Flint Hills

TRANSPORTATION PLAN

METROPOLITAN TRANSPORTATION PLAN 2040

FEBRUARY 2016

AECOM

Flint Hills MPO

Title VI Note

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Disclaimer

The preparation of this report has been financed in part through funds from the Federal Highway Administration and Federal Transit Administration, U. S. Department of Transportation, under the Metropolitan Planning Program, Section 104(f) of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

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1.0. Overview: What is the Flint Hills Transportation Plan?


Image Credit: City of Manhattan

Federal law requires Urbanized Areas exceeding 50,000 residents to create a Metropolitan Planning Organization (MPO) to carry out a continuing, cooperative, and comprehensive (3-C) multi-modal transportation planning process for the metropolitan planning area. The MPO designation enables access to federal funding for transportation infrastructure and investments. The Census-defined Manhattan Urbanized Area reached this population threshold with the 2010 Census. This led to the designation of the Flint Hills MPO (FHMPO), the first MPO designated by the State of Kansas in over three decades.

The FHMPO provides a forum for local decision-making on transportation issues of a regional nature. The FHMPO conducts regional transportation planning and programming in support of informed decision-making to improve and enhance a safe, efficient, and dependable regional transportation system. The FHMPO regularly engages with jurisdictional partners, local, state, and federal agencies, key stakeholders, and the public, to identify issues, concerns, and priorities for the regional transportation system. The FHMPO is responsible for producing a host of work products, including development of the region's long-range transportation plan, known as the Flint Hills Transportation Plan (Plan).

1.1. Why develop the Flint Hills Transportation Plan?

Transportation planning is a continual process of examining challenges and opportunities that face the region, and identifying a plan of action to positively impact transportation system performance. The FHMPO's planning process provides a regional approach to transportation to achieve regional interests. The Plan is intended to guide transportation system investments, providing a regional blueprint for long-term growth. The Kansas Department of Transportation (KDOT) consults and cooperates with the State's six MPOs to implement its statewide transportation program. The Plan serves as primary reference for KDOT, providing direction about regionally significant projects identified as investment priorities. Projects must be identified as a priority in the Plan in order to be a candidate for implementation by KDOT.

1.2. What are the requirements of the Flint Hills Transportation Plan?

Consistent with previous federal surface transportation legislation, the Moving Ahead for Progress in the 21st Century Act (MAP-21) continues the metropolitan planning process through a 3-C framework for transportation investment decision-making. MAP-21 carries forward a number of key provisions from prior legislation, including the consideration of the eight planning factors during the planning process, requirement of fiscal constraint, and to conduct public involvement. The most significant change is the move toward a performance-based policy and programmatic framework for the federal-aid program that focuses on infrastructure condition and the use of performance measures and targets to identify

transportation needs and assist with project selection. MAP-21 implementation is still ongoing, and, after a series of extensions, a new surface transportation program is under development.

MAP-21 Planning Factors

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity and efficiency.
2. Increase the safety of the transportation system for motorized and non-motorized users.
3. Increase the security of the transportation system for motorized and non-motorized users.
4. Increase the accessibility and mobility of people and for freight.
5. 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.
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.
7. Promote efficient system management and operation.
8. Emphasize the preservation of the existing transportation system.

Each planning factor has been considered as part of the Plan development and has been addressed as appropriate given the scale and complexity of the transportation issues within the region.

The basic federal requirements of the Plan are to:

- Cover a 20-year (minimum) forecast period;
- Update the Plan every 5 years (at minimum);
- Provide interested parties a reasonable opportunity to comment on the Plan and for it to be published/made available for public review;
- Develop a financial plan that demonstrates how the Plan can be reasonably implemented;
- Use a performance-based approach to transportation decision-making and Plan development;
- Integrate into the metropolitan transportation planning process other performance-based transportation plans or processes;
- Integrate all modes of transportation into the planning process; and
- Use updated assumptions for population and employment growth, land use, and travel demand.

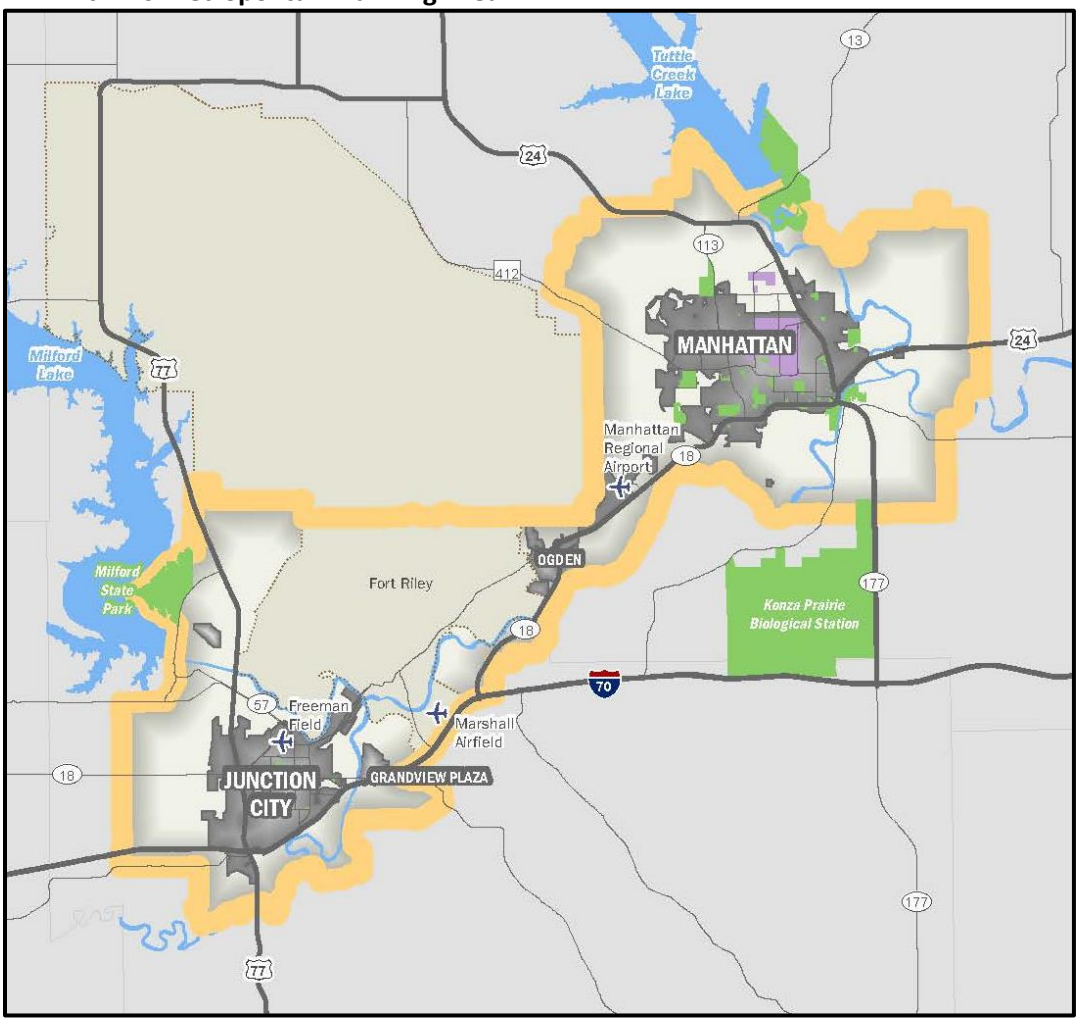
1.3. What area does the FHMPO cover?

The FHMPO planning boundary, known as the Metropolitan Planning Area (MPA), covers approximately 160 square miles and the following jurisdictions, as shown in Figure 1-1:

- Four cities (Manhattan, Junction City, Ogden, and Grandview Plaza);
- Portions of three counties (Riley, Geary, and Pottawatomie Counties); and
- The southern portion of the Fort Riley Military Installation.

Over 87,000 people reside within the MPA as of the 2010 Decennial Census. Unique to the area are the presence of Kansas State University (K-State) and the Fort Riley Military Installation, both major generators of transportation activity within the region. In Manhattan, K-State's enrollment for Fall 2015 was over 24,000 students in addition to administrative staff and faculty members. As a research institution, K-State is a major economic generator for the region, facilitating population growth and development opportunities. Fort Riley is an active military installation with a daytime population exceeding 50,000.

Figure 1-1 Flint Hills Metropolitan Planning Area



1.4. Who governs the FHMPO?

The FHMPO is governed by a Policy Board comprised of local elected officials from Riley, Geary, and Pottawatomie Counties, the Cities of Manhattan and Junction City, and a representative from KDOT. The Policy Board is supported by a Technical Advisory Committee (TAC), providing technical support and recommendations to the Policy Board for consideration. The TAC consists of staff-level representatives from various local, state, and federal agencies, as well as representatives from K-State and Fort Riley.

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2.0 Plan Development Framework: How was the Plan Developed?

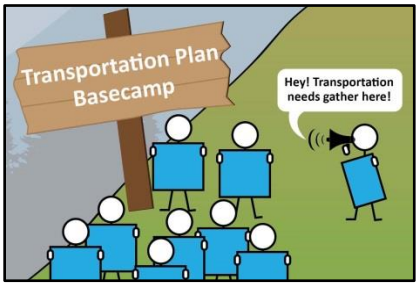
Since the creation of the FHMPO in early 2013, a significant amount of time has been allocated to educating stakeholders and the public about the existence of the FHMPO and its responsibilities. As part of the development of the region's first Transportation Plan, the educational focus has shifted to the purpose of regional long-range transportation planning, using the travel demand model as a planning tool, and the benefits of developing a Plan. It is important to lay this foundation so that all interested parties understand the regional transportation planning process and the engagement opportunities available for their voices to be heard.

2.1 What role does planning play in implementing projects?

One of the most important relationships to recognize in the long-range planning process is between the planning and programming of projects. The progression of a project from conception to construction is complex. "Mount Project Implementation" (shown in Figure 2-1) was created to better illustrate the project development process. Each of the planning and programming elements is broken out in more detail below.

Planning Components

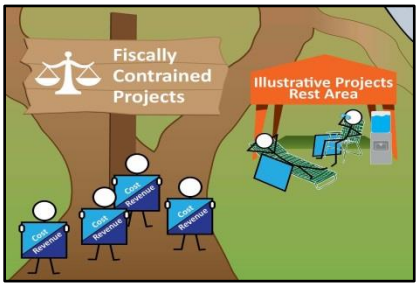
Regionally Significant and Federally Funded Projects



All regionally significant and federally funded projects must be reflected in the Plan. These consist of key transportation needs that typically require major capital expenditures and have an impact on regional travel or air quality. Examples include capacity expansion (e.g., new roads, new or expanded transit routes) and heavy preservation (e.g., roadway or bridge replacement projects).

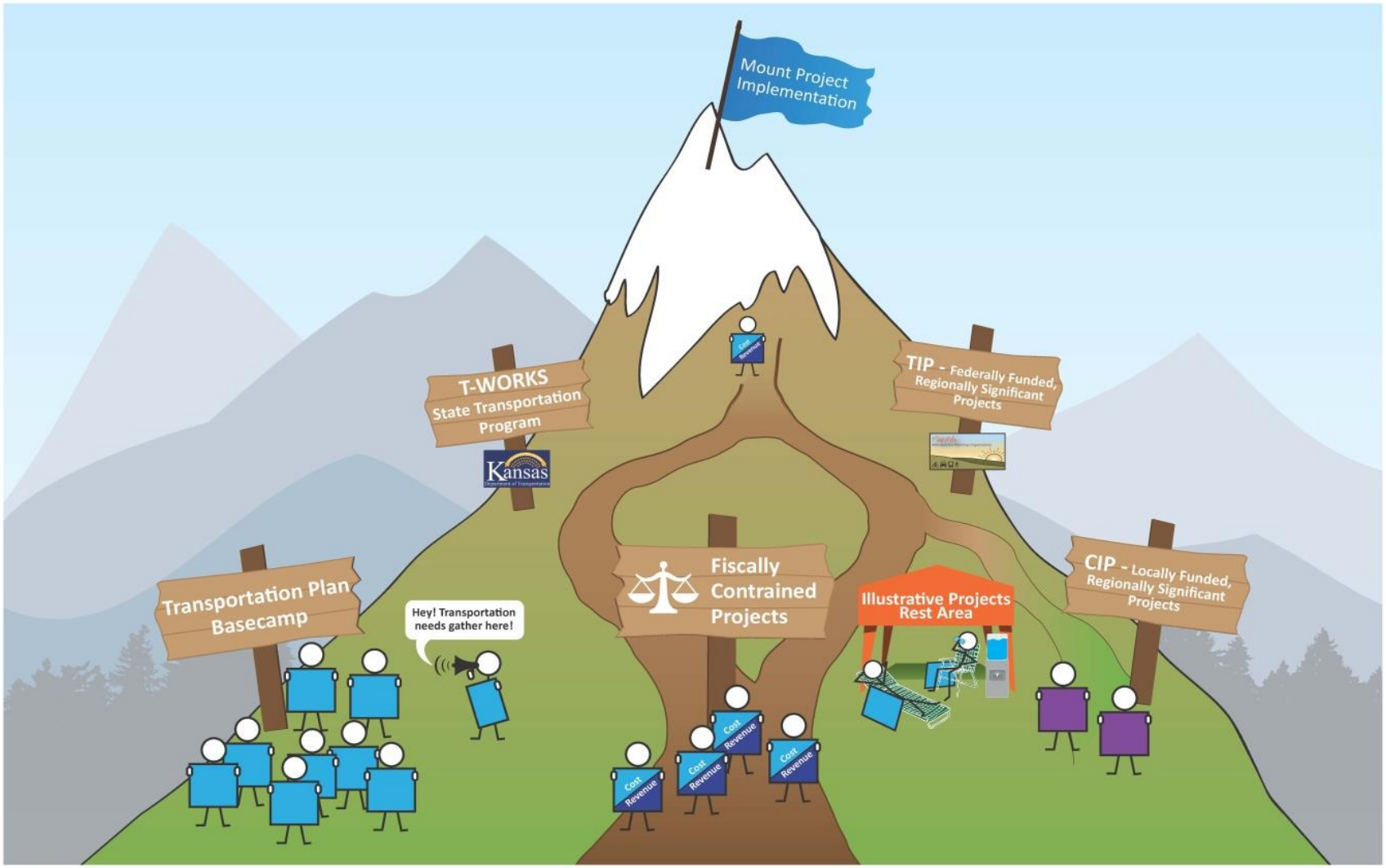
Major projects identified in the Manhattan Urban Area and Junction City/Geary County Comprehensive Plans are also contained in the Plan's project list.

Fiscally Constrained Projects



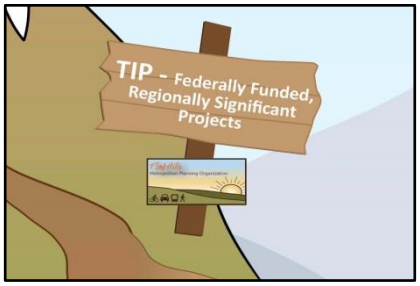
The Plan is required to demonstrate that adequate revenue sources are reasonably expected to be available or become available to fund the Plan's investment priorities, while still providing sufficient resources for operations and maintenance of the multimodal system. Some projects do not have funding identified and are therefore included in the 'illustrative' project list for future consideration. If additional funding becomes available, illustrative projects may advance to the fiscally constrained project list.

Figure 2-1 "Mount Project Implementation": Planning and Programming Components of the Project Development Process



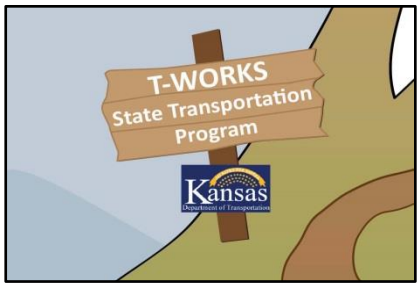
Programming Components

Regional Transportation Improvement Program (TIP)



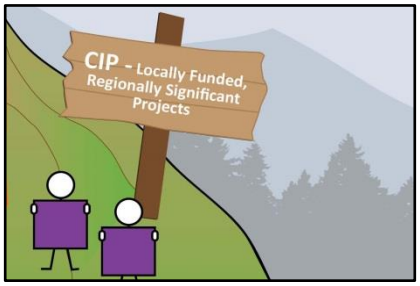
In order for a project identified in the Plan to move from planning to implementation, it must be identified in the FHMPO's TIP. The TIP is a four-year program that identifies the committed funding source for all federally-funded and/or regionally significant projects. It includes a schedule for obligating funds for all modes of transportation, including transit capital and operating assistance. The TIP essentially implements the Plan.

KDOT T-WORKS



T-WORKS reflects the State's transportation program proposed through the local consult process. T-WORKS projects are selected using KDOT's project selection criteria. Road and bridge construction projects are categorized into four core programs: Preservation, Modernization, Expansion and Local Construction. T-WORKS projects must be reflected in the Plan, and eventually the TIP, prior to being implemented.

Municipal or County Capital Improvement Program (CIP)



Typically accompanying the local jurisdiction's annual budgeting process, the CIP contains the program of major capital projects to be constructed, repaired, installed, or purchased. Local projects reflected in the Plan include any project deemed as regionally significant.

Each of the planning a programming documents described above is updated on regular cycles. Table 2-1 outlines the frequency of these updates so that these documents remain relevant and reflective of current trends and priorities.

Table 2-1 Planning and Programming Update Cycle

Document	Responsible Agency	Coverage	Frequency	Notes
Transportation Plan	FHMPO	20-25 year planning horizon	Updated every 5 years	Can be amended between updates
TIP	FHMPO	4 year program	Updated every 2 years (per MPO's discretion)	Amended quarterly
T-WORKS	KDOT	10-year program	Updated on a 2-year rolling basis	T-WORKS is set to expire in 2020
CIP	City/County	Multi-year	Updated annually	

2.2 What is the general Plan development process?

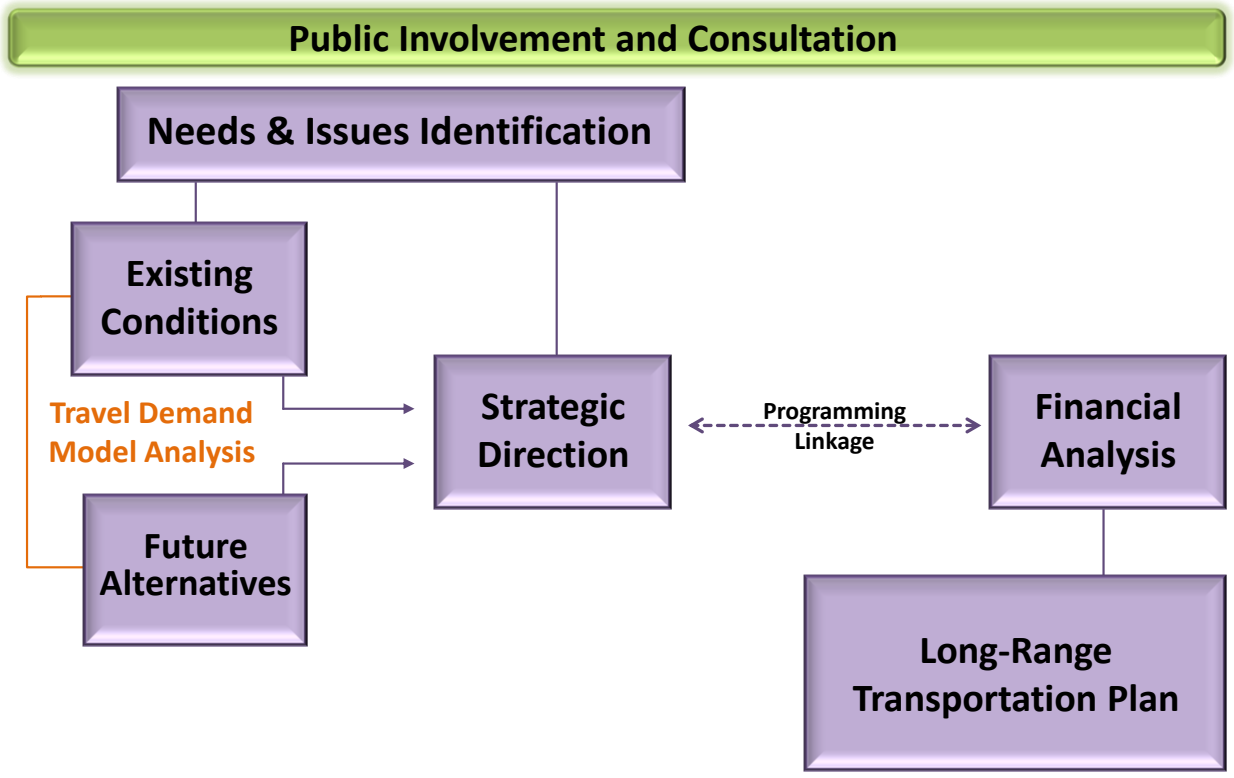
An Advisory Committee was created to oversee and guide the development of the Plan, mirroring that of TAC with the addition of representatives from the KDOT area offices. As the governing body of the FHMPO, the Policy Board received periodic updates during the Plan's development. The Advisory Committee provided direction on plan elements including:

- Guidance and feedback on the progress of technical work elements, methodology, and data;
- Input about current and planned agency plans and projects;
- Input to the final Plan recommendations and fiscally constrained projects; and
- General insight and expertise.

As previously described in Chapter 1, MAP-21 provides the legal basis for the Plan. However, MPOs have a large degree of flexibility with which to develop their long-range plan, as long as federal regulations are satisfied. Figure 2-2 summarizes the major work elements that the FHMPO undertook to develop the Plan. The primary development tasks are summarized below:

- **Public Involvement and Consultation** – As the hallmark of the planning process, the FHMPO provided multiple opportunities for public engagement. Moreover, the FHMPO has conducted extensive stakeholder outreach and coordination throughout the process.
- **Needs and Issues** – The identification of transportation needs and issues provides context for understanding existing and future conditions. These vary in nature, ranging from multimodal and transit service-related issues, to geographic (local and regional) and development pattern challenges.
- **Existing and Future Conditions** – This process is intended to define existing and future deficiencies of the transportation network. The travel demand model is one tool used better understand travel patterns and roadway capacity, both today and in the future.
- **Strategic Direction** – The strategic direction outlines the goals that the Plan is set to achieve, and the performance measures by which to measure progress in accomplishing the goals.
- **Financial Analysis** – The financial analysis is used to demonstrate how the Plan can be implemented by identifying project costs and revenue sources that are reasonably expected to be available to support projects.
- **Fiscally Constrained** Plan– The final recommended project list included in the Plan reflects the investment priorities of the region, given fiscal constraints.

Figure 2-2 Flint Hills Transporation Plan Development Flow Chart



2.3 How were stakeholders and the public involved?

The Plan reflects input and feedback obtained throughout the development process. All public input can be found in Appendix A. The outreach techniques employed are consistent with the FHMPO's Public Participation Plan (PPP), and are supplemented by the participation of the Advisory Committee. For planning purposes there are three broad groups that the FHMPO sought to engage:

- Policy-making elected/appointed officials;
- Federal, state, municipal, and agency staff that engage in transportation; and
- Citizens and groups interested in transportation within the region.

The engagement methods that were applied throughout the Plan's development were designed to match these stakeholder groups and provide multiple opportunities to share information and receive input, both throughout and at key milestones in the planning process. The following techniques were applied to solicit stakeholder participation and public input:

- Stakeholder one-on-one and group interviews;
- Face-to-face discussions with the Policy Board, TAC, staff leadership, and citizens;
- FHMPO and Plan websites with email and comment card features;
- Online survey via WikiMap;
- Email survey (in an online format) specific to Fort Riley personnel;
- Two rounds of Open Houses at project milestones in Fall 2014 and Spring 2015;
- Policy Board and TAC meetings; and
- Advisory Committee meetings.

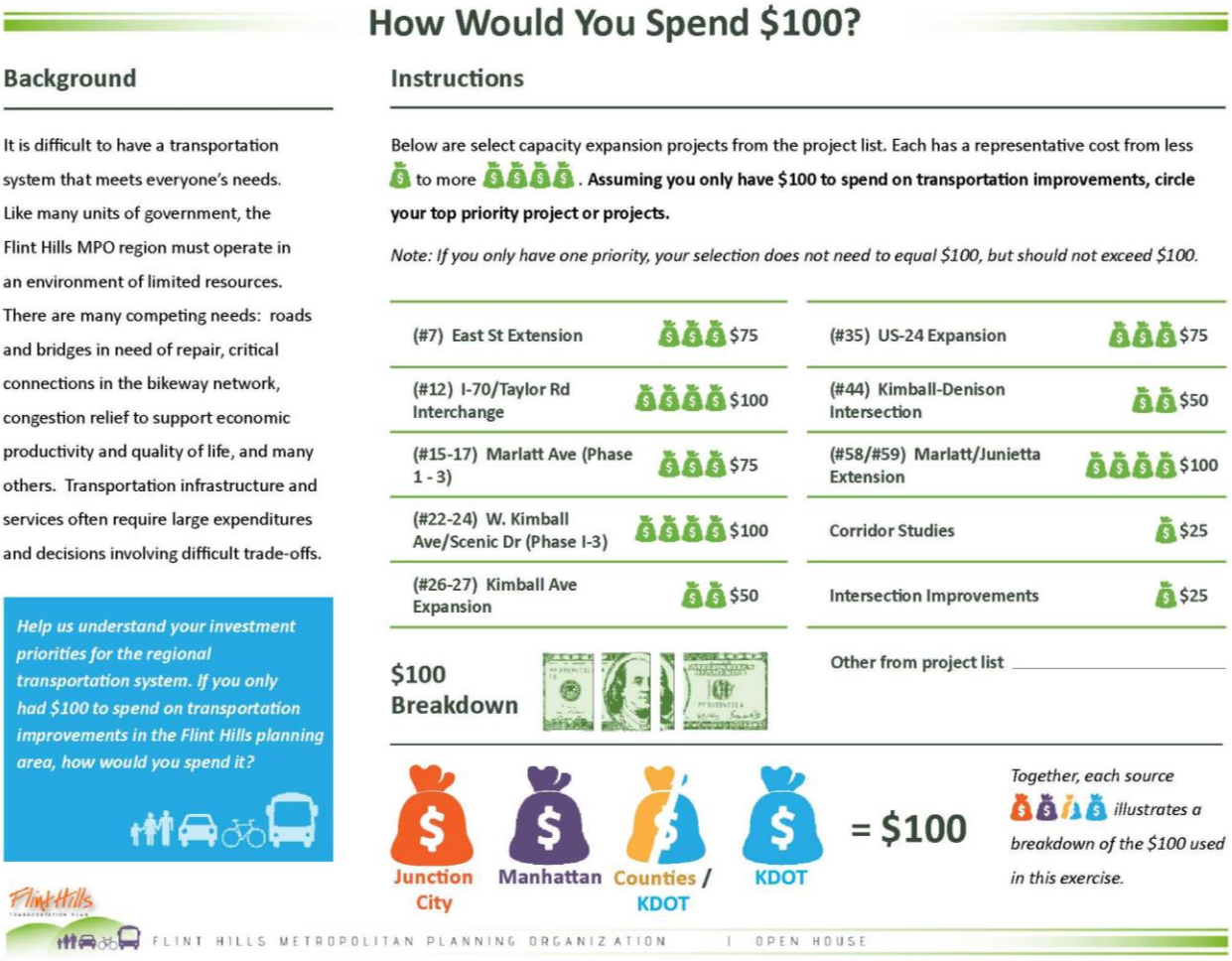
Targeted Stakeholder Interests

- Bicycle and Pedestrian
- Economic Development
- Fort Riley Military Installation
- Land Use Officials (also served as environment and natural resources representatives)
- Kansas State University
- Manhattan Regional Airport
- Transit
- Social Service Organizations

These methods meet the PPP objectives to provide a proactive public involvement process that increases public awareness and understanding, offers complete information and timely public notice, supports early and continued involvement of the public and stakeholders, and provides opportunities for meaningful involvement and citizen feedback. Figure 2-3 provides an example of an exercise employed at the Spring Open House to solicit public input on project priorities. Additionally, Plan information was distributed in a number of formats:

- Plan website;
- FHMPO website;
- Advisory Committee;
- Printed materials (Open House public input exercises, display boards, brochures, handouts);
- PowerPoint Presentations;
- Media outreach;
- Cable TV Public Access Channel;
- Video/YouTube;
- Social media;
- Blog;
- Telephonic, email, and face-to-face discussions; and
- Word of mouth.

Figure 2-3 Open House Funding Exercise on Project Priorities



2.4 What are the Plan Goals?

The Plan has defined a manageable set of six transportation goals for the region. As shown in Table 2-2, each goal is defined by a goal statement that further articulates the desired goal to be achieved. The goals provide a strategic direction that defines the desired result of the Plan. Goals take into account the national goal areas identified in MAP-21 (see Table 2-3) as well as specific regional goals. The region is well positioned to make progress toward these goals; however it will require continued coordination, commitment, and investment by all municipalities and partners. Consideration of Plan goals was given at as the following key points in the planning process:

- When determining which roadway and transit projects to model;
- When recommending the bicycle network;
- In developing the Regional Intelligent Transportation Systems (ITS) Architecture; and
- When applying fiscal constraint.

Table 2-2 Flint Hills Transportation Plan Goals

Plan Goal Area	Plan Goal
Safety and Security	Provide a safe and secure multi-modal transportation system.
Mobility and Accessibility	Contribute to a high quality of life by providing comprehensive mobility and accessibility opportunities for all travelers.
Transportation System Integration	Foster intra- and inter-modal connectivity, including connectivity across inter-jurisdictional boundaries.
Multi-Modal Choice	Make available and promote the usage of alternative transportation options for area residents and workers.
Asset and System Management	Preserve and maintain existing transportation assets and strategically manage roadway operations.
Economic Vitality	Support the economic health of the region through the provision of a reliable and accessible transportation system to move people and goods.

Table 2-3 National MAP-21 Transportation Goals

National Goal Area	National Goal
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, strengthen the ability of rural communities to access national and international trade markets, 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, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices

2.5 What is Performance-Based Planning?

More and more public agencies are using performance measures to track their progress against defined goals and objectives, and are reporting these results to internal and external stakeholders and partners. MAP-21 establishes a performance-based federal program[1], reflecting a national movement toward transportation performance management that promotes performance-based planning practices and data-driven decision-making for both KDOT and the FHMPO.

[1] MAP-21 only applies performance measurement at the programmatic, rather than project, level.

According to the Federal Highway Administration's (FHWA), performance-based planning refers to the application of performance management – a "strategic approach that uses performance data to support decisions to help achieve desired performance outcomes."[2] Performance-based planning occurs within the context of established transportation planning and programming processes used by agencies to deliver a multimodal transportation system. Carrying out performance-based planning and programming is meant to be an ongoing process, informed by quality data and public involvement throughout. Moreover, performance-based planning includes a feedback loop, where performance is monitored as an ongoing activity. Performance monitoring allows the FHMPO to evaluate whether the planning activities, programs, and projects are making progress toward Plan goals, and to make adjustments as necessary.

As a new entity, the FHMPO is in the early stages of establishing its performance-based planning process and has incorporated performance measures consistent with the available guidance from MAP-21. The requirements for performance measurement are continuing to be established. The FHMPO will work with KDOT and the regional transit service provider to finalize measures, gather baseline data, and establish targets.[3] It should be noted that the state of the practice at state DOTs and MPOs varies widely. Some agencies have limited data analysis and reporting capabilities, while other agencies have expended significant resources over time to develop and advance their performance management programs. Given that the requirements for performance-based planning are still being defined, the FHMPO anticipates that implementation of a performance-based planning process will evolve over time.

Performance Measures and Implementation Strategies

This Plan creates the foundation from which the FHMPO can prepare for future performance-based planning efforts. While an initial set of performance measures has been developed to measure progress over time, further work will be needed to refine measures, gather data, establish a baseline, and set targets. As previously noted, goals define what the region wants to achieve. Implementation strategies describe actions we can take that will help us meet the goals, and performance measures help to measure our progress over time. Together these are shown in Table 2-4.

[2] http://www.fhwa.dot.gov/tpm

[3] The new MAP-21 performance requirements are still being made through the rulemaking process, and are expected to be effective once the final rule is issued.

Table 2-4 Flint Hills Transportation Plan Goals, Measures, and Implementation Strategies

Goals	Measures	Implementation Strategies
Safety and Security Provide a safe and secure multi-modal transportation system.	a) Number of serious injuries and fatalities, represented as a 5-year rolling average b) Rate of serious injuries and fatalities per 100 million VMT, represented as a 5-year rolling average c) Transit safety d) Number of bicycle-related fatalities	• Manage access along high-volume corridors to support safe travel. • Implement multi-modal engineering features to make interactions among users of different modes safer. • Educate travelers across modes about safe travel behavior and techniques that are mode and age appropriate. • Develop a strategy for regional emergency coordination and response to address inter-jurisdictional emergency events, including evacuation routes and procedures. • Coordinate traffic system management and operations to respond to and recover from emergencies, including man-made threats and natural disasters.
Mobility and Accessibility Contribute to a high quality of life by providing comprehensive mobility and accessibility opportunities for all travelers.	a) Traffic congestion b) Employment within ¼ mile of bus stop c) Population within ¼ mile of bus stop	• Preserve corridor capacity through access management. • Improve transit route coverage and expand service hours of operation. • Coordinate transportation investments to ensure compatibility with the transportation facilities of adjacent municipalities and counties. • Explore policy direction to implement Complete Streets concepts. • Implement inter-jurisdictional signal timing. • Explore opportunities for strategic roadway redundancy and bypass routes. • Leverage transportation funds with other funding sources to achieve shared interests (e.g., public health, elderly, disadvantaged populations). • Work with area social service providers to eliminate barriers to travel.
Transportation System Integration Foster intra- and inter-modal connectivity, including connectivity across inter-jurisdictional boundaries.	a) Percent of bus stops with a sidewalk presence b) Percent of bus fleet equipped with bicycle racks c) Number/description of existing gap resolved	• Determine demand and feasibility of designated park-and-ride locations. • Encourage municipal and regional coordination in support of the provision of transit and non-motorized travel facilities. • Improve non-motorized facilities to ensure continuity and comfort for users. • Coordinate Fort Riley transportation planning efforts with those of the planning area cities and counties. • Outreach to area taxi companies to improve services for travelers.
Multi-Modal Choice	a) On-road mobile source emissions	• Encourage Complete Street concepts in roadway engineering and design

Make available and promote the usage of alternative transportation options for area residents and workers.	b) ATA transit ridership c) Change in miles of bicycle lanes (e.g., all or subsets like on-street/off-street/recreational trails) d) Percent of sidewalks that are Americans with Disabilities Act (ADA) compliant	to accommodate the needs of all users (e.g., auto, transit, bike and pedestrian). • Support public-private partnerships to fund transit service. • Continue to provide demand response service to transportation disadvantaged populations. • Invest in non-motorized facilities, amenities, and signage, especially those that link to activity centers and transit. • Liaison with businesses to provide access on commercial properties for non-motorized users. • Support maintenance and operating policies and procedures to enable year-round access to non-motorized facilities and transit stops. • Provide adequate resources to expand the use of Transportation Demand Management to help reduce the number of single occupancy vehicle trips within the region.
Asset and System Management Preserve and maintain existing transportation assets and strategically manage roadway operations.	a) Pavement condition b) Bridge condition c) Transit state of good repair	• Evaluate existing preservation and maintenance programs maintain and replace/rehabilitate transportation assets on a timely, systematic basis. • Implement the Regional ITS Architecture. • Deploy ITS investments as appropriate to optimize traffic flow and support incident management consistent with the Regional ITS Architecture. • Utilize transportation system management improvements when more cost effective than facility expansion.
Economic Vitality Support the economic health of the region through the provision of a reliable and accessible transportation system to move people and goods.	a) Freight movement on the Interstate system b) Performance of the non-Interstate National Highway System c) Truck volumes on I-70 d) Manhattan Regional Airport enplanements (split out by commercial and general aviation)	• Implement transportation investments to support designated growth areas, existing communities, and generators of economic activity. • Coordinate with area economic development organizations to support business through strategic transportation investment. • Preserve right-of-way to develop strategic corridors for future transportation systems. • Develop a system of preferred or designated truck routes.

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3.0 Flint Hills Regional Overview: How will our region grow in the future?

A defining feature of the transportation planning process is to identify needs. This begins with understanding the context of regional growth and development that drive population and employment. In addition, land use also contributes to trip-making behavior, as well as the ease of access to key destinations. To understand how the Flint Hills region will grow in the future, we must look at changes in the socioeconomic characteristics that will impact transportation needs.

3.1 Population and Employment

Population and employment in the Flint Hills region is primarily concentrated within the city limits of Manhattan and Junction City. Existing and projected population and employment for the region reflect the latest demographic and economic factors that significantly influence travel demand on all transportation systems in the region. Assumptions for population, employment, and land use have been incorporated within the travel demand model to reflect existing and future conditions consistent with current comprehensive plans for the greater Manhattan area and Junction City/Geary County.

Population and employment growth in the region is anticipated to continue through 2040 (see Table 3-1), with both Manhattan and Junction City experiencing growth, albeit at different magnitudes. Changes in the operations of Fort Riley mean that there exists a degree of uncertainty in the number of units stationed at the installation. As a result, population in the region may fluctuate. To put our growth in perspective, the region is anticipated to grow at a faster rate than State and national population projections, as shown in Table 3-2.

Table 3-1 Regional Population and Employment Growth

	2012	2040	▲	% ▲
Manhattan				
Population	53,080	76,467	23,387	44%
Employment	28,541	41,616	13,075	46%
Junction City				
Population	23,859	38,847	14,988	63%
Employment	10,281	15,717	5,436	53%

Source: Flint Hills Travel Demand Model.

Table 3-2 State and National Population Growth

	2012	2040	▲	% ▲
Kansas				
Population	2,885,966	3,238,356	352,390	12%
United States				
Population	314,112,078	380,219,000	66,106,922	21%

Source: U.S. Bureau of the Census.

Population and employment growth in Manhattan are anticipated to continue well into the future, with density intensifying largely in existing and planned population centers and commercial areas. Similarly, Junction City will experience population and employment growth through 2040; however Junction City's focus is on commercial and industrial development opportunities as opposed to residential given the

current surplus. Figure 3-1 through Figure 3-4 show the change in population and employment for both Junction City and Manhattan from 2012 to 2040. The darkest areas represent the greatest concentration of population or employment. Viewing the maps side-by-side helps to understand where population and employment centers shift over time.

Major Employers

Table 3-3 and Table 3-4 show Manhattan and Junction City's largest employers. Clearly evident is the powerful presence of K-State and Fort Riley, two major institutional assets in the region. Not only do these institutions help to shape the local and regional economy, but they also serve as major traffic generators, influencing the number and type of trips made in the region. The ability of the transportation network to serve major employment centers will be impacted as the workforce transitions to these facilities over time. For example, the National Bio and Agro-defense Facility (NBAF), currently under construction and expected to begin operations in 2022, and K-State's Global Food Systems Initiative, are anticipated to create new employment opportunities as well as spur complementary industry clustering. These will bring jobs and new development to the region, but will also have workforce implications (e.g., accessibility, housing affordability) that impact travel needs and behavior. As shown below in Table 3-3 and Table 3-4, both Manhattan and Junction City are home to large employers other than K-State and Fort Riley that influence travel patterns.

K-State: Planning for Growth

K-State is currently developing the North Campus Corridor Master Plan to inform the location of future research and corporate buildings, utilities, multi-modal access, and the integration of research and complementary private sector partners. The purple polygons in the image below are areas K-State has identified for future buildings and potential infill development.

Source: K-State

Table 3-3 Manhattan Top Ten Largest Employers

Rank	Employer	Number of Employees
1	Kansas State University	6,028
2	Fort Riley Civilian Personnel	3,543
3	Manhattan/Ogden USD #383	1,350
4	GTM Sportswear	900
5	Mercy Regional Health Center	795
6	Florence Manufacturing	519
7	Wal-Mart	480
8	City of Manhattan	374
9	Meadowlark Hills Retirement Community	349
10	Hy-Vee	300

Source: Manhattan Department of Economic Development.

Table 3-4 Junction City Top Ten Largest Employers

Rank	Employer	Number of Employees
1	Fort Riley Civilian Employees	3,543
2	USD 475 School District	1,350
3	Armour	448
4	ConAgra Amour Eckrich	435
5	Geary Community Hospital	413
6	Footlocker Distribution Center	338
7	City of Junction City	234
8	Geary County	197
9	Wal-Mart	177
10	Dillons	150

Source: Junction City Area Chamber of Commerce.

Figure 3-1 Manhattan Population, 2012 and 2040

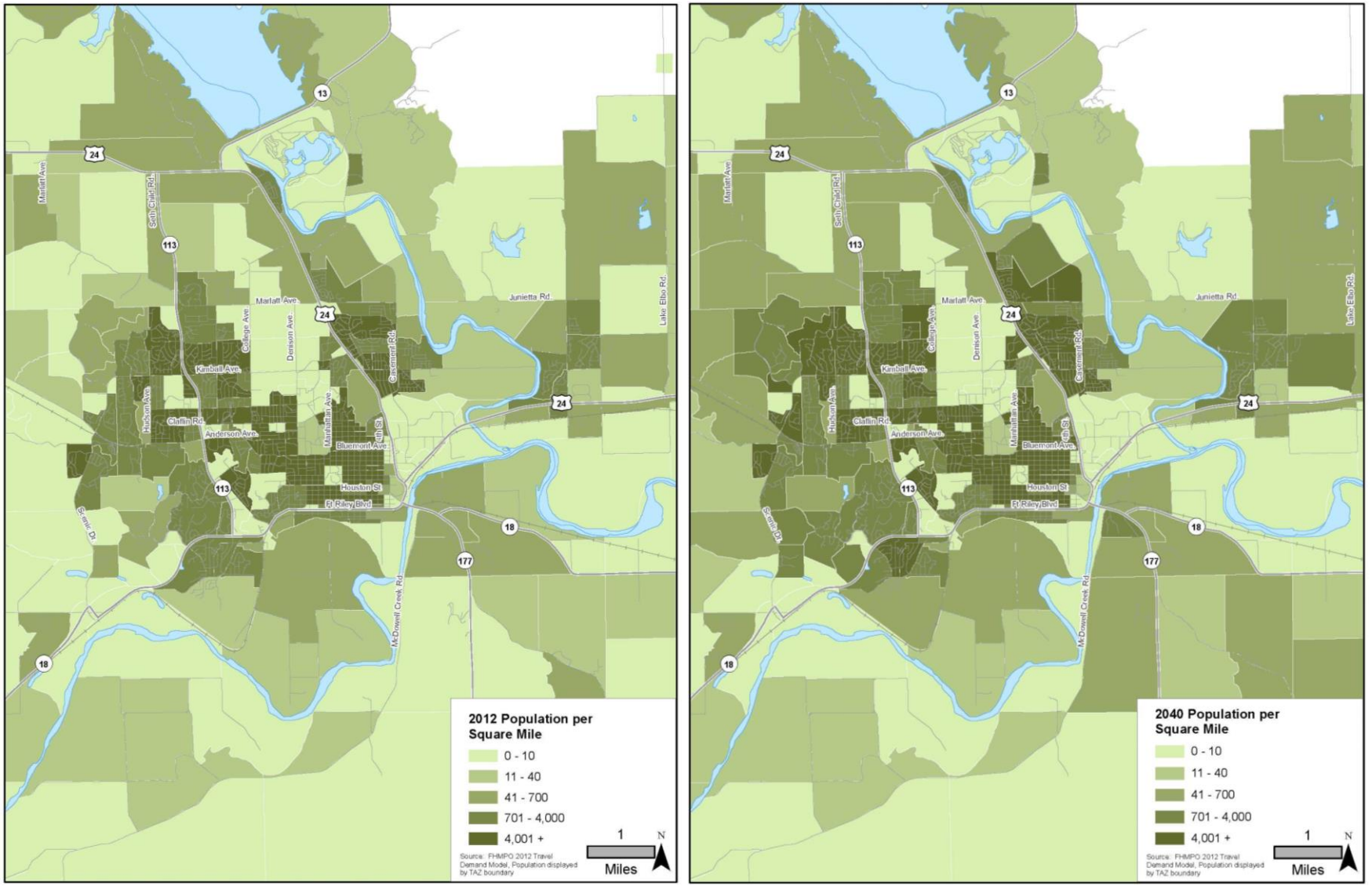
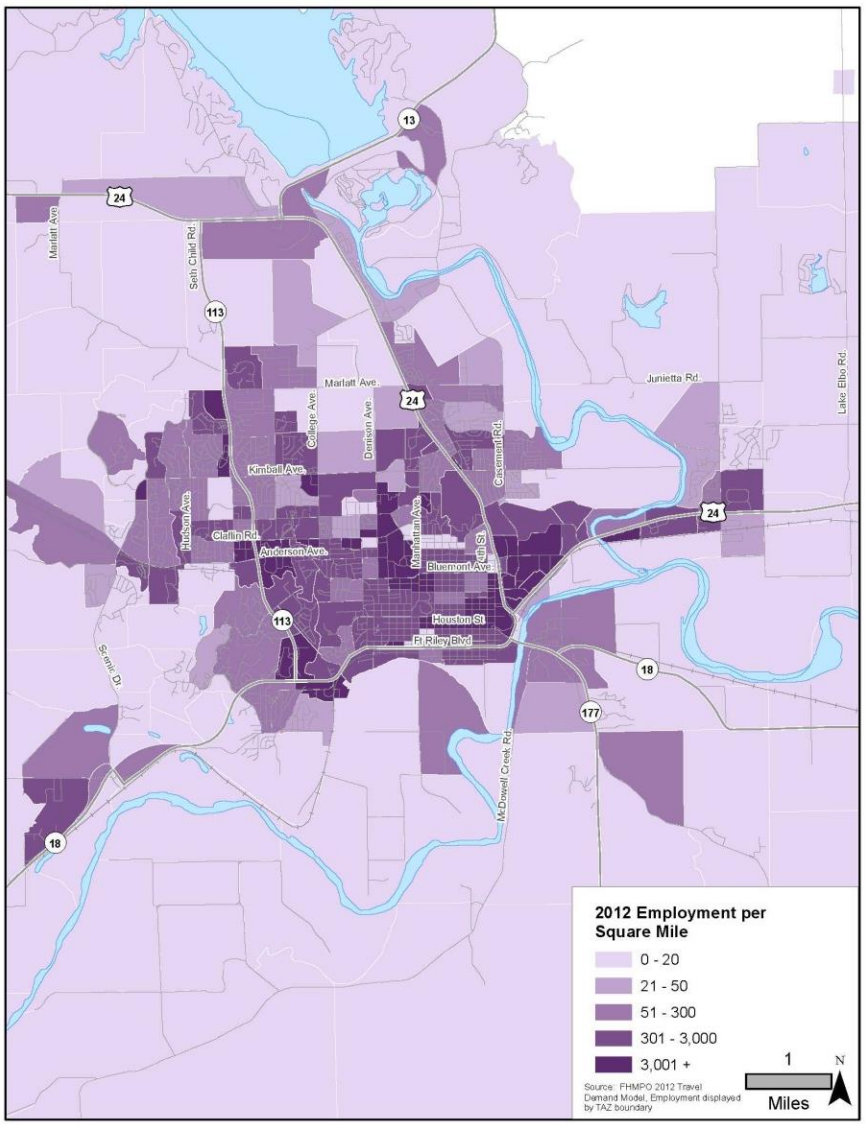


Figure 3-2 Manhattan Employment, 2012 and 2040



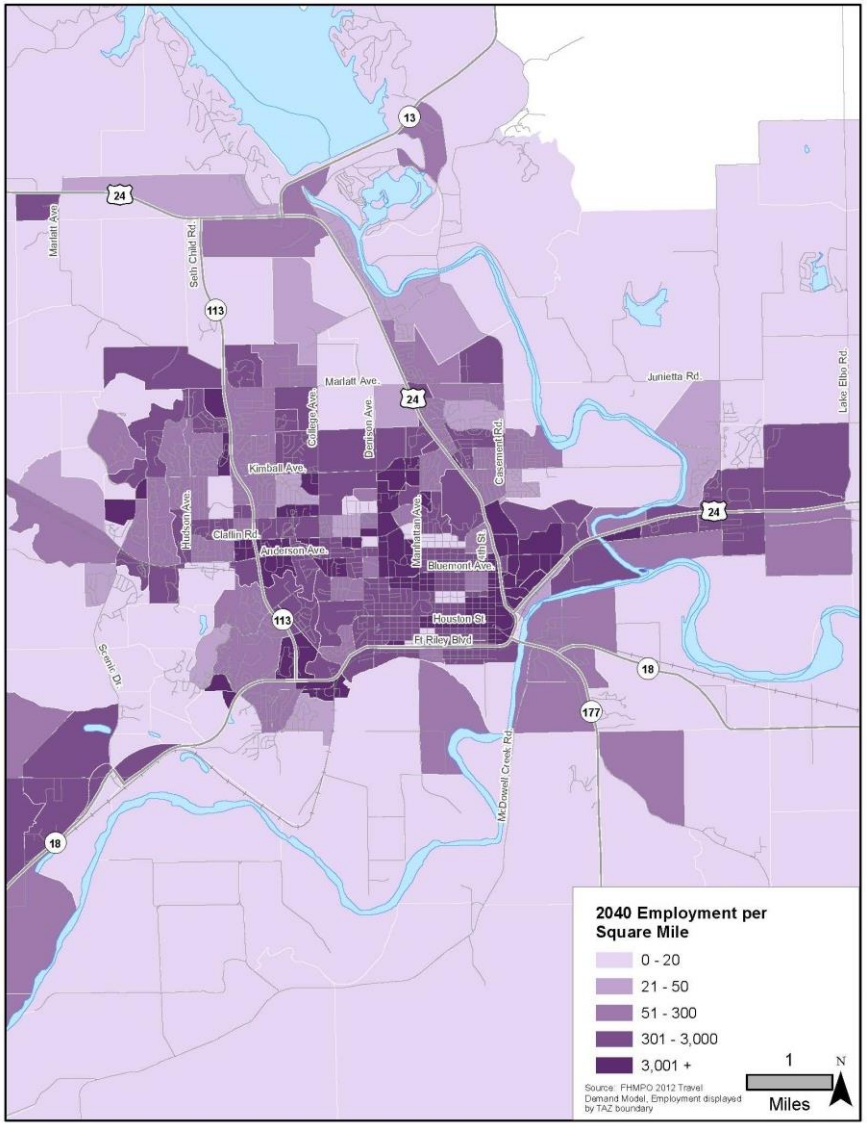


Figure 3-3 Junction City Population, 2012 and 2040

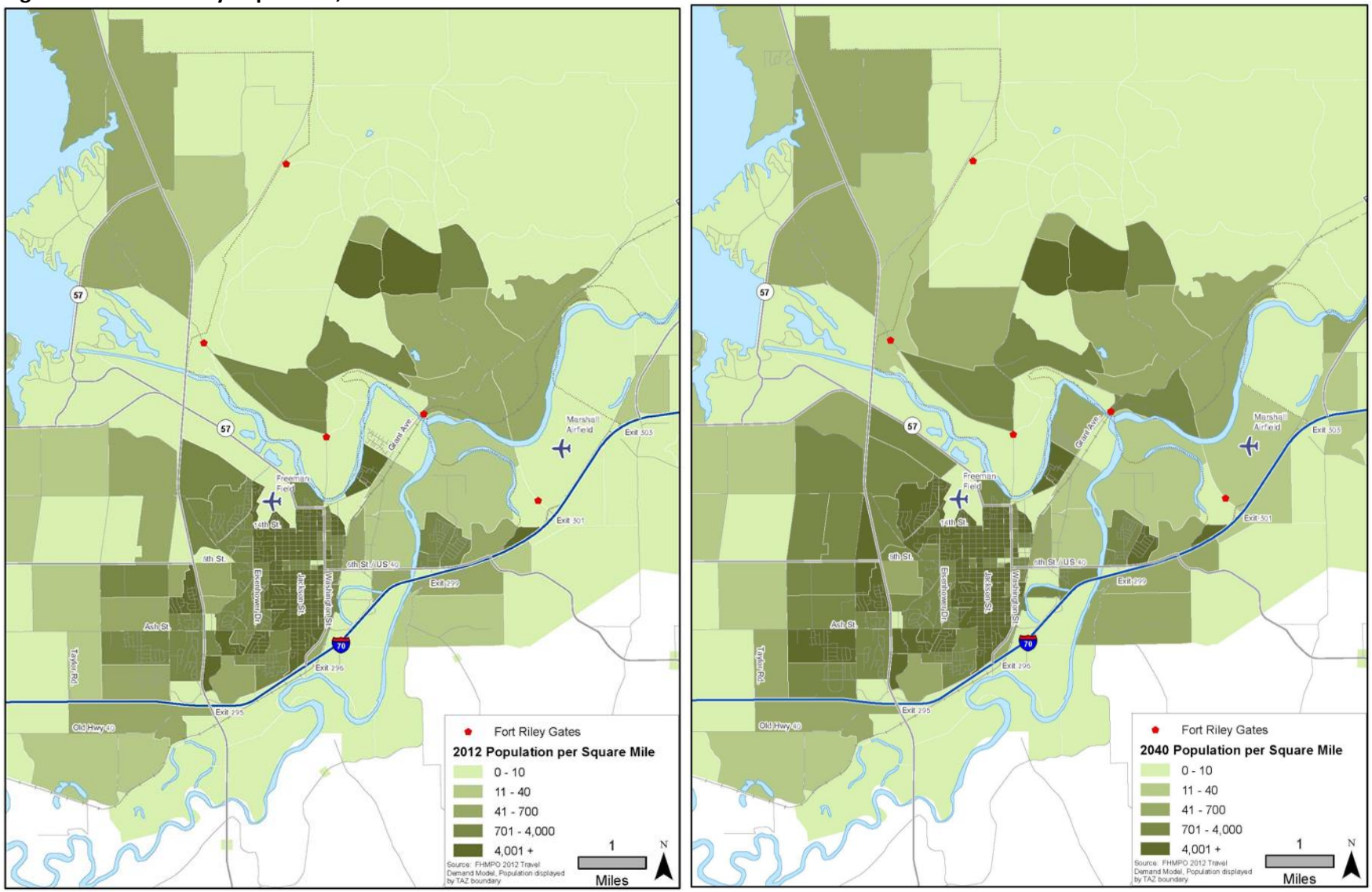
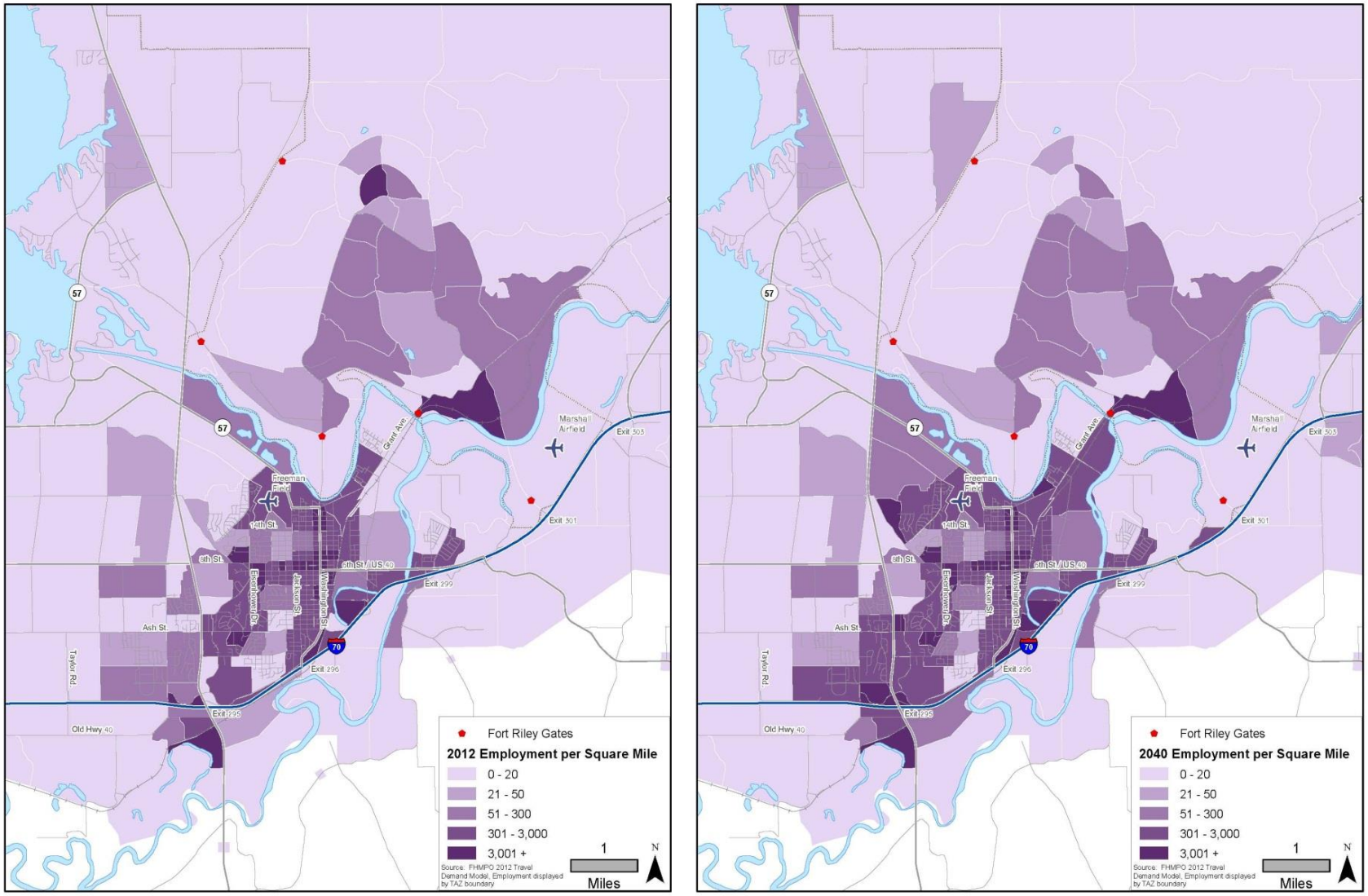


Figure 3-4 Junction City Employment, 2012 and 2040



3.2 Land Use and Growth Opportunities

While existing businesses and employers largely influence current travel patterns, and are likely to continue in the future, it is equally as important to identify where future growth and development is likely to occur. Mobility is intertwined with the location and type of development, known as land use. Land use has a direct link to transportation and one's ability to move throughout the community and region. Land use impacts the distance people must travel to access opportunities where people live, work, and play. Land use also helps to define what types of modes are available to travelers to make trips. For example, if a school is located within one mile of a residential area, there are multiple trip-making options, such as driving, bicycling, or walking, but these modal options decline as residential development occurs further away from the school.

Comprehensive plans were recently completed outlining future growth strategies and providing direction for future land use within the region.[4] These are the Manhattan Urban Area Comprehensive Plan (called Manhattan Area 2035), covering the City of Manhattan and portions of both Riley and Pottawatomie Counties, and the Junction City/Geary County Comprehensive Plan, covering all of Geary County and its municipalities. Figure 3-9 and Figure 3-10 show the planned future land uses in the region.

Similar to population and employment, land use is a key factor in trip generation. The FHMPO has incorporated planned land uses into the travel demand model to understand the impact of land use on travel (e.g. volumes, capacity constraints). Given the future land use and policy guidance contained in each comprehensive plan, complementary multimodal transportation system improvements will be needed to support desired land use and development patterns in the region. As such, the identification of future growth areas is a key input to identifying transportation needs. Further analysis of the impacts of future growth with respect to roadway capacity is described in Chapter 6.

Manhattan Area Growth Opportunities

As described in the Manhattan Area 2035, the Manhattan area has identified growth opportunity areas both through the redevelopment of existing land and development of current greenfield sites, as shown in Figure 3-5. Manhattan will focus its growth using the following two methods

- **Infill Development** — Development in the Manhattan area is constrained by many external factors. The Manhattan Area 2035 highlights opportunities to capitalize on infill development, allowing underutilized tracts and corridors within the core area to serve a higher purpose.
- **Greenfield Development** — Given Manhattan's growth constraints, there are limited areas where vacant land is suitable for development. Therefore, future growth is planned for areas on the fringe or outside of the City limits in Riley County and Pottawatomie County (represented as areas 1 and 5 in Figure 3-5).

[4] In general, land use designations are considered for future uses while zoning designations more specifically define what use is currently allowed on a specific parcel and outline design and development guidelines.

The growth areas identified in Figure 3-5 include different types of land use (e.g., retail, commercial, education, industrial, residential). Future growth changes anticipated for the Manhattan are summarized as follows and are described in more detail below:

- Expanded infill and redevelopment opportunities in the core area;
- Proposed increase density in the residential areas directly adjacent to the K-State campus on the east and west;
- Additional development in the Blue Township urban growth area;
- Continued development along the Eureka Valley Corridor and Manhattan Business Park ; and
- Expanded employment opportunities to the northwest along the US-24 Corridor.

Growth Opportunity Area #1: Blue Township/East US-24 Corridor —Blue Township is located in western Pottawatomie County with a majority of the commercial development located within the Manhattan City Limits, while most residential areas remain in the County. Blue Township is identified in the MAUCP as the largest residential growth area, with upwards of an additional 3,000 single-family housing units and more than 40 acres commercial and employment development at full buildout. Given the current rural nature of the US-24 corridor, connecting Blue Township and the City of Manhattan, there is an opportunity for commercial redevelopment. Blue Township also accommodates service commercial development located in the Green Valley Business Park.

Growth Opportunity Area #2: Downtown Core Area — There will be continued to support to reinvestment in the downtown core area to maintain a vibrant and economically healthy community center.

Growth Opportunity Area #3: Aggieville/East Campus Edge — The residential area located to the east of K-State's campus will experience significant changes with full buildout. With several blocks identified as Urban Core Residential, this could accommodate in excess of an additional 535 units. This would also provide opportunities for mixed-use development, allowing for commercial and retail uses along the ground floor.

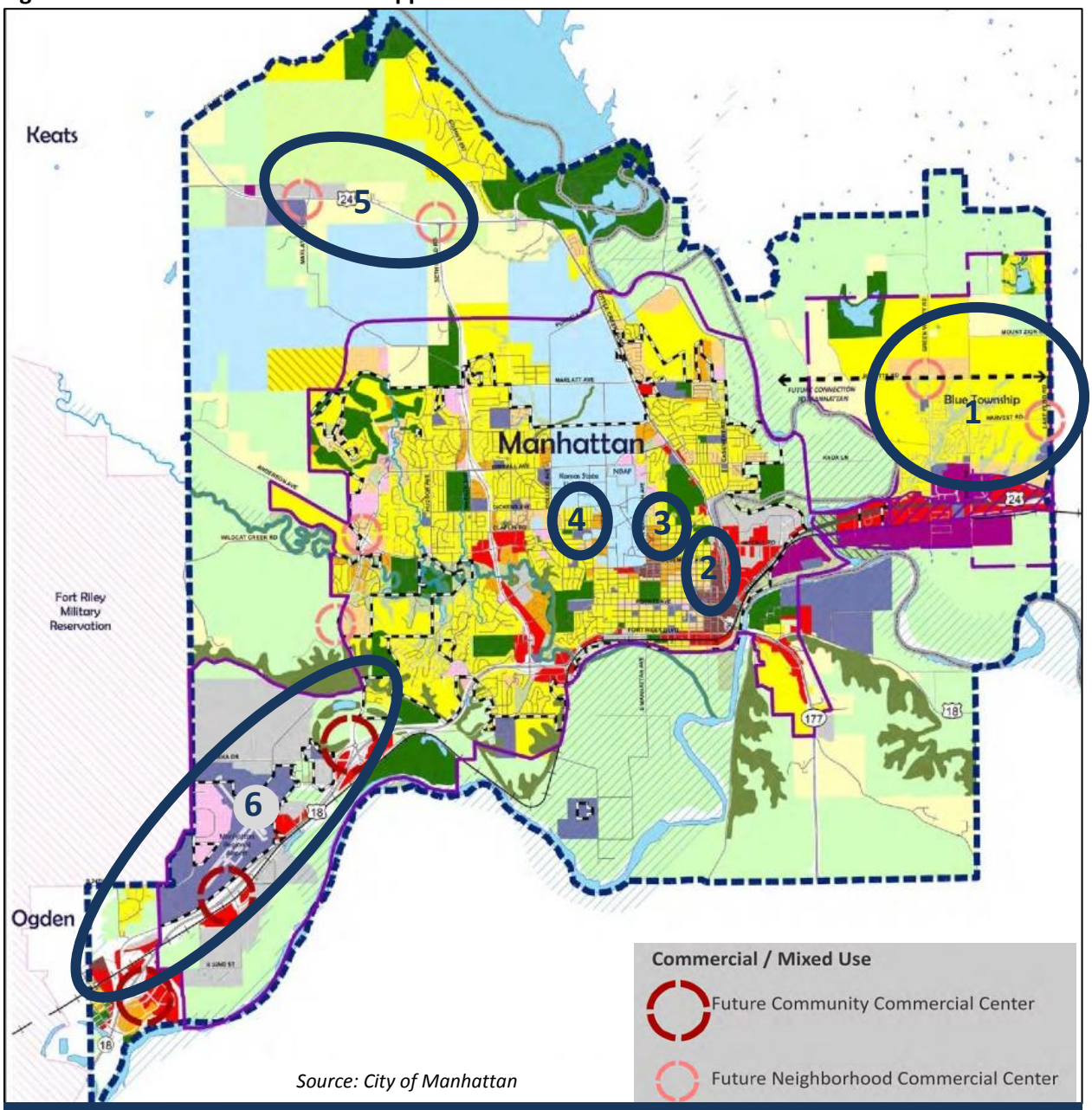
Growth Opportunity Area #4: West Campus Edge — The Manhattan Area 2035 up-zoned the area just west of K-State along Denison Avenue, between Hunting Avenue and Jardine Drive, to allow for high density residential. This has the potential to add approximately 150 additional housing units to this area.

Growth Opportunity Area #5: West US-24 Corridor — Two development nodes have been identified northwest of the City of Manhattan along US-24. The node furthest to the west, near the Riley County shops could accommodate a range of development opportunities for manufacturing, research facilities, or warehouses. The node located at the intersection of US-24 and K-113 (Seth Child Road) would provide opportunities for limited service commercial uses.

Growth Opportunity Area #6: Eureka Valley/Manhattan Business Park — With the realignment of K-18 near the Manhattan Regional Airport, Eureka Valley and the Manhattan Business Park has the opportunity to accommodate significant growth. The Eureka Valley area includes the

Manhattan Business Park, a 190-acre development, the Manhattan Regional Airport, and proposed community commercial centers. The Manhattan Business Park offers accommodations for light manufacturing, research facilities, office space and warehousing, while the great Eureka Valley corridor can accommodate retail and service commercial, industrial uses, and research facilities.

Figure 3-5 Manhattan Area Growth Opportunities



Source: City of Manhattan

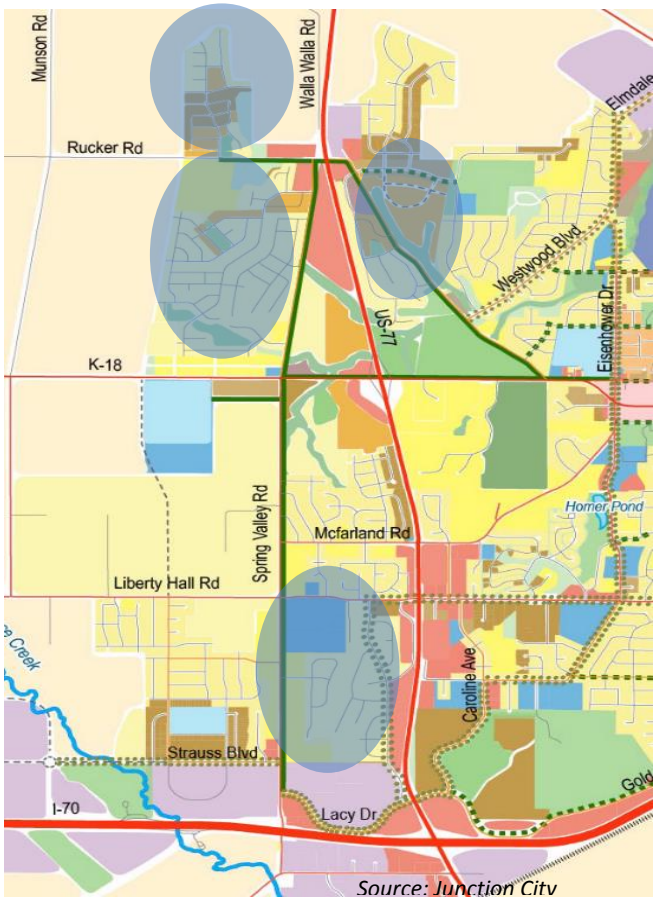
1) Blue Township/E. US-24
2) Downtown Core Area
3) Aggieville/East Campus Edge
4) West Campus Edge
5) West US-24 Corridor
6) Eureka Valley/Manhattan Business Park

Junction City Growth Opportunities

Similar to Manhattan, Junction City will rely on both infill and greenfield development to achieve the goals set forth in the Junction City/Geary County Comprehensive Plan. Given Junction City's low density land use patterns and surplus residential supply (especially single-family lots), residential development is anticipated to be focused within existing subdivisions, as depicted with blue ovals in **Error! Not a valid bookmark self-reference.**. The existing residential lot supply will meet much of the City's growth needs for the next 10 to 15 years.

The Comprehensive Plan identifies five (5) major growth opportunity areas for commercial land use, as depicted in Figure 3-7. A description of the type of development proposed for each growth area is as follows:

Figure 3-6 Junction City Residential Lot Supply



Growth Opportunity Area #1: Downtown — As Junction City's economic and civic center, the community plans to continue to make investments in this critical asset. There are opportunities identified that would make use of existing vacant lots and surface parking areas to increase the commercial, civic, and entertainment services already available.

Growth Opportunity Area #2: Chestnut Street Corridor — The Chestnut Street district currently offers a mix of retail and commercial services along the I-70 corridor. As a major gateway into the City, there have been investments made to the landscaping, lighting, and other amenities located along the corridor to improve the aesthetic quality. The community will continue to accommodate commercial development along this corridor.

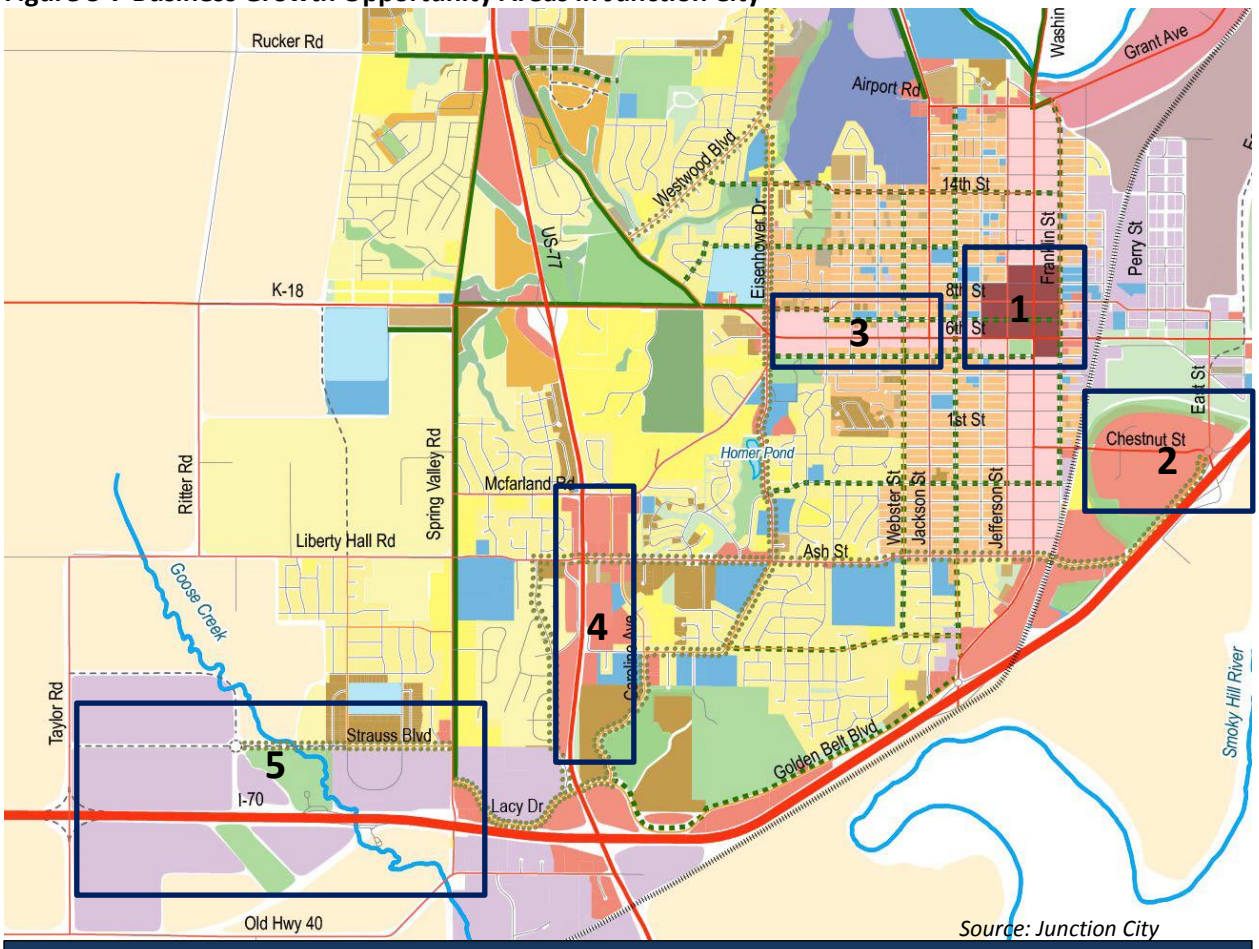
Growth Opportunity Area #3: 6th Street Corridor — Currently, a car-oriented mix of commercial development, the 6th Street Corridor serves an important economic purpose for the community. The Comprehensive Plan encourages the continued support of existing businesses and investment by new commercial developments. Reinvestment along the corridor should reinforce the goals of a multimodal transportation system by providing access for both vehicles and pedestrians.

Growth Opportunity Area #4: US-77 Corridor — The demand for commercial land use along the US-77 corridor is expected to continue. The roadway investments being made to US-77 and the

high visibility of development from the highway will continue to spur commercial development along the corridor. Like that of the Chestnut Street Corridor, the City will encourage development along US-77 to include landscaping, screening, and bring building setbacks closer to the roadway.

Growth Opportunity Area #5: I-70/Taylor Road Area — The land in this area provides the best opportunity for industrial growth in the region. With access and high visibility from I-70, this area is located outside of the floodplain and offers excess of 240 acres for industrial development.

Figure 3-7 Business Growth Opportunity Areas in Junction City



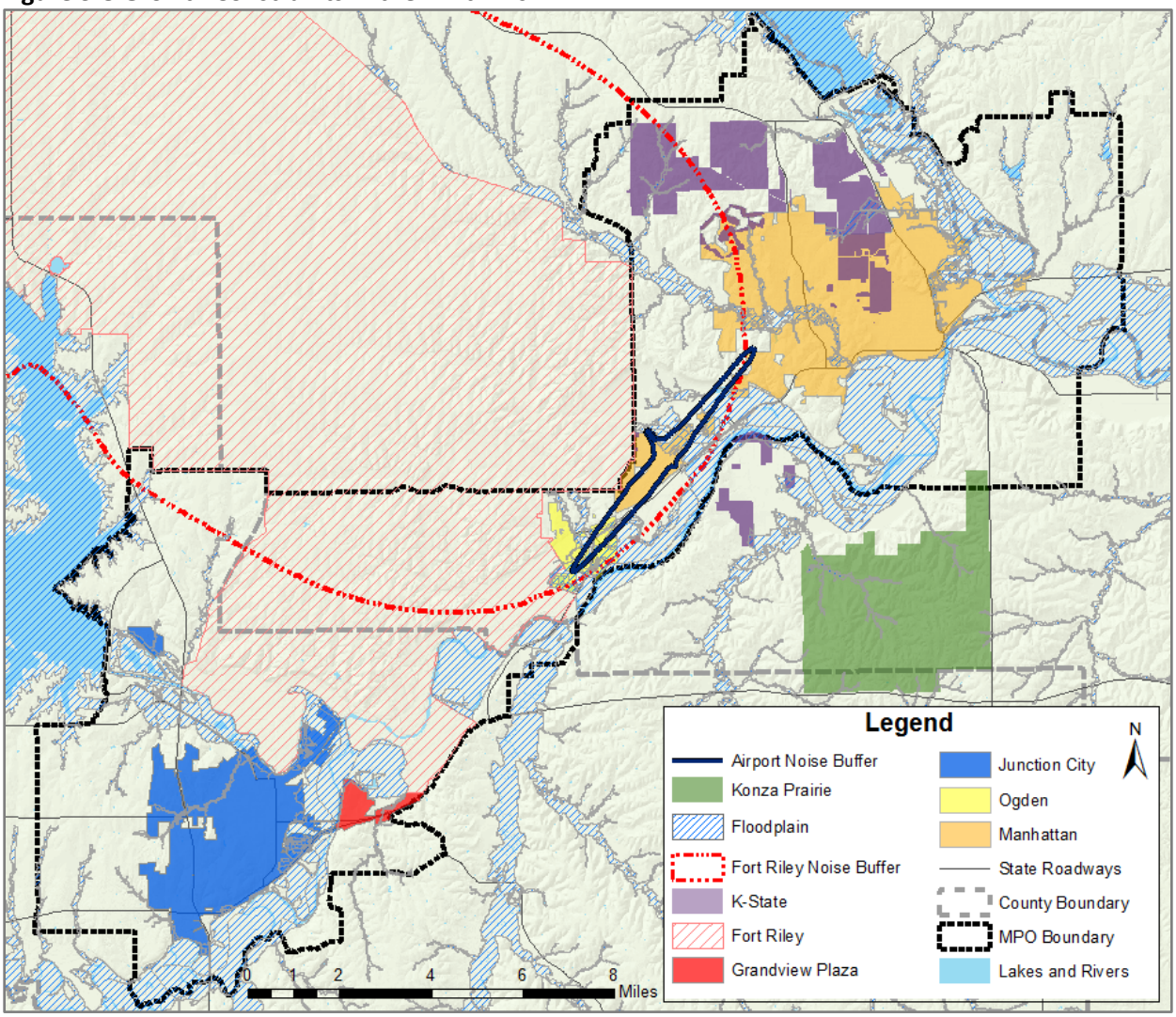
1) Downtown
2) Chestnut Street Corridor
3) 6th Street Corridor
4) US-77 Corridor
5) I-70/Taylor Road Area

Unique Growth Constraints within the Region

Aside from land use, there are a number of other factors that create limitations on growth in the region. For example, K-State and the KSU Foundation are major land holders in Manhattan, together owning more than 11 percent of land. This constraint means that development opportunities by other entities and for other purposes are limited. Other contributing factors that constrain growth include the 8,600-acre Konza Prairie Preserve, the presence of floodplains, and the need to limit noise sensitive land uses

around the Manhattan Regional Airport and the Fort Riley Installation. Figure 3-8 depicts the growth constraints faced in the region, to include the factors mentioned above.

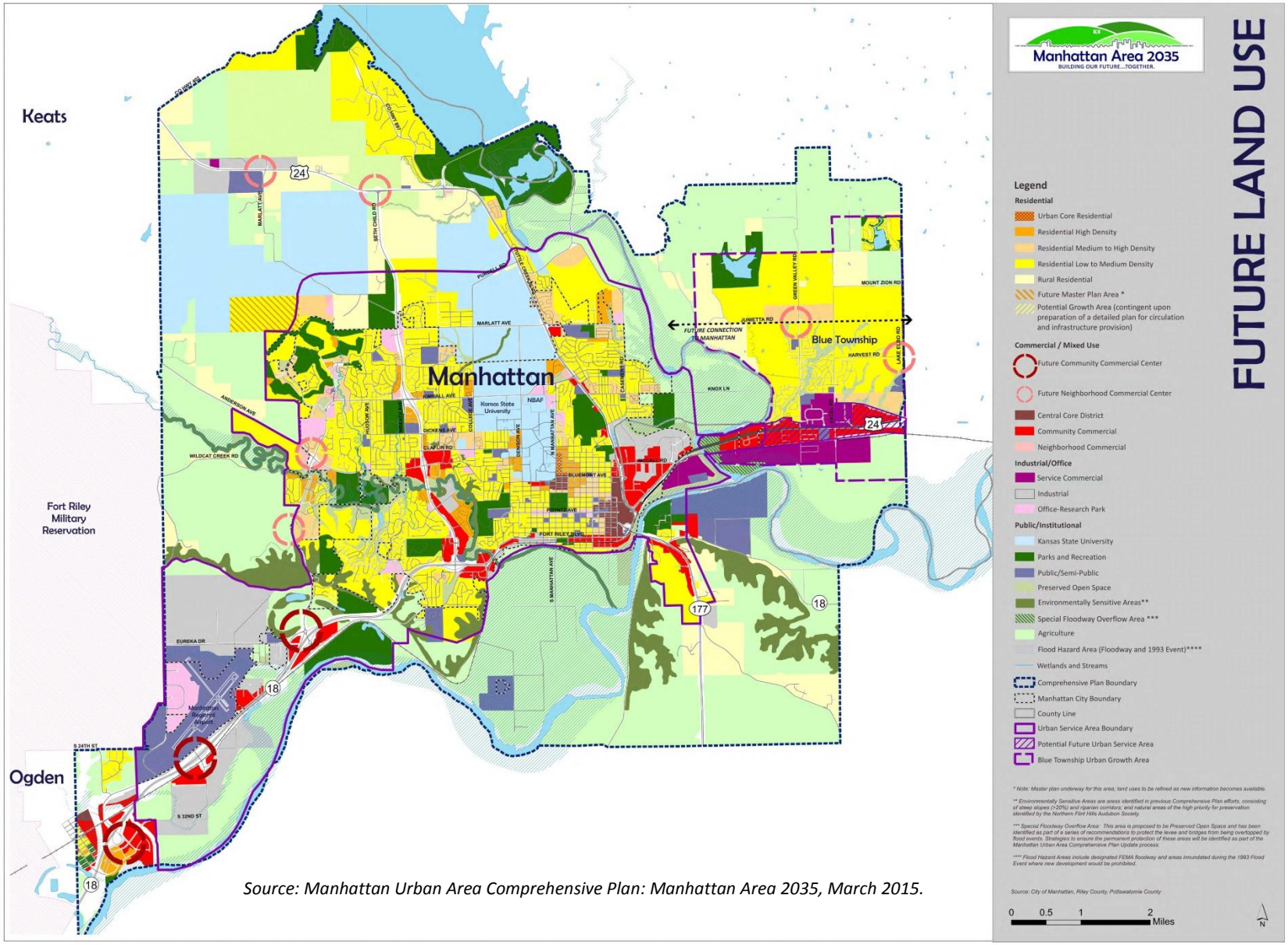
Figure 3-8 Growth Constraints in the Flint Hills



Summarized below are the major constraints restricting growth in the region:

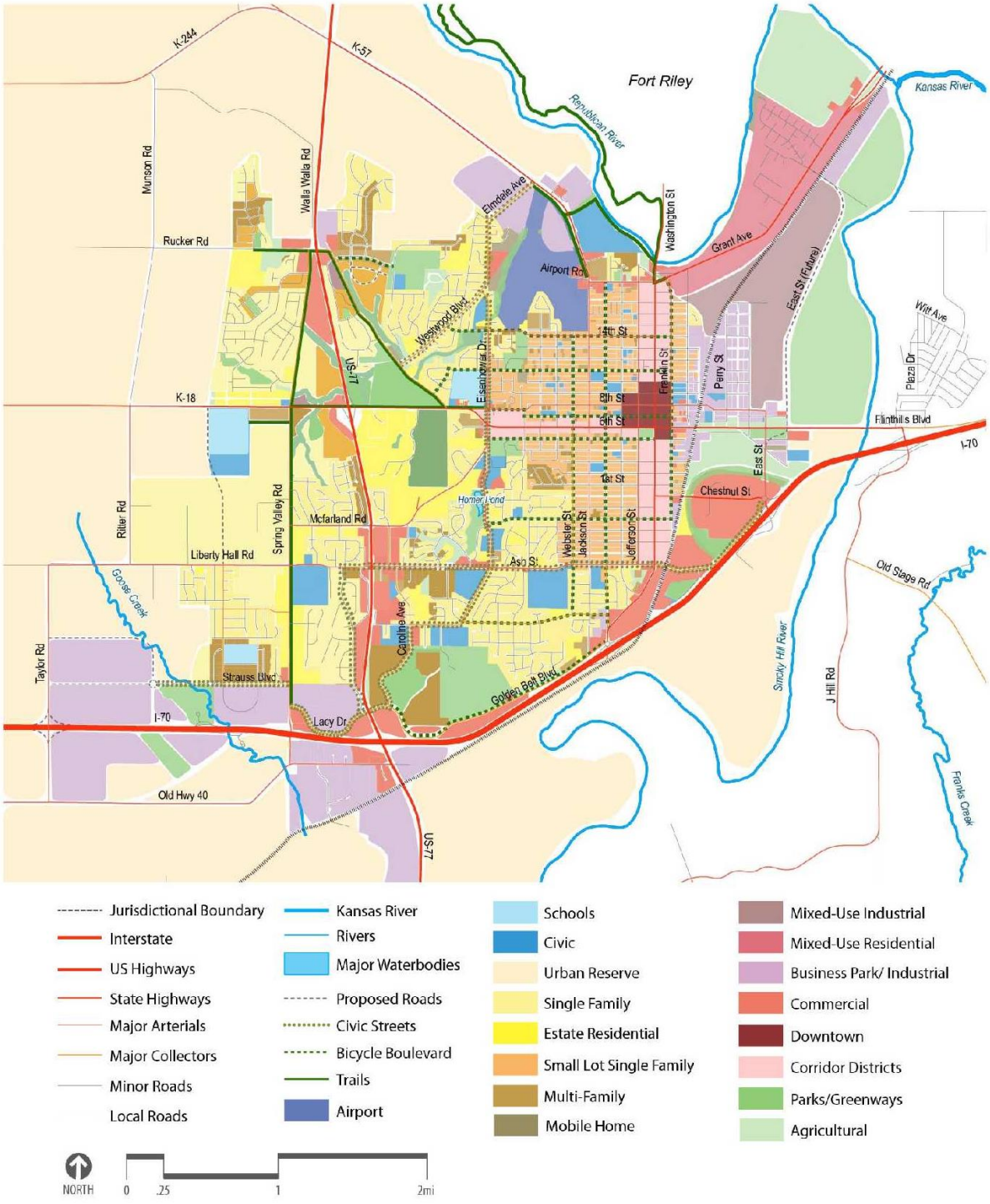
- Much of the land area in both Manhattan and Junction City lies within an identified FEMA Floodplain. Floodplains serve as a natural constraint to development. As a result, development is restricted or it is simply not permitted in flood hazard areas. Instead, much of the available land in the region is closed to development and is repurposed for agriculture or open space.
- Given the presence of the Manhattan Regional Airport and Fort Riley, development is further constrained by noise exposure and safety hazards associated with these facilities. In some cases, there may be no physical limitations to development in these areas; however, noise levels make them unsuitable for development.

Figure 3-9 Manhattan Future Land Use



Source: Manhattan Urban Area Comprehensive Plan: Manhattan Area 2035, March 2015.

Figure 3-10 Junction City Future Land Use



Source: Junction City/Geary County Comprehensive Plan, Draft December 2014.

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4.0 Existing Multimodal Assets: What do existing conditions look like?

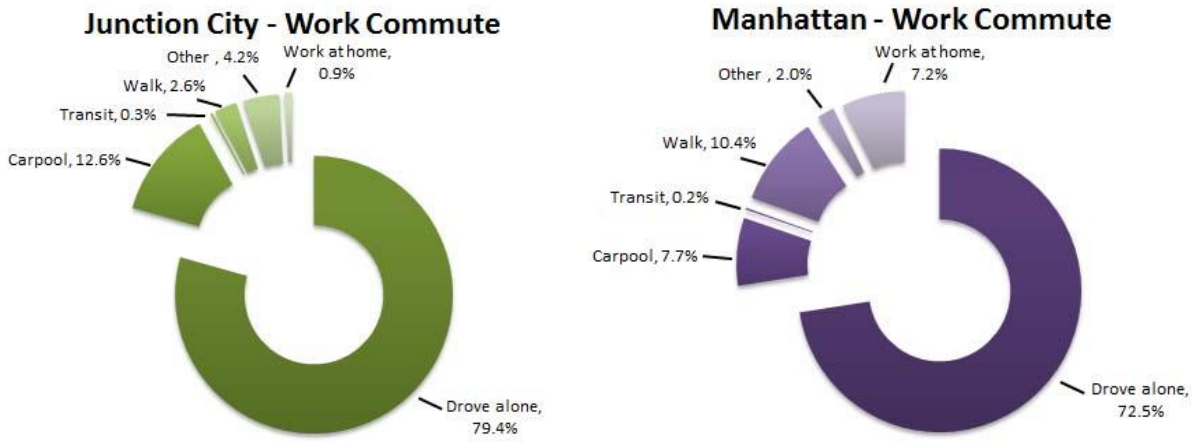
Taking inventory of our multimodal transportation assets is an important part of the planning process. In doing so, we also want to understand the broader context related to the needs and issues of our transportation system This chapter presents existing conditions and synthesizes the needs and issues of our existing transportation assets so that we can address deficiencies now and in the future through the fiscally constrained Plan.

Together, roadways, transit, bicycle and pedestrian facilities, aviation, and freight, facilitate the movement of people and goods, supporting the local economy and moving residents to where they live, work, and play. Safety and security of the transportation system as well as the influence of major institutions unique to the FHMPO region – K-State and Fort Riley – are also examined. Both existing and emerging issues are identified so that these deficiencies can be addressed strategically – now and into the future – through the implementation of projects, programs, and policies that align with the goals of this Plan. Appendix B provides more discussion and detail, including mapping, about existing conditions.

4.1. Roadways

While the MPA is becoming more multimodal in character, roadways remain the backbone of the transportation system, carrying tens of thousands of people each day. As shown in Figure 4-1, the majority of work trips in the area are made by personal automobile.

Figure 4-1 Journey to Work in the Planning Area



Source: U.S. Census, American Community Survey, 2009-2013.

4.1.1. Daily Traffic Volumes

Responsibility for the roadways in the planning area is split among a number of agencies, including KDOT, the Counties of Geary, Riley, and Pottawatomie, and the Cities of Manhattan, Junction City, Grandview Plaza, and Ogden. The functional classification of roadways is periodically updated to reflect changes in land use or travel patterns so that roads will adequately perform two primary functions: provide access to adjacent properties and provide mobility from one part of the region to another. The classifications of roadways within the planning area are shown in Table 4-1.

Table 4-1 Miles of Classified Roadways, 2014

Facility Type	Percentage	Total Mileage
Interstate	3.2%	23.8
Other Freeway/Expressway	3.3%	24.4
Other Principal Arterial	8.1%	60.2
Minor Arterial	5.7%	42.4
Major Collector	12.6%	93.5
Minor Collector	6.5%	48.1
Local	60.6%	450.0
Total	100.00%	742.3

Like many small metropolitan areas, the majority (60 percent) of roadways within the MPA are classified as local, as shown in Table 4-1 above. Local roads primarily provide access to residential and commercial properties and are typically low-volume. The primary function of higher roadway classifications is to provide mobility. Therefore, the higher mobility offered by Interstates and arterials explains why these facilities tend to carry higher traffic volumes for longer distances. As shown in Figure 4-2 and Figure 4-3, average daily traffic (ADT) volumes are heaviest on major roadways. These roadways also tend to serve as regional connectors, such that they provide mobility between communities within the region. Several observations about ADT volumes in the planning area are:

- In Manhattan, portions of the following roadways experience an ADT above 20,000: Anderson Avenue, Fort Riley Boulevard, Tuttle Creek Boulevard, E. US 24, K-113/Seth Child Road, Kimball Avenue, and E Poyntz Avenue. While portions of Bluemont Avenue reach over 30,000 ADT, the average ADT of most roadways is 10,000 or less.)
- In Junction City, Trooper Drive is the only roadway to reach ADT above 20,000. As with Manhattan, the average ADT of most roadways is 10,000 or less.

Figure 4-2 Manhattan Average Daily Traffic Volume, 2012

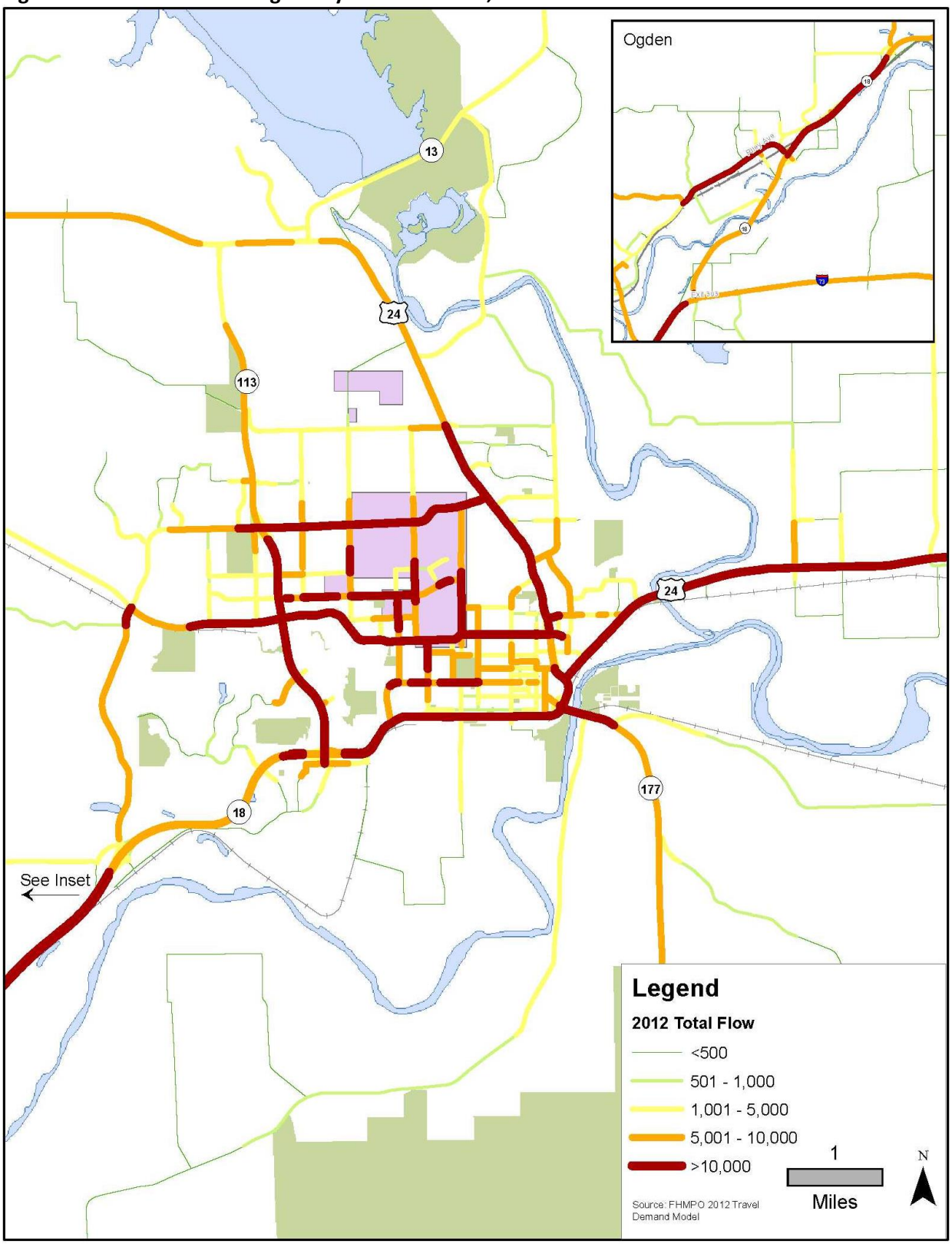
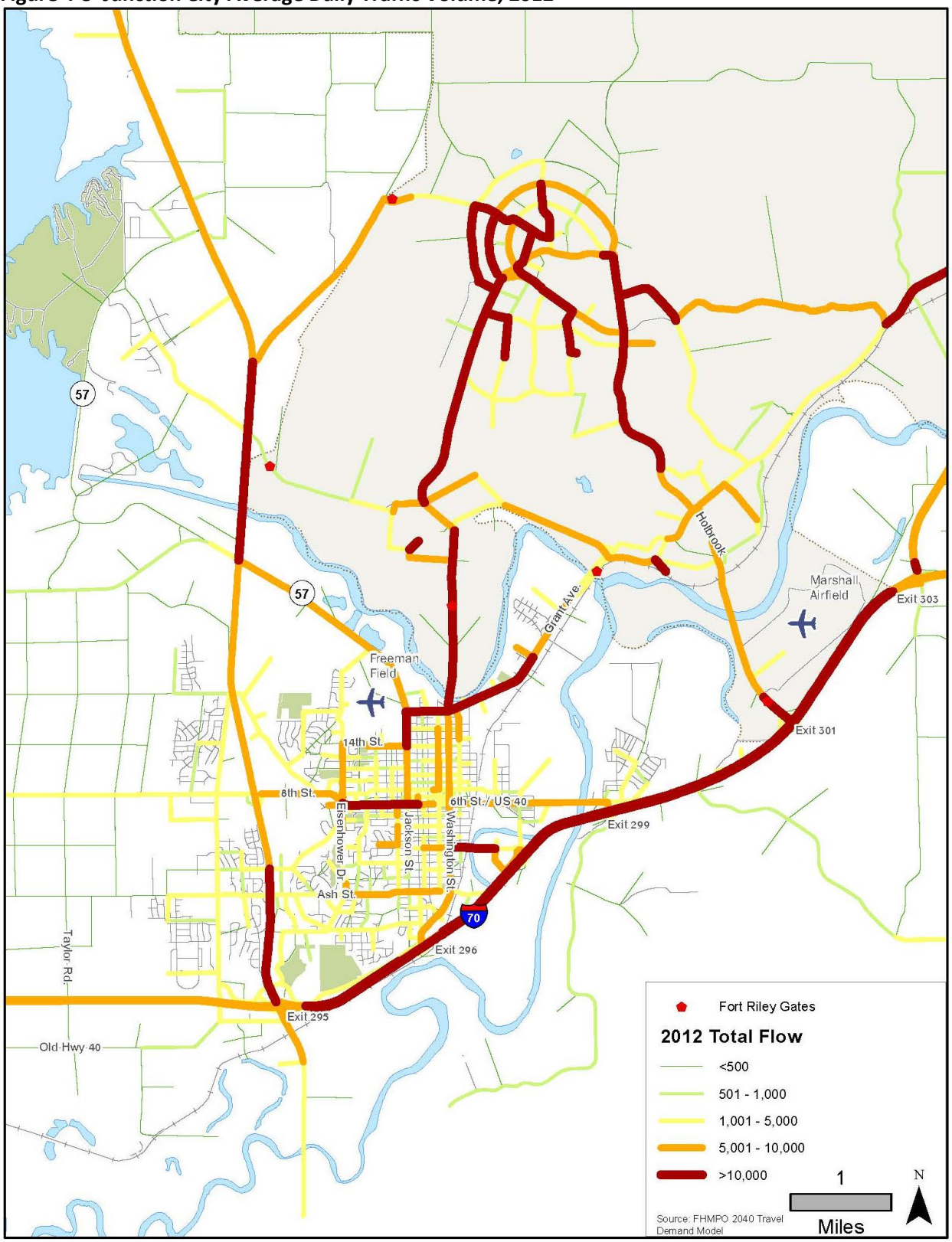


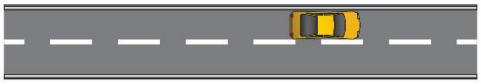
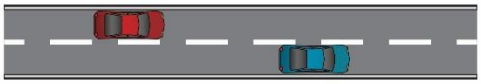
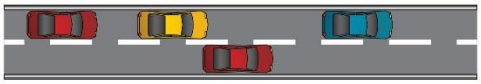
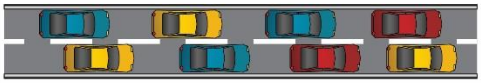
Figure 4-3 Junction City Average Daily Traffic Volume, 2012



4.1.2. Roadway Capacity Analysis

An analysis of existing conditions was conducted using the Flint Hills Travel Demand Model. Travel conditions from 2012 provide a baseline of existing conditions from which to evaluate future conditions. Level of service, referred to as LOS, is a planning-level measure of congestion to distinguish performance or service level. LOS describes the quality of travel, assigning a continuum of letter grades A through F associated with various travel conditions. A rating of 'A' represents the least congested roadways, which provides drivers with free flow vehicle maneuverability and no traffic related delays. In contrast, LOS 'F' reflects severe congestion, restricted vehicle maneuverability, slower speeds, and longer delays. Figure 4-4 illustrates what a driver would experience at LOS A through F.

Figure 4-4 Level of Service Illustration

Level of Service	Description	Result
A	Free Flow	
B	Reasonably Free Flow	
C	Stable Flow	
D	Approaching Unstable Flow	
E	Unstable Flow	
F	Forced Flow	

Determining a roadway's vehicle-carrying capacity includes two key components: traffic volume and roadway capacity (determined by design, number of lanes, etc.). Volume refers to the number of vehicles using a specific link in the transportation network, and capacity is the maximum number of vehicles that can be accommodated on that link based on its roadway characteristics. The calculation is called a volume-to-capacity ratio (v/c ratio). As the v/c ratio increases, travel speed decreases and delays occur. States and regions differ in terms of what LOS rating is deemed acceptable. The Flint Hills region typically designs to a LOS C. The v/c ranges that were developed for the FHMPO and their associated descriptions are provided in Table 4-2 (on the following page).

Table 4-2 Volume-to-Capacity Thresholds

Level of Service	Volume-to-Capacity Threshold	Description
A/B	0.000-0.499	FREE / STABLE FLOW Speeds restricted by travel conditions, minor delays.
C	0.500-0.749	STABLE FLOW Speeds and maneuverability closely controlled due to traffic volumes.
D	0 .750-0.899	STABLE FLOW Speeds considerably affected by change in operating conditions. High-density traffic restricts maneuverability, volume near capacity.
E	0.900- 0.999	UNSTABLE FLOW Low speeds, considerable delay, volume slightly over capacity.
F	1.000 and above	FORCED FLOW Very low speeds, volumes exceed capacity, long delays with stop-and-go traffic.

Source: Highway Capacity Manual (HCM 2010), and Olsson Associates.

Figure 4-5 and Figure 4-6 illustrate the current (2012) level of service for Manhattan and Junction City respectively. Overall, the roadway network in the MPA provides a high quality of service, operating at a LOS A, B, or C. It should be noted that while a capacity analysis can help identify deficiencies and inform different types of improvements to pursue (e.g., capacity expansion, operational), the presence of a capacity deficiency does not automatically mean that a roadway is not operating as desired. For example, some facilities such as Denison Avenue, N Manhattan Avenue, Anderson Avenue (near the K-State campus), and S 3rd Street have a low LOS. The desired performance for portions of these facilities is intentional as they are located in urban areas with heavy multimodal usage. As such, the LOS is low to improve safety for all users.

The capacity analysis suggests traffic congestion is currently not a widespread issue; however, select areas of Manhattan and Junction City do reflect concentrated roadway deficiencies. As previously noted, LOS is a measure of the quality of travel to reflect traveler satisfaction with a facility or service provided. Therefore, terms such as “congested” and “capacity” are by definition relative. The user experience typically equates to the “inconvenience” of having to wait multiple signal sequences for vehicles to travel through a particular segment of roadway.

In Manhattan, roadway deficiencies are concentrated on facilities around the perimeter of K-State. These areas are more urban in character as they surround and connect with the University, and as such, have high levels of use among different modes (bicycle, pedestrian, transit). The capacity analysis also indicates deficiencies on Bluemont Avenue and 3rd Street and on portions of US 24/Tuttle Creek Boulevard and K-18/Fort Riley Boulevard. These findings reflect known issues within Manhattan.

There is limited congestion in Junction City, with most roadways operating at LOS A, B, or C. Near central Junction City, there are some limited deficiencies on Chestnut Street. The most severe capacity issues are found on roadways entering and within Fort Riley. Fort Riley gates act as capacity choke points.

Capacity issues at the following gates are most severe: Henry Drive (Main Gate); Trooper Drive (Southwest Gate); and Ogden Gate (East Side). Many of the roadways directly servicing and connecting these gates are similarly at capacity and experience higher levels of congestion.

The number of lanes is a major input to the capacity analysis. Most roadways within the MPA are 2-lane as shown in Table 4-3. All lanes, whether urban or rural, have a carrying capacity, which is the primary roadway variable for determining available roadway capacity. In fact, some roadways are constructed to have more lane capacity than required to accommodate future traffic levels. Generally speaking, the fewer the number of lanes, the less capacity, and vice versa. For example, a traffic incident that blocks a single lane has a greater impact on a roadway with two travel lanes than a highway with three travel lanes.

Table 4-3 Lane Statistics, 2012

Number of Lanes	Miles	Percentage
1	30.57	8.56%
2	556.72	75.49%
3	4.83	0.43%
4	50.30	15.34%
5	0.32	0.14%
6	0.07	0.04%

Figure 4-5 Manhattan Existing Level of Service, 2012

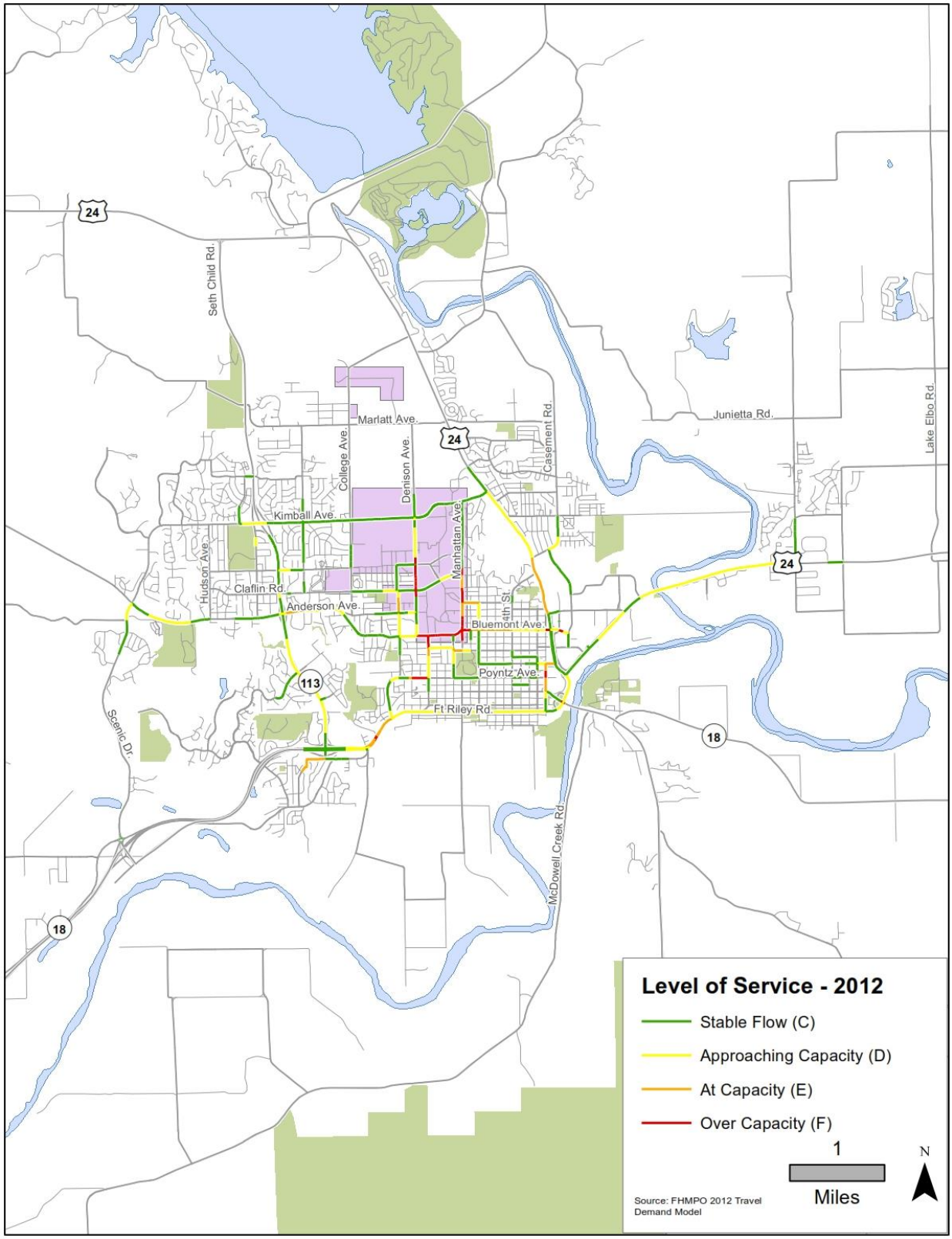
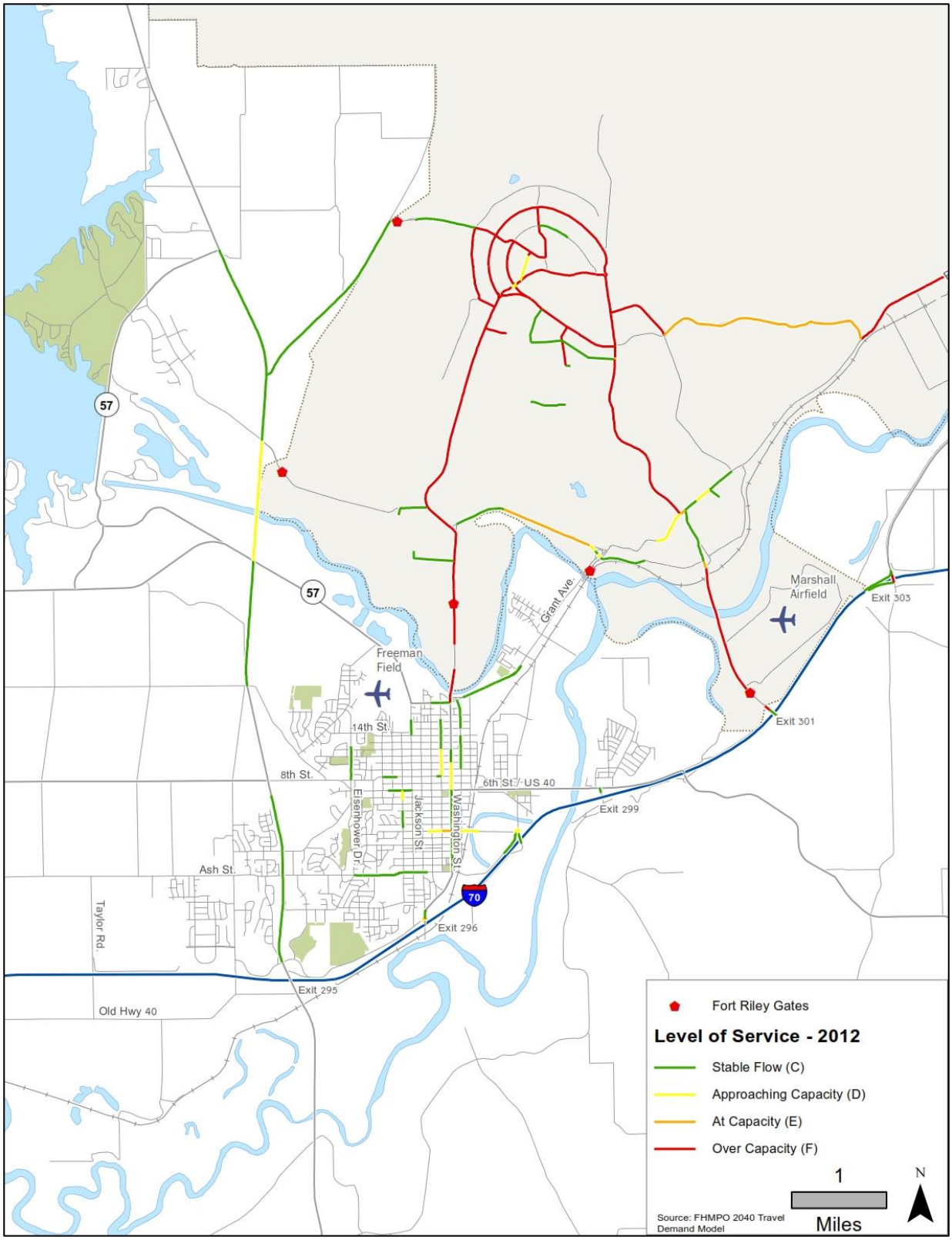


Figure 4-6 Junction City Existing Level of Service, 2012



4.1.3. Bridge Condition

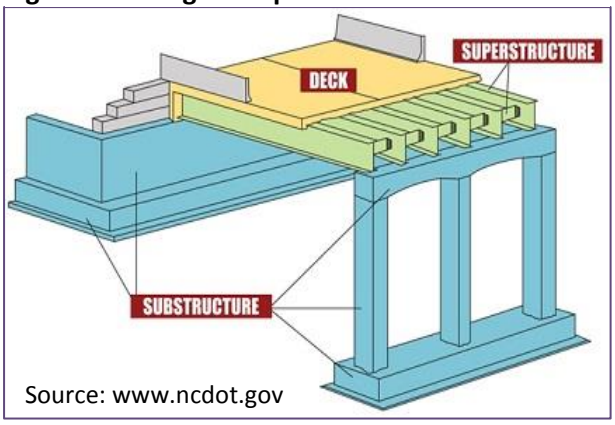
Most bridges are designed to last 50 years before major rehabilitation or replacement is needed. As in other states, KDOT, the three Counties, and the Cities of Manhattan and Junction City conduct biennial inspections of their bridge inventory in accordance with state and federal requirements. From the information collected through the bridge inspection process, assessments are performed to determine whether a bridge is adequate to service current structural and functional demands. As described in FHWA's *2013 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance*, structural assessments together with ratings of the physical condition of key bridge components determine whether a bridge should be classified as "structurally deficient." The primary consideration when evaluating and classifying structural deficiencies is the condition ratings of bridge components; specifically deck, superstructure, and substructure (as depicted in Figure 4-7). Structurally deficient bridges are not inherently unsafe. Properly scheduled inspections help to identify unsafe conditions and if a bridge is determined to be unsafe, it is closed. Deficient bridges often remain open to traffic and have posted weight restrictions. These bridges are scheduled for rehabilitation or replacement to address deficiencies.

A **structurally deficient** bridge is restricted to light vehicles or closed because of structural deterioration. Although not necessarily unsafe, these bridges must have speed and weight limits.

A **functionally obsolete** bridge has older design features and, although it is not unsafe for all vehicles, it cannot safely accommodate current traffic volumes or vehicles of certain sizes and weights.

In contrast to structural deficiencies, which are generally the result of deteriorating conditions of the bridge components, functional obsolescence typically results from changing traffic demands. Functional obsolescence is assessed by comparing the existing geometric configurations and design load-carrying capacities to current standards and demands and the disparities between the actual and the preferred configurations are used to determine whether a bridge should be classified as "functionally obsolete." Therefore, bridges classified as functionally obsolete do not necessarily have structural deficiencies.

Figure 4-7 Bridge Components



Source: www.ncdot.gov

There are over 25,000 bridges in the State of Kansas. The majority (about 18,500) of these bridges are owned by counties, followed by KDOT (over 5,000), and cities (over 1,000).[5] In total, there are 4,465 deficient bridges in the State (2,554 structurally deficient and 1,911 functionally obsolete).[6] KDOT has not issued any bridge weight restrictions on its bridges within the MPA. Figure 4-8 and Figure 4-9 depict structurally deficient and functionally obsolete bridges in 2013.

[5] FHWA, National Bridge Inventory, as of December 2013.
[6] Ibid.

Figure 4-8 Manhattan Structurally Deficient and Functionally Obsolete Bridges, 2013

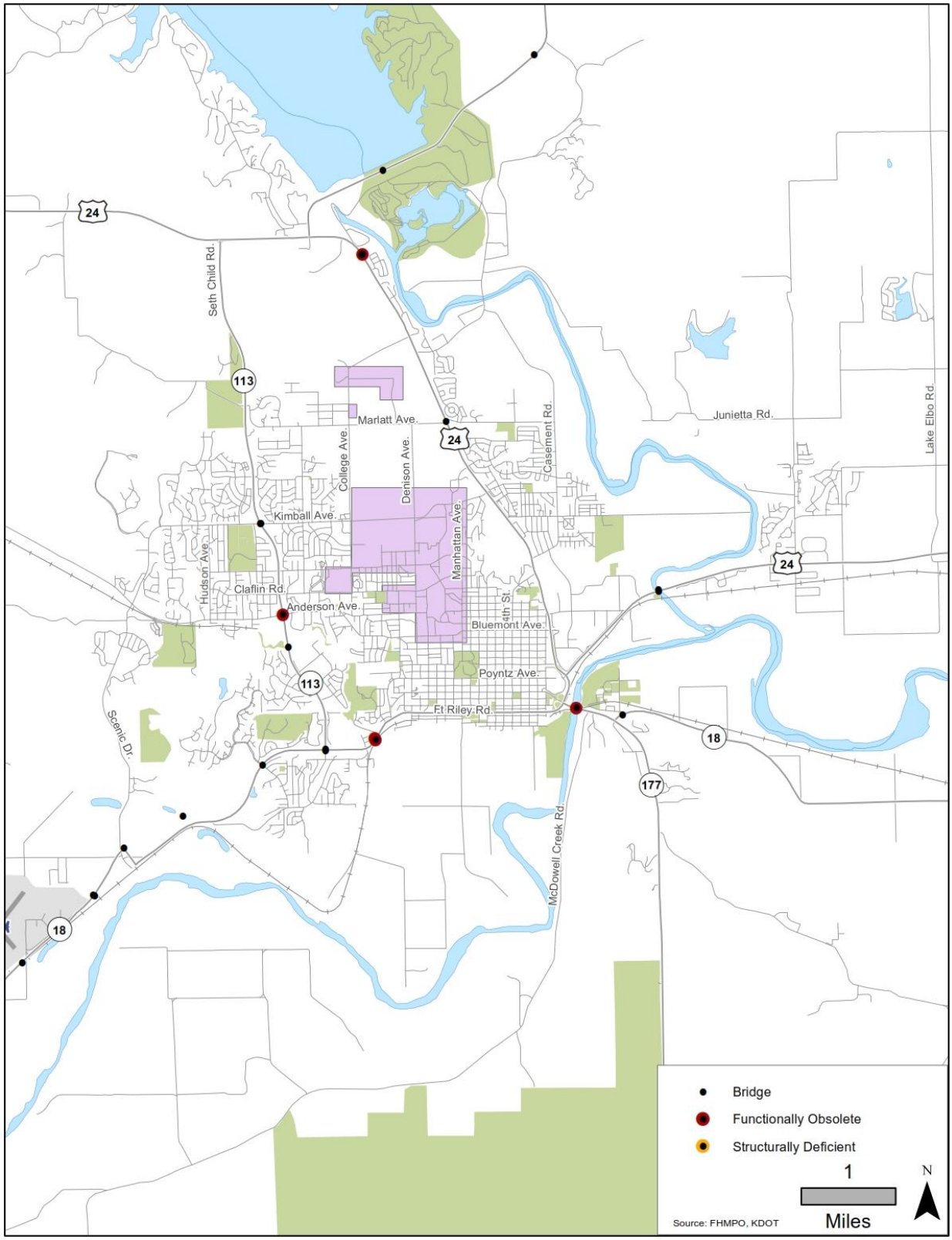
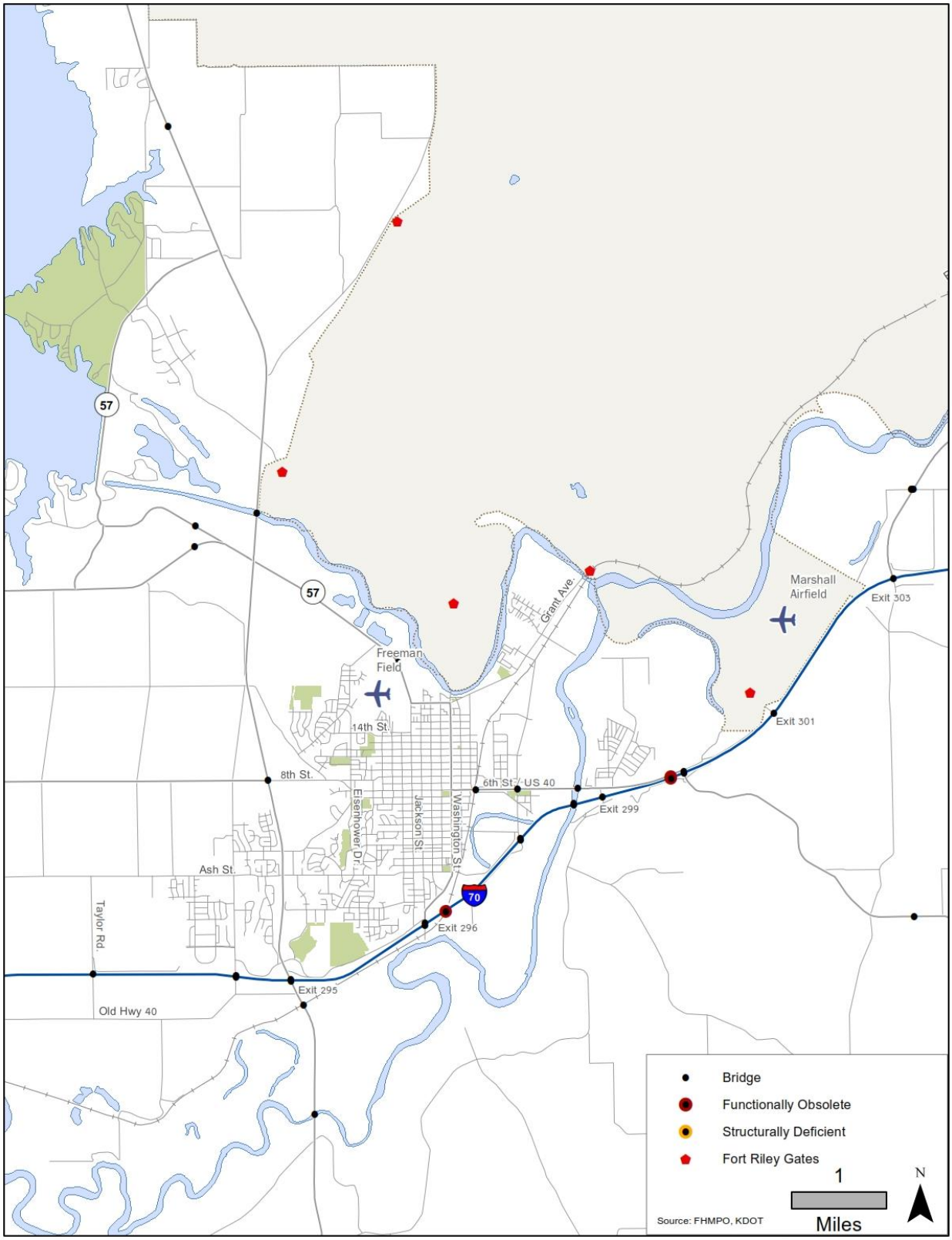


Figure 4-9 Junction City Structurally Deficient and Functionally Obsolete Bridges, 2013



4.1.4. Pavement Condition

Area travelers rely on safe, smooth, and well-maintained roads to serve their mobility needs. These same roads play a critical role in the local and regional economy. Pavement condition can impact the costs of passenger and freight transportation as poor road surfaces cause additional wear and tear to vehicles (e.g. vehicle suspensions tires). Poor pavement can also contribute to delays due to vehicles slowing down to avoid potholes or rough pavement. Poor pavement can also cause unsafe driving conditions; for example when surface conditions affect a vehicles' stopping and maneuverability.

Many agencies track pavement performance as a way to monitor and regularly maintain the health of pavements; however, agencies differ in how they measure pavement performance. Throughout the State, KDOT is responsible for maintaining approximately 11,000 miles of highway pavement. Annually, KDOT collects pavement condition data on the portion of the state highways that it maintains. KDOT rates pavement condition according to a performance level, or PL. There are three performance levels used by KDOT that generally correspond with common condition ratings of good, fair, poor. The PLs as described in the Pavement Management Information System (PMIS) glossary are:[7]

- **PL 1 (Good) –** Denotes segments that are smooth and exhibit few if any surface defects. Pavement segments in this category do not require corrective action; however it may be appropriate to perform preventative maintenance actions to prolong this good condition. Formerly denoted "Good" or "Acceptable" condition.
- **PL 2 (Fair) –** Denotes segments that appear to require at least routine maintenance to address roughness or to correct moderate surface defects. Formerly denoted "Deteriorating" or "Tolerable" condition.
- **PL 3 (Poor) –** Denotes segments that appeared to require a rehabilitative action beyond routine maintenance at the time of the survey. Formerly denoted "Deteriorated" or "Unacceptable" condition.

KDOT uses pavement data to select candidate project locations for maintenance. This data is also an input to KDOT's 'priority formula', which is used to select projects. KDOT tracks PL for state system pavements only. As shown in Figure 4-10 and Figure 4-11, much of the pavement on the state system within the MPA is in good condition.

The City of Manhattan annually reviews all arterial and collector street segments to determine the Pavement Condition Index (PCI). The PCI is used to indicate the general condition of a pavement with a numerical index between 0 and 100. An overall average PCI rating of 70 or above is considered acceptable. The PCI rating of many of Manhattan's roadways in the urban core are between 51 and 75, with other areas in the northwest and northeastern portions of the City experiencing lower PCI values (see Appendix B for a map of Manhattan's PCI rating). Pavement condition data is not available for Junction City.

[7] http://ksdot1.ksdot.org/bureaus/matResLab/pmis/glossary.asp

Figure 4-10 Manhattan Pavement Condition 2014

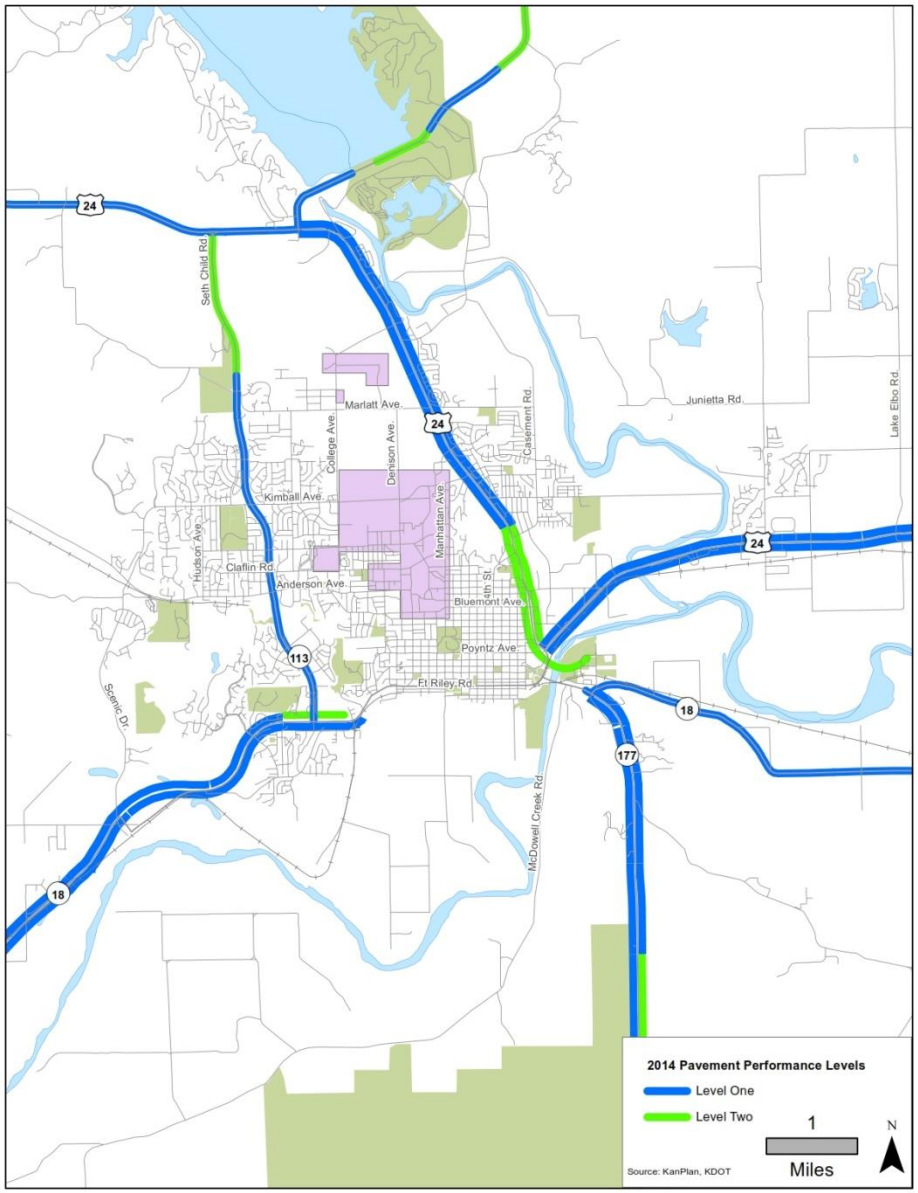
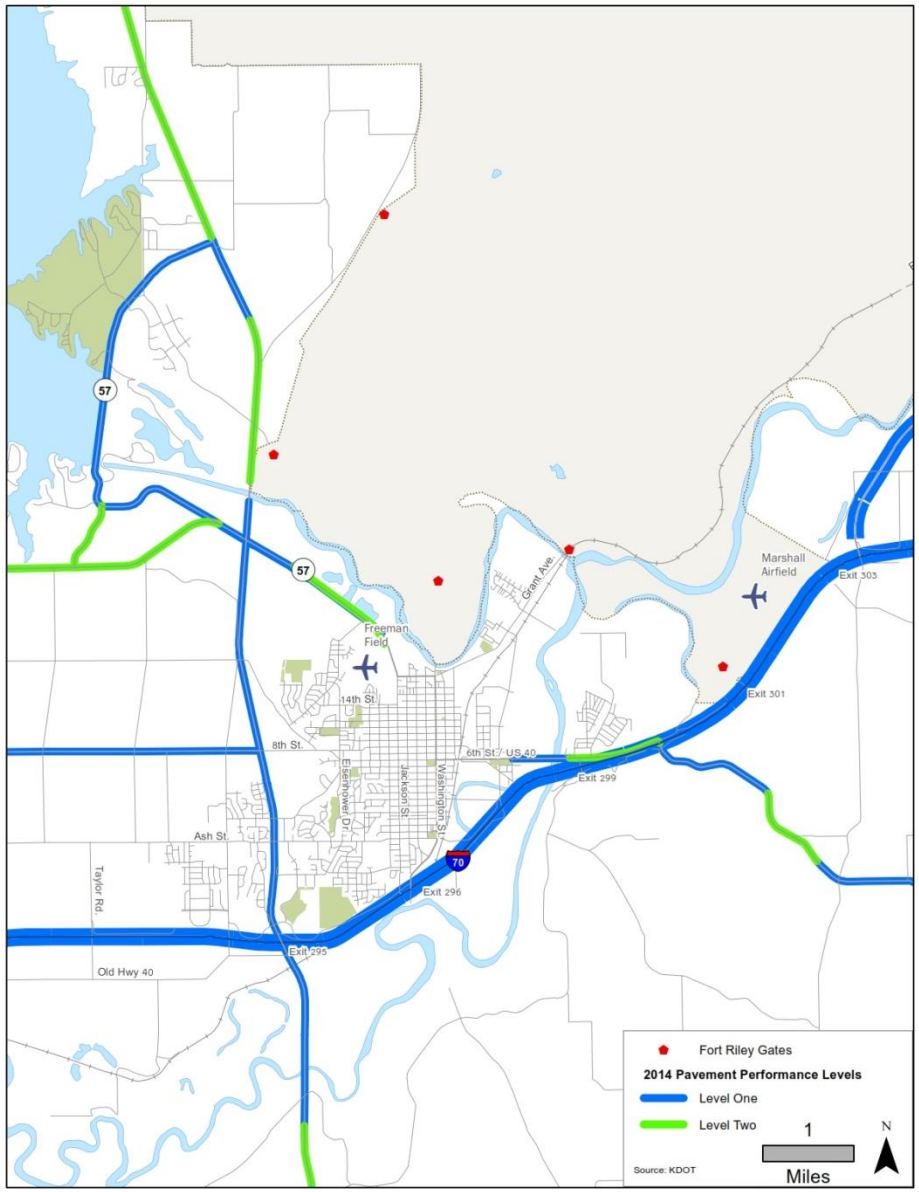


Figure 4-11 Junction City Pavement Condition 2014



4.1.5. Roadways: Existing and Emerging Issues

Based on the existing conditions analysis, following is a synthesis of the needs and issues of our existing transportation assets.

- Development of the National Bio and Agro-Defense Facility (NBAF) and Global Food Systems Initiative is anticipated to spur complementary industry clustering, which will have transportation implications for the entire MPA.
- Growth in Blue Township is expected to continue at rates higher than the rest of the region. East US-24 is already at capacity and LOS will only continue to decline.
- The Big Blue River creates a natural barrier to east/west travel between Riley and Pottawatomie Counties. As such, east/west trips are funneled through US-24 since alternatives are limited.
- US-24/Tuttle Creek Boulevard is also experiencing high demand, with high traffic volumes and congestion. While the corridor has decent access management, planned growth (residential and commercial) will impact traffic flow on US-24 and its connecting roadways.
- Planned growth in the MPA, especially in Manhattan and Blue Township, may necessitate strategic right-of-way (ROW) preservation to accommodate long-term transportation demands.
- Manhattan is looking to focus on opportunities to increase density in targeted areas; as a result, the roadway network will need to be able to accommodate these densities as well as the associated bicycle and pedestrian traffic.
- Junction City has good access to Fort Riley and to I-70, but multimodal options are in short supply.
- Junction City is interested in developing land near the I-70/I-77 interchange to concentrate industrial opportunities. As a result, it may be necessary to build additional roadway infrastructure to support these areas.
- Traffic operation systems within the MPA should maintain interoperability, as described in the Flint Hills Regional ITS Architecture.

4.2. Transit

The Flint Hills Area Transportation Agency (FHATA), commonly referred to by the public as aTa Bus, is the primary transit service provider in the MPA. The service area includes all of the City of Manhattan and Riley County, as well as the US-24 corridor in Pottawatomie County (to include Blue Township St. George, and Wamego), Fort Riley and Geary County, including Junction City, Grandview Plaza, and Milford. The regional transit system consists of different services and programs that function to meet variety of travelers' needs.

FHATA has experienced significant ridership growth in recent years. In 2007, service was limited to demand response service within the Manhattan-Riley County area and annual ridership was about 21,500 trips. Since then, total regional ridership significantly increased to nearly 300,000 in FY 2014. Though the demand response service area has expanded to include western Pottawatomie County, Junction City-Geary County and Fort Riley, the success of FHATA is largely due to its partnership with K-State. With most trips destined for K-State, ridership growth can be attributed to the Jardine Shuttle – a fixed route in Manhattan that serves the K-State campus and residential halls and is tied to the K-State

school year calendar. There were 156,976 trips made on the Jardine Shuttle in FY 2014, representing a 48.7 percent increase in the total annual ridership from FY 2013.

Types of Transit Service

Fixed Route Bus – Buses operate on a set schedule and route.

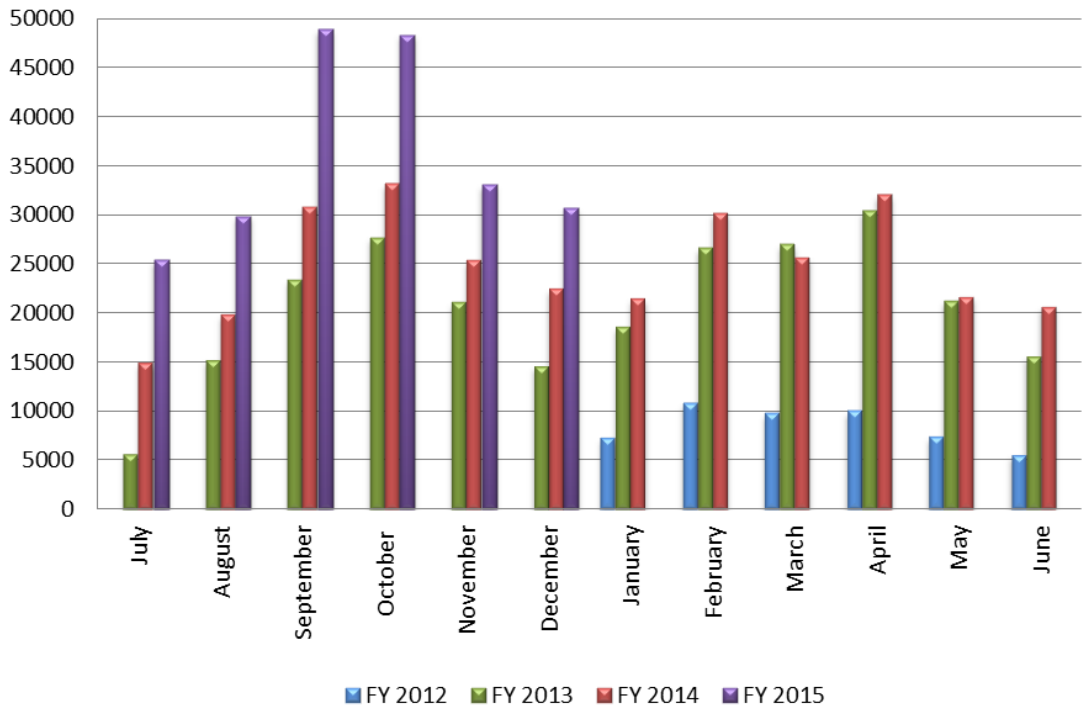
Paratransit – Often referred to as demand-response, this service is a door-to-door service. Buses are dispatched as needed to pick up passengers and transport them to their destinations. This is often utilized by elderly customers or persons with disabilities.

4.2.1. Fixed Route Service

In April 2012, FHATA introduced four fixed routes in the City of Manhattan known as city-wide routes. Currently there is no fixed route service in Junction City, though service is anticipated to be made available in early 2016. All current FHATA fixed routes, including the Jardine and Safe Ride Shuttles, are shown in Figure 4-13. Service frequency on the city-wide routes is hourly; however, given the overlap on much of the Orange and Blue routes and the Green and Red routes, headways are effectively every ½ hour for some locations.

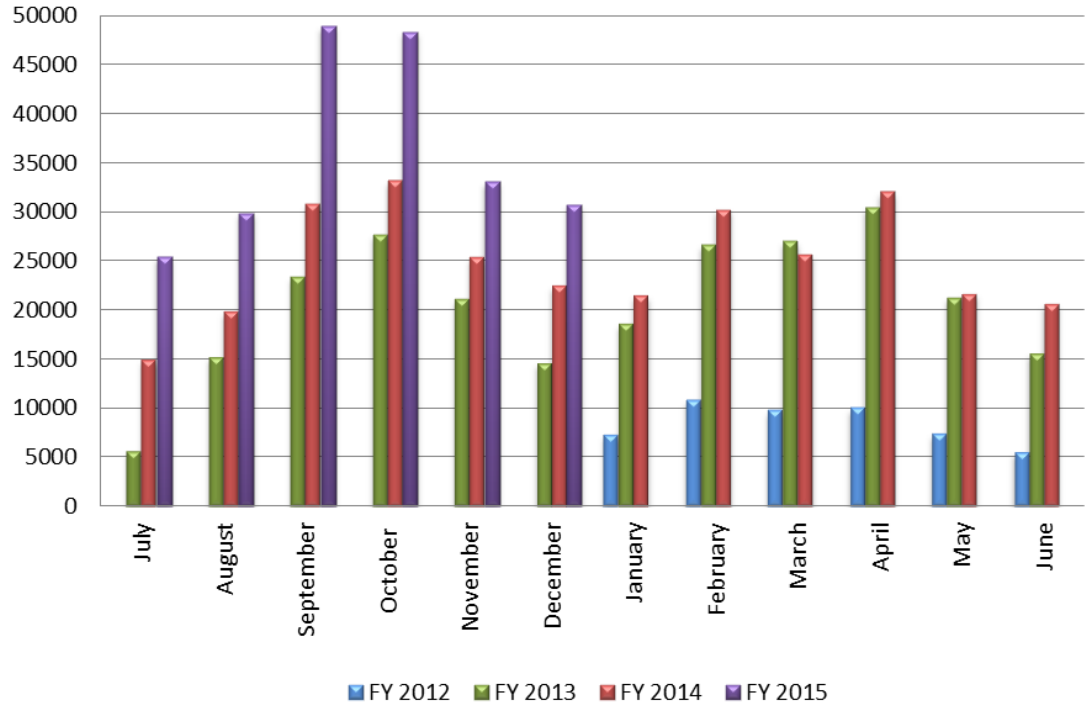
Total FHATA ridership across all FHATA services for fiscal years (FY) 2012 through 2015 is shown in

Figure 4-12 Total FHATA Ridership, State FY 2012 – 2015



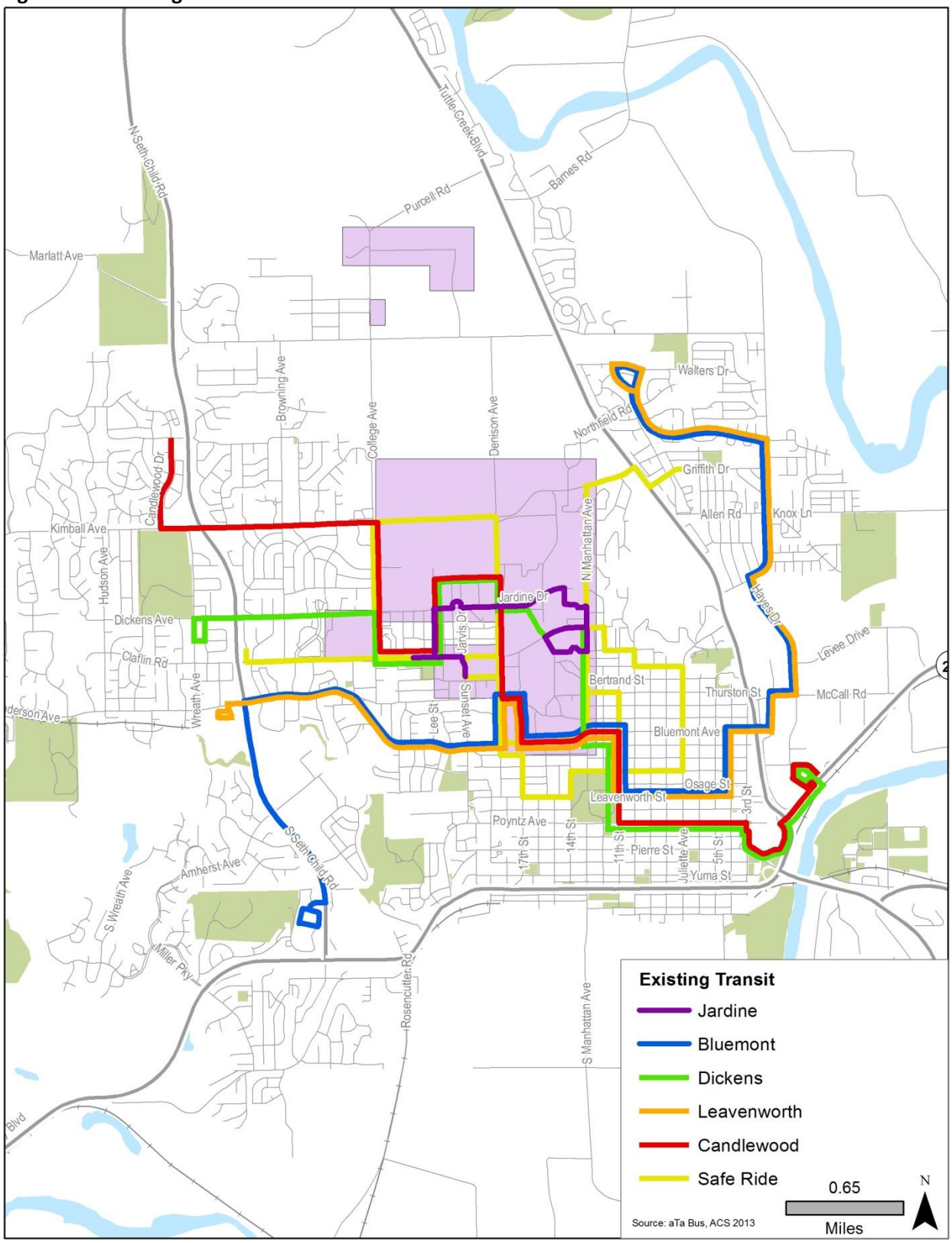
. Total FHATA bus fixed route ridership has increased each month between FY 2012 and FY 2015 (with the exception of March FY 2013 to FY 2014). It should be noted that FHATA FY begins July 1 and ends June 30. For its first full year of fixed route service, total FHATA ridership reached nearly 250,000 in FY 2013. By FY 2014, ridership grew over 20 percent to nearly 300,000. It should be noted that the Jardine Shuttle accounts for the largest share of ridership, over 105,000 (about 40 percent) in FY 2013 and over 150,000 (about 50 percent) in FY 2014.

Figure 4-12 Total FHATA Ridership, State FY 2012 – 2015



*Source: Flint Hills Area Transportation Agency, Inc. *Note: includes partial data for FY 2012 and FY 2015.*

Figure 4-13 Existing Fixed Route FHATA Service



4.2.2. Demand Response Service

FHATA also provides demand response service for Manhattan residents who live ¾-mile beyond the fixed route service area. Reservations can be made for rides between the hours of 7:00 am and 5:00 pm Monday through Friday. While total demand response ridership within Manhattan and Riley County remains greater than that of regional demand response ridership within Manhattan and Riley County decreased by approximately 4,000 rides (13 percent) and regional demand response ridership increased by approximately 3,000 rides (15 percent) in FY 2014.

Regional demand response service began in 2011 through a pilot program between FHATA and KDOT. The service area includes western portions of Pottawatomie County, Geary County, Junction City, and Fort Riley. As part of the regional demand response service, FHATA also operates an Inter-City Shuttle that runs between Manhattan and Fort Riley-Junction City, Monday through Friday from 6:00 am to 6:00 pm. Service in Fort Riley is at fixed drop off and pick up locations, specifically at the Post Exchange (PX), the Irwin Army Community Hospital, and in Ogden. The Fort Riley PX is a major activity center and is the top regional demand response stop. It should also be noted however that due to access control restrictions, Fort Riley is no longer an open Installation as of April 2015. The Inter-City Shuttle route has been realigned around the Installation and no longer provides on-base service. The FHMPO will continue to work with FHATA and Fort Riley to explore transit options to continue service for Fort Riley travelers.

4.2.3. Other Transit Operators

FHATA is the primary transit service provider in the MPA. However, other transit service operators, or community service providers, also offer transportation services. These community service providers typically offer transportation to select groups (e.g., elderly and disabled) and usually receive federal and/or state operating assistance. Some of the community service providers within the MPA include:

- Via Christi Village;
- Geary County Senior Center;
- Pawnee Mental Health Operating Assistance; and
- Big Lakes Developmental Center, Inc.

In addition, the Flint Hills Regional Transit Administration (FHRTA) was established in 2014 through an interlocal agreement between Geary County, Pottawatomie County, Riley County, Junction City, Manhattan, and Kansas State University. The FHRTA is governed by a six-member Regional Transit Board and serves as the direct recipient of Federal Transit Administration (FTA) Urbanized Area Formula Program funds, commonly referred to as 5307 funds. These funds may be used for transit services within or beginning or ending in the Manhattan Urbanized Area. The FHRTA is required to competitively procure a transit service provider for all 5307 funded services.

4.2.4. Transit: Existing and Emerging Issues

Based on the existing conditions analysis, following is a synthesis of the needs and issues of our existing transportation assets.

- Transit service is very limited on Fort Riley. While generally supportive of transit, the viability of service on the installation will need to be examined.

- Implementation of fixed route service in for Junction City is anticipated for early 2016.
- There is no local dedicated funding source for transit. Excluding federal and state funding, the only major funding partnership is with K-State, making transit service within Manhattan highly dependent on one source.
- Additional or expanded transit service is needed. This will be further examined during the Multimodal Integration Plan that is anticipated to start early 2016.
- Given that the fixed route system in Manhattan is relatively new service, there are few passenger amenities in place such as street furniture, bus shelters, and signage.
- Routes and stops are still being tested and developed, which means that crosswalks and sidewalks may not be in place to adequately provide safe and accessible locations for transit riders.
- Access control restrictions at Fort Riley changed as of April 2015; as a result, only those with a Fort Riley Access Pass or Badge are permitted entrance.

4.2.5. Intercity Bus Service

The MPA is served by Greyhound, the nation's largest intercity bus system. Service runs along I-70 through Junction City, with a bus stop located at 122 East Flint Hills Boulevard. There is no terminal or agency with ticketing, baggage, or package express service. The Greyhound stops in Junction City daily with two westbound and eastbound buses. KDOT completed a 2012 Statewide Intercity Bus Study that identified several cities worth considering for new or restored intercity bus service or connections, including Manhattan. The Study suggested connecting Manhattan to Kansas' existing intercity bus network by extending the Beeline Express Blue Line's Wichita-Salina route to include additional stops in Manhattan, Junction City, and Abilene.

4.2.6. Passenger Rail

There is no passenger rail service available to travelers within the MPA; however, there are statewide efforts to improve passenger rail service.

4.3. Bicycle and Pedestrian

Many of the components that support walking and bicycling are in place in Manhattan and Junction City; however, there is room for improvement to create a comprehensive network for walking and bicycling, which does not currently exist. Some key features in Manhattan and Junction City are that both are geographically small, and older sections have a grid network of streets. This ensures that key destinations such as grocery stores, employment centers, and major retail destinations are within a manageable travel distance for most people and are potential bicycle and pedestrian trips for adults. Moreover, the core of each city adheres to a strong grid network of local streets. Although this pattern breaks down at the edges where development has occurred in recent decades, large portions of each city offer a variety of direct routes that connect to key locations. The street grid also coincides with a network of many continuous sidewalks in each community (however, there is room for improvement). This street pattern is most conducive to allowing the shortest trips possible, an important contributor to walking and bicycling trips.

The bicycle and pedestrian network in Junction City is still evolving and is not as mature as the one in Manhattan. Therefore, data for Junction City is limited, in turn constraining the ability to examine the non-motorized network within the entire MPA.

4.3.1. Bicycling and Pedestrian Infrastructure

Manhattan is designated as a Bronze-level Bicycle Friendly Community and Kansas State University as a Bronze-level Bicycle Friendly University by the League of American Bicyclists. Manhattan has already installed some on-street infrastructure for bicyclists; including the bike lanes are present on 11th Street, Manhattan Avenue, and Mid Campus Drive. There are also bike lanes on the periphery of the city limits along Amherst Avenue, Miller Parkway, and Grand Mere Parkway. In addition to bike lanes, Manhattan has begun to install bike-specific improvements on select local streets, forming what are called "bicycle boulevards." These developments are encouraging to cyclists who may feel less comfortable riding on streets without bicycle accommodations. The result is that bicycling and walking are already viable and relatively comfortable options in areas of Manhattan near K-State, Downtown, and Aggieville. In addition, many of the recently added rural/suburban roads, such as Skyway Drive and Scenic Drive, have paved shoulders which help bicyclists make connections to Fort Riley in a much more comfortable manner since these roads have higher speeds. Another important connection to consider is that of Blue Township to the City of Manhattan. Currently, US-24 is the only facility that offers direct access to Manhattan from Blue Township. As an auto-dominated roadway, it is currently not conducive for bicycling or walking.

At present, there is no viable bicycling route between Junction City and Manhattan that doesn't require entry onto Fort Riley. However, once on-base, major roads almost universally provide wide paved shoulders. In particular, Huebner Road provides a connection, complete with wide paved shoulders, from the Ogden Gate to the Main Post and the Grant Avenue Gate at the edge of Junction City. Unfortunately, Fort Riley's location in relation to Manhattan is not conducive to commute via walking or biking for many who reside off-base in Manhattan. However, travel distances to nearby Junction City present far better opportunities for bicycling, though it remains too far for walking, to Fort Riley. It should also be noted however that due to security restrictions, Fort Riley is no longer an open Installation as of April 2015. As a result of the new access control restrictions, only those with a temporary Fort Riley Access Pass or Badge are permitted entrance.

Although almost all of the public streets can be used by bicyclists and pedestrians without dedicated infrastructure, in many cases the provision of facilities specific to the needs of non-motorized travelers helps to make all road users feel safe and can improve the efficiency of the system. The following types of non-motorized infrastructure are currently present in the MPA:

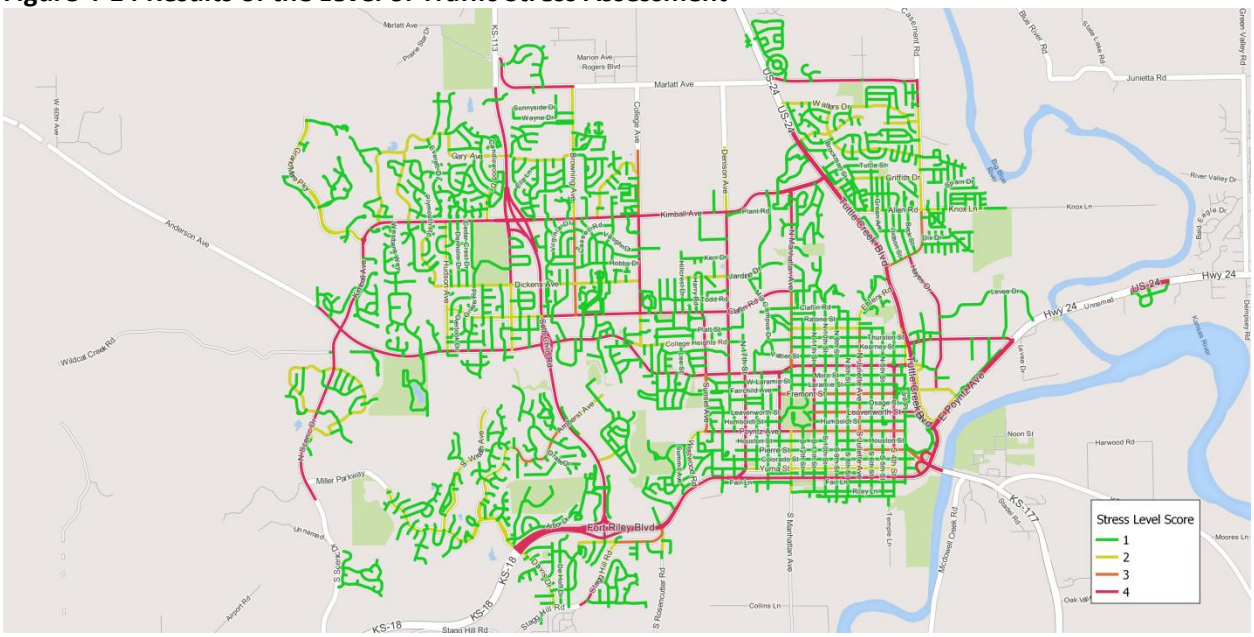
- Shared-use paths;
- Bike lanes;
- Bike boulevards;
- Signed bike routes; and
- Sidewalks.

4.3.2. Bicycle Level of Traffic Stress Assessment

In recent years, the Level of Traffic Stress (LTS) measure has become a way to identify the bicycling comfort level of various streets. The methodology is derived from the Mineta Institute at San Jose State University.[8] LTS incorporates information about existing bike facilities, traffic volumes, speeds, and roadway characteristics to assign a score between 1 (low stress) and 4 (high stress).

The results of the LTS analysis are shown in Figure 4-14, where a score of 1 corresponds to low stress and 4 corresponds to high stress.[9] Many of the streets in Manhattan are comfortable for bicycling. Arterials such as Anderson Avenue, Claflin Road, and Kimball Avenue were rated at level 4, which means they are unwelcoming for cyclists. These roads tend to provide the greatest level of mobility and connectivity across the City, however, their current configuration is uncomfortable for most bicyclists. One exception to this trend is Poyntz Avenue, which has a rating of 3 for part of its length due to its relatively low levels of traffic. Overall, the LTS analysis reveals that the roadways that offer the most mobility and connectivity are the same ones that are most uncomfortable for bicycling. Rather, local roadways, which may not always be the most direct route to a desired destination, tend to provide the most comfortable biking experience.

Figure 4-14 Results of the Level of Traffic Stress Assessment



4.3.3. Considerations for Biking and Walking

Within the MPA there exist some useful building blocks for creating a better environment for bicycling and walking. However, there are also challenges that must be addressed to make bicycling and walking more attractive options. These challenges include:

[8] Mineta Transportation Institute, Report No. CA-MTI-12-1005, "Low-Stress Bicycling and Network Connectivity", May 2012.

[9] See Appendix B for detailed LTS methodology, especially with respect to assumptions applied to 11th Street.

- Disappearance of the street grid;
- Excess roadway capacity;
- Natural barriers; and
- Infrastructure barriers.

Disappearance of the Street Grid – Development in Manhattan and Junction City has been generally suburban in nature, like many communities during the latter half of the 20th Century. The resulting street patterns are less continuous and offer fewer options to connect to important destinations. Furthermore, those connections that exist are typically more car-oriented, higher volume, and are less comfortable for non-motorized users. The grid network allows for a number of different routes of the same distance along local streets to travel from one point to another. The pattern in the newer neighborhood requires a long and circuitous journey to travel to a nearby destination.

Excess Roadway Capacity – Similar to other communities, the capacity for motorized travel during the 20th Century expanded in the MPA. As travel behavior changes, however, sometimes streets that were planned for high volumes of traffic have excess capacity. A number of roadways in the MPA have more capacity for motor vehicles than necessary. In some cases, lanes are wider than they need to be. In other cases, there are more lanes than needed to carry the existing traffic. Often, the additional or excess space afforded to vehicles can be "repurposed" for dedicated facilities to accommodate cyclists and pedestrians. Also wider streets with faster traffic are inherently less comfortable for non-motorized users and feel less safe to cross or travel, so efforts to narrow streets improves crossings for pedestrians.

Natural Barriers – The Flint Hills region includes the confluence of the Republican and Smoky Hill Rivers, which join to form the Kansas River as water flows eastward towards Manhattan as well as the Big Blue River – the largest tributary of the Kansas River – which separates Riley and Pottawatomie County. The rivers associated creeks and other water features are a great asset to communities in the region, but they can also act as a barrier to travel, often requiring an indirect route that adds significant time and distance. In addition, there are many hills that also present a challenge to non-motorized travel. In many cases, there is little that can be done about the steep climbs themselves, but dedicated facilities, which are currently lacking in the region, offer safety benefits and comfort as users climb steep grades.

Infrastructure Barriers – Aside from natural barriers, man-made barriers discourage bicycling and walking between communities within the MPA. In particular, a number of automobile-oriented highways connect communities and neighborhoods to each other, but hinder connections within communities and neighborhoods. Crossing these roadways or traveling along them can be uncomfortable, unsafe, and in some instances may be impossible. For example, US-24/Tuttle Creek Boulevard is an important connection between communities, so much so that some people walk adjacent to the high-speed traffic despite the lack of dedicated walking facilities. A visible path alongside the roadway illustrates that a trail has been created by such travelers.

4.3.4. Bicycle and Pedestrian: Existing and Emerging Issues

Based on the existing conditions analysis, following is a synthesis of the needs and issues of our existing transportation assets.

- The roadway network offers a high degree of mobility and connectivity within Manhattan; however, many of these same roadways are unwelcoming for bicyclists. In many cases the

provision of facilities specific to the needs of non-motorized travelers helps to make all road users feel safe and can improve the efficiency of the system.

- While Junction City has developed a trail network that is primarily used for recreational purposes, opportunity exists to implement walking and biking accommodations that foster mobility for trips that serve a transportation purpose.
- Access control restrictions at Fort Riley changed as of April 2015. As a result, only those with a temporary Fort Riley Access Pass or Badge are permitted entrance.
- There are a host of policy and physical challenges related to making bicycling and walking more attractive options for residents and workers in the MPA.
- The Multimodal Integration Plan will be developed to better integrate the region's multimodal transportation system and identify opportunities for where road, bike, and transit networks intersect.

4.4. Aviation

There are three airports serving the MPA: Manhattan Regional Airport, Freeman Field, and Marshall Airfield. The Manhattan Regional Airport is the only airport in the MPA that offers commercial air service; the other two airports are used for general aviation and military purposes. While the FHMPO is not charged with planning related to airport operations, for the purposes of the Plan, it is important to understand the interactions of these airports with the land-based transportation system. As such, the FHMPO recognizes that airport activity affects the regional transportation network, specifically roadway and transit, and supports opportunities to maintain and enhance landside access to air travel. Enhanced access to the airport was recently provided via new interchanges at Scenic Drive and K-114.

4.4.1. Aviation: Existing and Emerging Issues

Based on the existing conditions analysis, following is a synthesis of the needs and issues of our existing transportation assets.

- Noise exposure and safety hazards require compatible land uses in the communities surrounding the airport. The K-18 realignment opens up Eureka Valley for commercial and industrial uses; however, it is important to preserve lands for compatible uses from residential and commercial encroachment.
- K-18 provides good airport access, but there may be future opportunities to explore improved airport access for communities outside the FHMPO, such as northern communities near Marysville in Marshall County.

4.5. Freight

The freight system that falls within the MPA consists of a small portion of I-70 and one freight rail line, Union Pacific (UP), which is the only Class I railroad that operates within the MPA. Therefore, freight-related transportation infrastructure, programs, and polices are limited. Overall, freight operations integrate well with the other transportation systems and do not present issues with respect to congestion, delay, or safety conflicts that are created when freight is mixed with vehicular, bicycle, and pedestrian traffic.

4.5.1. Truck

Long-distance freight truck traffic is concentrated on the Interstate system. Trucks primarily travel on I-70, which cuts through the southern portion of the MPA, from Maryland west to Utah. Other facilities within the planning area, notably US-24, also carry freight traffic, albeit to a lesser extent than I-70. Pavement conditions along truck routes are in good condition, largely at PL 1 and PL 2 in some areas. There are several bridges along these routes that are classified as functionally obsolete.

4.5.2. Rail

The Kansas rail system plays an important role in the state's economy. Within the MPA, UP's Kansas Pacific carries between 10,000 and 25,000 tons of goods. Rail lines with the heaviest density are concentrated in the eastern and southeastern portions of the State, and do not include the MPA.

4.5.3. Waterways

Flint Hills is located in the Kansas-Lower Republican Basin on the banks of the Kansas River. While the flow from the Kansas-Lower Republican Basin discharges into the Missouri River Basin, only the Missouri River is navigable in Kansas. The Missouri River does not traverse through the MPA; therefore there is no waterborne freight transport in the MPA.

4.5.4. Intermodal

Kansas City is a hub for intermodal freight. There are no intermodal operations within the MPA.

4.5.5. Aviation

Currently, there is no freight cargo being moved through the MPA although the Manhattan Regional Airport can accommodate a consolidated freight facility. There is currently no air cargo demand.

4.5.6. Freight: Existing and Emerging Issues

Based on the existing conditions analysis, the following is a synthesis of the needs and issues of our existing transportation assets.

- There is good freight access within the MPA with freight movements primarily occurring on I-70 and on the UP railroad. The MPA is well-positioned to handle additional freight activity passing through the region.
- While freight movements do not currently present congestion, delay, or safety conflict issues within the MPA, it is important to continue to integrate freight into the planning process so that the benefits and impacts of freight are considered alongside the needs of local communities.

4.6. Safety

Roadway

An analysis of KDOT data showed that 1,934 crashes involving a fatality or injury occurred in the MPA between 2010 and early 2015 (see Table 4-4). Of the total crashes during this time period, 24 (1 percent) were fatal crashes, and 1,910 (99 percent) resulted in a serious injury. There are different levels of injury severity: possible, non-incapacitating and disabling and incapacitating. Only disabling and incapacitating

are considered serious injuries. While Manhattan experienced a higher number of crashes involving serious injuries than Junction City, crash patterns were similar in both municipalities. A majority of crashes occurred in the city-core and along major highways where there are more conflict points and high speeds, respectively.

Table 4-4 – Total Crashes in the MPA by Severity (2010-2015)

Severity	2010	2011	2012	2013	2014	2015**
Fatal	5	4	7	5	3	--
Serious Injury*	441	374	416	360	304	15
Total	446	378	423	365	307	15

*Includes Disabling and Incapacitating injuries only.

**2015 partial year data (January – February).

Given that intersections present multiple conflict points, an intersection analysis was conducted to identify intersections where a high number of crashes have occurred. There were 28 locations that have experienced five or more crashes within 250 feet of the intersection. As shown in Table 4-5, seven of these intersections represent the top one percent of intersection crashes in the MPA—all of which are located in Manhattan. With the exception of the intersection at Leavenworth Street and US-24, all of the high-crash intersections are located along the K-State perimeter and in Aggieville where there are multiple conflict points between roadway users. In Junction City, the only intersection with five or more crashes, including one fatality, is located at I-70 and US-77 (Exit 295). (See Appendix B for maps depicting the safety analysis).

Table 4-5 – Top 1 Percent of Intersection Crashes

Intersection	Number of Crashes
Kimball Avenue & Denison Avenue	10
Kimball Avenue & College Avenue	10
Claflin Road & Denison Avenue	8
Commons Place & K-113/Seth Child	8
Bluemont Avenue & 12th Street	8
Leavenworth Street & US-24*	7
Claflin Road & College Avenue	7

***Includes one fatal crash.**

Source: KDOT.

Bicycle and Pedestrian

KDOT crash data also includes information about pedestrian and bicycle crashes. Crash data is limited to only reported crashes resulting from collisions between bicyclists or pedestrians and motorists. There were a total of 84 reported incidents of pedestrian-motorist crashes during the reporting period. Of these, 64 (76 percent) occurred within the City of Manhattan. Another ten were reported in Junction City. None of the crashes reported in Manhattan or Junction City involved fatalities. Only two fatal pedestrian crashes were recorded within the MPA, both occurring east of Manhattan along US-24.The

majority of pedestrian-motorist crashes, 57 out of 84, resulted in serious injuries. Because pedestrians are unprotected when a crash occurs, their vulnerability makes serious injuries especially likely.

The concentration of the MPA's pedestrian and bicycle crashes within the City of Manhattan can be largely attributed to Manhattan's large share of regional population and the presence of the K-State, which tends toward higher levels of non-motorized transportation. There were no intersections in Junction City with more than a single incident during the reporting period.

At-Grade Rail Crossings

Rail safety issues are generally comprised of roadway/rail grade crossings, which is where the intersecting rail and roadway traffic meet at the same level. There are 5,950 at-grade public crossings in Kansas. It is at these at-grade crossing locations where potential train, vehicle, pedestrian, and bicyclist conflicts typically occur. KDOT has been heavily involved in efforts to improve the safety of the statewide rail system. KDOT maintains an inventory of prioritized crossing projects for inclusion in its work program. Based on data from the Federal Railroad Administration, there was one fatality in 2012 and one in 2013 in Junction City.

4.7. Security

With respect to transportation security, the most likely security threat involves the transport of hazardous materials, and specifically an incident resulting from a roadway accident or train derailment. The State Fire Marshal's Office Hazardous Materials Division[10] is responsible for making trained, equipped hazardous materials (Haz-Mat) teams available throughout the state to respond when these events occur. Haz-Mat teams support local first responders (e.g., police, fire department) in hazardous materials incidents, accidents, weapons of mass destruction (WMDs), and acts of terrorism. Haz-Mat response teams comprise a network and are able to support each other with personnel and/or equipment when needed. A Haz-Mat team is located in Manhattan.

4.7.1. Safety and Security: Existing and Emerging Issues

Based on existing conditions analysis, the following is a synthesis of the needs and issues of our existing transportation assets.

- The FHMPO will have an opportunity to engage in statewide safety planning under a future update to KDOT's SHSP. As part of this process, the identification of specific safety issues within the MPA may emerge (e.g., along US-24 between Seth Child Road/K-113 and K-13).
- The FHMPO will have an opportunity to coordinate with the counties in local area emergency management planning.
- Both a security and general mobility issue, there is little redundancy (e.g., bypass routes) built into the existing roadway network.
- The Regional ITS Architecture will also have implications for emergency management.

[10] Information referenced is from the State Fire Marshal's Office Hazardous Materials Division.

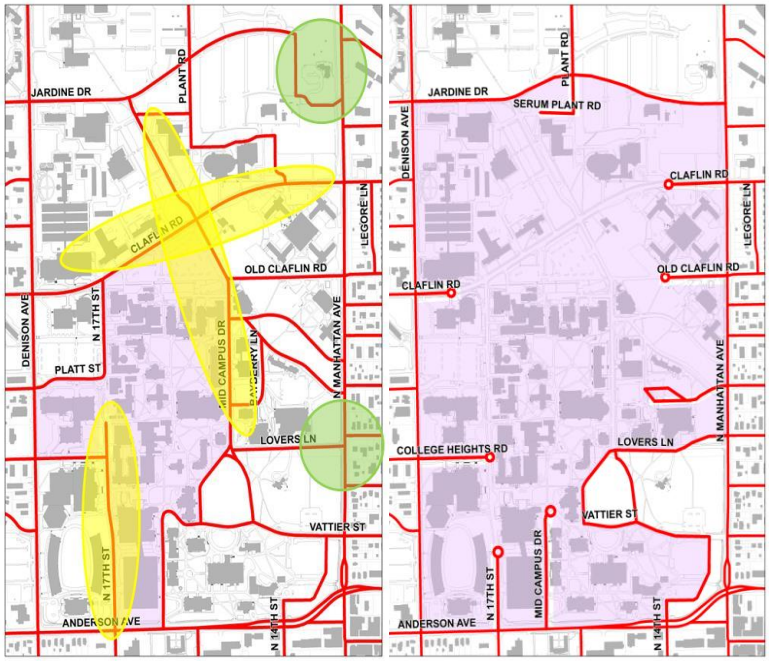
4.8. Influence of Major Institutions

Within the MPA there are two major institutional assets: K-State and Fort Riley. These institutions not only help shape the local and regional economy, but also influence travel patterns and multimodal transportation needs for area residents and workers. As such, any transformation to major employment centers like K-State and Fort Riley will impact the surrounding multimodal transportation network.

K-State

K-State is considered a major traffic generator as it concentrates employment on and near campus. For example, K-State is planning for the expected growth of the bio-science industries as it continues to expand its research activities to reach its goal to be a top 50 public research university by 2025. Such growth will have implications for not only for the campus community, but for the entire MPA. Consideration will need to be given to a host of related issues, such as the development of research and corporate buildings, utility locations, integration of complementary research and its associated workforce, multimodal access, and many others.

Figure 4-15 2025 Master Plan – Transportation Component



K-State was recently designated by the American League of Bicyclists as the first Bicycle Friendly University in Kansas. The Bronze-level designation recognizes the past multimodal improvements made by the University, but also highlights room for improvement. The leading blueprint for how K-State plans to improve the multimodal culture on campus is outlined in the 2025 Master Plan. The 2025 Master Plan covers all aspects of K-State's current needs and future growth of the campus, including transportation. Together the transportation elements of the 2025 Master Plan seek to improve safety, enhance walkability, and promote driving alternatives. The 2025 Master Plan will transform the way people move to, from, and within campus by implementing a transportation strategy that places an emphasis on creating pedestrian zones and the use of public transportation within the campus area. The University plans to limit roadways through campus and create more pedestrian zones as shown in Figure 4-15 by:

- Expanding the core pedestrian zone and force vehicle traffic to move around campus, not through it;
- Transforming 17th Street and Mid-Campus Drive into primary pedestrian routes;
- Closing Claflin Road and pushing through traffic to Jardine Drive; and
- Reconfiguring gateways on the east side of campus (Lovers Lane and Jardine Drive).

In addition, the 2025 Master Plan recommends changes to available parking on campus. The plan pushes parking to the periphery of campus and capitalizes on underutilized facilities by drawing surface parking to the large lots at Snyder Family Stadium and relying on transit service on campus. An additional parking garage is also planned for the east side of the campus. In 2014, FHATA began a Park-N-Ride Shuttle to facilitate north-south on-campus circulation. (It should be noted that there are no formally designated park-and-ride facilities located within the MPA. As such, multimodal linkages between automobile and transit are limited until a more comprehensive park-and-ride strategy is implemented within the region.) As previously noted, FHATA routes that serve campus have the highest ridership in the FHATA system. With this new Campus Master Plan, ridership bound for K-State is likely to continue to grow.

Fort Riley

Similar to K-State, Fort Riley is a major traffic generator, concentrating employment in the Junction City area and impacting the transportation network. Common duty hours apply to both soldiers and civilians who work on the Fort, which influences the performance of the transportation network on- and off-post. Moreover, Fort Riley regularly reviews traffic flow patterns and makes adjustments as necessary to improve flow. As a result, constraints and changes to traffic flow on-base have impacts on the surrounding communities. For example, the interoperability between on- and off-base traffic signals can result in poor traffic outcomes. In addition, access to Fort Riley is limited to seven gates. Given the sensitive nature of military operations, access control points at these gates must be fluid to adjust up or down the level of access to the Installation.

In total, there are approximately 3,500 civilian employees, 18,000 soldiers, and 25,000 family members associated with the Installation, which live both on- and off-post. It should be noted that the Fort Riley population is inconsistent and can go up or down each year as directed by Congress.

4.8.1. Institutions: Existing and Emerging Issues

Based on the existing conditions analysis, following is a synthesis of the needs and issues of our existing transportation assets.

- As K-State implements the transportation elements of the 2025 Master Plan, both the University and the City of Manhattan will need to work together to deliver a multimodal and connected network with the surrounding environment.
- The NBAF and Global Food Systems Initiative will have workforce, and by extension, transportation implications for the entire MPA.
- On-base ITS is not interoperable with the surrounding counties and communities. The Regional ITS Architecture will enable all jurisdictions, K-State and Fort Riley traffic operations to better integrate with those of its surrounding jurisdictions' traffic operations.
- Noise exposure and safety hazards require compatible land uses in the communities surrounding Fort Riley, which limit certain types of development.

4.9. Summary of Existing Conditions, Needs, and Issues

Following is a summary of the existing conditions analysis described in this chapter.

Roadway

- Overall, area roadways within the MPA generally provide a high level of service, at LOS A, B, or C and traffic congestion is currently not a widespread issue.
- Roadway deficiencies are primarily concentrated on facilities around the perimeter of K-State.
- Additional deficiencies are found on a handful of roadways with ADT above 20,000, including portions of Tuttle Creek Boulevard/US 24, East US 24, and K-113/Seth Child Road.
- There is limited congestion in Junction City, with the most severe capacity issues found on roadways entering and within the Fort Riley Installation.
- There are no structurally deficient bridges within the MPA.
- Much of the pavement on the state system within the MPA is in good condition.
- High travel volumes and low LOS is present in/out of Manhattan on the East US-24 corridor will only continue to worsen. According to the MAUCP, Blue Township is anticipated to be the largest residential growth area in the region and there is no bypass route in/out Manhattan from this area.
- Proximate to K-State is development of the NBAF. This, in addition to the Global Food Systems Initiative, will create new employment opportunities as well as spur complementary industry clustering, which will have workforce, and by extension, transportation implications for the entire MPA, especially in Manhattan and the Counties of Riley and Pottawatomie.

Transit

- Transit services that serve the campus community are integral to K-State's planned growth strategy.
- There currently exists a high degree of fixed route integration, with operational needs largely driven by K-State.
- Most trips are destined for K-State, and most riders use the Jardine Shuttle – a fixed route in Manhattan that serves the K-State campus and residential halls.

Bicycle and Pedestrian

- There is no viable bicycling route between the Manhattan and Junction City that doesn't require entry onto Fort Riley.
- While almost all of the public streets within the MPA can be used by bicyclists and pedestrians without dedicated infrastructure, existing bicycle and pedestrian infrastructure could be improved upon to foster greater connectivity and mobility with in the region.

Aviation

- There are no landside access issues to the Manhattan Regional Airport.

Freight

- There are no freight issues within the MPA.

Safety

- A majority of crashes occurred in Manhattan's core area where there are more conflict points. In addition, for both Manhattan and Junction City, most crashes occurred along roadways with a higher functional class.
- High-crash intersections are primarily located along the K-State perimeter and in Aggieville where there are multiple conflict points between roadway users.

Security

- There are no specific security issues within the MPA.

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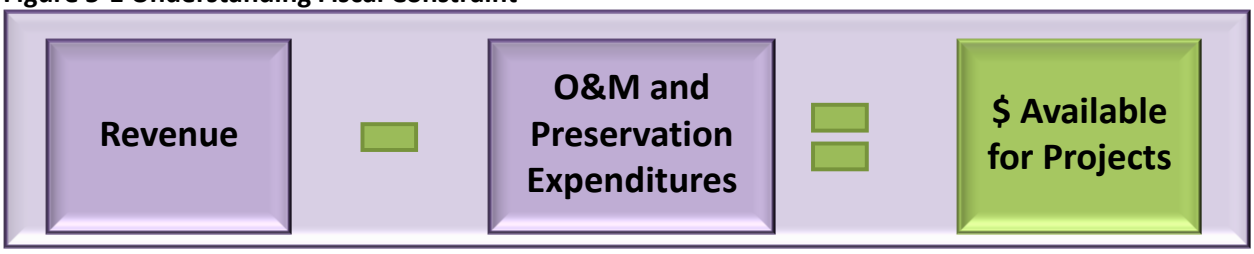
5.0 Overview of Financial Capacity Analysis

The Plan includes a financial analysis that demonstrates how the Plan can be implemented with available resources, consistent with federal regulations.[11] The Plan satisfies the fiscal constraint requirement, demonstrating that adequate revenue sources are reasonably expected to be available, or become available, to fund the Plan's investment priorities through the 2040 horizon period. Projects that do not have funding committed as part of the fiscally constrained Plan may be included as 'illustrative' projects for future consideration. If additional funding becomes available, illustrative projects may advance to the fiscally constrained priority project list.

The basic mathematical equation guiding the financial analysis is shown in Figure 5-1. This equation underpins the forecasting of resources that are reasonably expected to be available given forecasted expenditures that account for system preservation and operations and maintenance (O&M). The FHMPO places a high priority on system preservation and O&M of the existing transportation system. As such, the FHMPO's approach is to first deduct the cost of preservation and O&M "off the top" from the revenue forecast.

Figure 5-1 Understanding Fiscal Constraint



Appendix G provides more discussion and detail about the financial analysis assumptions and results.

5.1. The Fiscal Environment: Today's Realities

It is difficult to have a transportation system that addresses all needs. Like many units of government, the FHMPO region must operate in an environment of limited resources. There are many competing needs: roads and bridges in need of repair, critical connections in the bikeway network, congestion relief to support economic productivity and quality of life, and many others. Transportation infrastructure and services often require large expenditures and decisions involving difficult trade-offs.

Given current financial realities within the State and region, it is financially infeasible to address all identified transportation needs within the horizon year 2040. In other words, needs exceed available resources. If a project is identified as a priority for the region, but revenues are currently unavailable, the project sponsor is responsible for identifying new revenue sources for the project. As a regional document, the Plan focuses on projects with regional significance. Projects with regional significance have a meaningful impact on travel in the region by providing regional connectivity, mobility, or accessibility. The realignment and conversion of K-18 to limited access is a good example of a capacity project with regional significance.

[11] Metropolitan transportation planning 23 U.S.C. 134.

States and MPOs across the county are operating in an environment of constrained resources. For the FHMPO, these realities translate into the following understandings:

- State and local governments may become even more responsible for funding transportation in the absence of a strong and sustainable Federal-aid Highway Program. As such, it is assumed that transportation funding for the region in the next State transportation program will be consistent with or modestly above historic levels.
- Funding sources often have restrictions attached, which can create obstacles to project delivery.
- Infrastructure is aging and, as a result, a significant portion of funds will continue to be necessary to preserve our existing roads and bridges.
- While often not politically attractive, new revenue streams to address multimodal needs may be needed to meet regional transportation needs.

Given these understandings, the Plan reflects a conservative approach to future revenues available for transportation in the region.

5.2. Roadway Methodology, Assumptions, and Findings

The financial analysis assumptions employed are intended to provide a realistic picture of future year financial outcomes.

The FHMPO conducted collaborative discussions with KDOT, and with each county and municipality throughout development of the financial analysis revenue and expenditure forecasts. The financial analysis is based on the best available historic financial data of expenditures and revenues provided by KDOT (3 years), the Counties (5 years), and municipalities (5 years).[12] Projected expenditures and revenues are based on historic resources inflated at an annual rate. Historic data were then projected based on the financial assumptions described herein. The financial analysis integrates feedback received from all jurisdictions and applies reasonable estimates of expenditures and revenues from federal, state, and local sources.

In total, the Plan includes a fiscally constrained $131.8 million program (in year of expenditure dollars) of transportation projects and strategies to address transportation needs in the Flint Hills MPA. It should be noted the financial analysis represents an aggregate estimate based on federal, state, and local sums. These planning-level estimates therefore do not reflect the different requirements governing the use of funds. Instead, the aggregate sum represents the total transportation revenues available to the region.

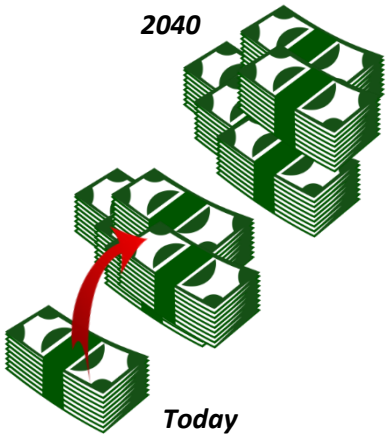
5.3. Expenditure Inflation Assumptions

As part of the financial analysis, a 3.5 percent inflation rate was applied to all expenditures throughout the 2040 horizon to reflect year of expenditure (YOE) dollars.

5.3.1. Project Costs in YOE

[12] The FHMPO will work with KDOT, the Counties, and municipalities to obtain historic financial data of expenditures and revenues to include in future updates to the Transportation Plan.

Each project identified in the project list was calculated in 2015 dollars and then inflated to YOE.[13] Given the long-range nature of the Plan, an average inflation rate for each time band was applied as part of the fiscal constraint process. Moreover, planning-level project costs were developed based on readily available information and may not fully capture all cost categories (e.g., right-of-way appraisal) that would be included in a detailed cost estimate developed during preliminary and final design of the project. As such, the cost estimates contained in the Plan should be refined as projects advance through planning, design, and construction.



5.4. Operations and Maintenance and Preservation Expenditure Assumptions

While the entirety of the Manhattan and Junction City municipalities are located within the MPA, only a portion of Riley, Geary, and Pottawatomie Counties are located within the boundary. The financial analysis was adjusted to reflect this disparity. In addition, jurisdictions have different ways for accounting and tracking preservation and O&M activities, which means that there is no standard way of accounting for and reporting these activities across local jurisdictions or with KDOT. For example, some municipalities identify preservation work as a capital cost while other municipal budgeting processes include a line item that does not distinguish preservation versus O&M activities. As a result of line item accounting, it is difficult to separate preservation and O&M expenditures with a high degree of confidence.[14]

Preservation is typically a major capital cost while O&M (e.g., sealing or pothole patching, mowing, snow removal, signing, striping, guardrail repair, maintenance of traffic control devices) represents routine activities to keep transportation facilities safely and productively open to the traveling public. However, as noted above, some budgeting processes include a line item that does not distinguish preservation versus O&M activities. As such, preservation expenses by local jurisdictions are spread across different (not project-specific) preservation activities. Given this limitation, planning-level system estimates for preservation and O&M were derived as part of the financial analysis to demonstrate that funding is set aside "off the top" for these critical activities. This "off the top" approach reflects both the region's commitment to maintaining and preserving the existing transportation network as reflects a conservative approach to assessing future revenues available for new capital construction in the region. Table 5-1 demonstrates the total expenditures anticipated for O&M and Preservation through 2040.

[13] KDOT projects include an inflation factor; therefore inflating to YOE was not necessary for these projects.
[14] The MPO will work with the local jurisdictions to obtain discrete preservation and O&M expenditures to include in future updates to the Transportation Plan.

Table 5-1 O&M and Preservation Expenditures by Jurisdiction

	2020-2025	2026-2030	2031-2035	2036-2040
Manhattan				
O&M	$2,541,340	$2,557,500	$3,037,500	$3,607,640
Preservation	$10,165,360	$10,230,000	$12,150,000	$14,430,560
Total O&M and Preservation	$12,706,700	$12,787,500	$15,187,500	$18,038,200
Junction City				
O&M	$8,557,000	$10,010,300	$2,104,480	$2,499,460
Preservation	$-	$-	$8,417,920	$9,997,840
Total O&M and Preservation	$8,557,000	$10,010,300	$10,522,400	$12,497,300
Geary County				
O&M	$1,471,700	$1,480,800	$1,759,000	$2,089,000
Preservation	$-	$-	$-	$-
Total O&M and Preservation	$1,471,700	$1,480,800	$1,759,000	$2,089,000
Riley County				
O&M	$6,551,900	$6,593,400	$7,830,900	$9,301,000
Preservation	$624,900	$628,900	$746,900	$887,000
Total O&M and Preservation	$7,176,800	$7,222,300	$8,577,800	$10,188,000
Pottawatomie County				
O&M	$2,280,480	$2,295,200	$2,726,080	$3,237,520
Preservation	$570,120	$573,800	$681,520	$809,380
Total O&M and Preservation	$2,850,600	$2,869,000	$3,407,600	$4,046,900

KDOT treats preservation as a capital cost under the T-WORKS program and tracks O&M expenditures separately. Since identifying preservation needs is a fluid process, KDOT includes a line item in T-WORKS for each KDOT District. To date, KDOT has committed over $116 million on 185 preservation projects in the MPA area under the T-WORKS program. Given that the Plan reflects regional interests, the FHMPO worked in consultation with the appropriate area engineer from District 1 and 2 to identify long-term preservation needs (see Table 5-2). Heavy preservation needs are based on the last known preservation or maintenance activity and the professional judgment of the local KDOT area engineer as to when these facilities will again require heavy preservation work. The forecast of KDOT's O&M expenditures across key O&M categories are shown in Table 5-3.

Table 5-2 KDOT Identified Preservation Needs Within the MPA

Roadway	Starting Terminus	Ending Terminus	Improvements	Approx. Improvement Year
I-70	RP 296.1	RP 300.5 EB & WB	Ultrathin bonded asphalt surface (UBAS)	2025
US-40B			Viaduct replacement at UPRR & Monroe St.	2020
US-40B	N East St Bridge		Bridge replacement	2030
US-40B	Smoky Hill River bridge		Bridge replacement	2035
US-24	K-13	US-24/US-77	Heavy mill and overlay	2025
US-24	US-24/K-177	Green Valley Rd	Heavy mill and overlay	2025

K-18	Miller Pkwy/Davis Dr	K-113	Heavy mill and overlay	2020
K-113	K-18	US-24	1 1/2" mill and overlay	2020
K-177	K-18	Kansas River bridge	Pavement replacement	2020
K-177	Kansas River bridge	I-70	2" mill and overlay	2020
K-18	Wildcat Creek Bridges 028 & 029		Bridge replacement	2020
US-77	Rush Creek Bridge (#043)		Bridge replacement (to include sidewalk)	2022

Table 5-3 KDOT Operations and Maintenance Expenditures

	2020-2025	2026-2030	2031-2035	2036-2040
Pavement	$541,700	$545,000	$647,200	$768,500
Shoulders	$332,100	$334,200	$397,000	$472,000
Drainage	$376,700	$379,400	$450,100	$534,600
Roadside	$1,587,900	$1,598,000	$1,898,300	$2,254,300
Bridge	$147,300	$148,100	$175,700	$208,800
Snow & Ice	$1,290,200	$1,298,500	$1,542,400	$1,832,600
Traffic Guidance	$439,100	$442,000	$524,800	$623,300
Total	$4,715,000	$4,745,200	$5,635,500	$6,694,100

Source: KDOT.

5.5. Revenue Growth Assumptions

As part of the financial analysis, a range of growth scenarios by revenue source (federal, state, local, and other) were developed and evaluated. The scenarios evaluated included: 1) no-growth baseline (reflecting current funding levels); 2) moderate growth of 1.5 percent (reflecting the T-Link projection); and a high-growth of 3.0 percent (reflecting a potential economic stimulus). The Advisory Committee selected a combination of the above revenue growth scenarios for use in the financial analysis, collectively referred to as the Future Growth Scenario (see Table 5-4). The Future Growth Scenario financial assumptions are intended to provide a realistic picture of future year financial outcomes. Given today's economic uncertainties, the Future Growth Scenario reflects a conservative financial approach.

Table 5-4 Future Growth Scenario Assumptions

Source	Program	Growth Rate
Federal	Surface Transportation Program (STP)	0.0%
State	Special City and County Highway Fund (SCCHF)	0.0%
	KDOT State Transportation Program (T-WORKS)	1.5%
Local	Example: Sales Tax, Mill Levy, General Fund	0.0%
Other	Example: Grants	0.0%

5.6. Future Growth Scenario Forecast

Based on the methodology outlined above, highway revenues under the Future Growth Scenario are shown in Table 5-5 by funding source. These revenues reflect the resources that are reasonably expected to be available to the Flint Hills region through 2040. In total, available funding throughout the

planning horizon totals $330.0 million; however, once off "off the top" expenditures for preservation and O&M commitments (as presented in Table 5-6) are deducted, only $179.6 million is left for other projects, including KDOT heavy preservation projects.

Table 5-5 Revenue Forecast by Source

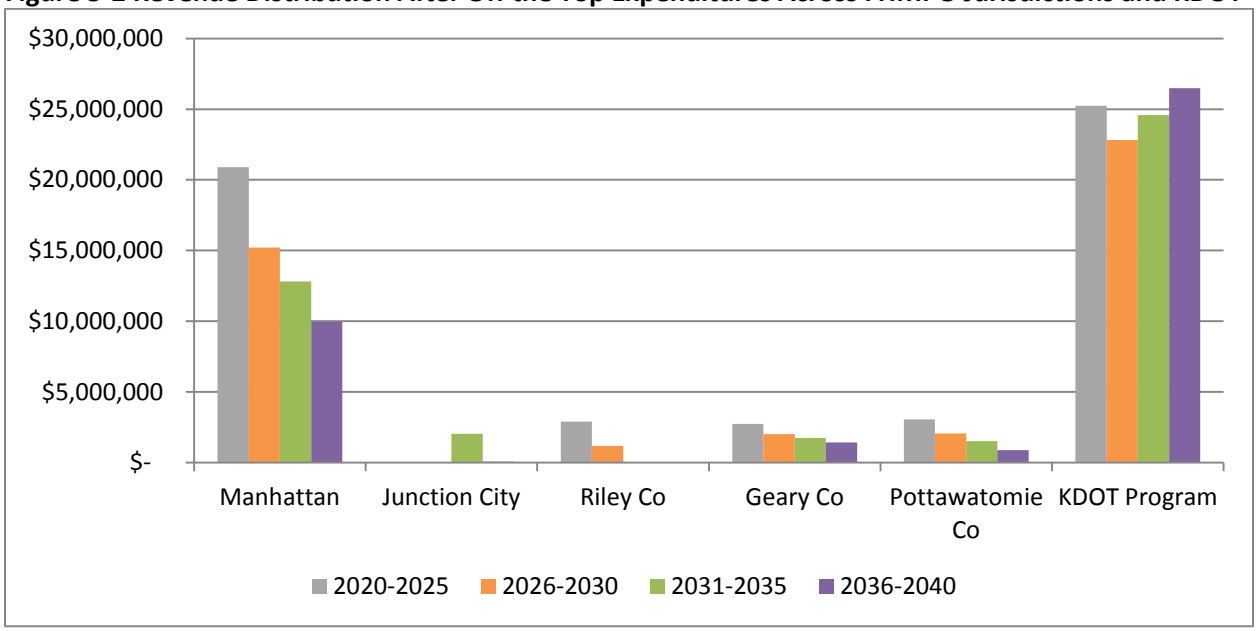
	2020-2025	2026-2030	2031-2035	2036-2040
Federal	$6,046,800	$5,039,000	$5,039,000	$5,039,000
State	$43,891,900	$38,368,000	$40,131,400	$42,031,300
Local	$27,791,700	$26,934,800	$29,489,500	$29,489,500
Other	$8,784,600	$7,320,500	$7,320,500	$7,320,500
TOTAL	$86,515,000	$77,662,300	$81,980,400	$83,880,300

Table 5-6 Revenues Available for Regional Investment Priorities

	2020-2025	2026-2030	2031-2035	2036-2040
Revenues	$86,515,000	$77,662,300	$81,980,400	$83,880,300
O&M Expenditures	$20,327,720	$22,937,200	$18,026,560	$19,833,120
Preservation Expenditures	$11,360,380	$11,432,700	$21,249,440	$25,237,780
$ Available for Projects	$54,826,900	$43,292,400	$42,704,400	$38,809,400

The revenues expected to be available after O&M and preservation expenditures are deducted are shown in Figure 5-2, broken out by jurisdiction. KDOT represents the largest source of transportation revenues in the region followed by Manhattan. County apportionments constitute a relatively small amount of revenue available to the region. Once Junction City has retired its debt in 2029, it will be in a better financial position to spend resources on much needed preservation and limited capacity expansion projects that benefit the region. It should be noted that, due to inflation, the revenue available for projects in the cities and counties decreases over time due since inflation increases cost and there is no corresponding increase in revenue (with the exception of modest growth (1.5 percent) in KDOT's State Transportation Program).

Figure 5-2 Revenue Distribution After Off the Top Expenditures Across FHMPO Jurisdictions and KDOT



5.7. Transit Methodology, Assumptions, and Findings

For purposes of the financial capacity analysis, highway and transit funds were accounted for separately. All financial data was provided by the FHATA and estimates of expenditures and revenues were derived based on these data. Furthermore, all expenditures and revenues estimates are reported in FY 2015 dollars, adjusted for inflation, to provide estimates of reasonably expected transit revenues and expenditures through the 2040 horizon year.

As previously noted, the FHATA is the primary transit service provider in the MPA for both rural and urban services and the FHRTA is the direct recipient of FTA 5307 funds. The FHRTA is required to competitively procure a transit service provider for all 5307 funded services and the FHATA was recently awarded the five-year contract for providing urbanized transit service in the Manhattan Urbanized Area.

5.7.1. Capital Expenditure Assumptions

The FHATA provided a range of historic transit expenditures. In the course of developing the revenue scenarios with the FHMPO and FHATA, FHATA advised applying an inflation rate of 3.5 percent, which was deemed to be a reasonably conservative estimate. It should be noted that fuel volatility represents the biggest cost variable for FHATA. Besides the cost of fuel, FHATA is also cognizant of the increasing costs to employers providing healthcare coverage, and includes these costs in the financial assumptions.

5.7.2. Maintenance & SOGR Assumptions

The FHATA does not currently have a formal schedule of SOGR activities or Transportation Asset Management Plan (TAM) in place. Current capital expenditures are for bus replacements, which

generally occur every five years.[15] Bus replacement of the existing fleet was assumed to occur so that a fifth of the fleet is replaced each year.

5.8. Revenue Growth Assumptions

Funding sources for transit in the FHMPO region are derived through the following sources: federal, state, local / K-State, fare box, and other revenues (interest, fundraising, donations, charters). The primary source of funding for transit are federal programs, followed by local funding, including that from K-State; which together make up the majority of transit funding. In FY 2014, these sources comprised nearly 90 percent of the total transit revenue. FHATA's success is due in large part to its partnership with K-State as most trips in the MPA are destined for or travel through K-State. As such, it is assumed that K-State will continue to be a valuable funding partner to any transit service provider in the Flint Hills region in future years.

Similar to the roadway analysis, three transit revenue alternatives were developed representing a no-growth baseline (reflecting current funding levels), Alternative 1 Modest (reflecting the T-Link projection) that assumes a modest growth rate of 1.5 percent across all revenue sources; and an Alternative 2 High (reflecting a potential economic stimulus) that assumes a growth rate of 3.0 percent across all revenue sources. The revenue alternative assumptions are intended to demonstrate the ability to achieve a fiscally constrained transit plan through 2040. At the direction of the FHMPO and FHATA, the Economic Stimulus Alternative 2 was removed from the analysis as it did not result in revenue outcomes that could be realistically justified. Alternative 1 Modest (T-Link Estimation) was modified and split to reflect two slightly different, but plausible, revenue assumptions (Table 5-7).

Table 5-7 Alternative 1 Modest (T-Link Estimation) Revenue Assumptions

Alternative 1A	Alternative 1B
Federal – 1.5%	Federal – no growth
State – 1.5%	State – 1.5%
Local/ K-State– 1.5%	Local/ K-State – 1.5%

5.9. Transit Service Scenarios

The transit scenarios modeled as part of the Plan range from a continuation of the current level of service to varying degrees of service enhancements and expansion as shown in Table 5-8. In summary, the transit service scenarios include the addition of two new routes and modifications to existing routes. These are grouped below under two service types: Core Area and Regional. At the time of scenario development, it was assumed that other existing services would remain unchanged; as such, only these new service modifications were included in the O&M model developed to compare the various service options. It should also be noted that the time of scenario development a Feasibility Study was being conducted for fixed route service in Junction City. This service is anticipated to commence early 2016.

[15] The FHMPO will work with the FHATA to obtain detailed SOGR expenditures to include in future updates to the Transportation Plan.

Table 5-8 Description of Transit Service Scenarios

Core Area	Regional
Expanded Coverage - New Route Providing Access South of Poyntz • 30 minute peak (weekday) • Hourly off-peak (weekday) • Hourly Saturday • Year-round service	**Airport Access - New Route Mainly serving the Manhattan core area, but with transfer to Intercity Shuttle at Ogden and service to Fort Riley** • Based on Manhattan arrival and departure schedule as of April 7, 2015 • Weekly (7 days) • Year-round service
Orange & Green Line - Extend to Year Round and Added Service Frequency • 30 minute peak (weekday) • Hourly off-peak (weekday) • Hourly Saturday • Year-round service	**Wamego Regional Shuttle - Modified Route to Serve Blue Township** • Hourly (weekday) • Year-round service
Jardine Shuttle - Extend to Year Round and Added Service Frequency • (Option A) 15 minute peak (weekday); 20-passenger van • (Option B) 15 minute peak (weekday); 40-passenger bus • Hourly off-peak (weekday) • Hourly weekend existing service • Year-round service	

In addition to developing an existing conditions baseline, two service scenarios were developed for evaluation based on discussions with the FHMPO and FHATA:

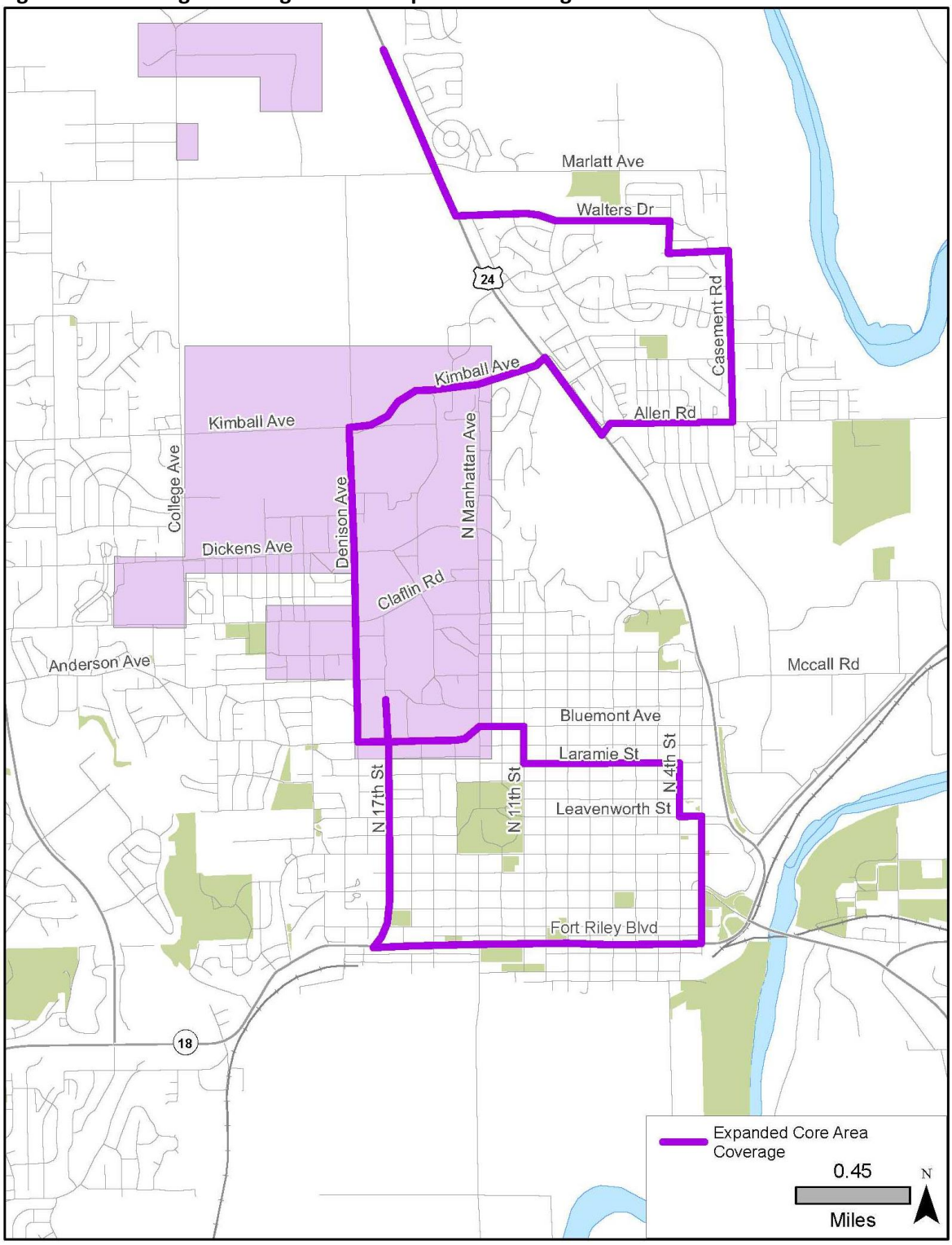
Top Priority – This scenario includes the two potential bus routes in the Core Area and Regional as described in Table 5-8 (referred to as Expanded Coverage - New Route South of Poyntz and Airport Access respectively). The general alignment of the Expanded Coverage and Airport Access routes were identified for planning purposes only and would require refinement based on more detailed study. Each route was overlaid across three factors often used for environmental justice analyses: zero-car households; households below the poverty line; and minority groups. Maps showing the general alignments of the routes are shown in Figure 5-3 and Figure 5-4.

Long-Term Vision – K-State transit needs were evolving at the time of analysis; therefore, no new coverage was evaluated. The Long-Term Vision includes:

- All elements of the Top Priority scenario;

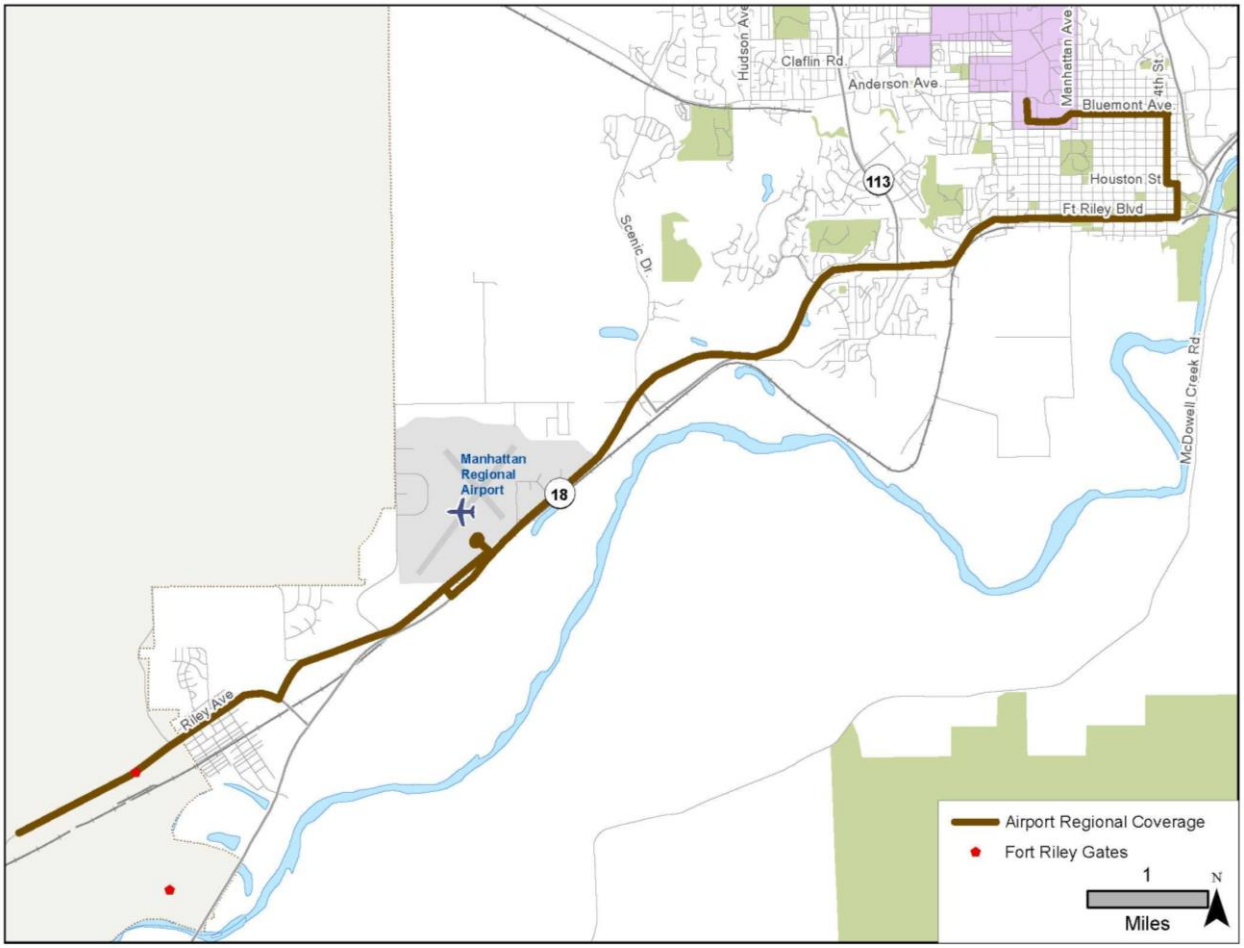
- Capital options were analyzed: (Option A) 20-passenger bus; and (Option B) 40-passenger bus for the Jardine Shuttle;
- Service changes to the Orange and Green Lines as described in Table 5-8;
- FHATA Regional Commuter Transit Study – covering Riley, Geary, Pottawatomie, Dickinson, Clay, and Shawnee Counties;
- Fort Riley Transit Study – study expansion of the currently limited access to Fort Riley and connecting to Intercity Shuttle at Ogden and covering Riley and Geary Counties;
- Fort Riley Fixed Route Service – study fixed route potential on Fort Riley and covering Riley, Geary, and Dickinson Counties;
- Transit Facility Expansion (Manhattan) – facility expansion for vehicle storage and maintenance; and
- Transit Facility Construction (Junction City) – new facility for transit administration, vehicle storage, and maintenance.

Figure 5-3 Planning-Level Alignment of Expanded Coverage Route



Note: Alignment is for planning purposes only.

Figure 5-4 Planning-Level Alignment of Airport Access Route



Note: Alignment is for planning purposes only.

5.9.1. Scenario Findings

Before presenting the transit scenario findings, it should be noted that the FHMPO received a competitive Consolidated Planning Grant (CPG) administered by KDOT in late 2015 for a realignment study of Manhattan's fixed route transit system. As such, much of the transit analysis will be replaced with findings from that study, which is anticipated to conclude in late 2016 or early 2017).

In summary, the financial analysis demonstrates that any transit service provider in the region will face significant challenges to keep public transportation a viable mobility option through 2040. Comparisons across Existing Service and Top Priority transit scenarios that were modeled across the revenue alternatives are shown in Figure 5-5. As shown in Table 5-9, existing service delivery under Alternative 1A becomes an issue beginning in about 15 years (2031) and the provision of new core area and airport service is financially infeasible without additional resources beginning in 2024 (the cumulative deficit accrues beginning in the 2026 time band).

The recent success of the FHATA fixed routes in Manhattan demonstrates that there is a strong transit market in Manhattan, and the demand for transit will likely grow. Looking ahead, the transit financial analysis demonstrates that regional transit needs – including those defined by K-State as of this report's

writing – outstrip available funding. Long-term solutions to fund transit in the region are needed. As shown in Figure 5-6, assuming modest growth in transit revenues, transit funding for existing service is sustainable over the next 15 years before a deficit occurs and service cuts or an alternative revenue source to balance the budget would be needed. However, to meet future demand and continue to serve the mobility needs of the region through enhanced regional services, alternative revenue streams will need to be explored.

Over time, the FHATA is expected to have funding short falls. As a result, FHATA may wish to explore ways to expand its revenue base. There are a range of options that transit agencies have used that the FHATA may wish to explore.

- Advertising – This may take many forms from in-vehicle ads, exterior vehicle ads, wrapping vehicles, advertising on bus benches, and others.
- FHWA Flex Funds – Some FHWA funding programs can be used for transit projects as well as highway projects. These programs include Congestion Mitigation and Air Quality, Surface Transportation Program (STP), and Metropolitan Planning.
- Local Service Contracts – Given the success of service contracts with K-State, the FHATA could pursue partnerships with other entities, such as the Fort Riley Military Installation and Chambers of Commerce.
- New Dedicated Local Revenue Stream – Many transit agencies collect a dedicated sales tax, and portions of vehicle registration fees, and/or property taxes. While these sources can create reliable sources of local funding, they are often controversial.

Figure 5-5 Revenue Distribution Across Transit Service Scenarios

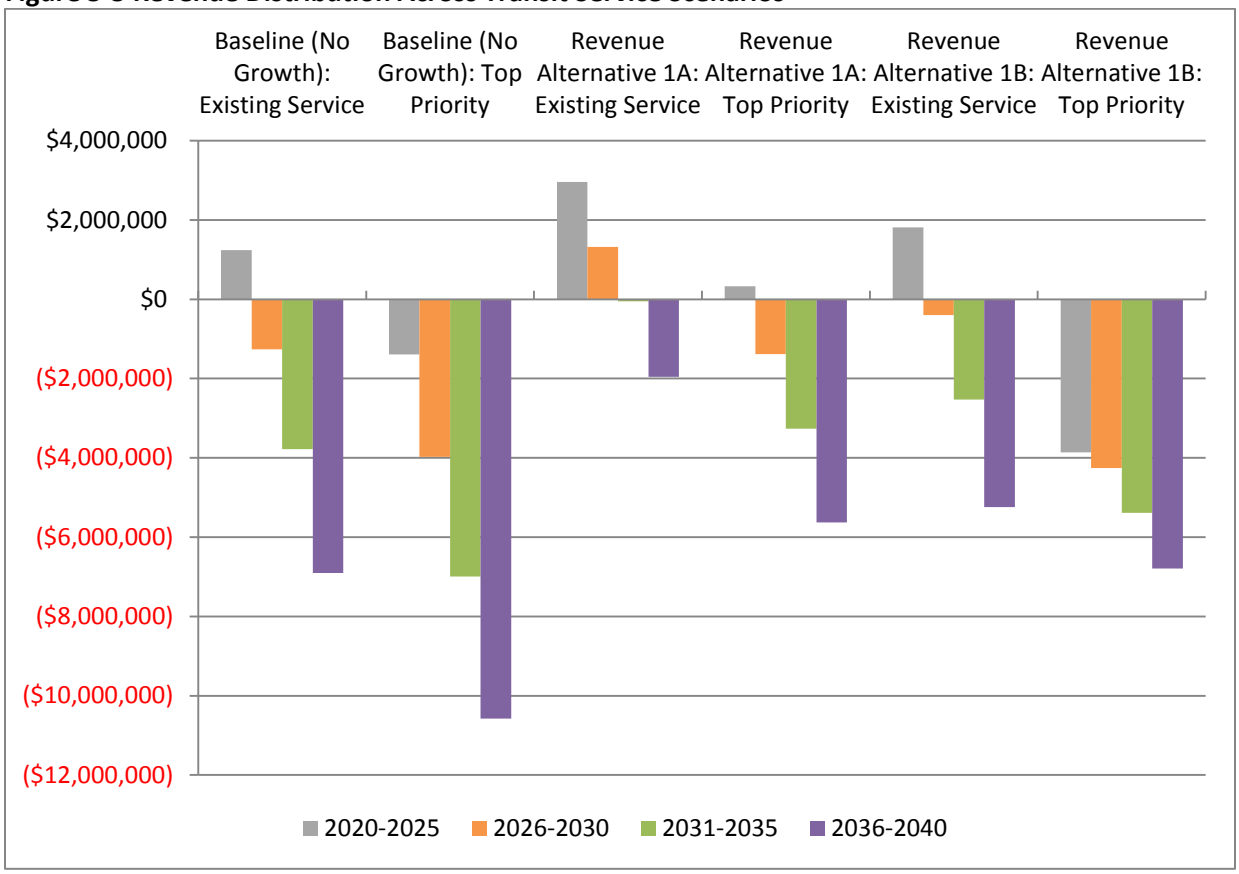
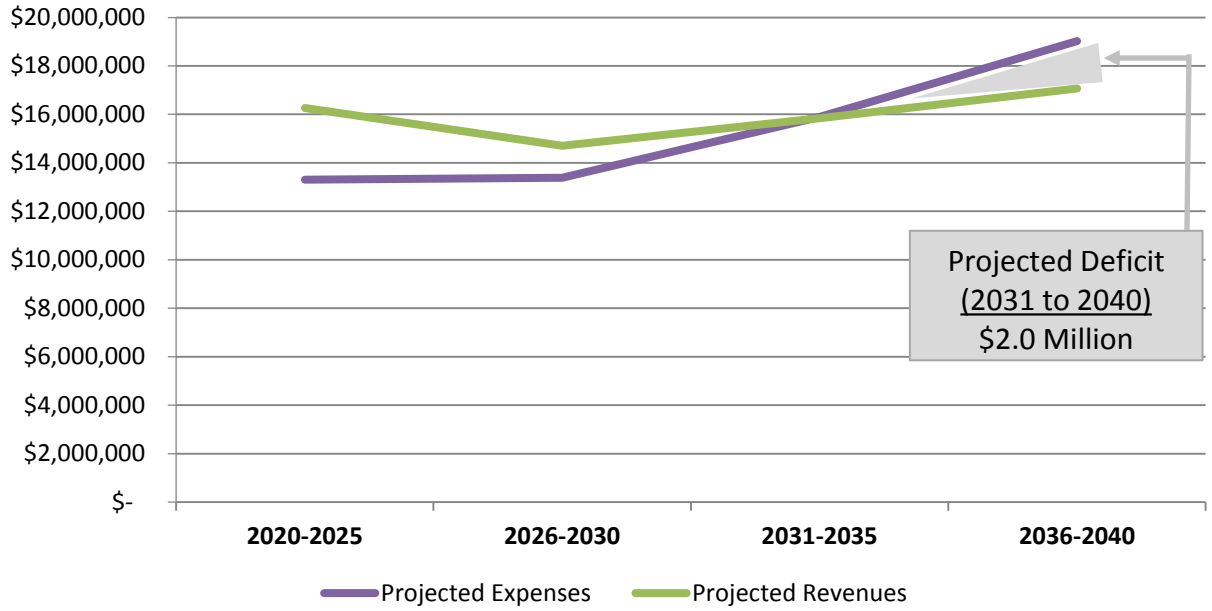


Table 5-9 Existing Service and Top Priority Transit Scenarios: Revenue Alternative 1A

	2020-2025	2026-2030	2031-2035	2036-2040
Existing Service				
Projected Expenses	$13,303,100	$13,384,900	$15,896,900	$19,021,900
Projected Revenues	$16,265,900	$14,709,100	$15,845,100	$17,069,600
Revenue available for Projects	$2,962,800	$1,324,200	$(51,800)	$(1,952,300)
Top Priority: Core Area And Regional Airport Access Transit Scenarios				
Projected Expenses	$15,937,300	$16,091,000	$19,111,000	$22,697,800
Projected Revenues	$16,265,900	$14,709,100	$15,845,100	$17,069,600
Revenue available for Projects	$328,600	$(1,381,900)	$(3,265,900)	$(5,628,200)

Figure 5-6 Existing Service Funding Deficit Under Revenue Alternative 1A



5.10. Bicycle and Pedestrian Methodology, Assumptions, and Findings

The bicycle network recommended it this Plan (see Chapter 6) includes a host of bicycle facility types and treatments. Table 5-10 provides planning-level cost estimates for the recommended Plan bikeway network mileage and a computation of bikeway costs (by facility type) based on the per-mile cost and the mileage. These planning-level costs represent an approximate cost range for long-range budgeting purposes and require further refinement based on specific project scopes, engineering plans, and competitive bids.

Table 5-10 Total Estimated Costs by Facility Type

Type of Facility	Full Build-out (Miles)	Average Cost Range	Total Cost (Range)
Bike Lane*	24.4	$10,000 to $350,000	$2,623,000 – $4,636,000
Bike Boulevard	9.7	$25,000 to $250,000	$242,000 – $2,420,000
Path	17.5	$200,000 to $400,000	$3,500,000 – $7,000,000
Shared Lane Marking	19.7	$10,000 to $15,000	$197,000 – $296,000
Paved Shoulder**	28.6	$50,000 to $100,000	$1,430,000 – $$2,860,000
Reconstruction***	15.2	$200,000 to $350,000	$3,040,000 – $5,320,000

**Half of bike lanes to be marked and made possible through road and lane diets and the other half when the streets are reconstructed or newly built.*

***Paved shoulders added during reconstructed and new construction projects when gravel shoulder is added as part of highway project.*

****Reconstruction projects were assessed the build bike lane costs.*

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6.0 Future Multimodal Assets: What do future conditions look like?

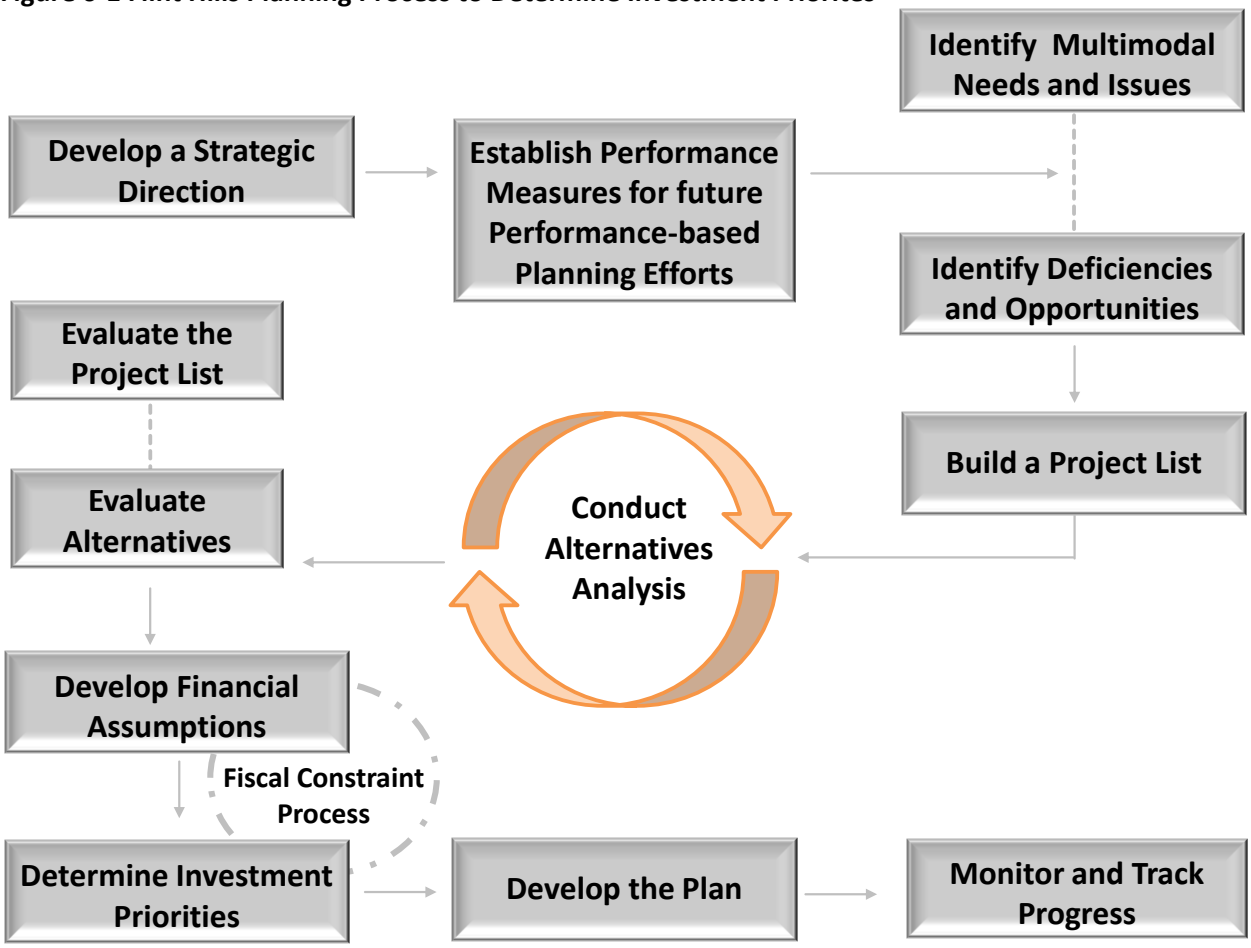
Building on our understanding of the needs and issues of our transportation system, we now turn to answering the question – what will the Flint Hills region's multimodal transportation network look like in the future? This chapter outlines the region's investment priorities through 2040 and describes the process and underlying rationale by which our investment priorities were derived. The Plan contains two sets of projects:

- **Regional Investment Priorities** – These represent the fiscally constrained projects identified in the Plan, or what the region can reasonably afford based on anticipated revenues through 2040.
- **Illustrative Projects** – These reflect the unmet needs within the region that have been identified through the long-range planning process. If additional funding becomes available or community priorities and future conditions change, illustrative projects may be elevated to an investment priority for the region.

The Flint Hills Transportation Plan is a living document and is intended to be revisited and updated as regional priorities changes.

The fiscally constrained Plan was developed through a process that defines and evaluates deficiencies and future opportunities in both quantitative and qualitative ways. The process takes into account the current political climate, recognizes planned growth opportunities, and engages with the public. Together this process, which is detailed in Figure 6-1, resulted in the identification of a set of core transportation investment priorities, which were balanced against projected revenues through the year 2040 in the fiscal constraint process (see Appendix E for more detail).

Figure 6-1 Flint Hills Planning Process to Determine Investment Priorites



6.1 Tools to Define and Evaluate Needs

The FHMPO used a variety of tools to define and evaluate transportation needs within the region. Together these helped to determine the region's investment priorities, known as its fiscally constrained projects.

6.1.1 Travel Demand Model

In consultation with KDOT, the FHMPO developed a travel demand model (TDM) to forecast daily traffic volumes. More detail on how the Flint Hills model was developed can be found in Appendix C. The TDM is a representation of the transportation facilities and the travel patterns of the vehicles using these facilities within the FHMPO boundary. The FHMPO TDM base year is 2012 and the future year 2040. The transportation network and the socioeconomic (population and employment) data underpinning the model reflect these years. Travel forecasts are generated within the TDM based on the assumed land use inputs reflecting current conditions and future conditions. The FHMPO TDM can be used to evaluate traffic forecasts by changing assumptions to two key model inputs:

- **Land use developments** – Changes to land use, such as new residential or employment growth, will affect the trip generation rates which are ultimately used to develop model volumes.

- **Transportation network** – Changes to the transportation network itself will affect the volumes and travel patterns associated with adding or reducing capacity (e.g., adding lanes, extending roads, adding new roads or interchanges).

It should be noted that a travel demand model is a tool to help estimate travel behavior and demand for a specific future time frame. Forecasted volumes assist in making informed transportation planning decisions; however, any model is just a tool and not the final word. Engineers and planners need to apply professional judgment to develop realistic forecast results. Furthermore, all models have limitations.

As one would expect, travel characteristics throughout the FHMPO region change in the future. While the roadway capacity analysis below illustrates more specific sites where congestion occurs, it is also important to understand these changes from a system-wide perspective. As measured by the four performance measures, the change in regional travel conditions is shown in Table 6-1. The change in trips generated between the baseline and future year 2040 conditions indicates how many trips will be made across the MPA. The change in vehicle miles traveled (VMT) between baseline conditions and 2040 provides a summary of the length of travel across the MPA. The change in vehicle hours traveled (VHT) between baseline conditions and 2040 provides a summary of time spent traveling within the MPA. As displayed, the increase in VMT and VHT within the region results in a slight decline in average travel speeds.

Table 6-1 Growth Across System-wide Measures of Effectiveness, Baseline and Future Year

Route	2012	2040	▲	% ▲
Number of Trips	620,699	886,259	265,560	43%
Vehicle Miles of Travel	2,096,583	2,915,933	819,350	39%
Vehicle Hours of Travel	47,385	70,539	23,154	49%
Average Speed	36.0 mph	34.5 mph	-1.5 mph	-4%

6.1.2 Future Year Roadway Capacity Analysis

Chapter 4 described the existing system performance, needs, and issues within the MPA. Coupled with stakeholder input and local expertise, a technical analysis to identify future year mobility issues was also conducted. Similar to the existing conditions roadway capacity analysis, a roadway capacity analysis was conducted to reflect future year (2040) travel conditions. The 2040 Existing + Committed (E+C) scenario reflects the existing roadway network plus projects that currently have funding identified for construction, and are reasonably expected to be constructed by 2040. Table 6-2 lists the committed projects coded in the 2040 FHMPO E+C scenario.

Table 6-2 Committed Projects

Route	Location	Project Description
US-77	K-18	Reconstruct to 2-lane on 4-lane ROW/ reconstruct K-18 interchange as diamond
US-77	Old Milford Road to K-57	Reconstruct as 2-lane on 4-lane ROW

McDowell Creek Road Reconstruct	K-177 SW 3 miles	Reconstruction
Casement Road	Brookmont to Griffith	Minor widening
US-24 Mall Entrance		Intersection
US-24 and Excel Road		Turn lanes
K-18 and K-113		Southbound capacity
US-77	Spring Valley Road; Ash, McFarland	Intersection - Widen US-77 to 4 lanes from Ash Street north to south ramps of K-18 interchange
US-77	At/near I70	DDI Interchange, Widen to 4-lanes Old US-40 to Lacy Dr. Extend climbing lane to Rucker Road
McCall Road	At US-24	WB Double LT
Manhattan Ave	Kimball to Research Park	Minor widening
Constructed*	US-57 / K-244	West of US-77 to North of 18th St.

**Project constructed after the model calibration year.*

While the overall roadway network in the MPA continues to provide a high quality of service in the future, operating at a LOS C or better, a number of capacity issues emerge in 2040. Unlike the baseline conditions in 2012, traffic congestion begins to become a more widespread issue as shown in **Error! eference source not found.** and Figure 6-3. In Manhattan, roadway deficiencies continue to be concentrated on facilities around the perimeter of K-State and capacity on US-24 (toward Wamego) becomes significantly more constrained. In addition, roadway deficiencies appear not only in the eastern portion of the city on US-24 (toward Wamego) and US-24/Tuttle Creek Boulevard, but are also present on Scenic Drive and Seth Child Road/K-113. Small portions of Marlatt Avenue and Kimball Avenue also begin to experience capacity issues. While the presence of congestion was nearly nonexistent in Junction City in the baseline scenario, roadway deficiencies appear on the western edge of the City limits along US-77, K-18, and Spring Valley Road in the 2040 E+C scenario. The most severe capacity issues continue to be located on roadways that provide access to and within Fort Riley.

Figure 6-2 Manhattan Future Level of Service, 2040

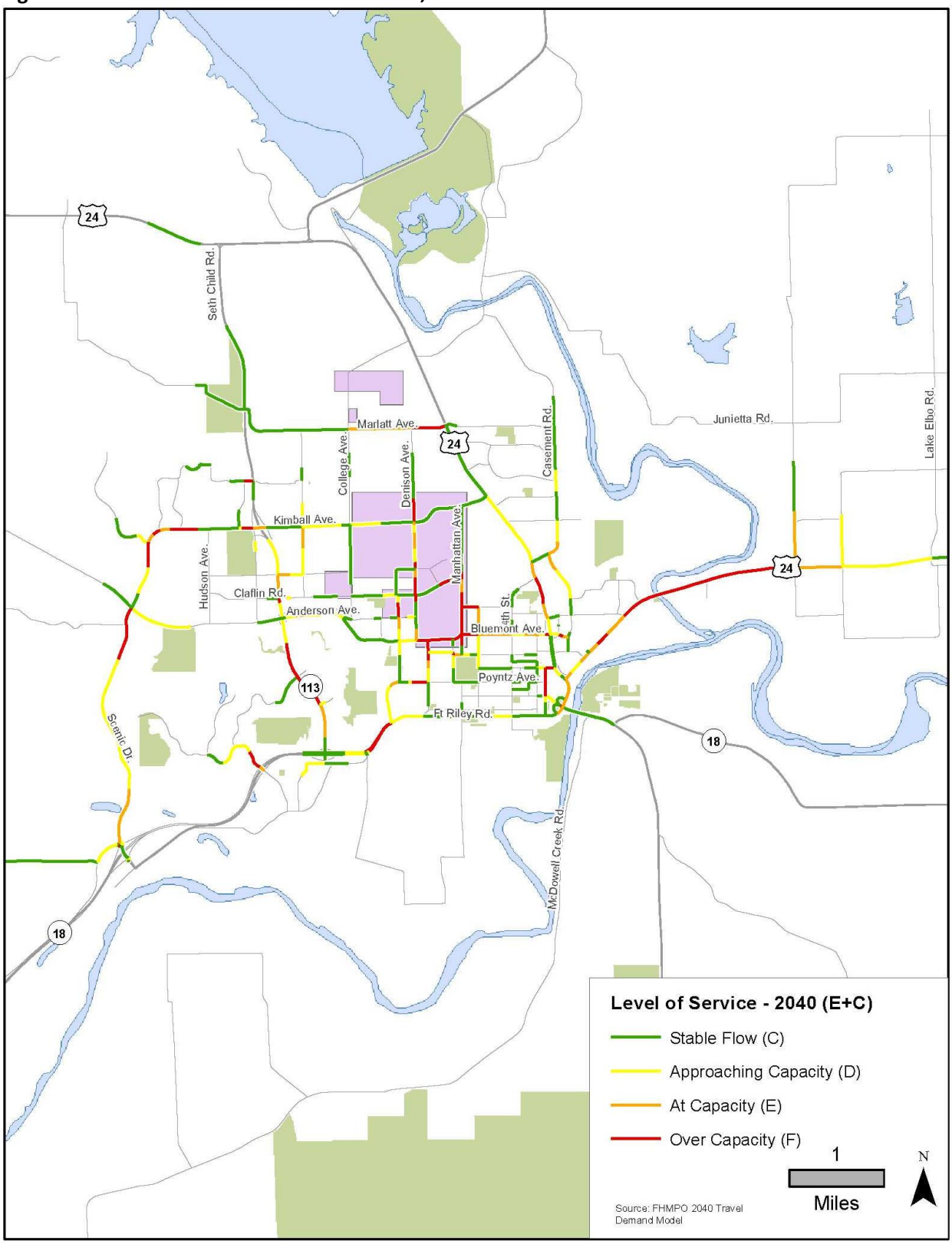
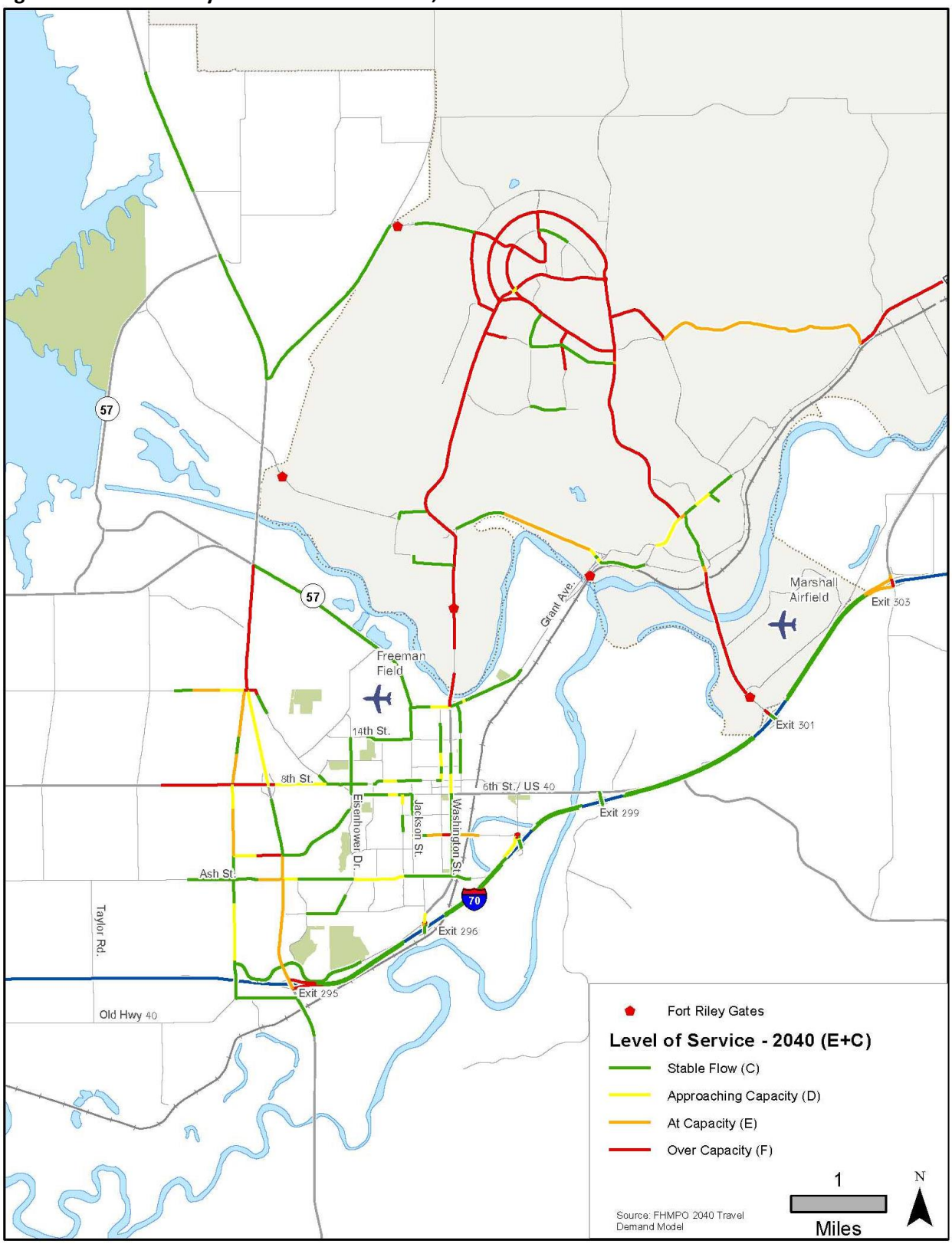


Figure 6-3 Junction City Future Level of Service, 2040



6.1.3 Alternatives Development

Roadway Alternatives Scenarios

Roadway projects for inclusion in the alternatives analysis were derived through consideration of:

- Jurisdictions / local expertise
- Stakeholder and public outreach
- Identification of needs/goals
- Growth areas from the area comprehensive plans
- Review of travel demand model deficiencies

As the designated MPO, an essential principle of the Plan is a focus on identifying transportation projects with regional significance. Regional projects have a meaningful impact on travel by facilitating regional connectivity, mobility, or accessibility. (The recent construction/realignment of K-18 is a good example of a project with regional significance.) The purpose of the alternatives analysis is to evaluate reasonable improvements to address future year mobility issues that have been identified through the technical analysis and input received through the planning process (see inset). Where warranted, issues, needs, deficiencies, and opportunities developed through the planning process were considered in the selection of potential improvements that were analyzed through the alternatives analysis. All projects that were modeled qualified as system expansion, providing enhanced capacity for a roadway or to the regional system. For each alternative, the 2040 E+C served as a baseline from which to assess the roadway impacts under three 2040 build scenarios. These scenarios were developed in conjunction with the Advisory Committee and reflect three discrete alternatives to test packages/combinations of roadway capacity improvements. The specific projects selected for analysis in the three build scenarios are shown in concert with the resulting LOS in Figure 6-4 through Figure 6-9.

Figure 6-4 Manhattan Level of Service, 2040 Build Scenario 1

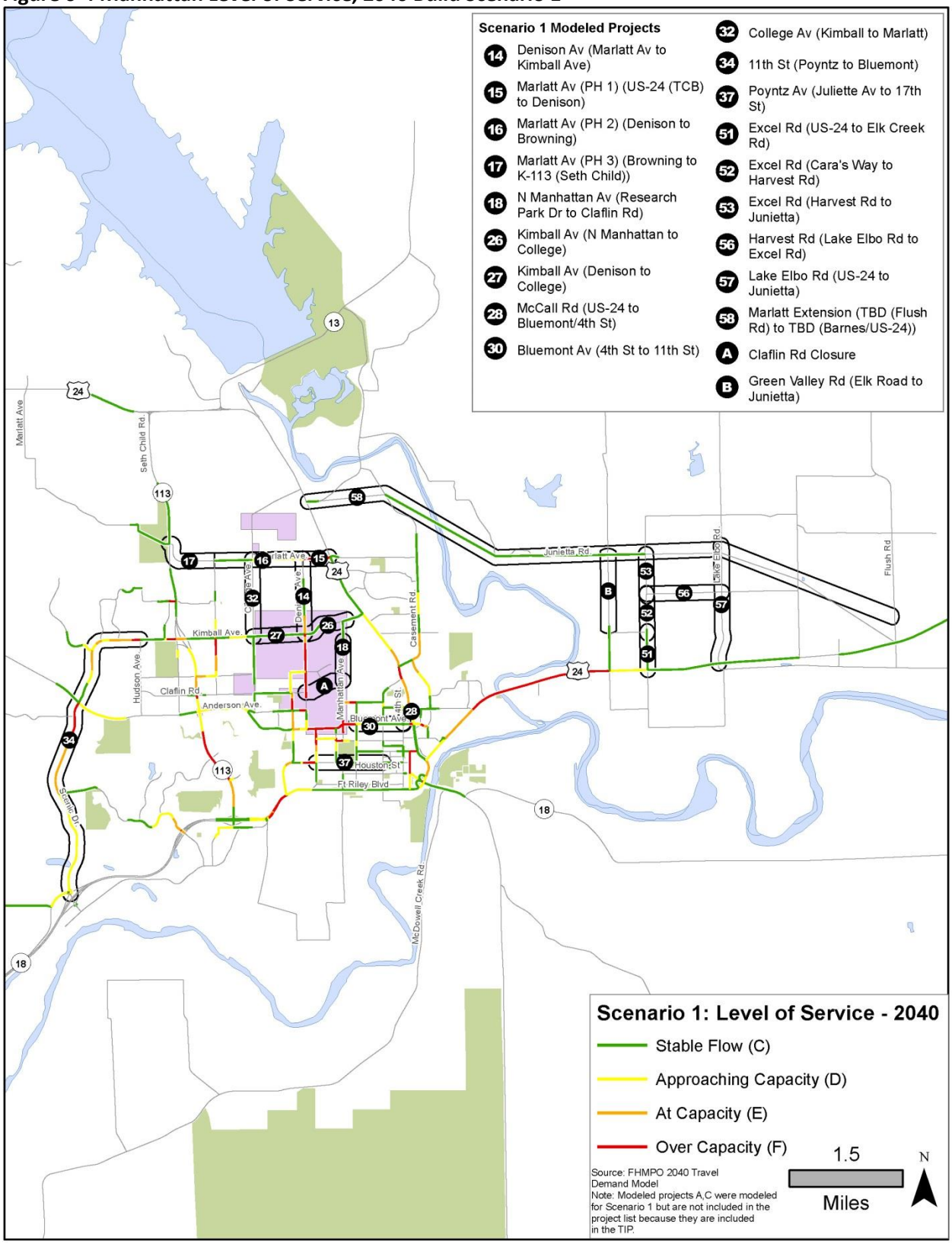


Figure 6-5 Manhattan Level of Service, 2040 Build Scenario 2

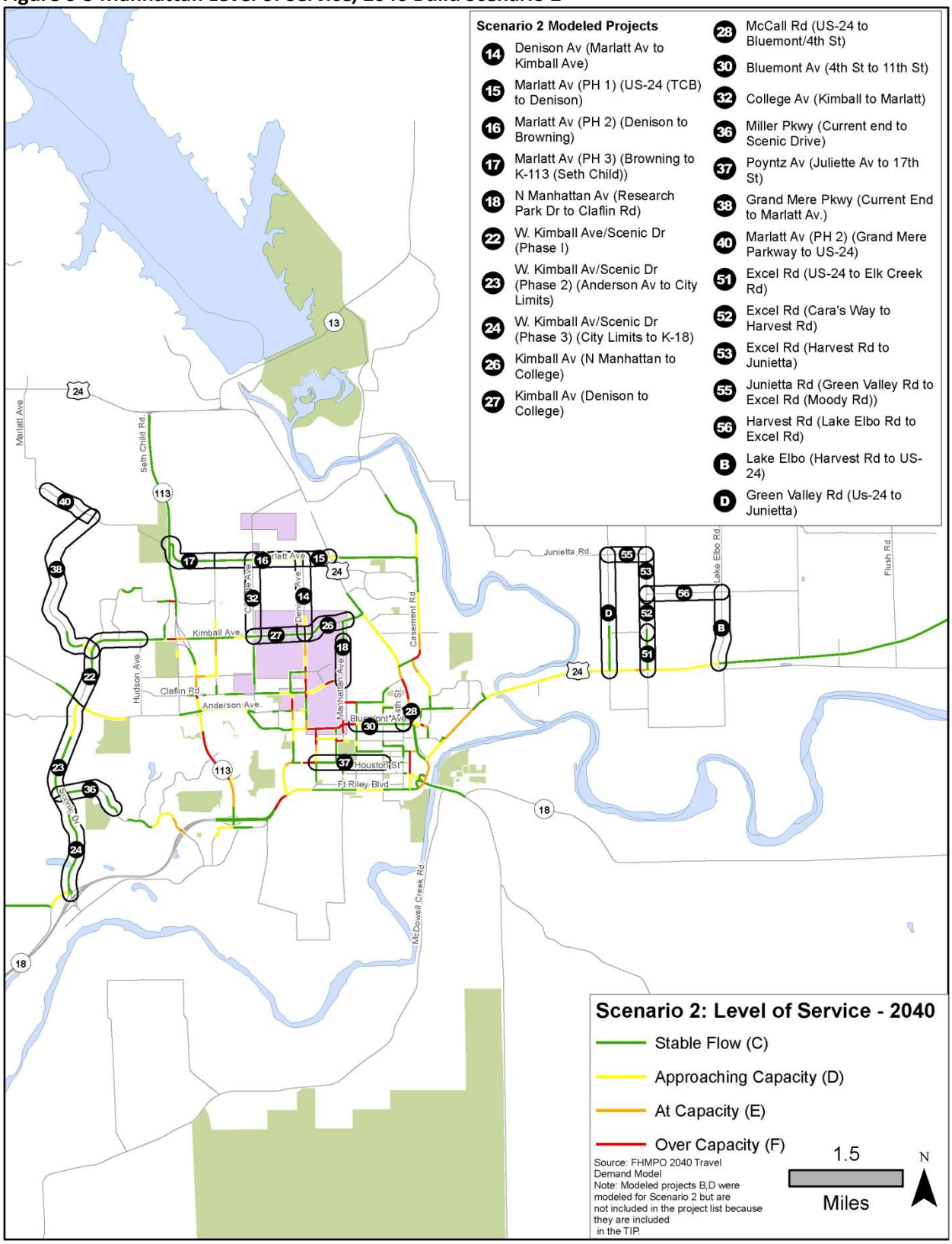


Figure 6-6 Manhattan Level of Service, 2040 Build Scenario 3

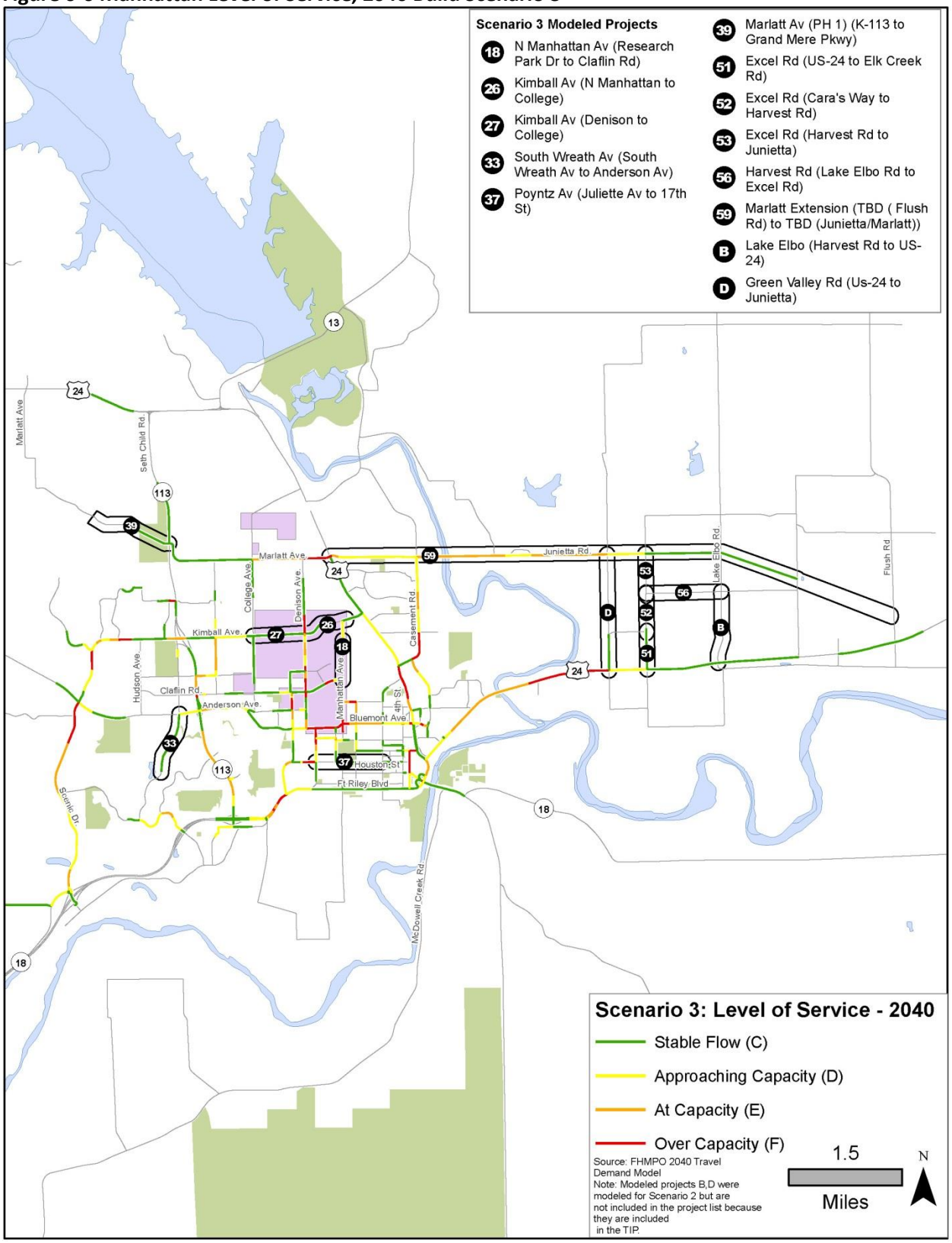


Figure 6-7 Junction City Level of Service, 2040 Build Scenario 1

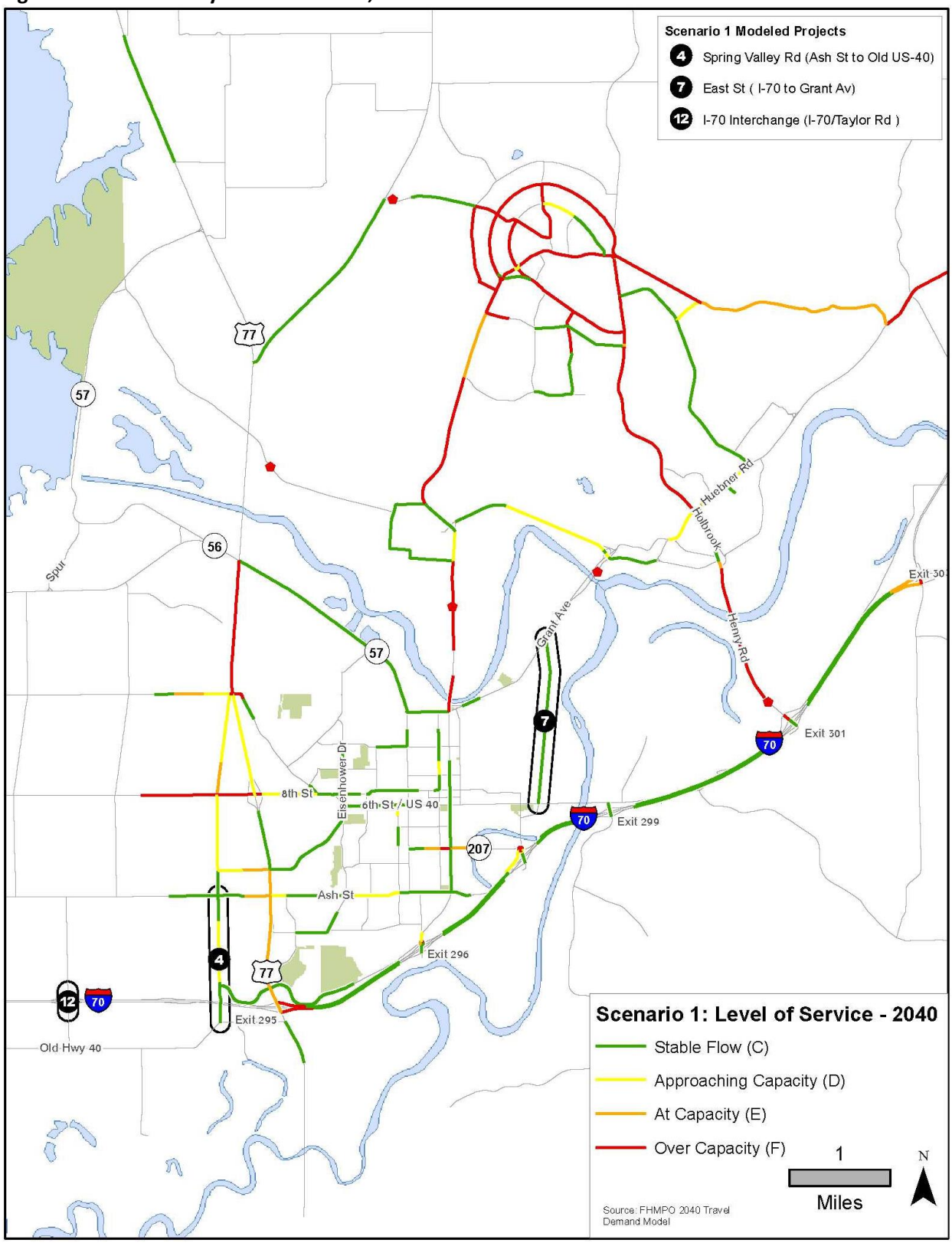


Figure 6-8 Junction City Level of Service, 2040 Build Scenario 2

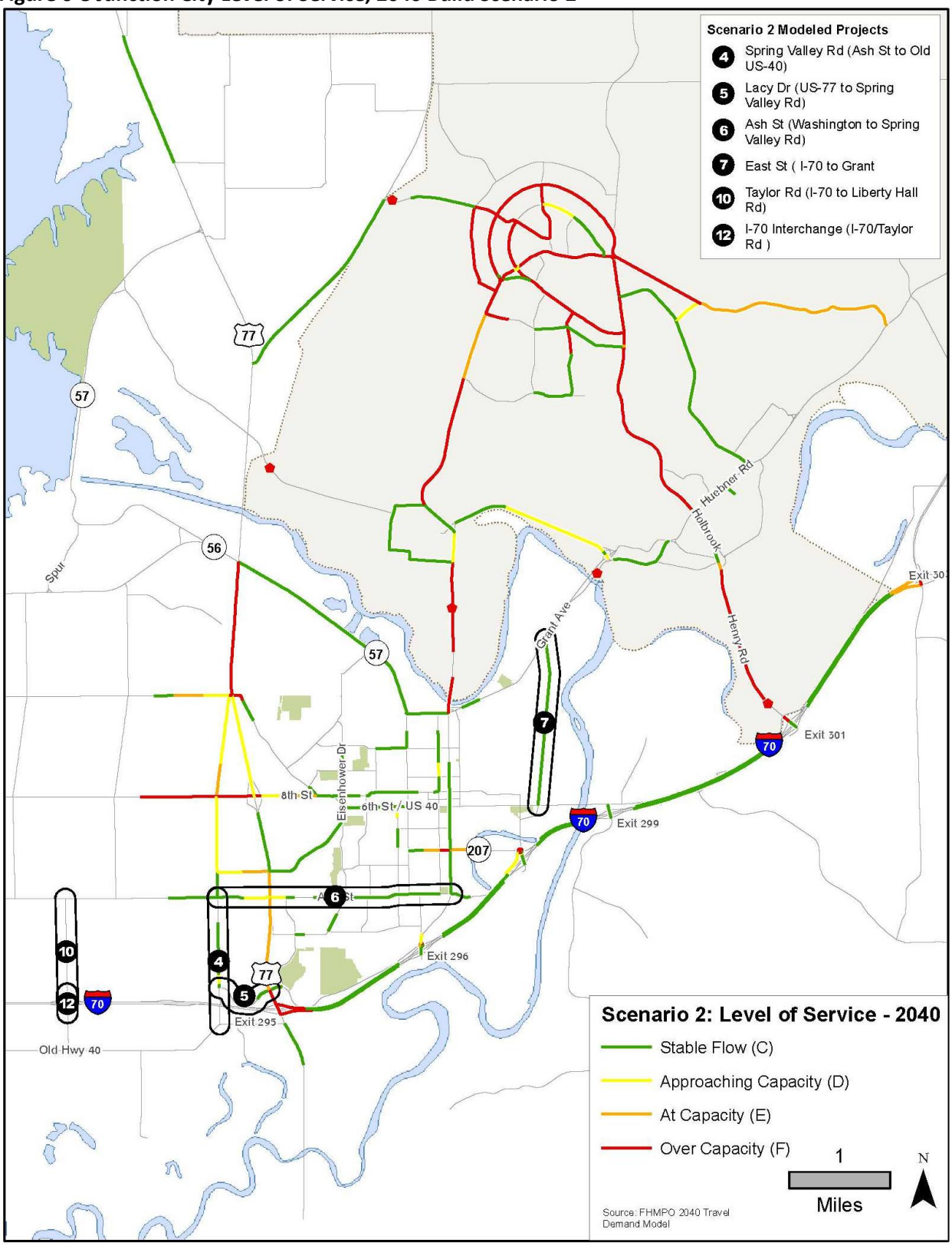
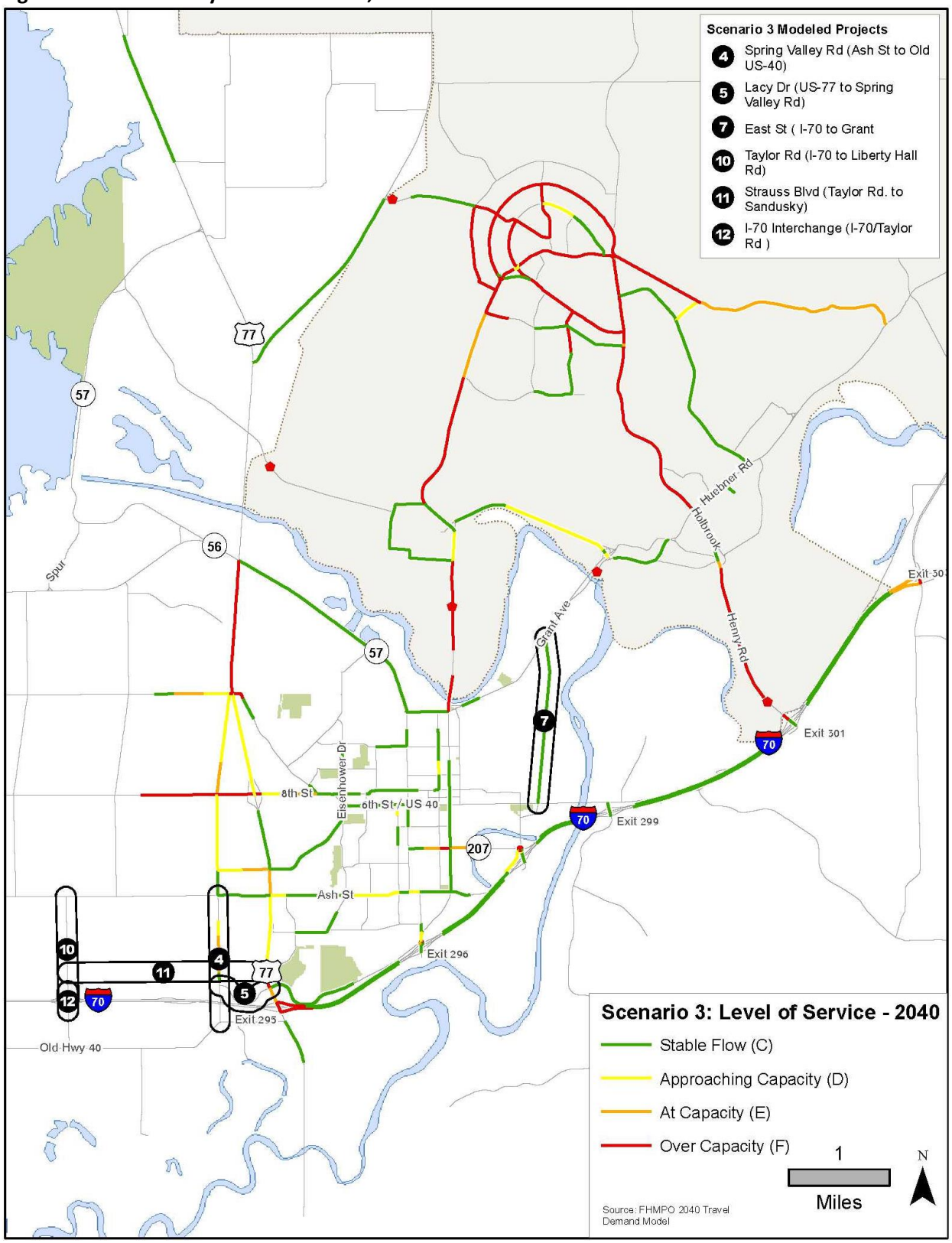


Figure 6-9 Junction City Level of Service, 2040 Build Scenario 3



The resulting volumes for each improvement modeled in Build Scenarios 1, 2, and 3 were presented to the Advisory Committee (see Appendix D). Some modeled projects in Manhattan and Junction City are smaller-scale projects and therefore do not have a noticeable impact on the roadway system and/or do not attract high travel volumes. Modeling of these projects is still an important exercise as it provides a window into the magnitude of travel volumes the improvement could potentially attract, which helps to inform whether a project is justified. Moreover, many of these projects facilitate greater connectivity of the roadway network. In other words, while these connections may not attract significant travel volumes, their potential value lies in their ability to better connect to higher functional classified roads that offer greater regional mobility.

While many of the capacity projects improved the LOS in Manhattan, several key projects stand out. When combined with several other improvements to Kimball Avenue, the expansion to five lanes of W Kimball Avenue/Scenic Drive (Phases 1-3) under Build Scenario 2 provides nearly continuous mobility improvement along the length of Kimball Avenue. With respect to Marlatt Avenue, modeling results show that the improvements are most effective when coupled with complementary improvements to Excel Road and Harvest Road. Further study is needed for US-24, but the general thinking within the region is that a combination of capacity and operational improvements to US-24 in tandem with a northern route paralleling US-24 (often referred to as the Marlatt/Junietta Extension) should be explored further.

Fewer improvements were evaluated in Junction City given that there are fewer congestion issues in the area (with the exception on-base travel on Fort Riley). Widening Spring Valley Road improves LOS across all three build scenarios as does Ash Street under Build Scenario 2. As noted above, many of the Junction City improvements do not impact the roadway system and/or do not attract high travel volumes. However, given the desire for future economic development on the western edge of the City near the I-70/Taylor Road area, the need for roadway capacity improvements may evolve over time.

Transit Alternatives Scenarios

The FHMPO TDM does not include a mode choice component. To account for this, an operational model was developed to analyze different regional transit service scenarios. A more robust discussion of the transit service scenarios along with the corresponding financial assumptions can be found in Appendix E. It should be noted, that at the time of scenario development, the FHATA was still in the process of developing fixed route service in Junction City (anticipated for early 2016). Therefore this service was not incorporated into the analysis. The transit service scenarios reflect a continuation of the current level of service as well as service enhancements and expansion.

6.1.4 Evaluation of Projects

A project scoring exercise was another tool used to assist the Advisory Committee in determining project priorities for the Plan. Project evaluation criteria were developed that included a mix of quantitative and qualitative criteria. These were applied separately for each of the modes – roads, bike, and transit (i.e., modal criteria are tailored as appropriate for each mode). The purpose of the project evaluation exercise was to help select modeling projects for the Build Scenarios as well as to help

identify priority transportation investments and illustrative projects for the regional transportation system.[16]

It is important to note that the results of the scoring process were intended to help inform the selection of projects. In other words, the ranking process was designed to support the decision-making process, rather than render a decision. The scoring results are not intended to be the final ranking, meaning that a project that scores as #1 does not necessarily mean that it reflects the top priority of the region. The FHMPO planning process is designed to recognize that there are other factors that go into the decision-making process that cannot be captured simply through project scoring.

Scoring criteria were developed consistent with the Plan goals. For each criteria, a rating scale from 3 (highest) to 0 (lowest) was applied to assess how well a particular project satisfies that criteria. To facilitate consistent use of the rating scale, a brief description on how the criteria should be applied was included. Preliminary weights were developed for review by the Advisory Committee. With each project scoring the numeric rating is multiplied by the criteria's weight to create a weighted score. Each weighted score was then summed to arrive at a total score for each project. Table 6-3 describes the roadway criteria and rating scale. The results of the scoring process for the entire list of identified transportation needs, including transit criteria and results, can be found in Appendix F.

[16] It should also be noted that since the project needs list was continuously modified throughout the planning process, the project scoring exercise represents a point in time. As noted, the project scoring was conducted prior to the alternatives analysis.

Table 6-3 Roadway Project Evaluation

Category	Evaluation Criteria	Weighted Value	3	2	1	0
Capacity Expansion	Congestion Relief	20%	Improves to LOS C or better	Improves to LOS D or better	Limited effect on LOS	No effect on LOS
Safety	Safety*	20%	Targets known safety concern	Reduces potential conflicts points	General safety improvement relative to existing conditions	No discernable safety benefit
Preservation	Asset Management	20%	High pavement or bridge preservation priority	Moderate pavement or bridge preservation priority	Routine treatment to improve pavement or bridge condition	No effect on pavement or bridge condition
Local Considerations	Potential Economic Benefits / Impacts	15%	Could significantly improve regional movement for people and goods	Supports improved regional movement for people and goods	Improves local movement for people and goods	Limited or speculative economic benefits
	Regionalism	10%	Provides significant regional connectivity, mobility, or accessibility	Provides limited regional connectivity, mobility, or accessibility	Provides localized/municipal connectivity, mobility, or accessibility	No effect to connectivity, mobility, or accessibility
	Multimodalism	10%	Accommodates bicycling	Future potential to accommodate bicycling	Minimal potential to accommodate bicycling	Does not accommodate bicycling
	Project Readiness	5%	Shovel ready	Final design	Preliminary engineering	Limited pre-planning
		100%				

**Note: It is assumed that all transportation improvements will be constructed to satisfy current safety design criteria.*

6.1.5 Area Comprehensive Plans

As described in Chapter 5, the Manhattan Area 2035 and Junction City/Geary County Comprehensive Plans were recently completed outlining future growth strategies and providing direction for future land use within the region. Growth trends from the area comprehensive plans were incorporated into the TDM, providing consistency between the development strategies in the comprehensive plans and the transportation planning process.

The FHMPO recognizes that complementary multimodal transportation system improvements will be needed to support desired land use and development patterns in the region. As such, the area comprehensive plans served as an input to defining transportation needs to accommodate future growth and also when determining investment priorities for the region.

6.2 Flint Hills Transportation Needs

6.2.1 Roadway Projects

Transportation needs within the Flint Hills region are described in more detail in Appendix F. These projects constitute the foundation from which regional priorities were drawn, and represent the complete list of regional transportation needs. The transportation project needs list addresses the "universe" of project needs within the MPA. The project needs list was developed in collaboration with the jurisdictions through an iterative process that incorporated multiple rounds of refinements. The location of these projects, grouped by project type (capacity expansion, preservation, and modernization/safety), and is shown in Figure 6-10 and Figure 6-11. The project needs list is composed of projects that typically require major capital expenditures, are important for regional mobility and connectivity, and typically support capacity, preservation, or safety. In addition, the project needs list contains other important activities, such as studies, that would inform whether future projects are warranted for inclusion in the project needs list. As noted, the project needs list was refined throughout the Plan development and is intended to be updated periodically as transportation needs are addressed, new needs emerge, or priorities change.

Figure 6-10 Location of Roadway Project Needs, Manhattan

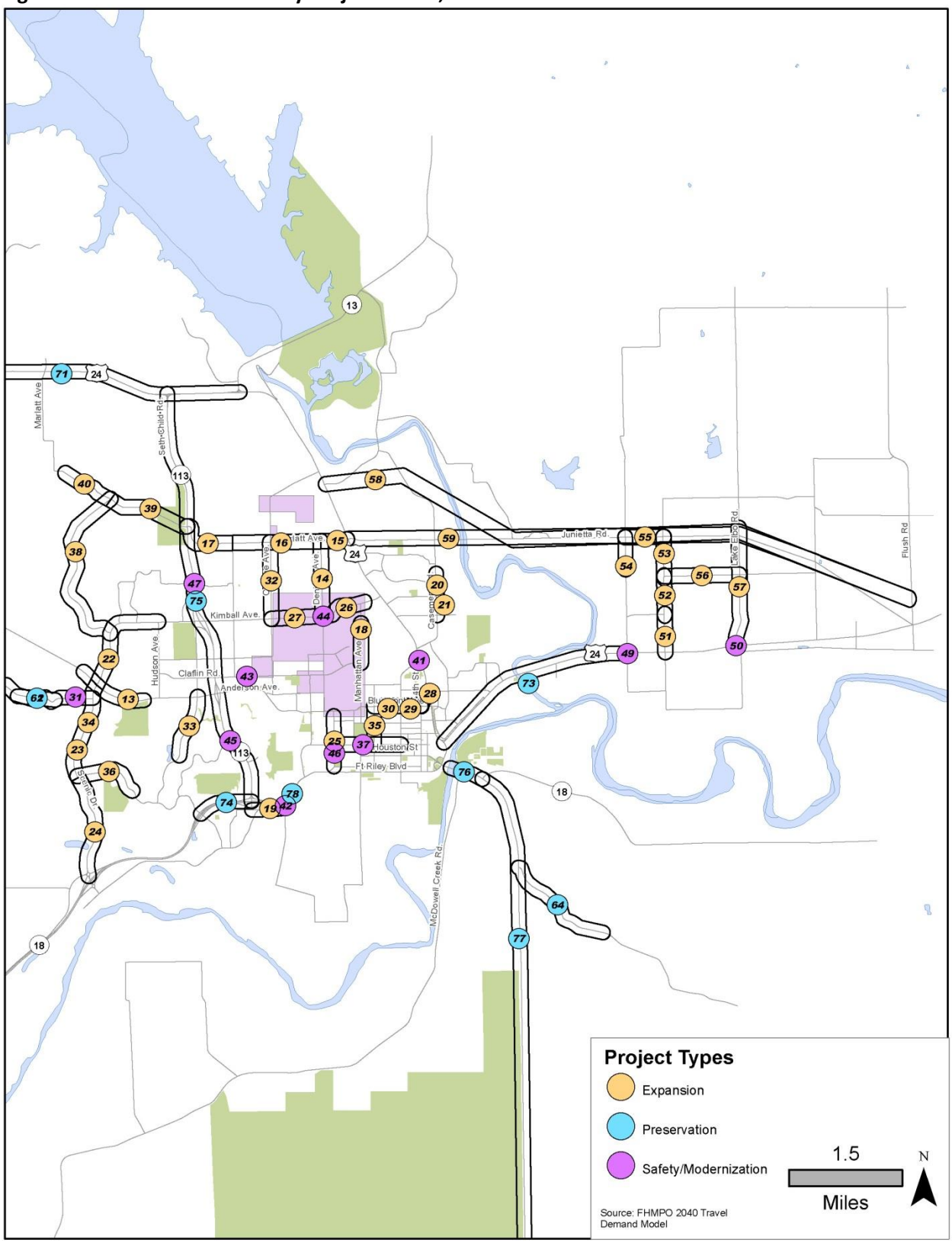
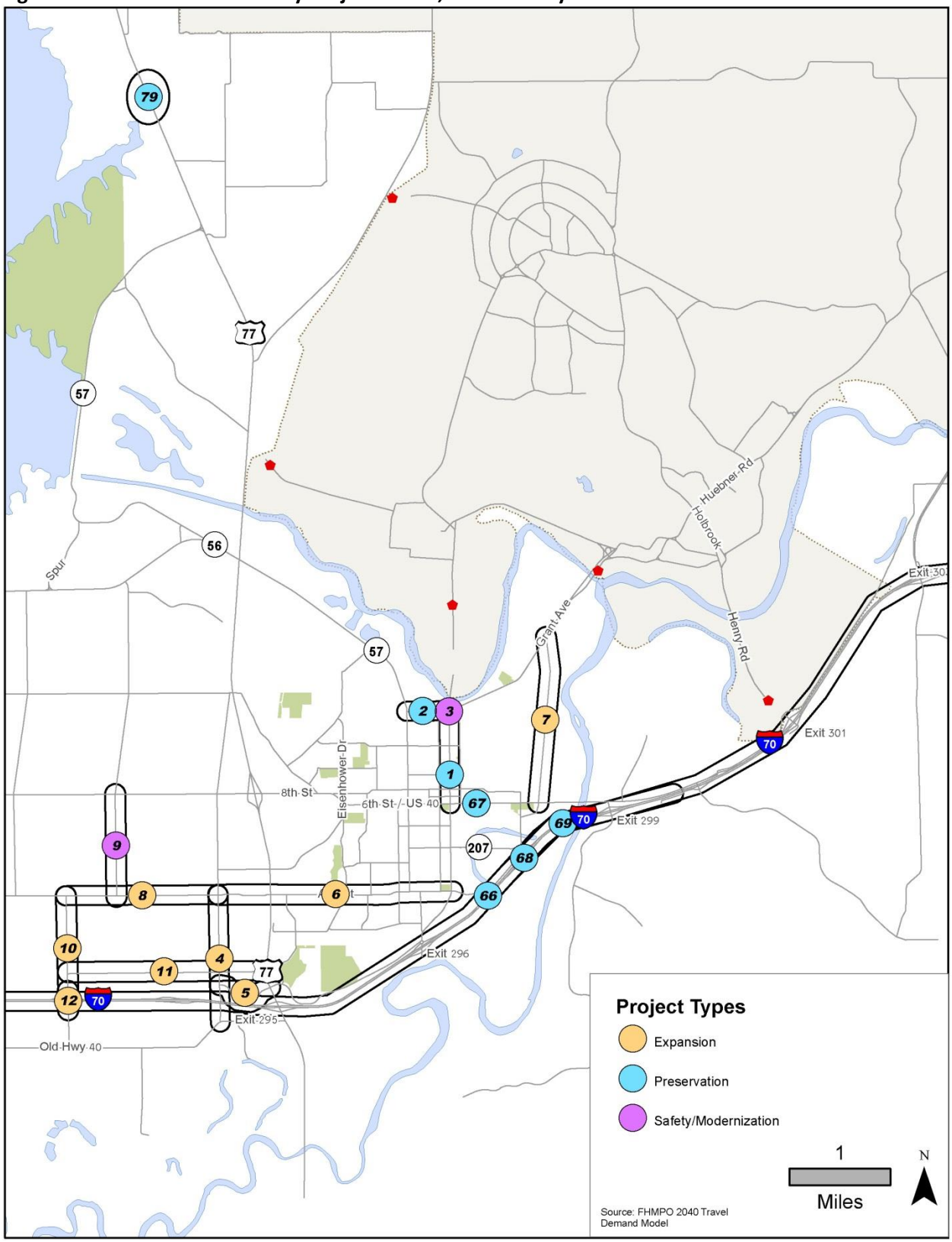


Figure 6-11 Location of Roadway Project Needs, Junction City



Fort Riley Projects

As a military installation, transportation planning and funding for Fort Riley occurs outside of the FHMPO transportation planning process and isn't overseen by FHWA and FTA. Moreover, access control at the Fort Riley gates must remain within the purview of the military for security purposes. While not directly under the FHMPO or local jurisdiction, access points to the Fort are frequently a source of traffic congestion within the MPA. As such, it is important that the transportation planning process, and area stakeholders, engage Fort Riley in the identification of issues and project needs. This engagement was completed as part of the Plan development. On-going coordination with Fort Riley will continue to play an important role in future regional transportation decisions. (See Appendix F for Fort Riley project needs.)

6.2.2 Transit Projects

While the primary priority for the FHATA is to maintain existing service, it is important that transit service evolves over time to meet customer needs. This often translates into service enhancements in terms of coverage (areas where service is offered) and frequency (amount of service offered). One way the FHATA can enhance its service offerings is through service contracts with local partners. For example, K-State has made it a priority to utilize transit service to move students, faculty, and visitors to/from the campus community. However, K-State is not the only the community with transit needs. The FHATA already provides transit service to Junction City through demand response and is currently finalizing its operational plan so that it can soon introduce fixed route service to Junction City (anticipated for early 2016). The FHATA has identified the following transit needs to more comprehensively service the region:

- Route Realignment Study – study fixed route service restructuring options;
- Expanded Coverage – new route providing access south of Poyntz;
- Orange & Green Line – extend to year round and add service frequency;
- Jardine Shuttle – extend to year round and add service frequency;
- Airport Access – new route mainly serving the Manhattan core area (with transfer to Intercity Shuttle at Ogden);
- Wamego Regional Shuttle – modify route to serve Blue Township;
- Regional Commuter Transit Study – covering Riley, Geary, Pottawatomie, Dickinson, Clay, and Shawnee Counties;
- Fort Riley Transit Study – study expansion of the currently limited access to Fort Riley and connecting to Intercity Shuttle at Ogden and covering Riley and Geary Counties;
- Fort Riley Fixed Route – study fixed route potential on Fort Riley and covering Riley, Geary, and Dickinson Counties;
- Transit Facility Expansion (Manhattan) – facility expansion for vehicle storage and maintenance; and
- Transit Facility Construction (Junction City) – new facility for transit administration, vehicle storage, and maintenance.

6.2.3 Regional Bicycle Network Projects

Like any network, the bicycle facilities in the MPA create links that can work together to facilitate travel across the region. The more linkages there are, the more useful the network becomes. At first, an individual bike facility is unlikely to attract high ridership until other connections to it are made. As such, it is important that new cycling infrastructure connect to the existing system where possible. More detail on the bicycle and pedestrian network analysis can be found in both Appendix F and Appendix G.

Phasing / Staging

Like other modes, some projects are more feasible than others. Like any other infrastructure system, building a bicycle network takes time. For example, it is common for a project to go through years of planning, community discussion, and financial preparation before it is implemented. Conversely, other projects are driven by opportunity; like when a roadway is resurfaced or reconstructed, opportunity often exists to incorporate a bikeway and walkways at a modest cost. Other projects represent minor changes to existing infrastructure and can be implemented quickly and at little cost. In addition, it is important to recognize that some network links are more critical than others. To this end, bicycle network projects are categorized into short-, medium-, and long-term projects. Each short-, medium-, and long-term project constitutes a useful connection to facilitate mobility within the regional bicycle network.

Short-Term – Timeframe is approximately 0-5 years. These are typically expected to be less intrusive and less expensive. Some short-term projects present some challenges and may be more expensive, such as the path connection along Fort Riley Boulevard, but have been included because of the critical importance of the connection they create in the regional network.

Medium-Term – Timeframe is approximately 5-15 years. Candidate projects tend to be more challenging than short-term projects and likely require further study and are higher cost.

Long-Term – Timeframe is greater than 15 years. Some projects require extensive work to overcome challenges or too expensive to be implemented in the foreseeable future given anticipated funding availability and current levels of cycling.

Bicycle Network Project Needs

The regional bicycle network consists of two different sets of projects: incidental and freestanding (see Appendix F for the listing of these projects). Incidental projects are bikeways that are tied to a roadway improvement whereas freestanding projects can be implemented independently as they are not necessarily tied to a specific roadway improvement for implementation. It should be noted that freestanding projects are incorporated into the overall phasing of projects, with many recommended for short-term implementation. Many freestanding projects are shared use path projects serving both bicyclists and pedestrians. The funding and prioritization differs depending on how these bikeway projects are categorized. Incidental bikeways are funded using the same source of funding as the roadway project. Freestanding projects typically use an independent funding source such as Transportation Alternatives Program funds or general revenue funds.

Many of the roadway projects have a bicycle and pedestrian element that could be incorporated into the project. The complete regional bicycle network is illustrated in the following maps in two different contexts: 1) as a unified network without regard to facility type emphasizing issues of connectivity and coverage across the MPA; and 2) with respect to facility type, so as to identify individual projects – pieces of the regional bicycle network – that contribute to the whole. (More information about typical bicycle facility types is contained in Appendix G.)

Figure 6-12 and **Error! Reference source not found.** illustrate the long-term unified network without regard to facility type in Manhattan and Junction City respectively. Illustrations of the short-and medium -term unified network without regard to facility type are shown in Appendix F. In general, the network in and around Manhattan is robust in the short-term, which is due in part to the presence of existing cycling infrastructure. In recent years, Manhattan has invested in building bike lanes and bike boulevards; Junction City, on the other hand, has not yet installed dedicated on-street cycling facilities.

With respect to facility type, it is not possible to recommend a specific facility type in some cases for two reasons. First, on many local streets the volumes and travel speeds are low enough that the street is already comfortable for cycling. As such, these streets are included in the network for purposes of connectivity, but are not in need of specific treatments to enhance bicycle travel. Second, in some cases a roadway presents significant challenges to providing appropriate cycling facilities. These tend to be arterials with high traffic volumes and limited right-of-way (ROW), such as Anderson Avenue in Manhattan. Given these constraints, garnering the space necessary for dedicated cycling facilities may not be feasible until the road undergoes reconstruction. These roadways are labeled “reconstruction,” meaning that appropriate bicycle facilities should be installed at the earliest possible opportunity.

Figure 6-14 and **Error! Reference source not found.** illustrate the short-term network with respect to facility type in Manhattan and Junction City respectively. Illustrations of the medium-and long-term unified network with respect to facility type are shown in Appendix F. Maps of each short-, medium-, and long-term project as compared to the overall network at the end of each phase are contained in Appendix G.

Figure 6-12 Manhattan Long-Term Bicycle Network

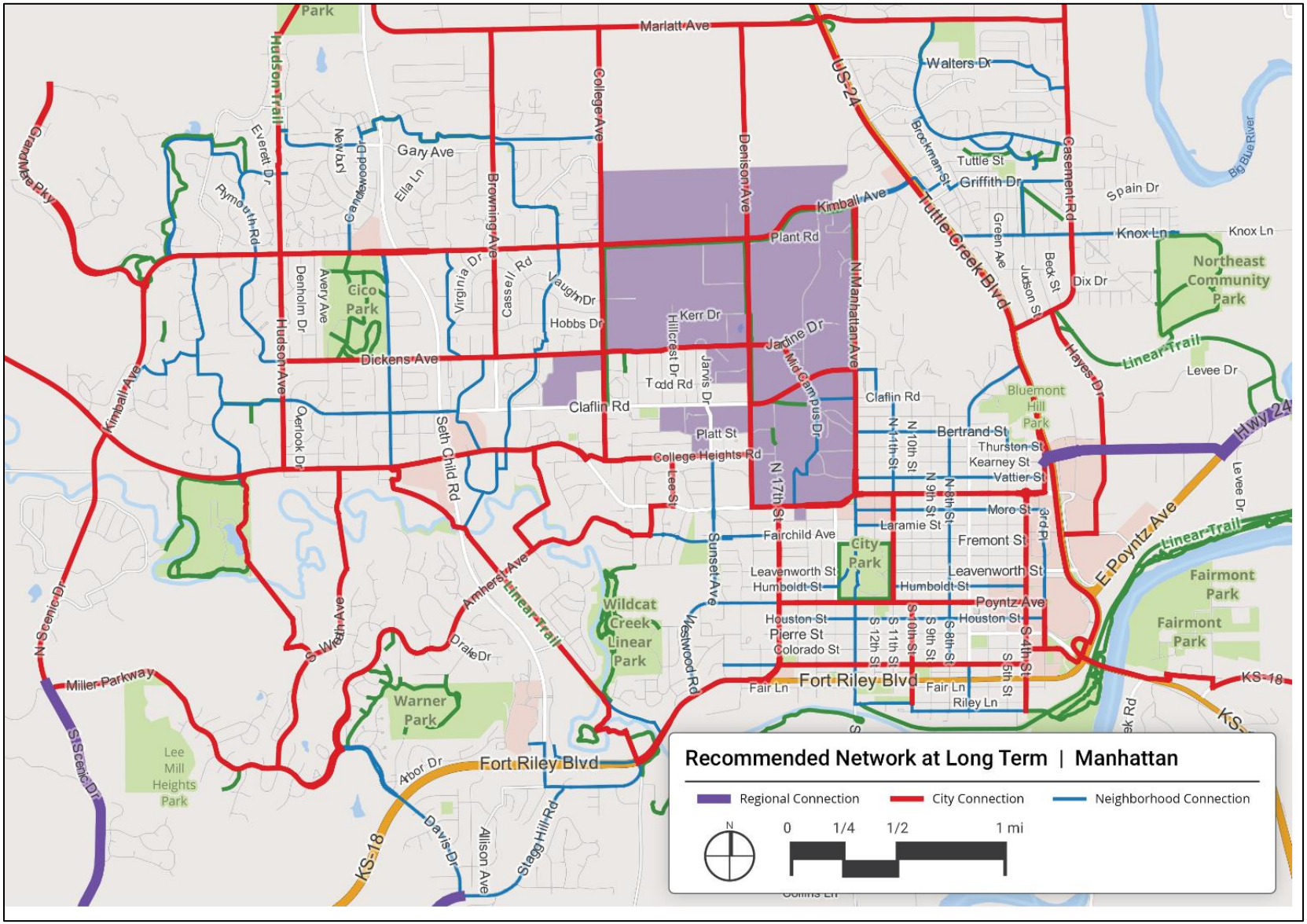


Figure 6-13 Junction City Long-Term Bicycle Network

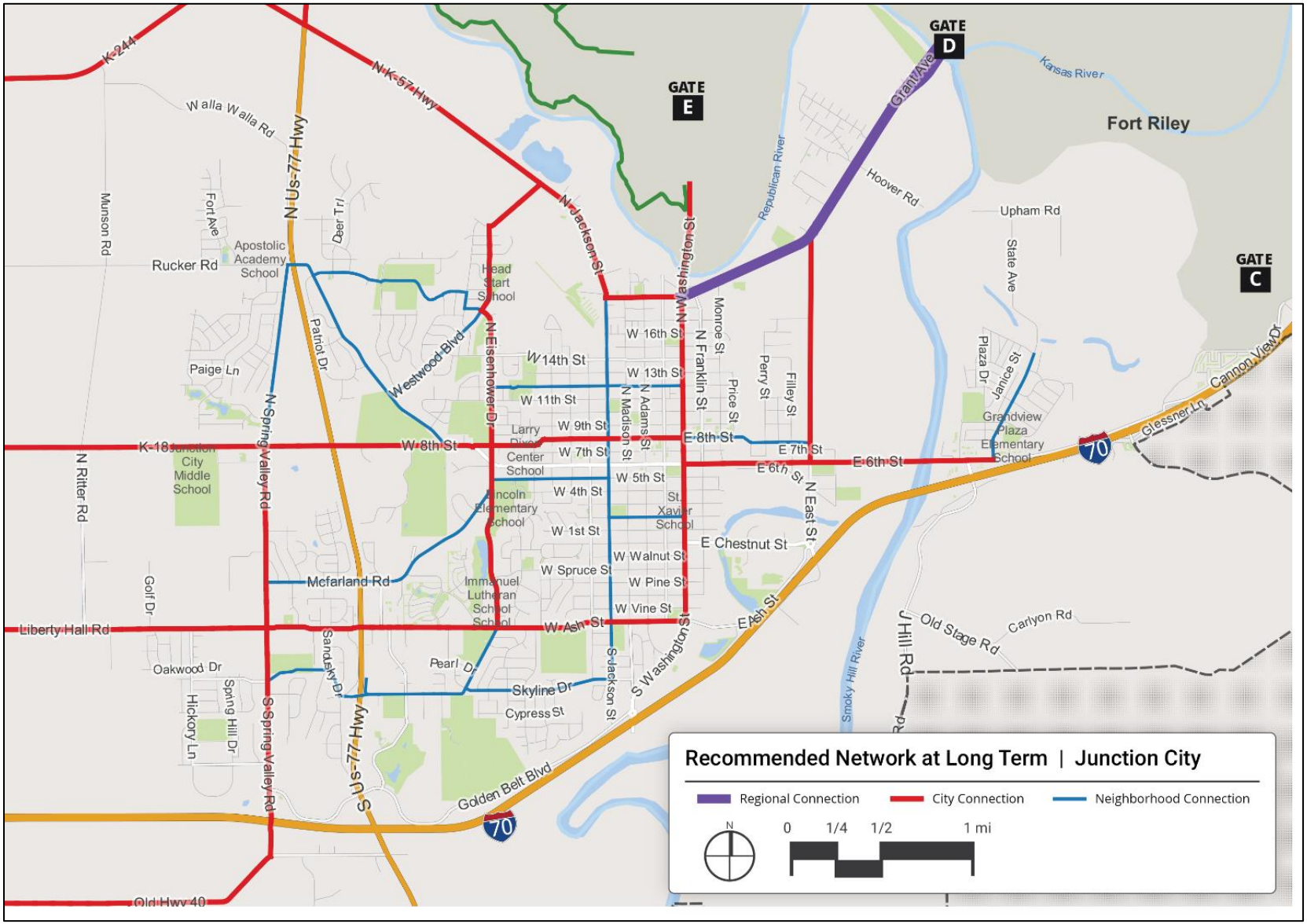


Figure 6-14 Manhattan Long-Term Bicycle Network by Facility Type

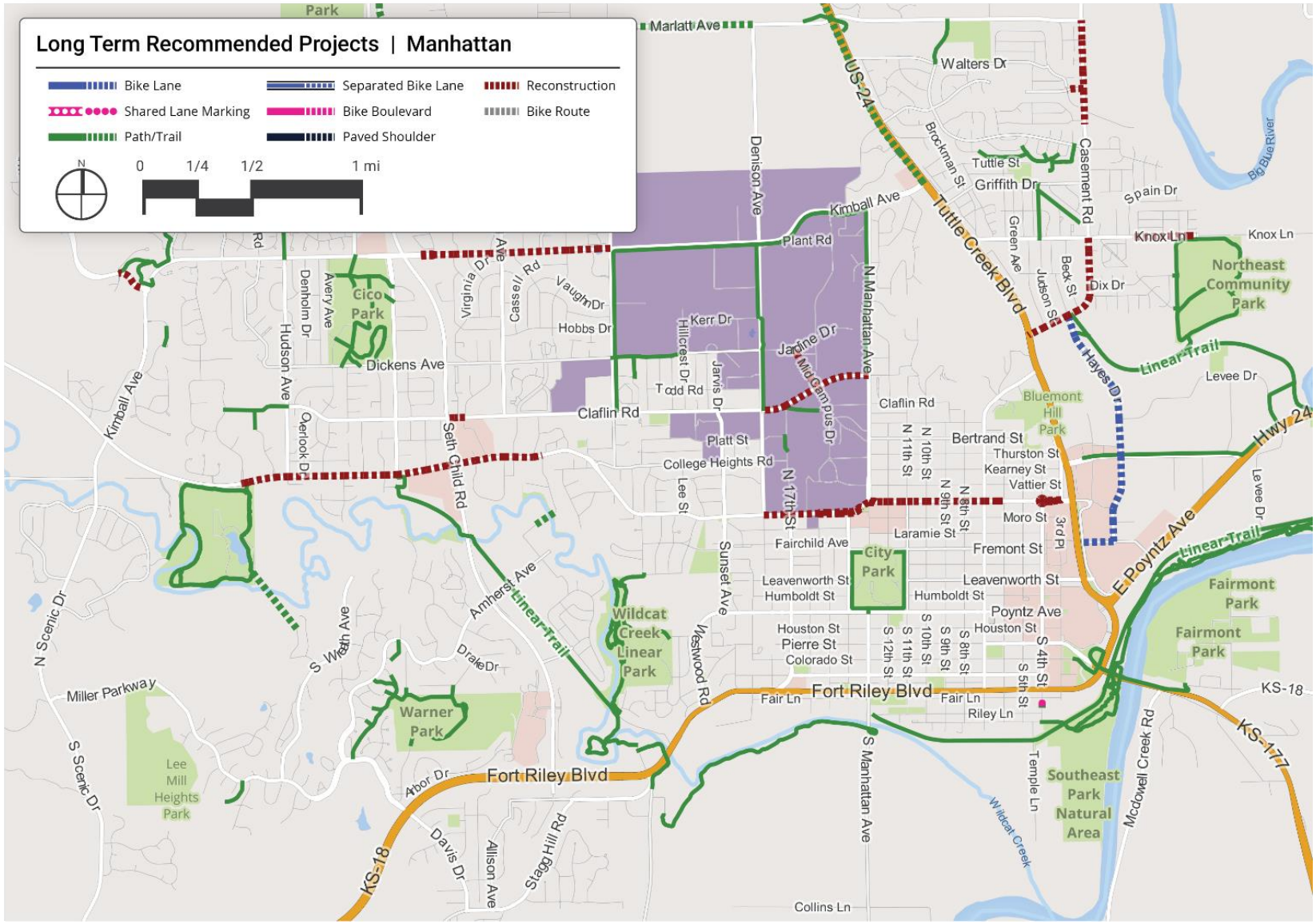


Figure 6-15 Junction City Long-Term Bicycle Network by Facility Type

Freestanding Bicycle Project Needs

Another strategy to build the bicycle network is to implement independent projects. Independent projects are seldom contained within a roadway ROW. Since implementation of these projects is not tied to a specific roadway improvement, they are considered "freestanding" by their very nature and their implementation is independent of other roadway projects. Constructing independent projects is integral to the entire bikeway network; the only difference is that, for practical purposes, independent projects are not contingent upon a roadway improvement. Shared-use paths are the most common freestanding project type since many are separated from a roadway and not dependent on other improvements. For example, several independent projects in Manhattan are bicycle boulevards where treatments, consisting primarily of markings and signage, can be added without the need for another roadway improvement such as street resurfacing or reconstruction.

6.2.4 Regional Architecture for Intelligent Transportation Systems and Projects

Intelligent transportation systems (ITS) are a set of applications of advanced computing and telecommunications technology used by transportation and public safety agencies and operators to improve the operations, management, and performance of the transportation network. ITS encompasses a broad range of wireless and hard wired communications-based information and electronics technologies for transportation infrastructure and vehicles. These technologies save time, lives, and money.

ITS Example: Traffic Signal Control / Arterial Management Technologies

- Advanced signal control / centralized control
- Adaptive control
- Signal coordination with highway-rail intersections
- Emergency vehicle preemption
- Transit vehicle priority
- Parking management and availability information

The FHMPO has completed a Regional ITS Architecture (Architecture) to guide the planning, implementation, and integration of ITS devices deployed and managed by multiple types of agencies that provide transportation services within the MPA and the greater Flint Hills region. The purpose of the Architecture is to ensure that ITS planning and deployment occurs in an organized and coordinated fashion. The complete Flint Hills Regional ITS Architecture can be found on the FHMPO website. In short, the Architecture describes the "big picture" for ITS deployment in terms of individual components (i.e., subsystems) that will perform the functions necessary to deliver the desired needs. It describes what is to be deployed; however, it does not identify how those systems are to be deployed. The Architecture defines the components and subsystems that must interface with each other, the functions to be performed by those subsystems, and the flow of data between these subsystems. A summary of the Architecture, including projects, is described in Appendix F.

6.2.5 Summary of Future Condition of Multimodal Assets

This Plan was built on the analysis of existing conditions and employed a variety of tools to define and evaluate future transportation needs within the region. Together, the results were used to inform the core set of future transportation needs in the region and, ultimately, the determination of the region's

investment priorities. The following is a summary of the major considerations reflected in the determination of future regional investment priorities for the transportation network through 2040.

Roadway

- Areas where growth is anticipated will need added capacity and improved intersection operations to support enhanced travel operations and safety. Specifically, these areas include Blue Township, the East US-24 corridor, Manhattan's downtown core area, the K-State perimeter, and the arterials proximate to the NBAF complex. Manhattan's downtown core and the K-State perimeter and Aggieville experience the most crashes since there are more conflict points in and around these locations.
- According to the Manhattan Area 2035, Blue Township is anticipated to be the largest residential growth area in the region, however there is no bypass route in/out Manhattan from this area. An alternative route to provide access to Manhattan or in combination with US-24 improvements would provide capacity relief and support evacuation operations.
- Engineers from KDOT District 1 and 2 have identified long-term pavement and bridge preservation needs. Additional preservation needs may be identified by KDOT over time and included in the next state transportation program.
- The most severe capacity issues in Junction City area are found on roadways entering and within Fort Riley.
- There is projected to be limited congestion in Junction City, which given its debt service requirements, will allow the City to focus its limited resources on routine O&M activities.

Transit

- Targeted areas in Manhattan (e.g., Aggieville/east campus edge and west campus edge) will have increased densities, with some supporting mixed-use development. FHATA will capitalize on these changes as part of the route realignment of Manhattan's fixed route transit system, which is a component of the upcoming Multimodal Integration Plan. As the current primary transit service provider, the FHATA has begun the process to determine where expanded transit services are needed (see Chapter 5).
- Until completion of the transit route realignment component of the upcoming Multimodal Integration Plan, the FHATA will focus on maintaining existing transit service and implementing enhancement where possible.

Bicycle and Pedestrian

- Currently there is no comprehensive regional bicycle network and building one takes time. The process for developing this system can be accomplished via a combination of investments in both incidental and freestanding projects. Currently, there are many opportunities to enhance connectivity through strategic neighborhood, city, and regional connections. The Regional Bicycle and Pedestrian Master Plan component of the upcoming Multimodal Integration Plan will be developed to better integrate the region's multimodal transportation system and identify opportunities for where road, bike, and transit networks intersect.

7.0 Fiscally Constrained Projects: What are our investment priorities?

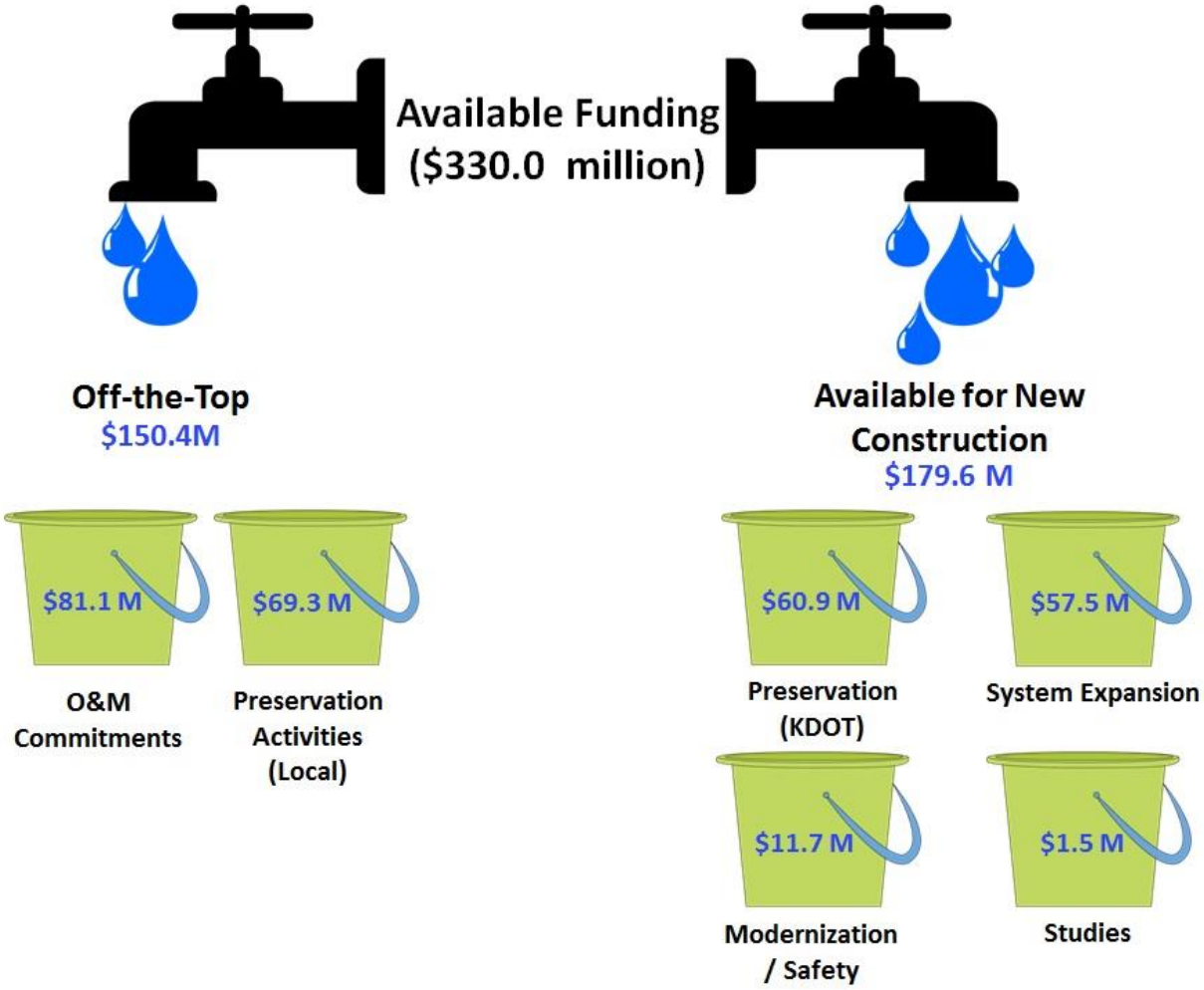
From a financial standpoint, it is impossible to address all transportation needs contained in the project list within the horizon year 2040. Simply put – needs exceed available resources. Given this reality, the FHMPO strives to be realistic about what the region's transportation needs are and uses the fiscal constraint process to guide where funding should be directed in terms of investment priorities. As such, financial assumptions were developed to provide a realistic picture of future year financial outcomes (see Chapter 5.) The region's investment priorities represent projects and studies that address an immediate transportation need and demonstrate fiscal constraint where adequate revenue sources are reasonably expected to be or become available.

Available funding – what the region can afford – totals $330.0 million; however, funding is taken "off the top" for O&M commitments ($81.1 million) and preservation activities ($69.3 million), leaving $179.6 million left for projects (see Figure 7-1). O&M commitments reflect routine activities to keep transportation facilities safely and productively open to the traveling public such sealing or pothole patching, mowing, snow removal while annual preservation expenses by local jurisdictions are spread across different (not project-specific) preservation activities as previously noted in Chapter 5. This approach reflects the region's commitment to maintaining and preserving the existing transportation network and provides a conservative assessment of future revenues available for new capital construction in the region.

As shown in Figure 7-1, the remaining funding would be directed toward the region's investment priorities, which fall across four categories:

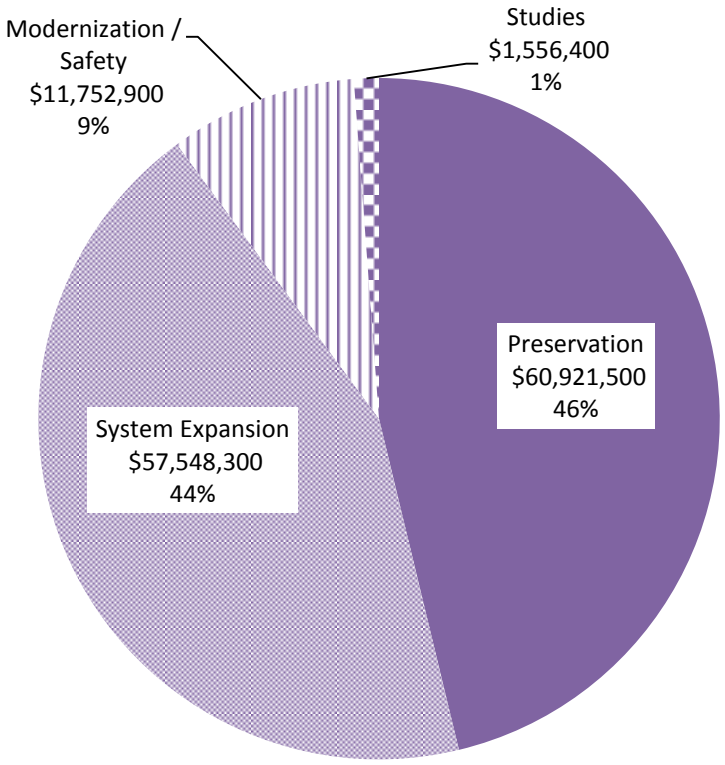
- Preservation (KDOT) – These projects protect transportation investments already made by preserving the existing State highway system (e.g., pavement rehabilitation and reconstruction, and bridge repairs and replacements).
- System Expansion – These projects add capacity to the existing system (e.g., new lanes, new roadways, interchanges).
- Modernization / Safety – These projects improve existing roadways and enhance safety (e.g., corridor management, intersection geometric design treatments, channelization)
- Studies – Corridor studies are the first step to analyzing an issue and exploring potential solutions.

Figure 7-1 Available Funding for Transportation



The region has identified a fiscally constrained $131.8 million program (in YOE dollars) of transportation projects and strategies to address transportation needs in the Flint Hills MPA. These projects reflect a range of needs, from preservation of KDOT highways and bridges to upgrading local intersections. Figure 7-2 shows the fiscal breakdown across the four project categories. Consistent with the FHMPO's emphasis on maintaining and upgrading aging road and bridge infrastructure, preservation represents the largest portion of Plan investments at 46 percent.

Figure 7-2 Regional Investment Priorites by Project Category



Roadway

The fiscally constrained roadway projects include resources for preservation of existing transportation infrastructure as well as strategic roadway expansion to accommodate future growth. These projects support the Plan goals and represent a long-term strategy for meeting future needs of area residents and the regional economy. Given that the TIP projects are already committed over the next four fiscal years (2016 through 2019), the region's investment priorities are broken out into five-year time bands beginning in 2020. These projects address many of the LOS issues and preservation needs (related to pavement and bridge condition) that have been identified throughout the long-range transportation planning process. Table 7-1 through Table 7-4 show the fiscally constrained roadway projects for each time band in YOE dollars. These projects are also illustrated in Figure 7-3 and Figure 7-4.

Because of jurisdictional involvement by the various municipalities and counties within the FHMPO, a number of projects are sequenced for implementation purposes. Breaking projects into phases provides a more realistic depiction of the coordination that will need to occur in order to implement projects that span multiple jurisdictions. Moreover, phasing projects provides greater flexibility in programming should funding become available.

Table 7-1 Investment Priorites by 2020-2025 Time Band

ID No.	Project Sponsor	Project Location	Starting Terminus	Ending Terminus	Description	Cost (YOE)
18	MHK	N Manhattan Ave	Research Park Dr	College	Road widening (5-lanes) - 4-lanes with turn-lanes at intersections	$4,933,500
21	MHK	Casement Rd (Phase III)	Griffith	Allen	Road widening to 3-lanes	$1,815,800
26	MHK	Kimball Ave	N Manhattan	Denison	Road widening (5-lanes)	$6,095,900
27	MHK	Kimball Ave	Denison	College	Road widening (5-lanes)	$1,945,500
29	MHK	Bluemont Ave	6th St	4th St	Road widening (5-lanes)	$478,300
30	MHK	Bluemont Ave	4th St	11th St	Road widening (5-lanes)	$1,020,000
36	MHK	Miller Pkwy	current end	Scenic Drive	Extend Miller Pkwy to 3-lanes, including bike lanes	$3,530,700
46	MHK	Intersection	17th-Poyntz		Intersection widening	$761,300
47	MHK	Intersection	Gary Ave-K-113		Traffic signal	$308,000
49	PT	Intersection	Green Valley Rd-US-24		Intersection improvements and widening (3-lane) up to Nellie Dr.	$2,853,400
54	PT	Green Valley Rd (Split 1)	Nellie Dr	Junietta Rd	Road widening (3-lanes) and pavement	$2,521,900
60	PT/KDOT	Marlatt/Junietta Extension APE Study			Advanced preliminary engineering (APE) study	$1,297,000
61	RL	Wildcat Creek Rd	1/2 miles W of Scenic Dr	1 mile W of Scenic Dr	GI and safety improvements	$218,900
63	RL	Intersection	Skyway-Wildcat Creek Rd	0	Turn-lanes on Wildcat Creek Rd	$972,800
65	RL	US-24 Corridor Study	K-13	E. Intersection of US-77	Corridor study/feasibility study	$259,400
74	KDOT	K-18	Miller Pkwy/Davis Dr	K-113	Heavy mill and overlay	$905,700
75	KDOT	K-113	K-18	US-24	1 1/2" mill and overlay	$2,000,000
76	KDOT	K-177	K-18	Kansas River bridge	Pavement replacement	$1,750,000

78	KDOT	K-18 Wildcat Creek Bridges	Wildcat Creek Bridges 028 & 029	Bridge replacement	$6,446,500
79	KDOT	US-77	Rush Creek Bridge (#043)	Bridge replacement	$6,126,800
TOTAL					**$46,241,400**

Table 7-2 Investment Priorites by 2026-2030 Time Band

ID No.	Project Sponsor	Project Location	Starting Terminus	Ending Terminus	Description	Cost (YOE)
25*	MHK	17th St (Split 1)	Yuma St	Laramie St	Road widening to 3-lane	$2,040,000
31	MHK	Wildcat Creek Rd Relocation	S. City limits	N. City limits	Realignment to allow for extension of the MHK Airport Runway to the West	$3,151,900
35	MHK / PT	US-24	McCall Rd	Green Valley Rd	6-lane expressway with new bridge over river with bike/ped accommodations	$10,962,000
37	MHK	Poyntz Ave	Juliette Ave	17th St	Lane reduction to 3-lanes w/ bike lanes	$1,898,800
38	MHK	Grand Mere Parkway	Current End	Marlatt Ave.	Road extension (2-lane)	$5,696,300
42	MHK	Intersection	Stagg Hill-Rosencutter		Safety improvements	$775,200
52*	PT	Excel Rd (Split 1)	Cara's Way	Harvest Rd	Road widening (3-lanes) and pavement (includes sidewalks)	$2,148,200
67	KDOT	US-40B			Viaduct replacement at UPRR & Monroe St.	$8,477,600
77	KDOT	K-177	Kansas River bridge	I-70	2" mill and overlay	$5,920,000
TOTAL						**$41,070,000**

**Note: As part of the fiscal constraint process, project is split across time bands.*

Table 7-3 Investment Priorites by 2031-2035 Time Band

ID No.	Project Sponsor	Project Location	Starting Terminus	Ending Terminus	Description	Cost (YOE)
19	MHK	Stagg Hill Rd	K-113	Rosencutter	Road widening 3-lane collector	$5,008,100
25*	MHK	17th St (Split 2)	Yuma St	Laramie St	Road widening to 3-lane	$4,048,100
28	MHK	McCall Rd (Funding Split 1)	US-24	Bluemont/4th St	Road extension/realignment, 3-lane	$2,979,000
43	MHK	Intersection	Hylton Heights-Claflin		Center turn-lanes on Claflin	$812,600
52*	PT	Excel Rd (Split 2)	Cara's Way	Harvest Rd	Road widening (3-lanes) and pavement (includes sidewalks)	$2,325,000
66	KDOT	I-70	RP 296.1	RP 300.5 EB & WB	Ultrathin bonded asphalt surface (UBAS)	$2,948,000
68	KDOT	US-40B	N East St Bridge		Bridge replacement	$5,000,000
69	KDOT	US-40B	Smoky Hill River bridge		Bridge replacement	$4,504,000
71	KDOT	US-24	K-13	US-24/US-77	Heavy mill and overlay	$6,792,200
73	KDOT	US-24	US-24/K-177	Green Valley Rd	Heavy mill and overlay	$4,528,200
TOTAL						**$38,945,200**

**Note: As part of the fiscal constraint process, project is split across time bands.*

Table 7-4 Investment Priorites by 2036-2040 Time Band

ID No.	Project Sponsor	Project Location	Starting Terminus	Ending Terminus	Description	Cost (YOE)
34	MHK	11th St	Poyntz	Bluemont	Road widening (3-lanes)	$5,522,500
TOTAL						**$5,522,500**

Figure 7-3 Location of Investment Priorities, Manhattan

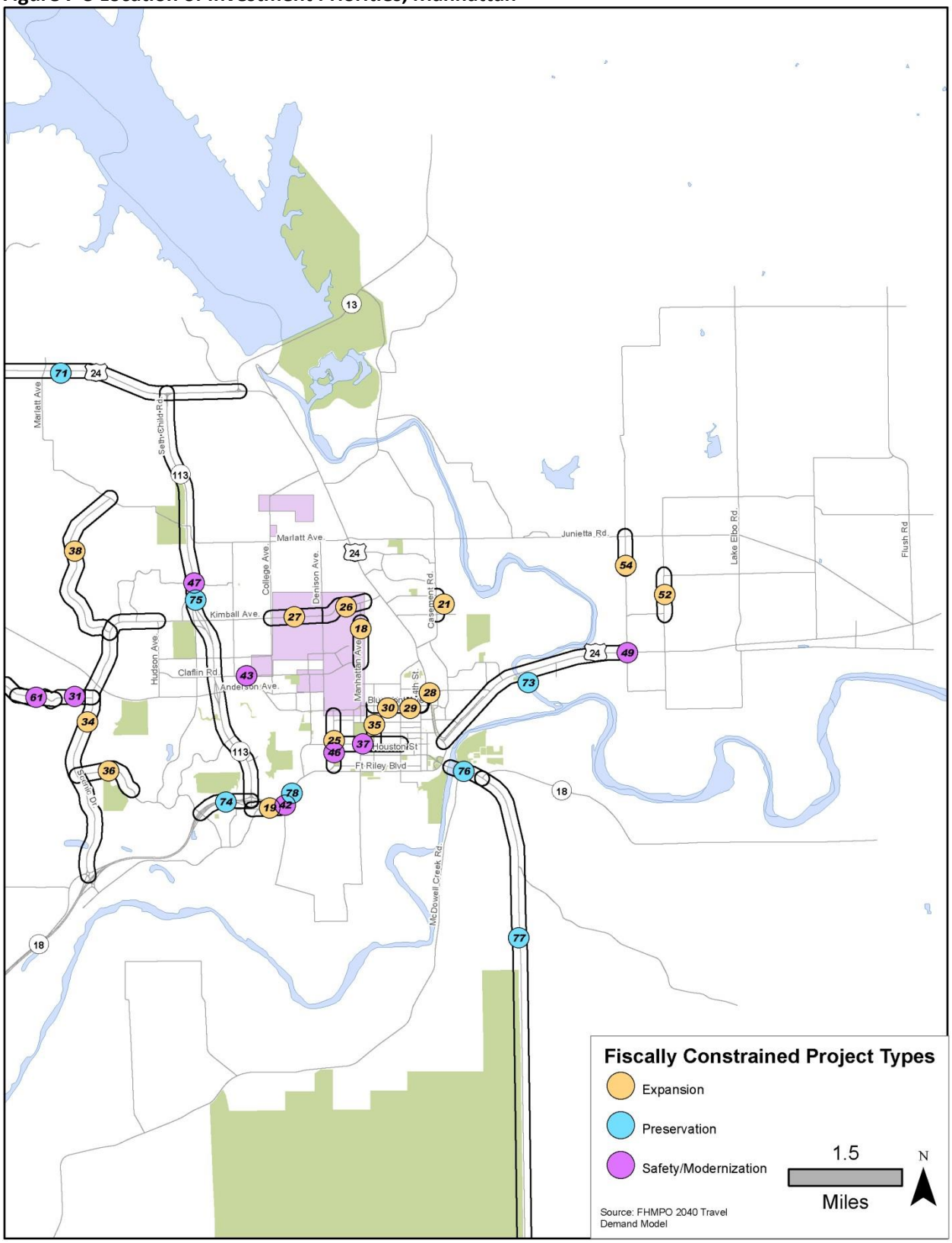
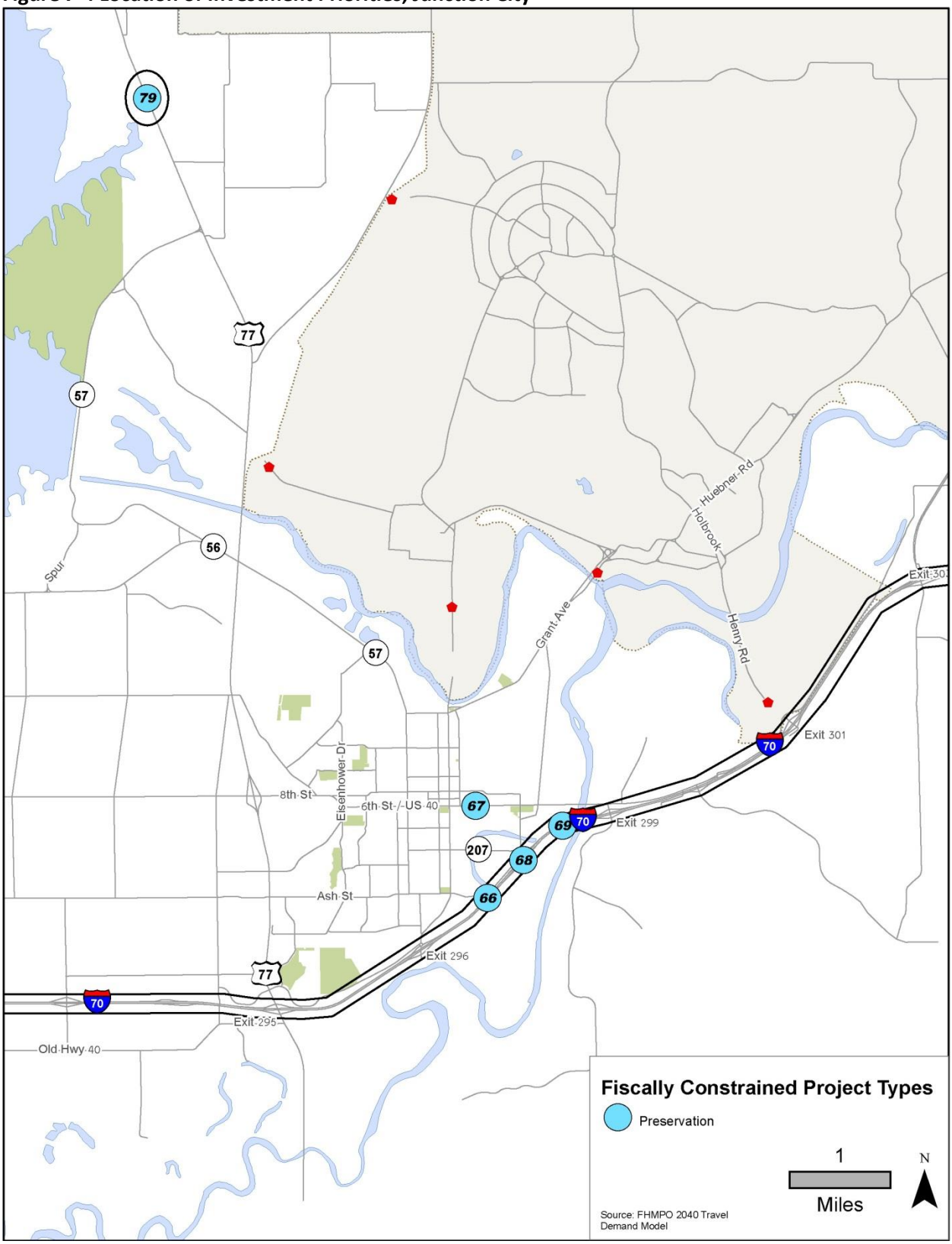


Figure 7-4 Location of Investment Priorities, Junction City



Roadway Studies

Three corridors emerged as candidates warranting further study before determining the appropriate project(s) to address existing or emerging transportation needs.

- Marlatt Extension Advanced Preliminary Engineering (APE) Study – The APE would determine whether an extension is needed as an alternative to US-24 or in combination with US-24 improvements. This study is a regional investment priority.
- US-24 Corridor Study – This study would focus on identifying safety improvements, such as passing lanes, left/right turn lanes, paved shoulders, cross sections, intersections, and additional traffic operational improvements. This study is a regional investment priority.
- K-113 Corridor Study – This study would assess corridor management strategies to preserve the existing quality of service to travelers and to accommodate anticipated growth in the area.

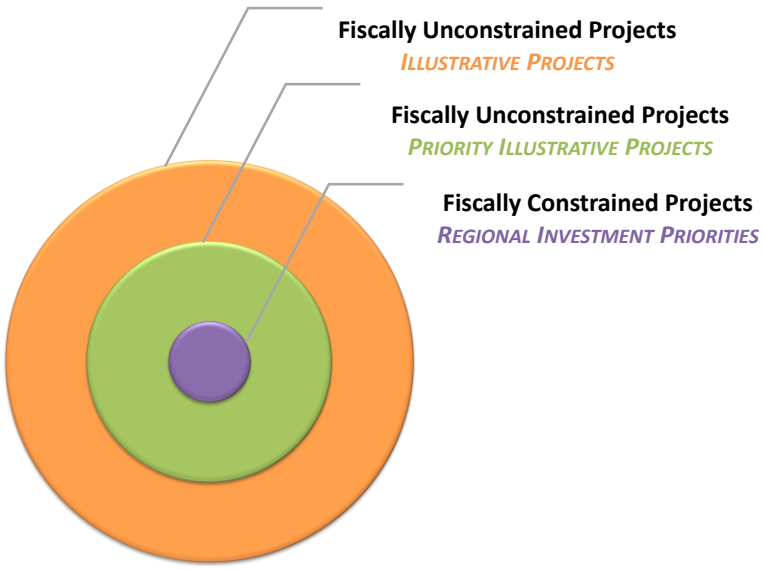
Transit

As described in Chapter 5, the transit service scenarios evaluated as part of the planning process reflect both a continuation of the current level of service and service enhancements and expansion. As part of the transit financial analysis described in Chapter 5, it was determined that revenues are not available to support all operational and capital transit needs through 2040. Assuming modest growth in transit revenues, transit funding for existing service is sustainable over the next 15 years before a deficit occurs and service cuts or an alternative revenue source to balance the budget would be needed (see Existing Service Transit Scenario: Revenue Alternative 1A). In short, the fiscally constrained Plan contains only existing transit service.

To meet future demand and continue to serve the mobility needs of the region through enhanced regional services, alternative revenue streams will need to be explored. FHATA will continue to pursue additional funding source(s) in order to implement unfunded improvements.

7.1 Illustrative Projects

Projects that support the transportation network but do not have funding committed as part of the fiscally constrained Plan are categorized as 'illustrative' projects for future consideration. Given the nature of long-range transportation planning, some illustrative projects may be conceptual or represent a potential need beyond the 2040 planning horizon. In general, illustrative projects do not



necessarily address an immediate transportation need and/or may require additional study and evaluation before they can advance to the fiscally constrained priority list.

To underscore that illustrative projects reflect identified needs and are not merely a "wish list", the FHMPO has specified illustrative projects in order of priority for the region. Priority illustrative projects should be given consideration first if additional funding becomes available or community priorities and future conditions change. These are shown in order of importance to each jurisdiction in Table 7-5 through Table 7-8.[17]

Two illustrative projects of interest to the region are the Marlatt Avenue extension (Project ID No. 58 and 59) and the I-70 interchange at Taylor Road (Project ID No. 12). Currently, these projects are at a conceptual level and require further detailed analysis to inform the decision-making process. Given the amount of additional analysis that will be necessary, their implementation may be beyond the 2040 planning horizon. It is anticipated that together the Marlatt Extension APE Study and the US-24 Corridor Study will help inform whether a parallel route to US-24 is needed as an alternative route or in combination with East US-24 improvements. With respect to the I-70/Taylor Road area, Junction City has identified this area as offering the best opportunity for future industrial growth. While development has not yet occurred in this area, should such development occur over time, future transportation investments will likely be necessary.

[17] Geary County has not identified priority illustrative projects.

Table 7-5 Manhattan Priority Illustrative Projects

ID No.	Jurisdiction	Partner Jurisdiction	Project Location	Starting Terminus	Ending Terminus	Description	Cost ($2015)
22	MHK	MHK / RL	W. Kimball Ave/Scenic Dr (Phase I)	Hudson	Anderson Ave	Road widening (5-lanes)	$13,187,500
23	MHK	MHK / RL	W. Kimball Ave/Scenic Dr (Phase 2)	Anderson Ave	City Limits	Road widening (5-lanes)	$12,100,000
24	RL	MHK / RL	W. Kimball Ave/Scenic Dr (Phase 3)	City Limits	K-18	Road widening (5-lanes)	$11,187,500
48	MHK		K-113 Corridor Study	US-24	K-18	K-113 corridor study	$300,000

Table 7-6 Junction City Priority Illustrative Projects

ID No.	Jurisdiction	Partner Jurisdiction	Project Location	Starting Terminus	Ending Terminus	Description	Cost ($2015)
12	GE	JC / GE	I-70 Interchange	I-70/Taylor Rd		New interchange	$15,000,000
4	JC		Spring Valley Rd	Ash St	Old US-40	Road widening (3-lanes)	$1,922,300
6	JC		Ash St	Washington	Spring Valley Rd	Road widening (3-lanes)	$4,019,300
5	JC		Lacy Dr	US-77	Spring Valley Rd	Road widening (3-lanes)	$2,000,000
3	JC		Intersection	Washington St - 18th		Safety/lane improvements	$393,500

Table 7-7 Riley County Priority Illustrative Projects

ID No.	Jurisdiction	Partner Jurisdiction	Project Location	Starting Terminus	Ending Terminus	Description	Cost ($2015)
62	RL		Wildcat Creek Rd	1/2 miles W of Scenic Dr	1 mile W of Scenic Dr	Construction/paving	$5,185,000
64	RL		Deep Creek Rd	K-177	1.5 mi south	Reconstruction	$6,510,000

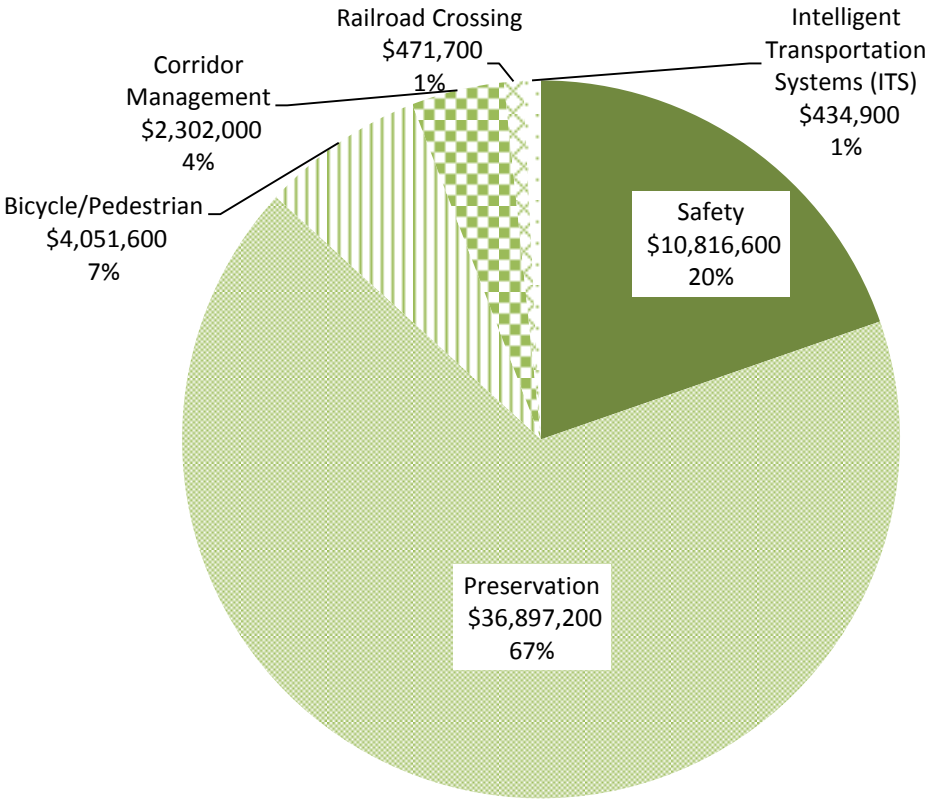
Table 7-8 Pottawatomie County Priority Illustrative Projects

ID No.	Jurisdiction	Partner Jurisdiction	Project Location	Starting Terminus	Ending Terminus	Description	Cost ($2015)
51	PT		Excel Rd	US-24	Elk Creek Rd	Road widening (3-lanes) & intersection improvements	$2,170,000
53	PT		Excel Rd	Harvest Rd	Junietta	Road widening (3-lanes) and pavement	$2,728,200
54	PT		Green Valley Rd	Nellie Dr	Junietta Rd	Road widening (3-lanes) and pavement	$1,944,400

Other Potential Project Funding Sources

KDOT routinely conducts a 'call for projects' where eligible projects are submitted for funding across a variety of discretionary programs. Based on historic and programmed funding (FY 2010 – FY 2021), Figure 7-5 presents what has/will be spent within the MPA outside of T-WORKS. The summary information contained in Figure 7-5 provides a baseline of the amount of funding spent in the region across key project types. Moreover, it is intended to be a resource moving forward to assist local jurisdictions in understanding the amount of funding that may be available when future 'calls for projects' occur.

Figure 7-5 Discretionary Grant Funding Program Funding Levels, 2010 – 2021



For example, there are a number of transportation improvements contained in this Plan that are eligible for discretionary funding. Two popular KDOT discretionary grant programs – Geometric Improvement (GI) and City Connecting Links (KLINK) – provide reimbursable grants to local governments that could be used for the illustrative projects where appropriate. The GI program is typically used to improve drainage, capacity and intersections, add turning lanes, and other improvements. The KLINK program is utilized for maintenance work such as resurfacing. Another potential funding source is the High Risk Rural Roads (HRRR) program, which can be used for safety improvements on rural major collectors, minor collectors, and local roads. In addition to any eligible projects that local jurisdictions have

identified, the FHMPO has identified the following projects as potential candidates for these programs, shown in Table 7-9.

The current federal funding sources with the most potential to fund bicycle and pedestrian projects are the STP-Urban program, Highway Safety program, and the Transportation Alternatives Program. These funds are best suited and should be reserved for the identified freestanding projects identified earlier in Table 7-9. Bikeway and pedestrian improvements tied to roadway projects should be funded through the same sources as the roadway.

Table 7-9 Candidate Projects for KDOT Discretionary Grant Programs

ID No.	Jurisdiction	Project Type	Project Location	Description	Eligible Program
1	JC	Preservation	Washington St./US-57	Preservation - deteriorating road surface	KLINK
2	JC	Preservation	18th St./US-57	Preservation - deteriorating road surface	KLINK
3	JC	Safety	Intersection	Safety/lane improvements	GI
41	MHK	Safety	Intersection	Right turn-lane for SB traffic	GI
45	MHK	Safety	Intersection	Intersection improvements	GI
47	MHK	Safety	Intersection	Traffic signal	GI
49	PT	Safety	Intersection	Intersection improvements and widening (3-lane) up to Nellie Dr.	GI
50	PT	Safety	Intersection	Add turn-lanes- all approaches, and widening (3-lane) up to Lake Elbo	GI
61	RL	Safety	Wildcat Creek Rd	GI and safety improvements	HRRR

8.0 Delivering the Plan: How will the Plan affect communities and the environment?

The Plan represents the desired transportation investment strategy for the region. As part of the planning process, the next step is to understand how our investment priorities affect the people who live here and the surrounding environment. The analyses contained herein provides a system-level summary of the potential impacts of the planned transportation projects on EJ populations and the area's resources, not on the specific impacts of an individual project. As a project advances through the project development process, it will be more closely examined to determine its impacts and whether it creates adverse effects or generates benefits. At that time appropriate measures to avoid, minimize, or mitigate these impacts would be developed as required by the National Environmental Policy Act (NEPA). Appendix H provides more detail about these analyses.

8.1 What is Environmental Justice?

Environmental Justice (EJ) is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of laws, regulations, and policies. The purpose of an EJ analysis is to determine whether potential transportation projects will have significant impacts on an area's communities and resources, to ensure no person is denied the benefit of such projects, and to then avoid, mitigate, or minimize any impact. The Plan adheres to federal requirements for environmental justice in which transportation plans and programs:

1. Must provide a fully inclusive public outreach program;
2. Should not disproportionately impact minority and low-income communities; and
3. Must assure the receipt of benefits of FHWA programs, policies, or activities by minority and low-income populations.

The planning process used to develop the Plan addresses these three principles. These principles are also adhered to in the TIP development process and will be considered for future projects as they move toward project design and implementation phases.

The EJ analysis herein evaluates the location of the region's investment priorities in relation to EJ populations. EJ populations are identified as areas of minority or low-income. Using the 2009-2013 American Community Survey (ACS) five-year estimates dataset from the U.S. Census, population groups were identified and located at the census tract level. Individual tract characteristics are assessed to determine whether the area is considered a minority and/or low-income area and then mapped in relation to the distribution of regional investment priorities (i.e., fiscally constrained projects).

Methodology to Identify EJ Tracts

Census tracts meeting one or both of the following criteria are defined as an EJ tract:

- The minority population is 20 percent or greater than the average for the respective area; and/or
- The median household income is at or below the Department of Health and Human Services' poverty threshold.

8.1.1 Environmental Justice Populations

Given that the regional investment priorities may receive federal funding, the FHMPO must ensure that programs, policies, and projects do not discriminate against minorities and low income populations.

Minority

Minority populations are defined as any identifiable group of minority persons who live in geographic proximity. Additionally, minority populations can include geographically dispersed or transient persons who would be similarly affected by a proposed transportation improvement. Minority persons include those who are American Indian, Alaska Native, Asian, Black or African American, Hispanic or Latino, and Native Hawaiian and other Pacific Islander.

Minority populations are identified based on census tract data in comparison to the county's average minority population. EJ and non-EJ minority areas are represented based on a census tract with a 20 percent or greater minority population than the average minority population for that county. Based on this methodology, the minority population thresholds for each county in the MPA are:

- Geary County: 37.4 percent;
- Riley County: 16.0 percent; and
- Pottawatomie County: 16.0 percent.

Low-Income

Low-income populations are defined by the median household income for all census tracts in the MPA. Based on ACS data, low-income populations are considered those with a median household income below the national poverty threshold, defined as $23,500 by the Department of Health and Human Services, and are identified based on census tract data.

Figure 8-1 and Figure 8-2 displays areas that meet the low-income threshold in the MPA. In the Manhattan area there is only one census tract that exceeds the EJ threshold, while in the Junction City area there are no census tracts that meet the EJ threshold. The qualifying tract in Manhattan is located adjacent to K-State campus and mainly consists of rental units occupied by students. An analysis of the median income of Riley County was recently conducted for the Manhattan Area Habitat for Humanity.[18] The analysis notes that the student population in Riley County significantly alters the median income for the County since the student population is roughly one-third of the total population. Students have lower median incomes reported than the general population as they often work only part-time, rely on loans, grants and/or parental financial support. For the purposes of the EJ analysis, the FHMPO does not consider this tract to meet the intent or definition of a low-income population and is therefore excluded.

8.2 EJ Analysis of Plan Investment Priorities

It should be noted that all transportation projects will have some level of impact on people and the environment whether they be short- or long-term impacts. These may be beneficial, such as making

[18] Katherine Nesse, Kansas State University, "Memorandum on Median Income for the population of Riley County, excluding students, June 3, 2013," Manhattan Area Habitat for Humanity.

more travel options available to users, improving connectivity of the modal network (road, transit, or bicycle/pedestrian), and reducing congestion. Other impacts may be negative, such as noise or air pollution, disruption to natural resources, and the displacement of persons or businesses. Where significant adverse impacts occur, appropriate measures should be taken to avoid, mitigate, or minimize them. As previously noted, a more detailed analysis of impacts occurs as projects move through the project development process.

Effects of Plan Investment Priorities

As shown in Table 8-1, in total there are 13 roadway investments (including two studies) planned in areas with EJ populations, including studies, all of which are located in Manhattan. Figure 8-1 and Figure 8-2 displays EJ populations by census tract within the MPA for Manhattan and Junction City in relation to the region's planned roadway investment priorities broken out by project type. In Manhattan, there are three census tracts that exceed the EJ threshold. There are two census tracts in Junction City and one in Fort Riley that exceeds the EJ threshold.

Figure 8-3 displays EJ populations by census tract within the MPA for Manhattan in relation to the region's planned transit investments. Revenues are not available to support all operational and capital transit needs through 2040. As such, transit investments reflect a continuation of the current level of service. There are no roadway investment priorities with an identified bicycle or pedestrian component located in an EJ tract; however, the comprehensive bicycle network as envisioned in Chapter 5 could potentially service these populations.

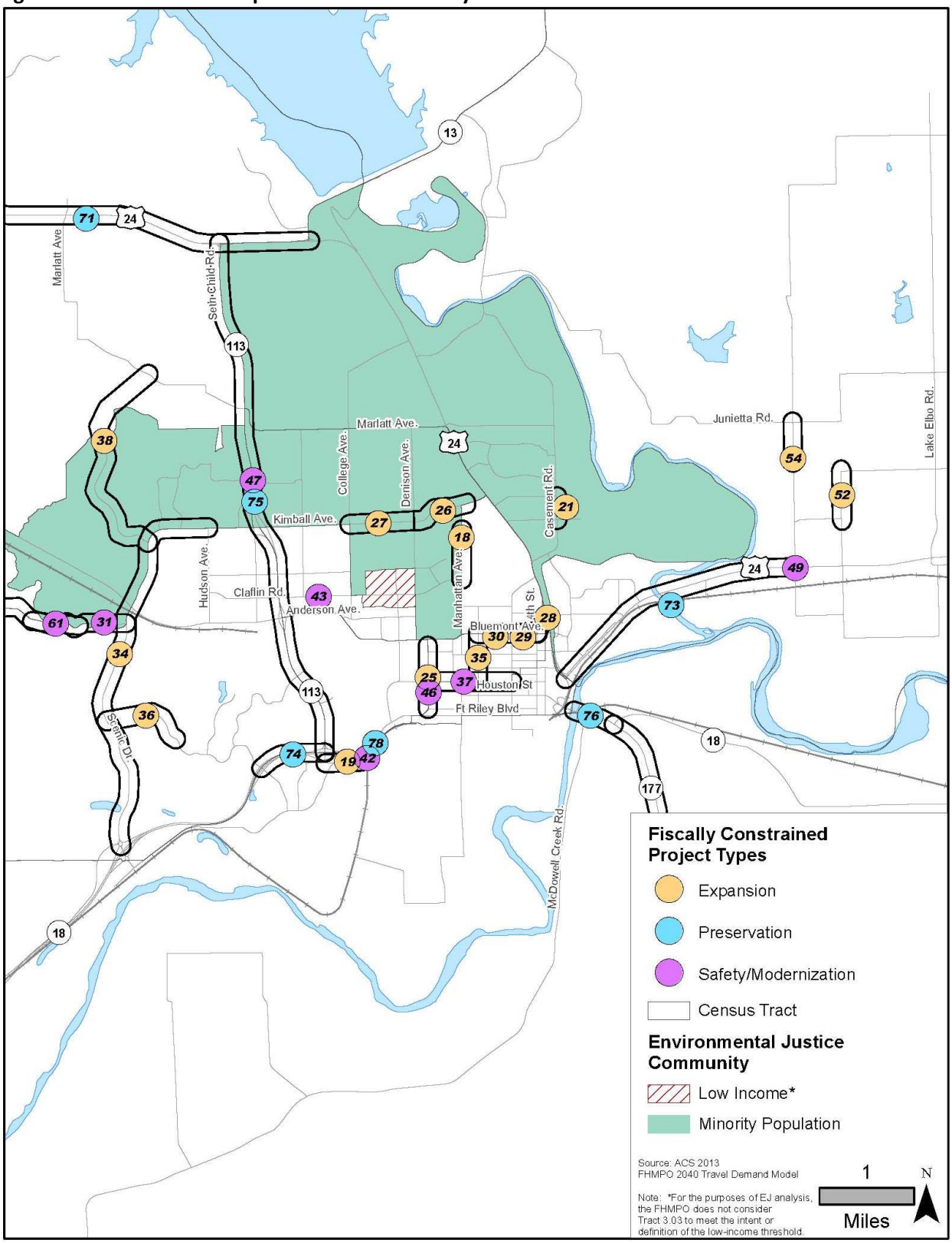
Table 8-1 Roadway Investment Priorities Located in EJ Tracts

ID No.	Project Type	Roadway	Starting Terminus	Ending Terminus	Description	Benefit
18	Expansion	N Manhattan Ave	Research Park Dr	Claflin Rd	Road widening (5-lanes) - 4-lanes with turn-lanes at intersections	
21	Expansion	Casement Rd (Phase III)	Griffith	Allen	Road widening to 3-lanes	Includes bicycle and pedestrian improvements and crossings
26	Expansion	Kimball Ave	N Manhattan	Denison	Road widening (5-lanes)	Includes bicycle and pedestrian improvements and crossings
27	Expansion	Kimball Ave	Denison	College	Road widening (5-lanes)	Includes bicycle and pedestrian improvements and crossings
31	Safety	Wildcat Creek Rd Relocation	S. City limits	N. City limits	Realignment to allow for extension of the MHK Airport Runway to the	

					West	
34	Expansion	11th St	Poyntz	Bluemont	Road widening (3-lanes)	Includes bicycle lanes and sidewalk improvements
38	Expansion	Grand Mere Parkway	Current End	Marlatt Ave.	Road extension (2-lane)	
47	Safety	Intersection	Gary Ave-K-113		Traffic signal	
61	Safety	Wildcat Creek Rd	1/2 miles W of Scenic Dr	1 mile W of Scenic Dr	GI and safety improvements	
71	Preservation	US-24	K-13	US-24/US-77	Heavy mill and overlay	
75	Preservation	K-113	K-18	US-24	1 1/2" mill and overlay	

Note: The following studies are also planned: K-113 Corridor Study and Marlatt Extension APE Study. Since the termini of the studies are unknown at this time, they are not depicted on the map products.

Figure 8-1 Manhattan EJ Populations and Roadway Investment Priorities



Note: Project ID No. 63 is outside the map extent, but is not located in an EJ tract.

Figure 8-2 Junction City EJ Populations and Roadway Investment Priorities

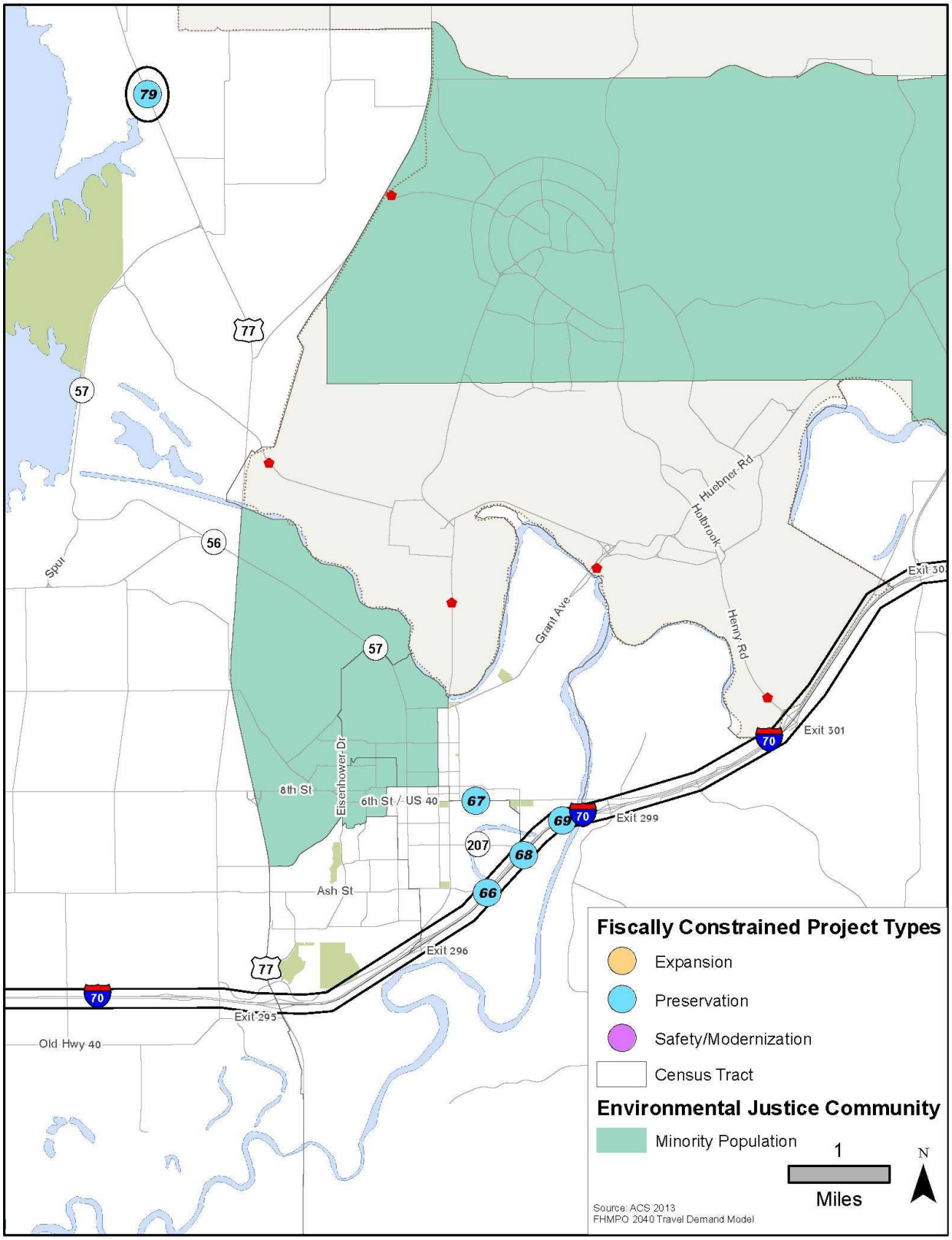
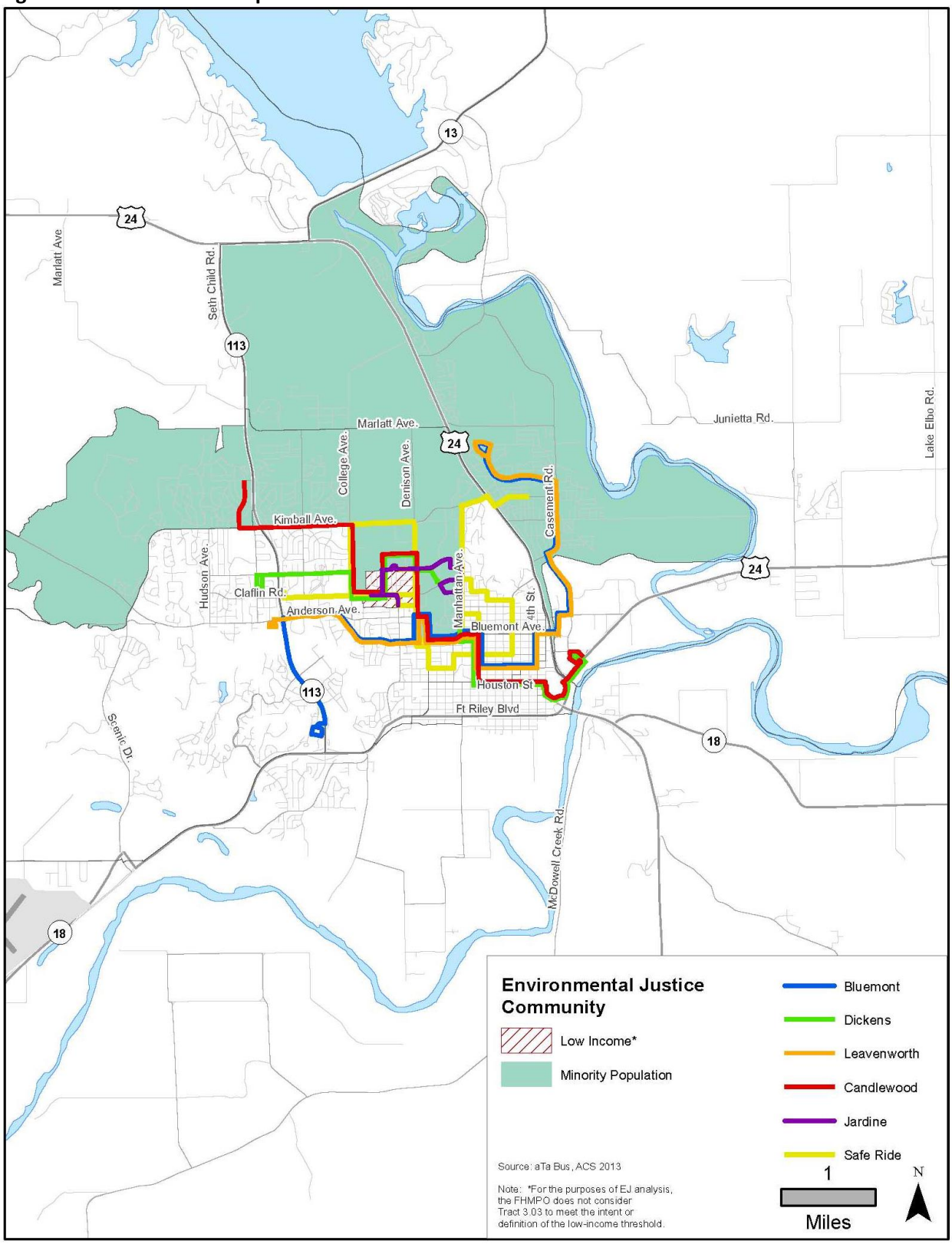


Figure 8-3 Manhattan EJ Populations and Transit Investment Priorities



As shown in Table 8-2, nearly one-third of the regional population that meets the EJ threshold would receive a planned roadway improvement. (As previously noted, all roadway investments planned in areas with EJ populations are located in Manhattan.) These EJ communities will receive all four types of projects that have been identified, offering improved mobility and safety, a better quality of driving, and/or a new bicycle and pedestrian accommodation. With respect to transit, much of the regional population is not touched by transit service when analyzed overall by census tract (see Table 8-3). However, of tracts with transit service, EJ populations would receive over half of the transit service available to the region, providing these populations greater travel choices.

Table 8-2 EJ Tracts Impacted by Roadway Investments

	EJ Tracts	Non-EJ Tracts	Total
Population in EJ Tracts	38,165	78,071	116,236
Percent of Total FHMPO Population	32.8%	67.2%	100.0%

**Note: Population figures include the entire census tract.*

Table 8-3 EJ Tracts Impacted by Transit Investments

	EJ Tracts	Non-EJ Tracts With Transit	Non-EJ Tracts Without Transit	Total
Population in EJ Tracts	20,866	40,555	54,815	116,236
Percent of Total FHMPO Population	18.0%	34.9%	47.2%	100.0%

**Note: Population figures include the entire census tract.*

Of the $131.8 million program (in YOE dollars) in regional investment priorities, a quarter of funds are planned to be implemented in areas with an EJ population. As shown in Table 8-4, over $33 million in transportation improvements are envisioned to be implemented in minority communities. The twelve projects slated in areas with EJ populations include several studies as well as roadway expansion projects to enhance mobility, modernization and safety projects to improve safety and traffic operations, and preservation of the existing system.

Table 8-4 Total Investments in EJ Tracts

	EJ Tracts	Non-EJ Tracts	Total
Total Investments	$33,078,500	$98,700,600	$131,779,100
Percent of Total Investments	25.1%	74.9%	100.0%

Statement of Environmental Justice Compliance

The EJ analysis focuses on the distribution of the region's investment priorities, not on the specific impacts of an individual project. The analysis illustrates that EJ populations are not denied the receipt of benefits of FHWA programs, policies, or activities. When looking at the distribution of projects in terms of portion of the affected population, level of investment and type of project, there appears to be no disproportionate impact when comparing the projects located within EJ census tracts versus non-EJ census tracts. Based on the analysis above, the FHMPO concludes that any benefit or adverse effect associated with implementing the Plan are not distributed to these populations in a manner substantially different than to the regional population as a whole.

8.3 What is Environmental Mitigation?

As required by MAP-21, the Plan considers the environmental impacts of the regional investment priorities. The FHMPO has reviewed relevant environmental resource data and compared them against the proposed transportation investments identified in the Plan. As a result of this process, the FHMPO has identified a preliminary suite of potential mitigation strategies. Similar to EJ impacts, it is anticipated that the NEPA process would address specific projects in a more detailed manner than the Plan.

The environmental mitigation analysis is primarily concentrated on mapping a set of environmental resources compared to the region's investment priorities. By overlaying environmental and project layers, areas of concern or environmental incompatibility can be visually compared to help inform potential mitigation efforts in advance of the more detailed NEPA process. The following four areas of interest were determined given their prevalence to the Flint Hills natural and built environment. As prominent characteristics to the region, these reflect key areas for consideration when implementing the region's transportation investment priorities:

- Wetlands;
- Floodplains;
- Threatened and Endangered Species; and
- Cultural and Historic Resources.

8.4 Environmental Analysis of Plan Investment Priorities

As previously noted, all transportation projects will have some level of impact on people and the environment. While not every project will have the same level of impact on the natural and built environment, it is important to note sensitive areas and potential conflicts so that appropriate measures can be taken to avoid, mitigate, and minimize the impact.

Similar to the EJ analysis, the mitigation strategies contained herein are described at a system-level and are not project specific. They generally aim to minimize environmental disturbances and to offer alternatives to minimize potential impacts for future consideration as projects advance through the project development process.

Appendix H provides more detail about these four areas of interest and offers a range of potential mitigation strategies for consideration and includes maps that overlay environmental resources as well as cultural and historic resources and project layers. Table 8-5 provides a summary table of the Plan investment priorities, denoting which type of resource – wetland, floodplains, threatened and endangered species, and cultural and historic resources – could potentially be affected by the planned investment.

Table 8-5 Summary of Plan Investment Priorities and Presence of EJ or Environmental Area of Concern

ID No.	Project Location	EJ Tract	Protected Area	Threatened/ Endangered Species	Floodplain	Historical Resource
18	N. Manhattan Ave: Research Park Dr to Claflin Expansion	■				
19	Stagg Hill Rd: K-113 to Rosencutter Expansion					
21	Casement Rd (Phase III): Griffith to Allen Expansion	■			■	
25	17th Street: Yuma St to Laramie St Expansion					■
26	Kimball Ave: N. Manhattan to Denison Ave Expansion	■				
27	Kimball Ave: Denison to College Expansion	■				
28	McCall Rd: US-24 to Bluemont/4th St Expansion/Realignment				■	■
29	Bluemont Ave: 6th St to 4th St Expansion					■
30	Bluemont Ave: 4th St to 11th St Expansion					■
31	Wildcat Creek Rd Relocation	■		■	■	
34	11th Street: Poyntz to Bluemont Expansion				■	
35	US-24: McCall Rd to Green Valley Rd Expansion			■	■	■
36	Miller Pkwy: Current end to Scenic Dr Expansion			■		
37	Poyntz Ave: Juliette Ave to 17th St Lane Reduction			■		
38	Grand Mere Parkway: Current End to Marlatt Ave Expansion	■				■
42	Stagg Hill/Rosencutter Intersection				■	
43	Hylton Heights/Claflin Intersection					
46	Amherst/K-113 Intersection					
47	17th/Poyntz Intersection					■
49	US-24/Green Valley Rd Intersection			■		
52	Excel Rd: Cara's Way to Harvest Rd					
54	Green Valley Rd: Nellie Dr to Junietta Rd	■		■		
61	Wildcat Creek Rd Safety Improvements	■		■	■	
63	Skyway Dr/Wildcat Creek Rd Intersection					
66	I-70: RP 296.1 to RP 300.5 EB & WB Preservation			■		
67	US-40B at UPRR/Monroe St Viaduct Replacement			■		
68	US-40B: N. East St Bride Replacement			■		

69	US-40B: Smoky Hill River Bridge Replacement				■	
71	US-24: K-13 to US-24/US-77 Preservation	■	■			
74	K-18: Miller Pkwy/Davis Dr to K-113 Preservation					
75	K-113: K-18 to US-24 Preservation	■	■		■	
76	K-177: K-18 to KS River Bridge Preservation				■	■
77	K-177: KS River Bridge to I-70 Preservation					
78	K-18 Wildcat Creek Bridge Replacement					■
79	US-77 Rush Creek Bridge Replacement		■		■	

For more information:
www.FlintHillsMPO.org