

BULLITT COUNTY GREENWAY

ENVISIONING THE FUTURE OF CONNECTIVITY



Disclaimer

The University of Kentucky in no way guarantees the work performed by students in this studio course and makes no warranties, expressed or implied, regarding the quality of any product produced. The community sponsor agrees to indemnify and hold harmless the University against any claims arising out of Sponsor's utilization, scale, or transfer of materials developed in the whole or in any part by students in the Landscape Architecture Program. Efforts were made to ensure the quality of this product, but it is important to recognize that the final documents are student works for academic purposes. Photographs and graphic images used in this report were obtained or produced by the UK Landscape Architecture Design Studio VII unless otherwise noted.

BULLITT COUNTY GREENWAY PROJECT

UNIVERSITY OF KENTUCKY
COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT
DEPARTMENT OF LANDSCAPE ARCHITECTURE
DESIGN STUDIO IV / VI

UNDERGRADUATE STUDENTS

STUDIO IV:

JEFF EMBREE
WES GRIFFITH
MEG MALONEY
HANNAH MCCLURE
JOHNATHAN WEHMER

STUDIO VI:

ELIZABETH CLARK
BRANDON COGGESHALL
TRAVIS KLONDIKE
ERIC LEE
QIANHUI MIAO
KEENAN PALMER

CLAYTON PITCOCK
AUSTIN SAUER
BOYD SEWE
ACHAN SOOKYING
NOLAN STONE
DEVERI WALKER
NATHANIEL WRIGHT

FACULTY

JAYOUNG KOO, *PHD*
ASSISTANT PROFESSOR

CAROLINA SEGURA
LECTURER

FALL 2014

EDITION 1.0

ACKNOWLEDGMENTS

Ruthie Ashbaugh

Magistrate

Linda Belcher

Kentucky State Representative

Martha Berner

Metro Parks Louisville

David Cross

Community Member

Bill Duffy

Community Member

Sherry Duffy

University of Louisville

Stephen Henry

Future Funds Land Trust

Steve Froeliche

Community Member

Thomas B. Givhan

Community Member

Becky Hurst

Community Member

John Hurst

Community Member

Chris O'Brien

Bullitt County YMCA

Melanie Roberts

County Judge Executive

Dianne Shelton

Community Member

Donnie Shelton

Community Member

John Swintosky

Metro Parks Louisville

Stephen Thomas

Pioneer News

Alex Winsatt

Community Member

Mark Wourms

Bernheim Arboretum and Forest

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
CHAPTER 1 - INTRODUCTION	3
CHAPTER 2 - INVENTORY & ANALYSIS	9
CHAPTER 3 - CASE STUDIES	49
CHAPTER 4 - MASTER PLANS	91
PROJECT CONCLUSION	167

EXECUTIVE SUMMARY

INTRODUCTION

The Bullitt County Greenway project is a collaboration between community members of Bullitt County and the University of Kentucky fourth and fifth year landscape architecture design studios (UKLA). A greenway can be defined as “a human endeavor with roots that go back several centuries.” More than a park, a greenway is rather an adaptation to the pressures of urbanization. Greenways help limit the loss of ‘natural space’ while balancing the expansion of a human dominated landscape (Searns, 1995, 65-66). The future Comprehensive Plan of Bullitt County proposes connections to regional projects such as the Louisville Loop, The Parklands of Floyds Fork, and the Kentucky Bourbon Trail. During the Fall of 2014, UKLA helped to strengthen the backbone of this vision.

PROCESS

During the analysis phase of this project which included collecting and interpreting data, the UKLA team conducted research on topics ranging from the area’s history, existing land uses, and environmental attributes, to the built and social environments of the county. Students researched case studies of constructed and planned greenway projects across the country in order to understand the process and characteristics of other greenways. These steps familiarized the UKLA team with Bullitt County, the surrounding region, and other successful greenway projects. This beginning point was key and helped students overlap information and begin to integrate new findings with their county-wide greenway design visions.

For the next phase, UKLA facilitated a community design workshop in September 2014. The workshop began with UKLA sharing findings from their analysis and case study research. Afterward, students and community members broke into small groups to examine more detailed questions and visions. The community members played a large role in helping students identify additional key issues and opportunities that related to the potential greenway development.

In the groups, the students conducted a series of activities that facilitated programmatic brainstorming. The activities included 1) discussing goals and objectives; 2) conducting a S.W.O.T. Analysis to highlight the county’s (S)trengths, (W)eaknesses, (O)pportunities, and (T)hreats; 3) creating bubble diagrams to enhance idea generation; and 4) group collaborations to produce preliminary conceptual plans for the greenway.

Back on campus, the students used the information gathered at the workshop to produce a series of opportunities and constraints maps and diagrams that reflected the community’s ideas. Students then utilized this information to help influence their designs for the greenway vision plan.

Key opportunities examined included:

- Connecting Communities and Populated Areas
- Strengthening the Identity of Bullitt County
- Identifying Tourism Opportunities
- Increasing Recreational and Open Spaces
- Preserving and Conserving Natural Resources
- Revitalizing Urban Areas

Key constraints examined included:

- Fort Knox
- Physical Characteristics (floodplains, waterways, existing land use)
- Major Roads (including Interstate-65)
- Subdivisions and Residential Areas

For the final phase, students collected further information, researched ideas and reflected the community’s vision in the goals for their designs. Six alternative designs were generated and focused on enhancing the county through increased connectivity, economic development, physical enhancement, improved quality of life, and increased walkability. While all the designs strive toward common goals, distinctive themes are illustrated within each of the six designs. This comprehensive greenway vision for Bullitt County can help inspire a new era of development while also supporting a sense of identity for the county.

SYNOPSIS

A county-wide greenway will enhance the relationship between community and environment by connecting the communities, key features, destinations, and environment of Bullitt County. The overall goal is that Bullitt County can strengthen its community identity. After a 3 month design process, the UKLA students proposed six alternative greenway plans, which offer different perspectives that retain existing assets while integrating potential elements. The final proposals exhibited ideas to improve the county’s connectivity, tourism opportunities, sense of identity, and natural resources. The UKLA students offered a series of flexible proposals through community engagement. With further support and resources, the greenway can become a reality in Bullitt County.

1 | INTRODUCTION



1 | INTRODUCTION

COMMUNITY BACKGROUND BRIEF HISTORY

Land surveyor Thomas Bullitt found the salt licks in 1773. This event marked the birth of Bullitt County. The county was officially established in 1797 from land that was acquired from Nelson and Jefferson Counties. Bullitt County was actually named after Thomas Bullitt's nephew, Lieutenant Governor Alexander Scott Bullitt (Figure 1.1.1) (Bullitt County History, 2014). The City of Shepherdsville, settled in 1793, was the first major city and continues to serve as the county seat.



Figure 1.1.1: One of the many historical markers located throughout the county (Source: Bullitt County History, 2014)

Salt and other natural resources played a significant role in the growth of the county. People came from great distances to retrieve salt for many purposes like food preservation. The Wilderness Road into

Bullitt County was built in response to the great demand for its natural assets and opened the door for other businesses to thrive (McDowell, 1956). The Wilderness Road created a direct link to Bullitt County and still exists today as a highly traveled paved road that follows roughly the same path as the original road (Bullitt County History, 2014).

In the 19th century, mineral springs were discovered in Bullitt County which sparked a new growth era. People from all over came to the popular springs, like Paroquet Springs, to camp for healing purposes or for vacation. In 1918, as the US looked to expand military facilities, West Point, Kentucky, was chosen for artillery training. This establishment became Fort Knox and grew to encompass most of the western border of Bullitt County. Bernheim Arboretum and Forest, another popular attraction in Bullitt County, was established in 1950 by the land owner Isaac W. Bernheim and the Olmsted firm (Figure 1.1.2) (Bullitt County History, 2014).



Figure 1.1.2: Existing directional signage at the entrance to Bernheim Arboretum and Forest.

COUNTY PLANS

Bullitt County's recent 2013 comprehensive plan updated the county's previous plan and focused on six areas: transportation, land use/environmental factors, community facilities, residential land use, commercial land use and environmental design. The comprehensive plan is intended to be implemented over the course of a five year period (Kris Lowry & Associates [KL&A], 2013).

The 2013 comprehensive plan addresses traffic concerns in the county. The plan presents an updated transportation system that is adapted and functional for current and future development of the county. The new transportation plan will aid in the development of both the residential and commercial land uses. As for community facilities, the plan states that community members should be informed about and be responsible for the facilities and services. The usage and planning of community resources should be taken into account in future plans (KL&A, 2013).

Land use, environmental factors, and environmental design are oriented to protect and preserve the county's resources. In order to preserve the rural identity of Bullitt County all of the scenic and natural resources and vistas should be considered when implementing new innovative designs. Historic sites including land and buildings need to be preserved and protected from new development (KL&A, 2013).

The current plan suggests that commercial and residential development consider ongoing and existing preservation and development efforts prior to implementation to avoid conflicts. Facilities and resources should play a vital role in the

development of both residential and commercial properties. Commercial properties should consider the available work force when expanding within the county (KL&A, 2013).

Future land use is constantly changing due to unpredictable economic trends and other factors. Future land use maps show a significant growth in residential use and development. However, it also reflects the community's consideration for preserving its natural resources by expanding conservation areas such as along Floyds Fork and the Salt River (KL&A, 2013).

PROJECT SYNOPSIS BULLITT COUNTY GREENWAY

The Bullitt County community members reached out to the UK Landscape Architecture Department regarding a bike/hike path study in the central part of the county in the summer of 2014. With further concerns about county-wide connectivity, the project expanded into a semester long community engagement and design studio project during the fall of 2014. The University of Kentucky's



Figure 1.1.3: Students working with community members during the design workshop in Bullitt County

Department of Landscape Architecture (UKLA) fourth and fifth year students collaborated with Bullitt County community members to identify and visualize design ideas for increased connectivity throughout Bullitt County (Figures 1.1.3-1.1.5). The concept of a greenway was chosen as the medium for a comprehensive connectivity plan.

More than just parks or amenities, greenways represent an adaptation to urbanization. They help mitigate the loss of 'natural space' to development and provide a counter-balance to an expanding human dominated landscape (Searns, 1995). UKLA students conducted multi-phase research that included data collection, analysis, case studies, and site visits to best understand how a greenway system could be applied in Bullitt County. First, the UKLA students researched and analyzed



Figure 1.1.4: University of Kentucky Landscape Architecture fourth and fifth years students and faculty

information to develop a basic knowledge of Bullitt County. Then the students prepared case studies of greenway systems from around the US and abroad. Analyzing different aspects of existing greenway proposals, plans, and built projects allowed students to explore opportunities, constraints, and application ideas that have been established in other projects.

On September 26, 2014, UKLA students visited the county and stopped by several specific locations. On the same day, students facilitated a design workshop with members of the community who had strong interests in Bullitt County's future. During the workshop, student groups worked with community members on four activities. Each activity expanded on ideas related to preliminary goals, opportunities and constraints within the



Figure 1.1.5: Trailhead of the hike and bike trail that links Jim Beam to Four Roses on Bernheim Arboretum and Forest property



Figure 1.1.6: UKLA team shares final greenway plans with community members at the final presentation.

county, and conceptual planning for a county-wide greenway system.

After the workshop, the students returned to Lexington and began working on preliminary designs. The class produced six alternative conceptual designs that were presented to a group of design professionals in October. The UKLA students presented their final greenway master plans to community members in Bullitt County on December 5, 2014 (Figure 1.1.6).

The UKLA team is suggesting a number of different greenway options that promote connectivity between cities, attractions and amenities. With a greenway, the county will be able to promote economic growth, tourism, and healthy lifestyles. Also, Bullitt County will be able to showcase its amenities and historical features. A further analysis of the goals and objectives are outlined below.

GOALS AND OBJECTIVES

The Bullitt County greenway system has the potential to reshape the county. It has the ability to enhance quality of life for residents while establishing connectivity to surrounding counties and attractions. The overall project offers multiple levels of usage and activities that lay the foundation for the greenway in the county. Residents and visitors will be able to decide their preferable level of usage throughout the system depending on their ability and interest. This diversity will further the project in its development for years to come, not only for residents but visitors as well. Overall goals and objectives for the Bullitt County Greenway system include establishing connectivity, protecting and engaging natural resources, and enhancing the built environment for improved quality of life.

Goal: Establish Connectivity

Objectives:

- Increase connections to the environment and cultural destinations
- Addition of non-vehicular trail systems for recreation
- Connect urban centers and rural areas within and around the county
- Connect to regional greenway systems

A Bullitt County greenway will create a stronger and attractive destination not only for tourists but for its residents. The greenway will provide a trail system, educational opportunities, and enhance quality of life. Residents will have safe areas for outdoor activities. A well connected greenway will give residents the ability to travel between urban, natural, and cultural areas within the county. The greenway system will improve the quality of life. The greenway will give Bullitt County an identity while attracting new businesses and attractions to the area.

Goal: Protect and Engage Natural Resources

Objectives:

- Create a growth boundary to prevent further expansion into the natural landscape
- Create buffers for environmentally sensitive areas
- Deter development in flood prone areas

Salt River, Floyds Fork, and the salt licks played an important role in the initial establishment of Bullitt County (Figure 1.1.7). It is important to consider such natural resources when planning for future development and growth in the county. Although Bullitt County was initially built around the available amenities like water and salt, those amenities are no longer what drive the county's development. The



Figure 1.1.7: The Salt River has played a role in Bullitt County throughout history.

Knobs of Bullitt County offer some constraints but also can offer unique opportunities for recreational development. Protecting and engaging the natural resources will strengthen the county's land use and planning (Figure 1.1.8). The smart growth boundary will prevent urban sprawl and unnecessary development in the major surrounding lands. Bullitt



Figure 1.1.8: Bernheim Arboretum and Forest exemplifies the natural resources in Bullitt County.

County is relatively strong agriculturally which is why the environmentally sensitive areas need to be buffered and protected from development.

Lastly, flood awareness should be taken into consideration in the initial development of a Bullitt County greenway. Places like Shepherdsville are located in either the hundred year or five hundred year floodplain which can effect the inhabitants' safety and also natural water way ecosystems.

Goal: Enhance Built Environment

Objectives:

- Provide and locate new recreational opportunities and open spaces
- Implement smart street design
- Provide additional educational opportunities
- Feasibility for events to occur from outside the county

The physical enhancement of Bullitt County is fundamental to the creation of a greenway system (Figure 1.1.9). Bullitt County residents, visitors, and tourists have limited access to recreational opportunities within the county. Residents travel out of the county to locations like Louisville and Bardstown. However, being in such close proximity to a large population offers opportunities for visitors to the area. With new recreational opportunities people may stay within the county's boundaries. Educational opportunities will offer additional activities for residents as well.

Smart street design will allow streets to become both beautified and walkable and when seamlessly tied into a greenway, the greenway will also offer event organizers new venues and trails to utilize.



Figure 1.1.9: Existing sidewalk and street design in Shepherdsville, KY.

CHAPTER BRIEF

These goals and objectives establish a framework for innovative ideas. These ideas will be used to create conceptual plans for a comprehensive greenway design to address the concerns of the community.

The second chapter moves toward the inventory and analysis phases of the project that were completed prior to meeting with community members. The chapter lays out the county's location, history, environment, and many other aspects that relate to the project.

The third chapter presents the reader with the case studies that were conducted by each student. The fourth chapter explains and lays out the process taken during the design phase of the project and presents the final master plans for each design alternative.

2 | INVENTORY & ANALYSIS

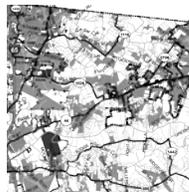
HISTORY • HISTORIC PRESERVATION • AGRICULTURE • PLANNING & ZONING • CONSERVATION • RECREATION
 • GEOLOGY & SOILS • HYDROLOGY • CLIMATE • FLORA & FAUNA • COMMUNITY FACILITIES • INFRASTRUCTURE
 • TRANSPORTATION • SOUND & NOISE • HOUSING & DEVELOPMENT • DEMOGRAPHICS • ECONOMICS • TOURISM



E. Clark



Q. Miao



K. Palmer



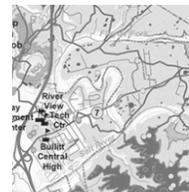
B. Sewe



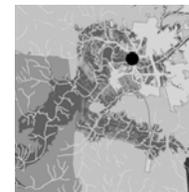
J. Embree



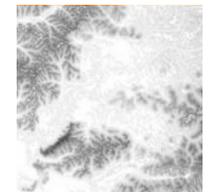
M. Maloney



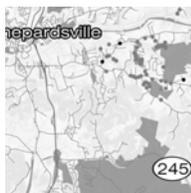
B. Coggeshall



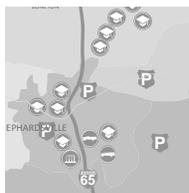
N. Wright



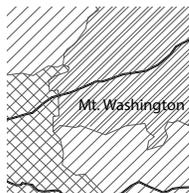
J. Wehmer



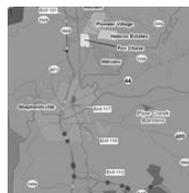
D. Walker



W. Griffith



E. Lee



C. Pitcock



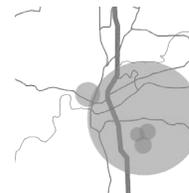
A. Sauer



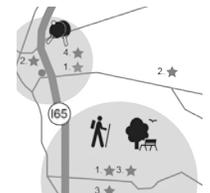
A. Sookying



H. McClure



T. Klondike



N. Stone

2 | HISTORY

INTRODUCTION

Appointed to survey Kentucky, Thomas Bullitt discovered Bullitt's Lick in 1773. In 1774, Captain John Floyd led a group into the area including James Knox and James Douglas, who surveyed Bullitt's Lick. During this same year, the party observed the mouth of the river and named it Floyd (McDowell, 1956).

FOUNDING

In pioneer days, a key element of survival was salt, the only food preservative, which kept people alive when food was in short supply. It is believed that Bullitt's Lick was established in 1779 as a result of George Rogers Clark's dire need of salt for his expedition. Bullitt's Lick was the first commercial saltworks west of the Alleghenies and was Kentucky's sole salt producer during the revolution. The Wilderness Road took a complete detour in order to reach Bullitt's Lick (McDowell, 1956).

Other businesses took off in areas around Bullitt's Lick. The Mud Garrison was built to protect the families of the salt makers, so named after its built form of mud packed between rows of parallel logs that completely encircled their homes. Dowdall's Station was located at the ferry crossing of the Salt River. Brashear's Station, the first settlement on the Wilderness Road, was built at the mouth of Floyd's Fork in 1779 (Figure 2.1.1) (McDowell, 1956).

EARLY SETTLEMENT

In 1793, Shepherdsville was established. Two years later, the Wilderness Road was open to wagon traffic. Land was taken in pieces from Jefferson and Nelson Counties. With this new land,

Bullitt County was formed on January 1, 1797. The county was named after Thomas Bullitt's nephew, Lieutenant Governor Alexander Scott Bullitt (www.bullittcountyhistory.com, 2014).

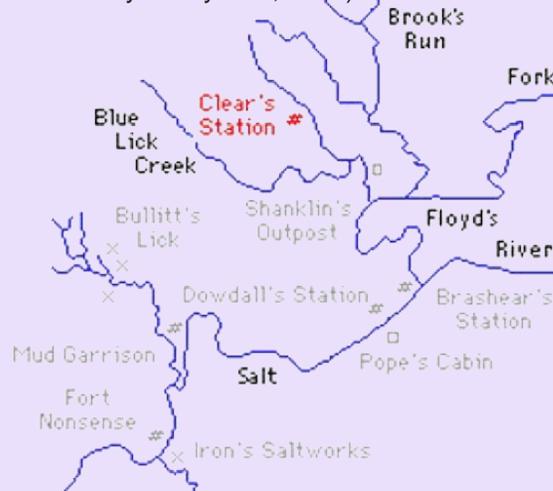


Figure 2.1.1: The original settlements in Bullitt County. (Source: The Bullitt County History Museum, 2014)

In the 19th century, mineral springs were known as healing springs. Cities did not have sanitary waste management systems which fostered disease outbreaks. When someone became ill, the entire family would camp out at a mineral spring to drink and bathe in the medicinal waters. In Bullitt County, as elsewhere, springs became a business that quickly grew from simple and sanitary healing places into social resort destinations (McDowell, 1995).

The springs offered a variety of activities from grass sports games to theatrical events. Families still came for healing and preventative care; however, it was common for them to come simply to enjoy

the amenities. Transportation improved around these springs with updated roads and taxi services to encourage travel (McDowell, 1995).

At the time, Louisville was often referred to as “the ponds” because of its extreme drainage problems. During warm months, those from Louisville who could afford to leave would vacation at the springs, mainly the springs in Bullitt County. These destinations are an important part of Kentucky history because of the famous Paroquet Springs. Paroquet Springs was particularly well-known for attracting the prominent families from all over the country and throwing fabulous balls (McDowell, 1995).

1900s

In 1929, whiskey maker Isaac W. Bernheim bought 14,000 acres of stripped land to develop into a forest, arboretum, and museum. Some of his favorite childhood memories were of walking in the woods by his house. His goal was to create a sanctuary for all to enjoy and inspire through nature, free of all conflict. The Olmsted firm began drawing up plans for the nature area in 1931 and Bernheim Forest opened in 1950 (www.bullittcountyhistory.com, 2014).

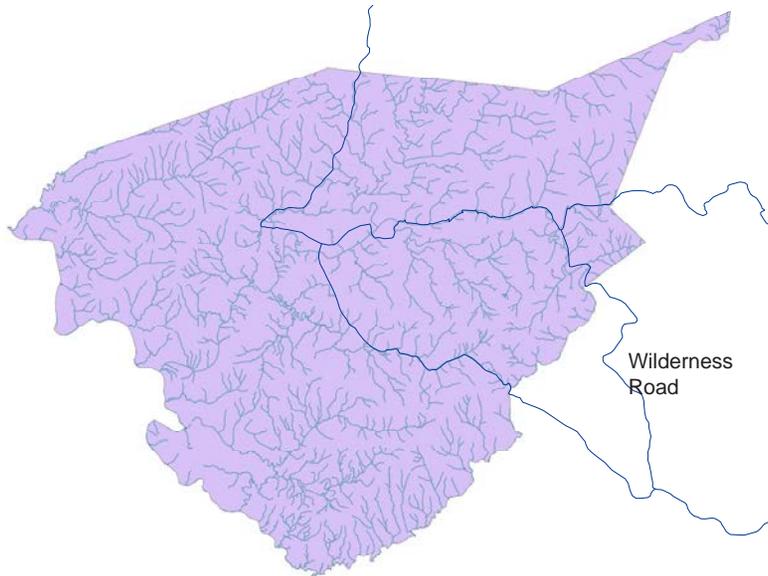


Figure 2.1.2: The Wilderness Road closely followed rivers and streams (Data Source: Kentucky Geography Network, 2014)

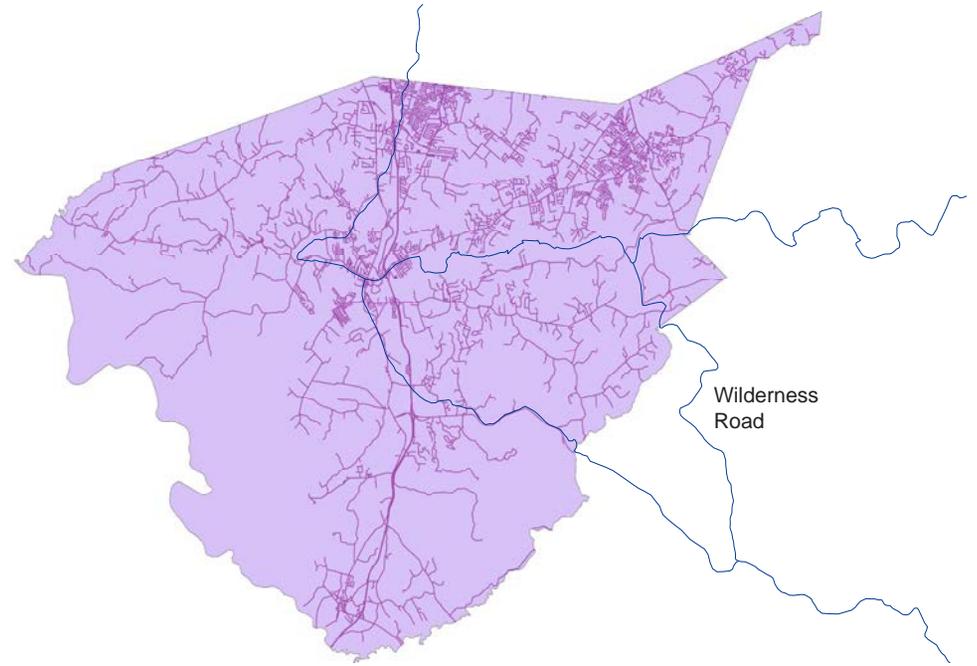


Figure 2.1.4: Current infrastructure stemmed from the Wilderness Road (Data Source: Kentucky Geography Network, 2014)

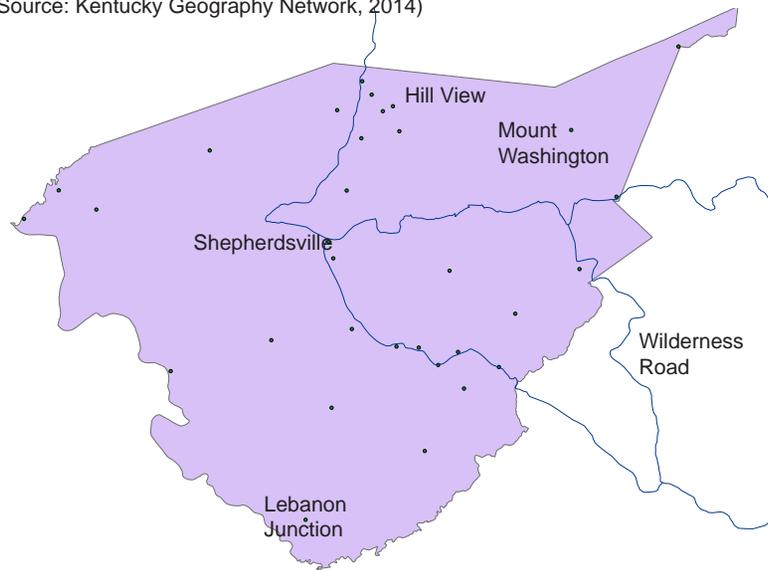


Figure 2.1.3: Currently, many heavily populated areas are located near the Wilderness Road. (Data Source: Kentucky Geography Network, 2014)

WILDERNESS ROAD

The Wilderness Road formed along the travel path with the most suitable conditions to sustain human life as settlers moved into Kentucky. The trail clearly followed the streams in many sections (Figure 2.1.2). Bullitt County developed with settlements along the Wilderness Road; some of which grew to become the heavily populated towns of today (Figure 2.1.3). Roads also formed along the Wilderness Road (Figure 2.1.4) thus, much of the original Wilderness Road is still in existence as a paved roadway and just as relevant today as ever before. People still use this route to travel through and around Bullitt County. Only now, the old settlements are a piece of the past and the road is sprinkled with historic landmarks. For the future of Bullitt County, it is important to remember and incorporate its historic roots.

2 | HISTORIC PRESERVATION

INTRODUCTION

A land use plan portrays development suitability in a variety of ways and many factors are considered in its development. The existing land use plan reflects present land use patterns, assessment of the problems with these land uses, and opportunities for future development. The future land use plan which was conducted by the Bullitt County Planning Commission, provides information about how the county will be developed in the future. It reflects the main planning objectives, which include preserving nature and historic resources, strengthening public infrastructure service, promoting tourism, and increasing overall recreational value. The comprehensive plan includes historic preservation areas which the community aims to protect and restore (Kriess Lowry & Associates [KL&A], 2013a).

EXISTING LAND USE

The existing land use map in the Bullitt County Comprehensive Plan shows that the county is composed predominantly of agricultural and low density residential areas. There are heavy uses, including commercial, industrial, residential, and public areas, on the north side of the city along I-65, Preston Highway, and Old Mill Road. The greatest concentration of commercial use is along East 4th Street between the CSX railroad and I-65. There is the highway-oriented commercial district near both Exit 117 (E. 4th St.) and Exit 116 (Cedar Grove Rd.) at the I-65 interchanges. The downtown area of Mt. Washington also concentrates the intense residential district and the mix of commercial and public uses along KY 44 west of US 31E (2013).

FUTURE LAND USE

In the future land use plan, significant change is anticipated (Figure 2.2.1) which may occur in the next five to ten years or perhaps not at all, due to unpredictable economic development and other factors. The future plan maps floodplain areas that are suitable for agricultural use, parks, open spaces, and water related activities. The nature conservation area is expanded in the Bernheim Arboretum and the Research Forest area, and new conservation areas are marked out in the north and east side of the county. This area provides crucial habitat for the Kentucky Glade Cress and can provide a buffer to protect the tributary from future environmental degradation (KL&A, 2013b).

Urban development, including high density residential, industrial, commercial, and concentrated single-family uses, is significantly expanded along existing urban areas. New commercial development along Preston Highway, John Harper Highway and new the Brooks Interchange would be anticipated once the highway is widened and if the new development is connected to public sewers. Residential purposes are not approved in close proximity to I-65 due to noise. Industrial use is also increased along I-65 on the future land use map (KL&A, 2013b).

Comparing future and existing land uses, there is a significant growth of residential use and nature conservation areas. As shown in Figure 2.2.2, the

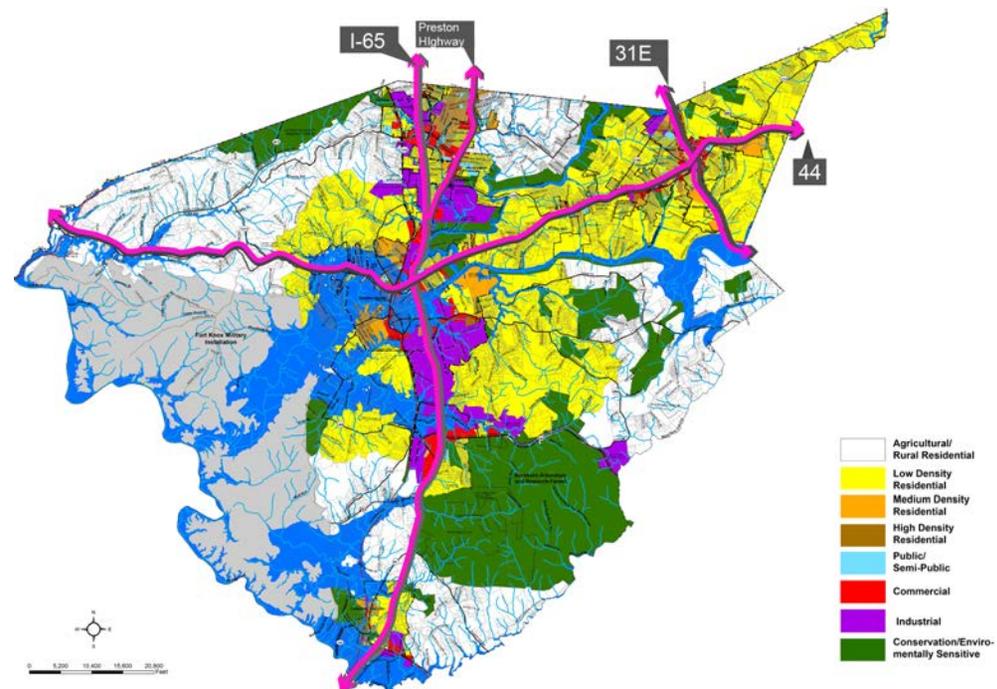


Figure 2.2.1: Future Land Use in Bullitt County. (Source: KL&A, 2013b)

nature conservation area is planned to increase 6%, residential land will expand up to 15%, and 12% of the entire area will be marked as floodplain area. In contrast, the agricultural lands are shown to decrease by 25%. Commercial and industrial use will also be expanded due to economic demands. There is little change in public and semi-public use anticipated in the future plan. The new residential development indicates the potential growth of population and urban development (Figure 2.2.2).

HISTORIC PRESERVATION

Bullitt County is defined by its historic structures and events. Its unique historic character could provide tourism and commercial opportunities. There are numerous historic sites identified by the Kentucky Heritage Council within Bullitt County (Figure 2.2.3). These areas, which are recognized as having historical and architectural value, should be restored and preserved during the future development. The historic districts can include

special zoning provisions governing existing structures, infill development, and design (KL&A, 2013b).

CONCLUSION

Overall, the existing land use shows significant development and conservation opportunities. The greenway plan has great accordance with Bullitt County's future land use plan. The overall objectives are to help the future plan to connect the existing conservation and historic areas and accelerate the county's urban development. The greenway plan should take advantage of the existing conservation area and historic sites and explore new opportunities.

Once the nature conservation area is planned, there are opportunities to connect these areas by creating greenway corridors. The proposed greenway system can connect existing nature conservation areas and help the county achieve future conservation plans. It should be noted that residential use and tourism areas should be protected from industrial waste and pollution.

The historic preservation areas also need to be incorporated with the green corridor across the county. These historic sites are located around urban development areas and nature conservation areas, where they have high potential to become attraction stops along the new greenway system.

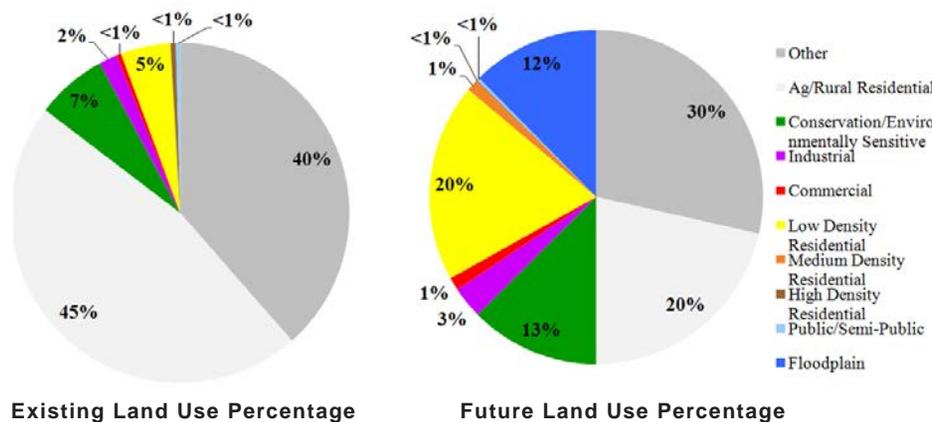


Figure 2.2.2: Percentages of Land Use in Bullitt County (Data Source: KL&A, 2013b)

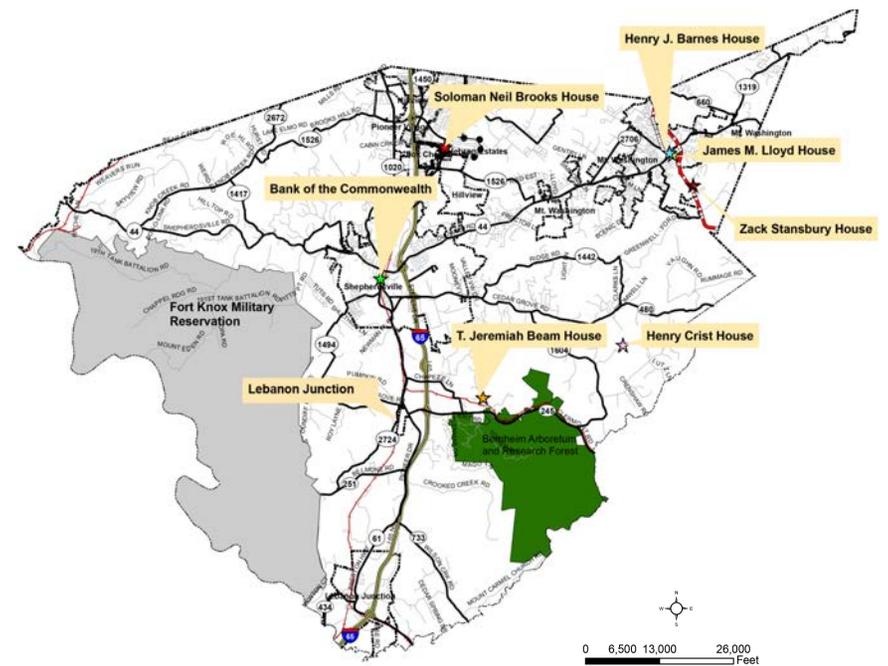


Figure 2.2.3: Historic Preservation Sites in the Bullitt County community. (Source: KL&A, 2013)

2 | AGRICULTURE

INTRODUCTION

AGRICULTURE PROFILES

Crop and Livestock Production

Total Farm Operations - 519

Total Number of Operators - 767

Acres for Farm Operations - ~51000

Percent of Total Land Acreage - 26.6%

Value of Agriculture Property - ~\$194,000,000

Total Value of Farm Sales - ~\$6,200,000

Food Resources

Grocery Stores - 7

Farmers Markets - 2

Convenience Stores - 35

Fast Food Restaurants - 42

Full Service Restaurants - 18

Percent of Food Sales: Restaurants - 52.5%

Percent of Food Sales: Markets - 47.5%

(Source: USDA, 2007)

LAND USE DESCRIPTION

All agricultural land, larger lots with residential structures, and undeveloped land is included in the agriculture land use category. Agriculturally related businesses, such as large scale nurseries, vineyards or lumber operations, are also included in this land use category. In some areas, agricultural lands may not be well suited for urban-type development due to the lack of infrastructure, adequate roads or distance from urban services (Kriess Lowry & Associates [KL&A], 2013b).

In order for the county to continue to benefit from an agricultural economy, land must be reserved and protected. However, due to a lack of enforcement of existing planning and zoning ordinances, agricultural land could disappear since some of the farmland is suitable for urban and residential growth. It is especially important to protect the existing prime agricultural land because it has an adequate and dependable water supply from precipitation or irrigation, favorable temperatures and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks (USDA-NRCS, 1997).

Other opportunities for farmland are located in flood prone areas of the county. However, best management practices should be used to prevent agricultural activities from polluting adjacent streams, waterways and underground water resources since, in general, farming practices often result in contamination or degradation of the environment and surrounding ecosystems, and/or cause injury to humans and their economic interests.



Figure 2.3.1: Vendor's Table at a Farmer's Market (Source: Bullitt County Farmers Market, n.d.)

CONDITIONS AND SUGGESTIONS

It can be seen in Figure 2.3.2 that there is a large proportion of land in Bullitt County designated for agricultural use. Urban development is beginning to sprawl into lands set aside for agricultural use, thus degrading usable land as well as increasing negative health, environmental and cultural issues.

In future plans, efforts should be made to protect and preserve agricultural type lands. This could be done with more strict enforcement of zoning and planning ordinances, urban growth boundaries and other management strategies.

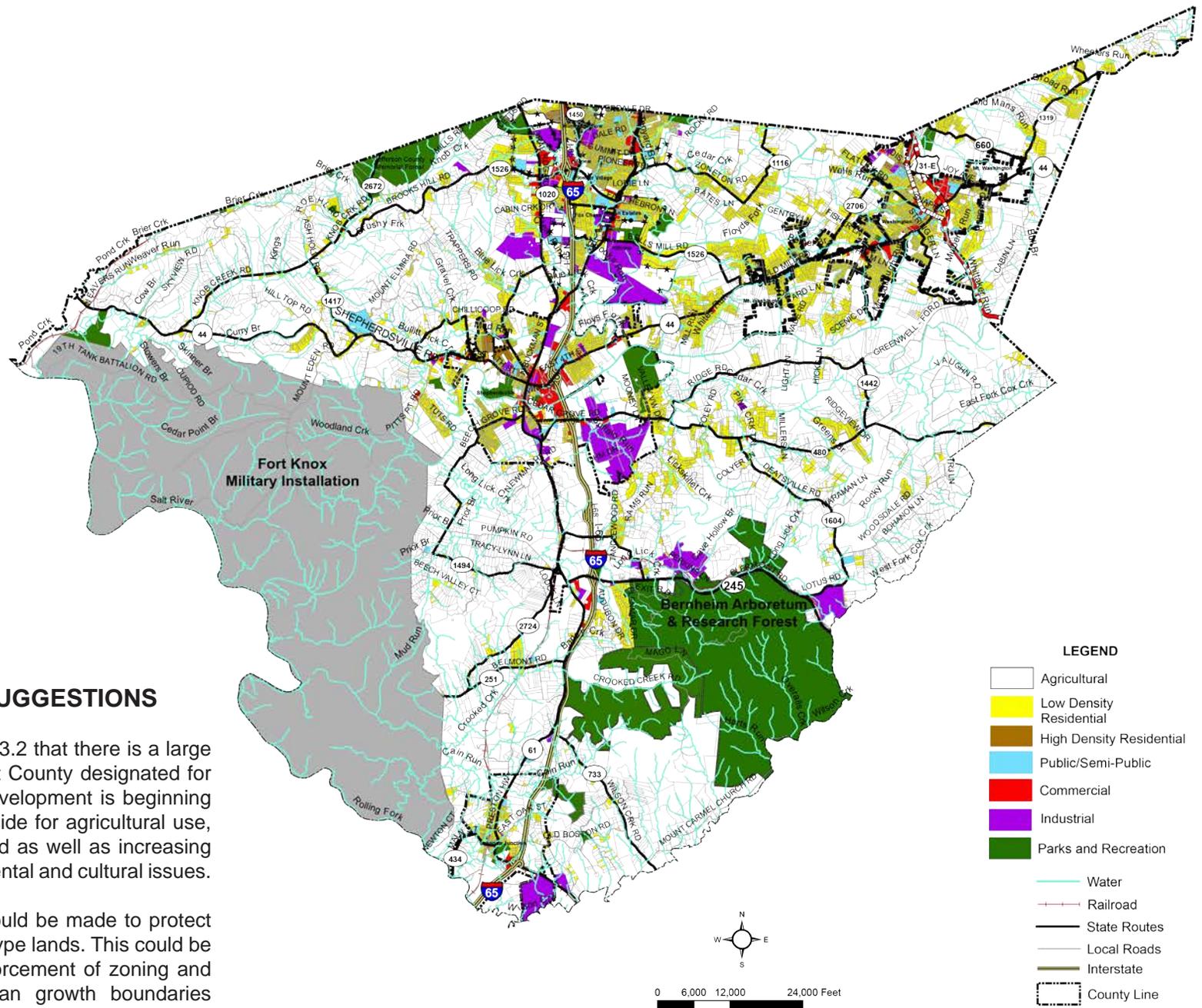


Figure 2.3.2: 2013 Existing Land Use Map. (Source: KL&A, 2013b)

2 | PLANNING & ZONING

INTRODUCTION

The Bullitt County Comprehensive Plan was produced in 2013 by Kriss Lowry and Associates Inc. The previous plan was completed in 1982, revised in 1987 and amended in 1991. The 1987 plan was intended to cover a 5 to 10 year period while looking further ahead where possible.

The commission that oversees the comprehensive plan is tasked with providing zoning information, making floodplain determinations, issuing building and sign permits and zoning compliances, reviewing site plans and subdivision plans, assigning addresses and investigating alleged zoning violations (Bullitt County Fiscal Court, 2013)

An evaluation of the comprehensive plan should be carried out every five years to modify and adopt components that need updating. Suggested ways to help implement the comprehensive plan include but are not limited to the following:

Local Leadership: A strong vision helps with the funding process.

Subdivision Regulations: Slows down sprawl and helps provide smart and sustainable growth.

Zoning Ordinances: Reinforce the zoning guidelines.

Site Plan and Development Plan Review: Enforces some of the zoning ordinances before a project takes off.

Road Management Plan: Bullitt County can have input on road connectivity within the county.

Public Improvement Program and Capital Budget: Budgeting helps in fund distribution and project priorities. This should be handled by qualified personnel and records should be transparent and available to the general public.

Public participation: The public should be encouraged to participate in all phases of decision making.

Land Acquisition: The land acquired should start with environmentally sensitive areas and future conservation areas. Easements should also be taken into consideration for future development.

State and Federal Assistance: Most programs that are geared towards protecting the environment and encouraging community health as well as expanding the economy are supported at both the state and federal level. Having a comprehensive plan highlighting some of the future plans makes it easier to seek and receive assistance.

COMPREHENSIVE PLAN GOALS AND OBJECTIVES

Transportation. Provide a transportation system that is sensitive and responsive to current and future development of the community. Implementing transportation facilities and services at the same time as land use projects will help with better connectivity and easement. Alternatives to vehicular transportation should be encouraged by expanding and developing the public transportation system. Planning for transportation connectivity should allow for utilization and accessibility of open space, recreational, historical and natural sites while maintaining their integrity. Designing and planning for a safe system that is made to optimize the flow of traffic is important.

Community Facilities. The community should participate in policy making and also determine the need for facilities and services. Consideration of multi-purpose facilities helps cut cost, lowers the environmental impact and reduces maintenance and operating costs. Public support facilities and

services should take into account site selection. Some of the factors to consider include:

- Adequate water supply
- Sewage collection and disposal facilities as well as solid waste management

Land Use/Environmental Factors. Growth and development should be planned around ways that will not further degrade the county's resources. Priorities for land development should be established. Zoning will help protect against premature development. Mixed use development of land adjacent to developed land should be an option. Natural and scenic resources should be protected which will preserve the rural character of Bullitt County. Addressing and regulating outdoor advertising can help preserve scenic areas. Water resources and farmland should be protected. Commercial facilities should be planned to serve residential communities. Minimizing industrial nuisances and implementing buffers between zones should be addressed.

Residential Land Use. Planning for residential projects should take into account the available facilities and support services. The housing stock should also be conserved and maintained while protecting and conserving the natural environment.

Commercial and Industrial Land Use. Expanding and developing commercial and industrial land should be planned. An emphasis should be placed on attracting smaller industries which should be spread throughout the county. The City of Shepherdsville should plan on attracting government, banking and related business activities. Utilizing the transportation infrastructure will help promote commercial and industrial development

Environmental Design. Designs that protect natural resources while maximizing the best use of land helps preserve and sustain the environment. Preserving historical buildings and sites while encouraging compatible new land uses should be a priority.

IMPLEMENTATION

The 2013 comprehensive plan covers: Transportation, Community Facilities, Land Use, and Environmental Design (Figure 2.4.1). The primary responsibility for implementing the plan lies in the public officials of Bullitt County. The public should be encouraged to take part in development plans. Separation of uses through zoning will help guide future development plans. Development plans should be closely reviewed before implementation. The county should also start strategically acquiring land for future development and preservation areas. Land should be acquired in ways that not only dictates the location for future development but also provides for buffer zones. These buffer zones can be used to connect parts of the county through trails and greenway development.

RECOMMENDATION

Although it is recommended that the zoning plan be updated every five years, the implementation of the plan is very important and an on-going process. Establishing ways to implement the current zoning plan should be a high priority for Bullitt County.

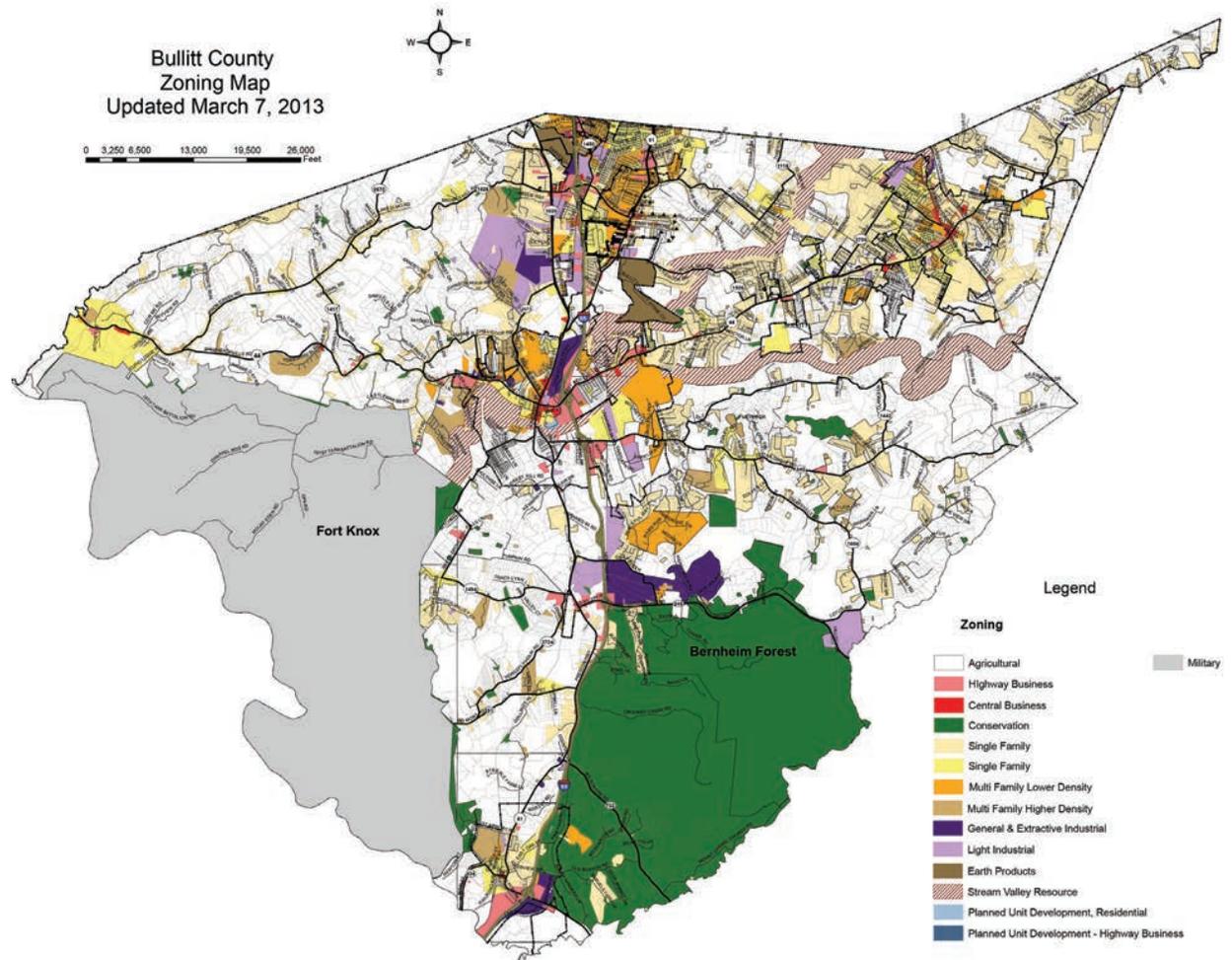


Figure 2.4.1: Bullitt County Zoning Map shows some of the protected land and future development opportunities (Source: Kriss Lowry & Associates, 2013c)

2 | CONSERVATION

INTRODUCTION

This section of analysis is devoted to future land use, open space, wildlife management, hunting and conservation areas. Identifying future land uses will allow the greenway trail to be designed in a way that complements future use. Identifying areas of conservation and hunting will allow those areas to be preserved and safeguarded.

FUTURE LAND USE

The Future Land Use Plan is intended as a guide for the physical development of Bullitt County. The plan includes proposals for the amount and location of land that will be needed as growth and development continues. Large portions of the county are not suitable for development, including floodplains, streams and their buffer zones, forest preserves and other environmentally sensitive areas.

CITY OF LEBANON JUNCTION

There are environmental constraints to future land use within Lebanon Junction. A large portion of the south end of the city and the northwest corner of the city are all within the 100 year floodplain of the Rolling Fork of the Salt River or its tributaries. Land use within the floodplain should be limited to agriculture or stream valley reserve with appropriate open space recreational uses.

CITY OF MOUNT WASHINGTON

There are limited areas of green space, parks and recreational areas within the city. It is recommended that land along Floyds Fork be preserved as green space to provide a buffer to protect the tributary from further environmental degradation and to serve as a greenway corridor for future trails and parks which can be linked to



Figure 2.5.1: Bernheim Forest Visitor Center (Image Source: Bernheim Arboretum and Research Forest, 2014)

those in nearby Jefferson County. There are also some areas south of KY 44 and east of US 31E designated for conservation land use as they are critical habitat for the Kentucky Glade Cress.

UNINCORPORATED AREAS

The floodplain areas are suitable for agricultural use, open space parks, trails and water related activities. They are not suitable for commercial or residential developments. The conservation future land use includes parks, golf courses, camps and forest areas. Environmentally sensitive areas are also appropriate for conservation land use (Kris Lowry & Associates [KL&A], 2013b).

PUBLIC HUNTING

Bullitt County has two areas that are open for public hunting (Figure 2.5.3, shown in red). The Fort Knox Military Reservation is considered public hunting land but requires reservations. The Knobs State Forest is also considered public hunting land and is a part of Bernheim Forest (Figures 2.5.1 and 2.5.2). These two areas combine for nearly forty thousand acres of public hunting land in Bullitt County.

ENVIRONMENTALLY SENSITIVE

Environmentally sensitive areas are mapped in green (Figure 2.5.3), with Bernheim Forest and Jefferson Memorial Forest the top contributors. An awareness of sensitive areas will facilitate the design and development of a greenway trail system and placement of amenities in areas that are not sensitive. When trails need to cross sensitive areas, it should be done with as little impact as possible.



Figure 2.5.2: Knob Creek Gun Range (Image Source: Slaughter, 2013)

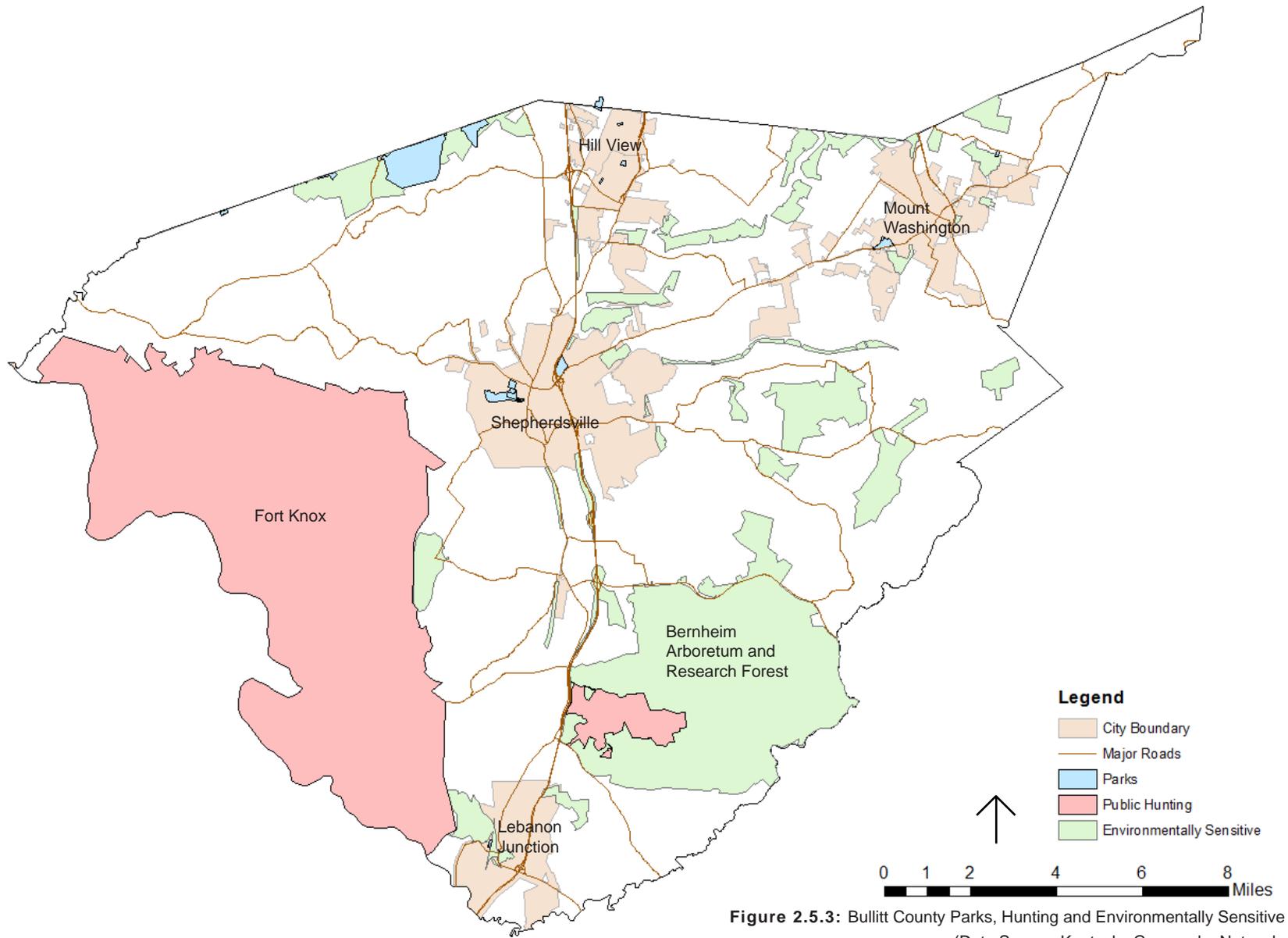


Figure 2.5.3: Bullitt County Parks, Hunting and Environmentally Sensitive Areas
 (Data Source: Kentucky Geography Network, 2014)

2 | RECREATION

INTRODUCTION

Incorporating access to recreational facilities in new and existing residential areas is aimed to improve physical and mental health and social capital by providing a variety of recreational facilities close to work and home to facilitate physical activity and social networking. Based on the LEED Development Rating System, parks and recreational facilities are suggested to lie within 1/2 mile of new and existing dwelling units and nonresidential buildings entrances. These publicly accessible outdoor recreational facilities should be at least 1 acre (0.4 hectares) in area (LEED for Neighborhood Development, 2009).

EXISTING PARKS AND RECREATIONAL FACILITIES

(Figure 2.6.2)

CITY OF PIONEER VILLAGE

Pioneer Village is a fourth class city located in the north central end of Bullitt County north of Hebron Estates. There is a tract of public/semi-public use land on the very south end of the city where the Brookland Cemetery is located.

CITY OF LEBANON JUNCTION

The City of Lebanon Junction developed as a railroad town between 1857 and 1955. There are some scattered public or semi-public uses in the city with the Lebanon Junction Elementary School, Lebanon Junction Cemetery and church sites being the largest. Parks and recreational uses include the Knobview Golf Course which is currently closed, Wall Street Park, and a small city park in the floodplain area on the south side of the city. The Fort Knox Military Reservation is located just west of the city.

CITY OF HILLVIEW

The City of Hillview was incorporated in 1974 and has grown through many annexations. The city is located in the north central portion of the county and extends from the Bullitt/Jefferson County line on the north to the City of Shepherdsville near Floyds Fork on the south end. Public or semi-public uses are scattered throughout the city and include the small Blue Lick Airport located just north of the City of Hunters Hollow and various churches. The Maplehurst Golf Course on Bells Mill Road and the Crossings Golf Course on Letts Road are the two largest tracks of parks and recreational use in the City of Hillview (Figure 2.6.1).

CITY OF MT. WASHINGTON

The largest areas of public or semi-public use are located at the public schools: Bullitt East High School, Mt. Washington Middle School, Eastside Middle School, and Mt. Washington Elementary School. Mt. Washington City Park, located behind Mt. Washington Elementary, is the only large area of parks and recreation use within the city.

CITY OF SHEPHERDSVILLE

Several public or semi-public uses are located within the central business area. Some of the larger sites are the public schools and their recreational facilities, including Bullitt Central High School, Bullitt Alternative Center, Roby Elementary School, Bullitt Lick Middle School, Shepherdsville Elementary School, and Cedar Grove Elementary School. There are also a number of churches within the city limits. Shepherdsville City Hall is located on Conestoga Parkway. The two major sites for parks and recreational use are Shepherdsville City Park just west of the CBD along the Salt River and Heritage Hills Golf Course off of Cedar Grove Road.

BULLITT COUNTY UNINCORPORATED AREAS

The Bernheim Arboretum and Research Forest at 14,378 acres is the largest area of a single land use in the county outside of the Fort Knox Military Reservation. It is located in the southeast corner of the county. The Knob State Forest and the Harry S. Frazier Jr. Scout Reservation are located just south of Bernheim. Other larger park and recreational uses in the county include the Jefferson Memorial Forest, Knob Creek Gun Range, and the Lion's Club Camp Crescendo. (Kris Lowry & Associates [KL&A], 2013b).



Figure 2.6.1: Maplehurst Golf Course (Source: Golf Advisor, 2014)

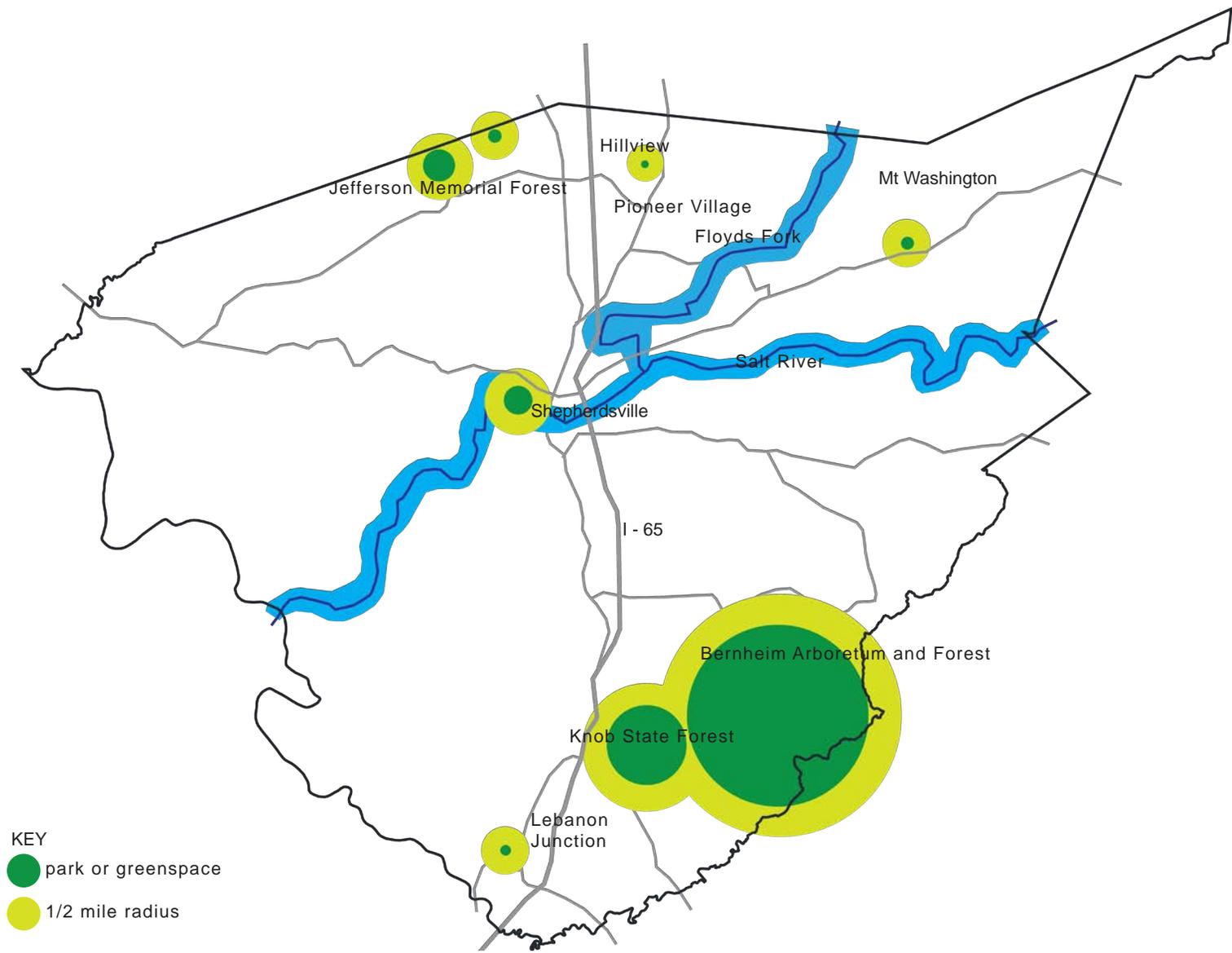


Figure 2.6.2: Bullitt County's Parks or Greenspace Locations. (Data Source: Kentucky Geography Network, 2014)

2 | GEOLOGY & SOILS

INTRODUCTION

Geology and soils are important when considering land development because the land itself is what allows development to happen.

PHYSIOGRAPHIC REGION AND TOPOGRAPHY

Bullitt County is mostly oriented in the Knobs Region with a small portion residing in the Outer Bluegrass (Figure 2.7.1) (Kriss Lowry & Associates [KL&A], 2013d).

Bullitt County has a topography that ranges from steep valleys and rugged terrain to broad flat meadows. The elevation above sea level in Bullitt County ranges from 385 ft in the Rolling Fork/Salt River Valley to 980 ft in the Knobs Forest. The difference between these locations is almost six hundred feet (KL&A, 2013d).

SEISMIC ZONES AND FAULT LINE

Bullitt County has one active fault line which is located in the north-western section of the county (Figure 2.7.2). The fault follows Knob Creek Road

and has no actual name. Due to there being an active fault line and seismic zone, precautions should be taken prior to development (KL&A, 2013d).

SALT RIVER / PRESENCE OF SALT

The Salt River is an ancient river that has not always flowed southward to the Ohio River. It used to flow northward between the Mississippian escarpment and the Outer Bluegrass. Over the past few millennia after a series of uplift and erosion events, the tributaries of the Ohio River started to drain parts of the Salt River causing it to switch its direction of flow. Floyd's Fork is a tributary of the Salt River and also flows from the Outer Bluegrass region. Floyd's Fork and Rolling Fork were two of the places the early pioneers came to but it wasn't for water but rather for the salt that had been deposited. The ground water that feeds the water table is forced up through rocks that contain salt. Since salt dissolves in water, it's pushed upward and mixed with the water table. As the water table rises and lowers, it is constantly depositing salt in the soil (Bullitt County History, 2014).

ROCK TYPES OVER TIME

There have been five different major rock type formations over the past five hundred million years. Water in Bullitt County is retrieved from consolidated sediments from these five rock formations. These formations are from the Ordovician (490 million years, Calloway Creek Limestone), Silurian (430 million years, Limestones and Dolomites), Devonian (400 million years, New Albany Shale), Mississippian (400 million years, Sandstones and Siltstones) and Quaternary ages (past million years, Unconsolidated sediments) (Figure 2.7.3) (Bullitt County History, 2014).

KARST

The state of Kentucky is famous for its karst landscape and characteristic sinkholes, sinking streams, caves, and springs. Bullitt County rests upon one of the largest areas of karst in Kentucky. Figure 2.7.4 shows all the rock units and their locations in Bullitt County and Table 2.7.1 shows their individual Karst Potential Rating (KPR) (Currens, 2001).



Figure 2.7.1: Physiographic regions of Kentucky with Bullitt County circled in black (Source: KL&A, 2013d)

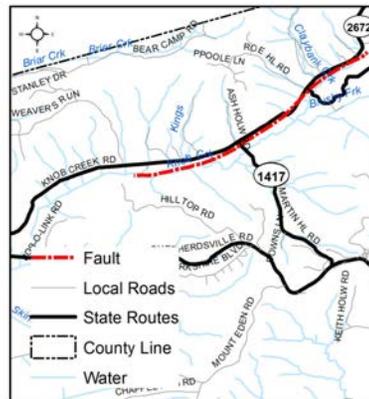


Figure 2.7.2: The active fault line (shown in red) that currently exists in Bullitt County (Source: KL&A, 2013d)

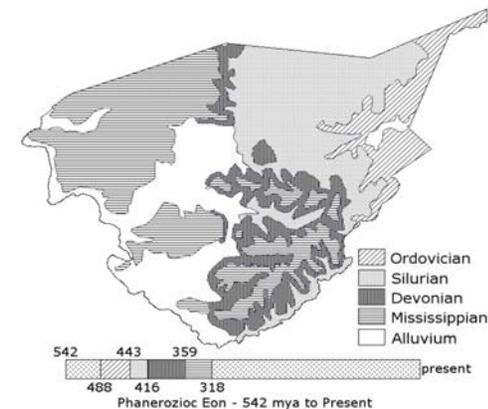


Figure 2.7.3: The areas of rock formation in Bullitt County (Source: Bullitt County History, 2014)

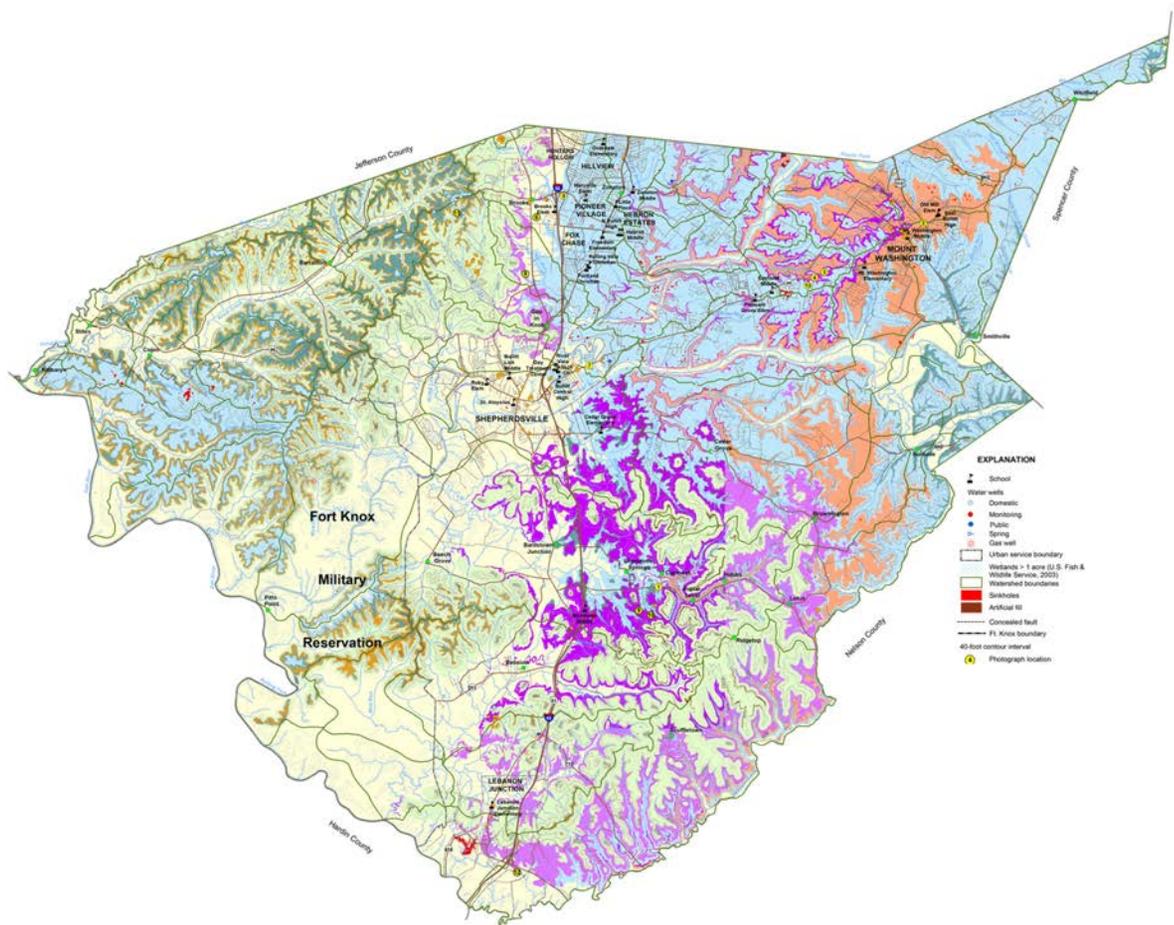


Figure 2.7.4: The Generalized Geology of Bullitt County (Source: KGS, n.d.).

SINK HOLES

Mount Washington is where most of the sink holes in Bullitt County are located but some are also found in Lebanon Junction and the northwestern end of the county. Before any development can occur construction implications must be addressed (KGS, 2004).

SOILS

There are many soil types and soils play an important role in anything that has to do with

development and land use. The two main types of soils that have to be taken into consideration are hydric/wetland soils and prime farming soils. The reason to consider the hydric/wetland soils and their role in land development is because they are usually saturated or can become easily saturated with water which is not good for building foundations. The hydric/wetland soils in Bullitt County are La, Le, Mc, Mo, Mv, Ne. Prime farmlands on the other hand have to be considered because they play a vital role in the county's economy. The prime farming soils in Bullitt County are BeB, Bo, CaB, CrB, EkA, EkB, EIA, EIB, La, Le, LoB, MaB,

Table 2.7.1. Modified version of the breakdown and explanation of the generalized geology. (Source: KGS, n.d.)

Rock Unit	Karst Potential Rating	Intensive Recreation	Extensive Recreation	Reservoir Areas	Reservoir Embankments
1. Silt, sand, and gravel [Yellow]	None, but on-site karst investigation recommended where less than 25 feet thick over soluble rock.	Refer to soil report (Whitaker and Waters, 1986).	Refer to soil report (Whitaker and Waters, 1986).	Refer to soil report (Whitaker and Waters, 1986).	Not recommended. Refer to soil report (Whitaker and Waters, 1986).
2. Limestone [Green]	High.	Slight to moderate limitations, depending on activity and topography. Possible steep wooded slopes.	Slight to severe limitations, depending on activity and topography. Possible steep wooded slopes. Slight limitations for forest or nature preserve.	Slight limitations. Reservoir may leak where rocks are fractured.	Severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.
3. Limestone, dolomite, and shale [Light Blue]	High.	Slight to severe limitations, depending on activity and topography. Possible steep wooded slopes. Sinks common.	Slight to severe limitations, depending on activity and topography. Possible steep wooded slopes.	Moderate to severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.	Moderate to severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.
4. Dolomite [Orange]	Medium.	Moderate to slight limitations, depending on activity and topography. Possible steep wooded slopes.	Slight to severe limitations, depending on activity and topography. Possible steep wooded slopes.	Moderate to slight limitations. Reservoir may leak where rocks are fractured. Sinks possible.	Moderate to slight limitations. Reservoir may leak where rocks are fractured. Sinks possible.
5. Siltstone, shale* [Light Green]	Low.	Severe limitations. Steep slopes.	Slight to moderate limitations.	Slight limitations. Reservoir may leak where rocks are fractured.	Moderate limitations.
6. Shale* [Purple]	Low.	Moderate to severe limitations. Depending on activity.	Severe to slight limitations, depending on activity and topography.	Slight limitations for small ponds.	Severe limitations. Poor strength and stability.
7. Shale and limestone* [Pink]	Medium.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes. Sinks common.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes.	Moderate to severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.	Moderate to severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.
8. Siltstone, dolomite, and limestone [Orange]	Medium.	Severe to moderate limitations. Rock excavation may be required.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes.	Slight limitations. Reservoir may leak where rocks are fractured.	Severe limitations. Reservoir may leak where rocks are fractured. Sinks possible.
9. Sandstone [Brown]	None.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes.	Severe to slight limitations, depending on activity and topography. Possible steep wooded slopes.	Moderate limitations. Requires liner material. Permeable rock.	Moderate to severe limitations. Difficult to excavate.

Mc, Mv, Mo, Ne, NhA, NhB, No, OtA, OtB, OwB, Sg, ShB, WoB, and ZaB. There are also some soils that are located in Bullitt County that are of state wide importance that need to be considered. These soils are BeC, CaC, CrC, EkC, FaC, HaC, LoC, NhC, OtC, WoC, and ZaC. All soil names and their descriptions can be retrieved using the soil symbols provided on the Soil Survey of Bullitt County, Kentucky or Web Soil Survey (USDA, n.d.; KL&A, 2013d).

2 | HYDROLOGY

INTRODUCTION

Bullitt County is home to major drinking water and recreational water sources along with many tributaries. Some of these water bodies include: Salt River, Floyd's Fork, Pennsylvania Run, Cedar Creek, Rolling Fork and others. Aside from surface water, Bullitt County also has groundwater within its karst topography that features sinking streams, springs and salt water (KGS, n.d.).

FLOODING, FEMA & FLOODPLAINS

Floodplains are an important factor to consider in terms of planning, building and zoning. With Bullitt County's extensive network of streams, attention to the floodplains is essential. Figure 2.8.1 shows the extensive network of streams and floodplains throughout Bullitt County. According to the Bullitt County Comprehensive Plan, two of the major cities within Bullitt County have a high percentage of their land within the 100 and 500 year floodplains. Shepherdsville has approximately 65% of its land within the 100 and 500 year floodplains, while about 40% of Lebanon Junction lays within the 100 and 500 year floodplains (Kriss Lowry & Associates [KL&A], 2013d).

In 1937, Bullitt County, along with surrounding counties including Jefferson County (Louisville), experienced disastrous flooding. This flood is the largest recorded flood in Bullitt County history, boasting an elevation of approximately 454 feet. In comparison, the most recent flood in Bullitt County was in 2011 where the water level reached about 437 feet in elevation. Bullitt County has experienced a recorded twenty three floods and "flash floods" since 1970 (KL&A, 2013d).

With this vast floodplain system, the Federal Emergency Management Agency (FEMA) has assigned several areas within Bullitt County as flood hazard areas (KL&A, 2013d). Presently, there is a considerable amount of development within both the 100 year and 500 year floodplains within Bullitt County. This development includes both residential and commercial facilities.

Land within the floodplains has already been zoned, but can not be rezoned for higher density or industrial uses (KL&A, 2013d). Recreational uses such as trails and natural areas can be located within the floodplain.

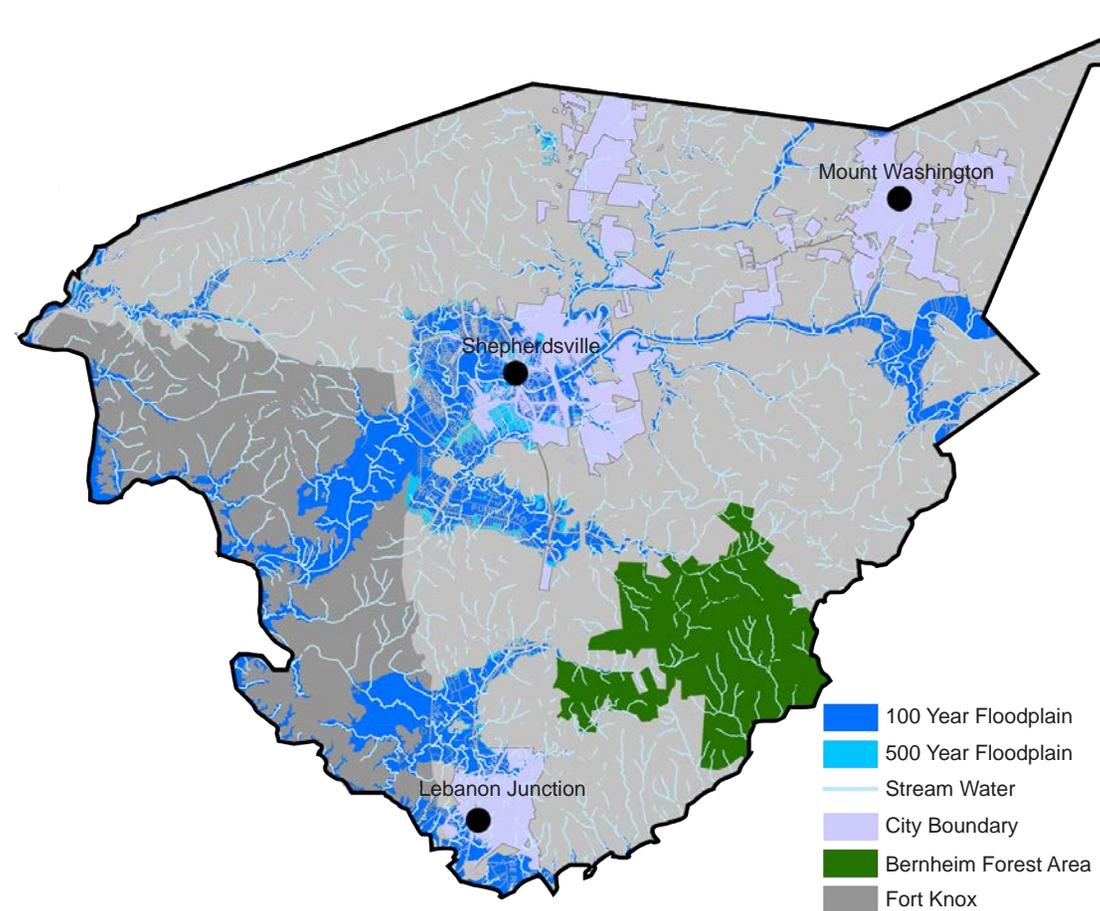


Figure 2.8.1: The locations of the 100 Year and 500 Year floodplains within Bullitt County along with streams, waterways, Bernheim Forest and Fort Knox. (Data Source: KL&A, 2013d; Kentucky Geography Network, 2014)

*Note: The floodplain maps for Bullitt County have been in the process of being updated by FEMA since October 2013 (KL&A, 2013d). The revised maps are not available at this point in time.

The updated floodplain areas in Bullitt County have discrepancies and caused conflict between Bullitt County residents and officials with FEMA. During the process of updating the floodplain maps, FEMA has added 1,500 new homes and buildings in Bullitt County to the floodplain area (Loosemore, 2014).

This knowledge has caused the residents and officials within Bullitt County to take action, not only against FEMA and the floodplain maps, but also in developing strategies for flood mitigation. In specific, the city of Shepherdsville has held meetings and workshops with members of Bullitt County and surrounding communities. These meetings have recognized faults within the new floodplain maps and identified potential areas in which to implement flood mitigation techniques such as retention and detention basins (City of Shepherdsville Kentucky n.d.). Most of these areas are specific to the city of Shepherdsville and involve land within the Fort Knox Armed Forces base. Members of the Bullitt County community have also communicated with the U.S. Army Corp of Engineers for help with flood mitigation within Bullitt County (City of Shepherdsville Kentucky n.d.).

WATER QUALITY

Although a comprehensive water quality report is not easily accessible, there is some information available about water quality within Bullitt County. Bullitt County has low-moderate to high sensitivity

to pollution within its ground water. This is defined by the speed contaminated water moves throughout a system along with other factors (Currens, n.d.). Water quality also affects the animal life within the water.

STREAM MONITORING

Bullitt County waterways have drawn attention for their discharge and flooding for years. Bullitt County has at least 6 United States Geological Survey (USGS) gages. A USGS gage measures factors such as discharge rate and water height in

order to understand aspects such as water flow and flood patterns. The stations within Bullitt County are located on the Salt River, Floyds Fork, Pennsylvania Run, Cedar Creek and Rolling Fork (shown with locations and gage numbers in Figure 2.8.2.).

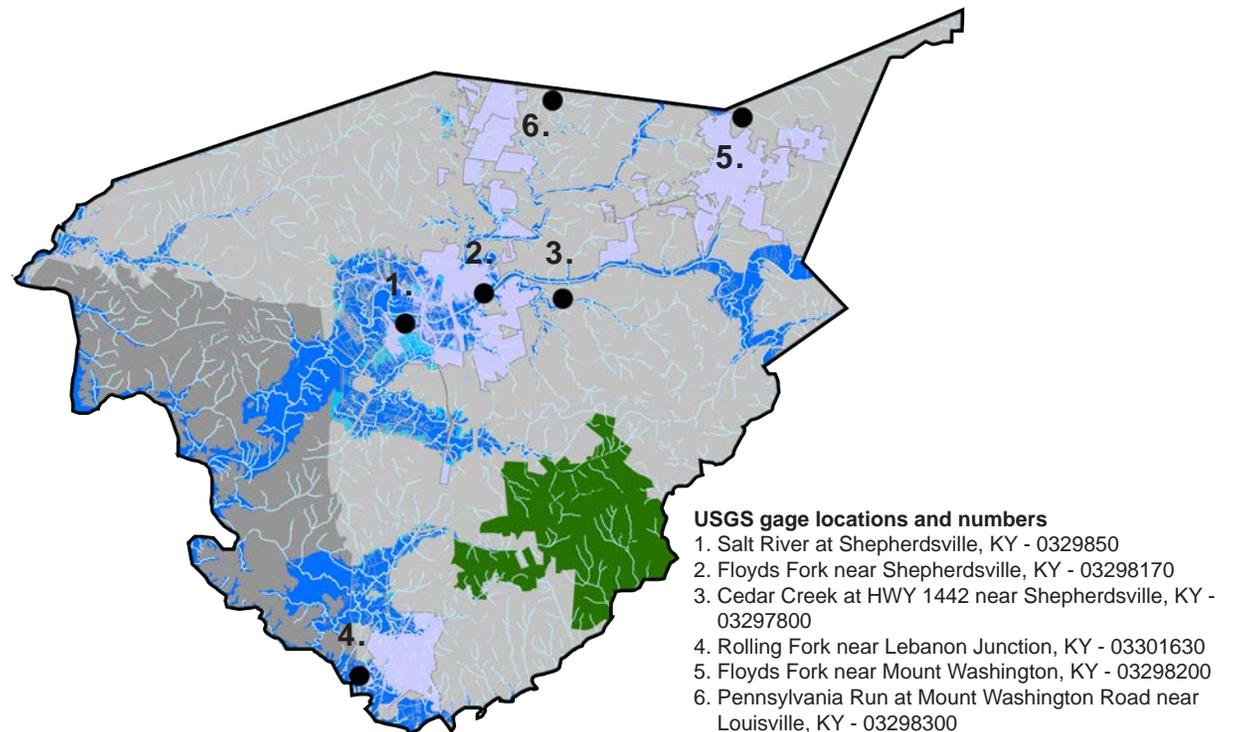


Figure 2.8.2: Approximate location of USGS stream monitoring gages within Bullitt County. (Data Source: KL&A, 2013d; Kentucky Geography Network. 2014)

2 | CLIMATE

INTRODUCTION

Bullitt County, located just south of Louisville in north central Kentucky, covers about 300 square miles of land with a diverse topography ranging from steep valleys and rugged areas to broad flat areas with streams (Kriss Lowry & Associates [KL&A], 2013d). Topography ranges from 385 feet at the county's lowest elevation along the Rolling Fork and Salt Rivers, to 980 ft at the highest elevation located in the Knobs Forest, with Bernheim Forest a close second at 900 feet (Figure 2.9.1). Among towns, Shepherdsville sits at the lowest elevation at 440 feet with Lebanon Junction not much higher at 540 feet; Mount Washington at 680 feet is the town at the highest elevation in Bullitt County.

Bullitt County is much like the rest of Kentucky in terms of weather and climate. The climate is normally temperate and humid with the prevailing winds coming from the south - southwest. Due to

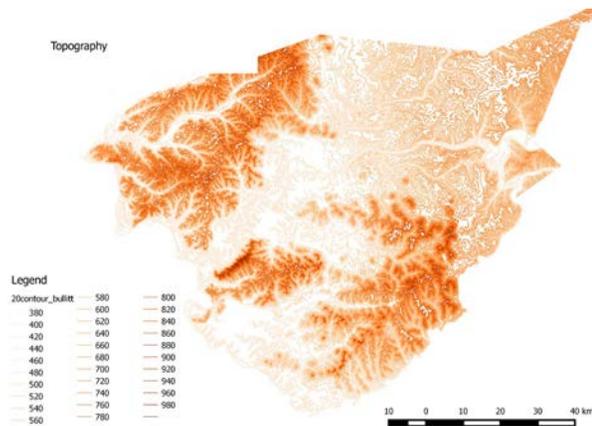


Figure 2.9.1: Topography map of Bullitt County. (Source: Bullitt County History Museum, 2014)

the large number of rivers, streams and large floodplains, when Bullitt County encounters severe weather such as thunderstorms, it can cause flooding along rivers and creeks. Since 1970, there has been 23 floods/ flash floods, 7 tornadoes, and 19 incidents of hail in Bullitt County (Citymelt, 2011). Multiple floods have been recorded before 1970 in Bullitt County; those floods are the Great Flood of 1909, the Flood of 1937, the 1961 Shepherdsville Flood, the flood in March 1964, and the flood in March 1997 (Figures 2.9.2 and 2.9.3). In the Flood of 1909, after 36 hours of rain Shepherdsville was submerged with water for the first time since 1894. The Old Salt River reached well above its normal limits. The Flood of 1937 occurred in January with the Salt and Rolling Fork Rivers covering the majority of Bullitt County including Shepherdsville, Lebanon Junction and

Pitts Point. This flood holds the record for the maximum flood stage recorded when it reached an elevation of 453.88 feet NGVD (KL&A, 2013d). In 1961, Shepherdsville experienced its worst flood when water reached an elevation of 447.42 feet NGVD. The flood in 1964 reached an elevation of 448.08 feet NGVD. The most recent flood in 2011 reached an elevation of 436.67 feet NGVD.

Most of the annual averages for temperature, precipitation, humidity, wind speed, snowfall, and the hottest and coldest temperatures in Bullitt County are similar to or slightly less than Kentucky's annual averages (Figure 2.9.4 and Table 2.9.1). Based on this information we can conclude that while Bullitt County's weather and climate are almost the same as that in the state of Kentucky, the main reason for flooding in Bullitt County is the high percent of land located in the



Figure 2.9.2: The Great Flood of 1909 where Shepherdsville was submerged with water. (Source: Bullitt County History Museum, 2014)



Figure 2.9.3: The McMahon home submerged with water in the Flood of 1937, water over 8ft deep. (Source: Bullitt County History Museum, 2014)

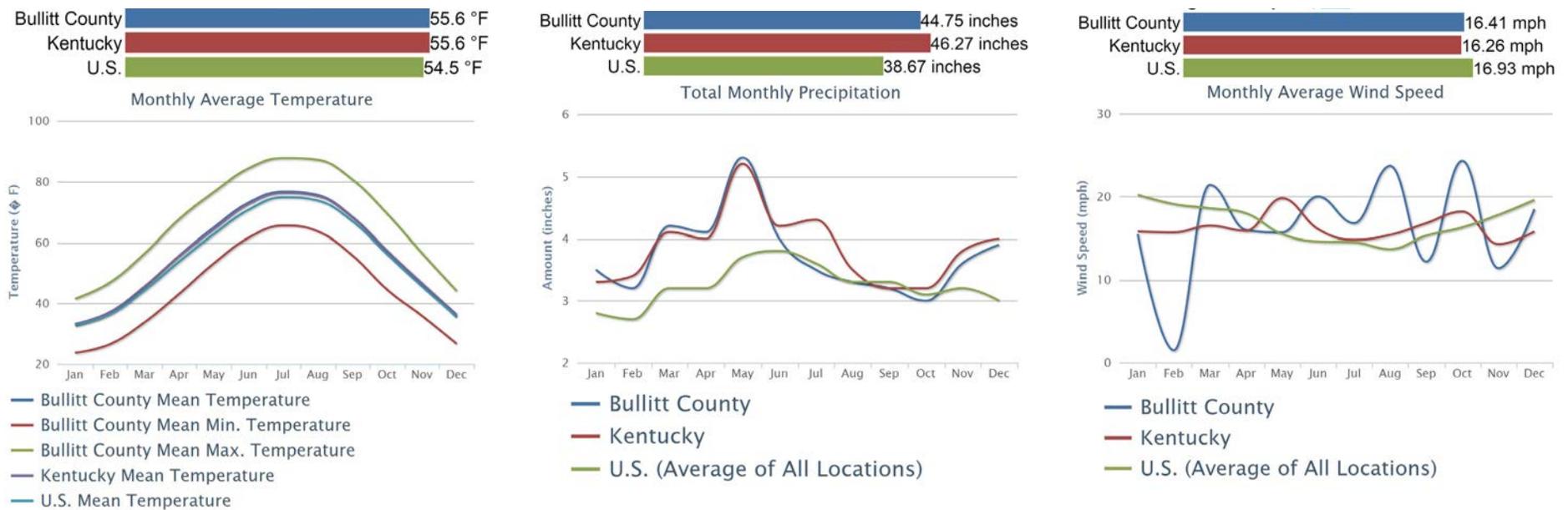


Figure 2.9.4: Average temperature (right), average precipitation (middle), average wind speed (right). (Source: Bullitt County Weather, 2014; USA.com, 2014)

Table 2.9.1: Annual Weather Statistics for Bullitt County, Kentucky, and the United States (Source: Bullitt County Weather, 2014)

Location	Bullitt County	Kentucky	United States
Annual average temperature	56.6 degrees F	56.6 degrees F	54.5 degrees F
Annual average precipitation	44.75 inches	46.27 inches	38.67 inches
Annual average humidity	77.43%	76.42%	77.52%
Annual average wind speed	16.41 mph	16.26 mph	16.93 mph
Average number of days with at least .1 inches of precipitation in a year	74.19 days	79.91 days	66.51 days
Annual average snowfall	5.53 inches	8.83 inches	23.27 inches
Average number of days with 1 inch or more snow depth in a year	4.38 days	6.99 days	27.17 days
Hottest temperature	106 degrees F	114 degrees F	134 degrees F
Coldest temperature	-24 degrees F	-37 degrees F	-80 degrees F

2 | FLORA & FAUNA

INTRODUCTION

Flora and fauna are the plants and animals indigenous to an area or time. A wide variety of plant and animal species exist within the 300 square miles of Bullitt County. However, the county's rapid growth may be putting some plant and animal species in danger of survival.

As people begin to realize that plant and animal populations are declining, measures can be taken to make sure the populations do not become extinct in the area. Government agencies give rankings to these species based on many different criteria. The most well known status designations are endangered, threatened, and species of special concern. Endangered is the status given to a species that shows critical monitoring and care should be taken to ensure the species does not continue to decline.

Bullitt County is home to four hundred and sixteen different animal species (Kentucky Fish and Wildlife Services [KFWS], 2014). According to the *County Report Of Endangered, Threatened, And Special Concern Plants, Animals, and Natural Communities for Bullitt County, Kentucky*, released by the Kentucky State Nature Preserves Commission (KSNPC) in August 2014, eleven species in Bullitt County are listed by the U.S. Fish and Wildlife Services (USFWS) as endangered, threatened, or a species of special concern. This report contains both the state and federal listed plants, animals, and natural communities of Bullitt County. Listed below are the KFWS endangered plants and animals with a short synopsis of their customary environments. Because these species are the most critical, it is vital to have an understanding of their habitat areas.

Vascular Plants

- Fee's Lipfern (*Cheilanthes feei*) - Calcareous bluffs and rocks
- Blackfoot Quillwort (*Isoetes melanopoda*) - Shallow depressions of sandstone and igneous glades and ledges, margins of ponds and sinkhole ponds, and moist depressions and ditches in sand
- Kentucky Glade Cress (*Leavenworthia exigua* var. *laciniata*) - Occurs in full sun on flat-bedded outcrops of Silurian limestone or dolomite in shallow soils of glades, rock outcrops, pastures and lawns
- Northern Dropseed (*Sporobolus heterolepis*) - Dry open ground, prairies, glades and woodland openings near glades/rocky cliffs

Freshwater Mussels

- Ring Pink (*Obovaria retusa*) - Resides in large rivers; species inhabits gravel and sand bars
- Orangefoot Pimpleback (*Plethobasus cooperianus*) - Usually found in large rivers in sand and gravel substrates
- Clubshell (*Pleurobema clava*) - Small streams and rivers although in Kentucky it is known to inhabit moderately large rivers; often deeply buried in the substrate and difficult to find

Crustaceans

- Louisville Crayfish (*Orconectes jeffersoni*) - Flat cobble and boulder strewn streams; in bedrock streams it is dependent on fissures and cracks. In pools, large substrates are needed. It also uses trash and man made retaining walls.

Mammals

- Northern Long-Eared Bat (*Myotis septentrionalis*) - In winter, use caves, mine

portals, abandoned tunnels, protected sites along cliff-lines and similar situations that afford protection from cold. They are easily overlooked as they often wedge themselves back into cracks in the walls and ceilings. In summer they can use hollow trees.

- Indiana Bat (*Myotis sodalis*) - Primarily uses caves for hibernacula, although they are occasionally found in old mine portals. During summer, colonies are found behind slabs of exfoliating bark of dead trees, often in bottom land or floodplain habitats, but also in upland situations.

Natural Communities

- Dolomite glade
- Limestone/dolomite prairie (KSNPC, 2014)

There is one species of particular interest: the Kentucky Glade Cress (Figure 2.10.1). This tiny plant is known to exist only in Jefferson and Bullitt Counties. While its small stature, annual growing habit, and specific living requirements are a challenge to its survival, this plant is a very rare community member. Its health status can indicate that damage to a greater ecological system is occurring. This is reflected in the endangered ranking of the *Dolomite glade* which happens to be the home of the Glade Cress, thus signifying larger ecological problems.



Figure 2.10.1: Kentucky Glade Cress, Apple Valley Preserve. (Photo by Dan Davison)

Bullitt County is making great efforts to address the loss of habitat and expand conservation and preservation lands (Figure 2.10.2). However, wildlife is impacted by many factors including climate change, water quality, forest fragmentation, and habitat modification or destruction.

Many efforts in Bullitt County have begun to protect the natural diversity and ecological health of the flora and fauna indigenous to the area. Eight preserves and significant conservation areas cover an estimated 25,000 acres in Bullitt County. These conservation/preservation areas are facilitated by many organizations as well as some private owners. Four of the larger groups are the Kentucky Department of Fish and Wildlife, the U.S. Fish and Wildlife Service, the Kentucky Natural Land Trust, and the Nature Conservancy. These preserves, state parks, and easements offer land that will remain preserved to protect the flora and fauna of the county. The eight preserves and acreages are listed below.

- Apple Valley Glade State Nature Preserve - 37 acres, research only
- Bernheim Arboretum and Research Forest - 14,378 acres
- Crooked Creek Preserve - 150 acres, almost completely forested and is part of the Ft. Knox to Bernheim Forest wildlife migratory corridor (Kentucky Natural Lands Trust [KNLT])
- Fort Knox - Bernheim Wildlife Corridor Easements - one mile buffer zone around Fort Knox; KNLT now holds two conservation easements in this area totaling around 308 acres
- Jefferson Memorial Forest - 6,400 acres (mostly in Jefferson County), a designated Audubon Wildlife Sanctuary
- Knobs State Forest and Wildlife Management Area - 1,539 acres

- Pine Creek Barrens Preserve - 110+ acres, offers critical habitat in eastern Bullitt County
- Salt River/ Rolling Fork - Spans several counties and the project encompasses 892,000 acres to preserve natural mixed deciduous forest, barrens, and grasslands

These lands offer great opportunities for designed greenway networking hubs and public education. The flora and fauna of a region is the best indicator of the ecosystem's health. Bullitt County is making great strides to protect its ecological integrity.

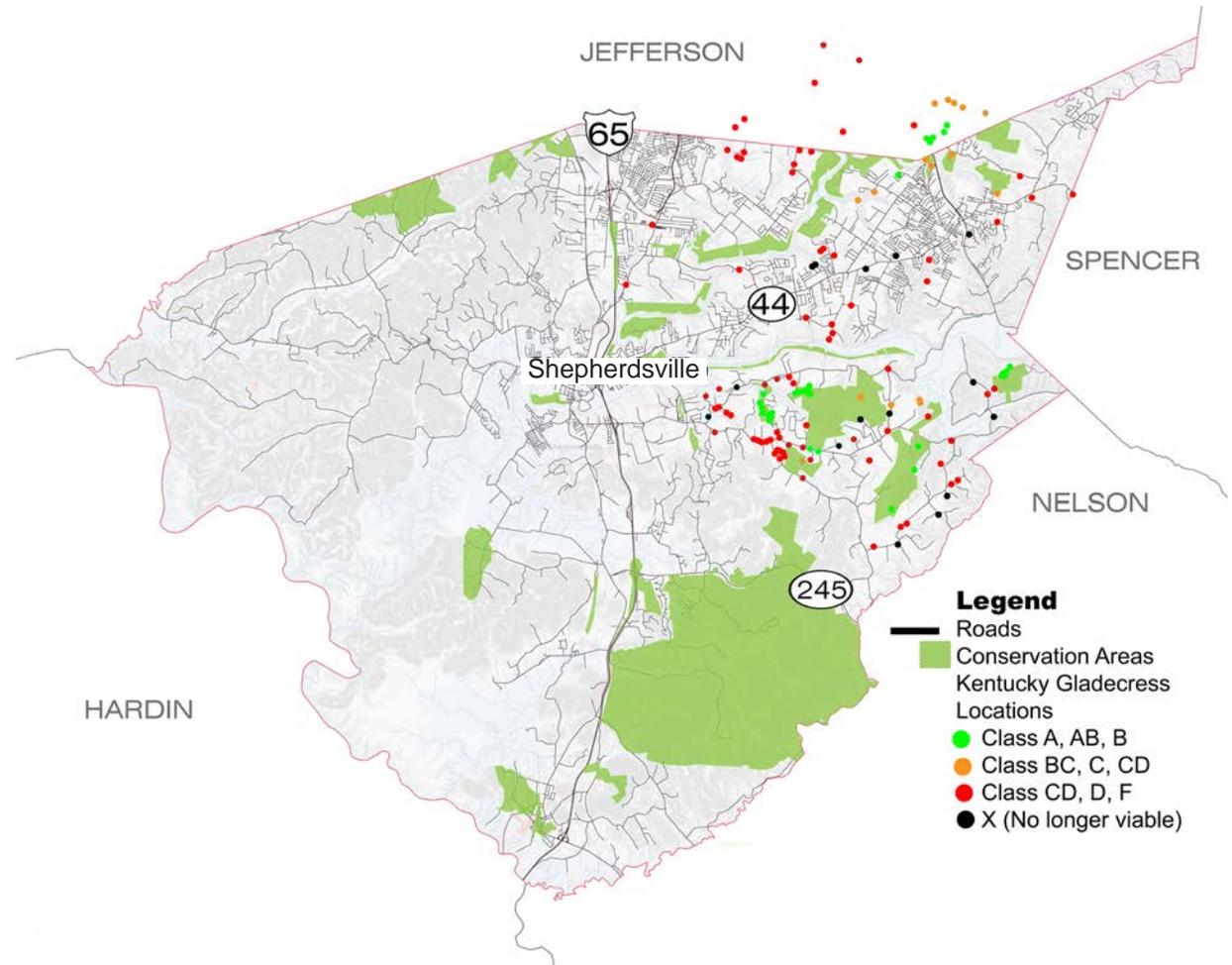


Figure 2.10.2: Map of existing and proposed greenspaces and Kentucky Glade Cress communities in Bullitt County (Redrawn from Data Source: KL&A, 2013b&d; Kentucky State Nature Preserves Commission (KSNPC), n.d.)

2 | COMMUNITY FACILITIES

INTRODUCTION

Various community facilities exist throughout Bullitt County, Kentucky. For the purpose of this project five major areas were focused on: Mt. Washington, Shepherdsville, Zoneton, Nichols, Southeast Bullitt and Lebanon Junction. The locations for schools, police stations, fire departments, libraries and community centers are identified in Figure 2.11.1. The majority of the community facilities throughout Bullitt County are located in the central and northeast region.

There are 23 schools, from primary to secondary, and private academies in the county and are listed in Tables 2.11.1 and 2.11.2. There are nine police stations that serve the county, along with five fire departments. Bullitt County is home to four libraries: the Mount Washington Library, the Lebanon Junction Library, the Dorothea Stottman Library in the Zoneton area, and the Ridgeway Memorial Library in Shepherdsville. The county is also home to multiple community centers including the Bullitt County Family YMCA in Shepherdsville. Along with these facilities, ten post offices are spread throughout the county. City Hall and the office of the Bullitt County Clerk reside in the heart of downtown Shepherdsville (Kriss Lowry & Associates [KL&A], 2013e).

PARKS & RECREATION

Bullitt County has three public outdoor swimming pools open during the summer months. They are located on Bullitt County Public School District property and operated

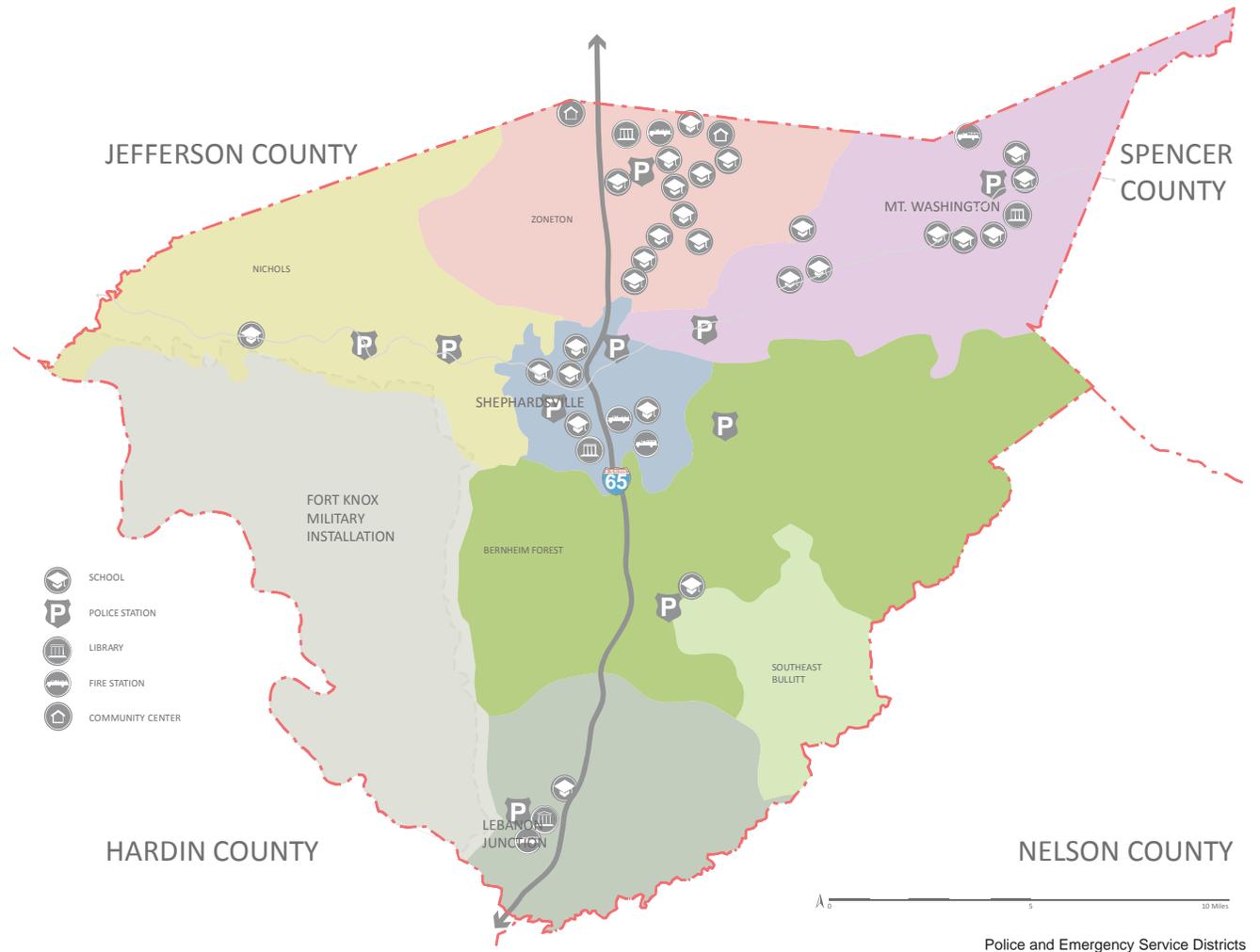


Figure 2.11.1: Map of schools, police stations, fire departments, libraries and community centers throughout Bullitt County (Data Source: KL&A, 2013e).

by the Bullitt County YMCA. A Spray Park is located behind Lebanon Junction Elementary School.

Bullitt County Fairgrounds is another main community facility. It is made up of 27 acres and hosts the annual Bullitt County Fair, as well as demolition derbies, tractor pulls, music festivals and wine festivals (KL&A, 2013e). Within the fairgrounds, facilities include an outdoor arena, a pavilion, and cattle barns. Four public 18-hole golf courses exist in Bullitt County: Maplehurst Golf Course, Penn Run Golf Course, The Crossings Golf Course, and Heritage Hills Golf Club.

NEEDS

With the Bullitt County community growing, it is vital to insure that land will be available for parks, recreation and open space to meet future needs of the community. Open space for group activities such as baseball fields and soccer fields are accessible, whereas facilities for individual recreation are limited. Studies have shown adults tend to stay more physically fit when they participate in individual activities like running, swimming, bicycling, resistance training rather than activities group participation (KL&A, 2013e).

MISSION

The Parks and Recreation Committee of Bullitt County have created a mission statement to develop, administer, and maintain a parks and recreation program that inspires healthy lifestyles, instills community pride, and promotes tourism while serving the needs of Bullitt County residents. The county plans to implement this mission through expanding parks and recreational facilities; developing hike and bike ways that connect parks, schools, playgrounds and neighborhoods throughout the county; providing facilities and programs to enable residents to become more physically fit; and providing facilities to support expanded programming (KL&A, 2013e).

FUTURE

As of 2103, the total population of Bullitt County was 76,854. With a projected population of 102,461 by the year 2030, Bullitt County will have to expand on the number and types of available community facilities, especially in their school systems which as of 2013 were almost at full capacity (Snider, n.d.).

Table 2.11.1: Facilities within police and emergency services districts of Bullitt County (Source: KL&A, 2013e).

Cities	Population	Schools	Police	Fire	Library
Mt. Washington	9,317	6	2	1	1
Shepherdsville	11,463	10	1	2	1
Zoneton	9,409	5	1	1	1
Nichols	2,724	1	2	0	0
Southeast Bullitt	8,526	1	2	0	0
Lebanon Junction	2,305	1	1	1	1

Table 2.11.2. Schools within police and emergency services districts of Bullitt County (Snider, n.d.).

Schools	Mount Washington	Enrollment	Shepherdsville	Enrollment	Zoneton	Enrollment	Nichols	Enrollment	Southeast Bullitt	Enrollment	Lebanon Junction
Primary	Mount Washington Elementary	493	Brooks Elementary	495			Nichols Elementary	167			Lebanon Junction Elementary
	Old Mill Elementary	447	Maryville Elementary	360							
	Pleasant Grove Elementary	576	Overdale Elementary	576							
			Shepherdsville Elementary	574							
Secondary/Middle	East Side Middle	599	Bullitt Alternative	50	Zoneton Middle	536			Bernheim Middle	500	
	Mount Washington Middle	513	Bullitt Central High	1,257	Hebron Middle	443					
	Bullitt East High	1,364	North Bullitt High	1,234							
			Bullitt Lick Middle	485							
Private			Bernheim Middle	500							
			Saint Aloysius Ganzaga	193	Little Flock Christian	192					
					Rolling Hills Christian	29					
				Micah Christian	196						

2 | INFRASTRUCTURE

INTRODUCTION

Bullitt County has many roadways, electric transmission lines, water and sewer lines, water ways and railroads. These infrastructure elements offer potential easements that could be used as part of a greenway corridor. However, the design team identified a few problems with the data that can be accessed. For example, the roads in the eastern portion of the knobs area indicate some roads are connected, but they are not. Water and sewer data are not mapped for the entire county. Lastly, there are no inactive rail lines in the county which could be incorporated into the proposed greenway corridor. All of the decommissioned rail line were removed and redeveloped.

ANALYSIS

The data gathered about infrastructure will mainly be used in the details phase of mapping out a greenway system. In the beginning stages this data will inform the design team of pivotal locations to consider for a greenway corridor. The team is most interested in water line easements and sewer sanitation districts, because the land above the water and sewer lines will be easier to conserve or to construct a trail above. How the existing infrastructure can be used in collaboration with the hike and bike trail to create a public greenway is an important part of this project.

The water companies have water lines that reach out into most areas of the county. Easement land is generally already cleared to prevent the encroachment of roots on pipes and allow easier access for maintenance. Most of the water lines are close to or within Shepherdsville and Mt. Washington city boundaries. There are lines that follow along Highway 245 (Clermont Road) to

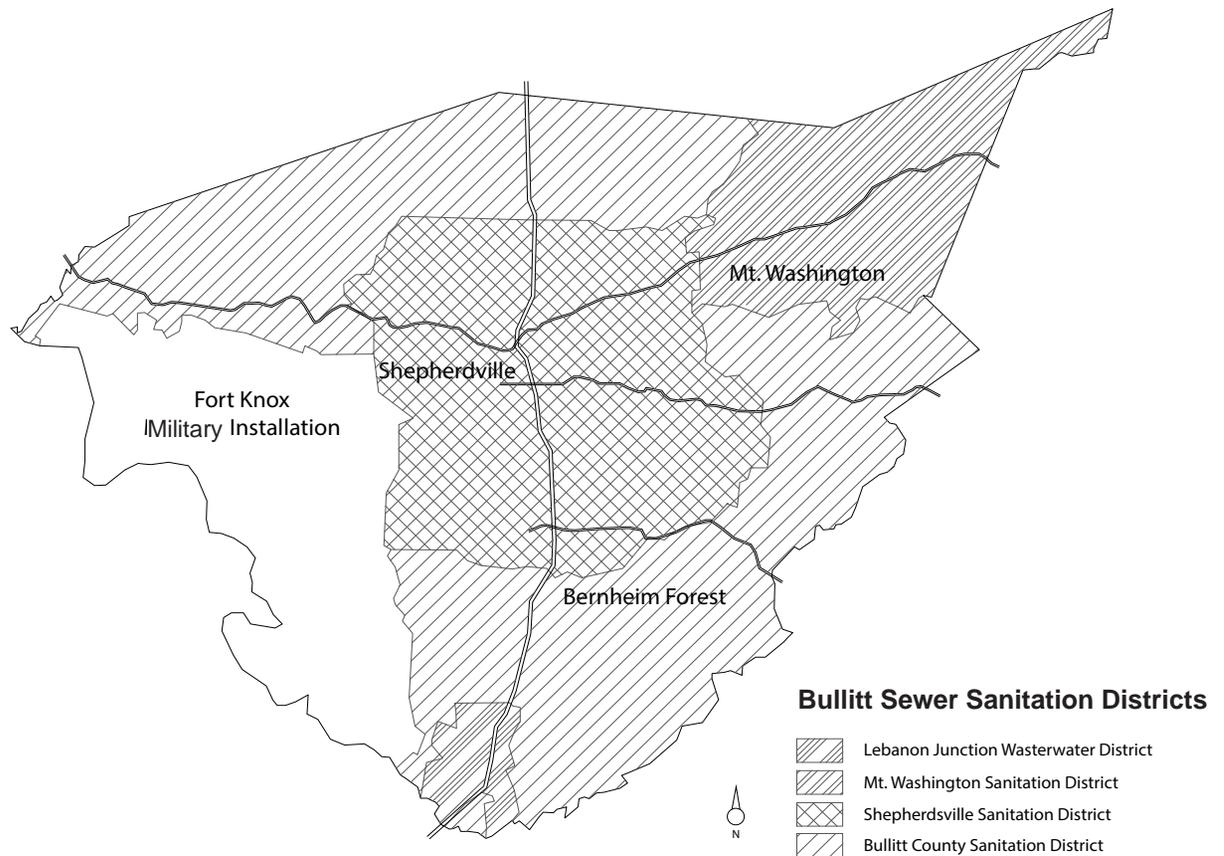


Figure 2.12.1. Bullitt Sewer Sanitation Districts. The Shepherdsville and Bullitt County districts are the main focus for this project. Information at this scale would be used to lay base locations for a greenway. (Data Source: Kentucky Geography Network. 2014)

the Jim Beam Distillery Company. Figure 2.12.1. shows the two main sewer districts within the study area and the Shepherdsville Sanitation lines. These easements can be converted to conservation land for use in the greenway which will allow for less fragmented animal habitats and provide scenic views along trails or in park designated areas. A greenway can create a unique experience for learning about nature, provide space for healthy activities, and help preserve the environment.

COMMENTS

Infrastructure easements can be a focus for greenway planning in that the land above the water and sewer lines can be obtained more easily. In order to create a greenway system that welcomes users of all ages and interests, the park-like areas and trail-heads will need access to water, sewer, and electric utilities for amenities, buildings and lighting of the areas for safety.

This is important because the 2013 Comprehensive Plan for Bullitt County states there is an urban services area in “the land immediately surrounding the cities of Mt. Washington and Shepherdsville.”. In an effort to make this greenway system more cost effective, it would be more logical to implement the areas of the greenway needing more infrastructure near the areas within the undefined urban services boundary (Figure 2.12.2). Utilizing the different types of easements throughout the county will allow for the greenway to connect portions of land that would otherwise be impossible. For example, a road easement in a built out neighborhood could be used to widen a sidewalk, and allow the street to be redesigned to include a shared bike lane as part of a trail.

The design team noticed that active railroads crossed through some densely populated areas in and around Bullitt County (Figure 2.12.3). This issue will need attention since rail lines may create safety issues and present unattractive views along portions of the greenway. An effort should be made to buffer some portions of the rail lines for safety and enhance the views along other parts. Views can be enhanced or romanticized by using the history of the rails themselves by making the



Figure 2.12.2: Shepherdsville Sewer Lines (Source: KL&A, 2013c)

tracks an attraction instead of just a mode of transportation. Bullitt County does not have any inactive railroads to convert to part of the greenway.

Although not typically thought of as infrastructure since it is no longer a major mode of transportation today, water-ways provide an important avenue to explore for incorporation into a greenway. The floodplains have immense potential for use in the greenway system for trails and land conservation because building construction should not occur in the flood plain. Bullitt County also has a vast collection of streams that could be integrated into the greenway system.

The last infrastructure type to take into account is the electric utility line easements. Overhead structures normally accompany this infrastructure and vertical obstacles present a challenge. The unsightliness of the poles and wires overhead is a concern. When electric line easements are utilized for a greenway, the design can minimize the length of the continuous portions of the easement used thus breaking up unpleasant views. The ability to obtain and utilize a variety of infrastructure easements throughout the county is essential for the development of a successful greenway system in Bullitt County.

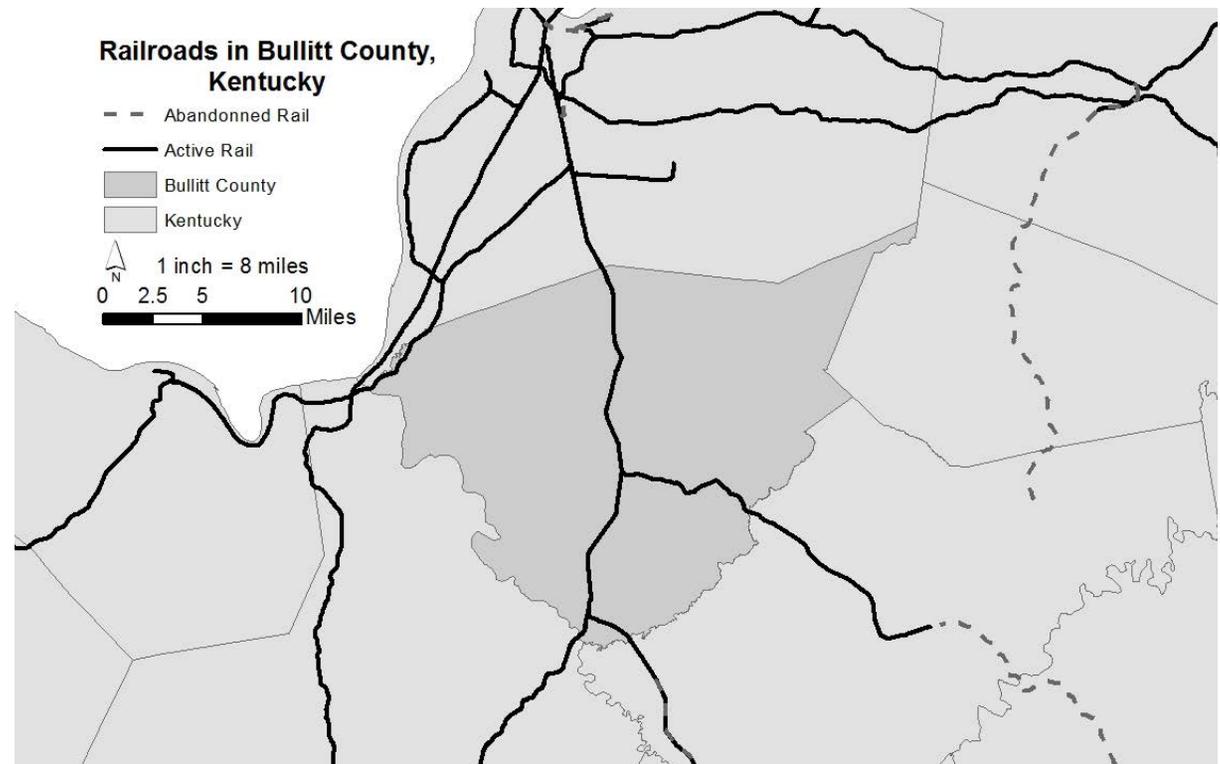


Figure 2.12.3: Active and inactive railroads in and around Bullitt County. (Source: KL&A, 2013c)

2 | TRANSPORTATION

INTRODUCTION

The Bullitt County Transportation Study was conducted in 2013 by Bullitt County and the Kentuckiana Regional Planning and Development Agency to identify community concerns and evaluate transportation alternatives to improve county-wide mobility. This study sought improvements for current transportation issues and anticipated future transportation deficiencies. The study demonstrated the need for improvements to existing routes and the construction of new roadways to relieve traffic congestion in the northern portions of the county and to provide more efficient travel routes connecting Bullitt County to employment centers in Jefferson County.

The obvious and most critical issue is the population growth over the last decade. This increase was not proportionate with transportation needs and improvements unless new roads were to be built. By 2030, Bullitt County will be the 9th most populous county in Kentucky (ENTRAN, PLC, 2010).

There were several meetings with community stakeholders, who are referred to as the Steering Committee, to define goals and issues that needed to be addressed. There have been short-term improvements, which include spot improvements at specific locations, such as Highway 44, that provide much needed benefits. Most of the projects are low cost and safety oriented (ENTRAN, PLC, 2010). Now, these spots must be connected for the improvement of the transportation system for this county and beyond.

Figure 2.13.1 illustrates recommended long-term improvements and proposed new roadways further consideration along with significant improvements to existing roadways. The new routes were prioritized, with input from the study Steering Committee, based on how the new routes relate to the existing transportation system and to one another (ENTRAN, PLC, 2010).

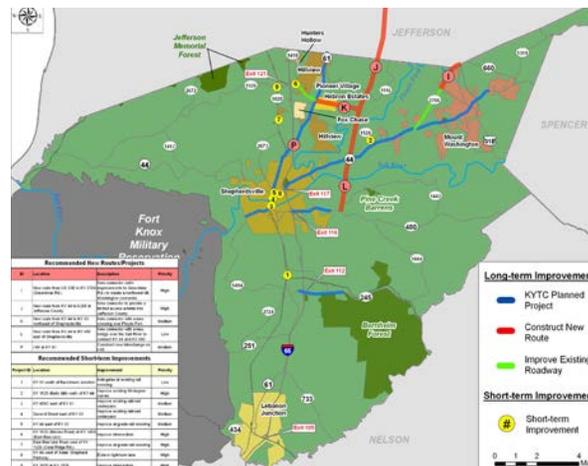


Figure 2.13.1: Long-term improvements (Source: ENTRAN, PLC, 2010)

The data gathered at the Steering Committee meetings is displayed in Figure 2.13.2. Meeting attendees were asked to rate seven transportation issues. This graph shows that rapid growth and lack of funding were found to be the two most significant issues affecting transportation. Long commutes, which are an average of 28 minutes, are of the least concern (ENTRAN, PLC, 2010).

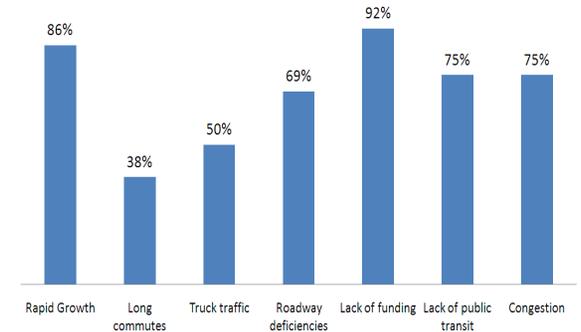


Figure 2.13.2: Issues of Bullitt County Traffic (Source: ENTRAN, PLC, 2010)

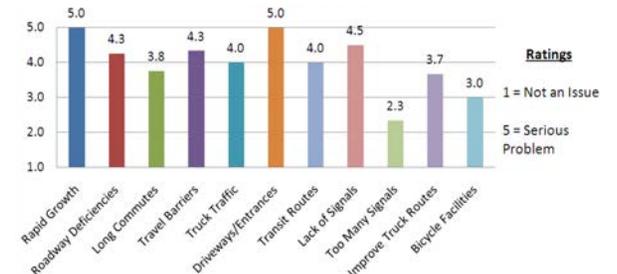


Figure 2.13.3: Reasons for Traffic in Bullitt County (Source: ENTRAN, PLC, 2010)

Figure 2.13.3 details the reasons for traffic in Bullitt County based on results from two public meetings held in Shepherdville, KY. The public showed concern that traffic issues were caused by rapid growth and too many driveways and entrances, followed by the lack of traffic signals. The issue that received the least amount of concern was the lack of bicycle facilities (ENTRAN, PLC, 2010).

Existing traffic characteristics for the study were obtained through field investigations and data provided by local and state agencies. Functional classification (Figure 2.13.4) is the hierarchy of roads, streets, and highways into integrated systems ranked by the level of mobility for through movements and access to adjoining

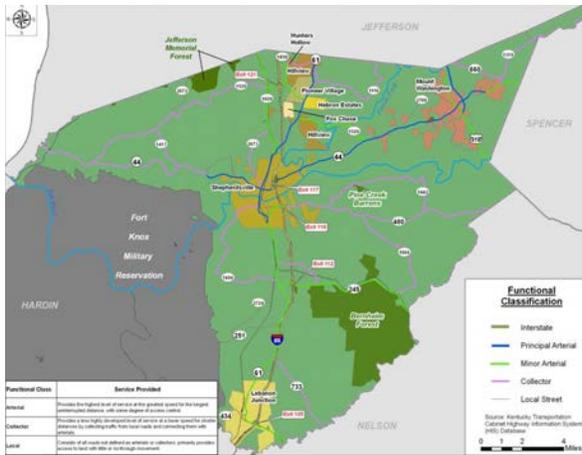


Figure 2.13.4: Functional Classification (Source: ENTRAN, PLC, 2010)

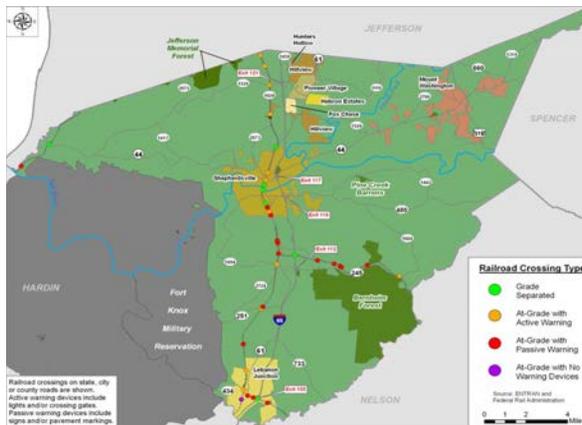


Figure 2.13.5: Railroad Connections (Source: ENTRAN, PLC, 2010)

land they provide. This grouping acknowledges that roads have different levels of importance and provides a basis for comparing roads fairly. Groupings provide a framework for highways serving mobility and connecting regions and cities within a state; provide a basis for assigning jurisdictional responsibility according to the roadway's importance; and provide a basis for minimum design standards according to function (ENTRAN, PLC, 2010). Figure 2.13.5 illustrates the location of railroad crossings. This could significantly alter future transportation planning, as sometimes railroads can cause traffic issues.

Public transportation in Bullitt County is limited. Currently, the TARC (Transit of River City) has one route that extends into the county. Route 66x provides express bus service from Bullitt County to downtown Louisville. The service is only provided during morning and evening peak hours totaling three round trips daily from Mt Washington to Shepardsville via KY 44 and then to downtown to Louisville, utilizing I-65 in the morning (vice

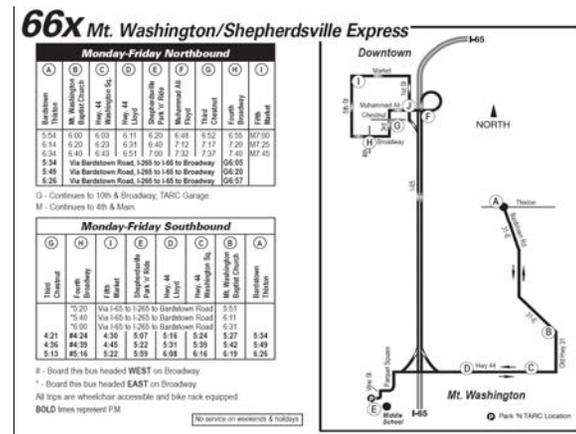


Figure 2.13.6: The Single TARC Route (Source: ENTRAN, PLC, 2010)

versa in the evening) (Figure 2.13.6). This informs the design team that there is not sufficient public transportation, an issues which can be addressed in the greenway master plan.

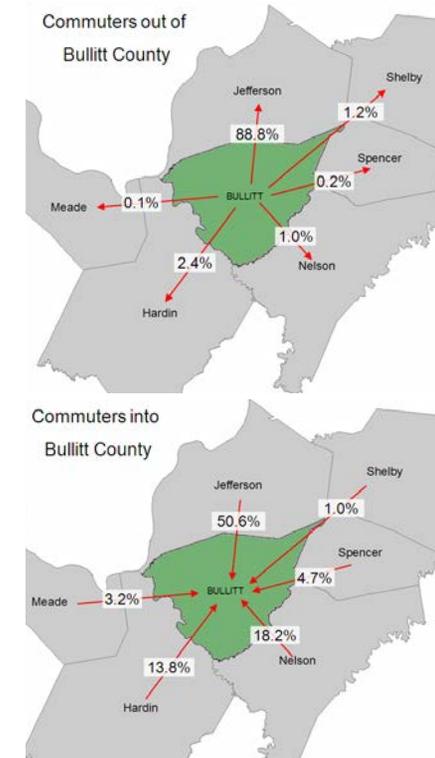


Figure 2.13.7: Bullitt County Citizens' Daily Commutes (Source: ENTRAN, PLC, 2010)

Data from the 2000 census indicates that 22,229 workers commuted out of Bullitt County each day for work, with nearly 89% of those traveling to jobs in Jefferson County. In contrast, 3,941 workers commuted into Bullitt County each day, with over 50 percent of those come from Jefferson County (Figure 2.13.7) (ENTRAN, PLC, 2010).

2 | SOUND & NOISE

INTRODUCTION

Fort Knox is a United States Army base that is located in the counties of Bullitt, Hardin, and Meade (2.14.1). Communities near Fort Knox include Brandenburg, Elizabethtown, Hodgenville, Louisville, Radcliff, Sheperdsville, and Vine Grove, Kentucky.

It currently holds the Army Human Resource Center of Excellence which includes the Army Human Resources Command, United States Army Cadet Command and the United States Army Accessions Command. It was once home to the United States Army Armor Center which was used by both the Army and Marine Corps to train soldiers on tank

operations (Figures 2.14.2). Since 1937, Fort Knox has housed the United States Department of Treasury Bullion Depository (Gold Vault) (Figure 2.14.3). Today the Gold Bullion Depository still stands; however, the amount of gold housed in the vault is uncertain (Lincoln Trail Area Development District, 2008).

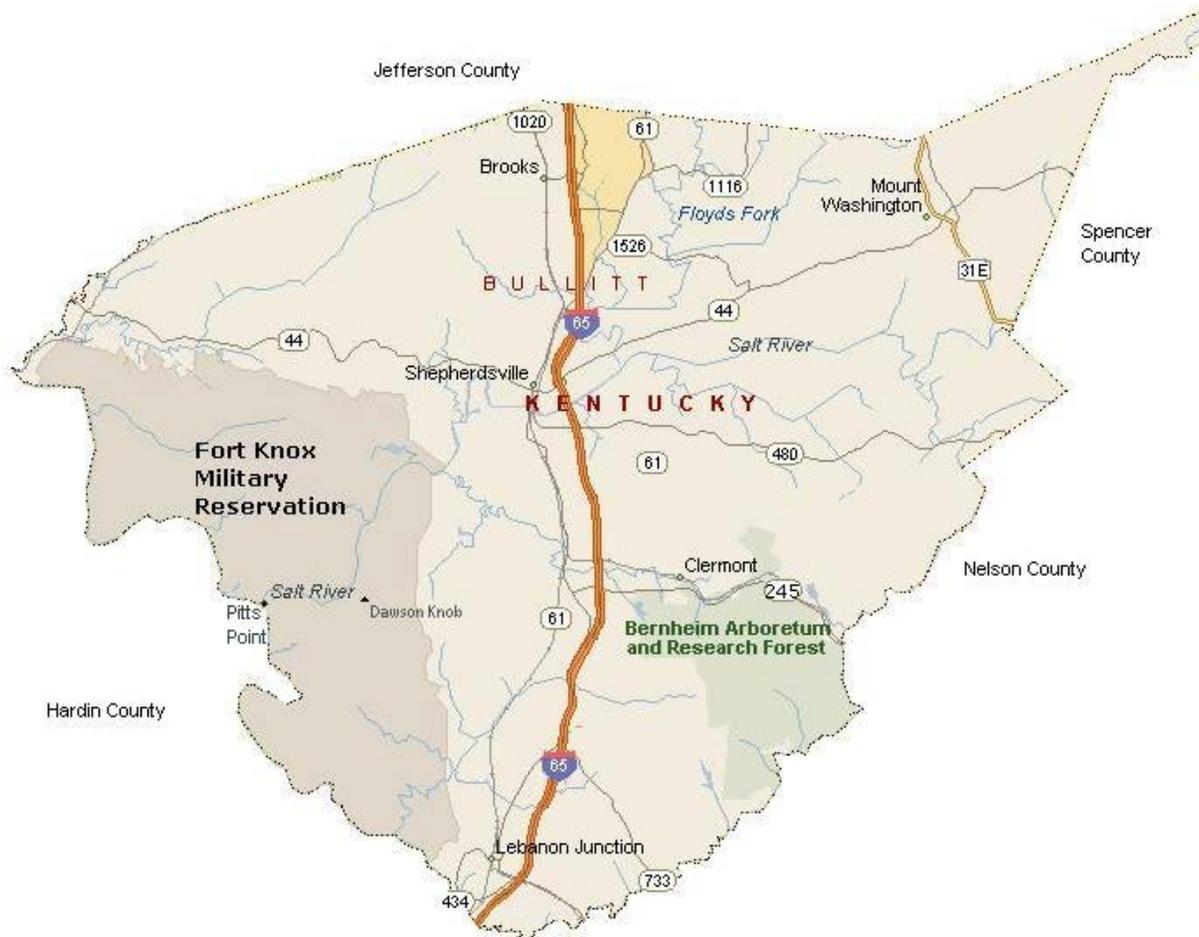


Figure 2.14.1: Map of Bullitt County representing the relationship between Fort Knox and its location relative to the rest of the county. (Source: <http://www.rootsweb.ancestry.com/~kybullit/photoshop/i65map-001.htm>)

As a part of the recommendations from the 2005 Base Realignment and Closure (BRAC) Commission, Fort Knox assumed new operational tasks.

“The Armor Center and School are relocating to Fort Benning to merge with the Infantry Center and form the Maneuver Center of Excellence ... Relocating to Fort Knox are Human Resources Command, Army Accessions Command and Cadet Command to join Recruiting Command information of the Human Resource Center of Excellence ... As the Army’s Human Resource Center of Excellence, Fort Knox is now positioned to continue its central role in the front ranks of military installations in the United States, recruiting, training, and supporting war fighters for the challenges of the twenty-first century.”

-Bullitt County, Fort Knox Joint Land Use Study

In 2008, as part of the revised *Joint Land Use Study (JLUS)*, Bullitt County and Fort Knox agreed that they need to be open about the relationship between each other and what each expects of the other.

With the new assignments in Fort Knox, there is an increase in attack helicopter fire and large round explosives. This is seen as undesirable for residents of the area but uncompromisable for the base. However, because of this study, both Fort Knox and Bullitt county are willing to work together to create a planned expansion of the base that takes into account the possible expansion of

residential areas in Bullitt County. The major take away from the *JLUS* is the improved relationship between the border of the base itself and Bullitt County. In an effort to become better community partners, each side has made compromises.

Requests from the Army base included limiting light pollution from residential areas and roadways. The light pollution interrupts the success of mock nighttime operations for training purposes. The light pollutes the night-vision used by infantry as well as vehicular uses (Lincoln Trail Area Development District, 2008). Requests from Bullitt County included limiting the time of use for large artillery

shells so they do not interfere with after hour activities in the surrounding communities. These are just a few of the requests exchanged between the two communities and both are interested in cooperating with one another.

Fort Knox brings in employment and tourism allure to the area; therefore, Bullitt, Harden, and Meade counties are all interested in keeping a positive relationship with the base. The base is also aware of the noise that leaks into the surrounding communities and tries to mold its schedule around the hours of the community (Lincoln Trail Area Development District, 2008).



Figure 2.14.3: Gold Bullion Depository at Fort Knox, Kentucky. (Source: <http://www.gainesvillecoins.com/resources/default/images/landing/ft-knox.jpg>)

Figure 2.14.2: Entrance into Fort Knox Army Base. (Source: [http://www.fortwiki.com/Fort_Knox_\(2\)](http://www.fortwiki.com/Fort_Knox_(2)))

2 | HOUSING & DEVELOPMENT

RESIDENTIAL GROWTH

Residential growth between 1990 to 2010 is rooted along the I-65 spine which essentially bisects Bullitt County (Figure 2.15.1). In 2010, the increase in residential growth can clearly be seen along the north/south axis created by I-65, except in Mount Washington where residential growth has declined. This increase in residential growth is possibly due to development occurring along the major highway which provides access to other major cities such as Louisville for work or leisure.

As one moves farther away from the highway, the concentration of residential and commercial development decreases. The less developed areas are composed primarily of suburban subdivisions and rural hamlets. The residential and commercial development along major roads occurs in part due to connectivity issues, possibly because there is a lack of efficient secondary roads. Therefore, a future goal for consideration should include redeveloping major connections to transportation and commercial nodes. Residents have expressed a desire for future housing in the Knobs area, therefore residential growth in that area could occur within the next 20 years.

In summary, in order to successfully plan for the future expansion of neighborhoods in Bullitt County, it is essential to integrate prime transportation and commercial connection nodes. There are a variety of smart growth design strategies available to facilitate development. Improving the diversity of the economic base would be one method to plan for and direct new growth. For example, encouraging and implementing infill development in urban core areas can attract new businesses into an area.

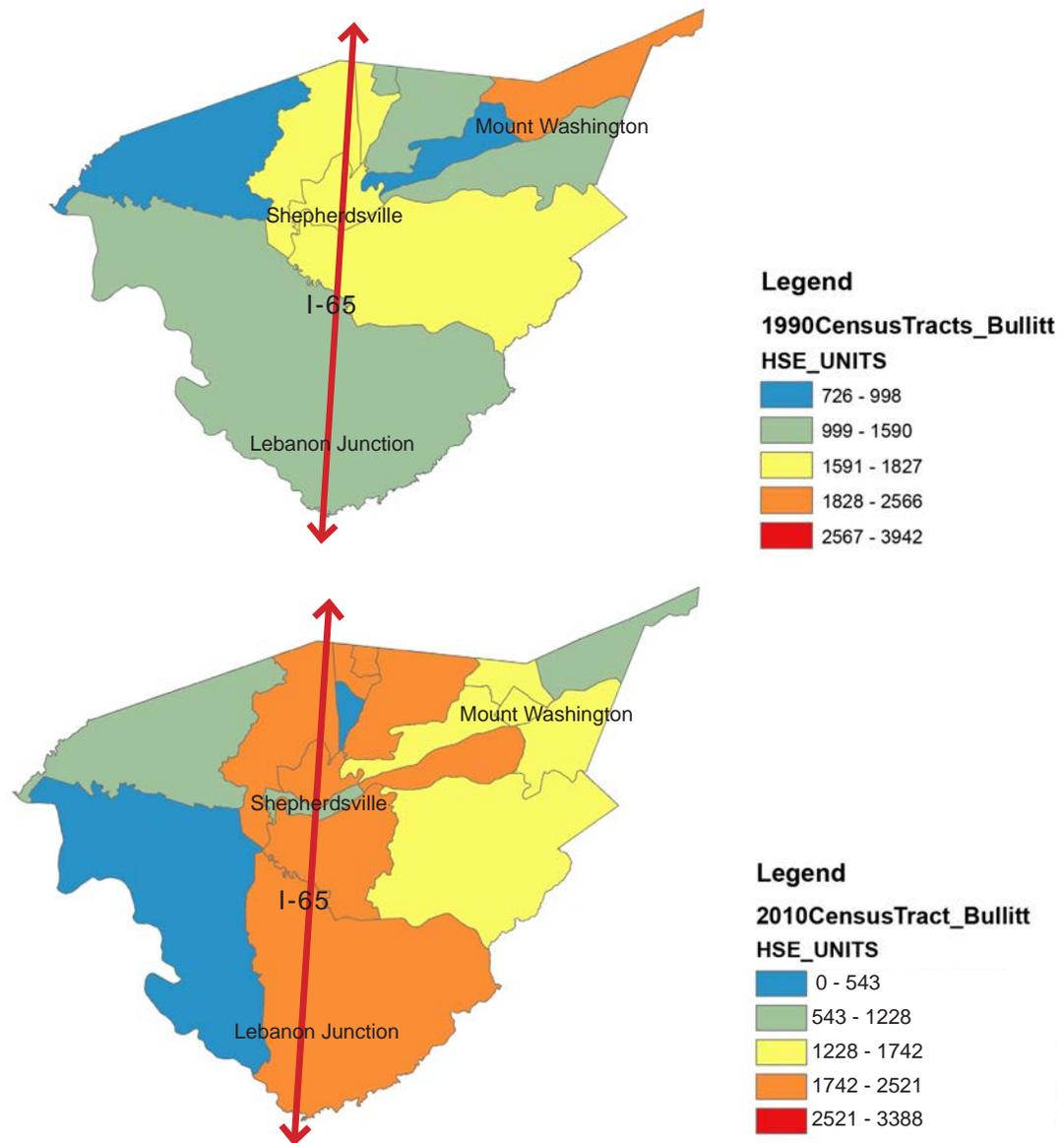


Figure 2.15.1: Census Housing Unit Growth in Bullitt County Between 1990 to 2010 (Data Source: Kentucky Geography Network, 2014).

LANDSCAPE DESIGN SUITABILITY

Eighty-one percent of Bullitt County's population are home owners which equates to 30,130 housing units in the county, while the remainder rent. The ownership rate within Bullitt County is actually higher than the ownership rate average for Kentucky (Table 2.15.1.) (U.S. Census Bureau, 2014). While Bullitt County does have a housing/subdivision regulation in place, there are unspecific sections within the guidelines which limit their usefulness for the purpose of designing a greenway system to connect subdivisions and cities across Bullitt County.

The regulation was written by the Bullitt County Planning Commission which focuses on the urban areas of Mount Washington, Hill View, Lebanon Junction, and Shepherdsville. The main goal of the commission is to improve the health, safety, convenience, and welfare of its citizens to provide for successful future development. The guideline as written covers basic building standards such as grading procedures, street dimensions, blocks, lots, alleys, etc. (Figure 2.15.2.) (Bullitt County, 1987). All the standards are thoroughly explained in the text which provides an extensive amount of information.

However, the housing/subdivision regulation lacks details and standards from a design or landscape architectural perspective which are essential in developing a greenway system. Therefore, in the future, the Planning Commission should be encouraged to adopt standards relative to elements such as plantings, materials, buffer zones and infrastructure incorporation for the purpose of improving the planning and design of infrastructure as the county grows. Such standards

would facilitate the effective development of a greenway/greenbelt system in Bullitt County.

As the county grows in the future and new housing or subdivisions are implemented, it is important that there be appropriate design regulations in place to integrate and guide development in ways



Figure 2.15.2: Image showing a typical housing subdivision (G&K Development, 2012).

that will improve connectivity throughout the area and preserve the historic and natural features that support the cultural landscape within the county.

The existing housing/subdivision regulation does not address the design elements associated with the implementation of a greenway, therefore it is imperative to design the greenway system in ways that will integrate it effectively with the existing infrastructure and natural systems present in the county. A well designed greenway can unite all areas of Bullitt County and enhance the quality of life for residents as well as visitors.

Table 2.15.1. Bullitt County residential statistics (U.S. Census Bureau, 2014)

Total Housing Units: 30,130

9.7% are multi-structure units

Median House Value: \$146,600
(higher than state average)

81% of the population own their home
(higher than state average)

Median Household Income \$53,922

10.2% of the population have incomes
below the poverty level
(less than state average)

2 | DEMOGRAPHICS

INTRODUCTION

Demographics refer to statistics and information about a given population (Table 2.16.1). In Bullitt County such information points to a steadily increasing population that is expected to continue increasing in the future. The quick increase in population over recent decades has led the county to be one of the fastest growing in the state. Current and future projections regarding the age of residents show that the average age is also increasing and thus leading to an aging population (Table 2.16.2). A movement of people from cities to suburban areas is also occurring, most heavily in the Mt. Washington area. The general expansion of the population is expected to continue for the next few decades at a minimum and will alter the needs of the community as it shifts toward a more mature population.

POPULATION

Bullitt County, Kentucky, has a population of over 74,319 (US Census, 2010). Between 2000 and 2010 more than 13,000 people joined the county's population, increasing the overall population by over 21% (Table 2.16.3.). This continues the high growth rates the county has experienced since 1950. Following the trend the population doubled between 1960 and 1970 and more than doubled again between 1970 to 1980 (Figure 2.16.1). Though still growing from 1980 to 1990, the growth rate was slower than the trend, but higher than the statewide growth rate for the same time period. It is predicted that the growth trend will continue into the future with projections reaching 114,000 by 2040 and over 126,000 by 2050 (Table 2.16.4.).

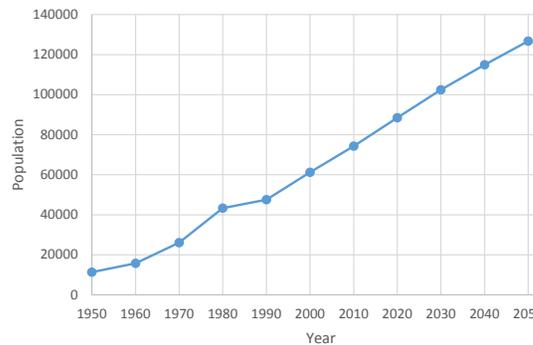


Figure 2.16.1: Population of Bullitt County. (Adapted from KL&A, 2013f).

Compared to the rest of Kentucky, Bullitt County ranked 13th in population out of 120 counties in 2000 and moved to 10th in 2010 making it the 8th fastest growing county in Kentucky between 2000 to 2010 (US Census, 2010).

Spatially, the greatest concentrations of the population occur along the northern side of Bullitt County where it borders Jefferson County and then again along interstate I-65. These areas include the cities of Shepherdsville, Hill View and Mt. Washington (Figure 2.16.2.). One of the largest percentage increase in county tracts occurred in the tracts around the Mt. Washington area suggesting that it is or will soon be one of the most densely populated areas in Bullitt County (Figure 3.16.3.). The cause for this large increase is most likely attributable to the expansion of subdivisions in the area due to its geographical proximity to both Shepherdsville and Louisville.

Table 2.16.1: Households in Bullitt County (Adapted from Kentucky Cabinet for Economic Development, 2014)

Number of Households	27,791
Persons per Household	2.67
Median Household Income	\$56,377

Table 2.16.2: Population in Bullitt County by Selected Age Group (2013) (Adapted from Kentucky Cabinet for Economic Development, 2014)

Age	Number	Percent Population
<16	15,911	20.7
16-24	8,760	11.4
24-44	20,158	26.2
45-64	22,016	28.6
65-84	9,215	12.0
85+	794	1.0

Table 2.16.3: Total Population in Bullitt County (Adapted from Kentucky Cabinet for Economic Development, 2014)

2009	75,653
2010	74,490
2011	75,289
2012	75,869
2013	76,854

Table 2.16.4: Population Projections for Bullitt County (Adapted from Kentucky Cabinet for Economic Development, 2014)

2015	81,358
2020	88,508
2025	95,623
2030	102,461

FUTURE POPULATION PREDICTIONS

Bullitt County's population is predicted to keep expanding into the future. The greatest concentration of population lies within the Shepherdsville and Mt. Washington areas, with the Mt. Washington area currently increasing the most.

The average age of residents is currently around 39 years old but is predicted to reach an average of up to 44 years old in the coming years. This implies that there is an overall trend of an aging population in the county. While there is a more slowly increasing number of residents under the age of 16 years old, the majority of the population

rests between the age groups of 25 to 44 and 45 to 65 years old. The total population is growing and will continue to grow for at least the next few decades. Bullitt County will see growth in its cities and a more mature age in its overall population.

The area along I-65 provides the main corridor of population density, with Mt. Washington becoming an outlier to the east. These areas are the most likely to expand in the future due primarily to their proximity and ease of access to Shepherdsville and toward the more rural areas located there. This expansion will create new challenges for the county and the needs of the community will grow and expand with its residents.

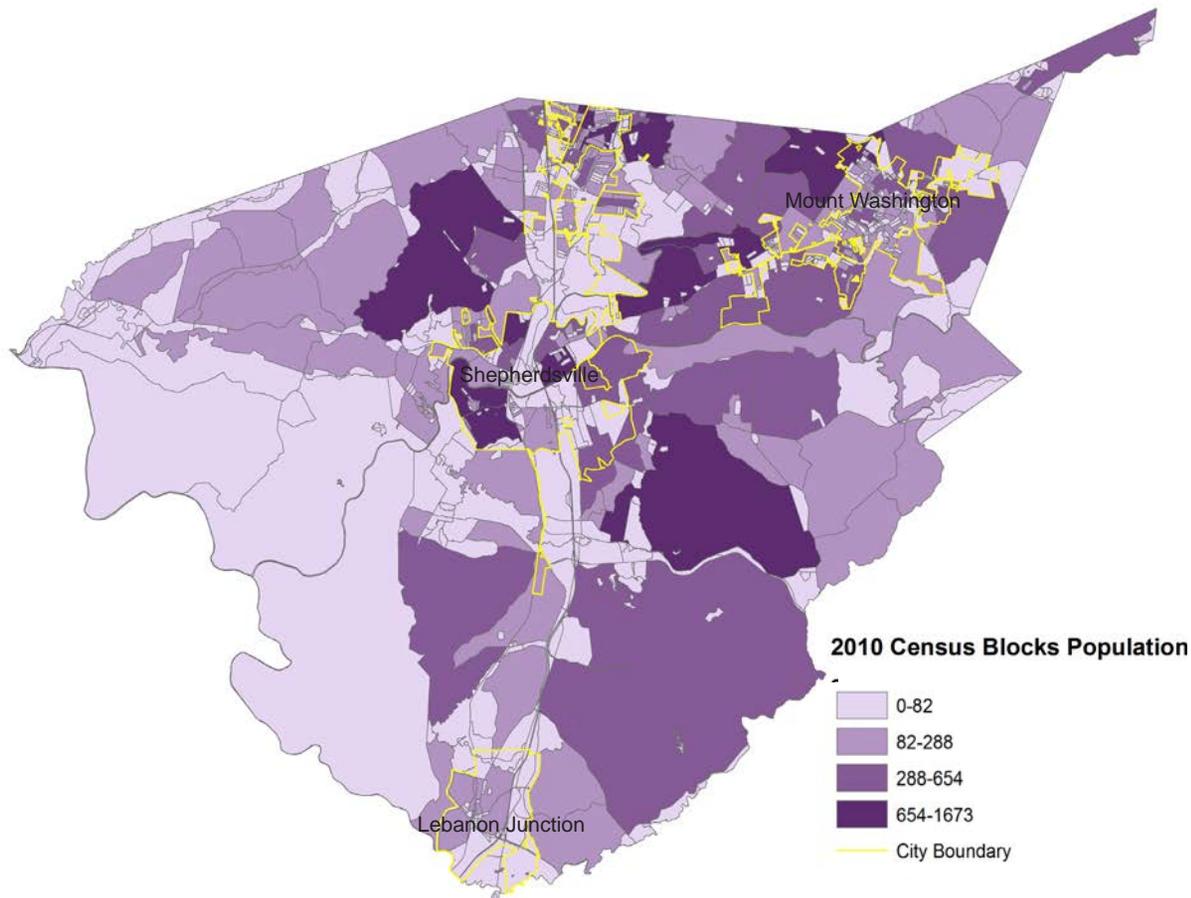


Figure 2.16.2: 2010 Bullitt County Population at the Census Block Level. (Source: Kentucky Geography Network, 2014)

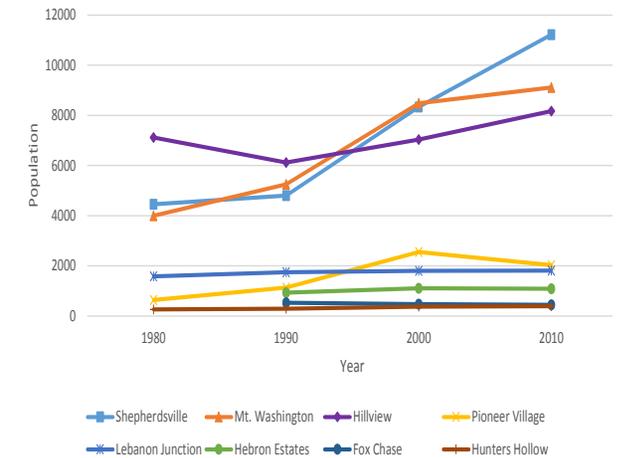


Figure 2.16.3: Population Trends of Cities in Bullitt County (Adapted from KL&A, 2013f).

2 | ECONOMICS

INTRODUCTION

An analysis of the existing economic conditions of Bullitt County is fundamental in developing a strategic plan for both short- and long-term land use planning and the overall economic productivity of the county. With these findings, it became evident that while Bullitt County has been economically performing well as of late (job growth, household income), it does not appear that this trend will likely continue due to inverse commuting patterns and low education levels.

EMPLOYMENT

From 2007 to 2011 Bullitt County saw a net increase of 3,007 jobs (19.6%). This is a significant increase when compared to both state and national averages within the same time frame. During the same time period, the state of Kentucky saw an overall job loss rate of four percent, due in large part to the economic downturn spurred by the collapse of the housing market in 2008 (Kris Lowry & Associates [KL&A], 2013).

As of 2011, the services sector provided the largest number of jobs in Bullitt County, comprising 5,047 (32.9%) of all jobs. The utilities, trade and transportation sector (which includes warehousing and trucking) had the second largest number of jobs, making up 4,618 jobs (30.1%). Together, these two sectors now compose 63.0% of all jobs in the county. While these two areas realized substantial increases in employment rates since 2007, the same cannot be said for the construction, manufacturing and information sectors - as they all experienced a net loss of jobs from 2007 to 2011 (KL&A, 2013).

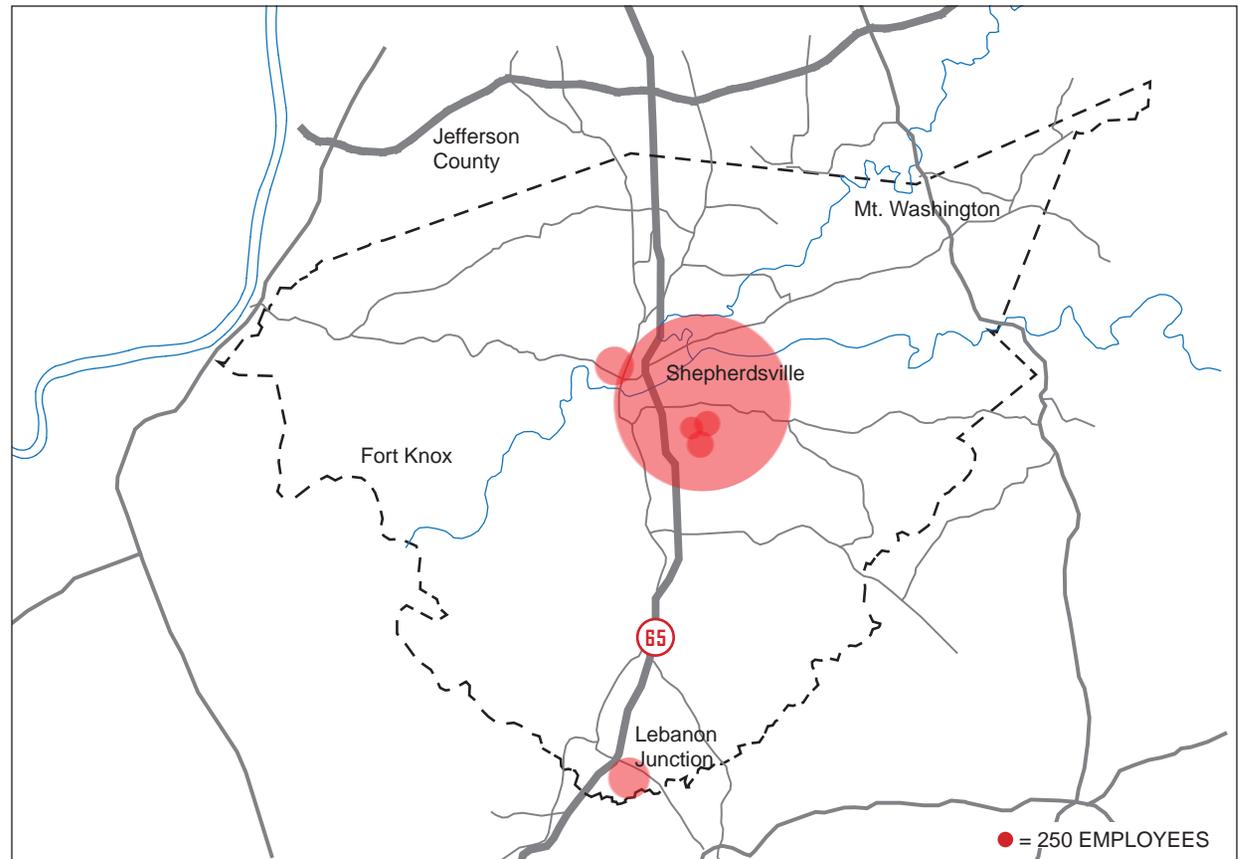


Figure 2.17.1: Location of top six employing businesses in Bullitt County, proportional to number of employees (Data Source: KR&A, 2013)

For the overall economic health of the county in the near-term, these numbers can be considered positive as the overall employment rate has been steadily increasing since 2007. However, the percentages of jobs *per sector* do not bode well with trends for sustained economic prosperity. These numbers show that there is an apparent lack of diversity in both employment sectors and location. In Bullitt County, nearly two-thirds of all

jobs are based in two economic sectors with the locations of these employment hubs being, for the most part, very mono centric. In Bullitt County, five of the top six companies, based on number of people employed, are located in Shepherdsville (Figure 2.17.1). Even more staggering, if the list of companies were to be expanded to include the top 33 employing companies, 29 are located within Shepherdsville. While this may provide many jobs

in Shepherdsville, it will likely stagnate the long-term economic growth of the county, as people will not have much choice in either location or sector of employment in Bullitt County.

REVENUE

The lack of diversity in employment sector is even further amplified when looking at the sales and receipts per sector in Bullitt County. Examining the sales and receipts indicates which sectors are providing an influx of money into Bullitt County. Figure 2.17.2 reveals that 86.0% of the sales and receipts in the county come from wholesale and retail trade in 2007 (KL&A, 2013).

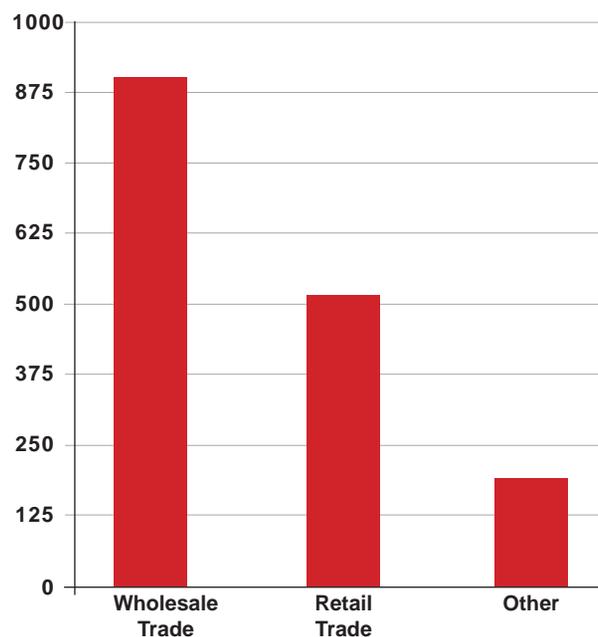


Figure 2.17.2: Sales, receipts, etc. (\$1,000,000) per sector in Bullitt County from 2007. (Data Source: KR&A, 2013)

HOUSEHOLD INCOME, EDUCATION & COMMUTING PATTERNS

For the purpose of this analysis, an understanding of a person's individual economic performance will be comprised of three sections: median household income, education level, and commuting patterns.

Median household income (Table 2.17.1) is data provided by the U.S. Census Bureau that shows annual estimates of wages, salaries, rental income, and dividend and interest earnings, along with any other form of taxable income. This is important as it shows if the average household is making enough money to sustain itself.

Education level (Table 2.17.2) is data provided by the 2011 American Community Survey that shows the percentage of high school graduates and bachelors degree recipients in Bullitt County. These percentages are important as they indicate whether future high-paying, skilled jobs can be obtained by those living in Bullitt County.

Commuting patterns (Table 2.17.3) are also provided by the U.S. Census Bureau, and they show where people are commuting for work. These numbers are important because it reveals *where* people are going for work, and thus, which businesses/regions are profiting from having employers present.

These tables show that while median household income for Bullitt County residents is actually above the state and national averages, the higher education levels and commuting patterns bring to light that this level of income is not likely to be sustained in the future. This is due to the fact that the acquisition of skilled jobs and money entering the local Bullitt County economy are both well

below national averages. In order for Bullitt County to have a successful economic future, it is of vital importance that a county-wide effort take place that seeks to diversify job availabilities in multiple sectors and locations, while also seeking to strengthen the number of college graduates within the county.

Table 2.17.1: Median Household Income for Bullitt County (U.S. Census Bureau, 2013).

	2007	2011	% Change
Bullitt County	\$49,861	\$52,033	4.4%
Kentucky	\$40,299	\$41,141	2.1%
United States	\$50,740	\$50,502	-0.5%

Table 2.17.2: Education Level for Bullitt County 2010 (American Community Survey, 2011).

	High School	Bachelors or Higher
Bullitt County	85.0%	15.0%
Kentucky	83.1%	21.1%
United States	85.9%	28.5%

Table 2.17.3: Commuting Patterns for Residents of Bullitt County (U.S. Census Bureau, 2013).

	2010	Percent
Residents of Bullitt County	33,495	100%
Working & Residing in Bullitt County	6,229	81.4%
Commuting out of Bullitt County	27,266	18.6%

2 | TOURISM

INTRODUCTION

According to information gathered for this study, the main attractions that promote tourism in Bullitt County consist of activities based on alcohol production and outdoor recreation (Figure 2.18.1). These include the growing presence of wine production in the area and Bullitt County's most well-known attraction, Bernheim Arboretum and Research Forest. While many of these attractions are primarily outdoors and are in relative proximity to major arterial roads, such as I-65, the towns of Shepherdsville and Mount Washington need more town-based tourism. Due to the unavailability of statistical information for tourism in Bullitt County, data was collected via tourism websites, such as Yelp and TripAdvisor, where the study team could see where people travel to and observe what their experiences were like based on their comments.

REGIONAL ANALYSIS

From a regional perspective, Bullitt County is surrounded by Jefferson County, the most populated county in Kentucky, as well as Hardin and Nelson Counties, all of which are connected by a major interstate or highway. Although Bullitt County's functions as a satellite county to Louisville (Jefferson County), it lacks diversity in its tourism which limits the flow of economic activity into the county. This limitation could apply to both Hardin and Nelson Counties as well. However, Nelson County benefits by having a well-known historic attraction in its major city of Bardstown (Federal Hill, "My Old Kentucky Home"), which is also recognized as one of America's best small towns, in addition to several Bourbon distilleries in the area, all of which promote tourism.

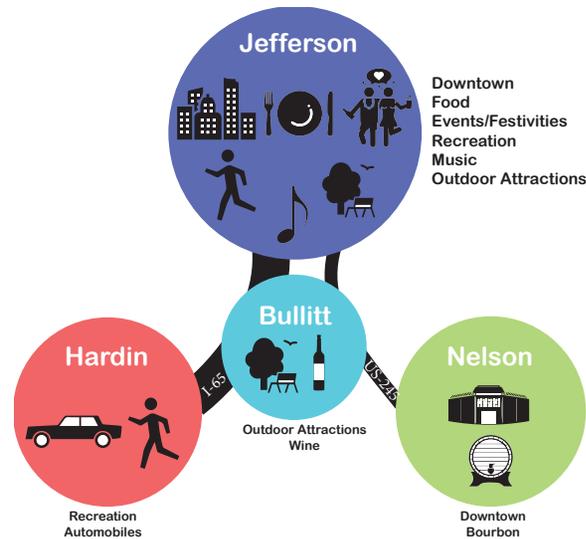


Figure 2.18.1: Surrounding County Tourism Diagram

COUNTY ANALYSIS

With the collected data, a map was created to illustrate tourism in the area (Figure 2.18.2). This map was then used to identify key issues relative to Bullitt County's tourism, while also considering external factors, such as surrounding county tourism, and physical connections, such as arterial roads. By analyzing the data on a county and regional (surrounding counties) scale, the study team was able to evaluate the key issues and address each issue based on the given factors.

Based on the data collected, from a county perspective Bullitt County has a strong tourism sector in alcohol production and outdoor recreation. Of these attractions, Bernheim Arboretum and Research forest is the most visited attraction in the county. Of the other major attractions, Knob

Creek Gun Range is considered one of the best ranges in the nation, and Kart Kountry boasts the "world's longest go-kart track." Other than recreation, Bullitt County hosts a variety of alcohol production facilities which include Jim Beam Bourbon, generally considered to be the beginning of the Bourbon Trail. Wineries in the area are also a major tourism attraction and produce some of Kentucky's most award winning wines.

KEY ISSUES

Considering the data, there are several key issues that limit tourism opportunities in Bullitt County.

- Accommodations (lodging, restaurants, and shops)
- Advertisement & Wayfinding
- Community Tourism
- Community Identity

ADDRESSING THESE ISSUES

To address the key issues, Bullitt County needs to develop a plan to improve and enhance the downtown areas in Shepherdsville and Mount Washington to better accommodate people who visit the major attractions. By providing additional accommodations and implementing appropriate wayfinding and advertising information, the county can develop a better community identity that welcomes visitors to explore the area. The bridge between rural and urban tourism can complement one other and provide visitors with the opportunity to stay longer and visit multiple attractions.

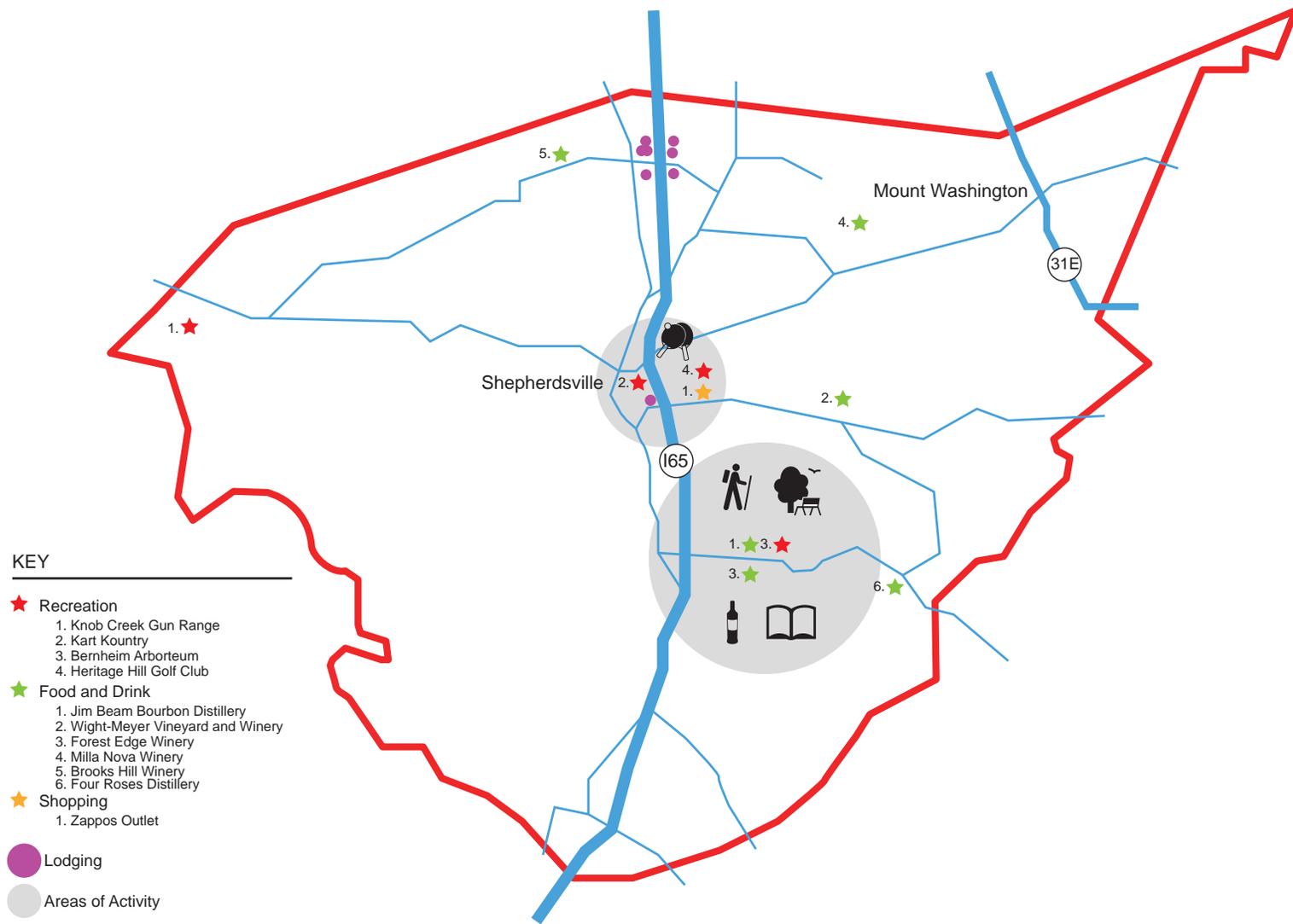


Figure 2.18.2: Bullitt County Tourism Inventory Map. The map illustrates the main attractions that promote tourism for the county, while also highlighting key locations of condensed activity.

2 | REFERENCES

HISTORY

Bullitt's Lick the Related Saltworks and Settlements (n.d.). Retrieved December 10, 2014, from <http://www.bullittcountyhistory.com/bchistory/mcdowellbullittslick.html>

Time Line Project. (n.d.). Retrieved December 10, 2014, from <http://www.bullittcountyhistory.com/bchistory/timeline.html>

The Wilderness Road. (n.d.). Retrieved December 10, 2014, from <http://www.bullittcountyhistory.com/bchistory/wroadmcdowell.html>

HISTORIC PRESERVATION

Future Land Use [Online image]. (2013). Retrieved November 7, 2014 from <http://www.krisslowry.com/bullitt/>

Historic Preservation Sites. [Online image]. 2013). Retrieved November 7, 2014 from <http://www.krisslowry.com/bullitt/>

Kriss Lowry & Associates, Inc. (KL&A) (2013a). Housing & Historic Preservation. In Bullitt County Comprehensive Plan (chap.5). Retrieved from www.krisslowry.com/bullitt/Bullitt%20Co_Chap%205_Comp%20Plan_Housing%20%26%20Historicb.pdf

Kriss Lowry & Associates, Inc. (KL&A) (2013b). Land Use. In Bullitt County Comprehensive Plan (chap.8). Retrieved from www.krisslowry.com/bullitt/Bullitt%20Comp%20Plan%20Chap%208%20Land%20Use.dec9.reduced.pdf

AGRICULTURE

Kriss Lowry & Associates, Inc. (KL&A) (2013b). and Use. In Bullitt County Comprehensive Plan (chap.8). Retrieved from www.krisslowry.com/bullitt/Bullitt%20Comp%20Plan%20Chap%208%20Land%20Use.dec9.reduced.pdf

United States Department of Agriculture. (2007). Census of Agriculture. Retrieved from <http://www.agcensus.usda.gov/Publications/2007/index.php>

United States Department of Agriculture. (1997). Natural Resources Conservation Service: Resource Assessment. Retrieved from <http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/>

PLANNING & ZONING

County Planning Commission, (1987). 'Zoning Regulations for Bullitt County and Cities of Hillview, Lebanon Junction, Mount Washington. Bullitt'. http://www.krisslowry.com/bullitt/Bullitt%20Co_%20Zoning%20Ordinance_ Revised.pdf

Kriss Lowry & Associates, Inc. (KL&A) (2013c). Implementation. In Bullitt County Comprehensive Plan (chap. 9). Retrieved from <http://www.krisslowry.com/bullitt/Bullitt%20Comp%20Plan%20Chap%209%20Implementation.DEC2013.pdf>

CONSERVATION

Kriss Lowry & Associates, Inc. (KL&A) (2013b). Land Use. In Bullitt County Comprehensive Plan (chap.8). Retrieved from www.krisslowry.com/bullitt/Bullitt%20Comp%20Plan%20Chap%208%20Land%20Use.dec9.reduced.pdf

Bernheim Arboretum and Research Forest. (2014). Bernheim Forest Visitor Center

Slaughter, M. (2013). Knob Creek Gun Range. Kentucky National Guard

RECREATION

Kriss Lowry & Associates, Inc. (KL&A) (2013b). Land Use. In Bullitt County Comprehensive Plan (chap.8). Retrieved from www.krisslowry.com/bullitt/Bullitt%20Comp%20Plan%20Chap%208%20Land%20Use.dec9.reduced.pdf

LEED for Neighborhood Development (LEED-D). (n.d.). Retrieved December 10, 2014, from <http://www.cnu.org/leednd>

GEOLOGY & SOILS

Bullitt County History. (2014) The Land. Retrieved September 5, 2014, from <http://www.bullittcountyhistory.com/bchistory/theland.html>

Currens, J. (2001). Karst. Retrieved September 5, 2014, from <http://www.uky.edu/KGS/water/library/gwatlas/Bullitt/Karst.htm>

Kentucky Geologic Survey. (n.d.). Generalized Geologic Map for Land-Use Planning: Bullitt

County, Kentucky. Retrieved September 5, 2014, from http://kgs.uky.edu/kgsweb/olops/pub/kgs/mc90_12.pdf

Geology of the County. (n.d.). Retrieved September 5, 2014, from <http://www.uky.edu/KGS/water/library/gwatlas/Bullitt/Geology.htm>

Kriss Lowry & Associates, Inc. (KL&A) (2013d). Environmental Considerations. In Bullitt County Comprehensive Plan (chap.4). Retrieved September 5, 2014, from http://www.krisslowry.com/bullitt/Bullitt_Co_Chap_4_Comp_Plan_Environmental_dec2013.reduced.pdf

Web Soil Survey. (n.d.). Retrieved September 5, 2014, from <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

HYDROLOGY

Kriss Lowry & Associates, Inc. (KL&A) (2013d). Environmental Considerations. In Bullitt County Comprehensive Plan (chap.4). Retrieved September 5, 2014, from http://www.krisslowry.com/bullitt/Bullitt_Co_Chap_4_Comp_Plan_Environmental_dec2013.reduced.pdf

Kriss Lowry & Associates, Inc. (KL&A) (2013b). Land Use. In Bullitt County Comprehensive Plan (chap.8). Retrieved from www.krisslowry.com/bullitt/Bullitt%20Comp%20Plan%20Chap%208%20Land%20Use.dec9.reduced.pdf

Kentucky Department of Fish & Wildlife Resources. (2014). Species Information Species observations for selected counties. Retrieved from: <http://app.fw.ky.gov/speciesinfo/countyListSpecies.asp>

Currens, J. (n.d.). Karst. Kentucky Geological Survey. Retrieved from: <http://www.uky.edu/KGS/water/library/gwatlas/Bullitt/Karst.htm>

Kentucky Geological Survey (KGS). (n.d.). Groundwater resources of bullitt county, kentucky. Retrieved from: <http://www.uky.edu/KGS/water/library/gwatlas/Bullitt/Waterquality.htm>

Loosemore, B. (2014). Rates jump for 1,500 added to Bullitt flood map. The Courier-Journal. Retrieved from: <http://www.courier-journal.com/story/news/local/bullitt/2014/11/06/bullitt-flooded-fema-map-questions/18590493/>

City of Shepherdsville Kentucky. (n.d.). FloodPlain News. Retrieved from: <http://shepherdsville.net/floodplain-news/>

CLIMATE

The Bullitt County History Museum. (2014, September 1). Retrieved November 10, 2014, from <http://www.bullittcountyhistory.com/index.html>

Bullitt County Weather. (2014). Retrieved November 10, 2014, from www.usa.com/bullitt-county-ky-weather.htm

Kriss Lowry & Associates, Inc. (KL&A) (2013d). Environmental Considerations. In Bullitt County Comprehensive Plan (chap.4). Retrieved September 5, 2014, from http://www.krisslowry.com/bullitt/Bullitt_Co_Chap_4_Comp_Plan_Environmental_dec2013.reduced.pdf

Bullitt County, Kentucky Complete Analysis. (2011, January 1). Retrieved November 10, 2014, from <http://www.citymelt.com/county/Kentucky/BullittCounty-KY.html>

FLORA & FAUNA

Kentucky Department of Fish and Wildlife Resources. (2014). State Threatened, Endangered, and Special Concern Species observations for selected counties. Retrieved October 3, 2014, from <http://app.fw.ky.gov/speciesinfo/countyListSpecies.asp>

Kentucky State Nature Preserves Commission. (2014). Report of Endangered, Threatened, and Special Concern Plants, Animals, and Natural Communities for Bullitt County, Kentucky. Retrieved from http://naturepreserves.ky.gov/pubs/publications/County_Reports/Bullitt.pdf

U.S. Fish and Wildlife Service. (2014, October 30). Endangered species. Retrieved October 30, 2014, from <http://www.fws.gov/endangered/>

COMMUNITY FACILITIES

Snider, J. (n.d.). Demographics. Retrieved November 7, 2014, from <http://www.thinkkentucky.com/cmnty/Demog.aspx?cw=013>

Kriss Lowry & Associates, Inc. (KL&A) (2013e). Community Facilities. In Bullitt County Comprehensive Plan (chap.6). Retrieved September 5, 2014, from http://www.krisslowry.com/Bullitt_Co_Chap_6_Community_Facilities_FINAL.dec2013.reduced.pdf

2 | REFERENCES

INFRASTRUCTURE

Kentucky Geography Network. (2014) Retrieved September from <http://kygeonet.ky.gov/>

TRANSPORTATION

ENTRAN, PLC. (2010, April). Go Bullitt County: Bullitt County Transportation Study. Final Report. Retrieved from http://www.kipda.org/files/PDF/Transportation_Division/Information/Bullitt_County/01_Final_Report_-_Bullitt_County_Transportation_Study.pdf

SOUND & NOISE

Lincoln Trail Area Development District. (2008). Noise/Vibrations. In Joint Land Use Study (JLUS) 2008 Update. Fort Knox, Kentucky: Kriss Lowry & Associates.

HOUSING & DEVELOPMENT

U.S. Census Bureau: State and County QuickFacts. U.S. Census Bureau. (2014). Bullitt County, Kentucky. Retrieved from <http://quickfacts.census.gov/qfd/states/21/21029.html>

Bullitt County. Bullitt County Zoning and Subdivision Regulation. (1987). Bullitt County, Kentucky. Retrieved from <http://bcplannin6.wix.com/bullitt-county-pandz#!regulations/c3o8>

Subdivision Image:
<http://gkdevelopment.files.wordpress.com/2012/05/subdivision.jpg>

DEMOGRAPHICS

Kentucky Cabinet for Economic Development. (2014). Bullitt County Community Profile. Retrieved September 15, 2014, from <http://www.thinkkentucky.com/cmnty/Demog.aspx?cw=013>

Kriss Lowry & Associates, Inc. (KL&A) (2013f). Population. In Bullitt County Comprehensive Plan (chap.6). Retrieved September 15, 2014, from http://www.krisslowry.com/Bullitt_Co_Comp_Plan_Chap_2_Pop_Nov_21.pdf

United States Census Bureau. (n.d.). Retrieved September 15, 2014, from <http://quickfacts.census.gov/qfd/states/21/21029.htm>

ECONOMICS

Bullitt County Economic Study. (2010, April 1). Retrieved September, 2014, from http://www.krisslowry.com/Bullitt_Co_Bullitt_County_Transportation_Study_reduced.pdf

The Economic Impact of the Local Healthcare System on the Bullitt County Economy. (2012). Retrieved September, 2014, from http://cedik.ca.uky.edu/files/Bullitt_County.pdf

Bullitt County Employment and Earnings. (2012). Retrieved September, 2014, from http://cedik.ca.uky.edu/sites/cedik.ca.uky.edu/files/Bullitt_WF_Profile.pdf

TOURISM

Trip Advisor. (2014). Shepherdsville KY. Retrieved September 9, 2014, from <http://www.tripadvisor.com/>

3 | CASE STUDIES

FLOYDS FORK • LOUISVILLE LOOP • OLMSTED PARKS • ELIZABETHTOWN GREENBELT • ADKISSON GREENBELT • WOODSTOCK GREENPRINTS • GREAT RIVERS • BOULDER GREENWAYS • NASHVILLE GREENWAY • WAKE FOREST GREENWAY • DAKOTA COUNTY GREENWAY • CENTRAL OHIO GREENWAYS • BIG CREEK GREENWAY • RAILWAY RESERVES • EMERALD NECKLACE • DENVER URBAN TRAILS • CAROLINA THREAD • FAIRFAX TRAILS



M. Maloney



A. Sauer



E. Clark



T. Klondike



E. Lee



N. Wright



K. Palmer



B. Sewe



B. Coggeshall



D. Walker



W. Griffith



J. Wehmer



J. Embree



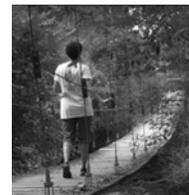
C. Pitcock



A. Sookying



H. McClure



N. Stone



Q. Miao

3 | PARKLANDS OF FLOYDS FORK

LOCATION: Louisville, KY

SIZE: 4,000 acres

BUDGET: \$120 million

DATE PLANNED: 2001

DATE CONSTRUCTED: 2011 - 2015

DESIGNER(S): Wallace, Roberts, & Todd Associates (WRT)

MANAGED BY: 21st Century Parks

PRIMARY USERS: Residents, Hikers, Bikers, Runners, Volunteer Groups, Wildlife Enthusiasts, and Non-Motorized Boats

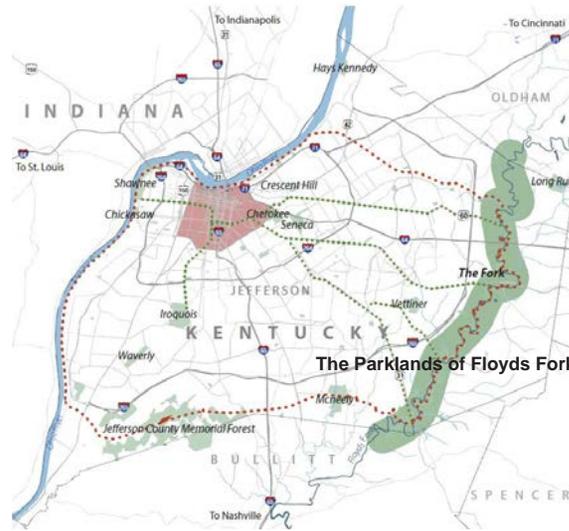


Figure 3.1.1: Park Context (Source: WRT, 2008)

INTRODUCTION

The Parklands of Floyd's Fork, a systematic donor-supported public park, is managed and being developed by 21st Century Parks, a private nonprofit corporation founded in 2004. The vision for The Parklands began in 2001. The master plan for the park was completed in 2008 and ground broke for phase I in 2011. The new park system containing four parks, Beckley Creek Park, Pope Lick Park, Turkey Run Park, and Broad Run Park, cuts through the last undeveloped region of Jefferson County with aims to put nature into neighborhoods as the city grows around the preserved landscape mosaic. Inspired by Frederick Olmsted, the vision for The Parklands will shape the city's geography, its social interactions, and its economies (The Parklands of Floyd's Fork, 2014).



Figure 3.1.2: Floyd's Fork Canoe Trail (Source: Flickr, 2014)



Figure 3.1.3: Miles Trailhead, Beckley Creek Park (Source: Flickr, 2014)

PARK GOALS

Many goals have influenced the master planning and vision of the park system. These goals include: 1) Creating a remarkable and creative combination of greenways, trails, and parklands of the highest quality standard, 2) Providing for conservation of natural resources and for environmental sustainability, 3) Fostering the creation of a well-used and well-loved community resource, 4). Creating a valuable recreational resource that is welcoming, inclusive, and serves a wide variety of needs and interests, 5) Developing facilities for The Parklands that are safe, effectively maintained, and economical to operate, and 6) Integrating on-going regional planning efforts, surrounding land uses, neighborhoods, proposed private developments, and public infrastructure improvements to create a symbiotic relationship between the park and its environs. (WRT, 2008)

MASTER PLANNING

The master plan was created in conjunction with federal and municipal agencies, civic leaders, park and recreation enthusiasts, private non-profit organizations dedicated to land conservation and parks, and the general public. It focused on themes such as experience, sustainability, and connectivity. Experiences within the park are designed to offer a variety of unique places with distinct characteristics. Places such as the Humana Grand Allee in Beckley Creek Park, a currently open park, offers walking paths, a picnic grove, wetlands, sports fields, and a festival promenade while Turkey Run Park, which will be open at the end of 2015, will offer extensive trail system for hiking, mountain biking, and cross country running. Sustainable practices are used

throughout the park to increase environmental and cultural stewardship. Ecosystem improvements to the landscape include invasive species removal, stream restoration, canopy extensions, and habitat restoration. Connectivity, a key backbone of The Parklands, links the public, the park, and its amenities. Three specific elements of the connectivity are the Louisville Loop (The Parklands will encompass an 18-mile segment of the 100-mile loop), a scenic park drive, and a water trail with canoe and kayak launches along Floyds Fork. (The Parklands of Floyds Fork, 2014)

This remarkable park took a lot of work to make it come to life. One of the most difficult tasks was land acquisition. Over 80 land transactions took place for 21st Century Parks to acquire the land for the park. Other difficult obstacles included receiving permission to take the Louisville Loop under a working railroad trestle and providing safe pedestrian crossings over major roads surrounding the park such as Taylorsville Road. (The Parklands of Floyds Fork, 2014)

USER EXPERIENCES

Many park goers visit The Parklands often. They enjoy exploring new places each time they come for visits. Some say that it is the best park system they have ever been to and are anxious for the final two parks to open. (The Parklands of Floyds Fork Facebook Page)

LESSONS

The most important lesson to take from The Parklands of Floyds Fork is the park's sustainability. For completion of another park system of this

scale, key strategies include having a strategic master plan as to how the park will operate once completed. To do so, the project vision must address the park's qualities and programming, the park's governance (who will be responsible for running the park), and the park's sustainability (how will future operations and long term maintenance be funded once the project is completed).



Figure 3.1.4: Balloon Glow, Beckley Creek Park (Source: Flickr, 2014)



Figure 3.1.5: Nature Viewers. (Source: Flickr, 2014)

3 | LOUISVILLE LOOP

LOCATION: Louisville, Kentucky

SIZE: 30 linear miles

BUDGET: Undetermined

DATE PLANNED: 1980's

DATE CONSTRUCTED: 1986-current

DESIGNER(S): Louisville Metro Parks with help from MSD: Public Works, The Parklands of Floyds Fork, Frederick Law Olmsted Parks, Health Department and Planning

MANAGED BY: Louisville Metro Parks

PRIMARY USERS: Walkers, Joggers, Cyclists



Figure 3.2.1: Louisville Loop (Source: www.louisvilleloop.org, 2014)



Figure 3.2.2: Louisville Loop Trail. Louisville, KY (Source: www.louisvilleloop.org, 2014)

INTRODUCTION

The Louisville Loop is a shared bike and pedestrian trail that will eventually span over 100 miles around the city of Louisville, Kentucky. The completion date is dependent on the collaboration of multiple firms and city departments, therefore, it is unclear as to how soon it will be finished. Upon completion, it will become a single network used to connect parks across the entire county. Currently, there are only about 30 of the 100 proposed miles completed (louisvilleloop.org). The trail system is open to the public and promotes use from walkers, joggers, skateboarders, rollerbladers, and in some places even horses.

The first completed section of the trail was the Riverwalk. It spans approximately 7 miles along the Ohio River, starting from the Waterfront Park and ending in Chickasaw Park. Along this trail, Metro Parks has utilized mile markers as educational opportunities. Every 1/10th of a mile there is a mile marker with information about 19th century river culture, such as nautical units of measurements, river jobs, and types of river boats (louisvilleloop.org).

The next series of completed trails/parks are expected to be completed by 2015:

- The Jefferson Memorial Trail
- Pond Creek
- Floyds Fork Trail
- Eastern Suburbs Trail
- River Road/Riverfront Trail
- Northwestern Parkway
- McNeely Lake Park
- Shawnee River Walk
- Fairdale Connector Trail

The Louisville Loop has received quite the praise from residents since the idea started in the 1980's. The first segment of trail built, at less than 7 miles long, saw less traffic than anticipated but the city forged ahead adding more trail segments. The Louisville Loop is now part of a municipal project called The City of Parks that is creating a continuous paved path around the city. The City of Parks has also created an up to date plan of how to achieve the 100 mile loop successfully.

"I really enjoy riding this bike path, which stretches (generally) along the Ohio River around Louisville. I tend to ride the southern-most 10-15 miles of the trail and it is always a good ride - seldom crowded, well looked after, etc. There are occasional benches to sit and have a rest or enjoy the view, as well as occasional water fountains (although

more wouldn't hurt). I can't wait for them to improve the levee trail between Watson and Farnsley-Moreman, though."

-LouieBiz (tripadvisor.com)

"The Loop will eventually circle Louisville for a whopping 110 miles, but for now you're riding the first 25, which are pure urban genius: gorgeous river views, dense forests and delightful chance encounters with kids, lawyers, golfers, rednecks, X-ray techs, stoners, junkyard dogs, and the occasional man-boobied sunbather."

-Jim Welp (leoweekly.com)

As a user of the project myself, I could not think of a more accurate description of the trail. It has a very unique ride in the sense that the environment is ever changing. As a bike rider or runner, new

scenery is a must to perform at your best. Surprisingly enough, the urban environment of the Waterfront leg of the trail, the one used the most, has a beautiful array of landscapes and scenery. This is one of the many reasons people seek the Loop for use. I have even made it a tradition to ride from my house, 8 miles away, just to get to the trail downtown, and then continue down the river on the trail another 12 miles and back to my house. It becomes about a 30 mile round trip and I do it once every summer. The one critique of the Loop expressed from others as well as myself is the need to actually complete the Loop. It has been talked about for so many years and yet there is only a continuous 30 mile stretch that can be used. On top of that, the last two years I road the trail I was stopped by a section of the trail being closed with no alternative routes (pictured below).



Figure 3.2.3: View of the city from the Louisville Loop. Louisville, KY.

3 | OLMSTED PARKWAY SYSTEM

LOCATION: Louisville, KY

SIZE: 6 Parkway (14.5 miles) & 18 Parks

DATE PLANNED: 1891

DATE CONSTRUCTED: Completed in 1930

DESIGNER Frederick Law Olmsted, Senior

MANAGED BY: The Board of Parks Commissioners, Louisville Department of Public Works, Kentucky Department of Forestry, and from 1989 until now by Olmsted Park Conservancy

PRIMARY USERS: Residents, Bikers, Pedestrians

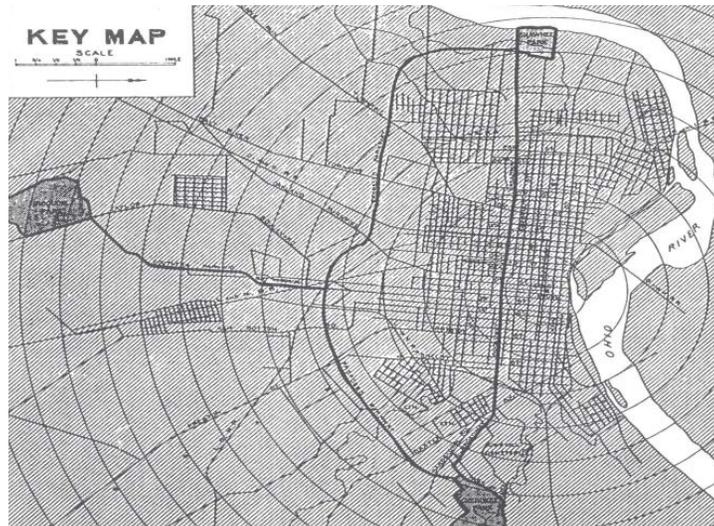


Figure 3.3.2: Frederick Law Olmsted completed the master plan to connect Louisville through a system of parks and parkways in 1891. Olmsted continued to design general plans for each park. (Source: Olmsted, louisvilleky.gov, 2014)



Figure 3.3.1: Today Southern Parkway has a healthy tree canopy, as intended by Frederick Law Olmsted. (Source: louisvilleky.gov, 2014)

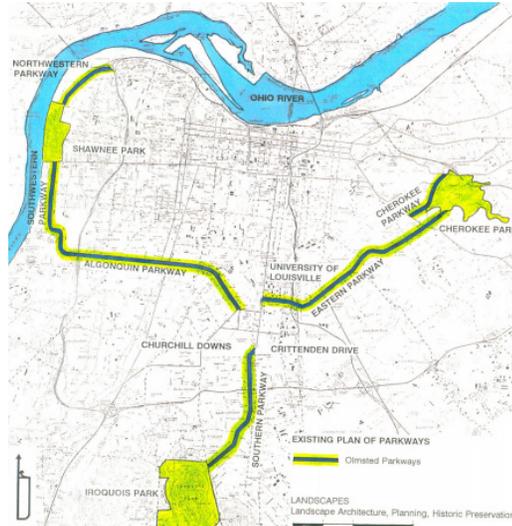


Figure 3.3.3: The current parks and parkway system in Louisville is not completely connected as Olmsted had intended. (Source: louisvilleky.gov, 2014)

INTRODUCTION

In 1887, the Park Commission President, Andrew Cowan, proposed a system of parks and parkways for Louisville, Kentucky. Four years later, Frederick Law Olmsted recommended a parkway system consisting of eighteen parks and six parkways for the city. City leaders agreed in concept, however they lacked a feasible plan of action. Obstacles, such as lack of leadership for the project, general lack of funding, and obtaining previously developed property, greatly slowed the implementation process. (City of Louisville, 2014)

REALIZATION

Much of the land necessary to build the parkway system was privately owned, and some owners were reluctant to sell. Between 1888 and 1930 land was slowly but surely acquired and developed. Finally, Olmsted's plan was realized. (http://louisvilleky.gov/sites/default/files/parks/planning_and_design/chapter1parkwayshistory2010oct22.pdf)

Louisville was on the rise as the parkway system was being built. The current parkway system is similar to the original Frederick Law Olmsted plan but does not follow it completely. For instance, the parkways are meant to form a complete circle around the city, but they do not. The plan had to evolve to fit into the growing city. Regardless of their importance, some connections were never made. (City of Louisville, 2014)

Frederick Law Olmsted made a science of parkway design. His designs follow the 7 "S's" of Olmstedian Principles, which are subordination, style, suitability, scenery, service, sanitation and



Figure 3.3.4: Mr. Olmsted's rendered vision of Southern Parkway, formerly known as the Grand Boulevard. (Source: louisvilleky.gov, 2014)

separation. All the parkway plans consisted of the same basic elements. (City of Louisville, 2014)

Frederick Law Olmsted had a grand vision for this parkway. "A central drive for pleasure travel and two smaller side drives for property access, for a total of three drives. Two green medians between the drives containing two or more tree rows each, grass verges, and pedestrian, bicycle and/or bridle paths. A pair of grass verges at the outermost edges near the residences, flanking each side with additional trees and additional sidewalks." These elements of a parkway are as relevant today as they were one hundred years ago. The concept of mixed-use paths and green space accompanying an automobile road is as safe and functional as it is enjoyable to use. (louisvilleky.gov, 2014)



Figure 3.3.5: Current Conditions of the Southern Parkway service road. It is used primarily by residents for automobile parking. (Source: louisvilleky.gov, 2014)

MAINTENANCE

The Board of Parks Commissioners were solely in charge of maintenance of the parks and parkway system. The Department of Parks and Recreation replaced the Board of Park Commissioners in 1942, and maintenance of the system became divided. The Louisville Department of Public Works was responsible for the parkway and park roads, whereas the Louisville Forestry Division maintained the trees along these roads. The six parkways were developed separately, thus creating slight variations in road and median size, inclusion of service roads and shared use paths, and amount of tree canopy. (City of Louisville, 2014)



Figure 3.3.6: In the latest plan for the Southern Parkway service road it is utilized more as a mixed-use path, which is much more as Mr. Olmsted intended. (Source: louisvilleky.gov, 2014)

THE FUTURE

By the mid 20th century the parks were in poor shape. In the 1970's, a group of citizens formed the "Friends of Olmsted Parks" to raise awareness of the parks disrepair. In 1989, Mayor Jerry Abramson created Louisville's Olmsted Park Conservancy for the parks maintenance and restoration. The Conservancy analyzed the parkways in depth and has plans to repair the neglected pieces. Olmsted planned for shared-use pathways, most of which were never executed. In 2010 a master plan was created to integrate bike paths and multi-use paths into all of the parkways and increase tree canopy along these paths. This plan will repair the parkway system to fulfill the vision of Frederick Law Olmsted and will soon be implemented. (City of Louisville, 2014)

3 | ELIZABETHTOWN GREENBELT TRAIL SYSTEM

LOCATION: Elizabethtown, KY

SIZE: 18 miles

BUDGET: \$40,000 per year + 250k endowment

DATE PLANNED: 1974

DATE CONSTRUCTED: On-going

DESIGNER(S): Greenspace Inc. + City Planner

MANAGED BY: Greenspace Inc.

PRIMARY USERS: Residents and clubs of Elizabethtown and surrounding areas that typically use the park for recreational uses (i.e., running, walking, biking)

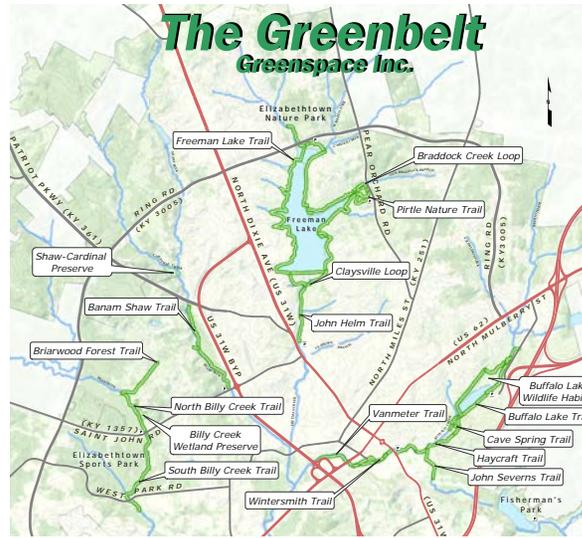


Figure 3.4.1: Greenbelt Trail Map (Source: Greenspace, Inc. 2014)

INTRODUCTION

Elizabethtown, Kentucky, is a city located in Hardin County, a mere 37 miles south of Bullitt County. Since 1974, a greenway system within Elizabethtown has been promoted, developed and maintained by a non-profit organization called Greenspace, Inc. This greenway system, named the Elizabethtown Greenbelt Trail System, is comprised of an expanding series of trails, parks and open spaces that host a wide variety of programmatic experiences.

In the late 1960's and early 1970's a project that required the damming up of several streams in this area led to the creation of several lakes. This created a unique opportunity for the residents of Elizabethtown to seek possibilities that would allow these newly formed lakes and adjoining streams to become recreational facilities (Ed Sprague. Interview. September 2014).

The founding of Greenspace, Inc. in 1974, gave a voice to community members who were vested in the best interest of the areas surrounding these lakes. With the objective of Greenspace, Inc. to "preserve streams and the accompanying riparian areas for recreational, ecological, educational, historical, and aesthetic values (<http://www.touretown.com/Portals/0/pdf/brochure-walkingtrails.pdf>)," it became clear that a greenway system would be the best solution. From here, Greenspace, Inc. began seeking sources for both land acquisition and funding.

LAND FOR DEVELOPMENT

One of the most interesting features of the Elizabethtown Greenbelt Trail System is that none



Figure 3.4.2: Billy Creek Trail, Elizabethtown Greenbelt (Source: Greenspace, Inc. 2014)

of the property that embodies the trail system is actually zoned for “parks” or “recreational facilities.” This is a rather unusual circumstance for linear parks. Most linear parks, whether they are publicly or privately funded, typically sit on land that is designated for that specific use. If the desired land is not currently zoned for parks or recreation, the managing body usually has to purchase said land for some monetary sum. However, in this case, the property owners have allowed for the joint public use of a portion of their property via easements to Greenspace, Inc., while still maintaining ownership over the lot. This, in turn made the design/construction processes much easier, and allowed for Greenspace, Inc. to save money that would have otherwise needed to go toward the acquisition of real estate.

FUNDING

One of the strengths of the Elizabethtown Greenbelt system is the variety of ways in which the entity in charge of maintenance (Greenspace, Inc.) obtains monetary funds for the upkeep of the park and trail properties. In addition to its operating account, Greenspace, Inc. has established an Endowment Fund. Donations to the Endowment Fund provide funds to assure the long-term success of Greenspace, Inc. and the Elizabethtown Greenbelt Trail System. The Endowment Fund is managed by a five-person volunteer board, and is invested in Stock Index Funds, Bond Funds and Credits of Deposits at local banks. This account currently has a value of roughly \$250,000 (Ed Sprague. Interview. September 2014).

Greenspace, Inc. relies primarily on personal, ongoing, annual, tax-exempt contributions to finance the annual operational budget which



Figure 3.4.3: Buffalo Lake Trail, Elizabethtown Greenbelt (Source: Greenspace, Inc. 2014)

ranges from \$35,000 to \$40,000 per year. This pays for the Trail Superintendent’s salary, other trail expenses, insurance and publications. (Ed Sprague. Interview. September 2014).

Greenspace, Inc. also receives non-monetary support from members, civic organizations like the Boy Scouts, church groups, city departments, the all-volunteer board, and others. Additionally, special projects like bridges, large equipment purchases, new major trail construction, and

unexpected repairs have received grants from government and other sources from within the community (www.greenspaceky.com).

However, the one factor that distinguishes Greenspace, Inc. from other entities is their relationship with the local government. Since this greenway has created a highly-used amenity for Elizabethtown, the local government matches a certain percentage of funds used for upkeep of the greenway. This partnership in particular has helped grow and sustain this trail system.

3 | ADKISSON GREENBELT PARK

CITY TRAIL SYSTEM

COUNTY TRAIL SYSTEM

LOCATION: Owensboro, Kentucky

LOCATION: Daviess County, Kentucky

LENGTH: 14.5 miles

LENGTH: 1.7 miles

BUDGET: Unknown

BUDGET: \$421 - 476 K

DATE PLANNED: 1990's

DATE PLANNED: 2008

DATE CONSTRUCTED: 1990's - 2013

DATE CONSTRUCTED: 2008 - 2009

DESIGNER(S): Unknown

DESIGNER(S): Unknown

PRIMARY USERS: All ages and capacities. Walkers, bikers, physically disabled, young and old. The paths include asphalt, concrete, and low-impact dirt trails.

MANAGED BY: Division of Parks and Recreation, with maintenance services sub-contracted out to local lawn care crews. Working budget for these services fluctuates based on annual funds.

INTRODUCTION

The Adkisson Greenbelt Trail is a greenway that connects six city parks and half a dozen or more communities and neighborhoods. With restrooms and water fountains every few miles, users have a comfortable place to rest and rehydrate while enjoying the healthy lifestyle that greenways provide. This segues perfectly into Owensboro's goal for the park system which is *"designed to encircle the city linking neighborhoods, business districts, parks, and schools ... enjoy walking, running, skating, or bicycling for recreation or to reach a destination..."* - Owensboro Parks and Recreation

In addition to connecting Owensboro's residential centers, the greenway connects the learning institutions across the city. This trail is aimed toward connecting people of all walks of life with nature and offering healthy choices of being active at a variety of levels.

CITY PARK SYSTEM

The Greenbelt Park Trail in Daviess County starts at Joe Ford Nature Park to the west and travels through many parks before ending in the Heartlands community to the east. Some of these notable connections are (east to west) Fisher Park, the Airport Practice Fields, Atlantis Health and Pool, Apollo High School, Town Square Mall, Malco: Owensboro Cinema, Horse Fork, and Owensboro Country Club, then north at Yewell Heritage Park to go through the Heartland Housing Community. This is the extent of the city portion that began construction over 20 years ago. This trail draws the city of Owensboro together as a community.



Figure 3.5.1: Multi-use trail in city portion of the Adkisson Greenbelt Park (Source: Owensboro Living, 2014)



Figure 3.5.2: County Trail bridge (Source: Heartland Home Community, 2014)

COUNTY PARK SYSTEM

The Greenbelt system circles Owensboro out past where major development has yet to occur, thus showing the city's planning foresight. This foresight has not been lost in connecting the developing rural parts of the county. The county extension connects to the city portion of the Greenbelt at Yewell Heritage Park and heads east along an inactive railroad bed for nearly two miles. This portion closely follows the Horse Fork. The property for this segment of the trail fell into the lap of the county and they decided to make something useful out of desolate land. The county has no plans to extend their portion of the Greenbelt in the near future. This does however leave room for expansion further out into the developing suburbs near the county trail.

COMMENTS

Adkisson Greenbelt Park is of particular interest because this is a type of greenway that Bullitt County should strive for in their communities; a comprehensive trail that connects many towns and amenities. This also allows for new parks and recreation areas to develop. The majority of the paths in the Greenbelt Trail were built on property easements, for example, the Joe Ford Nature Park in Owensboro. The Joe Ford Nature Park was developed as a trail head of the Greenbelt Trail because there was an apparent need for a beginning point of the greenway, and this location was thought to adequately serve this need.

There are some things that should be modified for future developments or when implementing a similar greenway system. The Greenbelt does not

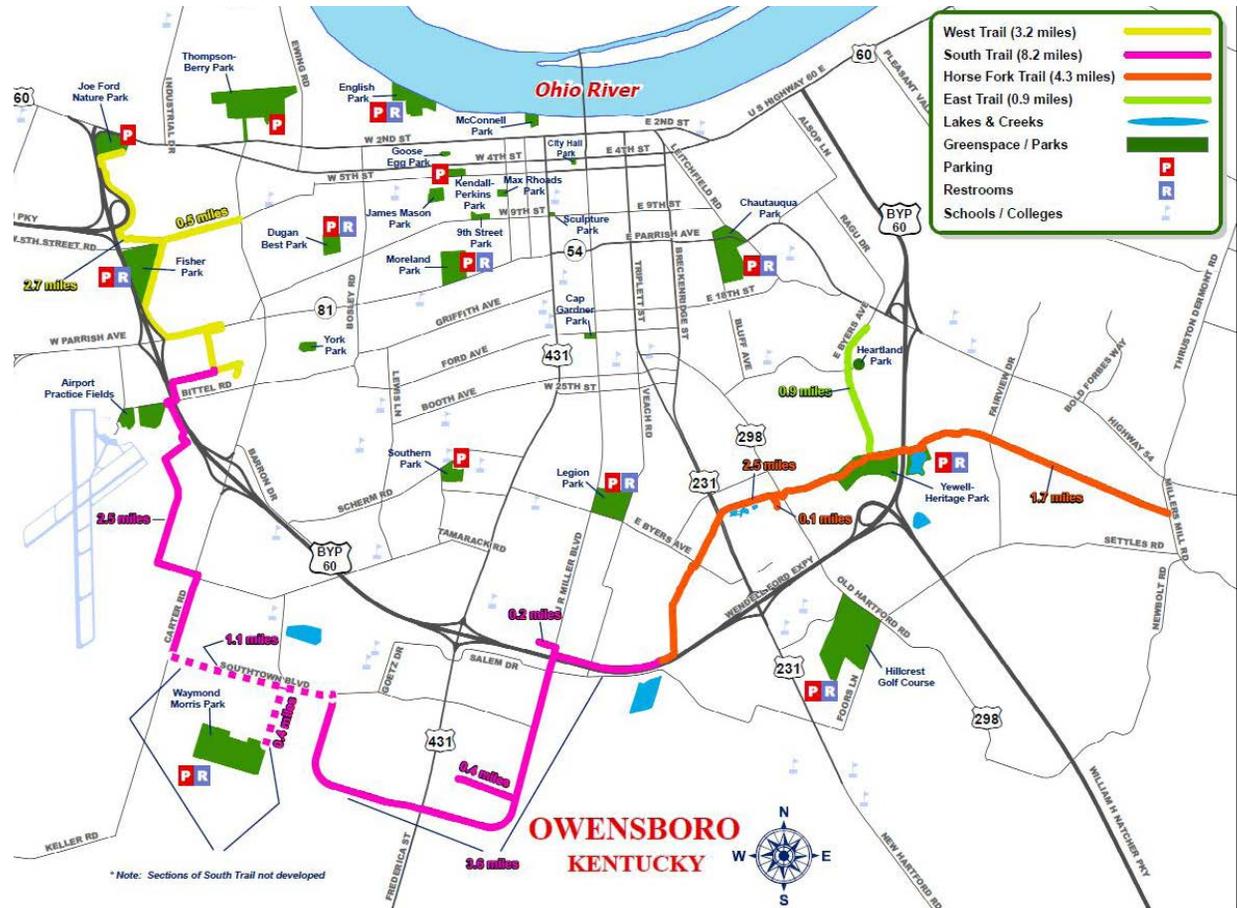


Figure 3.5.3: Diagram illustrating the phasing of the Greenbelt Trail. The southern portion was completed in the fall of 2013. As of now the city portion of the Greenbelt Trail is completed. As the county develops around Highway 54, the county portion will likely expand. (Source: Owensboro Parks and Recreation, 2012)

connect to the downtown core of Owensboro. Any trail systems in Bullitt County need to connect to Shepherdsville and Mt. Washington. The overall trail type could be similar: a ten foot wide asphalt path with minimal plantings along the path, allowing the landscape to grow naturally through succession. Incorporating parks, neighborhoods,

and business centers into the trail system will be crucial to the success of the greenway. One added component of the greenway system will be an awareness of conservation and habitats in the region. The greenway system will not only be a functional system, but an aesthetically appealing destination for Bullitt and surrounding counties.

3 | WOODSTOCK GREENPRINTS MASTER PLAN

LOCATION: Woodstock, GA

SIZE: 60+ miles

BUDGET: \$32 million

DATE PLANNED: 2007

DATE CONSTRUCTED: In Progress.
First segments opened in May 2014.

DESIGNER(S): Ecos Environmental Design, Pond & Co., The PATH Foundation, Pros Consulting

MANAGED BY: City of Woodstock/Greenprints Alliance

PRIMARY USERS: Hikers, walkers and cyclists



Figure 3.6.1: Viewing areas of a stream within the Greenprints Plan. (Source: Pond & Company, 2014).



Figure 3.6.2: Completed Taylor Randahl Memorial Mountain Bike Trail System. (Source: Greenprint Alliance, n.d.)

INTRODUCTION

The Greenprints Project of Woodstock, Georgia, backed by the Greenprints Alliance, strives to create “A sustainable greenspace and trail network that defines and enhances the City of Woodstock’s community, natural and economic resources for all generations” (Ecos Environmental Design Inc., *et al.*, 2008, p. 1). The Greenprints Alliance (a group of proactive community members that focuses on protecting and getting the community outdoors to enjoy the natural environment), and the city of Woodstock have listed four important goals to ensure the success of this project.

These goals are as follows:

- “Improve air and water quality”
 - “Create places for a diversity of users to enhance community health”
 - “Provide connectivity for people and wildlife”
 - “Protect natural and cultural resources”
- (Ecos Environmental Design Inc., *et al.*, 2008, p. 17)

DESIGN ASPECTS

Amenities, connections and attractions within the Parks and Trail Master Plan were also important to the future success of the project. This project will connect existing and future parks via one greenway system. Greenspace is pertinent to the design and is exhibited in several forms, such as neighborhood greenspace, community greenspace, natural greenspace and corridor greenspace. The parks that are connected via this single system will feature play structures, viewing areas, picnic areas, court games, athletic fields, education centers, nature centers, and 60+ miles of multi-use trails. These trails will provide

adequate recreational space for walkers, runners, joggers, hikers, and bicyclists (Greenprint Alliance, n.d.).

The Greenprints Master Plan document gives a description of the project. It states:

“The City of Woodstock’s Trail System has been developed to preserve greenspace, provide opportunities to experience natural areas, and to allow for alternate means of transportation and recreation between various points of interest... The trail system will connect city parks and county parks, proposed greenspace and community facilities; provide access to downtown Woodstock’s many amenities, Little River, Noonday Creek, and Rubes Creek. The resulting trail system will connect regionally to Blanket’s Creek, Riverchase Park, Leita Thompson Park and Sweat Mountain Park” (Ecos Environmental Design Inc., *et al.*, 2008, p. 33).

MASTER PLAN

Figure 3.6.3 shows the 2012 Revised Plan of the Woodstock Greenprints Parks & Trails Master Plan. The core principles of the design follows in accordance with the beliefs of the Greenprint Alliance, where existing riparian and natural corridors are incorporated into human-use systems. The plan shows the built and proposed park spaces and their ¼ mile to ½ mile each radius. Federally protected land is shown as greenspace that has been woven into the overall project design. The plan also shows the different trail systems throughout the project. The implementation of the project is currently in progress with multiple sections of the design already completed (Greenprint Alliance, n.d.).

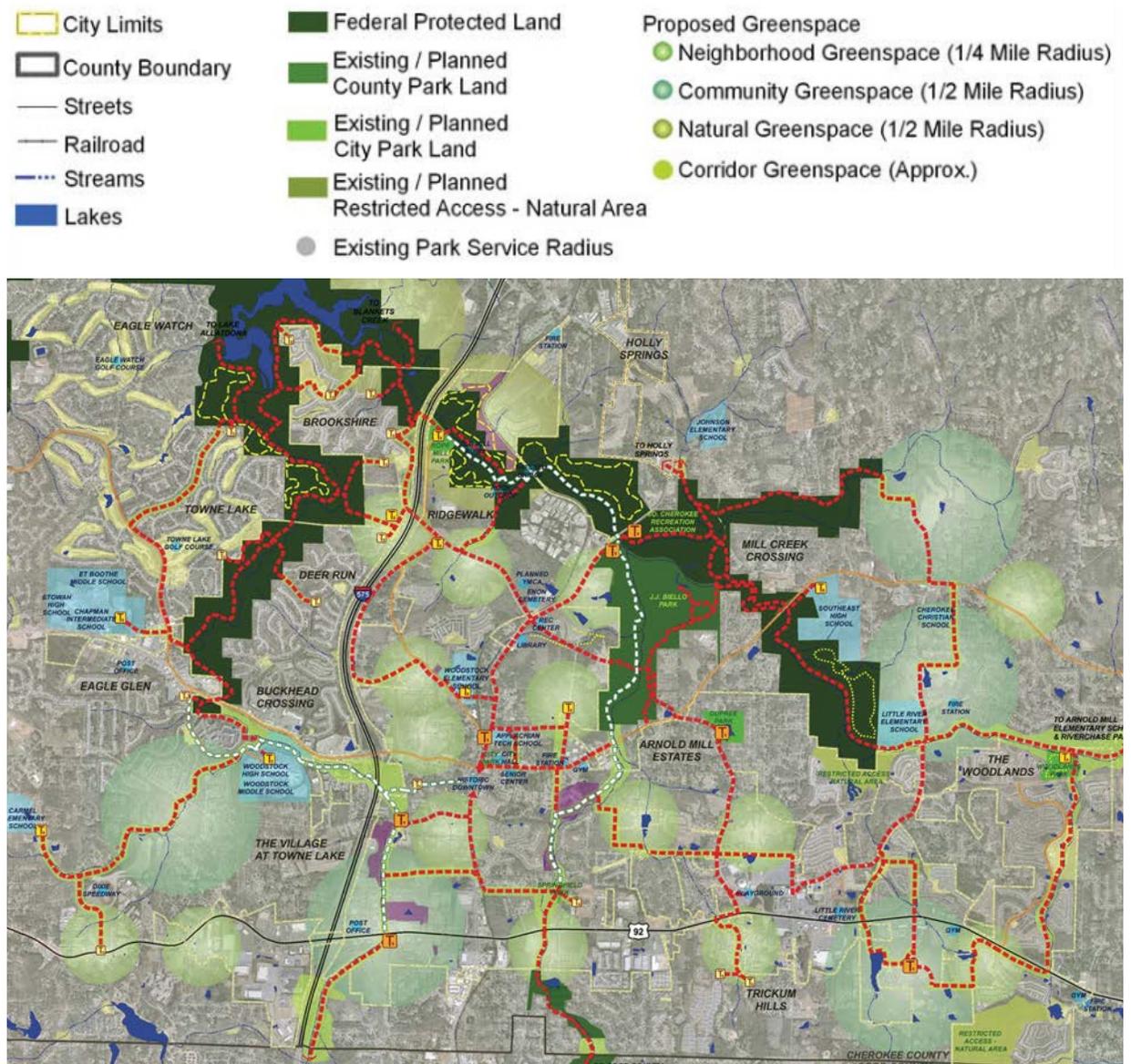


Figure 3.6.3: 2012 Greenprints Master Plan with legend, explaining proposed and existing greenspaces. (Source: Pond & Company 2014; Greenprint Alliance, n.d.)

3 | GREAT RIVERS GREENWAY

LOCATION: Greater Saint Louis Area, Missouri

SIZE: 250 Proposed miles of trails
1500 Proposed acres of preserved land

BUDGET: \$1.5 Million Annual Operating Budget

DATE PLANNED: 2000-2011

DATE CONSTRUCTED: On-going
(2000-Present)

DESIGNER(S): HOK, Vector Communications,
Alta Planning + Design, Trust for Public Land

PRIMARY USERS: Residents, Hikers, Bikers,
Volunteer Groups



Figure 3.7.1: River de Peres Master Plan (Image Source: Great Rivers Greenway, 2014)



Figure 3.7.2: Great Rivers Greenway Banner (Image Source: Great Rivers Greenway, n.d.)

INTRODUCTION

In 2000, the residents of the greater St. Louis area voted to create the Great Rivers Greenway. Since that time, the Great Rivers Greenway District has been working to carry out the vision of the people to make the St. Louis area a better place to live. The fundamental purpose of the Great Rivers Greenway District is to create a clean, green and connected region to address issues such as blight, urban sprawl and population loss. This will be accomplished through programmatic components such as trails to connect communities, bike-friendly streets and transit, and the region's rivers and parks, all of which showcase characteristics unique to the St. Louis Area.

Studies have shown that the creation and preservation of urban green spaces and parks

delivers tremendous benefits to communities (Rails to Trails Conservancy, 2006.) Infrastructure that promotes parks and greenways, as well as bicycle and pedestrian travel, have been shown to improve overall health, reduce pollution, stabilize communities, reduce crime, expand recreation and tourism opportunities, retain a vibrant workforce, encourage local investment, and increase property values.

The Great Rivers Greenway is working to create an amenity available to everyone and a lasting legacy in the region. Developing this system has already had an impact on area residents such as increased property values, (re)investment and reduced crime in areas nearby developed portions of the system, (St. Louis Post Dispatch, 2012.). The Greenway and will continue to benefit residents and foster a way of life that is meaningful and significant for generations to come.



Figure 3.7.3: Great Rivers Greenway Masterplan (Image Source: Great Rivers Greenway, n.d.)

PAST

Since 2004 the greenway has been guided by its original framework plan which emphasized investments via land acquisition and facility construction. As the framework document that has guided Great Rivers Greenway since 2004, the original Citizen-Driven Regional Plan established a number of principles that have become the foundation of the greenway.

PRESENT

In 2011, HOK created an update to the master plan. Using the original greenway plan as a foundation, the revised plan provides a series of strategies for building, promoting and sustaining the greenway. HOK's greenway plan update identifies public, private, non-profit and citizen-based partnerships that will allow the organization to carry out the plan.

FUTURE

Currently the Great Rivers Greenway is in mixed stages of development with some areas already complete while others are still in phases of design and/or engineering. In the future a balance between building and sustaining will be the most prudent way to ensure the perpetual state of high quality and safe conditions in the Great Rivers Greenway.

3 | BOULDER GREENWAY PROGRAM

LOCATION: Boulder, Colorado

SIZE: Composed of 14 creeks with a total stream length of 53.1 miles and a tributary drainage area of 299.6 square miles

BUDGET: Unknown

DATE PLANNED: Boulder Creek Corridor Plan was adopted in 1984. The master plan was adopted in 1989.

DATE CONSTRUCTED: Ongoing project started in 1984.

DESIGNER(S): Unknown

MANAGED BY: Greenway Coordinator in the Public Works Department

PRIMARY USERS: Residents, hikers, bikers, and tourists.

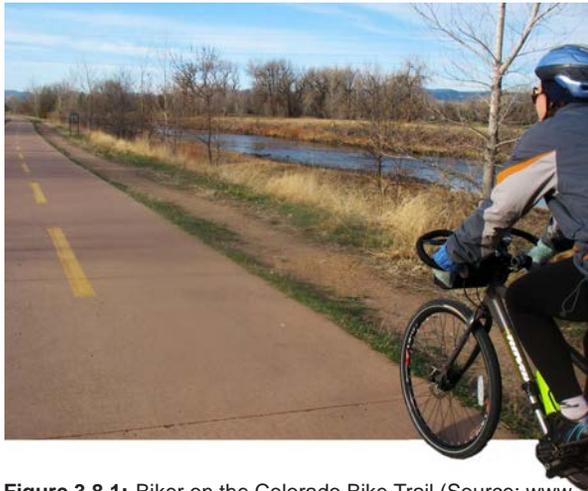


Figure 3.8.1: Biker on the Colorado Bike Trail (Source: www.alternativecommutepueblo.com, n.d.)

INTRODUCTION

The Greenway Program is located in the City of Boulder, Colorado. This project has spanned over three decades. In 1984, the City adopted the Boulder Creek Corridor Plan, which recommended development of a continuous path along the entire length of Boulder Creek. This was intended to serve both as a flood hazard mitigation measure and a linear urban park for recreational and transportation use. It also provide restoration and enhancement of wetlands and fish and wildlife habitat. (*Greenway Master Plan*, 2011). Since then the Greenway's uses and effects have expanded to include environmental health opportunities, conservation, tourism, education, stormwater management and economic benefits.

GOALS

Health Opportunities: Trails help promote healthier lifestyles and recreational activity participation.

Tourism: The Greenway attracts cycling enthusiasts from all over the US for leisure and sporting events.

Education: The Greenway trails have informational nodes that educate users about the environment, sustainability, and health benefits of physical activity.

Stormwater Management: The Greenway facilitates stormwater management which aids in maintaining water quality. It also helps limit development encroachment into floodplain zones as well as in conservation and preservation areas.

Economic Benefits: The Greenway improves tourism, property values and community health



Figure 3.8.2: 100 Year Flood Level Signage (Source; weadartists.org, n.d)

One success story of the Greenway Program is the development of the bike trails and overall increase in biking in Boulder. The city adopted the Transportation Master Plan in 1989. In 2003, the city council adopted the “complete street” concept to improve connectivity and safety throughout the city. The council decided that Boulder would provide mobility not by adding new roads, but through a wide array of transportation choices to make it easier to not drive (Roskowski, n.d.). Boulder has an 8.8 percent bicycle mode usage as compared to a nationwide average of 0.5 percent (American Community Survey 2006). Boulder is very bikeable - it has a bike score of 86 based on an evaluation by Walk Score, a private company that specializes in walkability/bikeability issues (www.walkscore.com). Boulder has been successful with its biking plans due to early establishment of a solid foundation in infrastructure and planning. The city then took the next actions necessary to provide workable alternatives to vehicular transportation.

PROS

The presence of the University of Colorado creates a built-in population in Boulder that is less inclined to drive, more educated and often more progressive in their willingness to change. The University's transportation policy and priorities have been fairly consistent with those of the city. Boulder focuses on building partnerships with the university, as well as the local school district, major employers and other agencies (www.pedbikeinfo.org, n.d.). Forward-thinking, comprehensive planning focuses growth within existing city boundaries. As a result, most of Boulder's growth is restricted to in-fill and redevelopment, which increases density and multimodal-friendly urban forms ("City of Boulder, CO Transportation Planning" n.d.).

Types of Bike Trails

- Bike Paths in Town: These include bike tracks, bike lanes and trails within an urban setting.
- Mountain Bike Trails: These are off road dirt trails. They are mostly used by active riders.
- Road Bike Trips: Used for leisure or sport. The leisure rides go through scenic back-roads.

IMPACT

Some of the reasons Boulder is attractive to bicycle enthusiasts include:

- Boulder is one of three cities to achieve Platinum Bike Status (www.bikeleague.org, n.d.).
- Planned events that encourage biking; for example, June is Walk & Bike Month, consisting of events and a Bike to Work Day.
- Expanding availability of bicycle amenities; for instance, two bike corrals replaced street parking in the downtown area.
- Bike share program



Figure 3.8.3: Green infrastructure (Source; epa.gov, n.d)



Figure 3.8.4: Bicycle Corral (Source; mediacdndisqus.com/, n.d)



Figure 3.8.5: Bike Share Program (Source; www.wordpress.com, 2013)

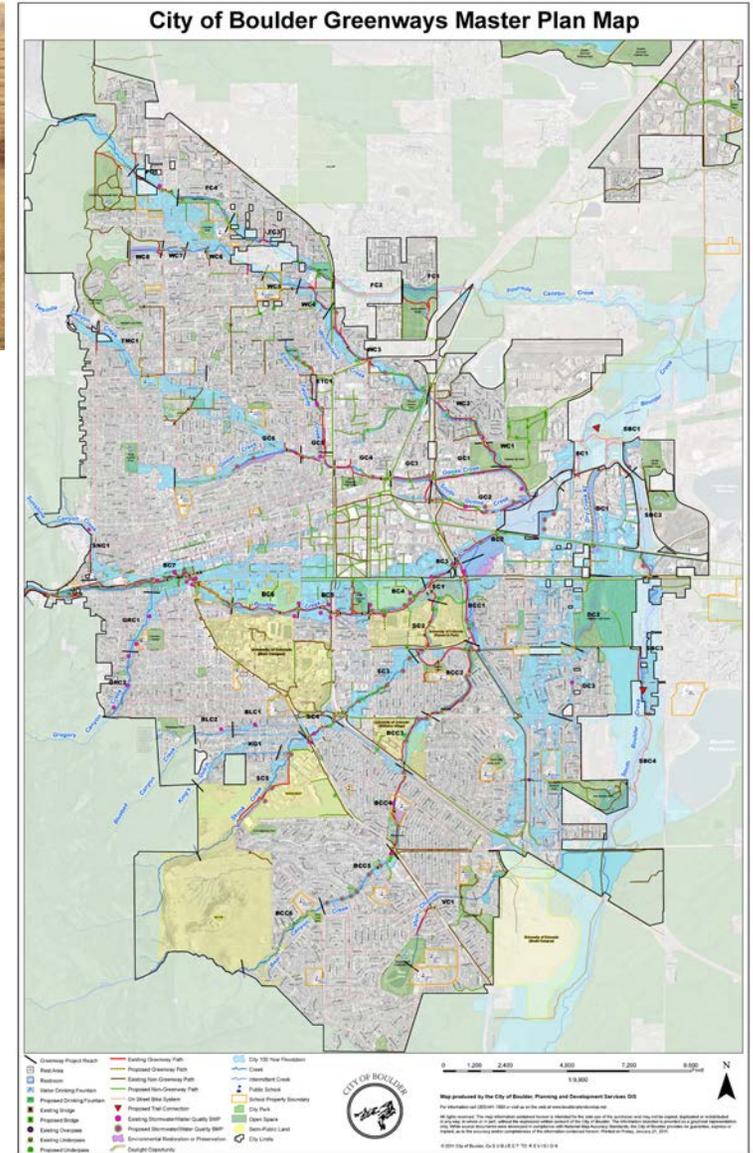


Figure 3.8.6: City of Boulder Greenway Master Plan (Source; www.bouldercounty.org, 2011)

3 | GREENWAYS FOR NASHVILLE

LOCATION: Nashville, Tennessee

SIZE: 75 miles of trails in greenways, 190 miles of trails in parks, 4,266 acres of conservation land and over 11,000 acres of protected land

BUDGET: Funded privately through donations and the Greenways Commission

DATE PLANNED: 1994 to Present

DATE CONSTRUCTED: Ongoing since 1995

DESIGNER(S): Master Plan led by Greenways Commission

MANAGED BY: Nashville Department of Parks and Recreation

AMENITIES: Parks, Paved trails, Hiking trails, Biking trails, Equestrian trails

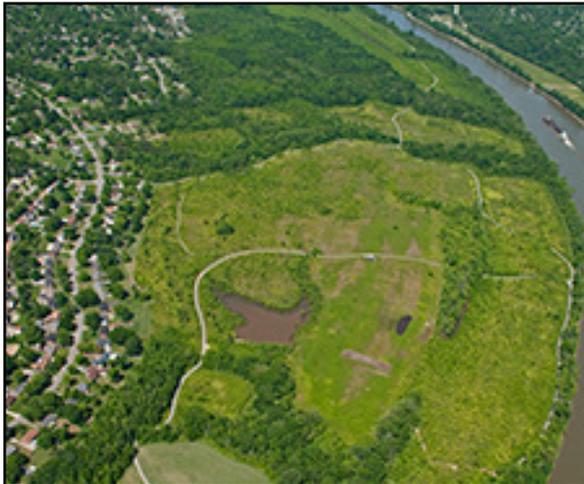


Figure 3.9.1: Ted Rhodes Golf Course and Metrocenter Greenway. (Photo Credit: Gary Layda from Greenways for Nashville, n.d.)



Figure 3.9.3: One of the downtown greenways at night after it was finished. (Source: Mike Noble, 2013)

INTRODUCTION

The Greenways for Nashville project goals are:

- Provide hundreds of thousands of people in Nashville opportunities for walking, running, bicycling, hiking and enjoying the outdoors
- Provide amenities that will improve property values adjacent to the Greenway by 6 to 30%
- Offer residents and visitors healthy recreational opportunities and other attractions
- Enhance the local transportation system by providing routes and bike lanes that limit the public's reliance on cars.
- Make Nashville more competitive from an economic standpoint by facilitating transportation independence from cars.

The ideas behind the development of the greenway system greatly benefit the city by providing educational opportunities, identifying potential sites for conservation, and promoting a good quality of life and a healthy lifestyle. The greenway system is used by numerous residents in the area and is also a destination for tourist. The greenways draw tourists throughout the city thus promoting and profiting the local economy.

The creation of the greenways also has had an adverse effect on the economy in some instances. When greenways are implemented, they can raise residential property values to the point where an owner might no longer be able to afford the property tax. Unfortunately, this sometimes means residents are forced to sell their properties and move. Also with the increase in size of greenways, comes an increase in the number of employees to maintain them. The Nashville Metro Parks Division is responsible for the Greenways upkeep. Being city and state funded is a recipe for a potential tax increase for residents and/or visitors.

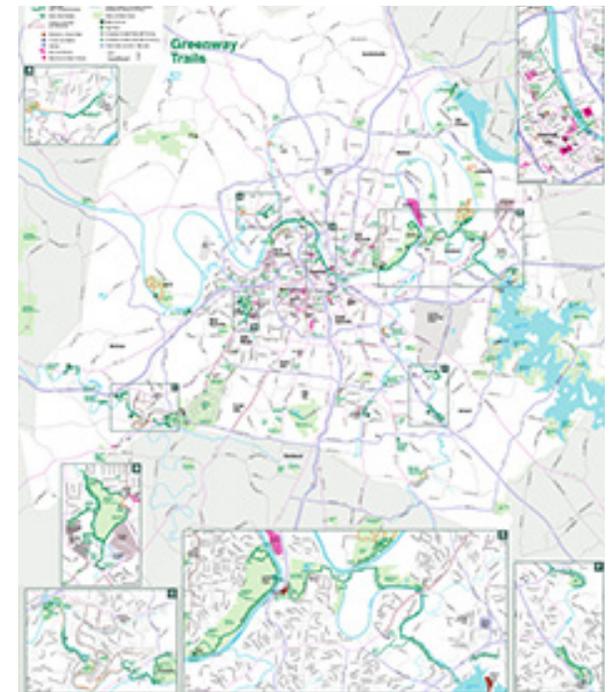


Figure 3.9.2: Interactive Map of Greenways for Nashville. (Source: Greenways for Nashville, n.d.)

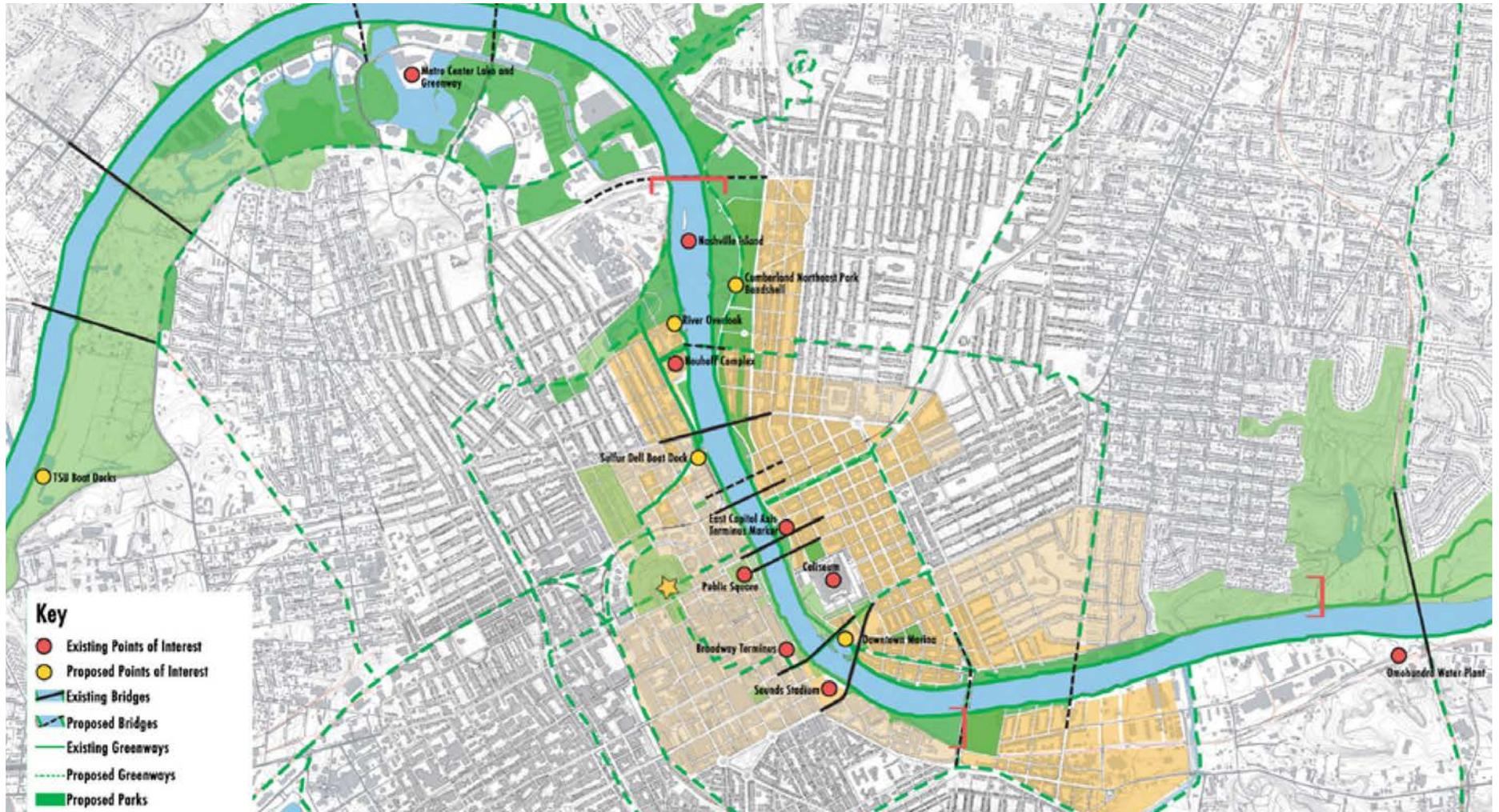


Figure 3.9.4: Nashville Riverfront Redevelopment Master Plan. (Source: Nashville Riverfront Redevelopment Plan Public Meeting Report, 2006, pg 30)

Nashville decided to turn a majority of its riverfront into a series of greenways, the size and scale of which are illustrated in Figure 3.9.4. The map shows existing points of interest, proposed points of interest, existing and proposed bridges, existing

and proposed greenways, existing and proposed parks, and existing and proposed neighborhoods.

This map illustrates how greenways can be used to break up a large area while taking up minimal

space by using existing parks and under-utilized spaces to link each sector of the greenway together. In places where there was not a lot of space the designers created a corridor through the proposed neighborhoods and along their streets.

3 | WAKE FOREST OPEN SPACE & GREENWAY PLAN

LOCATION: Town of Wake Forest, North Carolina

SIZE: ~50 miles

BUDGET: Phase 1 est. \$4,019,000+
Each section of the trail is funded individually

DATE PLANNED: Plan adopted in 2002, Updated in 2009

DATE CONSTRUCTED: Ongoing
Construction began in 2003

DESIGNER(S): Not specified

MANAGED BY: Various agencies

PRIMARY USERS: Residents, Forest areas

INTRODUCTION

In January 2002, Greenways Incorporated prepared a comprehensive 121 page proposal for the Wake Forest Planning Department and Wake Forest Parks and Recreation Department. The Town of Wake Forest adopted the open space and greenway system that would “protect the natural and cultural resources that community residents value most” (Greenways Inc., 2002). The main goals stated in the document are as follows:

- Identify parcels and corridors of land that are in need of protection and conservation measures
- Establish a comprehensive approach that will link greenspace lands and corridors to residential, commercial, institutional and central business areas of the community

- Define a concise set of strategies for protecting and conserving these corridors and at the same time developing public use facilities that would provide residents with access to these lands and corridors (Greenways Inc., 2002)

In 2003, construction began on the first phase of the project. Phase One consisted of two main axes of focus: the North-South Smith Creek corridor and the East/West corridor that follows Wait Avenue and Durham Road. After six years of construction a revised plan was proposed to address development concerns such as fragmented trail construction and an increased need for recreational open space due to new schools and facilities added along the proposed greenway routes (Greenways Inc., 2009).

PLAN REVISION 2009

In 2009, the plan (Figure 3.10.3) was updated to further the objectives as outlined and focus on new parameters that affected the 2002 Open Space and Greenway Plan, such as area population growth and new transportation patterns. New development caused connectivity issues, priority parcels had been modified by development, and corridors had changed due to regional and local issues. The new goals are redefined as:

- Provide specific recommendations for developing new priority greenway segments and facilities
- Explore potential connections that can be derived from linking the old greenway plan to the adopted pedestrian, bicycle, and parks and recreation plans



Figure 3.10.1: Smith Creek Section of Larger Greenway Plan. (Source: Smith Creek at Smith Creek Soccer Center, n.d.)

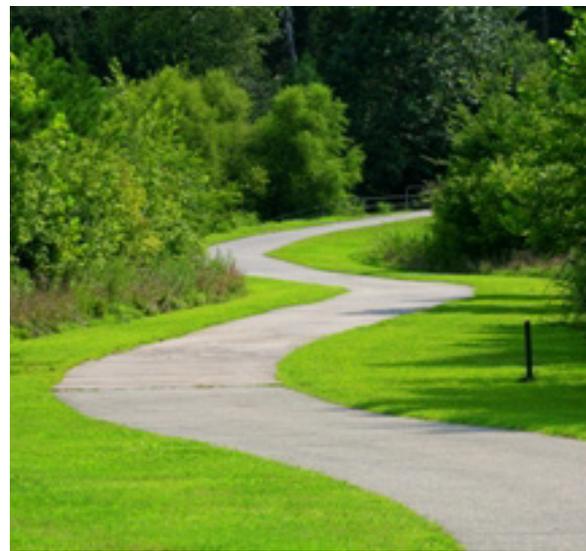


Figure 3.10.2: Segment of implemented Smith Creek Greenway. (Source: Smith Creek at Smith Creek Soccer Center, n.d.)

- Expand on recent planning efforts for the Smith, Richland, and Sanford Creek corridors by identifying trail locations within their more broadly defined greenways. (Greenways Incorporated, 2009)

CONCERNS

According to an October 14, 2014, article in the *Wake Forest Gazette*, a large section of the greenway has been closed for over a year because it was deemed unsafe. Since the greenway was built in the floodplain of a creek, severe stream bank erosion caused situations that affected the safety of the trail: including unstable trees along trail, the risk of trail collapse, and threats by falling trees on nearby electric lines.

Efforts to reinforce the stream bank by regrading, native plant introduction, and coil matting failed to fix the problems. The latest approach to reopen the trail includes moving 250 linear feet of the creek away from the greenway. Log vanes will redirect water flow to control water velocities and thus lessen stream erosion (*Wake Forest Gazette*, 2014). When building in floodplains or near bodies of water care must be taken to avoid unsafe conditions.

TAKE AWAYS

The use of planned phasing and individual trail funding allows the planners to prioritize trail sections and amenities but could lead to fragmented building. Wake Forest’s comprehensive approach and willingness to update and work with new situations allows this plan to weather adversities and grow with its community’s goals.

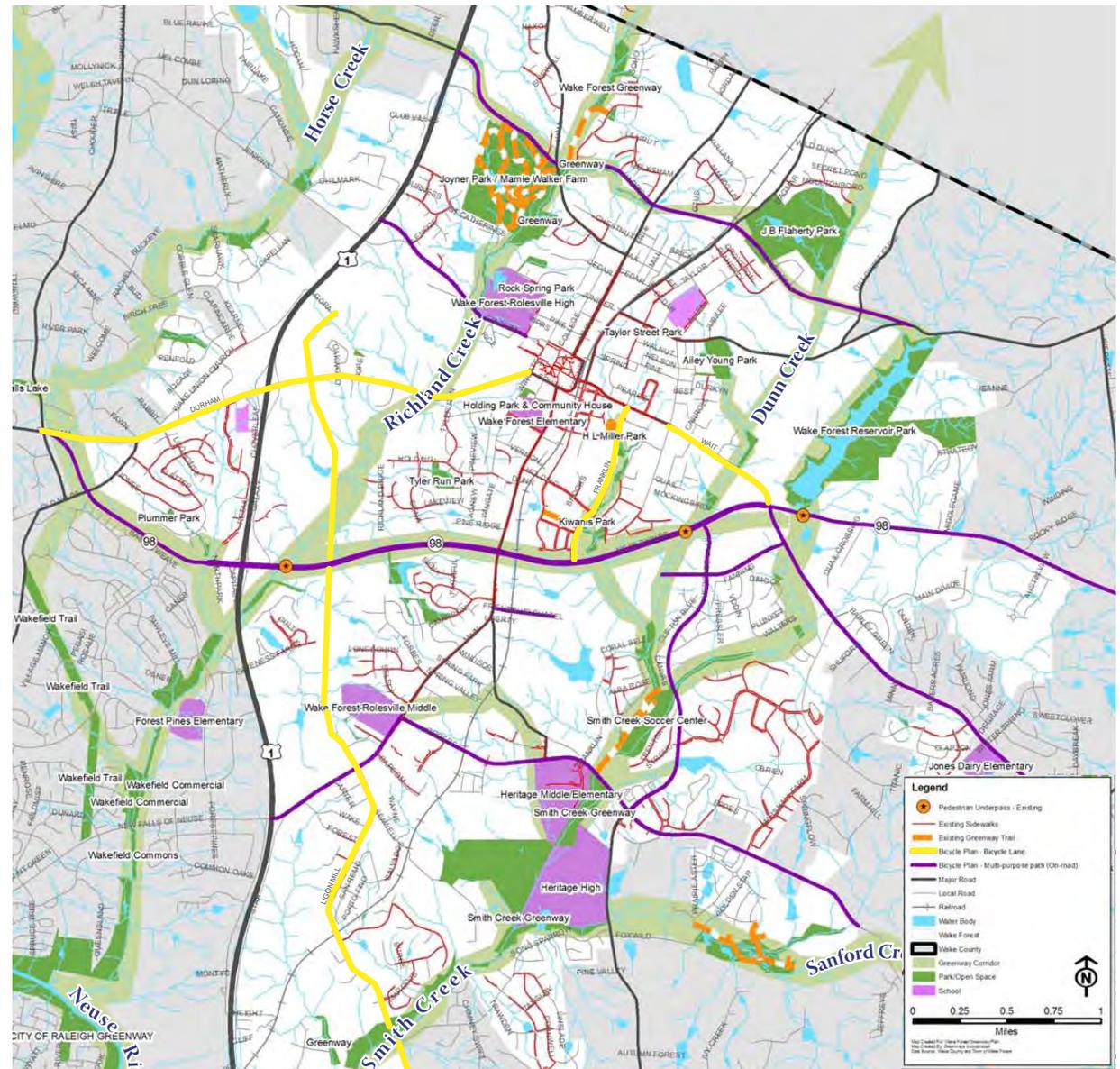


Figure 3.10.3: Wake Forest Greenway Plan and Existing Conditions Map.(Source: Greenways Inc., 2009)

3 | DAKOTA COUNTY GREENWAY COLLABORATIVE

LOCATION: Dakota County, MN

SIZE: 200 miles

BUDGET: not available

DATE PLANNED:

- Comprehensive plan created early 2008
- Adopted by Dakota County Board of Commissioners on September 28, 2010
- Plans phased through 2030

DESIGNER(S):

- Hoisington Koegler Group Inc.
- Friends of the Mississippi River

PRIMARY USERS:

Residents, Hikers, Bikers, Volunteer groups



Figure 3.11.1: Logos that represent Dakota County's focus on Habitat, Recreation, Non-Motorized Transportation and Water Quality (Source: *The Greenway Guidebook*, 2010)



Figure 3.11.2: A mountain biker rides along a technical wooden track through Lebanon Hills Bike Trail. (Source: *The Greenway Guidebook*, 2010)



Figure 3.11.3: Examples of experiences proposed in Lebanon Hills Regional Park Master Plan. (Source: *The Greenway Guidebook*, 2010)

GOALS

The Dakota County greenway vision proposes more than just a trail system. It suggests enhanced open space corridors along major waterways, such as the Minnesota River, Lake Marion and North Creek, that perform multiple functions and provide multiple community benefits in the areas of water quality, habitat, recreation and non-motorized transportation. Providing these will be the goal for each greenway segment, including the Minnesota River Greenway, Lake Marion Greenway, North Creek Greenway, Vermilion Highlands Greenway, Rosemount Greenway and Mendota-Lebanon Greenway, as well as a River to River Greenway.

FOCUS

The Dakota County Greenway Collaborative focuses on bringing parks to the people of the community by promoting destination parks that provide more gathering and celebration areas and swimming and water play areas, as well as winter activity areas. Along with the existing parks, a new Regional Park in Vermilion Heights will be implemented for public use. The Greenway Collaborative also wants to focus on providing the community with 200 miles of multi-use trails, 2/3 of which are on land currently in public or semipublic ownership. The users will be able to walk, bike or skate through linear parks that connect schools, playgrounds, parks, lake trails, and the Minnesota and Mississippi Rivers. Throughout this greenway system, Hoisington Kogler Group Inc. and Friends of the Mississippi River focus on green infrastructure. The greenways will help to protect stream corridors along with natural areas and open spaces through public/ private partnerships (*The Greenway Guidebook*, 2010).

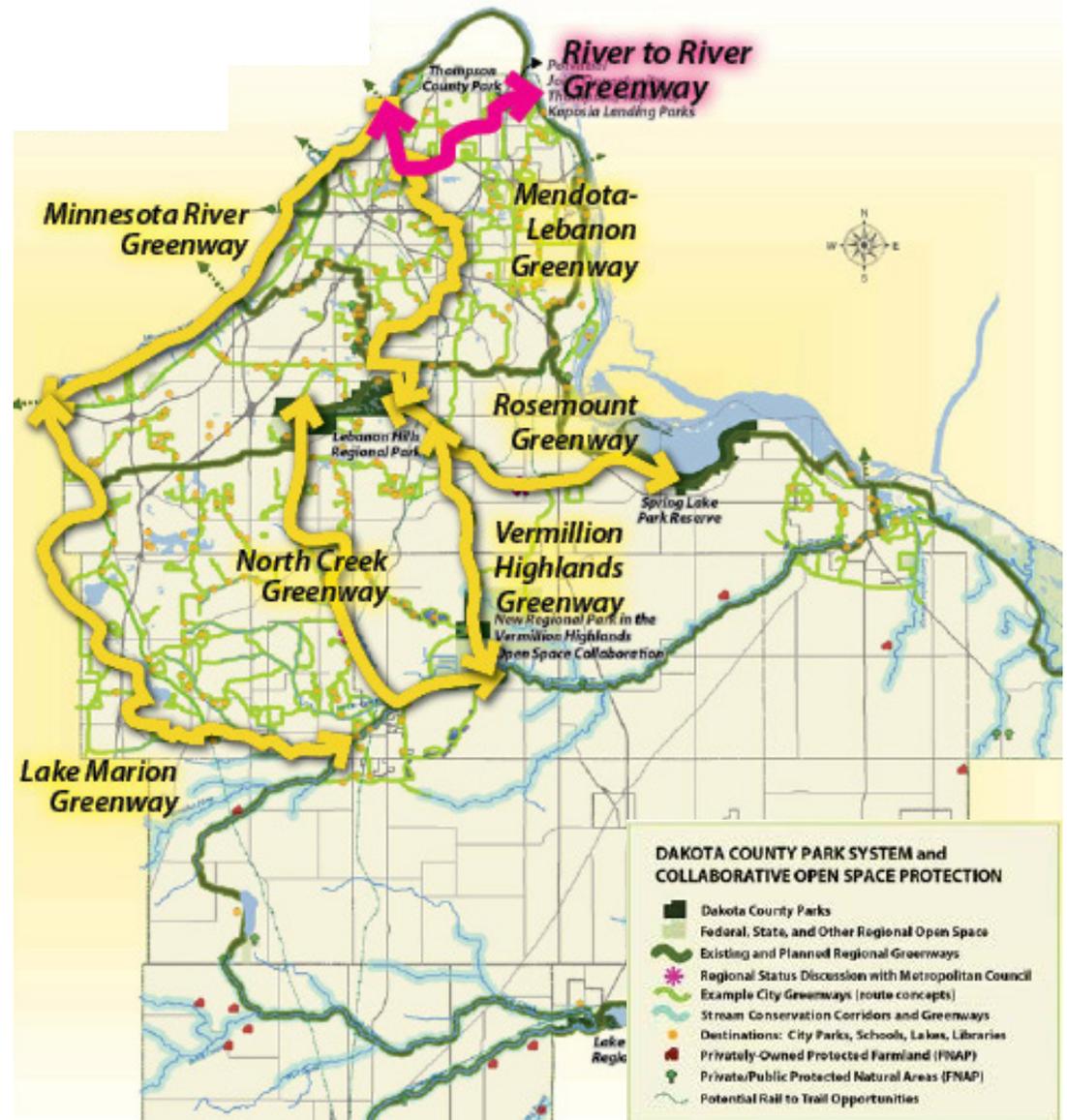


Figure 3.11.4: Dakota County Parks, Lakes, Trails and Greenway Vision 2030 (Source: *The Greenway Guidebook*, 2010)

3 | CENTRAL OHIO GREENWAYS

LOCATION: Columbus, Central Ohio

SIZE: 360+ miles

BUDGET: \$200+ million

DATE PLANNED: 1995

DATE CONSTRUCTED: 1997-present

DESIGNER(S): Mid-Ohio Regional Planner

MANAGED BY: The Central Ohio Greenways Steering Committee, The Central Ohio Greenway and Trail Forum

PRIMARY USERS: Residents, Hikers, Bikers, Volunteer groups

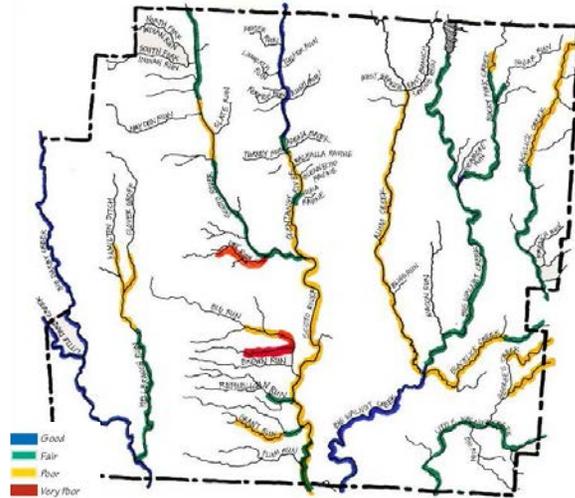


Figure 3.12.1: Central Ohio River/Stream Condition Map (Source: A Plan For Franklin County, N.D.)

INTRODUCTION

Central Ohio encompasses approximately 2,700 miles of inland rivers and streams (Figure 3.12.1.). Currently the Central Ohio Greenways project consists of 360+ miles of trails and stream/ivers through out central Ohio (Central Ohio Greenways Implementation Guide, 2006). The Mid-Ohio Regional Planning Commission (MORPC) is in charge of the current development and management as well as future plans for the Central Ohio Greenways. The commission defines the greenway as “linear open spaces or natural areas, set aside for recreational use or environmental protection, with trails within the greenway that provide access to nature and recreational opportunities (Overview, N.D.)” The commission is a voluntary association of Central Ohio governments and regional organizations which envisions and embraces innovative directions in transportation, energy, housing, land use, the environment, and economic prosperity. MORPC was first formed back in 1943 and was originally called the Franklin County Planning Commission until 1969, when they expanded their land areas and changed the name to MORPC. Their objective is “to improve the quality of life for all Central Ohio residents (Overview N.D.)”

Some of the major waterways running through Central Ohio include the Big and Little Darby Creeks, Scioto River, Olentangy River, Alum Creek, Big and Little Walnut Creeks, and Blacklick Creek as well as major tributaries such as Rocky Fork, Hellbranch Run, and Hayden Run (A Plan For Franklin County, N.D.). MORPC utilizes these waterways as greenway guides as well as actual parts of trails. The trails run close by streams and rivers which provide a relatively flat topography and makes for a nice easy ride/route for all users. These



Figure 3.12.2: Alum Creek Trail, a flat, well shaded route for a relaxing stroll or ride by all users. (Source: McCollam, B., 2013)



Figure 3.12.3: Blacklick Woods, a winter trail for cross country skiing and winter hikes. (Source: Metro Parks-Central Ohio Park System, 2009)

trails run along the streams and rivers creating aesthetically pleasing views for the users as well as new activities such as canoeing, fishing, swimming, etc.

As of 2013, the Central Ohio greenway consists of 9 different trails with an additional 6 proposed trails, totaling 15 trails through the greenway project (Central Ohio Greenways Implementation Guide, 2006). Not all of the paths are paved, some are constructed of crushed gravel or other materials allowing other seasonal activities to be preformed on these trails. For example, depending on the season and weather conditions, some trails can be used for cross country skiing, mountain biking, hiking, canoeing, and many other activities. These trails make it very clear how important it is to protect and restore of our water resources before they are lost. Pollutants may start up stream but no matter what will always travel down stream affecting a larger population. There are still many efforts being put forth today to help further the greenway and maintain/ improve the existing greenway space.

PROJECT GOALS/OUTLINE:

- Provide an attractive environment that supports economic development
- Stimulate tourism and increase recreational spending
- Provide long term protection for key riparian areas and watershed management
- Provide both transportation and cultural linkages between communities
- Preserve undeveloped land for storm-water management and flood control
- Restrict development from inappropriate terrain (steep slopes, floodplains)

(Source: A Plan For Franklin County, N.D.)

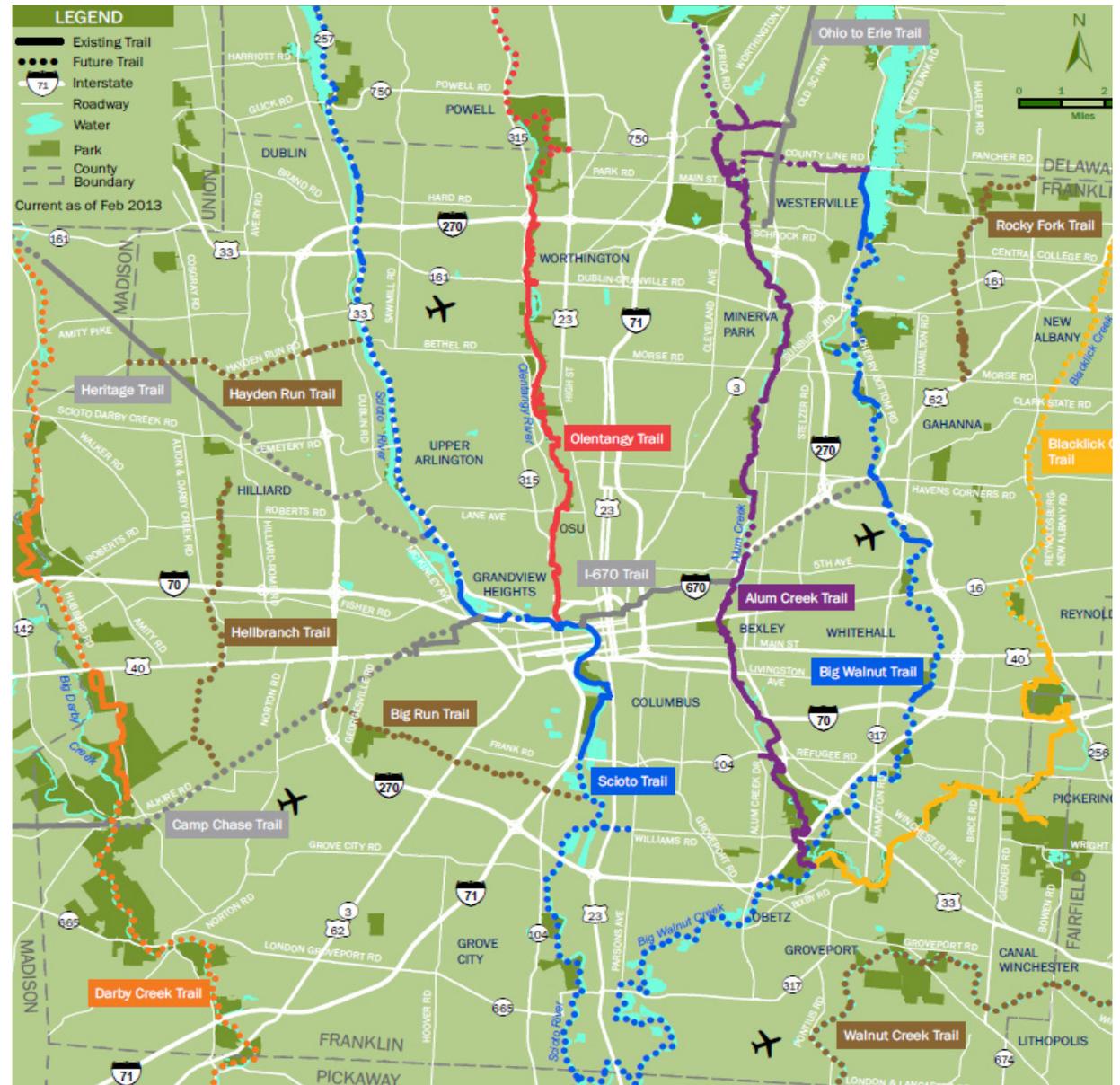


Figure 3.12.4: Trail map (Source: A Natural Connection, N.D.)

3 | BIG CREEK GREENWAY

LOCATION: Alpharetta, Georgia

SIZE: 15 miles

BUDGET: Phase 1-3: \$8 Million
Phase 4: \$2.8 Million
Phase 5: \$4.2 Million

DATE PLANNED: 2008

DATE CONSTRUCTED: 2009-2014

DESIGNER(S): Pond & Company, Atlanta, GA

MANAGED BY: City of Alpharetta

PRIMARY USERS: Residents, Hikers, Bikers

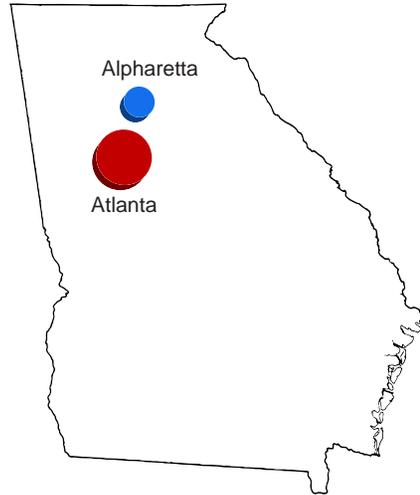


Figure 3.13.1: Context map for Alpharetta, Georgia (Source: www.netstate.com, 2014)



Figure 3.13.3. Example of trail along the Big Creek Greenway (Source: Pond and Company, 2014)

INTRODUCTION

The Big Creek Greenway Trail is located in Forsyth County, Georgia. This project consists of five development phases. The fifth phase was completed in October of 2014. The trail was designed by Pond and Company and will stretch approximately 15 miles when completed. The trail runs along the banks of the Big Creek in Forsyth County. Funding for the greenway park is provided by the \$100 Million Parks, Recreation and Green Space Bond. This bond was voted into action in 2008 by the residents of Forsyth County. Within the trail system, there are future spur trail locations that are still in the early design stages. The trail consists of twelve foot wide concrete paths and boardwalks within a twenty foot wide easement. Water crossings are equipped with prefabricated twelve foot wide pedestrian bridges. Major trailheads are equipped with restroom facilities, parking, lighting structures, emergency phones, park benches, and bicycle racks. Minor trailheads are equipped with all of the same amenities except for restrooms (Source: Pond & Company, 2014).

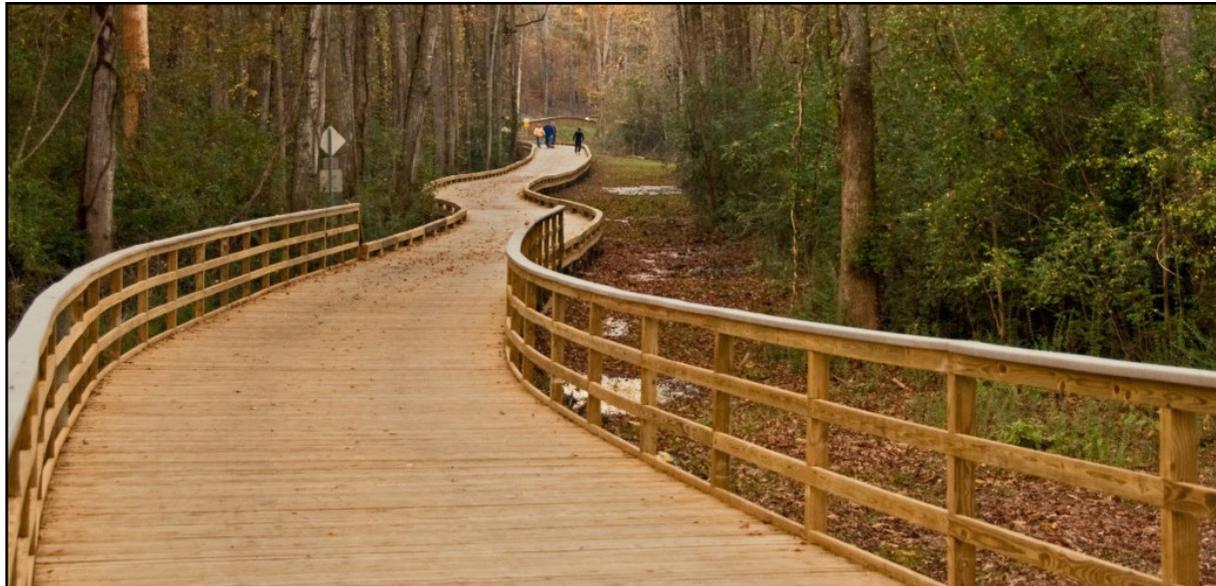


Figure 3.13.2: Big Creek Greenway Boardwalk (Source: Pond and Company, 2014)

THOUGHTS

The Big Creek Greenway Trail system serves as a benchmark for all other greenway projects. The community identified a need for a trail system and provided the funding and support to achieve it quickly and efficiently. The well thought out and planned design of the trail system is another reason as to why it is successful. The use of quality materials gives the trail a sense of security and adds to the overall success. Having adequate facilities, such as restrooms, parking and emergency services, allows this particular greenway trail system to thrive.



Figure 3.13.5: Big Creek Greenway (Source: Pond and Company, 2014)



Figure 3.13.6: Big Creek Greenway (Source: Pond and Company, 2014)



Figure 3.13.4: Big Creek Greenway (Source: Pond and Company, 2014)

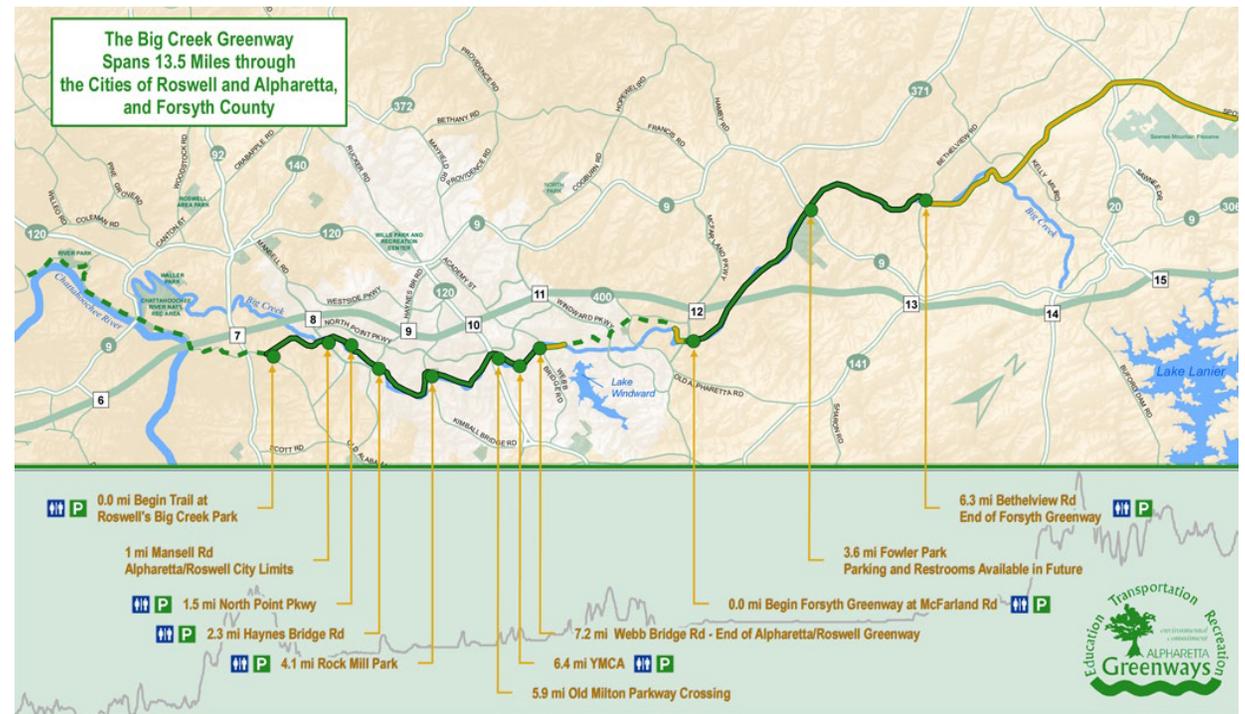


Figure 3.13.7: Big Creek Greenway Master Plan (Source: City of Alpharetta, 2014)

3 | RAILWAY RESERVES HERITAGE TRAIL

LOCATION: Western Australia

SIZE: 60 kilometers

BUDGET: Not Available

DATE PLANNED: 2011

DATE CONSTRUCTED: On-going since 2009

DESIGNER(S): Mundaring Bicentennial Community Committee

MANAGED BY: Tredwell Management Services

PRIMARY USERS: Residents, Hikers, Trail and Mountain Bikers, Horse-Back Riders, Nature Enthusiasts

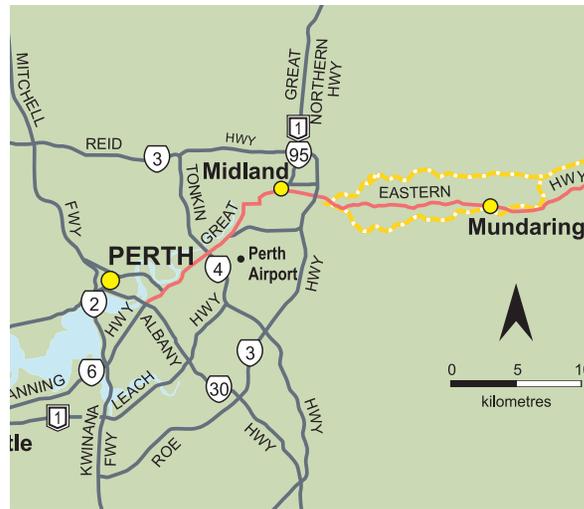


Figure 3.14.1: Context Map of proximity around Perth, Australia (Source: <http://www.traildino.com>, 2014)

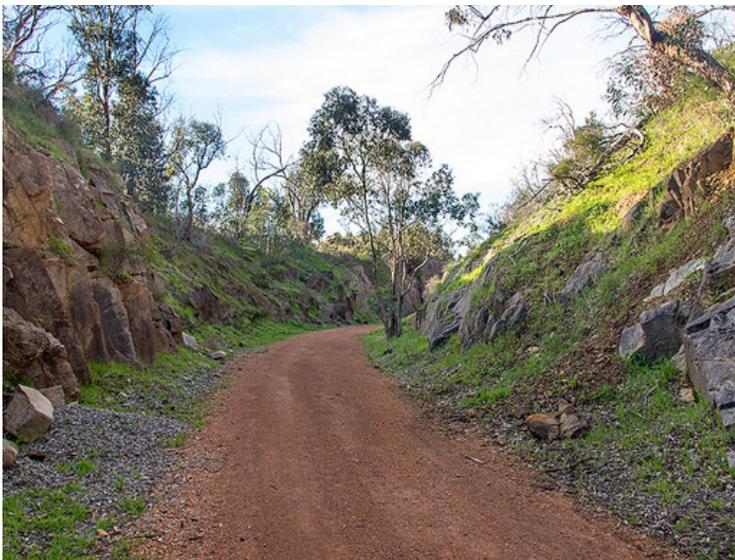


Figure 3.14.2: Heritage Trail, Perth Australia (Source: <http://www.railwayreserves.com.au>, 2014)



Figure 3.14.3: Equine Trail, Perth Australia (Source: <http://www.railwayreserves.com.au>, 2014)

INTRODUCTION

Located within the picturesque Perth Hills in Western Australia, the Railway Reserves Heritage Trail retraces 59 kilometers of the Old Eastern Railway that formerly linked Fremantle to York in the late 1880s. This popular walking and cycling trail begins at Bellevue, forming a unique 41 kilometer loop at Mount Helena entirely on railway formations, before extending to Wooroloo Reserve.

FEATURES

This trail is the ideal place to relax and unwind as users take in the peace and tranquility of the attractive flora, fauna, and natural landscapes of the Darling Range and John Forrest National Park. Users can enjoy time spent with family and friends, connecting with nature or simply appreciating the fresh air. Whether exploring the trail by walking, running, jogging, or riding, users can choose activities from different sections, lengths, and types of challenges. Users can take in the romance of the rail era as they discover the history and character of the charming settlements that evolved alongside the railway line, including the towns of Darlington, Parkerville and Mundaring (www.railwayreservesheritagetrail.com). The Railway Reserves Heritage Trail is accessible from many of the town sites within the Shire of Mundaring, a 40-minute drive east of Perth. A popular destination of this trail is the tunnel approximately 2 kilometers east of Pechy Road. There is also a scenic alternative route around the tunnel.

The comprehensive framework of the Western Australia Trail Plan aims to improve the economy, environment and infrastructure as well as providing

recreational opportunities, while enhancing heritage, arts, and community development.

In order to understand the needs, demands and requirements for this trail to be successful, a voluntary survey of 306 people in and around Perth, Australia, was conducted by www.Bushwalkingwa.org.

Survey results indicated that the majority of the Heritage Trail users bike, ride, or cycle at least once a week and some travel more than thirty minutes to ride on the trail. Almost three-quarters of the users spend more than two hours at a time on the trail. Exercise, fun, and nature appreciation are the top three reasons for usage. Over 30% of respondents said they use the trail for these reasons on a weekly basis.

This survey did elicit some critical, but useful, comments as well. Almost 60% of respondents stated that the existing trails are not suitable for current demands for several reasons. Some comments included a lack in diversity of trails, bike trails are over used and degrading, inadequate maintenance of trails, and poor signage. Other issues include water restrictions, environmental concerns, and lack of facilities. Although these critical comments are important, the overall quality of the trails and satisfaction of its average users is good.

Nearly one-third of the respondents said they learned about the trail system through word-of-mouth, and trail/recreation organizations were the source of knowledge for about one-third as well.

The survey's demographics of the area and users of the Heritage Trail are very similar to those of Bullitt County, Kentucky. Bullitt County can learn

from these projects and get a better idea of what does and does not work as they move forward in their greenway system plans.



Figure 3.14.4: Railroad revitalization project for new bike trail. (Source: <http://www.railwayreserves.com.au>, 2014)



Figure 3.14.5: The Heritage Trail offers a variety of different trail experiences on the Railway Reserves. (Source: <http://www.railwayreserves.com.au>, 2014)

3 | EMERALD NECKLACE

LOCATION: Boston, Massachusetts

SIZE: 1,100 acres/ 7-mile greenway

BUDGET: Unknown

DATE PLANNED: Not available

DATE CONSTRUCTED: 1870

DESIGNER(S): Frederick Law Olmsted

MANAGED BY: Emerald Necklace Conservancy

PRIMARY USERS: Residents, Walkers, Bikers, Volunteer Groups, Tourists, Recreational Athletes, Nature Enthusiasts, Sailing & Other Water Sports



Figure 3.15.1: View of the Muddy River (Source: Pressley Associates, 2014)



Figure 3.15.2: Diagram showing key locations within the Emerald Necklace including Franklin Park and The Muddy River. (Source: Olmsted, Olmsted, Eliot, 1894 via Emerald Necklace Conservancy, 2014)

INTRODUCTION

The Emerald Necklace is a linear sequence of parks and parkways that connects the Boston Common and the Public Garden to Franklin Park. Frederick Law Olmsted envisioned connecting the existing parks and newly designed parks in the 1860's to create a continuous greenway system (City of Boston, 2014).

The approximate linear distance of the greenway is 7 miles, running through the Boston Common, Public Garden, Commonwealth Avenue Mall, Back Bay Fens, The Riverway, Olmsted Park, Jamaica Pond, Arnold Arboretum and Franklin Park. After 1870, it provided a public space for residents and visitors to enjoy relief from pollution, noise, and the fast pace of the city (Emerald Necklace Conservancy & City of Boston, 2014).

The Emerald Necklace provided an outdoor space that Bostonians lacked in the late 1800's due to underdevelopment. The system promoted a diversity of users including carriages, horseback riders, and pedestrians (City of Boston, 2014).

The Emerald Necklace is not only aesthetically pleasant, but also delivers solutions to many ecological issues within the area. Olmsted redesigned the existing topography which resolved some of the sewage and drainage concerns of the city. His design featured a continuous flow of water by incorporating floodgates to regulate the levels of water.

Property attainment was an initial issue for Olmsted as he implemented the park system since it would be developed within a dense urban context (National Park Services, 1982). In order to

develop the full master plan, it was necessary to secure residential land in many instances through the process of eminent domain whereby property owners were fairly compensated for their land (National Park Services, 1982).

APPLICATION

The Emerald Necklace's diverse ecological elements can be applied towards a new greenbelt/greenway system in Bullitt County. Promoting a strong connection to the vehicular spine is important not only for internal access but will open up the system for tourists as well as existing residents.

Another component that led to the success of the Emerald Necklace involved creating convenient connections to activity nodes for sports and entertainment in order to attract users.

The Muddy River, which is located by the urban core, is an ecological corridor that filters water that arrives from the internal areas of the greenway, such as from the Back Bay and the Fens. After water goes through the filtration corridor which features a system of water plants, the output is released into a major ecological system, the Charles River.

Boston is a large urban area and the Emerald Necklace provides access to activity nodes throughout the city. The application of additional activity nodes can facilitate sport and recreational activities as well as access to natural features and tourist attractions. Bullitt County could utilize a similar concept as it develops its greenway system plans.

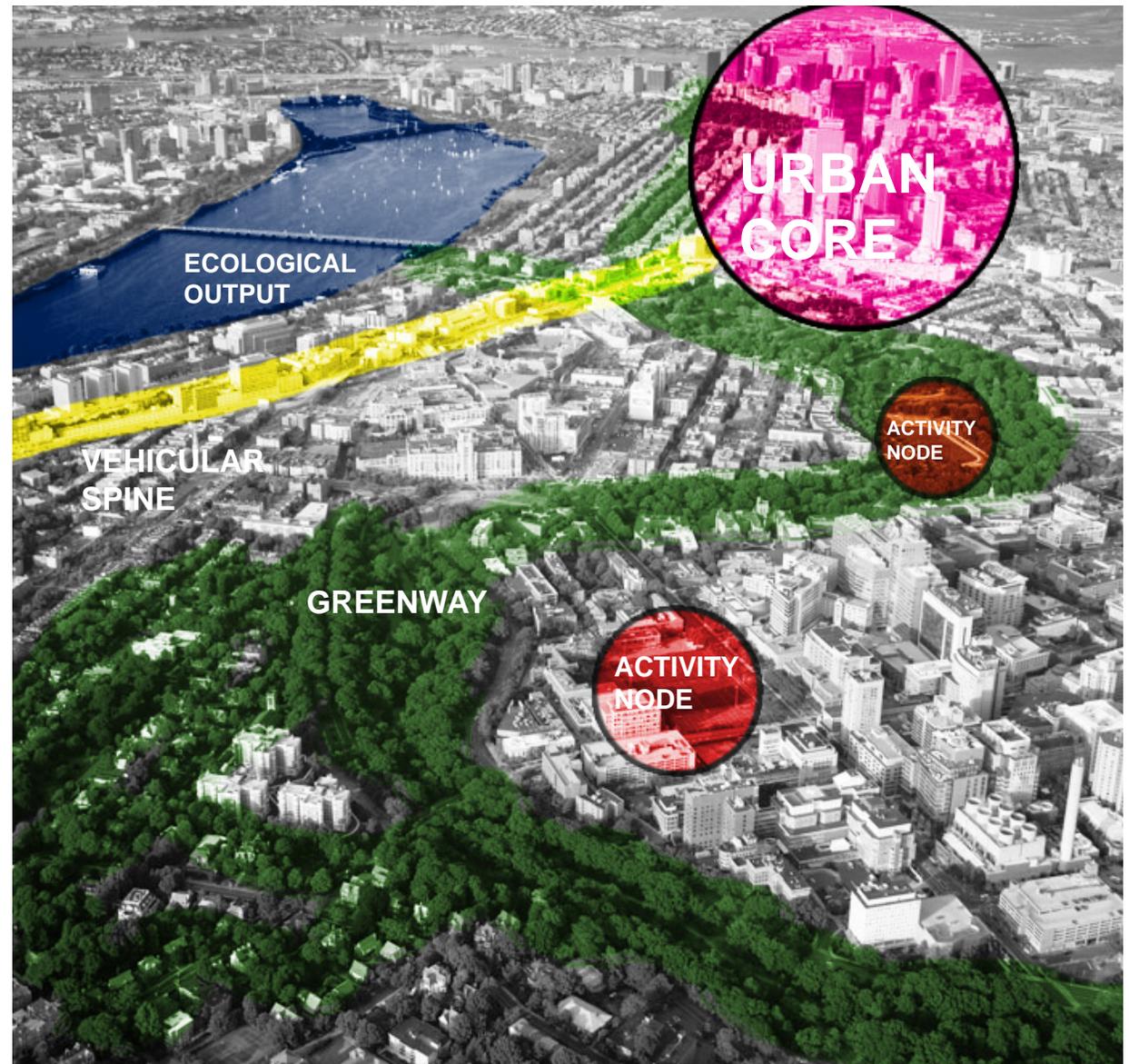


Figure 3.15.3: Birds-eye perspective of connections between different features that provides for a successful greenbelt in an urban context

3 | DENVER URBAN TRAILS

LOCATION: Denver, CO

SIZE: 80+ miles and growing

BUDGET: Indeterminate

DATE PLANNED: Unknown

DATE CONSTRUCTED: Earliest definite planned construction 1974 – Ongoing

DESIGNER(S): Unknown, though multiple

MANAGED BY: City of Denver

PRIMARY USERS: Residents, Hikers, Bikers, Volunteer Groups, Tourists



Figure 3.16.1: Image of Bear Creek Trail Run in Denver. Reprinted from Fun with Gravity, by J. Montgomery, Retrieved November 5, 2014, from <http://funwithgravity.blogspot.com/2011/05/bear-creek-trail-run.html>.



Figure 3.16.2: Image of Platte River South and Rail in Denver. Reprinted from Platte River South and Rail, Walk2connect, Retrieved November 5, 2014, from <http://walk2connect.com/event/platte-river-south-rail-13-miles/>.

INTRODUCTION

The Denver Urban Trails system in Denver, CO, is an ongoing project consisting of park loop trails, minor branching trails, neighborhoods trails, and major regional trails creating a lengthy system of trails and greenways. Though grouped, each trail is separate and designed by multiple groups and designers. Many of the trails are not accredited to any one designer or group and most do not have a date accompanying their origin or completion. The earliest definitive planned trail is recorded in 1974, though some trails may predate it.

Each trail is cared for by different organizations, however, the trails collectively create a network across the city of Denver and spread to connect outside the city to surrounding towns and cities, including Thornton, Littleton, Arvada, Commerce City, Broomfield, Englewood, Lakewood, Aurora, Wheat Ridge, Westminster, and Cherry Hills Village.

Many of the trails follow alongside waterways in and around Denver. These trails are utilized by the community for recreational purposes mainly in the form of walking, skating, running, cycling, dog-walking, and in some instances horseback riding (City and County of Denver, 2014). Quite a few of the parks in the city have trails along their perimeters with lake-loop trails that connect with the parks' interior trail systems as well. These trails are laced with vegetation and scenic views allowing for a pleasant atmosphere for families and the community at large.

3 | CAROLINA THREAD TRAIL

LOCATION: North Carolina & South Carolina (15 counties)

SIZE: 1,500 miles

BUDGET: \$40,000p/yr + 250k endowment (for Catawba County, NC)

DATE PLANNED: 2005

DATE CONSTRUCTED: Ongoing - Projected 10-20 years

DESIGNER(S): Carol R. Johnson Associates

MANAGED BY: Duke Energy and Catawba County

PRIMARY USERS: Residents, Students, Hikers, Bikers, Volunteer Groups, Visitors



INTRODUCTION

The Carolina Thread Trail is a regional greenway designed to “weave” communities together throughout North Carolina and South Carolina (Carolina Thread Trail, 2014). The series of greenways connects parks and towns together through hikeable and bikeable pathways. These greenways serve as an educational and recreational resources that promote community unity and health by connecting key destinations. By connecting over 15 counties with over 1,500 miles of trail, the Carolina Thread Trail is a recent greenway design that incorporated input from the communities to help provide positive feedback for the initial design phasing. With community feedback, trail planners were able to develop a series of goals and objectives in order to design an ideal greenway system that highlights community identity and function.

CATAWBA COUNTY

As one of the major counties in the Carolina Thread Trail, Catawba County serves as the flagship county greenway design for the Carolina Thread Trail. With a population of 159,125 (Carolina Thread Trail, 2014), Catawba County is a rural municipality outside Charlotte, NC, that is known for its natural features. Through a long, one-year public process, and with the help of landscape architects, the Steering Committee and the Carolina Thread Trail organization developed a plan to create a “green interstate” that would connect cultural aspects of Catawba County. Some of the major goals and objectives that were identified include the cultural, environmental, economical, and public connections of each county. The initial master plan development highlighted challenges in zoning,

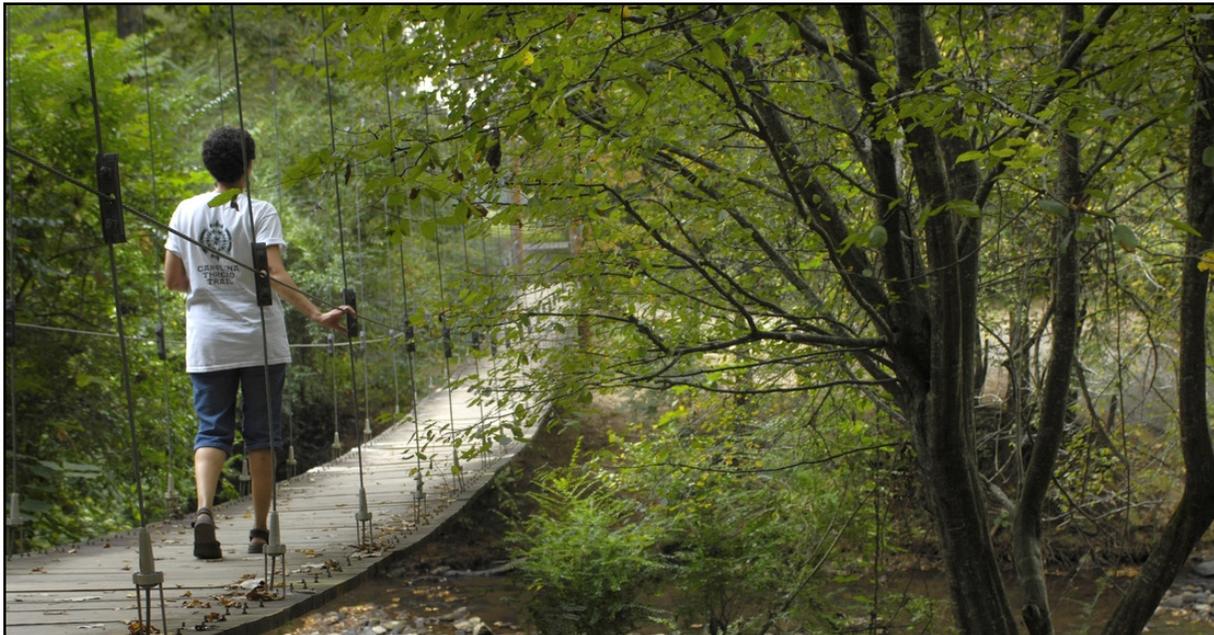


Figure 3.17.1: A segment of the Carolina Thread Trail, (Source: Nancy Pierce, 2014)

land ownership and the environment. The master plan for Catawba County divided the trail system into three individual routes: a blueway, a primary route, and alternative routes. These routes are connected through a series of destinations which highlight cultural, outdoor, and recreation centers. Some of the main amenities include hiking and biking trails, kayaking, horseback riding, and public parks. After proposing master plans, the Steering Committee decided to phase-out the project to establish a basis for continual growth and improvement. At the current rate, the trail system is planned to be finished within seven years.

CONCLUSION

The Carolina Thread Trail's main goal is to connect communities with their environment. Along with the development of the master plan, the connections among cultural centers (schools, downtowns, historic districts), recreational centers



Figure 3.17.2: Example of Floodway Trail Section. (Source: Carolina Thread Trail 2014)

(existing trails, parks), and conservation areas that help organize and layout the proposed connections in a meaningful way.

In Catawba County's case, the predicted economic benefits of the greenway open up endless possibilities in regard to recreational activities as well as for improving the quality of life in more urban areas.

The Carolina Thread Trail respects the rights of the people; by working with landowners and the public domain it is predicted that property values will increase in the area as a result of the trail system.

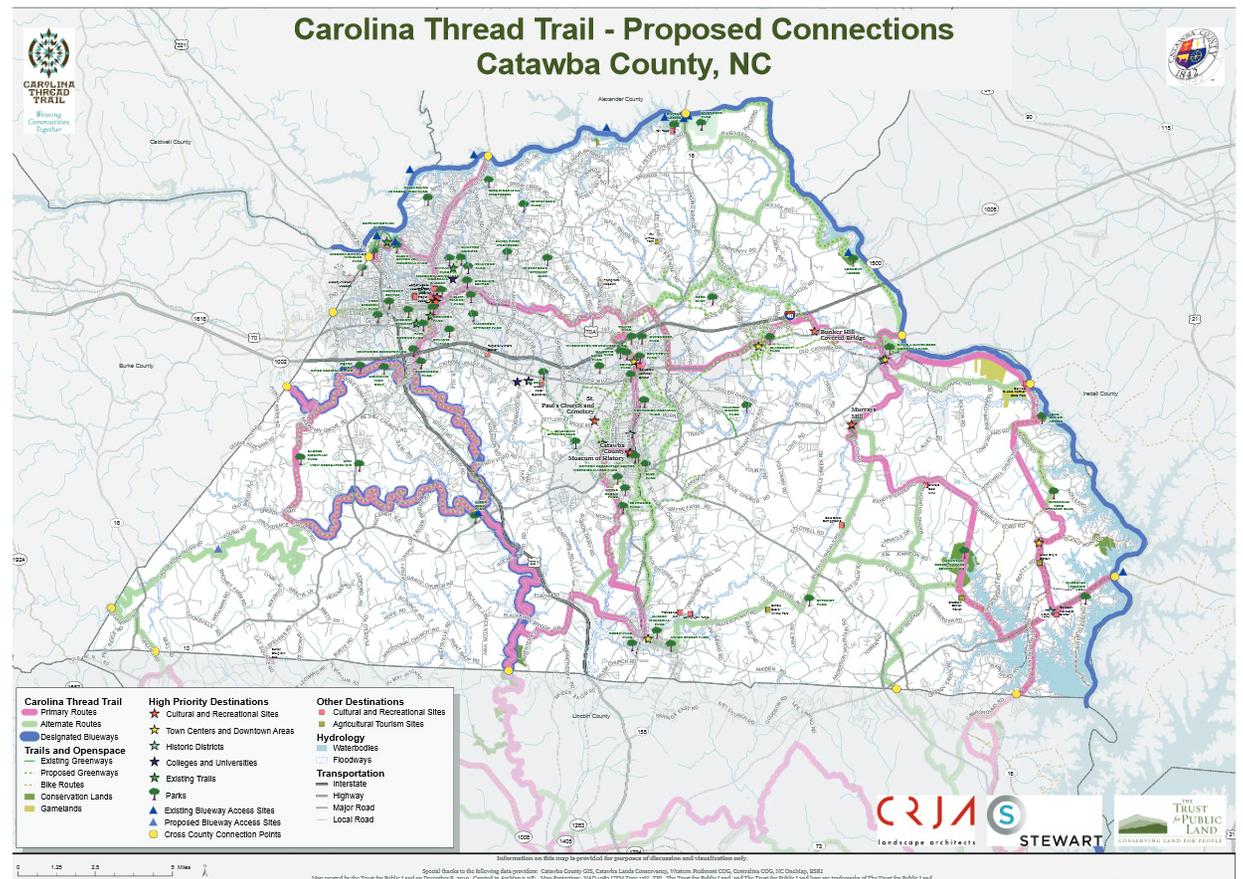


Figure 3.17.3: Catawba County Proposed Greenway System. (Source: Carolina Thread Trail 2014)

3 | FAIRFAX CROSS COUNTY TRAIL

LOCATION: Fairfax County, Virginia

SIZE: 40+ miles

BUDGET: \$5,200,000+ (for the finished part)

DATE PLANNED: 1997

DATE CONSTRUCTED: 2005
(Future improvements are planned.)

DESIGNERS: Environmental Interface LTD.,
Fairfax Trails and Streams, Volunteers
and Fairfax County +

MANAGED BY: Fairfax County Park Authority
(FCPA)

PRIMARY USERS: Pedestrians, joggers, bikers,
skaters and equestrians. The trail is multi-use in
some sections with users sharing the trail.



Figure 3.18.1: Fairfax County Cross County Trail. (Source: Fairfax County Virginia, 2013)

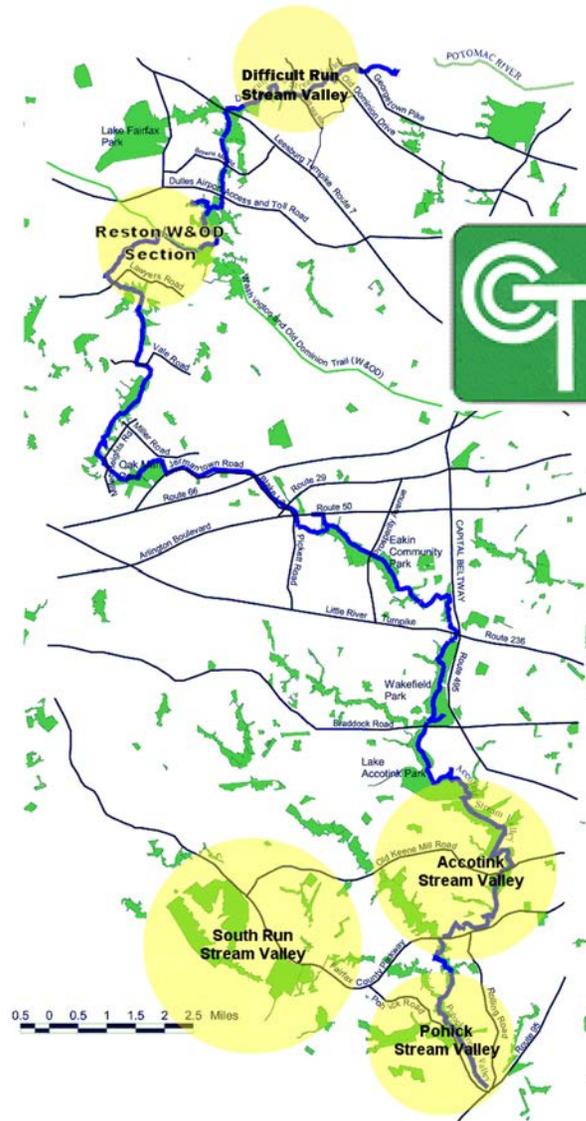


Figure 3.18.2: Fairfax County Cross County Trail Map. (Source: Fairfax County Virginia, 2013)

INTRODUCTION

The Cross County Trail (CCT) in Fairfax County, Virginia, is the primary north/south trail that connects the county from one end to the other. Passing through various types of landscapes -- woodlands, open spaces, streams, valleys, rolling hills, and parks -- along much of its length, the trail features amazing sceneries and rich experiences for users. It contributes significant connectivity around the county and promotes healthy lifestyles through increased physical activity (Fairfax County Virginia, 2013).

The CCT connects numerous trails both inside and outside the county (Figure 3.18.2.). Using a portion of the Washington & Old Dominion trail, the CCT provides a link to major east and west trails. The three stream valley trail systems (Pohick Stream Valley, Accotink Stream Valley, and Difficult Run Stream Valley) that are part of the CCT continue into other areas of the county, beyond the connections of the CCT. The CCT also links to the Fairfax County Parkway trail.

Trail users will see lots of wildlife such as deer, fox, muskrat, amphibians, and many species of birds. The southern half of the trail links many of the popular parks in the area, including Wakefield Park, Lake Accotink Park, Laurel Hill, and Occoquan Regional Park. The trail surface varies from paved sections to wide dirt paths to narrow single tracks (Fairfax County Park Authority [FCPA], 2013).

AMENITIES

Parking is provided at parks adjacent to the CCT. Trail entrances are marked by signs generally located off public streets or through adjacent

parkland. Accessible entrances allow users in wheelchairs or other assisting devices access to the trails. Kiosks are located at areas central to the major trail system to serve as starting points. The kiosks typically contain a map of the trail system as well as trail use guidelines, emergency information, etc. Water and food are frequently co-located with restrooms in staffed parks. The availability of vending machines and a snack bar allows users to extend their time on the trail. Permanent restroom facilities are located at various parks while others may have seasonal portable restrooms. Benches are provided every half mile along the CCT, allowing senior citizens or persons with physical disabilities to use trails with greater comfort (FCPA, 2013).

PROS

The CCT earned a lot of support from citizens in the area. The 2004 Needs Assessment Survey, a community based survey conducted by the FCPA, found that 65% of the respondents use



Figure 3.18.3: CCT Trail Bench (Source: Fairfax County Virginia, 2013)

trails, making trails the most widely used type of recreational facility in the county (Trail Development Strategy Plan, 2013). Further connections into Prince William County and Loudoun County are anticipated (Fairfax County Virginia, 2013).

In 2009, the FCPA presented Gerry Connolly, the representative of the Fairfax County Board of Supervisors who motioned to create the CCT, with the prestigious Sally Ormsby Environmental Stewardship Award for his local, regional, and national accomplishments to protect the environment and preserve open space (U.S. House of Representatives, 2014)

CONS

Since the CCT ties together different trails and a variety of terrains, some users will find that certain sections of the trail will not be appropriate for some uses. For example, much of the Difficult Run portion of the trail is not surfaced and is frequently muddy, with steep slopes and narrow passages. Many parts of the Accotink Stream Valley portion of the trail are paved and not appropriate for equestrian use. Motorized vehicles are not allowed on any part of the trail. The exception is for electric personal assistance mobility devices, such as Segways and similar devices (Fairfax County Virginia, 2013).

MAINTENANCE AND MANAGEMENT

The planned trails are maintained by the FCPA. Routine trail tasks include trail inspection, mowing, tree and brush pruning, leaf and debris removal, snow and ice removal, cleaning and replacement of culverts, maintenance of water crossings, and repairs to signs and other amenities (Fairfax County Virginia, 2013).

LESSONS LEARNED

The CCT demonstrates an example of a greenway system that was established and built by Fairfax County, its citizens and non-profit organizations. With similar purposes and uses, the greenway project in Bullitt County could strengthen its publicity to improve citizen awareness of the cross county trail, which would help with recruiting volunteers and gathering donations. The CCT trail is the result of a strong common consciousness to pursue a sustainable environment and encourage healthy lifestyles. Hence, branding the greenway is an important step as Bullitt County seeks to raise funds and adopt a long-term greenway plan.

In terms of planning, the CCT connects well to a variety of places with different characters, creating engaging biking and hiking experiences for all users. With rich geographic sights along with tourism and historic resources, Bullitt County has a host of potential opportunities to display its rural character by connecting these sites with the greenway. Like the CCT, multiple entrances are crucial to facilitate accessing the greenway. Clear indications of trail entrances should be provided through various wayfinding amenities, such as information kiosks, coordinated signage and folding maps. Strengthening connections to the outside of the county is also a key strategy for inviting more users into Bullitt County and introducing Bullitt County to Louisville and adjacent districts. A county-wide organization, like the Fairfax County Park Authority, could be formed in Bullitt County to better maintain and manage the greenway. Other amenities, such as benches, water and food supplies, and restrooms, should be provided to ensure users' comfort and extend the time they will use the trail and explore Bullitt County.

3 | REFERENCES

PARKLANDS OF FLOYDS FORK

The Fork: The Floyds Fork Greenway Master Plan Report. (2008). Wallace, Roberts, and Todd.

The Parklands. (n.d.). Retrieved December 10, 2014, from <http://www.theparklands.org>

LOUISVILLE LOOP

Louisville Loop Overview. (2014, January 1). Retrieved September 5, 2014, from <http://www.louisvilleloop.org/>

OLMSTED PARKWAY SYSTEM

Olmsted Parkways Shared-Use Pathway System Master Plan. One. Parkway History. (n.d.). Retrieved December 10, 2014, from http://louisvilleky.gov/sites/default/files/parks/planning_and_design/chapter1parkwayshistory2010oct22.pdf

Olmsted Parkways Shared-Use Pathway System Master Plan. Four. Existing Conditions. (n.d.). Retrieved December 10, 2014e

ELIZABETHTOWN GREENBELT

Sprague, Ed. "Greenspace, Inc. Questions." Interview. September 2014.

The Greenbelt. (2014). Retrieved Aug.-Sept. 2014. <http://www.greenspaceky.com/index.asp>

ADKISSON GREENBELT PARK

Interviews:

Angie Drury, Secretary of Owensboro Parks and Recreation. 270-687-8700

Ross Lee, Fiscal Court Director of Parks and Recreation, Owensboro. 270-685-6144

Kerry Bodenheimer, Superintendent of Owensboro Parks and Recreation. 270-687-8705

Owensboro Parks and Recreation. 2014. Retrieved August from http://www.owensboroparks.org/?page_id=38

WOODSTOCK GREENPRINTS

Greenprint Alliance. (n.d.) Woodstock trails. Retrieved from: <http://www.woodstocktrails.com/>

Pond & Company. (2014). Woodstock greenprints parks and trails master plan. Retrieved from: <http://www.pondco.com/portfolio/woodstock-greenprints-parks-and-trails-master-plan/>

Ecos Environmental Design, Inc., The PATH Foundation, Pros Consulting. (2008, June 16). The greenprints project. Retrieved from: <http://static.squarespace.com/static/52ebfd9be4b06a0b7ba771db/t/52efcca2e4b0186ede035316/1391447202231/2008-07-03-GreenprintsReport-FINALFORPRINTING-HighQuality.pdf>

GREAT RIVERS GREENWAY

United States Department of Agriculture. (2013). The economic benefit of recreational trails. Retrieved from <http://www.srs.fs.usda.gov/factsheet/pdf/rectrails.pdf>

Great Rivers Greenway. (2011). Making St. Louis a better place to live: An update to the regional greenway plan to build, promote, and

sustain the River Ring. Retrieved from http://www.greatriversgreenway.org/Portals/0/Documents/2c15ea3a-0dfe-4860-bbce-78c433990883_GRG%20Plan%20Update%20-%20FP%20WEB%20FINAL%20new%20page%2039%20image.pdf

Rails to Trails Conservancy. (2003). Economic benefits of trails and greenways. Retrieved from https://www.greenway.org/pdf/tgc_econ_benefits.pdf

BOULDER GREENWAY SYSTEM

<http://resiliency.lsu.edu/planning/boulder-greenways-master-plan/>

Knapp, K., 'The Boulder Greenways Example Strategies, Approaches and Lessons Learned from Boulder's Urban Creek System' http://cocowaterweb.org/get-involved/ccwf-meetings/Boulder_creeks_webready_rev.pdf

'Greenways Master Plan' (2011) <https://www.static.bouldercolorado.gov/docs/2011-greenways-master-plan-update-1-201304221316.pdf>

<http://www.pedbikeinfo.org/data/library/details/cfm?id=4299>

<http://www.m-bike.org/>

'Bikeway and Trail Adopted Design Standards Planning Guidelines Design Standards Planning Guidelines' <https://frederickcountymd.gov/documents/451/629/Bikeway%20and%20Trails%20Design%20Standards.PDF>

GREENWAYS FOR NASHVILLE

Greenways for Nashville. (n.d.) The Greenways. Retrieved September 5, 2014, from <http://www.greenwaysfornashville.org/greenways/>

Nashville Civic Design Center. (2006) Nashville Riverfront Redevelopment Master Plan. Retrieved September 15, 2014, from <http://atfiles.org/files/pdf/NashvilleRiverfrontReport.pdf>

Noble, M. (2013) Nashville Twilight. Retrieved September 5, 2014, from <https://www.flickr.com/photos/titanfan/14438248244/in/pool-greenways>

Parks and Recreation. (n.d.) Greenways and Trails. Retrieved September 5, 2014, from <http://www.nashville.gov/Parks-and-Recreation/Greenways-and-Trails.aspx>

WAKE FOREST GREENWAY PLAN

Greenways Incorporated. (2002). Wake Forest Open Space and Greenway Plan. Wake County and Town of Wake Forest.

Greenways Incorporated. (2009). Wake Forest, North Carolina Open Space and Greenway Plan Revised 2009. Retrieved from Town of Wake Forest website: <http://www.wakeforestnc.gov/Data/Sites/1/media/Residents/Planning/planning%20services/greenwaysopenspaceplan.pdf>

Greenways Incorporated. (2009). Smith Creek at Smith Creek Soccer Center. [Master Plan of Smith Creek Greenway]. Retrieved from <http://www.wakeforestnc.gov/smith-creek-at-smith-creek-soccer-center.aspx>

www.wakeforestnc.gov/smith-creek-at-smith-creek-soccer-center.aspx

Smith Creek at Smith Creek Soccer Center. [Photograph of Smith Creek Greenway Trail]. Retrieved from <http://www.wakeforestnc.gov/smith-creek-at-smith-creek-soccer-center.aspx>

Town of Wake Forest. (n.d.). Greenways - Town of Wake Forest, NC. Retrieved from <http://www.wakeforestnc.gov/greenways.aspx>.

The Wake Forest Gazette. (2014, October 8). Eroded Richland Greenway to get Repairs. The Wake Forest Gazette.

DAKOTA COUNTRY GREENWAY

The Greenway Guidebook. (2010, September 28). Retrieved November 6, 2014, from <http://www.co.dakota.mn.us/parks/Planning/Greenways/Documents/GreenwayGuidebook.pdf>

Welcome! (n.d.). Retrieved November 6, 2014, from <http://www.hkgi.com/projects/dakota/>

Trail Review. (n.d.). Retrieved November 25, 2014, from <http://www.lebanonhills.com/trails/>

CENTRAL OHIO GREENWAYS

A Natural Connection. (n.d.). Retrieved November 10, 2014, from <http://www.centralohiogreenways.com/index.php/maps>

Overview. (n.d.). Retrieved November 10, 2014, from <http://www.morpc.org/about-morpc/overview/index>

Metro Parks - Central Ohio Park System - Homepage. (2009, January 1). Retrieved November 24, 2014, from <http://www.metroparks.net/>

Central Ohio Greenways Implementation Guide. (2006, December 1). Retrieved November 10, 2014, from <http://www.morpc.org/pdf/GreenwaysImpl2006GUIDE.pdf>

McCollam, B. (2013, October 31). Neighbors, Metro Parks Connected by Central Ohio Greenways. Retrieved November 24, 2014, from <http://www.nacentralohio.com/neighbors-metro-parks-connected-by-central-ohio-greenways/>

A Plan For Franklin County. (n.d.). Retrieved November 10, 2014, from <http://www.morpc.org/pdf/greenways.pdf>

BIG CREEK GREENWAY

The Big Creek Greenway. (n.d.). Retrieved September 17, 2014, from <http://www.bigcreekgreenway.com/>

Big Creek Greenway Multi-Use Trail. (n.d.). Retrieved September 17, 2014, from <http://www.pondco.com/portfolio/big-creek-greenway-multi-use-trail/>

RAILWAY RESERVES HERITAGE TRAIL

Experience the Trail. (2012). Retrieved September 15, 2014, from <http://www.railwayreserves.com.au/Pages/home.aspx>

3 | REFERENCES

Perth Hills Master Plan. (2013, May 1).

Retrieved September 15, 2014, from [http://www.bushwalkingwa.org.au/docs/Perth Hills Trails Master Plan.pdf](http://www.bushwalkingwa.org.au/docs/Perth_Hills_Trails_Master_Plan.pdf)

EMERALD NECKLACE

Emerald Necklace. (2014, January 1). Retrieved December 10, 2014, from <http://www.cityofboston.gov/Parks/emerald/>

Park Overview - The Emerald Necklace Conservancy. (2014, January 1).

Retrieved December 10, 2014, from <http://www.emeraldnecklace.org/park-overview/>

United States. National Park Service. (n.d.). The Emerald Necklace--Reading 3 Creating the Jewels of the Emerald Necklace. Retrieved December 10, 2014, from <http://www.nps.gov/nr/twhp/wwwlps/lessons/86bostonparks/86facts3.htm>

Current Plan:

http://www.cityofboston.gov/images/documents/EMERALDN_tcm3-4403.PDF

Original Plan:

http://upload.wikimedia.org/wikipedia/commons/4/4b/Olmsted_historic_map_Boston.png

DENVER URBAN TRAILS

Denver Regional Trail Map [Online Image]. (2014). Retrieved November 5, 2014 from https://www.denvergov.org/Portals/747/documents/parks/trails/regional_trails_web.pdf

[Untitled image of Platte River South and Rail].

Retrieved November 5, 2014 from <http://walk2connect.com/event/platte-river-south-rail-13-miles/>

Montgomery, J. (2011). [Untitled image of Bear Creek Trail Run]. Retrieved November 5, 2014 from <http://funwithgravity.blogspot.com/2011/05/bear-creek-trail-run.html>

South Platte River Greenway - Great Public Spaces Project for Public Spaces (PPS). (n.d.). Retrieved October 6, 2014, from http://pps.org/great_public_spaces/one?public_place_id=57&type_id=1

WalkRideColorado. (n.d.). Retrieved January 1, 2014, from <http://www.walkridecolorado.com/denver-metro/denver-metro-trails>

Denver Parks and Recreation. (2014, January Retrieved September 12, 2014, from <http://www.denvergov.org/parksandrecreation/DenverParksandRecreation/Parks/Trails/UrbanTrails/tabid/444261/Default.aspx>

Regional Trails Map. (2014, January 1). Retrieved December 12, 2014, from https://www.denvergov.org/Portals/747/documents/parks/trails/regional_trails_web.pdf

Platte River South & Rail (13 Miles) - Walk2Connect. (2014, January 1). Retrieved September 12, 2014, from <http://walk2connect.com/event/platte-river-south-rail-13-miles/>

CAROLINA THREAD TRAIL

Trip Advisor. 2014. Shepherdsville KY. Retrieved September 9, 2014, from <http://www.tripadvisor.com/>

FAIRFAX CROSS COUNTY TRAIL

Fairfax County Virginia. (2013a). Trail Development Strategy Play. Retrieved from <http://www.fairfaxcounty.gov/parks/plandev/downloads/trail-development-strategy-plan.pdf>

Fairfax County Virginia. (2013b). Section I-Trail Planning. Retrieved from <http://www.fairfaxcounty.gov/parks/trailmanagement/trailplanning.pdf>

Fairfax County Virginia. (2013c). Section II Trail Development. Retrieved from <http://www.fairfaxcounty.gov/parks/trailmanagement/traildevelopment.pdf>

Fairfax County Virginia. (2013d). Section III Trail Management. Retrieved from <http://www.fairfaxcounty.gov/parks/trailmanagement/trailmanagement.pdf>.

Fairfax County Virginia. (2013e). Section IV Trail Maintenance. Retrieved from <http://www.fairfaxcounty.gov/parks/trailmanagement/trailmaintenance.pdf>

Fairfax County Park Authority. (2013). It's All About Connections. Retrieved from <http://www.fairfaxcounty.gov/parks/cct/#Q7>

InsideNova (2014). Fairfax's Cross County Trail to be Named After Gerry Connolly. Retrieved from http://www.insidenova.com/news/people/fairfax/fairfax-s-cross-county-trail-to-be-named-after-gerry/article_bddc4e2a-e743-11e3-b7b6-001a4bcf887a.html

U.S. House of Representatives. (Jun, 2014). Fairfax County to Recognize Rep. Gerry Connolly's Leadership in Creating 40-mile Cross County Trail. Retrieved from <http://connolly.house.gov/news/fairfax-county-to-recognize-rep-gerry-connollys-leadership-in-creating-40mile-cross-county-trail-at-renaming-ceremony-on-saturday-in-lorton/>

4 | MASTER PLANS

THE COMMON ELEMENT • TRI BULLITT TRAIL • THE BOUNDARY LOOPS • BULLITT'S BARREL RUN
 • KEEP CALM AND TRAIL ON • FOLLOW ME TO BULLITT COUNTY



THE COMMON ELEMENT



TRI BULLITT TRAIL



THE BOUNDARY LOOPS



BULLITT'S BARREL RUN



KEEP CALM AND TRAIL ON



FOLLOW ME TO BULLITT COUNTY



4 | PLAN A: THE COMMON ELEMENT

INTRODUCTION & BACKGROUND

Bullitt County has shown extensive growth in population, especially in the northern areas of the county near the Louisville metropolitan area. This population growth has provided Bullitt County with a diverse demographic, especially in age, in terms of county identity. An overall identity of Bullitt County is lacking and the county as a whole has become fragmented and disconnected from one area to another. Some areas within the county have more connections to the surrounding counties in terms of employment and social activity than within Bullitt County itself. The potential to improve connectivity provides opportunities to enhance the existing connections and green infrastructure of Bullitt County.

CONCEPT

The fragmentation present in Bullitt County led to the concept of a county-wide greenway system to connect the populated areas. This greenway system connects the fragmented areas of Bullitt County while creating an overall identity for the county.

The greenway concept connects Bullitt County's individual elements or fragmented areas with a *Common Element*, defined for this design as:

- **common** - "a piece of open land for public use"
- **element** - "a natural habitat, sphere of activity, environment..."

(dictionary.com)

This Common Element is a destination greenway system that will unite and connect the fragmented areas of Bullitt County (Figure 4.1.1). The design connects Bullitt County's Urban Cores, Natural Features and Cultural Resources areas.

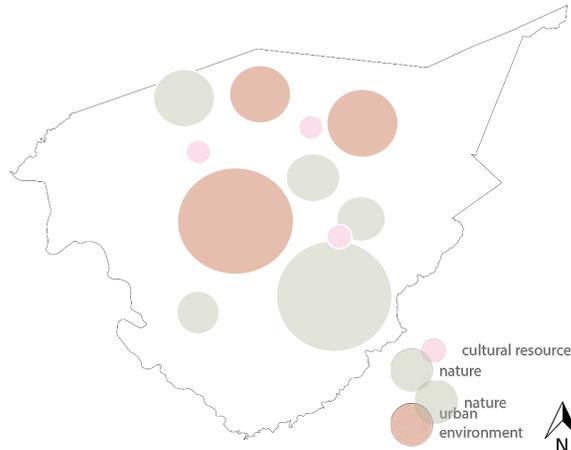


Figure 4.1.1: An illustration of the fragmentation of the Urban Cores, Natural Features and Cultural Resources areas of Bullitt County. Data Source: (Kentucky Geography Network, 2014)

GOAL/OBJECTIVES

The goal of this design proposal is to establish a greenway system that will unite and connect the fragmented areas of Bullitt County by a common element, a greenway system.

The design aims to successfully connect these fragmented areas by:

- Utilizing and enhancing the existing natural environment
- Diversifying and strengthening the county's economic base by improving social infrastructure
- Providing educational opportunities about the environment of Bullitt County with demonstration flood mitigation practices, signage and preservation areas
- Connecting the urban cores and populated areas of Bullitt County

ANALYSIS

After the overall analysis conducted by the University of Kentucky Landscape Architecture (UKLA) design teams, the teams participated in a design charrette with members of the Bullitt County community. During the charrette a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis was conducted that showed areas within Bullitt County that were lacking in connectivity, as well as areas that would benefit the most from a connectivity plan. The SWOT analysis also helped to identify factors that could pose as opportunities or threats (limitations) to a greenway system. Examples of potential areas of opportunity identified by SWOT occur along I-65, the Salt River, Floyds Fork and Bernheim Forest (Figure 4.1.2.). After the SWOT analysis several urban and natura systems were identified as the key influences of the potential greenway design. These systems include:

- Populated areas
- Major roadways
- Existing natural areas
 - Streams, waterways and floodplains
 - Environmentally sensitive areas

Floodplain and stream systems are two of the main influencing factors of most designs. Bullitt County has extensive floodplains throughout the county (Figure 4.1.3). Governmental regulations limit development within floodplains, thus making floodplains an ideal candidate for greenspace. Of the stream system, Floyds Fork and Salt River were identified as possible connecting factors due to their size and current recreational interest. Floyds Fork also presented an opportunity for connection to the Parklands of Floyds Fork in nearby Louisville.

City boundaries, urban cores, roadways and natural areas, such as Knobs State Forest and Bernheim Arboretum and Research Forest, were also identified as influential factors of the design. Bernheim Forest is an existing popular greenspace with trail systems that is privately owned but open to the public (Figure 4.1.3.). Connection of the existing trails within Bernheim Forest to the urban areas is an opportunity to link existing destinations within Bullitt County.

The roadways are existing connections throughout the county. Utilizing these roadways as green roadways within a greenway system would assist in giving an identity to Bullitt County. A green roadway would consist of a streetscape, along with aspects like bike lanes, in order to extend visually connecting greenspace throughout the county.

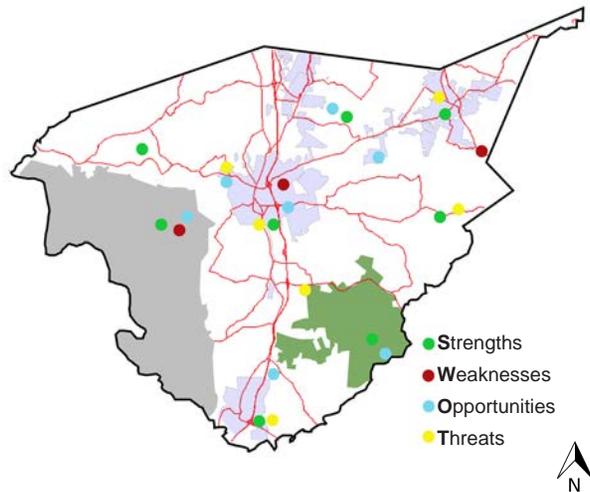


Figure 4.1.2: This image shows the SWOT (strengths, weakness, opportunities and threats) analysis within Bullitt County as identified by the Bullitt County community. Data source: (Data Source: KL&A, 2013; Kentucky Geography Network, 2014)

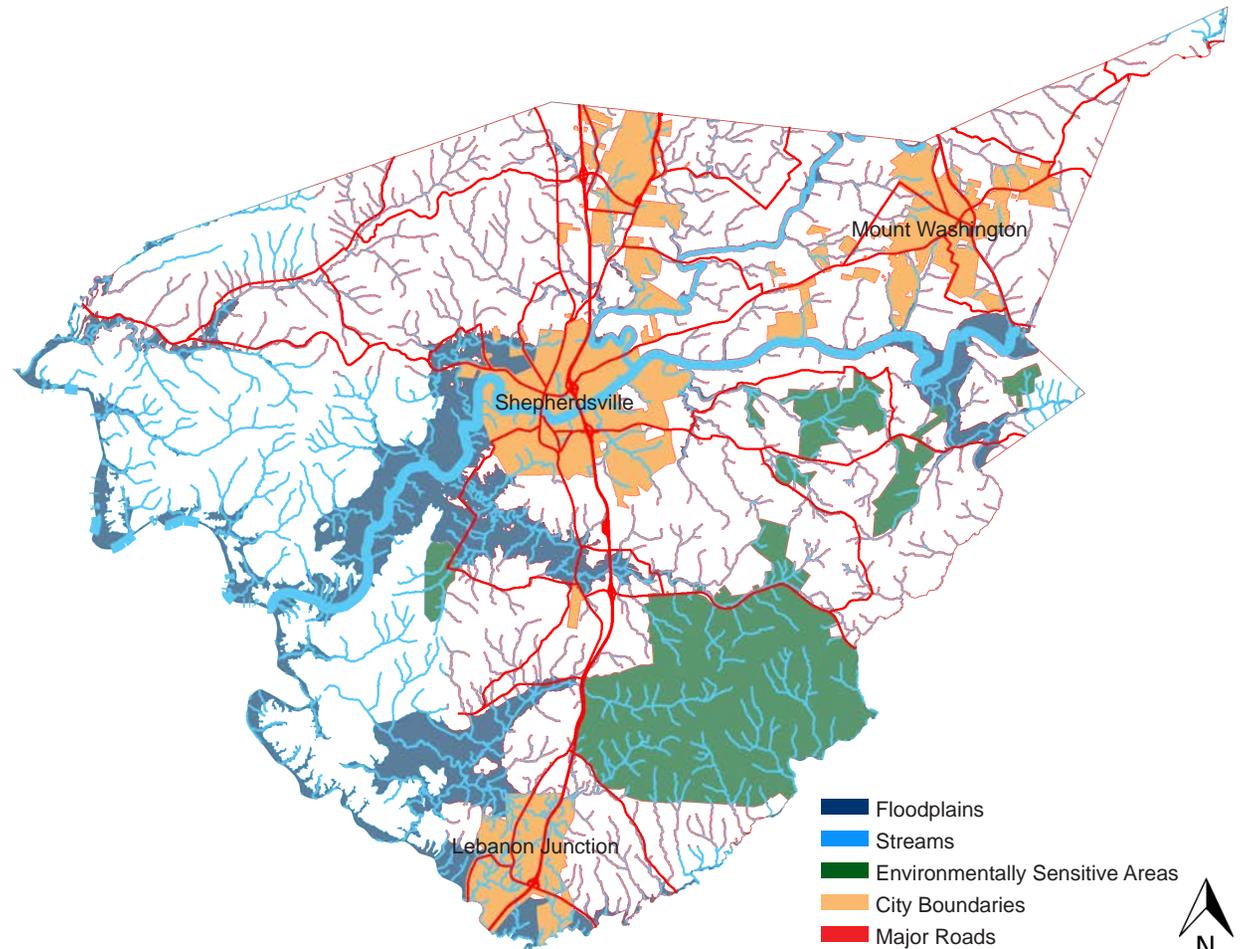


Figure 4.1.3: This figure shows the elements of Bullitt County that were used during the in-depth analysis. This analysis includes both urban and natural elements. Data Source: (Data Source: KL&A, 2013; Kentucky Geography Network, 2014)

4 | PLAN A: THE COMMON ELEMENT

MASTER PLAN

After analyzing the fragmentation, strengths weaknesses, opportunities, threats and systems of Bullitt County, the greenway design became evident. The plan connects the urban cores to the existing natural features and cultural resources. This moves the fragmented county into a unified one with nodes of interest connected by one common element, the greenway system (Figures 4.1.4 and 4.1.6).

PROGRAM

The design program consists of a number of elements working as one system, including:

Urban Core

- Rain Gardens
- Streetscapes/Complete Streets*
- Mixed-Use Infill

Natural Features

- Stormwater Retention
- Environmental Preservation
- Natural Trails

Cultural Resources

- Wayfinding
- Educational Interaction
- Environmental Systems
- Existing Attractions
-

*Complete Streets:

<http://www.smartgrowthamerica.org/complete-streets/a-to-z>

TRAILS

The plan consists of three multi-use trail types: primary, secondary, and tertiary. The primary trails connect the urban cores to the major natural features of Bullitt County such as Floyds Fork and the Bernheim Forest area. These trails are paved at trailheads and other sections in order to be universally accessible (accessible to those with

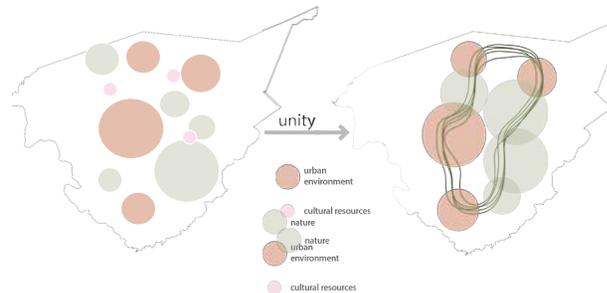


Figure 4.1.4: Design concept of connecting the fragmented pieces of Bullitt County via one Common Element, a greenway system. Data Source: (Kentucky Geograpy Network,2014)

physical disabilities). The secondary trails serve as alternative routes near the primary trails. These trails provide a scenic and natural route to the destinations in order to bring trail users closer to the natural environment (Figure 4.1.5). The tertiary trails branch from the primary and secondary trails and are recreation oriented in order to improve active greenspace within the county. These trails venture through natural and environmentally sensitive regions such as the Knobs. All of the trails will serve walkers, joggers, runners, hikers, cyclist and those who enjoy being outdoors.



Figure 4.1.5: A trail within the greenway. Trails of this type are not paved and are located at least 1/2 mile from trail heads and access points. They have a lower environmental impact.

AMENITIES

In addition to connecting the county via a greenway system, the plan also provides amenities to the users and residents of Bullitt County. The greenway system provides an aesthetic identity to Bullitt County by beautifying the county with usable greenspace and providing recreation, parks, and educational spaces. Amenities within the greenway system include :

- Parking (for greenway activities)
- Park space and playgrounds
- Stream access
- Education and demonstration areas
- Restrooms
- Conservation and preservation of environmental areas

CONCENTRATION

The design consists of three areas of concentration within the greenway system: Urban Cores, Natural Features, and Cultural Resources. The urban core concentration focuses on green roadways that unite the county via elements of street trees, stormwater management, wayfinding and accessibility. The natural features concentration focuses on bridging the gap between the urban and rural or natural areas of Bullitt County by utilizing existing natural elements and creating interactive spaces such as parks. The cultural resources concentration provides opportunities for the public to interact with and learn about the existing resources, environmental systems and greenway system in Bullitt County. In the following pages these concentrations are shown in specific areas, but are designed so that they may be implemented in similar areas throughout Bullitt County. Along with physical connections, this system will also provide multi-use greenspace, educational resources and an overall identity for Bullitt County.

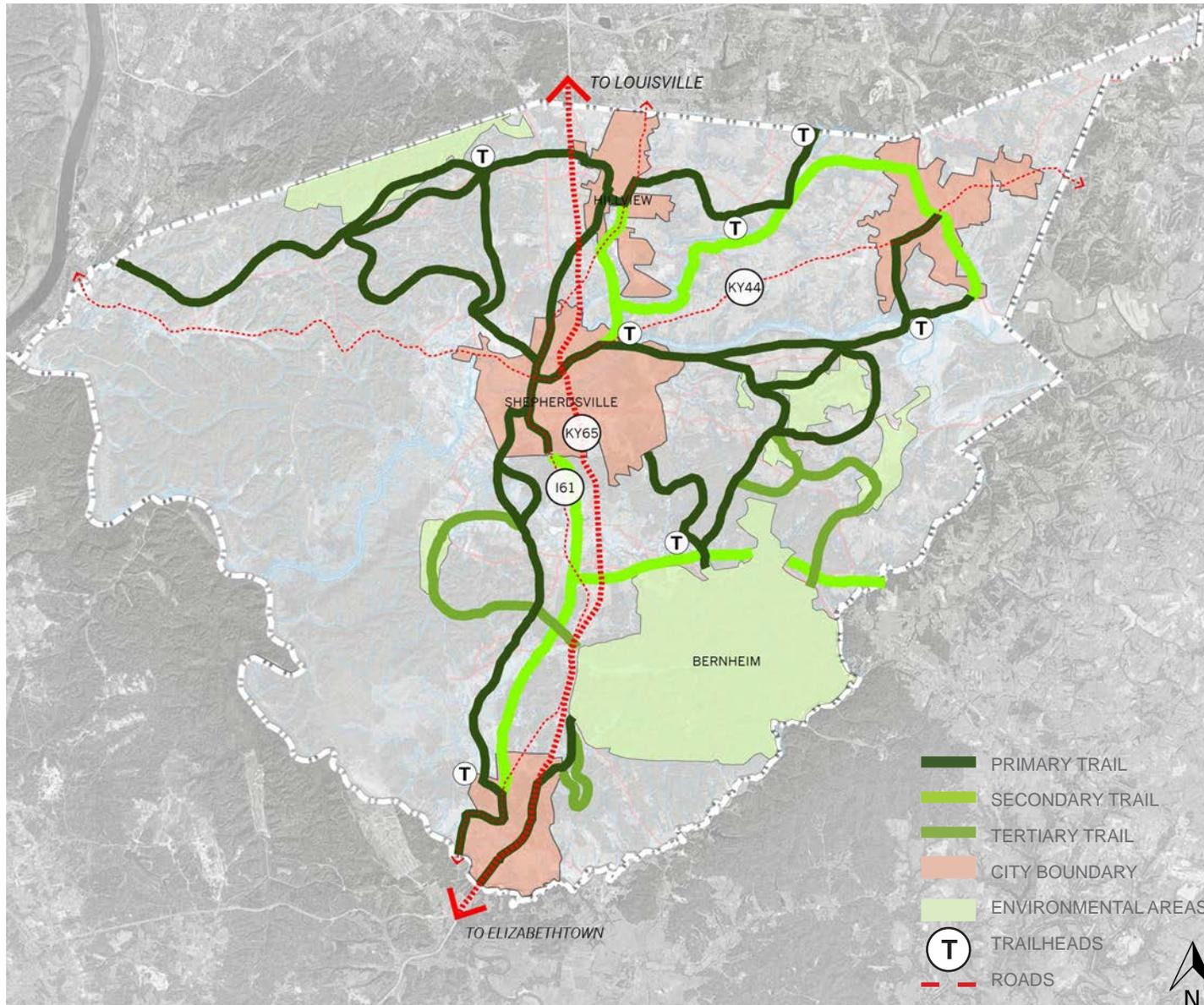


Figure 4.1.6: This figure shows the master plan for the Common Element greenway system within Bullitt County. It includes a hierarchy of trail types and greenway trailheads. (Data Source: Kentucky Geograpy Network, 2014)

4 | PLAN A: THE COMMON ELEMENT

URBAN CORE CONCENTRATION

Shepherdsville - Fourth St/ Buckman St

OPPORTUNITIES

The downtown area of Shepherdsville lacks a commercial hub that could promote and provide an economic and social boost for the community. The Salt River flows through the downtown and commonly causes flooding issues as indicated from floodplain data. Both Fourth Street and Buckman Street are potential catalysts to support growth in income, residents, tourists, and businesses that would benefit the county. Currently, the connectivity around the downtown core lacks a diversity of users (pedestrians, bikers, etc.). Shepherdsville is an automobile based town due to the generous street dimensions and lack of sidewalk width.

FROM STREET TO STREETSCAPE

The vision for revitalization focused on Fourth Street and Buckman Street along with Adam Shepherd Parkway. After the analysis, it was determined that Fourth Street is suited to serve as the commercial spine of the district because of its potential for future expansion to the south. The street is a mile long and 84 feet wide, and in the Common Element proposal is designed as a green, urban shopping boulevard. Its appearance is supplemented with rain gardens in the median, verdant street trees and plantings, bicycle lanes, and welcoming facades to attract a variety of users (Figure 4.1.7). The new Buckman Street is focused on the usage, comfort, and convenience of its users.

Fourth Street serves as a gateway to the main commercial corridor of Buckman Street. Newly planted street trees provide greenery to the existing streetscape that will serve to reduce the heat island effect. The existing roads are narrowed down to 10 ft. lanes to incorporate bicycle lanes. Buckham Street will serve as a transitional gateway to the commercial corridor of Fourth Street. This street's greenery will attract users from the local area along with motorists from Interstate 65 which will provide additional economic activity in the city.

CONNECTIVITY

The redesign of downtown is tailored to accommodate pedestrians and cyclists to reduce traffic and vehicle usage. The direction of travel for the traffic on both streets will remain unchanged for convenience. Vehicles are directed to reduce their speed in the downtown area in order to provide safe bicycle lanes and allow implementation of the rain gardens in the median of Buckham Street. The bicycle lanes take up part of the 14 ft. wide pedestrian zones along the commercial corridor (Figure 4.1.8).



Figure 4.1.7: Perspective showing the intersection of Fourth Street and Buckman Street in Downtown Shepherdsville



Figure 4.1.8: Section of Route 44/ Buckman Street. Pedestrian and biker based transition road to feed into Route 61/ Fourth Street.

ECOLOGICALLY CONSCIOUS

Placing native street trees along Buckman Street and Fourth Street will reduce the heat island effect from the existing hardscape, beautify the streetscape, and reduce stormwater management costs due to the filtering of Fourth Street runoff. The trees will also provide for a more welcoming image of downtown. Buckman Street's main ecological feature is the island of rain gardens that filter the rain water prior to its final destination into the Salt River.

MIXED-USE CONCEPT

The commercial corridor is unique in the sense that users will be able to experience each store, both visually and physically. Implementing a new commercial district with complementary design guidelines will allow passersby to enjoy the variety of redesigned facades of each shop. The master plan will be implemented in phases starting initially by introducing pop-up shops along with a farmer's market. In the end, the goal is to provide permanent structures of both traditional and modern mixed-use concepts while integrating a diverse flow of economic opportunities within the community (Figures 4.1.9 and 4.1.10).



Figure 4.1.9: Section of Route 61 showing the implementation of a bicycle lane, street trees, rain gardens and building signage. The components of this street fulfill the needs of Complete Streets*, which provide access for all types of users.

*Complete Streets: <http://www.smartgrowthamerica.org/complete-streets/a-to-z>



Figure 4.1.10: Master plan of Downtown Shepherdsville which shows the implementation of street trees, infills, and rain gardens. The components of this plan can be integrated within any of the urban areas within Shepherdsville.

4 | PLAN A: THE COMMON ELEMENT

NATURAL FEATURES CONCENTRATION

OPPORTUNITIES

Floodplains and proximity to streams are significant factors in terms of zoning and development, thus the corridors near Floyds Fork and the Salt River show great potential as locations for implementing a greenway system. Establishing a greenway system near these influential waterways allows access to recreation activities, points for environmental education and connectivity routes to areas within Bullitt County, including Mt. Washington, Shepherdsville, Hillview, and possibly to the Parklands of Floyds Fork in Louisville.

CHALLENGES

The location of a greenway system along streams promises opportunity, but also poses challenges. The runoff of human impacted areas near the streams, such as from parking lots, will negatively impact the water quality of the Floyds Fork and Salt River. This has an impact on habitats for aquatic species as well as on recreational use. The current use of the floodplains for practices such as farming, residential and industrial endeavors also pose challenges. Considerable attention must be given to the appropriate placement of trails and amenities in terms of maintenance and because of the potential for frequent flooding.

NATURAL FEATURES MASTER PLAN

The natural features concentration of the greenway follows Floyds Fork from its intersection with the Salt River in Shepherdsville north to Louisville, and on the Salt River from Floyds Fork east to Mt. Washington. The concentration area includes three trailhead locations and two trail access points (Figure 4.1.11). Each trailhead is near one or more urban core area in Bullitt County; making connections to the north, to the east/Hillview area,

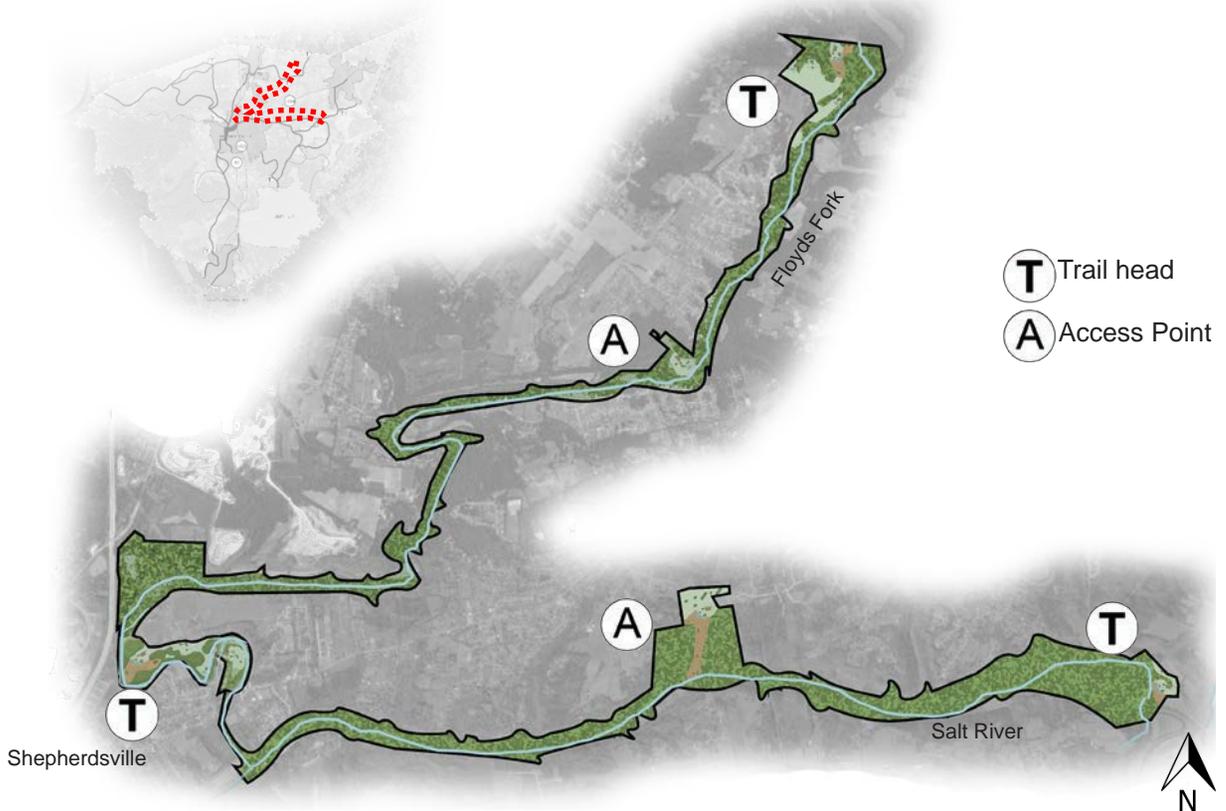


Figure 4.1.11: This diagram shows the master plan for the Natural Features concentration area along the Salt River and Floyds Fork. It shows the location of the greenway trail system trailheads (T) and access points (A) in and between Shepherdsville and Mt. Washington. Data Source: (Kentucky Geography Network, 2014)



Figure 4.1.12: This figure illustrates the trail within a 1/2 mile radius of the trailheads and access points for universal accessibility.



Figure 4.1.13: This figure illustrates the trail over a 1/2 mile radius from the trailhead. The trail is more rugged and natural.

and south to a cultural resources area. The three trailheads are located: 1) on Floyds Fork near Mt. Washington to the border of Louisville, 2) near MacDonald Knob along Floyds Fork to the east of Shepherdsville; and 3) on the Salt River to the south of Mt. Washington. There are also access points between each trailhead, creating a stopping point at least every 3 miles.

TRAILS

The greenway system within the natural features plan include two trail types, primary and secondary. The primary trails are the largest and most direct routes from one area to another such as from Shepherdsville to Mt. Washington. The secondary trails provide more interaction with the environment and trailhead areas along with a scenic view. Within a half-mile radius of all trailheads and access points, the trails will be paved for universal accessibility. Outside of that radius, the trails will be composed of organic material, such as mulch, in order to minimize the environmental impact Figures 4.1.12 and 4.1.13).



Figure 4.1.14: This perspective of an example trailhead shows how it can be used as a social gathering space.

TRAILHEADS & AMENITIES

The trailheads serve not only as trail entrances or parking areas, but also as parks, community space, educational areas, stream access points, and conservation or preservation areas (Figure 4.1.14). The amenities located at the trailheads consist of universally accessible trails, parking, restrooms, playgrounds, park space, stream access, information centers, educational centers, and wayfinding features (Figure 4.1.15). The trailheads also consist of native vegetation, meadows, and flood mitigation demonstration areas, such as stormwater retention basins and rain gardens that can offset the impact

of the greenway system on Floyds Fork and the Salt River by collecting and filtering runoff.

The Natural Features Concentration plan of the Common Element greenway system provides:

- Connections between three of Bullitt County's urban areas to each other and the natural landscape
- Recreational space to improve social and green infrastructure
- Educational and demonstration learning opportunities about natural systems
- Preservation and Conservation of Bullitt County's natural areas



Figure 4.1.15: An example master plan of a trailhead or access point along the Natural Features plan of the Common Element greenway system. It shows the amenities present at each trailhead and how the built and natural environment can be integrated.

4 | PLAN A: THE COMMON ELEMENT

CULTURAL RESOURCES CONCENTRATION

OPPORTUNITIES

For the purpose of this particular greenway plan, cultural resources are defined primarily as existing natural and environmental aspects of Bullitt County excluding stream and river systems. This concentration highlights areas where different environments and ecosystems interact with each other. Such ecosystems include wetlands and ponds as well as forested, grassland, and farmland areas. The land and trails along a cultural resources area focus on providing learning opportunities for trail users about the different systems and management practices in each area. Visitors are encouraged to engage and interact with the landscape while also learning about the elements of which the landscape is composed.

CHALLENGES

Environmentally sensitive lands in Bullitt County are prime locations at which to place cultural resources concentration areas (Figure 4.1.16). However, they are also spaces that require minimal human interaction occur within their boundaries. Endangered and protected species, such as the Kentucky Glade Cress, and areas devoted to preserving natural environments are within the environmentally sensitive boundaries and either cannot or should not be disturbed so as to protect the ecosystems within. This limits, but does not stop placement of such concentration areas in and surrounding environmentally sensitive land. To acknowledge the needs of the sensitive areas, trails and amenities in close proximity should be designed to be low impact and invade only a small part of the sensitive area's boundaries.

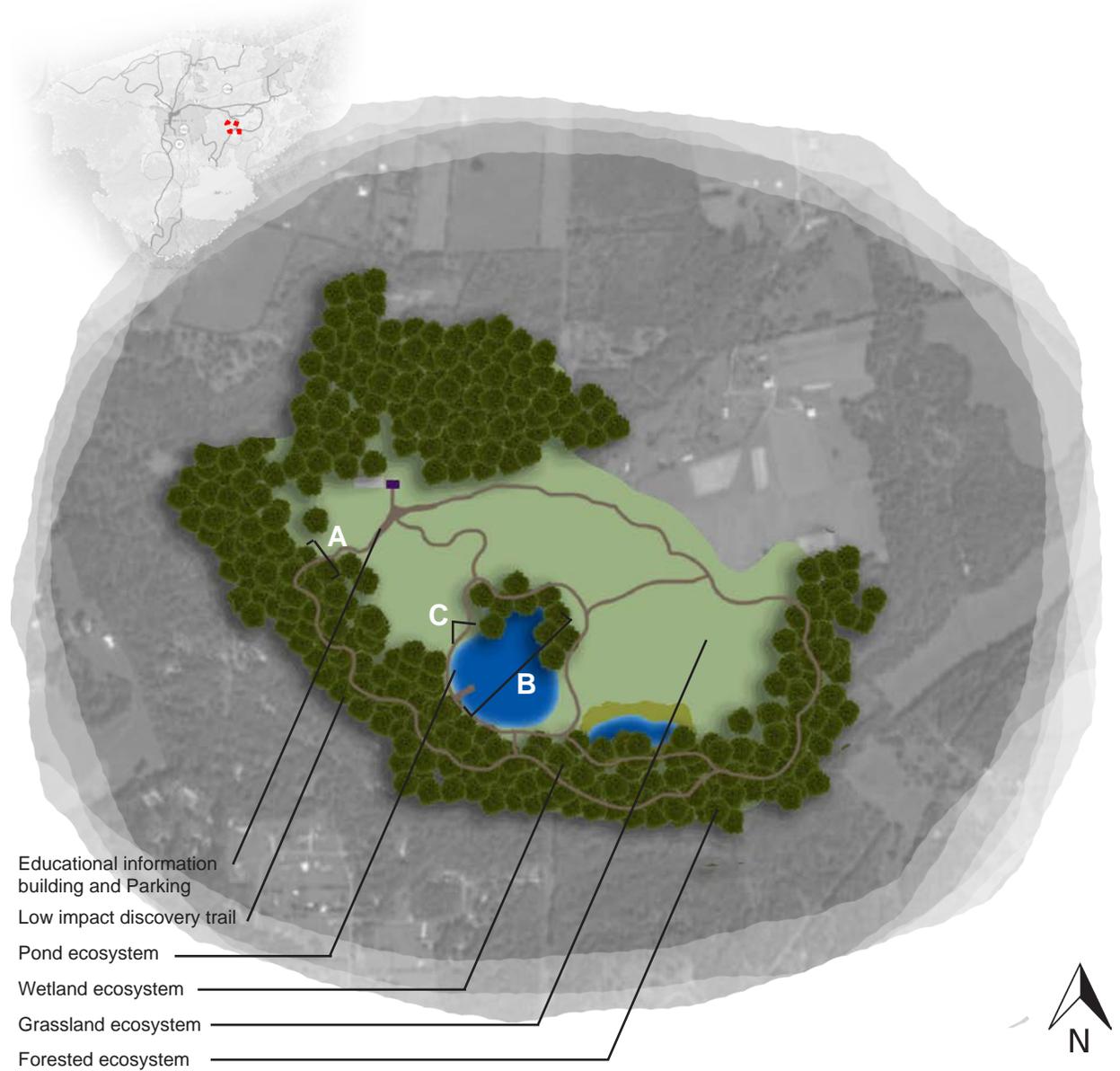


Figure 4.1.16: Plan view - Example of a cultural resources concentration area.

CULTURAL RESOURCES MASTER PLAN

Situated south of the Salt River and north of Cedar Grove Road, this concentration area provides access to many different ecosystems, such as wetlands, ponds, farmland and forested land. The proposed low impact Discovery Trail runs through the site and then connects to one of the master primary trails. Wayfinding signs situated throughout the site provide information pertinent to both the individual ecosystems and the trail system as a whole (Figures 4.1.17a/b and 4.1.18). Existing natural features provide demonstration areas where visitors can view how certain systems function within the landscape. Implemented features or those created for the site, such as the pond area, allow visitors to see the effectiveness of different management practices.



Figure 4.1.17a: Section as seen from Point A indicated in Figure 4.1.16. Typical trail and sign system within the cultural resources concentration areas.



Figure 4.1.17b: Section as seen from Point B indicated in Figure 4.1.16. Example of wetland and pond ecosystem showing how users are able to interact and learn about the environment.

The Cultural Resources plan focuses on:

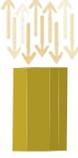
- Educational and demonstration type learning opportunities about different ecosystems and management practices specific to Bullitt County and Kentucky
- Environmental protection around sensitive land
- Interaction and engagement with different ecosystems
- Wayfinding

Focusing on utilizing, preserving, and improving upon existing natural features, the Cultural Resources concentration provides a more environmentally aware experience for users. Users are integrated into the landscape where they can learn more about Bullitt County from an environmental point of view. Visitors are able to understand how systems interact within a natural setting and then compare how they interact and react with more urban systems in the Natural Features and Urban Cores concentrations.



Figure 4.1.18: Perspective view as seen from Point C indicated in Figure 4.1.16. This is an example of a pond and wetland ecosystem interacting with a farm or grassland ecosystem. Users are able to engage the environment via the trail system while signs along the trails provide educational information about each area and the elements within.

THE

TR  BULLITT  TT TRAIL  L

COMMUNITY ————— NATURE ————— PEOPLE

4 | PLAN B: THE TRI BULLITT TRAIL

CONCEPT

Bullitt County is one of the few communities which continues to grow in the state of Kentucky. This project's goal is to improve the quality and health of the county so as to support the needs of the current population as well as the future residents of the county. The design team plans to achieve these goals as well as transform Bullitt County into a destination; a place which will attract and serve residents as well as visitors, and promote the well being and future sustainability of the community.

GOALS/OBJECTIVES

This project consists of three primary components to achieve the stated goals: 1) improving the health of the community, 2) preserving the health of the existing natural components, and 3) enhancing the health and quality of life of the people. The health of the community can be improved by creating connectivity through the development of places for social interaction, such as parks, trails and other gathering spaces. The health of the existing natural conditions can be preserved through environmental stewardship, conservation, and education. The health of the people can be enhanced by providing spaces and places for recreation that can promote healthier lifestyles.

ANALYSIS

First a physical analysis was conducted of Bullitt County (Figure 4.2.1) to identify features to utilize or avoid based upon existing characteristics. Next, major physical features, such as Interstate-65 and other highways as well as urban and city boundaries, were identified. Then many of the county's important destinations, landmarks and recreation areas, such as local wineries and distilleries, Bernheim Forest, the First Street Park

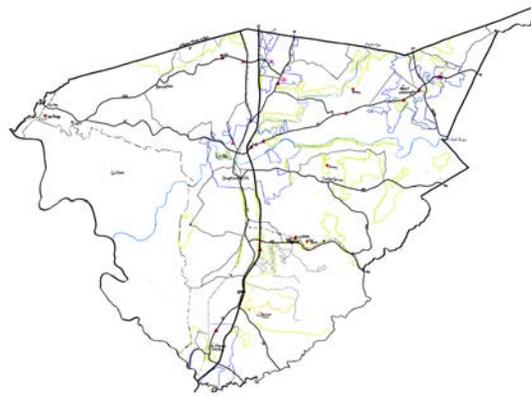


Figure 4.2.1: Physical Analysis

of Shepherdsville, The Parklands of Floyds Fork, and the Jefferson Memorial Forest, were located and mapped. Other unique and important natural hydrological components, such as rivers, creeks, streams, and local wetlands, were mapped as well. As part of the natural components analysis, critical habitat areas and environmentally sensitive sites, such as areas designated as critical habitat for the native Kentucky Glade Cress and native cedar-glades were pinpointed and mapped.

Following the physical analysis, a S.W.O.T. analysis was conducted (Figure 4.2.2). This is an analysis of the county's perceived strengths, weaknesses, opportunities and threats, as determined by members of the community. This analysis helped the designers gain more meaningful opinions and insight from the community as to how best meet the needs of the community. Most of the strengths and opportunities are located near urban areas such as Shepherdsville and Mt. Washington; strengths are also located near popular destinations such as Bernheim Forest, Jefferson Memorial Forest,

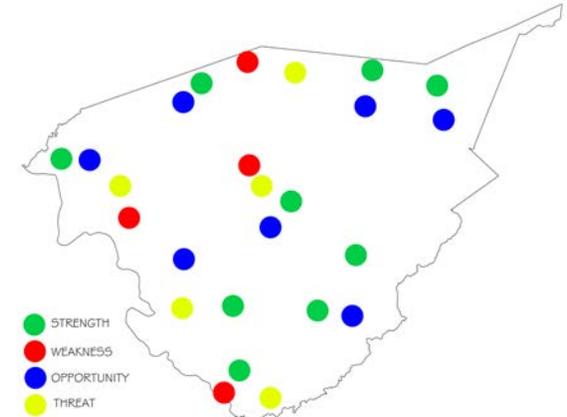


Figure 4.2.2: S.W.O.T Analysis

Floyds Fork and the Salt River. The opportunity to connect, develop and showcase these areas would be of great benefit to the county and helped to establish the initial conceptual master plan (Figure 4.2.3).

The initial concept for a county-wide greenway master plan highlights the areas and destinations which have the potential to be showcased, connected and developed. The design team diagrammed elements deemed to be important to the success of this greenway project, such as trails, environmental stewardship areas and unique physical environmental traits, in addition to access points to important areas, such as urban cores and recreational areas. Following the creation of the conceptual master plan, the design team continued to formulate and refine their ideas until ultimately developing the Tri Bullitt Trail design solution for a county-wide greenway master plan in Bullitt County (Figure 4.2.7).

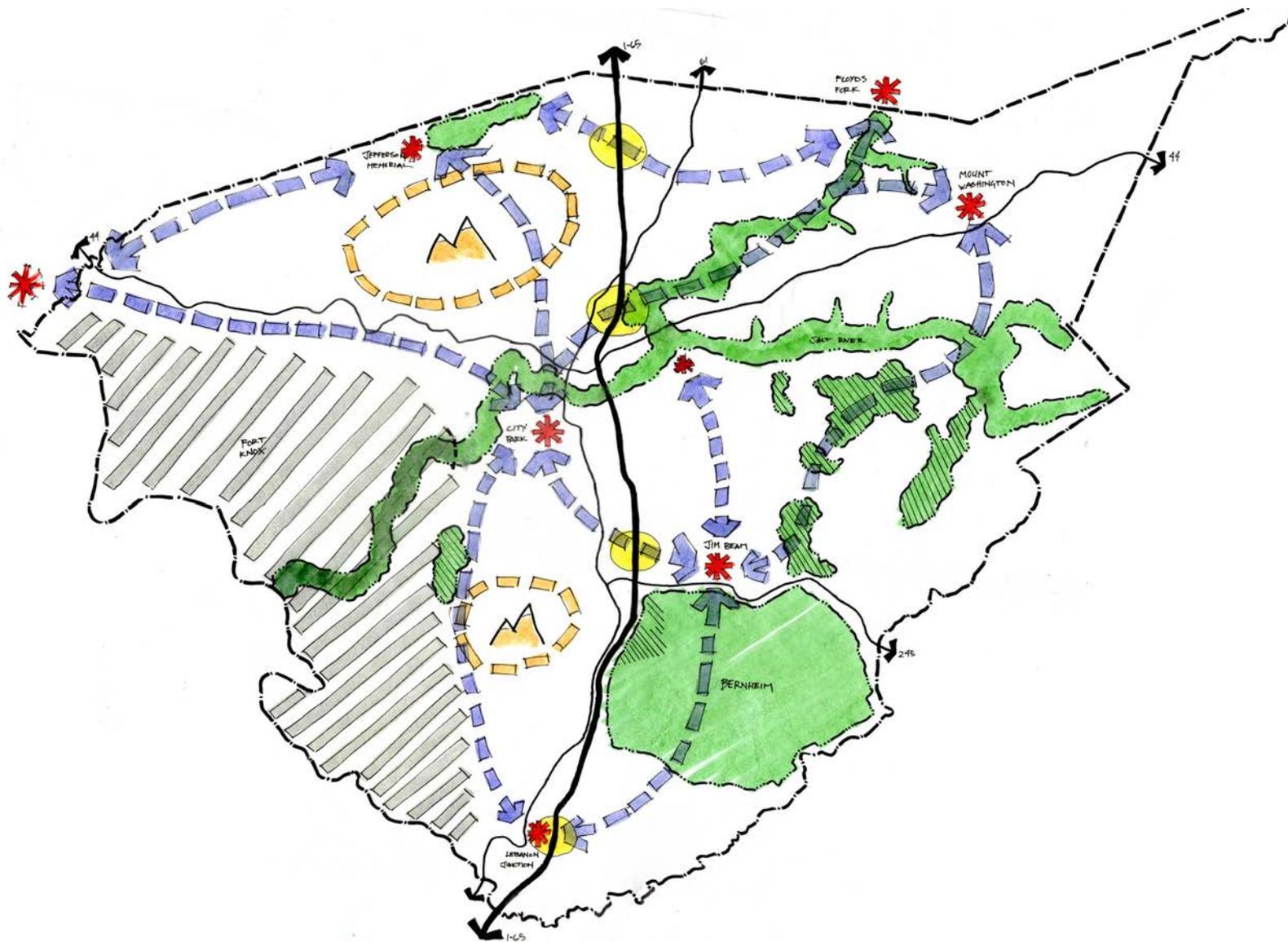


Figure 4.2.3: Tri Bullitt Trail Conceptual Master Plan

4 PLAN B: THE TRI BULLITT TRAIL

TRI BULLITT TRAIL

Community, natural sustainability and human health -- these are the most important components of a healthy, desirable and sustainable county. The Tri Bullitt Trail (TBT) plan addresses these goals. They have driven the design team's philosophy and, in turn, have been incorporated into the TBT greenway proposal. Successful implementation of the TBT will prove to be of great benefit to the future of the Bullitt County.

To begin, the design team aimed to connect people to their communities, to nature and to each other. This is accomplished by developing an expansive county-wide trail system spanning from the north, near Jefferson County, to the south, in the township of Lebanon Junction. The trail also spans from the east, near neighboring Nelson County, to the far western reaches of Bullitt County, near Jefferson County, the Ohio River, and Fort Knox.

This system is made up of multiple trail types including formal, multi-use trails intended for consistent heavy usage by a broad spectrum of users, such as recreational pedestrians, bicyclists, and other non-motorized forms of transportation and recreation, while also being universally accessible. Other trail types would include low and moderate impact trails which would be developed for more strenuous and adventurous forms of recreation and transit as well as for informative and functional exhibition of environmental stewardship strategies and implementation. The trail system will traverse a diverse variety of planned environments determined by existing environmental conditions. Areas designated for use as Adventure Areas will showcase and promote the utilization of the

unique, existing natural environment for adventure, exploration, discovery and other captivating forms of recreation (Figure 4.2.4).

Natural Stewardship Areas will be planned to focus upon exhibiting functional and engaging methods of preserving and conserving existing ecosystems, and educating the community about the value of environmental health, including the importance of critical habitats, fostering and increasing biodiversity, repairing and improving ecosystem functions, and mitigating negative human impacts upon the environment (Figure 4.2.5).

Establishing Urban Cores will be just as important to the success of the TBT proposal as more traditional greenway environments. Urban Cores will be developed and retrofitted to improve the urban condition and serve as destinations, transitions and activity hubs to effectively help promote usage of the proposed greenway (Figure 4.2.6).

The combined development of the TBT system and environments will allow for patrons to partake in an immense variety of excursion (Figure 4.2.7). The vast array of potential opportunities will encourage members of the community to discover and create new experiences and memories, unique and special to each user, all while enhancing the overall health of the county by: improving the social health of the community through the fostering of connectivity and interaction; improving the health of the local environment through stewardship, knowledge and community engagement; and improving the health of the people by providing opportunities for recreation and promoting active and healthy lifestyles.



Figure 4.2.4: Example of activity in planned Adventure Areas (shown: Lars Sternberg, nationally recognized biker).
Source: Tepper, C., VitalMTB



Figure 4.2.5: Kentucky Glade Cress, found only in Bullitt and Jefferson Counties. This species exists in planned Stewardship Areas along the Tri Bullitt Trail.
Source: Brugger, J., Louisville Courier-Journal



Figure 4.2.6: Example of urban improvement and redesign for Urban Core Areas (shown: streetscape in Brookings, SD).
Source: Lamp, J., Brookings Chamber of Commerce

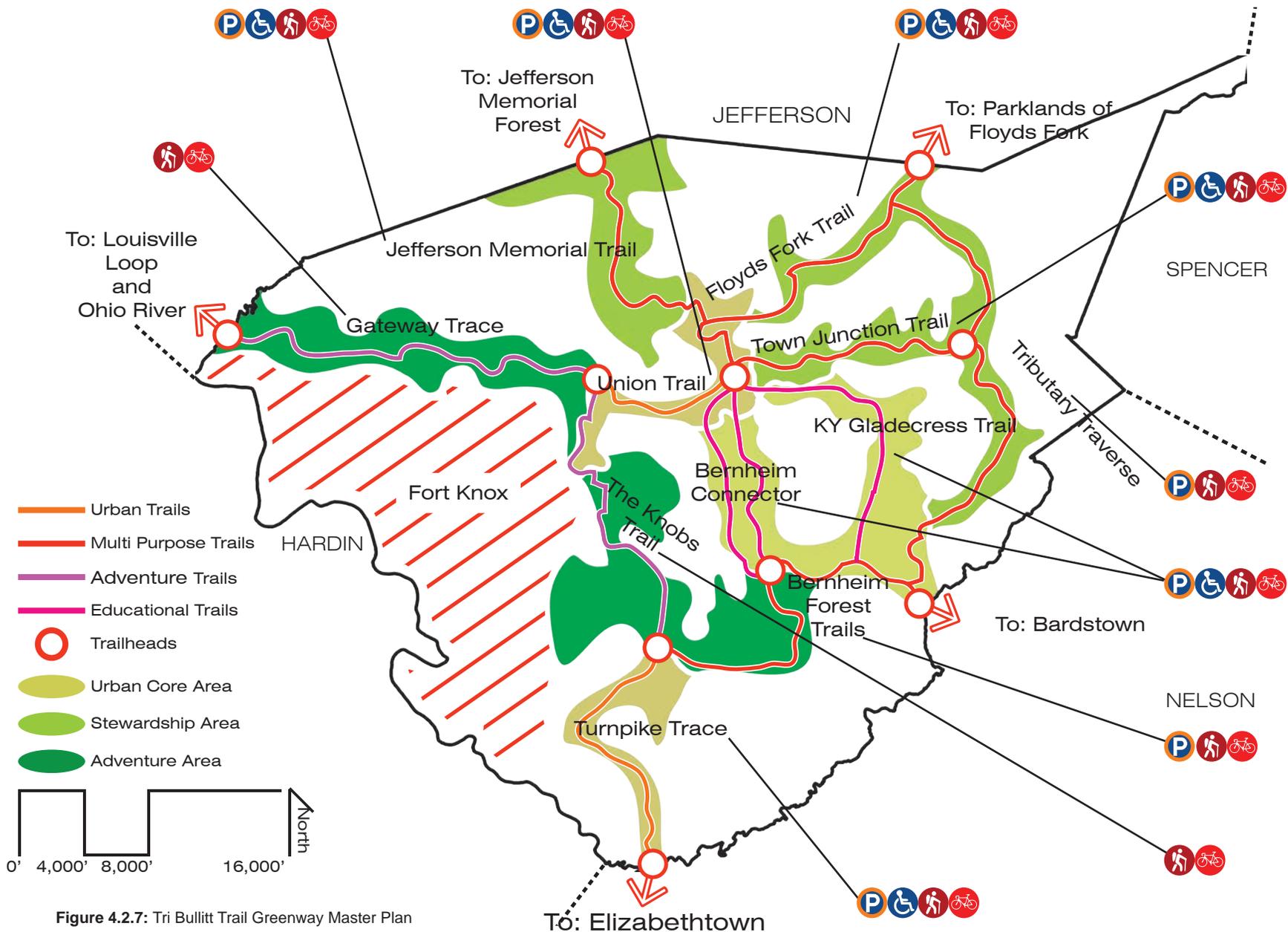


Figure 4.2.7: Tri Bullitt Trail Greenway Master Plan

4 | PLAN B: THE TRI BULLITT TRAIL

CITY PARK EAST

The design concept for City Park East is coordinated with the existing City Park West, located west of I-65 in downtown Shepherdsville. City Park East is located east of I-65 and is linked via the Salt River. The existing City Park West is a recreational, sports driven park while City Park East is designed as a more naturalistic park. It will be part of the longer Tri Bullitt Trail greenway that runs throughout the county (Figure 4.2.8). City Park East connects communities across the Salt River with a pedestrian bridge which allows access to the park from the community to the north (Figure 4.2.9). Walkable distances are shown as orange and green circles in Figure 4.2.8. City Park East boasts low impact trails through wooded and grassland areas and along the Salt River (Figure 4.2.10).

KEY COMPONENTS

- Connecting Communities
- Pedestrian Bridge
- Low Impact Trails
- River Access

LEGEND

-  Parking
-  Restrooms
-  Fishing
-  Picnic
-  Forest
-  Hiking
-  Stream Access

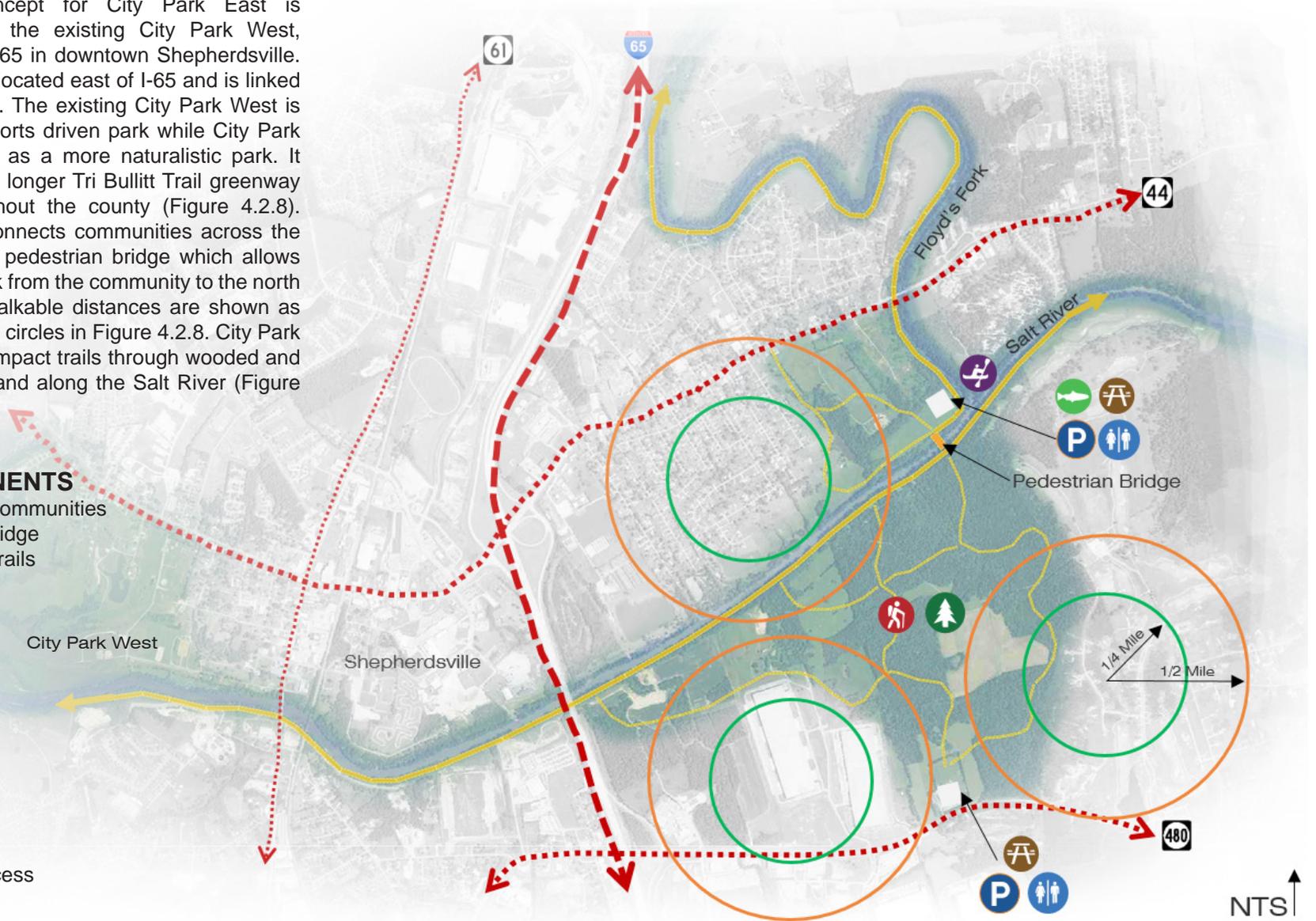


Figure 4.2.8: Master Plan of City Park East showing the connection to City Park West

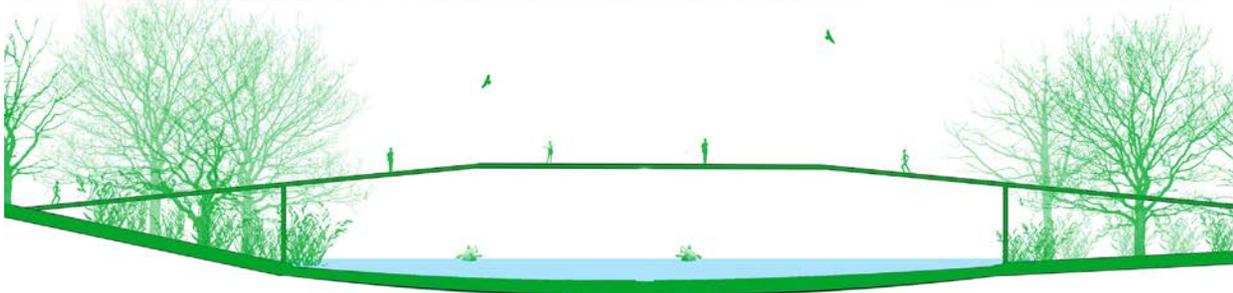


Figure 4.2.9: Example of pedestrian bridge (top); cross-section shown below.
Source: Schefflow Engineers

Figure 4.2.10: Example of environmentally low impact trail (top); cross-section shown below.
Source: Dept. of Parks and Recreation, Cary, NC

4 | PLAN B: THE TRI BULLITT TRAIL

INTRODUCTION

Educational trails and habitat health are the concepts for this focus area located on the east side on I-65, south of Salt River and north of Bernheim Forest. Highways 480 and 245 transect this area. There are six proposed and existing conservation areas within the larger focus area as well as connections to significant cultural landmarks.

Built amenities in Shephardsville and along the greenways provide convenient access to the surrounding communities. This plan introduces two distinct trail types: 1) paved, shared use trails and 2) environmentally low-impact trails. The trail types are based on the specific user experiences planned for those trails. The yellow trail illustrates the paved greenway trail, the majority of which follows electrical utility easements. The red and orange trails show the low-impact paths that connect the conservation areas and focus on educational opportunities (Figure 4.2.11).

GOALS AND OBJECTIVES

The goals of this focus area are to establish a network of greenways in Bullitt County that facilitate healthy living while educating users about habitat and ecosystem health.

To accomplish these goals the proposed trails will connect integral destinations and develop proposed conservation areas into cultural and environmental amenities. The Kentucky Glade Cress, a plant species specific to Bullitt and Jefferson Counties, will be used to spotlight the importance of ecosystem health issues, such as biodiversity, forest density, and wildlife conservation.

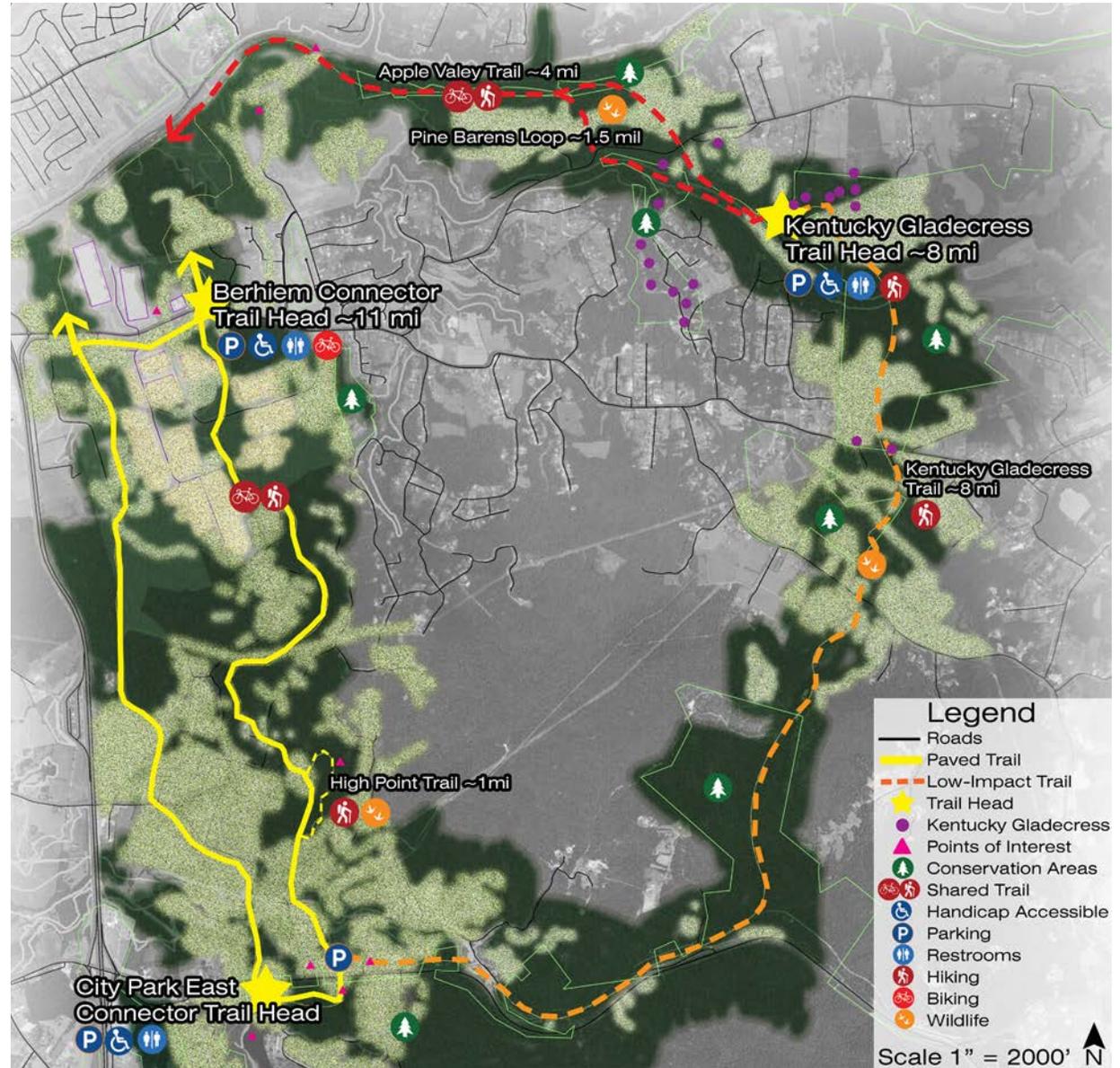


Figure 4.2.11: Tri Bullitt Trail - Plan B: Focus Area Master Plan

BERNHEIM PARK EAST CONNECTOR LOOP (~11 MILES)

The Bernheim / New Park East Connector Loop is an approximately eleven mile long trail that connects the industrial park, neighborhoods, and natural features by way of a formal, paved, shared use trail (Figures 4.2.12 and 4.2.13). This trail will provide pedestrians, runners and cyclists with access to urban and educational amenities.

EDUCATIONAL TRAILS

The educational trails (shown in red and orange on Figure 4.2.11) consist of low-impact trails and open spaces, The open spaces along the trail are areas that may not be publicly accessible, but add to the preservation of the natural character and scenic beauty of the trail.

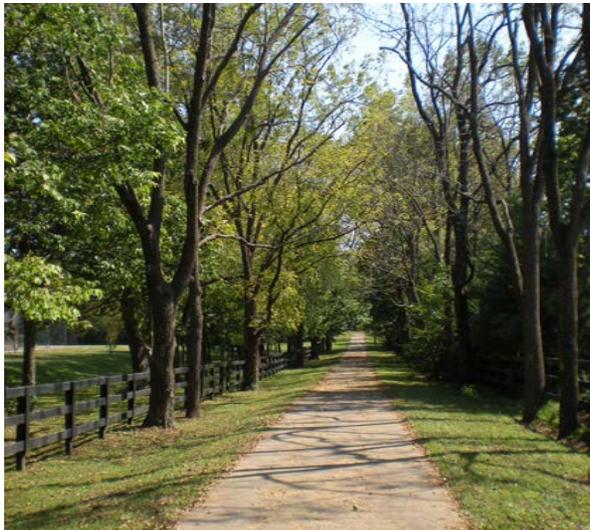


Figure 4.2.12: Shared use trail in Beaumont Greenway, Lexington, KY



Figure 4.2.13: Section of paved trail



Figure 4.2.14: Section of general low-impact trail

The main goal is to link a variety of conservation and preservation lands and develop main areas of interest to connect people with nature. These trails will offer access to nature in a simple way, while creating a user friendly experience with wayfinding markers, points of natural interests, and built activity centers as destinations.

These trails will take the user on a journey of natural wonders. The Apple Valley and Pine Barrens Trail are adjacent to the Salt River and the Pine Barrens Preserve. The Kentucky Glade Cress trailhead will offer an education center, parking, and restrooms. This is a key piece of the design because it presents an opportunity for the public to engage in learning about little known plants, animals, and ecosystems of the region.

KENTUCKY GLADE CRESS TRAIL (~ 8 MILES)

The Kentucky Glade Cress Trail extends approximately 8 miles, and traverses open spaces and conservation areas while allowing the user to see the natural environment closely because of the low-impact design of the trail (Figure 4.2.14). This segment of the overall greenway trail specifically leads users along areas of existing Kentucky Glade Cress (Figure 4.2.15) to increase appreciation and awareness of this species, which can then expand into discussions of habitat preservation and other threatened and endangered species.



Figure 4.2.15: Kentucky Gladecress

SUMMARY

This focus area will contribute to the overall health of Bullitt County by expanding non-vehicular networks, increasing environmental understanding by expanding educational opportunities, and incorporating conservation areas into the fabric of the community.

4 | PLAN B: THE TRI BULLITT TRAIL

KNOBS ADVENTURE AND RECREATION AREA

Currently, many residents have to travel substantial distances to engage in recreational activities. The Knobs Adventure and Recreation Area is proposed to address the desire for additional outdoor recreational opportunities in Bullitt County.

There are very few recreational opportunities within the western Bluegrass region. Popular destinations such as Mammoth Cave and the Red River Gorge are over an hour's drive from most major population hubs.

Located in southern Bullitt County near the township of Lebanon Junction, the Knobs Adventure and Recreation Area will utilize and showcase the unique geographic and ecological character of the area to provide outdoor and extreme adventure recreational activities, such as mountain biking, horseback riding and ropes courses (Figure 4.2.16).

The Knobs Adventure and Recreation Area could be further developed to establish Bullitt County as a recreation destination, attracting people from adjacent communities, such as Louisville, Elizabethtown, Bardstown, as well as from other regions and beyond. Potential economic opportunities exist to develop hospitality accommodations, such as bed and breakfasts or cabins which could be designed to complement and showcase the naturalistic and historical surroundings. This will enhance the visitor experience and encourage patrons to prolong their visits while further exploring the opportunities that Bullitt County has to offer.

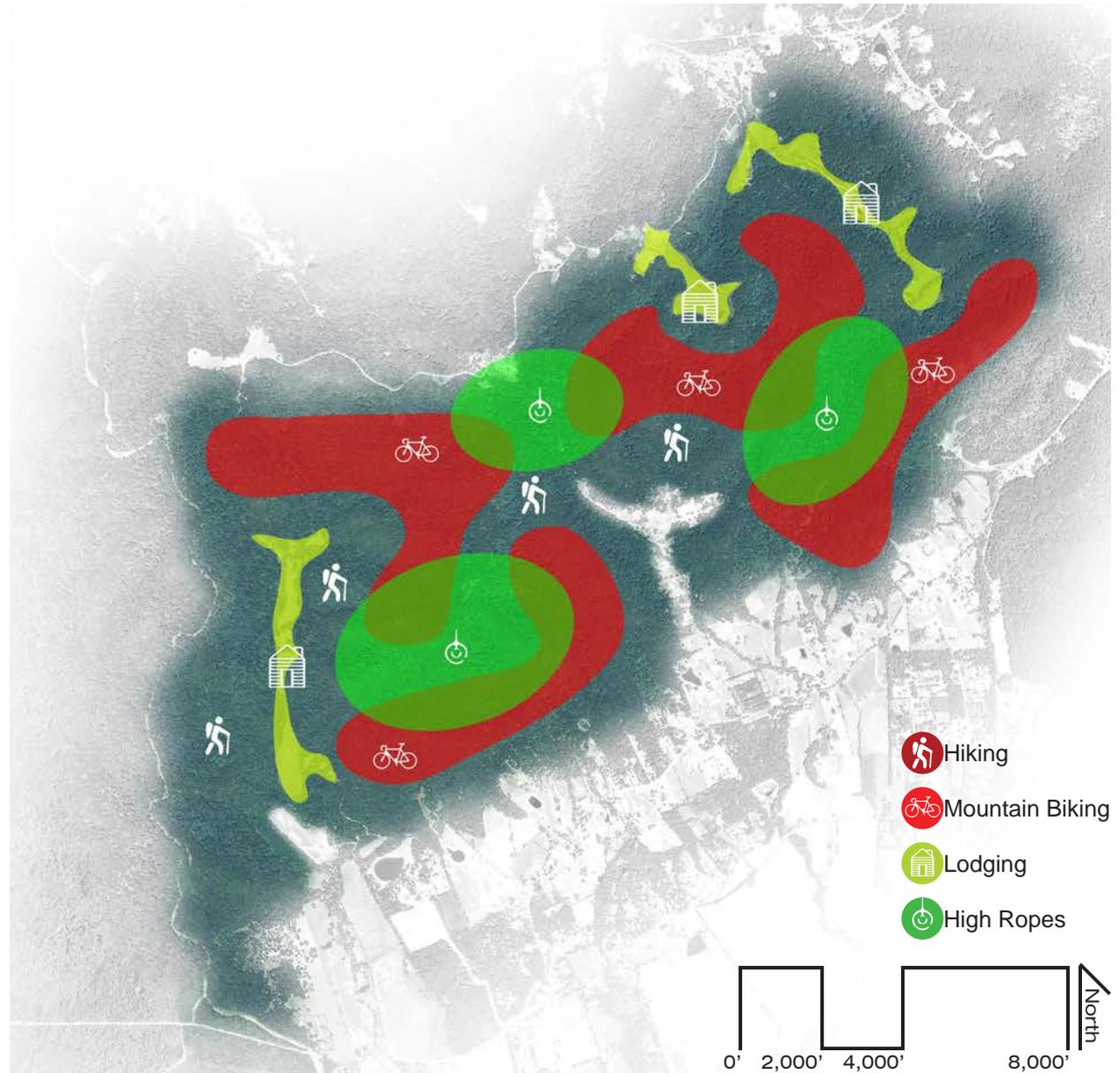


Figure 4.2.16: Tri Bullitt Trail - Plan B: Knobs Adventure and Recreation Focus Area Master Plan

AMENITIES

This 1,500 acre site is located in the southern knobs region of Bullitt County, half-way between Lebanon Junction and Shepherdsville, west of Interstate-65 and directly adjacent to the Fort Knox military base. Heavily forested and possessing a dramatic geographic character, the area is rather difficult to intensely develop, thus it has not witnessed the landscape degradation or over consumption of natural resources like much of the county has due to agriculture, growing urban and suburban populations and an expanding industrial sector.

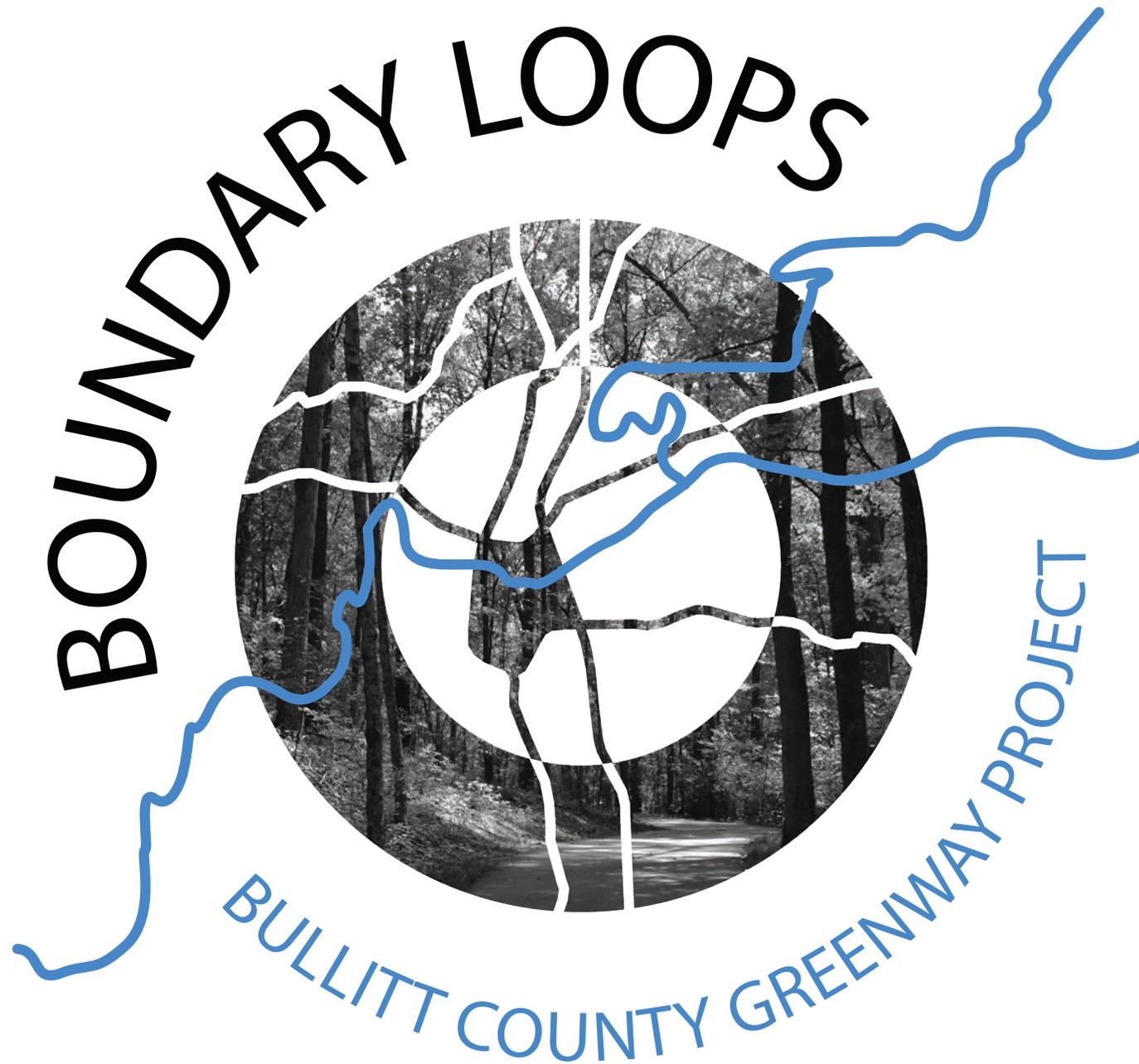


Despite this relative unsuitability for dense urban or suburban development, this site would actually be a more than suitable location for adventure recreational activities. The topography and natural surroundings are an appealing environment for cyclists, who seek challenging terrain, switchbacks, obstacles and other technical elements (Figure 4.2.17). In addition, the development of a cycling trail system has a relatively low impact on ecosystem functions. Clearing of trees to make courses is minimal and proper trail building techniques do not dramatically inhibit drainage or other natural processes.

Developing this area as a low impact recreational destination would be the most valuable use for this site. Based upon the existing physical conditions, approximately 30 miles of cycling trails would be suitable for this area. More precise planning will be needed to determine an actual bike trail but the estimate of 30 miles of trails is based on the site's physical conditions, such as total area and terrain, as well as the dimensions of similar existing trails. There is no set standard for miles of trails per unit area, but 20 miles per 1,000 acres is a typical figure associated with a number highly regarded mountain biking areas.



Figure 4.2.17: Example of mountain bike trail switchback (left); cross-section of switchback (right). (Source: Appalachian Trail Conservancy, n.d.)



4 | PLAN C: BOUNDARY LOOPS

INTRODUCTION

The intent of the Boundary Loops plan is to provide a greenway system that allows for people of all abilities the opportunity to enjoy the outdoors in a safe way. This trail will allow users to experience all that Bullitt County has to offer, including the Knobs, forests, wildlife, waterways, heritage, history, and bourbon heritage. Bullitt County has a great deal of untapped potential for tourism, conservation, recreation and education. Tourism opportunities abound in the area's natural land forms as well as in bourbon and wine attractions (Figures 4.3.1 and 4.3.2). Potential also exists for converting land into conservation areas for preservation of habitat and endangered species, as well as for educational endeavors. Lastly, recreational and learning opportunities exist in the form of available land for fields and parks aimed at teaching the youth about



Figure 4.3.1: The Salt River, one of the many currently underutilized areas of the county. (Source: Hannah McClure)



Figure 4.3.2: An existing trail between Jim Beam Distillery and Four Roses warehouse. (Source: Eric Lee)

the county and its ecological potential. These parks and recreation areas will accommodate the growth in population and housing developments in Bullitt County. A greenbelt or greenway can be the twine that binds the county together. The greenbelt merged with a greenway of conservation will give the county the structure it needs to build a healthy community for the future. Bullitt County needs a coordinated structure to bring the communities in the county together and to give the county a consistent forward direction.

DEFINITIONS

Several terms that this plan utilizes need to be defined for clarity. These terms are: *greenbelt*, *greenway*, *greenway system*, and *greenbelt system*. A *greenbelt* is a system of connected trails that is encased in vegetation and surrounds populations of residential areas. A *greenway* is relatively connected land that has both passive (conservation) and active (trails/parks) functions. A *greenbelt system* is a series of connected, but separate greenbelts that encase different residential populations. A *greenway system* consists of plural greenway vectors (paths) that are relatively connected. Relatively connected means that multiple paths are connected for the most part, but may contain fragments of land near connected paths.

GREENBELT

Bullitt County's population is young (Census, 2010) and a greenbelt system is a great way to provide the physically activities and entertainment opportunities that younger families desire. A greenway system can help ensure that the county's current and future residents will choose

to live in Bullitt County for years to come. There is concern that since the bulk of Bullitt County's residents work outside of the county, it will not be able to maintain the revenue necessary to sustain the county in the future. Bullitt County is essentially a suburb of Louisville; however, residents of Bullitt County who work in Louisville pay taxes in Bullitt County. These taxes fund schools, public works, public institutions, and the overall economy. In the nation, over \$169 billion was collected in property taxes to support public schools (Census, 2010). With an increase in the number of residents and housing developments in Bullitt County, a greenbelt provides a way to increase mobility and cohesion of neighborhoods. A greenbelt can also increase property values for homes adjacent to the greenbelt, which in turn provides greater revenue to the community.

GOAL

The main goal of the Boundary Loops plan is to create a greenway and park system that connects people to recreation, education, entertainment attractions and the natural environment. There is a vast amount of green space in the county, but it is not accessible to the general public. These spaces include conservation and agricultural lands. In addition, there currently is not ample park/recreation space for residents. The proposed park system will increase available green and recreation space for all residents. Presently there are three parks in the county. The addition of new parks can help increase tourism throughout the county. The county has many wonderful attractions, but needs to develop a characteristic identity to attract more tourists. Such an identity could feature Bullitt County as an active place that is hospitable for all ages, abilities, and interests.

OBJECTIVE

The goal can be achieved by using the characteristics of the natural landscape to complete a greenway system that also imposes an urban growth boundary for the major population centers in the county. The natural characteristics being utilized are waterways, floodplain areas, conservation areas, and mountainous regions. These areas are naturally and pragmatically appealing for use in an overall greenway trail system because of their relatively difficult use for building construction. The Boundary Loops plan will act as an urban growth boundary for population centers by surrounding the growth in a greenbelt. This will allow Bullitt County to retain its current identity as a rural county while sequencing into an expanded identity as a recreational, environmental and adventurous tourism town.

INVENTORY AND ANALYSIS

The first step was to identify and inventory the county's natural features, including the waterways and Knobs region, for use in a greenway and potential for a greenbelt (Figures 4.3.3-4.3.5). The primary focus was on the areas around the floodplains and major rivers. Floodplains contain land that needs special insurance in order to build structures which makes it difficult to develop. A more logical use for such land would be as a greenway trail system. The design team examined The Parklands of Floyds Fork in Jefferson County as a case study for the Boundary Loops plan. This led to analyzing potential connections between fragmented conservation areas and population centers. Once conservation information was compiled, specific cultural, historical and community facilities were mapped and overlaid

with the existing and projected conservation areas to expand and connect the fragmented areas and facilities. It was determined the conservation areas and public amenities were not the only things fragmented. The road network around the Salt River and in the Knobs region were also found to be fragmented. This information was used to develop a master plan to take advantage of potential opportunities and mitigate constraints.

PROPOSAL

Much work was done to understand the potential of urban growth boundaries (UGB). In most situations, UGB's are used to contain unplanned sprawl of residential areas and businesses into rural agricultural and business areas. UGB's have shown in some studies to increase land values inside and outside the boundary through market competition. UGB's also allow for populations to become more concentrated, which is appealing for businesses willing to invest in the region. As the urban areas in Bullitt County continue to develop inside the greenbelt and conservation areas, the land outside those areas will establish an agricultural identity of its own. This will assist in emphasizing the rural identity that Bullitt County has now and seeks to retain for the future. The initial Boundary Loops plan modeled parts of the greenbelt trail system after The Parklands of Floyds Fork in land adjacent to populated areas. These trails would connect to bike trails and others that would traverse rugged areas in the Knobs region. The main trails will be incorporated in the greenbelt and hospitable to users of all ages and physical demands. The main trails also will serve as the edges of the UGB. The boundary proposals are geared toward alleviating congestion in the cities of Shepherdsville and Mt. Washington.

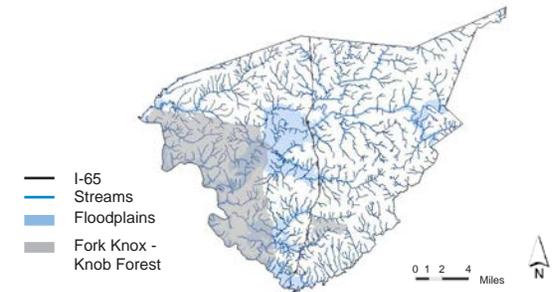


Figure 4.3.3: Analysis map of floodplains and waterways in Bullitt County. (Source: Kentucky Geography Network, 2014)



Figure 4.3.4: Analysis map showing relationship between conservation areas and city boundaries. Conservation areas shown are the county's projected areas and this proposal's additions. (Source: Kentucky Geography Network, 2014)

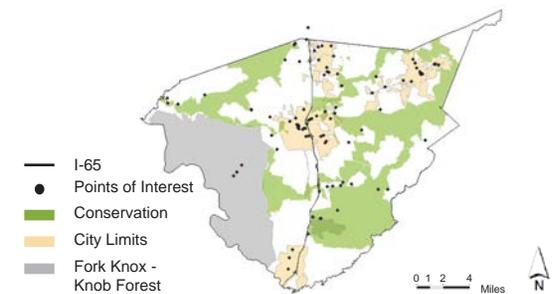


Figure 4.3.5: Analysis of cultural, historical and community facilities in Bullitt County. These points were used to determine a hierarchy of attractions in Bullitt County and immediately surrounding connections to population centers and county attractions. (Source: Kentucky Geography Network, 2014)

4 | PLAN C: BOUNDARY LOOPS

MASTER PLAN

The main urban population centers in Bullitt County are located in Shepherdsville and Mt. Washington. The goal of the Boundary Loops greenway master plan is to bring the population centers together as one entity through a common goal to make Bullitt County a prosperous community while creating connections throughout the county with a greenway. The Boundary Loops master plan utilizes floodplain areas as the starting point for a greenway trail system because construction restrictions make these areas better suited for trails and conservation easements. Connecting conservation properties also allows for animal and plant habitat connections. Keeping this in mind, options were considered on how to contain and concentrate growth into areas of business and residential uses which would promote healthy growth and sustainability (Figure 4.3.8).

CONCEPT

The Boundary Loops plan strives to assist the communities of Bullitt County to grow together in a fashion that is healthy for the entire county. Healthy growth is considered to be making an area more dense and connected to the infrastructure provided by cities, while also making population centers attractive and sources of revenue. Containing growth with an urban growth boundary (UGB) gives utility companies smaller service areas in which to provide water and sewers, which in turn helps to provide better services to all customers. An overarching issue for overall county is connectivity. While all modes of transportation are considered, this plan will concentrate on vehicular and bicycle traffic. The vehicular concentration will be on state roadway connections using already planned

routes and adding bicycle lanes to the existing roadways that can be adequately modified. The Boundary Loops plan also will be connecting bike lanes to roads in the Knobs. There are major connection opportunities in the Knobs which would relieve some traffic congestion on Highway 61 and Interstate 65. Creating these road connections and bike connections will allow for the concept of a greenbelt to function better, and facilitate easier commuting within the entire county (Figure 4.3.6).



Figure 4.3.6: Concept of the greenway being connected with the greenbelt.

Using a greenbelt to bind the growth of the population will give residents a chance to use the trails as a way of commuting throughout the county. This effort can lead to lower vehicular emissions in the county as well as congestion on the main roads and highways. Commuting to work will help keep residents physically active to promote healthy life styles. The greenway system has been designed to allow for all of Bullitt County's amenities to be utilized. This will help make Bullitt

County a regional destination in the mid-west for its beautiful scenery and sights (Figure 4.3.7). These include the Knobs region, Bernheim Forest, the beginning of the Kentucky Bourbon Trail (especially with the new tasting and merchandise addition of the Four Roses warehouse) and the outdoor activities that have been emphasized in this plan (canoeing, hiking, biking, mountain biking, ATV trails, and educational opportunities). The Boundary Loops plan intends to concentrate these amenities in the focus areas identified so that different regions of the county can develop specific identities. These regions are the focus for further study by individual design team members. The focus area objectives are Conservation, Adventure/Tourism, and Recreation. The focus areas will have programmatic overlap but will focus mainly on their overall objectives. These overlaps include opportunities for education, recreation, conservation of land, conservation of resources, and conservation of plant and animal habitat/species. Preserving the natural environment and repairing ecosystems to their pre-constructed operating capacities are concerns that will blanket all designs for the Bullitt County Boundary Loops Greenway.



Figure 4.3.7: Salt River, one of the sights in Bullitt County that is an attraction for the region. (Source: Hannah McClure)

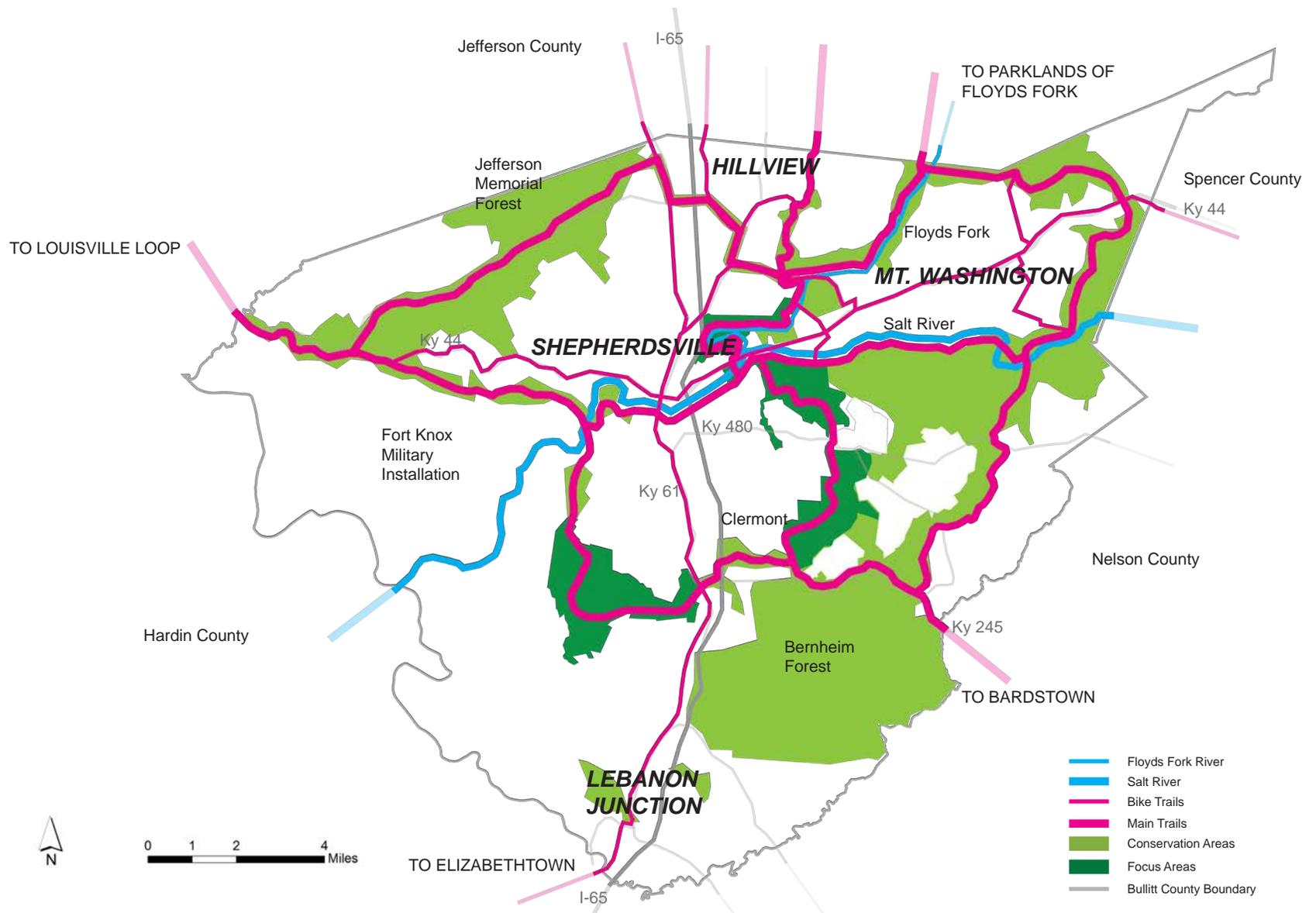


Figure 4.3.8: Boundary Loops master plan. The trails create the urban growth boundaries that surround the population centers of Shepherdsville and Mt. Washington. The northern portion of the urban growth boundary is the Knobs range. (Source: Kentucky Geography Network, 2014)

4 | PLAN C: BOUNDARY LOOPS

CONSERVATION AREA / PARK

The Conservation Area/Park includes existing, planned, and proposed environmentally sensitive areas located in Bullitt County (Figure 4.3.9). This area encompasses several acres of farmland and neighborhoods, and is in close proximity to Shepherdsville and Mt. Washington making it a destination for residents and visitors to the area.



Figure 4.3.9: Context map of Conservation Area.

GOAL

The goal of the Conservation Area/Park is to reclaim or redevelop land for municipal purposes that is environmentally viable due to its proximity to nearby sensitive areas that are home to multiple endangered species and waterways. These sensitive areas protect endangered species including mammals, mussels and plants. The area is open to recreational and educational pursuits with appropriate limitations.

RECLAMATION PLAN

In this plan, all existing buildings are removed because the elimination of permanent structures will benefit the conservation area. Once the land is cleared, a generous selection of trees and plants are installed. After the plants have taken root, then natural landscape succession will be allowed to

run its course, eventually filling in the forest and changing it back to rural undeveloped land.

AMENITIES

The Boundary Loops plan Conservation Area/Park has a lot to offer its visitors. This area is not only for conservation but also for recreational and educational opportunities. There are several trails that wind through the terrain giving users a vast range of difficulty levels while maintaining ADA status. All trails are paved concrete and more than wide enough for multiple people to pass each other comfortably. There are multiple marked trailheads with facilities and parking. The trails are enclosed by natural forest creating scenic views. The trails cross several different creeks throughout the Conservation Area (Figures 4.3.10-4.3.12). Users



Figure 4.3.10: Illustration of a Conservation Area trailhead showing how trails interact with surrounding forest and wildlife.



Figure 4.3.11: Illustration of the new proposed road in the Conservation Area and how the road relates to the trail that runs parallel to it.



Figure 4.3.12: Perspective illustration of a trail bridge crossing within the Conservation Area.

have the opportunity to experience a multitude of landscapes ranging from meadows to dense hardwood forest.

The Conservation Area's educational opportunities range from facilities to outdoor activities. The area protects a number of endangered or potentially endangered species. This presents learning opportunities for residents and visitors. This area includes habitat for the Gray Bat, Indiana Bat, Northern Long-eared Bat, Orangefoot Pimpleback, Rough Pigtoe, Pink Mucket, Sheepnose and the Kentucky Glade Cress (FWS, 2013). Throughout the trails there are wayfinding information signs that give appropriate information for the specific location, such as next to a patch of Kentucky Glade Cress (Figure 4.3.13).

PROPOSED ROAD

There are plans for a proposed new road to connect KY-1604 (Deatsville Road) to KY-44 (Old Mill Road). The Boundary Loops plan routes the potential road segment through the Conservation



Figure 4.3.13: Example of a wayfinding information sign located along trails throughout the Conservation Area. (Universal Sign Systems, n.d.)

Area/Park parallel to environmentally sensitive areas (Figure 4.3.14). The road has two entrances, one being a new route intersecting with KY-1604 and the other using Foley Road. The proposed road cuts straight across the Conservation Area/Park before winding around and crossing the Salt River. Once the road crosses the Salt River, it connects with Old Mill Stream Lane where drivers can exit via Lazy River Drive or Proctor Lane. It is proposed that the new road segment pass through the Conservation Area/Park at this point because it utilizes existing roads and interrupts minimal properties outside of the Conservation Area. A portion of the road also has a trail running parallel to it with a trailhead and parking.

Controlling vehicular speed along this route is a high priority issue in order to lessen its impact on the Conservation Area/Park. This issue is dealt with by using speed humps or tables, visual interactive speed signage, and potential roundabouts at all road intersections. The reduction of speed through

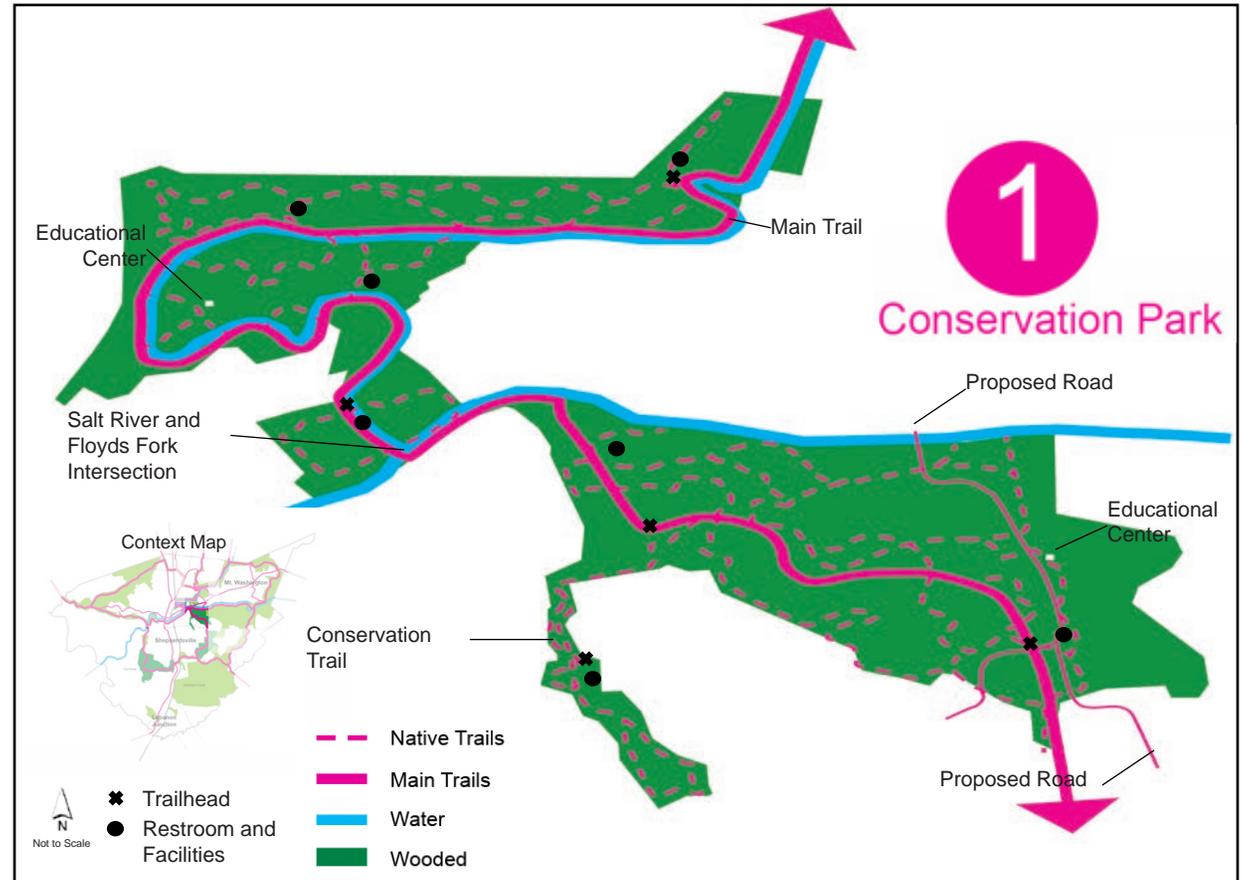


Figure 4.3.14: Master plan showing the Conservation Area/Park and proposed road

this area is critical because the less disturbance there is the better. Speed also needs to be reduced on the proposed road segment to address safety issues. There are blind curves that could cause drivers to strike unseen wildlife and slope elevation changes that could cause loss of handling. Vehicle noise (loud engines and aggressive tires) also could potentially cause wildlife to enter the roadway

or scare them away from the area. Using speed deterrents to mitigate speed issues is a relatively easy strategy to implement and will have the least physical impact on the Conservation Area/Park and its inhabitants, thus creating a safe, convenient, and scenic drive.

4 | PLAN C: BOUNDARY LOOPS

ADVENTURE / TOURISM AREA

The name of the proposed park for the Boundary Loops Adventure/Tourism Area is the Big Level Adventure Park. While studying the cultural, historical, and community facilities in Bullitt County, it was found that there was a concentration of tourist attractions in the Clermont and Mt. Washington areas. The attractions in Bullitt County include Bernheim Forest, Jim Beam Distillery, Four Roses Distillery, Forest Edge Winery, Wright-Myer Winery, KOA Camp Ground, Millanova Winery, the Salt River, and Floyds Fork (Figure 4.3.15).

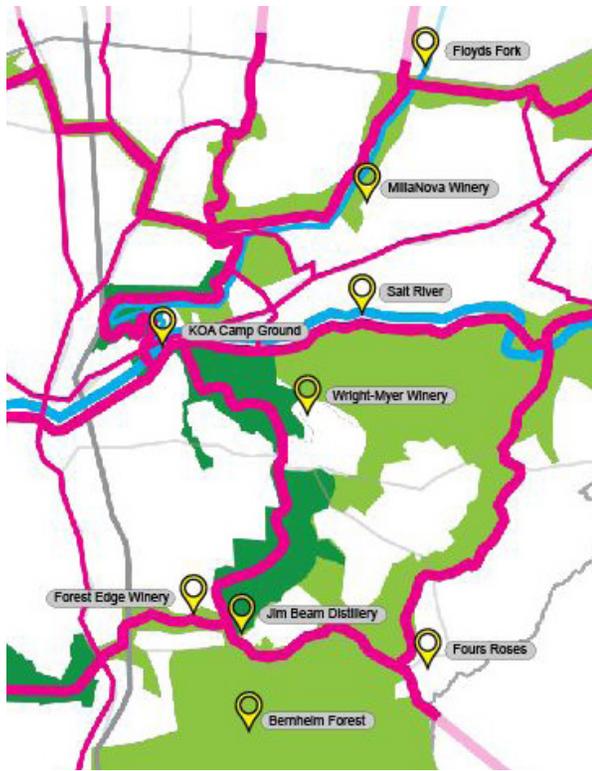


Figure 4.3.15: Illustrates the proximity of the existing tourism attractions.

GOAL

The goal for the Big Level Adventure Park is to create a space that visitors will come to from surrounding states as well as Bullitt County and Kentucky. This park will have activities for all ages as well as a family-friendly component. Tourism in this area will not only bring visitors into Bullitt County, but also create a vibrant place to live and work for Shepherdsville and Mt. Washington residents.

AMENITIES

Big Level Adventure Park is a regional destination that will attract both outdoor enthusiasts and adventure seekers. The Adventure Lodge is the staging area for zip-lining, mountain biking, bike rentals, and helicopter tours of Bullitt County. The helicopter tours will give enthusiasts a unique look at the Knobs range in Kentucky's karst region, while educating people about the interesting history of the geologic features and the present day region (Figure 4.3.16).

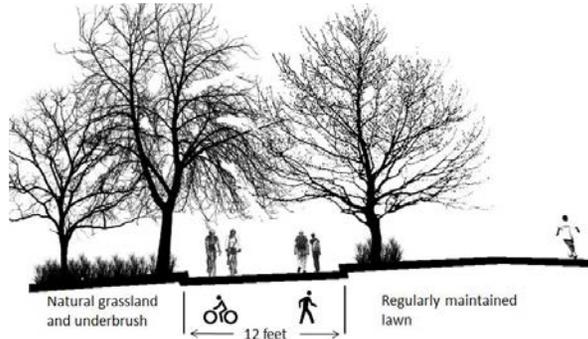


Figure 4.3.16: A section illustration of a main trail that will be 12 feet wide and accommodate both cyclists and pedestrians. In this ridge top example, the left side toward a slope remains in a natural condition; the right side has been cleared into open space for recreational activities and picnics.

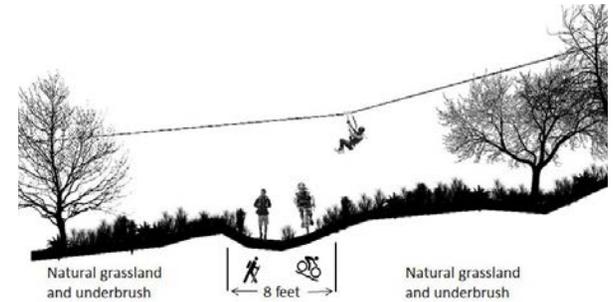


Figure 4.3.17: A section illustration of the zip-line crossing the mountain bike and rugged walk trails. These areas will revert back to nature if they are not used regularly by tourists.

Such tours can help promote the entire county as well as the other parks in the greenbelt system. One trailhead for the Big Level Adventure Park is located near the center of the park. This trailhead is the home of Licksillet Creek Lodge, that is the staging area for mountain biking, zip-lining, experienced hiking, and an ATV shuttle to the helicopter tour on the ridge top (Figures 4.3.17 and 4.3.18).

The site also has parking areas at both ends of the park along with directional wayfinding signage to the area's amenities (Figure 4.3.19). The staging area is near one of two food amenities located in this park, a diner near the Jim Beam Distillery called Fred's. The other diner, the Ridge Top Cafe, will be near the highest point of the park and thus will offer outstanding scenic views.

Another main component of the Big Level Adventure Park is a series of alcohol-spirits related attractions (mapped in Figure 4.3.15). This adventure starts at the Four Roses Distillery on Clermont Road near Bardstown and extends to the Jim Beam Distillery, which is also on Clermont Road at the southern end of the park.

Next along the route is Forest Edge Winery on Clermont Road, just past the Jim Beam Distillery. As one moves into the park itself, the next stop is the Wright-Myer Winery, which will have a new satellite shop and attractions built near the trail to preserve a plot of Kentucky Glade Cress (a plant on the federal endangered species list). The last stop is the MillaNova Winery to the north connecting to the extensive Parklands of Floyds Fork (proposed at this time by 21st Century Parks).

All of these amenities will come together in conjunction with the Big Level Adventure Park through the proposed trail system which will create a lively environment focused on entertaining people as well as being environmentally friendly.



Figure 4.3.18: View looking northeast at the helicopter tour and the Adventure Lodge. The picnic areas are in connection with the Ridge Top Cafe southwest of the site.

Big Level Adventure Park

- Mountain Bike Trails
- Main Trails
- Conservation Areas
- Focus Areas
- Bike Route
- Heli-tour
- Sport Field
- Picnic Area
- Hike Trail
- Canoe
- Parking
- Mountain Bike
- Alcohol Attraction
- Restroom
- Dinning
- Zip-Line



Figure 4.3.19: Master plan for the Big Level Adventure Park. The park rests in the Knobs region between Highway 480 and Clermont Road.

4 | PLAN C: BOUNDARY LOOPS

RECREATION AREA / PARK

The Recreation Park of Boundary Loops is located east of Highway 65 between Shepherdsville, Lebanon, and Fort Knox (Figure 4.3.20). The site property utilizes land that stretches from the future community college to Fort Knox. A Welcome Center is located at the east entrance of the park. At this location, visitors can learn more about the park and its amenities. Trail maps and other information will also be available for visitors.

PATHS AND TRAILS

Recreation Park is Bullitt County's central hub for outdoor recreation. The most distinguishing characteristic of the park is the multitude of trails it offers (Figures 4.3.21 and 4.3.22). The Primary Path stretches from both ends of the park connecting it to additional amenities along the Boundary Loops.

In addition to the Primary Path, there are two additional tiers of paths that intertwine throughout the park. Paved Trails provide easy to navigate experiences in the park but are less wide than the Primary Path. Soft Trails are located in the park to offer opportunities for more adventurous users to go off the beaten path (Figure 4.3.23).

Together the Primary Path, Paved Trails, and Soft Trails create a network that can be shaped to form any length of walk, run, or bike ride. Along all of the trails and paths are numerous trail wayfinding markers and maps so that users can stay oriented as to where they have traveled and where they are heading.



Figure 4.3.20. Map showing location of Recreation Park and context in relation to the Boundary Loops.

SPORTS AMENITIES

Both organized sports games and pick up games are welcome in the park. The main park road leads users to the west of the park where a sports complex and sports fields are located. The park has the capacity to host large sporting events of various levels of play. Meadows along side of the main road are great places for users to have pick up games, picnics, and pursue other recreational activities.



Figure 4.3.21. Perspective of Primary Path adjacent to the recreational fields.



Figure 4.3.22. Cross section of Primary Path adjacent to the recreational fields.



Figure 4.3.23. Cross section of soft trail in more rugged areas for adventurous hikers..

Bullitt's Barrel Run



One Trail Leads to Another

4 | PLAN D: BULLITT'S BARREL RUN

INTRODUCTION

The backbone of the Bullitt's Barrel Run greenway design was inspired by the history and heritage of Bourbon distilling in Kentucky.

- Kentucky is the birthplace of Bourbon, crafting 95% of the world's supply. Only the Bluegrass State has the perfect mix of climate, conditions and pure limestone water for producing the world's greatest Bourbon.
- Bourbon is America's only native spirit, as declared by Congress in 1964.
- Bourbon is a \$3 billion signature industry in Kentucky, generating 15,400 jobs with an annual payroll of \$707 million. Spirits production and consumption yields more than \$166 million in state and local taxes each year.
- U.S. distilled spirits exports topped \$1.5 billion in 2013. Kentucky Bourbon and Tennessee whiskey made up more than \$1 billion of that, making it the largest export category among all U.S. distilled spirits.

Bourbon Facts - Kentucky Distillers Association

The Bullitt's Barrel Run is a greenway trail system that is influenced by tourism, habitat and wellness (Bourbon + Wine = Barrel, Wellness + Habitat = Run).

The Barrel Run master plan consists of a series of three trails that connect different areas of Bullitt County to one another. Each trail utilizes specific features along the trail based on location and what key destinations the trail leads to. Overall, these features relate to one another and allow for all three trails to join as one large integrated greenway.

This greenway and its trails can be expanded to surrounding trails and greenways outside of Bullitt County. This county is home to many wineries and distilleries that have become tourist attractions. As such, the next logical step to advance tourism in

the county is to create a trail system that people can use to visit and explore the distilleries and other landmarks in the area. The Bullitt's Barrel Run greenway trail system was developed to help connect communities, local businesses and tourism to the area's natural environment thus creating a unique identity for Bullitt County.

GOAL

The main goal of the Barrel Run plan is to connect destinations in Bullitt County through a county-wide greenway with the intent of improving tourism and community engagement in order to create a unique county identity. Bullitt County has a vital strength over surrounding counties because of its proximity

to major distilleries and wineries. The Barrel Run phased greenway design was kept purposefully simple with five main objectives (Figure 4.4.1).

OBJECTIVES

- **Cultural Connections:** (between towns and key areas)
- **Wayfinding and Branding:** (how to navigate throughout the areas)
- **Blue-way Connections:** (utilizing water trails and activities)
- **Environmental Conservation:** (wildlife/plant protection and restoration)
- **Recreational Opportunities:** (areas for sports, exercise and relaxation)



Figure 4.4.1: Images representing Bullitt Barrel Run greenway plan objectives.

CONCEPT

The Bullitt's Barrel Run greenway trail system is designed to connect, revitalize, enhance, and promote Bullitt County. As part of the greenway, the Wine and Bourbon Trail was created to improve tourism for the wineries and distilleries located in Bullitt County. The premise is that once people are in the area, they will be inspired to explore other sights and activities along the trail. Campgrounds and cabin style lodging will entice visitors to stay and linger in the county which translates into increased revenue for the community.

This trail is based on a simple concept that mainly revolves around the bourbon and wine industry and the tourism it generates for Bullitt County. Each of the proposed and interconnected Barrel Run greenway trails can stand alone while also nourishing the development of a self-sustaining greenway after the first couple of years. The trail system can later expand throughout the county and to a greater audience. (Figure 4.4.2)

ANALYSIS

The first step in this process was to inventory and map the major towns and key destinations located around them. The design team then explored various routes to connect these points and ultimately mapped out three different trails that run along major roads. Consideration was also given to how these trails could utilize existing forested areas, environmentally sensitive areas, and areas of constraint. After analysis some aspects of the trails were expanded to connect to these areas where new activities, lodging, and tourism attractions might be created. Lastly, existing trails or greenways outside of the county were studied to see how they could be connected to Bullitt County's greenway in the future. (Figure 4.4.3)

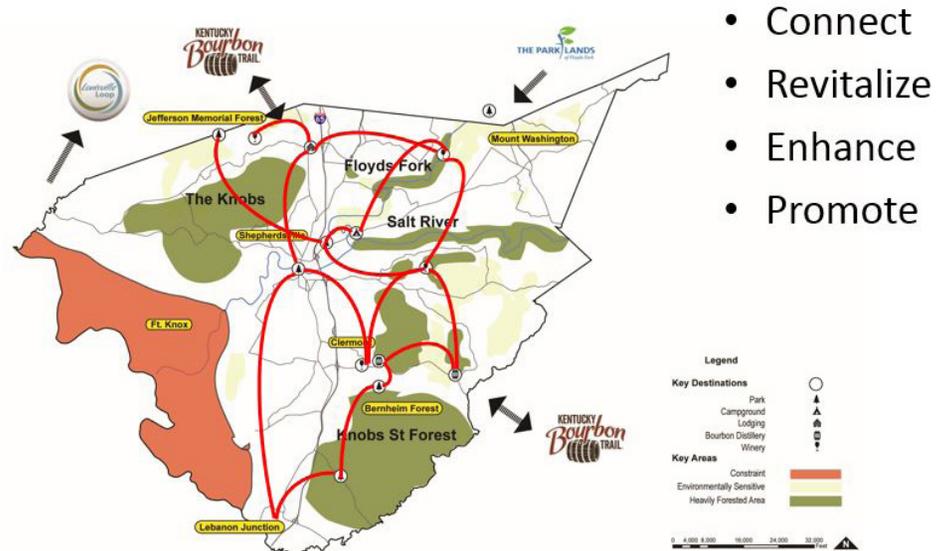


Figure 4.4.2: Concept diagram illustrating desired connections between Bullitt County's towns and key destinations. .

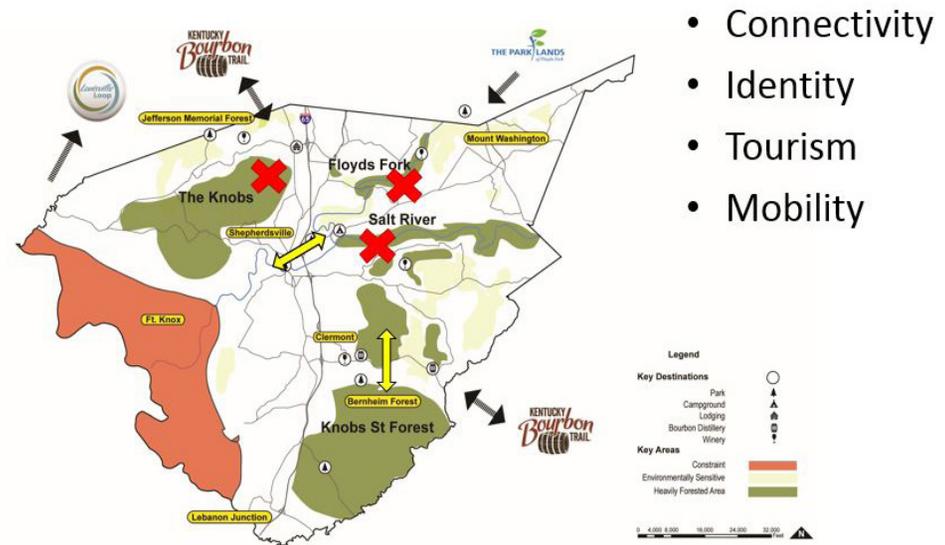


Figure 4.4.3: Key issues diagram illustrating disconnections between the communities and regions in Bullitt County.

4 | PLAN D: BULLITT'S BARREL RUN

MASTER PLAN

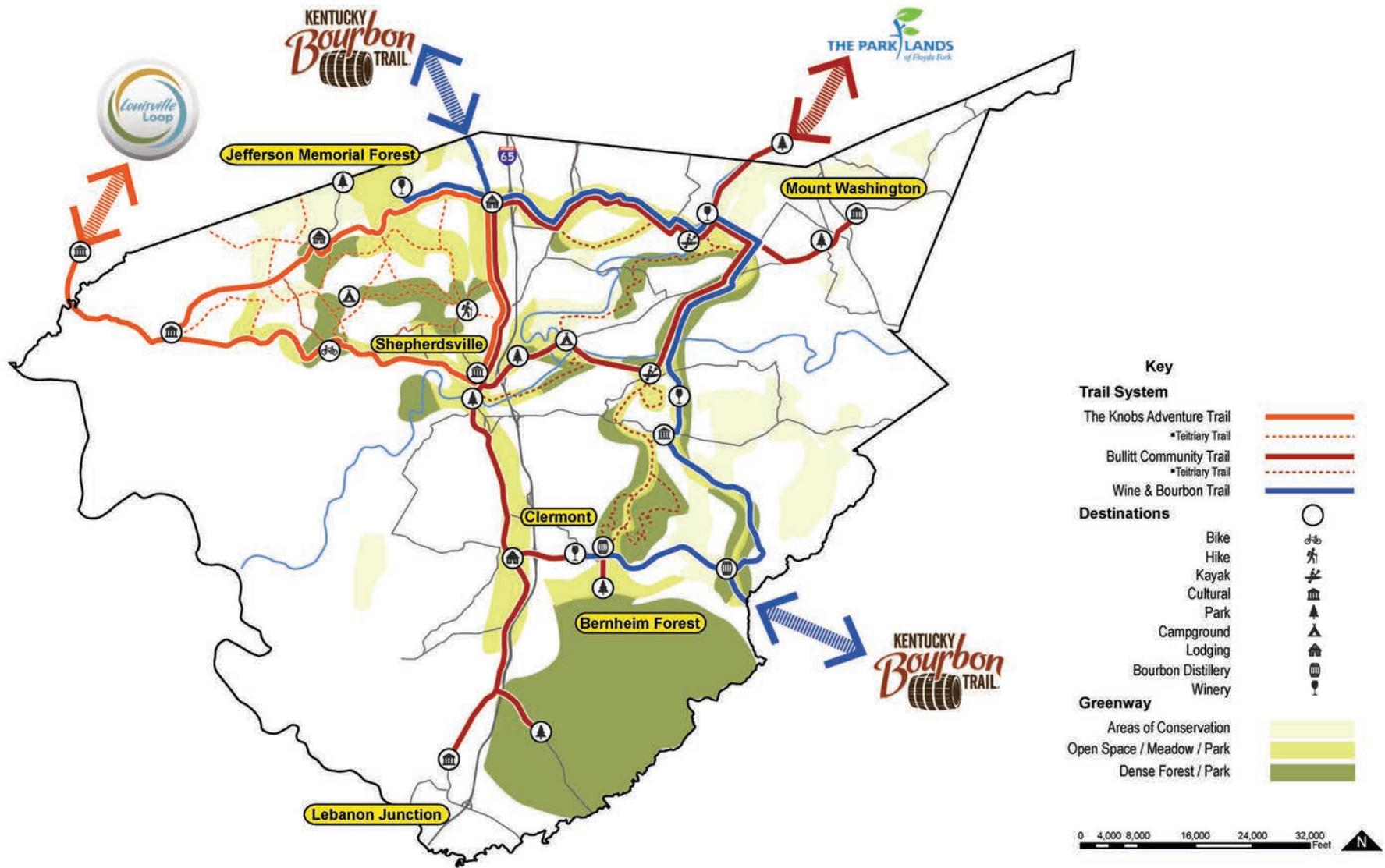


Figure 4.4.4: Master Plan of Bullitt's Barrel Run Greenway.

MASTER PLAN

The Bullitt's Barrel Run master plan is divided into three main trails (Figure 4.4.4). The **Knobs Adventure Trail** (shown in orange on the map) is located in the northwestern part of the county and consists of steep terrains and heavily forested areas. The **Community Trail** (shown in red on the map) is located in the northeastern part of the county and connects community areas such as parks and activity spaces. This trail also has a blueway connection utilizing Floyd's Fork and the Salt River. The **Wine and Bourbon Trail** (shown in blue on the map) is located in the eastern part of the county and connects all the wineries and distilleries in Bullitt County with a vision toward increasing tourism. A key element that connects these trails is the presence of cabin and tent camping areas along their routes. These camping areas are accessible from the hiking trails that run through the forested areas. There are also paved trails that run along the main roads and help connect shops and restaurants.

PHASING

Phase 1: Wine and Bourbon Trail

Phase 2: Knobs Adventure Trail

Phase 3: Community Trail

The wine and bourbon industry contributes 3 billion dollars to Kentucky's economy annually, providing roughly 1.66 million dollars in tax revenue. Developing a Wine and Bourbon Trail to link the wineries and bourbon distilleries in the county will increase tourism as well as encourage further development of these and related businesses along the trail. Increased tourism will also require increased lodging accommodations, attractions and other activities. This leads to Phase 2, the Knobs Adventure Trail that will provide cabins

and campgrounds in the rural part of Bullitt County. Currently, 75% of the people who travel on the existing Kentucky Bourbon Trail stay in a hotel or bed and breakfast; with 50% staying for at least 3 nights and 40% being in groups of 3 or more people (Johnson, A. 2012, January 28). The benefit of offering cabins and campgrounds is that such lodging can accommodate larger groups of people. Research has shown that people who go camping also prefer to engage in other outdoor activities. This leads to Phase 3, the Community Trail, which will provide more parks along with areas for recreation and outdoor activities. Currently, there are only 3 parks registered in Bullitt County, a number significantly lower than found in surrounding counties.

POTENTIAL IMPACT

Bullitt's Barrel Run provides a positive impact on the county as well as the residents living in and around the county. The following are ways that the greenway system could potentially impact and benefit Bullitt County:

- Tourism will improve Bullitt County's economy by providing more jobs and tax revenue.
- Community and social interactions can be enhanced by having more areas for people to gather and engage in activities.
- Increasing recreational opportunities has considerable health and education benefits.
- Preserving the natural environment advances the development of a healthy and sustainable relationship between people and nature.
- The trail system will help the county develop a unique sense of identity and bring communities closer together.
- Bullitt's Barrel Run can lead to endless economic and social opportunities.

FUNDING

Given the financial statistics, if the bourbon and wine industries could be prevailed upon to invest initial funding to jump start development of the Wine and Bourbon Trail, they would undoubtedly reap benefits from increased recognition and tourism. A portion of the county's increased income derived from tourism would go back into the greenway system, eventually allowing movement to Phase 2 where some lodging places and outdoor activities could then contribute a portion of their earnings toward the greenway system. Then the county can move to Phase 3 and provide additional community spaces and amenities in Bullitt County, using the same concept of taking a portion of the income from tourism and putting it back into the greenway system. This process should create a self-sustaining greenway system that can develop and support tourism while benefiting the residents of Bullitt County.

FURTHER REFERENCES

The following are examples of similar trail systems that could provide support and ideas for Bullitt's Barrel Run.

- Napa Valley Vine Trail - California: The Napa Valley Vine Trail Coalition is a grass-roots non-profit organization with a vision to build a walking and biking trail system connecting the entire Napa Valley. (http://www.visitnapavalley.com/hiking_biking-napa_valley_vine_trail_1066.htm)
- Shawnee Wine Trail - Illinois: Illinois received its first American Viticultural Area recognized by the alcohol and tobacco tax and trade bureau. (<http://www.shawneewinetrail.com/>)

4 | PLAN D: BULLITT'S BARREL RUN

WINE AND BOURBON TRAIL

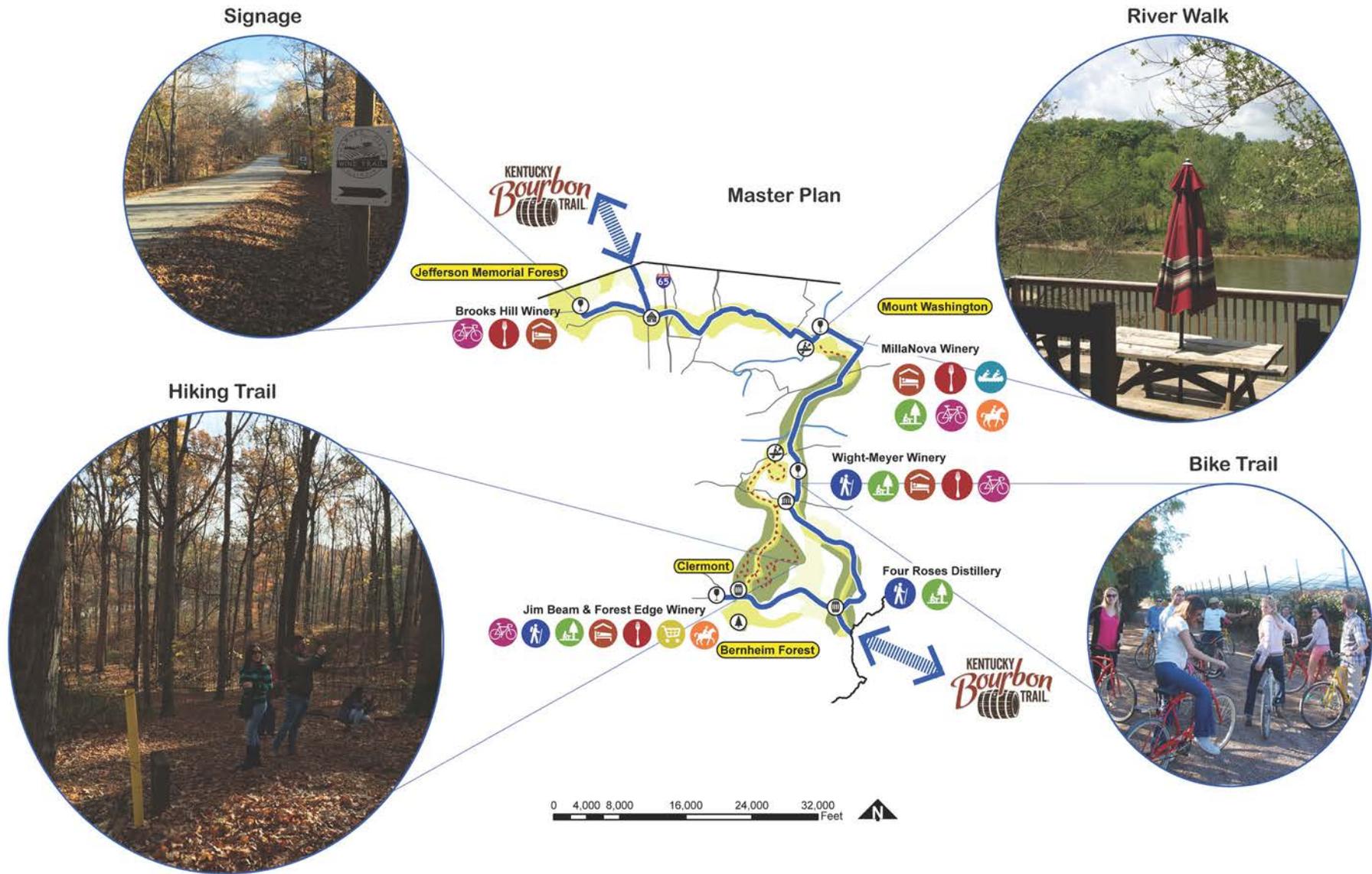


Figure 4.4.5: Master plan of the Wine and Bourbon Trail (center), with images illustrating various aspects of the trail.

WINE & BOURBON TRAIL

With the rich history of the Kentucky Bourbon Trail and the award winning wineries of Bullitt County, there is a tremendous opportunity for improving tourism in the area that can contribute to the economic and job growth at a regional scale. Wineries and bourbon distilleries are the most visited attractions in Bullitt County. The purpose of the proposed Wine & Bourbon Trail is to take advantage of this potential by connecting the wineries and distilleries of Bullitt County with a greenway trail system (Figure 4.4.5). This trail system would serve as the grassroots starter trail for the Barrel Run project, due to its potential to provide funding for implementation of the other trails and amenities.

Deriving from the initial analysis of the wine and bourbon industry in Bullitt County, the potential for the Wine & Bourbon Trail to create jobs and boost tax revenue is a realistic scenario. The trail connects all the wineries and distilleries in the county via existing roads. This was the most efficient and effective route that could simultaneously connect everything, while having accessibility from Interstate 65. Intended primarily for vehicular use, the phasing of the project can lead to the creation of bike lanes and pedestrian paths. In order for the trail to be successful there needs to be an implementation process that links the trail with the community in an affordable and logical manner. This may temporary solutions, such as painted bike lanes and signs, to permanent solutions, such as pedestrian corridors and rest stops.

PROCESS

The first step would be to establish an exciting and inviting trail branding and wayfinding structure throughout the county, including prominent and coordinated logos and signage easily recognizable

by visitors and the community. A great way to help publicize Bullitt County as a spirits-destination would be to apply for federal American Viticultural Area (AVA) status, a program that would identify the Knob's region as a grape growing area. The AVA status could be used with branding signage to promote the industry in Bullitt County. The establishment of a recognizable identity for the Wine & Bourbon Trail can also lead to expansion of the industry by attracting prospective grape growers, distillers, and other farmers who could purchase the prime farmland along the trail. In order to fund and expand the trail, tax revenue generated from the wine and distilling industry and increased tourism should be invested into improving the trail. As the trail evolves, additional tax revenue should be targeted into developing additional key trails and amenities as part of the Barrel Run greenway system.

AMENITIES

There are many types of amenities that could be developed to complement the Wine & Bourbon Trail. These amenities would support tourism and recreational endeavors as well as local businesses:

- Rental Cabins
- Artesian Shops
- Public Parks with camping facilities
- Boat Launches for kayaks, canoes, etc.
- Bed & Breakfast
- Local Restaurants

ACTIVITIES

In addition, a variety of activities could be offered to complement the trail by providing a diverse range of recreational and cultural opportunities:

- Tours
- Fishing
- Horseback Riding
- Kayaking/Canoeing/Tubing
- Cultural Events & Festivals
- Concerts
- Biking
- Weddings
- Hiking

BENEFITS

The primary benefits of the Wine & Bourbon Trail would be increased tourism and helping visitors get a sense of Bullitt County's cultural identity and rich natural environment. Bourbon production is a \$3 billion industry in Kentucky and the wineries in Bullitt County are recognized at a regional scale for their outstanding wine-making. In terms of tourism, the typical traveler spends an average of \$978 per trip (Figure 4.4.6) (Kentucky Distillers Association, 2014). This represents a potential \$978 investment into Bullitt County's community. With the recent opening of the Four Roses Distillery tasting facility, there has been a 65% increase in tourism and a 20% increase in jobs. The potential for additional amenities and activities that expand tourism can lead to increased local business and sourcing opportunities that will improve the county's overall economy.



Figure 4.4.6: Wine & Bourbon Infographic of potential influence in Bullitt County. (Source: Kentucky Distillers Association. 2014, Lockman, Cathy. 2014)

4 | PLAN D: BULLITT'S BARREL RUN

THE KNOBS ADVENTURE TRAIL

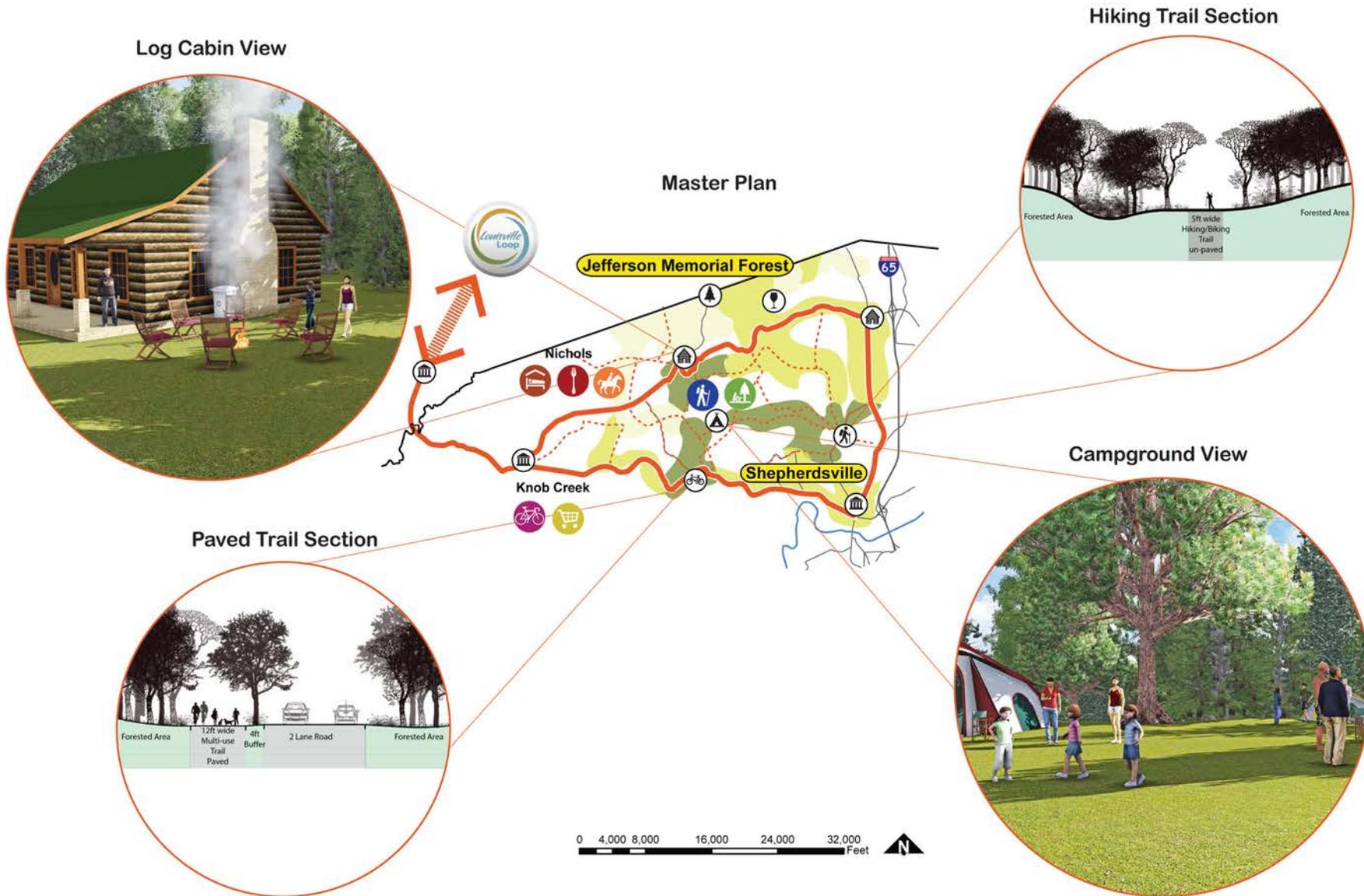


Figure 4.4.7: Master plan of the Knobs Adventure Trail (center), with images illustrating various aspects of the trail.

THE KNOBS ADVENTURE TRAIL

The Knobs Adventure Trail is located in the northwestern part of Bullitt County. It consists of steep terrain and heavily forested areas that are great for hiking and sightseeing. The hiking trails run through the forested areas leading up to areas for camping and other outdoor activities. The cabins and campgrounds will provide lodging accommodations for all types of visitors who desire a more rustic setting rather than a hotel. The paved trails run along the main roads in the Knobs area and connect shops and restaurants to the other trails in the county. The Knobs Adventure Trail connects to the Wine & Bourbon Trail as well the Community Trail.

This Knobs Adventure Trail area consists of multi-use paved trails running along side major roads such as Routes 44, 1526, and 1020 (Figure 4.4.7). These trails are 12 ft wide with a 4 ft vegetation buffer between the trails and roads. Along with paved trails, there are hiking trails that are roughly 5 ft wide through the forested areas. Campgrounds and cabins can be found along the trail for rental to visitors and hikers.

According to the 2012 American Camper Report, in 2010 there were 39.9 million people in the U.S. who went camping; in 2011 that total increased to 43 million people (Figure 4.4.8). This net gain of 2.6 million campers from 2010 to 2011 demonstrates that camping is an increasingly popular activity and lodging option. Of those 43 million people, 86% camped with a tent while 33% rented a cabin. About 76% of people who went camping also go hiking, thus illustrating the importance of providing cabins and campground amenities in areas close to hiking trails (Figure 4.4.8). In addition to hiking, other preferred

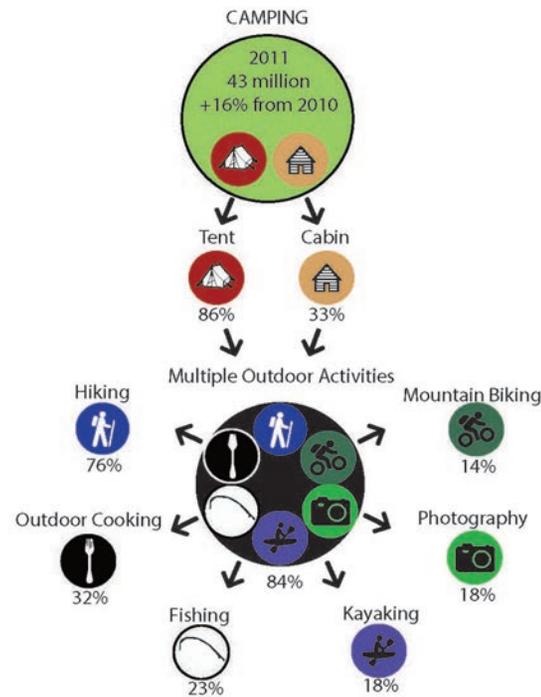


Figure 4.4.8: Camping and outdoor activities statistics for the U.S. in 2011. (Source: 2012 American Camper Report. (2012, January 1), Mlambert. (n.d.)

camping activities include outdoor cooking, fishing, kayaking/canoeing, photography, and mountain biking.

Another main tourism attraction that ventures through Bullitt County is the existing Kentucky Bourbon Trail. Of the 2 million people who have traveled along this trail in the previous 5 years (2006-2011), over 75% stayed in a hotel or bed and breakfast. Of that number, 50% of the people stayed for 3 or more nights in Bullitt County with 40% in groups of 3 or more people (Johnson, A. 2012, January 28).

The Knobs Adventure Trail area is planned to be bursting with nature and adventure opportunities perfect for families or group events. There will be multiple lodging opportunities located along the trail, thus visitors will have easy access to all the amenities in the Knobs area as well as the Wine & Bourbon and Community Trails. Providing a range of adventure activities and amenities to visitors, as well as residents, can only increase the economic outlook and cultural identity of Bullitt County.

ACTIVITIES

There are many amenities and activities that would be available in relation to the Knobs Adventure Trail. Below are examples of amenities that would support tourism and recreational endeavors as well as local businesses:

- Hiking
- Running
- Biking (road/mountain)
- Fishing / Hunting
- Canoeing / Kayaking
- Camping (primitive/cabin)
- Outdoor cooking
- Sightseeing / photography
- Shopping

The Knobs Adventure Trail area is very rural and great for people who enjoy interacting with nature. By coordinating implementation and funding of the Knobs Adventure Trail with the Wine & Bourbon Trail, along with assistance from the distillery and winery industries, the Bullitt's Barrell Run greenway system can continue to grow and eventually lead to Phase 3, the Community Trail.

4 | PLAN D: BULLITT'S BARREL RUN

COMMUNITY TRAIL

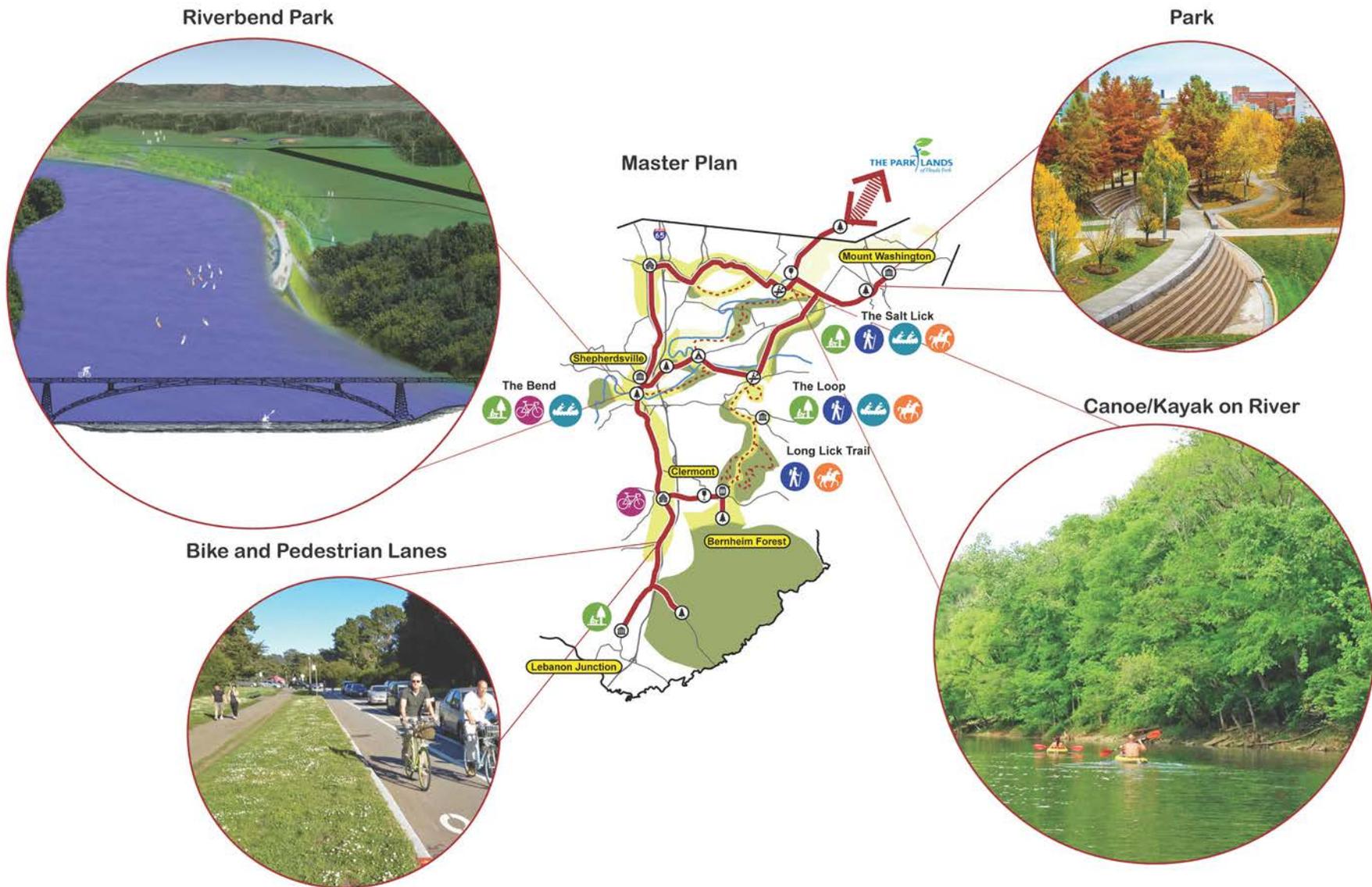


Figure 4.4.9: Master plan of the Community Trail (center), with images illustrating various aspects of the trail.

COMMUNITY TRAIL

Recreational opportunities, trails and open space are vital to healthy, thriving communities. Proximity to public parks and amenities has a direct correlation to the level of physical activity occurring in a community. With an increase in activity opportunities available to a community, the better chance there is for people to live a healthy, more balanced lifestyle (Figure 4.4.9). In any given 30 day period, Kentucky has about 31% of its population not participating in any physical activity. However, Bullitt County's physical activity rate is a little better than the state's average, with only 21% of its population not participating in physical activity during any given month (KentuckyHealthFacts.org). This statistic is a little surprising due to the small number of parks and outdoor opportunities available in the county. According to TravelBullitt.org, there are only three public parks listed in Bullitt County - a figure considerably lower than found in neighboring counties (Figure 4.4.10). With additional public parks, open spaces and recreational opportunities, even more community members could benefit from increased physical activity.

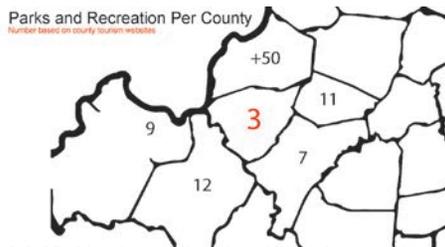


Figure 4.4.10: Number of listed parks and recreation open space per county. The number in red represents Bullitt County.

THE TRAIL

The Community Trail is oriented to be most accessible to the populated areas of the county. The bulk of the trail runs east and west along KY-44 between Mt. Washington and Shepherdsville, and north and south along HWY 61 (parallel to I-65). Following along major

roads in the county, the Community Trail will provide an easy alternative to driving, a trend that younger generations tend to desire. According to the U.S. Public Interest Research Group, 16 to 34 year olds as a group took 24% more bike trips in 2011, than this age group took in 2001. This is even with a population decrease of 2% for this age group (www.uspirg.org). New public parks are proposed along the Community Trail to accommodate more users of leisure outdoor activities. These new parks would be located in several areas: just outside of Mt. Washington, on Floyds Fork and in the heart of Shepherdsville as well as down near Lebanon Junction. It is important to incorporate as many access points to the parks throughout the county so that activities are not subject to singular locations but rather county-wide. The Community Trail will offer informal recreational opportunities, such as open fields and walking paths, that will be great for individuals as well as families. The goal is to provide a public park system that is safe for all users at any time, thus the segments of the Community Trail to each park, as well as the parks themselves, will be thoroughly lighted.

AMENITIES

A variety of amenities can be found in the proposed parks as inclusive public space including:

- Playgrounds
- Amphitheater
- Public Gardens
- Public Restrooms
- Educational Spaces
- Boat Launches
- Pavilions

ACTIVITIES

The types of activities which could be available in the informal, recreational spaces are limitless, including:

- Biking
- Fishing
- Sports
- Swimming
- Kayaking/Canoeing
- Jogging
- Picnics
- Nature Observation

BENEFITS

Providing a well-planned trail system that incorporates a county-wide public park system is essential for sustaining happy, healthy communities. Restricted outdoor resources in Bullitt County have caused a disconnect between people and places, and prevented the county from attaining the greatest quality of life possible for its residents.

Children need to grow up in an environment that allows for the freedom to pursue adventure and exploration as well as physical activity. With the limited number of parks available in Bullitt County, it is difficult for the county's younger residents to obtain an adequate amount of outdoor physical activity. Communities are then faced with the challenge either to create recreational experiences in places where it might be unsafe to do so or risk losing the interest of its residents who will seek opportunities outside of the county. With additional opportunities and public spaces, not only will the quality of life be improved for all, but residents will be more likely to seek activities in the county which will enhance social connectivity.

Besides providing additional public spaces and parks, it is equally important to offer the facilities necessary for each park. According to a study by Kaczynski, et al. (2008) in the American Journal of Public Health, parks that had more features were more likely to be used for physical activity. Of the facilities offered, trails have the strongest relationship with park use for physical activity. This research illustrates how vital a trail system is to improving the physical activity level of a community. Achieving this goal with a safe, well-planned, county-wide trail system will shed a positive light on a county whose residents typically seek recreation and entertainment opportunities in surrounding counties. Implementation of the Barrel Run greenway trail system can rectify the crisis of limited physical activity in Bullitt County's communities and create a safe environment for outdoor recreation.

DISCOVER BULLITT COUNTY



KEEP CALM AND TRAIL ON

4 | PLAN E: KEEP CALM AND TRAIL ON



CONCEPT

The **Keep Calm and Trail On (KCTO)** greenway plan identifies key concepts and makes recommendations for Bullitt County on how to implement a sustainable greenway system. These recommendations aim at improving and preserving the county's overall economy, health, and environment. This will be achieved by expanding the existing infrastructure, adding buffer zones to protect sensitive ecosystems and connecting the community through a sustainable trail system.

GOALS/OBJECTIVES

The goals of the KCTO plan are to achieve a healthy economy, environment and community. The plan uses trails, residential infill development and commercial development to discover, keep calm, and trail on to a healthier Bullitt County.

HEALTHY ECONOMY

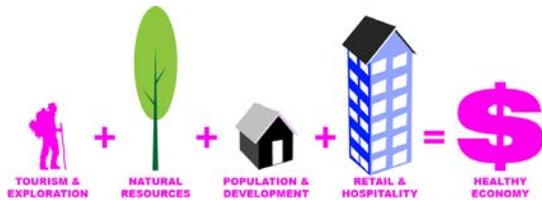


Figure 4.5.1: Prescription for a healthy economy.

A healthy economy will be achieved by promoting some of the natural and man-made attractions in the county to increase tourism (Figure 4.5.1). For example, Bullitt County has The Knobs area, a natural landscape phenomenon that stretches

throughout the north-western part of the county. These hills and their natural features are a big attraction to outdoor adventurers, nature lovers and other tourists.

But just having people visit the county is not enough to promote a healthy economy. Tourists have to spend money while visiting. Strategically incorporating commercial zones within the KCTO plan will help encourage increased spending by tourist while they explore Bullitt County.

With a successful greenway project, the county grows both in economy as well as in population. To accommodate a growing population, the plan looks at ways to add residential zones without stressing the environment. Promoting residential infill will help encourage a compact community, while at the same time saving money by minimizing new infrastructure.

HEALTHY ECOSYSTEM

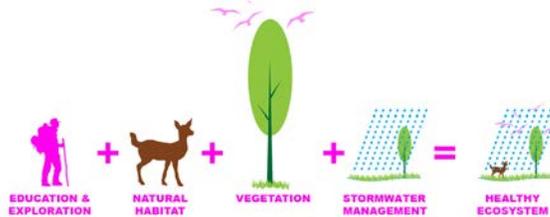


Figure 4.5.2: Prescription for a healthy ecosystem.

There are countless benefits to a healthy ecosystem (Figure 4.5.2). The KCTO plan proposes a greenway design that will be sustainable and have the least impact on the existing ecosystem. This will be achieved while protecting the sensitive ecosystems and habitats that have been identified in Bullitt County (Figure 4.5.3).

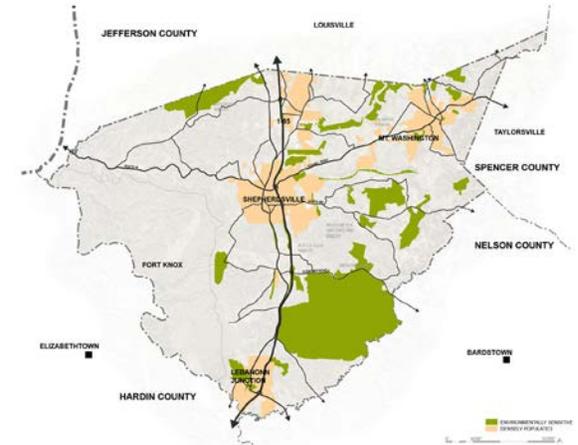


Figure 4.5.3: Sensitive ecosystems in Bullitt County. (Source: Kentucky Geography Network, 2014)

Two endangered species have been identified in Bullitt County, the Kentucky Glade Cross (*Leavenworthia exigua laciniata*) and the Indiana Bat (*Myotis sodalis*). These species have to be protected and incorporating ways to do so into the overall design is important. Creating a buffer zone around the Kentucky Glade Cross habitat areas will aid in this effort. As for the Indiana Bat, the main danger they face is loss of habitat and reduced shelter on their migration route. A widely practiced conservation strategy is habitat-based conservation. This involves conserving the entire biological and physical environment. The main benefit of habitat-based conservation is that it not only preserves endangered species, but also unknown ones. A vegetated buffer zone will help achieve the protection necessary around the ecologically sensitive areas within Bullitt County.

HEALTHY COMMUNITY



Figure 4.5.4: Prescription for a healthy community.

The KCTO plan also helps to create a healthy community. According to the State of Obesity 2013 report, Kentucky has the fifth highest adult obesity rate in the nation. In the Kentucky County Health Rankings 2013, Bullitt County was ranked 25th in health outcomes which represent how healthy a county is against a set of standards. While ranked in the first quartile of Kentucky's counties, Bullitt County can still take steps to improve the overall health of its residents.

Having a healthy community will not be achieved by simply having a network of trails or greenway systems, but these facilities do play a significant role in improving the general health of the community. Some factors that will encourage use of the recreational/physical opportunities offered include easy access to trails, availability of essential amenities, and ability to engage in exciting attractions along the trails. Increased use of the proposed trail system will lead to a sustainable greenway system and a healthy community (Figure 4.5.4).

COMMUNITY ENGAGEMENT

A community meeting between University of Kentucky Landscape Architecture students (UKLA) and Bullitt County community members was held on September 26, 2014. During the meeting there were activities geared toward understanding the county's suggestions and concerns about the proposed greenway system. These activities

included a Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis (Figure 4.5.5) and a Parti Diagram (Figure 4.5.6). These activities resulted in a list of concerns from the community which generated a list of actionable recommendations from the UKLA design team.

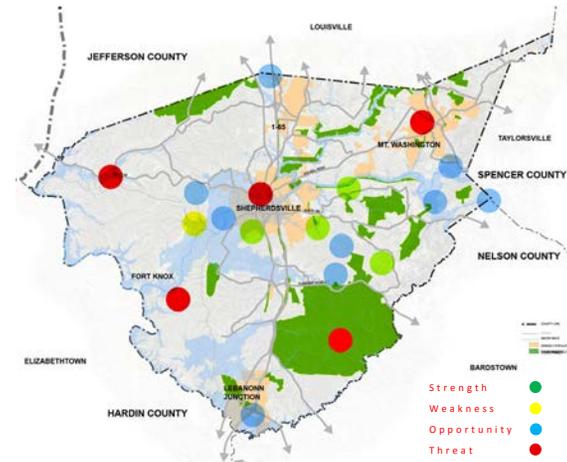


Figure 4.5.5: SWOT Analysis from community engagement.

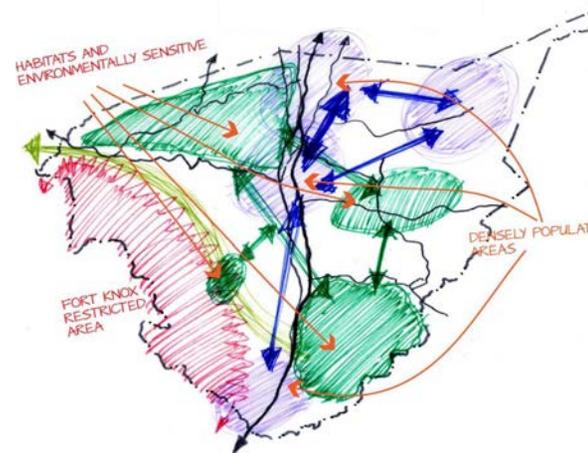


Figure 4.5.6: Parti Diagram from community engagement.

The community concerns included:

- Unplanned urban sprawl and encroachment from Louisville/Jefferson County
- Noise from Fort Knox
- Closed community around the Knobs
- Limited access / proximity to existing trails and parks
- Pollution of Salt River
- Lack of county Identity
- Lack of connectivity within the county
-

The UKLA design team recommendations included:

- Create gateways to the county
- Celebrate the county's rich culture and history
- Plan public spaces with multi-functional uses
- Minimize conflicts between pedestrians and vehicles
- Connect to existing/proposed circulation paths
- Universal accessibility to parks and trails
- Encourage centralized and connected residential and commercial development
- Connect community to nature
- Create vegetated buffer zones around environmentally sensitive areas
- Integrate stormwater management into overall greenway system design

MASTER PLAN

GROUNDING

To achieve the goal of having a healthy economy, ecosystem and community through low impact design and sustainable trails, the KCTO plan looked at the population, amenities, and attractions that are within a two hour drive from Shepherdsville. Bullitt County in general is within a two hour drive from four major cities that border the county, excluding Louisville directly to the north (Figure 4.5.7).

Multi-Use Trails



Figure 4.5.10: Section illustration of a multi-use trail, the main typology in the KCTO greenway plan.

Greenway Trails



Figure 4.5.11: Section illustration of trails designed for the sensitive ecological areas.

Off Road Trails

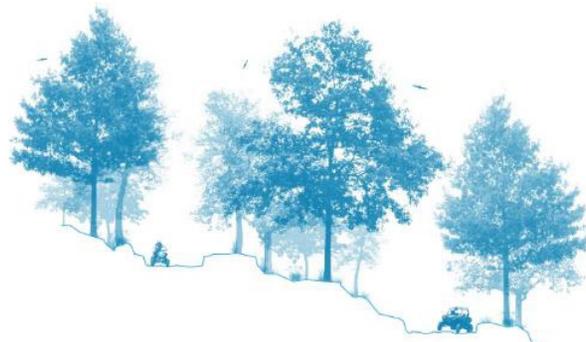


Figure 4.5.12: Section illustration of low impact, primitive trails used in the motorized and equestrian trails.

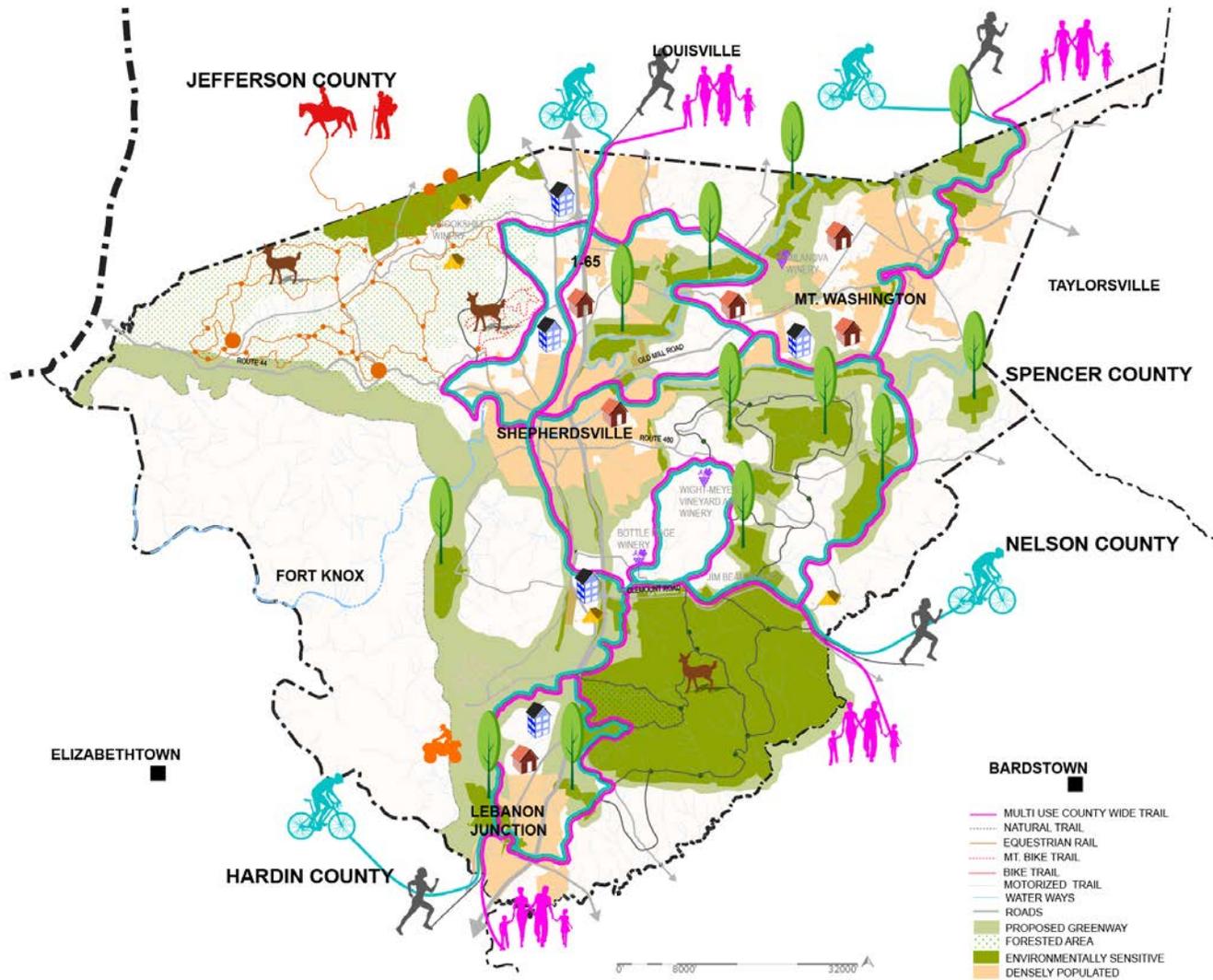


Figure 4.5.13: Keep Calm and Trail On (KCTO) master plan proposing a county-wide greenway system that includes trails, infill development and commercial development.

4 | PLAN E: KEEP CALM AND TRAIL ON

THE EXPLORATION TRAIL - CONCEPT

The Exploration Trail system in the KCTO greenway plan focuses on the areas around Lebanon Junction to promote connections from the urban area into the surrounding natural areas (Figure 4.5.14). Being a populated area, the community will be provided with many opportunities to easily access the trail system by various modes of travel, all leading through the surrounding natural environments, thus creating a sustainable trail system. These environments include Bernheim Forest, open green space, dense forested areas, and farmland, as well as downtown Lebanon Junction.

The **Exploration Trail** system consists of multiple trail types and will make Lebanon Junction a prime destination with ample opportunities to explore and experience all the natural environments Bullitt County has to offer.

Multi-use trails (Figure 4.5.10) provides users with wide paths to walk, run or bike around the Lebanon Junction area. **Urban trails** (Figure 4.5.9) will run through the downtown area, along Main Street, and connect with Preston Highway toward the east. These trails will provide the community with easy access to enjoy the surrounding natural environment or act as an alternate route to get to and from locations. Once outside of Lebanon Junction, users will experience the **Savannah trail** which winds through open meadows and green-space providing spectacular views and a sense of being outside of the urban setting (Figure 4.5.15). From the Savannah Trail, **Greenway trails** will guide users through densely forested areas that provide a true experience with nature as it meanders northeast into Bernheim Forest (Figure 4.5.17).

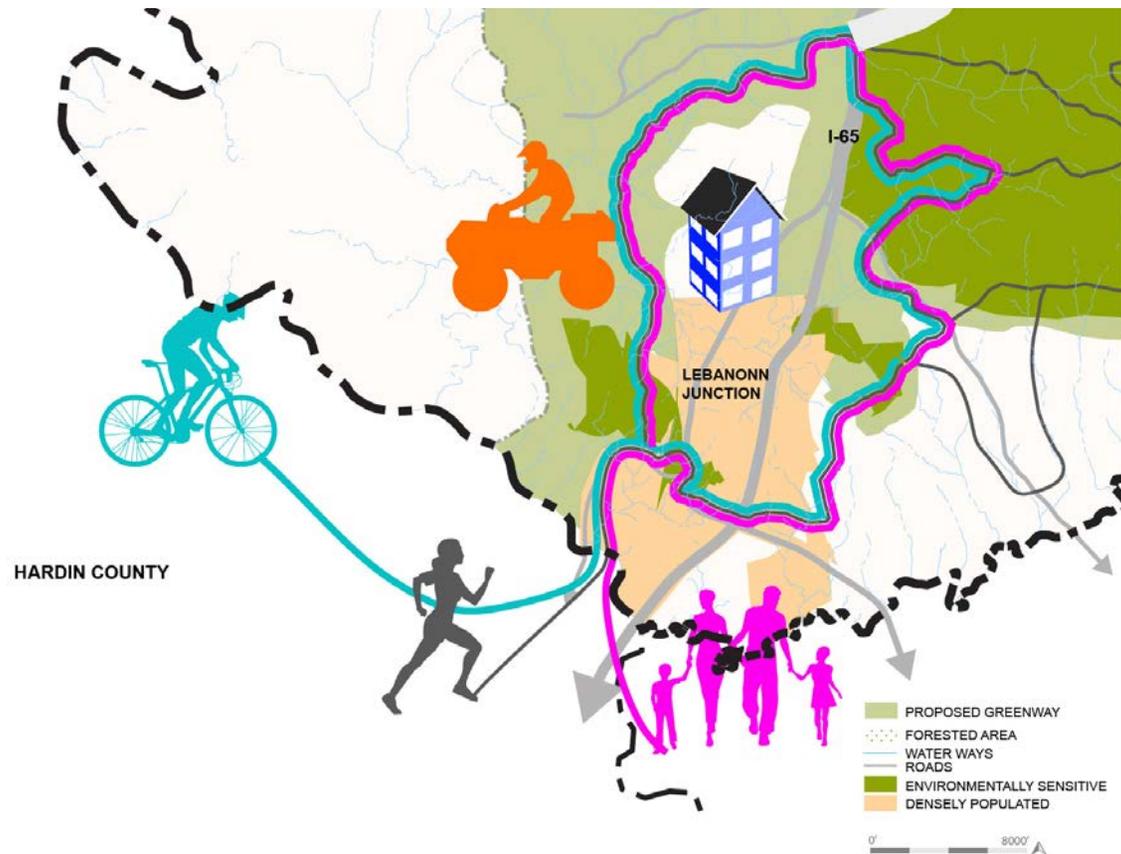


Figure 4.5.14: Map of the Exploration Trail system consisting of multi-use, urban, savannah, greenway and motorized trails.

Motorized Trail

One of the common concerns expressed by community members during the public meeting was about the noise coming from Fort Knox, just west of Lebanon Junction. The military base conducts active training exercises along with live artillery testing and practice. To help mitigate this issue, the design team has proposed blending this aggressive and disturbing noise with a recreational opportunity promoting extreme activity through

a motorized trail system (Figure 4.5.14). The motorized trail can help the community see the area in a different light by providing new experiences and bringing a sense of character to a previously avoided area.

Bullitt Off Road is a motorized trail system that provides users with a healthy and exciting recreational activity. The trail will be located northwest of Lebanon Junction and just east of Fort

Knox, providing a noise buffer to the surrounding area from the military base. The motorized trail system consists of a variety of routes through dense forests and open green-space. The routes will vary in difficulty from beginner, for those new to operating off-road vehicles, to advanced, for those seeking challenging, technical trails. This trail system will impact Lebanon Junction economically by promoting tourism for this type of recreational activity. Retail opportunities will develop within the town for ATV dealerships and repair, shops, restaurants, and lodging for tourists.

The Bullitt OffRoad plan includes a Welcome Center and will focus on the environment by incorporating a green parking lot at the trailhead (Figure 4.5.16). The lot will give users easily accessible parking for trailers and other mixed-uses. The trailhead will also include a pavilion/restroom facility, picnic area, and a wash station so users can clean their motorized vehicles on site. Alongside the wash station will be a source pollution management system. The area will include rain gardens that will help collect and filter water runoff. The trailhead will also function as an educational area by providing signage and information about the trails, rules, and the importance of preserving the surrounding environment (Figure 4.5.18).

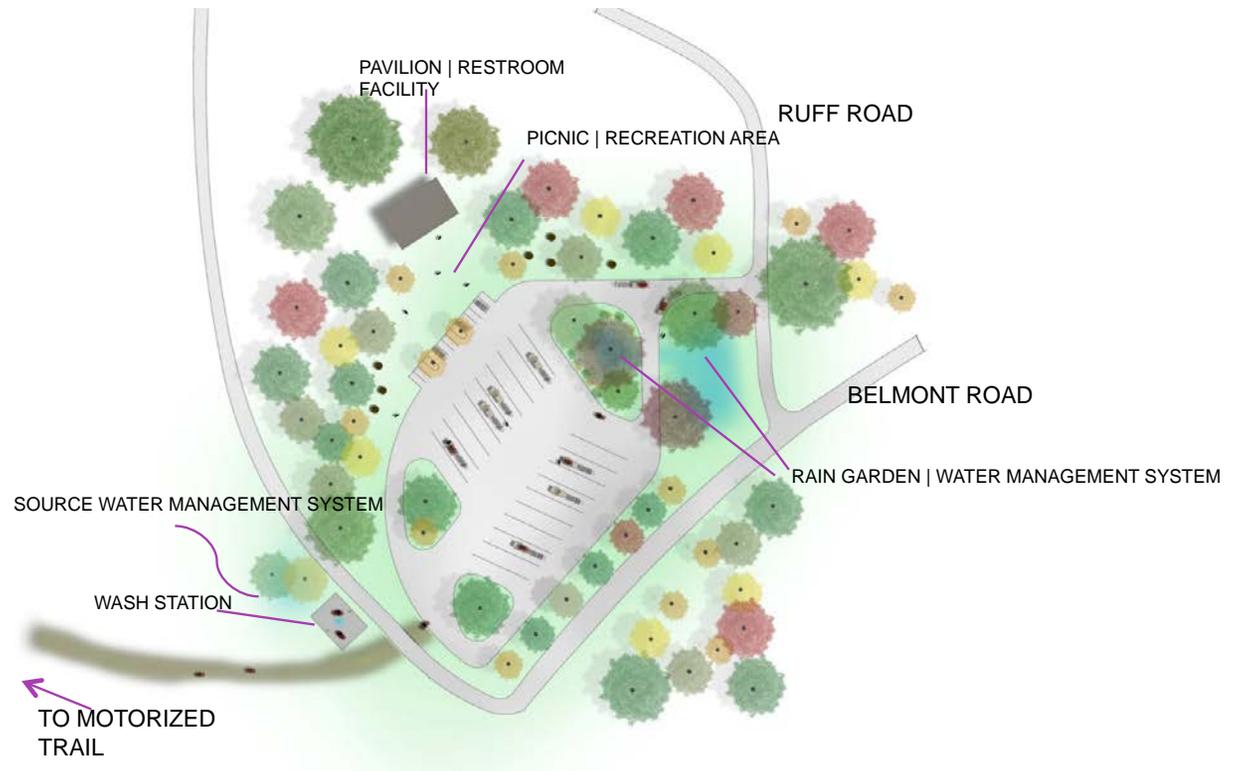


Figure 4.5.16: Bullitt Off Road Welcome Center



Figure 4.5.15: Savannah Trail



Figure 4.5.17: Greenway Trail



Figure 4.5.18: Example of a motorized trail located in Rush, Kentucky (Source: www.rushoffroad.com.)

4 | PLAN E: KEEP CALM AND TRAIL ON

THE SPIRIT TRAIL - CONCEPT

Spirit enthusiasts from around the country visit Kentucky to travel the legendary Kentucky Bourbon Trail. Bullitt County hosts two stops along this trail with the Jim Beam Brands Distillery and the Four Roses LLC Distillery, whose newly renovated visitor center opened on September 30, 2014.

The Kentucky Bourbon Trail leads visitors to Bardstown, the “Bourbon Capitol of the World.” Bardstown was designated as America’s “Most Beautiful Small Town” in 2012 by USA Today. Bardstown is located just a few miles away in nearby Nelson County and attracts a lot of tourists who visit Federal Hill, famous as “My Old Kentucky Home.” Bullitt County can take advantage of this ready-made tourist audience with its own Spirit Trail. Bullitt County has all the makings to draw large numbers of tourists to its popular attractions and to experience its supreme natural beauty -- it just needs the packaging which the Spirit Trail can provide.

GOALS/OBJECTIVES

The goal of the Spirit Trail is to create a sustainable trail system branch off from the Kentucky Bourbon Trail, featuring additional spirit-related destinations and experiences in Bullitt County thus boosting economic development and encouraging a healthier community.

MASTER PLAN

The Spirit Trail (Figure 4.5.23) connects the county’s bourbon distilleries and wineries through a mixed-use pathway for walking, running, and

biking. The distances between destinations are not far in an automobile using existing infrastructure, but the routes are indirect and too long for the average person to walk or bike. The Spirit Trail winds through distinctive grassland and forest scenery while touching key destinations and creating opportunities for new businesses along the way (Figure 4.5.19).



Figure 4.5.19: The Spirit Trail contains “primitive trails” composed primarily of mulch which has minimal environmental impact.

Potential economic opportunities along the Spirit Trail include lodging, restaurants, retail shops, and recreational activities available in the county (Figure 4.5.20). For example, at the Jim Beam Distillery tours typically begin around 9:00 or 9:30 AM. This early start provides an amazing opportunity for lodging and restaurants to be located off of the highway near Bernheim Forest and the Jim Beam American Stillhouse.

The Spirit Trail is not only an idea, but also a physical route. To capitalize on this, the Spirit Trail must have a more physical presence. The beginning should provide an introduction which prepares visitors for the historically delicious journey to come.



Figure 4.5.20: The Spirit Trail focus area is an ambitious guide for the further development of Bullitt County’s tourism in respect to the growing spirit industry.

The Spirit Trail journey quite literally begins at the official trailhead. The proposed trailhead is identified by an adventurous, monumental barrel pyramid located at the Jim Beam Brand Distilleries. The pyramid is constructed with a series of bourbon barrels and rope ladders. Each barrel in the pyramid represents a various distillery destination along the Spirit Trail (Figure 4.5.21).

Each stop along the the Spirit Trail will have a uniform oversized barrel sign that will welcome visitors (Figure 4.5.22). This will help identify the Spirit Trail route and give it a more tangible presence, while also providing a unique background for photos. Additional signage along the route will inform visitors of other destinations and attractions.



Figure 4.5.21: The beginning of the Spirit Trail is the gateway into Bullitt County. It deserves a distinctive and interactive entrance.



Figure 4.5.22: Trail access points and coordinated signage reinforce the identity of the Spirit Trail while also providing a platform for visitors to link to on social media - #spiritrail.

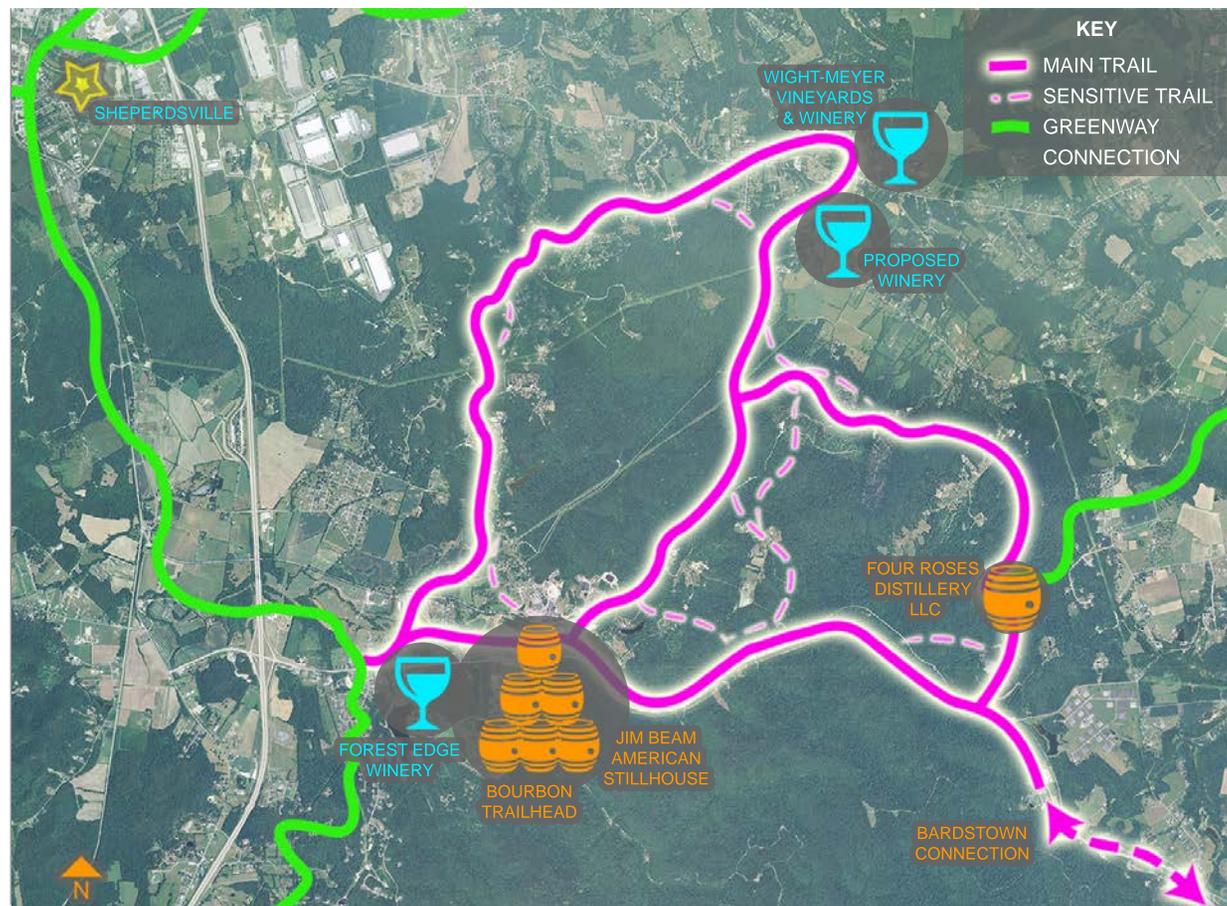


Figure 4.5.23: The Spirit Trail is a multi-use trail system which connects many popular and proposed destinations.

Bullitt County has several wineries, many of which have won state and international awards. It also hosts an annual wine festival. Two wineries are presently incorporated into the Spirit Trail but the opportunity exists to add others as they develop.

Kentucky's wine industry is growing in stature but has a shortage of workers with viticulture knowledge. In 2015, the University of Kentucky will

begin offering a certificate in distillation, wine and brewing studies because of the growing popularity of the field. Many students are learning about the industry and eager to join it.

With fertile land for grapes and enthusiastic residents, Bullitt County's wine industry is ripe for expansion.

4 | PLAN E: KEEP CALM AND TRAIL ON

HENRY KNOX TRAIL & THE FRONTIER TOWN - CONCEPT

The Henry Knox Trail is named after the first U.S. Secretary of War. It connects Mt Washington to Shepherdsville and then extends into the Knobs area. The loop connecting Mt Washington to Shephaerdsville is comprised of urban trails (Figure 4.5.9), multi-use trails (Figure 4.5.10) and greenway trails (Figure 4.5.11). The portion that extends into the Knobs area is designed with low impact off-road trails (Figure 4.5.12). The off-road trails are for use by hikers, mountain bikers and horseback riders. These trails connect to the Louisville Loop and Jefferson Memorial Forest. The estimated time it would take to ride the entire trail is two days. This fact contributed to the idea of adding campgrounds into the design.

Even though the overall KCTO greenway master plan (Figure 4.5.13) has designated areas for primitive camping, the design team decided that incorporating a more developed destination camping area with rustic facades and entertainment opportunities would attract additional tourists. This concept would further contribute toward the economic health of the KCTO sustainable greenway design. The main challenge was determining what type of design would fit this concept. A themed trailhead was the solution -- the Frontier Town would be modeled after a typical historic frontier town. This trailhead center is proposed to be located close to Shepherdsville and I-65 (Figure 4.5.24). This strategic location was selected due to three factors:

1. Proximity to a major corridor (I-65) and near a big population (Shepherdsville) would make the Frontier Town both easily accessible to travelers and town residents

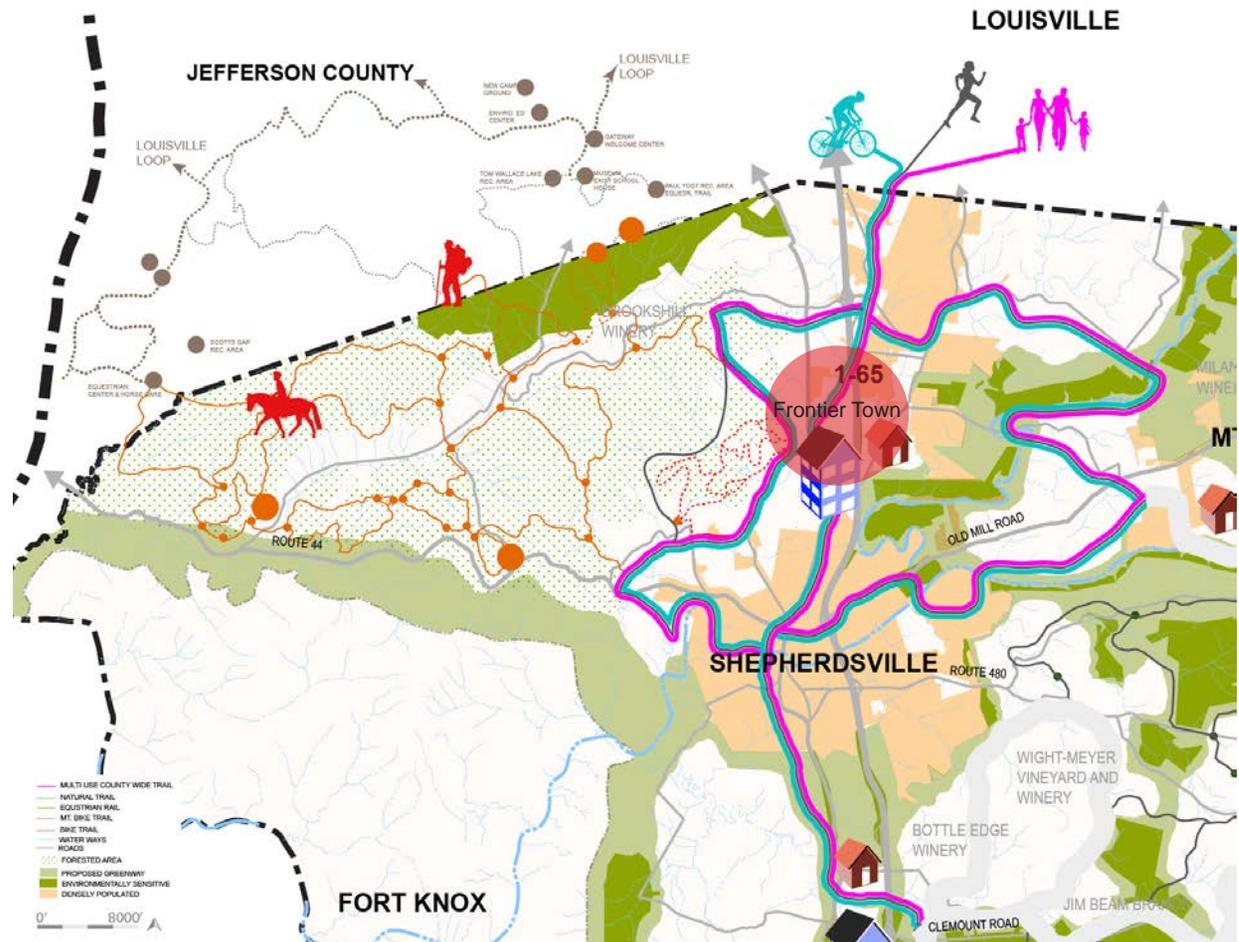


Figure 4.5.24: The Henry Knox Trail stretches from Mt Washington to the Ohio River and connects to the Louisville Loop

2. The location is approximately a day's horse ride from the equestrian trails in Louisville if one starts off traveling west. This location can offer a perfect night stop for riders. The Frontier Town will have full service stables and cabins for those who want to stay the night.
3. The proposed area is currently a mining location. Using this land as a trailhead can

help heal the environment while providing opportunities for economic development.

To reduce soil compacting and preserve the naturalistic character, the Frontier Town will only be accessible by horse, bicycle or on foot. Visitors will park in the green parking lot (Figure 4.5.16) on the periphery of the Frontier Town.



Figure 4.5.25: Plan of the Frontier Town trailhead center with rustic appearing facilities/amenities.

The Frontier Town will have rental cabins that are available to everyone all year round. These cabins will be complemented with amenities typically found in a small town, e.g. entertainment, restaurants, etc. (Figure 4.5.25) The walk from the parking lot will be through a tree lined walkway (Figure 4.5.26). The trees will screen those in the town from vehicles and trail users. The spaces

behind the cabins will provide gathering areas for people to congregate and enjoy neighborly activities such as picnics, impromptu music sing-a-longs, etc. (Figure 4.5.27). The Main Street will have horse hitching rails available for riders as they shop and dine (Figures 4.5.28 and 4.5.29).



Figure 4.5.26: Section of tree lined path from the parking lot to the Frontier Town



Figure 4.5.27: Section of areas behind cabins with gathering spaces



Figure 4.5.28: Section of Main Street with horse hitching rail



Figure 4.5.29: Main Street at the Frontier Town



4 | PLAN F: FOLLOW ME TO BULLITT COUNTY

CONCEPT

Currently, there is an outflow of residents who leave Bullitt County each day for work, but they also leave the county for play or recreational activities. The Follow Me to Bullitt County (FMBC) master plan aims to not only give residents reasons to stay in the county for recreation, but to also provide destination attractions that will draw tourists into the county for years to come.

GOALS/OBJECTIVES

The design team's goal is to create recreational attractions that will create an influx of people into Bullitt County. In the short term, the design team has identified spot projects that can have an immediate impact and are financially feasible. In the long run, the objective is to increase connectivity and tourism by promoting activities for a healthier lifestyle and access to cultural/geographic amenities.

PROJECT STATEMENT

Bullitt County is currently in a significant phase of urban development. With its advantageous geographic location, natural resources, and cultural character (Figure 4.6.1), it is time to coordinate and develop the overall infrastructure to support opportunities in health, tourism, and aesthetics. The FMBC project seek to improve the overall social connectivity and environmental quality of Bullitt County. Focusing on the north section of Floyd's Fork, the FMBC project continues and expands the greenway system of The Parklands of Floyd's Fork (Louisville/Jefferson County.) and provides connections into metropolitan districts, school areas, and adjacent neighborhoods. The design embodies sustainable and low-impact strategies in order to achieve

ecological restoration along the river. With its potential for recreational and educational use, the site can transform into a green infrastructure that provides active waterfront experiences.

PROJECT NARRATIVE

The question of how to fulfill the public's desire for a healthier environment and social identity

can be answered through increased public awareness of and opportunities offered by the greenway system. To accomplish this there are three major strategies: recreational landscape design, educational infrastructure, and natural conservation. This project seeks comprehensive solutions by analyzing and planning the county's future development objectives. With phased and integrated implementations, the FMBC proposal is within reach to enhance Bullitt County.

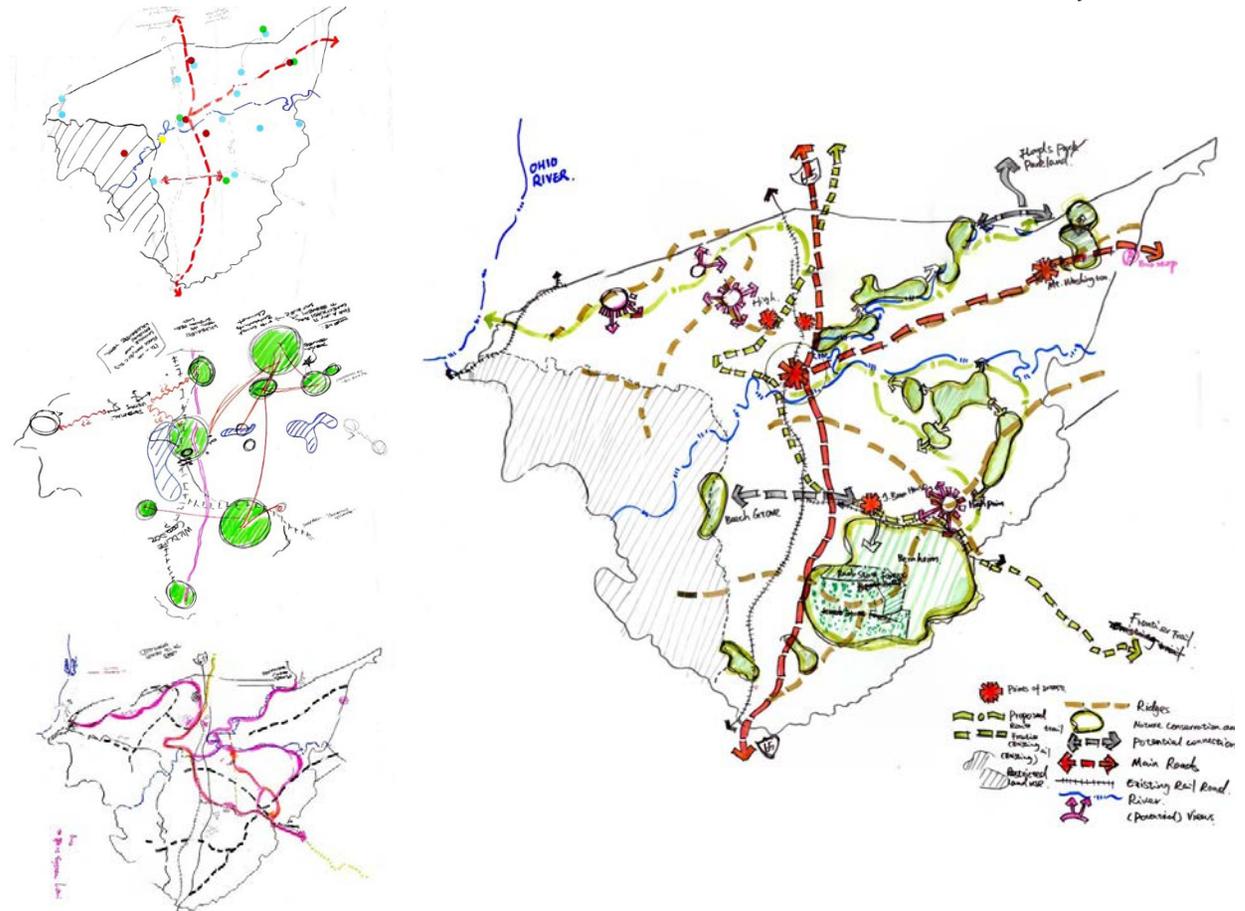


Figure 4.6.1: Compilation of analysis maps derived from the design charrette on September 26, 2014.

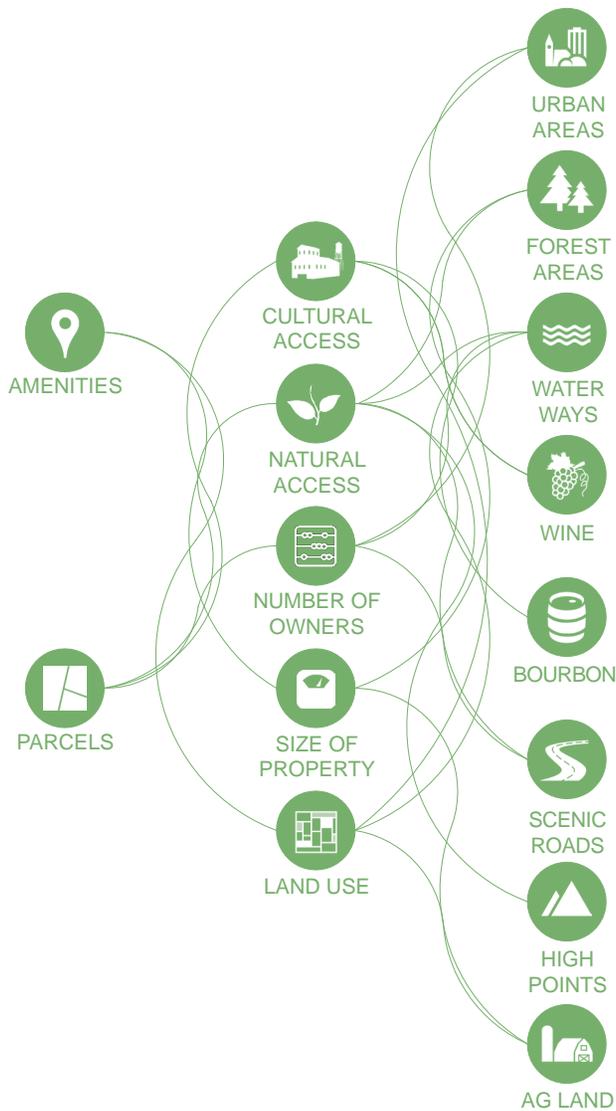


Figure 4.6.2: Representation of the site selection process used during preliminary design stages.

SITE SELECTION

As with any greenway system, site selection played a key role in determining the parameters of the FMBC trail greenway design (Figure 4.6.2).

After identifying the major opportunities and constraints of Bullitt County from a planning perspective, it became clear that any future greenway development needed to consider both macro and micro characteristics of the landscape. On the broadest of scales this was denoted as amenities and parcels. Essentially, this entails identifying potential attractions and parcel maps. Narrowing in scope, the design team took these two macro elements and broke them down into five categories: cultural access, natural access, number of owners, size of property, and land use. These five items became the tools used when identifying some of the potential connections for the greenway ... which cultural and natural features were to be connected, and which parcels of land would best serve as a means for these connections. Lastly, the design team identified eight specific characteristics of the landscape for inclusion in the overall greenway design. These characteristics were: urban areas, forested areas, waterways, wineries, distilleries, scenic roads, high points, and agricultural land. Incorporating as many of these items as possible in the greenway plan would yield the best results for creating fruitful economic opportunities as well as exciting experiences for users of the FMBC trail. Using this site selection process, the design team identified 82 individual parcels of land suitable for adoption as part of the greenway, in addition to existing and proposed roads/trails that would connect all of the amenities. From this process has grown the roots of a greenway system that paints a picture truly indicative of Bullitt County.

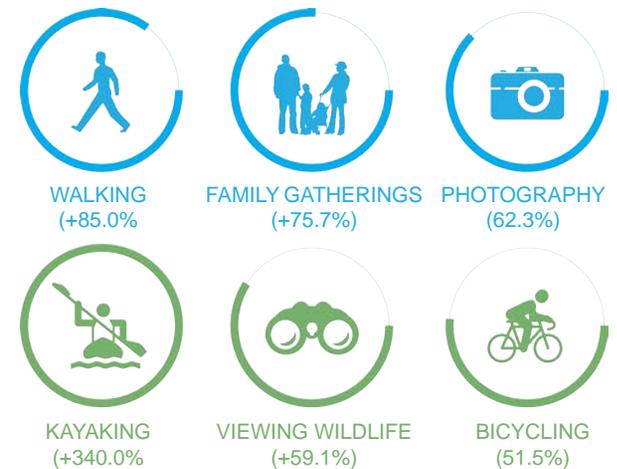


Figure 4.6.3: Representation of the three most popular (blue) and top trending (green) outdoor recreational pursuits. (Source: National Survey on Recreation and the Environment, 2004).

PROGRAM

After determining which parcels and amenities to connect, the design team began programmatic research for the proposed greenway system and amenities. This process was instrumental in developing preliminary concepts as it informed exactly how the specific sites could be designed on the micro scale (Figure 4.6.3).

Research results indicated that providing areas for activities such as walking, social/family gathering, and photography would have an immediate impact. Activities that have promise to impact use of the greenway in the future include kayaking/canoeing, wildlife viewing, and bicycling. Planning for a variety of types and scales of activities will insure the Bullitt County greenway system will not only be of immediate attraction to residents and tourists, but will offer opportunities for future users as well.

4 | PLAN F: FOLLOW ME TO BULLITT COUNTY

MASTER PLAN

Follow Me to Bullitt County (FMBC) is not just a catchy title - it is a greenway master plan (Figure 4.6.4). Data from the U.S. Census Bureau (2013) indicates that a large number of Bullitt County's residents travel outside of the county's boundaries for work and play. Over 18.5 percent travel to Jefferson County on their daily job commute with similar figures for exercise and recreation. The FMBC strategic master plan addresses several issues related to these statistics, such as connectivity, traffic congestion, inadequate infrastructure, and few recreation opportunities.

The FMBC plan proposes the acquisition of several parcels of land around the county to allow this vision to be successfully implemented. In one way or another, these parcels can connect existing fragmented public parks or waterways resulting in a greenway system that will benefit Bullitt County in a myriad of ways. For example, when there is not direct access to parks or green infrastructure, the use of shared vehicle/bike lanes can act as connections. While resolving some congestion issues by lessening the quantity of vehicular traffic, these connections can also aid in improving overall environmental and physical health. The FMBC greenway will encourage physical activity and inspire people to use the trail system by providing aesthetic and safe travel alternatives.

The FMBC greenway trail plan consists of the Floyd's Fork River Trail, the Winery and Bourbon Trail, and the Knobs Run Trail (Figure 4.6.5). This greenway system embraces the geography, topography, natural elements, and beauty of Bullitt County. The proposed FMBC plan will improve aesthetics, encourage healthier lifestyles, and boost the local economy of Bullitt County through tourism.

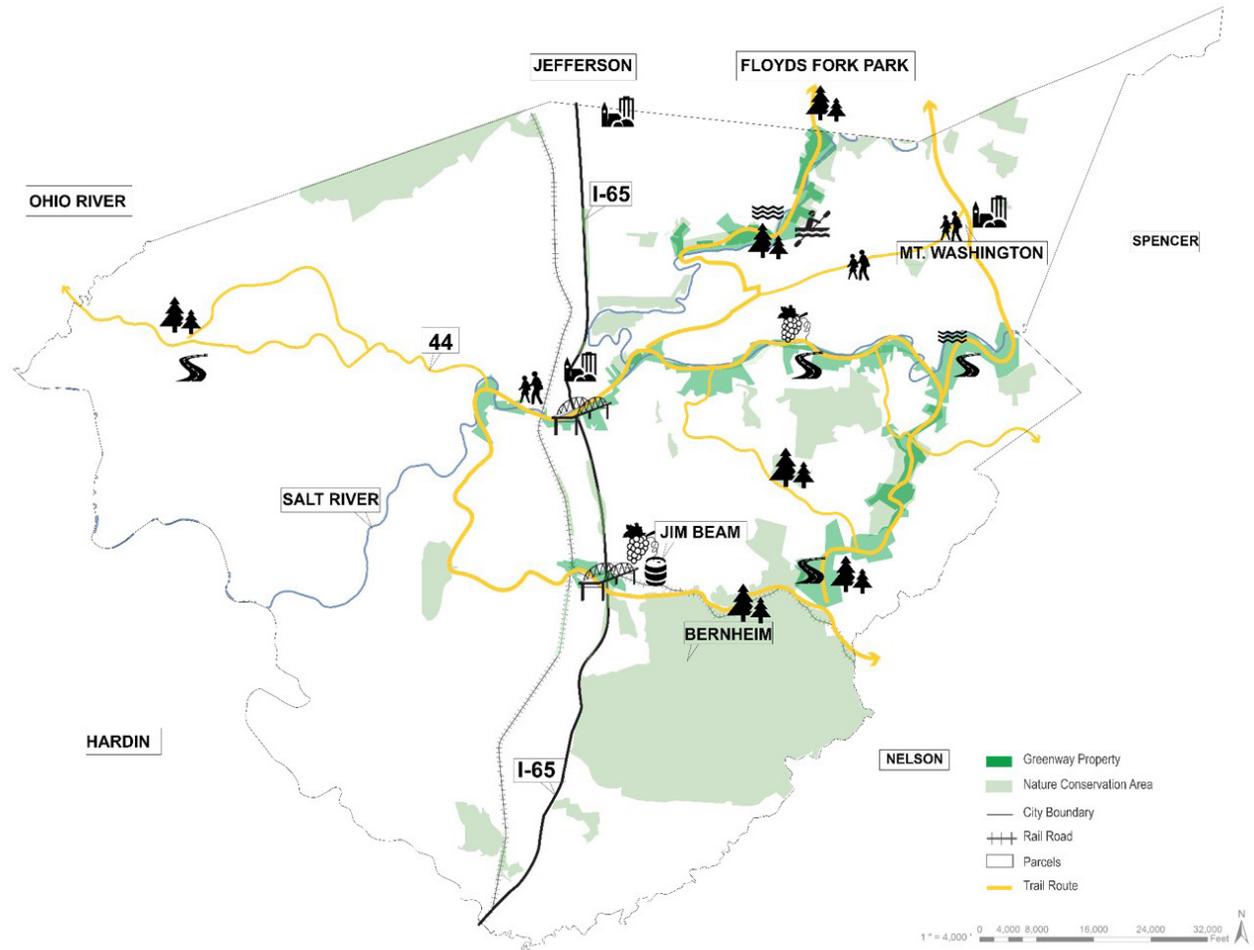
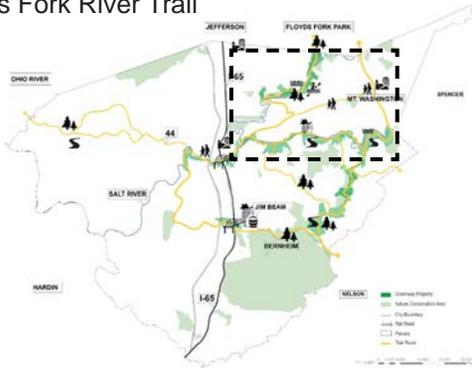


Figure 4.6.4: Follow Me to Bullitt County greenway master plan

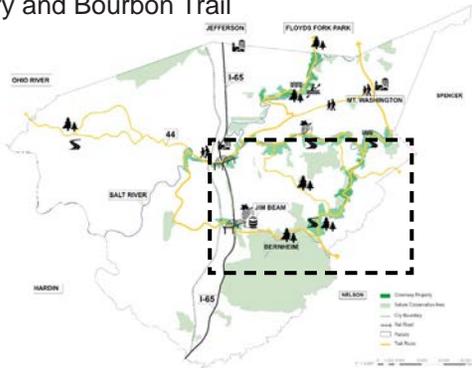
Floyds Fork River Trail



-  Waterways
-  Urban Areas
-  Forested Areas

This unique area, coined the Floyds Fork River Trail, is a continuation of the Parklands of southern Jefferson County. Similar in land use, soil types, and geography, this diverse landscape is laden with natural beauty and peaceful scenery. This region of Bullitt County can provide visitors with an enjoyable environment every time they travel on the trail as well as a different experience for every user. The least challenging trail of the FMBC greenway system and strategically developed around densely populated communities, this trail is for all ages and very family oriented.

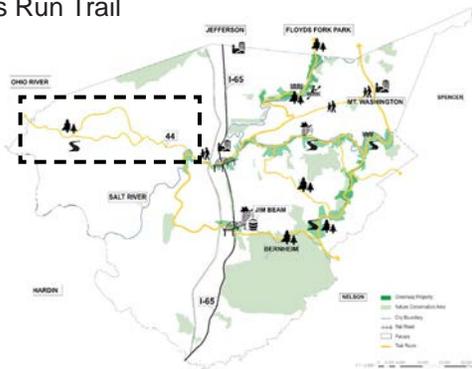
Winery and Bourbon Trail



-  Wineries
-  Distilleries

The Winery and Bourbon Trail is of particular interest in the master plan in that it boasts both natural and built elements. Critical in its geography, it is only 15 miles from the internationally recognized distillery hub, Bardstown, Kentucky. It is the goal of this region to interweave these natural and built amenities into a multi-use trail system. Different in experience from the other two trails in this greenway system, this particular trail will help boost the local economy and is heavily influenced by the tourism that will undoubtedly result.

Knobs Run Trail



-  High points/ Knobs
-  Scenic Routes
-  Agriculture Land

This region of Bullitt County is unique in its topography. While the challenging terrain limits development and construction, it asks for creative development to harness and convert these challenges into opportunities. This attractive landscape has an unlimited amount of uses, it just takes the right ideas and support to create a master plan that embraces the scenery and terrain to maximize the potential possible in this area. The Knobs Run Trail will attract visitors and allow users to get up into places of higher elevation where they can embrace nature and the beauty of this county.

Figure 4.6.5: Context Maps for the Follow Me to Bullitt County greenway focus areas.

4 | FLOYDS FORK RIVER TRAIL

FOLLOW ME TO . . . THE FLOYDS FORK RIVER TRAIL

THE SYMPTOMS

Isolation: Floyds Fork is located in the middle of hills and heavy woodlands, surrounded by large parcels of agriculture land, and lacks access points connecting it to neighborhoods and urban areas (Mt. Washington, Hillview, and Shepherdsville), as well as adjacent counties (Spencer and Jefferson).

Limited Programs: Recreational facilities in The Parklands of Floyds Fork, Louisville, do not continue across to Bullitt County. The northeast side of Bullitt County has a limited number of parks and public recreational spaces.

Sensitive Ecology: Floyd's Fork is indicated as the least environmentally compromised watershed in Jefferson County. The Floyd's Fork watershed contains the largest, most diverse population of mussels, an important, pollution-intolerant organism. However, the mussel population has declined in recent years under the impact of urban development in Jefferson County and Louisville. The water quality has declined primarily from heavy silt loads from construction sites, agricultural runoff and animal waste from farms, and nutrient enrichment from chemically treated lawns and golf courses (Metropolitan Sewer District [MSD], 2012). To prevent river pollution and erosion from future urban development in Bullitt County requires implementation of stream and floodplain buffers to mitigate development impacts related to water quality, flooding, and natural resources.

THE INSPIRATION

The design of The Parklands at Floyds Fork was inspired by and built on the existing land shape. Borrowing the natural geographic features and abundant forest resources, the area enriches the experience for users on the trail.

THE DESIGN AND THE SOLUTION

The proposed 4-mile Floyd's Fork River Trail (FFRT) connects forests, open spaces, riverfronts, and valleys (Figure 4.6.9). The FFRT trail provides access into Jefferson County and will link to the greenway program of The Parklands of Floyds Fork. The western portion of the trail continues to the west (Shepherdsville direction) and joins with Old Mill Road. Multiple entrances to the trail are located along the backsides of adjacent neighborhoods. A link to Twin Oaks Dr. is proposed to increase the accessibility to public schools and to Mt. Washington. Utilizing the existing roads (Glory Rd., Bates Ln., and Thixton Ln.) on the west side of the river, the trail connects into the metropolitan districts (Louisville and Hillview).

To minimize the cultural disturbance to natural resources and provide a safe recreational environment, most of the trail's routes follow the flat, light to middle woodland and open spaces along the river. There are some paths going into the forested areas to enrich the overall experience.

Parking areas are provided in the north and east entrances in order to encourage users from all locations. A visitor center is proposed at the north entrance accommodating customer service and amenities like restrooms, food and water supply, bike rentals, information center, etc.

There are three other pedestrian entrances connecting to Bates Ln., Zoneton Rd., and Gentry Ln. The purpose for these entrances is to create access points for residents who live within walking distance of the trail which will encourage its use.

A open gathering space is located in the middle section of the trail to facilitate multiple uses (Figures 4.6.6 - 4.6.8). Kayaking/canoeing, fishing, picnicing and kiting are activities supported in this area. The community center is set to provide recreational facilities, restaurants, convenience stores, etc., to offer necessary amenities and make people feel more comfortable as they use the trail and park.

The proposed educational center, located near the east entrance, aims to provide outdoor learning experiences for visitors and students from area schools. The site accommodates rain gardens, botanical gardens, and outdoor classrooms where people can interact with nature and enrich their knowledge about the environment.

The river and wetlands will be protected through the creation and implementation of a water sensitive and sustainable landscape. The greenway accommodates bioretention systems, rain gardens, and diverse native plantings which can absorb and filter waste water runoff resulting in improved aquatic ecosystems, while also beautifying the waterfront landscape.

Multiple pathways increase the opportunities for users to interact with different landscapes. Benches are provided about every 300 feet to allow elderly or physically challenged users to travel more easily. All trails are ten-feet wide and paved with concrete. Informational kiosks are located at each entrance and wayfinding signage is located along the trail.



Figure 4.6.6: View of kayaking along the trail.



Figure 4.6.7: View illustrating the recreational areas.



Figure 4.6.8: View illustrating the waterfront paths.

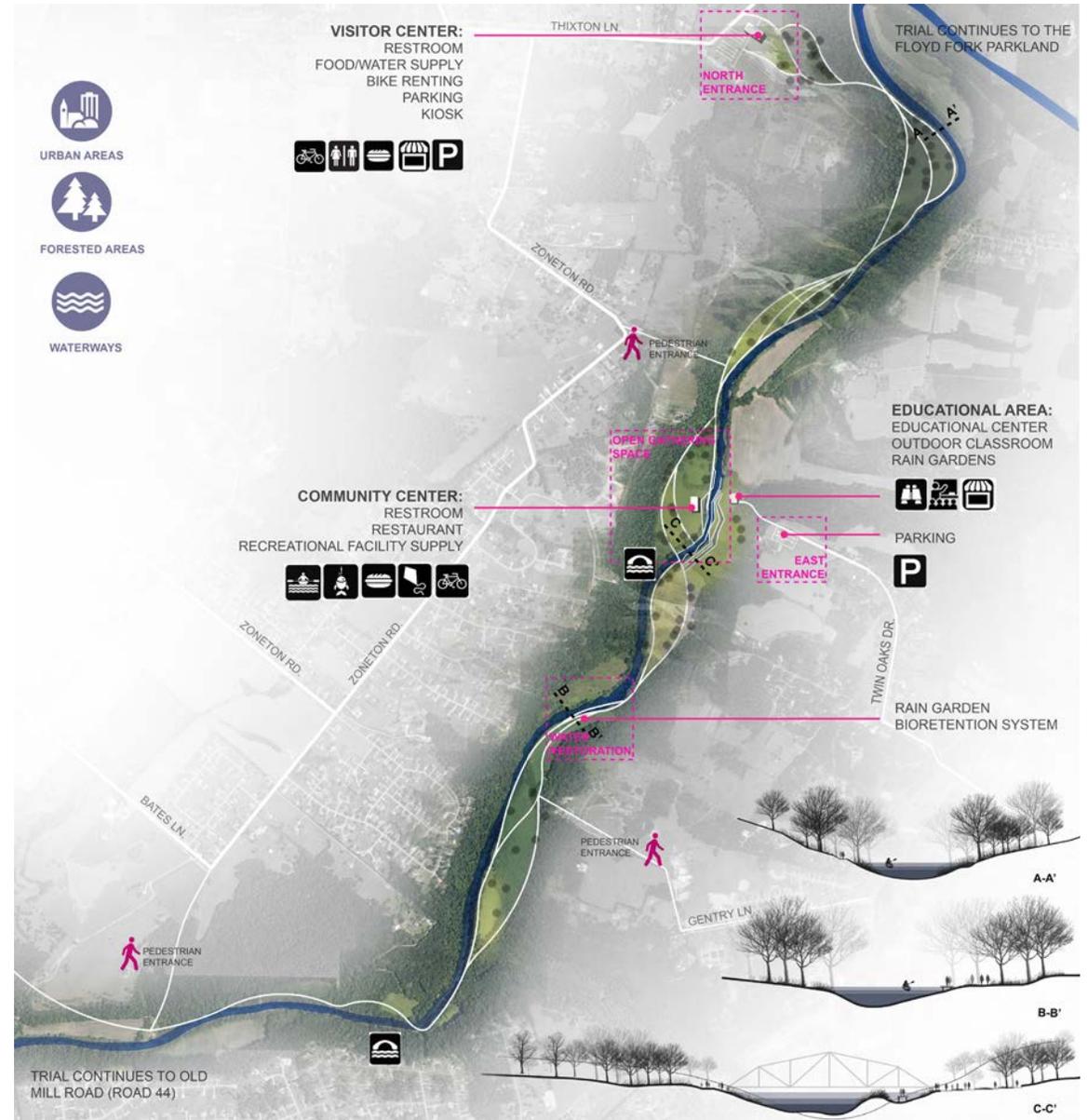


Figure 4.6.9: Plan view of the the proposed Floyds Fork River greenway and trail.

4 | KNOBS RUN TRAIL

FOLLOW ME TO . . . THE KNOBS RUN TRAIL

Bullitt County is unique in its geography in that it possesses a landscape unseen anywhere else in the region. It is also home to several rare plant species found only in this area. Specifically, in the northwest corner of the county, there are what appear to be rolling hills popping up out of the flat ground (Figure 4.6.10). These “monadnocks” are characteristic of this landscape and actually the remnants of an eroding limestone plateau that existed millennia ago. What remains is a distinct landscape with many issues and opportunities.

In addition, while many counties are experiencing population loss, the population in Bullitt County is growing at an exponential rate. However, with more residents than ever, Bullitt County has retained its small town feel. The increasing population is an issue because the existing infrastructure was not built to accommodate this type of population growth.

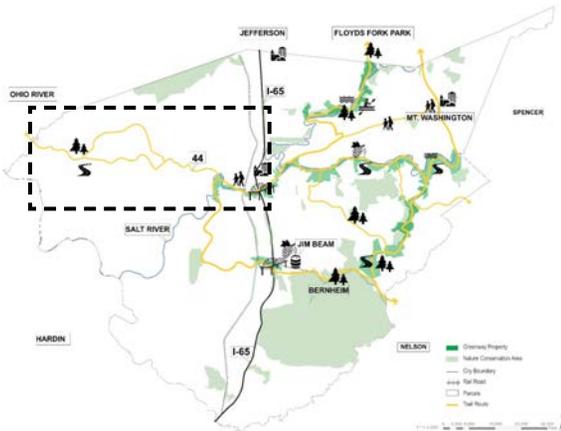


Figure 4.6.10: Context map for the Knobs Run Trail.

The Knobs Run Trail greenway masterplan has been developed to respond to the issues presented by this unique and environmentally sensitive landscape while addressing the needs and desires of the county's residents (Figure 4.6.14).

GOALS/OBJECTIVES

With rolling hills and characteristic topography, the Knobs region presents many constraints when it comes to development and construction. However, in the Knobs Run Trail greenway plan these issues have been re-envisioned into opportunities. This fragmented landscape has become a major role player in the greenway system design by becoming the means to connect visitors with these points of higher elevation to enjoy the nature and beauty the county has to offer. Facilitating access to the Knob area hills will not only lead to better infrastructure and connectivity in the county, but will improve the health of the trail's users as well as the local economy through tourism.

KNOB RUN MASTER PLAN

The main spine of the Knobs Run Trail follows along the congested Highway 44, Shepherdsville Road. One way to overcome the issue of traffic congestion is to provide transportation alternatives. Expanding the width of Highway 44 and adding shared bike lanes can provide a safe travel alternative to driving. Not only will this help improve the physical health of the trail's users, but it would also cut down on vehicle emission pollution. It is also proposed that the loop off of Highway 44 consisting of Knob Creek Rd. and Martin Hill Rd. become a shared bike lane. This provides for a complete trail route while the Knobs become a destination with look-

out points at various altitudes. Intersecting with the Knob Creek Rd./Martin Hill Rd. loop are alternative biking and hiking routes jutting out into areas of interest. These areas consist of tertiary trailheads, picnic areas, nature and wildlife viewing areas, and look-out vistas. These trailheads lead into the wilderness and provide for a more adventurous experience (Figure 4.6.11).

The Knobs Run Trail is located in close proximity to several communities to the east and a major arterial road, which allows for ease of access. Of greater vision, this trail connects to the Louisville loop to the west along the Ohio River, which will provide for even more regional access; thus, bringing in more tourists seeking more scenic trails and exercise opportunities.

INSPIRATION

For anyone who has spent time in this region, it is evident the Knob area terrain is special. The geographic features provide for extraordinary scenic opportunities to view streams, beautiful farmland, and wildlife (Figures 4.6.12 and 4.6.13). The existing Louisville Loop and the newly developed Parklands at Floyds Fork are evidence that these types of greenway systems are popular and successful. The bold character of this region indicates that Bullitt County can experience a success story . . . NOW is the time to take advantage!



Figure 4.6.11: Section views of hiking/biking trail (top) and shared-bike lane trail (bottom) in the Knobs Run Trail master plan.



Figure 4.6.14: The Knobs Run Trail greenway master plan.



Figure 4.6.12: Perspective view of a Knobs Run Trail experience.



Figure 4.6.13: Perspective of a shared-bike lane experience along Hwy 44 or Knob Creek Rd/ Martin Hill Rd

4 | WINERY AND BOURBON TRAIL

FOLLOW ME TO . . . THE WINERY AND BOURBON TRAIL

FOCUS AREA

This focus area takes a deeper look into the Follow Me to Bullitt County greenway plan details for the eastern portion of the county. This location boasts both natural (Salt River, Berheim Forest) and built (Jim Beam Distillery, Four Roses Distillery, Forest Edge Winery, Wright-Meyer Winery) elements that can be of significant use in a greenway design. An added benefit is that Bardstown, a nationally recognized hub of distilleries, is located a mere 15 miles away. It is the goal of this focus area to interweave these natural and built amenities into a multi-use greenway trail system (Figure 4.6.14).

CONCEPT

This area of the U.S. has a rich history in both bourbon distilling and wine production. With the eastern portion of Bullitt County being particularly close to a number of distilleries and wineries, it became obvious to design a greenway that highlighted these areas as destination points. Thus was derived the concept for this portion of the master plan: The Winery & Bourbon Trail. Developing a greenway that utilizes these landmarks will undoubtedly serve to increase both tourism and local economic activity.

DESIGN ELEMENTS

The design of the Winery & Bourbon Trail has two main foci: connections and economies. The fusion of these two principles can both facilitate unique user experiences along the trail and also provide Bullitt County with a tourism income generator.

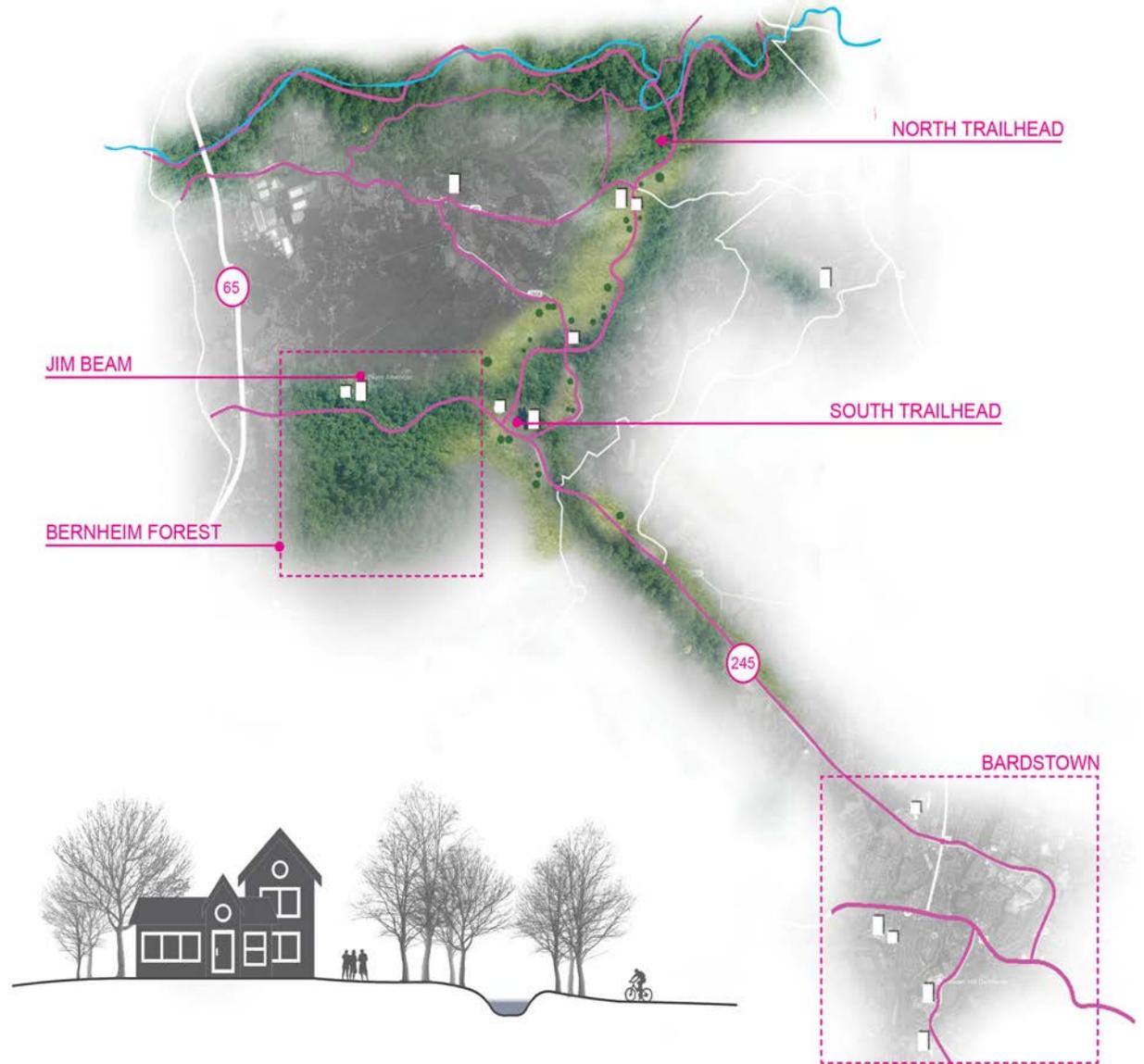


Figure 4.6.14: The Winery and Bourbon Trail master plan along with a section elevation of a potential distillery experience.



Figure 4.6.15: Perspective illustration showing multi-use trail as a user would approach a wine/bourbon destination.

CONNECTIONS

It was imperative when designing the Winery & Bourbon Trail that the route and destination points be carefully planned. Research indicates that the average bicycling speed ranges from 10-15 mph (City of Copenhagen, *City of Cyclists*, 2014). Thus, it became a goal of this design to have a landmark or stopping point located along the main

trail at least every 10-15 miles so that a rider could travel for an hour or less to reach a point of interest (Figure 4.6.15).

In developing the routes between destinations, existing roads are used to keep costs down with the addition of bike lanes, where applicable. Otherwise, this design calls for the acquisition of carefully selected parcels of land that can connect



Figure 4.6.16: Perspective of user experience along trail.

these points of interest or landmarks efficiently, but also in a manner that creates a more natural and aesthetic user experience (Figure 4.6.16).

ECONOMIES

Keeping in mind the goal of a landmark every 10-15 miles, it became apparent this could only be achieved through the addition of more distillery and/or winery related businesses along the trail. As shown in the master plan, there are five proposed sites for additional spirit-related endeavors - each serving as a catalyst to feed local economic growth.

Moreover, when taking into account the possible link to Bardstown (within the 15 mile biking radius), this trail system will eventually comprise a large network of connected distilleries and wineries. A high density of distilleries/wineries and satellite businesses will provide this area with that extra something seen in few places around the country.

4 | REFERENCES

TRI BULLITT TRAIL

Bruggers, J., (2014) Rare Local Plant Gets Federal Protection [photo]. retrieved from <http://www.courier-journal.com/story/tech/science/environment/2014/05/05/kentucky-glade-cress-listed-threatened-species/8737015/>

Davison, D. (n.d.) Kentucky Gladecress, Apple Valley Preserve. [Photo]. Retrieved from <http://naturepreserves.ky.gov/naturepreserves/Pages/applevalley.aspx>.

Kentucky Department of Fish and Wildlife Resources. (2014). State Threatened, Endangered, and Special Concern Species observations for selected counties. Retrieved October 3, 2014, from <http://app.fw.ky.gov/speciesinfo/countyListSpecies.asp>

Kentucky State Nature Preserves Commission. (2014). Report of Endangered, Threatened, and Special Concern Plants, Animals, and Natural Communities for Bullitt County, Kentucky. Retrieved from http://naturepreserves.ky.gov/pubs/publications/County_Reports/Bullitt.pdf

Lamp, J., Downtown Brookings [photo]. retrieved from <http://www.brookingschamber.org/pages/PhotoGallery#> Longview Bicycle Club.(2012) Hamby MTB Trail Work and Ride Day [photo]. retrieved from <http://www.longviewbicycleclub.com/category/trail-work/>

Scheflow Engineers. 2014. Pedestrian Bridge over South Branch. Retrieved October 18, 2014, from: <http://www.schefloweng.com/bridges.html>

Stevens Nature Center. 2013. Trails at Hemlock Bluffs. Retrieved November 23, 2014, from: http://www.townofcary.org/Departments/Parks_Recreation__Cultural_Resources/Parks_a_Greenways/Parks/Stevens_Nature_Center_At_Hemlock_Bluffs_Nature_Preserve/Trails_At_Hemlock_Bluffs.htm

Tepper, C., (2012) Lars Sternberg Hood River Enduro [photo]. retrieved from <http://www.vitalmtb.com/photos/member/2012-Hood-River-Enduro-Race-Report,4016/Joe-Mendonca,39028/corytepper-com,831>

U.S. Fish and Wildlife Service. (2014, October 30). Endangered species. Retrieved October 30, 2014, from <http://www.fws.gov/endangered/>

BOUNDARY LOOPS

Burgess, E., McKenzie, R., Park, R. (1925) The Growth of a City: An Introduction to a Research Project. The City. 161-169.

Bruegmann, R. (2005) The Causes of Sprawl. Sprawl: A Compact History. 213-221.

Calthorpe, P., Fulton, W. (2001) "Designing the Region", "Designing the Region is Designing the Neighborhood". The Regional City: Planning for the End of Sprawl.

Cho S., Chen Z., Yen S., Eastwood D. (2006) Estimating Effects of an Urban Growth Boundary on Land

Ding, C., Knaap, G. J., & Hopkins, L. D. (1999). Managing urban growth with urban growth boundaries: A theoretical analysis. Journal of Urban Economics, 46(1), 53-68.

Harvey, D. (1997) Contested Cities: Social Process and Spatial Form. Transformain Cities. 232-237.

Howard, E. (1902) The Town-Country Magnet. Garden Cities of To-morrow. 329-335.

Lynch, K. (1960) The City Image and its Elements. He Image of the City. 501-509.

Song, Y., & Knaap, G. J. (2004). Measuring urban form: Is Portland winning the war on sprawl?. Journal of the American Planning Association, 70(2), 210-225.

Kentucky Geography Network (2014) Retrieved September from [html://www.ky.geonet.org/](http://www.ky.geonet.org/)

U. S. Fish and Wildlife Service. (2013). Endangered, Threatened, Proposed, & Candidate Species in BULLITT County, Kentucky. Retrieved from http://www.fws.gov/frankfort/pdf/KY_te_list_by_county.pdf

Universal Sign Systems. (n.d.) Transit/ Trail Signage. Retrieved from Universal Sign Systems - Trail Signage | Tempered Glass and Polycarbonate Facing | Hiking and Biking Trail Signs

BULLITT'S BARREL RUN

Johnson, A. (2012, January 28). MASH APPEAL: KENTUCKY BOURBON TRAIL TOUR SETS NEW ATTENDANCE RECORD - Kentucky Bourbon Trail. Retrieved December 10, 2014, from <http://kybourbontrail.com/mash-appeal-kentucky-bourbon-trail-tour-sets-new-attendance-record/>

- Bourbon Facts - Kentucky Distillers Association. (2014, January 1). Retrieved December 10, 2014, from http://kybourbon.com/bourbon_culture/key_bourbon_facts/
- 2012 American Camper Report. (2012, January 1). Retrieved December 3, 2014, from <http://outdoorindustry.org/images/researchfiles/SpecialReportOnCamping2012.pdf?179>
- Mlambert. (n.d.). 40 million people go camping in the U.S. | Roadtripping. Retrieved December 3, 2014, from <http://miamiherald.typepad.com/roadtripping/2012/01/40-million-people-go-camping-in-the-us.html>
- President's Council on Fitness, Sports & Nutrition. (2010, February 23). Retrieved November 3, 2014, from <http://www.fitness.gov/resource-center/facts-and-statistics/>
- Location: Bullitt County. (2008, January 1). Retrieved November 18, 2014, from <http://www.kentuckyhealthfacts.org/data/location/show.aspx?cat=2,3&loc=15>
- Recreation in Bullitt County. (n.d.). Retrieved October 8, 2014, from <http://www.travelbullitt.org/recreation.shtml#parks>
- Davis, B., Dutzik, T., & Baxandall, P. (2012). Young People Choose to Replace Driving with Alternative Transportation. In *Transportation and the New Generation* (Vol. April). U.S. PIRG Education Fund.
- Kaczynski, A., Potwarka, L., & Saelens, B. (n.d.). Association Of Park Size, Distance, And Features With Physical Activity In Neighborhood Parks. *American Journal of Public Health*, 1451-1456. Retrieved December 3, 2014, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2446450/>
- Kentucky Distillers Association. (2014). The Results Are In: New Study Proves Kentucky Bourbon On Cusp of Golden Age. Retrieved November 17, 2014, from <http://kybourbontrail.com/results-new-study-proves-kentucky-bourbon-cusp-golden-age/>
- Lockman, Cathy. (2014). Kentucky's Wine Industry Grows As New Commercial Vineyards Open. Retrieved October 31, 2014, from <http://farmflavor.com/us-ag/kentucky/local-food-beverages-kentucky/grape-expectations-for-kentuckys-wine-industry/>
- KEEP CALM AND TRAIL ON**
- O'Dell, M.A.,(n.d) "Designing Shared-Use Trails to Include Equestrians." <http://atfiles.org/files/pdf/ODellEquesTrails.pdf>
- Kumar, R. (2009). "Architecture and Town Planning" http://townplanninglectures.blogspot.com/2009/02/planning-for-karachi_06.html
- Wridt, Pamela J. (2004). "An Historical Analysis of Young People's Use of Public Space, Parks and Playgrounds in New York City." *Children, Youth and Environments*. http://www.colorado.edu/journals/cye/14_1/articles/article3full.htm
- Childs, M. & March, J. (2003). "Innovation Resolves Park Design Challenges" [http://www.cprs.org/index.php?option=com_content&view=article&id=227:innovation-resolves-park-](http://www.cprs.org/index.php?option=com_content&view=article&id=227:innovation-resolves-park-design-challenges&catid=81:2003-magazine-articles&Itemid=56)
- design-challenges&catid=81:2003-magazine-articles&Itemid=56
- Kentucky Section American Institute of Professional Geologists (2010). "History and Geology of the Natural Bridge– Red River Gorge Area" <http://ky.aipg.org/GUIDEBOOKS/2010%20Guidebook.pdf>
- Coley, R., Kuo, F., Sullivan, W., 1997. Where does community grow? The social context created by nature in urban public housing. *Environ. behav.* 29, 468–494
- Chasan, P. 2007. Urban redevelopment in Washington State: legal issues, administrative models, and Seattle's central waterfront. Unpublished Master of Urban Planning Thesis. Department of Urban Design and Planning, University of Washington
- Maller, C., Townsend, M., St Leger, L., Henderson-Wilson, C., Pryor, A., Prosser, L., et al. (2008). Healthy parks, healthy people: The health benefits of contact with nature in a park context. Burwood, Melbourne: Deakin University and Parks Victoria.
- Rush Offroad. (2014). About the Park. Retrieved December 12, 2014, from <http://www.rushoffroad.com>
- FOLLOW ME TO BULLITT COUNTY**
- NSRE (2004) National Survey of Recreation and Environment. http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_001699.pdf

5 | CONCLUSION



CONCLUSION

Based on the collective analysis and case studies, the UKLA student design team proposed six alternative plans that facilitate developing a potential county-wide greenway system. These plans illustrate a collage of opportunities for the community and environment that can be categorized by common themes.

These themes were prevalent throughout the design process and contain elements that are both interconnected and exemplify characteristics associated with the essence of Bullitt County. The three main themes are:

-

Improved Connectivity

- Connecting Densely Populated Areas
Shepherdsville, Mt. Washington, Clermont, Nichols, and Lebanon Junction
- Identifying a System of Trails with Hierarchy

Emphasis on Tourism

- Wineries & Distilleries
- Exploring Opportunities in the Knobs region
Regional Attractions (Floyds Fork and Bernheim Forest)
- Amenities (lodging, shopping, and trailheads)

Creating Identity

- Healthier Lifestyle
- Revitalization of Urban Areas
- Appreciation for natural features

A greenway system can impart many benefits, including improvement in the social, physical, and economic well-being of the community. By efficiently connecting populated areas through a trail system, communities can be more accessible to each other as well as the greater region. Routes and trails optimized for alternative travel methods (walking, biking, etc.) offer more transportation options within the county.

Tourism can be enhanced by providing a diverse range of activities and utilizing current amenities. Existing commercial businesses and industries can serve as the main economic engine to encourage tourism and provide the support for the creation of additional amenities that will accommodate an influx of visitors.

By implementing a greenway system, the county's character and sense of identity will naturally evolve and strengthen as the county's cultural connections and natural amenities are enhanced. In order for such a greenway plan to develop and succeed requires that Bullitt County's residents, communities, and officials work together to envision a range of ideas and then implement their visions through phasing and planning guidelines.

STRATEGIES

The Bullitt County greenway needs to be planned appropriately to foster development. Future zoning revisions should reflect land use for the greenway and coincide with respectful land acquisition measures. Phasing should be conducted to create an organized system for development and to prioritize important steps of the process. Legal processes (documentation) and funding strategies are other important factors that are necessary to help permit and finance the greenway project.

FURTHER RECOMMENDATIONS

In light of the available resources and community support, Bullitt County is in position to advance a successful greenway development. Given the county's physical character and natural resources it is important to conduct additional environmental analyses to help determine the physical benefits and impacts of a greenway.

To further the public support of a greenway, a series of workshops about the associated benefits should be scheduled to educate and excite community residents. Finally, a financial plan can help foster the advancement of the greenway by providing a detailed strategy to fund the implementation of a greenway in Bullitt County.

PRIMARY AUTHORS

EXECUTIVE SUMMARY

NOLAN STONE

CHAPTER 1 - INTRODUCTION

BRANDON COGGESHALL
DEVERI WALKER

CHAPTER 2 - INVENTORY & ANALYSIS

CLIMATE
GEOLOGY & SOILS
FLORA & FAUNA
HYDROLOGY
HISTORY
DEMOGRAPHICS
ECONOMICS
INFRASTRUCTURE
RECREATION
TOURISM
TRANSPORTATION
AGRICULTURE
CONSERVATION
COMMUNITY FACILITIES
PLANNING
HISTORIC PRESERVATION
HOUSING
NOISE

JOHNATHON WEHMER
BRANDON COGGESHALL
DEVERI WALKER
NATHANIEL WRIGHT
ELIZABETH CLARK
HANNAH MCCLURE
TRAVIS KLONDIKE
ERIC LEE
MEG MALONEY
NOLAN STONE
CLAYTON PITCOCK
KEENAN PALMER
JEFF EMBREE
WES GRIFFITH
BOY'D SEWE
QIANHUI MIAO
ACHAN SOOKING
AUSTIN SAUER

CHAPTER 3 - CASE STUDIES

THE PARKLANDS OF FLOYDS FORK
LOUISVILLE LOOP
OLMSTED PARKWAY SYSTEM
ELIZABETHTOWN GREENBELT TRAIL SYSTEM
ADKISSON GREENBELT PARK
WOODSTOCK GREENPRINTS MASTER PLAN
GREEN RIVERS GREENWAY
BOULDER GREENWAY PROGRAM
GREENWAYS FOR NASHVILLE
WAKE FOREST OPENSOURCE & GREENWAY
DAKOTA COUNTY GREENWAY COLLAB.
CENTRAL OHIO GREENWAY
BIG CREEK GREENWAY

MEG MALONEY
AUSTIN SAUER
ELIZABETH CLARK
TRAVIS KLONDIKE
ERIC LEE
NATHANIEL WRIGHT
KEENAN PALMER
BOY'D SEWE
BRANDON COGGESHALL
DEVERI WALKER
WES GRIFFITH
JOHNATHON WEHMER
JEFF EMBREE

RAILWAY RESERVES HERITAGE TRAIL
EMERALD NECKLACE
DENVER URBAN TRAILS
CAROLINA THREAD TRAIL
FAIRFAX CROSS COUNTY TRAIL

CLAYTON PITCOCK
ACHAN SOOKING
HANNAH MCCLURE
NOLAN STONE
QIANHUI MIAO

CHAPTER 4 - MASTER PLANS

THE COMMON ELEMENT

ACHAN SOOKING
HANNAH MCCLURE
NATHANIEL WRIGHT

TRI BULLITT TRAIL

DEVERI WALKER
JEFF EMBREE
KEENAN PALMER

THE BOUNDARY LOOP

BRANDON COGGESHALL
ERIC LEE
MEG MALONEY

BULLITT'S BARREL RUN

AUSTIN SAUER
JOHNATHON WEHMER
NOLAN STONE

KEEP CALM AND TRAIL ON

BOY'D SEWE
ELIZABETH CLARK
WES GRIFFITH

FOLLOW ME TO BULLITT COUNTY

CLAYTON PITCOCK
TRAVIS KLONDIKE
QIANHUI MIAO

PROJECT CONCLUSION

NOLAN STONE

COVERS

ELIZABETH CLARK



UK
UNIVERSITY OF
KENTUCKY
College of Agriculture,
Food and Environment
Department of Landscape Architecture

Bullitt
LANDSCAPE ARCHITECTURE STUDIOS IV & V