LRTP was adopted in December 2011. Since that time, many of the high priority transportation projects identified in that plan have been successfully funded and constructed, as depicted on **Figure 2**.



1 I-80 Widening
2 W. Denton Rd. Construction
3 N. 14th St. Widening
4 Pioneers Blvd. 2+1
5 56th St. 2+1
6 Old Cheney Rd. Widening
7 SW 40th St. Viaduct
8 Van Dorn St. 2+1
9 N. Street Cycle Track
10 Antelope Valley Pkwy. Widening
11 1st St. 2+1
12 11th St. Bike Lanes
13 Holdrege St. 2+1
14 N. 70th St. 2+1
15 Pinnacle Bank Arena Dr. New Road
16 Penny Bridge Replacement
17 NW 48th St. Widening
18 S. 56th St. Widening

Figure 2. Major Projects Completed Since 2011 LRTP

2. Community Vision

Broad based, inclusive community outreach efforts for this plan encouraged active participation in identifying the vision, goals, and needs of the region. To create a vision that reflects the needs and desires of the residents of Lincoln and Lancaster County, the Lincoln MPO reached out to stakeholders across the region through internet surveys, open houses, and focus groups. The City of Lincoln and Lancaster County participated extensively in the development of this plan, as did the local transit agency (StarTran), NDOR, and many community-based organizations and advocacy groups representing the diverse interests of Lincoln and Lancaster County.

What the community LOVES about transportation in Lincoln:

Public Engagement Process

Considering the needs and desires of all populations is critical to the development of a transportation plan that creates access to opportunity for people of all ages, incomes, and abilities. Public engagement lays the foundation for the development and implementation of an integrated multimodal transportation system that supports community development and furthers the region's transportation goals.

Equity

Early in the LRTP planning process, the project team developed a Public Involvement Action Plan outlining the steps to implement the requirements of the *Lincoln MPO Public Participation Plan*, as amended February 20, 2014, and to comply with the Federal Transportation Regulations in 23 Code of Federal Regulation (CFR) Part 450. The goal of the MPO outreach activities was to ensure that all community members regardless of race, color, religion, income status, national origin, age, gender, sexual orientation, disability, marital status, or political affiliation, had an equal opportunity to participate in the MPO's decision-making process.

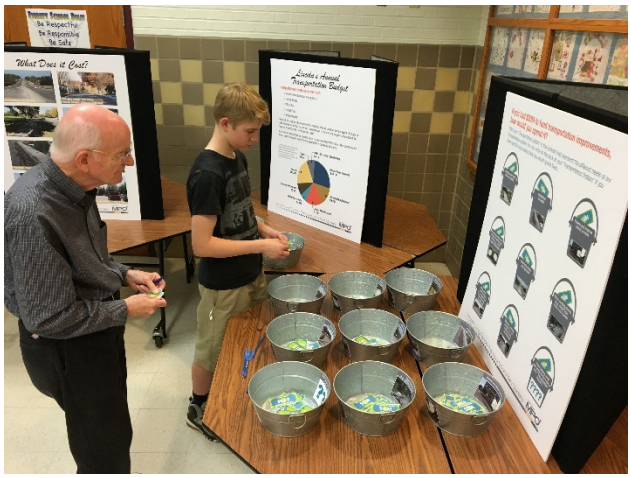
Public Input Phases

The Public Involvement Action Plan for the LRTP Update includes three phases of community outreach, each of which focuses on a key theme:

1. ***Transportation Needs*** (January and February 2016) – Identify current and future conditions, including deficiencies and problems, and solicit ideas for transportation improvements, goals, and objectives.
2. ***Understanding Priorities*** (May and June 2016) – Input on investment priorities and project priorities.
3. ***Validating a Vision*** (September and October 2016) – Public feedback on draft LRTP Update recommendations and report.

The first phase of the community outreach (Transportation Needs) involved eight focus group meetings with stakeholders representing various interests in the community; a public meeting on February 18, 2016; and an online survey.

The second phase (Understanding Priorities) included a public meeting on May 3, 2016, and an online survey that was open for two months and completed by more than 820 community members. The input received during this community outreach phase was instrumental in understanding the community's transportation priorities and was integrated into the project prioritization process and the resource allocation scenarios.



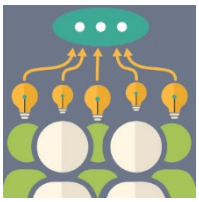
The third phase of community outreach (Validating a Vision) occurred during fall 2016 and provided various opportunities for public feedback on the draft LRTP.

The Planning Commission supplemented direct input from the community. The LRTP Project Team met approximately monthly with the Planning Commission. The Planning Commission represents the voice of the community and will provide a formal recommendation within the MPO decision-making process. All elements of the LRTP Update process have been presented and discussed with the Planning Commission; their input is reflected in the plan element recommendations.

Advertisement

Public meeting flyers were distributed to the participants of the January 2016 focus group meetings and posted on the LRTP Update webpage. More than 1,800 email notifications were sent to individuals on the Lincoln Planning and Neighborhood email lists. The public meeting notices were posted in the local news section of the *Lincoln Journal-Star* for five days before each meeting.

Key Themes of Public Input



Public outreach helps the Lincoln MPO establish priorities, policies, and ultimately investment strategies that meet the vision and needs of the community. Information gathered throughout the LRTP public engagement process resulted in several recurring themes as listed below:

- Technology has changed and will continue to change transportation in Lincoln (e.g., intelligent transportation systems, electric vehicles, driverless cars, automated convoys).
- As Lincoln continues to grow (both infill development in the downtown core and new development in the fringe areas), the

transportation network needs to support evolving travel needs.

- Changing demographics and travel preferences will continue to shape the mobility needs of the community; an increasing number of Millennials prefer not to drive, and an aging population may no longer be able to drive.
- The need for better north-south roads and support for the East Beltway.
- The importance of maintaining the transportation system and making the system function as efficiently as possible.
- The community values Lincoln's extensive trail network and would like to see more on-street bike facilities.

When asked what they love about transportation in Lincoln, the most common responses included the N Street protected bike lane, the trails, the availability of travel options (bus, bike, walk), the grade separations, and the ability to get anywhere in Lincoln within 20 minutes. When asked what they would change about transportation in Lincoln, the most common responses included the car-centric mentality, signal timing, and better balance among all travel modes. **Appendix B** includes complete documentation of the public outreach activities and input.

Transportation Vision and Principles

The vision for transportation in Lincoln and Lancaster County is a safe, efficient and sustainable transportation system that enhances the quality of life, livability, and economic vitality of the community.

The following five principles guide the plan toward that vision.

One Community: In Lincoln and Lancaster County, the unifying qualities of transportation will be emphasized. Neighborhoods, activity and employment centers, rural communities, and open lands should be connected by a continuous network of public ways. The transportation network needs to sustain the One Community concept by linking neighborhoods and rural communities.

A Balanced Transportation System: Transportation planning in Lincoln will be guided by the principle of balancing needs and expectations. It will recognize that transportation is a means to the goal of a unified, livable, and economically strong community. The system needs to move people and goods effectively around the community, while minimizing impacts on established neighborhoods, investments, and the natural environment. The concept of balance also applies to transportation modes. While the system must function well for motor vehicles, it should also promote public transportation, bicycling, and walking as viable alternatives that support the public health, safety, and welfare of the community.

Emphasis on Technology in Transportation: New transportation technologies are emerging to meet the challenges of increased demand on the transportation network. Connected and autonomous vehicles, alternative fuels, traffic analytics, on-road communications, Intelligent Transportation Systems (ITS) deployment, corridor signal optimization, among many other transportation technologies, offer efficient and cost-effective solutions to enhance the regional transportation systems.

Transportation as a Formative System: As linked systems, transportation and land use are subject to change by growth and development. The land use plan, which includes projections of future development, determines the character of the transportation plan. On the other hand,

transportation has a major impact on the form of developing areas. Lincoln and Lancaster County will use transportation improvements to reinforce desirable land use development patterns.

Planning as a Process: Transportation planning is a dynamic process, responding to factors such as community growth, development directions, social and lifestyle changes, and technological advances. Therefore, the Comprehensive Plan and LRTP employ an ongoing process of updates and amendments that respond to these changes.

Transportation Goals

Creating a performance framework for the LRTP allows a better understanding of how different projects, policies, and investments might affect the region's future. The goals listed below were formulated to represent the community's vision and the desired state for Lincoln and Lancaster County's transportation system. These seven goals are the foundation for performance measures, performance targets, recommended policy, and project implementation actions described in later chapters of this LRTP.

Maintenance – A well-maintained transportation system.

Mobility and System Reliability – An efficient, reliable, and well-connected transportation system for moving people and freight.

Livability and Travel Choice – A multimodal system that provides travel options to support a more compact, livable urban environment.

Safety and Security – A safe and secure transportation system.

Economic Vitality – A transportation system that supports economic vitality for residents and businesses.

Environmental Sustainability – A transportation system that enhances the natural, cultural, and built environment.

Funding and Cost Effectiveness – Collaboration in funding transportation projects that maximizes user benefits.

3. Needs Assessment

An inventory of the existing transportation system presented a snapshot of how transportation is provided to Lincoln and Lancaster County residents today. This chapter documents the current conditions of the multimodal transportation system and the future conditions based on the anticipated growth in the region. The primary purpose of this chapter is to assess the current and future roadway, bicycle, pedestrian, transit, freight, and rail systems.

Land Use and Demographics

Demographics are a key component of understanding the transportation system and anticipating where new or improved facilities may be located. Housing and employment are the two main demographic categories used in forecasting travel demand.

Not only does the number of people living and working in the region affect the transportation needs, but *where* people choose to live and work greatly influences the demand for transportation infrastructure and services. Understanding the region's existing and future housing and employment trends can help to inform and guide transportation investment decisions. Today's decisions must consider the changing needs of our population and align with future transportation needs.

Household and Employment Growth

The US Census estimates a 2014 population of 272,996 in Lincoln and 301,795 in Lancaster County, representing a 5.6 percent and 5.7 percent increase over the 2010 populations, respectively. The 2015 base year travel demand model for Lincoln includes more than 113,000 households. Based on the Lincoln-Lancaster County Comprehensive Plan Update (LPlan 2040) land use forecasts, the number of households within the model area is expected to grow by nearly 44,000 over the next 25 years (a 39 percent increase). **Figure 3** shows the distribution of household growth within the model area (the "Cordon Area"). Darker colors represent higher levels of household growth; most high growth areas are on the periphery of the future service limit.

Similarly, **Figure 4 and Figure 5** depict the commercial and industrial employment growth, respectively. Commercial employment is expected to increase by approximately 35 percent, and industrial employment by 47 percent. **Table 1** shows the 2015 base year, 2040, and interim 2026 household and employment forecasts within the model area. **Appendix C** documents the detailed land use forecasts by transportation analysis zone (TAZ).

Table 1. Household and Employment Growth

	2015	2026	2040	11-year Growth (2015 to 2026)	25-year Growth (2015 to 2040)
Households	113,018	132,595	156,825	19,577	43,807
Commercial Space (1000 SF)	43,675	49,604	58,915	5,929	15,240
Industrial Area (Acres)	3,194	3,943	4,686	749	1,492

HOUSEHOLD AND EMPLOYMENT FORECASTS FOR THE CORDON AREA, AS DEPICTED ON THE MAPS THAT FOLLOW

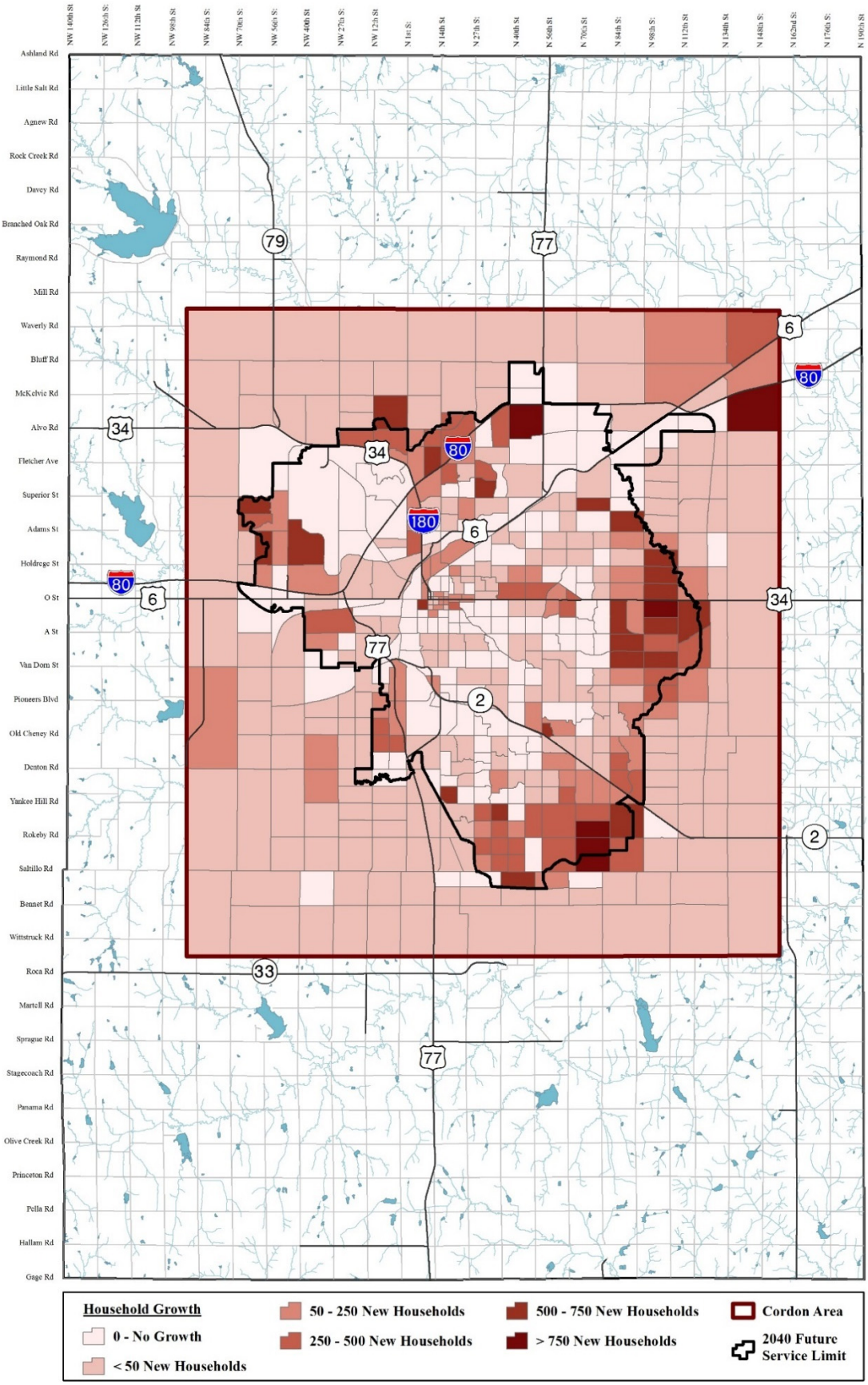


Figure 3. Household Growth

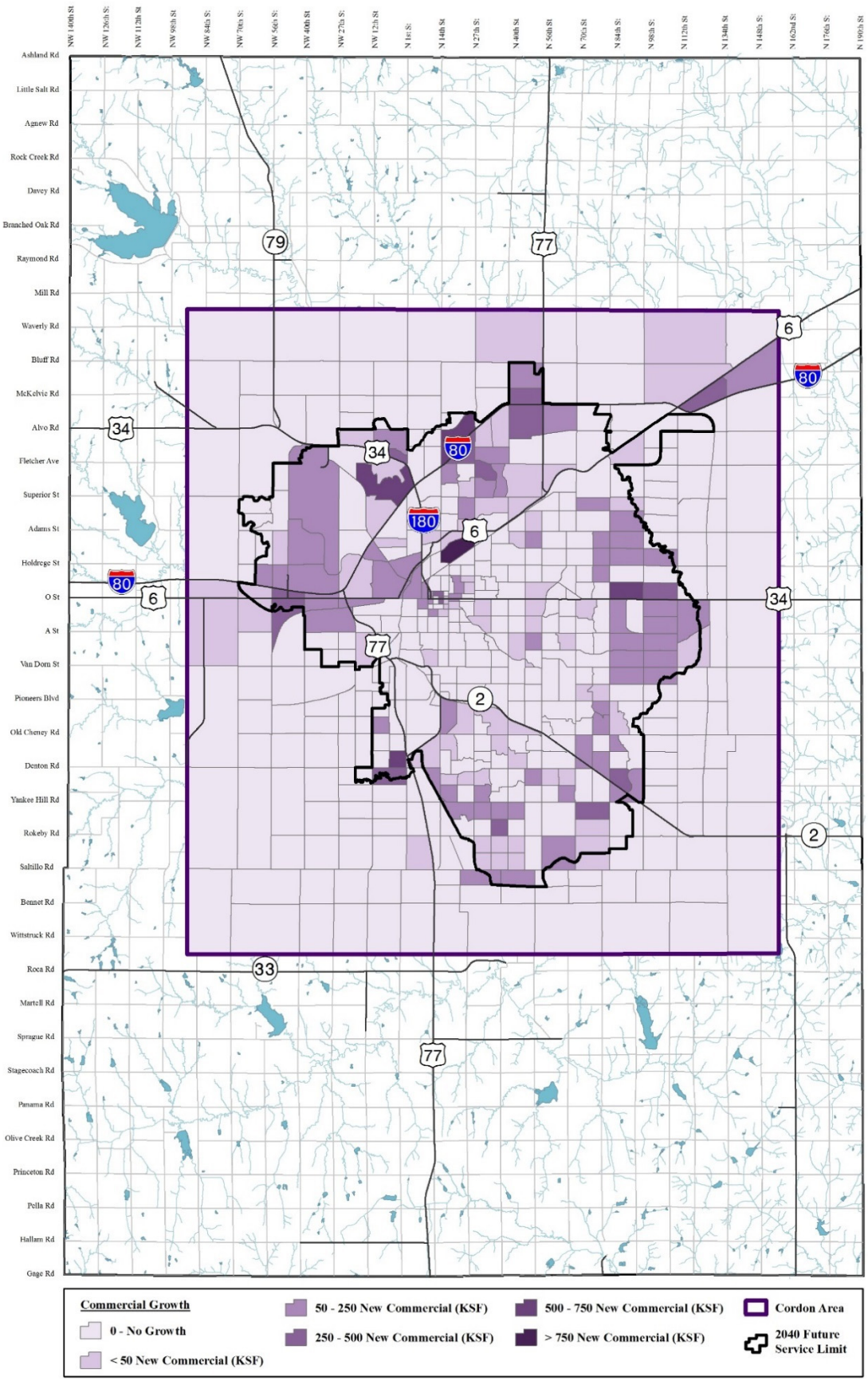


Figure 4. Commercial Growth

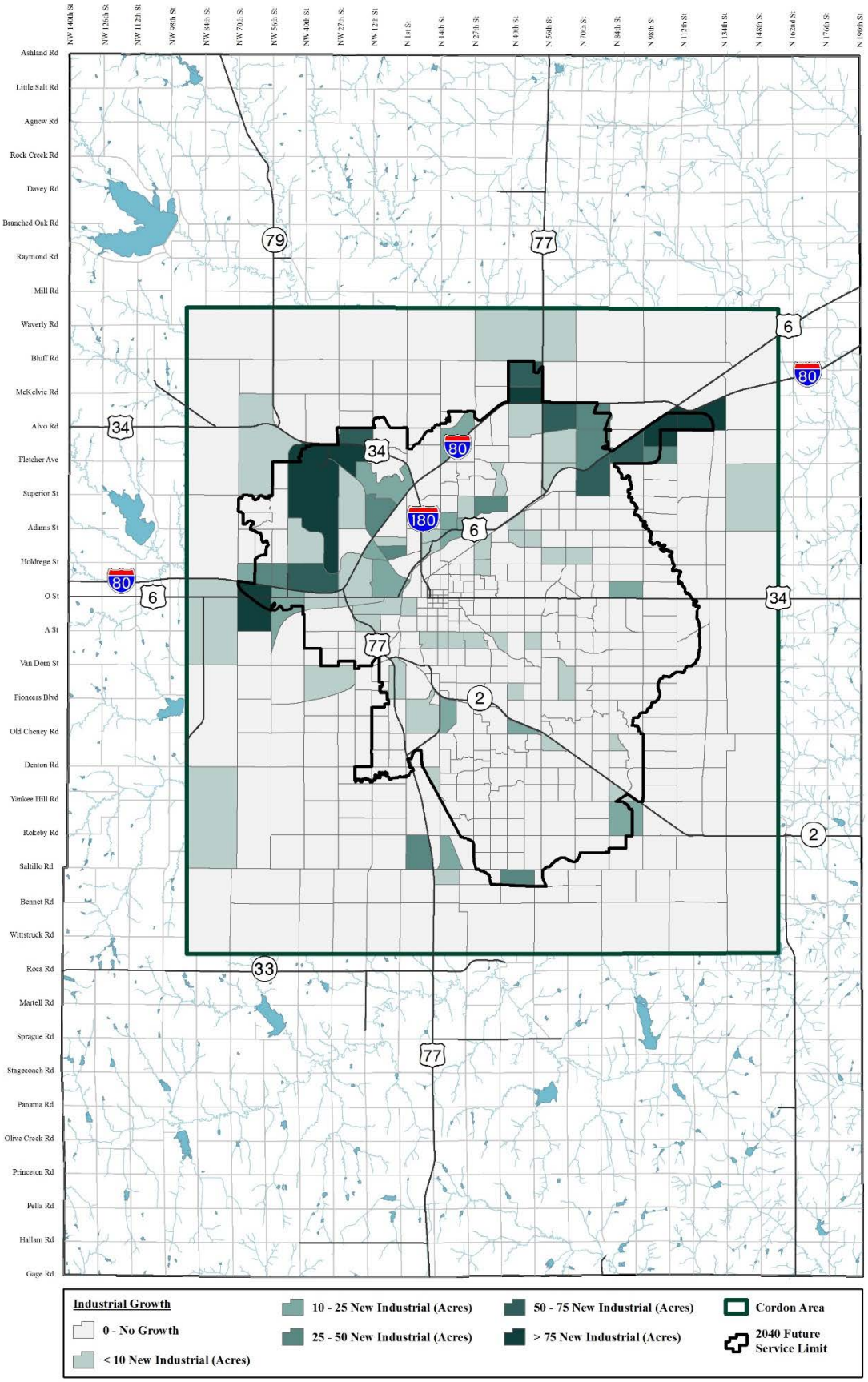


Figure 5. Industrial Growth

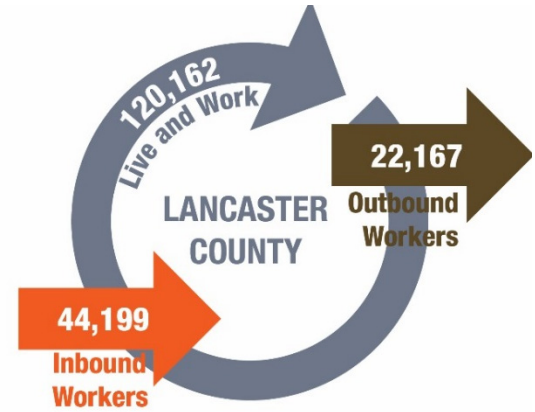
Travel Patterns and Trends

The following information provides an overview of transportation and commuting patterns in Lincoln and Lancaster County.

Commuting Patterns

Each day, more than 44,000 people travel to Lancaster County for work, while approximately 22,000 Lancaster County residents leave to work elsewhere (as shown on **Figure 6**). Another 120,000 County residents work within Lancaster County. That is, there is a net inflow of workers into the County, and around 84 percent of employed Lincoln/Lancaster County residents work in the County.

Figure 6. Workflows



SOURCE: US CENSUS LONGITUDINAL EMPLOYER-HOUSEHOLD DYNAMICS (LEHD) FOR LANCASTER COUNTY, 2013.

The average travel time to work for Lincoln residents is 18.1 minutes (18.4 minutes for all of Lancaster County)[1]. As shown in **Table 2**, 80 percent of Lancaster County residents can arrive at their place of work in less than 25 minutes. An additional 13 percent of residents can arrive to work in 25 to 34 minutes. The remaining residents travel more than 35 minutes to work, with 3 percent of trips taking more than an hour. These travel times have remained quite consistent since 2006.

Table 2. Travel Time to Work

Time	Share
Less than 5 minutes	3%
5 to 9 minutes	13%
10 to 14 minutes	21%
15 to 19 minutes	23%
20 to 24 minutes	18%
25 to 29 minutes	5%
30 to 34 minutes	8%
35 to 39 minutes	1%
40 to 44 minutes	1%
45 to 59 minutes	3%
60 or more minutes	3%

SOURCE: US CENSUS LONGITUDINAL EMPLOYER-HOUSEHOLD DYNAMICS (LEHD) FOR LANCASTER COUNTY, 2013.

Another informative transportation metric is the distance and direction between home and work locations. In 2013, more than 79 percent of workers living in Lancaster County traveled less than 10 miles from their homes to their work locations. A sizeable number, 13.3 percent, of workers travel 25 miles or more to get to work. **Table 3** shows the breakdown of commute travel by miles.

Table 3. Distance from Home to Work

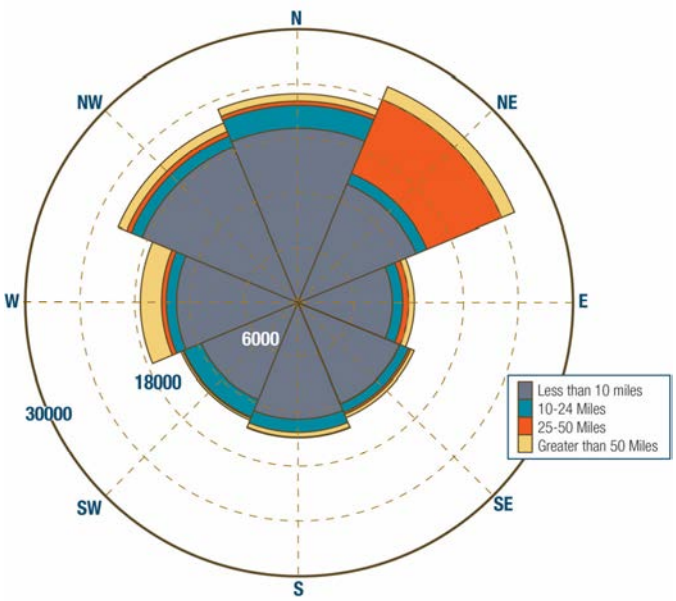
Distance	Count	Share
Less than 10 miles	112,631	79.1%
10 to 24 miles	10,680	7.5%
25 to 50 miles	11,712	8.2%
Greater than 50 miles	7,306	5.1%
Total Jobs	**142,329**	**100.0%**

SOURCE: US CENSUS LONGITUDINAL EMPLOYER-HOUSEHOLD DYNAMICS (LEHD) FOR LANCASTER COUNTY, 2013.

[1] American Community Survey (ACS) 5-year estimate for 2010–2014.

Most employees traveling between 25 and 50 miles are traveling in a northeastern direction, toward Omaha. **Figure 7** shows the total distance and direction of travel.

Figure 7. Distance and Direction from Home to Work



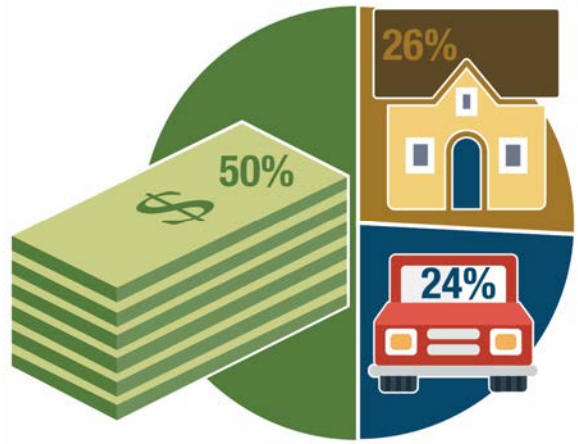
SOURCE: US CENSUS LONGITUDINAL EMPLOYER-HOUSEHOLD DYNAMICS (LEHD) FOR LANCASTER COUNTY, 2013.

Housing and Transportation Affordability

Housing is typically considered affordable when consuming less than 30 percent of a household's income. The Housing and Transportation (H+T) index expands this traditional measure to include transportation costs, usually a household's second-largest expense. By considering the combined costs of housing and transportation associated with the location of the home, the H+T index provides a more complete understanding of affordability and shows that location-efficient places can be more livable and affordable.

The typical household's housing expense in Lancaster County accounts for 26 percent of the total average income, while transportation expenses account for 24 percent. Combined, the cost of housing and transportation in Lancaster County is 50 percent of the average household income (**Figure 8)**, which is higher than the Center for Neighborhood Technology (CNT) benchmark of 45 percent.

Figure 8. Housing + Transportation Index



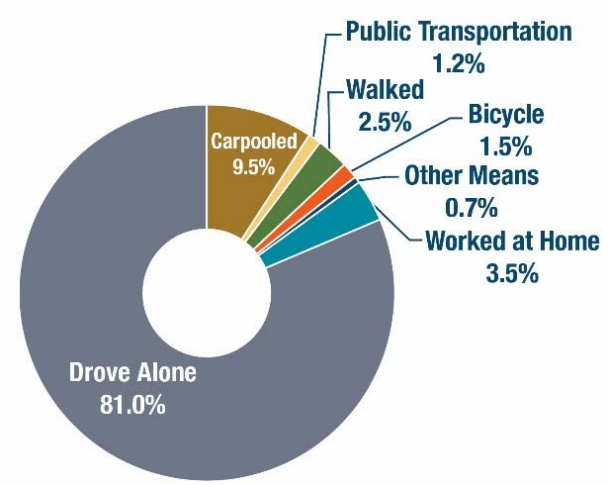
SOURCE: CENTER FOR NEIGHBORHOOD TECHNOLOGY; AVERAGE HOUSING AND TRANSPORTATION COSTS AS A PERCENT OF TOTAL HOUSEHOLD INCOME FOR LANCASTER COUNTY, BASED ON 2013 AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES.

The H+T index demonstrates that location-efficient neighborhoods—compact, mixed use communities with a balance of housing, jobs, and stores and easy access to transit—have lower transportation costs because they enable residents to meet daily needs with fewer cars, the single biggest transportation cost factor for most households. The way in which many cities have grown in the last half century has impacted American families. Families who buy homes farther from jobs often pay more in higher transportation costs. These same families are most sensitive to gas price increases because they drive longer distances. And the longer distances associated with outward growth mean more congestion on city streets, more time commuting, and higher greenhouse gas emissions.

Mode Split

The American Community Survey (ACS) asks respondents to identify their primary means of transportation to work. Driving alone is by far the most commonly used mode of transportation for Lancaster County. Over four out of five residents drive alone in their vehicles to work. **Figure 9** shows the percentage of workers who use each travel mode to travel to and from work.

Figure 9. Commuter Mode Split



SOURCE: 2014 AMERICAN COMMUNITY SURVEY (ACS) 5-YEAR ESTIMATE FOR LANCASTER COUNTY.

Zero Vehicle Households

Although most workers in Lancaster County travel alone in a vehicle, there are 7,614 households (6.5 percent) without access to a vehicle[2]. These households have an increased need for transit service and multimodal facilities. **Figure 10** shows the geographic distribution of zero vehicle households. There is a higher concentration of zero vehicle households (darker blue shading) in the downtown area where alternative transportation modes are more prevalent. However, sizable numbers of zero-vehicle households are sprinkled throughout the area.

[2] Source: 2014 ACS 5-year estimate for Lancaster County.

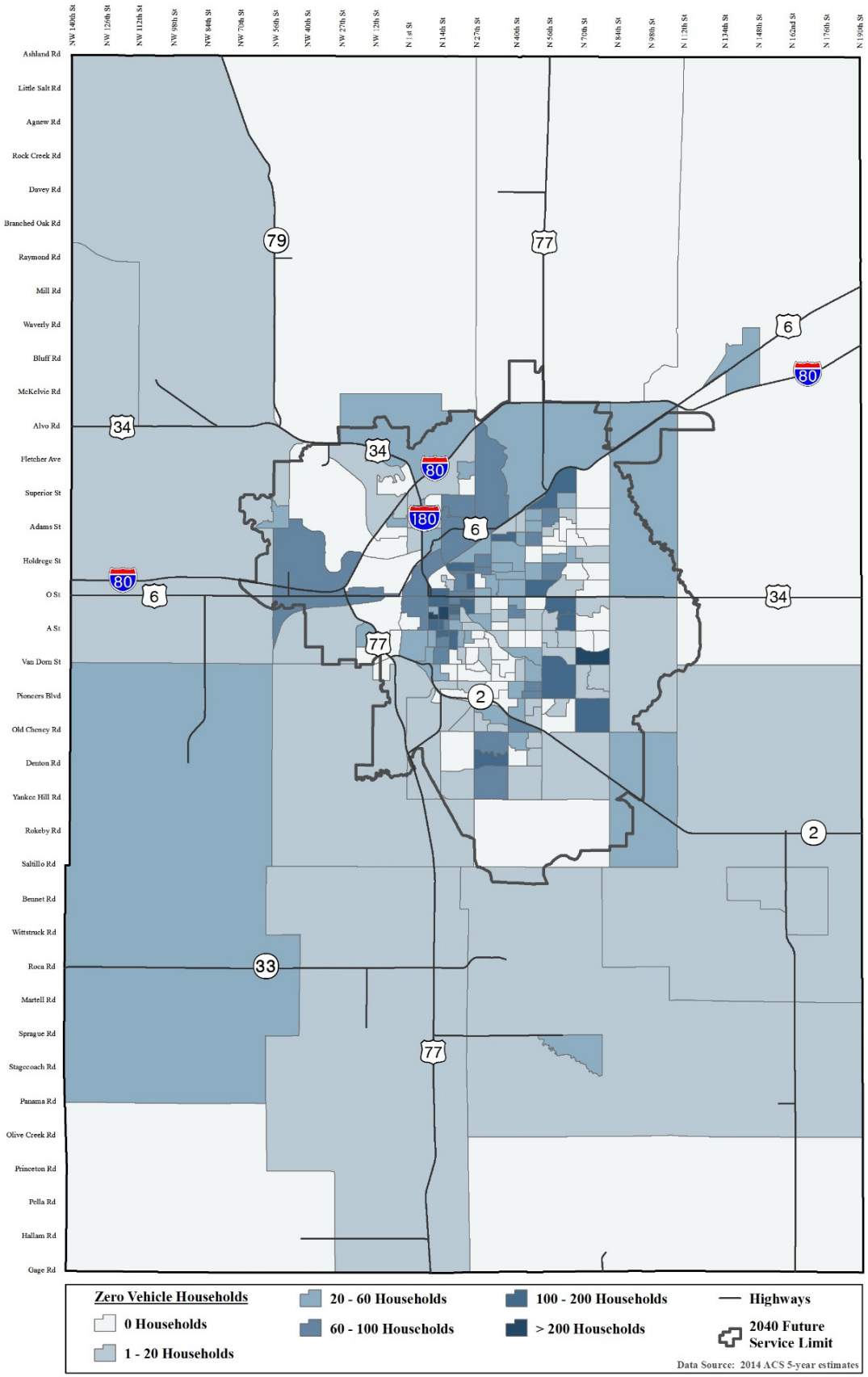


Figure 10. Zero Vehicle Households

Roads and Bridges

City, county, state, and federal roads and highways provide the majority of travel within the region. They also serve as the infrastructure for transit service, typically include sidewalks for pedestrians, and increasingly accommodate bicyclists on dedicated bike lanes or designated bike routes. The following sections provide a snapshot of the current and future state of the region's road and bridge conditions, the functionality, and the travel demand on the street network.

Surface Conditions

Every three to four years, the City of Lincoln monitors the pavement condition of the major street system, and about every ten years, the City conducts a full survey of all public streets. To conduct a pavement condition survey, a specially equipped van collects high-quality digital images of the pavement surface and measures the number and extent of defects. The van also records the extent of roughness and rutting along each street surface. The van is equipped with navigation and global positioning systems (GPS) to map each surveyed street section. Once all of the digital images are processed for each pavement section in the street network, the information is entered into a pavement management software program designed for the City of Lincoln's unique combination of traffic, climate, and paving materials.

Measurable improvements in the condition scores have been seen following recent one-time funding increases for arterials in 2012 (ARRA funding) and 2015 (Antelope Valley) and for residential in 2014 (increased gas tax collections). The City invested over $10 million in street rehabilitation in 2016, allowing for rehabilitation of 18.9 miles of arterial streets and 80 blocks of residential streets. The 2016 increase in rehabilitation funding has had a noticeable positive impact on the pavement condition, particularly on arterial streets.

Bridge Conditions

The City of Lincoln Public Works Department maintains a database of bridge conditions that is updated as bridges are rehabilitated and/or replaced. Bridges are inspected annually. A bridge's sufficiency rating is a measure of its condition and ability to serve its intended function. Sufficiency ratings range from 0 to 100, with 100 being the best. A low sufficiency rating may be due to structural defects, narrow lanes, low vertical clearance, or other factors that make it functionally obsolete. Bridges with ratings between 50 and 80 are eligible for rehabilitation, and bridges with ratings below 50 are eligible for replacement. As shown on **Figure 11** and summarized in **Table 4**, the City of Lincoln maintains 135 vehicle bridges (with an average sufficiency rating of 84.3), and Lancaster County maintains 184 bridges (with an average sufficiency rating of 75.2).

Table 4. Bridge Sufficiency Ratings

Bridge Sufficiency Rating	City Maintained Bridges	County Maintained Bridges
> 80	104	77
50 – 80	25	84
< 50	6	23
Total	**135**	**184**

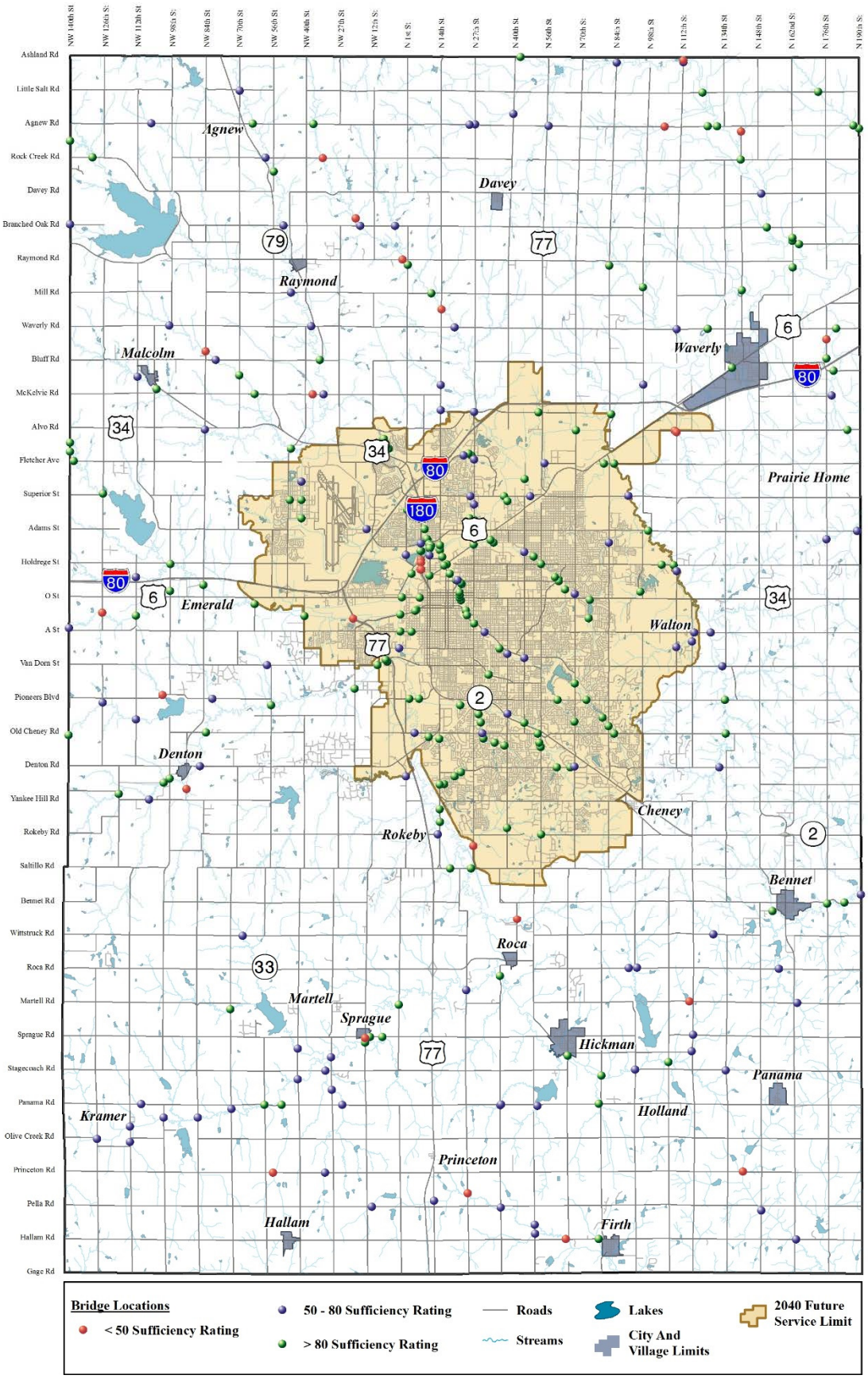


Figure 11. Bridge Sufficiency Ratings

National Highway System

The US Department of Transportation (USDOT), in cooperation with the states, local officials, and MPOs, developed the National Highway System (NHS) to identify the core road network considered critical to the nation's economy, defense, and mobility. The US Congress approved the NHS in 1995, with the intent that the United States would prioritize federal-aid funds appropriately to ensure that the NHS was adequately maintained. **Figure 12** shows the NHS routes in the Lincoln-Lancaster County region.

Functional Classification

The street network in Lincoln and Lancaster County includes roads ranging from local streets that provide residences and businesses direct access to Interstate 80 (I-80), as shown on **Figure 13.** **Figure 14** shows the number of through lanes.

Streets generally provide two important functions: mobility and land access. These functions conflict with each other—more land access generally leads to reduced traffic carrying capacity and mobility, and vice versa. Each roadway type is specifically designed to operate with certain characteristics based on the adjoining land uses, level of continuity, and proximity and connections to other facilities. A street's functional classification describes these characteristics.

Interstate and Expressway: These are divided, limited access facilities with no direct land access. The freeway does not have at-grade crossings or intersections. The expressway is similar to a freeway except that it may have cross streets that intersect at-grade and access is either fully or partially controlled. Both the freeway and expressway are intended to provide the highest degree of mobility serving potentially larger traffic volumes and long trip lengths.

Principal Arterials: This functional class of street serves the major portion of inter-community and intra-community traffic movement within the urban area and is designed to carry high traffic volumes. Facilities within this classification can provide direct access to adjacent land, but such access is incidental to the primary functional responsibility of moving traffic within the system.

Minor Arterials: This functional class serves trips of moderate length and offers a lower level of mobility than principal arterials. This class interconnects with and augments principal arterials, distributes traffic to smaller areas, and provides some direct land access. Minor arterial streets are designed to carry moderate to heavy traffic volumes.

Collector Streets: These streets serve as a link between local streets and the arterial system. Collectors provide both access and traffic circulation within residential, commercial, and industrial areas. Collector streets also provide more direct routes through neighborhoods for use by transit, pedestrians, and bicyclists.

Local Streets: These streets serve as conduits between abutting properties and streets of higher functional classification. Local streets provide the lowest level of mobility and are generally designed to carry low levels of traffic.

Current and Future Traffic and Congestion

Current Traffic

The City of Lincoln conducted an extensive traffic count program in 2015, with 469 count locations throughout the City. These counts, along with 18 County traffic counts and 64 NDOR traffic counts within the model area, were used to assess the current conditions and as a means to calibrate the travel demand model. **Figure 15** depicts the current daily traffic volumes using bandwidths.

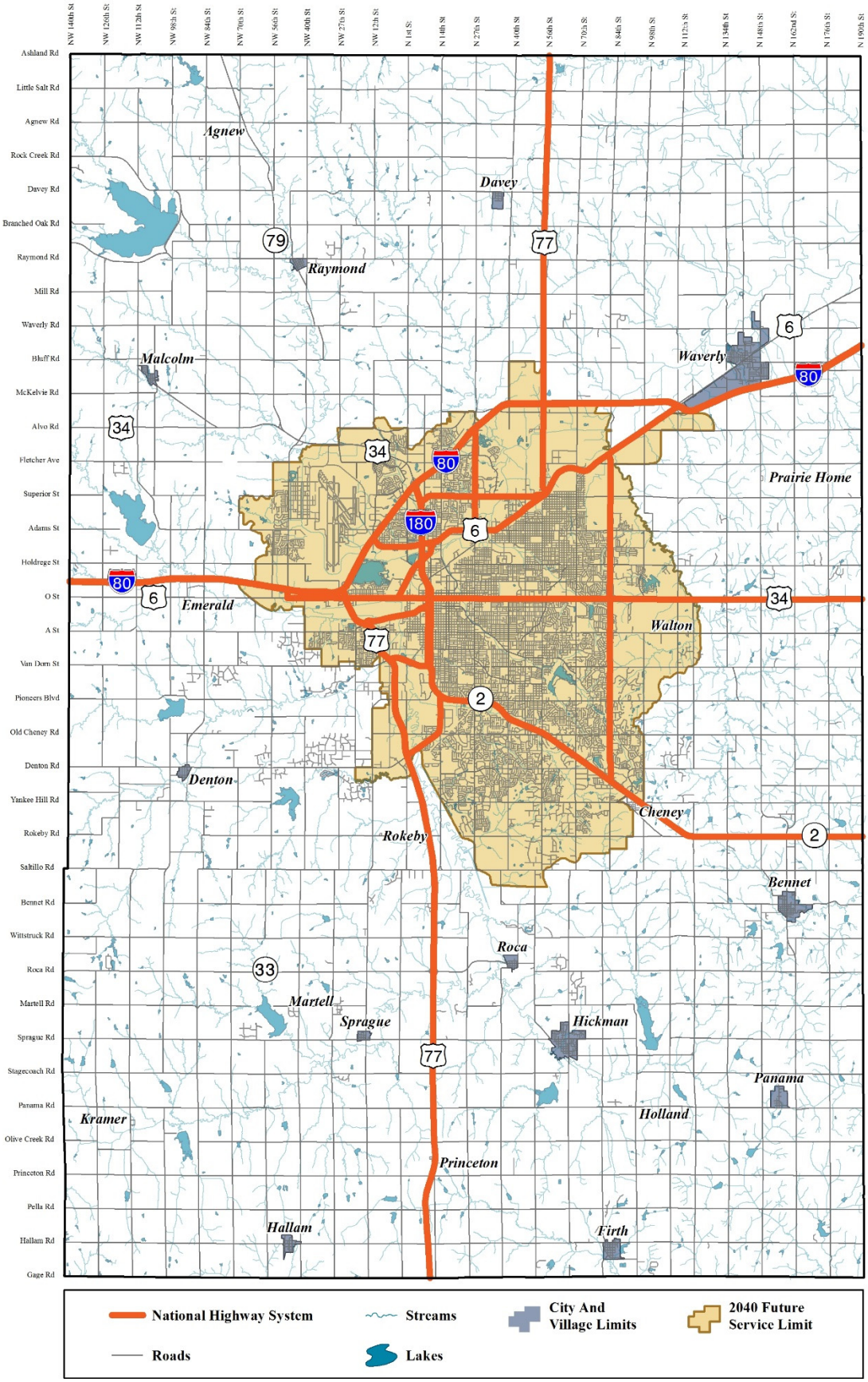


Figure 12. National Highway System

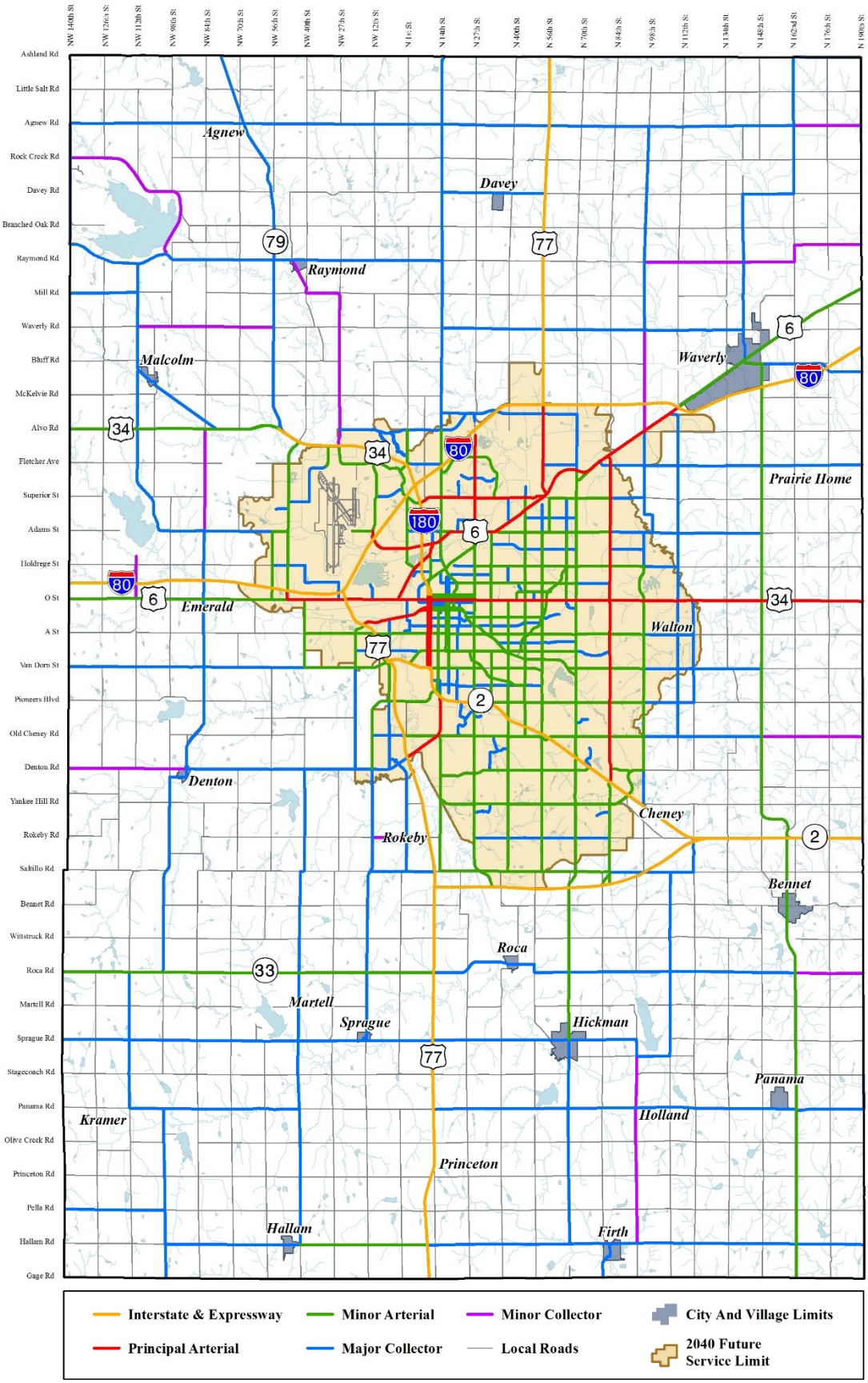


Figure 13. Existing Functional Classification

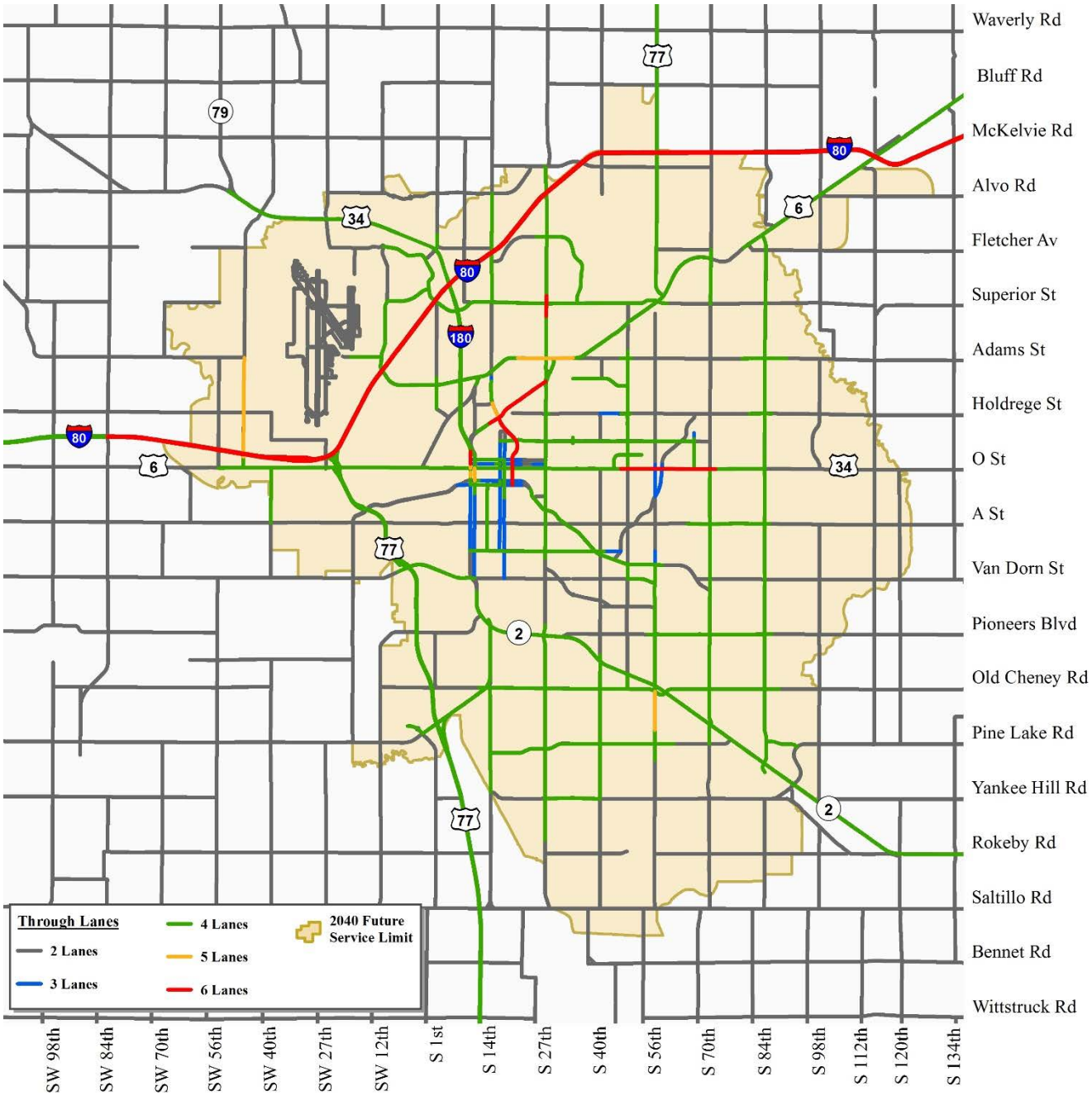


Figure 14. Existing Through Lanes

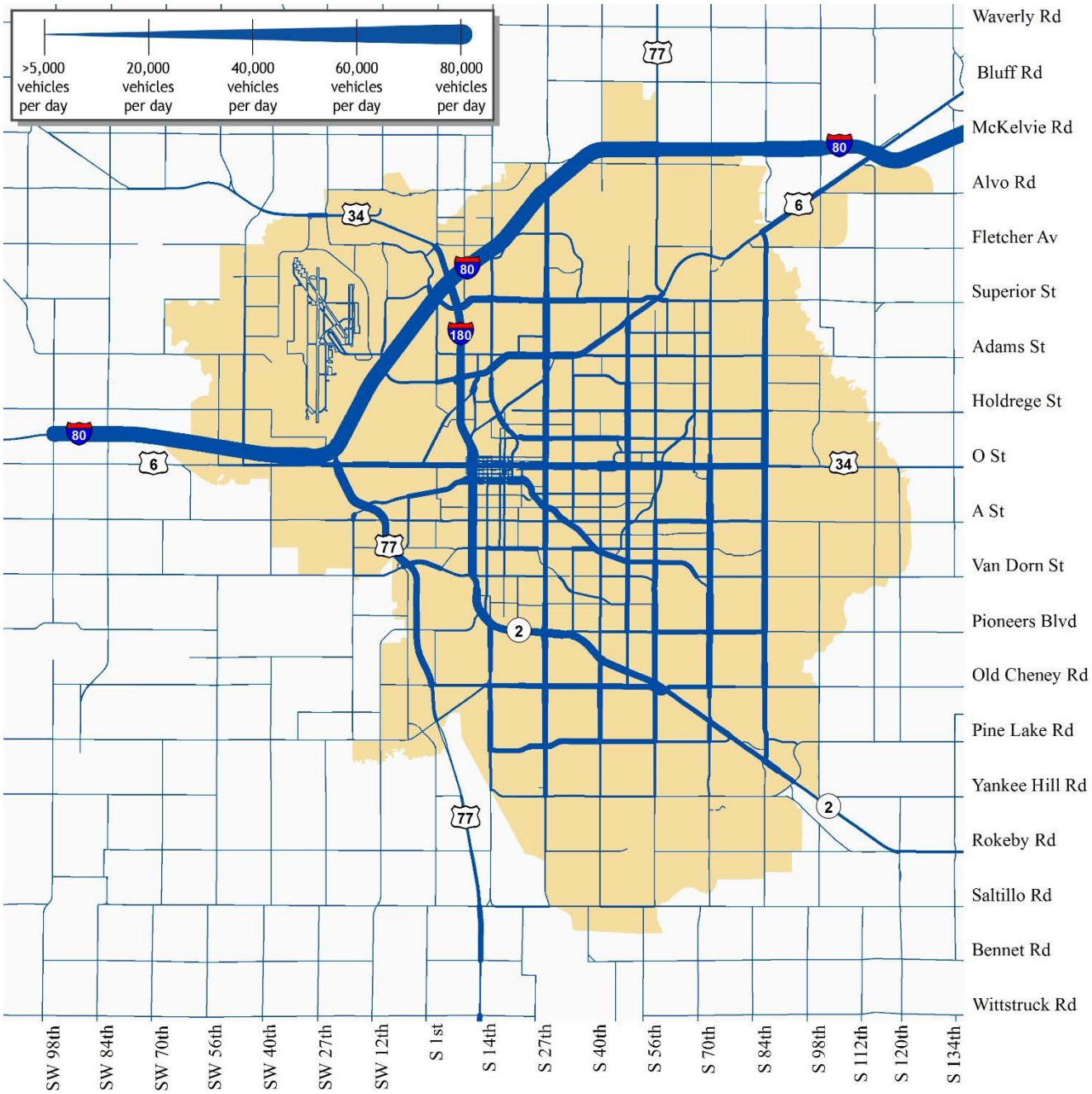


Figure 15. Current Daily Traffic Volumes

Comparing current daily traffic volumes with planning level capacities (volume to capacity [V/C] ratio) can help to identify levels of congestion on the roadway network. The planning level capacities used for this analysis vary depending on the street's functional classification, the area type, and the number of through lanes, as shown on **Table 5**. Because the V/C analysis uses planning-level capacities and daily traffic volumes, it does not explicitly account for delays or congestion that may be experienced at a particular intersection. This analysis provides a high-level snapshot of the current congestion. As depicted on **Figure 16**, the City of Lincoln currently has relatively free-flow conditions. Currently, congestion in Lincoln typically occurs at spot locations for a short duration (15 to 30 minutes) of the peak hour, or as a result of train delays, which are not accounted for in this analysis.

Future Travel Demands

As described in the **Land Use and Demographics** section, the future travel demand patterns in Lincoln are primarily a function of the household and employment growth in the area and of the future roadway network. To begin understanding the future needs of the roadway network, future year models (2026 and 2040) were developed using the Existing + Committed (E+C) roadway network—that is, the existing network plus those improvement projects with committed funding to begin construction over the next six years. **Table 6** lists projects included in the E+C networks. The South and West Beltways are included in the E+C networks to aid in prioritizing and programming alternative system improvements.

Table 5. Planning Level Daily Capacities (per Through Lane)

Functional Classification	Central Business District (CBD)	Urban	Suburban	Rural
Freeway	20,000	20,000	20,000	19,000
Expressway	11,000	12,000	12,000	12,000
Principal Arterial	9,300	10,800	11,200	11,200
Minor Arterial	7,400	8,600	9,000	9,000
Urban Collector	5,600	7,100	7,400	7,400
Major Rural Collector (State)	5,600	7,100	7,400	7,400
Major Rural Collector (County)	5,600	7,100	7,400	7,400
Minor Rural Collector	5,600	7,100	7,400	7,400
Others (Local)	5,200	6,600	6,900	6,900
Ramp	7,400	8,600	9,000	9,000
Freeway Ramp	9,300	10,800	11,200	11,200

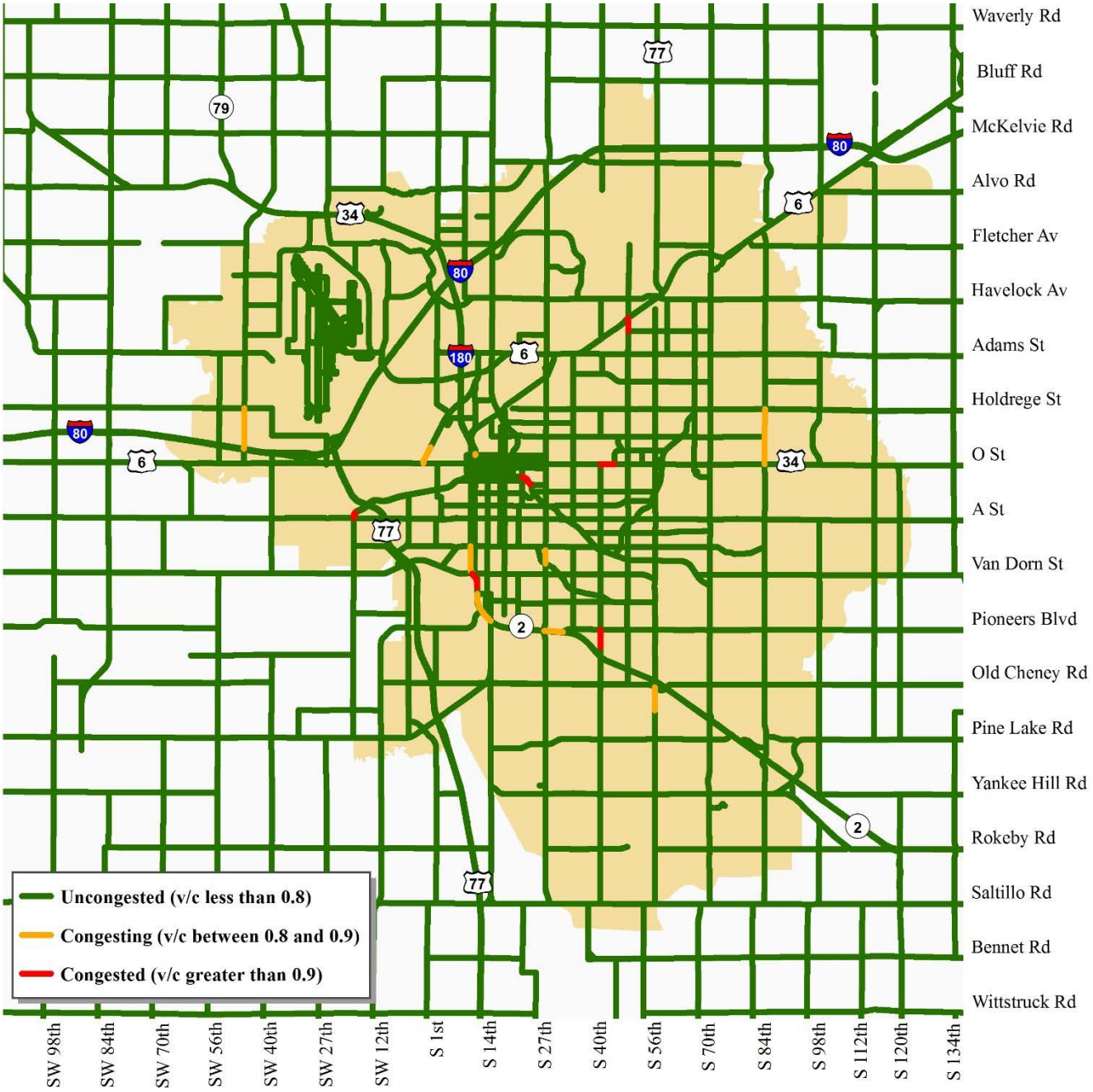


Figure 16. Current Congestion Levels

Table 6. Committed Projects

Roadway	Segment
Pine Lake Road widening	61st Street to Hwy 2
Yankee Hill Road urban cross-section	70th Street to Hwy 2
West "A" Street widening (2+1)	SW 40th Street to Folsom Street
North 10th Street & Military bridge rehab/replace	Over Salt Creek from Military Road to US 6
14th/Warlick intersection reconstruction	At Old Cheney Road
Rokeby Road	70th Street to 98th Street
South Beltway	US 77 to Hwy 2
West Beltway (US 77) improvements	I-80 to South Beltway

Figure 17 and Figure 18 present the daily travel demand forecasts for 2026 and 2040, respectively. These forecasts have been calibrated using existing traffic counts. **Appendix D** includes documentation of the travel demand model update process, including the calibration and validation.

The 2026 and 2040 traffic volume forecasts were compared with the planning-level capacities of each roadway segment to understand the future locations of congestion, as shown on **Figure 19 and Figure 20**, respectively. The V/C ratios use the fully calibrated traffic volumes and the capacities associated with the E+C network for each future year. **Table 7** summarizes the congestion levels over time. The miles in each congestion level are centerline-miles within the Lincoln City limits. With the committed projects in place, the congestion levels are expected to remain relatively low in the future; however, several corridors are expected to experience increased delays and congestion over time. All roads outside of the Lincoln City limits are expected to remain uncongested through 2040.

Table 7. Congestion Levels over Time

	Uncongested	Congesting	Congested
2015	325.1 miles (98.5%)	3.3 miles (1%)	1.6 miles (0.5%)
2026 E+C	317.7 miles (94.3%)	13.3 miles (3.9%)	6.0 miles (1.8%)
2040 E+C	298.1 miles (88.5%)	21.6 miles (6.4%)	17.3 miles (5.1%)

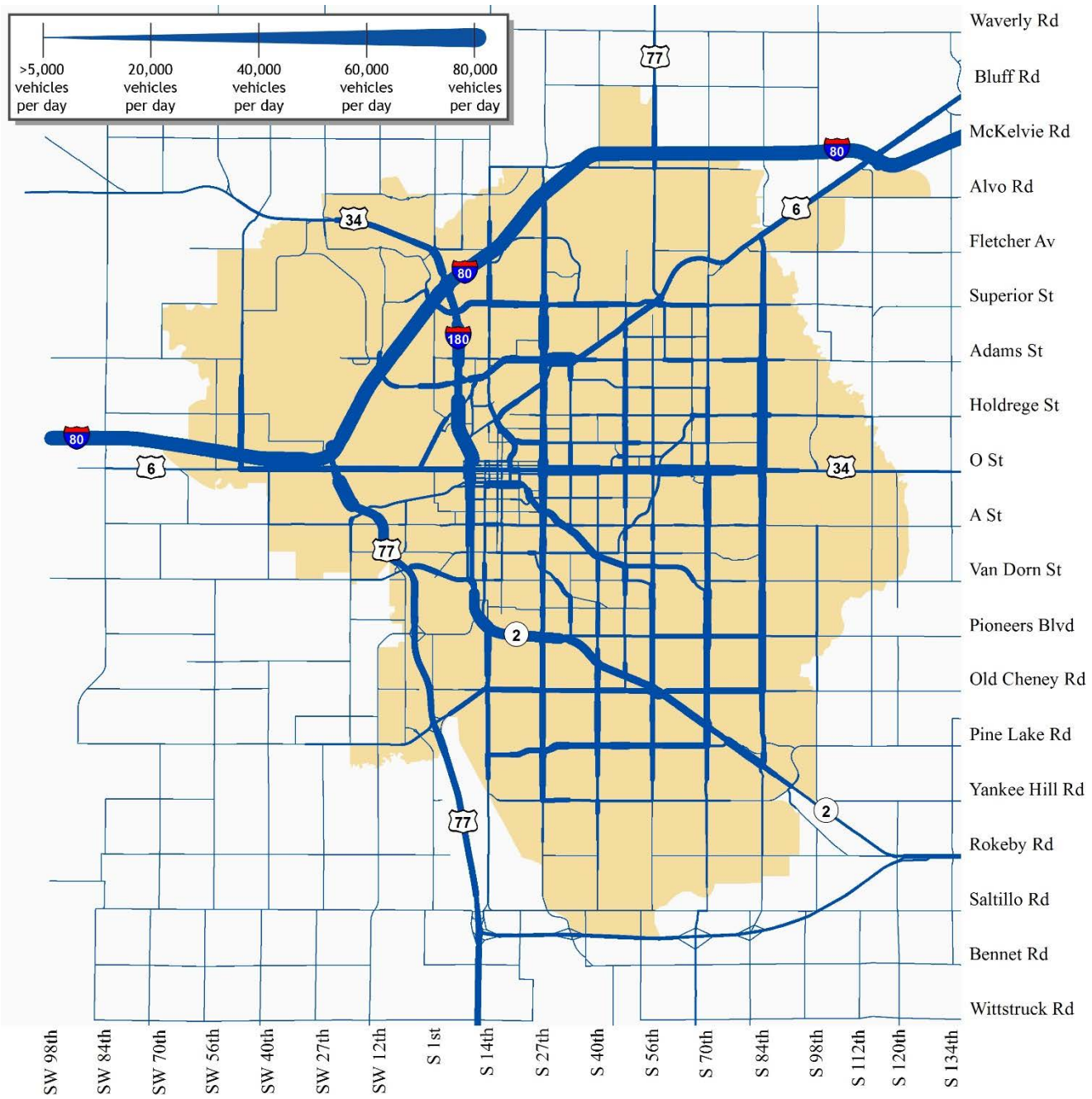


Figure 17. 2026 Daily Traffic Forecasts (E+C Network)

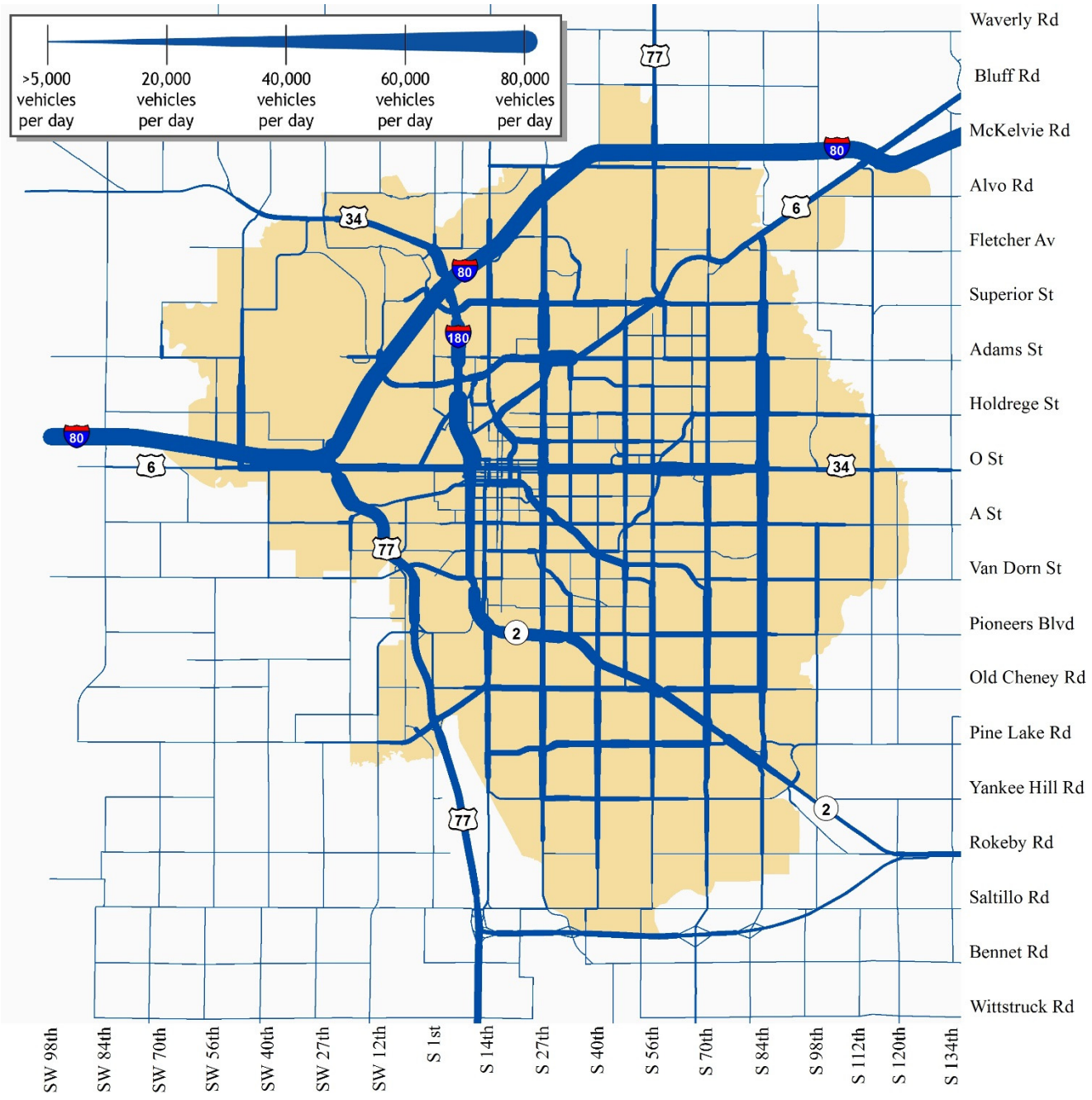


Figure 18. 2040 Daily Traffic Forecasts (E+C Network)

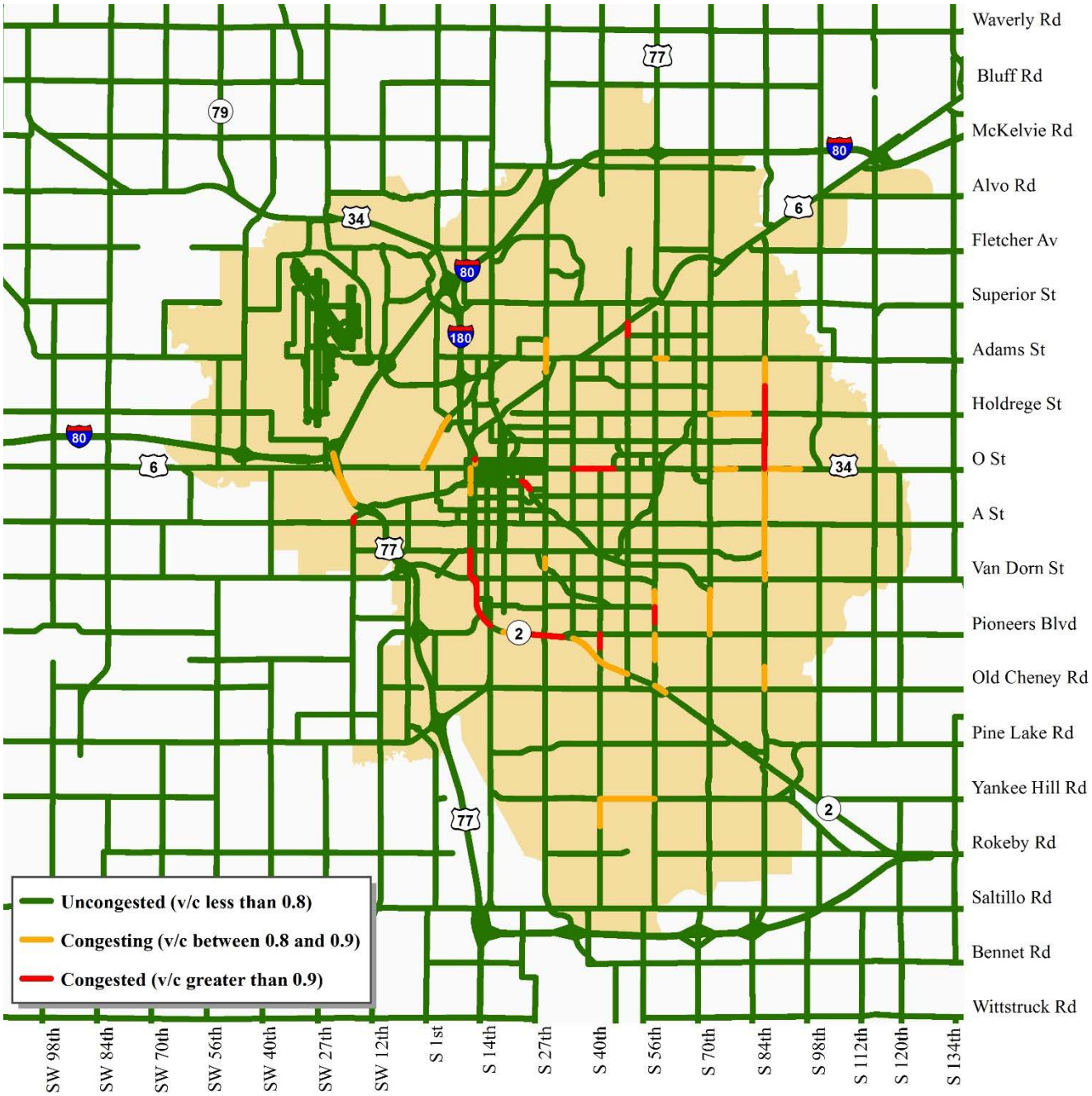


Figure 19. 2026 Congestion Levels (E+C Network)

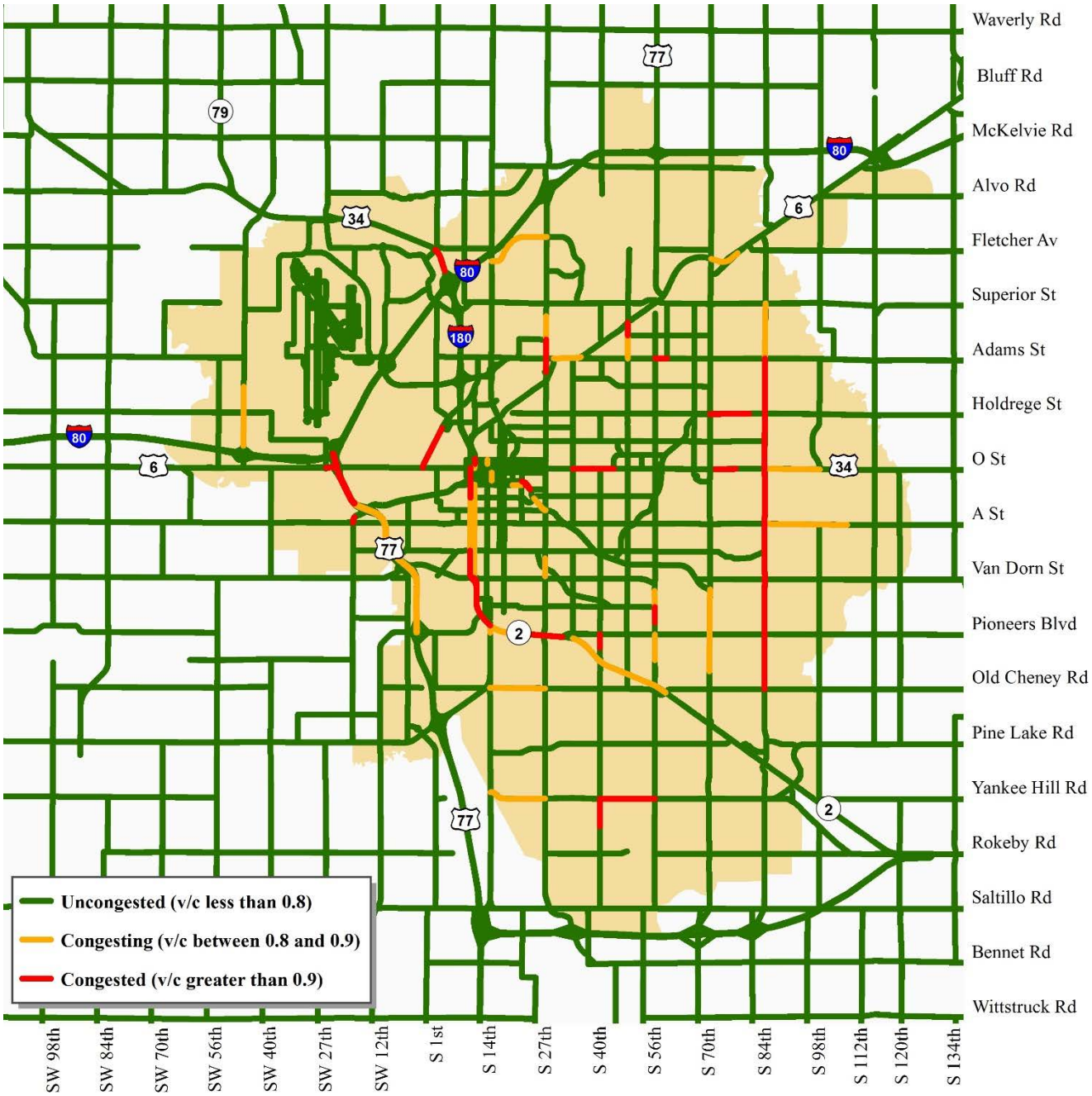
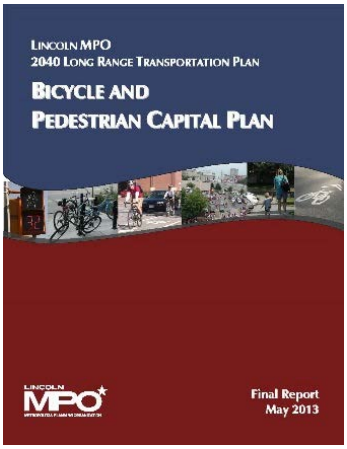


Figure 20. 2040 Congestion Levels (E+C Network)

Bicycle and Pedestrian



Completed May 2013, Lincoln MPO Bicycle and Pedestrian Capital Plan analyzes the existing bicycle and pedestrian system and examines the existing and future growth within the City and throughout the County to identify bicycle and pedestrian destinations. It also provides implementation strategies for prioritizing projects and implementing a successful plan. The Plan complements the community vision for a well-balanced transportation system.

The Bicycle and Pedestrian Capital Plan identifies strategies to develop a comprehensive bicycle and pedestrian network; to increase the use, safety, and convenience of bicycling and walking; and to promote bicycling and walking as integral components of the region's multimodal transportation system. The two main goals of the Plan include:

1. Provide and maintain a safe and an effective bicycle and pedestrian system that enables individual citizens of all ages and abilities to efficiently choose to bike or walk to a variety of destinations throughout the City as a means of travel, attaining health, and quality of life.
2. Fill in the missing bicycle and pedestrian segments and provide safe intersection crossings that connect residences and places of work, shopping, schools, transit, activity centers, and public activities so that people can reach destinations by walking or bicycling in addition to relying on personal vehicles.

The Plan addresses missing segments and deficiencies in the existing bicycle and pedestrian system. The Plan also includes a technical evaluation of work, shopping, business, and recreation destinations, and a short trips assignment to understand where bicyclists might ride and pedestrians might walk if facilities were available. The Plan incorporates a detailed assessment of pedestrian access to Lincoln's public schools.

Bicycle Facilities

As documented, Lancaster County has approximately 233 miles of existing bicycle facilities (trails, bike lanes, bike routes) as shown on **Figure 21**. The Plan notes that the system of bicycle trails, lanes, and routes provides the framework for a good bicycle system to serve the community. However, supplemental facilities will need to be developed to provide the opportunity for a comprehensive bicycle network, particularly in areas of new development and in areas where biking is more likely if a good network is available.

Many existing bicycle routes have been neglected and have missing signs and route designations. These facilities are in need of repair and require basic maintenance such as sweeping or removing tree overhangs. The lack of a maintained bicycle network limits bicycle mobility and travel.

There are also many areas of the City where bicycle routes are missing or begin and end erratically. These are often associated with new development. Many additional planned improvements have an unknown timeframe for completion.

Some existing facilities intersect with a higher volume arterial street with no traffic control, thereby making crossing the street challenging for bicyclists and deterring cyclists from using the system.

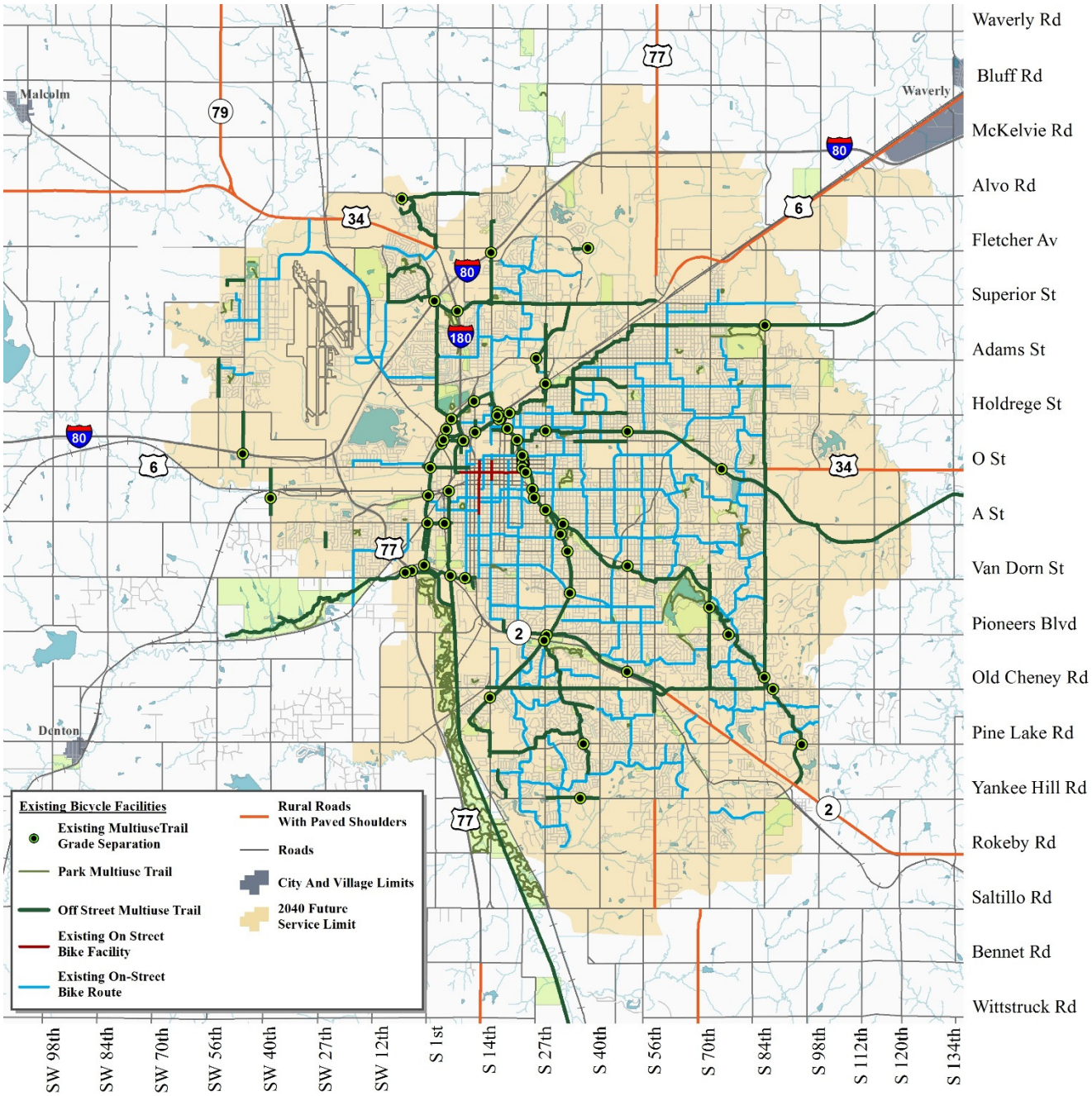


Figure 21. Existing Bicycle Facilities

The on-street bicycle network primarily serves the experienced commuter, not the less experienced rider or children. The existing trail system provides very good facilities for the recreational rider, but its direct access from many neighborhoods is limited. There is a need to expand the existing bicycle network with facilities that accommodate all types of users.

Using bike lanes on the arterial network has limited application because the arterial network within the City has narrow right-of-way (ROW) and multiple lanes with high speeds and traffic volumes. The exception is developing areas where the streets have not been completed to their ultimate condition.

On-street bicycle routes along residential streets and lower volume collector streets that are parallel to the arterial street system can effectively accommodate a broad range of bicyclists.

Off-street trails, such as recreational trails and shared use paths, have also been developed extensively in the City, taking advantage of abandoned railroad corridors and drainage ways. Because of the popularity and use of the trails, some 10-foot trails are reaching their capacity and potentially could be widened to 12 or 14 feet to accommodate the volume of users.

The N Street Cycle Track project includes the installation of a new two-way bikeway separate from traffic and pedestrians. The cycle track is on the south side of N Street from Pinnacle Bank Arena Drive to 23rd Street. The new cycle track connects the University of Nebraska-Lincoln (UNL) with existing bike lanes on 14th and 11th streets and to the trail system to the east and west of downtown. The project just opened in December 2015 and was recognized by People for Bikes as one of America's 10 best new bike lanes of 2015.[3]

The City of Lincoln will launch Phase 1 of the Lincoln bike sharing system in 2017, including 15 stations and 100 bikes. The City applied for, and was awarded, a Congestion Mitigation and Air Quality (CMAQ) grant for $600,000, which will be used for the new bike sharing system.

Pedestrian Facilities

In general, Lincoln has an excellent sidewalk network as depicted on **Figure 22**. Most homes and businesses are served by Lincoln's network of over 1,700 miles of sidewalks. Almost all neighborhood streets and arterials have sidewalks along both sides. For years, the City has required new development to include sidewalks on both sides of the street. The continuation of this requirement is important for future development areas.

However, sidewalks in many older areas of the City have developed cracks and heaving pavement and require maintenance, making it particularly difficult for those with disabilities. The maintenance of this existing system is important so that this network of sidewalks remains an asset to the community. The City has recently made a concerted effort to rehabilitate over 2,000 sections of sidewalks in poor condition, spending over $4 million in 2015 and $1 million in 2016 on sidewalk repairs in the last fiscal year.

The barrier for pedestrian travel tends to be crossing higher volume arterial streets at locations that do not have signalized traffic control. The presence of frequent vehicular curb cuts in some areas also inhibits pedestrian activity by creating more points for pedestrian and vehicle conflict.

[3] http://www.peopleforbikes.org/blog/entry/americas-10-best-new-bike-lanes-of-2015

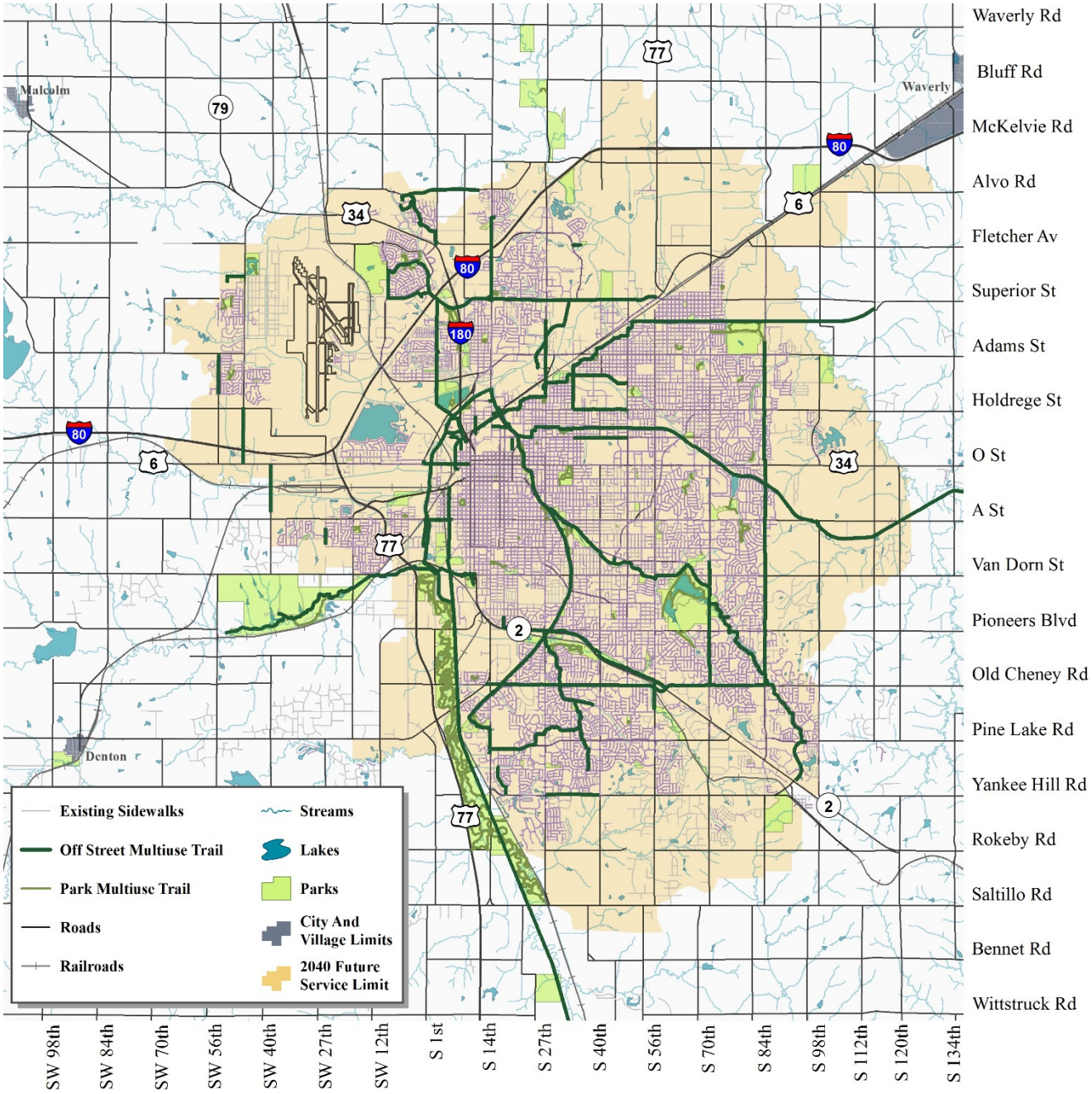
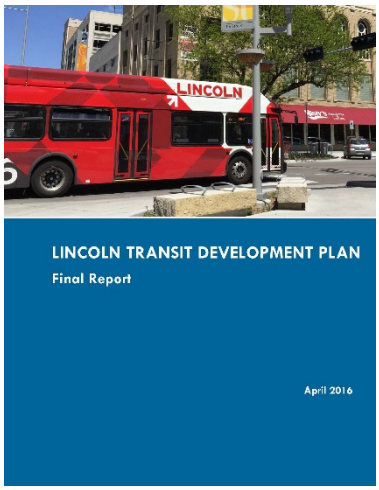


Figure 22. Existing Sidewalks and Trails

Transit



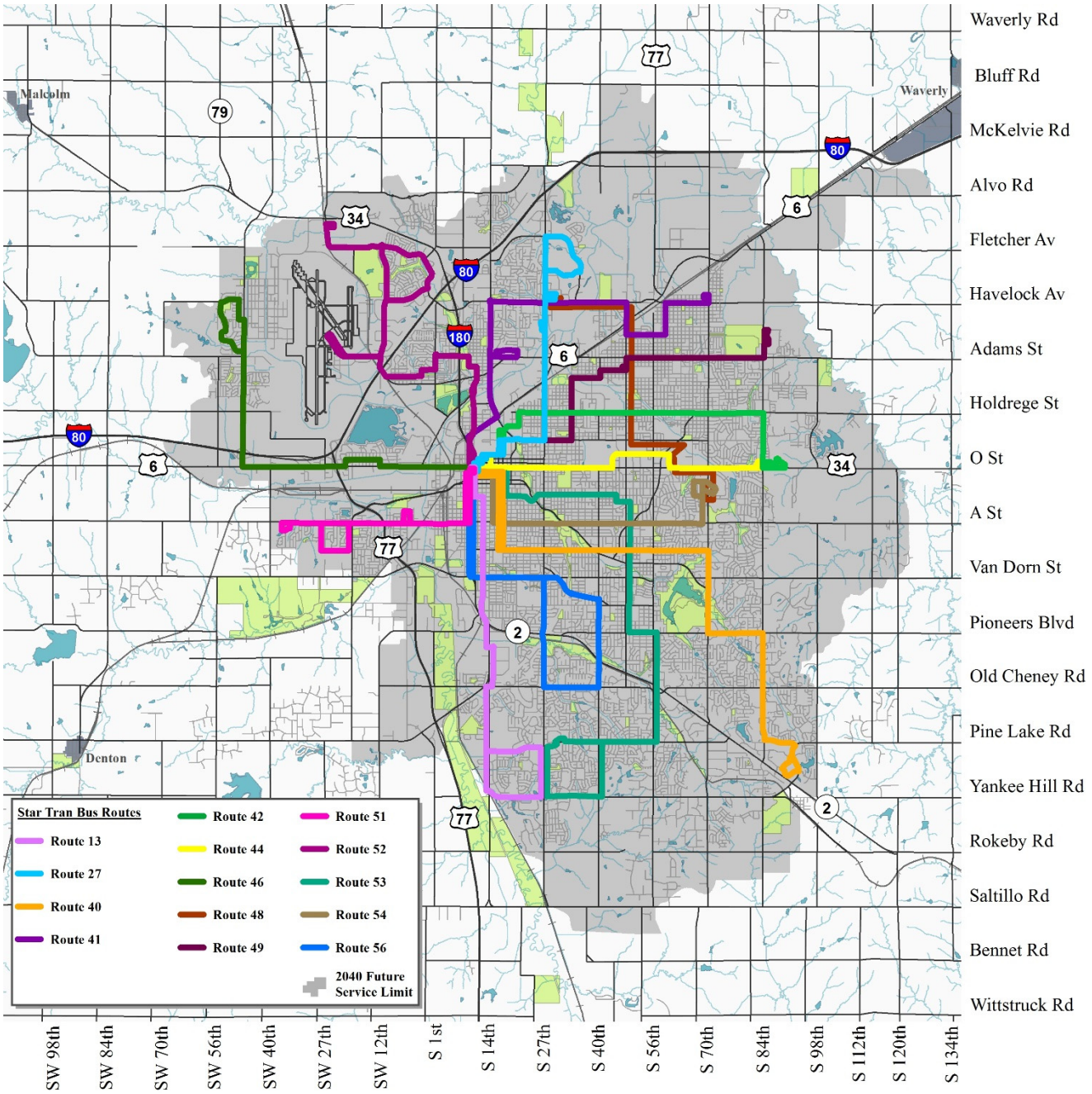
StarTran, a division of the City of Lincoln, provides fixed-route bus service within the city limits. In January 2015, StarTran launched the Transit Development Plan (TDP) effort to determine the best approach for improving and expanding transit service in Lincoln. The Plan, adopted in April 2016, concludes that the primary deficiencies in the existing StarTran system are limited service span (hours of operation), no Sunday service, and lack of frequent service. The Plan also identifies the need for better downtown connections.

StarTran's bus network in Lincoln (**Figure 23**) can be characterized as a hub-and-spoke system, in which all routes radiate from a single point. The primary hub for StarTran's 14 regular routes is a two-block on-street transfer point along 11th Street and N Street in downtown Lincoln. Because this two-block transfer point can accommodate only six buses at a time, timed connections among all routes serving downtown is not possible. There is a need for a single transfer point within downtown with enough capacity. This would allow streamlined alignments that would improve operational efficiency and reduce travel time for riders.

StarTran's fleet includes 67 fixed-route buses and 13 paratransit vehicles. The fleet is being converted, over time, to compressed natural gas (CNG). StarTran's use of CNG vehicles has reduced the amount of pollutants and greenhouse gases and decreased reliance on imported fuels. All StarTran fixed-route buses are equipped with bike racks, which can be an effective means of expanding the reach of transit service.

Intermodal Connections

As travel behaviors change and transportation technologies evolve, there is an increased awareness of the need for strong intermodal connections. Today, 6.5 percent of households in Lancaster County do not own a car—that number may increase as a result of the younger generation's preference for lower vehicle ownership and the desire to live, work, and play in concentrated areas. Technological advances such as Transportation Network Companies (TNCs), bike-sharing, bike racks on transit vehicles, and autonomous vehicles are making car-optional living more viable. To position Lincoln for these travel behavior and technology changes, there is a need to proactively plan for a strong interface between travel modes, allowing a mix of mobility options that are well-coordinated and can be competitive (in terms of travel time and cost) with private car ownership.



StarTran routes as of October 2016

Figure 23. StarTran Bus Routes

Rail

A network of railroad tracks extends radially from central Lincoln, as shown on **Figure 24.** Four railroad companies operate lines in Lincoln and Lancaster County: the BNSF Railway, the Union Pacific Railroad (UPRR), the OL&B Railroad, and the Omaha Public Power District (OPPD). Activity on the railroad lines ranges from 2 trains per day (on the UPRR and OPPD lines) to 63 trains per day on the BNSF-Creston line. Coal and agricultural products are the primary freight being moved by train through Lincoln, with some local manufacturing such as Kawasaki shipping light rail cars to the east coast.

Trains from four of BNSF's main lines—Ravenna, Cobb, St. Joseph, and Creston—cross connect through the Hobson Yard in Lincoln just west of downtown. The Hobson Yard is a vital service and support center for freight trains carrying coal and agricultural goods where inspections, maintenance, fueling, and switching all take place. The BNSF Havelock Shops in the northeast part of Lincoln are a primary freight rail car repair facility.

While the railroad lines through Lincoln and Lancaster County are critically important to the local economy, many railroad crossings with the street network are at-grade resulting in safety problems and travel delays. **Figure 24** shows the at-grade crossings in Lincoln and Lancaster County. The daily railroad crossing exposure rating (daily trains multiplied by the number of vehicles per day) reflects the potential for crashes between trains and motor vehicles at crossings. The NDOR – Rail and Public Transportation Division requires a minimum exposure rating of 50,000 to qualify for possible construction of a grade separation (underpass or overpass). There are 12 at-grade crossings with an exposure rating above 50,000, eight of which have an exposure rating greater than 100,000.

The Lincoln/Lancaster County Railroad Transportation Safety District (RTSD) identifies railroad crossings in need of work, prioritizes projects, and conducts studies to plan future work. The RTSD's mission has been to eliminate, as much as possible, conflicts between highway traffic and railroads in Lincoln and Lancaster County. Since its inception, many projects from its early long-range plan have been completed. The number of at-grade railroad crossings of public streets in Lancaster County has been reduced from 210 in 1970 to 114 today. About half of the closed crossings were due to abandonment, while the other half were due to consolidation and grade separations.

Freight

In addition to the railroads, the highway system in Lincoln plays an important role in freight movement. Currently, the primary truck routes through the region include all or portions of:

- I-80
- US 6
- US 34
- US 77
- Nebraska Hwy 2
- Nebraska Hwy 79
- 14th Street/Warlick Blvd (L55W)
- North 56th Street (L55X)
- 84th Street

Figure 25 shows the primary and secondary truck routes, along with the major truck destinations.

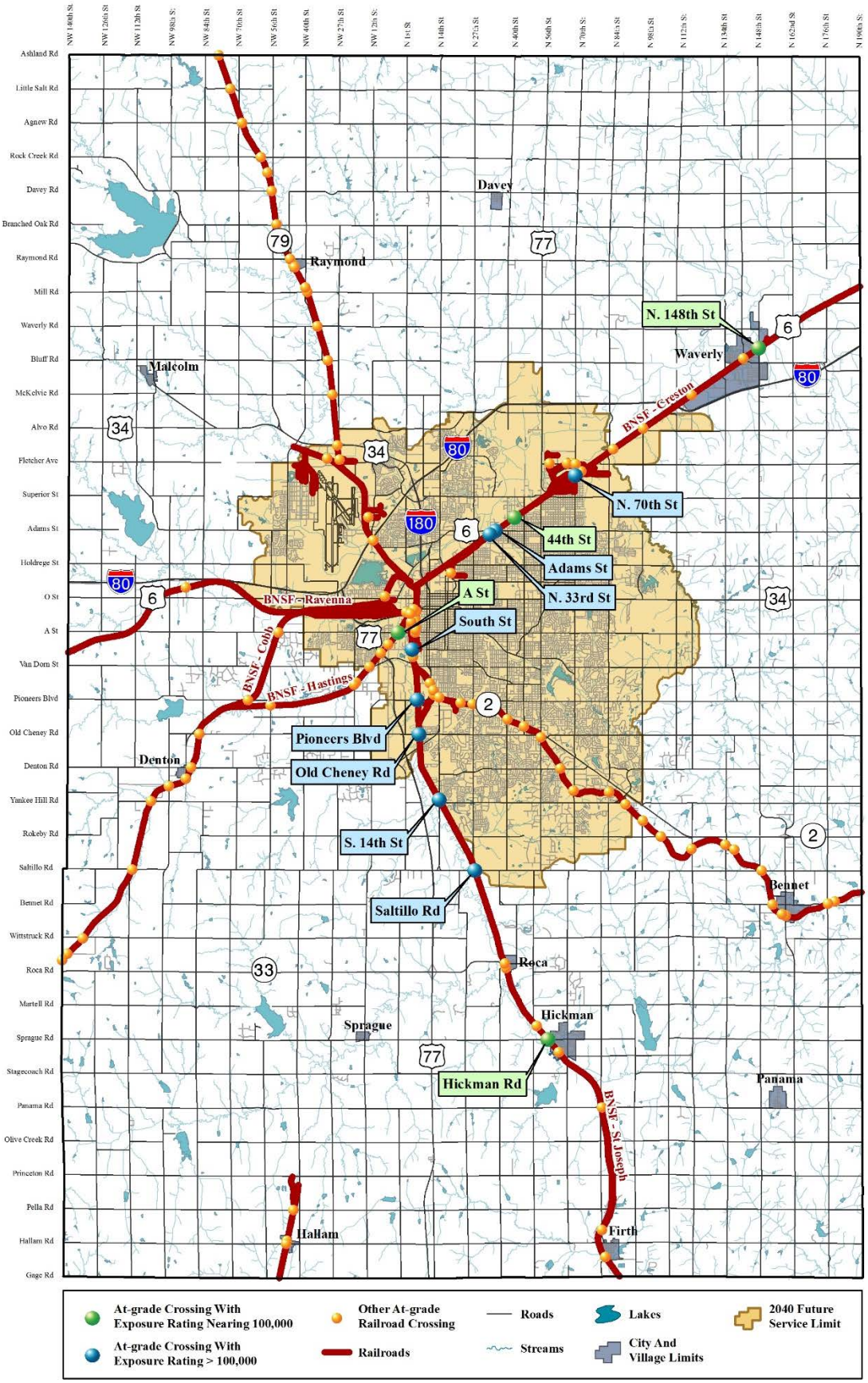


Figure 24. Railroad At-Grade Crossings

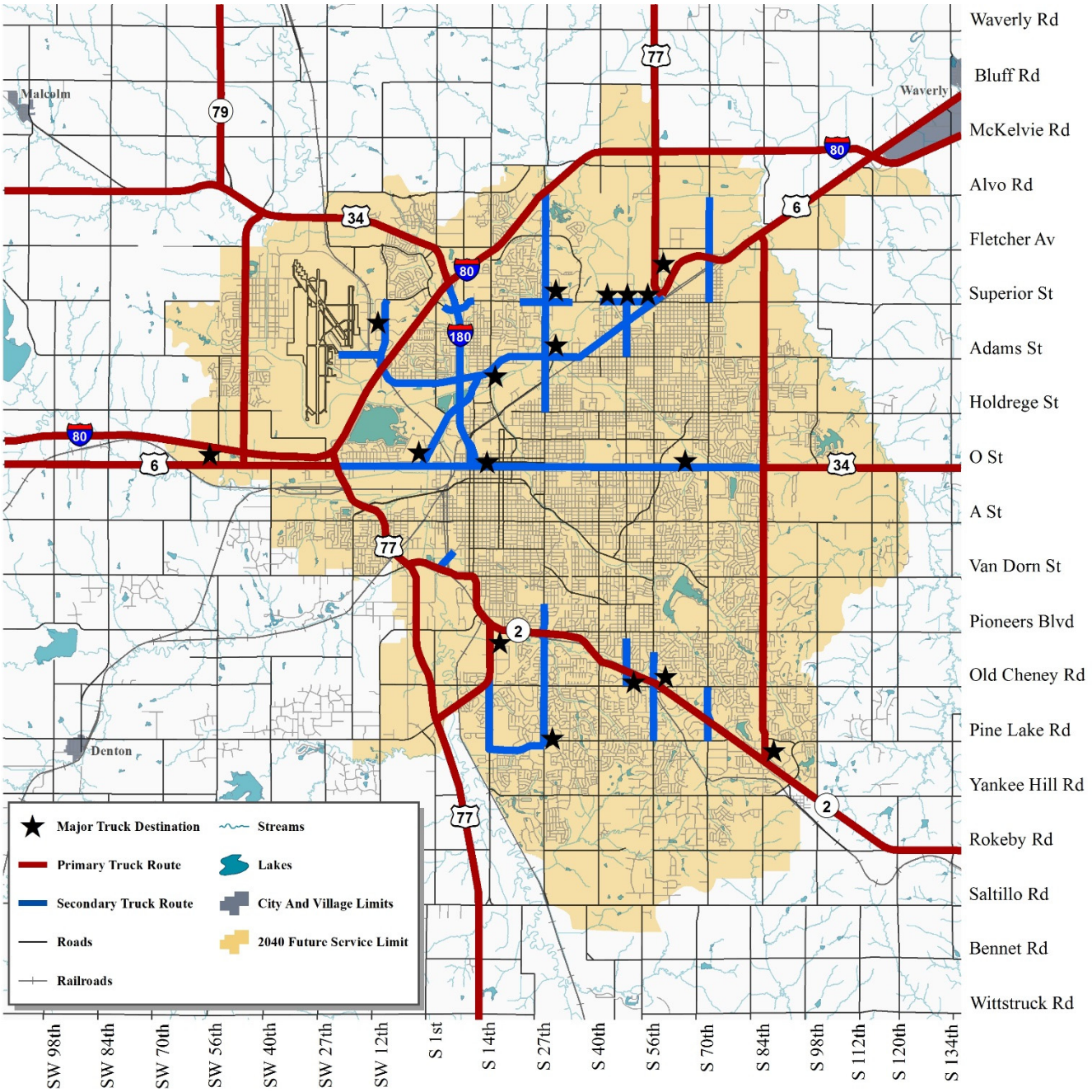


Figure 25. Truck Routes

Safety

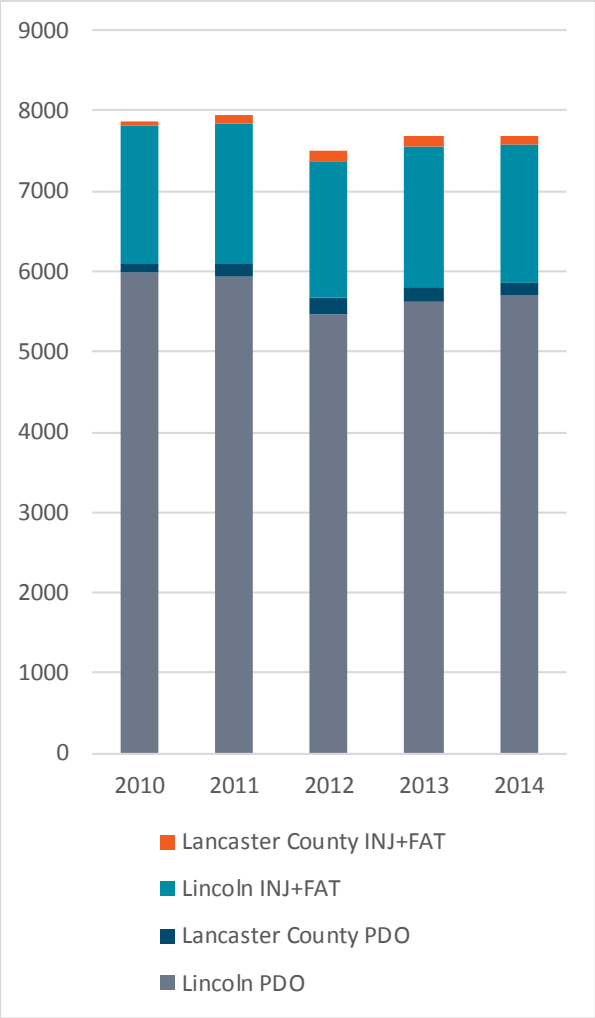
Safety is a top priority not only for Lincoln and Lancaster County but also at the state and federal levels. An understanding of the crash patterns that have occurred over time is important to identifying safety improvements. Crash data collected over the five-year time period between 2010 and 2014 show that there were over 38,600 crashes in Lincoln and Lancaster County, an average of roughly 7,700 crashes per year.

Figure 26 shows the severity of crashes in the region over time. Over the five-year period, there were 9,154 crashes resulting in injury (INJ) or fatality (FAT) – approximately 24 percent – and the remaining crashes involved property damage only (PDO). Allstate's 2015 "America's Best Drivers Report" ranks Lincoln as the 21st safest driving city in the country[4].

Table 8 lists in rank order the intersections with the highest Equivalent Property Damage Only (EPDO) crash rates during the 5-year period of 2011 through 2015. These intersections are candidates for focused safety improvements to address identified crash patterns.

Safety is a key element of successful bicycle and pedestrian networks. People may choose to ride or walk only if they feel safe and comfortable on the bikeway and pedestrian networks. The 2010–2014 crash history for Lincoln and Lancaster County was analyzed to identify bicycle-related and pedestrian-related crashes and severity over the five-year period. There were 735 vehicle-bicycle crashes over the five-year period on Lincoln and Lancaster County roads, an average of 147 per year. There were 470 vehicle-pedestrian crashes, an average of 94 per year.

Figure 26. Crash Severity



[4]https://www.allstate.com/resources/allstate/attachments/tools-and-resources/abd-report-2015.pdf

Table 8. Intersections with Highest Crash Rates

Rank	Intersection Location	EPDO Rate	5 Year Crash Total (2011 – 2015)
1	COTNER BLVD/O ST	13.8	146
2	DUXHALL DR/S 40TH ST	13.6	29
3	N ANTELOPE VALLEY PKWY/N 17TH ST	13.5	41
4	O ST/27TH ST	13.2	220
5	KNOX ST/N 27TH ST	13.0	98
6	VINE ST/N 27TH ST	12.5	176
7	P ST/N ANTELOPE VALLEY PKWY	12.0	22
8	R ST/N 46TH ST	12.0	20
9	A ST/S 48TH ST	11.9	78
10	A ST/S 13TH ST	11.6	39
11	NEBR HWY/S 40TH ST	11.6	124
12	PURPLE HEART HIGHWAY/W FLETCHER AVE	11.6	45
13	PINE LAKE RD/S 14TH ST	11.6	57
14	TICONDEROGA DR/N 27TH ST	11.5	42
15	NEBR HWY/S 70TH ST	11.5	69
16	CORNHUSKER HWY/N 27TH ST	11.2	238
17	O ST/48TH ST	11.1	212
18	SUPERIOR ST/N 14TH ST	11.0	262
19	A ST/S 18TH ST	10.9	26
20	P ST/N 22ND ST	10.7	15
21	CORNHUSKER HWY/N 44TH ST	10.7	28
22	SAUNDERS AVE/N ANTELOPE VALLEY PKWY	10.6	26
23	O ST/33RD ST	10.4	133
24	O ST/17TH ST	10.1	111
25	CAPITOL PKWY/S 27TH ST	10.0	130
26	VINE ST/N 48TH ST	10.0	122

Note: Based on Equivalent Property Damage Only rate; minimum of three or more crashes per year; EPDO Rate of 10.0 or higher

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4. Needs Based Plan

The current and future needs and candidate projects for Lincoln and Lancaster County's transportation system have been compiled from a variety of sources, including:

- Existing and future deficiencies, as documented in **Chapter 3**
- Current plans
  - Lincoln MPO Long Range Transportation Plan (2011)
  - Lincoln MPO Bicycle and Pedestrian Capital Plan (2013)
  - Lincoln Transit Development Plan (TDP) (2016)
  - NDOR's Statewide Transportation Improvement Program (STIP)
  - Railroad Transportation Safety District (RTSD) Capital Improvement Program
- LRTP committees
  - MPO Officials Committee
  - MPO Technical Committee
  - Oversight Planning Committee
  - Planning Commission
- 2040 Travel Demand Model
- Community input through focus group meetings, public meetings, and online surveys

The transportation needs cover all surface transportation modes: roadway, transit, bicycling, walking, and rail (specifically the railroad crossing needs). The current and future needs help to define a needs-based plan for the Lincoln MPO; that is, the transportation projects that could be constructed and programs that could be implemented to realize the transportation vision, if funding limitations were not a consideration.

Roadway

Roadway Capital Projects

More than $1.1 billion (in 2016 dollars) in candidate roadway capital projects have been identified as shown on **Figure 27** and listed in **Table 9**. These capital projects include major widening projects, new/reconstructed interchange and major intersection projects, construction of the East Beltway, urban improvement projects (bringing rural roads to two lane urban standards), and other corridor improvements. These projects cumulatively would address the future congestion problems identified in **Chapter 3** and beyond.

Intersection Capacity and Safety Projects

Whereas the roadway capital project list focuses on larger projects, much of current and future congestion occurs at intersections. Similarly, intersections are where most vehicular crashes occur. The City of Lincoln Public Works and Utilities Department regularly works to identify intersection improvements to address high-priority congestion and safety needs. An intersection improvement project could include additional right or left turn lanes, intersection geometric modifications, and signal modifications or roundabout construction. Costs for intersection improvements typically range from $200,000 to $2 million, depending on the scope of the improvements. Intersection capacity and safety improvements are an integral part of the region's ongoing Congestion Management Process.

Two Plus Center Turn Lane Projects

For years, the City of Lincoln has been adding a center left turn lane as part of programmed street rehabilitation along two-lane minor arterials and some collectors. This program has been very successful—by increasing the capacity of a two-lane roadway by approximately 50 percent and minimizing traffic congestion while improving safety and preserving the character and viability of the established neighborhoods and other components of the built environment.

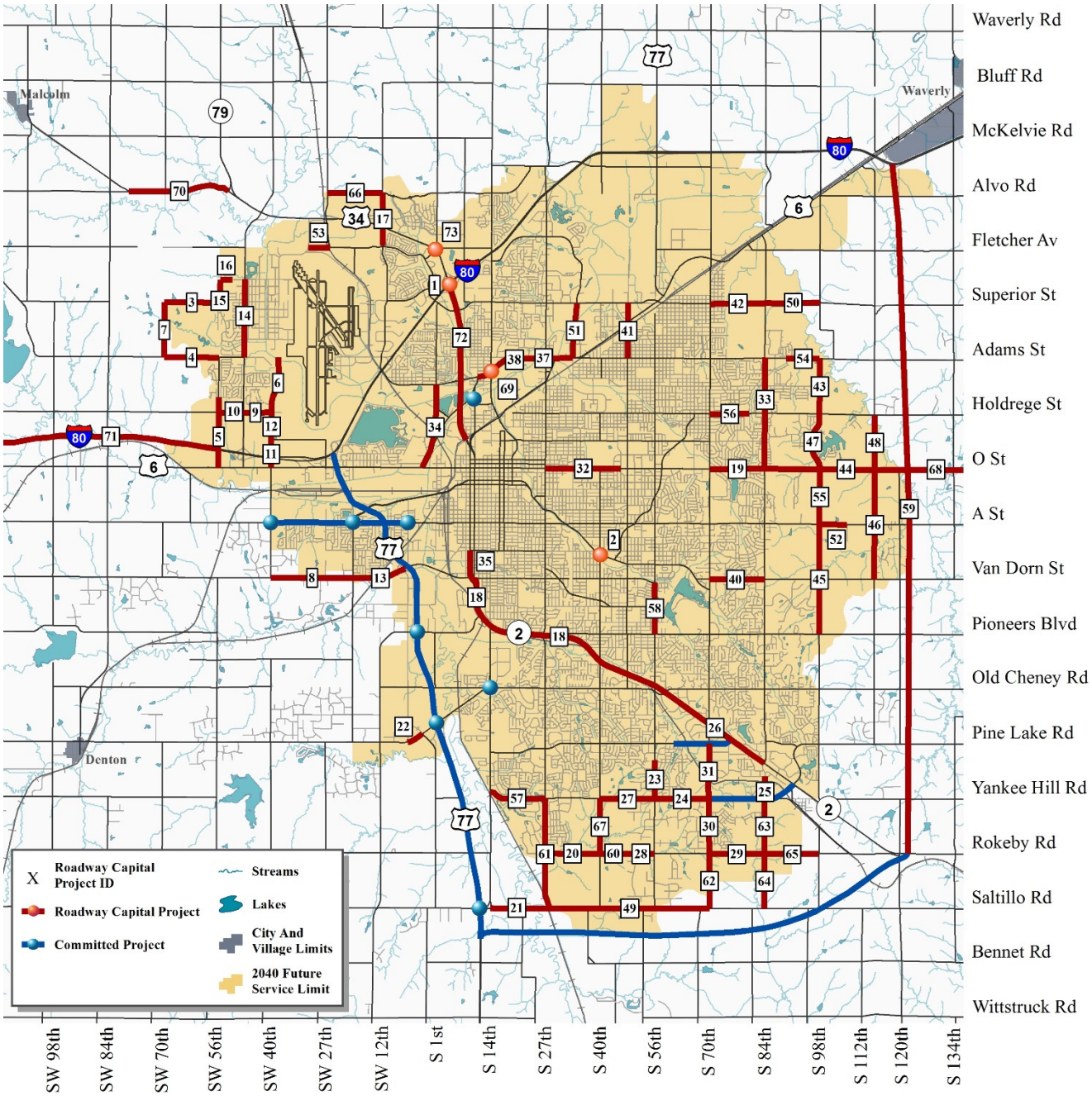


Figure 27. Candidate Roadway Capital Projects

Table 9. Candidate Roadway Capital Projects

Project ID	Street Name	Limits	Description	Lead Agency	Project Cost (2016$)
1	I-80	I-80 and I-180	Major interchange work	State	$41,000,000
2	S. 40th St	Normal Blvd and South St	Major intersection area work	Local	$8,600,000
3	W. SUPERIOR St	NW 70th Street to NW 56th Street	2 lanes + intersection improvements	Local	$7,400,000
4	W. ADAMS St	NW 70th Street to NW 56th Street	2 lanes + intersection improvements	Local	$7,000,000
5	NW 56TH St	W. Partridge Lane to W. "O" Street	2 lanes + intersection improvements	Local	$6,600,000
6	NW 38TH St	W. Adams Street to W. Holdrege Street	2 lanes + intersection improvements	Local	$6,000,000
7	NW 70TH St	W. Superior Street to W. Adams Street	2 lanes + intersection improvements	Local	$7,000,000
8	W. VAN DORN St	SW 40th Street to Coddington Avenue	2 lanes + intersection improvements	Local	$10,500,000
9	W. HOLDREGE St	NW 48th Street to NW 40th Street	2 lanes + intersection improvements	Local	$3,900,000
10	W. HOLDREGE St	NW 56th Street to NW 48th Street	2 lanes + intersection improvements	Local	$3,100,000
11	NW 40TH St	W. Vine Street to US-6, including I-80 Overpass	Overpass	Local	$11,500,000
12	NW 40TH St	W. Holdrege Street to W. Vine Street	2 lanes + intersection improvements	Local	$3,500,000
13	W. VAN DORN St	Coddington Avenue to US-77	2 lanes + intersection improvements	Local	$6,000,000
14	NW 48TH St	Adams Street to Cuming Street	2 lanes + intersection improvements	Local	$10,300,000
15	NW 56TH St	W. Cuming Street to W. Superior Street	2 lanes + intersection improvements	Local	$3,200,000
16	W. CUMING St	NW 56th Street to NW 52nd Street	2 lanes + intersection improvements	Local	$1,800,000
17	NW 12TH St	W. Alvo Road to Fletcher Avenue, US 34 Overpass	2 lanes + int. impr. + overpass	Local	$11,500,000
18	NEBRASKA HWY 2	Van Dorn Street to Old Cheney Road	6 lanes + intersection improvements	Local	$15,900,000
19	O St (US-34)	Wedgewood Drive to 98th Street	6 lanes + intersection improvements	Local	$28,000,000
20	ROKEBY Rd	S. 27th Street to S. 40th Street	2 lanes + intersection improvements	Local	$7,000,000
21	SALTILLO Rd	S. 14th St to S. 27th St	2 lanes + intersection improvements	Local	$8,200,000
22	DENTON Rd	Amaranth Ln to S. Folsom St	2 additional lanes	Local	$4,000,000
23	S. 56TH St	Thompson Creek Boulevard to Yankee Hill Road	4 lanes + intersection improvements	Local	$7,400,000
24	YANKEE HILL Rd	S. 56th Street to S. 70th Street	2 lanes + intersection improvements	Local	$7,000,000
25	S. 84TH St	Amber Hill Road to Yankee Hill Road	4 lanes + intersection improvements	Local	$4,300,000

Project ID	Street Name	Limits	Description	Lead Agency	Project Cost (2016$)
26	NEBRASKA HWY 2	Old Cheney Road to S. 84th Street	6 lanes + intersection improvements	Local	$30,100,000
27	YANKEE HILL Rd	S. 40th Street to S. 56th Street	2/4 lanes + intersection improvements	Local	$10,200,000
28	ROKEBY Rd	S. 48th Street to S. 56th Street	2 lanes + intersection improvements	Local	$7,000,000
29	ROKEBY Rd	S. 70th Street to S. 84th Street	2 lanes + intersection improvements	Local	$7,400,000
30	S. 70TH St	Yankee Hill Rd to Rokeby Rd	2 lanes + intersection improvements	Local	$4,800,000
31	S. 70TH St	Pine Lake Road to Yankee Hill Road	4 lanes + intersection improvements	Local	$10,500,000
32	O St (US-34)	Antelope Valley N/S Rdwy. (19th St.) to 46th Street	6 lanes + intersection improvements	Local	$27,300,000
33	N. 84TH St	O Street to Adams Street	6 lanes + intersection improvements	Local	$28,500,000
34	US-6 (SUN VALLEY)	Corn. Hwy (US-6) to W. O St.(US-6)	4 lanes + turn lanes	State	$16,000,000
35	S. 9TH St	Van Dorn St to South St	3 lanes + intersection improvements	Local	$3,500,000
37	CORNHUSKER (US-6)	N. 20th Street to N. 33rd Street	6 lanes + intersection improvements	Local	$16,800,000
38	CORNHUSKER (US-6)	N. 11th St to N. 20th St	6 lanes + intersection improvements	Local	$18,200,000
40	VAN DORN St	S. 70th Street to S. 84th Street	4 lanes + intersection improvements	Local	$10,200,000
41	N. 48TH St	Adams St to Superior St	4 lanes + intersection improvements	Local	$12,400,000
42	HAVELOCK Ave	N. 70th Street to N. 84th Street	2 lanes + intersection improvements	Local	$6,300,000
43	N. 98TH St	Adams Street to Holdrege Street	2 lanes + intersection improvements	Local	$8,000,000
44	O St (US-34)	84th Street to 120th Street	4 lanes + intersection improvements	State	$14,000,000
45	S. 98TH St	A Street to Pioneers Boulevard	4 lanes + intersection improvements	Local	$21,000,000
46	S. 112TH St	US-34 to Van Dorn Street	2 lanes + intersection improvements	Local	$14,000,000
47	N. 98TH St	Holdrege St to O St	Additional 2 lanes	Local	$5,400,000
48	N. 112TH St	Holdrege Street to US-34	2 lanes + intersection improvements	Local	$9,100,000
49	SALTILLO Rd	27th Street to 70th Street	2 lanes + intersection improvements	Local	$21,000,000
50	HAVELOCK Ave	N. 84th St to N. 98th St	2 lanes + intersection improvements	Local	$7,000,000
51	N. 33RD St	Cornhusker Hwy to Superior St	4 lanes + int. impr. & bridge	Local	$15,000,000
52	A STREET	S. 98th St to 105th St	2 lanes + intersection improvements	Local	$3,500,000
53	W. FLETCHER Ave	NW 31st St to NW 27th St	2 lanes + intersection improvements	Local	$3,200,000

Project ID	Street Name	Limits	Description	Lead Agency	Project Cost (2016$)
54	ADAMS St	N. 90th St to N. 98th St	2 lanes + intersection improvements	Local	$4,200,000
55	S. 98TH St	US 34 (O St) to A St	4 lanes + intersection improvements	Local	$10,500,000
56	HOLDREGE St	N. 70th St to N. 80th St	4 lanes + intersection improvements	Local	$7,900,000
57	YANKEE HILL Rd	S. 14th St to S. 27th St	Additional 2 lanes	Local	$4,000,000
58	S. 56TH St	Van Dorn St to Pioneers Blvd	4 lanes + intersection improvements	Local	$10,500,000
59	EAST BELTWAY	Nebraska Hwy 2 to I-80	New 4 lane divided highway	Local	$247,000,000
60	ROKEBY Rd	S. 40th St to S. 48th St	2 lanes + intersection improvements	Local	$3,500,000
61	S. 27TH St	Yankee Hill Rd to Saltillo Rd	2 lane realignment + int. impr.	Local	$14,000,000
62	S. 70TH St	Rokeby Rd to Saltillo Rd	4 lanes + intersection improvements	Local	$10,500,000
63	S. 84TH St	Yankee Hill Rd to Rokeby Rd	4 lanes + intersection improvements	Local	$10,500,000
64	S. 84TH St	Rokeby Rd to Saltillo Rd	4 lanes + intersection improvements	Local	$10,500,000
65	ROKEBY Rd	84th St to 98th St	2 lanes + intersection improvements	Local	$5,000,000
66	W. ALVO Rd	NW 27th Street to Tallgrass	2 lanes + intersection improvements	Local	$8,400,000
67	S. 40th St	Yankee Hill Rd to Rokeby Rd	2/4 lanes + intersection improvements	Local	$8,800,000
68	O St (US-34)	120th Street to east county line	4 lanes + intersection improvements	State	$29,000,000
69	N. 14TH St	US-6 Cornhusker Highway	Interchange	Local	$15,300,000
70	US 34	N79 to Malcolm Spur	4 lanes + intersection improvements	State	$12,000,000
71	I-80	Pleasant Dale to NW 56th Street	6 lanes + bridges	State	$76,000,000
72	I-180	I-80 to US-6	Reconstruction + bridges	State	$40,100,000
73	US 34	US 34 and Fletcher Ave	New interchange	State	$25,000,000

Table 10 lists the remaining 14 miles of two plus center turn lane projects estimated to cost approximately $45 million in 2016 dollars.

Table 10. Two Plus Center Turn Lane Projects

Street Name	Limits	Length (miles)	Project Cost (2016$)
S. 40th Street	Pioneers Boulevard to Gertie Avenue	0.40	$1,400,000
Adams Street	39th Street to 46th Street	0.50	$1,750,000
Havelock Avenue	60th Street to 63rd Street	0.25	$50,000
A Street	6th Street to 17th Street	0.85	$2,975,000
A Street	17th Street to 27th Street	0.75	$1,500,000
A Street	40th Street to 48th Street	0.44	$1,540,000
Van Dorn Street	11th Street to 27th Street	1.25	$2,500,000
Cotner Boulevard	48th Street to South Street	0.46	$1,610,000
S. 40th Street	L Street to C Street	0.50	$1,750,000
Fremont Street	48th Street to 70th Street	1.50	$5,400,000
S. 33rd Street	South Street to High Street	0.72	$1,440,000
Military Road	10th Street to 14th Street	0.16	$1,120,000
S. Folsom Street	A Street to South Street	0.50	$1,000,000
Leighton Avenue	48th Street to 70th Street	1.50	$5,400,000
Y Street	17th Street to 27th Street	0.66	$1,320,000
W. Adams Street	1st Street to 14th Street	0.90	$1,800,000
W. South Street	Coddington Avenue to Park Boulevard	1.55	$10,850,000
Calvert Street	48th Street to 56th Street	0.50	$1,000,000
N. 40th Street	Cornhusker Highway to Superior Street	0.58	$1,160,000

Intelligent Transportation Systems (ITS) and Technology

Green Light Lincoln will require many upgrades to, or complete replacement of, the existing traffic signal system and equipment. Key components include:

- New signal system management software and hardware
- New intersection detection systems
- New signal displays and signal phasing alternatives
- ITS deployment
- Corridor signal optimization (re-timing) program
- Traffic monitoring and incident management capability improvements

GREEN LIGHT LINCOLN™
IT'S GO TIME

The continued deployment of Green Light Lincoln will result in vast improvements to the overall traffic signal system and several projects with high benefit/cost ratios. Benefits of this initiative are wide-reaching and include:

- Reduced travel times, delays, and stops
- Reduced vehicle emissions and pollutants
- Reduced fuel consumption and savings at the pump
- Reduced number and severity of crashes
- Smooth traffic flow and reduced driver frustration
- Delayed need for major street widening projects

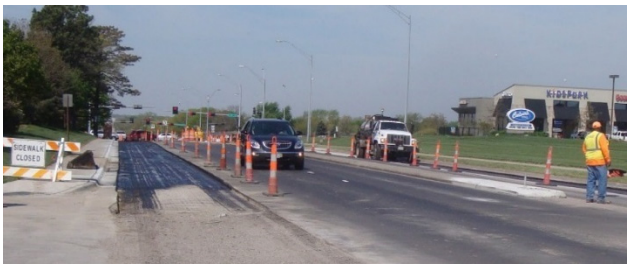
Full implementation of the Green Light Lincoln program is estimated to cost approximately $150 million through 2040.

Operations and Maintenance

The City of Lincoln's street maintenance operations program includes a variety of services and functions, including street sweeping, snow removal, stormwater, mowing, crack sealing, and pothole repair. Continuation of the current operations and maintenance program is estimated to cost $590 million through 2040.

Rehabilitation

The City of Lincoln's rehabilitation program includes residential streets, arterials, bridges, and traffic signals. Past funding for the rehabilitation program has not kept up with the need. Roadway rehabilitation became an important topic as part of the 2011 LRTP and continued to be an important topic for this LRTP update. As described in **Chapter 5**, the City's target is to rehabilitate five percent of the arterial street system each year and three percent of the residential street system. That is, each arterial street would be rehabilitated once every 20 years, and each residential street would be rehabilitated once every 33 years. The costs associated with this goal will increase as the system ages, as the community grows and adds miles of streets to be maintained, and as construction costs increase over time.



Railroad Crossing Improvements

While the railroad lines through Lincoln and Lancaster County are critically important to the local economy, many of the railroad crossings with the street network are at-grade resulting in safety problems and travel delays. The needs based plan for railroad crossings includes the addition of crossing gates and flashers at at-grade railroad crossings (approximately $400,000 per crossing), railroad crossing surface upgrades (approximately $40,000 every 20 years for each crossing), as well as grade separations, as listed in **Table 11**. **Figure 24** in **Chapter 3** shows the railroad subdivisions.

Table 11. Railroad Grade Separated Crossing Project Needs

Street Crossing	BNSF Subdivision	Daily Exposure (Vehicles x Trains)
Adams Street	Creston	708,500
N. 33rd Street	Creston	604,500
Old Cheney Rd.	St. Joseph	558,140
N. 70th Street	Creston	385,450
Saltillo Road	St. Joseph	341,291
South Street	St. Joseph	215,000
Pioneers Blvd.	St. Joseph	136,310
S. 14th Street	St. Joseph	102,942
N. 44th Street	Creston	97,500
Hickman Rd.	St. Joseph	91,805
W. A Street	Hastings	91,000
N. 148th Street	Creston	87,750

Rural Roads

Close coordination between the Lancaster County Engineer's Office and MPO staff occurred during the development of the LRTP update to identify a needs based rural roads program. The rural roads program includes two basic project types:

1. Rehabilitation and two lane widening projects
2. Paving gravel roads

Rehabilitation and two-lane widening projects involve repairing or rebuilding currently paved roadways and, in some cases, widening these roads to include wider lanes and paved shoulders. **Figure 28** shows the rural roads project needs.

In March 2006, the City of Lincoln and Lancaster County entered into an Interlocal Agreement to establish public street ROW and construction standards to be applied to the repair, maintenance, and construction of streets located within the 3-mile zoning jurisdiction of the City. The purpose of this agreement was to provide mutually beneficial guidelines for a more useful life of the public investments in the county roads while accommodating future growth with *rural to urban transition street (RUTS)* standards. The design and construction standards generally specify that rural principal arterial, rural minor arterial, rural major collector, and rural minor collector in the Lincoln – Lancaster County Comprehensive Plan be graded to future ultimate width, paved with an alignment shifted to one side of the centerline to accommodate two lanes of rural paving with urban culverts. This was to allow the addition of two urban lanes in the future without the need to close the roadway and detour traffic.

In May 2008, the Mayor's Road Design Standards Technical Task Force, a group consisting of City staff, developers, attorneys, and private engineers, reviewed the rural roads within the 3-mile area and, applying the RUTS standards, developed recommendations for one of four treatments on each roadway segment based on the future (2030) traffic forecasts. The intent was to further stretch public and private funds and to get as many roads surfaced as possible.

Ideas on the best method for making the transition from rural to urban sections continue to evolve as traffic needs and intersection design (roundabouts) change. The City of Lincoln Public Works and Utilities Department and Lancaster County Engineer's Office are currently reviewing the RUTS standards to evaluate whether there are adjustments that should be made to transition from rural to urban more efficiently.

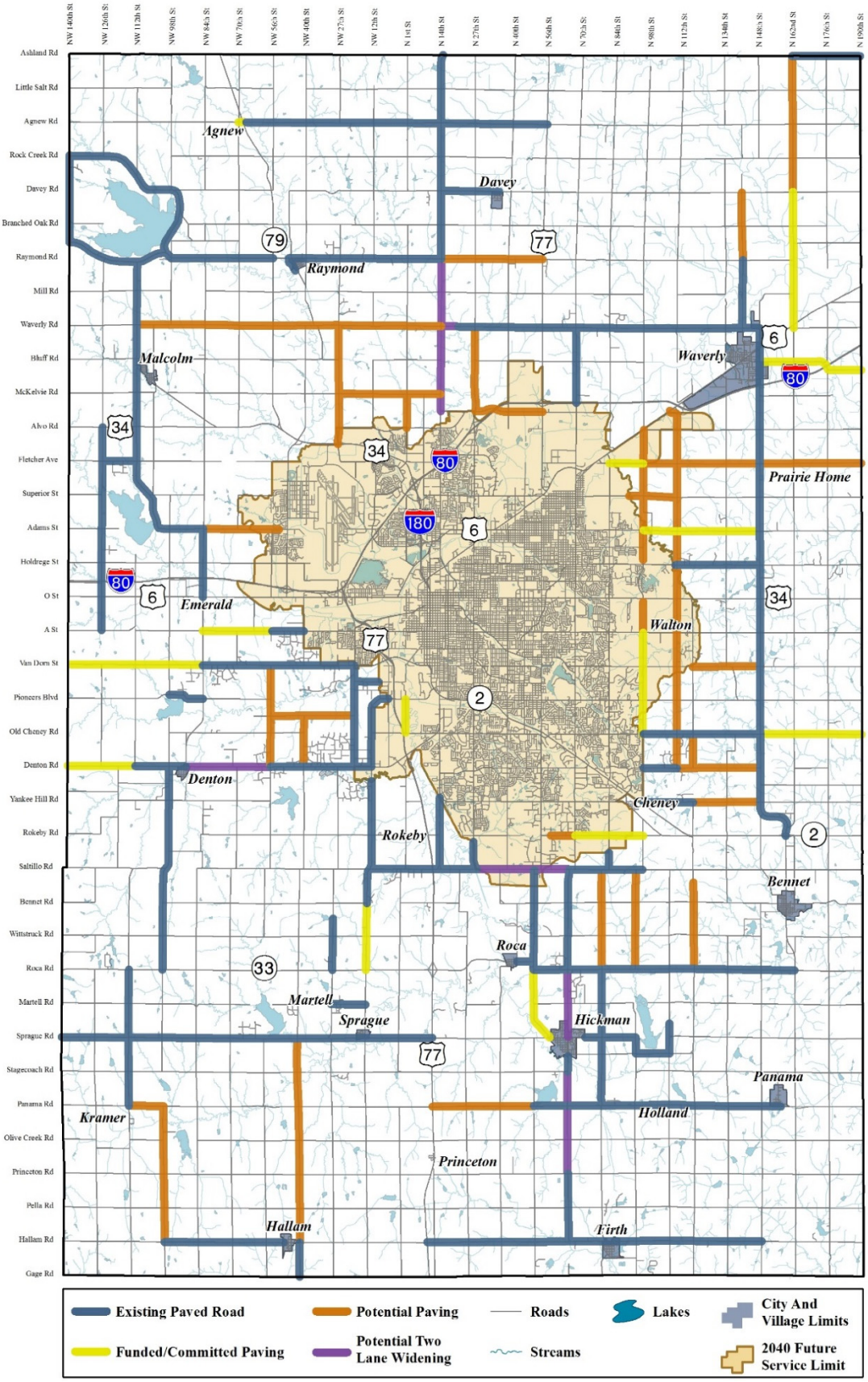


Figure 28. Rural Roads Project Needs

Bicycle and Pedestrian

The Bicycle and Pedestrian Capital Plan identifies a proposed network that has been updated as part of the LRTP update process, as shown on **Figure 29**. As a part of the LRTP development process, specific trail projects were identified, as listed in **Table 12**. The 45 candidate trail projects identified in this table total approximately $40 million in 2016 dollars.

The community has expressed a desire to continue expanding the network of on-street bike facilities to complement the trail system. Further study of the complete on-street bike network in Lincoln is needed and should include various facility types, depending on street context, such as cycle tracks, striped bike lanes, and signed bike routes (shared lanes).

The Bicycle Plan proposes a ½ to 1-mile grid to serve the City and its destinations. With the potential completion of 208 additional miles of facilities, the total miles of bicycle facilities will be approximately 441, or an increase of 90 percent. The future on-street bike facilities identified on **Figure 29** are anticipated to be implemented, to the extent possible, through the existing street improvement programs. Further study of these on-street facilities will be needed, as well as consideration of how they can be cost-effectively incorporated at the time of routine street maintenance.

The Pedestrian Plan highlights some policies that should remain in place to support pedestrian facilities. For example, sidewalks should not be placed adjacent to the curb but separated by a landscaped parkway consistent with the City's Design Standards for street trees, parking screening, and landscaping. This policy, in conjunction with others, will benefit the pedestrian environment.

The Pedestrian Plan also identifies improvements to be made, such as completing missing gaps, increasing amenities at and around transit stops, and other projects like mid-block crossing improvements, pedestrian countdown signal heads, and a wayfinding system.

A popular method for expanding the trails system has been to use rail corridors that are no longer operational. Two rail corridors within the City would provide trail expansion opportunities if these rail lines are ever abandoned:

- Highway 2 and Beal Slough running south and east
- Rail line running from the rail yard west of Haymarket to the north and west around the airport property

The Bicycle and Pedestrian Capital Plan should be updated and advanced in the near future.

Transit

The TDP divides service recommendations into two categories:

- A cost-constrained preferred alternative, which includes recommendations for restructuring the system
- Five new phases of recommended service expansions

The cost-constrained preferred alternative is projected to increase ridership on StarTran by between 5 and 10 percent within 2 years of implementation. The preferred alternative (refer to **Figure 23** in **Chapter 3**) will be implemented in October 2016.

Specific service recommendations include:

- Later evening service on most routes to improve access to jobs and education
- Midday frequency improvements on high ridership corridors
- Improved route directness to reduce customer travel time
- Frequent service (15 to 30 minute combined headways) to high-ridership neighborhoods between downtown and G Street, as well as between downtown and Vine/27th Street
- Service extension to the fast-growing Yankee Hill and 84th Street corridors
- New crosstown connections to improve trip directness and reduce transfers
- Consolidation or elimination of service in unproductive areas
- New commuter bus service from southeast Lincoln to downtown

The TDP recommended service expansions (in addition to the preferred alternative recommendations described above) represent the needs based transit plan and include:

- Sunday service on all routes (excluding UNL routes and StarShuttle)
- Improved headway on key routes
- Four additional transit vehicles
- Express bus service between southeast Lincoln and downtown Lincoln/UNL

The cost to implement and operate the transit needs based plan is estimated to be $520 million over the 24-year time horizon of the LRTP (2017–2040).

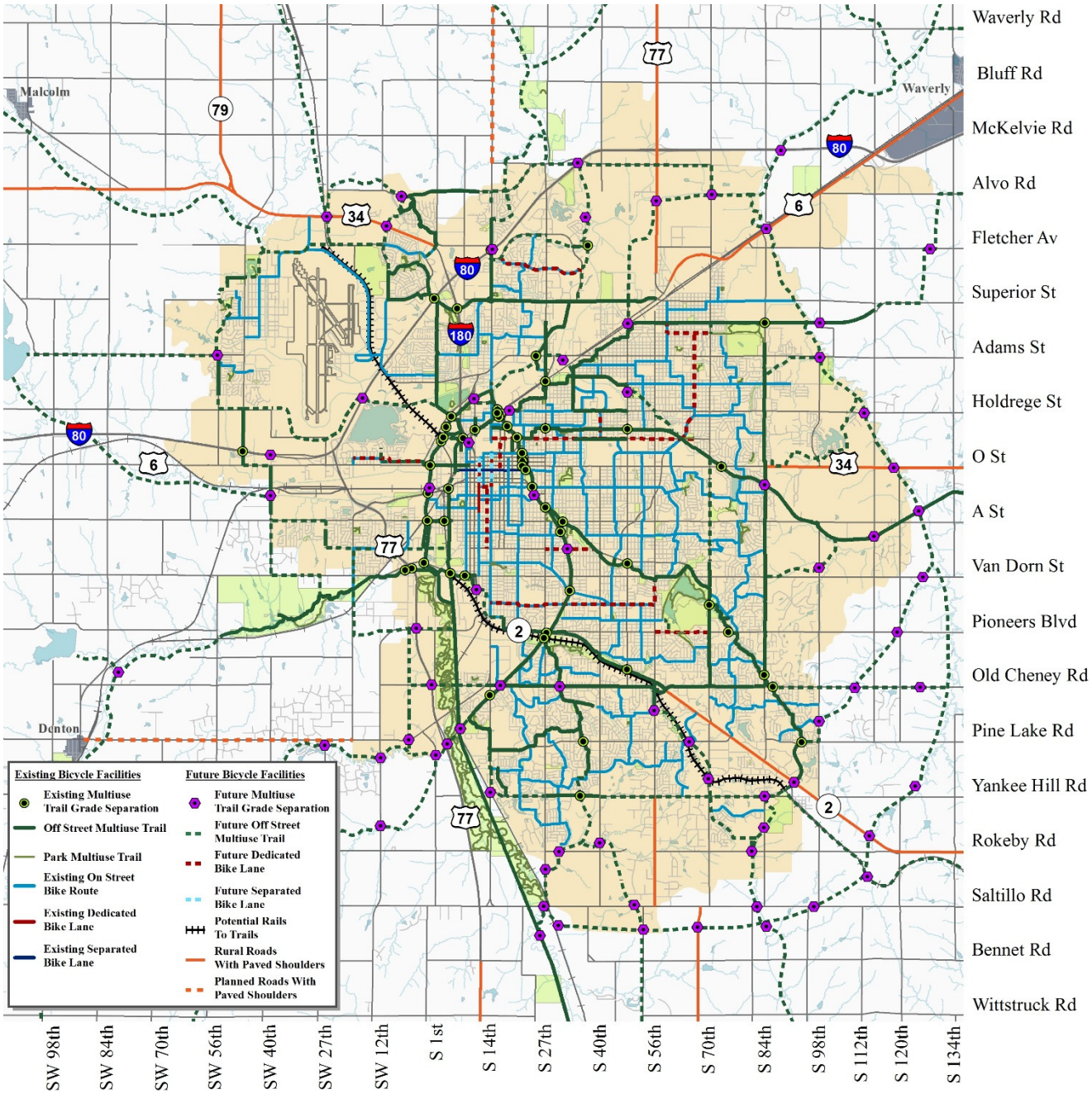


Figure 29. Existing and Proposed Bicycle Facilities

Table 12. Candidate Trail Projects

Project ID	Trail Name	Limits	Project Cost (2016$)
T-03	Woodlands	Jensen Park to Rokeby Rd	$470,000
T-04	Woodlands	Rokeby Rd to 70th St to Yankee Hill Rd	$900,000
T-07	Landmark Fletcher	33rd St & Superior St to 27th St	$600,000
T-08	Rock Island Connection	Viaduct over BNSF to Jamaica	$900,000
T-09	Wilderness Hills	Yankee Hill Rd to Rokeby Rd	$1,150,000
T-11	Waterford	84th to Stevens Creek	$850,000
T-12	Stevens Creek	Murdock Trail to Mo Pac Trail	$2,300,000
T-13	Cardwell Branch Trail	Hwy 77 to Prairie Creek	$700,000
T-14	Air Park Connector - Fletcher Ave	NW 27th St to NW 31st St	$90,000
T-15	W. Holdrege Street Trail	NW 48th St to NW 56th St	$140,000
T-16	N. 48th St Trail	Murdock Trail to Superior St	$170,000
T-18	N. 33rd St and Adams Trails	Murdock Trail to Cornhusker Hwy	$200,000
T-19	10th Street Trail	Van Dorn St to 17th St/Burnam St	$300,000
T-20	Deadmans Run Trail	48th St to Mo Pac Trail	$410,000
T-21	East Campus Trail	Leighton St to Holdrege St	$150,000
T-23	27th St Connector	Rokeby Rd to South Beltway	$460,000
T-24	56th Connector	Rokeby Rd to South Beltway	$1,200,000
T-25	84th Connector	Rokeby Rd to South Beltway	$450,000
T-26	South Beltway Trail - Phase I	27th St to 56th St	$1,500,000
T-27	Greenway Corridor Trail/Haines Branch - Phase I	SW 56th St to Saltillo Rd	$3,000,000
T-28	NW 56th	W. Adams to NW 56th to W. Superior	$550,000
T-29	South Street	SW 27th to Jamaica	$730,000
T-30	O Street	SW 40th St to SW 48th St	$240,000
T-31	A Street Connectors	SW 40th - A Street to F St & SW 27th - Shane Dr to A St	$90,000
T-33	Stevens Creek	Murdock Trail to Hwy 6	$610,000
T-34	N. 48th St/Bike Park Trail	Superior St to N. 56th St	$680,000
T-35	N. 1st St	N. 1st St crossing of Hwy 34	$400,000
T-36	NW 12th St	NW 10th St to crossing of Hwy 34 to Aster	$850,000
T-37	Rock Island	Grade separated crossing of Old Cheney	$1,200,000
T-38	Tierra Williamsburg	Grade separated crossing of Old Cheney	$1,200,000
T-39	10th Street	Grade separated crossing	$2,000,000
T-40	Hwy 2 & Yankee Hill Rd	Grade separated crossing	$2,000,000
T-41	Mo Pac Trail	Grade separated crossing of 112th	$1,100,000
T-42	Mo Pac Trail	Grade separated crossing of 84th	$1,500,000
T-43	Yankee Hill Rd	S. 56th St to S. 70th St	$310,000

Project ID	Trail Name	Limits	Project Cost (2016$)
T-44	14th & Yankee Hill Connector (w/RTSD proj)	S. 14th St - South LPS Property Line to Yankee Hill Rd	$320,000
T-45	Landmark Fletcher	Fletcher Ave from N. 27th St to N. 14th St	$950,000
T-46	Prairie Village Trail	84th St. to Stevens Creek, South of Adams	$450,000
T-47	Van Dorn Trail	84th and Van Dorn to 106th and MoPac Trail	$725,000
T-48	Air Park Connector - Phase I	NW 12th to Flectcher to NW 27th	$530,000
T-49	Air Park Connector - Phase II	NW 48th to NW 31st	$550,000
T-50	Greenway Corridor Trail/Haines Branch - Phase II	SW 56th to Saltillo Rd	$1,000,000
T-51	South Beltway Trail - Phase II	56th to 84th	$2,500,000
T-52	South Beltway Trail – Phase III	84th Street to Hwy 2	$3,500,000
T-53	NW 56th Street Trail	W. Holdrege to W Partridge	$80,000
T-54	Jamaica North – Arena Trail	J Street to N Street	$150,000
T-55	Yankee Hill Road	S. 40th Street to S. 56th Street	$310,000

5. Performance Measures

Performance-based planning affords a structure for this LRTP to ensure that scarce resources are used effectively and equitably. The community values of transportation are woven into the goals, objectives, performance measures, and ultimately, evaluation criteria, used to identify high-priority transportation projects. The LRTP is based on a set of goals intended to implement the vision and support the transportation needs and community values, while aligning with national goals and federal planning factors (as shown in **Table 13**).

This chapter is organized by the seven goal categories:

- Maintenance
- Mobility and System Reliability
- Livability and Travel Choice
- Safety and Security
- Economic Vitality
- Environmental Sustainability
- Funding and Cost Effectiveness

Goals and objectives are the foundation for performance-based planning; the seven goals articulate the desired end state, and the objectives are specific, measurable statements that support the achievement of a goal. Thirty-two system-level performance measures are linked directly to the objectives. Performance measures aid in planning, developing policy, prioritizing investments, and measuring progress. Several characteristics are common to good performance measures.

Available Data – Measures are often influenced by the availability of data and the ease of obtaining the data on a regular basis.

Trackable over Time – Measures should be based on consistently tracked data that can be compared annually or semiannually.

Relation to Goals – In performance-based planning, performance measures should track progress toward stated goals and objectives.

Storytelling Potential – Measures should be meaningful and help to weave a storyline around system performance. They can be an effective communication tool for requesting funds and garnering public support.

For each performance measure, available current and historic data show the current system performance and the trajectory of historic trends, providing insight into the projects, strategies, and policies needed to meet the stated performance targets. Specific performance targets have been identified for some performance measures; in other cases, a desired trend (increase, decrease, or maintain) has been identified.

Table 13. Relationship between LRTP Goals and FAST Act Goals and Planning Factors

		Lincoln MPO LRTP Transportation Goals						
		Maintenance: A well maintained system	**Mobility and System Reliability:** An efficient, reliable, and well-connected transportation system for moving people and freight	**Livability and Travel Choice:** A multimodal system that provides travel options to support a more compact, livable urban environment	**Safety and Security:** A safe and secure transportation system	**Economic Vitality:** A transportation system that supports economic vitality for residents and businesses	**Environmental Sustainability:** A transportation system that enhances the natural, cultural, and built environment	**Funding and Cost Effectiveness:** Collaboration in funding transportation projects that maximizes user benefits
FAST Act Planning Factors	Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency		✓			✓		✓
	Increase the safety of the transportation system for motorized and nonmotorized users				✓			
	Increase the security of the transportation system for motorized and nonmotorized users				✓			
	Increase the accessibility and mobility of people and for freight		✓					
	Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns			✓			✓	
	Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight			✓				
	Promote efficient system management and operation		✓					✓
	Emphasize the preservation of the existing transportation system	✓						
	Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation		✓				✓	
	Enhance travel and tourism		✓			✓		
FAST Act Goals	**Safety:** To achieve a significant reduction in traffic fatalities and serious injuries on all public roads				✓			
	Infrastructure Condition: To maintain the highway infrastructure asset system in a state of good repair	✓						
	Congestion Reduction: To achieve a significant reduction in congestion on the National Highway System		✓					
	System Reliability: To improve the efficiency of the surface transportation system		✓	✓				
	Freight Movement and Economic Vitality: To improve the national freight network and support regional economic development		✓			✓		
	Environmental Sustainability: To enhance the performance of the transportation system while protecting and enhancing the natural environment						✓	
	Reduced Project Delivery Delays: To reduce project costs, accelerate project completion, eliminate delays in project development, and reduce regulatory burdens							✓

Maintenance

As the transportation system ages, increased funding is required for maintenance. Naturally, street systems built in the 1950s, 60s, and 70s have aged to the point of needing reinvestment. Nebraska's climate is also hard on streets—freeze/thaw cycles and extreme temperature ranges cause continual pressure on the transportation system. There is often competition between funding for new projects and funding for the maintenance and operation of the existing system. Reductions in maintenance funding today lead to higher costs in the future. Constructing new roads increases future maintenance costs as new facilities age.

Goal: A well-maintained transportation system.

Objectives

Maintain streets, sidewalks, trails, transit fleet, and amenities to a state of good repair to maximize the value of Lincoln and Lancaster County transportation assets

System Performance Measures

1. **Percent of streets rehabilitated**
2. **Trail conditions**
3. **Square feet of sidewalks replaced**
4. **Age of traffic signals**
5. **Bridge sufficiency ratings**
6. **Age of transit vehicles**

Strategies

- Update the City's Asset Management Plan to include improved tracking
- Rehabilitate 5 percent of major streets, 3 percent of residential streets, and 1 percent of sidewalks each year
- Replace 15 signals each year (3 percent)
- Develop a methodology to monitor trail conditions

Maintenance

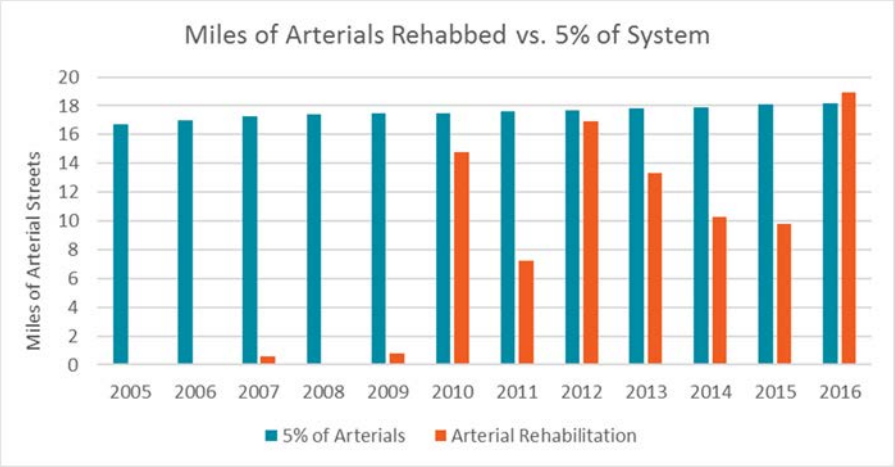
1 Percent of streets rehabilitated

The City of Lincoln's pavement management system aims to make the best use of limited funding to keep the City's transportation system functional. Lincoln has about 2,800 lane miles of streets. Maintaining an updated survey of pavement condition provides important data on how to prioritize street repair projects. The City's increased investment in street rehabilitation in 2016 resulted in a considerable improvement in the condition of the arterial streets. The charts below show the actual miles (or blocks) of street rehabilitation (in orange) compared to the City's goal (in blue) of rehabilitating 5 percent of arterials and 3 percent of residential streets annually. That is, each arterial street would be rehabilitated once every 20 years, and each residential street once every 33 years.

Baseline Data:

Percent of Arterial Streets Rehabilitated = **5.2%** (2016)

Percent of Residential Streets Rehabilitated = **0.6%** (2016)



Desired Trend:

Targets:

- Rehabilitate 5 percent of the arterial street system each year
- Rehabilitate 3 percent of the residential street system each year

Data Source(s) and Methodology:

The Public Works and Utilities Department tracks the percent of arterial and residential streets rehabilitated on an annual basis. Greater priority is given to arterial street streets due to their higher traffic volumes, speeds and potential for rapid deterioration.

Maintenance

2 Trail conditions

The community treasures Lincoln's trail system, and maintaining the trails in a state of good repair is important. Collecting data on the condition of the trail segments will be helpful to the Lincoln Parks and Recreation Department in scheduling major rehabilitation projects.

Baseline Data:	***Desired Trend:***
No data available; collect beginning in 2017	To be determined

Data Source(s) and Methodology:
The Lincoln Parks and Recreation Department is working to develop a methodology for assessing trail conditions.

Maintenance

3 Square feet of sidewalks replaced

Many sidewalks in older areas of the City have developed cracks and heaving pavement and require maintenance, making them particularly difficult for those with disabilities. The maintenance of this existing system is important so that this network of sidewalks remains an asset to the community.

Baseline Data:

Square feet of sidewalks replaced = **402,200** (2015)

Desired Trend:

An extensive effort and investment ($4 million) went toward sidewalk repairs in 2015. The 2016 budget of $1 million is more in line with historic investments in sidewalk repairs.

Data Source(s) and Methodology:

The City of Lincoln Public Works and Utilities Department maintains an inventory of the sidewalk panel repairs and replacements.

Maintenance

4 Age of traffic signals

The City of Lincoln maintains 430 traffic signals, including 350 full intersection signals, as well as pedestrian crossings, prepare-to-stop, and flasher locations. Currently, over 20 percent of the City's traffic signal installations are older than 30 years. By replacing these older traffic signals, current signal technology and interconnects can be introduced, resulting in not only reduced signal maintenance requirements, but also improved signal operations and coordination.

Baseline Data:

Number of traffic signals 30+ years old = **100** (2015)

Desired Trend:

Data Source(s) and Methodology:

The City of Lincoln Public Works and Utilities Department maintains a database of traffic signals that is updated as signals are replaced.

Maintenance

5 Bridge sufficiency ratings

Bridges provide important connections in the transportation system, providing vehicular, pedestrian, and bicycle crossings of highways and major roads, rivers, streams, and railroads, all of which would otherwise create barriers to transportation. The City of Lincoln owns and maintains 135 vehicle bridges, and Lancaster County maintains 184 bridges. Maintaining the City and County bridges to functional and safe conditions is a critically important component of achieving the maintenance goal.

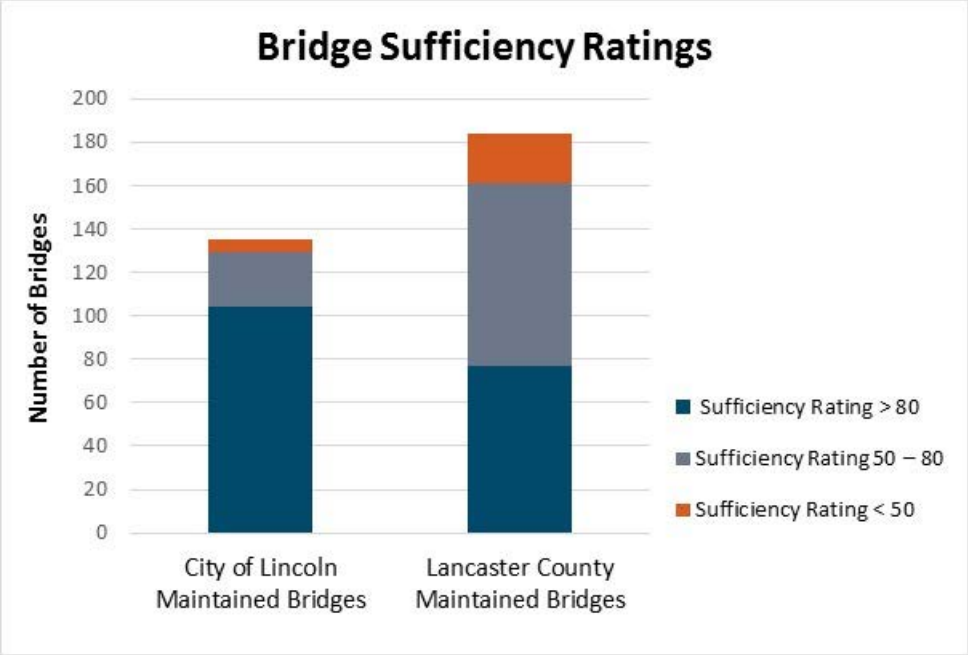
Baseline Data:

City of Lincoln:

Percent of bridges with sufficiency rating > 80 = **77%** (2015)
Percent of bridges with sufficiency rating > 50 = **96%** (2015)

Lancaster County:

Percent of bridges with sufficiency rating > 80 = **42%** (2016)
Percent of bridges with sufficiency rating > 50 = **88%** (2016)



Desired Trend:

The City of Lincoln's target is to maintain at least 75 percent of bridges with a sufficiency rating above 80 and to increase the percentage of bridges with a sufficiency rating above 50 to 100 percent.

Data Source(s) and Methodology:

Both the City of Lincoln Public Works and Utilities Department and the Lancaster County Engineer's Office maintain a database of bridge conditions. The database is updated following bi-annual inspections or when a bridge is rehabilitated or replaced. A bridge's sufficiency rating measures its condition and ability to serve its intended function. Sufficiency ratings range from 0 to 100, with 100 being the best. A low sufficiency rating may result from structural defects, narrow lanes, low vertical clearance, or other factors that make it functionally obsolete. Bridges with ratings between 50 and 80 are eligible for rehabilitation, and bridges with ratings below 50 are eligible for replacement.

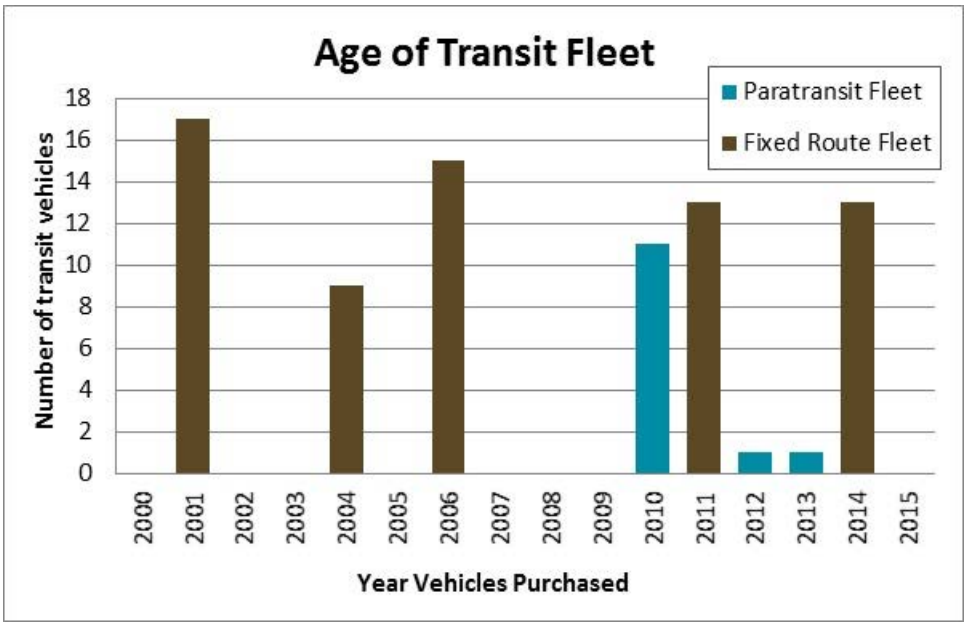
Maintenance

6 Age of transit vehicles

StarTran maintains a fleet of 67 fixed-route buses and 13 paratransit vehicles. All 80 vehicles are lift equipped. Within the next five years, more than half of the StarTran fixed-route fleet must be replaced, as vehicles are reaching the end of their useful lives.

Baseline Data:

Number of transit vehicles 12+ year old = **17**



Desired Trend:

Reduce the number of transit vehicles 12+ years old

Data Source(s) and Methodology:

StarTran maintains an inventory of fixed-route buses and paratransit vehicles.

Mobility and System Reliability

An efficient system allows people to move from place to place in as direct a route as possible, reducing the amount of time spent in travel, the distance that must be traveled, and the amount of time spent in congested traffic. A transportation system that performs well allows users to choose multiple transportation modes and to move through those modes efficiently and reliably. Most travelers are less tolerant of unexpected delays because such delays have larger consequences than those that drivers face with everyday congestion.

Goal: An efficient, reliable, and well-connected transportation system for moving people and freight.

Objectives	System Performance Measures
Optimize the efficiency of the transportation network	1 **Congested roadways**
Improve the performance and reliability of the transportation system	2 **Transit on-time performance** 3 **Signal detection reliability**

Strategies

- Address congestion through intersection improvements
- Improve intersection operations and coordinate signal timing
- Implement intelligent transportation systems (ITS)
- Implement transportation demand management (TDM) tools such as van-sharing

Mobility and System Reliability

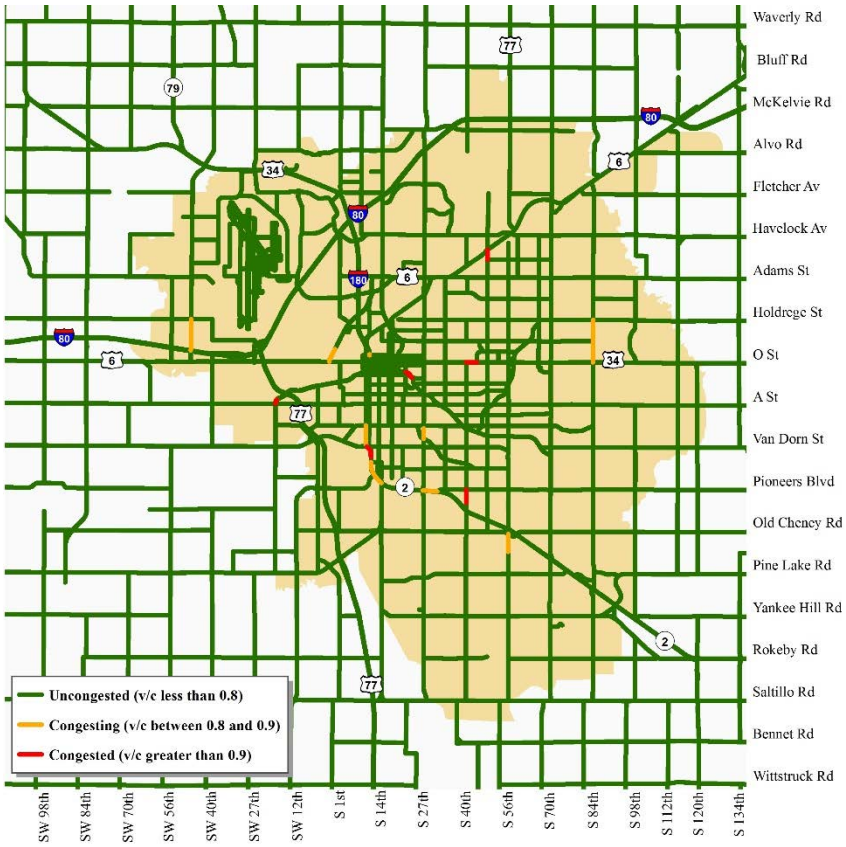
1 Congested roadways

Comparing traffic volumes with planning level capacities can be used in assessing the current congestion levels on the road network. Because this analysis uses planning-level capacities and daily traffic volumes, it does not explicitly account for delays or congestion that may be experienced at a particular intersection. This analysis provides a high-level snapshot of the current congestion.

Baseline Data:

Congested roadways (v/c > 0.9) = **0.5%** of major road network within the City of Lincoln (2015)

Congested + congesting roadways (v/c > 0.8) = **1.5%** of major road network within the City of Lincoln (2015)



Desired Trend:

Target: Maintain at least 85 percent of roads in uncongested conditions.

Note: This target, based on the Mayor's Taking Charge Initiative, calls for maintaining roadway capacity to ensure that average vehicle delay does not exceed 35 seconds per vehicle at 85 percent of signalized intersections. The systemwide v/c ratios are not a perfect comparison with intersection congestion, but they do provide a system-level measure of congestion over time.

Data Source(s) and Methodology:

To perform this analysis, a volume to capacity (v/c) ratio was calculated using daily traffic volumes and planning level capacities assumed for each roadway classification, area type, and number of lanes (these are the capacities used in the travel demand model). The baseline analysis used an extensive traffic count inventory completed in 2015.

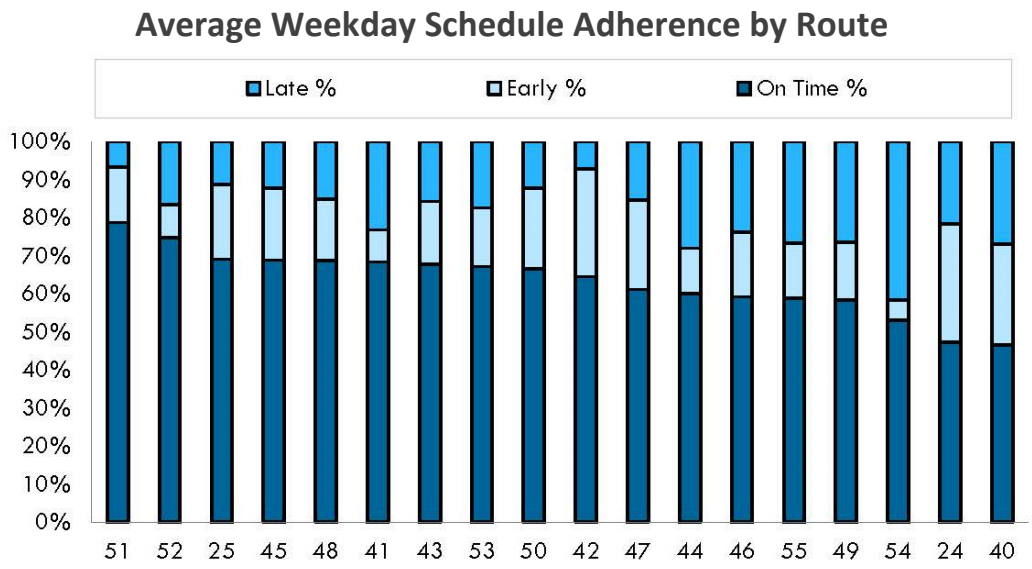
Mobility and System Reliability

2 Transit on-time performance

Transit dependability refers to service that arrives on time. On weekdays, the average systemwide on-time performance is 61 percent of all trips within zero to five minutes late at every time point. Routes 51 and 52 have the best on-time performance, with 79 percent and 75 percent of trips being on-time, respectively. Route 54 has the highest percentage of late arrivals (42 percent). Routes 24, 40, 41, 44, 46, 49, and 55 all have late arrivals averaging 20 percent or higher. Routes 24, 40, and 42 have the highest averages of early trips (31 percent, 27 percent, and 28 percent, respectively). With a few exceptions, early arrivals appear to be more prevalent than late buses. It should be noted that no StarTran routes have recovery time at terminal time points incorporated into their schedules.

Baseline Data:

Transit on-time performance = **61%** (2015)



Desired Trend:

Data Source(s) and Methodology:

StarTran vehicles are equipped with automatic passenger counters (APC) that also record the time vehicles arrive and depart time points. These data can be used to conduct a schedule adherence analysis for all StarTran fixed routes. The baseline data are based on the portion of trips that arrive within five minutes of the scheduled stop time (as documented in the StarTran Transit Development Plan Existing Conditions Report, September 2015).

Mobility and System Reliability

3 Signal detection reliability

Vehicle detection systems can detect vehicles arriving at a signalized intersection, sending a message to the signal controller that a vehicle is present. This message triggers the controller to give the waiting vehicle(s) a green indication. If the signal detection system is faulty, it may send false positive triggers to the controller, or conversely it may not detect a waiting vehicle. The reliability of the signal detection is important because it maximizes traffic flow efficiency. Lincoln's Traffic Engineering Section is working to improve the citywide detection systems using national best practices.

Baseline Data:	***Desired Trend:***
Signal detection reliability = **70%** (2015)	Target: 95 percent signal detection reliability

Data Source(s) and Methodology:
Lincoln Public Works and Utilities Department, Traffic Engineering Section is actively tracking the signal detection reliability.

Livability and Travel Choice

Lincoln ranks high as a livable city. The availability of a wide variety of mobility options, such as walking, biking, transit, and driving, is critical to maintaining or improving the quality of life for residents. Both older adults and the Millennial generation demonstrate a strong desire for walkable communities in which they can live proximate to jobs, shopping, and community activities. Connectivity between travel modes is important to enable a seamless transition between modes. Higher densities that encourage alternative travel modes can also help to maximize use of existing infrastructure.

Goal: A multimodal system that provides travel options to support a more compact, livable urban environment.

Objectives	System Performance Measures
Improve the quality of alternative transportation options (transit, biking, walking)	1 **Miles of trails, sidewalks, and on-street bike facilities** 2 **Annual transit ridership** 3 **Percent of transit-supportive areas served**
Accommodate all travel modes on Lincoln's street network	4 **Percent of projects incorporating Complete Streets elements**

Strategies

- Reduce the demand for single occupant vehicle (SOV) travel through coordinated land use and transportation decisions
- Implement recommendations of the Transit Development Plan and the Bicycle and Pedestrian Capital Plan
- Support mixed use development and higher densities
- Consider the travel needs of the aging population
- Implement and fully support the bike share program (launch scheduled for 2017)

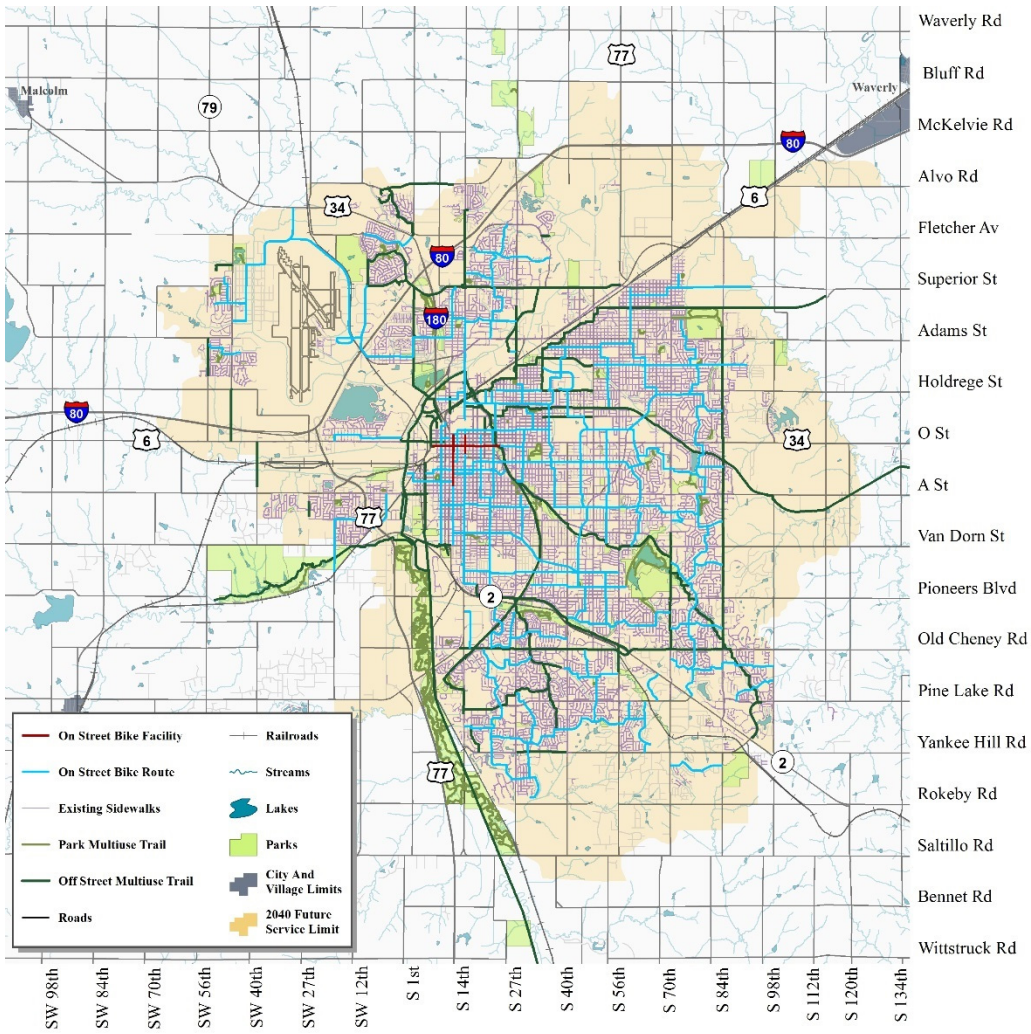
Livability and Travel Choice

1 Miles of trails, sidewalks, and on-street bike facilities

The nonmotorized transportation network comprises trails, sidewalks, and the street network (with the exception of freeways). Designated on-street bike facilities help to identify the best routes for bicyclists (bike routes) and to provide designated space for bicyclists (bike lanes). Trails, sidewalks, and on-street bike facilities are critical in providing travel choice options. As the network of nonmotorized infrastructure increases, residents have more options for travel and an increased quality of life.

Baseline Data:

Miles of Sidewalks = **1,715** (2016)
Miles of Trails = **183** (2016)
Miles of Bike Lanes = **2.2** (2016)
Miles of On-Street Bike Routes = **141** (2016)



Desired Trend:

Data Source(s) and Methodology:

Lincoln/Lancaster County Planning Department GIS Data

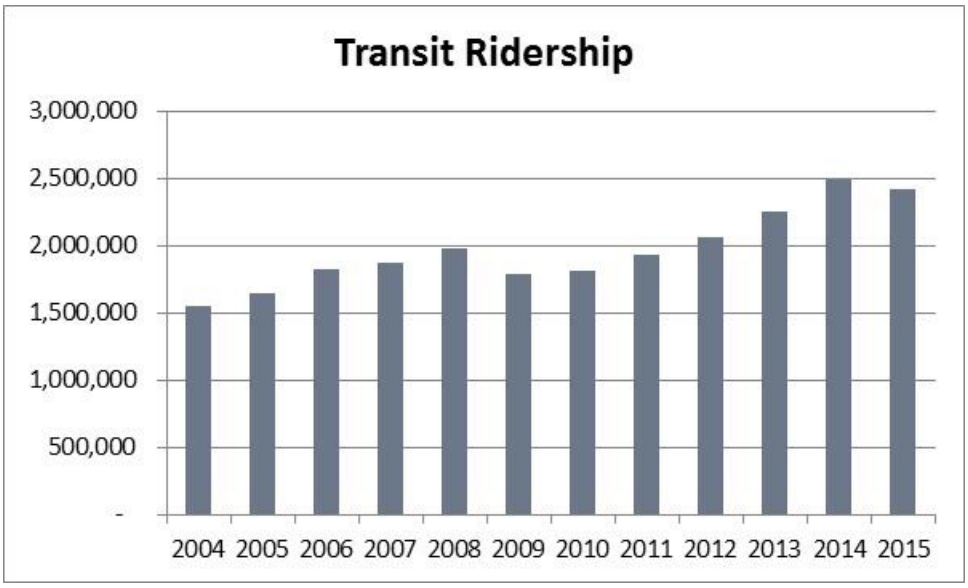
Livability and Travel Choice

2 Annual transit ridership

StarTran has seen a steady growth in systemwide ridership over the past decade. From 2004 to 2015, annual ridership increased by 56 percent from roughly 1.5 million to 2.4 million.

Baseline Data:

Annual transit ridership = **2,415,096** (2015)



Desired Trend:

Target: Increase StarTran ridership by 5 percent per year

Note: Consistent with Mayor's Taking Charge initiative.

Data Source(s) and Methodology:

StarTran, including fixed-route transit and paratransit trips

Livability and Travel Choice

3 Percent of transit-supportive areas served

Several studies have indicated that the distance an average person can reside from a bus route and still be considered to "have service" is one-quarter mile, which is approximately equivalent to a five-minute walk. The TDP identifies a standard of providing service to at least 90 percent of transit-supportive areas, including high-density areas within one-quarter mile of a bus route, major activity centers, employers or employment concentrations of 200 or more employees, health centers, middle and high schools, colleges/universities, shopping centers of over 25 stores, and social service/government centers.

Baseline Data:	***Desired Trend:***
No data available; collect beginning in 2017	To be determined

Data Source(s) and Methodology:
StarTran completes a service area coverage calculation annually and will convert to this measure in 2017.

Livability and Travel Choice

4 Percent of projects incorporating Complete Streets elements

In September 2013, Mayor Beutler signed Executive Order 086476, which approved Administrative Regulation No. 35, establishing a policy for the development of Complete Streets. The purpose for this Executive Order/Administrative Regulation was to encourage the design and operation of a transportation system that is safe and convenient for all users, regardless of age, ability, or transportation mode through the development of Complete Streets.

Baseline Data:

No data available; collect beginning in 2017

Desired Trend:

Data Source(s) and Methodology:

The Executive Order/Administrative Regulation established a Complete Streets Committee to discuss how to implement Complete Streets within the community. The committee is an interdepartmental group composed of representatives from Planning, Public Works and Utilities, StarTran, Urban Development, Building and Safety, Parks and Recreation, and the Health Department. Complete Streets Committee members identify projects within their departments to be reviewed by the Committee. The Complete Streets Committee focuses on projects that have a regional significance. However, project plans are typically sent out to departments for review, and several Complete Streets Committee members review Public Works and Utilities projects for Complete Streets elements outside the regular meetings. The percentage of reviewed projects that incorporate Complete Streets elements will be reported in the Complete Streets Annual Report.

Safety and Security

The safety and security of our transportation system for motorized and nonmotorized users are of critical importance. All transportation improvements should be designed to be safe and secure. Visibility, access control, and separation of incompatible modes, either through buffers or grade separations, are some of the methods that can be used to decrease conflicts and increase comfort. Security devices at key facilities, such as bus stops and trail head facilities, increase the safety and security of users. The federal government has established a goal of eliminating fatalities on the highway system–the "Vision Zero" initiative is reflected in the Lincoln MPO's goal.

Goal: A safe and secure transportation system.

Objectives	System Performance Measures
Reduce fatal, injury, and total crash rates for vehicles, bicyclists, and pedestrians	1 **Injury and fatal crashes per capita** 2 **Percent of total crashes involving injury or fatality** 3 **Bike crashes per 10K commuting bicyclist** 4 **Pedestrian crashes per 10K commuting pedestrian** 5 **Transit crashes per 100K miles driven**
Improve personal security for transportation system users	6 **Number of programs/campaigns related to safety and security**

Strategies

- Help the transportation system recover swiftly from incidents
- Consider installation of protected bikeways to provide a physical separation between bicyclists and motorists
- Continue to develop an annual crash report focusing on identifying significant crash patterns and countermeasures
- Develop educational programs related to the safety and security of the transportation system

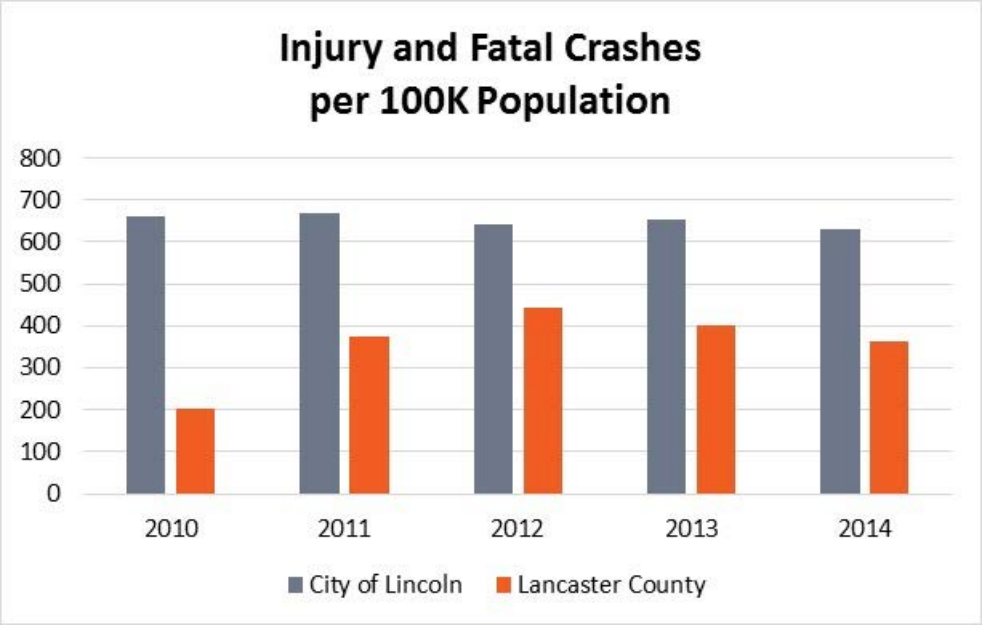
Safety and Security

1 Injury and fatal crashes per capita

Traffic crashes are a major threat to public safety. This measure tracks the number of injury and fatal crashes per 100,000 population.

Baseline Data:

City of Lincoln injury and fatal crashes per 100K population = **632** (2014)



Desired Trend:

Target: Maintain an injury/fatal traffic crash rate of no more than 700 crashes per 100,000 population in the City of Lincoln

Note: Consistent with Mayor's Taking Charge initiative

Data Source(s) and Methodology:

These data are drawn from traffic crash investigation reports prepared by police officers. The Police Department, Public Works and Utilities Department, and State Department of Roads Accident Records Bureau compile data pertaining to Lincoln traffic crashes monthly and annually. The population data for the City of Lincoln is from the US Census. The County Engineer's Office provides the Lancaster County crash data. The population used to calculate Lancaster County's crash rate per capita is the Lancaster County population less the City of Lincoln population, from US Census data.

Safety and Security

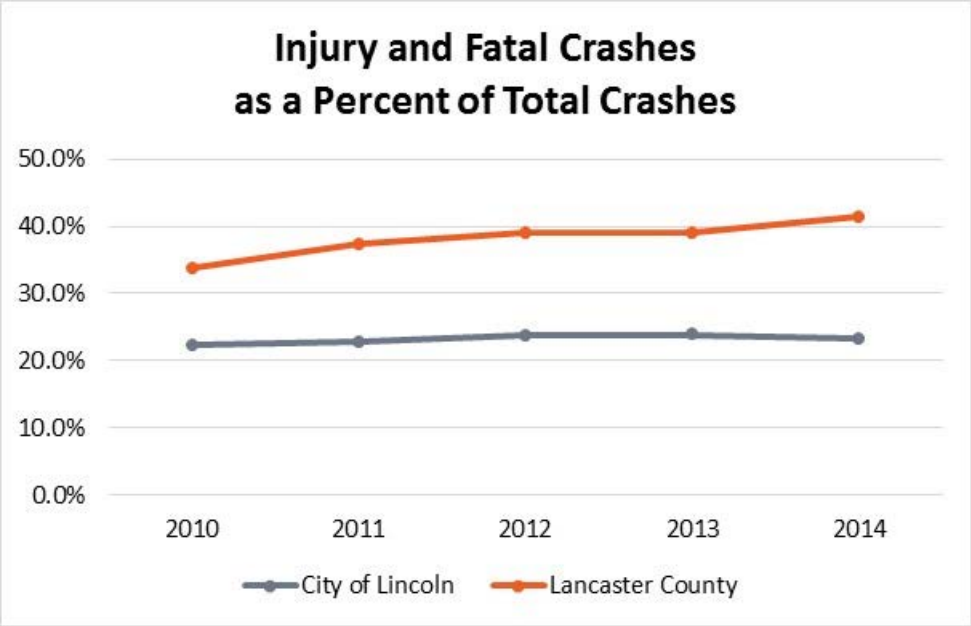
2 Percent of total crashes involving injury or fatality

Over the past five years, there has been an average of roughly 7,500 traffic crashes per year on Lincoln's transportation system and an average of approximately 260 traffic crashes per year on Lancaster County's roads. During the five-year time period (2010–2014), between 22 and 24 percent of the crashes in Lincoln have involved an injury or a fatality. The portion of injury or fatal crashes on Lancaster County roads has been higher—accounting for 34 to 41 percent of total crashes—and the percentage has been steadily rising each year. The federal government has established a goal of eliminating serious injuries and fatalities on the highway system—the "Vision Zero" initiative is reflected in this performance measure.

Baseline Data:

City of Lincoln:
Percent of total crashes involving injury or fatality = **23.3%** (2014)

Lancaster County:
Percent of total crashes involving injury or fatality = **41.3%** (2014)



Desired Trend:

Data Source(s) and Methodology:

These data are drawn from traffic crash investigation reports prepared by police officers. The Police Department, Public Works and Utilities Department, and State Department of Roads Accident Records Bureau compile data pertaining to Lincoln traffic crashes monthly and annually. The County Engineer's Office provides Lancaster County crash data.

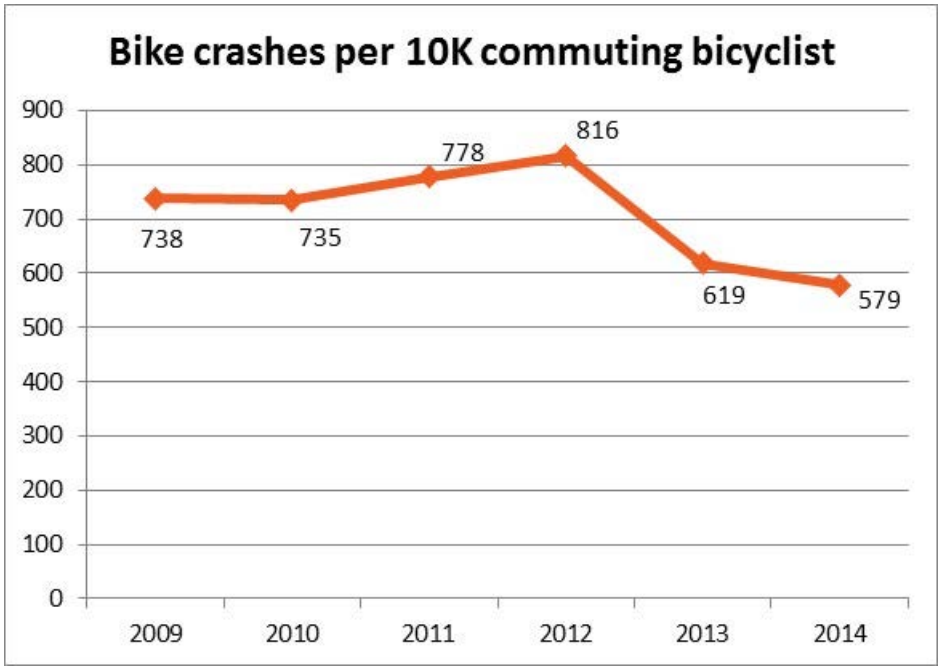
Safety and Security

3 Bike crashes per 10K commuting bicyclist

Crashes with motorized vehicles are a considerable safety risk to cyclists. In the past six years, there has been an average of 143 bicycle-involved crashes per year in the City of Lincoln. The ideal data to monitor bicycle-involved crash rates are not available. This measure is a commonly used indicator that normalizes the bicycle-involved crash data (which are readily available) with the estimated number of commuting bicyclists in Lincoln (reported by the American Community Survey) as a surrogate for total bicycle activity. The League of American Bicyclists (LAB) uses this measure as a key outcome for Bicycle Friendly Communities; the LAB's benchmark for bronze Bicycle Friendly Communities is 370 or fewer bicycle crashes per 10K commuting bicyclists.

Baseline Data:

Bike crashes per 10K commuting bicyclists in the City of Lincoln = **579** (2014)



Desired Trend:

Data Source(s) and Methodology:

These bicycle crash data are drawn from traffic crash investigation reports prepared by police officers. The Police Department, Public Works and Utilities Department, and State Department of Roads Accident Records Bureau compile data pertaining to Lincoln traffic crashes monthly and annually. The number of commuting bicyclists in Lincoln is taken from 2005 to 2014 American Community Survey (ACS) 5-year estimates. The ACS reports means of travel to work on a 1-year and 5-year basis. The 5-year estimate is used for these performance measures because it is based on a larger sample size and provides a higher degree of reliability. A rolling 5-year average should be used to monitor changes in this measure over time. For example, the 2014 data point is based on the number of bike crashes in Lincoln in 2014 and on the 5-year estimate of commuting bicyclists for 2010–2014.

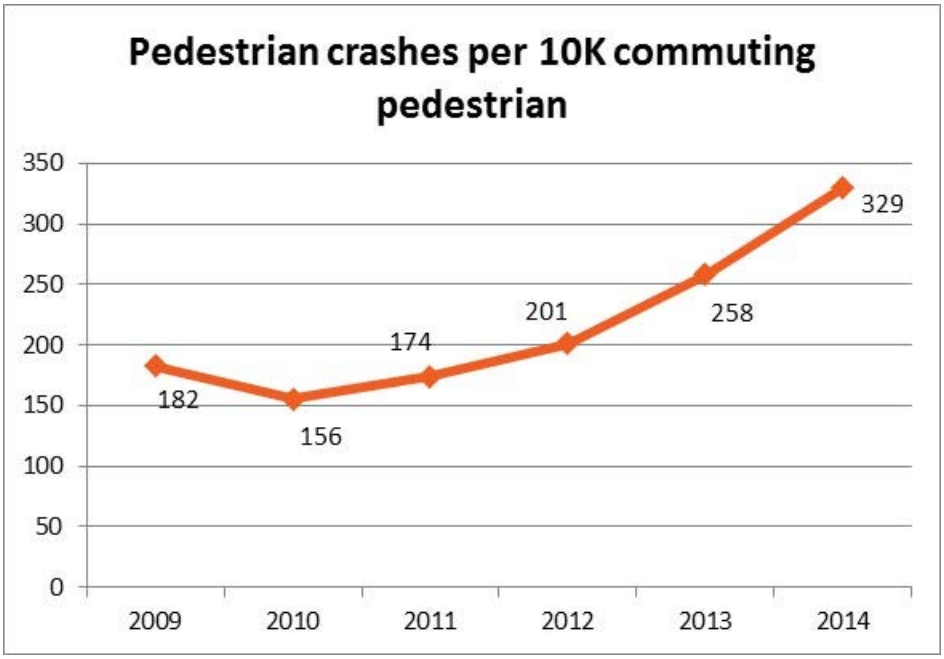
Safety and Security

4 Pedestrian crashes per 10K commuting pedestrian

Crashes with motorized vehicles are also a safety risk for pedestrians; over the past six years there has been an average of 91 pedestrian-involved crashes per year in the City of Lincoln. Similar to the bike crash rate performance measure, this measure uses the number of commuting pedestrians (from ACS data) as a surrogate for the total level of pedestrian activity in Lincoln.

Baseline Data:

Pedestrian crashes per 10K commuting pedestrians in the City of Lincoln = **329** (2014)



Desired Trend:

Data Source(s) and Methodology:

These pedestrian crash data are drawn from traffic crash investigation reports prepared by police officers. The Police Department, Public Works and Utilities Department, and State Department of Roads Accident Records Bureau compile data pertaining to Lincoln traffic crashes monthly and annually. The number of commuting pedestrians in Lincoln is taken from 2005 to 2014 ACS 5-year estimates. The ACS reports means of travel to work on a 1-year and 5-year basis. The 5-year estimate is used for these performance measures because it is based on a larger sample size and provides a higher degree of reliability. A rolling 5-year average should be used to monitor changes in this measure over time. For example, the 2014 data point is based on the number of pedestrian crashes in Lincoln in 2014 and on the 5-year estimate of commuting pedestrians for 2010–2014.

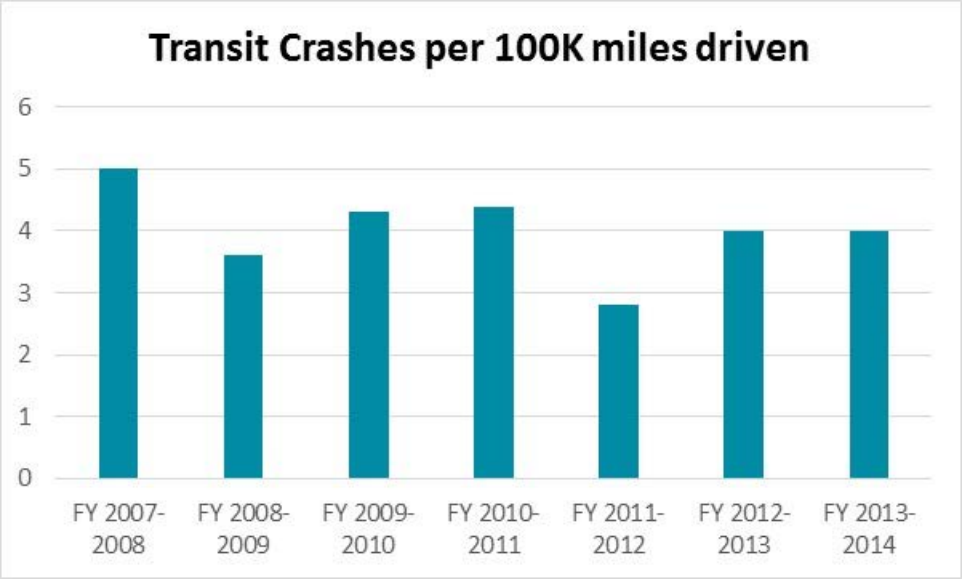
Safety and Security

5 Transit crashes per 100K miles driven

Riding the bus should provide a pleasant and safe riding environment for bus patrons. Crashes can cause injuries and disrupt patrons' riding experience. StarTran bus drivers must have a Commercial Driver's License, complete 40 hours of classroom training on safety, and have approximately 120 hours of supervised training behind the wheel before they are authorized to drive on their own. StarTran recognizes that vehicle crashes cannot be completely avoided but works to reduce their number and severity.

Baseline Data:

Transit crashes per 100K miles driven = **4.0** (FY 2013-2014)



Desired Trend:

Maintain a crash rate of less than 5.0 transit crashes per 100,000 miles driven.

Note: Consistent with Mayor's Taking Charge initiative.

Data Source(s) and Methodology:

A crash occurs when a bus collides with a stationary or moving object (another vehicle or an object). The number of crashes is then compared to the number of miles driven annually by StarTran buses. Crashes are assessed by the Accident Review Board, which consists of StarTran staff, bus drivers, and Lincoln Police Department. The Board determines if a crash was preventable or non-preventable as a basis for management to potentially assign disciplinary action.

Safety and Security

6 Number of programs/campaigns related to safety and security

Educational programs and public information campaigns can serve as a highly effective means of improving safety and security by changing behaviors of travelers of all modes. Safety campaigns can cover a broad range of topics and should be focused to best reach the target audience for the particular topic. Examples of safety campaign topics include sharing the road (with bicyclists and pedestrians), wearing seatbelts, minimizing distracted driving, avoiding aggressive driving, stopping drunk driving, etc.

Baseline Data:	***Desired Trend:***
No data available; collect beginning in 2017	To be determined

Data Source(s) and Methodology:

Economic Vitality

Economic vitality requires that many characteristics beyond transportation facilities be present, including a low cost of doing business, availability and access to technology, an educated and skilled workforce, choice of housing types, high-quality schools, low municipal and state debt, and other less tangible qualities. A good transportation system, which includes transit, vehicle, freight, air, nonmotorized, and rail modes all integrated with land use, can help contribute to these factors.

Goal: A transportation system that supports economic vitality for residents and businesses.

Objectives	System Performance Measures
Reduce the cost of transportation for system users Improve the economic competitiveness of the region by enhancing the transportation system	1 **Travel time to work** 2 **Jobs accessible in a 30-minute transit ride**
Improve the operations of the existing freight transportation system	3 **Number of potential stops on primary truck routes** 4 **Exposure rating of railroad at-grade crossings**

Strategies

- Fund and construct the South and East Beltways
- Grade separate railroad crossings
- Support affordable housing and higher densities
- Implement the recommendations in the Transit Development Plan
- Provide bicycle and pedestrian connections between neighborhoods and employment centers
- Continue funding Railroad Transportation Safety District (RTSD)
- Implement adaptive signal control on major truck routes

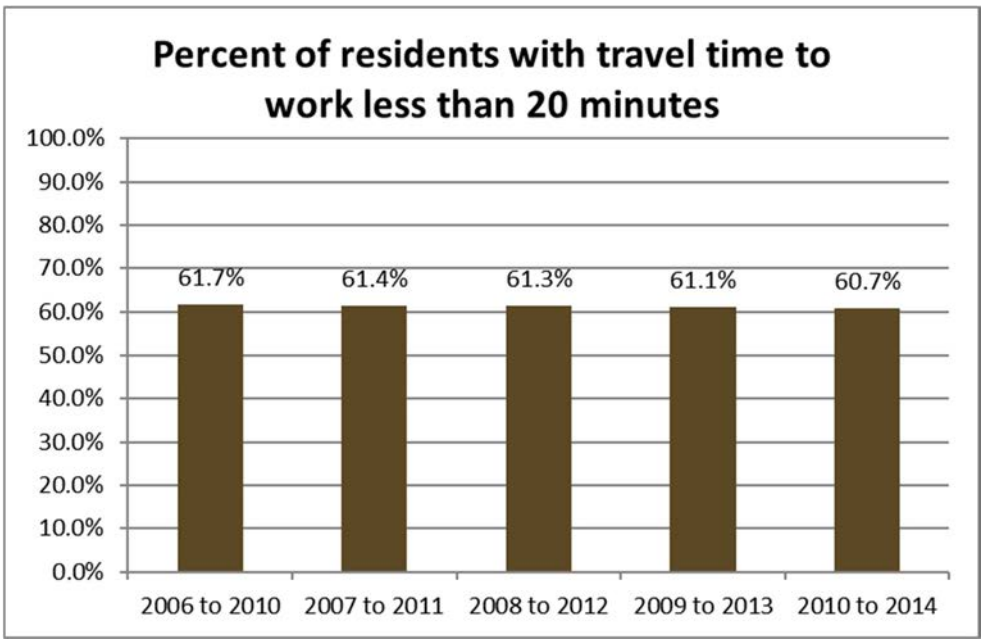
Economic Vitality

1 Travel time to work

Many factors influence the amount of time it takes to travel between home and work, such as mode of travel, the availability of desirable housing near job centers, and levels of traffic congestion.

Baseline Data:

Percent of residents with travel time work < 20 minutes = **60.7%** (2010–2014)



Desired Trend:

Target: Maintain 60 percent or more of City residents reporting travel time to work as less than 20 minutes.

Note: Consistent with Mayor's Taking Charge initiative.

Data Source(s) and Methodology:

2006 to 2014 ACS 5-year estimates. A rolling 5-year average should be used to monitor changes in this metric over time.

Economic Vitality

2 Jobs accessible in a 30-minute transit ride

The number of jobs accessible in a 30-minute transit ride reflects the potential of employees to travel by transit. The numbers of jobs accessible in a 30-minute transit ride can be increased by expanding the transit service (expand existing routes, add new routes), by increasing the number of jobs along transit routes, or by using a combination of both approaches.

Baseline Data:

Lincoln:
Average number of jobs accessible in 30-minute transit ride = **80,398**

Lancaster County (including the City of Lincoln):
Average number of jobs accessible in 30-minute transit ride = **73,243**

Desired Trend:

Data Source(s) and Methodology:

Center for Neighborhood Technology (CNT) All Transit application. The application is the largest source of transit connectivity, access, and frequency data in America. The value indicates that, on average, a household in the specified geographic area (Lincoln or Lancaster County) could access the specified number of jobs by riding transit a half hour or less.

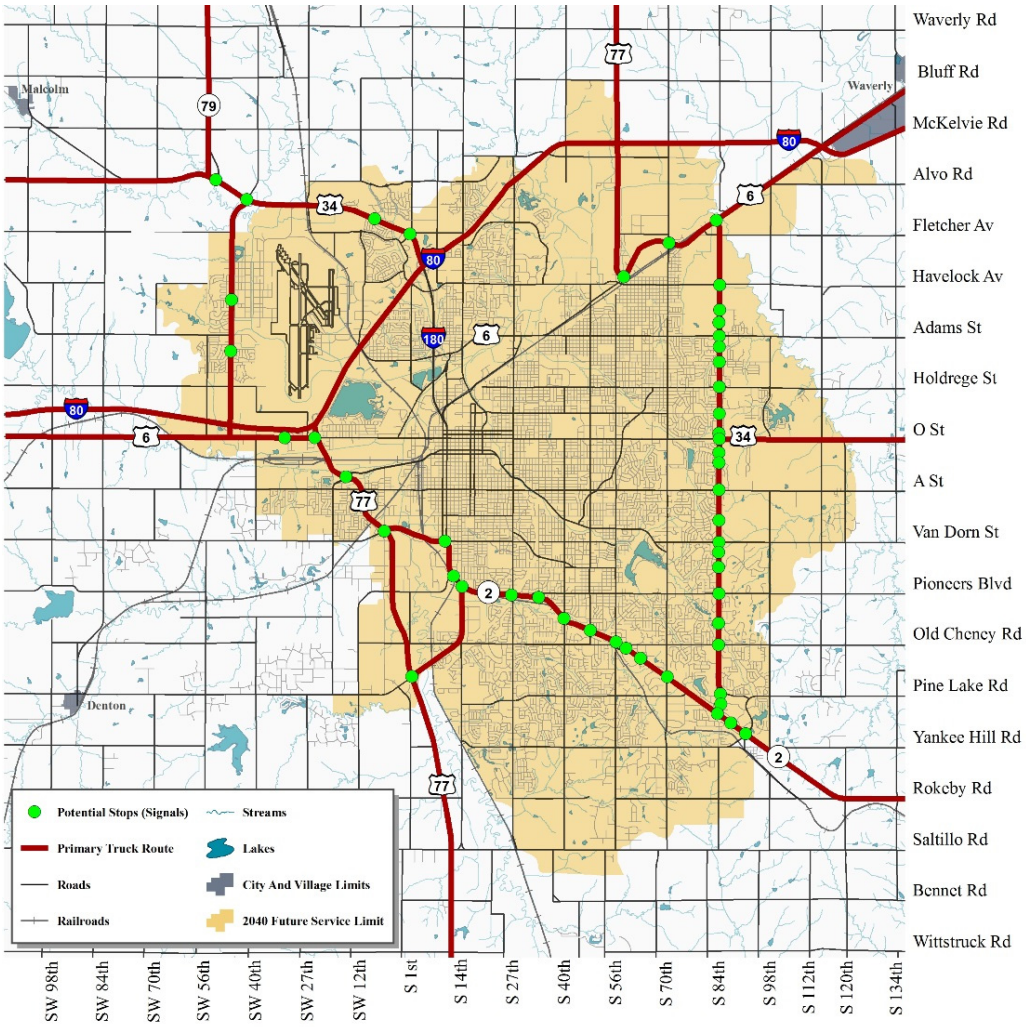
Economic Vitality

3 Number of potential stops on primary truck routes

The efficient movement of freight through Lincoln's transportation system is an important aspect of economic vitality. Access-controlled facilities such as interstates and expressways offer an efficient means for freight to be transported in and out of the Lincoln area. Trucks also use several arterial streets as a part of the primary truck route network, many of which have signalized intersections at half-mile or less intervals. These signalized intersections represent potential stops for trucks, which can result in slower travel times. The fewer signalized intersections that trucks are exposed to, the more efficient freight movement on the roadway network can be.

Baseline Data:

Number of potential stops on primary truck routes = **51** (2015)



Desired Trend:

Data Source(s) and Methodology:

City of Lincoln Public Works and Utilities Department, GIS database.

Economic Vitality

4 Exposure rating of railroad at-grade crossings

A network of railroad tracks extends radially from central Lincoln; the railroad lines are important to the local economy. Many railroad crossings within the street network are at-grade and result in safety problems and travel delays, negatively impacting the local economy. The daily railroad crossing exposure rating (daily trains multiplied by the number of vehicles per day) reflects the potential for crashes between trains and motor vehicles at crossings. The NDOR – Rail and Public Transportation Division requires a minimum exposure rating of 50,000 to qualify for possible construction of a grade separation (underpass or overpass). The BNSF Subdivisions are shown on **Figure 25** in **Chapter 3**.

Baseline Data:

Railroad at-grade crossings with exposure rating > 100K = **8** (2015)

Street Crossing	BNSF Subdivision	Daily Exposure		
		Vehicles	Trains	Rating
Adams Street	Creston	10900	65	708,500
N. 33rd Street	Creston	9300	65	604,500
Old Cheney Road	St. Joseph	12980	43	558,140
N. 70th Street	Creston	5930	65	385,450
Saltillo Road	St. Joseph	7937	43	341,291
South Street	St. Joseph	5000	43	215,000
Pioneers Boulevard	St. Joseph	3170	43	136,310
S. 14th Street	St. Joseph	2394	43	102,942
N. 44th Street	Creston	1500	65	97,500
Hickman Road	St. Joseph	2135	43	91,805
W. A Street	Hastings	7000	13	91,000
N. 148th Street	Creston	1350	65	87,750

Desired Trend:

Data Source(s) and Methodology:

City of Lincoln Public Works and Utilities Department and Railroad Transportation Safety District (RTSD).

Environmental Sustainability

Environmental stewardship of the natural environment and the cultural and built environment is a priority in the Moving Ahead for Progress in the 21st Century Act (MAP-21) and for the Lincoln MPO. Fossil fuels are limited in supply, and their burning has many effects on the environment, including increased greenhouse gases, particulate matter, and effects on global warming. Transportation projects in new areas often cross water ways, disturb land, and cut through tree masses. It is important, wherever possible, to avoid these resources or to mitigate their disturbances. Preserving the value and character of existing neighborhoods is also an important consideration, and particular attention shall be paid where a large portion of the population belongs to traditionally under-represented groups.

Goal: A transportation system that enhances the natural, cultural, and built environment.

Objectives	System Performance Measures
Maintain compliance with air quality standards	1 **Vehicle miles of travel (VMT) per capita** 2 **Mobile source emissions**
Reduce fossil fuel consumption by providing access to alternative modes and fuels	3 **Mode split** 4 **Number of alternatively fueled vehicles (AFVs) in fleet**
Avoid, minimize, and mitigate environmental impacts of transportation projects to the extent reasonably practical	5 **Miles of minimal impact projects completed (2+1)**

Strategies

- Implement Complete Streets projects and expand the on-street bike network for commuting purposes
- Convert City and County fleet to alternatively fueled vehicles
- Encourage the provision of electric charging stations
- Incorporate sustainable design elements into transportation projects by using low-impact development (LID) techniques to reduce runoff, alternative street designs, and permeable pavement
- Minimize impacts of transportation projects on the natural environment
- Reduce impacts of transportation projects on neighborhoods and cultural and historic resources
- Encourage infill development and higher densities that reduce demand for travel

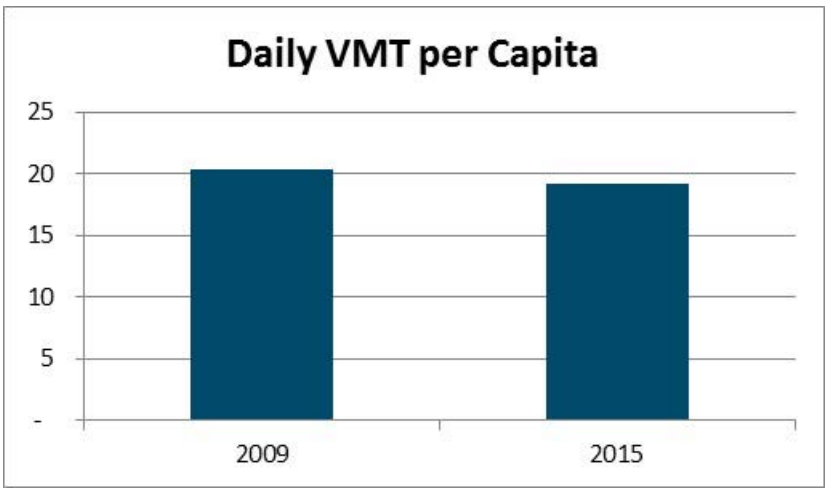
Environmental Sustainability

1 Vehicle miles of travel (VMT) per capita

Public health is an increasingly important topic in transportation planning, and planning in general. The availability of nonmotorized transportation options can have a great effect on public health by increasing time spent walking and biking. Shorter trips can be accomplished by creating more mixed use, compact neighborhoods, or increasing the integration of residential land uses into existing commercial areas through redevelopment.

Baseline Data:

Vehicle miles of travel (VMT) = **5,255,500** (2015)
VMT per capita = **18.95** (2015)



Desired Trend:

Data Source(s) and Methodology:

Daily VMT is calculated using the base year Lincoln MPO travel demand model; population is from the US Census for the City of Lincoln.

Environmental Sustainability

2 Mobile source emissions

Air quality is important for public health, environmental sustainability, and a good quality of life. The US Environmental Protection Agency has recently lowered some of the federal air quality standards, which relate to vehicle emissions. Even so, the Lincoln area should remain in attainment of the federal air quality standards, and one of the primary functions of this LRTP is to ensure that the fiscally constrained plan will help maintain attainment status into the future.

Baseline Data:

Daily Emissions Totals

Emission Type	2015
Volatile Organic Compounds (tons VOC) – Summer	4.6
Nitrogen Oxides (tons NO_X) – Summer	8.4
Carbon Monoxide (tons CO) – Winter	47.7
Greenhouse Gases (tons CO_2 Equivalent) – Summer	3,591
Greenhouse Gases (tons CO_2 Equivalent) – Winter	2,840

Desired Trend:

Data Source(s) and Methodology:

Lincoln MPO regional travel demand model and Motor Vehicle Emission Simulator (MOVES2014) calculations.

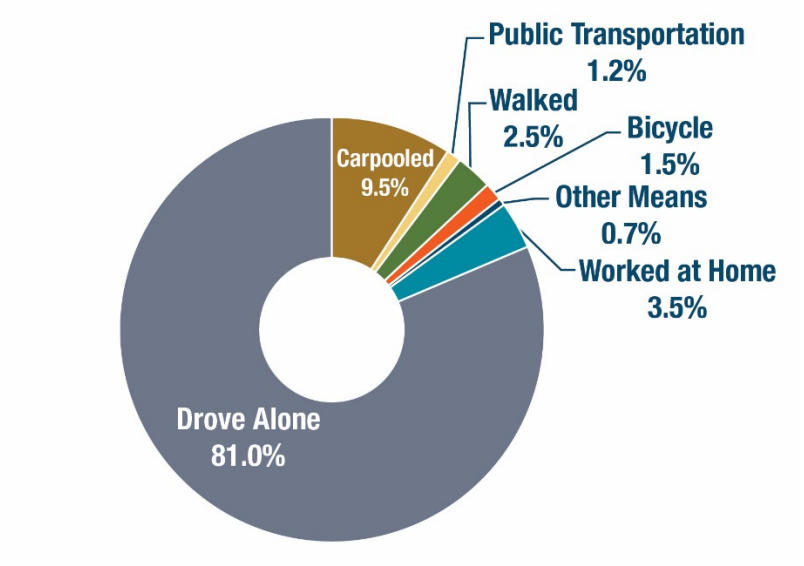
Environmental Sustainability

3 Mode split

The way in which workers get to and from work is an important transportation metric. Driving alone is by far the most commonly used mode of transportation for Lancaster County. More than four out of five residents drive alone to work. Encouraging more residents to use commuting methods other than the single occupant vehicle is important to enhance economic development and diversification, help build community ties, improve quality of life through the freedom of choice, and promote a healthy lifestyle. Further, an increased number of trips using non-single occupant vehicle modes reduces the number of vehicles on roadways and, therefore, reduces congestion and traffic delays, improves air quality, and enhances access to jobs and schools. Many factors impact the mode choice by commuters including, but not limited to, fuel prices, travel time, infrastructure conditions and availability, education, convenience, income, weather, parking (for bike or vehicle), cultural norms, availability of showers/lockers at work, and overall personal preference.

Baseline Data:

Mode share of non-SOV trips in Lancaster County = **19.0%** (2010–2014 5-year estimate)



Desired Trend:

Data Source(s) and Methodology:

The information for this indicator comes from the ACS, which is collected and compiled annually by the US Census Bureau. The ACS reports means of travel to work on a 1-year and 5-year basis. The 2010 to 2014 5-year estimate is used for this performance measure because it is based on a larger sample size and provides a higher degree of reliability. The baseline data for mode share are for all of Lancaster County. A rolling 5-year average should be used to monitor changes in this metric over time.

Environmental Sustainability

4 Number of alternatively fueled vehicles (AFVs) in fleet

Increasing the share of AFVs in the region contributes to the objectives of reducing air pollutant emissions and dependency on fossil fuels. Alternative fuel refers to fuels that are used in place of gasoline and diesel fuel; the US Environmental Protection Agency refers to them as clean fuels and defines them as those fuels that create less pollution than today's gasoline. The US Department of Energy lists AFVs as biodiesel, electricity, ethanol, hydrogen, methanol, natural gas, propane, p-series, and solar energy.

Baseline Data:

StarTran (2015):
13 Compressed Natural Gas (CNG) buses

City of Lincoln (2015):
1 CNG library bookmobile
6 CNG passenger sedans
1 biofuel passenger sedan
38 electric hybrid passenger sedans

Total: **59** AFVs (2015)

Desired Trend:

Data Source(s) and Methodology:
This performance measure focuses on AFVs in the City, County, and StarTran fleets.

Environmental Sustainability

5 Miles of minimal impact projects completed (2+1)

Preserving the value and character of existing neighborhoods is an important consideration and efforts should be made to minimize impacts on established neighborhoods and investments. In the past, many transportation projects in our country displaced citizens, destroyed valuable cultural resources, and displaced or divided neighborhoods. Transportation planning has since evolved to include a strong link to environmental justice, which is both desirable and required. It is vitally important that the residents, particularly those with larger underrepresented populations, be involved in transportation planning decisions and that these decisions consider and work to protect those resources important to neighborhoods.

Baseline Data:

Street Segment	Length (miles)	Year
Adams St from 57th St to 63rd St	0.44	2011
Holdrege St from 70th St to 79th St	0.62	2011
North 70th St from Aylesworth Ave to X St	0.39	2011
Fremont St from 48th St to 70th St	0.23	2011
Pioneers Blvd from Hwy 2 to 56th St	1.65	2012
South 56th St from Randolph St to South St	1.00	2013
North 1st St from Superior St to Cornhusker Hwy	1.5	2013
Van Dorn St from 33rd St to 37th St	0.25	2015

Desired Trend:

Data Source(s) and Methodology:

City of Lincoln Public Works and Utilities Department.

Funding and Cost Effectiveness

Public funding, both locally and nationally, for transportation facilities is extremely tight. Public and private groups have expressed the desire to see funds spent in the most efficient way possible. A successful transportation network comes from public, private, and nonprofit entities working together to achieve mutually beneficial goals. The Lincoln MPO seeks to explore creative options to fund high-priority transportation projects.

Goal: Collaboration in funding transportation projects that maximizes user benefits.

Objectives	System Performance Measures
Make the best use of public financial resources	1 **Cost per user of completed projects** 2 **Proportion of completed projects subjected to life cycle cost analysis**
Decrease the gap between funding needed to achieve LRTP goals and currently available funding	3 **Annual funding for transportation projects**

Strategies

- Consider creative alternative funding sources, such as public-private partnerships
- Implement roadway improvement projects over time based on need, applying the Rural to Urban Transition for Streets (RUTS) program
- Consider indexing the Wheel Tax
- Improve communication to the public about the need for increased transportation funding

Funding and Cost Effectiveness

1 Cost per user of completed projects

Projects should not be compared strictly on the basis of costs. A large project will have a high cost; however, that project may have a profound positive effect on the overall transportation system. Both costs and benefits must be evaluated when prioritizing projects. A benefit-cost analysis is frequently used to demonstrate economic justification for transportation projects. Because a benefit-cost analysis requires extensive data and analysis to monetize a project's benefits (many of which are difficult to readily monetize), this performance measure—cost per user of completed projects—represents a simplified approach to considering the cost effectiveness of public investment in transportation projects.

Baseline Data:	***Desired Trend:***
No data available; collect beginning in 2017	To be determined

Data Source(s) and Methodology:
The Lincoln MPO will track the cost per user of completed projects using the total capital cost of the project and the number of users, as defined by the number of persons per day expected to use and benefit from the project upon completion. The persons per day may be transit ridership on a particular route, the daily traffic volume times average auto occupancy on a road segment, or the number of bicyclists/pedestrians expected to use a certain facility.

Funding and Cost Effectiveness

2 Proportion of completed projects subjected to life cycle cost analysis

Life cycle cost analysis evaluates the total economic worth of a transportation project by analyzing the initial capital costs and discounted future costs including maintenance, reconstruction, and operating costs over the life of the project. A life cycle cost analysis can be used in the alternatives analysis phase, providing a comparison of total cost of various investment options.

Baseline Data:	***Desired Trend:***
No data available; collect beginning in 2017	To be determined

Data Source(s) and Methodology:
The Lincoln MPO will track the number of completed projects subjected to life cycle cost analysis and encourage the City of Lincoln, Lancaster County, and NDOR to integrate this process into the alternatives analysis process.

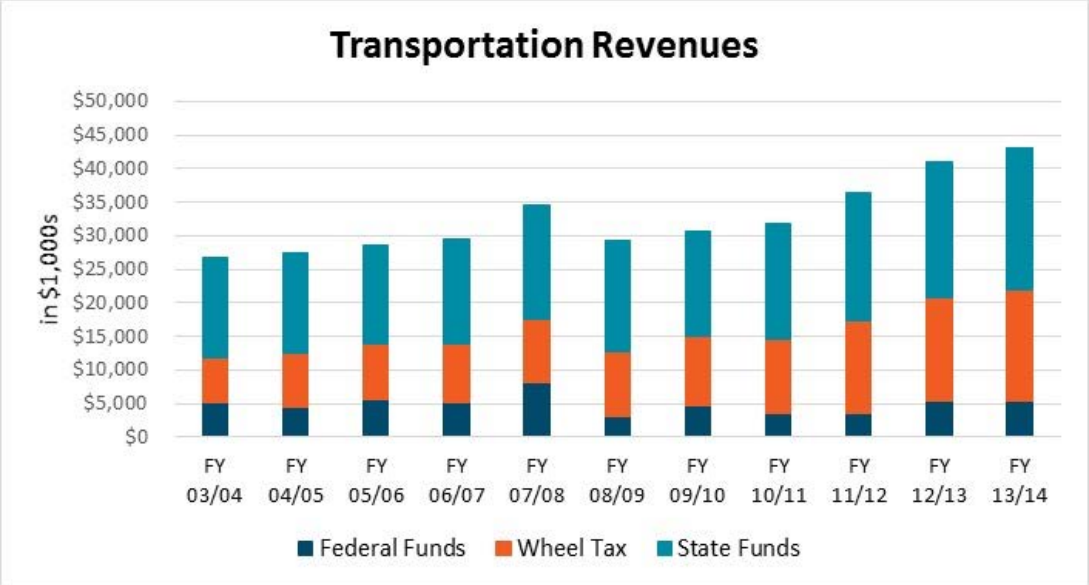
Funding and Cost Effectiveness

3 Annual funding for transportation projects

In the past, the primary source of funds for the nation's streets was the federal gas tax. But, the federal gas tax has been stagnant for more than 20 years. In fact, Lincoln's federal gas tax allocation has increased only $46,000 over the last decade, while construction inflation has increased an average of 5 percent per year. Local and state initiatives have been a tremendous help in closing the gap in transportation funding.

Baseline Data:

Annual funding for transportation projects = **$43.0 million** (FY 13/14)



Desired Trend:

Data Source(s) and Methodology:

City of Lincoln Public Works and Utilities Department

6. Funding Outlook

The transportation revenues expected over the 24-year time horizon of the LRTP will not be enough to cover the cost of the transportation needs in Lincoln and Lancaster County. Compounding the funding shortfall is the increasing cost to construct transportation projects; costs have inflated by approximately 5 percent per year in recent years. Careful consideration of investment strategies is needed, along with an understanding of the associated tradeoffs. This chapter presents an overview of the revenue forecasts, describes the resource allocation process, and establishes a strategy to maintain the transportation system and to make the system function as efficiently as possible, given transportation funding limitations.

Revenue Forecasts

Various sources will be used to fund transportation projects and programs included in this LRTP, such as federal, state, local, and private resources. The following sections describe the funding sources expected to be used to implement the LRTP recommendations.

Urban Roads Program Funding

The Urban Roads Program funding sources are described below, with **Table 14** detailing the estimated year by year revenue forecasts.

City Wheel Tax

The City Wheel Tax is a revenue source generated by a City tax on all vehicles registered within corporate limits. Wheel Tax revenues must be applied to specific uses:

- **Residential Rehabilitation Fund:** A portion of the Wheel Tax (14.86 percent) is dedicated to rehabilitating existing residential streets.
- **Construction Fund:** A portion of the Wheel Tax (35.14 percent) is dedicated to funding the design, construction, and ROW acquisition of streets, roads, alleys, or public ways.
- **Residual Fund:** The remaining portion of the Wheel Tax can be used for general street improvements in the City of Lincoln. Uses include arterial rehabilitation, street maintenance operations, new construction projects, and debt service.

The history of increases in the Wheel Tax generally supports the equivalent of a $5 increase every five years. Such a regular increase in the Wheel Tax is assumed in the 2040 LRTP. A modest growth in this funding source is also assumed to generally match the growth in the number of registered vehicles at 1.5 percent annually. The City Wheel Tax is estimated to contribute approximately $597 million in transportation funding through 2040.

General Revenues

Property tax, sales tax, and other sources make up the general fund, which is used for general operating functions of City departments. This local funding source represents pay-as-you-go contributions from the general fund for capital projects with or without other funding sources. In recent years, general fund revenues have accounted for approximately $5.5 million of the City's annual budget for the road program. The amount is anticipated to continue and is assumed to grow at 3 percent annually to account for economic growth in Lincoln. The City's general revenues are estimated to contribute approximately $189 million in road program funding through 2040.

Arterial Street Impact Fees

A local funding source, impact fees are dedicated to new water, wastewater, parks, trails, and arterial streets infrastructure. The City levies an impact fee charge against new development to generate revenue to support specific public projects. A one-time, up-front charge paid by new construction only, impact fees can generally be used on public projects within the district in which it is collected. Arterial Street Impact Fees currently generate approximately $4 million annually and are projected to increase

Table 14. Urban Roads Program Revenue Forecasts ($Millions)

Year	Local Revenues				State Revenues		Federal Revenues		Total
	Wheel Tax	General Revenues	Impact Fees	RTSD	State Train Mile Tax	State Highway Allocation (Less Bond Payment)	Surface Transportation Program (STP)	STPP Hazard Elimination	
2017	$18.38	$5.50	$4.27	$4.08	$0.40	$18.83	$5.30	$2.50	**$59.26**
2018	$18.65	$5.67	$4.32	$4.98	$0.40	$20.04	$5.39	$4.40	**$63.87**
2019	$18.93	$5.84	$4.38	$5.88	$0.41	$21.28	$5.48	$0.50	**$62.71**
2020	$19.22	$6.01	$4.43	$6.30	$0.41	$22.22	$5.57	$0.51	**$64.67**
2021	$20.68	$6.20	$4.48	$6.40	$0.42	$22.53	$5.67	$0.52	**$66.90**
2022	$20.99	$6.38	$4.54	$6.55	$0.42	$22.87	$5.77	$0.53	**$68.04**
2023	$21.31	$6.57	$4.59	$6.69	$0.43	$23.40	$5.86	$0.53	**$69.39**
2024	$21.63	$6.77	$4.65	$6.80	$0.43	$26.70	$5.96	$0.54	**$73.48**
2025	$21.95	$6.97	$4.70	$6.90	$0.44	$27.04	$6.07	$0.55	**$74.62**
2026	$23.55	$7.18	$4.76	$7.08	$0.45	$27.39	$6.17	$0.56	**$77.14**
2027	$23.90	$7.40	$4.81	$7.22	$0.45	$27.74	$6.27	$0.57	**$78.38**
2028	$24.26	$7.62	$4.87	$7.37	$0.46	$30.09	$6.38	$0.58	**$81.63**
2029	$24.63	$7.85	$4.93	$7.51	$0.46	$30.45	$6.49	$0.59	**$82.91**
2030	$24.99	$8.08	$4.99	$7.67	$0.47	$30.82	$6.60	$0.60	**$84.22**
2031	$26.74	$8.33	$5.05	$7.82	$0.47	$31.18	$6.71	$0.61	**$86.91**
2032	$27.14	$8.58	$5.11	$7.97	$0.48	$31.56	$6.82	$0.62	**$88.28**
2033	$27.54	$8.83	$5.17	$8.13	$0.48	$31.94	$6.94	$0.63	**$89.68**
2034	$27.96	$9.10	$5.23	$8.30	$0.49	$32.32	$7.06	$0.64	**$91.10**
2035	$28.38	$9.37	$5.30	$8.46	$0.50	$32.71	$7.18	$0.65	**$92.55**
2036	$30.28	$9.65	$5.36	$8.63	$0.50	$33.10	$7.30	$0.67	**$95.49**
2037	$30.73	$9.94	$5.42	$8.80	$0.51	$33.50	$7.42	$0.68	**$97.01**
2038	$31.19	$10.24	$5.49	$8.98	$0.51	$33.90	$7.55	$0.69	**$98.55**
2039	$31.66	$10.55	$5.56	$9.16	$0.52	$34.31	$7.68	$0.70	**$100.13**
2040	$32.13	$10.86	$5.62	$9.34	$0.53	$34.72	$7.81	$0.71	**$101.73**
Total	**$596.81**	**$189.49**	**$118.03**	**$177.06**	**$11.05**	**$680.64**	**$155.46**	**$20.11**	**$1,948.65**

1.2 percent annually, which is in line with overall population growth, resulting in an estimated $118 million in impact fee revenues for arterial streets over the life of the plan.

Railroad Transportation Safety District (RTSD)

This local funding source is generated by a countywide public entity, the Railroad Transportation Safety District, which has taxing authority to levy a property tax. These funds are designed for projects

throughout the City and County to eliminate automobile and railroad conflicts. This funding source is a countywide levy, and a portion of these revenues is projected to be used to help fund qualifying projects in the urban transportation program. RTSD annual revenues are expected to range from $4 to $7 million annually over the next 10 years. Subsequently, growth in this funding source is assumed to be 2 percent per year, resulting in an estimated $177 million in funding through 2040.

State Train Mile Tax

The state tax on rail traffic passing through the State is used for constructing, rehabilitating, relocating, or modifying railroad grade separation facilities. This funding is competitive statewide, and the RTSD often leverages their funds to pay the local share for qualifying projects. An average of $400,000 annually is assumed based on recent train mile tax revenues. Growth in this funding source is assumed to align with projected freight growth of 1.2 percent per year. An estimated $11 million in State Trail Mile Tax will be available to improve railroad crossings over the 24-year time horizon of the LRTP.

Highway Allocation Funds (State Fuel Tax)

A state funding formula allocates state fuel tax collections to the City of Lincoln. These funds are designated for projects throughout the City to rehabilitate, construct, and improve streets, intersections/interchanges, sidewalks, bikeways and trails, safety projects, intelligent transportation infrastructure, and landscaping. These funds are also used in the study, design, and acquisition of easements or ROW to support public projects. An estimated $27 million in annual State Fuel Tax funds are anticipated, with a modest 1.2 percent annual growth matching the population growth projections. The result is an estimated $724 million in Highway Allocation Funds through 2040.

In 2011, the Nebraska Legislature approved and the Governor signed the Build Nebraska Act, which approved the use of the statewide sales tax on roadway projects. A portion of this additional revenue goes to local communities; the State uses the remainder of the revenue on the State Highway system. This funding source is slated for use by the State to pay for 80 percent of the South Beltway project costs. Build Nebraska Act funds are not included in the Urban Roads Program revenue forecasts because the use of these funds is at the discretion of the State. These funds are being pursued for major illustrative plan projects in the Lincoln area, such as the East Beltway.

The City of Lincoln issued general obligation highway allocation bonds in 2004 and 2006 to fund rehabilitation, construction, and improvements to streets, intersections, interchanges, sidewalks, bikeways and trails, safety projects, intelligent transportation infrastructure, and landscaping in connection with street improvement projects. The roughly $5 million annual payment on these bonds is paid with Highway Allocation Funds. Two regular payments to these bonds are scheduled to be completed in 2023 and 2027, respectively. These bond payments are removed from the available State Highway Allocation Funds in 2017–2027 (as shown in **Table 14**). Beginning in 2028, the full allotment of Highway Allocation Funds will be available to the Urban Roads Project. The expected Highway Allocation funding through 2040 is estimated to be $681 million.

Federal Surface Transportation Program (STP)

A federal funding source, the STP is designated by formula for urbanized areas with a population of more than 200,000 and provides resources for various eligible transportation projects. Based on historic STP funding levels and growth over time, the STP revenue forecasts begin at $5.3 million in 2017 and are projected to increase 1.7 percent annually. An estimated $155 million in STP funds can be reasonably expected for use in the urbanized area through 2040.

STPP Hazard Elimination

This federal funding source (a subset of the Surface Transportation Program) provides resources for safety improvements on public roads, railroad crossings, public transportation facilities, bicycle and pedestrian pathways, and trails. The City's budget includes higher levels of STPP Hazard Elimination funds in 2017 and 2018; however, this funding source can vary greatly from year to year.

Beginning in 2019, the annual STPP Hazard Elimination funding is assumed to generally be $500,000, with a 1.7 percent annual growth based on historic growth in STP funds, resulting in an estimated $20 million through 2040.

Transit Funding

The transit funding sources are described below, with **Table 15** detailing the estimated year by year revenue forecasts.

Table 15. Transit Revenue Forecasts ($Millions)

Year	Federal Transit Administration (FTA)	State Revenues	Fares, Advertising, and UNL Contract	General Revenues	Total
2017	$1.73	$1.16	$3.15	$6.92	**$12.96**
2018	$1.76	$1.19	$3.28	$7.13	**$13.36**
2019	$1.79	$1.22	$3.42	$7.34	**$13.77**
2020	$1.82	$1.25	$3.56	$7.56	**$14.19**
2021	$1.85	$1.28	$3.71	$7.79	**$14.63**
2022	$1.88	$1.31	$3.87	$8.02	**$15.09**
2023	$1.91	$1.35	$4.03	$8.26	**$15.55**
2024	$1.95	$1.38	$4.20	$8.51	**$16.04**
2025	$1.98	$1.41	$4.38	$8.77	**$16.54**
2026	$2.01	$1.45	$4.56	$9.03	**$17.05**
2027	$2.05	$1.48	$4.75	$9.30	**$17.59**
2028	$2.08	$1.52	$4.95	$9.58	**$18.14**
2029	$2.12	$1.56	$5.16	$9.87	**$18.71**
2030	$2.15	$1.60	$5.38	$10.16	**$19.29**
2031	$2.19	$1.64	$5.60	$10.47	**$19.90**
2032	$2.23	$1.68	$5.84	$10.78	**$20.53**
2033	$2.27	$1.72	$6.08	$11.10	**$21.18**
2034	$2.30	$1.77	$6.34	$11.44	**$21.85**
2035	$2.34	$1.81	$6.61	$11.78	**$22.54**
2036	$2.38	$1.85	$6.88	$12.13	**$23.26**
2037	$2.42	$1.90	$7.17	$12.50	**$24.00**
2038	$2.46	$1.95	$7.47	$12.87	**$24.76**
2039	$2.51	$2.00	$7.79	$13.26	**$25.55**
2040	$2.55	$2.05	$8.11	$13.66	**$26.37**
Total	**$50.75**	**$37.52**	**$126.32**	**$238.23**	**$452.82**

Federal Transit Administration (FTA)

The FTA provides resources for transit operations and capital expenditures. A local match of 20 percent is generally required to quality for this funding. Currently, StarTran receives approximately $1.7 million in FTA funding for transit programs. It is assumed that this federal funding source will continue to be available and will grow at a rate of 1.7 percent annually, consistent with historic growth in federal funding. A total of approximately $51 million in FTA funding is expected through 2040.

State Revenues

State revenues include any State subsidy received in aid of public transit operations and capital expenditures. Currently, funding levels are roughly $1.2 million per year. It is assumed that this State funding source will continue to be available and will grow at a rate of 2.5 percent annually for a total of nearly $38 million through 2040.

Fares, Advertising, and UNL Contract

These funds include fare revenue from use of the transit system based on current and projected ridership. The fare revenues are expected to grow based on growth in the community (1.2 percent per year) and on expected fare increases (3 percent per year). Advertising and miscellaneous funding are expected to continue based on historical trends. The contract with the University of Nebraska provides funding to the transit system to provide transit service between the Downtown Campus and East Campus using student fees. In total, these funding sources are forecast to contribute approximately $126 million in transit funding over the life of the plan.

General Revenues

The City's general fund provides resources for general operating functions of City departments. A portion of the general fund has historically been allocated to support StarTran operations. The level of general revenues allocated to transit is assumed to remain consistent with historic levels and to grow at 3 percent per year. In total, an estimated $238 million in general funds will be available for transit through 2040.

Trails Funding

The trails funding sources are described below, with **Table 16** detailing the estimated year by year revenue forecasts.

Set Aside from ST Block Grant Program

This federal funding source (previously entitled Transportation Enhancements and Transportation Alternatives Program) provides resources for transportation-related activities designed to strengthen the cultural, aesthetic, and environmental aspects of the transportation system. A 20 percent local match is typically required. The City of Lincoln currently receives approximately $500,000 per year. This funding source is expected to continue to be available for trails and other bicycle and pedestrian projects and is assumed to grow at 1.7 percent annually, consistent with the historic federal funding growth rate. Approximately $15 million in funding can reasonably be expected through 2040.

Federal Recreational Trails

The Recreational Trails program provides funds to states to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail use. States develop and administer their own programs to distribute these funds for local projects. Historically, this funding source has largely been used to maintain and rehabilitate the local trail system. A 20 percent local match is typically required. The City of Lincoln is eligible to receive up to $150,000 annually. This federal funding source is also assumed to grow at 1.7 percent annually for a total of $4.4 million in available funding through 2040.

Lower Platte South Natural Resources District (LPSNRD)

These funds include a state subsidy received through the LPSNRD to aid the construction of the local multi-use trail system related to the regional drainage system and natural areas. A 20 percent local match is typically required. The City of Lincoln's trail system regularly benefits from approximately $150,000 annually through the LPSNRD's trails program. It is assumed that this source of funds will continue to be available and will grow at a 2.5 percent annual rate for a total of nearly $5 million in funding through 2040.

Table 16. Trails Revenue Forecasts ($Millions)

Year	Set Aside from ST Block Grant Program	Federal Recreational Trails	Lower Platte South Natural Resources District (LPSNRD)	Impact Fees	Private Contributions	Keno Funds	Park & Recreation Repair and Replacement	Total
2017	$0.50	$0.15	$0.15	$0.10	$0.10	$0.23	$0.03	**$1.25**
2018	$0.51	$0.15	$0.15	$0.10	$0.10	$0.23	$0.03	**$1.27**
2019	$0.52	$0.16	$0.16	$0.10	$0.10	$0.23	$0.03	**$1.29**
2020	$0.53	$0.16	$0.16	$0.10	$0.10	$0.23	$0.03	**$1.31**
2021	$0.53	$0.16	$0.17	$0.10	$0.10	$0.24	$0.03	**$1.33**
2022	$0.54	$0.16	$0.17	$0.11	$0.11	$0.24	$0.03	**$1.35**
2023	$0.55	$0.17	$0.17	$0.11	$0.11	$0.24	$0.03	**$1.38**
2024	$0.56	$0.17	$0.18	$0.11	$0.11	$0.24	$0.03	**$1.40**
2025	$0.57	$0.17	$0.18	$0.11	$0.11	$0.25	$0.03	**$1.42**
2026	$0.58	$0.17	$0.19	$0.11	$0.11	$0.25	$0.03	**$1.44**
2027	$0.59	$0.18	$0.19	$0.11	$0.11	$0.25	$0.03	**$1.47**
2028	$0.60	$0.18	$0.20	$0.11	$0.11	$0.26	$0.03	**$1.49**
2029	$0.61	$0.18	$0.20	$0.12	$0.12	$0.26	$0.03	**$1.52**
2030	$0.62	$0.19	$0.21	$0.12	$0.12	$0.26	$0.03	**$1.54**
2031	$0.63	$0.19	$0.21	$0.12	$0.12	$0.27	$0.03	**$1.57**
2032	$0.64	$0.19	$0.22	$0.12	$0.12	$0.27	$0.03	**$1.59**
2033	$0.65	$0.20	$0.22	$0.12	$0.12	$0.27	$0.03	**$1.62**
2034	$0.67	$0.20	$0.23	$0.12	$0.12	$0.28	$0.03	**$1.65**
2035	$0.68	$0.20	$0.23	$0.12	$0.12	$0.28	$0.03	**$1.67**
2036	$0.69	$0.21	$0.24	$0.13	$0.13	$0.28	$0.03	**$1.70**
2037	$0.70	$0.21	$0.25	$0.13	$0.13	$0.29	$0.03	**$1.73**
2038	$0.71	$0.21	$0.25	$0.13	$0.13	$0.29	$0.03	**$1.76**
2039	$0.72	$0.22	$0.26	$0.13	$0.13	$0.29	$0.03	**$1.79**
2040	$0.74	$0.22	$0.26	$0.13	$0.13	$0.30	$0.03	**$1.81**
Total	**$14.67**	**$4.40**	**$4.85**	**$2.76**	**$2.76**	**$6.22**	**$0.69**	**$36.35**

Trail Impact Fees

This local funding source is dedicated for trails. The City levies an impact fee charge against new development to generate revenue to support specific public projects. Impact fees, a one-time, up-front charge paid by new construction only, can generally be used on public projects within the district in which it is collected. The Trails Impact Fee currently generates approximately $100,000 annually and is projected to increase at 1.2 percent annually, which is in line with overall population growth. The result is an estimated $2.8 million in Trail Impact Fee revenues for trails over the life of the plan.

Private Contributions

The City of Lincoln's trails program has historically received periodic private donations for construction of the local trail system. Based on historic contributions averaged over time, an estimated $2.8 million in private donations can reasonably be expected to support the trails program.

Keno Funds

The City of Lincoln uses a portion of the Keno lottery funds to rehabilitate the local trails system. Current Keno funding levels for the trails program are roughly $230,000 per year. With an annual growth rate of 1.2 percent (matching the overall population growth), an estimated $6.2 million in Keno funds will be available for rehabilitation of the trails through 2040.

Park & Recreation Repair and Replacement

The Parks & Recreation budget typically allocates a small amount of money ($30,000 per year) toward rehabilitation of local trails. This allocation is expected to continue at a 1.2 percent annual growth rate, resulting in approximately $700,000 in trail rehabilitation funds through 2040.

Summary of Available Revenues

In total, an estimated $2.4 billion in transportation revenues can reasonably be expected for the urban area roadway, transit, and trails programs, as summarized in **Table 17**.

Table 17. Total Revenue Forecasts

Program	Revenue Forecasts (2017 – 2040)
Urban Roads Program	$1,948,650,000
Transit Program	$452,820,000
Trails Program	$36,350,000
Total	**$2,437,820,000**

Resource Allocation

With the revenue forecasts complete, the next step in developing a fiscally constrained transportation plan is to allocate the resources to various project and program categories, as depicted on the right side of the diagram in **Figure 30**.

Project and Program Categories

Seventeen transportation project or program categories are currently funded and expected to be funded through the life of the LRTP. These programs can be divided into four major categories:

Maintenance Activities

- System Operations & Maintenance
- Road & Bridge Rehabilitation
- Trail Rehabilitation

Alternative Modes

- Transit
- Committed Trail Projects
- Trail Projects
- Other Bike/Ped and Transportation Demand Management (TDM)

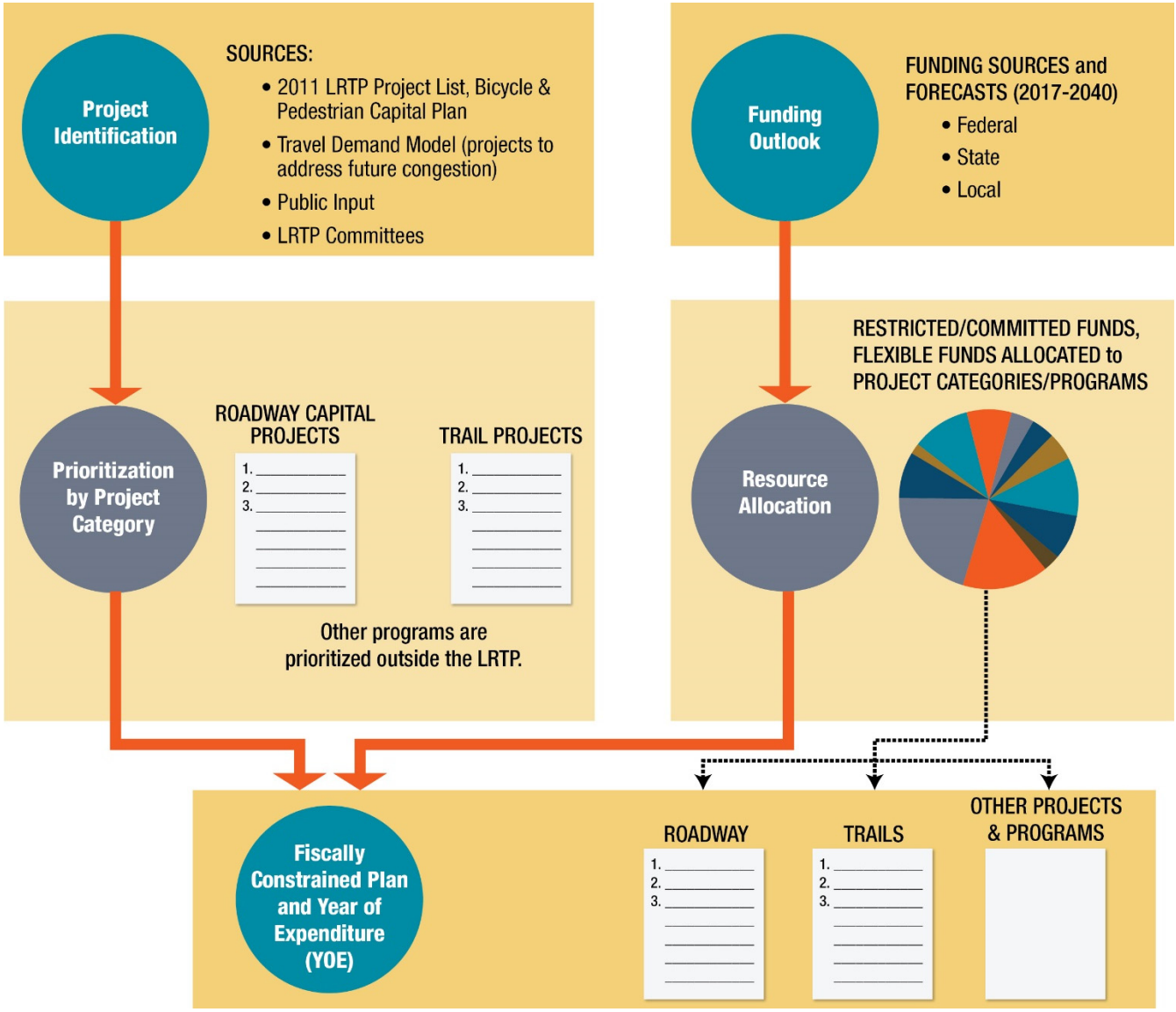
Roadway Construction Activities

- RTSD Projects
- State Train Mile Tax Projects
- Two Plus Center Turn Lane Projects
- Intersection Safety and Capacity
- Committed Capital Projects
- Developer Commitments
- Roadway Capital Projects

Other Programs

- ITS and Technology
- East Beltway Preservation
- Studies, PE, ROW, and Statutorily Required Records

Figure 30. Fiscally Constrained Plan Development



Committed and Restricted Funds

A portion of the approximately $2.4 billion total resources described in the previous section is either restricted to certain project types or has already been committed to specific projects or programs. Approximately $810 million (one-third of the total available revenues) is either committed or restricted to particular program or project categories. The funding restrictions and commitments associated with each funding source are accounted for by aligning them with the associated project or program category, as shown in **Table 18**. The remaining $1.6 billion in funding is considered "flexible" and could be used for a variety of transportation-related purposes.

Table 18. Funding Restrictions and Commitments

Funding Source	Project or Program Category	Amount ($Millions)	Description
RTSD Funds	RTSD Projects	$177.06	RTSD funds are fully restricted for use on railroad crossing improvements (RTSD projects).
State Train Mile Tax Funds	State Train Mile Tax Projects	$11.05	State Train Mile Tax funds are fully restricted for use on railroad crossing improvements (State Train Mile Tax projects).
Federal Transit Administration Funds (5307 Program)	Transit	$214.59	These three funding sources are restricted for use on transit operations and capital expenditures.
State Transit Funds			
Fares, Advertising, UNL Contract			
STP Block Grant Set Aside	Trail Projects (Committed and Future)	$28.06	These four funding sources are restricted for use on trail projects, including those in the current CIP that are assumed to be fully funded in the LRTP. A small portion of these funds is used for trail rehabilitation.
Federal Recreational Trails			
Natural Resources District			
Trail Impact Fees			
Keno Funds	Trail Rehabilitation	$8.29	The City of Lincoln has committed to use these funds for trail rehabilitation. A portion of this funding commitment comes from the overall trail funds (described previously).
Parks & Recreation Repair and Replacement Funds			
STPP Hazard Elimination	Intersection Safety and Capacity	$20.11	These federal funds are restricted for use on high-priority safety improvements.
Wheel Tax	Road & Bridge Rehabilitation	$88.69	14.86% of the Wheel Tax revenues are committed to residential rehabilitation.
	Roadway Capital Projects	$168.66	35.14% of the Wheel Tax revenues are committed to the construction fund.
Various Roadway Funding Sources	Developer Commitments	$25.55	Various roadway funding sources are dedicated to specific projects for which the City has made a commitment to a developer.
Various Roadway Funding Sources	Committed Capital Projects	$66.82	The Roadway Capital Projects included in the current CIP are assumed to be fully funded in the LRTP.
Total Funding Restrictions and Commitments		**$808.86**	

Resource Allocation Scenarios

Resource allocation is the process that establishes how the Lincoln MPO intends to distribute the available funding for the urban area transportation system improvements to best achieve the vision and goals of this plan.

During the second phase of community outreach ("Understanding Priorities"), community members were asked, "If you had $100 to fund transportation improvements in Lincoln, how would you spend it?" The funding category options provided to the public were simplified to be more easily understood. With a total of 824 responses (public meeting and online survey), the top choice of the community was to maintain existing streets (refer to **Figure 31**). The results of the community's responses, however, reinforced the need for a balanced approach to funding transportation in Lincoln; many participants expressed that all categories are important.

Figure 31. Community Input on Funding Priorities

If you had $100 to fund transportation improvements in Lincoln, how would you spend it?

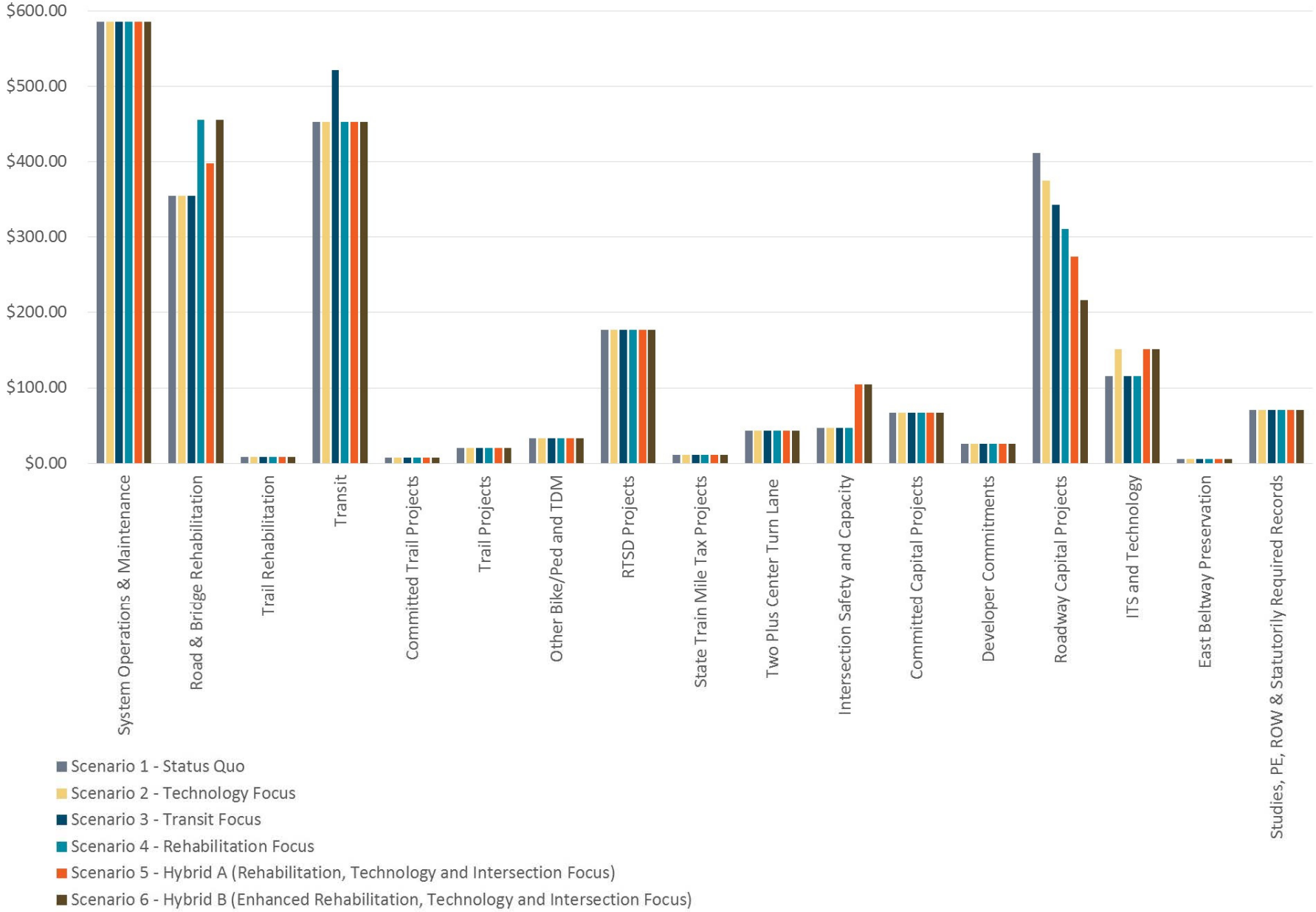
Number of Responses = 824

After accounting for funding restrictions and commitments, the remaining flexible funds can be used for any of the 17 project or program categories. Six resource allocation scenarios were developed by a subset of the Oversight Planning Committee with input from the full Oversight Planning Committee, the Planning Commission, and with strong consideration for the community input on funding priorities. The six resource allocation scenarios include:

- **Scenario 1: Status Quo** – Scenario 1 uses an approach consistent with the 2011 LRTP. That is, the allocation to each project and program category aligns with the previous LRTP allocation. Once each program category is allocated agreed to funding amounts, the remaining resources are then allocated to the Roadway Capital Projects program. This scenario represents a baseline for comparison purposes and was not intended to be an option to choose as the new LRTP resource allocation because it is incompatible with new information developed during the update process.
- **Scenario 2: Technology Focus** – Using the Status Quo scenario as a starting point, Scenario 2 includes $36 million of increased funding in the ITS and Technology category to allow full implementation of the Green Light Lincoln initiative. The result is a decrease in the available funds for Roadway Capital Projects.
- **Scenario 3: Transit Focus** – Again, Scenario 3 builds on the Status Quo Scenario. Additional funds ($69 million) are allocated to transit to allow implementation of the Phase 3 – 5 service expansions as identified in the TDP. The allocation to Roadway Capital Projects would be reduced as a result.
- **Scenario 4**: **Rehabilitation Focus** – Beginning with the Status Quo Scenario, Scenario 4 allocates $101.1 million of additional funds to Road and Bridge Rehabilitation, resulting in an equivalent reduction in the Roadway Capital Projects allocation.
- **Scenario 5: Hybrid A** – Scenario 5 uses the Status Quo Scenario as a starting point but includes increased funding for three categories identified by the LRTP Oversight Committee, the Planning Commission, and the community as being high priority: ITS and Technology, Road and Bridge Rehabilitation, and Intersection Safety and Capacity. The result is an increased emphasis on maintaining the existing system and improving the efficiency of that system before allocating additional funds to major Roadway Capital Projects.
- **Scenario 6: Hybrid B** – Again, Scenario 6 uses the Status Quo Scenario as a starting point but includes increased funding for ITS and Technology, Road and Bridge Rehabilitation, and Intersection Safety and Capacity. Scenario 6 includes an *additional* increase in the Road and Bridge Rehabilitation category when compared to Hybrid A.

Figure 32 shows the total resource allocation (2017–2040) for each scenario by project or program category.

Figure 32. Resource Allocation Scenarios – Total Funding by Program ($Millions)



Increasing Construction Costs

A project that costs $10 million today will cost $20 million in 2030, and over $32 million in 2040.[1] That's more than triple the current cost. Current transportation revenues are only growing at approximately half the rate of inflation and, therefore, will not be able to keep pace with this level of project cost inflation.

Funding Objective

Based on an initial list of Roadway Capital Projects and their associated costs, the project team realized that the available funds in any of the six resource allocation scenarios would allow only a short list of Roadway Capital Projects to be completed using the assumption that adequate funding highest priorities is continued. The initial list of projects included several major six-lane widening projects (e.g., Highway 2, 84th Street, O Street, Cornhusker Highway) and other four-lane widening projects, such as Van Dorn Street, that would be costly to construct.

Highway 2 Case Study

Based on input from the LRTP Oversight Committee, the Planning Commission, and the community, the project team investigated an alternative approach to corridors such as those that were originally identified for six-lane widening. The project team wanted to gain a better understanding of the benefits of six-lane widening compared to a considerably less expensive approach of improving traffic signal coordination and improving key intersections to eliminate bottlenecks. Highway 2 from Van Dorn to 84th Street was used as a case study.

Using the LRTP 2040 TransCAD travel demand model, the project team found that widening Highway 2 to six lanes could result in the following:

- An increase in daily vehicle throughput: +6,000 vehicles per day
- A decrease in daily congestion: -300 hours per day
- An increase in average daily travel speed: + 2 mph
- A decrease in average travel time: -3 minutes per vehicle

The widening of Highway 2 would benefit Lincoln travelers; these benefits would come at the considerable cost of $46 million (or more, depending on when the project could be constructed). The decrease in daily congestion (-300 hours) represents a roughly 20 percent reduction.

Based on research and before and after studies conducted around the country, this level of congestion reduction aligns with what might be expected by improving signal coordination and addressing corridor bottlenecks through spot improvements at intersections—a considerably more cost-effective approach.

The focus on improving traffic signal coordination and key intersections to eliminate bottlenecks would bring comparable benefits to Lincoln travelers at a much lower cost. Additionally, budgeting for these types of improvements could be easier resulting in quicker implementation and associated benefits for the users of congested corridors.

[1] Assumes a 5% annual inflation, consistent with trends over the past five years; current revenue sources are projected to increase at 2.5% per year

Recommended Resource Allocation

Based on this investigation, the limited funding availability, input from the LRTP Committees and the general public, and the potential for emerging technologies in transportation (ranging from signal coordination and traveler information to driverless cars), the project team established a recommended resource allocation for the LRTP to further maximize the system capacity. The funding plan recognizes the importance of maintaining the transportation system and making the system function as efficiently as possible, given transportation funding limitations, and includes:

- Scenario 5 – Hybrid A as the recommended resource allocation; this scenario allows increased emphasis on rehabilitation, technology, and intersection bottlenecks, while allowing construction of critical capital projects and continuation of funding for alternative modes.
- An alternative approach to major widening projects including traffic signal coordination and intersection improvements on major corridors as initial, though potentially ultimate, corridor improvements.

This funding plan is reflected in the Fiscally Constrained Plan, as documented in **Chapter 7**, and is highly compatible with the Lincoln MPO Congestion Management Process (**Appendix E**).

7. Fiscally Constrained Plan

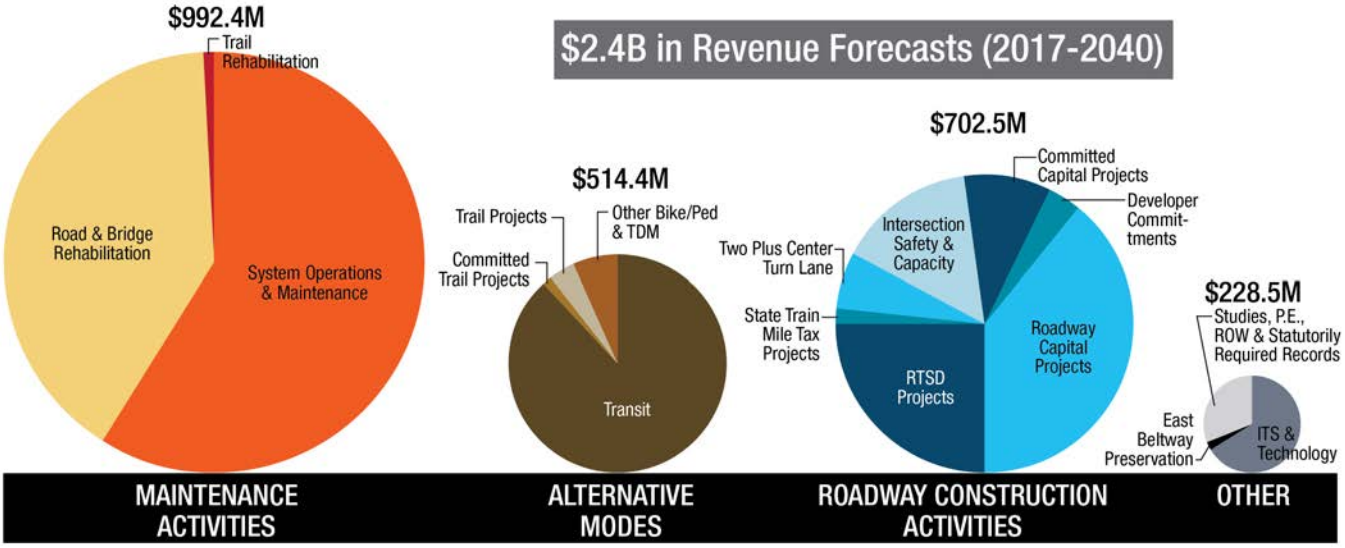
Transportation needs and opportunities in Lincoln and Lancaster County are great. **Chapter 5** presented a compilation of current and future needs to improve the region's transportation system. Current funding realities indicate that not all desired projects will be built within this plan's 24-year time horizon. This chapter builds from the funding plan established in **Chapter 6** and forms the basis for decisions about how best to prioritize and phase transportation improvement projects and programs. The resource allocation used to develop the Fiscally Constrained Plan is shown on **Figure** and detailed in **Table 19.**

While the Lincoln MPO plans and develops programs for all of Lancaster County, separate and defined funding sources are used to fund the respective urban and rural transportation programs. Urban sources of funding are generally planned to be used within the Urban Area Boundary. Rural sources of funding are generally planned to be used outside this identified boundary. The Fiscally Constrained Plan provides detailed funding and programmatic information for the Urban Area programs and related projects.

Table 19. LRTP Resource Allocation

Program	Resource Allocation in Millions (2017–2040)
System Operations & Maintenance	$586.00
Road & Bridge Rehabilitation	$398.13
Trail Rehabilitation	$8.29
Transit	$452.82
Committed Trail Projects	$7.75
Trail Projects	$20.31
Other Bike/Ped and TDM	$33.51
RTSD Projects	$177.06
State Train Mile Tax Projects	$11.05
Two Plus Center Turn Lane	$43.29
Intersection Safety and Capacity	$104.68
Committed Capital Projects	$66.82
Developer Commitments	$25.55
Roadway Capital Projects	$274.01
ITS and Technology	$151.85
East Beltway Preservation	$6.00
Studies, P.E., ROW & Statutorily Required Records	$70.70
Total	**$2,437.82**

Figure 33. LRTP Resource Allocation



Project Prioritization Process

Although the LRTP addresses funding for various project types, only Roadway Capital Projects and Trail Projects are prioritized within the LRTP. All other project categories, including Transit, RTSD, System Operations and Maintenance, etc., are prioritized outside the LRTP. These other programs are funded through a "pool" of funding as established in the Resource Allocation step (**Chapter 6**). The Fiscally Constrained Plan includes the top ranked Roadway Capital Projects and Trail Projects, and a pool of funding for the various other transportation programs and project categories.

With limited funding available, the process of prioritizing projects must be comprehensive and strive to identify those projects that will most effectively move the region's transportation system toward fulfilling the vision and achieving the transportation goals. In compliance with federal requirements for performance-based planning, the project prioritization process is structured to identify those projects that will provide the greatest contributions toward meeting the seven transportation goals and associated performance targets. The evaluation criteria used to compare projects are directly related to the goals.

Project Scoring Committees

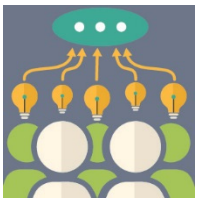
The Roadway Capital Projects and Trails Projects were scored by the Roadway and Trails Scoring Committees, respectively, both of which are a subset of the LRTP Oversight Planning Committee. The Roadway Scoring Committee included representatives from the Lincoln Planning Department and the Lincoln Public Works Department. The Trails Scoring Committee included representatives from the Lincoln Planning Department, the Lincoln Parks and Recreation Department, and the Lincoln Public Works Department. Committee members scored the projects independently, and project scores were averaged. The Scoring Committees met to discuss the scoring results and presented their recommended scores to the LRTP Oversight Planning Committee.

Project Scoring

Each project was given a score of 0, 1, 2, or 3 for each goal. A score of 1 generally corresponds to a "Low" rating, a score of 2 a "Medium" rating, and a score of 3 a "High" rating. A score of 0 is reserved for projects that may have a negative impact on reaching a particular goal. **Table 20** summarizes the evaluation criteria. Scoring Committee members were provided with a packet of information to assist with the scoring process, including detailed scoring guidelines, inventory maps, environmental resources maps, and a spreadsheet populated with values to assist in assigning a score for each evaluation criterion (**Appendix F**).

The relative importance of the seven goals varies; therefore, weights are assigned to each goal category and corresponding evaluation criteria. Because the relative importance of the goals differs for Roadway Projects and Trail Projects, a separate set of weights is established for the two project categories. The LRTP Oversight Planning Committee, with input from the Planning Commission and the general public, developed the weights shown in **Table 21**.

The project score (0 – 3) for each goal was multiplied by the corresponding weight, resulting in a total project score ranging from 0 to 300.



During the second phase of community outreach, the public was asked which Roadway Capital Projects are of most importance. The results from 738 individual responses were treated as bonus points for those projects with strong community support. Likewise, 673 individual responses about the most important Trail Projects were used to assign bonus points to those projects with strong public support.

Appendix B includes a summary of the public input on high-priority Roadway and Trail Projects, and **Appendix G** includes the scoring results for the Roadway and Trail Projects.

Table 20. Project Evaluation Criteria

Goal	Roadway Project Criteria	Trail Project Criteria
Maintenance	Will the project improve the condition of the existing facility?	Will the project improve the condition of the existing facility?
Mobility and System Reliability	Will the project provide operational improvements or decreased travel time?	Will the project complete a gap in the trail system?
Livability and Travel Choice	Will the project incorporate infrastructure for all modes of transportation?	Will the project encourage the use of alternative modes of transportation?
Safety and Security	Will the project alleviate a known safety problem?	Will the project alleviate a known safety problem?
Economic Vitality	Will the project improve access to and/or add value to surrounding land uses? Will the project improve travel on a designated truck route?	Will the project improve access to and/or add value to surrounding land uses?
Environmental Sustainability	Will the project reduce mobile-source emissions? Will the project protect the natural, cultural, and built environment?	Will the project protect the natural, cultural, and built environment?
Funding and Cost Effectiveness	How does the cost of the project compare to the benefits?	How does the cost of the project compare to the benefits?

Table 21. Weights by Goal and Project Category

Goal	Weight for Roadway Projects	Weight for Trail Projects
Maintenance	18.3	14.8
Mobility and System Reliability	17.6	21.2
Livability and Travel Choice	14.1	19.0
Safety and Security	15.5	15.9
Economic Vitality	11.4	7.7
Environmental Sustainability	11.4	12.2
Funding and Cost Effectiveness	11.7	9.2
Total	**100**	**100**

Fiscally Constrained Plan Elements

The recommended resource allocation (as described in **Chapter 6**) establishes the Fiscally Constrained Plan. The following sections provide information on what can reasonably be funded over the 24-year time horizon of the LRTP within the Fiscally Constrained Plan.

Maintenance Activities

System Operations & Maintenance

This category includes ongoing maintenance requirements (e.g., snow removal, street sweeping, stormwater management, and pothole repair) to keep the transportation system functional. The $586 million allocation to this category will provide continuation of the current operations and maintenance activities. The City of Lincoln has pursued innovation and the use of technology advances to make efficient use of available resources.

Road and Bridge Rehabilitation

The Rehabilitation program includes the repair of arterial and residential streets and bridges. A pavement condition rating system is used to help determine which road surfaces are in most need of repair. It is important to note that money invested today in the ongoing maintenance and repair of the street system saves a significant amount of money in the future by avoiding the expanded costs associated with full reconstruction of roadways.

Routine and preventative maintenance activities will be performed, such as localized repairs, crack and joint sealing, and various surface treatments (slurries, sealing, and micro-surfacing). As pavement ages, thin to thick overlays, panel replacements, base stabilization, and repairs will be used in an effort to avoid more costly reconstruction if possible.

Currently, the Rehabilitation program is funded at increased levels—a 58 percent increase since 2010—resulting in 72.2 miles of arterials and 487 blocks of residential street improvements. These targeted investments in the rehabilitation program over the past six years have resulted in measurable improvements in the condition of our streets.

Community members identified maintaining the existing transportation infrastructure as the top priority; the LRTP resource allocation increases funding for Road and Bridge Rehabilitation compared to the 2011 LRTP. However, the $398 million allocation to the Road and Bridge Rehabilitation Program is not adequate to meet the future demands of the program – rehabilitation needs continue to outpace investment as the current system ages and expands with City growth, and as construction costs increase.

The Public Works and Utilities Department is committed to using the available rehabilitation funds efficiently, using the pavement management system as a tool to identify the most effective maintenance treatments. Several additional strategies are recommended to help offset the shortfall in funding for the rehabilitation program:

- Continue experimentation and innovation to maximize return from available resources.
- Encourage the use of alternative travel modes (biking, walking, and transit) to lessen the demand on the streets.
- Implement the Green Light Lincoln program to maximize the operational efficiency of the existing system, thereby reducing the

pace of lane-miles being added to the street network.

- Streets that are neglected over time require costlier reconstruction. Continue to advance preventative maintenance strategies (e.g., pothole repairs and crack sealing) to extend the life of Lincoln's streets and minimize the life-cycle costs.
- Investigate opportunities for increased rehabilitation funding.

Trail Rehabilitation

The $8.29 million allocated to trail rehabilitation is composed of Keno funds, Park and Recreation Repair and Replacement funds, and other trail-specific funding sources; this allocation will allow the continuation of the current trail rehabilitation program.

Alternative Modes

Transit

The allocation to Transit will allow StarTran to operate the Transit Development Plan (TDP) Preferred Alternative routes and services and to maintain the fleet of 67 fixed-route buses and 13 paratransit vehicles. **Table 22** identifies the funded and priority transit projects. These projects are expected to be funded within the Fiscally Constrained 2040 Plan. Additional transit enhancements (such as next bus information and transit signal priority) will be addressed in the ITS and Technology Program.

Table 22. Priority Transit Projects

Project Description	Project Cost (2016$)
Funded/Committed Transit Projects	
Purchase Replacement Buses	$1,983,200
Purchase Replacement Handivans	$0
Transit Enhancements (bus shelters, passenger stops)	$40,000
Security Enhancements (upgrade buildings/shelters)	$40,000
Purchase Replacement Supervisor Vehicles	$0
Computer Replacements and Upgrades	$320,000
Shop Equipment Replacements and Upgrades	$15,000
Purchase Replacement Service Vehicles	$20,000
Building Renovations and Improvements	$200,000
Priority Transit Projects	
Purchase Replacement Buses	$52,596,200
Purchase Replacement Handivans	$5,250,000
Transit Enhancements (bus shelters, passenger stops)	$1,035,000
Security Enhancements (upgrade buildings/shelters)	$1,035,000
Purchase Replacement Supervisor Vehicles	$305,000
Computer Replacements and Upgrades	$3,600,000
Shop Equipment Replacements and Upgrades	$1,165,000
Purchase Replacement Service Vehicles	$290,000
Building Renovations and Improvements	$2,400,000

Committed Trail Projects

The 2016–2022 CIP includes six Trail Projects that are assumed to be fully funded and completed within the first six years of the plan. These committed Trail Projects total $7.75 million and include the Rock Island Connection, the Waterford Trail, the Fletcher Landmark Trail, the Wilderness Hills Trail, the Woodland Trail, and the Salt Creek Greenway Corridor Trails. There are several additional Trail Projects with committed funding (outside the LRTP funding revenues) that will be constructed in the near future. These projects are listed on **Table 23** and shown in blue on **Figure 34**.

Trail Projects

The Trails Scoring Committee evaluated more than 40 Trail Projects using evaluation criteria that align with the seven goals, as described previously. Based on annual revenues and year of expenditure project costs (assuming a 3 percent annual inflation rate, which is consistent with recent trends in trail construction cost inflation), approximately 21 new Trail Projects (36 miles of trail) could be added by 2040 using the $20.31 million allocation. In addition, five of the Trail Projects are part of street projects in the Fiscally Constrained Plan. A total of 55 miles of new trails (including the Committed Trail projects) are expected to be constructed by 2040. **Table 23** lists the priority Trail Projects that are expected to be funded within the time horizon of the LRTP. The priority Trail Projects are depicted on **Figure 34**. The order of projects may change depending on opportunities for funding.

Trail Projects that improve trail crossings of a railroad may be funded with RTSD funds, as described in the RTSD Projects section of this chapter.

Appendix G includes the Trails Project scoring results.

Table 23. Priority Trail Projects

Project ID	Trail Name	Limits	Project Cost (2016$)
Funded/Committed Trail Projects			
T-54	Jamaica North – Arena Connector Trail	J Street to N Street	
T-57	Stonebridge Trail	N 14th and Humphrey to N 11th and Alvo Rd.	
T-58	Salt Creek Levee Trail	14th and Salt Creek to 27th and Salt Creek	
T-59	A Street Trail	SW 40th to SW 27th	
T-60	Salt Creek Levee Trail Underpass	RR Underpass at J Street	
T-61	Beal Slough Trail	S 56th and London Rd to S 70th and Yankee Hill	
T-62	Yankee Hill Rd Trail	S 70th to Highway 2	
T-08	Rock Island Connection	Viaduct over BNSF to Jamaica	$900,000
T-27	Greenway Corridor Trail/Haines Branch - Phase I	SW 56th St to Saltillo Rd	$3,000,000
T-04	Woodlands	Rokeby Rd to 70th St to Yankee Hill Rd	$900,000

Project ID	Trail Name	Limits	Project Cost (2016$)
T-11	Waterford	84th to Stevens Creek	$850,000
T-09	Wilderness Hills	Yankee Hill Rd to Rokeby Rd	$1,150,000
T-45	Landmark Fletcher	Fletcher Ave from N. 27th St to N. 14th St	$950,000
Trail Projects Within Fiscally Constrained Roadway Capital Projects			
T-16	N. 48th St Trail	Murdock Trail to Superior St	$170,000
T-18	N. 33rd St and Adams Trails	Murdock Trail to Cornhusker Hwy	$200,000
T-15	W. Holdrege Street Trail	NW 48th St to NW 56th St	$140,000
T-53	NW 56th Street Trail	W Holdrege to W Partridge	$80,000
T-55	Yankee Hill Road	S. 40th St to S. 56th St	$310,000
Priority Trail Projects			
T-19	10th Street Trail	Van Dorn St to 17th St/Burnam St	$300,000
T-35	N. 1st St	N. 1st St crossing of Hwy 34	$400,000
T-21	East Campus Trail	Leighton St to Holdrege St	$150,000
T-31	A Street Connectors	SW 40th: A St to F St, SW 27th: Shane Dr to A St	$90,000
T-07	Landmark Fletcher	33rd St & Superior St to 27th St	$600,000
T-29	South Street	SW 27th to Jamaica	$730,000
T-30	O Street	SW 40th St to SW 48th St	$240,000
T-20	Deadmans Run Trail	48th St to Mo Pac Trail	$410,000
T-46	Prairie Village Trail	84th St. to Stevens Creek, South of Adams	$450,000
T-47	Van Dorn Trail	84th and Van Dorn to 106th and MoPac Trail	$725,000
T-50	Greenway Corridor Trail/Haines Branch – Phase II	SW 56th to Saltillo Rd	$1,000,000
T-44	14th & Yankee Hill Connector (w/RTSD project)	South LPS Property Line to Yankee Hill	$320,000
T-23	27th St Connector	Rokeby Rd to South Beltway	$460,000
T-24	56th Connector	Rokeby Rd to South Beltway	$1,200,000
T-26	South Beltway Trail - Phase I	27th St to 56th St	$1,500,000
T-28	NW 56th	W. Adams to NW 56th to W. Superior	$550,000
T-03	Woodlands	Jensen Park to Rokeby Rd	$470,000
T-34	N. 48th St/Bike Park Trail	Superior St to N. 56th St	$680,000
T-48	Air Park Connector - Phase I	NW 12th to Fletcher to NW 27th	$530,000
T-49	Air Park Connector - Phase II	NW 48th to NW 31st	$550,000
T-12	Stevens Creek	Murdock Trail to MoPac Trail	$2,300,000

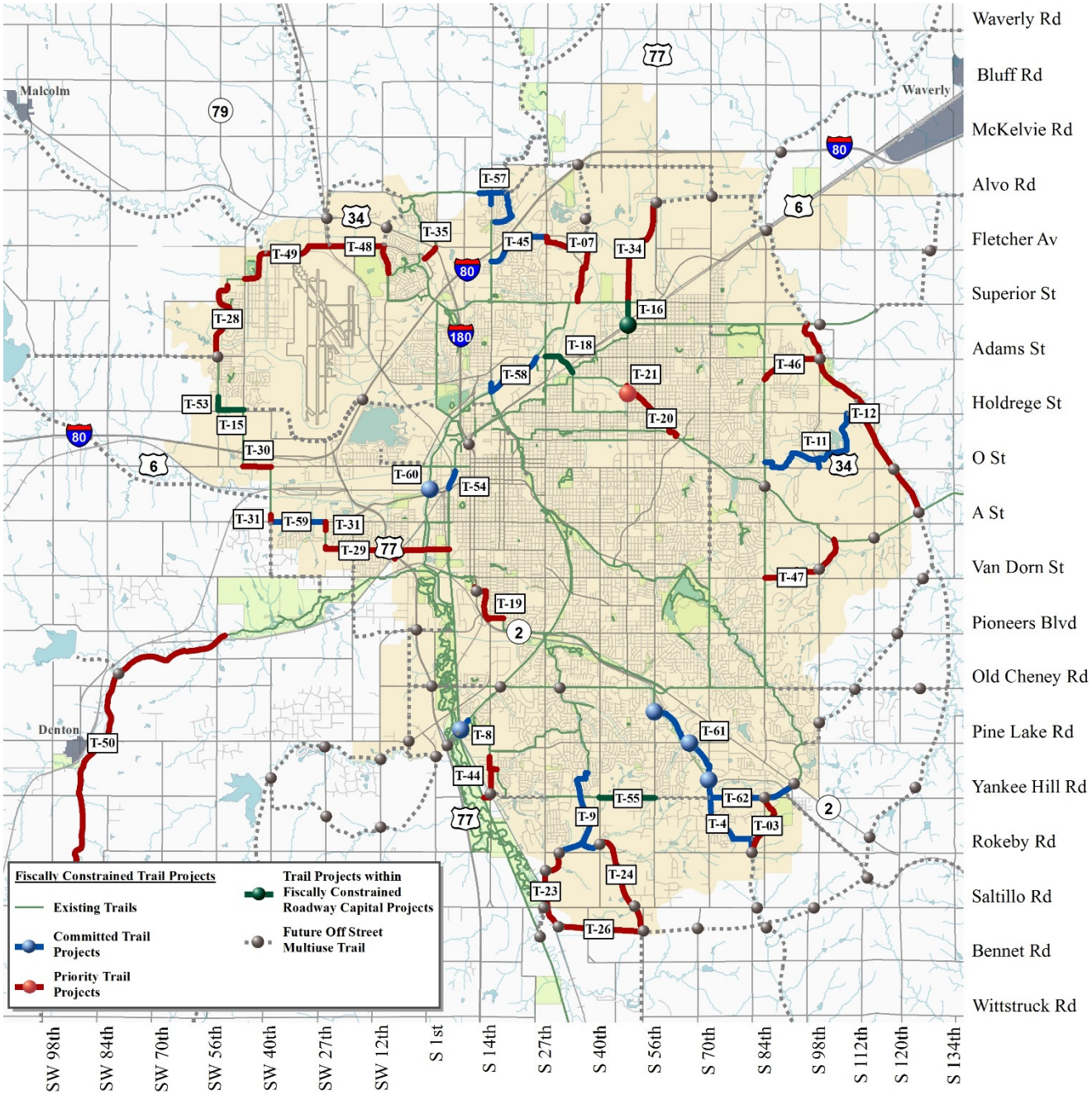


Figure 34. Priority Trail Projects

Other Bike/Ped and Travel Demand Management (TDM)

This program includes sidewalk repairs, ADA compliant ramps, restriping to add bike lanes, and the travel options program. The allocation of $33.51 million would cover roughly 3 miles of sidewalk repairs per year.

On-Street Bike Facilities

This program includes on-street bike facilities. The public comments received through the LRTP have included much praise for the N Street Cycle Track. The community has expressed a desire to continue expanding the network of on-street bike facilities to complement the trail system. Further study of the complete on-street bike network in Lincoln is needed and should include various facility types, depending on street context, such as cycle tracks, striped bike lanes, and signed bike routes (shared lanes).

The future on-street bike facilities identified in Chapter 4 (**Figure 29**) are assumed to be funded, to the extent possible, through the existing street improvement programs. Further study of these on-street facilities will be needed, as well as consideration of how they can be cost-effectively incorporated at the time of routine street maintenance.

With the success of the N Street Cycle Track, the City of Lincoln is considering a north-south cycle track in the downtown area. 11th Street and 14th Street have been identified as possible corridors for a cycle track. Further study will be required to assess the feasibility of a one-way or two-way cycle track along these streets. Private funding and/or grants should be pursued to help fund bike projects such as this.

Where traffic volumes allow, the City of Lincoln will consider painted bike lanes as part of the Complete Streets initiative. In some cases, four-lane roadways may be considered for “road diets,” in which they would be converted to two through lanes, a center left turn lane, and bike lanes. Example candidate streets for this type of treatment include:

- S. 13th Street from K Street to South Street
- Vine Street from 16th Street to Antelope Valley Road
- 16th Street from R Street to Vine Street through the UNL Campus
- Pioneers Boulevard from 56th Street to 70th Street

This type of treatment could be done very cost-effectively, particularly if it is paired with a planned street overlay or rehabilitation projects.

While the allocation to this program is not sufficient to fund major on-street bike facilities such as a cycle track, funds for these types of projects could be pursued through Tax Increment Financing (TIF) with commercial redevelopment in the downtown area (similar to funding for the N Street Cycle Track).

With the South Beltway funded and planned for construction in the near future, it is important to plan for bicycle connectivity across the Beltway. Bicycle connectivity will be accommodated through the Highway 77 and Highway 2 system interchanges. The City of Lincoln and NDOR are coordinating to identify opportunities to accommodate planned trails in south Lincoln.

TDM Program

The TDM portion of this program may include partnerships with employers to support biking, walking, and transit commuting; flexible work hours; and remote work options. The program could also consider partnerships with Transportation Network Companies (TNC) such as Uber or Lyft, as well as car share and bike share options, to support shared mobility options in Lincoln.

Roadway Construction Activities

RTSD and State Train Mile Tax Projects

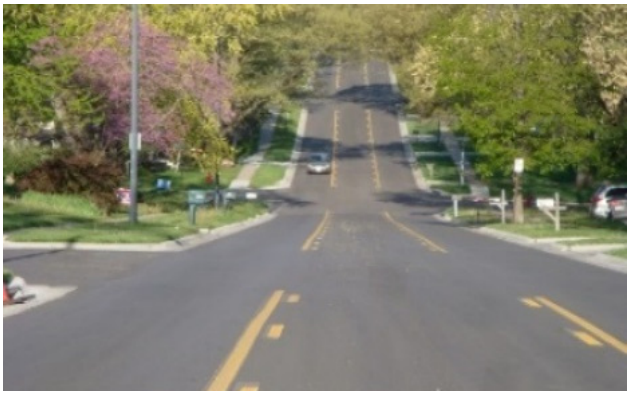
The $188.11 million allocated to RTSD and State Train Mile Tax Projects is directly from the two highly restrictive funding sources. This amount is estimated to cover major railroad grade separation projects at 33rd and Adams and the South Beltway, along with railroad crossing gates and flashers at two crossings per year, and six railroad crossing surface upgrades per year.

Trail projects that improve trail crossings of a railroad may be constructed as a part of larger RTSD Projects or constructed as stand-alone projects with RTSD funds. Examples of such trail projects include the 33rd and Cornhusker project, the Rock Island Trail bridge in Densmore Park, and a South 14th and Yankee Hill Road trail crossing.

Two Plus Center Turn Lane Projects

The City of Lincoln has been adding a center left turn lane as part of programmed street rehabilitation along two lane minor arterials and some collectors for many years. This program has successfully increased the capacity and safety of a two-lane roadway and minimized traffic congestion, while preserving the character and viability of the established neighborhoods and other components of the built environment.

Approximately 14 miles of Two Plus Center Turn Lane (2+1) projects remain in Lincoln. The allocation of $43.29 million will allow construction of approximately 7.5 miles of 2+1 projects. This estimate accounts for the increasing cost of construction projects using a 5 percent annual inflation rate.



Intersection Safety and Capacity

Much of the current and future congestion on the street network occurs at existing intersections. The LRTP resource allocation includes an increased allocation to this program over historic funding levels, totaling $104.68 million, which would allow construction of one intersection project per year in addition to critical safety improvements. This increased emphasis on intersection aligns with the alternative approach to transportation corridor investments described in **Chapter 6** and would

allow expanded geographic coverage of this approach by addressing critical bottlenecks in the system through intersection improvements.

Committed Capital Projects

Eight Roadway Capital Projects included in the 2016–2022 CIP and/or current Transportation Improvement Program (TIP) are assumed to be fully funded and completed within the first six years of the plan. These committed capital projects include:

- West Beltway interchanges from I-80 to Saltillo Road
- N. 10th Street and Military Bridge over Salt Creek
- Rokeby Road from 84th Street to 98th Street
- Yankee Hill Road from 70th Street to Hwy 2
- West "A" Street from SW 40th to Folsom
- South Beltway
- 14th/Warlick/Old Cheney
- Pine Lake Road from 61st to Hwy 2

Developer Commitments

The City has made commitments to developers to contribute a portion of the construction cost for some roadway projects. The timing of these projects is uncertain and depends on when the associated development occurs. For the purpose of the LRTP, the City's contributions to these projects are treated similar to the Committed Capital Projects; that is, they are assumed to be complete before funding is allocated to any new Roadway Capital Projects. The plan includes a total of $25.55 million in developer commitments. Projects with current commitments are listed in **Table 24**. Funding for some of these projects will come from Impact Fees, while funding for others may come from various local funding sources. Other future developer agreements may impact the timing and priority of roadway capital projects.

Roadway Capital Projects

The Roadway Scoring Committee evaluated more than 70 Roadway Capital Projects based on evaluation criteria that align with the seven goals. The resulting ranked projects were compared with the available funding for Roadway Capital Projects. The Fiscally Constrained Plan must consider the year of expenditure (YOE) cost of projects—a 5 percent annual inflation has been applied to the 2016 project costs. This inflation rate is consistent with construction cost increases over the past five years. **Table 24** lists the ranked projects that can be funded within the Fiscally Constrained Plan, including the committed projects and developer commitments. **Figure 35** shows the fiscally constrained roadway projects.

In total, the funding allocation for Roadway Capital Projects is $366.38 million, including $66.82 million for Committed Projects, $25.55 million for Developer Commitments, and $274.01 million for other Roadway Capital Projects. As shown in **Table 24**, this would allow construction of 27 high priority Roadway Capital Projects.

Table 24. Fiscally Constrained Roadway Capital Projects

RANK	Project ID	Street Name	Limits	Description	Lead Agency	Project Cost (2016$)	Local Portion (2016$)	Year of Expenditure (YOE)			*Refer to Notes Below Table*
								YOE	YOE Project Cost	Cumulative Cost (YOE)	
Committed		West Beltway (US 77)	I-80 to Saltillo Rd	Freeway with new interchanges	State	$15,700,000					*1*
Committed		N. 10th St	N. 10th St and Military Bridge over Salt Creek	Bridge replacement	Local	$3,500,000					*1*
Committed		Yankee Hill Road	70th Street to Hwy 2	2 lanes + roundabouts	Local	$14,790,000	$9,980,000				*1*
Committed		West A Street	SW 40th to Folsom	2 lanes + intersection improvements	Local	$16,980,000	$16,980,000				*1*
Committed		South Beltway	US 77 to Hwy 2	4 lane freeway	State	$200,000,000	$15,400,000				*1, 6*
Committed		14th/Warlick	14th/Warlick/Old Cheney	Intersection improvements and grade separation	Local	$24,930,000	$15,020,000				*1*
Committed		Pine Lake Road	61st St to Hwy 2	4 lanes + turn lanes	Local	$10,850,000	$9,450,000				*1*
Impact Fee/LES	65	Rokeby Rd	84th St to 98th St	2 lanes + intersection improvements	Local	$5,000,000	$1,500,000	2017	$1,575,000	$1,575,000	*2, 5*
Impact Fee	29	Rokeby Rd	S. 70th Street to S. 84th Street	2 lanes + intersection improvements	Local	$7,400,000	$7,400,000	2018	$8,158,500	$9,733,500	*2*
	A	Nebraska Hwy 2	84th Street to South Street	Corridor Study	Local	$1,500,000	$1,500,000	2019	$1,736,438	$11,469,938	*3*
Impact Fee	60	Rokeby Rd	S. 40th St to S. 48th St	2 lanes + intersection improvements	Local	$3,500,000	$3,500,000	2023	$4,924,851	$16,394,789	*2*
Impact Fee	9a	W. Holdrege St	NW 48th St to Chitwood (east ¼ mile)	2 lanes + intersection improvements	Local	$925,000	$925,000	2023	$1,301,568	$17,696,357	
Developer Commitment	67	S. 40th St	Yankee Hill Rd to Rokeby Rd	2/4 lanes + intersection improvements	Local	$8,800,000	$8,800,000	2024	$13,001,608	$30,697,965	*2*
Developer Commitment	17a	NW 12th St	W. Alvo Road to Aster	2 lanes + turn lanes	Local	$2,800,000	$2,800,000	2024	$4,136,875	$34,834,840	*2*
Developer Commitment	10	W. Holdrege St	NW 56th Street to NW 48th Street	2 lanes + intersection improvements	Local	$3,100,000	$3,100,000	2025	$4,809,117	$39,643,957	*2*
1	41	N. 48th St	Adams St to Superior St	4 lanes + intersection improvements	Local	$12,400,000	$12,400,000	2026	$20,198,293	$59,842,251	
	B	Nebraska Hwy 2	84th Street to South Street	Priority improvements (TBD by Corridor Study)	Local	$20,000,000	$20,000,000	2028	$35,917,127	$95,759,377	*3*
3	2	S. 40th St	Normal Blvd and South St	Major intersection area work	Local	$8,600,000	$8,600,000	2029	$16,216,583	$111,975,960	
4	27	Yankee Hill Rd	S. 40th Street to S. 56th Street	2/4 lanes + intersection improvements	Local	$10,200,000	$10,200,000	2030	$20,195,302	$132,171,262	
6	58	S. 56th St	Van Dorn St to Pioneers Blvd	4 lanes + intersection improvements	Local	$10,500,000	$10,500,000	2032	$22,920,183	$155,091,445	
7	33	N. 84th St	O Street to Adams Street	Intersection improvements	Local	$4,125,000	$4,125,000	2032	$9,004,358	$164,095,803	*4*
8	32	O St (US-34)	Antelope Valley N/S Rdwy (19th St) to 46th St	Intersection improvements	Local	$14,000,000	$14,000,000	2034	$33,692,669	$197,788,472	*4*
11	19	O St (US-34)	Wedgewood Drive to 98th Street	Intersection Improvements	Local	$4,100,000	$4,100,000	2035	$10,360,496	$208,148,968	*4*
12	37	Cornhusker (US-6)	N. 20th Street to N. 33rd Street	Intersection Improvements	Local	$4,500,000	$4,500,000	2036	$11,939,840	$220,088,808	*4*
13	14	NW 48th St	Adams Street to Cuming Street	2 lanes + intersection improvements	Local	$10,300,000	$10,300,000	2037	$28,695,415	$248,784,223	
14	40	Van Dorn St	S. 70th Street to S. 84th Street	Intersection improvements	Local	$2,900,000	$2,900,000	2038	$8,483,256	$257,267,479	*4*
16	42	Havelock Ave	N. 70th Street to N. 84th Street	2 lanes + intersection improvements	Local	$6,300,000	$6,300,000	2039	$19,350,600	$276,618,078	
17	23	S. 56th St	Thompson Creek Blvd to Yankee Hill Rd	4 lanes + intersection improvements	Local	$7,400,000	$7,400,000	2040	$23,865,740	$300,483,818	

[1] Committed projects are included in the 2016–2022 CIP and/or the current TIP and are assumed to be fully funded and constructed prior to allocation of resources to other Roadway Capital Projects.
[2] The timing of the Impact Fee/Developer Commitment projects depends on development; for the purpose of the LRTP, they are assumed to be complete prior to allocation of resources to other Roadway Capital Projects.
[3] Rather than assuming the widening of Hwy 2 to six lanes, a Corridor Study is recommended to evaluate alternative improvements for the corridor. A $20 M placeholder for construction of priority improvements is included as a high priority; the specific improvements will be identified in the Corridor Study.
[4] These corridor projects include the alternative approach to six-lane widening (or four-lane widening in the case of Van Dorn) – traffic signal coordination and key intersection improvements to address bottlenecks.
[5] The Rokeby Road project (84th St to 98th St) is being partially funded by Lincoln Electric System (LES) ($3.5 M) and partially by directed impact fees ($1.5 M).
[6] The $15.4M local portion for the South Beltway project is the Wheel Tax funding only.

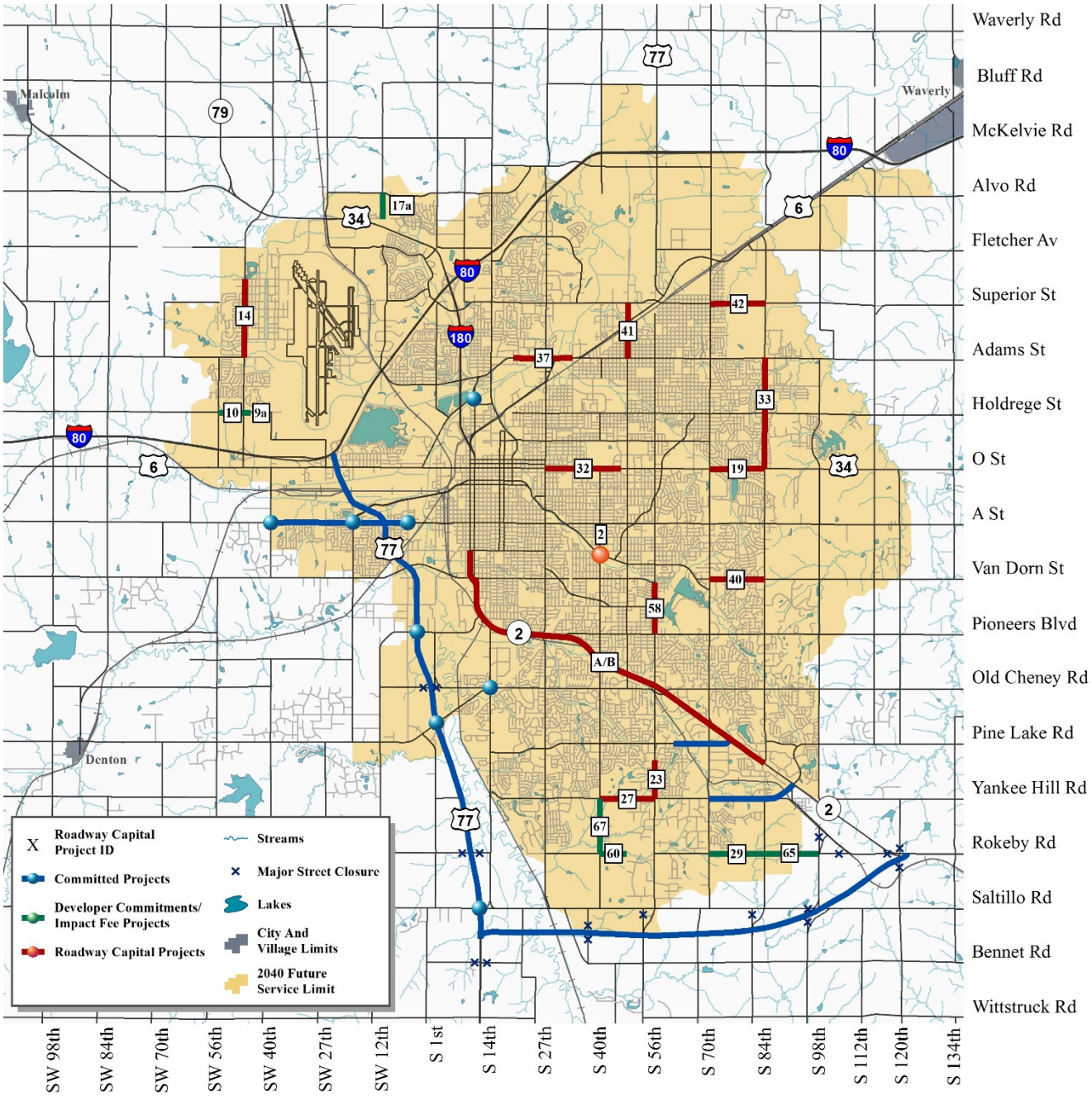


Figure 35. Fiscally Constrained Roadway Capital Projects

Highway 2 Projects

As described in **Chapter 6,** Highway 2 was used as a case study to better understand the benefits of six-lane widening compared to a considerably less expensive approach of improving traffic signal coordination and key intersections to eliminate bottlenecks. The LRTP includes a Highway 2 Corridor Study, which could be a Planning and Environmental Linkages (PEL) study, to evaluate alternative improvements for the corridor. This Corridor Study (Project "A") is listed as the top priority and is scheduled for 2019. A $20 million placeholder for construction of priority improvements is included as a high priority (Project "B"); the specific improvements will be identified through the Corridor Study.

Alternative Approach Corridors

In addition to the Highway 2 corridor, several roadway corridors were originally contemplated as six-lane (or four-lane) major widening projects. However, an alternative approach to major widening is recommended for these corridors. This approach would focus on traffic signal coordination and intersection improvements. This alternative approach is recommended for five corridors within the Fiscally Constrained Plan:

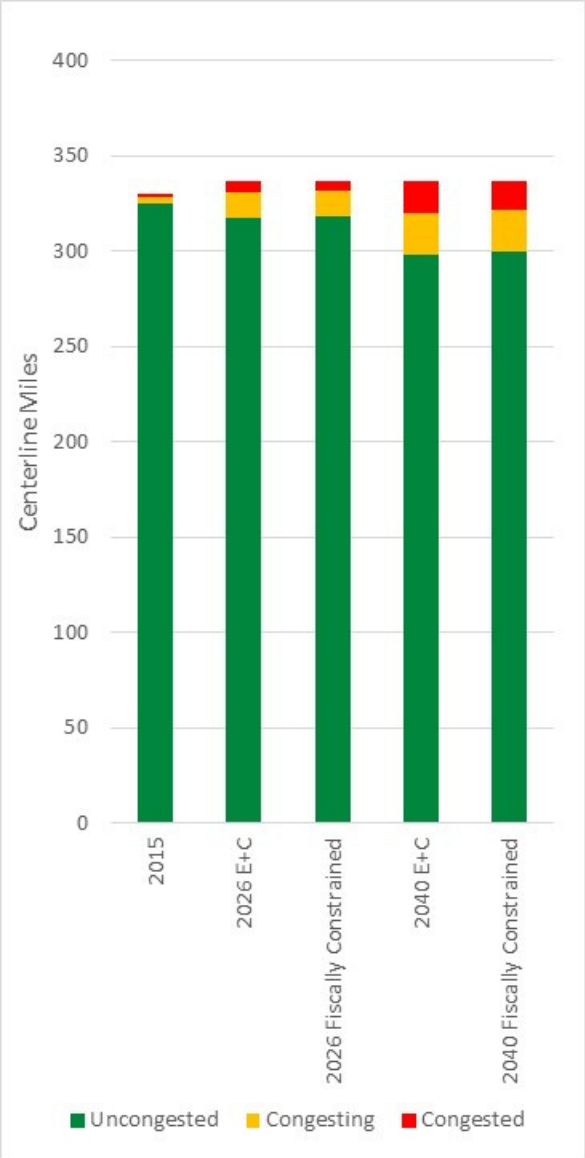
- N. 84th St between O St and Adams St
- O St between Antelope Valley and 46th St
- O St between Wedgewood Dr and 98th St
- Cornhusker Hwy between N. 20th St and N. 33rd St
- Van Dorn St between S. 70th St and S. 84th St

By applying this alternative approach to these corridors, the limited funding available for Roadway Capital Projects can be stretched to address the congestion needs on more corridors. The LRTP Oversight Committee identified intersections that could benefit from capacity improvements along each of these corridors and developed planning level cost estimates accordingly. Costs are shown in **Table 24**.

Future Congestion Levels

The 2026 and 2040 Lincoln MPO regional travel demand models were run with the Roadway Capital Projects included in the Fiscally Constrained Plan (**Table 24**). The resulting congestion levels are summarized on **Figure 36** and mapped on **Figure 37** and **Figure 38** for 2026 and 2040, respectively. With the Fiscally Constrained Roadway Capital Projects in place, 94.5 percent of the system (within the Lincoln City limits) is expected to be uncongested in 2026, and 89 percent uncongested in 2040. All roads outside the Lincoln City limits will remain uncongested.

Figure 36. Congestion Levels



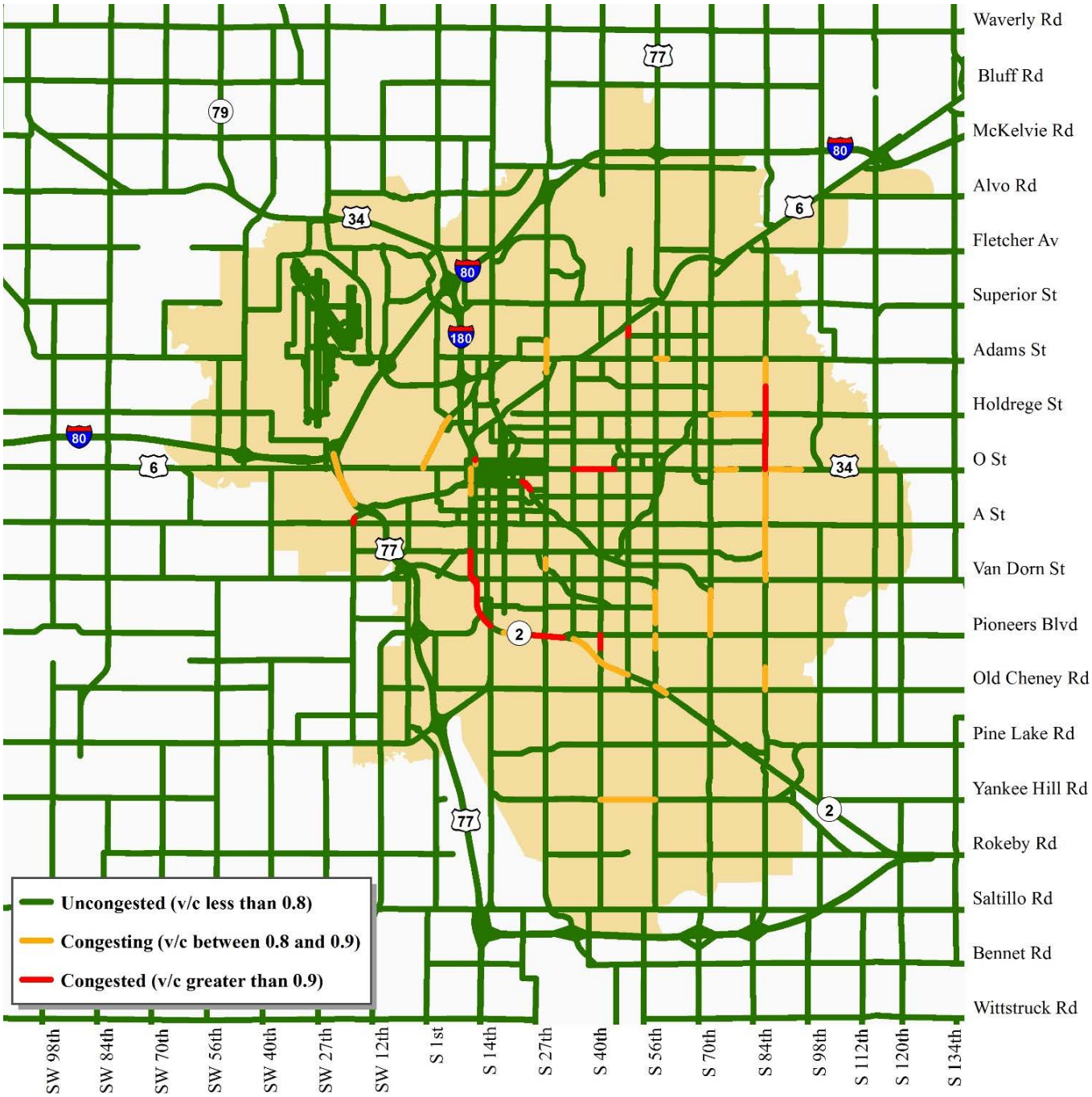


Figure 37. 2026 Congestion Levels (Fiscally Constrained Plan)

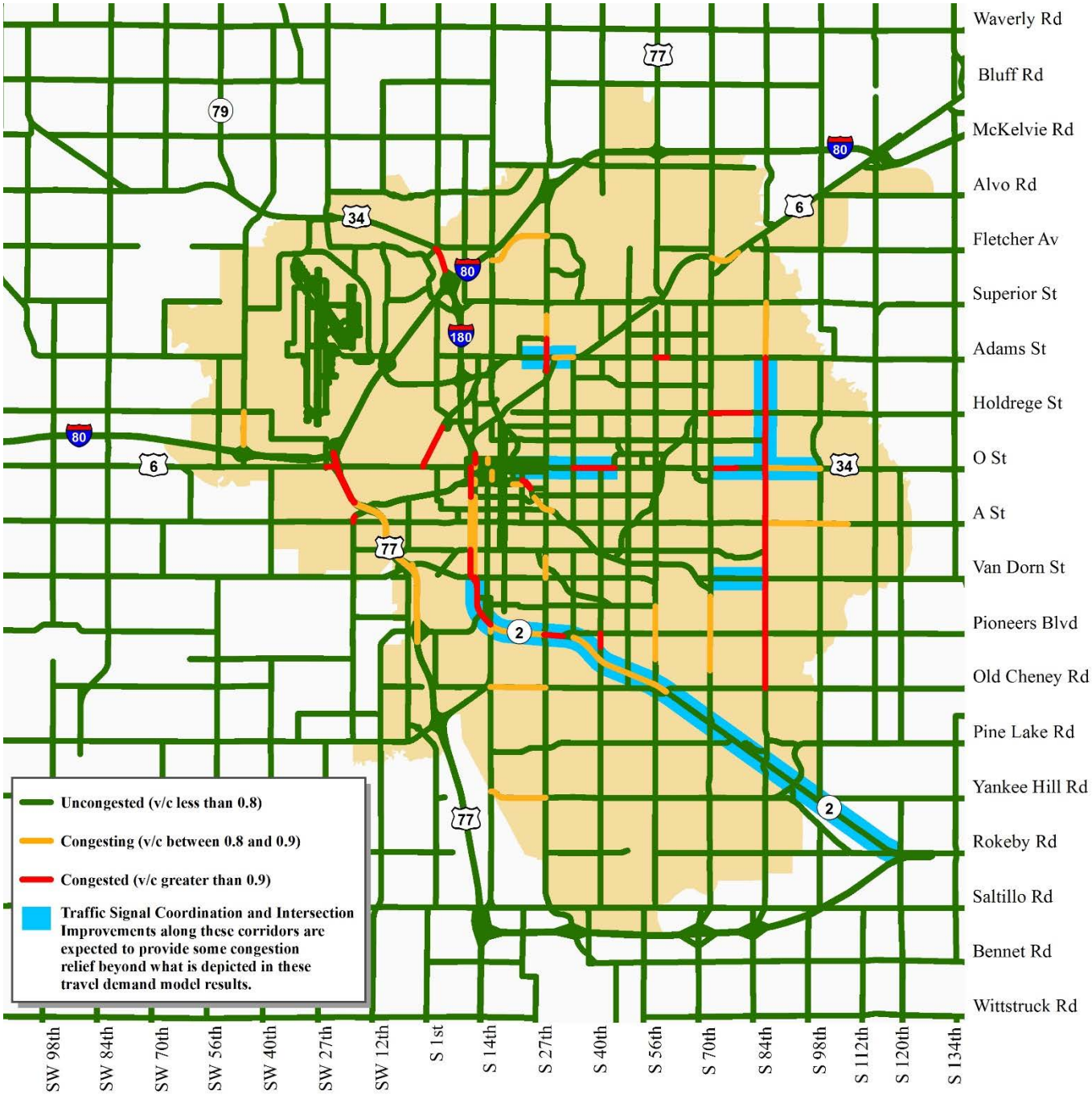


Figure 38. 2040 Congestion Levels (Fiscally Constrained Plan)

The travel model is not, however, an effective tool to measure the benefits of the traffic signal coordination and intersection improvements identified for the "Alternative Approach Corridors." Some of these corridors (e.g., Highway 2, 84th Street, O Street) show "congested" conditions on **Figure 37** and **Figure 38**. However, the traffic signal coordination and intersection improvements along these corridors are not accounted for in the travel demand model. Congestion levels are expected to be reduced with these cost-effective improvements. To supplement the model results, the region-wide travel time savings anticipated in 2040 have been evaluated. **Table 25** compares the daily vehicle-hours of travel (VHT) anticipated to occur in 2040 given the completion of committed projects, including the Fiscally Constrained roadway widening projects, and then including the Fiscally Constrained "Alternative Approach Corridor" projects.

Table 25. Daily Travel Time

Network	Daily VHT
2040 Existing + Committed (E+C)	201,412
2040 E+C and Widening Projects	200,747
2040 E+C, Widening Projects and Alternative Approach Corridor Projects	200,094

VHT describes all of the hours of travel experienced daily by all vehicles throughout the road system, and reduction in VHT indicates travel time savings experienced by users. These results highlight the benefits of the different project types in the Fiscally Constrained Plan, which attributes 665 hours of travel time savings to the widening projects and an additional 653 hours of travel time savings to the intersection improvements and traffic signal coordination along the Alternative Approach Corridors. The intersection improvements travel time savings have been calculated using the methodology described in the Highway 2 Case Study in **Chapter 6**.

Other Programs

ITS and Technology

The Green Light Lincoln initiative uses smart technologies to improve traffic flow and reduce travel times. By using the next generation of traffic management systems, Lincoln travelers can expect less time waiting at red lights, fewer vehicle emissions, and a reduction in crashes. By maximizing the existing capacity of the City's streets through signal timing improvements, the need for major capacity expansions could be postponed or eliminated. The LRTP resource allocation includes a total of $151.85 million in funding for this program, which would allow full implementation of the City's Traffic Management Plan and Green Light Lincoln initiative. Travel delay reductions in the range of 20 percent may be expected with full implementation of Green Light Lincoln.

Technology could also help to improve transit service through applications such as transit signal priority treatments and next bus rider information. As transportation technologies advance, it will be important to stay abreast of how connected vehicles and driverless cars change the travel needs in Lincoln.

East Beltway Preservation

The allocation of $250,000 per year ($6 million over the 24-year time horizon) could be used to preserve approximately 170 acres of land along the East Beltway corridor, which is approximately 20 percent of the total land needed for the future corridor. The East Beltway was identified as the highest priority Roadway Capital Project by the public; proceeding with construction of a project this size depends on additional funding from the State and/or Federal government.

Studies, PE, ROW, & Statutorily Required Records

This program category covers pre-project level engineering studies, responses to non-project-specific public inquiries, engineering standards and guidelines, staff coordination with private sector growth proposals, and legal requirements for record keeping. The $70.7 million allocation will allow continuation of these essential staff functions.

County Projects

The LRTP Project Team has coordinated closely with the Lancaster County Engineer's Office throughout the development of the LRTP Update. The County's Rural Roads Program identifies priority paving projects that are most likely to receive funding for paving improvement during the 2040 planning period. The order and priority of the paving projects may vary as traffic conditions warrant. Funding for the Rural Roads Program is separate from the MPO funding described in the preceding sections. Most of the budget for the rural roadway network is devoted to maintenance of the network including grading, spreading gravel, snow removal and bridge and ROW maintenance. About $1 million per year is devoted to the programmed paving projects. **Figure 39** shows the rural roads projects, which are also listed in **Table 26**.

Some of the County projects shown on **Figure 39** are located within Lincoln's 2040 Future Service Limit. The City and County will closely coordinate these projects to determine appropriate phased rural to urban roadway cross sections and drainage improvements at the time of construction. The objectives in phasing construction of the first two lanes of paving on these segments are to maximize pavement life, minimize pavement reconstruction, and reduce traffic disruption when traffic volumes warrant additional lanes. The pace of adjacent land development, rate of traffic growth, the need for sidewalk and trails, together with funding availability, will determine the initial and ultimate design.

Ideas on the best method for making the transition from rural to urban sections continue to evolve as traffic needs and intersection design (roundabouts) change. The City of Lincoln Public Works and Utilities Department and Lancaster County Engineer's Office are currently reviewing the *rural to urban transition street* (RUTS) standards to evaluate whether adjustments should be made to transition from rural to urban more efficiently.

Table 26. Rural Roads Projects

Priority	Project ID	Street	Location	Length (Miles)	Project Type	Planned Improvement
2016	11	Bluff Road	Waverly City Limits to I-80	2.10	County Project	Programmed Paving
2016	18	Rokeby Road	S. 84th Street to 98th St	1.00	County Project	Programmed Paving
2016	33	W. Agnew Road	Hwy. 79 west 0.2 miles	0.20	County Project	Programmed Paving
2016	34	W. Denton Rd.	SW 112th St. to SW 140th St.	2.00	County Project	Programmed Paving
2016	35	Old Cheney Rd.	148th St. to 190th St.	3.00	County Project	Programmed Paving
1	9	Adams Street	Steven's Creek to N. 148th St	3.50	County Project	Programmed Paving
2	5	S. 54th Street	Hickman Rd to Roca Rd	2.00	County Project	Programmed Paving
3	1	S. 68th Street	Hickman to Roca Rd	1.30	Federal-Aid County Project	Two Lane Widening
4	32	Saltillo Road	S. 27th St to S. 68th St	3.00	County Project	Two Lane Widening
5	15	W. A Street	SW 84th St to SW 52nd St	2.20	County Project	Programmed Paving
6	30	Havelock Avenue	Stevens Creek to N. 112th St	1.40	County Project	Potential Paving
7	16	NW 27th St	Hwy 34 to W. Waverly Rd	3.50	County Project	Potential Paving
8	2	S. 68th Street	Princeton Rd to Stagecoach Rd	3.00	Federal-Aid County Project	Two Lane Widening
9	3	N. 14th Street	Waverly Rd to Raymond Rd	2.00	Federal-Aid County Project	Two Lane Widening
10	8	S. 98th Street	Old Cheney Rd to Hwy 34	4.00	County Project	Programmed Paving
11	4	N. 14th Street	Arbor Rd to Waverly Rd	2.50	Federal-Aid County Project	Two Lane Widening
12	6	SW 14th Street	Highway N-33 to W. Bennet Rd	2.00	County Project	Programmed Paving
13	10	Fletcher Avenue	N. 84th St to N. 98th St	2.00	County Project	Programmed Paving
14	29	N. 98th Street	Holdrege St to Highway US-6	4.30	County Project	Potential Paving
15	13	W. Van Dorn Street	SW 112th St to SW 84th St	2.00	County Project	Programmed Paving
16	7	S. 120th Street	Bennet Rd North 0.5 Miles	0.50	County Project	Potential Paving
17	17	Arbor Road	N. 27th St to Highway US-77	2.00	County Project	Potential Paving
18	12	N. 162nd Street	Highway US-6 to Davey Rd	3.80	County Project	Programmed Paving
19	24	W. Van Dorn Street	SW 140th St to SW 112th St	2.00	County Project	Potential Paving
20	14	S. 1st Street	Old Cheney Rd to Pioneers Blvd	1.00	County Project	Programmed Paving
21	25	W. Waverly Road	NW 112th St to Highway N-79	4.00	County Project	Potential Paving
22	26	W. Waverly Road	Highway N-79 to N. 14th St	5.00	County Project	Potential Paving
23	27	N. 1st Street	Alvo Rd to McKelvie Rd	1.00	County Project	Potential Paving
24	22	N. 27th Street	Arbor Rd to Waverly Rd	2.50	County Project	Potential Paving

Priority	Project ID	Street	Location	Length (Miles)	Project Type	Planned Improvement
25	19	S. 82nd Street	Roca Rd to Saltillo Rd	3.00	County Project	Potential Paving
26	21	W. Adams Street	NW 84th St to NW 56th St	2.00	County Project	Potential Paving
27	23	Van Dorn Street	S. 120th St to S. 148th St	2.00	County Project	Potential Paving
28	28	Panama Road	Highway US-77 to S. 54th St	3.00	County Project	Potential Paving
29	20	McKelvie Road	NW 27th St to N. 14th St	3.00	County Project	Potential Paving
30	31	Bluff Road	I-80 to N. 190th St	1.10	County Project	Potential Paving

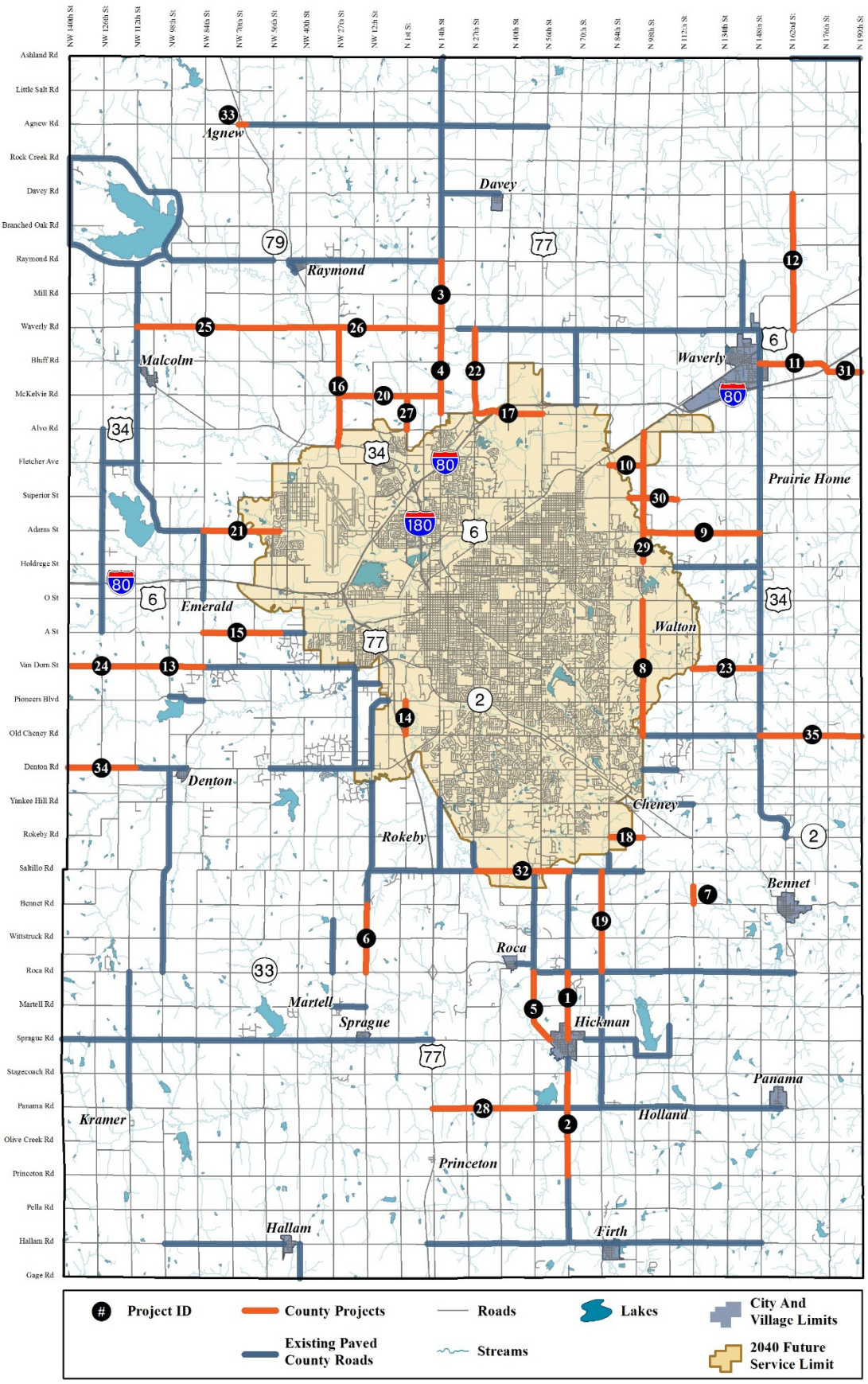


Figure 39. Rural Roads Projects

Illustrative Plan

Roadways

All remaining Roadway Capital Projects (including an additional 52 lower ranked projects that are not included in the Fiscally Constrained Plan) are included as Illustrative (unfunded) projects in the LRTP. These projects are depicted on **Figure 40** and detailed in **Table 27**.

State Projects

Several State projects are included in the candidate Roadway Capital Projects list and were ranked by the Scoring Committee. The rankings of these projects reflect where they fall within the Lincoln MPO's priorities. However, it is recognized that the timing of these projects will depend on the statewide priorities and funding availability. Therefore, all State projects are shown in the Illustrative Plan.

Trails

The remaining trail projects that are not expected to be funded within the 2040 Fiscally Constrained Plan are included as Illustrative projects in the LRTP, as depicted on **Figure 41**. The timing and priority of these projects may change depending on opportunities for funding.

Transit

The Illustrative Plan includes full implementation of the future phases of improvements identified in the TDP. The following transit projects and services are included as Illustrative (unfunded) projects.

Multi-Modal Transportation Center

A Multi-Modal Transportation Center will provide a high level amenity for StarTran bus riders, bicyclists who desire to use transit when they travel, pedestrians as an information center and travel hub, and other transportation providers. A Multi-Modal Transportation Center (MMTC) would also provide a strong and permanent statement of intent on the part of Lincoln to become a multi-modal friendly community.

The MMTC would function as a bus transfer center, StarTran administrative office, bicycle storage facility, bike share facility, and likely offer space for supportive retail, taxi stands, and downtown parking, benefitting all of the City of Lincoln. The proposed location for a MMTC would be in downtown Lincoln to improve connections between people and centers of employment, education, and services. Such a center would allow convenient, safe, and easy bus passenger transfers. Having a transfer facility would also reduce the criminal activity at the bus stop by making the area more transparent and the presence of continued administrative staff in the area. The estimated cost for design, ROW, and construction of the MMTC is $28 million.

Maintenance Facility and Bio-Gas Fueling

StarTran will be in need of a new bus maintenance and storage facility. Currently, the bus maintenance and a significant portion of the bus storage facility is well beyond its reasonable building life. The facility, built in the 1930s, is located within the South Haymarket Neighborhood Plan, which the Lancaster County/Lincoln Planning Commission approved in November 2015. The area would be redeveloped into a mixed residential/commercial district. The current facility will need to move within a couple of years.

StarTran has applied for $16 million under the FTA Grants for Buses and Bus Facilities Program to fund design and construction of a new bus maintenance and storage facility to be located on Theresa Street, adjacent to the Lincoln Wastewater System sewage treatment plant to help facilitate the proposed Renewable Natural Gas (RNG) project that will be located there. The RNG project employs an innovative methane gas recovery conversion to vehicle fuel process, using methane from the sewage treatment plant. The plan is to locate the

RNG fueling station adjacent to the StarTran bus maintenance and storage facility, allowing buses to be fueled onsite.

Implement TDP Expansion Plan

The approved 2015 TDP included an expansion plan for increasing service on key routes and adding vehicles.

Bus Rapid Transit

Consider BRT in high use corridors such as "O" Street and 27th Street.

Technology Improvements

Enhance customer knowledge and trip planning with passenger information systems.

Consider private transportation options such as Uber or Lyft to enhance customer travel. Such applications could be used to transport customers at the end of the bus line to their final destinations.

Alternative Fueled Vehicles

Consider different fuel types and propulsion systems such as electric buses as a means of reducing GHG emissions and lowering fuel costs.

Use of Rail Corridors for Passenger Use

Study the potential of using existing rail corridors, such as Highway 2 and Cornhusker Highway, for light rail.

Inter-City Transit Service

Consider inter-city transportation between Lincoln and Omaha.

Table 27. Illustrative Plan (Unfunded) Roadway Capital Projects

Rank	Project ID	Street Name	Limits	Description	Agency	Project Cost (2016$)	Local Portion (2016$)
	C	Nebraska Hwy 2	84th Street to South Street	Future Improvements (TBD by Corridor Study)	Local	$30,000,000	$30,000,000
9	34	US-6 (SUN VALLEY)	Corn. Hwy (US-6) to W. O St.(US-6)	4 lanes + turn lanes	State	$16,000,000	$3,200,000
15	44	O St (US-34)	84th Street to 120th Street	4 lanes + intersection improvements	State	$14,000,000	$2,800,000
18	1	I-80	I-80 and I-180	Major interchange work	State	$41,000,000	$0
19	38	Cornhusker (US-6)	N. 11th St to N. 20th St	Intersection Improvements	Local	$1,000,000	$1,000,000
21	24	Yankee Hill Rd	S. 56th Street to S. 70th Street	2 lanes + intersection improvements	Local	$7,000,000	$7,000,000
22	25	S. 84th St	Amber Hill Road to Yankee Hill Road	4 lanes + intersection improvements	Local	$4,300,000	$4,300,000
23	69	N. 14th St	US-6 Cornhusker Highway	Interchange	Local	$15,300,000	$15,300,000
24	50	Havelock Ave	N. 84th St to N. 98th St	2 lanes + intersection improvements	Local	$7,000,000	$7,000,000
25	56	Holdrege St	N. 70th St to N. 80th St	4 lanes + intersection improvements	Local	$7,900,000	$7,900,000
26	71	I-80	Pleasant Dale to NW 56th Street	6 lanes + bridges	State	$76,000,000	$0
27	21	Saltillo Rd	S. 14th St to S. 27th St	2 lanes + intersection improvements	Local	$8,200,000	$8,200,000
28	13	W. Van Dorn St	Coddington Avenue to US-77	2 lanes + intersection improvements	Local	$6,000,000	$6,000,000
29	57	Yankee Hill Rd	S. 14th St to S. 27th St	Additional 2 lanes	Local	$4,000,000	$4,000,000
30	17b	NW 12th St	US 34 Overpass	Overpass	Local	$8,700,000	$8,700,000
31	49	Saltillo Rd	27th Street to 70th Street	2 lanes + intersection improvements	Local	$21,000,000	$21,000,000
32	59	East Beltway	Nebraska Hwy 2 to I-80	New 4 lane divided highway	Local	$247,000,000	$247,000,000
33	31	S. 70th St	Pine Lake Road to Yankee Hill Road	4 lanes + intersection improvements	Local	$10,500,000	$10,500,000
34	51	N. 33rd St	Cornhusker Hwy to Superior St	4 lanes + int. impr. & bridge	Local	$15,000,000	$15,000,000
35	5	NW 56th St	W. Partridge Lane to W. "O" Street	2 lanes + intersection improvements	Local	$6,600,000	$6,600,000
36	30	S. 70th St	Yankee Hill Rd to Rokeby Rd	2 lanes + intersection improvements	Local	$4,800,000	$4,800,000
37	61	S. 27th St	Yankee Hill Rd to Saltillo Rd	2 lane realignment + int. impr.	Local	$14,000,000	$14,000,000
38	68	O St (US-34)	120th Street to east county line	4 lanes + intersection improvements	State	$29,000,000	$5,800,000
39	52	A Street	S. 98th St to 105th St	2 lanes + intersection improvements	Local	$3,500,000	$3,500,000
40	72	I-180	I-80 to US-6	Reconstruction + bridges	State	$40,100,000	$0
41	70	US 34	N79 to Malcolm Spur	4 lanes + intersection improvements	State	$12,000,000	$2,400,000
43	12	NW 40th St	W. Holdrege Street to W. Vine Street	2 lanes + intersection improvements	Local	$3,500,000	$3,500,000
44	9b	W. Holdrege St	Chitwood to NW 40th Street	2 lanes + intersection improvements	Local	$2,975,000	$2,975,000

Rank	Project ID	Street Name	Limits	Description	Agency	Project Cost (2016$)	Local Portion (2016$)
45	11	NW 40th St	W. Vine Street to US-6, including I-80 Overpass	Overpass	Local	$11,500,000	$11,500,000
46	54	Adams St	N. 90th St to N. 98th St	2 lanes + intersection improvements	Local	$4,200,000	$4,200,000
47	53	W. Fletcher Ave	NW 31st St to NW 27th St	2 lanes + intersection improvements	Local	$3,200,000	$3,200,000
48	63	S. 84th St	Yankee Hill Rd to Rokeby Rd	4 lanes + intersection improvements	Local	$10,500,000	$10,500,000
49	4	W. Adams St	NW 70th Street to NW 56th Street	2 lanes + intersection improvements	Local	$7,000,000	$7,000,000
50	55	S. 98th St	US 34 (O St) to A St	4 lanes + intersection improvements	Local	$10,500,000	$10,500,000
51	8	W. Van Dorn St	SW 40th Street to Coddington Avenue	2 lanes + intersection improvements	Local	$10,500,000	$10,500,000
52	20	Rokeby Rd	S. 27th Street to S. 40th Street	2 lanes + intersection improvements	Local	$7,000,000	$7,000,000
53	3	W. Superior St	NW 70th Street to NW 56th Street	2 lanes + intersection improvements	Local	$7,400,000	$7,400,000
54	6	NW 38th St	W. Adams Street to W. Holdrege Street	2 lanes + intersection improvements	Local	$6,000,000	$6,000,000
55	62	S. 70th St	Rokeby Rd to Saltillo Rd	4 lanes + intersection improvements	Local	$10,500,000	$10,500,000
56	47	N. 98th St	Holdrege St to O St	Additional 2 lanes	Local	$5,400,000	$5,400,000
57	45	S. 98th St	A Street to Pioneers Boulevard	4 lanes + intersection improvements	Local	$21,000,000	$21,000,000
58	7	NW 70th St	W. Superior Street to W. Adams Street	2 lanes + intersection improvements	Local	$7,000,000	$7,000,000
59	66	W. Alvo Rd	NW 27th Street to Tallgrass	2 lanes + intersection improvements	Local	$8,400,000	$8,400,000
60	43	N. 98th St	Adams Street to Holdrege Street	2 lanes + intersection improvements	Local	$8,000,000	$8,000,000
61	46	S. 112th St	US-34 to Van Dorn Street	2 lanes + intersection improvements	Local	$14,000,000	$14,000,000
62	48	N. 112th St	Holdrege Street to US-34	2 lanes + intersection improvements	Local	$9,100,000	$9,100,000
64	15	NW 56th St	W. Cuming Street to W. Superior Street	2 lanes + intersection improvements	Local	$3,200,000	$3,200,000
65	28	Rokeby Rd	S. 48th Street to S. 56th Street	2 lanes + intersection improvements	Local	$7,000,000	$7,000,000
68	73	US 34	US 34 and Fletcher Ave	New interchange	State	$25,000,000	$0
69	22	Denton Rd	Amaranth Ln to S. Folsom St	2 additional lanes	Local	$4,000,000	$4,000,000
70	16	W. Cuming St	NW 56th Street to NW 52nd Street	2 lanes + intersection improvements	Local	$1,800,000	$1,800,000
71	64	S. 84th St	Rokeby Rd to Saltillo Rd	4 lanes + intersection improvements	Local	$10,500,000	$10,500,000

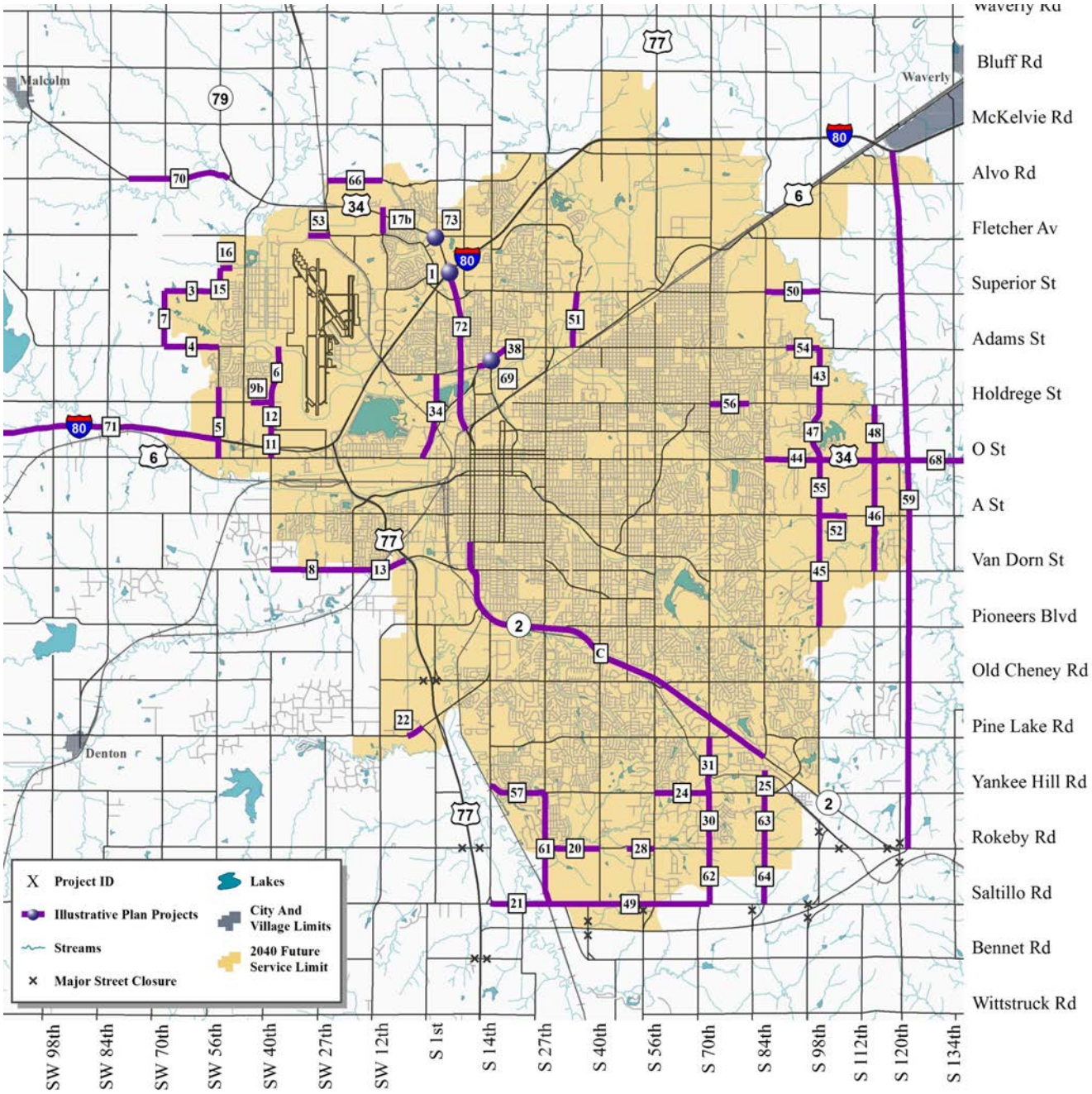


Figure 40. Illustrative Plan (Unfunded) Roadway Capital Projects

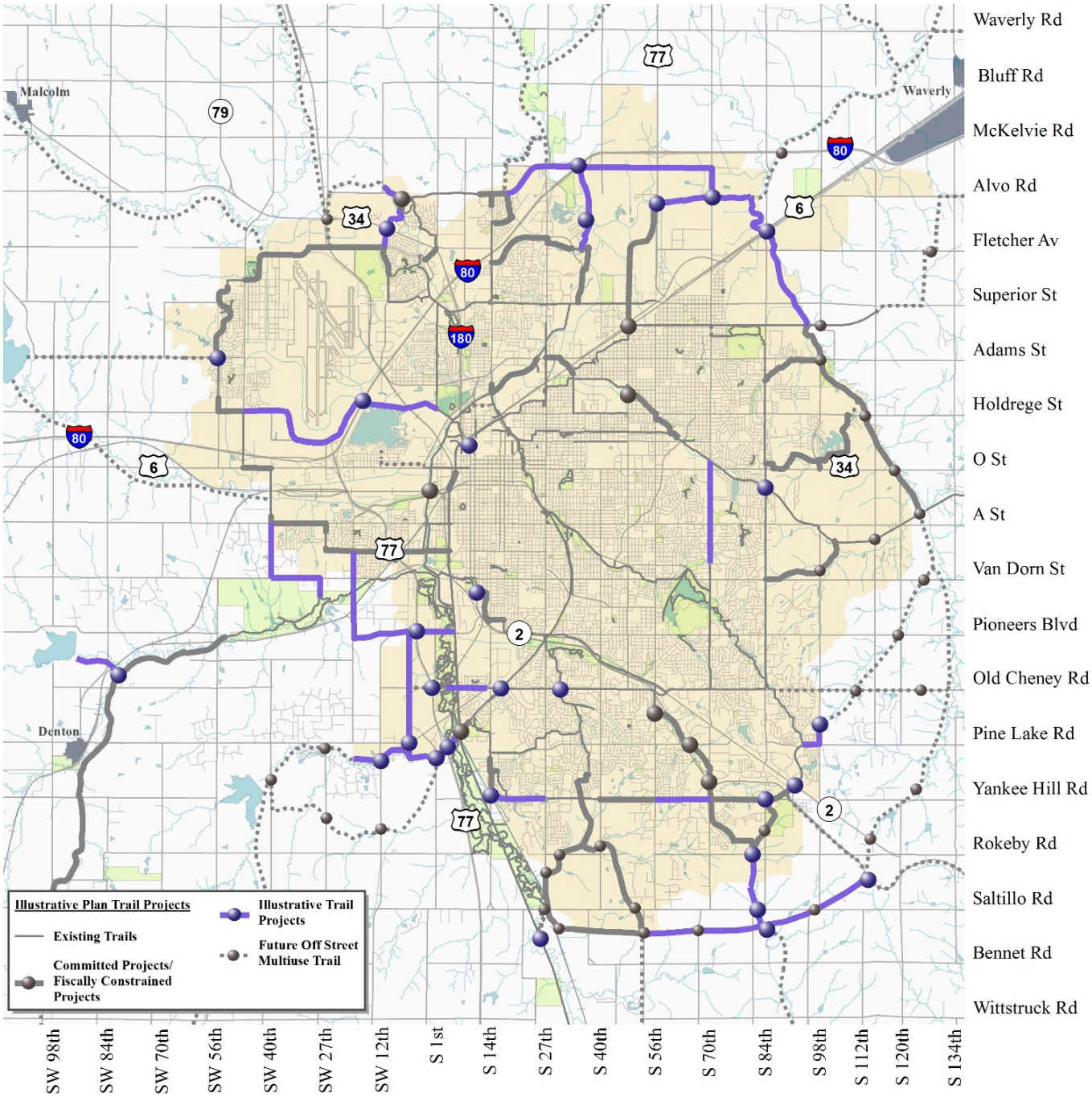


Figure 41. Illustrative Plan (Unfunded) Trail Projects

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8. Environmental Overview

Introduction

Environmental stewardship of the natural, social, and cultural environment is a priority for the Lincoln MPO. This chapter provides an overview of the potential environmental, social, and cultural resources that could prompt further analyses for the proposed transportation system improvements considered for the LRTP. The following sections provide a general description of the resources, potential project overlap indicating future assessment needs, and recommended mitigation measures associated with proposed multimodal alternatives. This overview is broad in scope and meant to assist in the prioritization of future projects; specific improvement projects would still require separate resource reviews, as needed, for environmental compliance. **Appendix H** includes references for the environmental overview.

Federal Requirements

The FAST Act states that the MPO will communicate with state and local agencies concerning land use management, natural resources, environmental protection, conservation, and historic preservation during the LRTP planning process. Discussions are to include the identification of potential mitigation measures, in consultation with federal, state, and tribal wildlife agencies, as well as land management and regulatory agencies. This chapter documents assessments conducted to comply with these requirements. The assessments were used to identify additional planning needs or mitigation measures associated with proposed projects.

Location of Projects

Lancaster County, located in southeast Nebraska, encompasses an area of 847 square miles or 542,080 acres. Lincoln is the largest city in Lancaster County, with an estimated population of 265,811 (US Census Bureau 2014a). Twelve other cities and villages are located in the county. Most of the proposed projects occur within the future service limit of the City of Lincoln.

Environmental Study Area (ESA)

Each roadway project under consideration in the LRTP was assigned a 120-foot (ft) ROW regardless of its hierarchy, such as two-lane or four-lane. In addition, a 100-ft buffer was established on both sides of the ROW to represent an area of potential disturbance to natural, social, and cultural environmental resources (for a total buffer width of 320 ft). For trail projects, a 100-ft buffer was used (for a total buffer width of 200 ft). The ESA was defined as the area within the buffer boundaries. **Appendix F** contains the maps showing the overlays of the environmental resources with the roadway and trail projects.

Resource Assessment Methodology

For most environmental, social, and cultural resources, maps created in ESRI's ArcMap (GIS software) identify potential areas of concern associated with future projects. A few resources required other inventory methods. The ESA boundary for each roadway and trail project was overlaid onto the resource maps to determine potential concerns requiring further investigation.

Air Quality

The projects and decisions contained within the Lincoln MPO 2040 LRTP can influence local air quality. Estimated vehicle emissions of select air pollutants that are typically related to mobile transportation sources were assessed for the LRTP.

Because the Lincoln area is currently in attainment or unclassifiable for the National Ambient Air Quality Standards (NAAQS) under the Clean Air Act, the evaluation was primarily for informational, planning, and stewardship purposes. The evaluation was based on traffic data developed through the MPO's regional travel models and from pollutant emission data developed for this project using US Environmental Protection Agency Motor Vehicle Emission Simulator software (i.e., MOVES2014).

Evaluation Overview

The evaluation for air pollution emissions included three traffic situations covering the MPO area: 2015 existing conditions and two future fiscally constrained road networks planned by the MPO (years 2026 and 2040). Air pollutant emissions data for these situations were calculated using MOVES2014.

The evaluation examined five air pollutants of concern commonly associated with motor vehicles: carbon monoxide (CO), particulate matter less than 2.5 microns in diameter (PM2.5), two ozone precursor pollutants (volatile organic compounds [VOCs] and oxides of nitrogen [NOx]), and greenhouse gases (GHGs) expressed as carbon dioxide (CO2) equivalents. These pollutants are of concern for several reasons:

- ***Carbon Monoxide:*** CO, an odorless, colorless gas, is most commonly formed by incomplete combustion of fuel. CO is dangerous because it interferes with the body's ability to absorb oxygen. High concentrations of CO can cause dizziness, headaches, loss of vision, impaired dexterity, and even death if the concentration is high enough. Major sources of CO include vehicle exhaust, coal burning, and forest fires. CO is most commonly a concern in localized areas around the CO sources, such as near congested road intersections. CO can be a regional concern if concentrations are high enough and disperse into the surrounding area. CO tends to be highest in winter.
- ***Particulate Matter:*** PM2.5, a complex mix of very small solid particles and liquid droplets, is a concern because it can be inhaled deeply into the lungs and can interfere with lung function or lead to other health effects. PM2.5 can aggravate asthma, diminish lung capacity, and cause lung or heart problems. Particulate matter can also cause haze. Sources of particulate matter include smoke, and diesel engine exhaust. Particulate matter can be a localized concern near the sources or can cause regional concerns through dispersion.
- ***Ozone and Precursors:*** A strong oxidizing agent, ozone can damage cells in lungs and plants and can cause eye irritation and coughing. Ozone is not emitted directly; rather, it is formed by chemical reactions between other precursor pollutants in the atmosphere. VOCs and NOx in the presence of sunlight and certain weather conditions can form ozone. So, ozone concentrations can be affected through the concentrations of the precursor pollutants. Automotive sources of ozone precursors include vehicle exhaust, fuel evaporation, and vehicle refueling. Ozone is a regional concern because it takes time for ozone to form and the pollutants can drift a considerable distance in that time. Ozone generally is most problematic in summer.
- ***Greenhouse Gases***: CO2 is the largest component of vehicle GHG emissions. Other prominent transportation-related GHGs include methane and nitrous oxide. Water vapor is the most abundant GHG and makes up approximately two-thirds of the natural greenhouse effect. GHGs are a concern in terms of global climate change. Human-generated GHG emissions can contribute to climate change through the burning of fossil fuels and other activities. For this evaluation, overall GHG emissions have been quantified in terms of an equivalent amount of CO2 emissions.

MOVES2014 Modeling

MOVES2014a was the software version used to develop two groups of vehicle emission results for the air pollutants described above. For each of the three evaluation years, the MPO developed a

representative set of average pollutant emission rates in grams per mile traveled for various vehicle speeds. Then, the MPO calculated the cumulative daily total of emissions (in tons) for a weekday for January and July of the three evaluation years.

MOVES2014 requires a considerable amount of technical data for input to generate these results. Some of the needed data can be difficult and costly to develop specifically for a region/locality, so it is not readily available. The MPO has developed data for vehicle miles of travel (VMT) for the road networks through the traffic models, which were used in MOVES2014 modeling. However, other detailed, local data were not available because these inputs were derived from the MOVES2014 default dataset. A "national level" MOVES2014 model for Lancaster County was run to provide input data for the vehicle mix and the VMT distribution. MOVES2014 default data were also used for inputs such as fuel types and weather conditions. Changes to any of the inputs (e.g., temperature) will affect the emission results to some extent, so this air quality evaluation is intended to illustrate general trends for the MPO region.

Pollutant Emissions Results

For the first group of emission results, graphs of tailpipe emission rates versus vehicle speeds were developed for the air pollutants of interest (**Figure 42)** to illustrate how emissions can vary with changes in traffic congestion levels and time. Note that **Figure** represents averaged results for the entire vehicle fleet, but for a single set of weather conditions—summer, 60 degrees, 60 percent humidity, etc. Other conditions may provide different results. The graphs illustrate that traffic flow improvements (higher speeds) generally reduce emissions until relatively high speeds are reached. For a higher-level look at these emission rates, average weekdays in winter (January) and summer (July) were merged to calculate composite average rates for all street types and vehicle types for the MPO area (**Table 28**). **Table 28** results are from many weather conditions and are not for a single condition like in **Figure** .

Table 28. Composite LRTP-Wide Vehicle Pollutant Emission Rates

Pollutant	2015 (g/mi)	2026 (g/mi)	2040 (g/mi)
CO	7.33	3.35	1.82
PM2.5	0.0256	0.0095	0.0066
NOx	1.28	0.37	0.24
VOC	0.759	0.261	0.167
GHGs as CO2	499	368	305

Future years are expected to see progressively lower emission rates due to federal emission regulations and improvements in vehicle technologies. As older vehicles are replaced with newer ones, lower emissions are expected. Some reductions will be substantial; on the order of 80 percent. Therefore, future vehicle emission levels may be lower even with more vehicles or VMT.

For the second group of emission results, total daily emissions from the MPO road network for average weekdays in winter and summer were calculated **(Figure 43**). The levels will vary due to several factors—time of year, temperature, day of week, VMT, level of congestion, etc.—which complicates evaluation. To simplify and illustrate general trends, the seasonal results were merged to calculate composite daily emission totals (**Table 29**).

Table 29. Composite Daily Pollutant Total Emissions

Pollutant	2015	2026	2040
CO (tons)	47.3	26.6	17.6
PM2.5 (tons)	0.165	0.075	0.064
NOx (tons)	8.26	2.96	2.28
VOC (tons)	4.89	2.07	1.62
GHGs as CO2 (tons)	3,215	2,918	2,952
VMT (miles)*	5,847,249	7,191,600	8,785,431

*FROM MOVES2014; THIS VALUE IS CALCULATED INTERNALLY AND MAY DIFFER FROM TRAFFIC MODEL VALUE

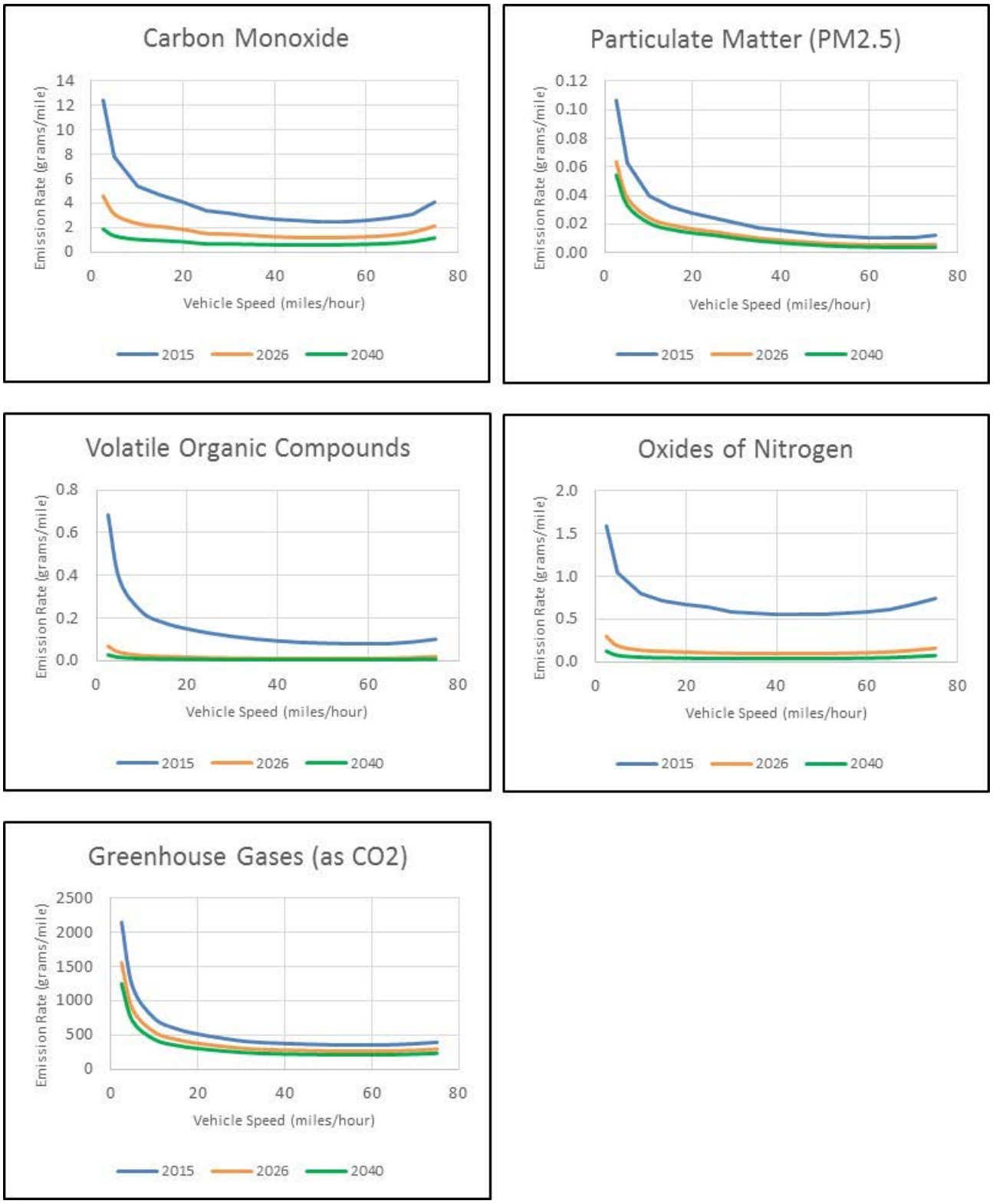

Figure 42. Example Pollutant Emission Rates for Lincoln Arterial Streets in Summer

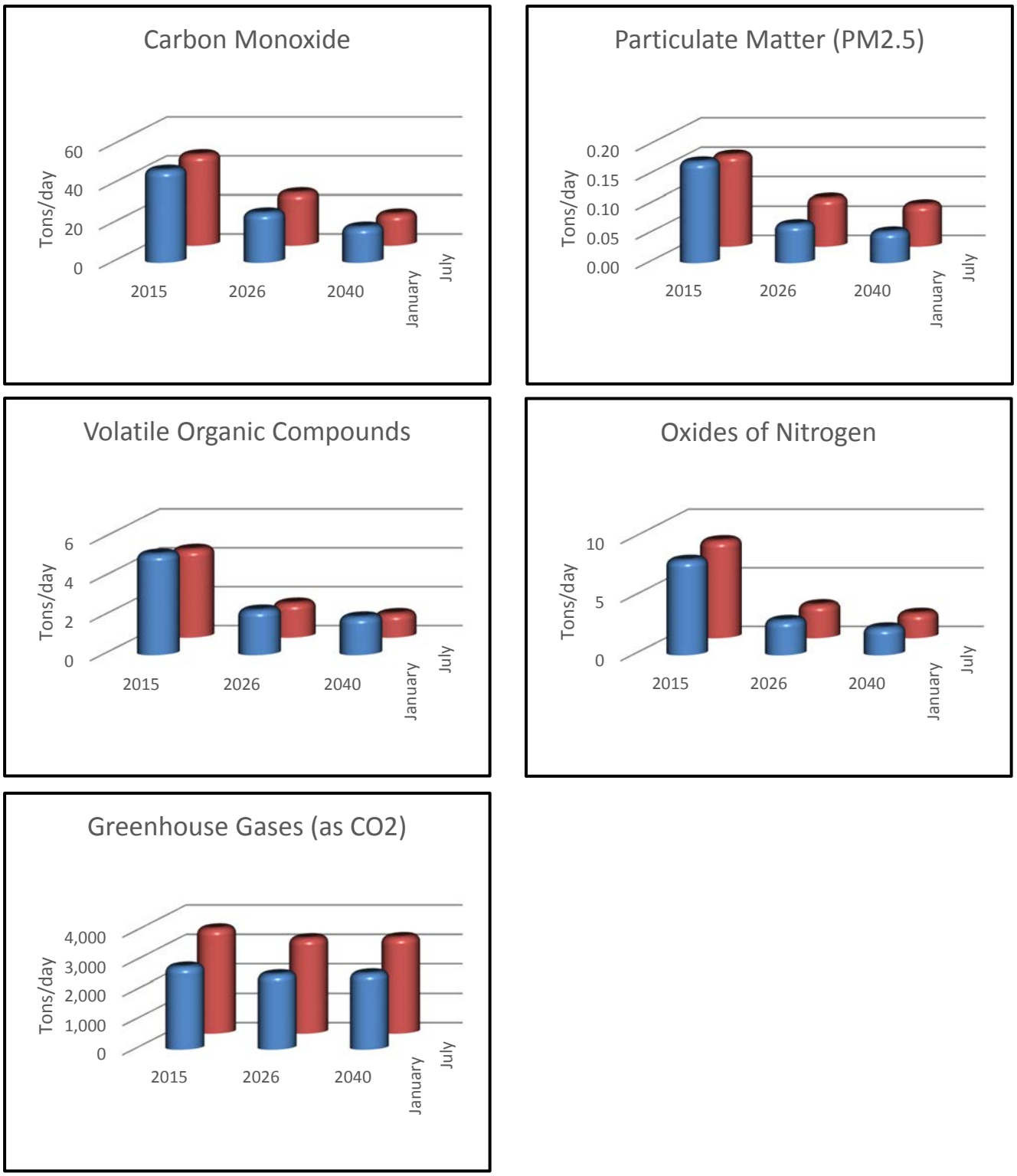

Figure 43. Typical Weekday Pollutant Emission Totals for Fiscally Constrained Road Network

Table 29 and **Figure 43** present total daily City of Lincoln and Lancaster County vehicle emissions for 2015, 2026, and 2040. **Table 29** also includes the forecast VMT for comparison. These results show substantial decreases in pollutant emissions from 2015 to 2040 while VMT will increase by approximately 25 percent by 2026 and by 50 percent by 2040.

The future year emissions for the City of Lincoln and Lancaster County—averaged for vehicle types and travel speeds—will have lower emissions per VMT than current conditions. The emissions results suggest that improved vehicle efficiency and more efficient travel speeds have more effect on reducing VOC, NOx, CO, and PM2.5, which are reduced by about 70 to 80 percent, than on GHGs, which are reduced by about 40 percent (**Table 28**).

As shown in the GHG graph in **Figure 43**, these average daily emissions will not decrease as much as is predicted for the other pollutants and appear to level off from 2026 to 2040. CO2 is a byproduct of burning fossil fuels, so reducing fuel consumption is one strategy to minimize CO2 emissions—gas mileage improvements and reductions in VMT can contribute to this. The City of Lincoln and Lancaster County Comprehensive and LRTP include elements to help reduce the growth in VMT by promoting more walkable, mixed-use activity centers, implementation of the Green Light Lincoln initiative, and providing alternative transportation choices (including through efforts of the Complete Streets initiative).

Vehicles are getting cleaner, but more miles are being driven each year. Which of these two trends will dominate in terms of pollutant emissions? Based on the traffic forecasts of the LRTP coupled with the pollutant emission forecasts from MOVES2014, air quality is expected to improve for the air pollutants examined due to improving vehicle emission and fuel technologies, even with increased VMT through 2040. These controls have resulted in significant improvements in air quality over the past few decades and will continue to provide reductions in emissions with the vehicle mandates scheduled for the future.

Natural Environment

Topography

Lancaster County is located in the Rolling Hills, Valleys, and Plains topographic regions. The general topography of the county consists of hilly land with moderate to steep slopes and rounded ridge crests composed mostly of glacial till that has been eroded and mantled by loess. The hills slope toward the Valley regions and gradually flatten near the historic floodplains of creek channels. At the southwest edge of the county, the topography transitions from the Rolling Hills to Plains region, the flat land that lies above the valley. Elevations range from a high of 1,520 feet above sea level in the northwest and southwest part of the county to a low of 1,080 feet above sea level in the northeast.

Hydrology

Surface water flows in more than 400 miles of warm water streams that meander through Lancaster County. Most notably Salt Creek flows from across the county southwest to northeast toward the Platte River. Major Salt Creek tributaries include Middle Creek, Oak Creek, Haines Branch, Beal Slough, and Stevens Creek. Several tributaries of the Nemaha River drain to the southeast in the southeast corner of the county. Many streams and their adjoining corridors consist of a variety of floodplain and riparian habitats. The floodplains for these streams account for 13.8 percent of the land area of the county.

Vegetation

Historically, tallgrass prairie dominated the landscape of Lancaster County; however, only approximately 8,640 acres of native prairie remain, mostly concentrated in the west-central portion of the county. Forested areas generally occur along stream corridors, within recreational areas, and on

city/state properties. Planted trees are also common along residential streets.

The Nebraska Natural Legacy Project's State Wildlife Action Plan designates the Salt Creek basin as a Saline Wetlands biologically unique landscape (Schneider et al. 2011). Freshwater wetlands occur throughout the county within floodplain depressions, closed depressions, ditch depressions, and stream or riparian corridors.

Agricultural land uses surround the City of Lincoln and other urban areas and consist of row crops, pasture, hay land, and other farming operations.

Parks and Natural Areas

The County contains 10 state wildlife management areas with reservoirs, including Branched Oak, Pawnee, Conestoga Lake, Bluestem, Olive Creek, and Stagecoach. The City of Lincoln, Lower Platte South Natural Resource District (LPSNRD), Nebraska Game and Parks Commission (NGPC), and other organizations manage several major park and natural areas, including Pioneers Park, Arbor Lake, Shoemaker Marsh, and Nine-Mile Prairie.

Natural Resource Assessments

The following resource assessments create a framework for environmental reviews for future LRTP projects. These resource assessments are based on data from the City of Lincoln Planning Department using their Natural Resource Geographic Information Systems (NRGIS) dataset (Lincoln-Lancaster County Planning Department 2001).

Stream Corridors

Stream corridors consist of the waterway, its floodplain, and the transitional upland fringe. Corridors generally include diverse habitat types supported by a close connection to the hydrology of the waterway. These ecosystems can be important to wildlife because they provide water, shelter, a source of food, and connections to other habitat areas, especially in the areas surrounding Little Salt Creek, where the federally endangered Salt Creek tiger beetle (SCTB) (*Cicindela nevadica lincolniana*) and state endangered saltwort (*Salicornia rubra*) occur. Stream corridors also provide floodwater attenuation and improve water quality by filtering runoff and collecting sediment before it enters the waterway.

A City of Lincoln building code regulation limits the placement of buildings or fill within a 60-ft buffer surrounding drainageways (i.e., streams or creeks) and is referred to as the "minimum flood corridor" (LMC Ordinance 26.07.126). Stream channels are also protected under the Clean Water Act, which requires compliance with Section 404 regulations for excavation or fill activities.

Stream corridors were identified and mapped on **Figure 44** using the National Hydrography Dataset, which is available online (USGS 2016). A 60-ft buffer area was delineated along all streams within the future service area of the City of Lincoln to identify the "minimum flood corridor." Based on the resource assessment, 55 roadway and 27 trail projects cross streams and/or occur within the minimum flood corridor.

Project constraints or resource impacts associated with stream corridors would be reduced through avoidance, minimization, and mitigation measures. Project designs would be developed to avoid or minimize fill within the "minimum flood corridor" and to lessen disturbance within the natural habitat. If impacts cannot be avoided or minimized, then mitigation would be developed. Mitigation may consist of on-site solutions to restore the flood corridor and habitat or off-site solutions to attenuate flood levels or preserve, restore, or establish similar habitat. Impacts to stream channels or wetlands within the corridor would require Section 404 permitting. Nebraska Department of Environmental Quality (NDEQ) guidelines may require that a 30-ft vegetated buffer be set aside along impacted channels and be planted with perennial native species.

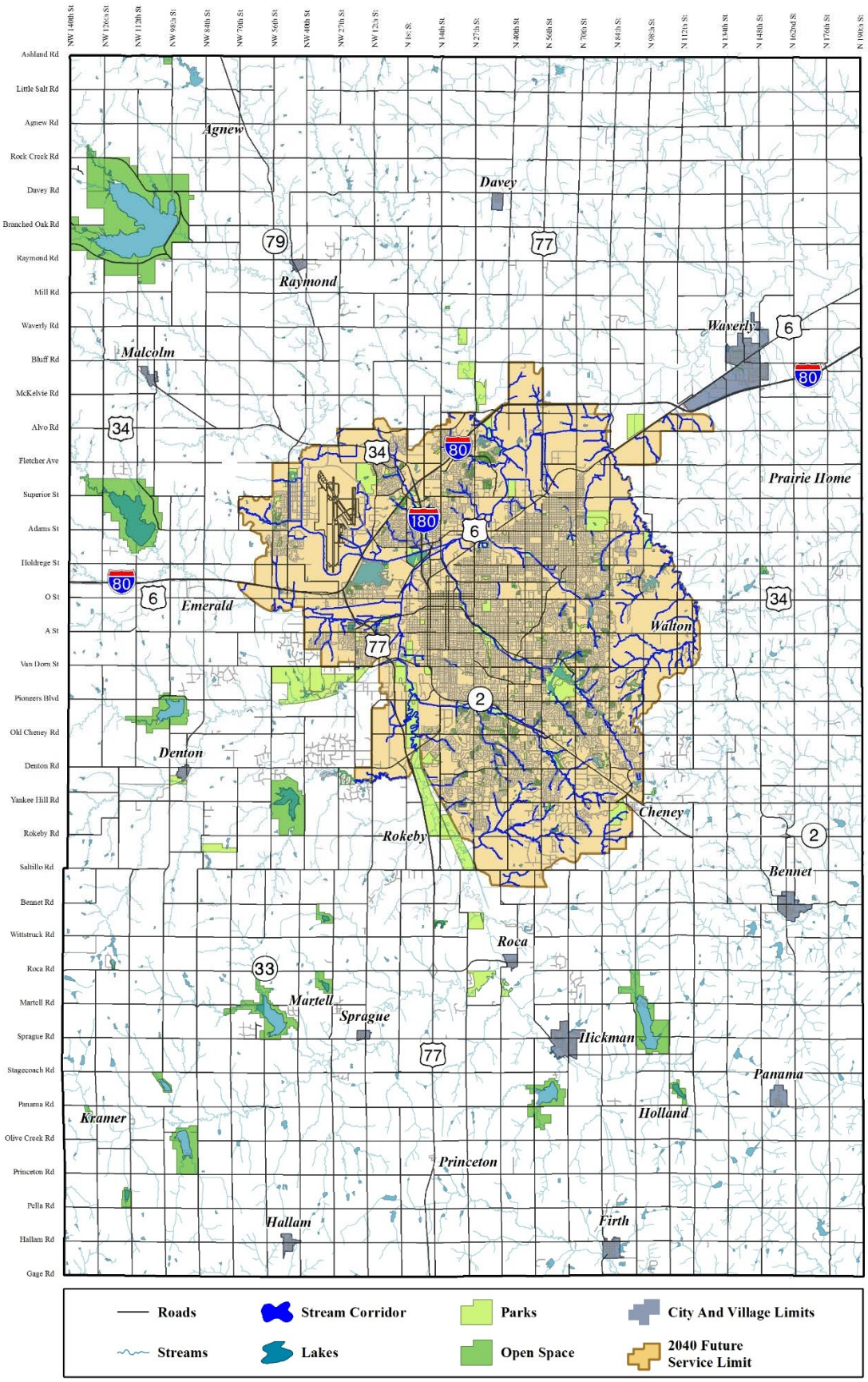

Figure 44. Stream Corridors

Floodplains

Floodplains are defined as the land area adjacent to a stream, river, or other waterbody that is subject to periodic inundation by regular flooding. The floodplain includes the floodway, which consists of the channel and overbank areas, and the flood fringe, which begins at the edge of the floodway and continues outward to the transitional upland fringe. The surface hydrology of floodplains is important because it affects the risk of flooding, and flooding can create erosion or sedimentation problems.

To reduce the risk of flooding and flood damage, floodplains are protected by city ordinances, which require a floodplain development permit for construction in the floodplain. NDEQ requires a National Pollutant Discharge Elimination System (NPDES) permit for any construction sites greater than 1.0 acre.

Floodplains were identified using Flood Insurance Rate Maps (FIRMs) provided by the Federal Emergency Management Agency (FEMA) (FEMA 2010–2013), as depicted on **Figure 45**. These maps identify the base floodplain, which is the area subject to a 1 percent or greater chance of flooding in any given year (also known as the 100-year flood). Based on the resource assessment, 72 roadway and 37 trail projects are located within the base floodplain. These projects may require a floodplain development permit and may be subject to restrictions concerning raises in floodplain surface elevations. Similar to stream corridors, project designs can be developed to avoid or minimize impacts to the base floodplain. Changes in floodplain surface elevations within the base floodplain may require submittal of a conditional letter of map revision (CLOMR) to FEMA.

Freshwater and Saline Wetlands

Wetlands are defined as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328). Wetlands and riparian areas are important because they provide habitat for plants, fish, and wildlife; serve as groundwater recharge areas; provide storage areas for storm and flood waters; serve as natural water filtration areas; and provide protection from wave action, erosion, and storm damage.

Eastern Nebraska saline wetlands are found only in Lancaster and southern Saunders counties and are categorized as a measure of their functionality and restoration potential (**Table 30**).

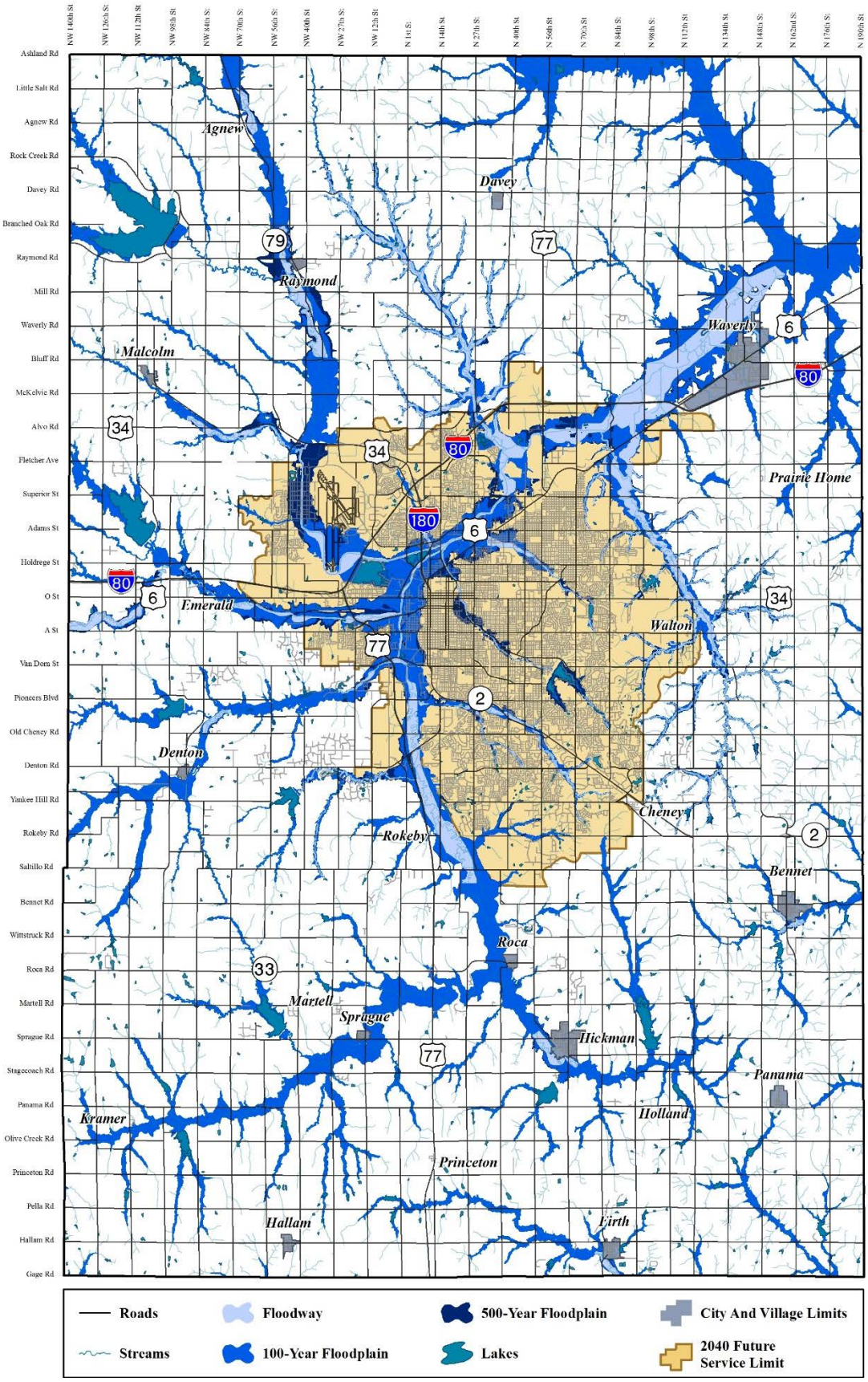

Figure 45. Floodplains

Table 30. Saline Wetland Categorization

Category	Description
I	These wetlands support salt-loving plants, occur on saline soils, and have high value saline wetland functions or the potential to provide high values following restoration or enhancement measures.
II	These wetlands occur on saline soils but are significantly disturbed or degraded by adjacent land use or altered hydrology. Salt-loving plants may occur as part of the site's flora, but the degree of degradation would not allow restoration to a higher quality saline character.
III	These wetlands occur on saline soils but support freshwater vegetation. These sites represent former saline wetlands that had an influx of freshwater runoff due to urban or agricultural modifications within the watershed, thus diluting soil salt concentrations.
IV	These freshwater wetlands on non-saline soils occur within the saline wetland study area boundary (additional freshwater wetlands are mapped separately).

Saline wetlands are unique in that they support salt-adapted plant communities and provide habitat for the federally endangered SCTB and state endangered saltwort. Saline wetlands were historically present along the terraces of Salt Creek and its tributaries but have been greatly reduced due to urban development, agriculture, and flood control projects along Salt Creek and its tributaries.

All wetlands are protected under Section 404 of the Clean Water Act by the US Army Corps of Engineers (USACE) and under Title 117 of the Nebraska Administrative Code and implemented by NDEQ. These regulations require a permit and possible mitigation for impacts to wetlands and waters.

Wetlands were identified using the National Wetland Inventory (NWI) (USFWS 2016c), supplemented by NRGIS dataset. Freshwater (**Figure 46**) and saline (**Figure 47**) wetlands were mapped separately because mitigation requirements are often greater for saline wetlands. Based on the resource assessment, 27 roadway and 16 trail projects would cross freshwater wetlands. Seventeen roadway and 10 trail projects would cross saline wetlands. These projects may require a Section 404 permit and may be subject to restrictions concerning temporary and permanent wetland impacts. Similar to stream corridors and floodplains, project designs would be developed to avoid or minimize wetland impacts.

If permanent impacts to wetlands are unavoidable and greater than 0.1 acre, then compensatory mitigation would be required. Wetland impacts would be offset by one of the following methods:

- Use of mitigation bank credits
- Construction of permittee-responsible mitigation consisting of either on-site or off-site wetland restoration, enhancement, establishment, or preservation, in addition to yearly monitoring (as set by USACE)

Compensatory mitigation may be required at a 1:1 or higher ratio depending on the type and quality of wetland impacted. Impacts to saline wetlands (especially Category I) would require higher mitigation ratios (Taylor and Krueger 1997).

Native Prairie

Native prairie is a grassland ecosystem lacking trees and dominated by native grasses, such as big bluestem, little bluestem, and Indian grass in the eastern Nebraska tallgrass prairie. Prairie grasslands are an important natural resource for wildlife and plant species and provide ecological benefits, such as protecting water quality through sediment retention, forming and protecting soil, maintaining biodiversity, and providing seasonal habitat for migratory birds. Administered by the NGPC and US Fish and Wildlife Service (USFWS), the Fish and Wildlife Coordination Act protects native prairies.

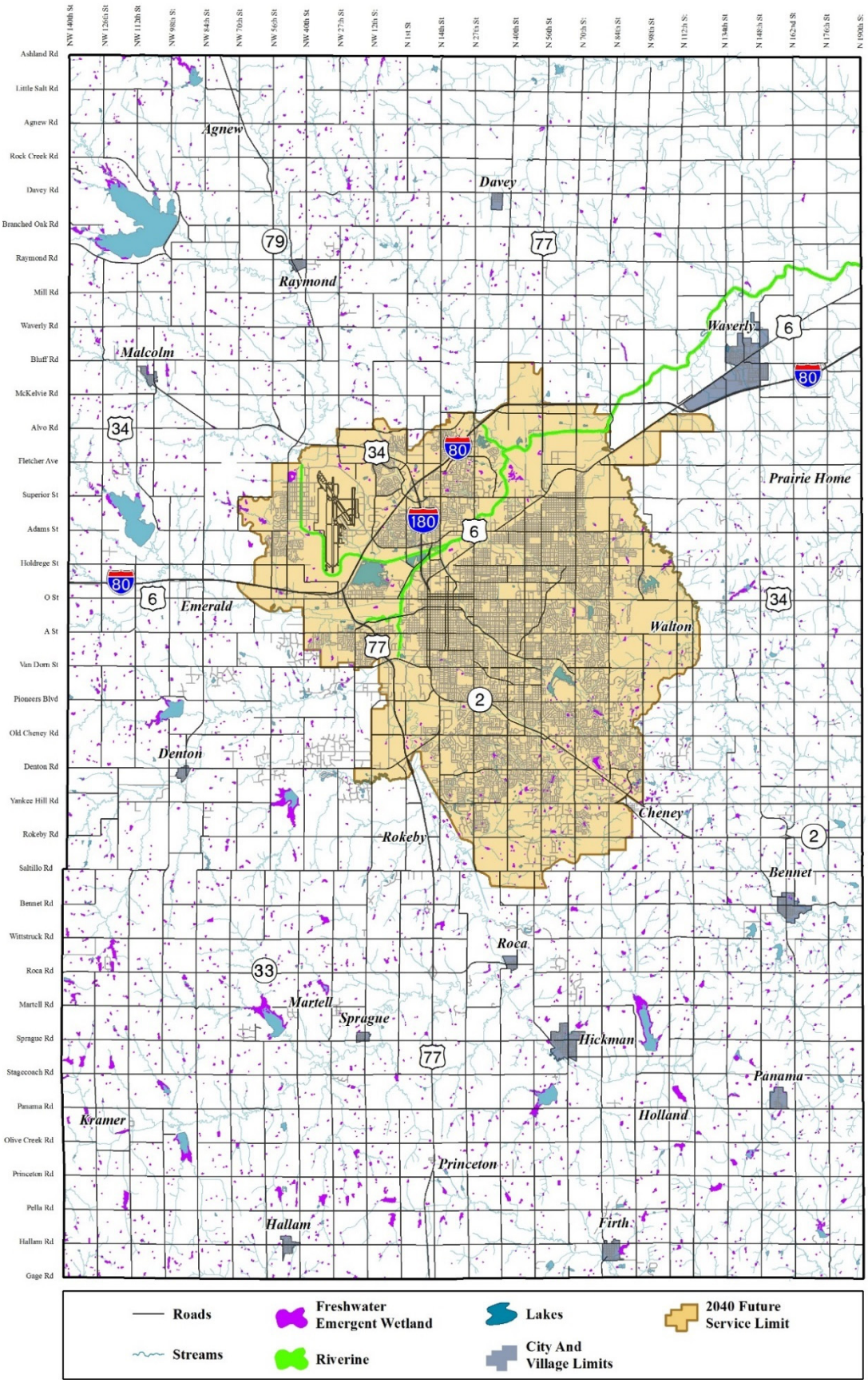

Figure 46. Freshwater Wetlands

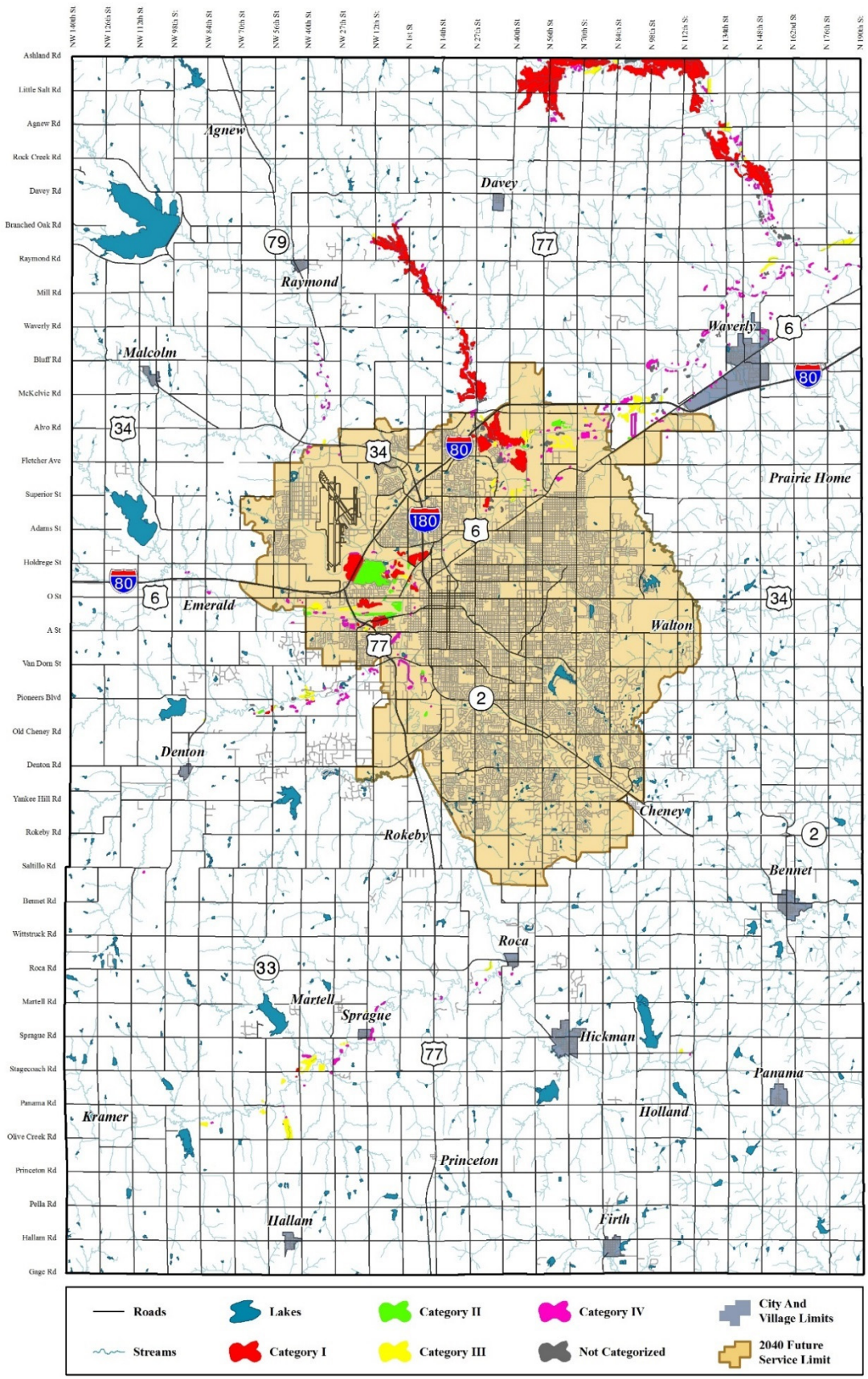

Figure 47. Saline Wetlands

The evaluation identified native prairies (**Figure 48**) using the NRGIS dataset, which used information from prairie inventories conducted in 1990 and 1997 (Lincoln-Lancaster County Planning Department 2001). Based on the resource assessment, 12 roadway and 3 trail projects would cross native prairies. Similar to other resources, impacts to prairies would be minimized through planning and design and could be mitigated through prairie restoration efforts.

Tree Mass

Tree masses are defined as various wooded areas, which are mostly located in the periphery of Lincoln, in public parks, or in rural areas. Trees are important because they provide habitat for wildlife, sustain soil stabilization, attenuate wind disturbance, and provide shade. Since 1976, the Arbor Day Foundation has designated the City of Lincoln as a "Tree City USA" (Lincoln Parks and Recreation 2016). Hickman and Waverly also hold the distinction of a "Tree City USA" (Arbor Day Website 2016).

The Lincoln Parks and Recreation Department Community Forestry Section is responsible for all trees on public property. Natural wooded areas are protected by the Fish and Wildlife Coordination Act and in some cases the Endangered Species Act, which are administered by USFWS and NGPC.

The evaluation identified tree mass areas (**Figure 49**) using the NRGIS dataset, which used information from updates in 2004 and 2007 (Lincoln-Lancaster County Planning Department 2001). The dataset primarily maps tree masses in rural, riparian, and park settings. Although many residential areas have tree-lined streets, these data were not available for the resource assessment. Based on the resource assessment, 52 roadway and 26 trail projects would cross tree mass areas.

Project construction could indirectly impact tree masses by altering the area hydrology through grade changes or by damaging roots through compaction. Where possible, tree removals would be minimized during planning and design. The use of retaining walls may minimize the effects of extensive grade changes. If tree removal is unavoidable, then replacement tree planting would be a suitable mitigation measure; however, special consideration should be given to the location and variety of re-planted trees. For example, the Lincoln Parks and Recreation Department Community Forestry Section provides several alternatives to replace ash trees (*Fraxinus* spp.) (Lincoln Parks and Recreation 2015) to minimize the spread and adverse impacts of the emerald ash borer (*Agrilus planipennis*) (Nebraska Emerald Ash Borer Working Group 2009).

Threatened and Endangered Species

Endangered species are plants or animals that are in danger of extinction throughout all or a significant portion of their range; threatened species are likely to become endangered within the foreseeable future. Conservation of threatened and endangered (T & E) species and their habitats help maintain the diversity and functioning of natural areas.

T & E species are protected by the Endangered Species Act and the Nebraska Nongame and Endangered Species Conservation Act, administered by USFWS and NGPC, respectively.

The evaluation used county lists from NGPC (2015) and the Information for Planning and Conservation (IPaC) website (USFWS 2016a) to collect information on the potential presence of T & E species and their habitat. Species ranges were obtained from mapping provided by NGPC. **Table 31** identifies the eight species listed as potentially occurring in Lancaster County.

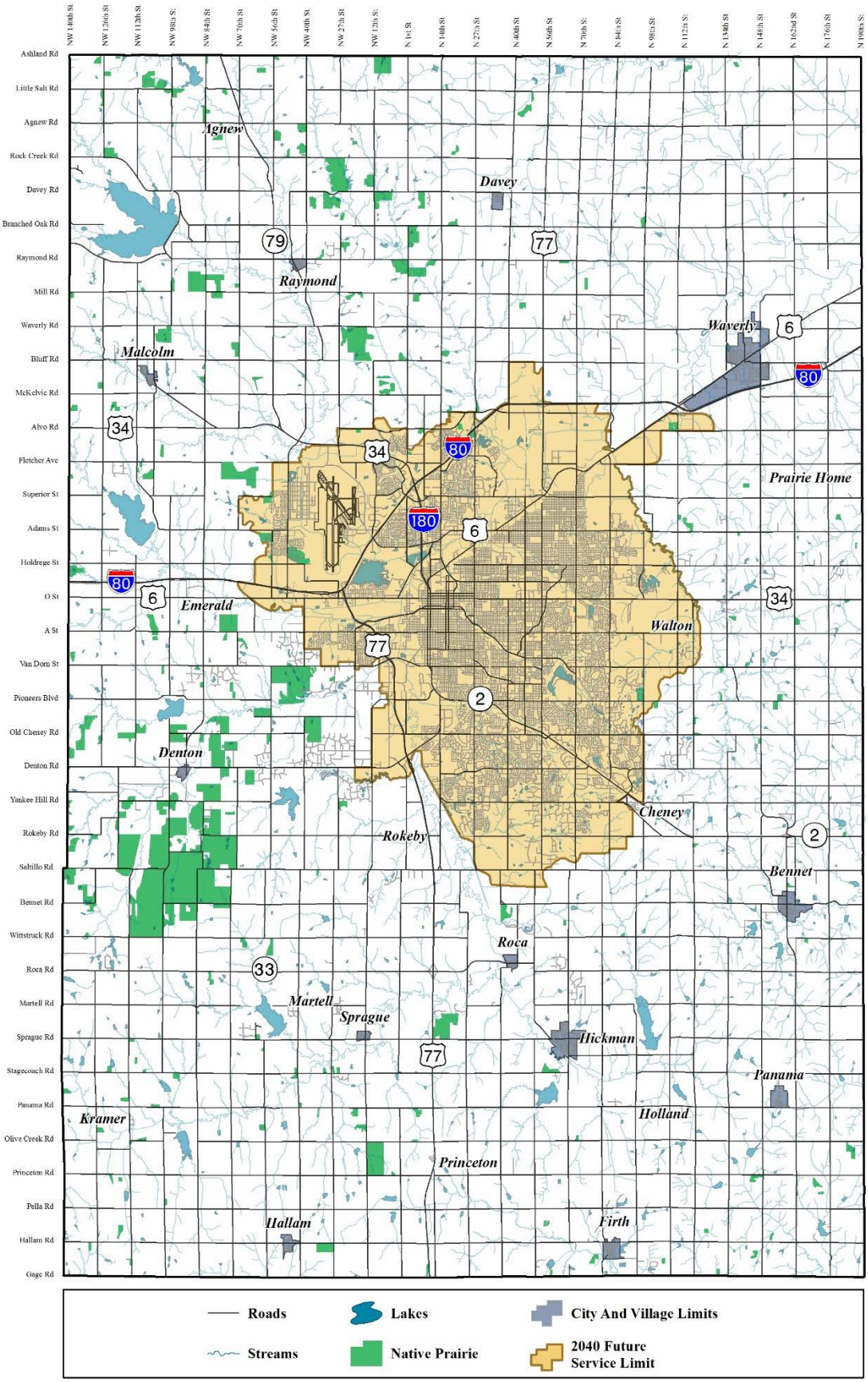

Figure 48. Native Prairie

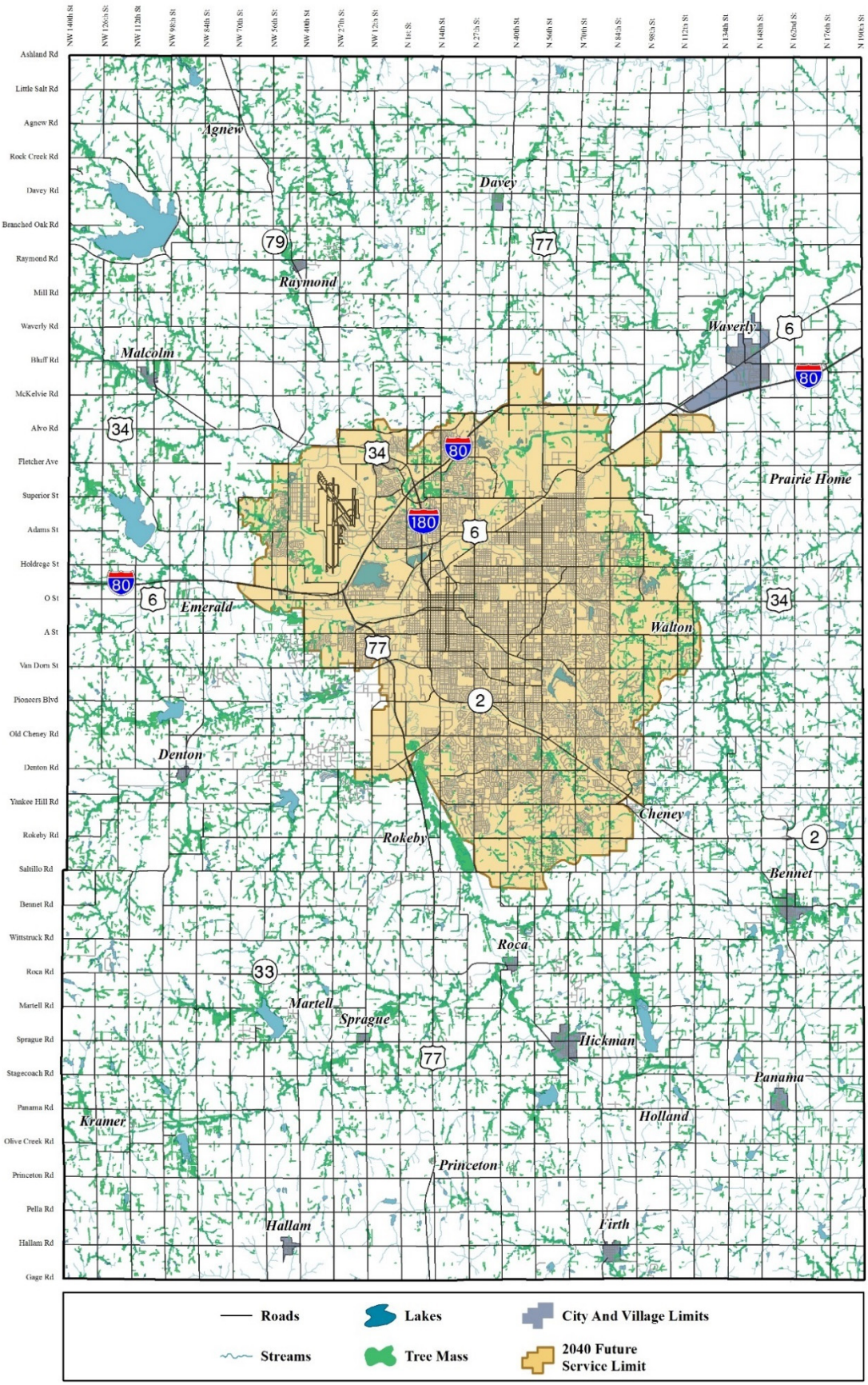

Figure 49. Tree Mass

Table 31. Threatened and Endangered Species Listed in Lancaster County

Common Name (Scientific Name)	Status[1]	Range within Lancaster County[2]
Birds		
Interior least tern (*Sternula antillarum athalassos)*	FE, SE	No
Piping plover (*Charadrius melodus*)	FT, ST	No
Whooping crane (*Grus americana*)	FE, SE	No
Fishes		
Pallid sturgeon (*Scaphirhynchus albus*)	FE, SE	No
Invertebrates		
Salt Creek tiger beetle (*Cicindela nevadica lincolniana*)	FE, SE	Yes
Mammals		
Northern long-eared bat (*Myotis septentrionalis*)	FT, ST	Yes
Plants		
Saltwort (*Salicornia rubra*)	SE	Yes
Western prairie fringed orchid (*Platanthera praeclara*)	FT, ST	Yes

[1]FE = Federally Endangered, FT = Federally Threatened, SE = State Endangered, ST = State Threatened

[2]Ranges provided by Nebraska Game and Parks Commission (NGPC 2015).

Only four of the species listed in **Table 31** have mapped ranges extending into Lancaster County. Although mapping indicates the extent of a species range, suitable habitat within that range may be limited. For example, the ranges of the northern long-eared bat and western prairie fringed orchid cover most of Lancaster County; therefore, the resource assessment indicated that all of the roadway and trail projects would occur within the ranges of those two species. However, the northern long-eared bat would likely occur only in areas with tree masses and low urban development (**Figure 50**) whereas the western prairie fringed orchid would likely occur in only rural areas with native prairie or wet meadows (**Figure 51**). Based on the resource assessment, 10 roadway and 7 trail projects would occur within the range of the saltwort (**Figure 52**), and 1 roadway and 2 trail projects occur within the range of the SCTB (**Figure 53**). As such, most of the Lincoln Future Service Limit Area does not contain suitable habitat for most of the species.

Each project would be evaluated for potential T & E presence using the Nebraska Biological Evaluation Process (NDOR 2013) to ensure that proper conservation measures are incorporated into the project planning and design to avoid and minimize impacts to T & E species or their habitat. If impacts are not sufficiently mitigated with the use of conservation measures, then further consultation with NGPC and USFWS would be required.

When possible, trails would be located outside sensitive habitats to avoid impacting T & E species. If design and planning considerations involve T & E conservation, then trails can provide educational signage and increase awareness.

T & E Critical Habitat

USFWS designation of critical habitat provides special protection to areas that are considered essential to species conservation. The SCTB is the only T & E species in **Table 31** with critical habitat occurring in Lancaster County. The SCTB is a sub-species that is endemic (i.e., not found in any other part of the world) to the remnant saline wetland ecosystems within the county. These beetles are an insect predator on saline mudflats and along the muddy stream banks of Salt Creek and its tributaries.

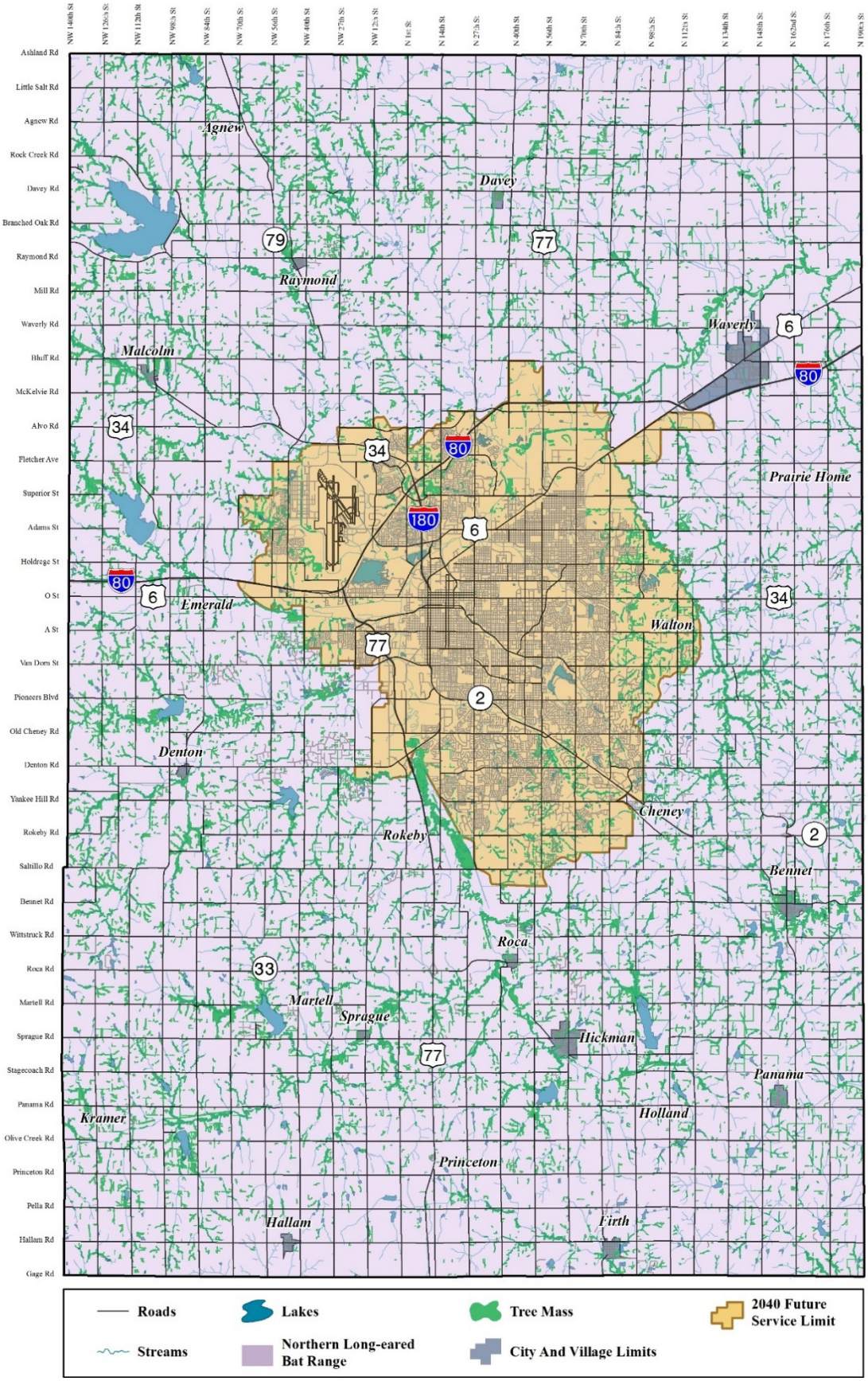

Figure 50. Threatened & Endangered Species: Northern Long-Eared Bat

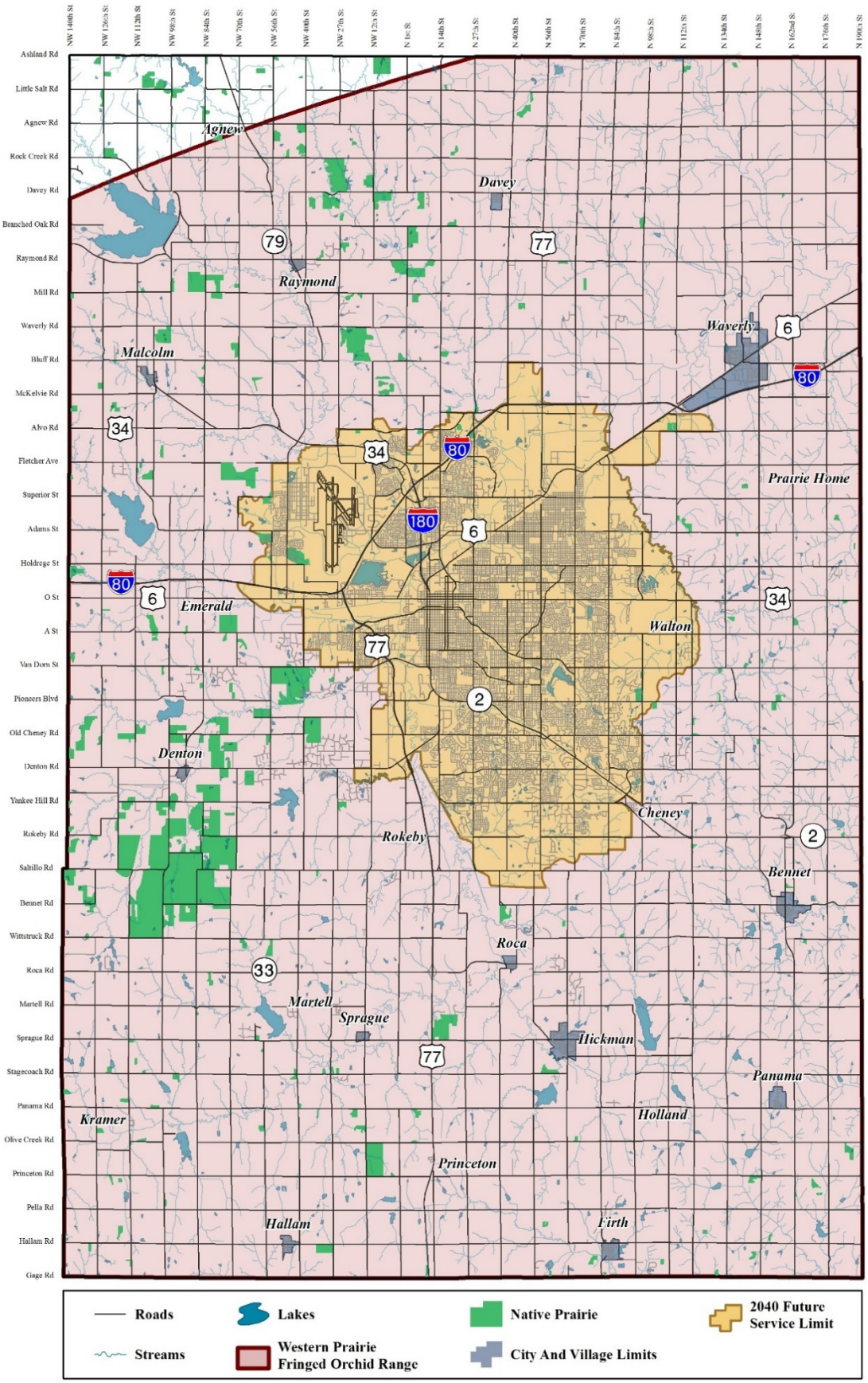

Figure 51. Threatened & Endangered Species: Western Prairie Fringed Orchid

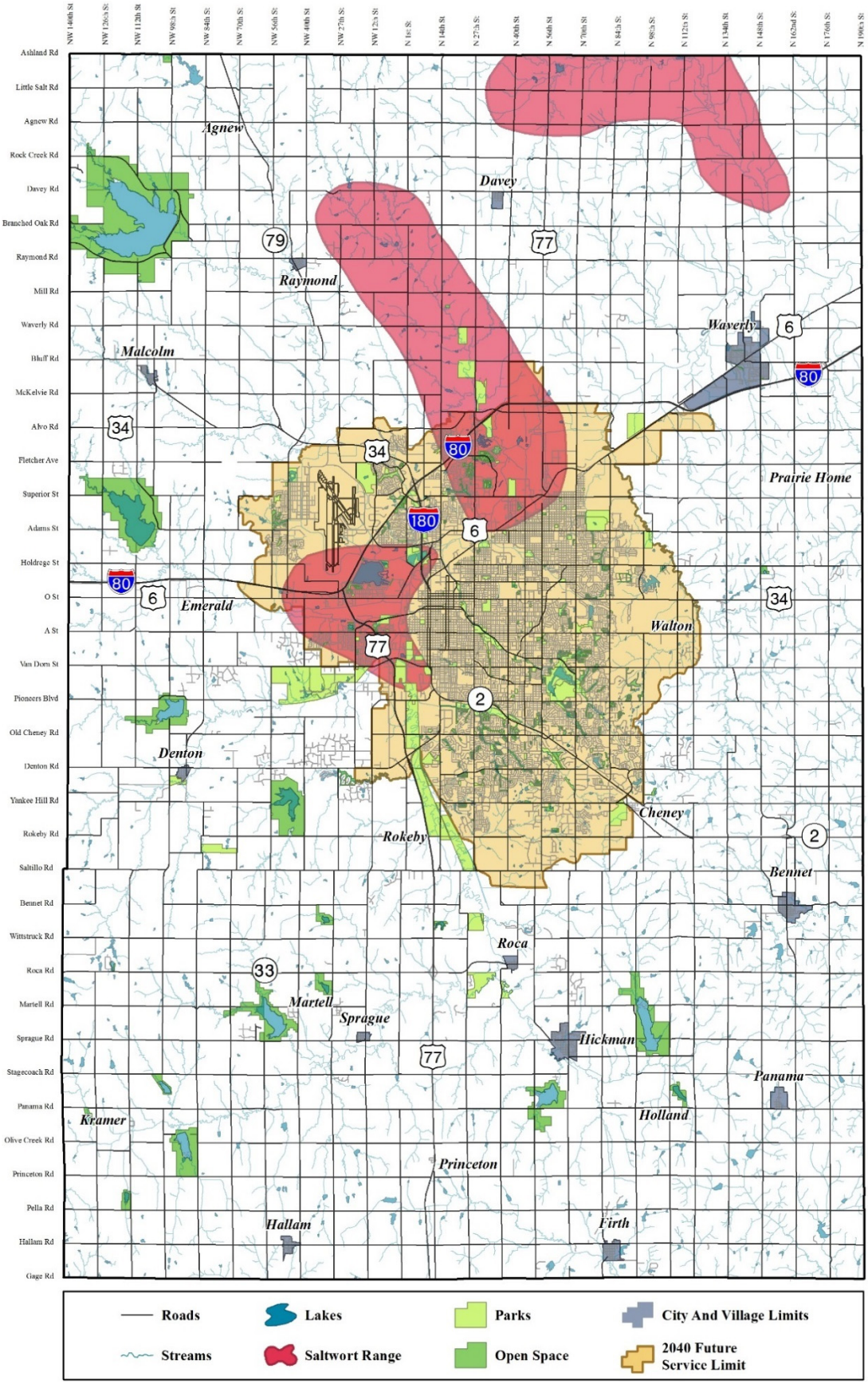

Figure 52. Threatened & Endangered Species: Saltwort

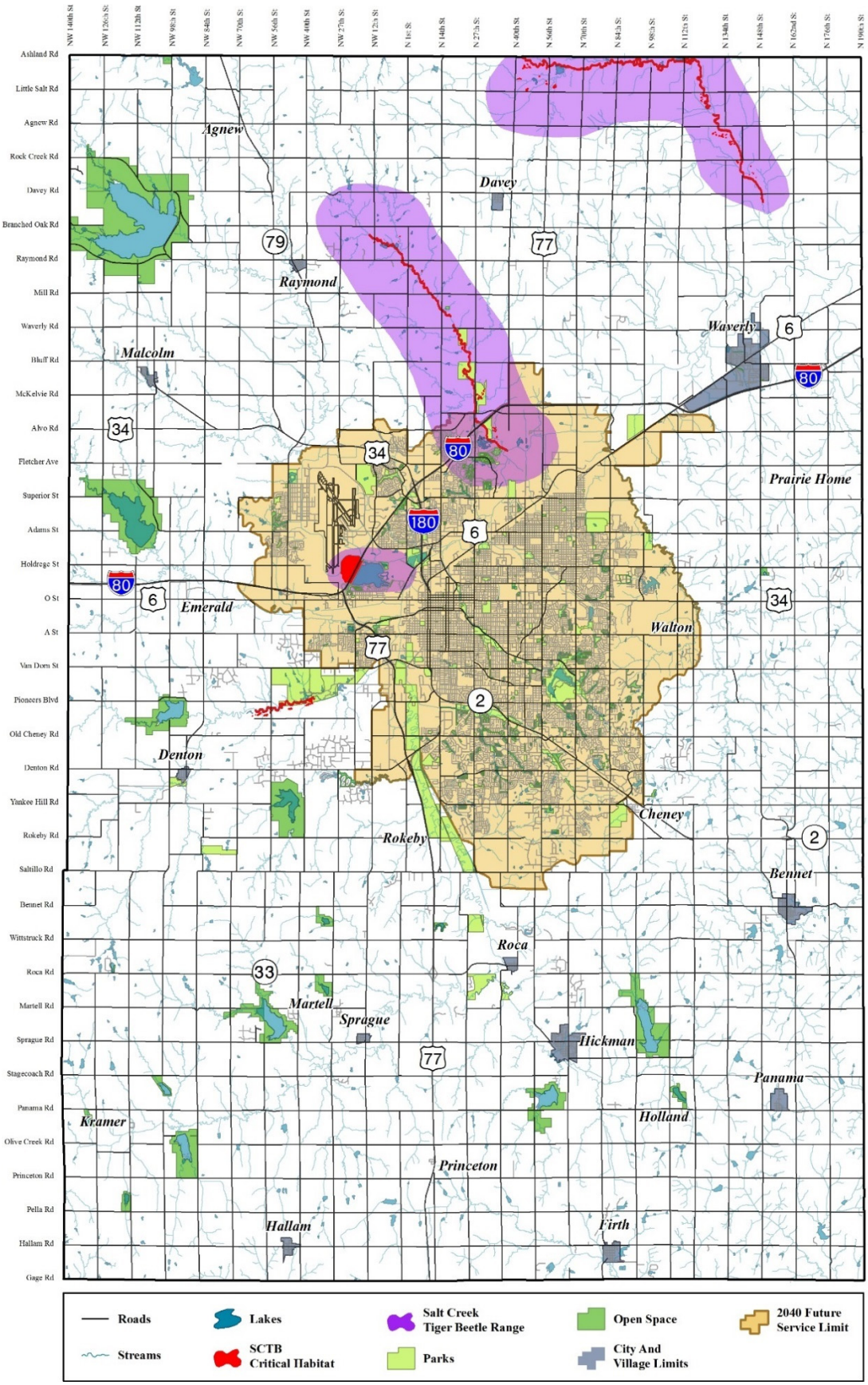

Figure 53. Threatened & Endangered Species: Salt Creek Tiger Beetle

Federal agencies are required to avoid destruction or adverse modification of designated critical habitat (USFWS 2015). Critical habitat for SCTB is protected by the Endangered Species Act, which is administered by USFWS.

Critical habitat was identified using data provided by USFWS (2016b). Based on the resource assessment, only 1 trail project would cross critical habitat for SCTB. To avoid, minimize, or mitigate impacts to SCTB critical habitat, coordination with USFWS would be initiated as early as possible during project planning.

Bald and Golden Eagles

Bald eagles use mature, forested riparian areas along large rivers and lakes throughout the state. There are several areas within Lancaster County with suitable habitat for bald eagles, such as at Branched Oak Lake and along Salt Creek. Golden eagles use shortgrass and mixed-grass prairie habitat in western Nebraska; therefore, no golden eagle habitat is present in Lancaster County.

Bald and golden eagles have specific protection under the Bald and Golden Eagle Protection Act (BGEPA), which is administered by the USFWS. This act prohibits the "taking" or possession of bald or golden eagles or their parts, feathers, nests, or eggs. The BGEPA also protects bald eagles from disturbances that may interfere with their normal behavior or cause abandonment of nests.

Specific habitat and ranges were not available for the roadway and trail project resource assessments; however, it is likely that much of the Lincoln City Future Service Limit Area does not contain suitable habitat for bald eagles because of the urban setting.

If bald eagles, bald eagle nests, or suitable habitat are found in a project area, then certain conservation measures, such as presence/absence surveys, would be implemented to help avoid impacts. A qualified biologist would conduct a survey prior to construction to determine the presence or absence of nesting/roosting eagles or bald eagle nests. The implementation of surveys ensures that no bald eagles nesting within the project area would be directly displaced from their active nest by construction activities. NDOR has developed an Avian Protection Plan (APP) to help avoid and minimize project impacts to bald eagles. The APP includes standard evaluation procedures and protocols for compliance with BGEPA (NDOR 2014).

Migratory Birds

Migratory birds are species that travel from one habitat to another at specific times of the year and often over long distances. These birds are important components of the ecosystems they migrate to and from because they help balance the food web, disperse seeds, and function in plant pollination. According to the USFWS IPaC website (USFWS 2016a), more than 24 species of migratory birds could use trees, shrub-scrub, wetland, stream, and grassland habitats within Lancaster County for breeding and nesting. Bridges and large culverts also provide habitat for various swallow species.

The Migratory Bird Treaty Act (MBTA) provides protection to most migratory birds in Nebraska. Under MBTA, construction activities that would otherwise result in the "taking" of migratory birds, eggs, young, and/or active nests should be avoided. Although the provisions of MBTA are applicable year-round, most migratory bird nesting activity in Nebraska is from April 1 to September 1 and from February 1 to July 15 for raptors.

While specific habitat and species ranges have not been evaluated, general considerations can be applied to all roadway and trail projects in the LRTP to avoid or minimize impacts to migratory birds.

To avoid impacts to these species, construction activities would include certain conservation measures. Removal of vegetation in suitable nesting areas would occur outside the primary nesting season (i.e., April 1 to September 1) and when no

birds are actively nesting. (Note: Some may be ground nesting birds.) Work on bridges or culverts would also occur outside the primary nesting season. If removal of potential nesting habitat cannot be avoided during the primary nesting season, then a qualified biologist would survey prior to construction to determine the presence or absence of breeding birds and active nests. The NDOR APP includes standard evaluation procedures and protocols for compliance with MBTA, as well as BGEPA (NDOR 2014).

Water Quality and Watershed Master Plans

The protection of water quality is important because of the need for a reliable drinking water supply, for swimming and recreating, for fish and shellfish consumption, for adequate agricultural production, for fish and wildlife habitat, and for other beneficial uses. Clean water is pivotal in the protection of human health and the environment.

Watershed master plans are created to provide long-term planning tools and guidance to address water quality, flood management, and stream stability for sustainable urban growth in each major Lancaster County watershed. An important component of water quality management involves monitoring and managing pollutants in stormwater runoff. Stormwater runoff can carry sediment, nutrients, road salts, heavy metals, bacteria, oil, and other pollutants that deteriorate water quality within a watershed or adjacent wetlands.

City of Lincoln regulations are in place to address water quality, including post-construction stormwater management, stormwater best management practices, and Stormwater Pollution Prevention Plans (SWPPP) for erosion and sediment control. These regulations were developed to minimize adverse effects of pollutants entering waterways from stormwater runoff associated with the continued development of hard surfaces, such as roads, parking lots, sidewalks, and trails.

The Lincoln City Planning Department provided watershed master plans (**Figure 54**). Based on the resource assessment, 16 roadway and 10 trail projects would extend across areas with multiple completed watershed master plans. Additional coordination may be needed to adhere to each watershed master plan for those projects. Only 13 roadway and 6 trail projects would occur in areas without watershed master plans. In addition to using the watershed master plans, all future projects would need to develop SWPPP documents for erosion and sediment management.

Socioeconomic Environment

Public Use Properties

Parks and recreation resources are important community facilities that warrant consideration in the planning process. These public use areas include parks, open space areas, trails, and some school playgrounds that offer opportunities for recreation.

The Department of Transportation Act (DOT Act) of 1966 includes a special provision, Section 4(f), which stipulates that the Federal Highway Administration (FHWA) and other DOT agencies cannot approve the use of land from publicly owned parks, recreation areas, wildlife and waterfowl refuges, and public or private historical sites unless the following conditions apply:

- There is no feasible and prudent avoidance alternative to the use of land; and
- The action includes all possible planning to minimize harm to the property resulting from such use;

OR

- The Administration determines that the use of the property will have a *de minimis* impact.

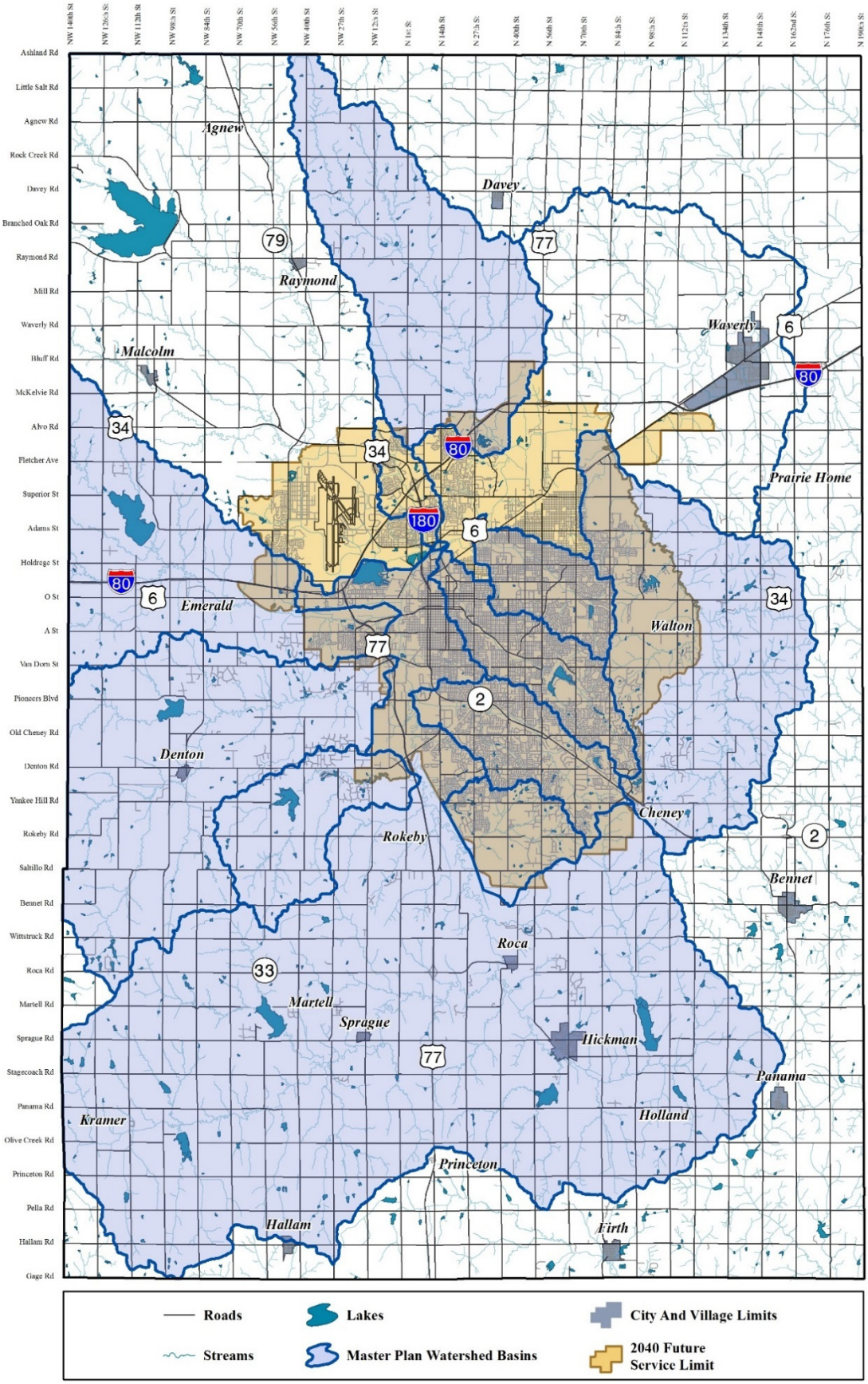

Figure 54. Master Plan Watershed Basins

In certain cases, school playgrounds may be considered Section 4(f) properties. Project activities that restrict access may also be considered a "use" under Section 4(f).

Recreation resources developed with federal funding through the Land and Water Conservation Fund (LWCF) are also protected under Section 6(f) of the LWCF Act, which prohibits the conversion of these properties to anything other than public outdoor recreation uses.

Parks, Open Space, and Trails

Parks, open space areas, and bike trail locations were identified using GIS data provided by the Lincoln-Lancaster County Planning Department (**Figure 55**). Each resource was evaluated as a potential Section 4(f) property. Based on the resource assessment, 43 roadway and 29 trail projects would potentially cross Section 4(f) properties.

Projects would require assessment of impacts on the activities, features, and attributes of the 4(f) resource. Depending on the type and size of the impact, as well as the type and size of the 4(f) resource, a number of options may be available to minimize harm to the property and resolve the impact, including programmatic evaluations, *de minimis* determinations, exceptions, and 4(f) statements.

School Playgrounds

While some school properties may not meet Section 4(f) criteria, the resource assessment identified all school locations using GIS data provided by the Lincoln-Lancaster County Planning Department. Based on the resource assessment, no roadway or trail projects cross school properties.

Environmental Justice

Title VI of the Civil Rights Act of 1964 (Title VI) ensures that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving Federal financial assistance on the basis of race, color, or national origin (42 United States Code [USC] 2000d et seq.). Executive Order 12898 on environmental justice directs that programs, policies, and activities not have a disproportionately high and adverse human health or environmental effect on minority and low-income populations (59 FR 7629).

On June 14, 2012, FHWA issued Order 6640.23A, Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which established policies and procedures for FHWA and state transportation agencies to use in complying with Executive Order 12898. The Order provided definitions for terms and concepts applicable to this type of analysis (**Table 32**).

To comply with Title VI and Executive Order 12898, the demographic characteristics within the City of Lincoln Future Service Limits were examined to determine if any of the proposed projects would disproportionately affect minority or low-income populations. The demographic and economic character of each Census Block Group was compared with that of Lancaster County and the City of Lincoln using the EPA's Environmental Justice Screening and Mapping Tool (EPA 2016), which uses data from the 2010 Census of Population and Housing (US Census Bureau 2010), or the 2014 Community Survey (US Census Bureau 2014b).

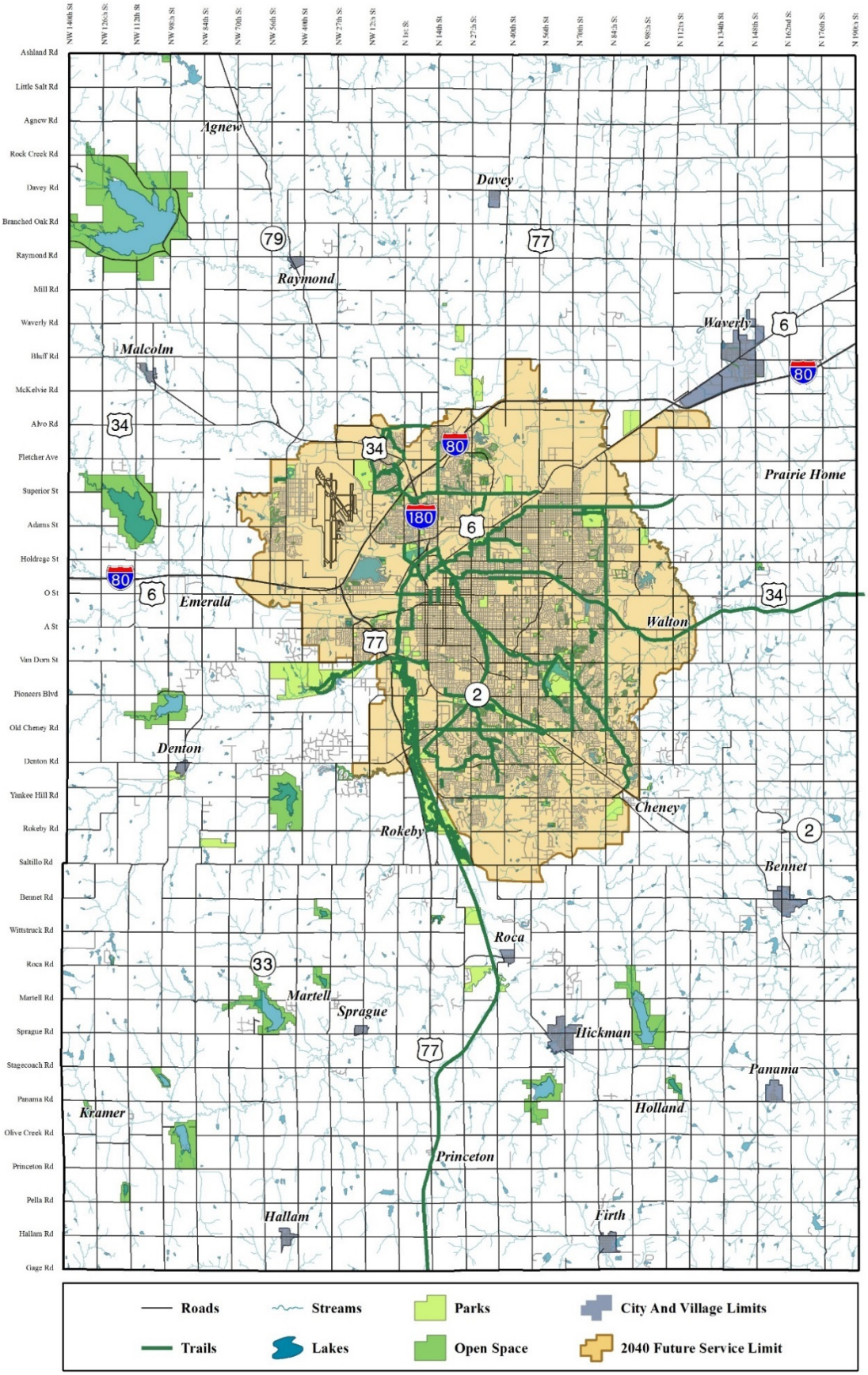

Figure 55. Parks, Trails, and Open Space

Table 32. Social Environment Definitions

Term	FHWA Definition
Adverse Effects	The totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects, which may include, but are not limited to, bodily impairment, infirmity, illness or death; air, noise, and water pollution and soil contamination; destruction or disruption of human-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of, benefits of FHWA programs, policies, or activities.
Disproportionately High and Adverse Effect to Low-Income and Minority Populations	An adverse effect that: 1. is predominately borne by a minority population and/or a low-income population; OR 2. will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non-low-income population.
Minority	A person who is: 1. Black: a person having origins in any of the black racial groups of Africa; 2. Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race; 3. Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia or the Indian subcontinent; 4. American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition; OR 5. Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa or other Pacific Islands.
Low-Income Person	A person whose median household income is at or below the Department of Health and Human Services poverty guidelines. (Note: The US Department of Health and Human Services does not publish tabulations of the number of people below the DHHS poverty guidelines, which are a simplified version of the federal poverty thresholds. The federal poverty thresholds are used to calculate all official poverty population statistics and are updated annually by the Census Bureau. The best approximation for the number of people below the DHHS poverty guidelines in a particular area is the number of persons below the Census Bureau poverty thresholds in that area.)
Minority Population	Any readily identifiable group of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity.
Low-Income Population	Any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity.

Census Block Group data were used to determine whether or not roadway or trail projects would occur within low-income or minority population areas. A threshold to identify both the minority populations and low-income populations was established by determining the City and County average and using the lower percentage of the two measures. For example, the minority population threshold was determined to be 17.2 percent for Lancaster County and 16.9 percent for the City of Lincoln; therefore, the assessment threshold was 16.9 percent. The low-income population threshold was determined to be 14.0 percent for Lancaster County and 16.2 percent for the City of Lincoln; therefore, the assessment threshold was 14.0 percent. Low-income and minority populations are shown on **Figure 56** and **Figure 57**, respectively.

Based on the resource assessment, 24 roadway and 12 trail projects would occur within a block group above the minority population threshold. Forty-seven roadway and 28 trail projects would occur within a block group above the low-income population threshold.

Projects located in areas that exceed the threshold would likely need additional project-specific coordination during project planning and implementation. Requirements would vary based on funding for the projects (e.g., federal-aid or local funds).

Cultural Environment

The cultural environment consists of historic resources, including historic standing structures, historic districts, and archeological sites. These resources are important because they add value to a community's sense of culture and provide a tangible link with the past.

Historic resources encompass man-made features and physical remains of past human activity. These resources are generally at least 45 years old (properties constructed in 1970 or earlier), and include buildings, bridges, railroads, roads, other structures, landmarks, and archeological sites. Section 106 of the National Historic Preservation Act of 1966 requires evaluation of project effects on historic properties that are on, or eligible for, the National Register of Historic Places (NRHP). Criteria for determinations of eligibility are set forth in 36 CFR Part 60.4 (70) and are described in National Register Bulletin How to Apply the National Register Criteria for Evaluation (36 CFR Part 60). For a property to be determined eligible, it must meet at least one of the NRHP criteria for historic significance and retain a high degree of historic integrity.

- Historic significance may be present in one of four categories: (1) important historic events; (2) significant people in history; (3) significant architecture, design, or property type; and (4) potential to yield important historic information.
- Historic integrity is characterized by one of seven aspects defined by the NRHP: (1) location, (2) design, (3) setting, (4) materials, (5) workmanship, (6) feeling, and (7) association. In general, a property will always possess several, and usually most, of these aspects.

Records searches were conducted with the City of Lincoln, Nebraska State Historic Preservation Office (SHPO), and Nebraska State Historical Society Highway Archeology Division to identify known historic sites, historic districts, and archeological sites previously surveyed, recommended NRHP eligible, listed in the NRHP, or listed as local landmarks.

Historic Sites

The records search identified 146 historic sites located within Lancaster County. Based on the resource assessment, 2 roadway and no trail projects would cross historic sites. These sites would also be considered Section 4(f) properties.

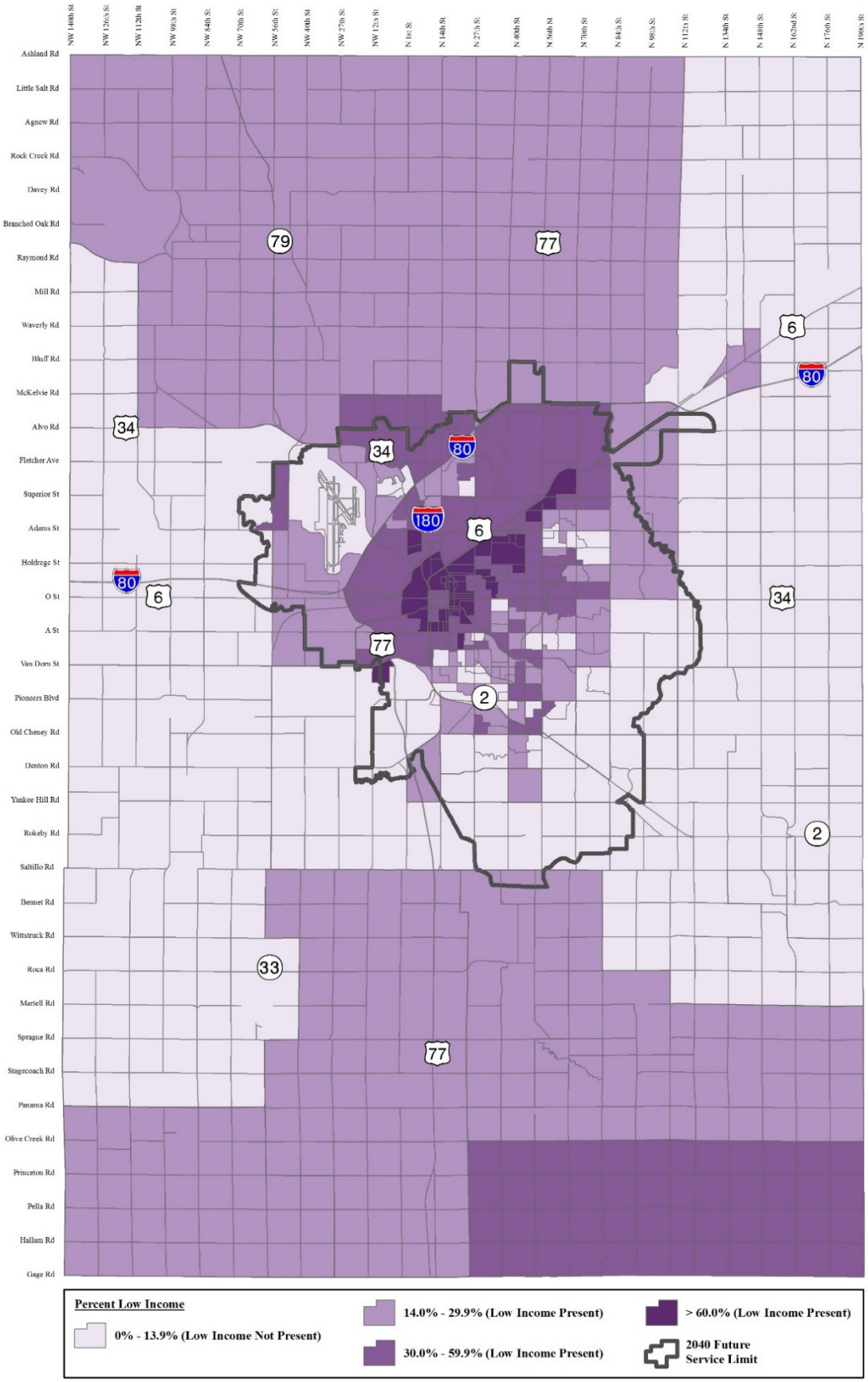

Figure 56. Low-Income Population

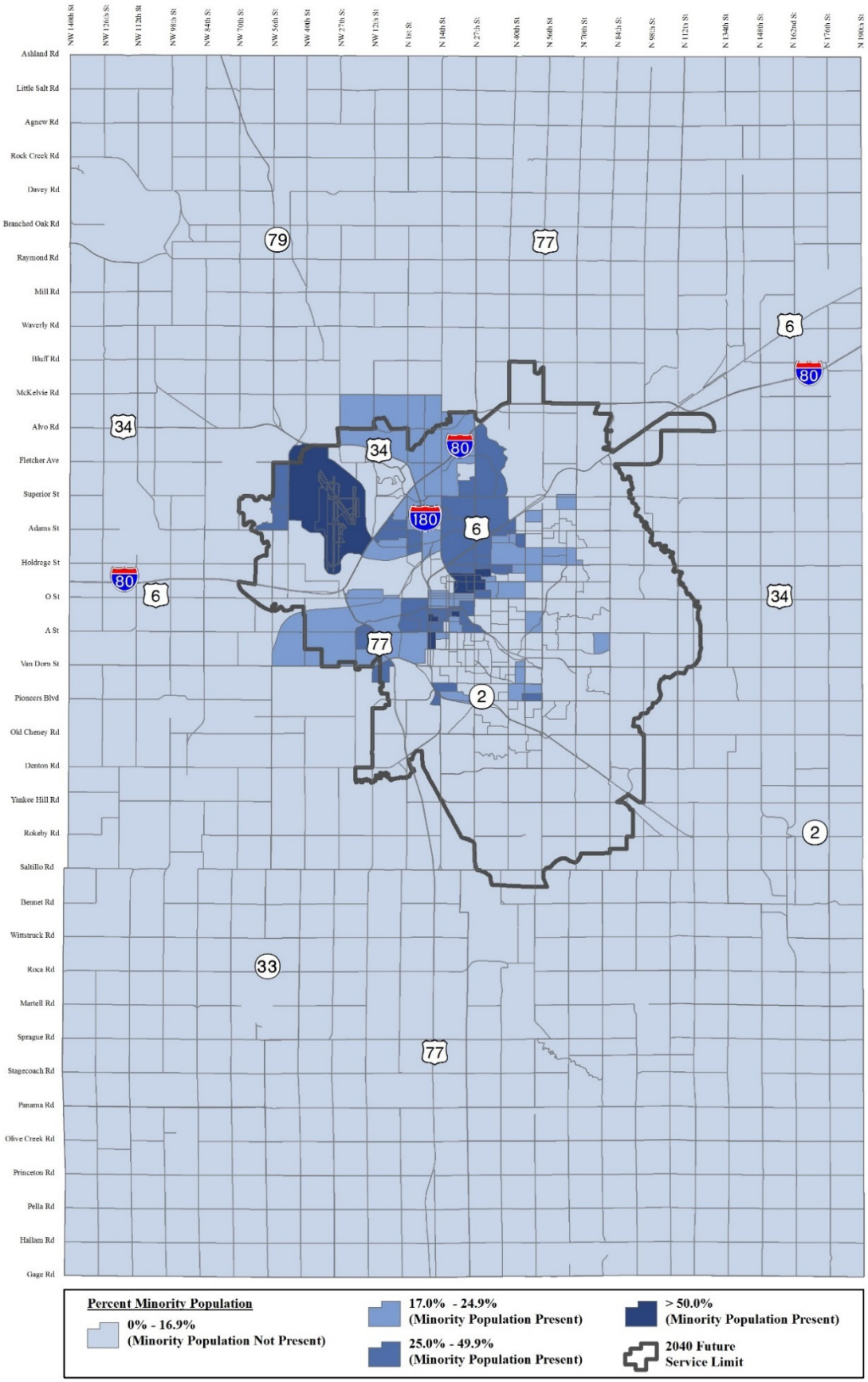

Figure 57. Minority Population

Historic Districts

The records search identified 18 historic districts located within the Lincoln future service limit. Based on the resource assessment, no roadway or trail projects would cross historic district areas.

Archeological Sites

The locations of archeological sites are not readily available to the public and would be addressed when a specific project moves forward.

Each project would require consultation with Nebraska SHPO during planning, including possible surveys for historic standing structures and archeological sites, and assessment of eligibility. Avoidance and minimization of impacts, and mitigation if needed, would be situational and likely different for each project but could consist of vibration restrictions or modifications to design plans to avoid specific structures or areas.

Agency Coordination

This document has been provided to the following environmental, socioeconomic, and cultural agencies for review and comment to comply with FAST Act requirements.

Environmental Agencies

1. Lower Platte South NRD
2. Lincoln Parks and Recreation
3. Sustainability Coordinator for City of Lincoln
4. Lincoln Watershed Management Division of Public Works and Utilities
5. Nebraska Game and Parks Commission
6. Nebraska Department of Environmental Quality
7. US Army Corps of Engineers
8. Nebraska Department of Natural Resources
9. US Fish and Wildlife Service
10. Natural Resource Conservation Service
11. Mayor's Environmental Task Force
12. County Ecological Advisory Committee
13. Nebraska Land Trust
14. The Nature Conservancy Nebraska Field Office
15. University of Nebraska Foundation (Nine-Mile Prairie Director)
16. Lower Platte River Corridor Alliance
17. Nebraska Environmental Trust
18. Wachiska Audubon Society
19. Nebraska Audubon
20. Nebraska Chapter Sierra Club
21. Nebraska Chapter Bluestem Group
22. Nebraska League of Conservation Voters
23. Friends of Wilderness Park
24. Great Plains Trails Network
25. Joslyn Castle Institute

Socioeconomic and Cultural Agencies

1. Human Services Federation
2. Lincoln Housing Authority
3. NE Commission for the Blind and Visually Impaired
4. Lancaster County Health Board
5. Lancaster County Human Services
6. NeighborWorks Lincoln
7. Malone Center
8. The Indian Center
9. The Mexican American Commission
10. The Asian Cultural and Community Center
11. El Centro de las Americas
12. Nebraska Commission on Indian Affairs
13. People's City Mission
14. Community Action Partnership
15. Center for People in Need
16. NAF Multicultural Human Development Corporation
17. Nebraska State Historical Society
18. Historic Preservation Planner, Lincoln-Lancaster County Planning Department

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9. Implementation Plan

Strategies

The Lincoln MPO is committed to moving forward with the implementation of this plan's goals and in helping to implement the programs and high priority projects identified in the plan.

The Implementation Plan provides a series of strategies that will guide the MPO's implementation of this LRTP over the next five years.

Performance Tracking

- Develop a methodology for and begin tracking those performance measures (in **Chapter 5**) that are not currently being tracked
- Track the progress in each performance measure annually and provide an annual performance report
- Update the City's Asset Management Plan to include improved tracking and reporting

Traffic Signals and Technology

- Implement the Green Light Lincoln program
- Improve intersection operations and coordinate signal timing
- Replace 15 signals each year (3 percent)
- Implement intelligent transportation systems (ITS)
- Implement adaptive signal control with emphasis on major truck routes
- Consider the impacts that emerging technologies in transportation (e.g., autonomous cars and online goods delivery) may have on travel behaviors and the future capacity needs of the system

Bicycle and Pedestrian

- Elevate the status of pedestrians and bicyclists in the community to be an integral part of the travel options in Lincoln
- Implement the recommendations of the Bicycle and Pedestrian Capital Plan
- Update the Bicycle and Pedestrian Capital Plan
- Implement and fully support the bike share program (launch scheduled for 2017)
- Consider installation of protected bikeways to provide a physical separation between bicyclists and motorists
- Provide bicycle and pedestrian connections between neighborhoods and employment centers
- Implement Complete Streets projects and expand the on-street bike network for commuting purposes
- Add bike lanes in conjunction with street rehabilitation projects
- Make adequate maintenance of bicycle and pedestrian facilities a priority
- Rehabilitate one percent of sidewalks annually

Transit

- Implement the recommendations in the Transit Development Plan
- Pursue funding for construction of a downtown Multimodal Transportation Center

Streets and Roads

- Continue advancing preventative maintenance strategies (e.g., pothole repairs and crack sealing) to extend the life of Lincoln's streets and minimize the life-cycle costs
- Invest in the rehabilitation program to provide ongoing maintenance to the arterial and residential streets
- Address congestion through strategic intersection improvements and signal coordination
- Construct the committed and priority Roadway Capital Projects per the Fiscally Constrained Plan
- Encourage the use of alternative travel modes (biking, walking, and transit) to lessen the demand on the streets

- Grade separate railroad crossings
- Use technology to assist the transportation system recovery from incidents
- Continue to develop an annual crash report focusing on identifying significant crash patterns and implement countermeasures
- Develop educational programs related to the safety and security of the transportation system
- Collaborate to refine the Rural to Urban Transition for Streets (RUTS) program standards to identify efficient transitions from rural to urban conditions

Travel Choices

- Implement transportation demand management (TDM) tools such as van-sharing
- Consider the travel needs of the aging population
- Identify opportunities to improve the connectivity between travel modes such as pedestrian access and bike parking at bus stops

Land Use

- Promote consistency between land use and transportation plans to enhance mobility and accessibility
- Reduce the demand for single occupant vehicle (SOV) travel through coordinated land use and transportation decisions
- Support mixed use development
- Support affordable housing and higher densities
- Encourage higher density infill development to reduce demand for travel

Alternative Fuels

- Encourage the provision of electric charging stations
- Convert City and County fleet to alternatively fueled vehicles

Environmental Considerations

- Incorporate sustainable design elements into transportation projects by using low-impact development (LID) techniques to reduce runoff, alternative street designs, and permeable pavement
- Minimize impacts of transportation projects on the natural environment
- Reduce the impacts of transportation projects on neighborhoods and cultural and historic resources

Funding

- Continue discussions with the community about how more of the transportation needs can be met
- Maximize the cost effectiveness of transportation investments
- Continue to work with NDOR to pursue funding options for construction of the East Beltway
- Continue funding the Railroad Transportation Safety District (RTSD)
- Consider creative alternative funding sources, such as public-private partnerships
- Consider indexing the Wheel Tax

Amendment Process

Federal regulations require the LRTP to be updated every five years. During these five-year updates, the assumptions and identified needs and priorities of the transportation plan will be reexamined to best reflect changes that occurred since the previous five-year update. Between the five-year updates, there is an amendment process through which the LRTP can be modified.

As with all long range plans, conditions in the community will likely change over time and related shifts in priorities will occur. A change such as an increase in the amount of growth in one direction of the urbanizing area with a corresponding decrease in expected growth in another direction will shift the needs and priorities of the transportation

system. Some projects that were expected to be needed farther out in the planning period may be needed sooner. Likewise, a project that is no longer needed as soon as expected could be delayed.

Changes in the basic assumptions or goals and policies of the 2040 Lincoln/Lancaster County Comprehensive Plan and the LRTP may require formal amendments to both documents. More likely will be more specific shifts in needs and priorities that will need to be reflected in the LRTP to continue to have a Fiscally Constrained Plan that meets the needs of the community over time. Changes to the Fiscally Constrained Plan are to be made by a formal plan amendment through the MPO planning process. These may take the form of a standalone amendment or as a package of amendments during the established annual review process.

For example, when a project is identified as needed sooner than expected and that need is in the first ten years of the Fiscally Constrained Plan, a project(s) of similar cost will need to be dropped lower in the priority list to keep the plan fiscally constrained.

Close adherence to the amendment process will be of particular importance if a project is desired to be placed in the first four years of the plan. The first four years of the Fiscally Constrained Plan should closely reflect the MPO Transportation Improvement Program (TIP) for projects of regional significance and those using the federal planning process and federal funding. Close coordination and consistency between the TIP and the LRTP should be an ongoing effort.

All amendments to the Fiscally Constrained Plan will need to be reviewed and approved by the MPO Technical Committee, which includes local, state, and federal representation; the Lincoln-Lancaster County Planning Commission; and the MPO Officials Committee. The amendment process will also need to adhere to the MPO's public engagement and information dissemination.

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