

# Multimodal Planning Studies



## COUNTYWIDE BIKEWAY SYSTEM PLAN



BURROUGHS CREEK  
PARK & TRAIL  
Trail Regulations  
1. Bike, Walk, Jog, Skate on the Right Hand Side of Trail  
2. Pass Others on Your Left  
3. Acknowledge "On Your Left" When Passing Someone  
4. Slow Down in Traffic  
5. Keep Dogs on Leash  
6. Clean Up After Your Pet  
7. No Weapons on Trail

December 2013

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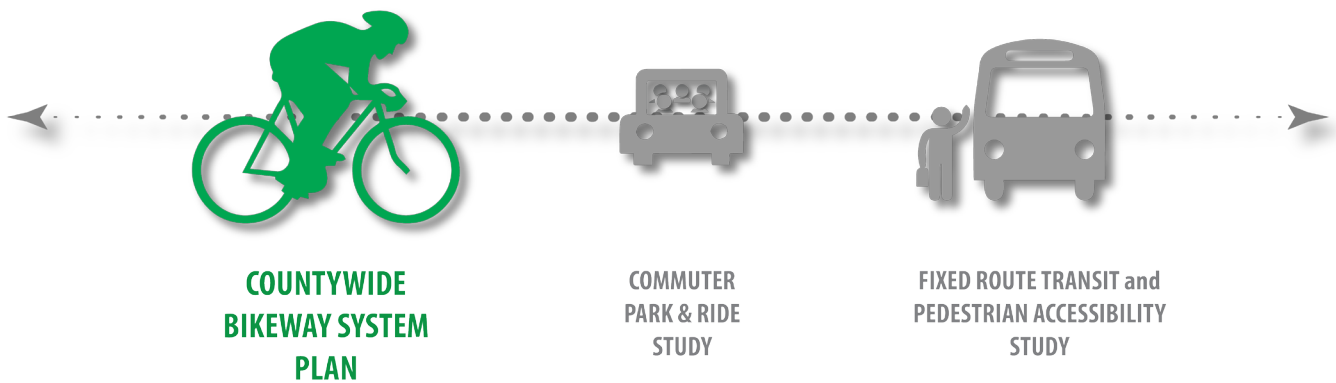




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*Bicyclist Preparing to cross 6th Street*





## Chapter 1

# INTRODUCTION

### Project Overview




In 2013, the Lawrence-Douglas County Metropolitan Planning Organization (L-DC MPO) completed the Multimodal Planning Studies. The goal of this planning effort was to identify and prioritize transportation needs for commuters, pedestrians, cyclists, and transit riders for the next five to ten years, and to develop a range of short and long-term improvements to support a more multimodal region. The Multimodal Planning Studies consists of a Commuter Park & Ride Study, a Fixed-Route Transit-Pedestrian Accessibility Study, and a Countywide Bikeway System Plan. This report documents the evaluation process and recommendations for developing a Countywide Bikeway System Plan. This new countywide plan builds on and complements the work done in the past to complete the 2004 Bike Plan (<http://lawrenceks.org/assets/mpo/bicycle/2004BikePlan.pdf>), the 2010 Bike Rideability Map, the 2013 Transportation 2040-Bicycle & Pedestrian Chapter (<http://lawrenceks.org/assets/mpo/T2040/Ch5.pdf>), and many other activities of the MPO staff and its planning partners (city and county governments, Kansas Department of Transportation (KDOT), Bicycle Advisory Committee, etc.). All of those documents can be reviewed on the MPO website (<http://lawrenceks.org/mpo>) or by contacting the MPO staff.

### *Developing a Multimodal Transportation System*

Multimodal refers to a wide range of mobility options – vehicular traffic, public transportation, walking, bicycling, and ridesharing (carpooling and vanpooling). To some degree, this planning effort addresses opportunities to enhance all of these modes, but the primary focus of the Multimodal Planning Studies is to improve walking, bicycling, and transit riding conditions, as well as to develop ridesharing facilities within the Lawrence-Douglas County Region.

Developing a truly multimodal transportation system is consistent with the Complete Streets Policy adopted by the Lawrence City Commission on March 27, 2012 and the Complete Streets Resolution approved by the MPO on September 15, 2011. In addition to supporting this policy, a multimodal transportation system has several benefits including reducing travel costs, promoting an active and healthy lifestyle, expanding mobility options for all users, and providing environmental benefits by reducing traffic congestion and helping to improve air quality within the region. The desire to develop a multimodal transportation system is also consistent with the L-DC MPO's Transportation 2040 (T2040) Metropolitan Transportation Plan (MTP). T2040 also serves as the Lawrence and Douglas County transportation chapter of the joint Comprehensive Plan which is currently called Horizon 2020.

## STUDY SCOPE

-  To refine bikeway recommendations for the Lawrence Urban Area that build upon past bikeway recommendations;
  
-  To identify bikeway recommendations for the portions of Douglas County that have not previously made plans for bikeways;
  
-  To identify bikeway recommendations for four focus areas:
  - ▶ The areas around the Eudora public schools;
  - ▶ The areas around the Baldwin City public schools;
  - ▶ The intersection area of Iowa and 6th Street in Lawrence; and
  - ▶ The connection between the Burroughs Creek Trail, Hobbs Park and Constant Park in Lawrence.

## Vision and Goals Overview

The City of Lawrence and the L-DC MPO have conducted bicycle planning exercises since the mid-1970s. The most recent bicycle planning effort was carried out as part of developing the T2040 transportation plan for the region.

This Countywide Bikeway System Plan serves to update and expand the existing bikeway system planning carried out for T2040 and previous planning efforts. This plan provides updates to the existing and planned T2040 bikeway network for the Lawrence Urban Area and proposes bikeway connections throughout the remainder of Douglas County, including the Cities of Eudora, Baldwin City, and Lecompton.



Lawrence BFC Signage



## Review of Existing Vision Statements and Goals

*(From the 2004 Lawrence-Douglas County Bikeway Plan and the T2040 Metropolitan Transportation Plan)*

The 2004 Bikeway Plan for Lawrence and Douglas County recognizes and incorporates a vision for bicycling with several broad-reaching goals stemming from it.

### *2004 Lawrence-Douglas County Bikeway Plan – Vision Statement*

*“To advance bicycling as a safe and efficient means of transportation through facility development, educational programs, and progressive governmental policy, with the ultimate goal of connecting Lawrence’s areas and neighborhoods, improving quality of life, and meeting transportation and recreation needs.”*

The T2040 vision statement emphasizes the importance of multimodal system planning and the value of the transportation networks as an asset to the community. The plan supports an accessible environment that serves to improve the quality of life and prosperity in the region for all users.

### *Transportation 2040 – Moving Forward Together - Vision Statement*

*“Develop a multimodal transport system that safely, efficiently and equitably serves all users whom travel to, from and within the region; and develop a regional transport network of facilities and services that complements the region’s economy and enhances the region’s livability. “*



Bicyclist at the intersection of Massachusetts and 11th Street

## Goals and Objectives from the T2040 Transportation Plan and the 2004 Bikeway Plan

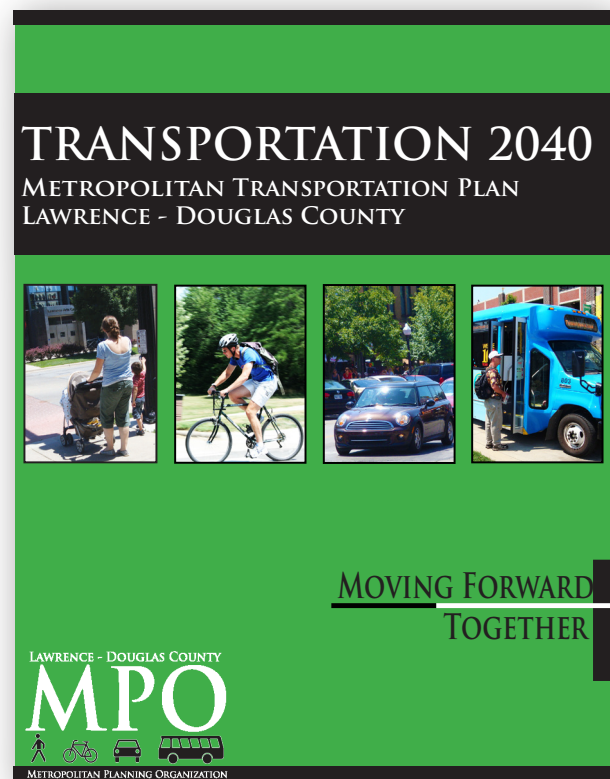
The T2040 Plan has four main goals: Improve Safety & Security, Focus on System Preservation and Economic Efficiency, Maximize Accessibility and Mobility, and Consider the Environment and Quality of Life. Each goal sets a general statement and objectives accompanied with strategies for achieving the goal. The goals, objectives, and strategies listed below support bicycling system planning in the context of multimodal planning for all modes of transportation. Goals three and four and their accompanying objectives and strategies address bicycling.

### Goal 3 of T2040 Plan: Maximize Accessibility and Mobility

- ▶ Objective 3.2: Provide viable transportation alternatives (transit, bicycle, pedestrian) with better interconnectivity for people and goods by considering transit, bikeway and pedestrian facility details in all new development site planning, and adhering to local Complete Streets policies.
- ▶ Objective 3.3: Assure all users are provided access to the regional transportation system and planning process through the use of the following strategies:
  - Strategy 3.3.1: Encourage land development patterns and transportation system designs that allow and encourage people to use all transportation modes, especially those that are human powered and support healthy lifestyles
  - Strategy 3.3.2: Coordinate multimodal review of maintenance plans and transportation facility plans
  - Strategy 3.3.3: Improve the linkages between transportation planning and public health planning
  - Strategy 3.3.4: Enhance and maintain a coordinated transit system including special services for senior citizens and persons with disabilities, and connections to regional commuter services

### Goal 4 of T2040 Plan: Consider the Environment and Quality of Life

- ▶ Objective 4.1: Minimize adverse social, economic, and environmental impacts created by the transportation system through the use of the following strategies:
  - Strategy 4.1.5: Encourage the use of alternative modes of transportation and encourage development that minimizes reliance on the automobile, especially the single occupant car







## *Bikeway Related Objectives from Chapter 5- Bicycle and Pedestrian of the T2040 Plan*

The action steps listed below are found in the Bicycle-Pedestrian part (Chapter 5) of the T2040 Transportation Plan. These action steps support the more general goals and objectives from Chapter 3 of T2040 that are listed on the previous page.

Overarching objectives identified in T2040 Chapter 5 as part of the Bikeway Plan are listed below:

- ▶ Further develop bicycle facilities that extend into future growth areas as land uses are identified, and continue to explore opportunities that provide connections to schools, parks, commercial zones, and other activity areas. This may include bikeway developments along collector and arterial roads, and may also include the creation of alternative routes for cyclists to take advantage of neighborhood roads with lower vehicular speeds and/or greater convenience.
- ▶ Establish a dedicated funding plan to complete implementation of a bikeway system plan and for maintenance of the region's bicycle facilities.
- ▶ Prioritize and implement critical bikeway segments that provide continuity for the system and provide connections to major activity centers (shopping areas, schools, KU campus, etc.).
- ▶ Evaluate existing roads with bicycle routes and other roadway corridors for appropriate opportunities to provide bicycle lanes, routes, or paths and to improve safety based on an analysis of the accident data.
- ▶ Evaluate other (non-road) linear features in the region that connect activity and population clusters (e.g., streams, sewer lines, utility corridors, etc.) and study those corridors for possible bikeway developments.
- ▶ Maintain existing route maps for all shared use paths, bike lanes, and bike routes designated on the Bikeway System Map and provide appropriate signage along those bikeways.
- ▶ Increase signage for bike routes and lanes in roadway corridors to convey the legitimacy of bicycle traffic on roads.
- ▶ Implement a public information and education program that encourages this alternative mode of transportation.



## *T2040 Bikeway Action Steps from Chapter 5: Bicycle & Pedestrian of the T2040 Transportation Plan*

Bicycle & Pedestrian Action Step 1 & 7 from T2040 are related to the creation of this plan and commit the Lawrence-Douglas County Region to implementing this plan, once approved. They also commit the MPO to incorporating this plan into a future amendment of T2040 Chapter 5.

- ▶ Action Step 1: Expand, Update and Implement the Bikeway System Recommendations from the 2004 Lawrence-Douglas County Bicycle Plan and the Future 2013 Lawrence-Douglas County Bicycle Plan

The following Action Steps included in T2040 Chapter 5-Bicycle and Pedestrian are related to the work tasks for the Lawrence-Douglas County Region. They are the specific bicycle planning, engineering, enforcement, encouragement, and education steps recommended to carry out the goals in Chapter 3. Chapter 5 also has measures of progress or evaluation criteria which are noted at the end of the chapter.

- ▶ Action Step 2: Update the Lawrence-Douglas County Bicycle Plan and Bikeway System Map at Least Once Every Five Years
- ▶ Action Step 4: Adopt Bicycle Facility and Street Design Standards and Guidelines for Development
- ▶ Action Step 5: Consider Bicycles & Pedestrians in Development Review
- ▶ Action Step 7: Implement Douglas County Rural Bicycle Plan Elements
- ▶ Action Step 8: Plan and Construct Bicycle and Bicyclists Amenities
- ▶ Action Step 9: Develop a Bicycle and Pedestrian Education Program and Enforce Traffic Laws
- ▶ Action Step 10: Coordinate Bicycle and Pedestrian Planning Issues
- ▶ Action Step 11: Use Signage That Conveys the Legitimacy of Cyclists to Use the Road
- ▶ Action Step 12: Funding for Bicycle & Pedestrian Facilities

In addition to these facility recommendations in T2040 Chapter 5, the following program and policy recommendations were made in T2040:

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>▶ Focus on connections to specific key destinations and the ease and safety of transportation to those areas. The typical cyclist in Lawrence requires safe and convenient access to connect their residence with school, employment, entertainment, and shopping destinations. These linkages must provide safe access across high volume arterial streets.</li> <li>▶ Routes well suited for the commuter, multi-use rider, or fitness rider, should provide a medium-to long-range round trip, safe access, and variety. Routes that parallel main east-west and north-south arterial roadways are ideal, particularly for business, employment and basic shopping destinations outside of Downtown Lawrence,</li> </ul> | <ul style="list-style-type: none"> <li>and such routes may encourage novice cyclists that do not like to ride on arterials with motor traffic to use cycling for more utilitarian trips.</li> <li>▶ Treat cyclists with the same respect and legitimacy as other users of roadways through separate signage reflecting their right to be on the roadways and duties to follow the laws.</li> <li>▶ Expand the existing bikeway plan to provide effective access by bicycle to all areas of Douglas County (e.g., residential neighborhoods and shopping districts).</li> </ul> |
|--|--|





- ▶ Educate the public using a variety of media outlets and community outreach about the bike plan, local and state bicycle regulations, and guidelines for safe cycling.
- ▶ Provide alternative parallel routes for bike traffic where integration of bicyclists with motorists is unlawful (e.g., on interstate highways) or undesirable (e.g., highly congested high speed roads with numerous driveways and sight distance problems). Where existing motorized traffic routes create barriers for non-motorized travel, provide effective accessible crossings at regular intervals.
- ▶ Continuously measure bicycle and pedestrian usage to understand traffic patterns of non-motorists, and adjust planning accordingly.
- ▶ Prioritize the bicycle system plan to connect neighborhoods and large apartment complexes to each other and with schools, universities (University of Kansas, Haskell University, Baker University), and major shopping areas (Downtown Lawrence, 23rd and Louisiana, 31st & Iowa, 6th & Wakarusa, and other commercial areas in Douglas County).
- ▶ Work with the school districts and universities to encourage and educate the proportionately higher percentage of non-motorists in their populations about safe cycling practices, the existing bicycle system, the planned bikeway network in the region, and ways to better integrate the bicycle system into school campuses.
- ▶ Encourage local businesses and organizations to participate by encouraging their employees, customers, and clients to choose bicycling.
- ▶ Provide intercity bike routes between Lawrence, Eudora, Baldwin City, and LeCompton.

These program and policy recommendations are still valid and appropriate for not just the Lawrence Urban Area, but Douglas County as a whole.

## *2004 Bikeway Plan – Core Objectives*

This 2004 Plan identified six core objectives with accompanying program activities. The objectives are listed below.

- ▶ Objective 1: Provide logical bikeway connectivity within Lawrence, Douglas County, Douglas County communities, including schools, parks, downtowns, and other major activity areas.
- ▶ Objective 2: Provide consistent design standards for typical situations in consideration of bicyclists and pedestrians.
- ▶ Objective 3: Minimize crashes and/or injuries of bicyclists and motorists caused from existing hazards or barriers.
- ▶ Objective 4: Maintain a citizen-based bicycle advisory committee as an organized voice for bicycling issues in Lawrence and in Douglas County, Kansas.
- ▶ Objective 5: Maintain on-going Bicycle Education Program that conveys safety messages and vehicular regulations to all segments of the population.
- ▶ Objective 6: Actively promote bicycling or walking as a viable alternative to motorized transportation in Lawrence and Douglas County, while maintaining safety of all users on the roadway.

## *League of American Bicyclists – Recommendations for Lawrence*

The League of American Bicyclists also has a series of recommendations for Lawrence which can be found at <http://lawrenceks.org/assets/pds/planning/documents/BikeFeedback.pdf>. This feedback report from the League was issued with the Bronze Award the City received in 2012 and is valid until 2016. These recommendations note that more bicycling education and encouragement activities need to take place in Lawrence, and those recommendations are consistent with, and complementary to, the 2004 Bikeway Plan and the T2040 Metropolitan Transportation Plan recommendations for bikeway system development.

## Countywide Bikeway System Plan

### Vision and Goals

The goals, objectives, recommendations, and action steps noted in the previous pages serve as the building blocks for the remainder of this document and the plans to enhance the bikeway system in the Lawrence-Douglas County Region. Those items are reorganized below to form the Main Objectives for this Countywide Bikeway System Plan. These main objectives are organized around the 5E's (engineering, education, enforcement, encouragement, evaluation) of bikeway system planning and development.


The vision statement below has been amended to include Douglas County and is the vision statement for this Countywide Bikeway System Plan. As stated currently in the T2040 document, it is the intent of the MPO to amend the current Transportation 2040 Plan incorporating the vision statement and goals for bikeway development that are listed below.


#### Vision Statement


*"To advance bicycling as a safe and efficient means of transportation through facility development, educational programs, and progressive governmental policy, with the ultimate goal of connecting Lawrence and Douglas County's areas and neighborhoods, improving quality of life, and meeting transportation and recreation needs."*


Carried forward from the 2004 Plan in this new Countywide Plan vision and goals is the idea that, "the effectiveness of the Bike Plan is increased when government efforts are coordinated with community efforts." The ultimate goal is to make Douglas County a welcoming, safe, and accommodating place for bicyclists of all ages, abilities, and trip purposes. This will lead to improvements in community health as well as the environment and the local economy.


### BIKEWAY OBJECTIVES


 Objective 1:  
Engineering - Connectivity


 Objective 2:  
Engineering - Consistent  
Design Standards


 Objective 3:  
Engineering - Plan and  
Construct Amenities

 Objective 4:  
Enforcement and Safety

 Objective 5:  
Continued Participation

 Objective 6:  
Education

 Objective 7:  
Encouragement

 Objective 8:  
Evaluation





## *Countywide Bikeway System Plan – Objectives*

The goals and objectives for this countywide plan are taken from the 2004 Lawrence-Douglas County Bikeway Plan and the T2040 Metropolitan Transportation Plan. These previous plans provided direction for this Countywide Bikeway System Plan as they contain additional important goals, objectives, and strategies.

### ► **Objective 1 – Engineering - Connectivity**

Provide logical bikeway connectivity within Lawrence, Douglas County, Douglas County communities, including schools, parks, downtowns, and other major activity areas.

- Further develop bicycle facilities that extend into growth areas as land uses are identified and continue to explore opportunities that provide connections to schools, parks, commercial zones, and other activity areas. This may include bikeway developments along collector and arterial roads, and may also include the creation of alternative routes for cyclists to take advantage of neighborhood roads with lower vehicular speeds and/or greater convenience.
- Focus on connections to specific key destinations and the ease and safety of transportation to those areas. The typical cyclist in Lawrence requires safe and convenient access to connect their residence with school, employment, entertainment, and shopping destinations. These linkages must provide safe access across high volume arterial streets.

- Routes well suited for the commuter, multi-use rider, or fitness rider should provide a medium- to long-range round trip, safe access, and variety. Routes that parallel main east-west and north-south arterial roadways are ideal, particularly for business, employment and basic shopping destinations outside of Downtown Lawrence; and such routes may encourage novice cyclists who do not like to ride on arterials with motor traffic to use cycling for more utilitarian trips.
- Evaluate other (non-road) linear features in the region that connect activity and population clusters (e.g., streams, sewer lines, utility corridors, etc.) and study those corridors for possible bikeway developments.
- Provide alternative parallel routes for bike traffic where integration of bicyclists with motorists is unlawful (e.g., on interstate highways) or undesirable (e.g., highly congested high speed roads with numerous driveways and sight distance problems). Where existing motorized traffic routes create barriers for non-motorized travel, provide effective accessible crossings at regular intervals.

► **Objective 2 – Engineering - Consistent Design Standards:** Provide consistent design standards for typical situations in consideration of bicyclists and pedestrians.

- Standards and guidelines should be adopted that develop minimum bicycle and pedestrian standards and guidelines for all new roadways and reconstruction of existing roadways focusing on routes and then on roads.
- Standards should take into consideration the national best practices for bicycle and pedestrian infrastructure. Designing and building facilities with standards ensures that consideration has been given to sound design that is sensitive to the needs of bicyclists and pedestrians and their interactions with other roadway users.

Most engineers have an intuitive understanding of design requirements for automobiles. Creating standards for bicycle and pedestrian facilities encourages engineers to think similarly about cyclists and pedestrians and ensures that bicyclists and pedestrians can know what to expect from each facility type.



Bicyclist on the Burroughs Creek Trail

A wide range of possible options for enhancing a community’s multimodal friendliness exist through design. Improvements can be simple, inexpensive, and involve minimal design effort. For example, adopting a bicycle-safe drainage grate standard, or adjusting traffic signal timing can be inexpensive ways to make bicycling safer and more enjoyable. However, standards can also require more substantial allocations of funds, carefully prepared detailed designs, and multi-year commitments to phased developments. In those situations, standards are valuable to ensure that a project remains relevant and useful. These standards shall also include street crossing treatments, sidewalk design, landscaping, and other amenities for cyclists and pedestrians.

- Local development / planning staff should consider bicyclists and pedestrians in development reviews. Local governments should review and/or modify their development review processes to include requirements for on and off-site bicycle and pedestrian connections, facilities, and amenities that connect the development to key destinations and activity centers. Without adding delay for land development projects, local governments should ensure that bicycle and pedestrian considerations are discussed early in the planning/design process and that appropriate bikeways are made a part of the final approved construction plans.

► **Objective 3 – Engineering - Plan and Construct Amenities:** Besides the actual bikeway, bicyclists also need other facilities.

- Safe and secure bicycle parking should be provided as necessary near schools, universities, libraries, recreation centers, grocery stores and other retail locations, other public buildings, at activity centers, and along activity corridors, as well as in city parks, especially where high use is anticipated (e.g., Holcom, Lyons, Veterans, etc.).



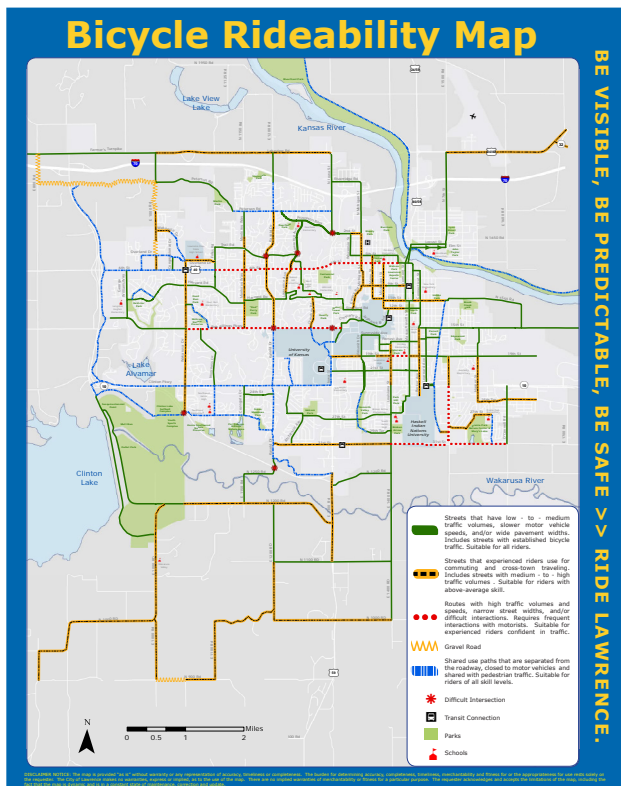
- Develop bicycle rack and storage options for new developments. Options should address design, location, and number of spaces. Options should also consider covered bicycle parking for major proposed developments.
  - Bicycle storage areas should be located at easily identifiable spots and located prominently on each site to foster self-policing behaviors. Crime Prevention Through Environmental Design (CPTED) principles should be employed in planning bike parking areas. These bike parking spaces should also be located in convenient places for cyclists to use and for pedestrians and motorists to maneuver around.
  - Provide functional bicycle racks and storage facilities at activity centers and along activity corridors (e.g., in Lawrence at community centers and in Downtown).
  - Explore the opportunity for trailhead restoration, information, and parking facilities for high demand trails.
  - Expand the use of existing man-made structures for use as bike storage fixtures (e.g., add bike park rings onto existing parking meter poles).
  - Plan for, and build, facilities needed by commuter cyclists and others to encourage more bicycling as the first choice for trips (e.g., workplace showers and lockers, bike lockers for long-term parking). Also, provide services to support bicycling (e.g., bike racks on transit buses, advance warning of bikeway closures in construction zones).
- **Objective 4 – Enforcement and Safety:** Minimize crashes and/or injuries of bicyclists and motorists caused from existing hazards or barriers.
- Evaluate existing roads with bicycle routes and other roadway corridors for appropriate opportunities to provide bicycle lanes, routes, or paths, and to improve safety based on an analysis of the crash data.
  - Provide police resources and manpower to enforce bicycle, pedestrian, and vehicular traffic laws as part of an education and encouragement campaign.
- **Objective 5 – Continued Participation:** (encouragement, education, and evaluation) Maintain a citizen-based bicycle advisory committee as an organized voice for bicycling issues in Lawrence and throughout Douglas County. Continue to coordinate bicycle and pedestrian planning issues throughout the Lawrence-Douglas County Region, and coordinate bikeway planning issues between Douglas County and adjoining counties.
- **Objective 6 – Education:** Maintain an on-going Bicycle Education Program that conveys safety messages and vehicular regulations to all segments of the population.
- Develop a bicycle and pedestrian education program as part of the region’s overall communication and education program.



Burroughs Creek Trail crossing at 11th Street

- Treat cyclists with the same respect and legitimacy as other roadway users through separate signage reflecting their right to use roadways and their duties to follow the laws.
- Educate the public using a variety of media outlets and community outreach about the bike plan, local and state bicycle regulations, and guidelines for safe cycling.
- Maintain existing route maps for all shared use paths, bike lanes, and bike routes designated on the Bikeway System Map and provide appropriate signage along bikeways.
- Work with the school districts and universities to encourage and educate the proportionately higher percentage of non-motorists in their populations about safe cycling practices, the existing bicycle system, the planned bikeway network in the region, and ways to better integrate the bicycle system into school campuses.

- ▶ **Objective 7 – Encouragement:** Actively promote bicycling and walking as viable alternatives to motorized transportation in Lawrence and Douglas County while maintaining safety of all users on the roadway.
  - Implement a public information and education program that encourages these alternative human-powered modes of transportation.
  - Encourage local businesses and organizations to participate by encouraging their employees, customers, and clients to choose bicycling.
  - Work with the school districts and universities to encourage and educate their staff and students about safe cycling practices, the existing bicycle system, the planned bikeway network in the region, and ways to use bicycling as a means of travel.
  - Increase signage for bike routes and lanes in roadway corridors to convey the legitimacy of bicycle traffic on roads.
- ▶ **Objective 8 – Evaluation:** Monitor the outcomes and document the results of the implementation of the other E's. Continuously measure bicycle and pedestrian usage to understand traffic patterns of non-motorists and adjust planning accordingly.



Specific engineering recommendations are included in Chapter 3 for Lawrence and in Chapter 4 for rural areas of Douglas County. Chapter 5 has recommendations for Lecompton, Eudora, and Baldwin City. Chapter 6 provides non-infrastructure recommendations based on past plans, the League's recommendations, and public comments made during this plan's preparation.







## Overview of Existing Recommendations

The sections below provide brief descriptions of the parts of this plan, while later chapters provide detailed recommendations for bikeway developments and bicycling operations improvements.

### *Lawrence Urban Area Recommendations*

T2040 is the Metropolitan Transportation Plan (MTP) for the Lawrence-Douglas County Region of Kansas. The plan, “identifies future transportation needs, investments, and system improvement recommendations for all modes of transportation (automobile, public transit, bicycle, pedestrian, etc.) that will be necessary to meet the transportation needs of the region through 2040.”

Chapter 5 of T2040 includes a bicycle facility map and recommendations for further bikeway development in the Lawrence Urban Area. The map displays existing as well as recommended bicycle facilities in and around Lawrence. The map includes recommendations for future bike lanes, bike routes, and shared use paths that, when combined with existing facilities, form a relatively complete bicycle network for the Lawrence Area.

This Countywide Bikeway System Plan affirms and builds upon the recommendations made in T2040 and recommends some modifications and additions to the bikeway network recommended in that MTP. Additionally, this plan includes specific recommendations for providing a connection from the Burroughs Creek Trail, through Hobbs Park, to Constant Park in Lawrence – a critical connection through Central and Downtown Lawrence. The MPO and the T2040 Plan acknowledges this countywide bikeway system planning process, and the MPO staff plans to incorporate updates from this Countywide Bikeway System Plan into the T2040 document in the future.

### *Rural Douglas County and Small Cities Recommendations*

T2040 only included bicycle facility recommendations for the Lawrence Urban Area. It was the intent of the MPO staff developing T2040 that this plan would build on the Lawrence Urban Area recommendations, expanding the bicycle network into the remainder of Douglas County. This plan provides a network of bikeways throughout the rural portions of Douglas County, as well as providing connections into and within the cities of Eudora, Baldwin City, and Lecompton. The bikeways included in this plan form a continuous network throughout Douglas County, connecting the Lawrence Urban Area to the outlying cities, parks, and other recreation destinations and provides connections into neighboring counties. T2040 should be updated to include these recommendations for the rural areas and small cities in the region.



New path in Baldwin City along 6th Street

## Special Focus Areas

Four focus areas were specifically called out for close examination and recommendations in the development of this plan. These include recommendations for two specific areas in Lawrence: the intersection of West 6th Street and Iowa Street, and a route between Hobbs Park and Constant Park. The intersection of West 6th Street and Iowa does not include any bikeways currently and is difficult and intimidating for bicyclists and pedestrians to navigate. The connection from Hobbs Park (and the nearby Burroughs Creek Trail) and Constant Park is an important connection around Downtown Lawrence that is currently difficult for many bicyclists to navigate. Recommendations for both of these areas are included in Chapter 4. This plan also provides recommendations for better bikeway connections to public schools in Eudora and Baldwin City. The recommendations are based on observations of existing conditions around the schools, as well as the routes actually traveled by students on foot or bike as they arrive at or leave school.

## Policy and Program Recommendations

Bicycle facility improvements alone will not create the type of synergy that is necessary to achieve the goals and objectives of this plan. Building facilities will address the Engineering 'E' of transportation. By itself, it is not enough to ensure the development and operation of a successful bikeway system. The other E's of transportation are necessary to fully set this plan into action. These other E's include actions related to education, enforcement, encouragement, and evaluation. Chapter 6 of this plan provides these as policies and programs.

## Public Outreach

Public involvement is a high priority in the MPO's transportation planning process, and in the development of this Countywide Bikeway System Plan. The MPO's public participation process for the Multimodal Planning Studies (and all other MPO transportation planning projects) reflects the MPO's rigorous approach to public involvement. It outlines a process that provides complete information, timely public notice, and full public access. The stakeholder and public participation process included opportunities for input via the Multimodal Studies website, online interactive mapping, online survey, public open houses, and mobile meetings. A summary of the comments collected can be found in Appendix A. The stakeholder and public participation process included opportunities for input via the following Multimodal Studies public outreach tools:

- ▶ Online Mapping
- ▶ Open House Events
- ▶ Steering Committee
- ▶ Mobile Meetings
- ▶ Project Website
- ▶ Online Surveys

The draft Countywide Bikeway System Plan was made available for a 15-day review period and was presented to the Lawrence-Douglas County MPO for review and approval. Comments that were received were discussed by the consultant team, MPO staff, and the Steering Committee, and incorporated into the final document where appropriate.

<sup>1</sup> <http://www.lawrenceks.org/assets/mpo/T2040/EntirePlan.pdf>





## Online Mapping

An online interactive WikiMap was available early in the planning process to gather public input about bicycle facilities and issues within Douglas County. WikiMaps allows users to draw specific types of points on a map and enter comments on those points. The WikiMap was available from April 10 through July 17, 2013.

The WikiMaps were available for all three Multimodal Planning Studies with the majority of responses being related to this Countywide Bikeway System Plan. Please refer to Appendix A for a complete list of the bikeway related results.

## Open House Events

Two open house events were held, the first on Wednesday, June 5, 2013 from 4:30 to 7:30 p.m. at the Lawrence Visitor Center / Union Pacific Depot (402 N. 2nd Street) in North Lawrence, and the second on Wednesday, October 9, 2013 from 4:30 to 7:30pm at the Indoor Aquatic Center in West Lawrence. The June event was designed as an opportunity for people to receive general information on the project, and to view poster boards with ongoing findings at that time. Presentations were also given on the topics of Fixed Route Transit and Pedestrian Accessibility and the Commuter Park & Ride Study. The October event provided more extensive information that included existing conditions assessment and preliminary recommendations for each of the three studies.

## Steering Committee

A Steering Committee was formed by the Lawrence-Douglas County MPO to provide input on and guide the development of this plan. The Steering Committee met regularly over the course of this plan's development to review recommendations, provide local knowledge, and highlight bicycling issues and desires to the consultant team. The Steering Committee included staff members from local municipalities and Douglas County, KDOT, KU, public health advocates, public schools, and representatives of the Lawrence-Douglas County Bicycle Advisory Committee as identified in Table 1.

Table 1: Bikeway Steering Committee

Member	Agency
Becky Pepper	KDOT Bicycle/Pedestrian Coordinator
Charlie Bryan	LDC Health Dept
Chris Burger	BAC Vice Chair
Eileen Horn	Sustainability Coordinator
Justin Eddings	BAC Eudora/Baldwin City Rep
Kari Cantarero	KU Sustainability-Staff of KU BAC
Keith Browning	Douglas County Public Works
Lisa Hallberg	BAC Chair
Mark Thiel	Lawrence Public Works
Mary Miller	PDS Staff
Ron May	Director of Administrative Services USD 497

## Mobile Meetings

Mobile meetings were held following each public open house. The mobile meetings included the same general information presented at the open houses but the project team conducted informal meetings with the public throughout Douglas County. Four mobile meetings were held following the first open house and three mobile meetings were held following the second open house. The meetings were held at the following locations / dates:

- ▶ Family Fun Night in Laws Field, Eudora (7-12)
- ▶ Downtown Lawrence Farmers' Market (7-13)
- ▶ Douglas County Fair Grounds - Family Day (8-2)
- ▶ Baldwin City Art Walk (8-16)
- ▶ Downtown Lawrence Farmers' Market (10-19)
- ▶ Baker University Football Game (10-19)
- ▶ Eudora High School Football Game (10-25)

In addition, the mobile meetings aided in:

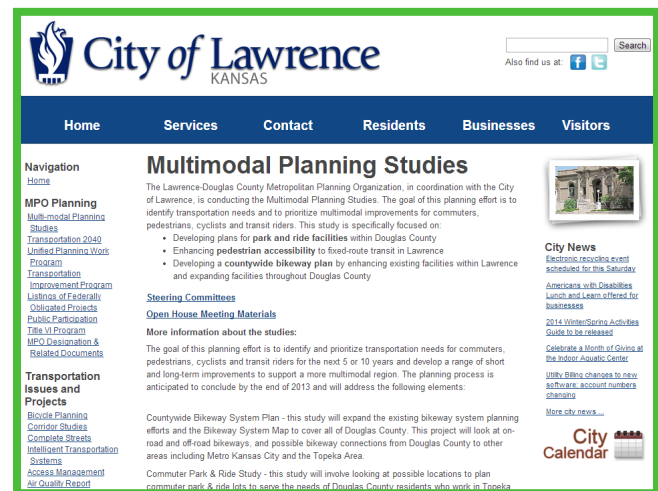
- ▶ Building awareness about the Multimodal Planning Studies planning effort and increasing understanding of its objectives/goals for the region;
- ▶ Driving traffic to the web page for the Multimodal Planning Studies;
- ▶ Sharing initial feedback gathered for the Multimodal Planning Studies thus far;
- ▶ Gathering comments on existing conditions and concerns connected to the transportation system, such as obstacles to carpooling, riding the bus and riding a bicycle for trips to work, school and other practical trips in the region.

## Project Website

Throughout the life of the project, a dedicated website was available for members of the public to find general information about each of the multimodal studies, information regarding the open house events, and contact information for questions. The website was hosted through the official City of Lawrence website via [www.lawrenceks.org/mpo/study](http://www.lawrenceks.org/mpo/study).

## Online Survey

The online survey contained 32 multiple choice and fill-in-the-blank / box questions and was active from September 3, 2013 to October 15, 2013. Anyone could access the website and complete the survey, which received 113 respondents. Although some questions were skipped by some respondents, the majority of questions were answered by all of the respondents. Questions addressed the issues present in each of the three studies. Responses to these questions have been incorporated into the recommendations of each Multimodal Planning Study, including this Countywide Bikeway System Plan.



Multimodal Planning Studies Project Website (November, 2013)





## Chapter 2

# EXISTING BIKEWAY FACILITIES

This chapter provides a brief overview of the types of bikeways recommended in this plan as well as more specific discussion about the use of side paths and narrow travel lanes in the region.











### Bikeway Types

The exhibit on the right provides brief descriptions of the different bikeway types recommended in this plan. Not every facility noted below is included in the plan recommendations, but all of them may prove useful to have as bikeways are actually developed, and different facilities from those recommended in the plan may be deemed appropriate. Links to detailed planning considerations and design details are provided later in this section.

Planning considerations and design details for these facility types are available from the following resources:

- ▶ The American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, 4th Edition (2012)<sup>2</sup>
- ▶ The Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (2009)<sup>3</sup>
- ▶ The National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide (2013)<sup>4</sup>

### SUMMARY OF BIKEWAY TYPOLOGIES

-  Bike Lane
-  Buffered Bike Lane
-  Climbing Bike Lane
-  Colored Bike Lane
-  Cycletrack (Protected Bike Lane)
-  Neighborhood Greenway / Bicycle Boulevard
-  Shared Lane Marking - Collector or Arterial Street
-  Shared Lane Marking - Neighborhood Street
-  Signed Bike Route
-  Bike Route with Paved Shoulders
-  Shared Use Path
-  Side Path

<sup>2</sup> [https://bookstore.transportation.org/item\\_details.aspx?id=1943](https://bookstore.transportation.org/item_details.aspx?id=1943)

<sup>3</sup> <http://mutcd.fhwa.dot.gov>

<sup>4</sup> <http://nacto.org/cities-for-cycling/design-guide>



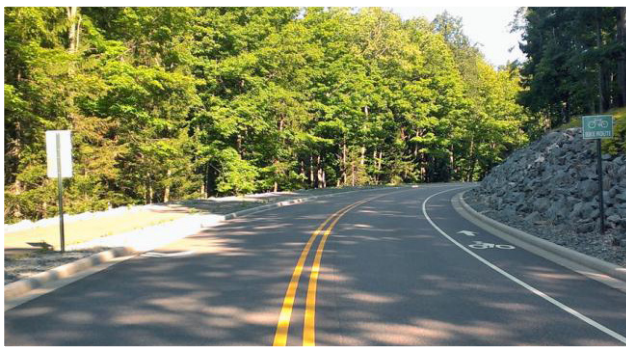
## Bike Lane

A bike lane is a pavement marking that designates a portion of a street for the preferential or exclusive use of bicycles. Bike lane markings are typically dashed where vehicles are allowed to cross the bike lane, such as for right turns or at bus stops. Bike lanes are recommended on two-way arterial and collector streets where there is enough width to accommodate a bike lane in both directions, and on one-way streets where there is enough width for a single bike lane. These lanes are always noted with pavement markings and may also be marked with signage.



## Buffered Bike Lane

Buffered bike lanes are created by striping a buffer zone between a bike lane and the adjacent travel lane. Some buffered bike lanes also offer a painted buffer between the bike lane and an adjacent parking lane. Buffered bike lanes should be considered at locations where there is excess pavement width or where adjacent traffic speeds are above 35 mph.



## Climbing Bike Lane

A climbing lane is a bikeway design for a two-way street that has a steep slope and insufficient width to permit bike lanes in both directions. A bike lane (the climbing lane) is provided in the uphill direction to accommodate slow moving bicyclists in the uphill direction and a shared lane marking is provided in the downhill direction, where bicyclists can typically travel at speeds closer to motor vehicles.



## Colored Bike Lane

All of the above bike lanes may have green color applied to them to highlight the presence of the bike lane. Colored lanes are typically used in high-conflict areas such as through complicated intersections, in areas where traffic is merging across the bike lane, or in areas where traffic frequently turns across the bike lane. In 2011, colored bicycle lanes received interim approval from the FHWA to be used on streets, thereby making way for their ultimate inclusion in the Manual of Uniform Traffic Control Devices in its next update.



## Cycletrack (Protected Bike Lane)

A cycletrack, sometimes called a protected bike lane, is a bicycle facility that is physically separated from both the street and the sidewalk. A cycletrack may be constructed at street level using street space, or at the sidewalk level using space adjacent to the street. Cycletracks separate bicyclists from motor vehicle traffic using a variety of methods, including curbs, raised concrete medians, bollards, on-street parking, large planting pots/boxes, landscaped buffers (trees and lawn), or other methods. Cycletracks designed to be level with the sidewalk should provide a vertical separation between bicyclists and pedestrians, as well as a different surface treatment to delineate the bicycle from the pedestrian space (such as asphalt vs. concrete). Cycletracks can be one way for bicycles on each side of a two-way road, or two-way and installed on one or both sides of the road. Cycletracks provide cyclists with a higher level of comfort compared to bike lanes, and are typically used on large multi-lane arterials where higher vehicle speeds exist. They may also be appropriate on high-volume but lower-speed streets.



## Neighborhood Greenway / Bicycle Boulevard

A neighborhood greenway, sometimes also called a bicycle boulevard, is a street with low motorized traffic volumes and speeds designated to provide priority to bicyclists and neighborhood motor vehicle traffic. Neighborhood greenways may simply have signs and shared lane markings, or may include traffic calming elements including speed humps, traffic circles, chicanes, or traffic diverters. Neighborhood greenways benefit neighborhoods by reducing cut-through traffic and speeding without limiting access by residents.





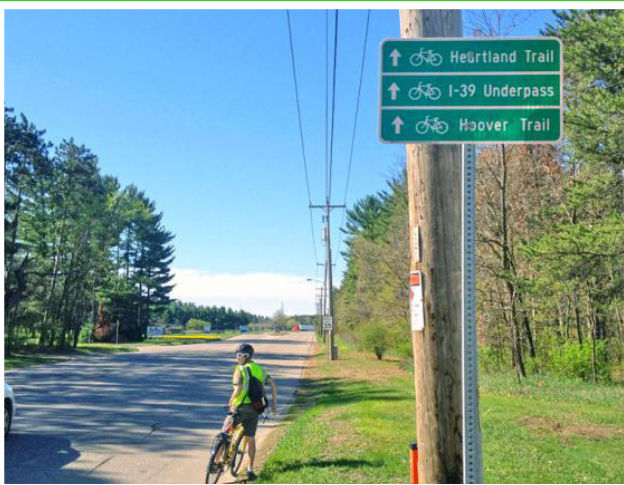
## Shared Lane Marking – Collector or Arterial Street

Shared lane markings (sharrows) are used on streets where bicyclists and vehicles share travel lanes. The sharrow helps position bicyclists and also provides a visual cue to motorists. On a four lane street, sharrows should be placed in the outside lane. If the outside travel lane is too narrow for a motorist to comfortably pass a cyclist (less than 13') the sharrow may be centered in the lane. This encourages cyclists to “take the lane,” and encourages motorists to use the left lane to pass. In a 12-14' lane, the marking may be offset from the curb by 4 feet. For 10-12' lanes, the BIKES MAY USE FULL LANE sign is recommended, because drivers may not provide comfortable clearance when passing. Sharrows are not appropriate on streets with speed limits greater than 35 mph.



## Shared Lane Marking – Neighborhood Street

Shared lane markings (sharrows) may also be used on local and residential streets to designate bicycle facilities where there is not sufficient width for bike lanes. Studies have shown that sharrows direct bicyclists away from the “door zone” of parked cars, alert motorists of appropriate bicyclist positioning, and encourage safe passing of bicyclists by motorists.



## Signed Bike Route

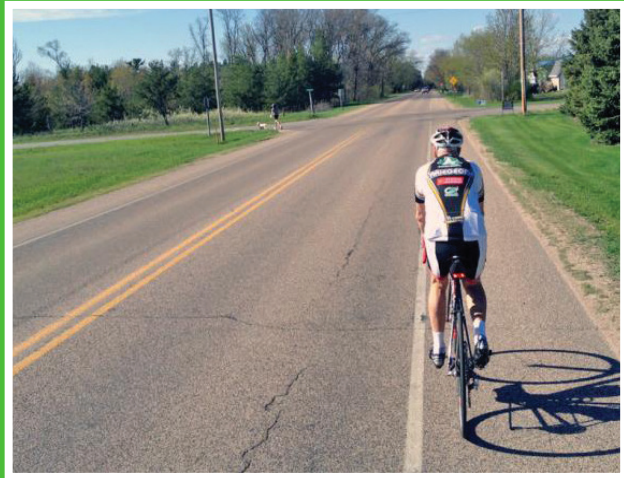
Signed bike routes provide distance and directional information as a wayfinding aid for bicyclists. Signed routes may be established on streets, trails or any combination of facility types that offer a continuous bicycling environment. Signs should offer cyclists information about alternative routes and accessible destinations from their current location, and not simply designate the street as a bike route. They also can be used to suggest the types of conditions cyclists can expect on a route by referencing trails or roadways by name. Signed routes provide new cyclists greater confidence when they are exploring utilitarian cycling for the first time or when they are in unfamiliar territory. Signed routes can also prevent cyclists from getting lost in residential areas with curvilinear street layouts and few through streets.





## Bike Route with Paved Shoulders

Signed bike routes on busier roads should provide a paved shoulder for bicyclists to use. In addition to benefiting bicyclists, paved shoulders increase the longevity of the roadway, reduce pavement maintenance, provide safety benefits to motorists, provide additional space for agricultural equipment and other slow moving vehicles, and provide a number of other benefits to all users of the roadway.



## Shared Use Path

A shared use path is an off-street bicycle and pedestrian facility that is physically separated from motor vehicle traffic. Typically SUPs are located in an independent right-of-way such as in a park, stream valley greenway, along a utility corridor, or an abandoned railroad corridor. SUPs are used by other non-motorized users including pedestrians, skaters, wheelchair users, joggers, and sometimes equestrians.



## Side Path

A side path is a shared use path located adjacent to a street. It is designed for two-way use by bicyclists and pedestrians. Side paths are sometimes created by designating a wide sidewalk for shared use, or they may be a segment of a longer trail or network of trails. Side paths are sometimes provided to facilitate connections to on- and off-street bicycle facilities. A side path is not generally a substitute for on-street bicycle facilities, but may be considered in constrained conditions, or in addition to on-street facilities. Side paths may not be appropriate in areas of high pedestrian activity unless there is space to separate pedestrians and cyclists and to successfully manage conflicts. Side paths may also not be appropriate along streets with numerous driveways or intersections, particularly in commercial areas with high traffic volumes.



## Use of Side Paths

The Lawrence Area has a growing network of side paths along city streets, particularly in West Lawrence. Side paths can be a good bicycle facility for some bicyclists, but they also present conflicts at intersections and driveways. In general, bike lanes should also be included on any urban street that has a side path. Providing bike lanes allows faster bicyclists to use a more direct route than a side path while avoiding conflicts with other path users. Bike lanes also allow bicyclists to access destinations on the opposite side of the street than where the side path is located. Field work conducted for this plan indicates that many of the streets with side paths can accommodate bike lanes by being re-striped in the future.

Kansas has a “mandatory side path law” – a law that requires bicyclists to ride on a side path if one exists. Based on a Kansas Supreme Court ruling, it is now understood that this law only applies when a side path adjacent to a street is for the exclusive use of bicyclists.<sup>5</sup> All paths in Lawrence and Douglas County that are open to bicyclists are also open to pedestrians and other non-motorized users. As such, the Kansas side path law does not apply to these paths or future shared use paths that may be constructed. If area law enforcement agencies are incorrectly enforcing the side path law and requiring bicyclists to use side paths where they exist, an effort should be undertaken to educate law enforcement officials about the applicability of the law.



Clinton Parkway sidepath near the intersection with Wakarusa Drive

<sup>5</sup> Hugh, Brent. “Kansas Sidepath Law Clarified: Schallenberger v. Rudd 244 Kan 230.” Missouri Bicycle & Pedestrian Federation. Jan 27, 2009. <http://mobikefed.org/2009/01/kansas-sidepath-law-clarified-schallenberger-v-rudd-244-kan-230.php>



## Use of Narrow Travel Lanes

The potential to add bike lanes by widening streets increases greatly when streets are reconstructed, however, to add bike lanes to an existing street adequate width must be available. Many streets in the Lawrence Urban Area can accommodate bike lanes by restriping the existing roadway, but some streets would require 10 or 11 foot wide travel lanes. Traditionally, 12 feet is the desired standard for motor vehicle travel lanes. Narrower lane widths have been avoided in the past due to concerns about vehicle occupant safety and congestion, especially on arterial roadways. The only substantial research effort published which documented safety benefits were attributable to 12-foot lanes on rural two-lane highways.<sup>6</sup> However, new research on suburban and urban arterials has shown that 12 feet is not always needed for safety and capacity and lane widths between 10 feet and 11 feet on arterials and collectors do not negatively impact overall motor vehicle safety or operations. A summary of safety and capacity-related research is provided below.

### Safety

A study by the Midwest Research Institute entitled *Relationship of Lane Width to Safety for Urban and Suburban Arterials* concluded, "That there is no indication that crash frequencies increase as lane width decreases for arterial roadway segments or arterial intersection approaches."<sup>7</sup> The study compared 408 miles of urban and suburban arterials under state and local jurisdictions in two states. The types of roads in the analysis included the following arterial roadway types:

- ▶ Two-lane undivided arterials
- ▶ Three-lane arterials (one lane each direction + center turn lane)
- ▶ Four-lane undivided arterials
- ▶ Four-lane divided arterials
- ▶ Five-lane arterials (two lanes each direction + center turn lane).

According to the study, "A safety evaluation of lane widths for arterial roadway segments found no indication, except in limited cases, that the use of narrower lanes increases crash frequencies." Further, the study found that, "The lane width effects in the analyses conducted were generally either not statistically significant or indicated that narrower lanes were associated with lower rather than higher crash frequencies." Similarly, the study found no indication, except in limited cases, that the use of narrower lanes for arterial intersection approaches increases crash frequencies.

It is important to note that this study highlighted three situations in which the observed lane width effect was inconsistent including: lane widths of 10 feet or less on four-lane undivided arterials; lane widths of 9 feet or less on four-lane divided arterials; and lane widths of 10 feet or less on approaches to four-leg STOP-controlled arterial intersections. According to the study, these inconsistent findings do not mean that the use of narrower lanes must be avoided in these situations, but rather that, "It is recommended that narrower lane widths be used cautiously in these situations unless local experience indicates otherwise."

The study also provides a caveat that, "Lane widths less than 12 feet should be used cautiously where substantial volumes of bicyclists share the road with motor vehicles, unless an alternative facility for bicycles such as a wider curb lane or paved shoulder is provided." This statement is intended to suggest that bicyclists comfort and safety should be accommodated on projects where lanes are narrowed to add additional roadway capacity for motorists.

<sup>6</sup>Harwood, D. W., F. M. Council, E. Hauer, W. E. Hughes, A. Vogt, *Prediction of the Expected Safety Performance of Rural Two-Lane Highways*, Report FHWA-RD-99-207, Federal Highway Administration, December 2000.

<sup>7</sup>Potts, Ingrid B, Harwood, Douglas W and Richard, Karen R. *Relationship of Lane width to Safety for Urban and Suburban Arterials*. Washington, D.C. : Transportation Research Board, 2007.

The safety study described above included roads with buses and heavy vehicles. However, it bears mentioning that these vehicles are wider than single-occupancy vehicles (10.5 feet inclusive of mirrors on buses and trucks compared to 8 feet for smaller motor vehicles). Providing a bike lane, or paved shoulder adjacent to a traffic lane, carrying higher volumes of motor vehicles is beneficial to both users as it potentially increases the total effective width of the space.

Finally, a report of the National Cooperative Highway Research Program (NCHRP) report titled *Effective Utilization of Street Width on Urban Arterials* reached a similar conclusion.<sup>8</sup> This report considered the effectiveness of various strategies to re-allocate widths on urban arterials. The report surveys a wide range of crash data and finds no consistent relationship between 10 foot lanes and increased crash rates. The report recommends that narrower lanes should be considered as a strategy to implement other geometric improvements.

## Capacity

Research has also been done to determine the effect of reducing lane widths on motor vehicle capacity. NCHRP Project 3-72 entitled *Lane Widths, Channelized Right Turns, and Right-turn Deceleration Lanes in Urban and Suburban Areas* studied saturation flow rates for various lane widths, and found only a negligible difference (less than 5%) between the saturation flow rate of a 12 feet travel lane versus a 9.5 feet travel lane.<sup>9</sup> Therefore, reducing a travel lane width from 12 feet to 10 feet has been found to have little adverse effects on motor vehicle capacity in urban and suburban locations.

The Highway Capacity Manual (HCM) is the standard reference document for determining the capacity of roadways and intersections. It was updated in 2010 and reflects the research findings discussed above.<sup>10</sup>

## Comfort and Preference for Bicyclist Separation

The Florida Department of Transportation sponsored research to develop a "Bicycle Level of Service" model to measure the comfort of various bicycle facilities for bicyclists.<sup>11</sup> The research concluded bicyclist comfort increased with additional separation from motorized traffic on roadways and decreased with increasing speed and/or volume of traffic. Generally speaking, the provision of separate bicycle lanes provides bicyclists a substantially higher degree of comfort than a shared wide travel lane. This research has been thoroughly evaluated and calibrated through its application in bicycle master plans throughout the United States. The procedure is now included in the 2010 Highway Capacity Manual.

A 2013 Transportation Research Board (TRB) paper documents findings that motorists prefer the presence of bicycle lanes when interacting with bicyclists.<sup>12</sup> Evidence of this is also found in a recent survey of Bay Area drivers, who overwhelmingly agreed that bicycle lanes, "make bicyclists more predictable" and "give bicyclists their own space." Finally, bicycle lanes have been shown to encourage more bicyclists to ride on the roadway instead of the sidewalk, improving safety for pedestrians using the sidewalk.

## Narrow Lane Use Summary

Based on the most recent research, this plan includes recommendations that feature 10 foot travel lanes for urban streets (none for rural areas). These recommendations are informed by traffic volumes, anticipated bicycle usage, posted speeds, and functional classification of the roadway. Recommendations involving the use of 10 foot travel lanes are conservative, selecting the best combination of factors for their application.

<sup>8</sup> Harwood, D.W. *Effective Utilization of Street Width on Urban Arterials*. Washington, D.C.: Transportation Research Board, 1990. NCHRP 330.

<sup>9</sup> *Lane Widths, Channelized Right Turns, and Right-turn Deceleration Lanes in Urban and Suburban Areas*.

<sup>10</sup> Transportation Research Board. *Highway Capacity Manual*. Washington, DC: TRB, 2010.

<sup>11</sup> Petritsch, T. A., B. W. Landis, et al. (2006). *Bicycle Level of Service for Arterials*, Florida Department of Transportation

<sup>12</sup> Sanders, Rebecca, Cooper, Jill. *Do All Roadway Users Want the Same Things? Results from a Roadway Design Survey of Pedestrians, Drivers, Bicyclists, and Transit Users in the Bay Area*. Washington, DC. TRB, 2013. <http://safetrec.berkeley.edu/trb2013/13-4475.pdf>





## Chapter 3

# LAWRENCE URBAN AREA RECOMMENDATIONS

### Existing Conditions

Notable strides have been made in recent years to increase the number and length of bikeways in the Lawrence Urban Area. However, significant challenges remain for people interested in bicycling in the area who are not comfortable bicycling on busy streets with, or in, proximity to motor vehicle traffic. Some of the existing challenges are described below.

Note that the bikeway recommendations for the Lawrence Urban Area are intended to build upon the background and recommendations outlined in the T2040 MTP.

#### *Physical Barriers*

A number of significant physical barriers exist to bicycling in the Lawrence Urban Area:

- ▶ Major streets including Iowa Street, West 6th Street, 23rd Street, and others that carry significant motor vehicle traffic serve as barriers to bicyclists because they are difficult to cross and generally lack bicycle facilities.
- ▶ Topography can serve as a barrier, with significant hills present in Lawrence. Providing bicycle facilities such as climbing lanes on streets that ascend large hills can reduce these barriers.



Intersection of 6th Street and Iowa

## *Discontinuous Network*

The existing bikeway network in the Lawrence Area is discontinuous – bikeways begin and end suddenly and often do not connect to other bikeways. A discontinuous network is often typical of new bikeway networks that are being implemented. This is particularly true of bikeways such as bike lanes and paths that may take significant time and money to implement. Communities that have streets arranged in grid patterns or have neighborhoods that have this pattern of streets will have an inherent advantage and more options in establishing easier connections for bicyclists.

## *Additional Bikeway Types Needed*

The existing bikeway network is comprised of three primary facility types: bike lanes, bike routes, and shared use paths. Additional bikeway facility types are increasingly common in urban areas, and can better meet the needs of bicyclists than standard lanes, routes, and paths. This plan includes recommendations for implementing a number of additional facility types throughout the Lawrence Urban Area.

A range of bikeway facility types were highlighted in Chapter 2. For example, in the Lawrence Area there may be bikeway segments that could be served with cycle tracks or bike boulevards.

## *Wayfinding Signs Needed*

The existing bikeway network does not indicate to users the direction or distance to different destinations. Wayfinding signs provide information about destinations, direction, and distance to help bicyclists determine the best routes to take to major destinations. Signs provide on-the-ground information that helps bicyclists understand and use the on-street and trail network without the use of a map.

Directional signs also provide additional messaging to motorists to expect bicycles on the roadway. The presence of signs encourages bicycling on designated corridors because users feel the signs will direct them to the best route for getting to their destination. Signs may also be used to direct bicyclists around barriers.

## *Street Cross-Sections*

A number of streets in Lawrence have been recently reconstructed but are too narrow to include bicycle lanes. In general, two lane streets with no parking should be 32 feet wide (pavement, not including gutters), which allows for two 11-foot travel lanes and two 5-foot bike lanes. Streets that are heavily utilized by transit buses or other truck traffic should accommodate 12-foot travel lanes. While bike lanes can be retrofitted onto streets that are 30 feet wide, it can result in a less than desirable operating environment for bicyclists.

Two important additional conditions (safety and sharing the road etiquette) not directly related to bikeway design were also cited in the T2040 Plan as noted on the following page.



An example of a wayfinding sign



## Safety

The safety (real or perceived) of riding a bicycle on the road with cars close by is a major factor in travel mode choice decisions. The quantity of high speed, distracted, or unlawful driving exhibited by motorists, especially on major roads and during certain times of the day and year, can threaten the safety of bicyclists (and car drivers) becoming a prohibitive factor in citizens choosing bicycling as a viable means of transportation. The personal safety of bicyclists (or perceived safety) is also a factor, particularly for children, elderly people, and women (e.g., isolated areas depending on time of day). Personal security was also cited as an existing concern either as being real or a perceived threat in certain areas whether people ride on or off road.

## Sharing the Road Etiquette

Bicyclists on public roadways have the same rights and responsibilities as automobile drivers and are subject to the same state laws and local ordinances. As in many communities, friction sometimes exists between these common users of the roadway. Cyclists and motorists who take care to display correct roadway etiquette will do much to increase the respect between the two modes of travel. They will also be safer on the roads if they do all they can to obey the road traffic laws. Bicyclists and motorists should view each other with mutual respect as legitimate users of roadways.

Existing bikeways in the Lawrence Urban Area are displayed on Map 1.



Bicyclist on 27th Street



Bicyclists at the Lawrence Rotary Arboretum Ride Lawrence bike rack

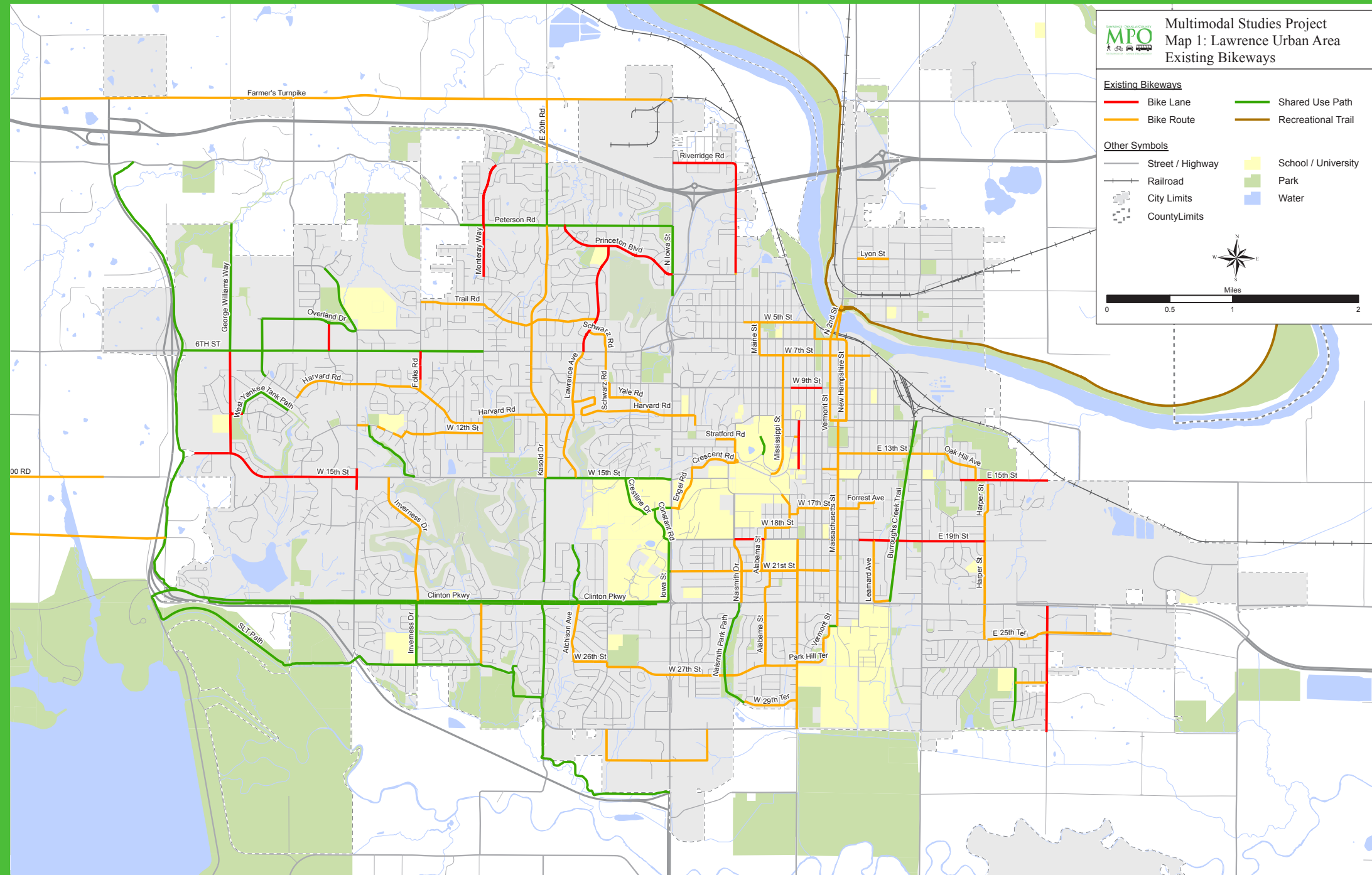
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## Map 1: Lawrence Urban Area Existing Bikeways



### Bicycle Level of Service

Urban bicycle-level-of-service (BLOS) measures are intended to indicate the level of service that a bicyclist can expect to find on a given street. A BLOS model can measure many factors, which combine to affect bicycling conditions on roadways. The models can be put to use to help evaluate and plan for streets or as a means to recommend street improvements to reach certain levels of service. Once the specific factors of a BLOS have been chosen and weights or scores have been assigned to each factor, a total score for each street segment can be calculated. Another common use for BLOS results is to present the ratings on a map for immediate use by bicyclists. The Lawrence Bicycle Rideability Map is this form of map and places street conditions into three broad categories. Currently, there are a handful of methodologies for assessing conditions, but most of them are intended for and work better with urban and suburban roadways. A separate rural method was used for Douglas County roads.

The Federal Highway Administration sponsored the creation of a bicycle level of service model called the Bicycle Compatibility Index (BCI) which was developed by University of North Carolina Highway Safety Research Center and published in 1998. (see Appendix B for the formula). Of importance for urban bicycle evaluation, changes in volumes — even considerable changes in volumes — do not affect the ratings significantly. On the other hand, the model is especially sensitive to the provision of paved shoulders and bike lanes with often a full point increase. Numerical ratings are determined for streets then slotted into categories and presented with an equivalent letter grade. More information about BCI is provided in Appendix B of this report.

The most commonly used BLOS model is actually called the Bicycle Level of Service model. The model has been refined and a version is being used in the Highway Capacity Manual for rating urban and suburban roadways. Like the BCI, the BLOS model is not extremely sensitive to changes in volumes of traffic, but more sensitive than the BCI.

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For example, with 12-foot travel lanes, at 40 mph, and good pavement conditions, the rating improved from 3.54 to 2.75 when the volume of traffic decreased from 5,000 to 1,000 per day (still within the same letter grade of C). The formula for the Bicycle Level of Service model is also displayed in Appendix B.

It was not within the scope of this project to rate all arterial and collector streets within the urban area using one of these methodologies. However, a simplified approach was used which considered both the BCI and BLOS to classify the arterials and collectors into three categories: scores of A/B, C/D, and E/F. Most of the arterial streets fell within the E/F category including North 2nd Street, 6th Street, Bob Billings Parkway, Clinton Parkway/23rd Street, Iowa Street, 31st Street, and parts of Wakarusa Drive, Kasold Drive, Monterey Way, Peterson Road, 19th Street, and Massachusetts Street. Several of these streets had paths running adjacent to them which provides bicycle accommodations within the corridor, but the methodologies are not equipped to take into account these side path facilities within street corridors.

Many of the collector streets were rated in the middle category (C/D) including Harvard Road, Naismith Drive, Haskell Avenue, Harper Street, and parts of Monterey Way, Kasold Drive, North Iowa Street, West 2nd Street, West 4th Street, Vermont Street, East 15th Street, West 21st Street, and West 27th Street. Falling into the best (A/B) category of bicycling conditions were lower volume collector streets and moderate volume collector streets with bike lanes and included North Street, Lyon Street, North 7th Street, Locust Street, Princeton Boulevard, 25th Terrace, East 27th Street, O'Connell Road, West 27th Street, and parts of Lawrence Avenue, Michigan Street, and River Ridge Road.

The ratings of some of the streets fell right at the breakpoint between two categories. A more thorough evaluation including the consideration of truck traffic, pavement condition, and prevalence of parking could mean a change in letter grade. The provision of bicycle lanes would mean the reclassification of many of the arterial streets and the resulting placement of them in the middle category of conditions – a rating of C or D. Adding bicycle lanes would also result in an improvement in collector streets and some minor arterial streets to a letter grade of B.



Naismith Drive South of 19th Street

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## General Engineering Recommendations

The following general bikeway recommendations are made for the Lawrence Urban Area:

- ▶ Include bike lanes on all future arterial and collector streets.

Numerous new streets are proposed on the Lawrence Urban Area Bikeway Map, with the majority of these located on the outer edges of Lawrence. All new streets that are classified as arterials or collectors should include bike lanes, even if these streets include plans to construct side paths. As noted earlier in this plan and in the AASHTO Guide for the Development of Bicycle Facilities, 4th Edition, there are a number of benefits for including bike lanes, even when a side path is present. Maps 2 and 3 display the location of future bike lanes within Lawrence (see pages 43 and 44).

- ▶ Include bike lanes when reconstructing urban arterial and collector streets.

A number of streets in Lawrence that have been reconstructed in recent years are slightly too narrow to accommodate standard bicycle lanes. In general, these streets are 30 feet from curb-to-curb. When accounting for the gutter pan, this width does not allow for the provision of a standard bike lane. When arterials and collectors are reconstructed, standard bike lanes should be included, even if this means slightly widening the street. In general, an absolute minimum width of 30 feet of pavement (not including gutters) should be provided for a two lane street with bike lanes. Preferably, the cross-section should be 32 feet in width (exclusive of gutters) providing 11 foot travel lanes and 5 foot bike lanes.



Photo rendering of Kasold Drive to include a climbing bike lane

- ▶ Use shared lane markings to connect currently discontinuous segments of bike lanes.  
 Bike lanes have been installed in discontinuous segments on a number of streets in Lawrence. Although there are legitimate reasons for why this has occurred, an effort should be made to connect these segments. If bike lanes cannot be installed due to width or other restrictions, shared lane markings should be installed until bike lanes can be installed.
- ▶ Narrow travel and/or center turn lanes on select streets in order to accommodate bike lanes.  
 A number of streets in Lawrence can accommodate bike lanes within the current curb lines by narrowing the travel and/or center turn lanes. Although a traffic study may be needed, it appears that several of these streets provide an opportunity to narrow or eliminate the center lane and reallocate the roadway width to include bike lanes or buffered bike lanes.
- ▶ Provide shared lane markings (sharrows) on all bike routes with an average daily traffic (ADT) count greater than 1,500.  
 Many bike routes in the T2040 network are on busier streets that are too narrow to accommodate bike lanes. Sharrows should be added on all bike routes that carry over 1,500 vehicles per day. The sharrows will help guide bicyclists to the proper position on the street and will reinforce to motorists that bicyclists will be traveling on these streets.

## Recommended Bikeway System Map Updates – Lawrence Urban Area

This section presents specific recommendations for updates to the Lawrence Urban Area Bikeway Map. The recommendations are divided into sections for the Lawrence Urban Area and the University of Kansas area. The recommendations were developed based on a number of factors including public input, street dimensions, improving bikeway connectivity, and providing facilities to separate bicyclists from motor vehicle traffic when possible. Chapter Six of this plan provides recommendations on non-engineering solutions. It is essential that the engineering recommendations be implemented with the other four E's to maximize the effectiveness of the plan.

Table 2 displays the miles of each facility type recommended for the City of Lawrence and the University of Kansas. It also includes the costs for the updated parts of the Lawrence Urban Area plan. All of the Lawrence projects, except several of the path projects, are recommended as short term actions since they involve the re-marking of existing street facilities.

**Table 2:** Miles of Recommended Bikeways in Lawrence and the University of Kansas

Facility Type	Lawrence	KU	Total	Estimated Cost
Bike Lanes	13.97	0.38	14.35	\$231,200 to \$680,300
Bike Routes with Paved Shoulders	0.55	0	0.55	\$50,000 to \$100,000
Climbing Lanes	1.89	0.29	2.18	\$23,000 to \$47,000
Cycle Tracks	0.26	0	0.26	\$50,000 to \$70,000
Shared Lane Markings	3.28	1.21	4.49	\$22,000 to \$78,000
Shared Use Paths	5.77	1.53	7.3	\$1,450,000 to \$2,165,000
<b>Total</b>	<b>25.72</b>	<b>3.41</b>	<b>29.13</b>	<b>\$1,826,200 to \$3,140,300</b>



# COUNTYWIDE BIKEWAY SYSTEM PLAN



## Lawrence Urban Area Recommendations

Tables 3 through 12 presents detailed recommendations for bikeways in the Lawrence Urban Area, with separate tables for different facility types. The Lawrence Urban Area - Existing and Proposed Bikeways Map (Map 2) displays the planned network for the Urban Area, while the Central Lawrence and KU Existing and Proposed Bikeways Map (Map 3) displays a more detailed view of the planned network for Downtown Lawrence and the University of Kansas campus. The table also provides planning level cost estimates for the recommended bikeway changes. In addition to bicycle lanes recommended below, a traffic study is recommended to determine the feasibility of converting Massachusetts Street from four lanes to three lanes from 11th Street south to 23rd Street to enable the addition of bicycle lanes.

**Table 3: Bicycle Lanes Recommended for the Lawrence Urban Area**

Name	From	To	Mi.	Major Action	Estimated Cost
E. 9th St.	Connecticut St.	Delaware St.	0.25	Add shared lane markings in near term; bike lanes with reconstruction	\$2,500 to \$10,000 for striping material
E. 11th St.	New Jersey St.	Pennsylvania St.	0.86	May require 10' travel lanes and 3.5' + 1.5' shoulder and/or parking limits	\$17,000 to \$40,000 based on marking material
E. 21st St.	Massachusetts St.	Barker Ave.	0.17	Use shared lane markings until street can be widened for bike lanes or made into a bicycle boulevard	\$1,700 to \$6,800
Harvard Rd.	Stoneridge Dr.	Wakarusa Dr.	0.54	None	\$5,500 to \$22,000
Haskell Ave.	E. 23rd St.	E. 31st St.	1.01	May require reducing/ eliminating center lane	\$20,000 to \$50,000
Inverness Dr.	Bob Billings Pkwy.	Clinton Pkwy.	1.12	None	\$11,000 to \$44,000
Kasold Dr.	Peterson St.	Bob Billing Pkwy.	2.08	Narrow existing lanes to add bike lanes	\$41,500 to \$104,000
Lawrence Ave.	Clinton Pkwy.	W. 31st St.	1.06	May require 10' travel lanes and 3.5' + 1.5' shoulder	\$21,000 to \$53,000
Legends Dr.	Bob Billings Pkwy.	Wakarusa Dr.	0.7	None	\$7,000 to \$28,000
Mississippi St.	Fambrough Dr.	Memorial Dr.	0.4	None	\$4,000 to \$16,000
N. 3rd St.	North St.	Locust St.	0.57	Will require 10' travel lanes and 3.5' + 1.5' shoulder	\$11,500 to \$28,500
New Hampshire St	E. 6th St.	E. 11th St.	0.63	Narrow existing lanes or eliminate center turn lane	\$12,500 to \$31,500
Oread Ave.	W. 12th St.	W. 13th St.	0.13	None	\$1,500 to \$5,500
Ousdahl Rd.	W. 19th St.	W. 21st St.	0.25	None	\$2,500 to \$10,000
Vermont St.	6th St.	11th St.	0.65	Narrow existing lanes or eliminate center turn lane	\$13,000 to \$35,000
W. 21st St.	Iowa St.	Massachusetts St.	1.34	Use shared lane markings until street can be widened for bike lanes or made into a bicycle boulevard	\$14,000 to \$67,000
W. 27th St.	Lawrence Ave.	Iowa St.	0.52	May require 10' travel lanes and 3.5' + 1.5' shoulder	\$10,000 to \$26,000
W. 4th St.	McDonald St.	Indiana St.	0.96	Will require 10' travel lanes and 3.5' + 1.5' shoulder	\$20,000 to \$48,000
W. 7th St.	Tennessee St.	New Jersey St.	0.48	Narrow existing lanes or eliminate center turn lane	\$9,500 to \$24,000
W-E 9th St	Vermont St.	Connecticut St.	0.25	Stripe bike lanes	\$2,500 to \$10,000
<b>Total</b>			<b>13.97</b>		<b>\$228,200 to \$659,300</b>

**Table 4:** Climbing Lanes Recommended for the Lawrence Urban Area

Name	From	To	Miles	Major Action and Estimated Cost
Fambrough Dr.	Missouri St.	Maine St.	0.07	Add lane marking \$1,000 to \$2,000
Harvard Rd.	Kasold Dr.	Randall Rd.	0.71	Add lane marking \$7,000 to \$14,000
W. 11th St.	W. Campus Rd.	Missouri St.	0.14	Add lane marking \$2,000 to \$3,000
W. 14th St.	Jayhawk Blvd.	Tennessee St.	0.21	Add lane marking \$2,000 to \$4,000
W. 7th St.	East of Iowa St.	Michigan St.	0.45	Add lane marking \$5,000 to \$9,000
W. Campus Rd.	W. 11th St.	Jayhawk Blvd.	0.31	Add lane marking \$3,000 to \$ 6,000
<b>Total</b>			<b>1.89</b>	<b>\$20,000 to \$38,000</b>

**Table 5:** Bike Routes with Paved Shoulders Recommended for the Lawrence Urban Area

Name	From	To	Miles	Major Action and Estimated Cost
E. 23rd St.	Noria Rd.	Lawrence Limits - East	0.55	Mill and overlay shoulders \$50,000 to \$100,000
<b>Total</b>			<b>0.55</b>	<b>\$50,000 to \$100,000</b>

**Table 6:** Cycle Tracks Recommended for the Lawrence Urban Area

Name	From	To	Miles	Major Action and Estimated Cost
6th St. Cycle Track	Massachusetts St.	New Hampshire St.	0.07	Add two way cycle track on north side of the street \$15,000 to \$22,500
E. 7th St. Cycle Track	Rhode Island St.	New York St.	0.14	Add two way cycle track on north side of the street \$25,000 to \$35,000
Rhode Island St. Cycle Track	E. 7th St.	Parking lot entrance	0.05	Add two way cycle track on west side of the street \$10,000 to \$12,500
<b>Total</b>			<b>0.26</b>	<b>\$50,000 to \$70,000</b>





# COUNTYWIDE BIKEWAY SYSTEM PLAN



**Table 7:** Shared Lane Markings Recommended for the Lawrence Urban Area

Name	From	To	Miles	Major Action and Estimated Cost
Delaware St.	E. 8th St.	E. 13th St.	0.65	Add markings \$3,000 to \$11,000
E. 9th St.	Connecticut St.	Delaware St.	0.25	Add markings \$2,000 to \$6,000
Fambrough Dr.	Maine St.	Mississippi St.	0.19	Add markings \$2,000 to \$6,000
Massachusetts St. <sup>13</sup>	6th St.	11th St.	0.65	Add markings \$3,000 to \$11,000
W. 27th St.	Iowa St.	Louisiana St.	1.03	Add markings \$5,000 to \$18,000
Wisconsin St.	W. 2nd St.	W. 6th St.	0.51	Add markings \$2,500 to \$9,000
<b>Total</b>			<b>3.28</b>	<b>\$17,500 to \$61,000</b>

**Table 8:** Shared Use Paths Recommended for the Lawrence Urban Area

Name	From	To	Miles	Major Action and Estimated Cost
W. 6th St. Path	6th St. Cycletrack	Constant Park Path	0.12	Add as part of park-to-park connection \$25,000 to \$40,000
W. 6th Street Sidepath	Vermont St.	Kentucky St.	0.06	Add as part of park-to-park connection \$15,000 to \$25,000
W. 6th Street Sidepath	Rockledge Rd.	Wisconsin St.	0.57	\$115,000 to \$170,000
Burroughs Creek Trail Extension - 11th to 8th	E. 11th St.	E. 8th St.	0.43	Add as part of park-to-park connection \$80,000 to \$120,000
Burroughs Creek Trail Extension - 8th to 7th	E. 8th St.	E. 7th St.	0.23	Add as part of park-to-park connection \$45,000 to \$65,000
Delaware St. Sidepath	W. 8th St.	W. 10th St.	0.26	Add as part of park-to-park connection \$50,000 to \$75,000
Harvard Connector Path	Harvard Rd.	Harvard Rd.	0.06	\$15,000 to \$25,000
Hobbs Park Path	Delaware St.	Burroughs Creek Trail	0.26	Add as part of park-to-park connection \$50,000 to \$75,000
Powerhouse Underpass	6th St. Cycletrack	6th St. Path	0.16	Add as part of park-to-park connection \$35,000 to \$50,000
RI-NH Path	Rhode Island St.	New Hampshire St.	0.11	Add as part of park-to-park connection \$25,000 to \$35,000
23rd Street Sidepath	Iowa St.	Haskell Ave.	2.0	\$400,000 to \$600,000
Iowa Street Sidepath	W. 23rd St.	K-10 Path	1.51	\$300,000 to \$450,000
<b>Total</b>			<b>5.77</b>	<b>\$1,155,000 to \$1,730,000</b>

<sup>13</sup> Massachusetts Street from 11th Street to 23rd Street should also be considered for a 4-lane to 3-lane conversion. Current traffic volumes fall within the range of acceptable limits for a conversion, but a traffic analysis is recommended. Bike lanes can be added with the three lane cross-section providing a direct link to downtown and to numerous businesses located south of downtown on Massachusetts Street.

## University of Kansas Area Recommendations

Tables 9 – 12 provide lists of recommended bikeways for the University of Kansas area. The majority of these recommendations are on private, University of Kansas maintained streets. These recommendations were developed in coordination with the KU master planning process.

**Table 9:** Bicycle Lanes Recommended for the University of Kansas Area

Name	From	To	Miles	Major Action and Estimated Cost
Naismith Dr.	Crescent Rd.	W. 15th St.	0.12	\$1,000 to \$3,000
Sunnyside Ave.	Naismith Dr.	Sunflower Rd.	0.38	\$6,000 to \$18,000
<b>Total</b>			<b>0.50</b>	<b>\$7,000 to \$21,000</b>

**Table 10:** Climbing Lanes Recommended for the University of Kansas Area

Name	From	To	Miles	Major Action and Estimated Cost
Sunflower Rd.	Jayhawk Blvd.	Indiana St.	0.29	\$3,000 to \$9,000
<b>Total</b>			<b>0.29</b>	<b>\$3,000 to \$9,000</b>

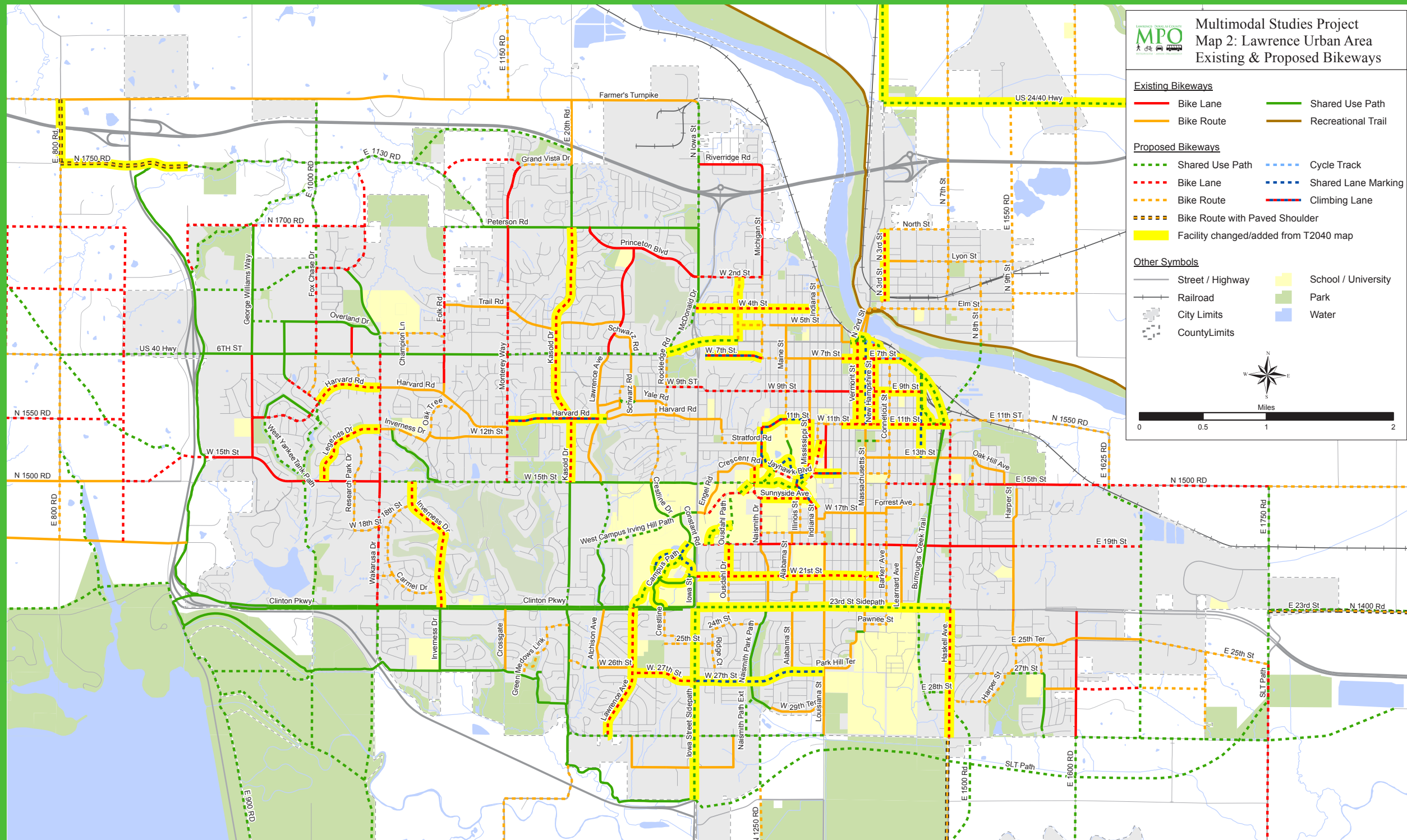
**Table 11:** Shared Lane Markings Recommended for the University of Kansas Area

Name	From	To	Miles	Major Action and Estimated Cost
Becker Dr.	Constant Ave.	Existing path	0.25	\$1,000 to \$3,000
Constant Ave.	W. 19th St.	W. 21st St.	0.31	\$1,000 to \$3,000
Memorial Dr.	W. Campus Rd.	Mississippi St.	0.53	\$2,000 to \$6,000
Mississippi St.	Memorial Dr.	Jayhawk Blvd.	0.12	\$500 to \$1,000
<b>Total</b>			<b>1.21</b>	<b>\$4,500 to \$13,000</b>

**Table 12:** Shared-Use Paths Recommended for the University of Kansas Area

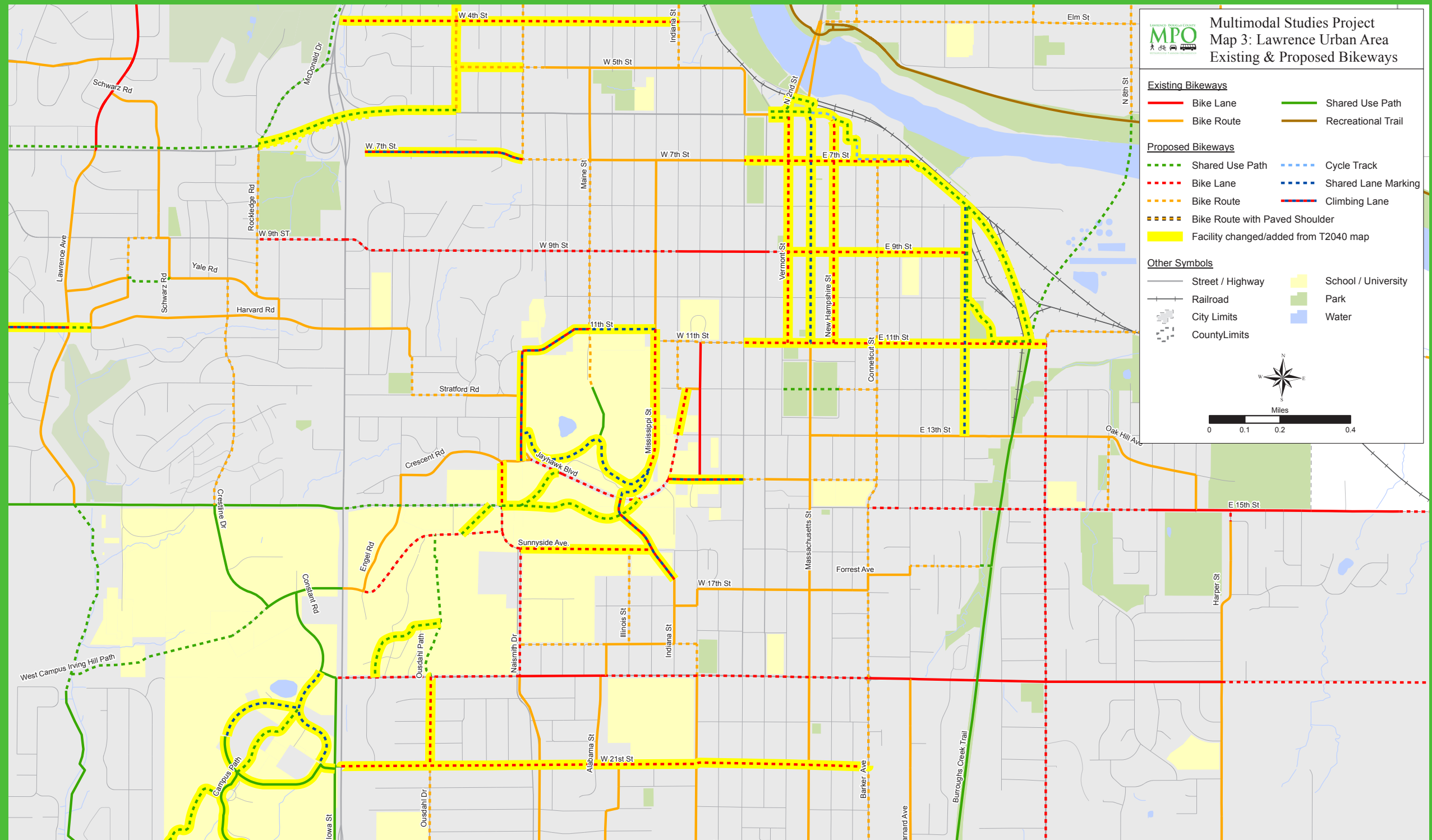
Name	From	To	Miles	Major Action and Estimated Cost
Campus Path 1	Clinton Pkwy.	Existing path	0.28	\$55,000 to \$75,000
Campus Path 2	Becker Dr.	Constant Ave.	0.27	\$55,000 to \$75,000
Campus Path 3	W. 19th St.	Planned path	0.29	\$55,000 to \$75,000
Campus Path 4	Irving Hill Rd.	Naismith Dr.	0.12	\$25,000 to \$40,000
Campus Path 5	Naismith Dr.	Jayhawk Blvd.	0.42	\$85,000 to \$125,000
Campus Path 6	Planned Campus Path 5	Jayhawk Blvd.	0.15	\$30,000 to \$45,000
<b>Total</b>			<b>1.53</b>	<b>\$295,000 to \$435,000</b>





**Map 2:**  
 Lawrence Urban Area Existing & Proposed Bikeways

**Map 3:**  
 Central Lawrence  
 and University of Kansas  
 Existing & Proposed Bikeways





## Special Study Area

The development of this Countywide Bikeway System Plan included the evaluation and identification of recommendations for two special study areas within Lawrence. These included the intersection of West 6th Street and Iowa Street, and the connection between Hobbs Park and Constant Park in Central Lawrence. The issues and recommendations for these special areas are discussed in the following sections.

### *6th Street & Iowa Street- Lawrence, KS*

#### Existing Conditions

This intersection involves an interchange where Iowa Street crosses underneath 6th Street. The bridge has some deficiencies and bicyclists and pedestrians have considerable difficulty negotiating this crossing. The problem is further complicated by there being so few crossings of Iowa Street making this a critical crossing spot. Currently a sidewalk exists on the north side of the bridge and is connected to sidewalks on that side. A sidewalk is not present on the south side of the bridge, but exists to the east side of the bridge, but not on the west side until it picks up again at Rockledge Road. There are no bicycle lanes or paved shoulders on the bridge or leading up to it on 6th Street. Iowa Street is limited access between Interstate 70 and 9th Street, including this interchange area. There are two free-flow ramps from 6th to Iowa – on the northeast quadrant and the southwest quadrant.

The bridge is scheduled for improvements in 2014 to address some deficiencies which will provide an opportunity to include improved bicycle and pedestrian facilities. The Lawrence City Commission voted in September, 2013 to widen the sidewalk on the north side to act as a two-way path. A sidewalk will also be added to the south side with crosswalks and pedestrian indicators.



6th Street looking west just east of Iowa Street ramp



Iowa Street Sidewalk

## Recommendations

The project consultant team agrees with the position taken by the City Commission. The important aspects of that decision involve:

### ▶ North Side

A path is supported by the City Commission for the north side of the bridge. This makes the most sense as the path continues from the structure to the east and west. This plan recommends that the path should extend west to the previously planned sidepath beginning at Rockledge Road, and east to Wisconsin Street where the path can connect to a proposed bike route.

### ▶ South Side

A sidewalk should be located on the south side of the bridge and continue through the park to Rockledge Road. Currently there are noticeable signs of pedestrian traffic on that side. Although the walk will probably have to be limited to five feet of width and placed immediately behind the curb, it will make a critical connection for pedestrians (and some bicyclists) to the new sidewalks built on the eastside of the bridge in 2012 and the sidewalks west of Rockledge Road.

These recommendations are displayed on Map 4.

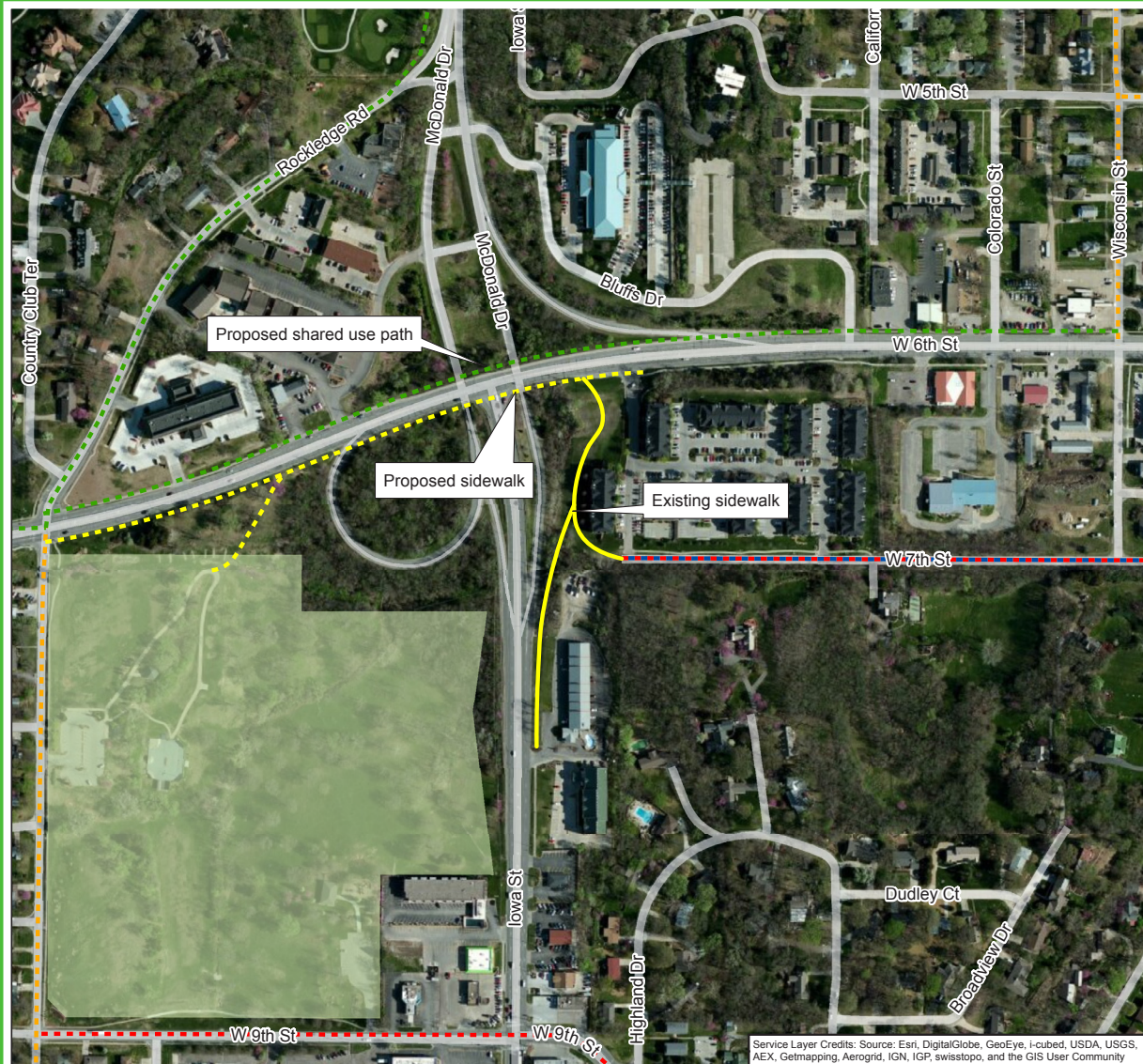
When the bridge is totally replaced, the long term plan should provide space on the deck itself for bicyclists. Bicyclists are currently using the bridge. In the easterly direction there is a significant grade and it is not unusual for bicyclists to be traveling at speeds of 20 mph to 25 mph. Since a new bridge will be in place for 50 years or longer, having additional space, such as shoulder space, on the bridge and approaches makes sense for making future bikeway connections. Shoulders also have benefits for other users, such as an area for breakdowns, and more room for turning vehicles, buses and temporary snow storage.



Cyclist traveling through the intersection of 6th Street and Iowa



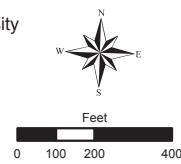
## Map 4: Proposed bikeways and sidewalks at 6th and Iowa Streets



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map 4: West 6th Street & Iowa Street Focus Area

Existing Bikeways	Proposed Bikeway Connection	Other Symbols	
Shared Use Path	Shared Use Path	Street / Highway	School / University
Bike Lane	Bike Lane	Railroad	Park
Bike Route	Climbing Lane	City Limits	Water
	Shared Lane Marking	County Limits	
	Sidewalk		



This map is provided "as-is" for informational purposes and no guarantee is made as to the accuracy of the map or data. Plot date 04/21/2013.

## Constant Park to Hobbs Park Connection- Lawrence, KS

This section contains recommendations for providing bicycle connections between Hobbs Park and Constant Park. The recommendations are organized into near-, mid-, and long-term recommendations in recognition that some of the recommended bikeways may take substantial amounts of time to plan and fund. An overview of the existing conditions and recommendations is provided below.



6th Street in front of city hall looking east



Hobbs Park at 10th and Delaware Streets

### Existing Conditions

Currently there is no continuous bikeway connection, on-street or off-street, between the popular Hobbs and Constant Parks, which provide connections to other parts of the city (see Map 5). Bicyclists use a combination of existing paths, sidewalks, parking lots, and city streets to make their way from one park to the other. A number of issues have arisen about the current conditions:

- ▶ The sidewalk in front of City Hall and portions of the parking lot/structure between New Hampshire and Rhode Island Streets are commonly used by bicyclists attempting to avoid riding on 6th Street or other nearby streets. This presents conflicts with pedestrians on sidewalks and with motor vehicles in the parking area, as well as occasional trespassing concerns.
- ▶ Streets that could be used to make the park-to-park connection are often busy or have heavy truck traffic. East 8th Street carries substantial truck traffic due to the presence of a concrete plant just east of the railroad tracks. Many of the north-south streets are either busy or constructed with brick, making them unappealing to use.
- ▶ Some adult bicyclists are comfortable using the streets on their own in this area, but are not comfortable bicycling with their families on those same streets due to safety concerns.
- ▶ East and West 6th Street segments are busy, particularly near the Massachusetts and Vermont Street bridges, which creates potential conflicts.

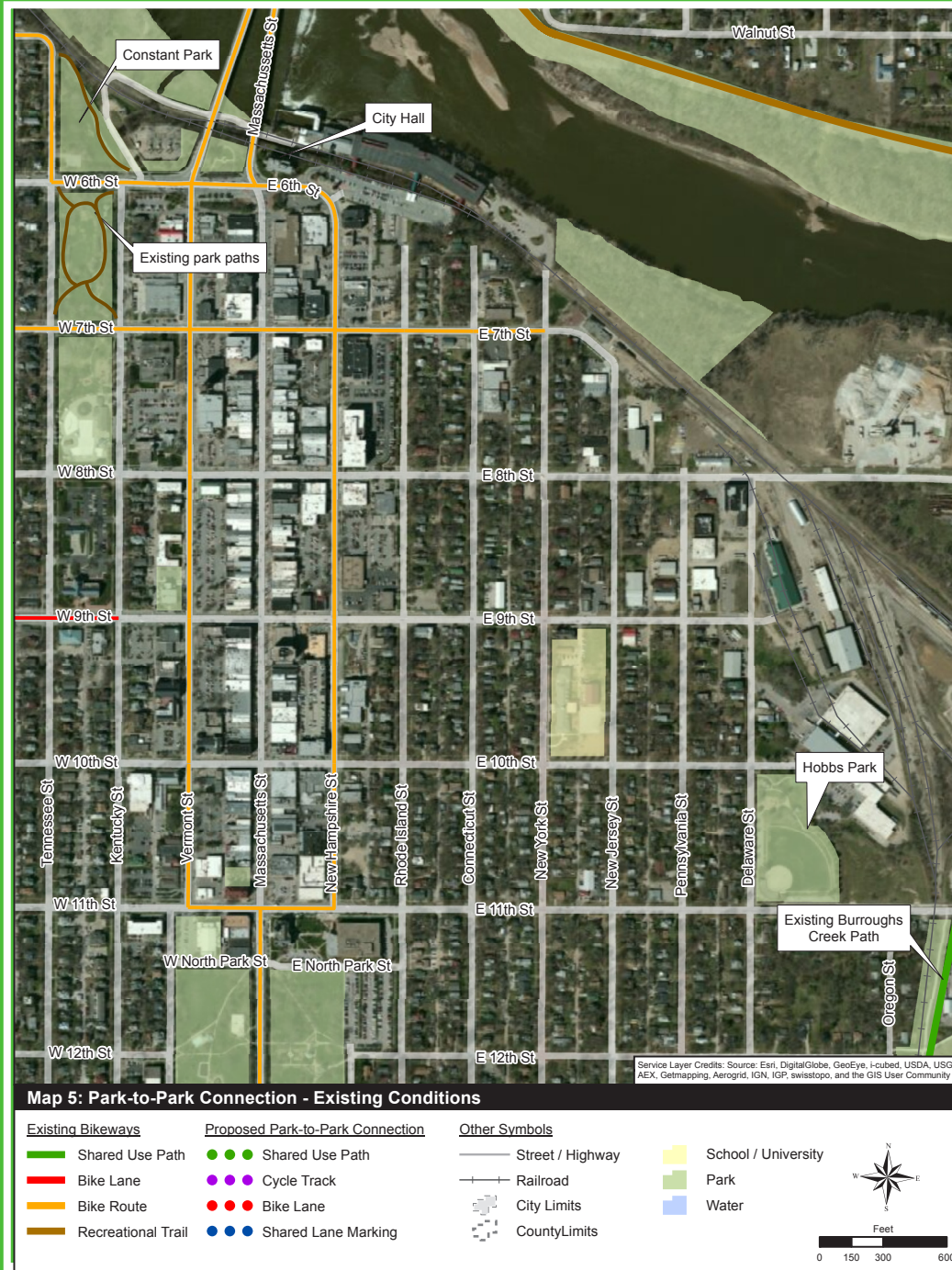
Many of these issues can be addressed by providing clear on- and off-street route options for bicyclists between the two parks. The remainder of this section presents recommendations to connect the two parks, first with on-street bikeways, and then with off-street bikeways.

The existing conditions are displayed on Map 5.





## Map 5: Park-to-Park Connection - Existing Conditions



## Near-Term Recommendations

The near-term recommendations focus on providing a well-defined on-street connection between the two parks and are intended to be carried out in 1-2 years. Although an on-street connection may not be desirable to some community members, and may not be appropriate for all bicyclists, it is an improvement that could be completed in very short order. The recommendations are summarized below and displayed on Map 6.

1. Widen the existing paths in Hobbs Park to AASHTO standards.
2. Provide shared lane markings (“sharrows”) on Delaware Street. Our recommendations for the Lawrence Urban Area call for sharrows on Delaware Street from East 8th Street south to East 13th Street, but for the purposes of this connection, they are only needed between East 9th Street and East 11th Street.
3. Provide sharrows on East 9th Street from Connecticut Street to Delaware Street.
4. Provide bike lanes on West/East 9th Street from Vermont Street to Connecticut Street.
5. Provide bike lanes on Vermont Street.
  - a. Recommendations for the Lawrence Urban Area call for bike lanes on Vermont from West 6th Street south to West 11th Street, but for the purposes of this connection, they are only needed between West 6th Street and West 9th Street.
  - b. A counterflow bike lane is necessary between West 6th Street and West 7th Street. This lane will accommodate northbound bicycle travel as Vermont Street is one-way southbound on this block. A small number of parking spots, approximately three or four, would be removed for the bike lane.
6. Provide a sidepath on the south side of West 6th Street from Kentucky Street to Vermont Street to allow bicyclists to access the crosswalk at Kentucky Street and West 6th Street.
7. Provide clear wayfinding signage along the entire route to guide cyclists between the parks.
8. Develop cost estimates for a street separated path between the two parks. The most significant challenge is the segment between Rhode Island Street at 7th Street and 6th Street at Massachusetts Street. The cost estimates will likely be high based on the fieldwork conducted for this study. This is also the segment that has numerous options. If an acceptable and affordable set of solutions are found for this segment, long-term work on this connection should continue. Taking this segment of project into preliminary engineering may be the best option to determine the range of costs and solutions.



Photo rendering of Vermont Street with bike lanes - view is to the north from 7th Street. Includes a counter-flow bicycle lane



## Map 6: Park-to-Park - Near-Term Recommendations



Note: Numbers preceding notes refer to recommendation numbers in plan document.

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**Map 6: Park-to-Park Connection - Near-Term Projects**

Existing Bikeways	Proposed Park-to-Park Connection	Other Symbols	
Shared Use Path	Shared Use Path	Street / Highway	School / University
Bike Lane	Cycle Track	Railroad	Park
Bike Route	Bike Lane	City Limits	Water
Recreational Trail	Shared Lane Marking	County Limits	

This map is provided "as-is" for informational purposes and no guarantee is made as to the accuracy of the map or data. Plot date 04/21/2013.

## Mid-Term Recommendations

The mid-term recommendations focus on adding off-street bikeways (shared use paths and cycle tracks) to make the connection between the two parks. The mid-term recommendations are intended to be implemented within two to four years. These bikeways will appeal to a broader range of users than the on-street bikeways provided in the near-term recommendations. The recommendations are considered feasible in the mid-term, but will require significant engineering and planning work, potential land acquisition, and funding. The recommendations are summarized below and displayed on Map 7.

9. Provide sharrows on Delaware Street between East 9th Street and East 8th Street (if they were not provided as part of the near-term improvements). Add a sidepath along Delaware Street between East 8th Street and East 10th Street.
10. Provide a shared use path along the existing rail corridor from East 8th Street to the intersection of New York Street and East 7th Street. The path can be routed in front of the Amtrak/multimodal station as pedestrian conflicts will be relatively limited.
11. Provide a two-way cycle track on the north side of East 7th Street from Rhode Island Street to New York Street.
12. Provide a two-way cycle track on the west side of Rhode Island Street from East 7th Street to the entrance of the parking lot.
13. Provide a shared use path through portions of the parking lot to a location near the parking lot entrance at New Hampshire Street and East 6th Street.
14. Provide a two-way cycle track in front of City Hall from approximately the parking lot entrance to the intersection of Massachusetts and 6th Streets.
15. Widen the existing sidewalk/path on the north side of West 6th Street to AASHTO standards between Constant Park and Massachusetts Street.
16. Provide clear wayfinding signage along the entire route to guide cyclists from one park to the other.



Possible location of a path just to the south of the Riverfront parking ramp at 6th and New Hampshire Streets



## Map 7: Park-to-Park - Mid-Term Recommendations



## Long-Term Recommendations

The long-term recommendations focus on completing the park-to-park connection with off-street facilities and removing a number of busy intersection crossings from the route. These recommendations are considered long-term due to substantial planning and engineering needs, land acquisitions, and substantial funding, and may take five years or longer to implement. The recommendations are summarized below and displayed on Map 8.

17. Provide a shared use path along the existing rail corridor from the current terminus of the Burroughs Creek Trail at East 11th Street to East 8th Street where a connection can be made with the path recommended in the mid-term recommendations.

18. Provide a shared use path from the East 6th Street cycle track, around City Hall, under the Massachusetts and Vermont Street bridges, and connecting to the shared use path along East 6th Street.

19. Provide clear wayfinding signage along the entire route to guide cyclists from one park to the other.

Additionally, bike lanes should be added on East 9th Street between Connecticut Street and Delaware Street when the street is reconstructed. East 9th Street does not have adequate width to add bike lanes as currently constructed.

Recommendation 18 will be the most difficult to implement, and likely the most expensive, portion of the entire park-to-park connection. An engineering study will be required to determine if a path under the bridges can be constructed in the available space while meeting AASHTO and ADA requirements. Specific issues relate to the grade that must be traversed, providing adequate overhead clearance on the path, and potential construction of a retaining wall within the railroad right-of-way.

## Park-to-Park Bikeway Summary

By implementing these recommendations in stages, a clear on-street route can be provided between Hobbs and Constant Parks in the near-term, while providing a vision to complete an off-street route in the mid- and long-term. This staging of projects recognizes that facilities such as signs and street markings (sharrows and bike lanes) can be implemented very soon at little cost, while projects such as cycle tracks and shared use paths will take more time to accommodate planning and engineering, possible land acquisition, and secure funding.





## Map 8: Park-to-Park - Long-Term Recommendations



Note: Numbers preceding notes refer to recommendation numbers in plan document.

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### Map 8: Park-to-Park Connection - Long-Term Projects

#### Existing Bikeways

- Shared Use Path
- Bike Lane
- Bike Route
- Recreational Trail

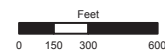
#### Proposed Park-to-Park Connection

- Shared Use Path
- Cycle Track
- Bike Lane
- Shared Lane Marking

#### Other Symbols

- Street / Highway
- Railroad
- City Limits
- County Limits

- School / University
- Park
- Water



This map is provided "as-is" for informational purposes and no guarantee is made as to the accuracy of the map or data. Plot date 04/21/2013.



South Lawrence Trafficway (SLT) shared use path





## Chapter 4

# RURAL AREA PLANS AND RECOMMENDATIONS

Douglas County provides a beautiful, rolling countryside that can be an excellent bicycling venue. With the communities of Eudora, Baldwin City, and Lecompton, and scenic attractions such as Clinton Lake and Lone Star Lake, the rural areas of the County provide attractions and destinations for people on bicycles. However, without a more fully developed bikeway network, it can be challenging for people to reach specific destinations and to find which roads are the best to travel on as a bicyclist. Bicycle travel in Douglas County is further complicated by the fact that a large portion of the roads are not paved – something that may be a simple annoyance to a motorist, but can be a show-stopper for many bicyclists. For these reasons, it is important to provide a network of bikeways connecting communities, parks, and other attractions in Douglas County and surrounding areas.

### Plan Methodology

A number of steps were involved in identifying the proposed bicycle network for Douglas County. As work progressed through these steps, the Steering Committee provided important guidance.

#### *Step 1: Corridor Identification*

General corridors were determined based on the desire to connect all cities within the County. Other major destinations were also considered such as Clinton Lake, Clinton Lake State Park, and Lone Star Lake Park. These corridors were often served by either state or county highways.

#### *Step 2: Bicycle Level of Service Analysis*

A bicycle level of service analysis was conducted to qualitatively examine and determine which highways offered the best opportunities within the corridors. The analysis also helped to inform what changes (paved shoulders, bike lanes, paths) could be used to bring potential highways to an acceptable level of service.

#### *Step 3: Project Costs Estimating*

This step involved the estimating of costs for projects. Costs were determined using average costs for past projects and cost estimates based on other planning projects. By getting some sense of the magnitude of costs for projects, project prioritization could be informed.

#### *Step 4: Project Prioritization*

The last step in this process is the selection of priorities. For this step, a number of the aforementioned tools were used. Again, the bicycle level of service model was instrumental in helping identify the most critical connections that were poorly rated and needed to be addressed by the plan.

## Bicycle Level of Service Assessment

One of the most important analysis tools used for assessing bicycling conditions is a bicycle level of service formula or methodology. Not only is this an excellent tool to rate conditions for bicycle maps, but it can be used as a planning tool. The two national methodologies (the BCI and BLOS) are well regarded for their ability to rate urban and suburban conditions for bicycling, but have limitations for rating rural roadways. Another model used by the Wisconsin Department of Transportation (WDOT) and now several other states was developed with higher speed roadways in mind. WDOT has been using this bicycle level of service model since 1982. With an abundance of low volume country roads (approximately 50,000 to 60,000 miles of paved town and county roadways in Wisconsin) the model was designed to be sensitive to the conditions of low and moderate volume rural roadways. Of most of the models in use, this Wisconsin DOT model has the most sensitivity to volumes of traffic in the mid to low ranges.

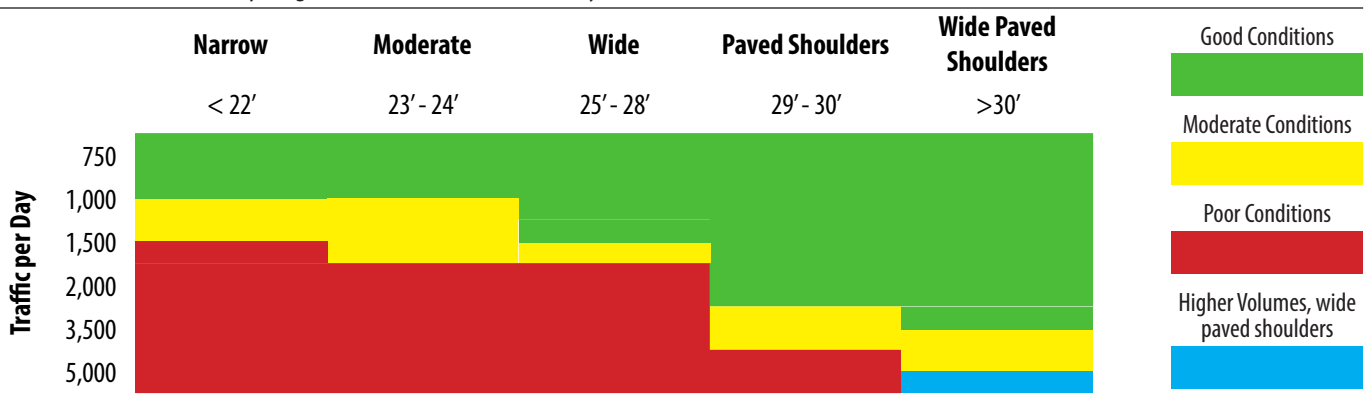
The model was based on the probability of a conflict. Very few rural roads with low volumes of traffic in rural areas such as Kansas, have enough width to allow three vehicles (2 passing motorists and a bicyclist) to comfortably share the same linear space. The statistical probability of motor vehicle/bicycle/ motor vehicle conflict has a major impact on the suitability of a roadway for shared use and overall safety.

The model was made sensitive to volumes based on earlier research conducted for warranting passing lanes on highways. Using and modifying that formula for its Wisconsin model, a bicyclist can expect to encounter nine times as many conflicts on a road with 1,500 vehicles per day as compared with a road that has 500 vehicles. On a road with 5,000 vehicles, the conflicts would be one hundred times as great as on a road with 500 vehicles per day.

Unlike the other methodologies it “tops-out” at about 5,000 vehicles per day, which is still a relatively high volume for rural area roads. Wisconsin DOT officials actually established upper volume thresholds at which point roadways would automatically receive undesirable ratings even when wider paved shoulders existed. Although it has been adapted to account for use with paved shoulders, Wisconsin DOT officials acknowledge that the conflicts occurring with vehicles when paved shoulders are present are different than bicyclists sharing travel lanes.

This bicycle level of service assessment was performed for all paved rural state and county highways as part of the existing conditions assessment. The formula was adapted for Douglas County to rate roads based on factors including average daily traffic volume, roadway width, posted speed limit, percent yellow line, and percent truck traffic (only for state highways). Based on a combination of these factors, roadway segments are rated “good” (or best), “moderate,” or “undesirable.” A generalized table of the methodology is displayed in Table 13.

**Table 13:** Generalized Bicycling Conditions for Rural Roadways<sup>14</sup>



<sup>14</sup> Wisconsin Rural Bicycle Planning Guide. Wisconsin Department of Transportation. April 2006. 15.





Although Table 13 only displays traffic volume and roadway width, it is clear that as traffic volumes increase, the roadway width must also increase to maintain bicyclist comfort levels. A similar pattern exists for other factors: as truck volumes and speeds increase, a wider roadway is needed to achieve best or moderate ratings.

The ratings provided are for cyclists over 16 years of age who are generally comfortable with some level of higher speed traffic. However, it should be recognized that bicyclists have differing levels of comfort with motor vehicle traffic, and the ratings may not be appropriate for all bicyclists. Table 14 displays the miles of roadway with each of the ratings for the approximately 200 miles of roadway that was rated while Map 9 displays the ratings by roadway segment.

**Table 14:** Miles of Rural Roadway in Douglas County by BLOS Rating

Rating	Miles	Percent of Total
Good	116.5	56.6%
Moderate	17.3	8.4%
Poor	72.0	35.0%
<b>Total</b>	<b>205.8</b>	<b>100.0%</b>

Overall, bicycling conditions in the County are relatively good. Over 65% of the highways in the County are rated as either good or moderate for bicycling. Approximately 60% of the 72 miles that are rated as undesirable for bicycling are state highways.

At a minimum, there should be at least one desirable way on each side of the Lawrence Urban Area for bicyclists to travel to and from Lawrence and the rural and small city parts of Douglas County. The following conditions exist that affect that travel:

- ▶ **Northside:** Good connections from Michigan Street, Iowa Street, and Kasold Drive to County Route (CR) 438. CR 438 is rated in good condition for bicycling according to the bicycle level of service analysis. It has moderate volumes of traffic, but new paved shoulders.
- ▶ **Westside:** There are paths along 6th Street and Clinton Parkway to access Kansas Highway 10 (K-10). K-10 provides an excellent bikeway north and south along the highway. However, except for access into Clinton State Park, there are no paved road options westbound that are rated as even moderate for bicycling conditions.
- ▶ **Southside:** According to the WikiMaps, the bicycle demand map developed for this project, comments from bicyclists, and observed bicycling, the connections to the south of Lawrence appear to be some of the most well used in the region. Currently there are numerous ways that bicyclists are accessing the countryside and vice-versa for rural residents accessing the city. Access to Clinton State Park is good and, although somewhat circuitous, bicyclists can access county highways to the south of the lake through this access point.

Together North 1250 Road and East 1150 Road offer a relatively low volume connection as well to this part of Douglas County. East 1400 and East 1500 roads are rated as moderate or undesirable for bicycling and these two are likely to be the most well-used bicycle access points to the south of Lawrence. In addition to the higher traffic volumes along these roads, the crossings of K-10 at 27th Street and East 1200 Road have been identified as challenging by area bicyclists. The crossing at 27th Street is signalized, while East 1200 Road is not requiring a crossing of four lanes with over 60 feet of pavement including the K-10 shoulders.

- ▶ **Eastside:** County Route 442 (N. 1400 Road) was recently reconstructed with five foot paved shoulders. Most of it falls within the best conditions rating for bicycling. There are several ways of connecting to CR 442 using North 1500 Road and East 1750 Road.
- ▶ **Northeast:** East 1500 and East 1600 Roads are low volume and connect immediately north of the City of Lawrence and cross underneath Interstate 70. East 1600 is gravel and East 1500 transitions to gravel north of Highway 24/40. Highway 59 to the northwest and Highways 24/40 to the east are considered undesirable for bicycling according to the level of service model. Both have some of the highest levels of traffic in Douglas County aside from Interstate 70 and K-10.

## Connections To / From Small Cities

Access into and out of the other cities in Douglas County is mixed as well, and there are challenging connections. Here is a summary of the conditions based on the level of service tool.

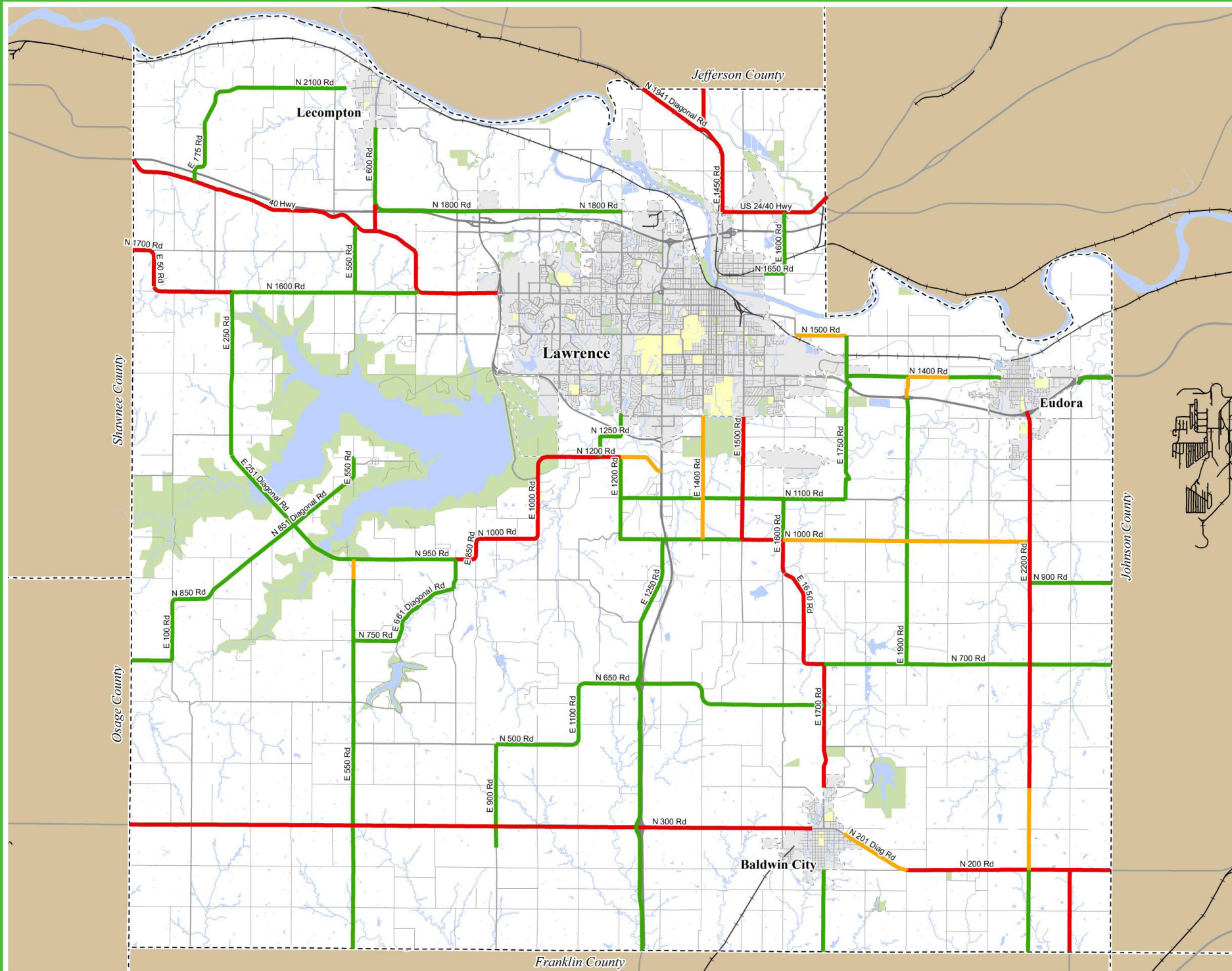


Rural roadway looking north on E 1200 Road



Bicyclist traveling south on E 900th Road across the impoundment

- ▶ **Eudora:** Conditions for Route 442 from the west and especially to the east are considered as good. To the south beginning at K-10, conditions are undesirable along Route 1061. This also presents a problem with access to the two schools located along that road immediately south of K-10.
- ▶ **Baldwin City:** A new path has been located along 6th Street (CR 1055) from Ames Street (US- 56) to State Lake Road (CR 12). Although this improves conditions within the City, CR 1055 (E1700 Road) is rated as undesirable for bicycling from that point to the north. Similarly, US Highway 56 west and east of the City is also rated as undesirable. A new, but short reconstruction project on US-Highway 56, contained almost entirely within the City, does provide roughly four foot wide paved shoulders. Beyond that point the paved shoulder narrows slightly and traffic volumes are relatively high. CR 1055 to the south of the City provides a high level of service for bicycling given the low traffic volume.
- ▶ **Lecompton:** There are three major means of traveling into and out of Lecompton. County Route 1029 (E600 Road) from the south and north and CR 1023 (N2100 Road) from the west. With the recent addition of wide paved shoulders, CR 1029 falls in the good category for bicycling. However, the bridge heading north across the Kansas River is narrow, lacking sufficient shoulder space for bicycle use. CR 1023 to the west falls into the good category for bicycling due to very low traffic volumes.



Data provided by the Lawrence - Douglas County MPO and the U.S. Census Bureau. This map is provided "as-is" for informational purposes and no guarantee is made as to the accuracy of the map or data. Plot date 12/10/2013.

MPO Multimodal Studies Project  
Map 9: Bicycle Level of Service

### Legend

#### Bicycle L.O.S. Rating

- Good
- Moderate
- Undesirable

#### Other Symbols

- Street / Highway
- Railroad
- City Limits
- County Limits
- School / University
- Park
- Water



### Description

This map depicts the Bicycle Level of Service (BLOS) for paved arterial and collector level roads and highways in Douglas County, outside of the urban areas.

The BLOS describes the "bikeability" of specific road segments - good, moderate, and undesirable. The ratings are based on a variety of factors including roadway width, average daily traffic volumes, and posted speed limits. In general, as roadways get wider, their BLOS rating improves. At the same time, as traffic volumes increase, the BLOS rating decreases.

The methodology used for this map was developed by the Wisconsin Department of Transportation for use on rural roadways.

## Map 9:

# Bicycle Level of Service Ratings for Douglas County Rural Area Recommendations

## Recommended Network for Douglas County

The following tables detail the bicycling facilities recommended for the Douglas County Rural Area. The tables are broken down by bikeway type, and provide the streets (or other features) that the recommended facility runs between. Almost all of the facilities recommended for the rural area consist of either bike routes or bike routes with paved shoulders; there is one recommended shared use path connection between the Cities of Lawrence and Eudora.

In discussing bicycling conditions in the rural area, the term bicycle route is used in more of a generic sense. Although some of these roadways are being suggested for paved shoulders, other roadways form good or very good connections for bicyclists without any changes to the roadway itself. It is far more important to focus on making improvements to roadways that are in the greatest need of improvement (increasing separation) than spending funds on roadways that are currently providing a higher level of service. While most recommendations for bicycle routes within the urban area are paired with recommendations for wayfinding signage, Steering Committee members did not feel that bike route signage was necessary in rural areas with the possible exception of a few key intersections. The rural road system is straightforward and bicyclists who are using the roads are believed to have a working knowledge of which roads are the most bicycle friendly based on experience.

Existing conditions in Douglas County are displayed on Map 10, while Map 11 displays the recommended facilities.

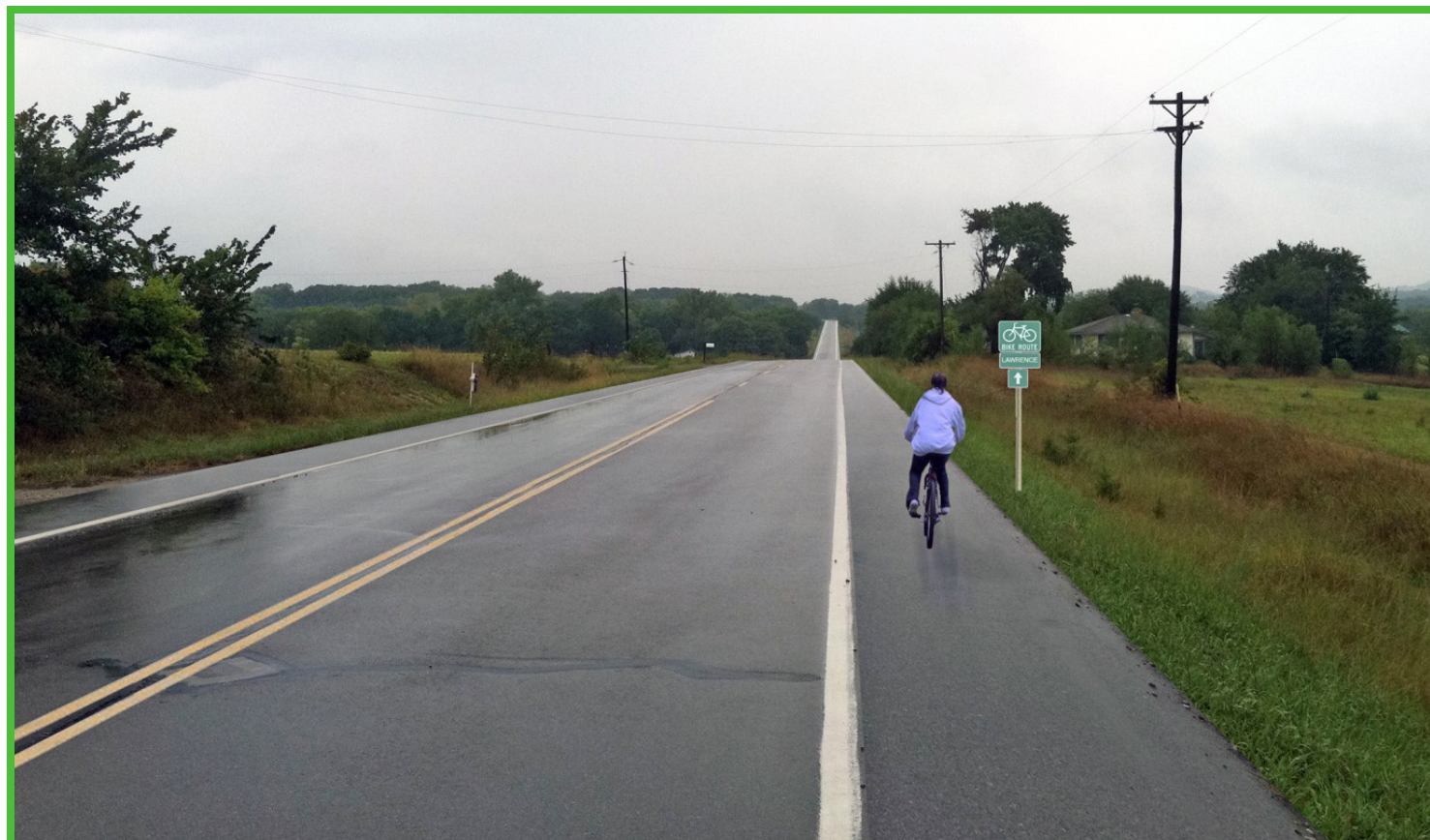
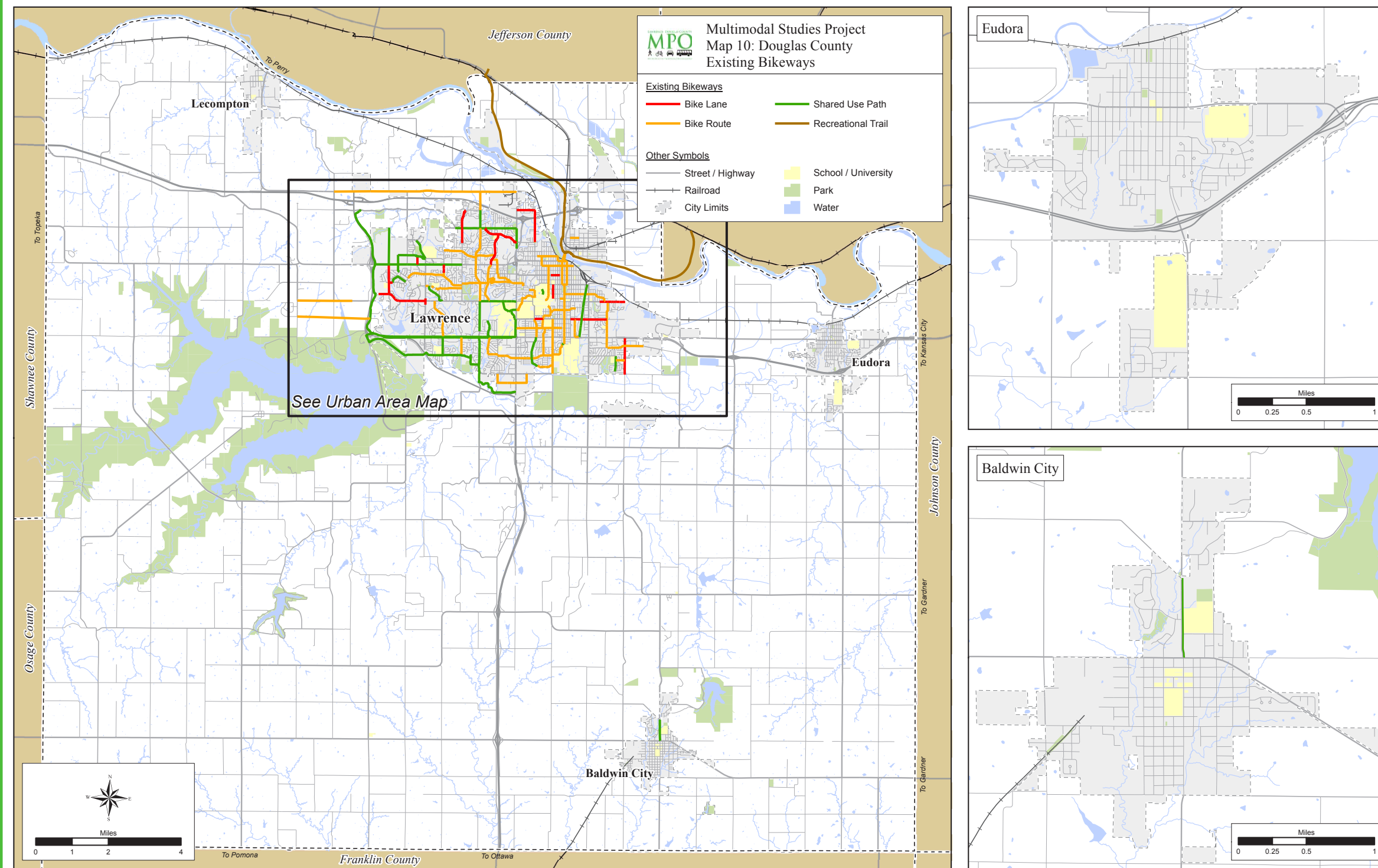


Photo rendering of paved shoulders on County Route 458 south of Lawrence.

**Table 15:** Bike Routes Recommended for the Douglas County Rural Area

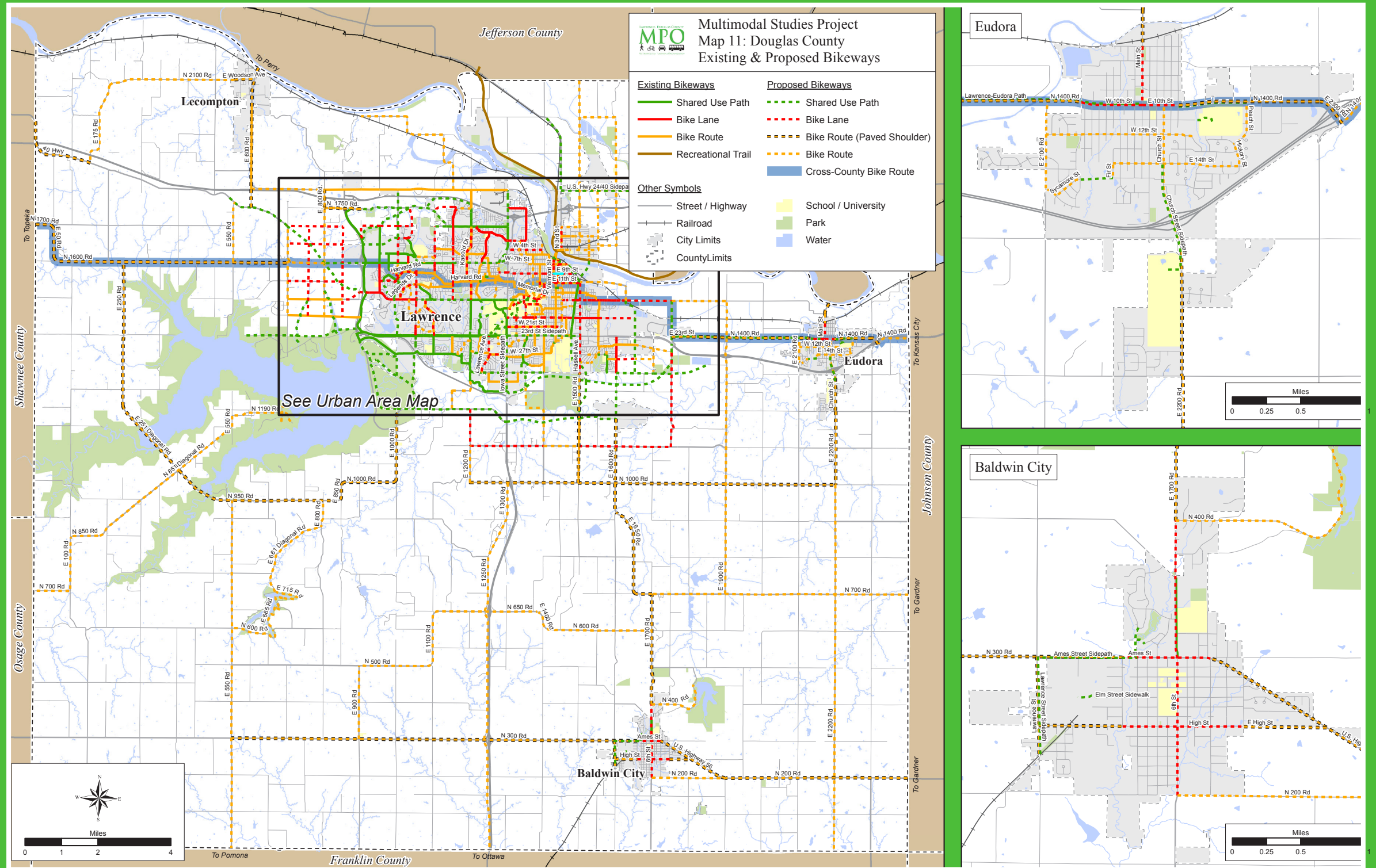
Name	From	To	Miles
E. 100 Rd	N. 850 Rd.	N. 700 Rd.	1.48
E. 1100 Rd (CR 460)	N. 650 Rd.	N. 500 Rd.	1.44
E. 1200 Rd	N. 1100 Rd.	N. 1000 Rd.	1.01
E. 1250 Rd	N. 900 Rd.	Franklin County	9.24
E. 1300 Rd	N. 1000 Rd.	N. 900 Rd.	1.01
E. 1400 Rd	N. 650 Rd.	N. 600 Rd.	0.40
E. 175 Rd	N. 2100 Rd.	U.S. Highway 40	2.36
E. 1900 Rd (CR 1057)	N. 1500 Rd.	N. 700 Rd.	8.03
E. 2200 Rd (CR 1061)	N. 1000 Rd.	Franklin County	10.03
E. 550 Rd (CR 1029)	N. 950 Rd.	Franklin County	9.52
E. 550 Rd (CR 1029)	N. 1190 Rd.	N. 1150 Rd.	0.32
E. 550 Rd (CR 1029)	U.S. Highway 40	N. 1600 Rd.	1.63
E. 661 Diagonal Rd	E. 800 Rd.	E. 715 Rd.	2.58
E. 665 Rd	E. 715 Rd.	N. 600 Rd.	1.64
E. 700 Rd	North end	South end	0.58
E. 715 Rd	E. 582 Rd.	E. 665 Rd.	1.06
E. 800 Rd	N. 950 Rd.	E. 661 Diagonal Rd.	0.73
E. 900 Rd	N. 500 Rd.	U.S. Highway 56	2.01
N. 1190 Rd	N. 1180 Rd.	Clinton Lake	1.59
N. 1190 Rd	E. 550 Rd.	N. 1180 Rd.	0.26
N. 1400 Rd	E. 2300 Rd.	Johnson County	0.90
N. 200 Rd	E. 1700 Rd.	E. 1900 Rd.	2.01
N. 2100 Rd (CR 1023)	E. 175 Rd.	Clark St.	3.46
N. 400 Rd	E. 1700 Rd.	State Lake Park	1.83
N. 500 Rd (CR 460)	E. 900 Rd.	E. 1100 Rd.	1.98
N. 600 Rd (CR 460)	E. 550 Rd.	E. 650 Rd.	1.46
N. 600 Rd (CR 460)	N. 550 Rd.	City of Eudora	3.02
N. 650 Rd (CR 460)	E. 1100 Rd.	E. 1400 Rd.	2.83
N. 700 Rd (CR 460)	E. 1st Rd.	E. 100 Rd.	1.00
N. 700 Rd (CR 460)	E. 1700 Rd.	E. 2200 Rd.	7.02
N. 850 Rd	E. 100 Rd.	N. 851 Diagonal Rd.	0.77
N. 851 Diagonal Rd	N. 850 Rd.	E. 550 Rd.	4.72

<b>Total</b>			<b>87.92</b>
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**Map 10:**  
Douglas County  
Existing Bikeways

**Map 11:**  
 Douglas County  
 Existing & Proposed  
 Bikeways





# COUNTYWIDE BIKEWAY SYSTEM PLAN



**Table 16:** Bike Routes with Paved Shoulders Recommended for the Douglas County Rural Area

Name	From	To	Miles
US-40	Shawnee County	E. 175 Rd.	2.30
E. 1000 Rd (Hwy 458)	N. 1200 Rd.	N. 1000 Rd.	1.94
E. 1500 Rd	E. 31st St.	N. 1000 Rd.	3.01
E. 1600 Rd (Hwy 1055, partial)	N. 1100 Rd.	E. 1650 Rd.	2.57
E. 1650 Rd (CR 1055)	E. 1600 Rd.	N. 700 Rd.	2.41
E. 1700 Rd (Hwy 1055)	N. 700 Rd.	N. 400 Rd.	3.04
E. 2200 Rd (Hwy 1061)	N. 1000 Rd.	N. 1200 Rd.	2.01
E. 2200 Rd (Hwy 1061)	N. 1500 Rd.	Jefferson County	0.38
E. 250 Rd (Hwy 1023)	N. 1600 Rd.	E. 250 Diagonal Rd.	3.94
E. 251 Diagonal Rd	E. 250 Rd.	N. 950 Rd.	3.95
E. 50 Rd (Hwy 442)	N. 1700 Rd.	N. 1600 Rd.	0.87
E. 800 Rd	N. 1800 Rd.	N. 1750 Rd.	0.50
E. 850 Rd (Hwy 458)	N. 1000 Rd.	N. 950 Rd.	0.46
N. 1000 Rd (Hwy 458)	E. 1200 Rd.	E. 2200 Rd.	10.02
N. 1000 Rd (Hwy 458)	E. 850 Rd.	E. 1000 Rd.	1.47
N. 1400 Rd (Hwy 442)	City of Lawrence	Cedar St.	3.20
N. 1600 Rd (Hwy 442)	E. 50 Rd.	E. 700 Rd.	6.52
N. 1700 Rd (Hwy 442)	Shawnee County	E. 50 St.	0.47
N. 1750 Rd	E. 800 Rd.	Planned path	1.01
N. 200 Rd (US-56)	E. 1900 Rd.	Johnson County	5.00
N. 300 Rd (US-56)	E. 550 Rd.	11th St.	11.13
N. 700 Rd (Hwy 1055)	E. 1650 Rd.	E. 1700 Rd.	0.48
N. 950 Rd (Hwy 458)	E. 535 Rd.	E. 850 Rd.	3.13
<b>Total</b>			<b>69.81</b>

**Table 17:** Shared Use Paths Recommended for the Douglas County Rural Area

Name	From	To	Miles
Lawrence-Eudora Path	E. 1750 Rd.	Cedar St.	3.75
US 24/40 Sidepath	E. 1450 Rd. (Highway 59)	Leavenworth County	2.73
US 24/59 Sidepath	N. 1800 Rd (Highway 40)	E1400 (Highway 1045)	2.17
<b>Total</b>			<b>8.65</b>

A main objective of this plan is to have a route system that connects all cities to each other. In order for this to occur in a way that ensures a high level of service for bicyclists, paved shoulders on highways leading into these communities is necessary. Most of these paved shoulders are already in place. Other secondary connections are also recommended. Most of these are not recommended for paved shoulders at this point in time based on the low volumes of traffic. When traffic volumes are low, overall exposure is reduced (fewer inherent conflicts because there are fewer motorists passing bicyclists) and motorists are able to overtake bicyclists with relatively ease and ample separation because of fewer oncoming motorists. This means that motorists are encountering fewer situations where they might be trying to negotiate an ill-advised pass of a bicyclist when a motorist is oncoming.



A new section of State Highway 56 includes a 4 foot paved shoulder in Baldwin, KS

## Project Cost Estimates

Estimating costs for projects is one of the most difficult parts of developing a bicycle plan. It has several purposes: knowing what the costs are for capital budgeting purposes and helping to prioritize projects. The most significant challenge is trying to gather and assess all of the factors that might impact the cost of projects. This is often not known until preliminary engineering work is done. In order to proceed with this important step, often historical unit costs or “planning level costs” are used to help with the estimating. For the Douglas County plan, caveats are described below.

By far the most common facility type recommended in this plan for the rural areas of the County is paved shoulders. Paved shoulders have multiple benefits and have been shown in cost/benefit studies, for even moderately-low levels of motor vehicle traffic, to have enough benefits for motorists and maintenance purposes to merit inclusion on projects. While estimating the costs of paved shoulders can be conducted in often a rudimentary fashion, the apportionment of those costs to “bicycling” or “walking” is often more difficult since shoulders provide benefits across the board to all roadway users.

The costs for adding paved shoulders to a reconstruction or pavement replacement project where adequate shoulder width already exists would have a relatively low cost compared to the cost of the overall project. To add paved shoulders to a project that does not have gravel shoulders or enough shoulder width for adequate paved shoulders is considerably more expensive, and would involve the construction of the gravel shoulders and new ditching work to accommodate the new shoulders. If shoulders are being added for other non-bike/pedestrian reasons, which are often the case to meet modern highway standards for higher functioning highways, only the cost associated with providing any additional paved width for bicyclists or pedestrians should be reflected as the true marginal cost of paved shoulders for bikeway development.



A simple and basic approach to estimating the cost of shoulder construction is by analyzing past Douglas County projects. This would provide the best estimator of local construction costs. Ten projects were evaluated which were constructed with paved shoulders since 2002. Average costs can be derived by simply dividing the total project cost by ultimate pavement width including paved shoulders. This is not the most accurate way since constructing shoulders and the associated excavation and embankment work for ditches is considerable and adds significantly to the project cost compared to a simple mill and overlay project.

Using this very rough estimation technique, the average cost for four foot paved shoulders per mile ranged from \$50,000 to \$150,000 and could easily be double this cost for eight foot paved shoulders where narrow shoulders were present to begin with. Many of the projects added a new gravel base to support the paved shoulders. Comparing these results with other estimations from the Midwest indicate that these costs are within the range for highway projects involving paving shoulders that are part of major reconstruction or pavement replacement projects. Again, it is important to note, that although there is a significant cost to providing paved shoulders, especially where no shoulders existed in the first place, these costs cannot be apportioned to just bicycling and walking. And if the project was going to include paved shoulders, regardless of the recommendations of the bicycle plan, the costs should not be attributed to bicycling or walking accommodations.

In Douglas County, given the current practice of reconstructing important segments of county highways with shoulders and paving a significant portion of them, the recommendations of the plan will likely wait until these highway segments are reconstructed or the pavement is replaced.

The cost for paving shoulders is estimated for the 22 miles of identified priorities. Although the estimated costs are provided, they are not considered a true cost of implementing the plan since most of these projects would have already included shoulders as part of their design. If only four foot wide paved shoulders are used, the range of costs will range from \$1.1 million to \$3.3 million. For eight foot wide paved shoulders, the cost is estimated at \$2.2 to \$6.6 million.

Another means of providing the costs of paving shoulders is to simply estimate the pavement cost of the shoulder. This does ignore the fact that in Douglas County the standard practice has been to add paved shoulders to wider gravel shoulders for a variety of purposes. Adding paved shoulders to already shouldered segments of highway generally costs about \$50,000 to \$75,000 per mile for five foot wide paved shoulders. Assuming that highway projects either already have gravel shoulders or the project already includes gravel shoulders, the cost for all 65 miles of paved shoulder recommendations would amount to \$3 million to \$4.5 million. There will be some segments of highway where it will be more difficult to include paved shoulders than others.

Table 18 identifies the priority highways with a level of difficulty rating based on the field work conducted for this bikeway system plan.

**Table 18: Bike Routes with Paved Shoulders Recommended as Priorities for the Douglas County Rural Area**

Name	From	To	Level of Difficulty and Cost*
CR 458	US-59	N1150 Rd	Moderate difficulty, moderate cost
CR 458	N1150 Rd	E800 Rd	Moderately-low difficulty, moderate cost
CR 458	CR 1055 North	CR 1055 South	Moderately-high, moderate to high cost
CR 1055	E 31st Street	CR 458	Moderate to Very Difficult (Most costly segment to be completed with K-10 project)
CR 1055	CR 458	CR 12 (State Lake Road)	Mostly moderately-high, but with ¾ mile as very difficult. High cost
US-40	K-10	CR 442	Moderate difficulty, moderate cost
CR 1061	K-10	CR 458	Moderate difficult, moderate cost

\* See discussion of costs on previous page. Difficulty ratings and costs are based on the level of effort involved in providing entire shoulders where they do not exist. Paving over existing and adequate gravel shoulder as part of a project is relatively low cost, but those conditions for the priorities established in this table do not exist.

Lastly, nearly nine miles of path are also recommended in the plan. These are recommended along County Route 442, and US Highways 24/59 and 24/40. These shared use paths are estimated to cost \$200,000 per mile for a total of \$1.8 million.

## Priority Projects

A number of steps were involved in determining the proposed bicycle network for Douglas County. The last step in this process involves the selection of priorities. For this step, a number of tools were used. Again, the bicycle level of service model can be put in practice to find where the most critical improvements are needed based on their poor level of service ratings. The other tools that were used were the WikiMaps and the bicycle heat map. The WikiMaps provided some sense of current and desired bicycle use based on direct feedback by area bicyclists. The maps were especially helpful in identifying bicycle usage in and out of the Lawrence Urban Area. The bicycle heat maps showed not only existing but latent demand for bicycling. Again, the maps were especially informative at the edges of the urban area where the bikeway network began to transition into rural parts of Douglas County.

Based on the results of these tools and the proceeding steps, the following projects and road segments are recommended as the highest priorities. The first three are transitions between the urban area and the rural area and are primarily located in the urban area, but are listed here since they are rural cross-section highways and serve the rural area surrounding the urban area:

### *East 1500 Road (CR 1055) from East 31st Street in Lawrence to N1100 Road*

Based on relatively high bicycle demand from the nearby urban area, this road serves as a common route for bicyclists. By providing bicyclists with paved shoulders, they will be able to access N1100 Road, which is fairly bicycle friendly already based on low volumes of traffic. A lower priority would be to provide paved shoulders all the way to CR 458. Fortunately, just over half of this recommended stretch of road will receive wide paved shoulders when it is realigned and reconstructed in 2014 as part of the South Lawrence Trafficway/K-10 project.





## ***US Highway 40 from K-10 to East 700 Road and CR 442***

This is the only paved road option that extends west of Lawrence and enables a connection to CR 442 (rated as good). The two mile segment has moderately-high traffic volumes, no paved shoulders, and is hilly in spots with poor sightlines.

## ***County Route 458 from East 1200 Road to East 800 Road***

This is a key connection for bicyclists destined to Lone Star Lake Park and traveling around Clinton Lake. Sightlines are fairly good, but traffic volumes are moderate, and there are no paved shoulders. A segment of CR 458 is also recommended for a path as part of the urban area plan. The path makes broader connections to the west and east and should be pursued in addition to adding paved shoulders to the common section of CR 458 / N1200 (about 1.5 miles).

## ***County Route 1061 from K-10 to CR 458***

This is also recommended in the Eudora Bike Plan for bike lanes/paved shoulders and a path for that part of CR 1061 within the City limits.

This entire stretch is considered to be undesirable for bicycling because of high traffic volumes and no usable paved shoulders. This stretch will improve bike access to the middle and high schools located south of K-10. It will also form part of an improved bikeway connection between Eudora and Baldwin City.

## ***County Routes 1061, 460, and 1055 from Highway 458 to the Baldwin City limits***

This is the lowest of the high priorities, in part, because of its very high cost estimate, slightly lower bicycling volumes, and motor vehicle volumes. Additionally, an alternative for bicyclists exists with the recent opening of East 1250 Road (old US-59). That newly refurbished road can be taken to CR 460 and then to CR 1055. This would limit bicyclist travel on CR 1055 to just two miles.

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A significant number of roadways and paths remain as longer term and less pressing recommendations. Given their location, costs for bikeway treatment, and current conditions for bicycling, their priority is considered lower.



County Route 1061 (Church Street) Eudora.

## Basic Implementation Measures

The current practice in Douglas County is to include full width shoulders (approximately eight to ten feet wide) on reconstruction projects. Paved shoulder width ranges from four to 10 feet. The County tries to undertake at least one of these major projects per year. This allows the inclusion of at least four foot paved shoulders. There are several fundamental implementation measures that are associated with the recommendations for the network plan that are made in consideration of the County's current practices.

### *Project Scheduling and Priorities*

From an engineering and a pavement sustainability standpoint, the best time to provide paved shoulders is when the pavement is replaced for the travel lanes of a highway or when the roadway is reconstructed. There are about 22 miles of higher priority paved shoulders segments. The following offers a strategy for inclusion of these paved shoulders:

- ▶ If these prioritized roadway segments are scheduled for significant pavement replacement or reconstruction work as some are, then these projects can and should be scoped to include paved shoulders.
- ▶ If only minor work is being planned for a highway containing a priority segment that does not include a timely opportunity for the project to include paved shoulders, the project should be "re-scoped" to include a minimum of four foot paved shoulders.
- ▶ If the priority segments are not included in a short term schedule of repair work (in the next five years), the County and state should consider moving these key segments up in the schedule, pursue funding to finance the bikeway improvements, and/or provide short term paved shoulders until the segment is scheduled for major replacement or reconstruction. Providing short term paved shoulders is only feasible when adequate gravel shoulders exist.

Unfortunately, that is not the case with nearly all of the priority projects. A dedicated funding source could be used to help spur on the implementation of these bicycle-related improvements. The survey responses conducted as part of the plan showed support for dedicated funding for both the urban and rural area plans.

Opportunities to include the non-priority recommendations should also be pursued when major work is being done; however, taking the additional measures as outlined above are optional.

### *Mapping*

There are often ways for bicyclists to plan trips around challenging segments in the system. Most of the paved shoulders are recommended to be added in the next five years, but under the best case scenario, there will still be a number of years before segments are completed. Providing bicycle suitability maps and guide maps are often useful for informing bicyclists as to current conditions. For example, there is a parallel route option for bicyclists traveling south from Lawrence – instead of using a busier segment of East 1500 Road to County 458 south of the Wakarusa River, segments of North 1175 Road and East 1550 Road could be used.

### *Selective Use of Share the Road Signing*

Share the road signs make the most sense when bicyclists are sharing the travel lane with motorists especially when conditions change from a situation where bicyclists were using a paved shoulder. The judicious uses of these signs are appropriate for some of these priority segments with especially high volumes of traffic such as US Highway 40 between K-10 and CR 442.





## Chapter 5

# SMALL CITY PLANS AND RECOMMENDATIONS

This chapter provides primarily bikeway recommendations for the Cities of Baldwin City, Eudora, and Lecompton in Douglas County. The recommendations for Baldwin City and Eudora were driven by the need to provide better bikeway and walking connections to the public schools, and to provide a bicycle connection to the Lawrence Urban Area. Recommendations for Lecompton were driven by the need to improve bicycling conditions on the two main streets in the City.

### Baldwin City

#### *Existing Conditions*

Baldwin City is a city of approximately 4,500 people located in southeastern Douglas County.<sup>15</sup> The city covers approximately two and a half square miles, and has largely developed around a grid-based street network. This network of grid streets provides good bicycling and walking access throughout much of Baldwin City, although a number of barriers exist.

U.S. Highway 56, known as Ames Street within the city, runs east to west across the northern portion of Baldwin City and is a significant barrier to walking and bicycling. Traffic volumes and speeds on Ames Street are relatively high for the area, which can make crossing the street difficult. There are no bicycle facilities on Ames Street, and many bicyclists use the sidewalk on the south side of the street.

Sixth Street is a County Highway (East 1700 Road/ County Route 1055) that carries a considerable amount of traffic between Baldwin City and Lawrence. The street has recently been reconstructed north of Ames Street. The reconstructed portion of the street consists of two travel lanes and one center turn lane. A shared use path exists on the east side of the street between Ames and Signal Ridge Drive.

No specific on-street bicycle facilities exist in Baldwin City, and the shared use path noted above is the only off-street bikeway.

### Safe Routes to School

Baldwin City has great potential for community-wide connectivity with multi-modal infrastructure. The 2007 Safe Routes to School Plan provided a strong start to connecting the city's neighborhoods to its schools. Some of the work planned in the SRTS program has been accomplished, while some is yet to occur. Of particular interest, and potentially of much benefit to the SRTS program, was the construction KDOT began in the spring of 2013 on three bridges along Highway 56. At one point it was believed that the easternmost box culvert reconstruction between 10th Street and 11th Street would include sufficient width for and the construction of two 5 foot walks, one on each side of the highway. This would have been a key connection to the school especially for children living on the north side of the city who would find it more convenient to use the sidewalk than to travel down to Elm Street to make an awkward connection to the primary and intermediate schools. However, at the time of the writing of this plan, sidewalks have not been included in that KDOT bridge project.

<sup>15</sup>"Population Estimates." United States Census Bureau. Retrieved 2013-10-24.

An open area from the newer subdivisions to the northeast offers a safe alternative and shorter route to the primary and intermediate schools. A walk or trail could connect the walk at Blaze Boulevard/ Flame Way in Firetree Estates to the walks near the retail area along Highway 56. A spur could connect over to Silver Leaf Lane as well. Because of the presence of manholes in this corridor, this appears to be a sewer easement, yet exact alignment of the pipe is unclear. Additional bicycle and pedestrian infrastructure could follow the stream corridors that crisscross Baldwin City.

The rail corridor currently owned by Midland Railroad between High Street and U.S. Highway 56 is not active and could provide a valuable north-south connection in the western portion of town. The tracks are currently in use as storage for historic rail cars.

Observations were made at the Baldwin City Elementary School Primary and Secondary Centers. Brief descriptions of the observations are provided in the following sub-section.



The pedestrian environment of downtown Baldwin City

## Baldwin City Elementary School – Primary

Baldwin City Primary Center is located on the western edge of the City. Neighborhoods with aging infrastructure border the Primary Center to the south and east. Streets are narrow with no curbs, gutters and decaying sidewalks. The remaining property around the school is currently agricultural. A bicycle rack is located on the north side of the school, adjacent to the car entrance and exit.

Baldwin City Primary Center allows students to arrive at school through two building entrances. The main entrance at the front of the building is for car-rider drop-offs, walkers, and bicyclists. The entrance on the east side of the building is used by bus riders. One staff member is present to supervise all arrivals.

The location of the Primary Center poses a problem for students walking or biking. The only pedestrian connection to surrounding neighborhoods is a sidewalk along Elm Street which connects to a concrete path northeast of the Primary Center. This trail routes walkers and bikers across abandoned railroad tracks to Elm Street and neighborhoods to the east. Lawrence Road, a two-lane road with no sidewalks and ditches on each side, is the only road connecting the school to neighborhoods to the south.

No students were observed arriving at or departing the school on foot or bike during the morning and afternoon observation periods.

## Baldwin City Elementary School – Intermediate

Baldwin City Intermediate lies on the western edge of the City, divided from the main residential areas by Highway 56 and the tracks of the Midland Railroad. This is not a through-route for the rail line, and is inactive, serving as storage for historic rail cars. It does pose a barrier for the community as east-west roadways do not cross the tracks between US 56 Highway and High Street.





The Intermediate School receives bus riders along the north driveway. These students enter the front door along with students whose parents drop them off at the west driveway loop. Walkers and bicyclists are allowed to enter the south door along with students dropped off by parents in the south lot. Bike racks are provided at the south end of the building between the ball fields and the south entrance along the main walking path.

Since the community's residential roads dead-end before crossing the tracks at the school, connectivity is limited. Elm Street, one of these dead-end roads, does provide designated pedestrian access across the tracks and routes walkers and cyclists via a trail connection between the parked rail cars (separated by fence) then through the hub of the ball fields and on to the school. Though Elm Street does provide the best connection to the Intermediate Center, the road does not include sidewalks; the children must walk in the road to get to the connection point. In the neighborhoods to the east, remnant sidewalks are present, but they have intermittent and lacking curb ramps. These are some of the oldest neighborhoods in Baldwin City, flanking the Baker University campus. The original cross-sections include wide setbacks between road edges and homes, with the sidewalks closer to the homes than the roadways.

Bicycle and pedestrian traffic to the school is confined to two possible directions, east across the railroad tracks at Elm or west along Elm toward the Elementary School. The majority of housing lies to the east, making the railroad crossing the most traveled route. During the morning observation, three students were observed walking to school, while two arrived on bike despite a rainy day. In the afternoon, ten students were observed leaving school on foot, while the morning bicyclists also departed on bike.

**Table 22: Sidewalks Recommended for Baldwin City**

Name	From	To	Miles
Elm St. Sidewalk*	Railroad tracks	9th St.	0.37
<b>Total</b>			<b>0.37</b>

\*This segment of Elm Street is recommended as a designated bike route along the roadway; sidewalks at this location are intended for pedestrian-only usage.

## Recommended Bikeways

The following tables detail the bikeways recommended within Baldwin City. The tables are broken down by bikeway type, and provide the streets (or other features) that the recommended facility runs between. The recommended bikeways for Baldwin City are displayed on Map 12.

**Table 19: Bike Lanes Recommended for Baldwin City**

Name	From	To	Miles
6th St.	State Lake Rd.	Orange St.	2.01
Ames St.	11th St.	3rd St.	0.64
High St.	11th St.	1st St.	0.89
<b>Total</b>			<b>3.54</b>

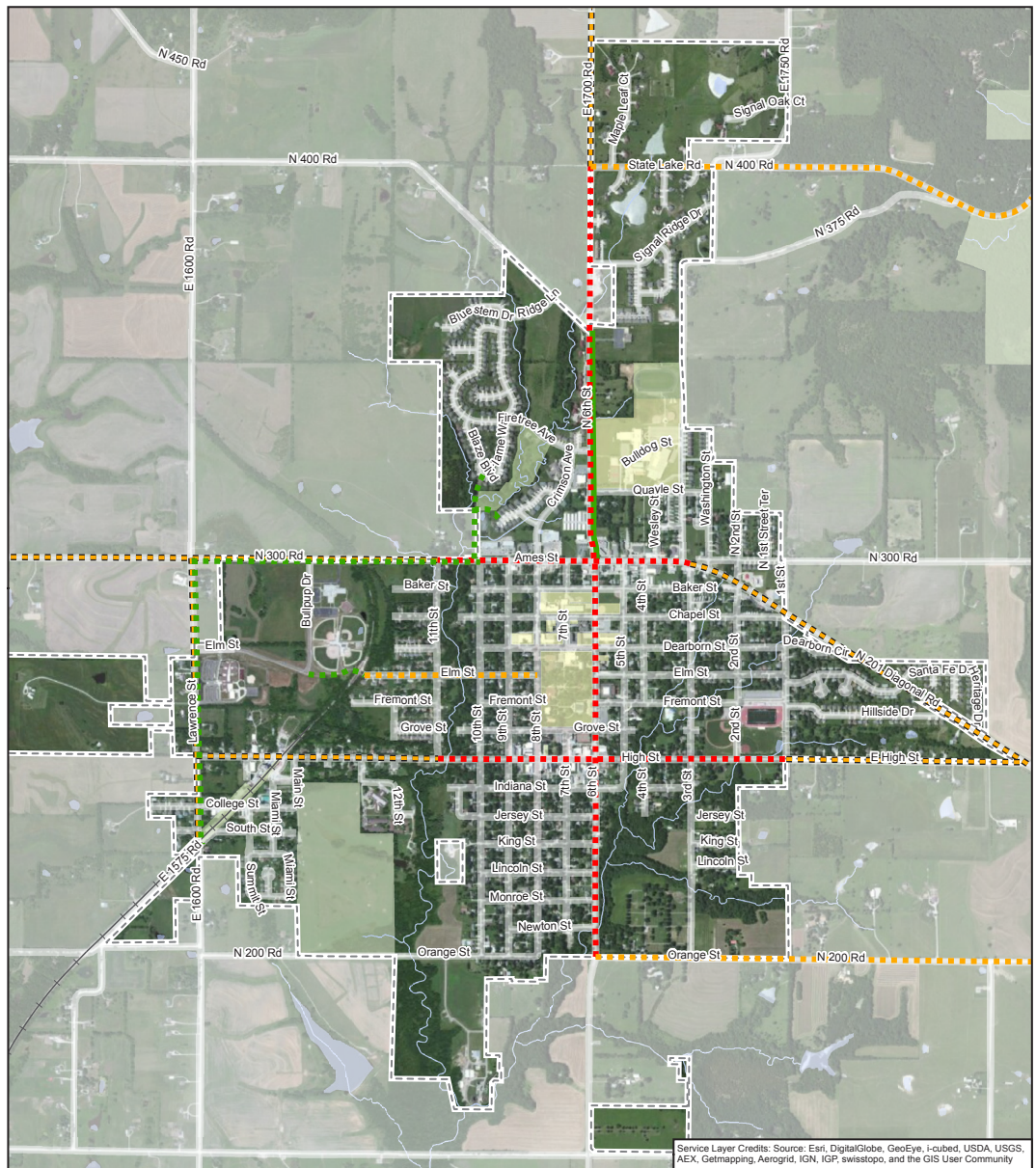
**Table 20: Bike Routes with Paved Shoulders Recommended for Baldwin City**

Name	From	To	Miles
E. High St.	1st St.	U.S. Highway 56	0.61
High St.	Lawrence St.	11th St.	0.61
Lawrence St.	U.S. Highway 56	South St.	0.73
U.S. Highway 56	Ames St.	E. 1900 St.	2.04
<b>Total</b>			<b>3.99</b>

**Table 21: Shared Use Paths Recommended for Baldwin City**

Name	From	To	Miles
Ames St. Sidepath	Lawrence St.	10th St.	0.73
Elm St. Connection	Elm St./Bullpup	Elm St./RR tracks	0.15
Firetree Subdiv. Path	Blaze Blvd.	U.S. Highway 56	0.22
Lawrence St. Sidepath	U.S. Highway 56	South St.	0.72
Silver Leaf Path Connection	Firetree Subdiv. Path	Silver Leaf Ln.	0.08
<b>Total</b>			<b>1.90</b>

## Map 12: Baldwin City Proposed Bikeways



**Map 12: Baldwin City Bikeways - Proposed Facilities**

Existing Bikeways	Proposed Bikeways	Other Symbols
Shared Use Path	Shared Use Path	Street / Highway
Bike Lane	Bike Lane	Railroad
Bike Route	Bike Route	City Limits
	Bike Route with Paved Shoulders	School / University
		Park
		Water

This map is provided "as-is" for informational purposes and no guarantee is made as to the accuracy of the map or data. Plot date 04/24/2014.





## Priority Projects

There is just one viable way for children to access the primary and intermediate schools. Elm Street is a low volume street, but a four block long sidewalk or path is important to make a safe route connection to the schools. That project is a logical first priority for bikeway improvements in Baldwin City. Most of the other bikeways can only be incorporated when the street itself is reconstructed, thus are dependent on the scheduling for those improvements. The recommended bikeways should be part of the scope when those street segments are reconstructed.

## City of Eudora

### Existing Conditions

The City of Eudora is located approximately eight miles east of Lawrence. The City has an estimated population of 6,180 and covers an area of nearly three square miles.<sup>16</sup> The majority of Eudora lies between the Wakarusa River to the north and State Highway 10 (K-10) to the south, although Eudora High School, Eudora Middle School and two residential subdivisions lie to the south of that freeway. The older portions of the City are built around a grid street network that provides relatively good connectivity, but newer development is less well connected with street patterns that include cul-de-sacs.

Tenth Street (old Highway 10), Church Street, and Main Street are the primary streets in the City. None of these streets have bike lanes, although portions of Tenth Street and Church Street have paved shoulders.

No specific on-street or off-street bikeways exist in Eudora except for a recently added path just to the south and west of the K-10 / Church Street Interchange.

### Safe Routes to School

Observations were made at Eudora Elementary School and Eudora Middle School to ascertain conditions for students walking or bicycling to school and to observe student travel patterns. Brief descriptions of the observations are provided below.

## Eudora Elementary School

Eudora Elementary School is located on the eastern edge of the City. Housing development encircles the school on the east, south and west sides. Aside from a few houses along North 1400 Road across from the school, the remainder of property to the north is currently agricultural. Western neighborhoods appear to be the oldest, and eastern and southern neighborhoods appear to be the newest. This is reflected in the type of infrastructure installed within the neighborhoods. Older streets are narrow with rural cross sections and no sidewalks on either side while newer streets are constructed wider with curbs and gutters and a walk on one side of the street.

Eudora Elementary allows children to arrive at school through three building entrances. Two entrances in the front of the building are for car-rider drop offs. These entrances are approached from N 1400 Road / CR 442, which is a two-lane road with ditches on each side and no sidewalks. The entrance at the rear of the building is used by bus riders, walkers, bicyclists, and parents walking their children in to school from their cars in the parking lot. The school district and the Eudora Police Department agreed on a policy to discourage children from riding their bikes to school based upon equity of access for all students and safety concerns. Also for safety reasons, children are not allowed to walk to the front door nor to the school from the front of the school property along CR442 / N 1400 Road / 10th Street even though a sidewalk was constructed to the front door from that roadway. Despite the biking policy, bike racks are provided at the south end of the building between the playground and the south entrance.

<sup>16</sup> "Population Estimates." United States Census Bureau. Retrieved 2013-10-29.

Pedestrian connections from the south and east sides of the school are relatively flat grade compared to the grade between the school and the neighborhood to the west. At the west edge of the school property, the terrain drops and forms a high bank of a south to north running stream. There is currently no pedestrian connection to the west, but pedestrian traffic does pass north of the ball fields, drop down the slope and jump the creek, as is evidenced by the worn grass path across from Lane C. A driveway with a culvert across the stream approximately one block south provides better access across the stream, but does not appear to be used as well as the straight jump across the water near Lane C. The primary purpose of the driveway is unapparent, as it doesn't appear to connect to a home. Ownership is unclear whether it is under the school district's or private control.

During morning observations of the school grounds, 62 children arrived on foot, and 1 on bike. Of those walkers, 48 arrived from the south, 14 from the east, and none from the west or north. The afternoon observation was more difficult to track due to the vast number of children departing from the south entrance. Walkers, bus riders and parents parking and walking to the door to pick up their children, as well as children who headed to the playground when school let out, complicated the tally process. That process was further complicated when buses arrived with students from other schools that disembarked and walked home from here. As a result the counts were much higher than the morning counts, with totals reaching 170 walkers and 1 biker. Eighteen (18) students walked home to the east, 9 students walked home to the southeast (across a field), 137 to the south, and 6 to the west (across a field north of the ball fields).

## Eudora Middle School

Eudora Middle School is located at the extreme southern end of the City, south of K-10 Highway. Eudora Middle School allows students to arrive at school through the south building entrance; all other doors are locked. Students gather outside of the main building entrance until the doors are unlocked. One staff member is present to supervise all arrivals.

Newer housing development borders the middle school property to the south and west, while Eudora High School is located directly to the north. The neighboring residential areas have wide streets with curbs and gutters and a sidewalk on at least one side of the street. East of the High School, across E 2200 Road / CR 1061, is a newer housing development. The remaining property around the school is currently agricultural, but new housing construction is slowly expanding to the southwest.

Pedestrian connections from the south, west, and north are a relatively flat grade. A concrete pathway to the south and a concrete pathway to the east tie into neighborhood sidewalks. The surrounding neighborhoods have newer sidewalks with ramps, but minimal signage and painted only (with no signage) crosswalks make crossing connecting streets challenging. A concrete sidewalk from Eudora Middle School to Eudora High School ties into a signed and painted crosswalk located at the intersection of E 2200 Road and 23rd Street. This crosswalk provides the only safe connection to the east. A school crossing guard is stationed here during morning arrival and afternoon pick-up.

During the morning observation of the school, 24 walkers and 3 bikers were observed – 13 arrived from the south, 12 from the west, and 2 from the north. Three buses dropped off students in the bus unloading zone, but the majority of students (approximately 160) were dropped off by car at the designated drop-off location on the far west side of the parking lot. In addition, 20 elementary school students were dropped off by car at the Middle School and shuttled by bus to Eudora Elementary School.





During the afternoon observation, bus riders were released from the main building entrance 5 minutes earlier than car-riders, walkers, and bikers. Four buses were parked in the bus-loading zone, and over 120 students loaded onto the buses. After the buses loaded and departed, the remaining students were released. Approximately 40 students were picked up by car. In total, 37 walkers and 3 bikers were observed departing school. Twelve (12) departed to the south, 10 to the west, and 15 to the north.

## Recommended Bikeways

The following tables detail the bikeways recommended within the City of Eudora. The tables are broken down by bikeway type, and provide the streets (or other features) that the recommended facility runs between. The recommended bikeways for Eudora are displayed on Map 13.

## Priority Projects

In step with the Safe Routes to School Plan, the highest priority needs are those that serve the two school campuses. Additionally, improving the connection across K-10 to the schools will provide an important all around connection for bicyclists and pedestrians to the south side of the City where there are a number of subdivisions and some businesses along E. 20th Street. The most important connection to the Eudora Elementary School is right along 10th Street from Ash Street to Peach Street. The highest priority segment of this connection is from Ash Street to the first school driveway. This will be an expensive stretch of sidewalk/path, because of the creek crossing, but far less expensive than the crossing of K-10 at Church or Elm. The City should pursue state and federal funding (Transportation Alternatives - TA) for this 10th Street section, and also continue with plans for improving the bike and pedestrian crossing of K-10 with a subsequent TA funding application.

**Table 23:** Bike Lanes Recommended for the City of Eudora

Name	From	To	Miles
E 10th St.	Main St.	Ash St.	0.26
Main St.	6th St.	10th St.	0.43
W 10th St.	Cedar St.	Main St.	0.45
<b>Total</b>			<b>1.14</b>

**Table 24:** Bike Routes Recommended for the City of Eudora

Name	From	To	Miles
Church St.	E. 10th St.	E. 20th St.	1.09
E 14th St.	Fir St.	Hickory St.	0.92
E 2100 Rd.	N. 1400 Rd.	Hawthorne St.	0.65
Fir St.	W. 14th St.	W. 15th St.	0.11
Hawthorne St.	E. Winchester Rd.	Sycamore St.	0.09
Hickory St.	Peach St.	E. 14th St.	0.17
Peach St.	N. 1400 Rd.	E. 12th St.	0.36
Sycamore St.	Hawthorne St.	Cedar St.	0.22
W 12th St.	E. Winchester Rd.	Bluestem Dr.	1.07
<b>Total</b>			<b>4.68</b>

**Table 25:** Bike Routes with Paved Shoulders Recommended for the City of Eudora

Name	From	To	Miles
Church St.	E. 20th St.	N. 1200 Rd.	0.91
E 2300 Rd.	N. 1400 Rd.	N. 1400 Rd.	0.24
Main St.	6th St.	N. 1500 Rd.	0.27
N 1400 Rd.	Ash St.	E. 2300 Rd.	1.03
<b>Total</b>			<b>2.45</b>

**Table 26:** Shared Use Paths Recommended for the City of Eudora

Name	From	To	Miles
11th Street Path Extension	11th St. / Grandview Trailer	Eudora Elementary	0.17
Church Street Sidepath (or Elm Street Overpass)	14th St.	School	0.88
Eudora Path	Cedar St.	Main St.	0.45
Eudora Elementary Path	Ash St.	Peach St.	0.50
Sycamore/15th St. Path	Sycamore St.	15th St.	0.24
<b>Total</b>			<b>2.24</b>

**Map 13:**  
 Eudora  
 Proposed  
 Bikeways



**Map 13: Eudora Bikeways - Proposed Facilities**

Existing Bikeways	Proposed Bikeways	Other Symbols	
Shared Use Path	Shared Use Path	Street / Highway	School / University
Bike Lane	Bike Lane	Railroad	Park
Bike Route	Bike Route	City Limits	Water
	Bike Route with Paved Shoulders		

Miles  
 0 0.125 0.25 0.5

This map is provided "as-is" for informational purposes and no guarantee is made as to the accuracy of the map or data. Plot date 12/10/2013.





Photo rendering of paved shoulders and path added to County Route 1061 / Church Street in Eudora

## City of Lecompton

### Existing Conditions

Lecompton is a small city in the northwest corner of Douglas County. The City has approximately 627 residents and covers less than two square miles.<sup>17</sup> The majority of streets in Lecompton carry very little traffic and do not need any special accommodations for bicyclists. East 600 Road/CR 1029, known as Eisenhower Memorial Drive within the City Limits, passes through Lecompton from north to south, and is the busiest street in the City. That street has ample paved shoulders from the Jefferson-Douglas County Line south through Lecompton and then along other county or state highways into the Lawrence City limits. North 2100 Road/CR 1023, known as Woodson Avenue within Lecompton, is the second busiest street in the City. That street is approximately 22 feet wide, and does not have paved shoulders.

### Recommended Bikeways

The following table details the bikeways recommended within the City of Lecompton. The tables are broken down by bikeway type, and provide the streets (or other features) that the recommended facility runs between. The recommended bikeways for Lecompton are displayed on Map 14.

### Priority Projects and Implementation

Because Eisenhower Memorial Drive already has paved shoulders, the recommendation above does not require any change to the street. Woodson Avenue currently does not have paved shoulders but given the level of traffic, paved shoulders should only be added when the street is reconstructed.

**Table 27:** Bike Routes with Paved Shoulders Recommended for the City of Lecompton

Name	From	To	Miles
E. Woodson Ave.	Clark St.	Eisenhower Memorial Dr.	0.55
Eisenhower Memorial Dr.	E. 600 Rd. / south city limit	Jefferson County Line	3.94
<b>Total</b>			<b>4.49</b>

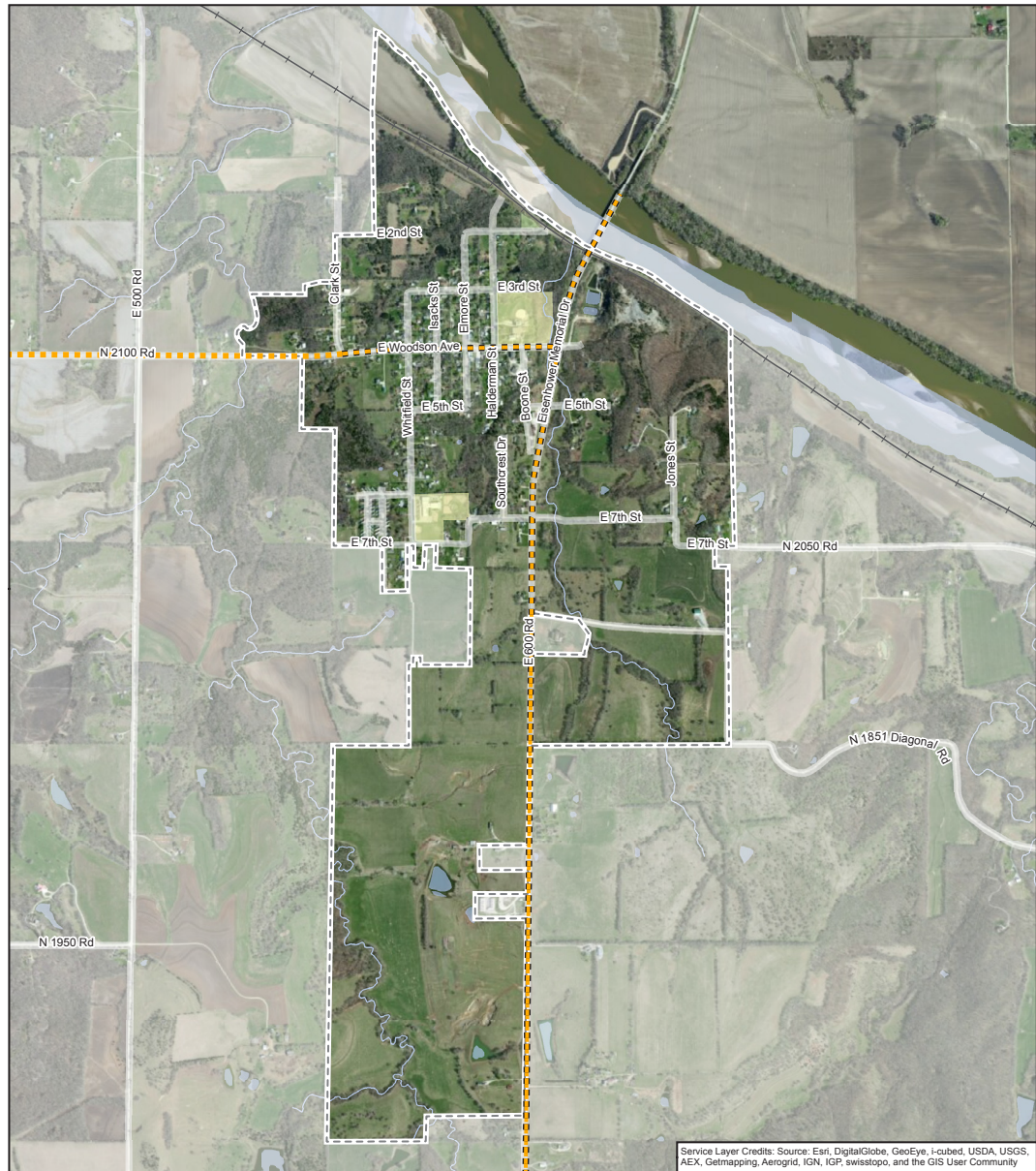
<sup>17</sup>"Population Estimates." United States Census Bureau. Retrieved 2013-10-29.







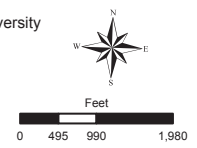
**Map 14:**  
Lecompton  
Proposed  
Bikeways



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aergrid, IGN, IGP, swisstopo, and the GIS User Community

**Map 14: Lecompton Bikeways - Proposed Facilities**

Existing Bikeways	Proposed Bikeways	Other Symbols	
Shared Use Path	Shared Use Path	Street / Highway	School / University
Bike Lane	Bike Lane	Railroad	Park
Bike Route	Bike Route	City Limits	Water
	Bike Route with Paved Shoulders		



This map is provided "as-is" for informational purposes and no guarantee is made as to the accuracy of the map or data. Plot date 12/10/2013.



Example of a transit vehicle with a bike rack



## Chapter 6

# POLICY AND PROGRAM RECOMMENDATIONS

This chapter describes the non-infrastructure policies and program recommendations that have been developed to help the Lawrence-Douglas County Region achieve its vision, goals, and objectives for bicycling. The success of achieving the goals and objectives of this plan rest with the ability to pursue bikeway development in a coordinated manner, along with the other E's: Education, Enforcement, Encouragement, and Evaluation. The other E's (minus Engineering) are presented below with a series of recommendations for their implementation. Another set of non-engineering recommendations which do not fall neatly into any one of the E's are provided at the end of this section.

Responsibility for Engineering recommendations are clear: City and County Public Works Departments and KDOT are generally responsible for carrying out most of the infrastructure recommendations. Responsibility for the other E's is more complicated. In general, Enforcement recommendations fall to law enforcement agencies, but Education, Encouragement, and Evaluation recommendations may be carried out by a variety of departments, agencies, or independent organizations. For example, Encouragement activities may include activities such as sponsoring Bike to Work Week, Bike and Walk to School Day, a commuter challenge, or a local ride; these activities could be carried out by a parks or public works department, local health department, independent businesses or workplaces, schools or school districts, or service organizations. Because of the wide range of groups that can carry out these recommendations, it can be difficult to assign specific responsibility for conducting specific encouragement activities.

Similarly, determining cost estimates for many of the E's recommendations is difficult due to the wide range of programs and the manner in which they are run. Sponsoring Bike to Work Week activities may be as simple as having a staff member use work time to organize activities and recruit additional sponsors or donors – in this case the only cost would be staff time. On the other hand, sponsoring Bike to Work Week activities could involve hiring outside vendors, purchasing supplies, or renting facilities; all of those are activities that may have substantial monetary costs associated with them. Because of the wide range of costs associated with Encouragement, Education, Evaluation, and Enforcement activities depending on the intensity of the event and how it may fit within departmental duties, cost estimates are only provided for recommendations where additional staff is recommended. Specific costs that are included in this section are noted in Table 28.

**Table 28:** Planning Level Cost Estimates for Select E's Recommendations

Name	From
Add bike racks to all fixed-route buses that do not have them	\$50,000 - \$60,000
Hire a full time Bicycle and Pedestrian Coordinator	\$80,000 (annual cost including salary and benefits)

## Multimodal Planning Studies

### The Five E's of Bicycle Planning

*Bicycle and Pedestrian Plans commonly refer to the Five E's: Engineering, Education, Encouragement, Enforcement and Evaluation.*

*Simply providing bicycle facilities will not ensure that people will bicycle more or that a community will be bicycle friendly. Plans and recommendations focused on the Five E's help ensure that a plan is comprehensive and encourages bicycling and walking through a variety of means.*

#### Engineering



- 🚲 Engineering refers to physical infrastructure. This is the category that is typically thought of when people think about plans.
- 🚲 Engineering recommendations are typically divided into short-term, medium-term and long-term priorities based on cost, ease of implementation and other factors.
- 🚲 Engineering recommendations may include:



- On-street facilities such as bike lanes, sharrows and traffic calming
- Off-street paths
- Directional and wayfinding signage
- Bicycle and pedestrian bridges and tunnels
- Bike parking facilities
- Anything physical in nature that facilitates walking and bicycling for travel

#### Education



- 🚲 Education efforts typically focus on educating people about the rules of the road.
- 🚲 Education may focus on teaching bicyclists, particularly children, how to properly interact with motorists and how to avoid the most common dangerous situations that occur for bicyclists.
- 🚲 Education may also focus on making bicyclists aware that they have the same responsibility as motorists to follow the rules of the road.



- 🚲 Motorist education typically focuses on reminding motorists of the rules of the road and how to properly interact with bicyclists and pedestrians.
- 🚲 Education efforts may include:



- Bike rodeos and helmet fairs
- Public Service Announcements (PSAs)
- Workshops for planners, engineers, law enforcement officials
- Driver education and safe cycling classes

#### Encouragement



- 🚲 Encouragement activities focus on increasing bicycling and walking through fun and interesting activities.
- 🚲 Encouragement activities may include:
  - Bike to Work Week activities
  - Bike and Walk to School Day
  - Workplace wellness programs
  - Ciclovias
  - Community bike rides
  - Providing bicycling maps
  - Bike share systems

#### Enforcement



- 🚲 Enforcement activities focus on enforcing the rules of the road for all users - motorists, bicyclists and pedestrians.
- 🚲 Enforcement also prioritizes having links between the law enforcement community and the bicycling community.
- 🚲 Enforcement activities may include:
  - Efforts to reduce speeding
  - Efforts to increase motorists yielding to pedestrians and bicyclists where appropriate
  - Efforts to reduce bicycle theft

#### Evaluation



- 🚲 Evaluation efforts seek to quantify the impacts of the other "E's."
- 🚲 Evaluation efforts may include:
  - Measuring the growth of bicycle and pedestrian facilities in a region
  - Measuring the rate of bicycling in an area or the number of users on a specific facility
  - Evaluating crash data for patterns and / or frequency

Poster of the Five E's



## Encouragement

Encouragement combines many initiatives and the strategies of the other E's to build enthusiasm and interest in the bikeway network and its use. Small incentives or events can encourage people to walk or bike more. Often a simple challenge or perks like commute stations that provide coffee and bagels during Bike to Work Week provide the nudge people need to walk or bike for a trip for which they normally would have driven. Programs include National Bike Month activities, launch parties for new bike/ped facilities, Cyclovias (large citywide events that will often close a street or series of streets for bicycling for a four to six hour period on a weekend), and employer driven incentive strategies such as mileage reimbursements.

Bicycling to work or to other destinations is a great way to get exercise, save money, reduce pollution, and have some fun. Bike to Work Week and Bike and Walk to School Day are national activities and are easily organized with help from the League of American Bicyclists website ([www.bikeleague.org/](http://www.bikeleague.org/)). Information on the website includes national and local events, promotional materials, and a handbook. Bike and Walk to School Day is an important component of Safe Routes to School activities as it both encourages and educates students on how to get to school via bike or their feet.

The National Bike Challenge is an annual event geared towards encouraging people to replace car trips with bicycle trips. This national challenge can easily be made into community challenges which targets workplaces, hoping to increase the number of people who choose to commute via bicycle. Employees can form teams based on their location or their workplace, and prizes are awarded in the transportation category.

Family friendly events can be a great way to capture the interested but concerned portion of the cycling population, as well as a great way to introduce kids to bicycling as part of everyday life. These events are often community oriented and can be as simple

as a group ride organized on a Sunday afternoon or a Wednesday evening. In Lawrence, there are numerous formal and informal groups that provide slow to fast-paced riding. Other events include Cyclovias, themed rides, and rides organized around existing neighborhood festivals, parks, or cultural destinations.

The T2040 Plan calls for improved encouragement activities by enlisting the efforts of the Bicycle Advisory Committee and using the MPO's planning process to encourage people to think of bicycling as a viable means of travel. Examples where bicycling can be encouraged include participation in the annual Earth Day Celebration in Lawrence, the Baldwin City Health Fair, and other community events where bicycling issues are discussed.

Engagement of groups such as the Lawrence Home Builders Association and Chamber of Commerce that have not been heavily involved in bicycle issues in the past is also encouraged. These groups should be asked to plan, build, and support developments that are bicycle and pedestrian friendly.

The MPO and BAC members should continue efforts to disseminate Bike Rideability maps and other bicycling materials to schools, recreation centers, libraries, and other locations, as well as continue efforts to participate in local bicycle safety and helmet events.

A new group that has recently become active in bikeway planning and encouragement is the LiveWell Lawrence-Healthy Built Environment Work Group. In 2013 that group began to work on plans to build more shared use paths around Lawrence, and specifically became interested in working on plans for making the Hobbs Park to Constant Park Connection in Lawrence. The MPO staff has continued to work with that and other groups, as well as individuals interested in bikeway system planning and will continue those coordination efforts with the community as this bikeway system plan is implemented over the next several years.

## Education

Education is a broad category that ranges from identifying and promoting safe routes for pedestrians and bicyclists to promoting how-to strategies, such as how to ride safely or adjust a helmet. Education policies and programs are instrumental to the success of networks as they empower users to get out and use the facilities. Education is critical to the success of a bicycle and pedestrian network within a community. A major national effort that has been gaining more and more attention in Douglas County communities is the Safe Routes to School (SRTS) program. SRTS programs have education components that are a perfect way to tie education with more comprehensive approaches intended to encourage more bicycling and walking to school.

There is often a mentality that, “if you build it, they will come” when considering bicycle facilities. However, this is not always the case. If people are not comfortable riding their bikes for whatever reason, even the best facilities will remain underutilized. Most Douglas County residents do not receive any formal training on how to ride their bikes on a street, how bicycles work, or the rules of the road for cyclists. Similarly, motorists get very little or no training on how to share the road with cyclists. Educational activities and strategies attempt to fill that knowledge gap.

Bike Rodeos and participatory workshops are a great way to direct and deliver bicycle related curricula to children. Topics discussed typically include the parts of a bicycle, how a bike works, how to fix a flat tire, proper helmet fitting, rules of the road, road positioning, and on-bike skills.



Lawrence Helmet Fair

These rodeos are often facilitated by local police departments or cycling clubs, and model programs are available through the League of American Bicyclists website ([www.bikeleague.org/](http://www.bikeleague.org/)).

Including bicycle and pedestrian related educational pieces in utility or tax bills is an easy way to reach a large group of people, including motorists and bicyclists. Simple communications can cover a general topic such as rules of the road (aimed at motorists and bicyclists), local bicycling ordinances, back-to-school safety information, and a seasonal topic like rules for using lights on bikes tied into the Fall changing of daylight savings time.

Providing bicycle and pedestrian safety and education material to residents via the MPO’s and municipal websites is an excellent way to reach potential and current users. Information should include (much of this is already furnished on the MPO website):

- ▶ Maps and other resources;
- ▶ Links to laws, statutes, and ordinances related to walking and biking – both local and state;
- ▶ Information about local biking and walking events;
- ▶ List of and links to local bike shops;
- ▶ List of and links to all walking and biking groups, including clubs, racing teams, and advocacy groups.

A unique education/enforcement program involves offering a bicycle and pedestrian education course as an alternative for bicyclists, pedestrians, and motorists who are first-time minor traffic law offenders. A course like that which focuses on the motorist, bicycle, and pedestrian-related rules of the road is an efficient and cost effective way to deal with minor traffic law infractions. The City of Lawrence and Douglas County should explore this option for educating rather than punishing some rules of the road violators. Municipal judges can ask or request that offenders take the course instead of paying the fine. Model two hour courses have been developed by other municipal governments around



the country so that the local governments in Douglas County should be able to adapt an existing program to their needs instead of creating a new one.

Develop the bicycling public education and outreach program as a tool to complete the bicycle and pedestrian system planning process and tie that into the larger MPO multimodal transportation planning program. That includes ongoing education on air quality and the health benefits of bicycle transportation, and its contribution to the reduction of traffic congestion. Recently the MPO staff has begun to discuss these issues more frequently and more in-depth with local health agencies and advocates. Most notably the Lawrence-Douglas County Health Department staff has become more involved in the MPO planning process, especially the bike-ped planning part of MPO work that matches with the Health Department's goals of encouraging active transport and walkable/bikeable communities in the region. The local public works departments have also gotten involved in these discussions with health agencies, and how active transport and its health benefits is becoming part of the regional transportation planning discussion. This strong addition of the health factors to the multimodal transport discussions has educated staff from all of these agencies and groups. The MPO staff plans on continuing this emerging transportation-public health-environment-land use discussion with various groups as this Countywide Bikeway System Plan is implemented.

## Enforcement

Enforcement includes policies that address safety issues such as speeding, illegal turns and movements, and general rules of the road. Programs include options for community members to work collaboratively to promote safe bicycling, walking, and driving. Initiatives include speed enforcement; Share the Road campaigns, and Be Safe, Be Seen – a bike light enforcement campaign. Despite a number of laws aimed at improving safety for non-motorized users, a lack of compliance with those laws by drivers

(i.e. motorists passing too close to a cyclist) is an often cited reason for why residents do not bike or walk to local destinations more frequently.

Likewise, bicyclists who disobey traffic laws and do not exhibit safe cycling practices (e.g., cyclists who ride through stop signs), often endanger themselves and irritate and frustrate motorists who see these activities. Enforcement of traffic laws for cyclists and motorists alike is often the most effective way of creating a culture of compliance. Law enforcement officers need to pull over both motorists and bicyclists if they are clearly violating traffic laws that can lead to serious safety concerns.

A more recent strategy is to focus enforcement attention on the violations of traffic laws that are most likely to lead to traffic injuries. Motor vehicle-bicycle crashes tend to be clustered around certain crash types. As the MPO, public works, and law enforcement staff completes its crash analysis it is recommended they use a crash typology system (PBCAT: <http://www.walkinginfo.org/facts/pbcats/>) that will identify the most common crash types. This will also help identify traffic violations that have contributed to the crashes making targeted enforcement more effective.

Too often speed limits are viewed as guidelines by motorists. Studies show that the probability of serious injury and death to non-motorized users when hit by a car exponentially increases with each increment of 5 mph. The enforcement of posted speed limits through warnings, ticketing, and yard sign campaigns can quickly make compliance the rule of the neighborhood. The use of automated speed-tracking equipment is a cost effective way to alert motorists to their speed. The equipment usually utilizes flashing LED signs that change significantly in appearance when an excessive speed is detected. Often placed near schools and other places where pedestrians are known to be present, automated speed-tracking equipment can cause motorists to consciously slow down.

The City of Lawrence and Douglas County should explore ways of making it possible for people to report dangerous behaviors. Although enforcement agencies will have limitations on what they can do to enforce laws after citizens self-report risky behaviors of others, just having such a mechanism in place will still allow a “paper trail” to be established, and for a letter to be issued to a potentially dangerous driver.

There are very few education programs designed for police officers. The most effective program taught in many states over the past ten years is Enforcement for Bicycle Safety. An abbreviated edition of this course is available at [www.nhtsa.gov/ Driving+Safety/ Bicycles/ Enhancing+Bicycle+Safety:+Law+ Enforcement%27s+Role](http://www.nhtsa.gov/Driving+Safety/Bicycles/Enhancing+Bicycle+Safety:+Law+Enforcement%27s+Role).

## Evaluation

Evaluation includes monitoring the outcomes and documenting the results of the implementation of the other E’s. Data collection, before and after infrastructure improvements are implemented, such as user surveys and bicycle and pedestrian counts, are critical to measuring the overall effectiveness of the network. By evaluating and assessing the levels of cycling and walking within Douglas County, community leaders, city, and county, and MPO staff will be able to more effectively direct their efforts to improve cycling and walking conditions for residents and visitors. MPO and city/county staff will also be able to justify proposed capital improvements with quantifiable statistics.

A key part of evaluation involves the on-going operation of a Bicycle Advisory Committee (BAC). In 2009, the BAC rewrote the bylaws to become a nine-member countywide group representing the City of Lawrence, Eudora, Baldwin City, Lecompton, and Douglas County. The BAC has a broad set of responsibilities which should include an expanded role in measuring progress of plans, policies, and programs related to bicycling.

The BAC also works with other groups in the region that are interested in bicycle issues, and the BAC has been instrumental in obtaining the Bicycle Friendly Community-Bronze Level designation from the League of American Bicyclists for Lawrence. Not only is this a recognition program, but it enables an evaluation of its performance. Applications have over 50 evaluation criteria. Lawrence was named the 51st Bicycle Friendly Community (BFC) in 2000 by the League of American Bicyclists, a symbol of Lawrence’s commitment to providing the best cycling opportunities in Kansas. The designation has been renewed receiving recognition at the bronze level. The current recognition expires in 2016. As a recognized Bicycle Friendly Community, the City of Lawrence is working on enhancing existing facilities, while planning for the future needs of cyclists in Lawrence. The MPO and City of Lawrence should continue taking steps to elevate Lawrence to a silver or gold level. In order to raise that level above bronze, the City will need to examine the feedback that the League provided after the last BFC designation and work on those recommended improvements before the next BFC application is due in early 2016. Additionally, Douglas County should consider submitting an application in the next five years.



Bike lanes on Princeton Avenue in Lawrence





In addition to the BAC, it is recommended that a Bicycle and Pedestrian Coordinator be added to the local government staff (Lawrence-Douglas County, but not the MPO staff). Hiring a bicycle coordinator, or formally designating a bicycle and pedestrian coordinator, would provide a centralized point of contact for planning, programming and policies related to both on and off street facilities throughout Douglas County. Typical job duties could include:

- ▶ Planning and managing new programs in the areas of non-motorized accommodations, safety, education, enforcement, and recreation;
- ▶ Developing safety and promotional information such as newsletters and route maps;
- ▶ Arranging for special displays and events at public and technical information presentations;
- ▶ Development, review, and implementation of bicycle master plan projects and updates;
- ▶ Serving as principal contact with federal, state, and local agencies on bicyclist and pedestrian matters;
- ▶ Coordinating and maintaining a bikeway system budget and forecasting budgetary needs;
- ▶ Seeking funding for implementation of bicycle facilities and working with appropriate offices to fully integrate bicycle and pedestrian projects in programming decisions;
- ▶ Serving on the bicycle advisory committee and the safe routes to school committee's programs and projects;
- ▶ Developing priorities for special studies in areas such as the location and cause of crashes, effectiveness of new facility designs, barrier removal analyses, and annual bicycle and pedestrian counts.

A full time position would cost approximately \$80,000 inclusive of benefits.

The BAC and MPO have taken on an effort to analyze crash data with GIS (Geographic Information System) technology that allows staff to pinpoint reoccurring safety areas and provides a way to introduce counter-measures based on the crash typologies. Measuring the number, severity, and location of crashes is an important measure of safety. The MPO staff plans on obtaining support from other local government agencies (police, public works, etc.), as well as other interested groups in 2014 in order to pursue this enhanced safety analysis, including a detailed review of bike crash data and the contributing factors to those cycling incidents.

## Performance Measures for the E's

Here is a list of performance metrics recommended for use in gauging the success of all of the E's.

### *Engineering*

Keeping track of the facilities installed throughout Lawrence and Douglas County will allow staff to plan appropriately for future improvements. Using the determined prioritization criteria and having a good understanding of existing conditions will enable planners to make the best use of capital dollars when implementing new facilities. Here are specific metrics:

- ▶ Mileage of marked bicycle lanes, paths, paved shoulders, wide and marked shared lanes, and signed routes;
- ▶ Mileage of streets/roads that are rated at a certain level using a bicycle level of service model (Bicycle Level of Service, Bicycle Compatibility Index, etc.);
- ▶ Average number of days to respond to bikeway hazards with appropriate maintenance measures;
- ▶ Bike rack installations in public right-of-way;
- ▶ Number of bikeway overpasses / underpasses;
- ▶ Bike share – number of bicycles in program.

## Education and Enforcement

All road users should be educated to share the road and interact safely. This includes maintaining an on-going bicycle education program that conveys safety messages and vehicular regulations to all segments of the population. More specific metrics include:

- ▶ Percentage of schools that participate in Safe Routes to School programs (or similar programs) that include bicycle education. Number of students participating and total number of bicycle school trips;
- ▶ Outside of schools, the number of children taught safe cycling skills;
- ▶ Number of League Cycling Instructor led workshops held in the past year. Number of participants;
- ▶ Number of training days (workshops, conferences, webinars, etc.) professional staff participated in that related directly to bikeway planning and / or engineering;
- ▶ Number of bicycle-related training days police officers attended;
- ▶ Number of enforcement or safety programs that improve safety of bicyclists;
- ▶ Analyzing the number of citations issued to bicyclists or involving bicyclists to be done in correlation with a safety analysis to correlate impacts of safety with enforcement;
- ▶ Number of helmets distributed annually.

## Encouragement

Bicycling or walking should be encouraged as a viable alternative to motorized transportation in Lawrence and Douglas County, while maintaining safety of all users on the roadway. More specific metrics include:

- ▶ Number of promotions Lawrence and Douglas County participated in including national bike day/month, dedicated bike community rides, commuter challenge; bike and walk to school days, car-free days, community rides, summer streets/Ciclovia/Sunday rides, etc.;
- ▶ Number of programs Lawrence and Douglas County participated in including mentoring program for new riders, public education campaign relating to cycling (e.g. with a focus on public health and / or environmental benefits), public service announcements, etc.;
- ▶ Number of publications and website resources provided and updated including a guide to bike month events, bike month website, videos promoting bicycling on community website/ television channel, etc.;
- ▶ Number of Bicycle Rideability Maps distributed;
- ▶ Number of businesses that are Bicycle Friendly Businesses as recognized by the League of American Bicyclists.





## *Evaluation and Planning*

Taking stock of how far a community has come is an important step in the evolution of any bicycle program. Much of this evaluation is done by measuring usage and the safety of bicyclists (included separately below). Other specific metrics include:

- ▶ Number of full-time equivalent employees working on bicycle planning, design, education, enforcement, etc.;
- ▶ Number of active bicycle groups and number of members in those groups;
- ▶ Complete Streets Policy Review - since the passage of the MPO Complete Streets Resolution (2011) and the Lawrence Complete Streets Policy (2012), the years following T2040 Plan approval (2013), and prior to writing the next Metropolitan Transportation Plan update in 2017-2018, there will be a period of review of the impact to the passage of the Complete Streets Policy. Many of the factors listed in this section will be used in the review of the Complete Street Policy impacts.



Cyclists at the Community Bike Ride

## *Usage and Safety*

Collecting and analyzing bicycle and pedestrian count data allows staff to track annual trends and to analyze the breakdown of travel modes in Douglas County. This is of particular importance to transportation planners, because changes in mode choice can have large impacts on health, environment, and congestion. Counts also allow staff to monitor data before and after facilities are built to calculate the number of trips attracted on the facility. This is useful in warranting future projects and estimating demand for facilities. The counts will also be used to strengthen grant applications and leverage additional federal funding for bicycle and pedestrian projects. It allows staff to track the rate of bicyclists observed wearing helmets and the impact our local programming has on this percentage.

The National Bicycle and Pedestrian Documentation Project provides a recommended methodology, survey and count forms, and reporting which are currently being used in the City of Lawrence, and recently expanded to other communities in Douglas County. Counts are conducted using volunteer labor; therefore, putting little financial burden on local budgets. Local trainers for the program are also available.

The ability to measure the region's bicycling and walking rates is likely to become more important, as each succeeding federal transportation bill places more emphasis on performance measures and evaluation. As a result, Lawrence and Douglas County will be in the forefront of collecting this data, and will be part of a larger nationwide effort to establish a national database of bicycle and pedestrian count and survey data generated by consistent methods and practices. Specific bicycling metrics include:

- ▶ Number and percentage of trips being taken by bicycle;
- ▶ Number and percentage of commute trips being taken by bicycle;
- ▶ Number of reported bicycle crashes.

## Other Program / Policy Recommendations

This section contains program and policy recommendations that do not neatly fit into one of the Five E categories, but are important considerations for bicycling and walking.

### *Connections to Transit*

Transit can be a great complement to bicycling and walking. Buses allow bicyclists and pedestrians to extend their trips, and provide alternate transportation if the weather changes. By providing bicycle facilities and improving pedestrian access to the bus network, the City of Lawrence can ensure that its transit system is best serving all of its users.

Bikeways and transit stops work together to create complete non-automobile networks within a community. Transit stops that are not accessible via bikeways or sidewalks are likely to be underutilized, and if they happen to be heavily used, a lack of well-designed bike-pedestrian connections can create uncomfortable and potentially dangerous conditions for users.

Providing bicycle parking at transit stops may enable residents and visitors to use non-automobile transportation options for longer trips, ones they would have completed by using a car. It also provides more transportation options to residents who choose not to drive, or are unable to drive, to their destinations.

Currently, bike racks are provided on buses that operate on Routes 1 through 11 in the City of Lawrence; buses operating on the University of Kansas routes do not have bike racks. According to Lawrence Transit, adding a rack to a bus costs approximately \$1,000 per bus; outfitting all of the fixed-route KU on Wheels buses, currently without racks would cost \$50,000 to \$60,000. Bike racks should be added to all buses in the coordinated KU-City transit system to make multimodal trips easier for transit users.

## *Funding*

Funding is arguably the greatest limitation to expanding bicycle and pedestrian infrastructure. The last several years of recession have seen dwindling local, state, and federal budgets. Undoubtedly, this has affected the capital budgets of Lawrence and Douglas County. State and federal grant programs have not been immune to cut-backs resulting from the recession either. Competition for grant funding continues to increase while the total sum available shrinks. Without short-term and long-term funding solutions for capital improvements, bicycle and pedestrian infrastructure, amenities, and planning will remain at a minimal investment level when compared to the overall transportation network. Developing a strategy to maximize the availability of funding for bicycle and pedestrian projects in Douglas County is important to the implementation of this plan.

It is important to make the most of the region's internal funding resources. Often, the most cost-effective way to implement bicycle and pedestrian infrastructure improvements is by adding them to the scope of other capital projects. Building paths while replacing or upgrading utilities, or striping bike lanes as part of a street resurfacing project both provide economies of scale that will help funding for bicycle and pedestrian projects go farther. Douglas County has been using this strategy for years to incorporate paved shoulders for bicyclists and other users. Lawrence has been using this strategy to add bike lanes where possible when urban streets are resurfaced.

One of the most significant grant programs for bicycle and pedestrian projects is the Transportation Alternatives Program or TAP (formerly Transportation Enhancements), which is administered by the Kansas Department of Transportation.<sup>18</sup> The TAP program consolidates the previous TE and other related federal funding programs, like SRTS, into one new federal funding category.

<sup>18</sup> More information regarding the USDOT Transportation Alternatives Program (TAP) is available from the Kansas Department of Transportation: <http://www.ksdot.org/burtransplan/TransEnhance.asp>





Because it is the largest grant program dedicated to these types of projects, it is highly recommended that Douglas County municipalities submit multiple project-specific applications each application cycle. Additionally, the MPO staff should monitor this bikeway funding situation and amend its plans if needed to conform to the realities of funding programs under MAP-21. Local funding of bikeways is also difficult to estimate, but in recent years the City of Lawrence has provided support for bikeway development by matching federal funds and incorporating bikeways into larger construction and maintenance projects.

T2040's Financial Plan conservatively estimates that over the 28 year period (2012-2040) covered by the plan there will be at least \$13 million for bicycle and pedestrian improvements. That averages out to approximately \$450,000 per year. Those funding levels are fiscally constrained based on past trends and existing funding sources. Lawrence and Douglas County should consider increasing bikeway construction funding as part of each budget cycle.

Although the recommendations for rural Douglas County are overwhelmingly going to be funded as part of larger roadway projects, having a set-aside of roughly \$250,000 will provide funds for short gaps to be made independent of larger projects. This sum of money would roughly pave one mile of shoulder assuming just a modest amount of shoulder and ditching work. Comparatively more independent projects (often referred to as free-standing) are recommended for the City of Lawrence. A set-aside program of \$500,000 is recommended for Lawrence.

One of the most effective ways to increase the amount of grant funding available for projects within the community is to hire a grant writer or make these duties an important part of a person's job responsibilities. A person in a dedicated position will also be able to find more grant opportunities and submit more applications than departmental staff that is already assigned many other duties.

This position can be full- or part-time, in-house or contracted, and need not focus solely on bicycle/pedestrian grants, though experience and knowledge in this area is beneficial. Usually, a skilled grant writer will "pay for themselves" each year, as the funding they are able to secure often exceeds their salary. If a Bicycle and Pedestrian Coordinator is hired or appointed, these duties could fall under their purview. Otherwise, a contract grant writer may be a feasible option with costs dependent on the number of grants that are pursued.

## *Bike Share*

Pioneered in Europe in the 1970s, bike sharing systems have existed in the United States since Portland's Yellow Bike Project began in 1994. In recent years, new programs have been rapidly expanding across the country and feature membership systems and the ability to find a bike to rent via the internet. These systems are recognized as effective tools for introducing people to cycling, supporting tourism, and increasing pedestrian activity in walkable retail areas as bike share systems help to connect walkable districts.

This plan does not specifically examine the feasibility of a bike share system in the City of Lawrence. However, from the field work that was conducted, it is likely that a small system could be supported in the Downtown Area and University of Kansas area. A full bike share feasibility analysis should be conducted to determine if such a system could work and how it would be funded. This analysis would validate and adjust the preliminary station locations (Downtown and KU) identified in the previous step. It would also estimate the level of demand at each station, develop a schedule for station implementation, and forecast costs and revenues. Finally, along with the feasibility analysis, recommendations will be made regarding the specific bike share system equipment and technology to acquire, as well as suggestions for station-area security and amenities.

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## Chapter 7

# CONCLUSION

This document expands comprehensive coverage of bicycle planning in the Lawrence-Douglas County Region by addressing bicycle system needs in the rural areas and smaller cities in the County. Douglas County has a good start at providing accommodations for bicyclists by providing paved shoulders as standard design practices for many major County highway projects. The implementation of several key priority projects will go a long way towards providing an improved and connected network. Much of the planning work for the small cities focused on schools. All of the schools examined had at least a few disconnected pedestrian and bicycle routes to their campuses. Significant efforts are called upon in this plan to address those routes to school concerns.

The City of Lawrence has been involved in bicycle planning for decades. This plan simply builds on the work already conducted with a series of relatively short term recommendations.

Clearly, this plan is not just about bicycle facilities. Many of the concerns voiced by the public touched on safety, education, and encouragement efforts. Although conventional wisdom has been “build it and they will come”, this will only move a community so far for increasing the number of bicycle trips. A combination of the other E’s of education, enforcement, encouragement, and evaluation are other important supporting elements of a bicycle program. This comprehensive approach will yield the greatest returns on investments and create a community where all citizens regardless of travel mode respect each other’s presence on the road, who are at the same time getting healthier by using active transport, and are doing their part to protect Douglas County’s highly regarded environment.



Burroughs Creek Trail

*Please visit the L-DC MPO website for  
additional public comments and supporting materials:  
[www.lawrenceks.com/mpo/study](http://www.lawrenceks.com/mpo/study)*







## Appendix A

# WikiMap MAPS AND COMMENTS

Maps 15 and 16 display the locations of point and line comments submitted by the public to an online interactive map. Patterns are readily apparent that indicate where people prefer to bicycle and where they regularly encounter problems. The full list of comments is reprinted below. Many of the comments lack the appropriate context without being linked to the map feature they were originally attached to; however, all comments were analyzed by the project team in their original context.

Comments are reprinted verbatim in Table 29 as recorded by the WikiMap software. Some lengthy comments may have been truncated by the software if they were over a specific length.

**Table 29:** Comments Received on the WikiMap

#	Comment
1	Heavy traffic area without bike lanes.
2	Around Clinton Lake.
3	Cyclist signs and markings needed
4	Dangerous traffic.
5	The Muffin. Well used for decades.
6	Work Ride
7	Eudora to Downtown Lawrence
8	Eudora Loop
9	Loop in the woods
10	Eudora to Sprint
11	Big Loop around North Lawrence
12	Mike's route from home to Amarr
13	Kasold from Peterson to 6th needs a sidewalk all the way at least on one side.
14	This section of Princeton blvd need a side walk.
15	this route could be a great connector from central Lawrence and Ku to South Lawrence.
16	This route could be a great route with already (more or less) existing underpasses that would be great for safe route to schools etc. and would connect central Lawrence with South Lawrence.

17	bicycle/ped Bridge from Marvonne neighborhood to other neighborhood to make it easier to bike walk to store etc. Biking along a 45 mile hour road with small children is scary.
18	To campus
19	Just needs to be connected to other paths and it could have some really great underpasses
20	Would not 40 MPH serve all users better. It feels fast when I'm driving my children to school, but scary when I bike. It seems an appropriate road to slow down for safety sake.
21	I heard they're going to add this to posted bike routes--the hill here is ridiculous and not recommended, especially when riding on the street with speeding traffic.
22	This section is a good, flat ride with traffic-calming speed bumps and pedestrian crossings.
23	Hill is steep here, not safe to ride down and hard to ride up.
24	Road bike route here would be better if speeds were enforced. Two lane road seems too narrow to ride with traffic. Sidewalks also pretty bad.
25	Traffic lanes are narrow and speed limits are rarely enforced. Leads to uncomfortable situations with passing cars.
26	Nice wide multi-use path. Good for fun rides, and connects neighborhoods.
27	Fun rail-to-trail multiuse path. Safe route to downtown from Haskell area.
28	Skull rattling brick road for most of the way. Shame, since there's a convenient traffic light at 9th and Miss.
29	Decent biking route with low speed limits. Few too many stop signs, though. Couple of brick intersections, and way too many potholes.
30	Good wide street with low posted speed limit, but limit rarely enforced. Not well lit at night (need to use ALL the blinkies).
31	Separated wide path on west side of Iowa. Good idea, because hill and crazy Iowa traffic. Sad that it peters out into a regular sidewalk by Bob Billings.
32	Practical, mostly flat route from Clinton to Sixth. Would be even better with separated infrastructure. Speed limit a little too high to ride on the street.
33	Mostly a sloping hill, challenging but doable as one approaches Jayhawk Blvd. Hill at the end of Miss. a little steep. Traffic ok-ish for riding on the street. Downhill a lot of fun.
34	Jayhawk Blvd would be a good ride without the risk of playing "Dodge the Bus" or "Don't Get Doored by Parked Cars."
35	Hill steep here, lots of potholes.
36	Good route until the hill on Emery.
37	Bit too curvy at posted speeds for safety. Near the intersection of Emery and Ninth, the only sidewalk a rider might be able to bail onto in an emergency has a wall cut into the hill.
38	OK when posted speed limits are obeyed. Cars backing out of parking spots a bit of a hassle. A little narrow, too. Sidewalk riding banned downtown for a good reason, but narrow street leaves few options. Better to divert a block over.
39	Difficult route. Sidewalk goes from non-existent to wide enough to share, but patchy. Too hilly and too high speed to share the road with traffic. Looks like they may be adding a wide path on the south side--good idea. Hope it goes all the way between low

# COUNTYWIDE BIKEWAY SYSTEM PLAN



40	Decent multiuse path here. Hills relatively gentle. Would be even better if pedestrian and bicycling paths could be separate.
41	Sixth street could really benefit from infrastructure improvements. The sidewalk is too close to the road, especially at the intersection with Iowa, and it's often broken and narrow. Separated and protected bike lines would be great here because the road
42	May need a bike lane (even better, a separated and protected bike lane). Street pretty wide, but lots of traffic. Sidewalk for most of this leg of Maine only on west side of street.
43	Decent stretch; a little traffic but not too much to share road with. Might need more street lighting on Michigan.
44	Needs more street lighting. A lot of street parking, need to be cautious of being doored.
45	Nice wide path, good for coasting downhill.
46	Nice wide sidewalk (multiuse?) on the south side of the street. Not sure how far it extends, but definitely exists around 6th and Wakarusa.
47	This leg of Naismith is wide and would be decent if posted speed limits were enforced.
48	There should be a major North-South bike route (besides the rail trail/west of Mass) that is safe and has bike lanes. Neither Mass, Kentucky, or Tennessee or Iowa have bike lanes or provide safety for bikers
49	Not a route I currently use, but one I plan to in the future, and would like to see improved.
50	This is a route I don't feel safe using, but would if there were bike lanes.
51	We need a bike lane on MASS!!!
52	The islands in Louisiana Street make this VERY dangerous for cyclists. Drivers have told me that they would hit me on my bicycle rather than hit one of the islands.
53	The islands in Barker Street make this VERY dangerous for cyclists. Drivers have told me that they would hit me on my bicycle rather than hit one of the islands.
54	This path needs to be paved to complete a path from the Burroughs Creek Trail to the south City Limit and the coming paths along the new extension of K-10.
55	The best way to get from my house to downtown!
56	Connecticut Street has pavement markings for bikes, but with so much I-70 to K-10 traffic, it's too busy and dangerous for me to ride. I saw a car full of out-of-towners threaten a bicyclist at 11th and Conn. this week.
57	A fun, short evening ride.
58	The "Smell the Roses" route is a nice low-traffic and relatively flat ride out into the countryside.
59	Iowa is currently being improved but it does not appear any bike lanes are being added. This is troubling.
60	Downtown from our house
61	Alternate downtown route using the east Lawrence bike trail.
62	This is an out-and-back route used by many cyclists in the community.
63	There is a very dangerous stretch on McDonald...no shoulder, lots of car traffic.
64	rough sidewalks...too dangerous in the street. we use 5th street instead, but you have to get back onto 6th at Colorado and those sidewalks are not all that good. Wouldprefer a bike lane.

65	Need shoulder in this section for safer biking.
66	Hwy 40 extremely dangerous for biking. Need shoulders.
67	Pedestrian access from Prairie Park area to South Middle School (their school) would be a major benefit. Connects to existing rail-trail. Requires HINU negotiation... challenging in the light of recent history, but better connection to surrounding town
68	Overland Dr west of this point and Trail east of Folks are a good east-west ped/bike route. Overland in front of FSHS has only narrow sidewalks, relatively narrow street, and lots of rather energetic drivers. Bike path/lanes here would minimize conflict
69	The new sidewalk from 9th/Iowa to the west end of 7th is a very nice addition. 7th St here is in horrible shape. If it is ever reconstructed, consider bike/ped infrastructure.
70	This small route has been in plans forever... many pedestrians use the existing cut-through, but the rest is in a muddy field.
71	Connect to semi-paved road in Osage County.
72	89th is paved in Shawnee County and a popular bike route. Pavement ends at DG county line.
73	Bike connection between "Old 59" and county roads that does not involve getting on the shoulder of "New 59" freeway.
74	No pedestrian access from city to its school is just plum sad.
75	Very long-term, a route with Johnson County across the Sunflower Plant (as it gets redeveloped) should be on the dream list.
76	Marked as bike route, but too busy, narrow, curvy, and poor sight lines to serve well. A multipurpose path replacement for the existing sidewalk may be negotiable with Comptons. Would connect with other multipurpose paths at 15th.
77	Path along East side of Holcolm Park. Many cyclists use the Crestline alignment from Clinton Pkwy to 27th (and Fourwheel Dr. south of that). Currently, they cut through apartment parking lots in this stretch, which is sub-optimal.
78	Bike path from Pearson fountain to Alumni Place (already in common use by cyclists who dismount and walk in front of Battenfeld). KU project.
79	Connections along 15th between Inverness sections (both popular with bikes) and also the McGrew trail.
80	Extend lovely McGrew trail.
81	This one-block connector exists and is an example of a Good Thing. The bollards on the east end are narrow and it could stand to be better paved/marked, but glad it's there.
82	If this is meant to be the bike routing through this section, it could use better signs, paving, and ticketing cars who park in the pathway. Or strengthen Mass as a bike alternative between 11th and 15.
83	Even just finishing the sidewalk here would help.
84	North Iowa Stub has a path... that goes nowhere. Rockledge has a few disconnected sidewalks.
85	Obviously this is in the long-term vision for Farmland site redevelopment, but bike/ped access to the current business park should be a high priority in Farmland plans, not a 'when we get to it' priority.
86	Princeton and Lawrence are already very good routes, but it would be nice to suggest that these are designed for one traffic lane (not passing cars). Some 'bikes belong' stencils might help, as might some painted parking spaces (even though street parking)
87	Hello... sidewalk goes nowhere.
88	Another magical disappearing sidewalk... look at the 'cowpath' in the grass to see that people are already walking this way.





89	Now you see a sidewalk, now you don't.
90	Connect Sesquicentennial Point to existing trail, especially if we ever plan to use it more.
91	Wasn't there a cut-through here in the original plat?
92	This is not technically a street (private property access roads behind the old Sears), but it acts as a defacto street and is necessary for bikes. The city may want to officially take some responsibility before someone redevelops that site.
93	This de-facto bike route is popular and as hill-taming as possible. Sometimes there are barricades, sometimes it's easily bike-passible.
94	This alley is frequently used by cyclists. Formalize?
95	Old 59 is growing in popularity among road cyclists with new 59 open. Consider speed limits, signage, etc in that light. Also, consider advertising this route to visitors.
96	Is this or is this not a city R.O.W.? I know that some bigwigs live near here, but it would be a very useful connection for cyclists (to Avalon+Cambridge)
97	While I put a MPT on the east side of Holcom as a higher priority, a path along the northern edge wouldn't be amiss.
98	Flood control berms... possible greenway depending on private property rights?
99	Is this rail-spur fully defunct? Is it too short to consider rail-banking? Would connect to flood control berms north of airport.
100	Utility corridor (N-S segment) could equal linear park. Westar is more hesitant than some other electric companies.
101	Utility corridor = linear park if Westar agreeable.
102	Largely would follow existing streamway. I'd follow the streamway closer, but, you know, millionaires. Also why this isn't going to happen.
103	If the Gaslight lands are being re-developed, a short trail along the north edge (by the drainage) would be nice. Offroad bike/ped access from 23/Naismith to Home Depot area.
104	Paving the shoulder between the bridge and Cherry (aka 'the hill' would reduce bike/car conflicts. Bikes are common and often slow going uphill. Shoulder/right-of-way already there, just needs two feet of pavement next rebuild.
105	Two feet of grass isn't 'defending your neighborhood' in any way that a tiny bit of sidewalk connecting to points east wouldn't.
106	The 2-1/2 block 'thought that counts'. I'm glad that the ROW is preserved in case there's ever a meaningful bike route on 19th. As long as this little lane doesn't actually encourage novices to ride on 19th outside these two blocks (which they really sho
107	Very cool idea. Lousy surface to ride on, but totally worth it for the half-block.
108	One little curb-cut on the west end of this, and you've got a nice little wheelchair/bike connector. Paving 17th and the east end would be nice, but eh.
109	Curb-cuts on both ends and you've got a nice bike/wheelchair connection. right there
110	The 'no, the bike trail doesn't really start here, people don't park in this lot for the trail all the time, so the muddy cowpath is a mystery' is just one of those humorous things.
111	Is there some logical reason the sidewalk deviates here, away from the crosswalk, etc? Drunk planning again?
112	Our original rail-trail in town, and lovely it still is. However, at some point we need criteria for when/if this gets a hard surface. It washes out regularly and crews regrade it frequently. Not that concrete is free, but at some point as this gets even

113	While the priority of everyone here is extending this trail into 'west campus', just a little bridge to re-connect to the east side neighborhoods 'at the top' seems like it would be pretty easy. No property needs taken to do it.
114	Greatest county road shoulders ANYWHERE. County treasure. Needs: better connection to SLT trail, wider shoulders east of interchange.
115	Sadly built in the 'sidewalks are bad' era.
116	Creek area/transfer station road makes a N-S alternative connection instead of Kasold. Not an ultra-high priority, but could be nice.
117	pretty ride through the river valley
118	Making 12th street a bike and ped thoroughfare would allow access to New York School, Central Middle School, South Park, Downtown, and KU. It is already a street that cars avoid because it is brick, you could easily connect it to the Bouroughs creek trail
119	Spur from the 12th street "bike plaza" to Central Middle School
120	spur from the 12th Street "bike Plaza" to New York School
121	Need an east-west connection from Haskell to Louisiana between 23rd and 31st (or the new K10/SLT when it gets built).
122	It would be nice to connect the Burroughs Creek trail with 21st street. Moving east-west on this side of town is difficult between 23rd and 19th, especially when there is construction.
123	Bicycling on the pedestrian paths isn't good, bit it be nice to have a bike friendly route that goes from Mallot, behind the ROTC building and connecting with Hoch Drive (including a nice curb cut). The grade of this path is much less steep than any other
124	This is the primary route out of town to the South
125	this is the primary route to get to the edge of town to the south
126	these two roads are the primary routes to head to the east
127	this is a primary route to head north and/or east
128	primary routes to head north and west
129	this is a thoroughfare into downtown
130	a thoroughfare into downtown
131	main route from campus to downtown
132	a great road for families looking for a longer ride
133	Route to get downtown
134	Route to get to school.
135	Grocery shopping.
136	Lots of lanes. Also lots of family-friendly attractions in the area (school playground, DQ, Dillons, Iwig). Eastbound on 19th difficult for bicyclists. Tempting to use sidewalks.
137	bike with kids to school
138	bike from older kids school to youngest pre-school



# COUNTYWIDE BIKEWAY SYSTEM PLAN



139	bike from preschool to work
140	direct bike commute from home to work
141	Need a bikeway connecting the Burrough's Creek Trail to the Kansas River bridges and Pinckney neighborhood
142	Road bike ride to Eudora and back
143	Out and back to ride the big hill on Clinton Parkway west of Wakarusa
144	Park at Movies, ride 5 miles out and back
145	Pathway to connect E Lawrence to future industrial area
146	need bike lanes
147	path I take to get to burrough's creek trail
148	rough roadway
149	rough roadway
150	rough roadway
151	Path I took to run errands to go to Downtown, then Walgreens, then Iwig, then Home
152	Widen sidewalk as a rec path for cyclists going south from downtown
153	Rebuild alley and use as a N-S bike path to avoid 1300 blk of Vermont (brick street)
154	The Riverfront Connector Path with a river overlook at Robinson Park
155	Connect Trail to Public Transportation
156	Connection to New York School, Warehouse Arts District, Downtown, and Arts Center
157	Connect Existing Path through West Campus to KU
158	West Campus Recreational Loop Path. Route would be coordinated with KU Master Plan and would take some recreational advantage to the natural areas on KU West Campus
159	Connect West Campus path to Kasold Drive
160	Burcham Park to K-10 Connector. Not sure of the exact route
161	Connector Edit
162	Burroughs to Brook Creek and Across the River
163	Riverfront Connector to Pedestrian Bridge and North Lawrence
164	Shared Use Path Connection from Burroughs Creek to East Lawrence Rec Center and Edgewood Park
165	Connect to Existing Riverfront Promenade "dedicated to all the citizens of Lawrence by Buford M. Watson Junior"
166	Connector for north end of promenade. This is an important route for the economic viability of the riverfront commercial area!!!
167	Alternate super-dynamic and compelling route along the north side of the power plant
168	Need Pedestrian and Bike connection to pending "active senior housing project to shopping and Naismith Park
169	Naismith Park Connection

170	United Way Connection
171	Groceries Connection
172	Naismith Park Route to Schwegler School
173	Connect to shopping
174	Scenic shared use path connector
175	Connection to new Bob Billings Path
176	No bicycle lanes, sidewalk in bad condition
177	I am looking for a safe route for all levels of bicyclist to be able to access multi use pathways. This takes us from Centennial Park to the end of Trail Rd.
178	Barker neighborhood to Baker U. in Baldwin City
179	It would be fantastic if this section could be paved for cyclist traffic -- that way we'd be off the main route b/t Lawrence and Baldwin. Way less risky.
180	Find a way to open up this little stretch of space where Vermont is closed. Just a little path would do it. Kentucky is not particularly safe as a cycling route, especially at night.
181	Path through city owned property along a creek... nice for recreation and good access to schools (underpass under Inverness and Crossgate where creek is recommended)
182	I know this is mostly private land, but the residents might be interested in having a nice path behind their house especially if a park is added with amenities (I think people really liked DeVictor park in the end from what I've heard). Underpasses at eac
183	Route to go along property boundary between Presbyterian Manor and hidden valley. I think the residents at the manor would really like a pathway safe for walkers and wheelchairs.
184	I know this route is already in the plan... but work with KU Master Plan to help make it happen since it would be really helpful (and beautiful... next to creek).
185	An underpass at Kasold would be nice... but maybe not enough traffic to justify. Another route to work with KU Master Plan.
186	Allow people to/from campus on a nice route away from cars and surrounded by forest.
187	When places like the golf course come for sale for as little as this one did (\$360K for 30 acres), the city should consider purchasing. The path here could follow the creek and go under 15th Street where the creek goes under.
188	Shared use path along creek here would be nice to cut off the hill a little and much more pleasant ride away from the road and next to a creek. Underpass potential here.
189	Haskell would probably be interested in the city collaboration on a boardwalk/path through the wetlands which would be beneficial to students there and everyone in the city. An excellent opportunity to see nature while walking or cycling.
190	Underpasses at 15th and Iowa possible where the creeks flow under the roads. A really nice forested area. Another privately owned area... It would allow everyone in the neighborhood to avoid these two major roads which lots and lots of students/ staff/facu
191	In general the city should be buying right of way and requiring all new development to set aside space for shared use paths that deconflict from cars and take advantage of the beautiful landscapes that we have. So this path is just an example, but should







192	Wallmart bypass for trail around Lawrence
193	Great relatively flat (less sweaty at work) route to west campus with easy crossing of Iowa St.
194	Round trip - 20 miles. Includes S. Lawrence Trafficway Trail from 6th to Clinton Parkway.
195	Route to downtown.
196	Bike lanes desired
197	Connection needed between bike path and N 1750 Road
198	No wide sidewalk on this section, and pavement is not in very good condition. For riders riding on wide sidewalk traveling north from 23rd street, transition at 15th Street is awkward. Requires crossing over at 15th to street. Used as 4 lanes and traffi
199	This route connects to 6th Street, Clinton Parkway trail, 31st Street
200	Add bicycle accommodation.
201	Choice used when avoiding heavy traffic on 6th Street. Lightly traveled but pavement is in bad condition on much of the section so not all that desirable.
202	Lone Star rec ride
203	Add bicycle accommodation to complete the loop around Clinton Lake. Stull back to Lawrence is difficult.
204	It would be great if there were a better way to get from West to East Lawrence via bike. It is currently very difficult to commute this route or to use it to head downtown on the weekends
205	connect with recreational lane..... a real safe bike only lane!
206	Wider shoulders would be appreciated south of Clinton Lake (N950 Rd, N4000 Rd, E 1000 Rd.) There is a very dangerous spot on Grand Vista Rd. where a traffic calming structure reduces lane widths to car widths only - not wide enough for cars and bikes. I h
207	Wider shoulders would be great south of Clinton Lake
208	The short stretch along HWY 40 is scary
209	Tennessee St. needs a dedicated bike lane - with parked cars and students, not as bike friendly as it should be.
210	Needs a painted stripe to keep cars out of bike lane.
211	Needs to be wider, with painted stripe to keep cars out of bike lane
212	If a paved trail were put in place here, it would be very easy to connect the K10 trail to the Peterson Rd/Monterey Way Bike Routes, making for a nice loop.
213	Alternative route to Rotary Arboretum (not very easy to bike to from north end of town)
214	Overall a good route; traffic is high on Ferguson Rd, could use shoulders. Also, bridge over river is a little narrow
215	Muffin Ride
216	Lizard Ride
217	Route has a very short section designated for cyclists. Road is too busy for just signs indicating the need to share the road.
218	Road has only a short section of designated bike lane. Too busy, with too many young drivers - needs designated lane. Important bike transit corridor

219	Important connector route, but no room for bikes. Road is too busy, with too many young and inexperienced drivers.
220	Connector to south of town bike routes
221	Western leg of Ironman Kansas bike route. Lots of bikers train on this course.
222	Different route back.
223	Heavy traffic, big trucks. Dedicated bike lane would be great on this bike route!
224	Traffic calming structures too narrow for bike and cars both. Have seen dangerous incidents where cars speed up to get around cyclists and into the narrow lanes.
225	Needs to be wider to accommodate cars and cyclists both
226	Too many stop signs for a bike route.
227	Connector route
228	Low traffic in park
229	If/when the wetlands mitigation project progresses and relocates Louisiana to the west of the restored wetlands, that would be a good time to upgrade the road to include a wider shoulder for bicyclists all the way out to N 1000 Rd so folks could safely
230	See comment on destination point located at 35th and Haskell
231	It is hard to get across town east and west.
232	Hobbs to Constant Park Connection with US-59 undercrossing
233	Bike to School Route connecting older residential areas to new school site
234	City-School Connector
235	School connector
236	Commuting to grocery store and park via bike.
237	connect with bridge over drainage creek
238	Bike trail from Naismith Valley park to the new wetlands nature center, also the Naismith connection would be connected to the bike trail that stops near the holiday inn express. This would also hookup to the new bike path that will be along the new SLT
239	Connect the new SLT bike path to Mary's lake nature trail. This will allow recreationists to travel from the new Wetlands Nature center to the prairie park nature center. This will also help pull the whole prairie park neighborhood into using the new bi
240	New path to connect the Haskell rail trail to the new SLT bike path. This would bring in recreationist from a good portion of East Lawrence all the way north to Hobbs park.
241	Bike trail from Naismith Valley park to the new wetlands nature center, also the Naismith connection would be connected to the bike trail that stops near the holiday inn express. This would also hookup to the new bike path that will be along the new SLT
242	Make a connection from prairie meadows/holcom park to adjoining neighborhoods. This will get kids access to the Holcom park facilities without having to get on Kasold, Clinton Parkway, or 31st St.
243	Regular commute to work.
244	Bike route to Bus stop or Mass Street take alley between 11th and 9th between Indiana and Mississippi



# COUNTYWIDE BIKEWAY SYSTEM PLAN



245	Great trail!
246	Need stop signs at 12th and Indiana
247	High traffic area with jaywalkers little room for cars to pass you and legal and physical inability to ride on sidewalk
248	Point comments: 5
249	Centennial Park could use bike racks.
250	The levee trail and the mountain bike trails are amazing. Would love to see more facilities like these.
251	bike path should continue on to the Farmer's Turnpike to access routes that go north and west
252	having a shoulder on Hwy 40 from E 550 Rd to E 600 Rd would complete a safe route to Stull and the west side of Clinton Lake.
253	I have been buzzed more on 458 than any other road. It is a major east-west route for bikers and gives access to Lone Star, southwest Douglas County, Vinland, Eudora, and eastern Douglas County. needs shoulders.
254	I never ride on the bike paths in these areas on Clinton Pkwy and Kasold where there are a lot of side streets and business curb cuts. Motorists don't know where to expect a biker: on the road with traffic, on the path with traffic, on the path contra-traffic. Side street motorists entering the arterial routinely run through the pathway lane.
255	The stop sign on Speicher is too far south. It tells motorists to roll through the bike path before stopping.
256	Many signalized intersections are not timed and do not change for bicycles. It would be very helpful if these could be signed so a bicyclist knows they need to push the pedestrian button to cross.
257	Naismith Drive is a shared bike/vehicle road. There are images of a bicycle on the right side of the road. I don't beleive these are visible to vehicles. Occassional signage would be helpful.
258	Large amount of hills and limited shoulders make this very dangerous for bikers.
259	I would love to see this path extend somewhere.
260	Downtown is, and should be, a destination for all. Lawrence is growing out, and it should be easier for people who don't live downtown to get there by bike. There would also be less of a need for valuable downtown space to be used as parking.
261	Needa good way to get to farmers turnpike from here. Maybe a trash can!
262	Cars nearly always speed through cross-walk before stopping, many close calls
263	Cars nearly always speed through crosswalk before stopping.
264	Many cars do not yield. Scary with kids.
265	Many cars do not yield. Scary with kids.
266	Cars on Hawthorne coming from Hyvee and waiting to turn right to go west on Clinton will invariably block the zebra crossing even if there is a "Walk" signal on -- blocking cyclists & pedestrians from crossing Hawthorne. The reason cars block the crossing is because they want to see the traffic on Clinton Pkwy so they can safely make a right turn. Perhaps a white line north of the zebra crossing and a sign that says "Stop Here".
267	Cars (eastbound on Clintown) and turning left on Hawthorne to go into Hyvee will left hook cyclists/pedestrians crossing Hawthorne. It will be safer for cyclists/peds on Clinton Pkwy if left turn is not allowed on yield -- like the left turn on Kasold form Clinton Pkwy). There is a left turn signal on Hawthorne/Clinton Pkway, but cars can turn left after yielding.

268	Cars westbound on Clinton Pkwy and turning right to go north on Kasold will not yield to cyclists/pedestrians crossing Kasold with the "Walk" on. There is a sign way up the light pole that says "Yield to Pedestrians" that is ignored by most drivers. The solution is to have a red right-turn-arrow that is activated by the crossing button. Something like no right turn if the green-right-turn-arrow is not lit.
269	Lawrence River trail
270	Clinton trailhead
271	Clinton trailhead
272	Perry Lake MTB trails
273	People do not yield to peds and bicycles in cross walk. I used to think people were rude but now as a frequent motorist at this intersection I think there is a design problem that contributes to this.
274	widening makes it difficult to be a ped or bicyclist crossing here.
275	Wide
276	Difficult for cars to see bikes and peds. No traffic signals, high speed traffic and VERY wide. Iowa is hard and unsafe to cross on a bike except at Irving hill rd. overpass and then the rails are very low.
277	Used to cross here. Myself with infant in stroller, my husband and my father have all almost been hit. Needs an over pass or SOMETHING.
278	Cars are watching neighborhood not bikes are peds to the west.
279	Hilly area.
280	Steep hill about here, and the intersection is dangerous as oncoming traffic as viewed from eastbound lane on Fambrough Dr is difficult to see past the curve.
281	Stubby little bike lane on 9th street ends suddenly here, without a good exit point for riders not comfortable riding with busy street traffic.
282	Children cross here without cars stopping East/West bound. Cars turning left are especially dangerous.
283	This bike lane on 9th is very dangerous. When using it, you are stuck between parked cars with opening doors on the right and motorists that drive right up to the bike lane. Make the bike lane wider to give a buffer from the motorists on your left and the opening car doors on your right.
284	When biking north on Mass Street (if you want to keep going north) you have to change lanes since the right lane is turn only. Many motorists do not let you change lanes or yell at you out of ignorance.
285	Do not ride on this bridge. It is simply a death trap. Motorists are either going to become enraged or not notice you. The sidewalk is the safest option although it is made for pedestrians.
286	There is a huge pot hole at the base of this hill (east bound). It is easy to get to 25mph down this hill and there is a 2-3" deep pot hole (actual some kind of access cover to something aka man made). This is a horrible accident waiting to happen.
287	There is a large gutter here that juts out into the road requiring bikes to move over into traffic. It is on the north side of 19th, just west of Mass. I'm sure there are others like it around town.



# COUNTYWIDE BIKEWAY SYSTEM PLAN



288	Kentucky and Tennessee are dangerous due to car doors swinging open. Both these two-lane, one ways should give bikes full access to the right lane, with signs and road paint notifying drivers of such intentions. Same with Mass. Between 23rd and South Park.
289	This path needs to be extended to make the connection to the south edge of the city and the planned paths along K-10.
290	Dillon's for groceries.
291	Lawrence Public Library
292	Sunflower Bicycle Shop
293	Vermont is good riding except for the 1400 block, where your options are either Kentucky or Massachusetts, both of which are fast-moving, high traffic streets.
294	Vermont is good riding except for the 1400 block, where your options are either Kentucky or Massachusetts, both of which are fast-moving, high traffic streets.
295	Need to jog because Vermont is not continuous.
296	23rd is a challenge to cross unless you have a light.
297	E. Lawrence trail ends, it could easily be extended to downtown
298	Brick street is very rough, we go two blocks out of our way to avoid.
299	This needs a crossing for the students and staff that commute from KU West Campus to KU main campus
300	Bike path dangerous at this intersection. Lake traffic, Eagle Bend Golf traffic and other traffic and multi-directional movement makes it difficult to continue thru the intersection on the bike path.
301	Connection needed from existing SLT trail to Farmers Turnpike. Just getting to the shoulder of K-10 at this point would be better than the current options.
302	Ped/bike access from points north to Home Depot/Best Buy area is needed. Small waterway to bridge.
303	A pedestrian access from Trail (a popular ped/bike route for miles) to FSHS/Aquatic Center environs should have been mandated when this development was built. Unfortunately, too late now on this one.
304	KDOT's plans for bike/ped with regards to the new SLT-K10 needs clarification at Iowa St. What E-W connection is expected for the existing SLT trail (34th Street light is an acceptable answer)? Also, if the current 'bridge to nowhere' is not being replaced (current plan is that it won't be), there is no N-S ped/bike access along Iowa under the bridge currently. This especially should be fixed if there is to be more development south of the SLT.
305	Connect path to KU west campus. Also, reconnect to neighborhoods on both sides of creek at ~19th.
306	DG county fishing lake - popular camping location for bike riders/tourists.
307	McGrew trail end abruptly at narrow sidewalk... could continue extra foot to street and a curb cut.
308	Nothing wrong here... just want to compliment someone who did a Good Thing when they laid out the area.
309	Alabama is a popular ped/bike route south through this area, but the wait to cross 19th can be epic (15 minutes, kid you not). HAWK?
310	A relatively common and dangerous point for cyclists to cross. Probably not realistically going to change, and better than no trans-SLT access.

311	59 has adequate shoulders north and south of here for cycling. But then we have this 60s-style island bulging out in the road and 59 suddenly has no shoulder.
312	Consider 25th to Naismith Valley Park trail (would require bridge). 24th would also be reasonable.
313	Connection to Naismith Valley trail should be part of any Gaslight redevelopment plan.
314	Crossing Clinton Pkwy is relatively awkward here, but no better way to get between the halves of the SLT trail.
315	A surprising number of recreational riders on the trail south of Clinton Pkwy don't know there *is* a trail north of it. Signs and a clearer way to cross Clinton would help. Rounded corners at this particular trail junction would be a nicety.
316	Bikes, Peds, and Cars... ain't nobody likes this intersection.
317	A lot of cyclists use the elevators in the garage to knock 50 feet off the climb. I don't think KU Parking wants to encourage it, though.
318	One of either 24th or 25th should connect to trail on the other side. Current best option is Dillons parking lot which is suboptimal.
319	The amazingly convenient to most of town (heh) rec center. (Multiple) Bike routes to it are desirable. Though, if you've ridden there from east of Iowa, working out at the gym would probably be redundant.
320	As a recent accident here shows, 'high-speed' curved road entry/exits aren't nearly as compatible with multiuse trails as are predictable 90-degree intersections.
321	A number of cyclists manage to get to this point enroute to S Iowa businesses/trailhead/apartments. Crossing 31st gets... exciting. Wider sidewalk on the N side of 31st encouraging use of the Nieder light, perhaps?
322	We're still building developments like this, hemmed in with no plan for pedestrian access to the greater area? It's not 1971 anymore, Lawrence developers. We shouldn't put up with it.
323	Iowa can be a major hurdle to cross, and the 21st bike route needs a way to connect with the multi-use path on the West side of Iowa.
324	23rd Street is terrifying to ride on and difficult to cross at all points
325	Iowa Street s difficult to ride on and terrifying to cross at all points
326	23rd and Louisiana connects bikers to several favorite paths, but is difficult to cross at
327	The Merc is probably one of the most unaccessible biker destinations in town
328	primary delta for traffic heading downtown from north and west
329	this road is filled with killer pedestrian islands
330	downtown
331	Checkers
332	KU
333	Seems to be at the top of a hill with relatively heavy/fast traffic. Dangerous to make left turns at this location.
334	Unsure of exact location. Traffic calming devices squeeze bicyclists.
335	Playground at school.
336	work



# COUNTYWIDE BIKEWAY SYSTEM PLAN

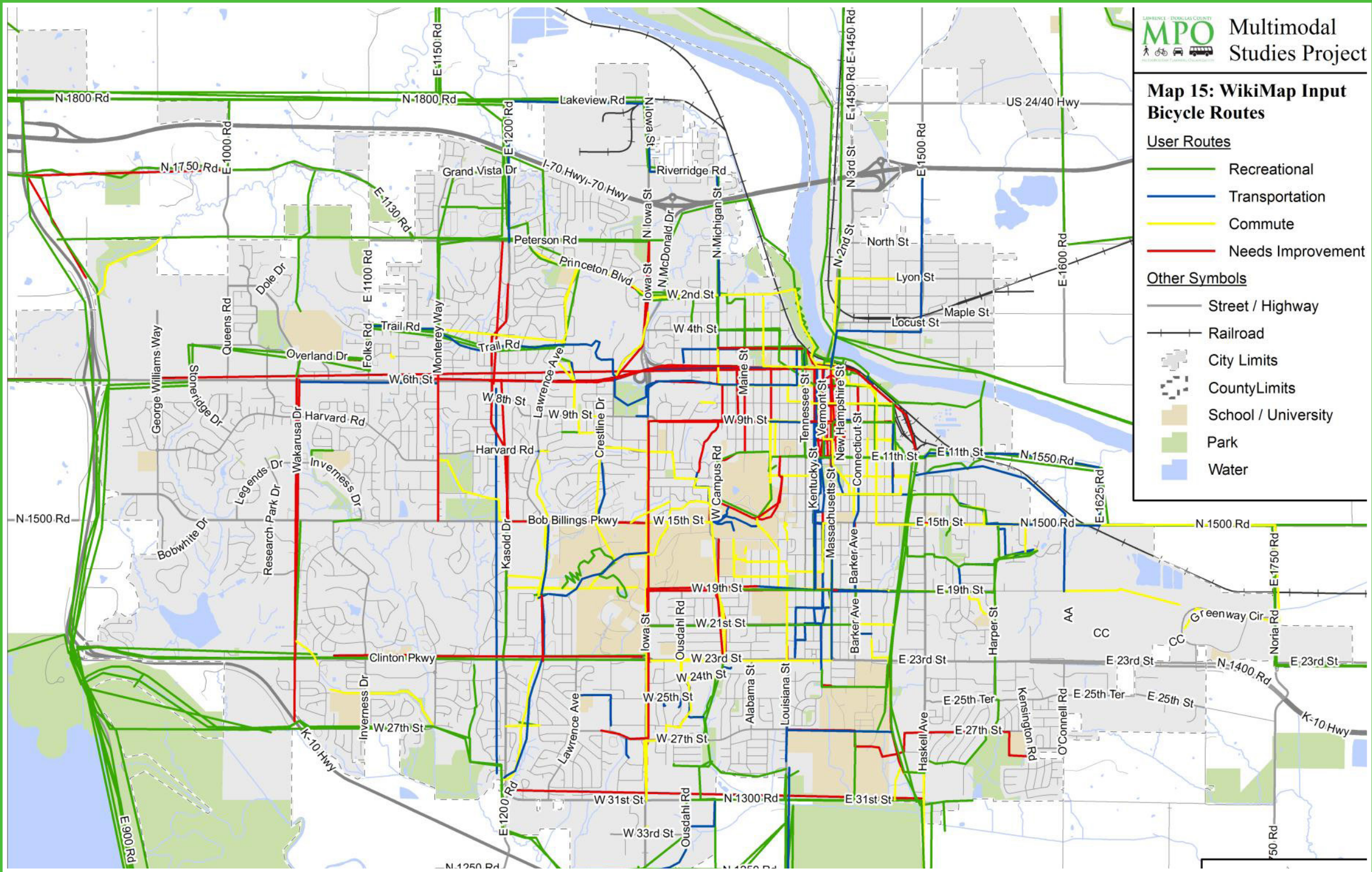


337	Century School
338	Kennedy Elementary School
339	connecticut & 9th
340	19th & haskell
341	Its hard to cross angled railroad, especially with vehicular traffic. I have to cross rr perpendicular on a road bike.
342	21st & iowa
343	19th & iowa
344	connect Burroughs Creek to a new trail north
345	Connect Pickney neighborhood to east lawrence
346	intersection is offset
347	Motorists do not seem aware of cyclists or pedestrians. I have to be extra careful here. Especially right turners off of 9th Street onto iowa.
348	I would like to see a trash can at this location. I saw many plastic bottles on the ground around this parking lot when I visited July 1st
349	Iwig / Alchemy
350	To go south from downtown on Vermont I try to avoid this brick road
351	To avoid the 1300 block of Vermont I tried this alley... It is in direpair.. Could be rebuilt and be a viable option for bike path if rebuilt?
352	New River Overlook at Robinson Park
353	Connect to North End of Burroughs Creek Trail
354	Public Restroom and water fountain at Hobbs Park
355	Warehouse Arts District
356	Train Station, Bus Connection, Public Restrooms
357	City Hall
358	Constant Park Connection
359	Riverfront Park Access
360	New York Elementary
361	Warehouse Arts District
362	Connect to Existing Shared use Path
363	Connect to Existing Path
364	Vacate Industrial Use and Develop as Parkland
365	Connection to East Lawrence Rec Center Leg
366	We need this promenade to connect to trail on the west end either through a tunnel in the building or around the power plant

367	Pending Active Senior Housing Project
368	United Way Building (many community meetings are held here)
369	Groceries
370	Schwegler School
371	Difficult place for kids to cross to go to school. Many Schwegler kids reside south of 23rd
372	New Pedestrian/Bike Bridge Across the river!
373	A bicycle/pedestrian bridge from the top of 7th St to Centennial Park would provide a safe passage West side to East side.
374	This hill is really steep. Probably not much you can do about that.
375	Wells Outlook
376	Lone Star Lake is a routine destination for recreational cyclists.
377	Our friend was hit on her bike at this intersection. It was the SE corner. This is definitely a sketchy intersection for peds/bikes (especially kids) to cross.
378	Tons of kids crossing here each day... consider underpass here or nearby.
379	There is no connection
380	going westward the shoulder changes to curb, effectively making the biking zone very small
381	Need a connection to a street or path here to make a more useful connection. Currently assumes that you've driven your car to the parking lot and unloaded your bike, rather than continuing on to the north or east.
382	Lanes are too narrow for bikes and cars
383	Pedestrian crossing has made the road too narrow for bikes and cars. Dangerous for bikes
384	Bridge is narrow for cars and bikes
385	The wetlands makes it difficult to add a shoulder to Haskell/E1500 road, but it sure would be nice to maybe widen the shoulder, perhaps on the east side of the road, so that bicyclists could more safely take this rolling and beautiful road. It would also make the pull-in entrance to the wetlands at 35th street much more accessible to bikers, so that, for instance, folks coming from either the 31st street wetlands entrance, or for folks coming back from Wells Overlook could make the 35th st. entrance a safe destination.
386	This intersection is very wide because of the angle Missouri and W 27th st cross. So wide that you have to run across in case there is traffic coming you can't see. A crosswalk is needed, especially for kids walking to and from school on way to Broken Arrow
387	Connect Haskell rail trail south to new SLT bike path and prairie park nature area
388	Connect Naismith trail south to new SLT bike path and Menards retail development. Indian Hill residents "ride your bike to Menards and or the South Iowa retail corridor".
389	Connect prairie park nature area to the new SLT bike path and link to the Haskell rail trail
390	No transition from bike lane to street. Many times individuals turn without flashers
391	There is no stop sign here. Many people speed around the corner yet there is zero visibility to your left if going south bound or your right if west bound. I have watched a few cars go fast enough around it to skid a bit or people that go straight through to dead end.
392	Cars do uturns crossing into bike path. Bike path is often drove on giving very little space for bikes so I use side walk till Kentucky where it's illegal to use sidewalk then walk to 9th and newhampshire
393	Narrow, cars turning south often

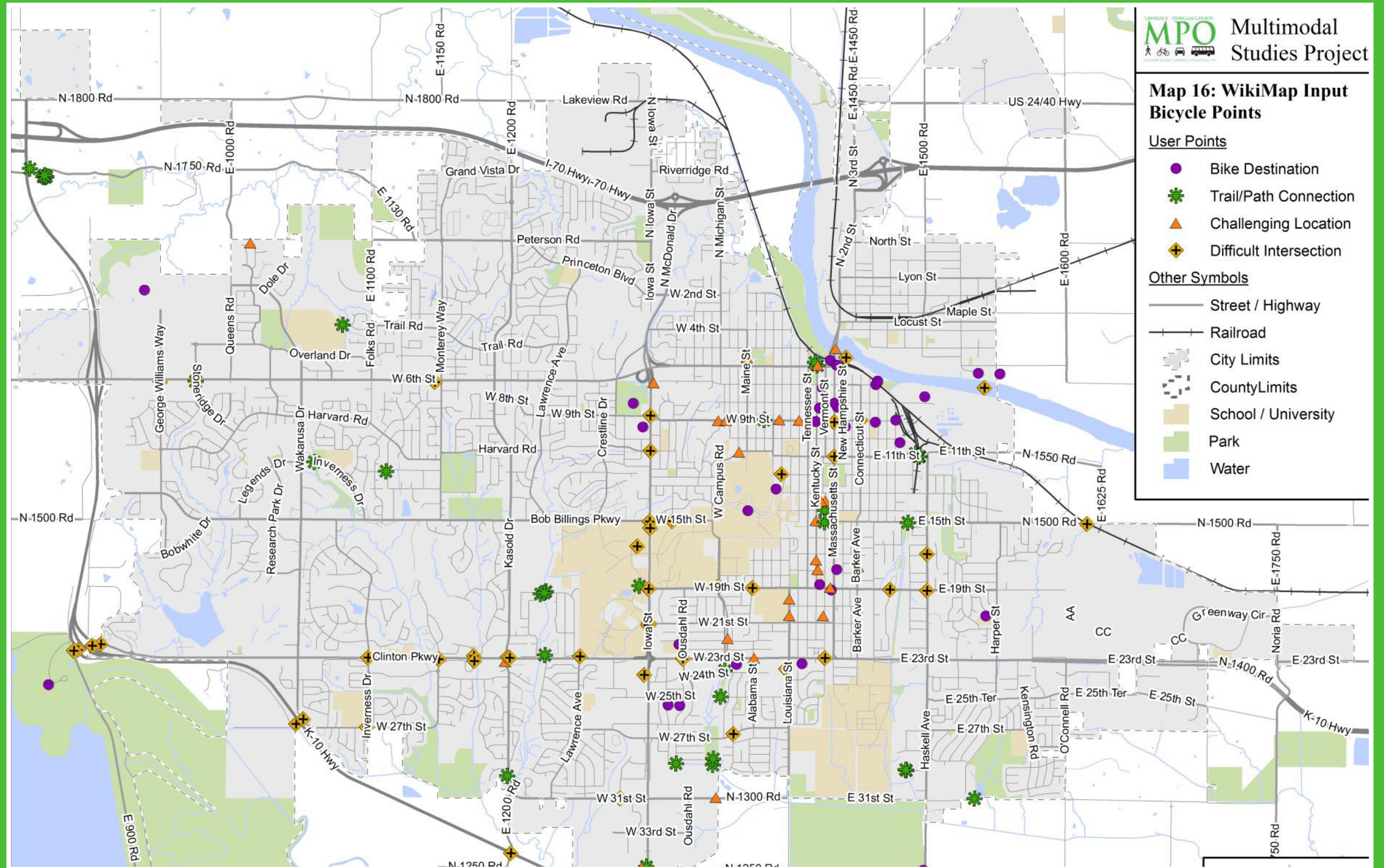






**Map 15:**  
WikiMap User Input -  
Bicycle Routes

Map 16:  
 WikiMap User Input -  
 Bicycle Points





## Appendix B

# URBAN BICYCLE LEVEL OF SERVICE FORMULAS

Tables 30 – 32 display Bicycle Level of Service (BLOS) ratings and formulas discussed in Section 3.2 of this plan.

**Table 30:** Bicycle Compatibility Index (BCI) ranges associated with level of service designations

LOS Designation	BCI Range
A	< 1.50
B	1.51 – 2.30
C	2.31 – 3.40
D	3.41 – 4.40
E	4.41 – 5.30
F	> 5.30

**Table 32:** Bicycle Level of Service Model Version 2.0

$$\text{Bicycle LOS} = a1 \ln(\text{Vol15}/\text{Ln}) + a2 \text{SPT}(1 + 10.38 \text{HV})^2 + a3(1/\text{PR5})^2 + a4(\text{We})^2 + C$$

Where:

Vol15 = Volume of directional traffic in 15 minute time period

Vol15 = (ADT x D x Kd) / (4 x PHF) where:

ADT = Average Daily Traffic on the segment

D = Directional Factor

Kd = Peak to Daily Factor

PHF = Peak Hour Factor

Ln = Total number of directional through lanes

SPT = Effective speed limit

SPT =  $1.1199 \ln(\text{SPp} - 20) + 0.8103$  where:

SPp = Posted speed limit (a surrogate for average running speed)

HV = percentage of heavy vehicles (as defined in the 1994 Highway Capacity Manual)

PR5 = FHWA's five point pavement surface condition rating

We = Average effective width of outside through lane

**Table 31:** Bicycle Compatibility Index (BCI) model

$$\text{BCI} = 3.67 - 0.966\text{BL} - 0.125\text{BLW} - 0.152\text{CLW} + 0.002\text{CLV} + 0.0004\text{OLV} + 0.035\text{SPD} + 0.506\text{PKG} - 0.264\text{AREA} + \text{AF where:}$$

BL = presence of a bicycle lane or paved shoulder > 3.0 ft no = 0 yes = 1	PKG = presence of a parking lane with more than 30% occupancy no = 0 yes = 1
BLW = bicycle lane (or paved shoulder) width ft (to the nearest tenth)	AREA = type of roadside development residential = 1 other type = 0
CLW = curb lane width ft (to the nearest tenth)	AF = ft + fp + frt where:
CLV = curb lane volume vph in one direction	ft = adjustment factor for truck volumes (see below)
OLV = other lane(s) volume - same direction	fp = adjustment factor for parking turnover (see below)
	frt = adjustment factor for right-turn volumes (see below)

Note: There are adjustment factors for truck volumes, parking turnover rates, and volumes of right turns