Louisville Greenways - South Points

A Greenways Master Plan for South and Southwest Louisville, Kentucky

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Mayor's Healthy Hometown Movement

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Special thanks to the following people and organizations:

Mayor Greg Fischer
Mary Lou Northern, Office of the Mayor
Mike Heitz, Director Metro Parks
Councilman Rick Blackwell
Councilman David Yates
Councilwoman Vicki Welch
Councilman Bob Henderson
Riverside, the Farnsley-Moremen Landing
Jefferson Memorial Forest
Lassiter Middle School
Olmsted Academy South
Olmsted Academy North
St. Mary & Elizabeth Hospital
Southwest Dream Team
Aida Copic, TARC
Nicholas Seivers, TARC
David Johnson, MSD
Phil Bills, Metro Planning & Design Services
Charles Roth, Kentucky Division of Water
Tom Hall, Kentucky Transportation Cabinet, District 5
Patti Clare, Office of Economic Growth & Innovation
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Rolf Eisinger, Metro Public Works
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This project made possible through funding provided by:

"Communities Putting Prevention To Work" grant awarded by the U.S. Department of Health and Human Services and administered by The Louisville Metro Department of Public Health and Wellness.

List of Foldouts

PROJECT BACKGROUND 07

Project Area 13

PROJECT INVENTORY AND ANALYSIS 18

District Key Map 21
Destinations/Points of Interest 23
Bike and Pedestrian Inventory 25
Contour/Road Right-of-Way 27
Walking Radius Map 29
Overhead Electrical Easements 31
Cursory Data Review: GAP Land Cover 53
Cursory Data Review: GAP Surface Water Resources 55
Cursory Data Review: Wetlands 57
Cursory Data Review: Hydric Soils 59
Cursory Data Review: Large Forest and Interior Forest Areas 61
Cursory Data Review: Large Grassland Patches 63
Conservation Analysis: Steep Slopes 65
Conservation Analysis: Potential Rare, Threatened, and Endangered Species Occurrences 67
Biological Conditions/Resources 69
Cursory Data Review: Ecological Regions 87
CID Land Map 91

GREENWAY MASTER PLAN 94

Proposed Alternative Route Map 95
MASTER PLAN GREENWAY ROUTE MAP 103
Greenway Trail Center Concept Plan 105
Greenway Trailhead at Existing Parking Center 107
Equestrian Campground/Trailhead 109
Adaptive Reuse Concept Plan 111
Greenway Trailhead Concept Plan 113

Note: A digital enlarged copy of the above foldout illustrations can be found on the attached CD ROM.

Table of Contents

PROJECT BACKGROUND 07
- Project History 8
- Definition of Planning Area 11

PLAN PURPOSE AND OBJECTIVES 15
- Goals 1 - 5 16

PROJECT INVENTORY AND ANALYSIS 18
- Existing Studies Review 33
- Community Survey and Results 42
- Stakeholder Meetings 44
- Biological Conditions/Resources 47
- Historical/Archeological Conditions/Resources 78
- CID Land Map 89

GREENWAYS MASTER PLAN 94
- Proposed Alternative 94
- Master Plan Route Map 103
- Small Area Concept Development Maps 105
- Public Outreach/Trail Marketing 115

GREENWAY DESIGN GUIDELINES 122
- Applicable Typical Sections from Louisville Loop Guidelines 123
- Greenway Typical Sections 124
- Identity Standards 128

PRELIMINARY COST OPINION 131
- Cost Opinion per Trail Typical Sections 133
- Cost Opinion per Trail Segment (Trail Only) 134
- Cost Opinion per Trail Segment with Amenities 135
- Priority Recommendations 143

OPERATIONS AND MANAGEMENT PLAN 145

APPENDIX (CD-ROM) 167
- Appendix A: Community Survey 168
- Appendix A-1: Survey Question Write-In Results 173
- Appendix A-2: Community Survey Analysis 184
- Appendix B: Ecological Cursory Data Assessment Memo 204
- Appendix C: Ecological Field Write-Up 218
- Appendix D: Ecological Field Data 228
- Appendix E: Historical/Cultural Cursory Review and Tables 358
- Appendix F: Historical/Cultural Narrative 397
- Appendix G: Marketing Component 448

PROJECT BACKGROUND

Section 1

Project History

Project History

The South and Southwest Greenways Master Plan was undertaken by Louisville Metro Parks as a first step toward creating a system of shared-use paths and soft-surface trails that would encourage people to improve their fitness and health by exploring the region's natural and historic resources and using travel ways for non-motorized transportation. The master plan was funded through a federal grant by the Centers for Disease Control.

Sunset over Ohio River at Riverside, Farnsley-Moremen Landing

The South and Southwest Greenways Master Plan was developed over a 14-month period that began in December, 2010. The planning process began with a comprehensive inventory and analysis of the area to assess the opportunities and constraints associated with the development of a greenway network. This "discovery phase" began with a review of relevant studies and master plans within South and Southwest Louisville. A summary of this review is contained in Section 3 of this report.

Two in-depth inventory and analysis studies were completed as part of the project discovery phase that focused on historic, archeological, and cultural resources and biological and natural resources. Data were gathered on known historical and archaeological sites through requests to the State Historic Preservation Office (SHPO). These studies provided critical information in the development of the greenway network by identifying opportunities for exploration, education and interpretation of the area's resources while protecting sensitive resources.

Other physical data relating to the study area were gathered and analyzed, including area topography and existing land use. The study area was divided into three sub-districts—Jefferson Memorial Forest, Dixie/Greenbelt Highway, and Iroquois—in order to collect information at a more manageable scale.

Public input was considered vital to the master plan development and was sought throughout the planning process. A series of public meetings was held early in the process to explain the purpose of the study, gather opinion on possible greenway destinations, and collect information relating to area resources. The three

Community Meeting - Fairdale

sub-districts were used in the public input phase.

These neighborhood stakeholder meetings took place on:

- March 21, 2011, at the Farnsley-Moremen Visitors Center
- March 23, 2011, at the Louisville Public Library Beechmont Branch
- March 28, 2011 at the Fairdale Playtorium

Youth Focus Group

The greenway system is intended to serve a variety of interests and user groups. A Greenway Focus Group meeting was held on May 9, 2011 at the Southwest Government Center. Over 20 groups representing area businesses, neighborhood associations, seniors, equestrians, cyclists (on and off road), schools, and institutions were invited in an effort to capture as many user needs and viewpoints as possible.

Youth are important trail users that are often difficult to reach through traditional public participation venues. To ensure that this user group was heard, the project team reached out to middle schools within the study area. Work sessions were held with classes at Lassiter Middle School on May 12, 2011, and Frederick Law Olmsted Academy South on October 12, 2011. Students were questioned about locations near their homes and schools that they frequently visited and how they traveled there. Using maps, students then sketched possible trail connections between destinations and talked about barriers to using a trail system (security concerns, distance, terrain, rail or major roadway crossings, etc.). A summary of these interviews is found in the appendix of this plan.

A community survey was distributed as a part of the initial public outreach efforts. The purpose of the survey was to support the planning process by measuring residents' opinions and perceptions. Probability sampling was used by drawing a random sample of 6,400 Jefferson County residents. A second sample of 1,600 was drawn from the zip codes of 40272, 40118, 40258, 40214, and 40216 in order to over-sample the south and southwest portion of the county (i.e., the study area for the planning project), allowing for these zip codes to be sampled at twice the level of the other quadrants. In total, the survey consisted of 8,000 individuals. After the sample list was filtered through the National Change of Address (NCOA) database, 23 individuals needed to be removed; this made the final number of invitees 7,977. In total, 958 valid responses were received. The effective response rate of the survey was 12.9% which is a high rate of response for this type of community survey. The results of the community survey can be found in Section 3 of this report.

Metro Parks staff and their consultant team of planners, landscape architects, transportation engineers, biologists, and historians participated in an intensive 2-day charrette on June 23 and 24, 2011, at the Farnsley-Moremen Visitors Center. Potential greenway trail locations were identified using the inventory and analysis data, input from stakeholders, and user groups, and resource mapping. These alternative trail locations were then reviewed and refined based on field reconnaissance. A second neighborhood stakeholder meeting was held on August 30, 2011, at the Fairdale Playtorium to present the preliminary trail

Project History

alternatives to the public.

A Community Workshop was held on September 24, 2011, at Sts. Mary and Elizabeth Hospital in the Hazelwood neighborhood. The purpose of the half-day workshop was to:

- discuss the value of an area greenway/trail network
- provide an overview of the planning process to-date
- present the draft trail alternative locations

Educational sessions were also offered to address common questions and concerns associated with greenways. These included user interaction on multi-use trails, protecting private property rights, trail safety and security, and trail design and ecological restoration.

A Technical Advisory Group consisting of state and local review agencies helped ensure that the recommendations put forward in this plan are implementable. The Technical Advisory Group consisted of representatives from Metro Planning and Design Services, Metro Public Works, Metropolitan Sewer District, Transit Authority of River City (TARC), Kentucky Transportation Cabinet, Kentucky Nature Preserves Commission, Kentucky Division of Water, US Army Corps of Engineers, and the Natural Resources Conservation District.

A draft master plan was then developed based on input provided from each of the public venues and the Technical Advisory Group. The draft plan included recommended trail locations for both hard and soft surface trails; general design standards for each trail type; a long-term management plan for the greenway system; preliminary costs; prioritization for implementation of the plan; and a marketing strategy for promoting the plan. The draft master plan was presented at a final public meeting on March 5, 2012. The final master plan was then produced taking into consideration comments received at the final public meeting.

The master plan process concluded with a follow-up user survey. This survey was used to measure changes in residents' perceptions regarding greenways as well as to gauge understanding of and reactions to some of the recommendations contained in the master plan.

Planning Area

The South and Southwest Greenways Master Plan study area is defined by the geographic boundaries of Interstate-264 (Henry Watterson Expressway) to the north; Interstate-65 to the east; the Ohio River to the west; and the Jefferson County/Bullitt County line to the south. The land area encompassed by these boundaries, over 98 square miles, is rich in natural and cultural resources. This area is also known for its many and varied neighborhoods, steeped in history and tradition.

Two stream corridors traverse the study area—Mill Creek and Pond Creek. The Mill Creek watershed contains approximately 1,000 acres of publicly-owned land that meanders through the center of this region from the Mill Creek Cutoff to Lower River Road, containing a diverse environment of woodlands, occasional farmland, and parklands. Over three-hundred additional acres of publicly-owned land are in the Pond Creek watershed near its confluence with the Salt River. These stream corridors, their tributaries, watersheds, and the public lands contained within them represent a rich cross section of natural resources that offer opportunities for interpretation, restoration, and preservation.

A significant portion of the study area is managed by Louisville Metro Parks, including more than 6,000 acres that make up the Jefferson Memorial Forest. This park, considered one of the largest urban forests in the country, encompasses much of the study area's southern boundary. The Forest is largely eastern deciduous woodland habitat and offers the region a variety of outdoor activities and educational programs. Iroquois Park, a 725-acre park located in the northeastern corner of the planning area, is one of three large urban parks that anchor Louisville's historic Olmsted designed park system. The study area is also home to a variety of neighborhood and regional parks including Waverly, Sun Valley, Riverview and Sylvania.

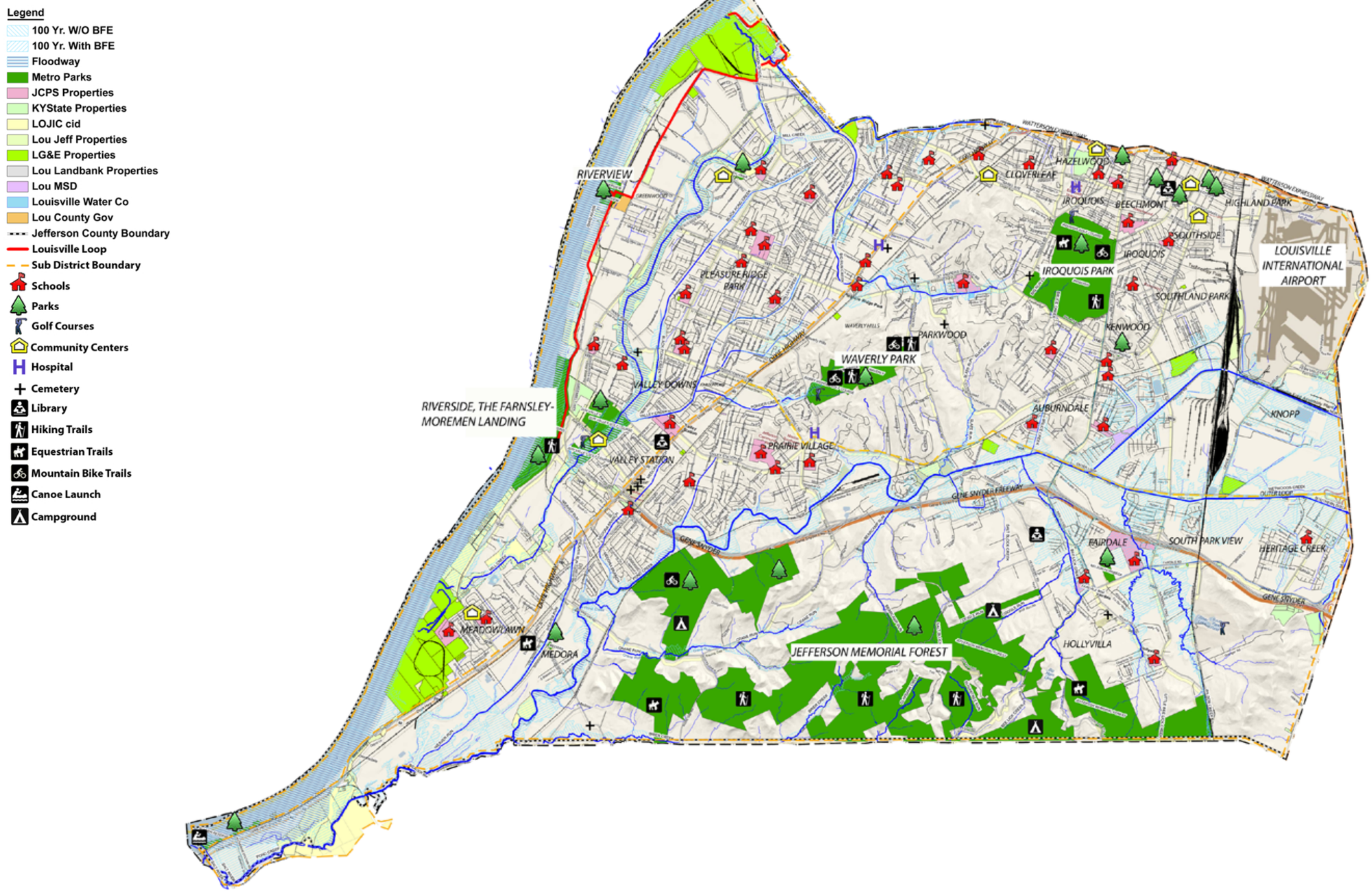
Along the western edge of the study area is the Ohio River Levee Trail, an asphalt shared-use path atop the flood levee that parallels and overlooks the Ohio River. The Levee Trail is part of the Louisville Loop, an approximately 100-mile path planned to traverse the perimeter of Louisville through five physiographic regions, connecting neighborhoods, cultural and historic landmarks, and ecological habitats. The Louisville Loop will serve as the "spine" to the network of trails developed as part of the South and Southwest Greenways system.

Fairdale, Hollyvilla, Medora, Valley Station, Pleasure Ridge Park, Riverport, Hazelwood, Beechmont, and Kenwood Hill are some of the study area's diverse neighborhoods and communities. Each of these communities has a unique history, character, and set of traditions that contributes to the area's rich diversity.

Fairdale

Mill Creek

Project Area



PLAN PURPOSE AND OBJECTIVES

Section 2

Plan Purpose and Objectives

Goals and objectives were developed to guide the planning process. Goals were divided into the following categories: recreation and alternative transportation; safety; fitness, health and quality of life; environmental stewardship; and improving economic health.

Goal 1: Recreational and Alternative Transportation Opportunities

Develop a comprehensive greenway system that increases and improves connectivity while providing non-motorized recreational opportunities.

Objectives:

1. Create a regional network of recreation and transportation routes.
2. Provide greenway access to a variety of users, including walkers, joggers, bicyclists, horseback riders, skaters, wheelchair users, and other non-motorized recreationists and commuters.
3. Establish accessible links between neighborhoods, businesses, schools, shopping areas, bus routes, and parks and recreation facilities.
4. Establish on- and off-road corridors to improve alternative transportation opportunities.
5. Coordinate with state and local transportation agencies to incorporate greenways along with other existing and planned bicycle and pedestrian facilities and public transportation.
6. Promote bicycle- and pedestrian-friendly land use patterns in Louisville.
7. Establish greenways as connections between Louisville attractions and regional attractions in adjacent counties.

Goal 2: Increase Safety

Create a greenway system that is safe and secure for all users to enjoy.

Objectives:

1. Establish greenways as safe routes between schools, colleges, parks, recreation facilities, and neighborhoods.
2. Provide greenways that are accessible for most people in Louisville.
3. Educate the public about greenway safety, and use.
4. Encourage respect for private property rights.

Goal 3: Improve Fitness, Health, and Quality of Life

Encourage use of the greenway system by area residents for better health and social benefits.

Objectives:

1. Provide opportunities on greenways for fitness and wellness activities.
2. Provide greenways as places for community events.
3. Use greenways as an educational tool to interpret historic, cultural, and environmental resources.

Goal 4: Encourage Environmental Stewardship

Develop greenways as a network of linear open spaces to protect, restore, and maintain environmental, historic, and culturally sensitive lands

Objectives:

1. Restore degraded streams, provide stream bank/drainage stabilization, and preserve natural flood plains to improve water quality.
2. Promote the use of native vegetation in greenway development.
3. Provide interpretive signs along some greenways to highlight the natural, historic, and cultural features of the area.
4. Protect and enhance Louisville's scenic beauty and encourage responsible environmental behavior.
5. Preserve and encourage biodiversity through the protection of important and distinctive habitat throughout Louisville.

Goal 5: Improve Economic Health

Increase the value of nearby residential, commercial, and industrial properties through greenway development

Objectives:

1. Develop greenways as magnets for businesses.
2. Establish greenways as tourist destinations.
3. Foster opportunities for economic growth through the creation of trail-related businesses

(such as bike rental shops, restaurants, and lodging).

4. Promote the efficient use of existing resources by developing greenways within publicly-held lands and utility rights-of-way.

Tow Boat on Ohio River near Farnsley-Moremen

PROJECT INVENTORY AND ANALYSIS

Section 3

Existing Conditions

Land uses in the South and Southwest study area range from the commercial corridor of Dixie Highway, to the rugged woodlands of Jefferson Memorial Forest, to the industrial center of Riverport and the many residential neighborhoods in the area. A detailed inventory was conducted of the area to provide a clear picture of the users, the topographic conditions, the land uses, and the challenges and opportunities within the area.

The project area was divided into three sub-districts to better understand the land use characteristics of the area. The project team held three meetings in each of the sub-district areas to encourage larger attendance.

Detailed information regarding the different aspects of inventory and analysis is contained within the following pages in this section. Mapping and analysis includes:

- Existing Studies Review
- Community Survey and Results
- Stakeholder/Focus Group Meetings
- Technical Advisory Committee
- Land Use Conditions/Resources
- Biological Conditions/Resources
- Historical/Archeological Conditions/Resources

Dixie Highway Commercial

Residential Neighborhood

Land Use Conditions/Resources Mapping

Mapping was developed to evaluate the physical inventory of existing conditions in the project area. This mapping was utilized during the analysis phase of the project.

Destinations/Points of Interest - details the locations of key destinations and points of interest for the project area. Facilities listed include parks, schools, golf courses, community centers, hospitals, cemeteries, libraries, hiking trails, equestrian trails, mountain bike trails, canoe launches and campgrounds. Evaluation of proposed trail locations included connections between neighborhoods and these key destinations and points of interest. Connections between the destination points and the Louisville Loop were also considered a high priority to provide opportunities to bring Louisville Loop visitors further into the project area.

Bike and Pedestrian Inventory - maps existing and proposed bike and pedestrian trails for the project area. Proposed routes were extracted from the review of existing studies to provide a comprehensive map of proposed and existing routes within the area. A key

Jefferson Memorial Forest

is provided to indicate from which master plan or previous study the route shown was taken. Evaluation of each of these routes included a detailed review of feasibility and level of service provided for current conditions.

Contour/Road Right-of-Way - illustrates the topographic conditions and challenges in this portion of the county. The hills, shown by the darker areas of contours, have created barriers for pedestrian, bike and equestrian connections between Iroquois Park, Waverly Park and Jefferson Memorial Forest. Greenway trail alignments from both existing studies and also the current study were evaluated for feasibility in terms of the amount of terrain that would need to be traversed by each of the user groups. Although limiting to some user groups, the terrain create trails more desired by other user groups such as mountain bikers. The contours also indicate areas of scenic beauty and opportunities for overlooks.

Walking Radius Map - demonstrates a five-minute walking distance from the center of each circle shown on the map. Key destinations and points of interest were located in the center of the walking distance radius to evaluate the area of a comfortable walk. This map illustrates the scale of the project area and the need for a network of trails which connects the many destination points.

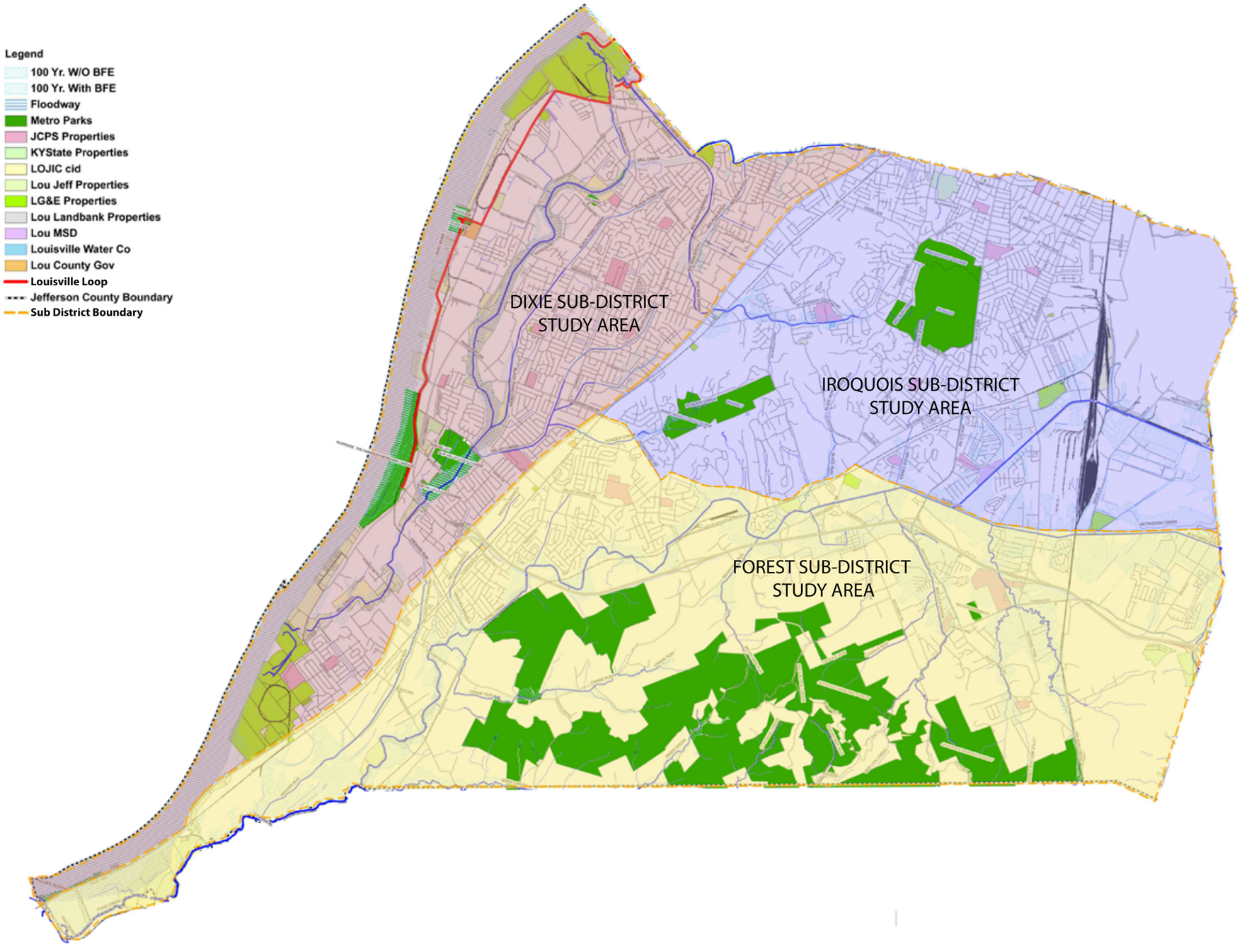
Overhead Electric Easements - illustrates the overhead electric easement locations and how they traverse the project area. Although these easements do not generally allow public access now, they do present an opportunity for a compatible use such as a trail system. The easements currently have established routes cutting across many private properties to accommodate their utility lines. These routes were evaluated to see where they provide connections between key destination points such as Iroquois Park, Waverly Park and Jefferson Memorial Forest.

Levee Trail

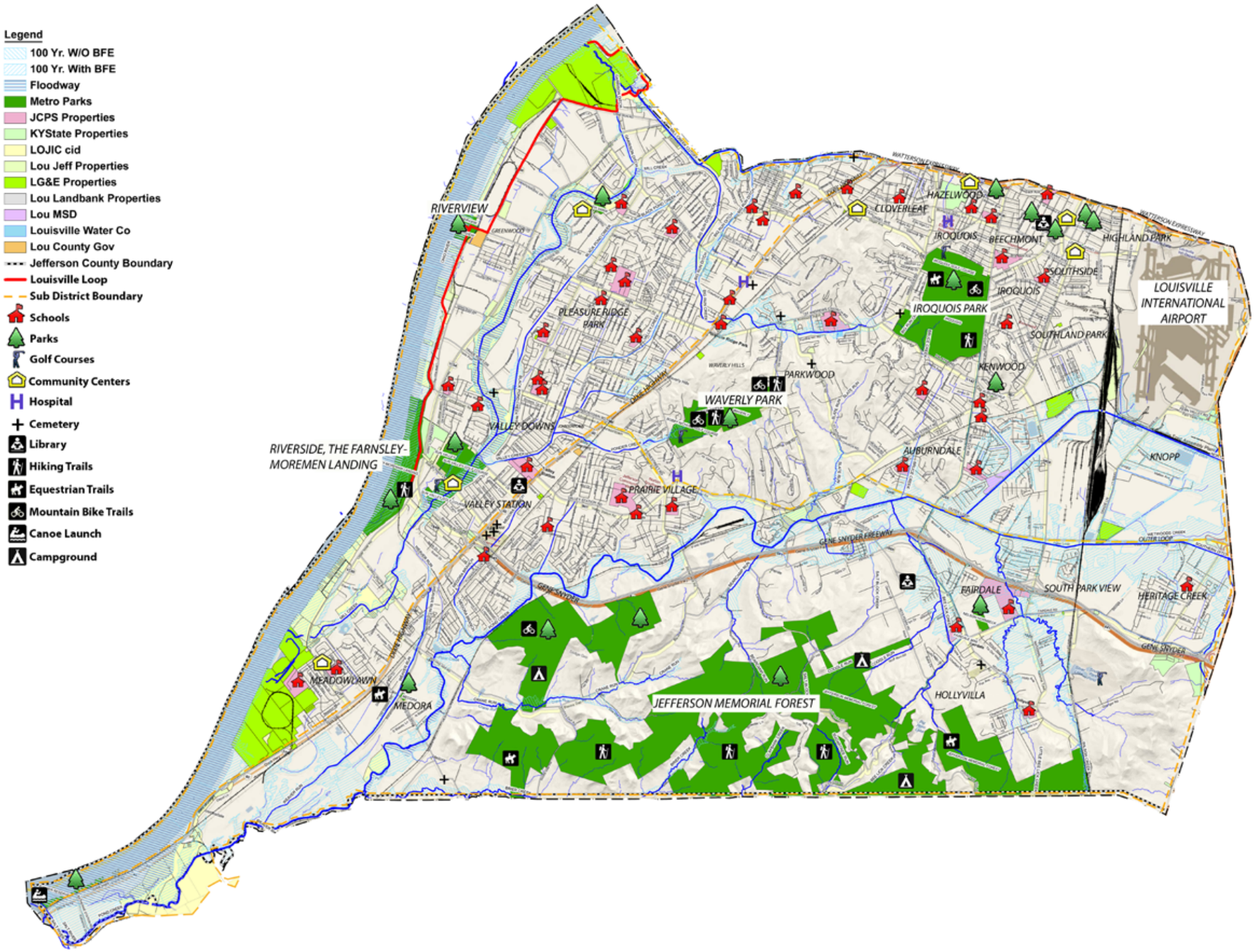
Hills of Jefferson Memorial Forest

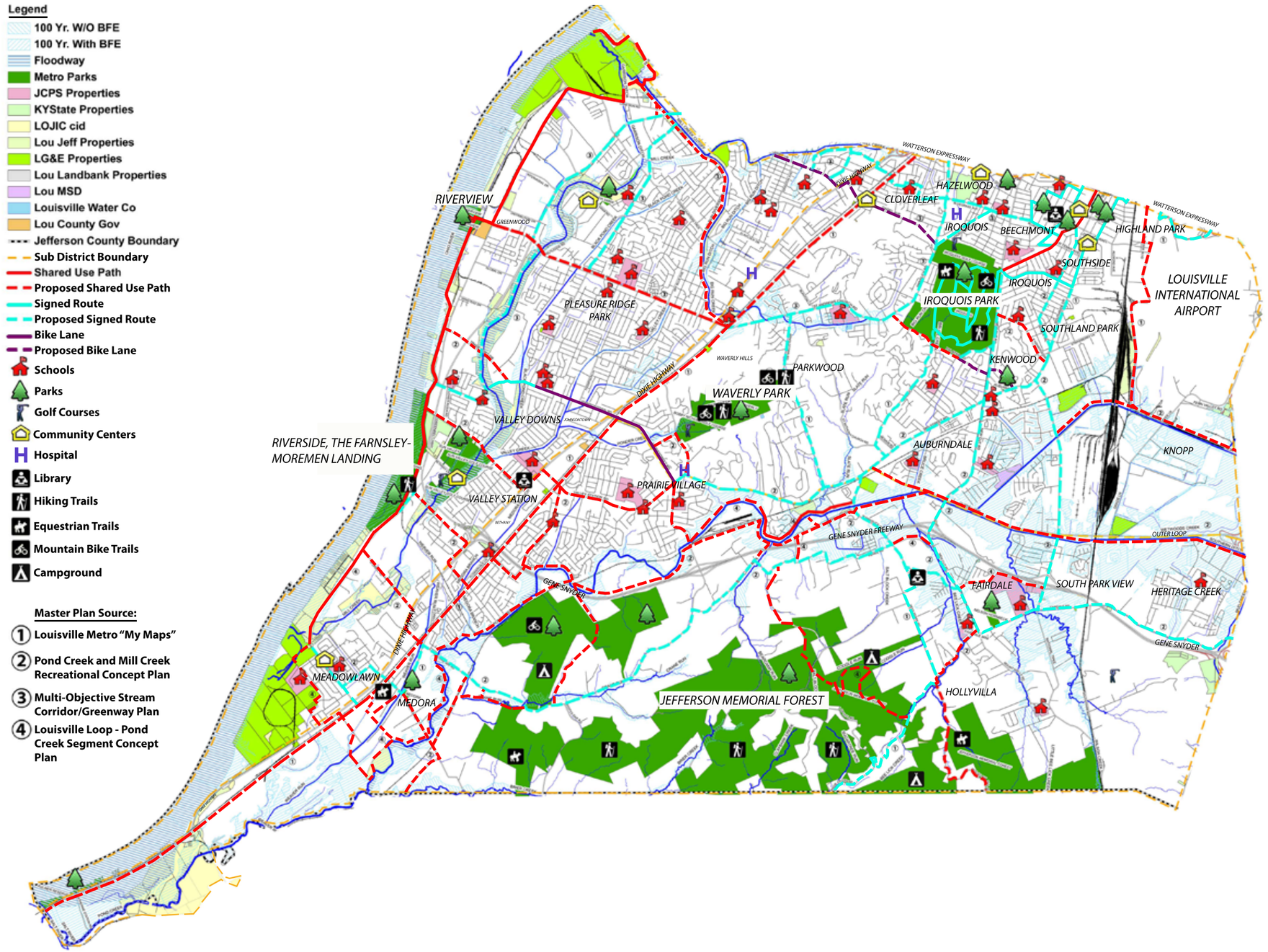
Overhead Electric Easement

District Key Map



Destinations/Points of Interest



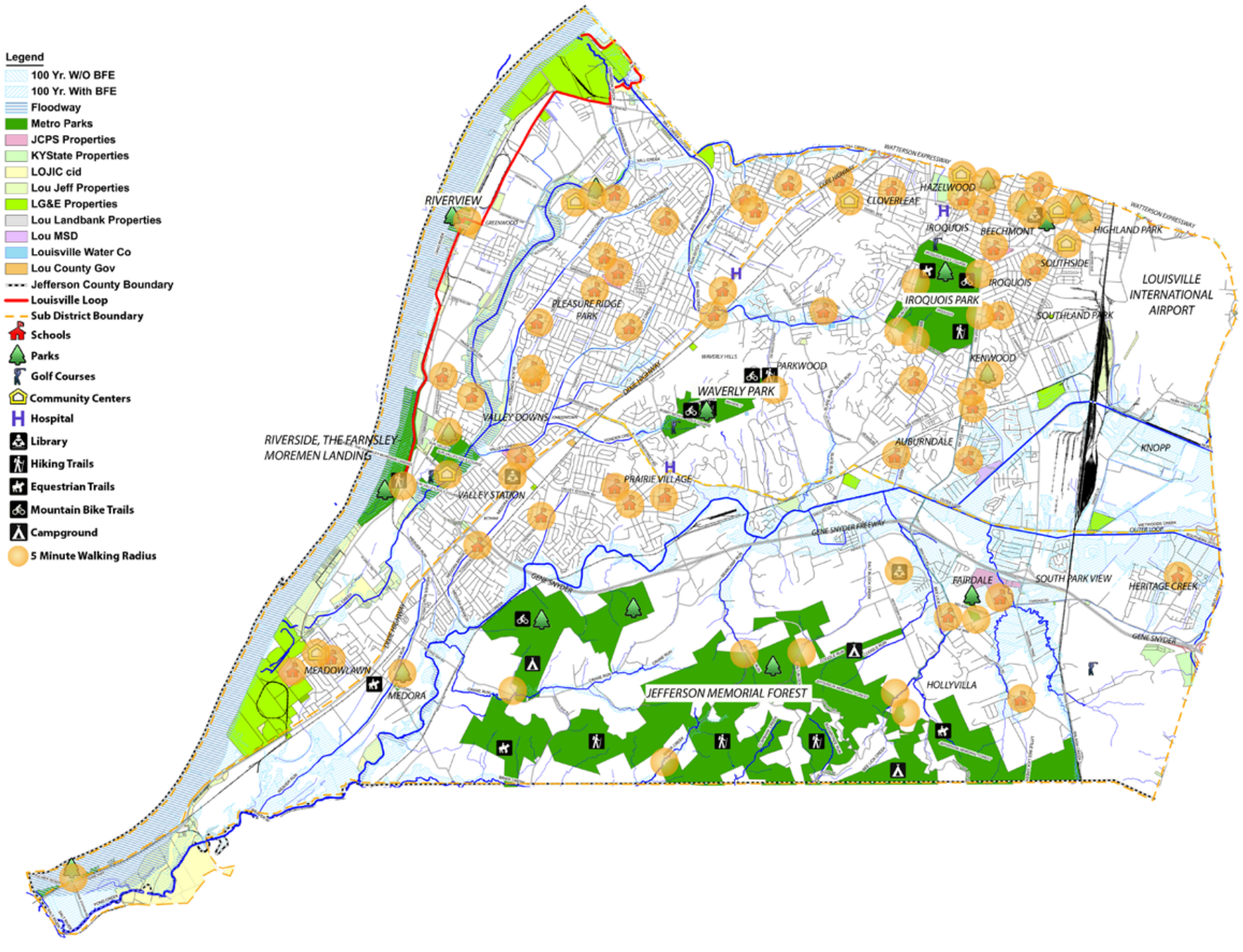

Legend
100 Yr. W/O BFE
100 Yr. With BFE
Floodway
Metro Parks
JCPS Properties
KYState Properties
LOJIC cid
Lou Jeff Properties
LG&E Properties
Lou Landbank Properties
Lou MSD
Louisville Water Co
Lou County Gov
Jefferson County Boundary
Sub District Boundary
Shared Use Path
Proposed Shared Use Path
Signed Route
Proposed Signed Route
Bike Lane
Proposed Bike Lane
Schools
Parks
Golf Courses
Community Centers
Hospital
Library
Hiking Trails
Equestrian Trails
Mountain Bike Trails
Campground
Master Plan Source:
1 Louisville Metro "My Maps"
2 Pond Creek and Mill Creek Recreational Concept Plan
3 Multi-Objective Stream Corridor/Greenway Plan
4 Louisville Loop - Pond Creek Segment Concept Plan
RIVERSIDE, THE FARNSLEY-MOREMEN LANDING
RIVERVIEW
PLEASURE RIDGE PARK
VALLEY DOWNS
VALLEY STATION
PRAIRIE VILLAGE
WAVERLY PARK
PARKWOOD
CLOVERLEAF
HAZELWOOD
IROQUOIS
BEECHMONT
HIGHLAND PARK
SOUTHSIDE
IROQUOIS PARK
SOUTHLAND PARK
KENWOOD
LOUISVILLE INTERNATIONAL AIRPORT
AUBURNDALE
KNOPP
GENE SNYDER FREEWAY
FAIRDALE
SOUTH PARK VIEW
HERITAGE CREEK
HOLLYVILLA
JEFFERSON MEMORIAL FOREST
MEADOWLAWN
MEDORA
WATTERSON EXPRESSWAY
DIXIE HIGHWAY
GENE SNYDER

Contour/Road Right-of-Way

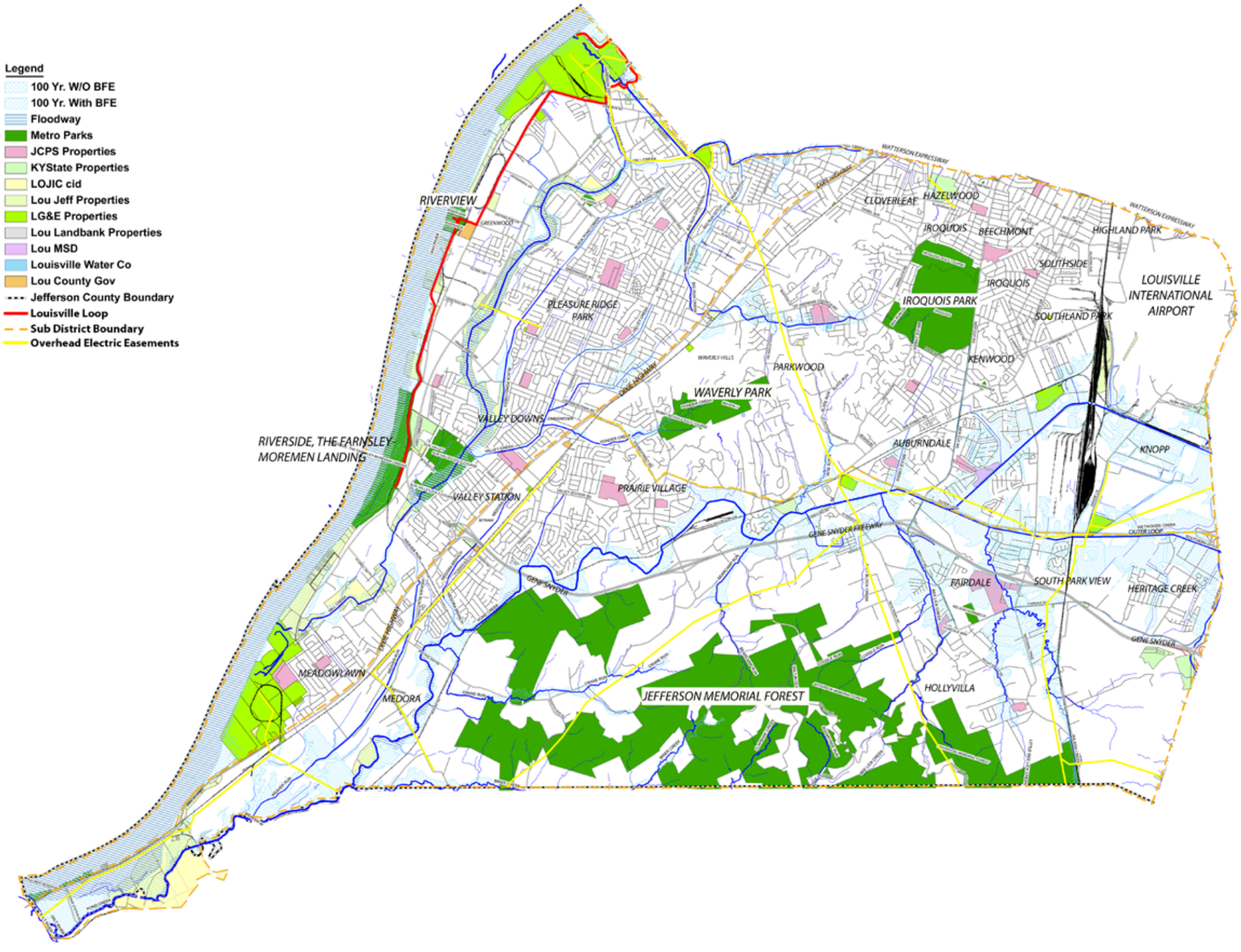
Legend

- Project Boundary Line
- Sub District Boundary
- Streams & Ditches
- Contour Lines

Walking Radius Map



Overhead Electric Easements



The purpose of the existing studies review was to gather information and recommendations from previous work to be incorporated, where feasible, into the South and Southwest Greenways Master Plan. There are a number of existing studies that have been completed, or are in the process of being completed, for this portion of Jefferson County.

Document: Louisville Public Art Master Plan
Prepared by: Creative Time
Date: June 2009

The Louisville Public Art Master Plan outlines a system to incorporate more visual art into public spaces including sculpture, paintings, film and video, sound, light and performance, to name a few. The master plan goes into detail about the administration of the plan, the organization of committees, the importance of public involvement, and the allocation of resources that would be dedicated to realizing this plan. The plan created the COPA or Commission On Public Art. This new group will archive the current artwork belonging to the city, create a fund specific to the cause, identify sites appropriate for new works, and work toward "a long term legacy of art in public spaces in Louisville." The plan emphasizes the importance of partnerships, through public and private entities, to implement the Master Plan.

The Louisville Public Art Master Plan emphasizes the need for visual art in public spaces across the county. The South and Southwest Greenway Master Plan should identify potential locations where public art can be incorporated. The South and Southwest Greenways System will be a source of many diverse entities, with many different environmental, historical and geographical amenities which can be represented through artworks. The implementation strategies of the Art Master Plan should be used to guide similar implementation strategies for the greenway system.

Document: Louisville Loop Design Guidelines
Prepared by: HNTB
Date: December 2009

The Louisville Loop Design Guidelines include a plan for the systems and materials to be used in the Loop and a reference document to ensure that all site amenities are uniform. Regulatory standards are included in the document and provide recommendations for operational standards, facility standards, crossing standards and support facilities. The manual details standard trail widths, materials, markings, trail rules and etiquette, signage and crossing standards.

The Louisville Loop Design Guidelines provide a thorough set of recommendations for all aspects of the Loop trail design. Although the South and Southwest Greenways system will have a unique identity, it is also a part of a more comprehensive system of parks and trails which will include the Louisville Loop. As a part of this overall compatible system the South and Southwest Greenways Master Plan will ensure that detailed guidelines, established as a part of the master plan process, will be compatible with the Louisville Loop guidelines.

Policy Statements

1-4

Louisville Loop Design Guidelines

Document: Base Realignment and Closure Army Transformation and Regional Economic Growth
Prepared By: CORE Committee
Date: November 2009

The BRAC project includes projected growth of the area around Fort Knox that is anticipated as a part of the expansion of Fort Knox. The BRAC document includes planned developments, projected income versus expenditures for the community, and numbers to detail the growth of population and the economy as a result of the new personnel at Fort Knox.

Document: Pond Creek Stream Restoration Project
Prepared by: Redwing Ecological Services
Date: May 2010

The Pond Creek Stream Restoration Project is a set of construction plans produced by Redwing. The project involves an engineered stream restoration to a small tributary to Pond Creek. The stream starts at a pond south of the Gene Snyder Freeway near Jefferson Memorial Forest (Moreman's Hill Section). It heads northeast under the Gene Snyder Freeway (I-265) and joins Pond Creek.

The restoration plans add new features such as riffles, log vanes, and channel plugs to improve the stream quality as well as meandering its bends. The project ends at the headwall before the stream goes underneath the Gene Snyder Freeway.

One of the interesting features of the plan, other than the improvement of this tributary, is the tunnel underneath the Gene Snyder Freeway which is large enough for two-wheeled vehicles. This is not a stream pipe but rather a transportation connection that might be useful for a non-grade crossing of the Gene Snyder Freeway. It appears that the conceptual alignment of the Louisville Loop plans on using this underpass as it travels from the west, outside of the Snyder passing over the Moreman's Hill Section, to east inside of the Gene Snyder Freeway (see the Jefferson Memorial Master Plan document, page 8 of the pdf).

Document: Ohio River Corridor Master Plan
Prepared by: Livability Committee of Cornerstone 2020
Date: 1996

The Ohio River Corridor Master Plan was prepared as a part of Cornerstone 2020, the Comprehensive Plan for Metro Louisville. This master plan was prepared to provide a framework for development and recreation planning along the Ohio River from Oldham County to Hardin County. Sixteen key concepts were identified as the most fundamental ideas related to implementing the master plan. The key concepts relate to the five major themes for the vision of the master plan. These key concepts included: people connect to the river; people connect to each other; people connect to nature; home connects to work; and people connect to the past, present, and future.

The proposed master plan contained four fundamental elements: the river's edge, community connections, activity centers, and an environmental framework. The plan's recommendations included a continuous trail as close to the water's edge as feasible. The plan also recommended several community connections through on-road facilities and greenway connections along stream corridors. The plan identifies activity centers including along Salt River and Lower River Road between the Farnsley-Moremen Landing to Mike Linning's. These activity centers were identified as locations for a variety of leisure and recreational activities. The Salt River activity center is recommended to focus on fishing and small boat access to the Salt River and the Ohio River. This activity center would also serve as the hub for a connection to a potential Salt River Greenway leading into Hardin County. The plan highlights the lack of park space for the south and southwest portion of the county along Dixie Highway.

A number of proposed greenways are identified within this master plan including Mill Creek Greenway, Pond Creek Greenway, Salt Creek Greenway and trail connections from Johnsontown Road to the Mill Creek Greenway. Roadways identified for trail connections include Greenwood Road, Johnsontown Road, Bethany Lane, Blevins Gap, and Watson Lane.

Document: Bike Master Plan
Prepared by: Louisville Metro Public Works and Assets
Date: March 2010

Mission:
To serve as the liaison between Louisville Metro Government and the Greater Louisville community through education, encouragement, engineering, and evaluation efforts that will allow Louisville to reclaim its heritage as a center for bicycling.

Comments on the plan included: creating a trail system; adding trailheads with parking; connecting to existing facilities, meeting concrete goals of miles of new trails every year, creating a bicycle skills course, expanding off-road facilities with non-asphalt materials, and integrating interesting features for mountain bikers of varying skill levels.

Also included is a document from the Kentucky Mountain Bike Association (KYMBA) recommending a single track, multi-use, natural surface trail built adjacent to the Louisville Loop. It would serve mountain biking (trail riding), trail runners, and hikers.

Various maps round out the document which include: on-road bike facility prioritization shown in tiers, population without vehicles (by census tract), current bike facilities, and current bike trails (in Cherokee and Seneca Parks). Three of the top nine bike projects are in South and southwest Jefferson County. Those projects would stripe bike lanes along arterial and collector roads.

Document: Pedestrian Master Plan
Prepared by: Louisville Metro Public Works and Assets
Date: March 2010

The Louisville Community Walkability Plan gathered a large amount of information through public workshops and a pedestrian summit, which provided the framework for the Pedestrian Plan.

Mission:
The mission for this plan was to create a community-wide culture that supports pedestrians through physical improvements, policies and pedestrian programs by increasing the pedestrian system network while simultaneously reducing the rate of pedestrian crashes.

Many objectives were listed under the three recommendations including: establishing criteria for sidewalk construction, implementing a priority sidewalk construction list, coordinating with current and future projects, increasing enforcement, and fully implementing Louisville's Complete Streets Policy.

Similar to the Bike Master Plan, the Pedestrian Plan estimated the demand for sidewalks based on a latent demand analysis. GIS is used in combination with a formula to create a hierarchy of demand between where the pedestrians live and their destinations. A benefit-cost index then sets the priority for constructing a sidewalk along a roadway.

Maps shown at the end of the document are Current Sidewalks, Future Sidewalks, and Latent Demand Sidewalks.

Document: Jefferson Memorial Forest Master Plan
Prepared by: Jones & Jones, Biohabitats, Environs, et. al
Date: July 2009

The Jefferson Memorial Forest (JMF) Master Plan creates a framework for improvements and design considerations for the future. The plan balances the needs of being a regional facility for outdoor activities with a need to minimize the ecological impact of visitors. JMF expects to grow to be a major contributor to environmental education programs using its lands and offerings. The six primary goals are: advance the effort of JMF's activities while generating revenue; connect JMF with local destinations and the Louisville Loop; make the park a good example of environmental stewardship and sustainable design; make the entrance and circulation through JMF comprehendible, enjoyable, and safe; promote forest stewardship and watershed protection throughout JMF and adjacent lands; and plan for JMF to be the preeminent environmental education venue for the region. Jefferson Memorial Forest is the largest regional park in the county as well as one of the few venues for certain groups such as equestrians.

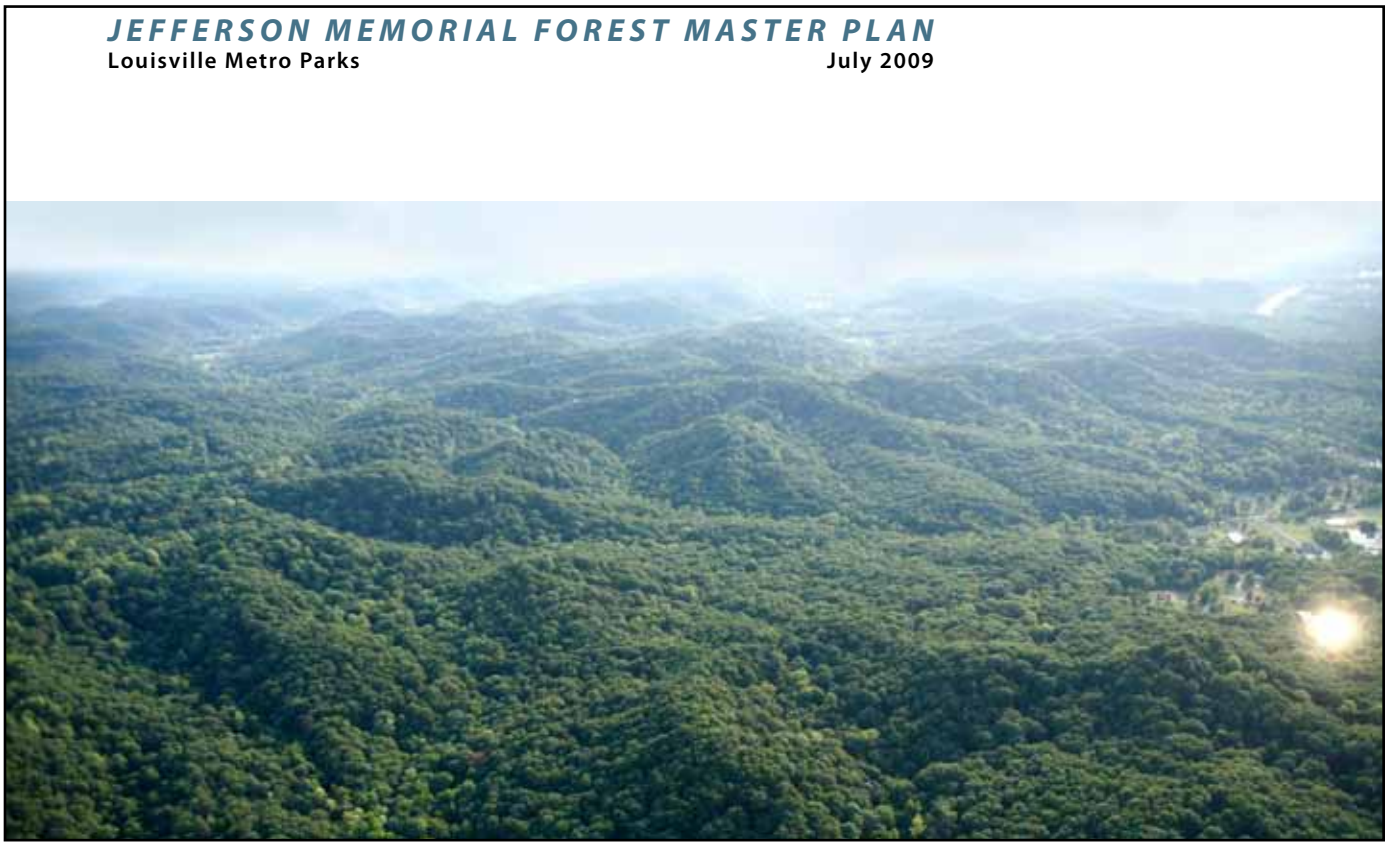
Existing Studies Review

An overall map of JMF's sections and boundaries can be found on Page 4 of the master plan. The plan covers historical and cultural areas including one in the forest and another large area north of the Gene Snyder, east of Stonestreet. Community involvement was conducted through a steering committee, public meetings, user group surveys and stakeholder interviews.

The Jefferson Memorial Forest Master Plan identifies trail connections beyond the forest to the Louisville Loop Trail. The exact alignments were not selected in July of 2009, but loosely include a spur to JMF's proposed Welcome Center, two possible alternate trails through the forest and Moreman's Hill Section. The trail exits west to the Ohio River. The spur of the Loop comes from Fairdale (Manslick Road) to JMF's proposed Welcome Center at the intersection of Mitchell Hill Road and Holsclaw Hill Road.

Both alternates create a stronger connection to the Loop. One alternate turns the spur into a loop up to MSD's Pond Creek Trail section. It is described as, a "soft and/or hard surface for hiking, biking, and equestrian use. It would also access the future Environmental Education Center and Campground proposed in this master plan." The Louisville Loop Trail travels along Pond Creek, south under the Gene Snyder through the Moreman's Hill Section and connects to Medora Road. Trailheads were proposed at Moreman's Hill Section and at JMF's proposed Welcome Center. The map on page 108 of the report demonstrates all of the connections. The overall proposed improvements by the Jefferson Memorial Forest Master Plan can be found on page ii and again on Page 114.

From an ecological standpoint, the plan emphasizes the importance of protecting existing large patches of forest and building on them to increase the size of the protected area to improve their connectivity with other areas. It also built upon the 1995 Resource Manage-



ment Plan, which grouped the forest according to general quality/age categories and recognized different forest communities that change depending on their location relative to knob elevation and aspect.

One important recommendation in the plan was to work on designating the higher-quality parts of the forest as a State Nature Preserve, which is the strongest form of land protection available in Kentucky. Metro Parks has since pursued this recommendation and is currently in the process of working with the State Nature Preserves Commission to make this designation.

An extensive historical inventory was prepared as a part of the master plan. The information contained within the report was utilized in the South and Southwest Greenways Master Plan to inform designers on this area of Louisville.

Document: Multi-Objective Stream Corridor/ Greenway Plan
Prepared by: Greenways Incorporated & Ogden Environmental and Energy Services, Inc.
Date: March 1995

The Multi-Objective Stream Corridor/Greenway Plan touched on four key areas of Cornerstone 2020: mobility, community form, marketplace, and livability. The plan intended to bridge environment, quality of life, and comprehensive planning. The plan fits with the Ohio River Corridor Master Plan and the Parks and Open Space Plan. The plan was directed by the Metropolitan Sewer District (MSD) as a way to manage stream corridors differently, especially due to flooding. The plan lists a host of objectives centered around managing land with emphasis on stormwater, habitat, buffer creation, recreational uses, and creating new values (economically and culturally). The focus of this plan was to create greenways along streams within their floodplain while preserving, or restoring, their ecological qualities.

The plan defines a greenway as a linear, natural corridor connecting natural, outdoor spaces/features. It names a number of greenway types: urban riversides, recreational greenways, ecological corridors, scenic/ historic routes, and networks of linear open spaces. The plan recommends a voluntary land stewardship program to secure lands in the floodplain. The plan discusses different strategies to implement using easements, plan review, preservation, conservation, buffer zone creation, property acquisition, condemnation, and impact fees. Based on the action plan set by the Multi-Objective Stream Corridor/Greenway Plan, we are now beyond the horizon of implementation. It left off asking for an evaluation of the plan at its expiration and to update a plan for the Stream Corridor/

Greenway system.

Starting at Page 68 of the plan, there are large-scaled maps of the Pond Creek and Mill Creek watersheds showing potential greenways that follow the stream corridors.

The appendix describes the procedure for evaluating a parcel for inclusion by location, management, threat of loss, rarity, use/utility, accessibility, proximity, and aesthetic quality.

Document: Master Plan for Riverside, The Farnsley-Moremen Landing
Prepared by: Kise Straw & Kolodner Planning
Date: November 2001

This plan is intended to be a guide for future development of Riverside, the Farnsley-Moremen Landing, recommending that it become a "history center". This approach allows for a balance between preservation and profit. It recommends that Riverside become less dependent on local government for funding and support. It also recommends further study of what to do with the nearby Aydelott house and site including stabilization of the house, linking the two sites together (Riverside and Aydelott) by new trails and roads, and performing a market study to explore ways to earn income from the site. Further study is also recommended of wayfinding, signage and landscaping issues as well as the Indian burial grounds south of Aydelott.

Document: Riverside Farnsley-Moremen Landing Site Development Plan
Prepared by: Environs/Inc., Rowland Design
Date: January 2006

This plan includes further study of issues from the 2001 Master Plan study, including specifics and cost estimates. One new issue was where to relocate the Moreman Chapel on the overall site. Graphics included in the plan show existing conditions as well as possible new internal circulation using trails, roads, pulloff areas and parking for Aydelott and Riverside. A proposed signage system is included detailing entrance signs, directional signs, maps & interpretive signs. The top priorities identified were the Aydelott site and building work (including relocating the Moreman Chapel) and the internal pedestrian and vehicular circulation work.

Both Riverside studies (2001 and 2006) have important information about the history of south and southwest Jefferson County that could be useful for the South and Southwest Greenways plan. These reports offer information about important cultural, environmental and historic resources at Riverside. The historic buildings and farmland, visitor's center, riverboat landing, archaeological site, community gardens, trails, and wetlands make this site a key destination to be considered as part of the planning for the South and Southwest Greenways system.

Document: Water Quality in Jefferson County, Kentucky - A Watershed Synthesis Report, 2000-2007
Prepared by: Department of Biology, University of Louisville and MSD
Date: December 2009

Physical, chemical, and biological sampling of surface water began in 1988. The Long-Term Monitoring Network (LTMN) of 28 sites is constantly monitoring water temperature, dissolved oxygen, pH, and conductivity. Laboratory samples also looked at biotic life and water quality data for each watershed overseen by MSD during the 2000-2005 timeframe. The monitoring locations in relation to the land use patterns can be found on Page 14 of the document.

At Mill Creek, the upstream monitor showed a fair to poor rating, while the downstream (at Cane Run and Mill Creek Cutoff) was poor in 2005 for biotic integrity. This seemed to be the trend through various measurement criteria.

Pond Creek has four monitoring locations in the main stem of the watershed: the most upstream location, Fern Creek at Old Bardstown Road; the second location, Northern Ditch at Preston Hwy; the third location, Pond Creek at Manslick Road; the most downstream location, Pond Creek at Pendleton Road. The amount of development and forested areas differs through the watershed (roughly +60% developed with 17-21% impervious); and therefore, the effects on the water quality vary. The siltation index at the upstream location indicates an impaired stream with some changes to species adapted to silts and shifting sediments. The downstream monitoring of the fish community went from very poor in 2002 and 2003 to poor in 2005. Overall, the rating of the upstream was classified as fair on the combined biotic integrity indices in 2005. The downstream portion was considered poor.

The Louisville and Jefferson County Watershed Synthesis Report 2009, as it is also called, recommends more monitoring at synchronized times yearly and in

each season annually to have comparable results. A map of imperviousness and sampling sites can be found on Page 247 of the document. The interrelationship of urban intensity to stream variables to the biotic response can be found on Page 248 of the plan.

For the South and Southwest Greenways Master Plan the information to note from this report is that the upper watershed of Pond Creek has relatively higher water quality scores than the rest of the watersheds in the project area making this a natural asset for the project area.

Document: Status Report of the Salt River Watershed
Prepared by: Kentucky Division of Water
Date: November 1998

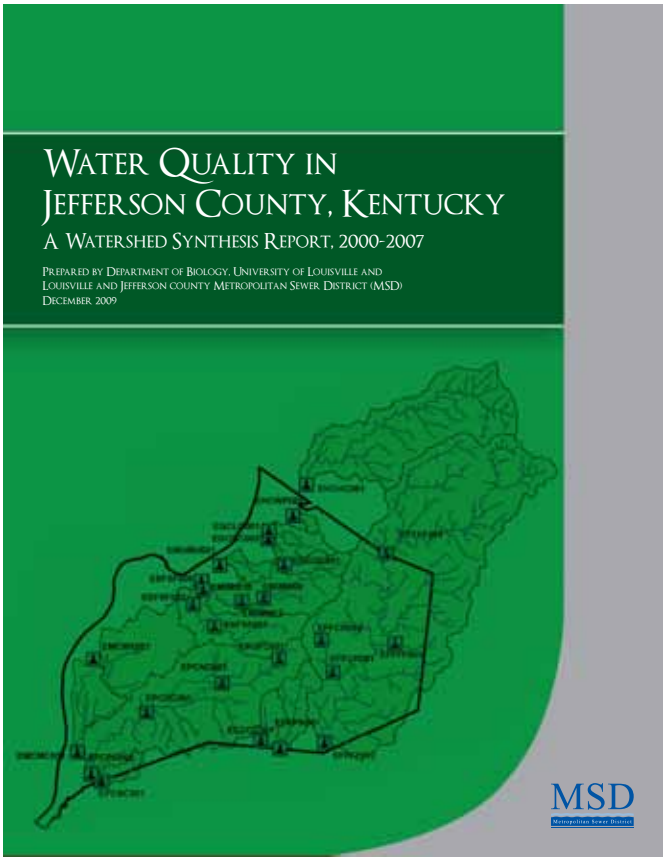
The Salt River Watershed and Minor Ohio River Tributary Watershed are major watersheds for the state of Kentucky. The status report discusses the watershed, its water quality, the major concerns and what can be done to improve the water in the watershed. The project area contains two hydrologic divisions from this watershed: the Lowe Salt Watershed and the Minor Ohio River Watershed.

Several of the waterways within the project area were assessed and identified as impaired for both swimming and aquatic life. Impaired waterways identified in the report include Pond Creek, Fern Creek, Slop Ditch, Southern Ditch, Mill Creek and the Mill Creek Cutoff. Mill Creek and Mill Creek Cutoff are impaired for swimming only.

A few waterways were identified as having good water supply capable of supporting swimming and aquatic life. These include Fishpool Creek and the Salt River. Most waterways have been harmed by intensive development within their local watersheds. New water quality standards have made some improvements in recent years to these waterways.

Document: Dixie Highway Corridor Master Plan
Prepared by: HNTB
Date: March 2011

The Dixie Highway Corridor Master Plan looked at a



study area including Dixie Highway and properties directly adjacent to the roadway from Oak Street to Greenwood Road. The study area was divided a north section and a south section. The south area lies within the study area of the South and Southwest Greenways Master Plan. Recommendations were presented for Dixie Highway relating to transportation, land use and urban design. These recommendations included changes to the Land Development Code, pedestrian and bike improvements, and streetscape improvements.

The Dixie Highway Corridor Master Plan recommendations included two proposed town centers within the South and Southwest Greenways project limits. The town centers are proposed south of I-265 to Gagel Avenue and within the area of Lower Hunters Trace. Pedestrian improvements within these areas would be implemented to create safer crossings at key intersections. Lower Hunters Trace was identified to have enhanced pedestrian crossings. Another key recommendation included converting the P&L railroad, running

adjacent to Dixie Highway, to commuter rail between Ft. Knox and downtown. Improvements to pedestrian facilities along Dixie Highway included streetscape elements and an eight foot wide sidewalk along the length of Dixie within the South and Southwest Greenways project area. An additional transportation recommendation included a proposed greenway north of Greenwood Road to connect Dixie Highway with the Louisville Loop. Urban design recommendations included a trail connection, gateway, and open space enhancement opportunities at the intersection of Dixie Highway and Big Run Creek.

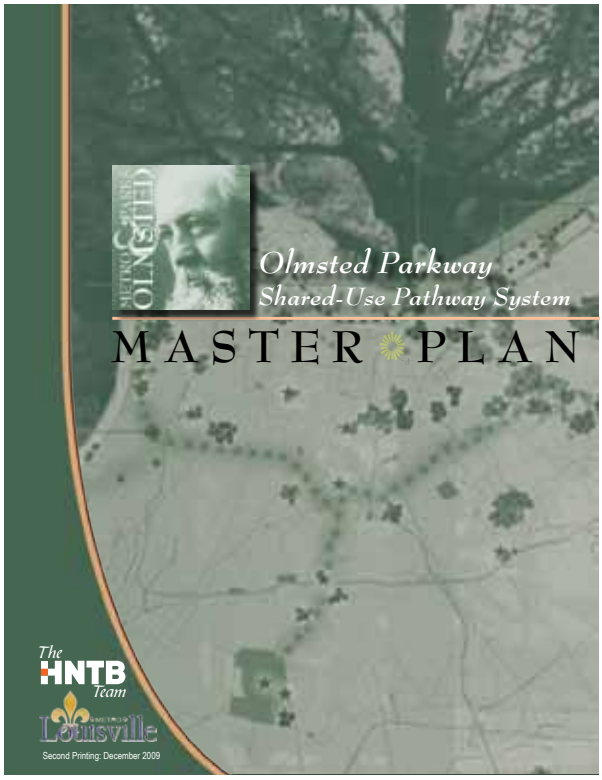
Document: Park Hill Industrial Corridor Implementation Strategy
Prepared by: EDAW
Date: October 2009

The Park Hill Industrial Corridor Master Plan was developed to redefine an existing industrial park to encourage job growth and provide a sense of place to the Park Hill area. Recommendations of the master plan included five key areas: programs and policies, land-use enhancements, transportation enhancements, public realm enhancements, and connection with the workforce.

Although the Park Hill Industrial Park is located to the north of the South and Southwest Greenways study area, it is important due to the large employment base and the opportunity for that employment base to increase. In addition, the branding of the Park Hill Industrial Park as a center for "green" practices, products and services will create a workforce with increased awareness and desire for facilities which will be planned as a part of the South and Southwest Greenways Master Plan.

Document: Olmsted Parkway Shared-Use Pathway System Master Plan
Prepared by: HNTB/Gresham Smith and Partners
Date: December 2009

The Olmsted Parkway system includes Southwestern Parkway, Algonquin Parkway, Southern Parkway, and Eastern Parkway. The master plan provided recommendations for the implementation of a shared-use



path system along these historic parkways. Recommendations for the parkways included restriping existing roadways to accommodate bike lanes, shared-use pathways adjacent to the roadway, and modification of existing service roads to accommodate new shared-use pathways. In addition, landscape improvements are recommended to more closely achieve the original intent of the parkways as green linear parks.

Southern Parkway is the only Olmsted Parkway reaching into the South and Southwest Greenways project area. Connection to Southern Parkway and the remaining parkway system can provide additional connections to downtown along with a tourist destination for the South and Southwest Greenways system. Proposed improvements for Southern Parkway include a multi-use path which will provide a bike and pedestrian facility for all levels of experience.

Document: Pond Creek and Mill Creek Recreational Concept Plan
Prepared by: Stantec
Date: October 2009

The Pond Creek and Mill Creek Recreational Concept

Plan was prepared to begin to identify possible routes to link McNeely Lake Park to the Ohio Levee Trail. The concept plan identified four trail alternatives which include walking, biking, hiking and horseback riding. The concept plan did not include public input, but was rather a tool to be utilized in further developing trail alternatives along this portion of the Louisville Loop. Four key themes shaped the analysis: connections, people and places, flexibility, and cost effectiveness. Ecological restoration opportunities were an important consideration in the selection of possible trail routes.

Each of the potential routes is included in the inventory mapping provided for the South and Southwest Greenways Master Plan. The Southern route included a possible location for crossing under the Gene Snyder Freeway at Blue Lick Road and continuing south to Fairdale. The trail would then follow Keys Ferry Road to the Jefferson Memorial Forest Welcome Center, then to Penile Road and Blevins Gap Road to Dixie Highway. The majority of this alternative would be a shared-use path along the roadways. The Northern-Middle Route would reach a higher population but was a more costly alternative and included routing along more heavily traveled roadways. This alternative would connect the levee trail at Farnsley-Moremen landing. The Southern-Middle Route follows a route similar to the Northern-Middle Route but would connect with the levee trail farther south at Orell Road. The final route, the Northern Route, would travel through Fern Creek, along the Northern Ditch and would connect with Mill Creek near Johnsontown Road. This route would be a combination of multi-use path and on-road facilities. This study provides a cursory review of ecological conditions within the route study areas.

The ecological component of this assessment identified the possibility of Indiana Bat habitat areas within the project site. It identified thirty-six to fifty acres of possible wetland creation or restoration based on hydric soil presence; it examined existing Species of Concern reports for Jefferson County for potential species present; and potential wetland enhancement opportunities in the area of the Pond Creek Pumping Station through the creation of a dam. This area of Louisville should be noted for its environmental value in the South and Southwest Greenways study.

Document: Kentuckiana Regional Planning and Development Agency (KIPDA) Horizon 2030 & TIP

Prepared by: KIPDA

Date: 2010

Proposed projects pertinent to this project include:

- Widen Greenwood Road from two to three lanes from Greenbelt to Dixie Hwy. and include a shared-use path
- Widen Manslick Road from two to four lanes from St. Andrews Church Road to the Watterson
- New Interchange at the Watterson and Manslick Road
- Ohio River Levee Trail from Riverside Historic Site to Mill Creek Generating Station
- Ohio River Levee Trail from Cane Run Road to Lees Lane
- Olmsted Parkways Multi-Use Path System
- Outdoor Classroom and Trail at Stonestreet Road Elementary School
- Widen St. Andrews Church Road from two to four lanes from Dixie Hwy. to Palatka Road
- Widen Manslick Road at Fairdale Road – Intersection Improvements
- Widen Mt. Holly Road from two to three lanes from National Turnpike to Fairdale Road
- Widen Valley Station Road from two to five lanes from Dixie Hwy. to New Cut Road
- Widen National Turnpike from two to three lanes from Fairdale Road to South Park Road
- Widen Outer Loop from two to five lanes from 3rd Street Road to KY 1020
- Widen Palatka Road from two to three lanes from St. Andrews Church Road to 3rd Street Road

Community Survey

Background and Purpose

A survey of Jefferson County residents was conducted in the spring of 2011 to assess use and opinions of Metro Parks facilities. The survey questionnaire was developed in partnership with Louisville Metro Parks. Although the purpose of the survey was to support the master plan process by measuring Louisville Metro residents' opinions and perceptions about south and southwest Louisville, the survey tool was also designed to meet the dual purpose of assessing the general state of satisfaction and opinion regarding the park system.

The specific objectives established to guide this research included:

- Awareness of park, recreation, and cultural resources in Louisville, specifically in the south and southwest
- Use of such resources
- Satisfaction with such resources
- Perceived and actual barriers to use of such resources
- Opinions regarding additional resources
- Opinions regarding the connection of parks, recreation, and cultural resources with schools, businesses, neighborhoods, TARC routes, bicycle paths, and sidewalks
- Demographics
- Messaging and communication preferences
- Association of parks, recreation, cultural resources, the Louisville Metro Parks agency, and planning processes to quality of life in terms of environmental, social, economic, physiological, and psychological factors.

Survey Results

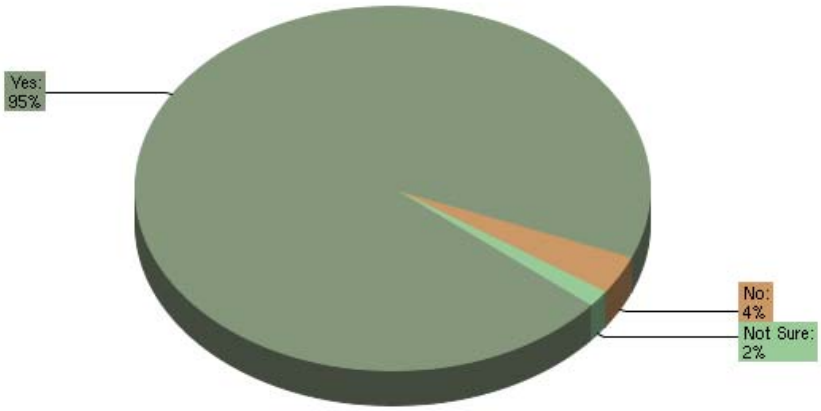
Survey Distribution

Probability sampling was used by drawing a random sample of 6,400 Jefferson County residents. A second sample of 1,600 was drawn from the zip codes of 40272, 40118, 40258, 40214, and 40216 in order to oversample the south and southwest portion of the county. In total, the survey consisted of 8,000 individuals. After the sample list was filtered through the National Change of Address (NCOA) database, 23 individuals needed to be removed; this made the final number of invitees 7,977.

Printed surveys were mailed to the participants by name along with a postage-paid return envelope. Participants were also given the opportunity to take an internet-based version of the survey.

Descriptive Results

In total, 958 valid responses were received resulting in a 3.16 confidence interval. A total of 544 surveys were returned as undeliverable, reducing the number of invitees to 7,433. Given this, the effective response rate was 12.9%.



Value	Count	Percent %
Yes	874	95%
No	32	3.5%
Not Sure	14	1.5%
Total Responses		920

Respondents who have heard of the Louisville Metro Parks Dept.

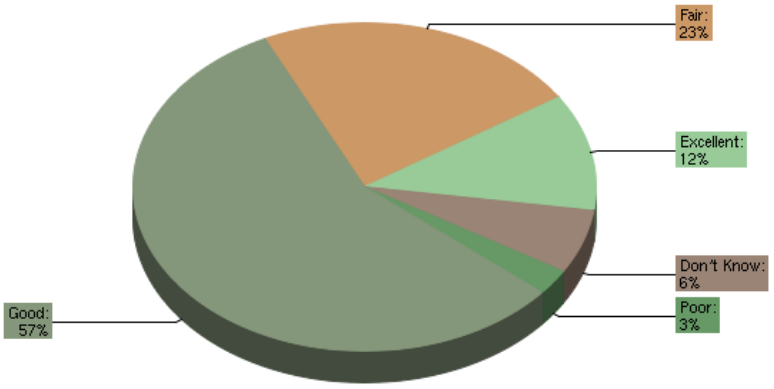
Survey Analysis

Complete results of the survey analysis can be found in Appendix A-2. A summary of the responses includes:

- A significant majority of respondents (95%) had awareness of Louisville Metro Parks Department.
- Of the 941 respondents to Question 2, approximately 94.8% recognized Iroquois Park. Of the parks listed in Question 2, on average 9 were rec-

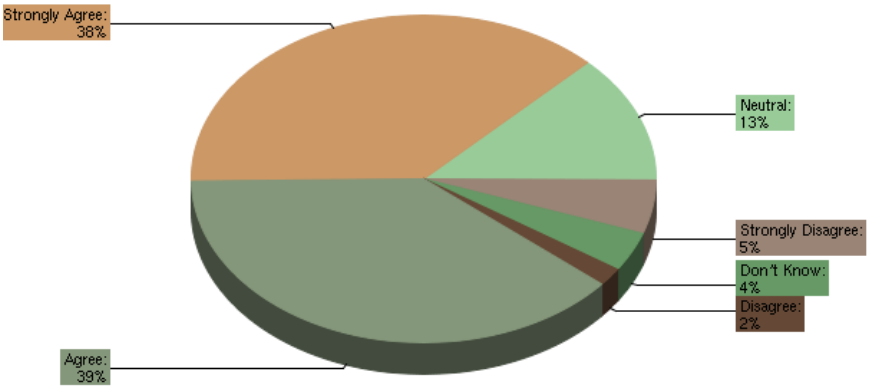
ognized.

- Playgrounds, picnic areas, shelters and sidewalks to parks were listed as the most important amenities for parks.
- Respondents indicated they were neutral in opinion for the following amenities: horse trails, skate parks, mountain biking trails, ice skating rinks, golf courses, and dog parks.
- Iroquois Park was listed as the favorite park or recreation facility in Jefferson County.
- The most common barrier limiting use of parks was identified as lack of leisure time. Other barriers listed include: lack of desired facilities, maintenance of facilities, lack of accessibility and safety concerns.
- Trails were listed as the most frequently used park amenity. Natural areas, outdoor sports courts, and youth-oriented facilities followed in popularity.
- Respondents indicated connections should be made between communities and parks through the greenways system.
- The survey responses identified a perceived lack of restrooms, community gardens, and recreation programs in the parks system.
- 38% of respondents strongly agree that Metro parks improve the community's quality of life



Value	Count	Percent %
Excellent	106	11.5%
Good	523	56.8%
Fair	211	22.9%
Poor	23	2.5%
Don't Know	58	6.3%
Total Responses		921

Respondents rated the overall quality of the parks system



Value	Count	Percent %
Strongly Agree	351	37.7%
Agree	361	38.7%
Neutral	118	12.7%
Disagree	17	1.8%
Strongly Disagree	49	5.3%
Don't Know	36	3.9%
Total Responses		932

Respondents rate the value of Metro parks on the quality of life

Stakeholder Meetings

Public meetings were conducted as a part of the inventory process. A variety of people from the project area where invited to three public meetings conducted in each sub-district. After viewing an presentation on the project, the stakeholders were asked to offer their input and knowledge for the area. Main takeaway points for each of the sub-district meetings are included below.

Dixie Sub-District Area

- The South and Southwest Greenways project is important for economic health as well as physical health
- Streets in this area are hard to bike – no sidewalks
- Attempt to utilize old roadway and RR bridges or abutments that aren't actively used but still have structural remnants and rights-of-way
- Riverview Walkway exists but is overgrown and hasn't been used since the '97 Flood
- Old bridge south side of 31-W to cross Salt River and provide connection to Bullett County and Otter Creek Park
- Avoid Arnoldtown Road on bikes – too many cars
- Blevins Gap Road has a lot of bikes
- Stonestreet Rd. bike lane is used a lot
- Include Mike Linnings as destination
- RR underpasses crossing under Gene Snyder – potential crossing for pedestrians and bicyclists
- Dixie, Gene Snyder and railroads major barriers
- Is there any way to use conservation easement given by Kosmos
- Receive news about parks and projects through Council Member website and newsletters
- 1922 – Cattle drive down Dixie Hwy.
- 1937 Flood - Major impact on this area
- Salt licks along Manslick Road
- Blevins Gap – Civil War Lane
- Meadowlawn Distillery – "White Lightning"
- Like to see connection across Salt Creek to get to Otter Creek Park
- New Bridge across ditch to Loop – Rose Farm Drive and Dixie
- Old train station still standing near Kosmosdale
- Need to connect Valley Station with Iroquois
- Need more sidewalks to connect schools
- Greenwood Road might be a good bike route if widened
- Is there additional right-of-way along railroad at East Page's Lane
- Most favored path suggested by local residents would be to connect all the parks on the edge (like Iroquois, Jefferson Memorial Forest) to a central hub like Waverly park
- Locate old buffalo trails

Forest Sub-District Public Meeting

Iroquois Sub-District Area

- Park Use
  - Use Jefferson Memorial Forest for hiking
  - Waverly Park for mountain biking and hiking
  - Iroquois Park for running, biking, hiking, disc golf and horseback riding
- Beechmont (hill of beech trees) used to be the "Country Retreat" for wealthy people in the city – many vacation homes
- Barriers – Gene Snyder, Outer Loop, Preston Highway, Dixie Highway
- Like the idea of boxes along trail to have people tell stories about the history of the area
- Southside Drive is decent road to ride on bike – not 3rd Street Road or Ashland
- Connect to wetland constructed behind Walmart on Outer Loop
- Historical barn behind medical office building on 5th – people used to rent horse rides
- Douglas Park race track, Little Loomhouse, history of Beechmont
- Several mini-parks in the Beechmont area – need to connect these parks to each other, neighborhoods and the schools
- Connect Little Loomhouse, Waterfront Wednesdays, ballgames
- Utilize community churches for historical resource
- Very diverse area – Kentucky Refugee Ministries, Americana Center (some don't have cars – rely on other modes of travel)
- Southside Drive good to use for bike route. Ashland also good
- "Big Island" in Okolona area
- Use Forest, Waverly, Iroquois as central points
- Need lighted trails and paths
- Other areas to travel to on foot and bike:
  - Grocery store
  - Schools
  - Sporting events
  - Downtown events
  - Commercial areas (shopping)
  - Frankfort Avenue
  - Highlands
  - Germantown
  - Beechmont
  - ValuMart – Third Street
- Connected, efficient roadways
  - Southside better than New Cut
  - Third Street really narrow
  - Ashland – wide but not too much traffic
  - Page's Lane
  - Stonestreet Road – gets narrow farther out of town
  - New Cut Road south of 3rd Street - not much traffic

Forest Sub-District Area

- Current preferred activities
  - Biking
  - Hiking
  - Fishing
  - Paddling
  - Camping
  - Commuting by bike
- Would like to bike from Seneca Park to Beargrass Creek to Loop to Pendleton to Forest Visitors Center
- Many families have lived in the area for generations
  - Longacres
  - Mitchells
  - Rennirts
  - Caples
- Many neighborhoods have ditches that run behind them – use MSD easements for trails
- Use ditches to connect New Cut and Outer Loop to Manslick
- Outer Loop has a lot of easement space
- Use Wilson Creek to take people from neighborhoods
- Possible horse trail or hiking trail through area near Granger Road from Jefferson Memorial Forest to McNeely Lake Park
- Strong desire for locals to do more biking in the area but there are not many safe routes
- Coral Ridge Elementary - maybe new sidewalk to Fairdale Library
- Arnoldtown Road and St. Andrews are scenic routes
- Use Playtorium as trailhead/hub for trails
- Historic Southpark Country Club
- Scotts Gap Road is very scenic

Focus Group Meeting

The focus group meeting was held to gather more detailed information from specific user groups. Over 80 users were invited to attend the meeting and give input. Specific information related to each user group is given below.

Equestrian

- Frequents Beargrass Creek Greenway
- Using Big Run Ditch
- Ride horses in Iroquois – also ride Levee Trail
- What's important to equestrians
    - Enough room to park trucks and trailers
    - Yost in JMF – parking area small
    - Like maintained trail
    - Friends like to ride at JMF
    - Iroquois safe – visibility around park
- Hitching rail at destination points
- 15 min./mile – equestrian
- 10-18 mile is ideal for equestrian rides with couple of stops along way
- Have ridden from farms in western part of county to Jefferson Memorial Forest
- Like place to gather several trailers and ride together
- Good to have destinations – ride, have lunch, and ride back – need place to tie up horse
- Mounting blocks – picnic tables also work
- Better to cross a road than ride on it
- Signal to trigger at horseback height
- Preferred trail surface –crushed limestone
- Currently traveling to Brown County or Taylorsville to find the length of trail for good rides
- Types of rides
    - Single-file ride (usually due to narrow trail)
    - Bikers yield to horse riders

Mountain Bike

- Working on awareness of maintenance of trails
- Waverly only safe to arrive by car, Arnoldtown and Cane Run not safe to bike on
- Need to find a way through Parkwood from Iroquois to Waverly
- 20 miles ideal number for mountain bike ride- 10 miles minimum
- Out & back rides are good
- Like to have a destination to go out to and back
- 6 MPH average for mountain bike
- Likes to ride all over county – Cherokee, Waverly
- Algonquin Pkwy. okay to bike ride because of width of roadway
- Bike lanes that do not go anywhere – lanes go around rather than to destinations
- Develop program where riders help maintain trails
- Preferred trail surface – dirt

Canoe/Kayak

- Harrod's Creek – put in at Quartermaster ($2 for upkeep)
- William Miles Park – Floyd's Fork
- Ohio main waterway for larger kayak's
- Canoe/kayak in southern Indiana
- Like to put-in at New Albany below Falls and paddle down river
- Some canoe on Salt River
- Not utilizing creeks and rivers in south and southwest Jefferson County - terrain may impede

Walker/Runner

- Iroquois Park, Jefferson Memorial Forest, Levee Trail
- Would like length of trail with mile markers
- Variety of trails needed – hilly, flat, urban, rural
- Like to have water source and restrooms available
- Some security concerns
- Need lighting in heavily-used areas for winter evening hours
- Prefer not to share trails with equestrians

Destinations

- Mike Linnings
- Iroquois as destination – top of park
- End destinations with determined length of ride
- Like "goal" to get someplace
- Great views can be destinations
- Motivation to take family on a ride
- Something to do
- Bed and breakfast
- Camp
- Quality and length of trails is most important – not necessarily natural setting – urban area good
- Like to connect to Fort Duffield, Fort Knox, Otter Creek, and Bernheim

Introduction

The South and southwest portion of Louisville contains many natural resources. Although there are large areas that have been fully developed, there are also large areas of natural land. Because of the unique environmental assets of the area, this project included an emphasis on inventory for the biological conditions.

In an effort to identify ecological resources throughout the study area and to help determine where to identify and prioritize field assessment of ecological resources within the project area, an overlay analysis was conducted using Geographical Information Systems (GIS) and various digital data layers.

The project area is a large, almost 100-square-mile area that encompasses a large portion of Louisville and large tracts of park and natural areas such as the Jefferson Memorial Forest. With that in mind, focusing field reconnaissance efforts was necessary due to the numerous potential ecological and natural resources available within the project area.

GIS software provided an ideal platform for viewing and combining data over a broad scale such as the study area. By combining numerous digital spatial data layers such as wetlands, soils characteristics, geologic features, and rare, threatened, and endangered species potential, as well as examining documentation from previous planning and natural resource study efforts, areas of high ecological importance were identified.

Digital Data Collection Process

Digital data were acquired from various sources. Data from the Louisville/Jefferson County Information Consortium (LOJIC), which covered all of Jefferson County, were utilized. The LOJIC data contained many non-pertinent layers that were screened and cropped as necessary. A search for spatial data available on the internet that extended outside of Jefferson County was performed. The main sources for this search were the Kentucky Geologic Survey (www.uky.edu/KGS/gis/

Map	GIS Layer	Source	Date
Geology	Major Karst Potential	KGS	1988
	Minor Karst Potential	KGS	1988
	Geology	KGS	1988
Surface Water Resources	Hydrographic Lines/Polygons	LOJIC	2003
	FEMA Floodplain	FEMA	2006
Groundwater Resources	Sinkholes	KGS	2003
	Springs	KGS	2001
	Water Wells	KGS	2002
Vegetation	Vegetation	KY Gap Anal.	2000
Soils	Prime Farmland	NRCS	2010
Wetlands	Hydric Soils	NRCS	2010
	NWI Weltands	NWI	2010
	NLCD Wetlands	NLCD	2001
Rare, Threatened, Endangered Species	RTE	KY State Nature Preserves Commission	2010
Cursory Review	Composite	Biohabitats	2011

Table 1: List of Data Layers and Their Sources

index.htm), Kentucky Division of Geographic Information (ogi.ky.gov/gisdata.htm), the U.S. Department of Agriculture's National Land Cover Dataset (http://www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prog&topic=nai), and the National Wetlands Inventory (NWI) data from the U.S. Fish and Wildlife Service (http://wetlands.fws.gov/). In addition, data were obtained from the Kentucky State Nature Preserves Commission (KSNPC) and Kentucky GAP data from the Kentucky Department of Fish and Wildlife Resources (KDFWR). Refer to Table 1 for more information on the specific GIS data layers used in the cursory assessment.

Cursory Data Analysis

Maps were processed and generated from the GIS data using ESRI ArcGIS 10, a spatial analysis and mapping software program. The maps were based on the North American Datum (NAD) of 1983 and Kentucky State Plane coordinate system. Based on the existing data, maps were created for the following natural resources inventory features:

- ***Geology:*** examines karst potential, as determined by the Kentucky Geological Survey (KGS). Karst potential is broken down into two classifications of major and moderate karst potential which, according to metadata, were based on field experience of the data authors and other geologic data.
- ***Prime Farmland Soils:*** includes soils that are considered as prime and other important farmlands. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses.
- ***Rare, Threatened, and Endangered Species Potential:*** includes data created by the ecological study. Points were generated based on geographic coordinates of occurrence reports obtained from the KY State Nature Preserves Commission. An arbitrary 1000-ft buffer was then generated around the points to simulate habitat potential for those species as well as to provide a polygon area for the overlay analysis.
- ***Surface Water Resources:*** maps the surface water features such as rivers, streams, ponds, and lakes. It also includes the 100-year floodplain from the Federal Emergency Management Administration (FEMA), and water quality overall use attainment data reported by DOW for 1998 to 2004. The surface water protection area corresponds to the Cedar Ridge Camp on Routt Road.
- ***Groundwater Resources:*** shows springs and wells as determined by Kentucky Department of Water, from KGS databases, and sinkholes mapped by KGS using USGS 7.5 minute topographic maps. According to KGS data, there were no geologic faults within the project area. Springs and wells were each given an arbitrary buffer of 300 feet for visual and for the overlay assessment purposes as a polygon area was needed.
- ***Wetlands:*** mapping includes wetlands data from National Wetlands Inventory (NWI) data for Kentucky, National Land Cover Data (NLCD) classifications for wetlands, and hydric soils as they are an indicator of wetland potential. Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough dur-

Wetlands on CID Lands

ing the growing season to support the growth and reproduction of hydrophytic vegetation.

- ***Vegetation:*** displays the plant community-related cover types that were developed by the Kentucky Gap Analysis Project, except for active agricultural lands such as row crops. The Gap Program is a nationwide effort implemented by individual states to assess the extent of protection for native plant and animal species. For more information, refer to the Gap Program website: gapanalysis.nbii.gov.

Ecological Features Occurrence Overlay

To help focus both the ecological master planning and field reconnaissance efforts, GIS was used to map geospatial data of existing resources. Using GIS to map the data allowed the team to efficiently cover the large project area, and to identify various ecological data layers of importance. Each of the existing conditions metrics listed above was overlaid to identify areas of the highest concentration of ecological features. In instances where there were several data layers representing one inventory metric, those data layers were combined into one data file representing that metric. For example, the Wetlands Metric was a union of the NWI, NLCD wetlands classifications and hydric soils data layers.

The final overlay file, depicting the total ecological feature occurrences, was then mapped with parcel data, parks, easement properties, and other natural area data layers to visually assess areas of high ecological potential and possible locations for field reconnaissance efforts. The total number of metrics combined in the analysis was seven and the maximum number of ecological feature occurrences from the overlay analysis was six. As a result, areas with the maximum number of occurrences were identified. Due to the importance of property ownership in the planning process, the ecological overlay map was split into two separate maps, one showing medium and high ecological potential on public parcels and the other on private parcels.

Ecological Assessment Goals & Objectives

The ecological goals & objectives were identified to guide the recommendations and include:

GOAL 1: Inform the Master Plan process regarding ecological attributes and ecologically-important areas.

- Objective 1a: Identify ecologically-important areas and significant features for conservation and protection to assist in locating greenway alternative alignments.
- Objective 1b: Identify ecological features that are of interest to the sense of place and environmental interpretive learning opportunities.

GOAL 2: Assess the attributes and conditions of ecological features and identify their restoration needs.

- Objective 2a: Identify gaps in existing ecological resource data and conditions assessment previously performed throughout the project study area.
- Objective 2b: Identify areas along the greenway that need ecological enhancement and restoration, and recommend restoration and management approaches.

GOAL 3: Identify and inform sustainable and regenerative design opportunities for greenway facilities and green infrastructure systems.

- Objective 3a: Identify ecologically beneficial greenway regenerative design opportunities for facilities and amenities utilizing ecological functions and natural processes.
- Objective 3b: Identify green infrastructure integration opportunities and accompanying parameters for tracking ecological footprint and ecosystem services metrics.

Results of GIS Mapping & Document Review

Based on the ecological occurrence overlay analysis, two main areas with high frequencies of ecological occurrences were found. These areas were located along Mill Creek and within and around Jefferson Memorial Forest. Once these general areas of interest were found, the Jefferson County Parcel data was utilized to identify public and private parcels for potential field reconnaissance efforts. Concentrated efforts were focused on publically-available sites with 5-6 ecological occurrences identified. These sites were categorized as “high priority,” and areas with 4 ecological occurrences were given a “medium priority”. “Low priority” public properties were those properties with a frequen-

cy of 3 ecological occurrences. Using these criteria, a total of 21 potential public parcel sites for field reconnaissance were identified, 9 high priority and 12 medium priority sites (see Appendix B, Table 2). Because there were such a large number of high- and medium -priority sites, low-priority sites were not considered. A visual overlay of GAP forest data was included to depict the large forest parcels and forest coverage distribution that might also indicate the need for a greenway connection between otherwise relatively low priority parcels. The more intact large forest parcels were identified within Jefferson Memorial Forest. In addition to the identified potential public parcels, potential private parcels were identified for field reconnaissance. The criteria for prioritization were the same as those for the public properties. Due to the large number of properties identified, only high- or medium-priority parcels were identified. A total of 87 private parcels were identified, 15 of which are Environmental Trust Easement properties. One easement property and all other private parcels were given high-priority. Fourteen easement properties were given medium-priority (see Appendix B, Table 3). Similar to the identified public parcels, the identified private parcels were located along the Mill Creek corridor and around Jefferson Memorial Forest.

Jefferson Memorial Forest

Ecological Conservation Suitability Analysis and Mapping

Using GIS, conservation suitability rankings for georeferenced ecological-system components were developed based on their relative contribution to providing ecological functions pertinent to the project area. While most of the study area is valuable to some degree with regards to ecological functions and processes, the purpose of this analysis was to prioritize and help inform the development of alternatives for greenway development at a master-planning level. The rankings were based on the relative conservation value of different features related to streams and wetlands, geomorphology, vegetation, landscape ecology, and wildlife habitat. Scoring of the separate components ranged from 3 points for items with the highest value and were the most fragile; 2 points for features with a medium conservation value and that could withstand some disturbance but only with the appropriate best management practices or regulations; and 1 point for those components that were more resistant to disturbance. Some features, such as streams, were counted more than once since they provided multiple benefits. The scoring for each ecological component is summarized below:

High Ranking Areas/Features

Ecological features that automatically received the highest points (3) exhibited some combination of providing a multitude of vital benefits and being extremely susceptible to disturbance.

Streams and Wetlands
- Streams and wetlands
- 100-yr floodplain
- Springs and seeps with buffers

Geomorphology
- Erodibility greater than 0.32
- Major karst areas
- Sinkholes
- Slopes greater than 25%

Landscape Ecology
- Forest patches greater than 50 acres

Wildlife Habitat
- Streams and rivers
- Known RTE habitat

Medium Ranking Features

Ecological features with a medium rank (2 points) were very important; but, with careful consideration and design, their ecological value may be maintained or enhanced with the incorporation of less intensive greenway components. Inclusions of high ranking features may exist within these areas but were not identifiable due to the resolution of available data.

Streams and Wetlands
- 100-foot conservation buffers around streams and wetlands

Geomorphology
- Soil erodibility K factor of less than 0.32
- Major karst areas
- Slopes from 15% to less than 25%

Vegetation
- Presence of interior forest, wetlands, or dry oak forest

Wildlife Habitat
- Presence of forest interior dwelling species
- Greater than 50 acres of forested habitat
- Stream corridors (channel plus 100-foot buffer)
- Greater than 40 acres of grassland habitat
- Presence of karst
- Presence of wetlands

Low Ranking Features

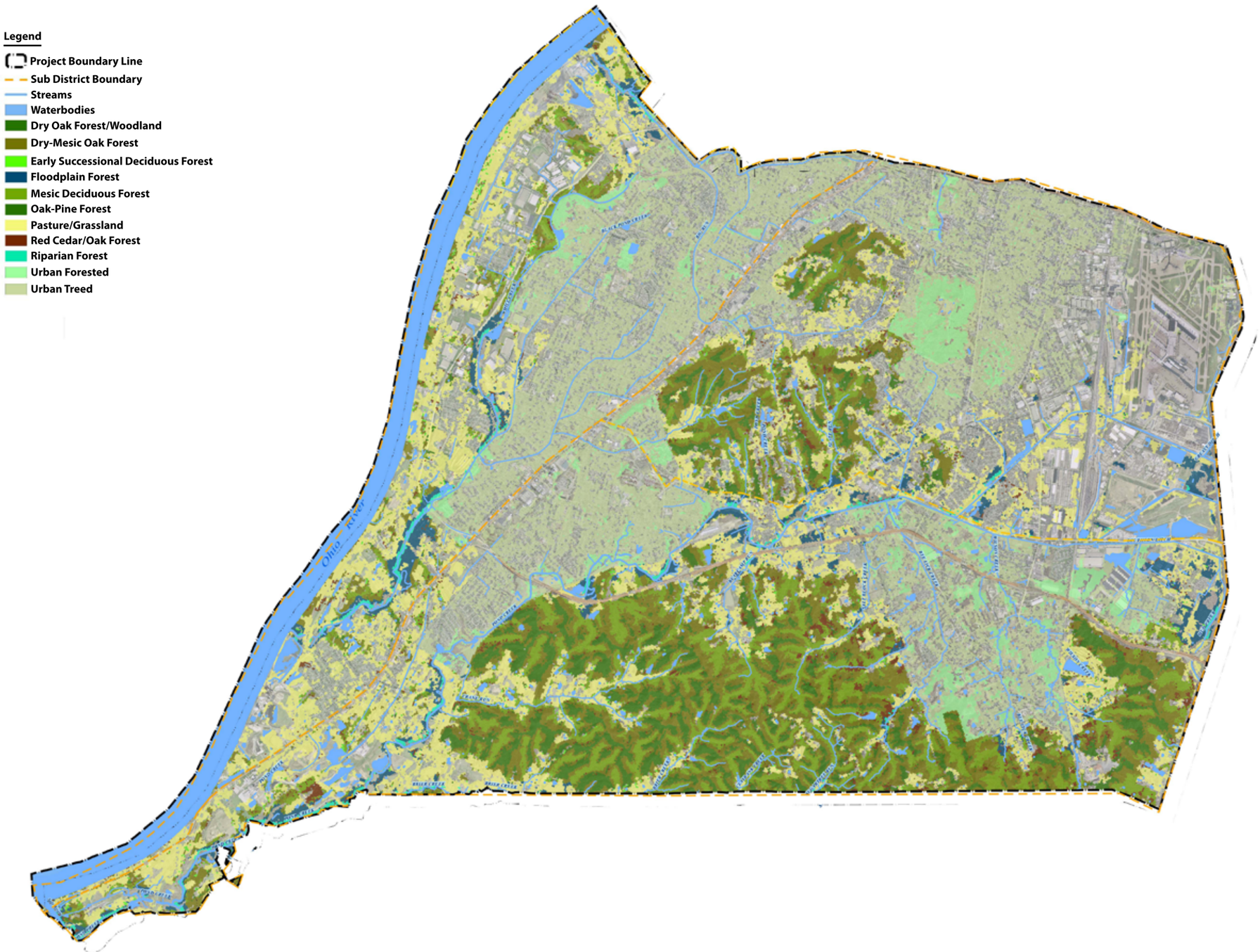
Ecological features with a low rank (1 point) were resistant to disturbances that may result from greenway development. Such areas may contain inclusions of high or medium ranking features due to resolution of the available data.

Geomorphology
- Moderate karst areas
- Slopes from 0% to less than 15%

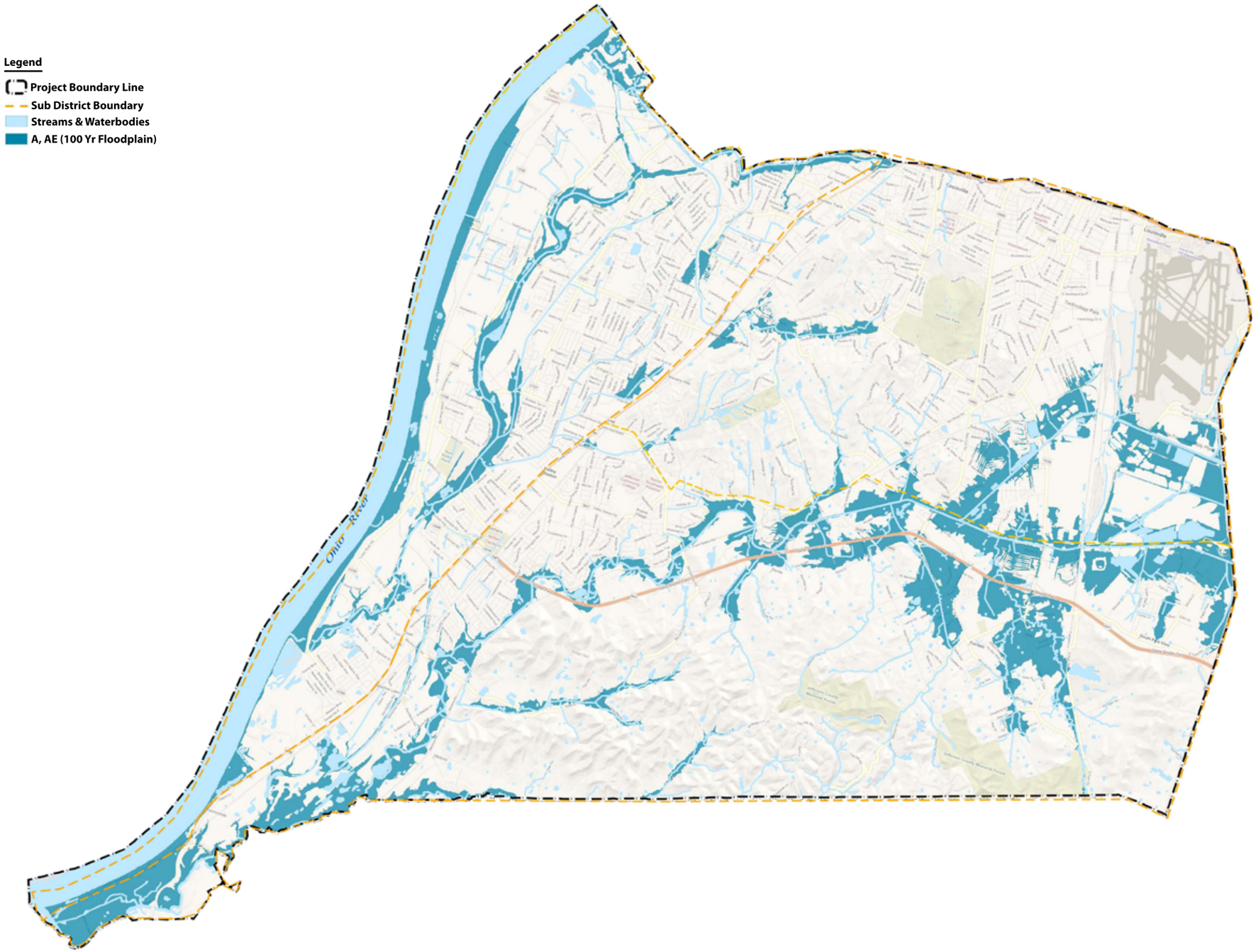
Based on the criteria discussed above, scores were assigned to each ecological component. Then, all scores for each area were added together to estimate a total conservation suitability score for that area. The resulting range of cumulative scores was from 0 to 48 points. Based on several iterations of mapping, Biohabitats developed the following four conservation suitability categories based on the cumulative scores: 0 to 2 points = Low – Disturbance Area for Re-use; 3 to 11 points = Moderate – Conservation Use with BMPs; 12 to 31 points = High – Sensitive Protection Area; 32 points or more = Very High – Preservation Areas. These rankings are shown on the Conservation Suitability map by different shades of green, with the darker shade indicating a higher rank. The lighter low-rank areas show potential locations for higher-intensity greenway development such as visitor facilities and parking lots. Areas with moderate conservation suitability would be best suited for limited development that makes use of low-impact methods. Both the high and very high areas should be protected.

Mill Creek CID Land

Cursory Data Review: GAP Land Cover



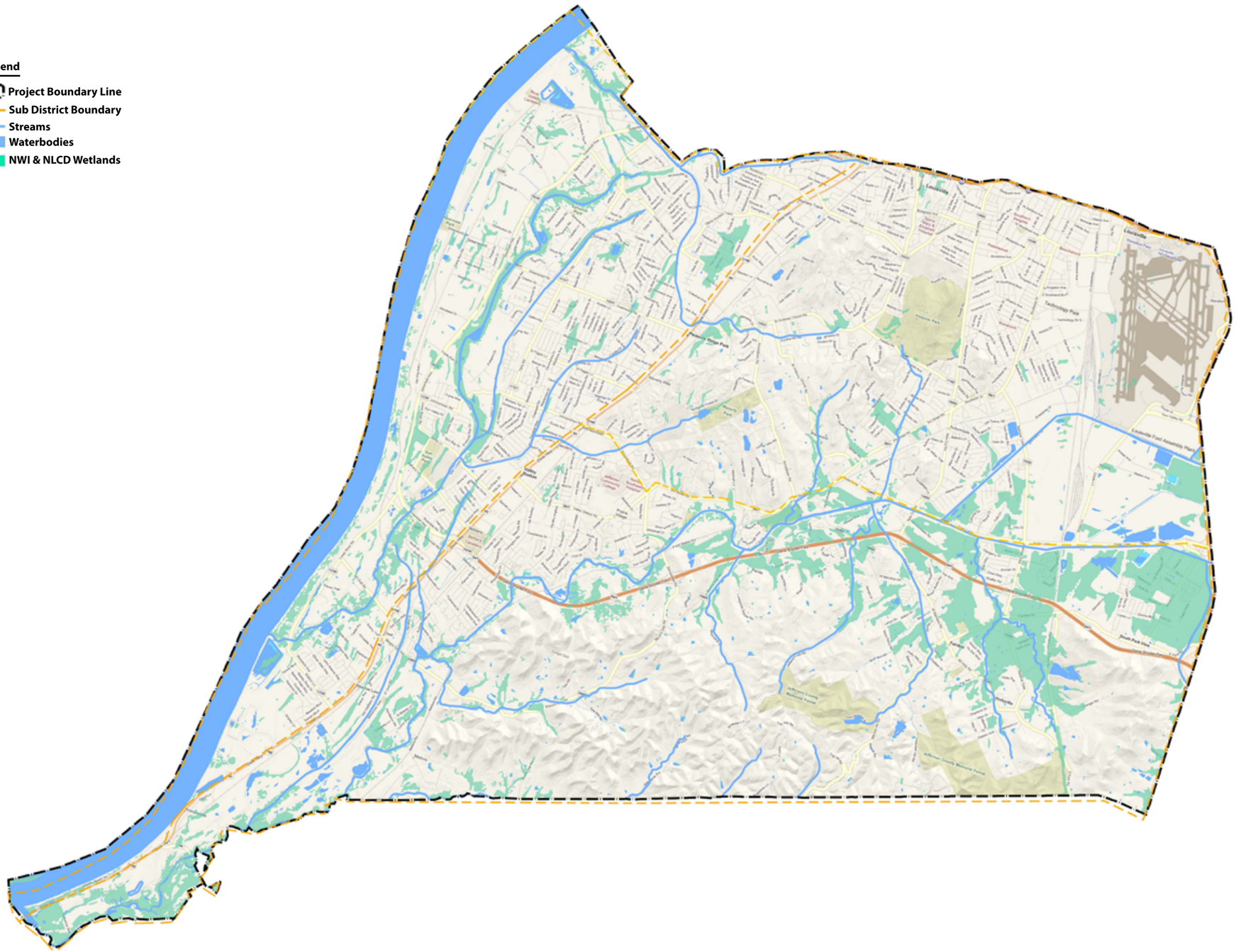
Cursory Data Review: Surface Water Resources



Cursory Data Review: Wetlands

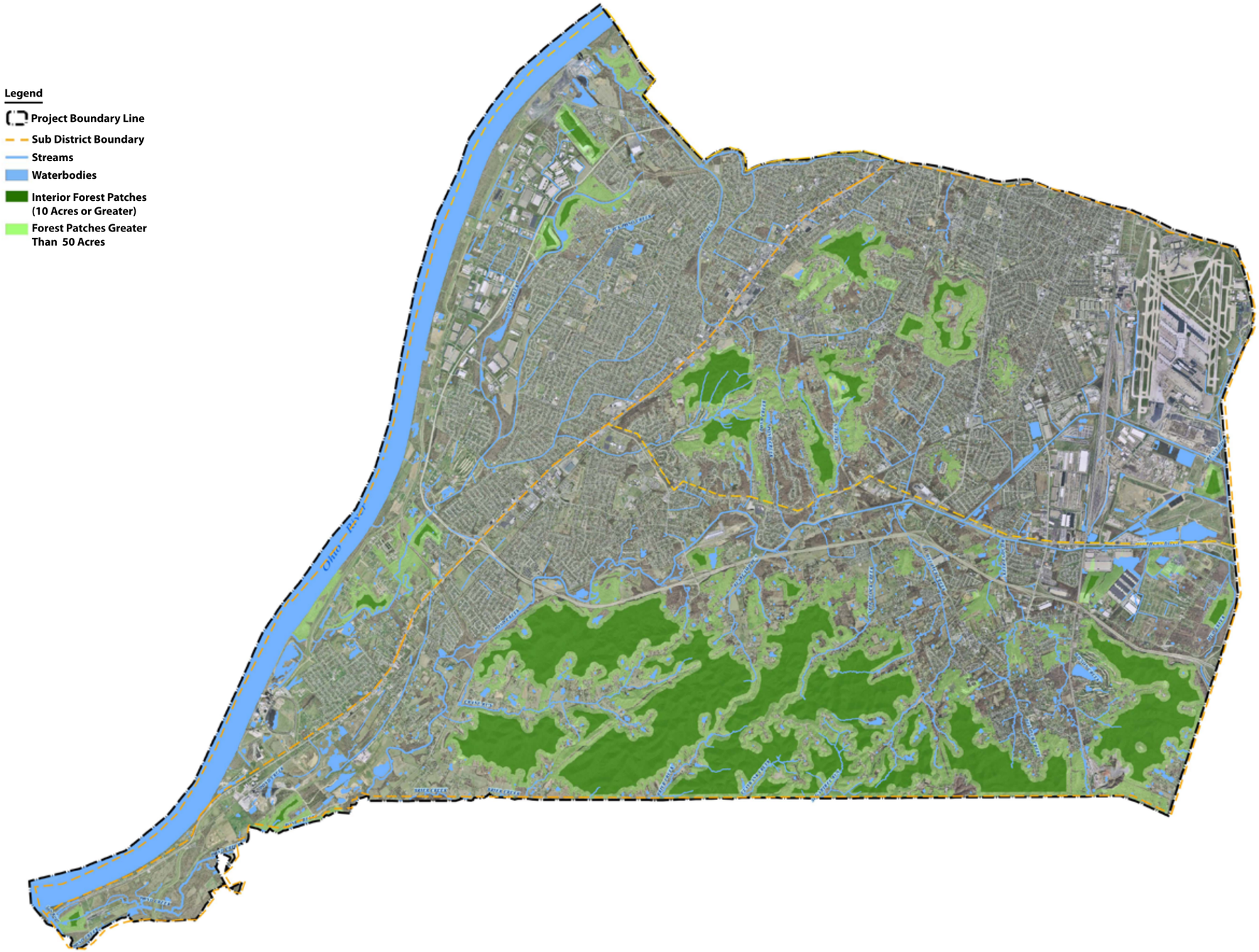
Legend

- Project Boundary Line
- Sub District Boundary
- Streams
- Waterbodies
- NWI & NLCD Wetlands



Cursory Data Review: Hydric Soils

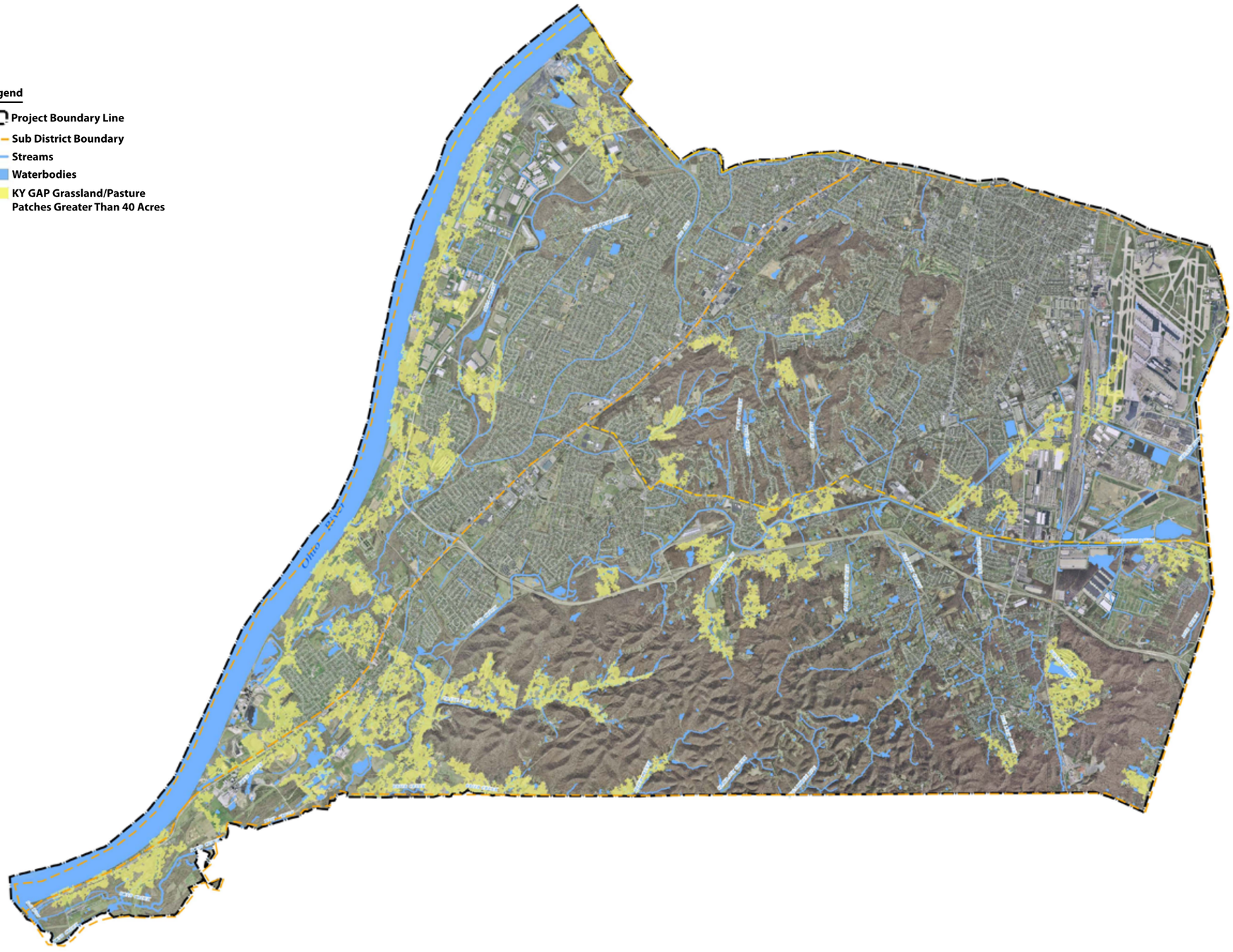
Conservation Analysis: Large Forest and Interior Forest Area



Conservation Analysis: Large Grassland Patches

Legend

- Project Boundary Line
- Sub District Boundary
- Streams
- Waterbodies
- KY GAP Grassland/Pasture Patches Greater Than 40 Acres

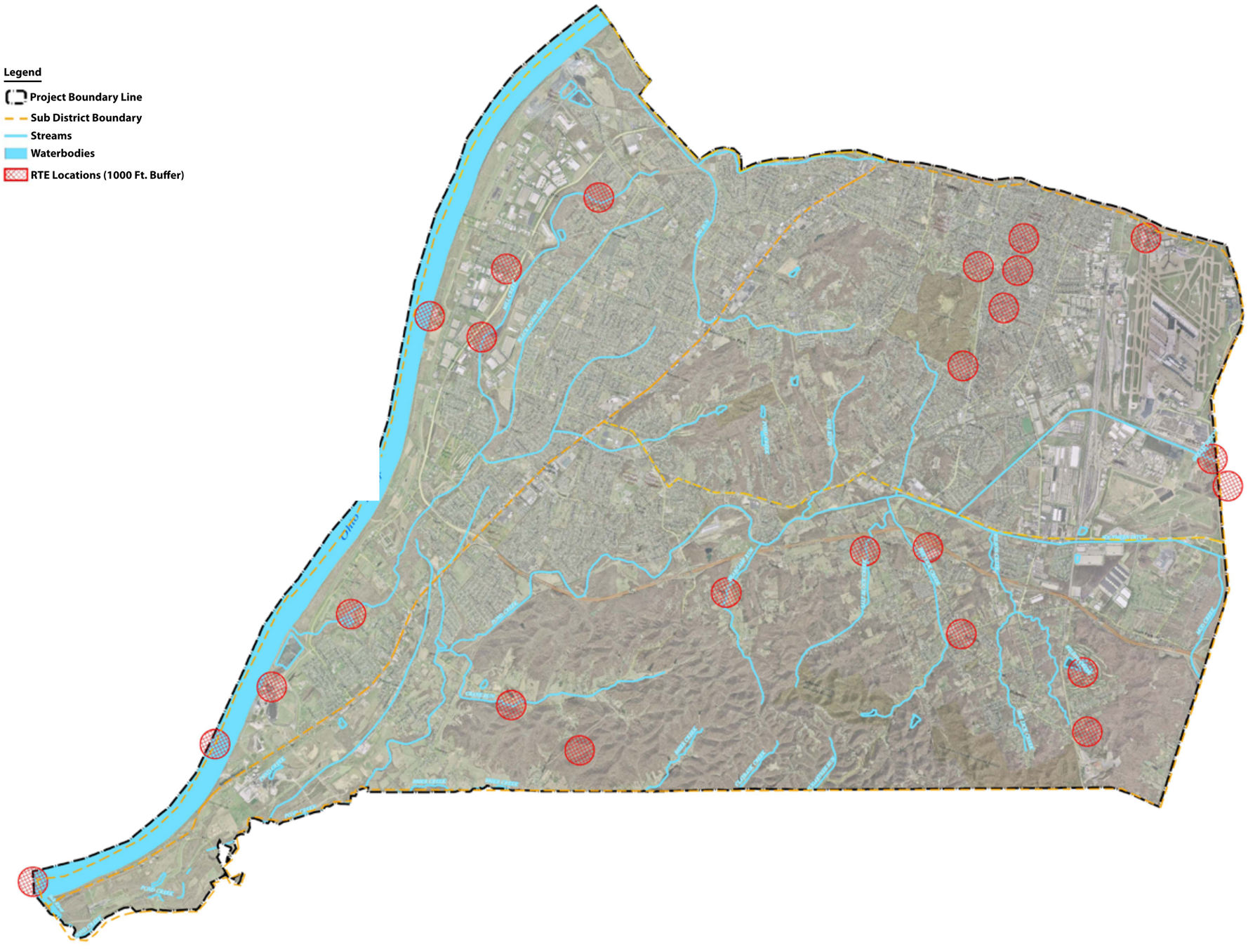


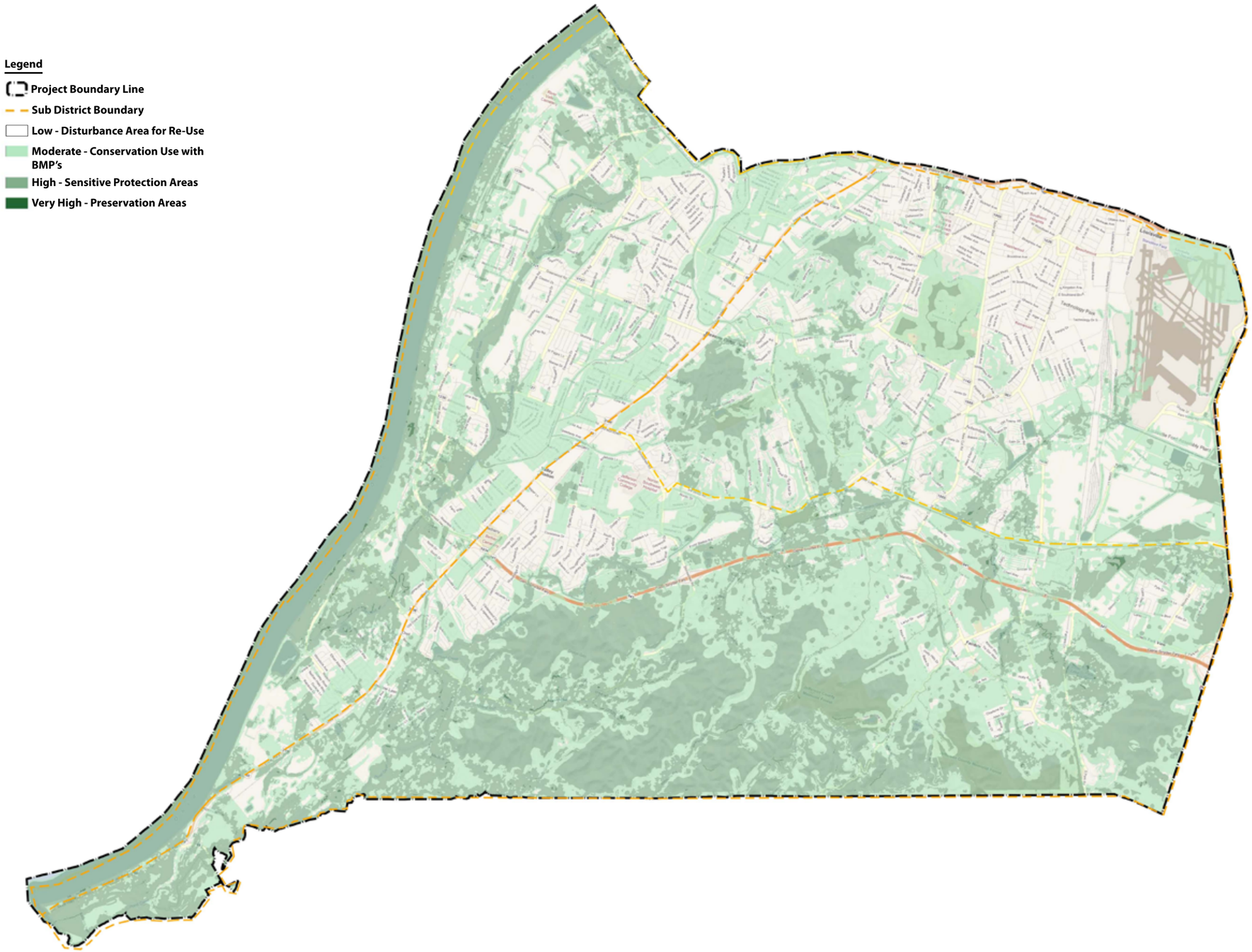
Conservation Analysis: Steep Slopes

Conservation Analysis: Potential Rare, Threatened, and Endangered Species Occurrences

Legend

- Project Boundary Line
- Sub District Boundary
- Streams
- Waterbodies
- RTE Locations (1000 Ft. Buffer)




Legend
Project Boundary Line
Sub District Boundary
Low - Disturbance Area for Re-Use
Moderate - Conservation Use with BMP's
High - Sensitive Protection Areas
Very High - Preservation Areas

Field Survey

In addition to the cursory GIS inventory review a more detailed field survey was conducted for specific locations within the study area. After determining the parcels within the project area that were of high ecological importance, it was necessary to refine the selection further for field assessment efforts. Parcels selected for field efforts were chosen based upon the following factors:

- the ecological importance ranking from the overlay analysis
- The ownership of a parcel with public parcels was given priority over privately-owned land
- The type of ecological features present on the parcel
- The likelihood of the area being part of the greenway

By examining these factors, a range of sites was selected to provide an overall sampling of existing ecological communities within the project area, to determine areas of protection and conservation, and to find opportunities for ecological restoration or enhancement.

A. Resource Assessment Methods

The information gathered during the assessments of the pre-selected parcels was used to categorize these locations as suitable for protection or restoration/enhancement activities as it relates to the alignment of the Louisville South and Southwest Greenways system, to determine ecological communities that are prevalent in the project area, and to help guide the location of the greenways.

1) Stream Assessments

Stream assessments were conducted using data forms and protocols from Stream Visual Assessment Protocol of the U.S. Department of Agriculture (NRCS, 1998). This assessment protocol provides a basic level of stream health evaluation based primarily on physical conditions within the assessment area. The stream visual assessment worksheet consists of two sections: reach identification and reach assessment. In the identification section, basic information was recorded about the reach, such as name, location, and land uses. In the assessment section, scores for up to 15 relevant assessment elements were recorded including: hydrology, bank stability, in-stream habitat, riparian habitat, and in-stream macroinvertebrates. Based on the scores and observations made at each site, general restoration/enhancement opportunities were identified.

Mill Creek

2) Wetland Assessments

Wetland assessments were conducted using field forms and methodology from the Wisconsin Department of Natural Resources, Rapid Assessment Methodology for Evaluating Wetland Function Value (WI-RAM) (WDNR, 2001). Eight functional values were assessed in this methodology: floral diversity; wildlife habitat; fishery habitat; flood/stormwater attenuation; water quality protection; shoreline protection; groundwater; and aesthetics/recreation/education. Existing data sources were reviewed, site visits performed, and questions answered that indicated the presence of factors important for each functional value. The answers to the questions were used as a guide in rating the significance of each functional value for a wetland with possible ratings: low, medium, high, exceptional, and not applicable. Based on the ratings and observations made at each site, general restoration/enhancement opportunities were identified. The following sites were assessed: Windsor Open Space near the confluence of Slate Run and Pond Creek, Mill Creek near Johnsontown Road, Kulmer Preserve at the confluence of the Salt and Ohio Rivers, and Mill Creek near Orell Road.

3) Vegetation Assessments

Vegetation assessments were conducted using field forms and protocols from the California Native Plant Society- Vegetation Rapid Assessment Protocol (CNPS, 2004). The rapid assessment method was used to gather information on species composition and structure within each site and to document impacts and/or disturbance relative to the plant community's health. Based on the observations made at each site, general restoration/enhancement/preservation opportunities were identified.

The following sites were assessed: Farnsley Moremen Landing south of the visitors center, Mill Creek at Greenwood Road near Penile Church, Mill Creek at Winstead Road, Pond/Knob Creek by Shepherdsville Road, and the MSD property along Northern Ditch north of Outer Loop.

4) Avian Surveys

The occurrence of avian species was measured using timed point count bird surveys. Point counts were conducted at two locations and stratified by habitat. Multiple sampling sites at each location were positioned a sufficient distance apart such that birds previously recorded at the previous sampling station would not be recorded again. The first location, off of Moorman Road, represented several types of open field habitat. The first sampling site at this location was located within a scrub/shrub clearing in a forested section along the Ohio River. The second sampling site at the Moorman Road location was located on the edge of the forest along a maintained field and community garden at Farnsley-Moremen. The second location, along Mill Creek near West Orell Road, represented forested habitat. Two sampling sites at these locations were selected, both positioned off-trail.

There are many variations on point count methods. The point count method used followed recommendations established by participants in a national point count workshop and generally follows the basic procedures set forth in Ralph et al. (1995). For this study, a 10-minute point count was conducted at each of the sampling sites that constituted a trail-side or off-road survey site. During the point count, all birds were recorded that were detected and identified by any means

Bald Cypress Stand

during the 10-minute period—including songs, calls, or visual cues—to get as complete a record as possible of the birds present on the site during that period. Birds only seen or heard before or after the sampling time period were not recorded. "Pishing" or the use of attracting devices was not allowed during the count, but was used as a way to attract a bird after a count to get positive identification. Only one observer was permitted to count birds at a single station. During the time of sampling, weather was overcast, but weather did not inhibit sampling (i.e. with fog, rain, or wind). Birds detected by flying over the station rather than detected from within the vegetation were recorded separately. Because not all birds were clearly visible or calling, not all birds were detected that were present. However, it is believed that the majority of avian species at each site was recorded using the point count proce-

dure. (Ralph, C.J., Sauer, J.R., Droege, S., 1995. Monitoring Bird Populations by Point Counts. Gen. Tech. Rep. PSW-GTR-149. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 187 p.)

5) Herpetology Surveys

Herpetofauna were recorded using both daytime visual encounter surveys and nighttime audible surveys. The daytime visual encounter surveys were performed within sampling plots 50 meters long by 20 meters wide at both the Windsor Open Space along Pond Creek, and the Greenwood Road (Mill Creek Greenwood Area) site along Mill Creek. Sampling locations at each property were placed in differing habitats to capture variability in topography, vegetative communities and hydrology that would influence the composition of herpetofauna. At the Mill Creek Greenwood Area, a single sampling plot was surveyed along the Mill Creek corridor and parallel to Greenbelt Highway. At the Windsor Open Space, one sampling plot was located within the forest on the northeast end of the property and one plot was located on the southwest end of the property. Visual encounter sampling was performed by two biologists beginning at one end of the study area slowly and methodically moving through the plot on meandering parallel tracks for 10 minutes (Figure A). During the survey the biologists looked for adult herpetofauna, as well as egg masses and larval forms of amphibians. A considerable effort was spent overturning rocks, logs, and other debris in an effort to locate more secretive fauna.

Although standing water and apparent vernal pools were observed in the plots at both sites, no herpetofauna were found during the timed searches within the plots. One key consideration that may have influenced this outcome is that the field work was preceded by extreme spring weather events, including heavy rain systems, significant flooding, and debris deposition with potential disturbance to herptiles. Bullfrog tadpoles (*Rana catesbeiana*) and one midland painted turtle (*Chrysemys picta marginata*) were observed during a qualitative survey along the flooded west bank of Mill Creek.

Nocturnal audible surveys were performed at one location at Greenwood Road, and at two locations at the Windsor Open Space. Audible monitoring was performed using a modification of the marsh monitoring protocol used by Bird Studies Canada (*http://www.bsc-eoc.org/volunteer/glmmp/index.jsp?targetpg=glmmpfrog&lang=EN*) on the evening of May 23, 2011, when air temperature was approximately 66°F during an evening with light wind. Sampling points were located over 500 feet apart to ensure that anuran species recorded at the previous sampling point would not be recorded during monitoring at other locations on the site. After arriving at a monitoring location, the biologists began recording frog calls after sitting motionless for one minute. Recording continued for a period of three minutes. Calls were recorded by species and the relative intensity of each species. Intensity levels were assigned according to:

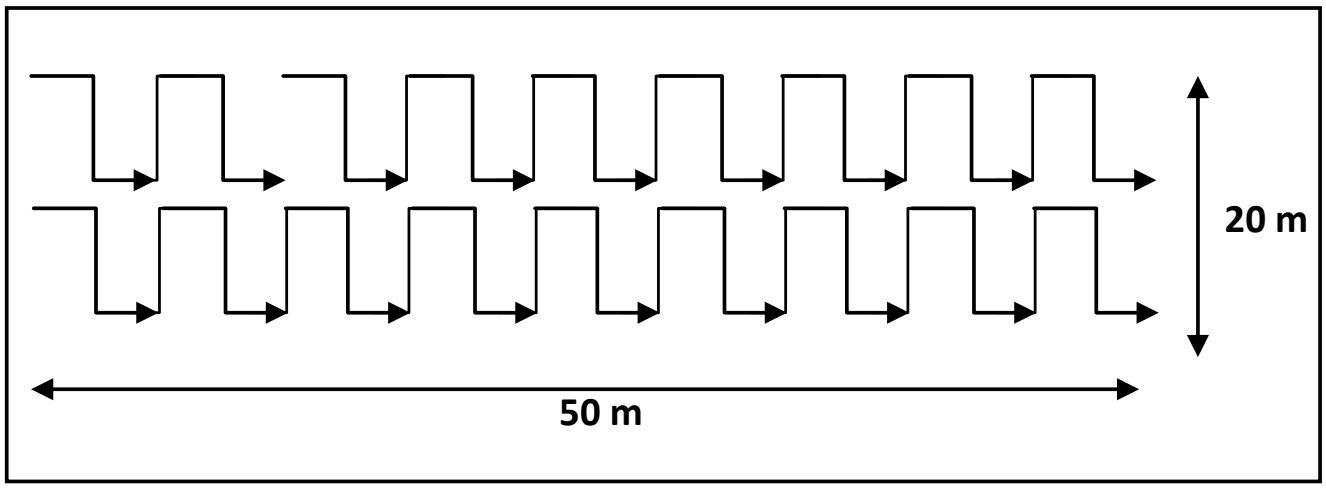


Figure A: Herpetofauna visual survey sampling pattern

1 – Individual calls do not overlap and the individuals can be counted.
2 – Calls of individuals sometimes overlap, but numbers of individuals can be estimated.
3 – The overlap in calls creates a continuous "chorus" and an accurate estimate of numbers is not possible.

B. Results/Recommendation

The assessment was broken into two site visits. An initial visit was scheduled May 16-18th and May 23-24th, 2011 to complete the majority of the field work. Assessments of the stream, wetland and vegetation, avian, reptile and amphibian resources within the project area were performed. A second site visit was conducted after the design charrette and initial greenway alternatives had been developed. This visit took place August 29-September 1, 2011. During this visit, wetland and vegetation assessments were performed in areas that had not been previously visited but were located along trail alignments or could be possible restoration/preservation areas. A stream assessment was also performed along a portion of Crane Run. The following section provides a brief explanation of the findings from the two site visits by type of assessment conducted.

1) Stream Assessment

Many of the streams within the project area originate from the knobs either within the project area or surrounding it. The eastern streams flow in to the Wet Woods area – a large historic wetland located in the southeastern portion of the project site – before entering Pond Creek and flowing to the Salt River. The remaining drainage runs to the Ohio River via Mill Creek and its various tributaries. Large portions of the project site were prone to flooding. Due to human development of these areas, many of the streams were ditched to promote drainage of the surrounding swamps and rapid transport of water through their drainages. Draining the wetlands of the Wet Woods and Ohio River floodplain has caused an irreplaceable loss of important ecological communities. The channelization of the stream corridors in the project areas has caused the functions of the remaining natural ecosystems within the watersheds to degrade, and the headwater tributaries are being affected by severe erosion and incision as they adjust to the changes made decades ago downstream. Most streams within the project area that are not maintained for flood control by MSD are incised. The surrounding riparian habitat is either floodplain forest or upland forest. Often there is heavy ATV usage and illegal dumping along the stream corridor. In places where the streams have been channelized and are maintained for flood control, the infrastructure is often failing.

Erosion along Mill Creek

In the course of this project, approximately three miles of Mill Creek from Moorman Road to the Ohio River were assessed. This portion of Mill Creek was chosen based upon the ecological overlay analysis as described previously and because it was one of the least modified and studied streams in the project area. Mill Creek was divided into six reaches based upon physical characteristics of the stream and surrounding riparian area. Overall this section of Mill Creek is extremely entrenched and incised (banks up to 16 feet tall), with evidence of historical channelization. Floodplain connectiv-

ity and in-stream aquatic habitat diversity is lacking. There is evidence of illegal dumping in the large riparian area, along with heavy ATV usage. The riparian corridor is predominately a second growth upland forest with some invasive species present. All six reaches had scores in the poor range.

Restoration/Protection Mill Creek:

- Install a wet prairie in the field by the pump station
- Retrofit outfall near the pump station
- Remove and fine for illegal dumping
- Curtail ATV usage
- Restore connection to oxbows through removal of dike along stream in certain places
- Restore instream habitat - for example, increase amount of riffles
- Install floodplain bench
- Stabilize eroding banks
- Manage invasive species
- Buy adjacent private properties to keep woodland habitat

A second section of stream was also assessed during the second site visit. Approximately 2,200 linear feet of Crane Run is owned by Metro Parks on the north side of Blevins Gap Road, with another portion on the south side of Blevins Gap Road which was not assessed due to access issues. This portion of Crane Run on the north side of Blevins Gap Road was chosen for an assessment due to the proximity to a proposed trail alignment and potential for restoration. It was assessed as one reach and received a score of "poor." Crane Run has been impacted by a large upstream sediment load and is disconnected from its floodplain. The banks are actively eroding during storm events. The stream has good base flow evidenced by water still within isolated pools which provide fish and macroinvertebrate habitat during dry periods.

Restoration/Protection Crane Run:

- Restore the stream – reconnect to a floodplain
- Watershed assessment (recommended study of basin-wide conditions and impacts)
- Restore adjacent lands to forest habitat

An additional enhancement feature, such as a two stage ditch, could be accomplished along many of the stream channels that have been ditched for flood protection where there isn't room for a more natural stream channel design. This methodology promotes ecological and flood benefits by creating a low flow channel within the larger ditch. The ditch stability is increased which also provides ecological benefits through reduction of nutrients and sediment into the stream system. Within the project area there are ditches that already

ATV Use Along Mill Creek

are beginning to form a two stage ditch on their own. An example is Big Run where it crosses St. Andrew's Church Road by Doss High School. More information on this methodology can be found at: *http://glc.org/basin/pubs/projects/wi_WtSedCoBs_pub1.pdf.*

2) Wetland Sites

Historically, wetlands were one of the predominant ecosystems in the project area. Not much information remains about exactly what they were like, but a guess can be made from looking at the remnants. Most of the wetlands are located along the Pond and Mill Creek stream corridors, and in the Wet Woods, located between Fern Creek Road and the National Turnpike. Existing wetlands in these areas tended to be forested, either hardwood or bald cypress in composition. Along the upper Mill Creek corridor they are still well connected to the stream system and stay wet-

ter than the downstream Mill Creek wetlands and the wetlands in the Pond Creek watershed. Much of the oxbow wetlands along the lower Pond Creek and Mill Creek Corridors are disconnected from the stream, which leaves them drier than they would have been historically. The remnant wetlands in the Wet Woods area are drier because of the ditching and draining that had taken place.

Eight sites were visited for the wetland assessment. The type of wetlands visited ranged from remnant wet woods wetlands to oxbow wetlands and were mostly floodplain forest in composition. Most of the wetlands were lacking in fish habitat and did not exhibit standing water for most of the year. Two of the wetlands are emergent (permanent open water) wetlands: the former Flynn Brothers site and the Mill Creek Rutledge Site. Both of these sites appear to have been created by humans – the former Flynn Brothers site was an old sand pit, while the Mill Creek Rutledge site was a restored wetland. Invasive species present were Japanese stiltgrass, multiflora rose, poison ivy and bush honeysuckle. About half of the sites were missing an understory shrub layer due to deer browse: Kulmer Preserve, Wilson Run, and Northern Ditch MSD sites.

Restoration/Protection:

- Manage invasive species
- Restore wetland habitat along rail line in Kulmer Preserve
- Remove trash
- Prohibit ATV usage at Kulmer Preserve and Mill Creek areas
- Manage for Bald Cypress Swamp at Mill Creek near Greenwood Road
- Don't mow along Mill Creek and Northern Ditch
- Restore Slate Run
- Remove construction access culverts across Slate Run and other tributary to Pond Creek
- Improve species diversity through native plantings (Northern Ditch MSD site and former Flynn Brothers site)

3) Vegetation Assessment

The vegetation communities vary greatly across the project area. The large size of the site allows for multiple predominant types of ecosystems, with the predominant three being wooded wetlands (riparian and non-riparian), upland forest, and meadow/prairie. Sites sampled included riparian habitat from early successional woods at Farnsley Moremen to mid- to late-successional hardwood wetlands with pockets of bald cypress, meadow, and upland forest at the Louisville Water Company site. Most areas tended to be wooded, with the riparian zone along streams being a maple/ash mix and in the uplands an oak/elm mix. Common invasives are bush honeysuckle, Japanese honeysuckle, multiflora rose, Japanese stiltgrass, and euonymus.

	Site							
Function	Kulmer Preserve	Mill Creek Johnson-town Rd.	Mill Creek Orell Rd.	Windsor Open Space	Wilson Run	Wet Woods	Mill Creek Rutledge	Flynn Bros
Floral Diversity	1	2	3	3	2	3	3	1
Wildlife Habitat	2	2	3	3	2	3	3	2
Fish Habitat	1	1	1	NA	1	NA	3	2
Flood Attenuation	1	3	2	1	2	2	3	1
Water Quality Protection	1	2	1	1	3	3	3	2
Shoreline Protection	3	1	NA	NA	2	NA	2	1
Ground Water	NA	NA	3	3	1	1	1	1
Aesthetics/Recreation/ Education	3	2	3	3	3	3	3	2
Scoring:	Low = 1 Medium = 2 High = 3 Exceptional = 4 Not Applicable = NA							

Figure B: Wetland Chart

Restoration/preservation:

- Manage invasive species
- Remove illegal dumping
- Limit ATV usage
- Limit deer access along Mill Creek
- Preserve bald cypress and Indiana Bat habitat along Mill Creek (e.g., conservation easements, interpretive signage, and education of landowners and stewards)
- Don't mow along Mill Creek
- Improve species diversity through native plantings
- Set up hiking trails in the CID land in Bullitt County
- Purchase properties along I-65 south of Outer Loop for preservation/restoration of remaining Wet Woods Habitat.
- Purchase properties along Slate Run for preservation/restoration.
- Restore Slate Run
- Meadow Restoration along powerlines

4) Avian Survey

Between the two survey periods at the Orell site, ten species were recorded. Four species were common to both locations. Most species recorded are relatively common vocal passerines that utilize many types of habitats. Of the species recorded, the veery (*Catharus fuscescens*) and Acadian flycatcher (*Empidonax virescens*) have the strongest association with forest interior habitat. Notably absent are less common passerine species that rely on forest interior habitats, such as wood warblers.

Twenty-three species were identified between the two survey locations at the Moorman Road site. The range of species is reflective of the edge setting at these locations, with forest, old field, field, and open water habitats all proximal to the survey locations. Most species are fairly common to this mixture of habitat settings. Brown-headed cowbird (*Molothrus ater*) is a parasitic nesting species observed at one of the two survey locations. If a strong population of brown-headed cowbird (*Molothrus ater*) is present, this could indicate some threat of parasitism to forest interior dwelling species, such as the Cerulean warbler (*Dendroica cerulean*).

For both sites, volunteer efforts could be used to better define a broader range and frequency of avian usage. The preservation of large mature forested areas (and the possible longer term creation of additional such areas) would help support forest interior dwelling avian species.

5) Herpetology Survey

Four species were recorded at the Windsor Open Space site, and one species was recorded at the Mill Creek Greenwood site. Cope's gray tree frog (*Hyla chrysoscelis*) was the most vocal/dominant species at all monitoring locations and the only species recorded at the Mill Creek Greenwood location during the audible monitoring. The American toad (*Bufo americanus*) and southern leopard frog (*Rana sphenocephala*) were also common at the Windsor Open Space location.

It is highly likely that other anuran species exist at the Windsor Open Space and Mill Creek Greenwood sites. Due to inclement weather conditions, the monitoring was performed during the middle of the amphibian breeding season and may not have captured the vocalization period for some early and late breeding frogs (e.g. spring peeper, wood frog, and pickerel frog). To gain a better understanding of the anuran communities of the project area, it is suggested that a volunteer amphibian monitoring program be considered.

Amphibian diversity and numbers could potentially be improved in greenway areas by increasing the amount of cover and connectivity to permanent, or semi-permanent (vernal pool) bodies of water. Both the Windsor Open Space and the Mill Creek Greenwood Site have adequate cover in the in the form of downed logs and woody debris and are near, or within the floodplains of Pond Creek and Mill Creek, respectively. Habitat in other greenway areas that lack these attributes may be improved by constructing vernal pool habitat and augmenting open meadow areas with woody debris. Over time areas with younger forest stands will develop more cover as older trees provide deadfall.

Historical/Archeological Resources

Cultural Resources

This section provides an overview of the cultural resources located in south and southwest Louisville that may be impacted by the project and how concern for those resources can be integrated into project planning and development. The concerns for cultural resources are two-fold. The first concern pertains to regulatory requirements. Section 106 (16 U.S.C. 470f) of the National Historic Preservation Act is triggered when a project is federally funded or requires federal permitting or approval. Due to this requirement, the project will need to consider impacts to cultural resources listed on, or eligible for inclusion on, the National Register of Historic Places (NRHP or National Register). Development of the South and Southwest Greenways system should be planned in a way that avoids or minimizes impacts to significant archaeological sites, historic buildings and other structures, districts, and cultural resources while highlighting and promoting these resources. This process is overseen by the State Historic Preservation Offices (SHPOs), as well as through consultation with county and municipal governments and concerned public constituencies. Initiating the Section 106 process is appropriate since funding for the South and Southwest Greenways Project was granted by the United States Department of Health, a Federal agency.

The second concern of the proposed network of paths and greenway corridors is to connect the region's neighborhoods to historic sites as well as natural areas and community facilities. Certain historic properties, such as significant historic buildings, neighborhoods, and cultural landscapes, could be destinations or waypoints integrated into the trail system for the education and benefit of the families and individuals who utilize the South and Southwest Greenways corridors.

The information considered within this study drew from a number of archives and repositories. The primary sources of information were site records and investigation reports on file at the Kentucky Heritage Council/State Historic Preservation Office (KHC/SHPO) in Frankfort and the Office of State Archaeology (OSA) at the University of Kentucky in Lexington. Additional research was conducted at the Jefferson County Landmarks Commission, the Filson Club, State Library and Archives, the Kentucky History Center, the Louisville Free Public Library, the University of Louisville Archives and Photo Archives, and Louisville Metro Archives. In addition, the project area was visually inspected to assess and characterize the current cultural and historic landscape. Finally, the cultural resource project team participated in a number of public focus groups for the project where members of the public had opportunities to discuss ideas or concerns related to historic preservation.

Postcard showing Observation Point at Iroquois Park

Assessing Cultural Resource Significance

At the heart of the historical/archeological study process is the identification of historic properties listed on the National Register or eligible for inclusion on the National Register. Historic properties include buildings, structures, objects, sites, and districts that are associated with American history, architecture, archaeology, engineering, and culture. Except in rare instances, they must be at least 50 years old to ensure adequate time has elapsed to allow for consideration of their historic contributions. They must have integrity of location, design, setting, materials, workmanship, and/or feeling and must be associated with at least one of four essential criteria for significance. These include: Criterion A: Significant Events; Criterion B: Significant People; Criterion C: Design/Construction; and Criterion D: Information Potential.

Archaeological Resources

As of June 2011, a total of 259 archaeological sites had been identified within the 98-square-mile project area. They were representative of the history of human occupation in Louisville and the surrounding region. Table 1 on Page 81 lists the frequencies of cultural and temporal "components" represented within this set of 259 sites. In archaeological terms, a "component" refers to the artifacts associated with a specific occupation that occurred at a particular time or by a particular group of people. Many sites were repeatedly occupied over the course of thousands of years and may have multiple distinct cultural and temporal components. The archaeological sites in the project area had archaeological components representative of every temporal period recognized by regional researchers in the American midcontinent. These periods range from the earliest Paleoindian hunter-gatherers who arrived between 9,500 to 9,000 B.C. to residents of early twentieth century historic neighborhoods in Louisville and other communities in Louisville.

The largest, and most reliable, source of data on the presence or absence of archaeological sites within the project area came from a large number of Section 106 compliance investigations that had been conducted over the previous four decades, since passage of the National Historic Preservation Act in 1966. More than 60 archaeological surveys and other subsequent investigations had been conducted. The compliance investigations, along with research projects undertaken in the study area, are summarized in Table X in the Appendix. In all, a total of approximately 5,345.9 acres (8.35 square miles) were systematically examined for archaeological sites. The remaining 57,025.9 acres were not subjected to systematic survey to identify archaeological sites. Additional archaeological sites are likely to be present, many of which may be eligible for inclusion on the National Register.

Farnsley-Moremen House

Table 3 in the Appendix E provides descriptive information and National Register assessment data on the 259 known archaeological sites. Table 4 in Appendix E lists the archaeological sites by their National Register status in a more concise format. Listed below is a breakdown of the NRHP status of sites within the project area. The status description combined NRHP evaluation language as it has evolved with the field, and as such, requires some explanation. Sites within the project area are identified as National Register listed, eligible for inclusion, eligible but mitigated, sites not assessed for eligibility, and not eligible.

National Register Listed (Archaeology Sites)

Three archaeological sites were listed on the National Register within the project area. These include sites 15JF267, 15JF531, and 15JF569. Site 15JF267 is known as the Kentucky Air National Guard (KYANG) site. It was identified in the early 1970s by the Univer-

sity of Louisville during improvements to the KYANG facility at Standiford Field (Bader and Granger 1989). The site is a large Middle to Late Archaic settlement intensely occupied by early Native American groups who exploited the marshlands that once covered much of the area. The site was eligible under Criterion D due to the information it can provide on the lives of the prehistoric groups who occupied the region during this time period. Sites 15JF531 and 15JF569 were both part of the Farnsley-Moremen National Register Property (McBride et al 1989; Stottman and Prybylski 2004; Stottman, Watts-Roy and Rossen 2000; Watts-Roy and Stottman 1995). The Farnsley-Moremen House (15JF531) is an 1830s late Federal to early Greek Revival brick farm house with intact archaeological deposits in the yard and surrounding area. Intact Early Woodland prehistoric deposits were also present and recorded as a separate archaeological site (15JF569). Both are significant under Criterion D. Sites that are listed on the National Register should be avoided or appropriate mitigation measures developed in consultation with the KHC/SHPO. Any historical sites on the greenways should be interpreted.

Eligible for Inclusion on the National Register (Archaeology Sites)

Nineteen sites were determined to be eligible by the KHC/SHPO or had been recommended eligible for inclusion on the National Register. Sites that were eligible had been found to meet one or more significance criteria that warrant their inclusion on the National Register. Though not listed, they should be avoided or appropriate mitigation measures developed in consultation with the KHC/SHPO. Any historical sites on the greenways should be interpreted.

Eligible for National Register but Mitigated through Data Recovery Investigation (Archaeology Sites)

Six of the sites in the project area were determined to be eligible and were subjected to data recovery investigations to mitigate adverse effects. Sites 15JF14, 15JF18, 15JF110, 15JF215, and 15JF243 were all Archaic sites located in the Ohio River Floodplain and were adversely impacted by construction of the USACE flood control levee in the 1970s. The University of Kentucky conducted data recovery investigations in 1978 (Collins 1979). Site 15JF571, the Hall site, was a late nineteenth century lower middle class farm representative of small residential sites in the "Wetwoods" marshes south of Louisville. It was subjected to Phase III data recovery in 1992 Archaeological Resource Consulting Services (ARCS) (Stottman et al. 1992). Because these sites were subjected to data recovery investigations, further investigation may not be required. Consultation with the KHC/SHPO would be required to make this determination.

National Register Eligibility is Not Assessed (Archaeology Sites)

The largest assessment category represented by archaeological sites in the study area were those for which National Register eligibility was not determined. A total of 132 sites were included in this category. Though recorded as archaeological sites with the OSA, they were either never professionally investigated or were subjected to investigations that were insufficient in scale to adequately assess their integrity and potential significance. These sites should be avoided or subjected to minimal assessments necessary to provide preliminary archaeological assessments.

Another nine sites within the project area may be eligible for the National Register based on findings during the initial surveys that identified them. Typically, such sites had intact archaeological deposits and artifacts dating to specific time periods or were indicative of particular cultural groups. Sites that may be National Register eligible should be avoided or would require further archaeological investigation to fully assess their significance and eligibility.

Sites Not Eligible for the National Register (Archaeology Sites)

Eighty-nine archaeological sites in the project area were determined not eligible for the National Register. Eighty-two sites consisted of ephemeral scatters of artifacts, or lacked sufficient archaeological integrity to provide information. Seven of the sites had been destroyed. No further investigations were required on these sites.

Archaeological Sensitivity Areas

Developing a reliable "predictive model" for archaeo-

logical sites in the project area was hampered by a lack of data. Archaeological surveys are spatially restrictive and do not encompass a broad enough cross of the area's geographic features to be considered representative. Successful predictive models were constructed, but additional research would be needed to acquire data sets necessary to build a reliable model.

Temporal/Cultural Component	Date Range*	N=
Prehistoric, Indeterminate (OSA)	9,500 B.C. to A.D. 1700	152
Paleoindian, Indeterminate	9,500 B.C. to 8,000 B.C.	1
Paleoindian, Early	9,500 B.C. to 9,000 B.C.	0
Paleoindian, Late	8,500 B.C. to 8,000 B.C.	1
Archaic, Indeterminate	8,000 B.C. to 1,000 B.C.	15
Archaic, Early	8,000 B.C. to 6,000 B.C.	19
Archaic, Middle	6,000 B.C. to 3,000 B.C.	33
Archaic, Late	3,000 B.C. to 1,000 B.C.	39
Archaic, Terminal	Circa 1,000 B.C.	1
Woodland, Indeterminate	1,000 B.C. to A.D. 900-1000	8
Woodland, Early-Middle	1,000 B.C. to A.D 500	2
Woodland, Early-Middle, Middle-Late	1,000 B.C. to A.D 500; 200 B.C to AD 1000	1
Woodland, Early	1,000 B.C. to 200 B.C.	29
Woodland, Middle	200 B.C. to A.D. 500	11
Woodland, Late	A.D. 500 to A.D. 1000	1
Late Woodland/ Mississippian	A.D. 900-1000 to A.D. 1700	18
Historic, General	Circa 1770 – 1950	43
Total Components	9,500 B.C. to A.D. 1950	374

*Date ranges are from Kentucky Archaelogy, edited by R. Barry Lewis (1996).

Table 1: Frequencies of Cultural Components

Despite these limitations, it was possible to make a generalized assessment of archaeological "sensitivity" based on the distribution of known prehistoric and historic sites. Previously recorded archaeological sites were clustered in three roughly defined areas – 1) the Ohio River floodplain, 2) the interior tablelands (which were once the poorly drained marshlands known as the Wet Woods), and 3) the level floodplain adjacent to Pond Creek that connected the old marshland on the east to the Ohio floodplain on the west. It is possible that this apparent pattern reflects the fact that most of the large archaeological surveys were conducted in these areas. However, many of the archaeological sites in the area were documented in the early 1970s by University of Louisville researchers based on interviews with local artifact collectors and were not discovered as part of systematic surveys. They represent the most "visible" prehistoric sites present in the landscape.

The distribution of sites also roughly corresponds with the topographic division between the floodplain and lowland marshes and the rugged terrain of the knob's on the other. The knobs were an imposing geographic feature that challenged travelers and inhibited historic settlement. The knobs offered economic opportunities in the form of timber and iron ore which was exploited in the early 1800s (Roberts 2001:486). Other than scattered small farmsteads, most families avoided the rugged and isolating landscape. Earlier Native American groups may also have avoided extensive exploitation of the knobs. Native American use of the Knobs includes gathering of chert for stone tool manufacture from outcrops present along ridge tops and knob summits. This area would also have been home to game animals such as whitetail deer, but a broader spectrum of food resources would have been present along the margins of the marshlands and floodplains below the knobs.

Various factors were considered in evaluating the potential for archaeological sites including topographic or landform setting (e.g., floodplains, hillsides); proximity to water; location along major routes of transportation; and the extent of ground disturbances within the area resulting from erosion, construction, or agricultural activities. The close proximity of the study area to multiple creeks suggests that this area may have been an ideal location for seasonal prehistoric archaeological sites and long term prehistoric habitations. Additionally, the long historic occupation of the county suggests the possible presence of historic archaeological sites relating to farmsteads and associated agricultural activities. Finally, the numerous historic transportation routes, such as Dixie Highway, suggest a higher probability to locate historic archaeological resources along its course.

Criteria for determining a high probability of archaeological sites included areas that have close proximity to water (creeks), transportation routes (roads and navigable waterways), and exhibit moderate to level

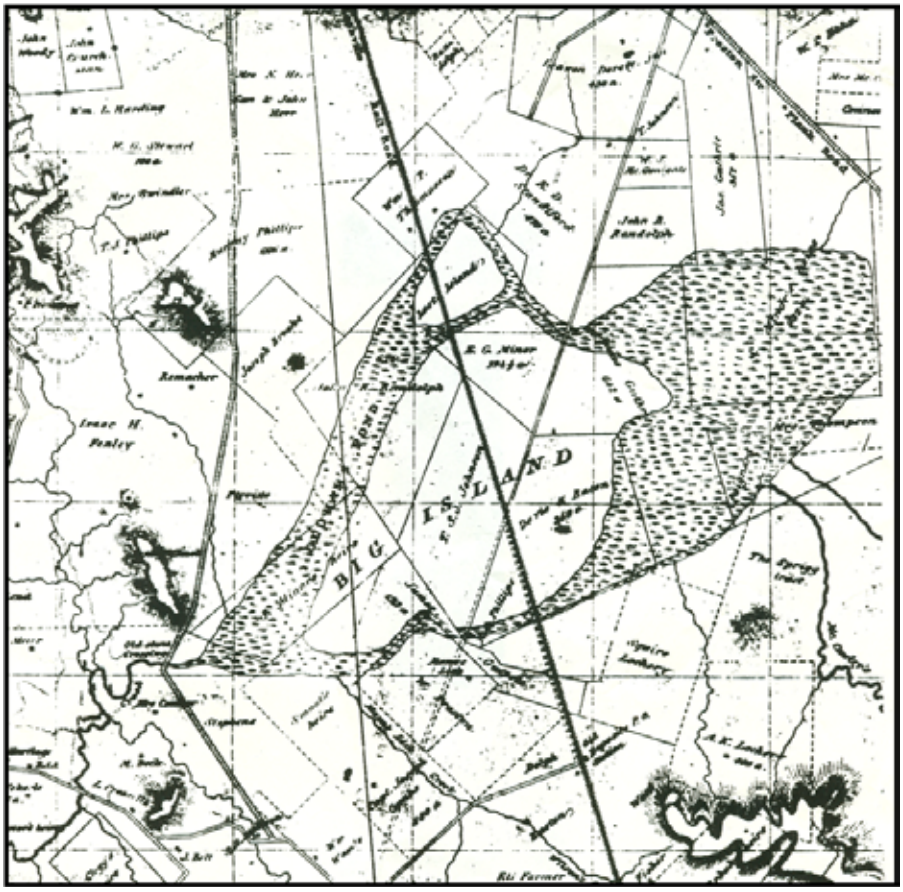
elevation ranges. The criteria for determining a low probability of discovering archaeological sites included areas with steep elevation ranges and areas not in close proximity to water (streams) or transportation routes. Medium probability areas are those areas that did not fall within the high or low probability areas.

Two specific sensitivity zones for archaeological sites, high sensitivity and moderate sensitivity, can be defined within the project area. The "high" sensitivity zones include the Ohio River floodplains along the western boundary of the project area, the old interior marshlands in the northeast portion of the project area near Standiford Field, and the Pond Creek floodplain corridor that connects them. The upland knobs area could be assessed as having a "moderate" sensitivity for archaeological sites. Historic and prehistoric sites are likely to be present in the area, but not in the density that would be expected along the floodplain and marshlands.

Preliminary Archaeological Management Recommendations

The archaeological data discussed in this section and summarized in Tables 3-4 in Appendix E are presented to aid development of the trail system. Development of the trail system should proceed in a manner that avoids or minimizes adverse impacts to significant archaeological sites.

- To the extent possible the proposed trails should be placed in areas that have been previously surveyed for archaeological resources.
- The proposed trail routes should avoid archaeological sites that are listed on or eligible for listing on the National Register.
- The trail routes should avoid previously recorded archaeological sites that may be eligible for the National Register or for which National Register eligibility has not been assessed.
- Archaeological surveys will be needed in those trail corridor sections that have not previously been investigated to determine if significant National Register eligible archaeological sites are present.
- The specific locations of archaeological sites should not be marked as destinations or waypoints along the trail corridor routes, although information regarding the cultural usage of the area would be appropriate.
- In order to minimize impacting unrecorded archaeological sites, it is recommended that routes should be placed in easily accessible areas that have low to moderate cultural sensitivity, as opposed to the Ohio floodplain or old interior marshlands.
- Interpretive signs should be developed to describe the region's cultural heritage as revealed by archaeological investigations.



1858 G.T. Bergmann map of Big and Lost Island

Architectural Resources

The process of identifying historic buildings, areas, and topics was begun by performing research at the KHC/SHPO. A check of the KHC/SHPO database identified approximately 332 resources that had been previously documented including (see Figure 3, Appendix E):

- 115 resources listed on the NRHP.
- 7 resources and structures recommended and accepted as eligible for NRHP listing.
- 136 resources recommended and accepted as not eligible for NRHP listing.
- 53 resources requiring re-assessment for NRHP eligibility.
- 21 resources that have not been assessed for NRHP eligibility.

These resources are a combination of buildings and structures that date from 1796 to 1950. They represent domestic, commercial, religious, transportation, and industrial buildings, as well as bridges and other infrastructure elements (Table 5, Appendix E). The majority of these buildings are privately-owned residences or were located on industrial property with no public access. Only Riverside, the Farnsley-Moremen Landing, the Aydelott House, Fort Duffield, the Little Loom House, Iroquois Park, and Southern Parkway are accessible to the public.

Defining historically sensitive areas for above-ground resources is dependent upon several factors:

- Resources that have been documented and determined eligible for or already listed on the NRHP.
- Areas that, through research, show specific historic significance within the project area based on a specific occurrence, such as the Civil War, or a particular topic, such as recreation or architecture.
- Modern impacts to the built environment associated with the annexation of neighborhoods, industrial development, and alterations to the topography.

NRHP-Listed Architectural Resources

Approximately 115 resources within the project area were listed on the NRHP. These resources include 18 individual resources and 97 contributing resources to two historic districts. The NRHP-listed resources, based on KHC data, included:

- Aydelott House
- Cardinal Hill Reservoir
- Cornelia Bush House
- Cornelia Gordon House
- Fort Duffield
- Iroquois Park
- James F. Miller House/Cedar Hill
- Kosmosdale Depot
- Little Loom House (three buildings)
- Riverside, the Farnsley-Moremen Landing
- Southern Parkway
- Southern Heights-Beechmont Historic District (22 contributing resources)
- S. S. Bush House
- Temple Bodley Summer House

Little Loomhouse

- Waverly Hills Sanitarium (three buildings)
- West Point Historic District (75 contributing resources)

These resources met one or more NRHP criteria for eligibility, and as such, should be avoided. If the proposed routes cannot avoid these resources, the potential adverse impacts will need to be assessed and possibly mitigated. Mitigation occurs in consultation with the KHC/SHPO.

NRHP-Eligible Architectural Resources

A total of seven resources were identified as eligible for listing on the National Register. These resources included a variety of building types and functions, including a private residence, two bridges, a church, a school, and a private residence/camp. These resources had been recommended and accepted as eligible for NRHP listing, and should be avoided. If these resources cannot be avoided, they are to be treated as though listed on the NRHP.

Architectural Resources Not Eligible for NRHP Listing

A total of 136 resources were recommended and accepted as not eligible for listing on the NRHP. These resources required no further documentation or consideration for adverse impacts.

Architectural Resources Requiring Re-Assessment for NRHP Eligibility

Fifty-three resources had undergone some documentation on appropriate architectural survey forms, but require re-assessment for eligibility due to the age of the original documentation. The majority of these buildings are private residences or commercial buildings. While it is best to avoid these resources, should the project be unable to avoid these resources, they will need to be documented and assessed for NRHP eligibility. If a re-assessed resource is recommended and accepted as eligible for NRHP listing, then adverse impacts should be assessed and mitigation performed as necessary.

Architectural Resources Not Assessed

A total of 21 resources had undergone some documentation on appropriate architectural survey forms, but require documentation and assessment for NRHP eligibility because no formal evaluation was made. As with the previous resources, baseline documentation and evaluation would be needed to assess NRHP eligibility and potential adverse impacts from the proposed project. If an eligible resource could not be avoided, and the impact from the project was determined to be adverse, then mitigation would need to occur in consultation with the KHC/SHPO.

Preliminary Architectural Management Recommendations

The architectural data discussed in this section and summarized in Table 5, Appendix E are presented to aid development of the trail system. Development of the trail system should proceed in a manner that avoids or minimizes adverse impacts to significant architectural resources.

- Many of the architectural resources are privately-owned, and as such, would not be directly connected to the proposed trails. It is recommended that these resources be avoided and incur minimal indirect adverse impacts from proposed construction, such as noise or visual impacts.
- NRHP-listed architectural resources that are accessible to the public, or will be in the future, should be incorporated in some manner into the trail system. Iroquois Park, Southern Parkway, Fort Duffield, the West Point Historic District, and Riverside, the Farnsley-Moremen Landing in particular have potentially a higher probability to be directly connected than the Little Loom House, which is in a residential neighborhood, or Waverly Hills, which is currently closed to the public. NRHP-listed resources not accessible could still be incorporated into educational signage to promote these resources.
- Should mitigation of a NRHP-listed or eligible resource be required, non-traditional mitigation measures should be considered.
- Resources that cannot be avoided, or resources that have not been documented and assessed for NRHP eligibility, should be assessed during the design phase. An Area of Potential Effect (APE) should be devised in consultation with the KHC/SHPO, and the resources over 50 years of age within that APE should be documented and assessed for both NRHP eligibility and adverse impacts.

- The themes discussed in the historic context narrative (see Appendix F) will be utilized to create signage and, if desired, even a “walking tour” brochure.

Historical/Cultural Narrative

A historical/cultural narrative for this portion of Louisville was prepared as a part of this project (See Appendix F for full text). A general overview of the people, places and culture of the area was presented. Specific information pertaining to the south and southwest area was included to provide an understanding of the area from earliest development to present day. This information helped the design team make informed decisions when developing the route and to adequately consider potential effects on historical and cultural resources. Information contained in the narrative includes:

- Prehistoric Cultural Context
- Contact Period History
- Historic Period Cultural/Historical Context
- Agriculture
- Architecture
- Education
- Families and People of Interest
- Industry
- Neighborhoods
- Park and Recreation
- Points of Interest
- Religion
- Transportation

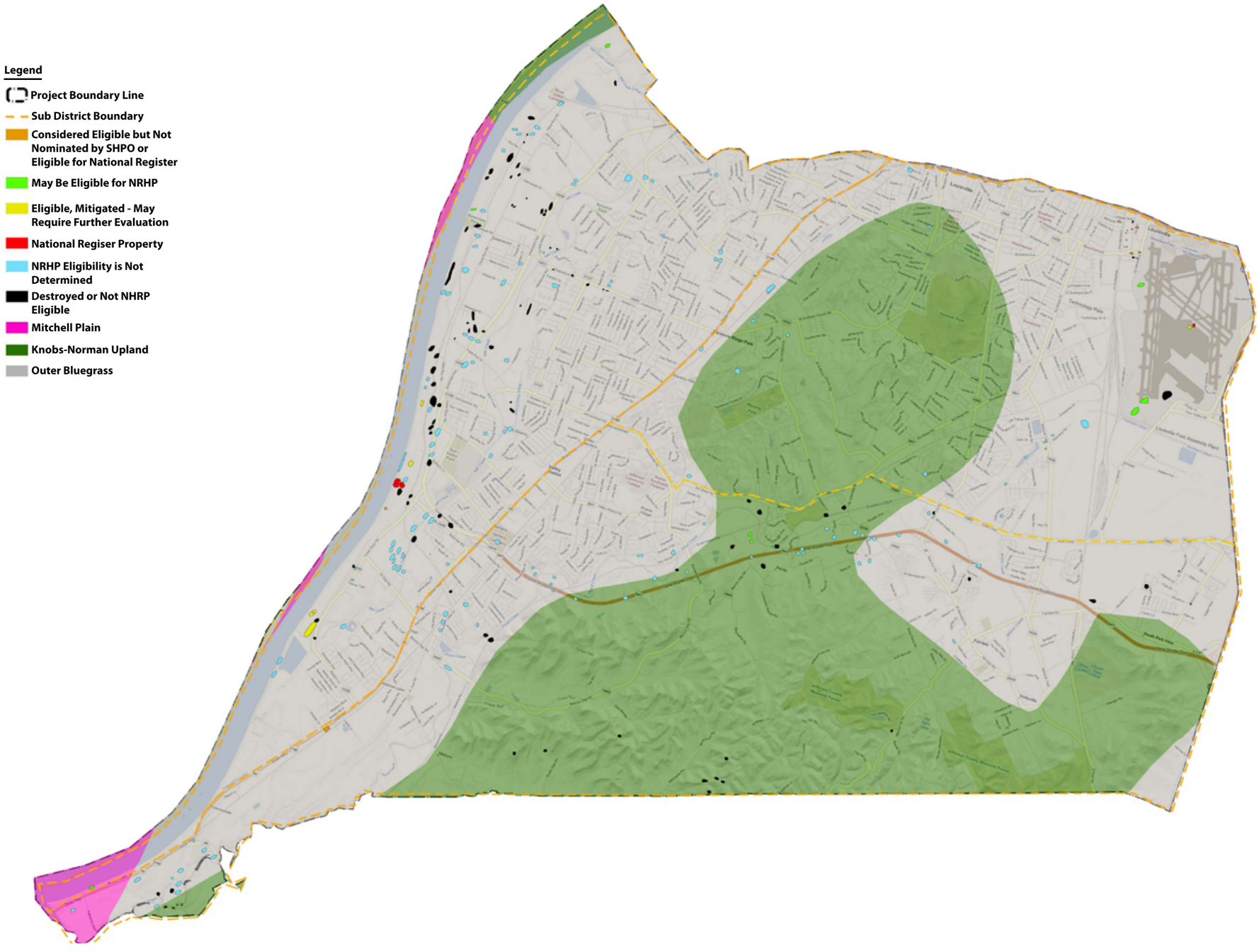
Potential locations for interpretive opportunities were identified on the proposed route map as a result of information presented in the historical/cultural narrative. The narrative will be an important tool for future development of the greenway system and themes along the trail including the development of an interpretive signage system, educational opportunities and potential for tourism.

Waverly Hills Tuberculosis Sanitarium

The Eckstein Norton Institute

James Russell Lowell Elementary School

Cursory Data Review: Ecological Regions



Jefferson County Community Improvement District (CID Land)

Historically, large areas of Louisville and Jefferson County were wetlands. Over the years efforts have been made to drain the swamps, keep the river within its banks and control the inland streams and creeks so development could take place in Louisville. After two major floods in 1937 and 1945 devastated the Louisville area, floodwall construction began. The first 17-mile segment was completed in 1957, which protected the area from Beargrass Creek to just south of Rubbertown. When major flooding occurred in 1964, a push began to expand the floodwall to protect the south and southwest parts of Jefferson County. A voter referendum took place in the 1970's asking voters to approve a property tax increase for several major public projects including flood protection. Of the many projects proposed, only two were approved: the southwest flood protection project and a new "detox" center for alcohol and drug abuse. A board was appointed to oversee these projects known as the Jefferson County Community Improvement District.

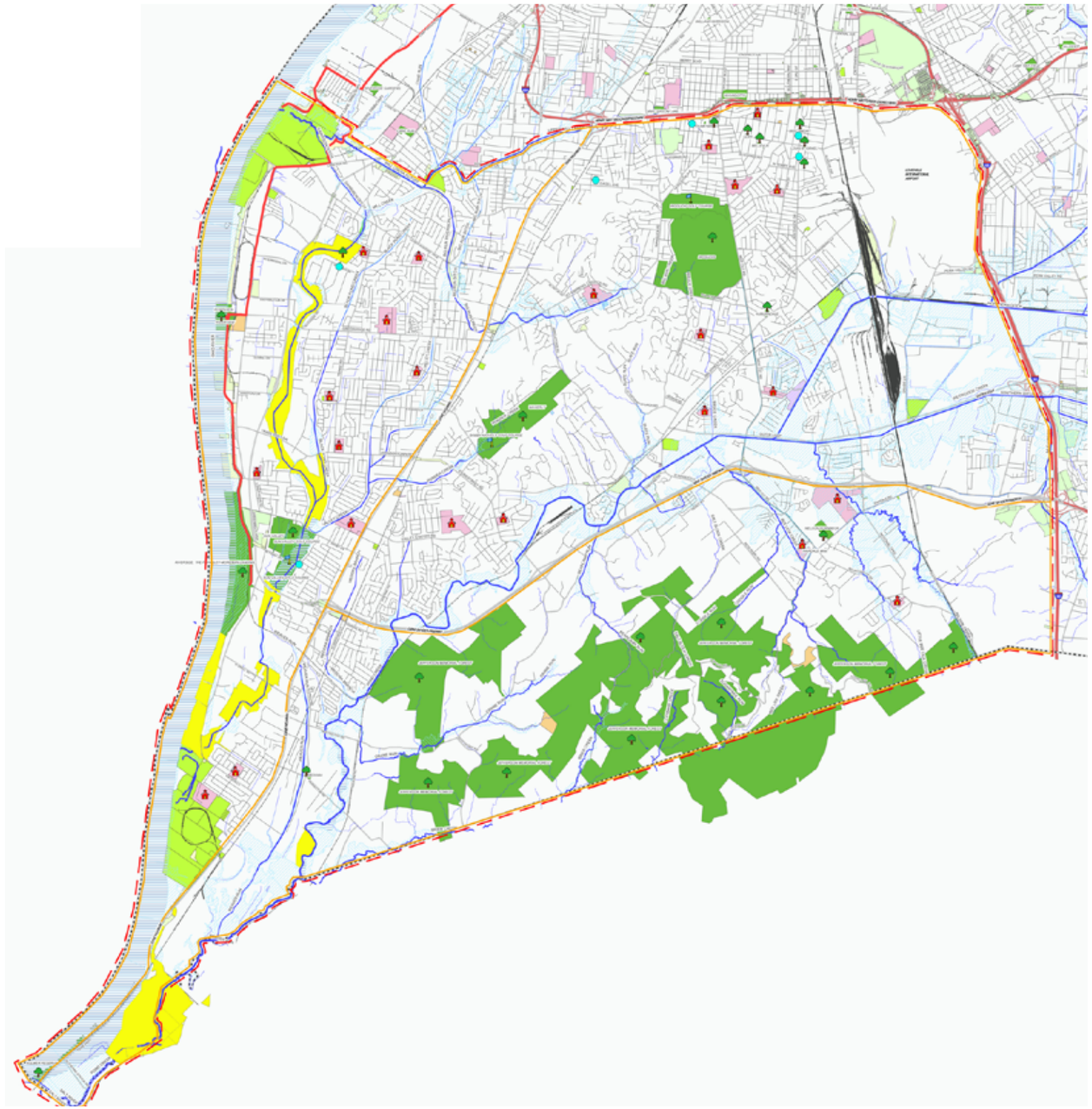
The focus of the flood protection project was to finish the floodwall from Rubbertown south to the Jefferson/Bullitt County line. Inland flooding protection was also a goal along the major watersheds in south and southwest Jefferson County. These included upper and lower Mill Creek, Black Run Creek, Pond Creek and Pond Knob Creek. Land was purchased using CID tax money and later general fund money from Fiscal Court. For the most part, citizens were very supportive of these efforts and there were relatively few legal challenges. Thousands of acres were purchased by the Community Improvement District over a 20-plus year timeframe, including several hundred in Bullitt County.

In 1987, the Interlocal Agreement was entered into between the City of Louisville, Jefferson County Fiscal Court and the Metropolitan Sewer District which turned over all drainage and flood protection responsibilities to MSD. This included managing and maintaining the floodwall and flood control system but not the CID land itself. As time went on, the CID land was no longer a priority with county government, and in some respects, it was forgotten. Over the years, problems occurred with dumping, encroachments, and unauthorized uses of the CID land. Since all of this land was acquired before computerized records, it was often difficult to confirm property ownership and boundaries between the public CID land and private properties. Even PVA records were inadequate and often inaccurate.

In the 1990s, a joint effort between the County Public Properties and Planning Commission offices was begun to document the CID properties. Old deeds and plats were researched, a database was established, and new LOJIC maps were produced. Every piece of property purchased for flood protection in south and southwest Jefferson County and northern Bullett County was documented. In late 1998, a massive deed was recorded that transferred ownership of the CID lands into the name of Jefferson County Fiscal Court. This was necessary to complete the work of the CID.

The primary purpose of the CID land is flood protection (the floodwall) and maintaining the inland lands as floodplains. In two instances CID land has served dual purposes: expansion of the Sun Valley Golf Course and the establishment of the Farnsley-Moremen Historic District. Metro Parks now oversees a portion of the CID lands along Mill Creek from the Riverside Landing at Farnsley-Moremen to Sun Valley Park.

The CID lands provide a unique opportunity for the greenways system. Although not suitable for residential or commercial development because of flooding issues, this land is compatible with a greenway. The linear nature of these largely continuous parcels is another advantage that the greenway system should capitalize on. These lands have been largely ignored since being purchased in the flood protection program. Because of this there are natural areas interspersed with illegal uses such as dumping and ATV use. Locating a greenway trail within the CID land might help to curb some of these illegal activities while providing an opportunity to restore native habitats and environments. The master plan process shall consider these advantages when considering layout of the greenways system.



Note: CID Land Highlighted in Yellow

GREENWAY MASTER PLAN

Section 4

Alternative Development

Upon completion of the inventory and analysis phase of the project, and the intensive two-day consultant charrette, the alternatives map was developed. This map went through several iterations of development. Alternatives were developed to meet the goals and objectives of the master plan but also to remain compatible with the topographic conditions present along each route. Special considerations were given to ecologically, historically and culturally sensitive areas. Routes were located to provide connections to the Louisville Loop, neighborhoods, schools and business centers as well as area parks.

Proposed routes shown on the alternatives map are conceptual in nature. Although the general route and layout has been identified on this map, each segment will need further study and design to bring these routes to implementation. Additional design development will be needed to determine how the greenway crosses roadways and streams. Design will also take into account greenways that could traverse easements and private property and how to minimize impacts to these properties. Routes shown on the alternatives map include a combination of paved trails, soft surface trails, on-road facilities, hiking trails and water trails to meet the needs of a variety of users. Although the general heirarchy of the system was identified on this map, specific trail cross sections were not identified for each segment.

The greenway system illustrated on the proposed alternatives map demonstrates a heirarchy of trails within the system. Primary routes are shown with a bold orange line. Secondary routes are shown with a purple line. Alternative routes for the secondary routes are shown with a purple dashed line. Soft surface trails are shown with a dashed green line. Ecological trails (trails designed to have minimal environmental impact) are shown with a solid light green line. Water trails are shown along waterways with a dashed blue line.

Several criteria were considered in route development in association with the knowledge gathered in the inventory phase of the project. This criteria included:

- slopes
- ecologically sensitive land
- historically sensitive land
- road right-of-ways
- public land
- rooftops reached
- connections from communities to parks, schools, business centers
- scenic beauty
- variety of trail experiences including urban and natural
- trails to serve a variety of users
- economics of trail development
- existing publically owned lands

Also shown on the alternatives map are locations for trail centers, trailheads and interpretive signage. Trail centers would include areas along the trail developed with amenities focused on trail users. Different types of trail centers and trailheads might include:

- retail focused
- user focused (paddlecraft, equestrian, cyclist, pedestrian, exercise enthusiast)
- education focused (ecological, historical, cultural)
- tourist focused

Interpretive signs will play an important role along the greenway trail system. Many of the rich cultural, historical and environmental resources in this part of the county have been lost to development. Interpretive signs can be used to educate on the resources that have been lost but also to bring awareness to reduce the future loss of similar resources in the future. Points of interest were identified on the alternatives map to begin to identify potential locations of signage along the greenways to tell specific stories identified in the ecological and historical inventory of the project area.

It is important to note that routes shown on the proposed alternatives map are conceptual in nature. Routes shown on private property do not mean that this land will be confiscated, condemned or taken for public purpose. Specific route layout will be determined on an individual basis with input from the public and land owners.

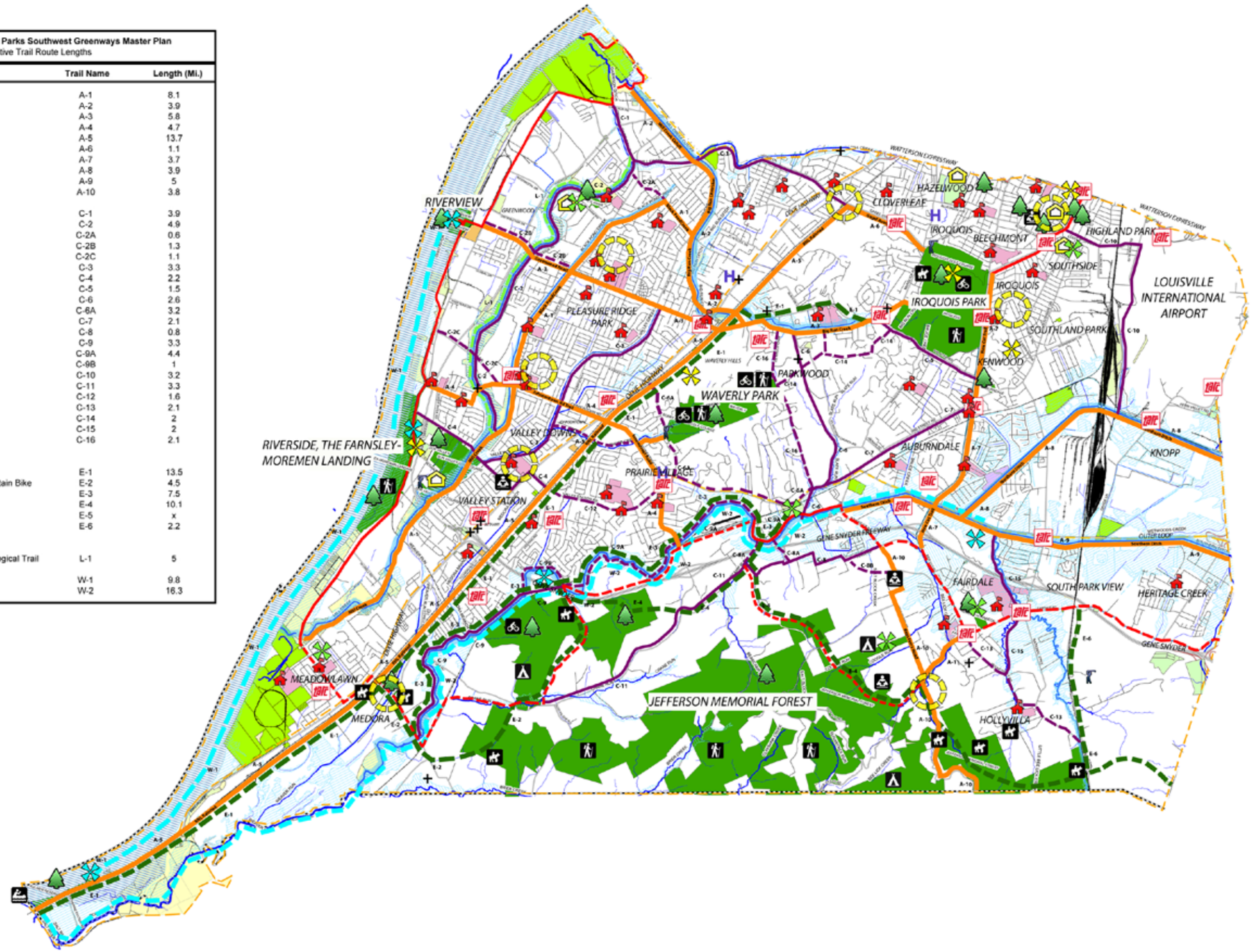
Proposed Alternative Route Map

Legend

- 100 Yr. W/O BFE
- 100 Yr. With BFE
- Floodway
- Metro Parks
- JCPS Properties
- KYState Properties
- LOJIC cid
- Lou Jeff Properties
- LG&E Properties
- Lou Landbank Properties
- Lou MSD
- Louisville Water Co
- Lou County Gov
- Jefferson County Boundary
- Sub District Boundary
- Existing Louisville Loop
- Proposed Louisville Loop
- Hard Surface Trail - Primary
- Hard Surface Trail - Secondary
- Alternative - Secondary
- Soft Surface - Equestrian
- Low Impact Ecological Trail
- Water Trail
- Trailhead/Park - Water Focus
- Point of Interest
- Trailhead/Park
- Trail Center
- Schools
- Parks
- Golf Courses
- Community Centers
- Hospital
- Cemetery
- Library
- Hiking Trails
- Equestrian Trails
- Mountain Bike Trails
- Canoe Launch
- Campground

Louisville Metro Parks Southwest Greenways Master Plan
Proposed Alternative Trail Route Lengths

Trail Type	Trail Name	Length (Mi.)
Primary Trail	A-1	8.1
	A-2	3.9
	A-3	5.8
	A-4	4.7
	A-5	13.7
	A-6	1.1
	A-7	3.7
	A-8	3.9
	A-9	5
	A-10	3.8
Secondary Trail	C-1	3.9
	C-2	4.9
	C-2A	0.6
	C-2B	1.3
	C-2C	1.1
	C-3	3.3
	C-4	2.2
	C-5	1.5
	C-6	2.6
	C-6A	3.2
	C-7	2.1
	C-8	0.8
	C-9	3.3
	C-9A	4.4
	C-9B	1
	C-10	3.2
	C-11	3.3
	C-12	1.6
	C-13	2.1
	C-14	2
	C-15	2
	C-16	2.1
Soft Surface - Equestrian/Mountain Bike	E-1	13.5
	E-2	4.5
	E-3	7.5
	E-4	10.1
	E-5	x
	E-6	2.2
Low Impact Ecological Trail	L-1	5
Water Trail	W-1	9.8
	W-2	16.3



Alternative Development

During the evaluation of the alternative route map, each segment was considered in detail to examine the feasibility and desirability for a greenway along these corridors. Existing physical conditions and the impacts to neighborhoods and communities were considered. The greenway segments were evaluated for their impacts to neighborhoods and neighboring properties in both positive and negative aspects. Each route considered potential connections between neighborhoods and schools, business districts and scenic areas of the county, including parks. Basic amenities for the trail system were also considered during the development of the alternatives map. Some of these amenities include potential locations for interpretive signage, trailheads and trail centers. The trail centers are areas along the trail developed with uses that cater specifically to the trail. Uses might include bike shops, ice cream shops, education centers and other trail related retail uses. The following segment descriptions highlight the main considerations for each segment.

Segment Name: Black Pond Creek – Lower Hunter's Trace
Symbol: A-1
Length: 8.1 miles

- Wide "easement" footprint
- Portions of top bank flat and maintained by adjacent property owners
- Parallel to Mill Creek corridor allowing heavy foot traffic to stay off of ecologically sensitive areas
- Traditional greenway character (as opposed to adjacent to roadway)
- Lower Hunter's Trace has wide verge with existing sidewalks – provides direct link to school
- Connects with Mill Creek corridor below area of highest environmental sensitivity
- Connects with Sun Valley Golf Course and Community Center

Segment Name: Mill Creek Cut-off – Big Run Creek
Symbol: A-2
Length: 3.9 miles

- Access from Iroquois to the Loop in combination with segment A-3
- Traditional greenway character
- Piped under Dixie Highway – will need to cross at grade of Dixie Highway
- Many small culvert crossings under roads – trail will have to rise to roadway level to cross over rather than through an "underpass"

Segment Name: Greenwood Road – Big Run Creek
Symbol: A-3
Length: 5.8 miles

- Access from Iroquois to the Loop in combination with segment A-2
- Planned multi-use path with roadway improvements to Greenwood Road
- Combination of greenway character with multi-use path in more residential area
- Direct connection to three schools and trail system
- Connection to Southwest Government Center with Big Run Creek directly adjacent
- Trail Center opportunity at Greenwood Elementary School area
- Retail/Commercial opportunity with existing ice cream shop and small town center area along Greenwood Road near Valley Creek

Segment Name: Johnsontown Road – Stonestreet Road
Symbol: A-4
Length: 4.7 miles

- Existing developed intersection at Dixie and Johnsontown Road with crosswalks and pedestrian signals
- Wide verge with existing sidewalks along portions of Johnsontown Road
- Planned roadway widening for Stonestreet Road
- Connection between Waverly Park and JMF
- Connection between JMF and the Loop

Segment Name: Railroad Corridor Adjacent to Dixie Hwy.
Symbol: A-5, E-1
Length: 13.7 miles

- Wide right-of-way with utility easements adjacent to rail corridor
- Current use of corridor by neighborhoods
- Existing buffer from Dixie Highway
- Gentle grade of railroad
- Desired length of equestrian and mountain bike

trail (over 12 miles)
- Connection to southern areas of the county and Hardin County
- Opportunity for combination system of multi-use path for bike/ped. and soft surface trail for equestrian/mountain bikers

Segment Name: Gagel Avenue
Symbol: A-6
Length: 1.1 miles
- More residential character with some distance from Dixie Highway
- Connection between Dixie and Iroquois Park with Segment C-1
- Connection between Iroquois Park and the Loop with Segment C-1
- Overhead electric lines set back from edge of pavement – easement established with wide front yards

Segment Name: New Cut Road
Symbol: A-7
Length: 3.7 miles
- Connection to Olmsted Parkways system
- Good north-south connection between Iroquois and JMF via the Loop
- Existing overpass over Gene Snyder Freeway
- Opportunity for Trail Center at Colonial Gardens and existing coffee shop across from Iroquois Park
- Cultural connection – Little Loom House
- Connection to Beechmont Historic District
- Potential trailhead opportunity at Southern Ditch crossing
- Commercial corridor opportunities with development along New Cut Road

Segment Name: Northern Ditch
Symbol: A-8
Length: 3.9 miles
- Could establish more traditional greenway character while bringing more of stream character to Northern ditch
- Currently used by neighborhoods
- Provides connections to areas east of study area
- Existing access road along ditch could be utilized
- Wide “easement” footprint of ditch

Segment Name: Southern Ditch
Symbol: A-9
Length: 5.0 miles
- Opportunity to buffer Outer Loop
- Currently used by neighborhoods
- Portion of Outer Loop scheduled for road widening
- Wide “easement” footprint of ditch
- Large culvert under New Cut Road

Segment Name: Keys Ferry Road – Mitchell Hill Road
Symbol: A-10
Length: 3.7 miles
- Direct connection to JMF Visitors Center
- More rural character – fewer driveway crossings
- Becomes windy and narrow
- Keys Ferry Road fairly flat

Segment Name: Mitchell Hill Road – JMF Trail – Blevins Gap Road
Symbol: A-11
Length: 7.5 miles
- Hilly route
- Utilize forest trails to cross area
- Bring visitors into JMF instead of around
- Possibly enough right-of-way along Blevins Gap Road for trail
- Rural in nature
- Scenic route

Segment Name: Garrison Ditch – Mill Creek – Rockford Lane
Symbol: C-1
Length: 3.9 miles
- Wide “easement” footprint
- Neighborhoods currently using
- Connection between Iroquois and the Loop
- Need to cross at grade on Dixie at Rockford Lane – need intersection improvements
- Wide right-of-way along Rockford Lane with existing sidewalks
- Challenge with several driveway crossings

Segment Name: Mill Creek North
Symbol: C-2, L-1
Length: 5.0 miles
- Wide “easement” footprint
- Potential lower-level use trail or as main arterial in-

stead of Black Pond Creek
- Potential ecological restoration project with soft surface trail for local use only
- Low impact trail incorporated with restoration project used for education
- Boardwalks in select areas over wetlands
- Many opportunities to access creek from neighborhoods at street dead ends
- Connects with two primary east-west routes

Segment Name: Mill Creek Restoration Alternative
Symbol: C-2A, C-2B, C-2C
Length: 0.6 miles, 1.3 miles, 1.1 miles
- Alternate if purely restoration project is design choice for Mill Creek North
- Connections to Mill Creek for education and monitoring along Greenwood Road, Global Drive and Lower Hunter's Trace

Segment Name: Valley Creek
Symbol: C-3
Length: 3.3 miles
- Wide "easement" footprint
- Opportunity to re-establish as creek instead of ditch
- Currently used by neighborhoods
- Occasional pedestrian bridge over ditch
- Flat bank top – maintained
- Reaches into neighborhoods and not just around
- Many opportunities to access at neighborhood street dead ends
- Opportunity for trailhead/feature at confluence of Valley Creek, Big Pond Creek and Mill Creek – currently private property
- Runs behind potential Trail Center and Valley Station High School

Segment Name: Ashby Lane – Valley Station Road
Symbol: C-4
Length: 2.2 miles
- Access to Sun Valley Park/Community Center
- Potential for feature/trailhead at intersection with Dixie – KYTC ownership
- Potential for trail to cross Dixie Highway at intersection with Ashby Lane – would need intersection improvements
- Wide shoulders on Ashby Lane with overhead electric set back from edge of pavement
- Lower traffic volumes

Segment Name: Palatka Road
Symbol: C-5
Length: 1.5 miles
- Scheduled for road widening
- Wide right-of-way with large front yards and overhead electric set back from edge of pavement
- Scenic route along Iroquois Park
- Connects two primary routes

Segment Name: Overhead Electric Easement From Big Run Creek to 3rd Street Rd.
Symbol: C-6
Length: 2.6 miles
- Established wide easement backing up to private properties
- Portion of north-south route from Iroquois to JMF
- Opportunity to provide greenway character to trail
- Potential challenges with terrain through corridor
- Existing buffer between easement and adjacent properties

Segment Name: 3rd Street Road
Symbol: C-7
Length: 2.1 miles
- Overhead electric set back from pavement edge along portions of the roadway
- Deep front yards – wide right-of-way
- Fairly flat terrain
- Connection between neighborhoods and Iroquois and JMF

Segment Name: Penile Road – Blevins Gap Road
Symbol: C-8
Length: 1.8 miles
- East-west alternative to hilly route through JMF
- Scenic, windy rural roadway – opportunity to show different character of southern Jefferson County

Segment Name: Pond Creek
Symbol: C-9
Length: 3.3 miles
- Cross under Gene Snyder at existing sand pit entrance
- Opportunity to provide trailhead/park feature on

sand pit property
- Many neighborhood roads dead end at Pond Creek creating easy access into neighborhoods
- Connect with proposed Kosmos greenway trail
- Opportunity to provide some restoration features to Pond Creek

Segment Name: Woodlawn – Crittenden Drive
Symbol: C-10
Length: 3.2 miles
- Wide right-of-way on Crittenden Drive
- Access to employment centers near airport
- Existing verge with sidewalks along Woodlawn Avenue – potential to widen sidewalks for multi-use trail

Segment Name: Arnoldtown Road
Symbol: C-11
Length: 1.8 miles
- North-south access to Waverly Park
- Some hilly terrain with steep side banks – may be challenging for typical multi-use path
- Scenic route

Segment Name: Valley Station Road
Symbol: C-12
Length: 1.3 miles
- Scheduled for road widening
- Connection to Trail Center at Valley Station High School
- Established intersection at Dixie Highway
- Connection to Stuart Middle School
- Wide right-of-way with existing sidewalks on one side and deep front yards

Segment Name: Mount Holly Road
Symbol: C-13
Length: 1.8 miles
- Scheduled for road widening
- Connection to Wilson Creek and Fairdale Trail Center
- Connection to Coral Ridge Elementary School
- Narrow and windy in locations – slower traffic speeds

Segment Name: Cardinal Hill
Symbol: C-14
Length: 1.3 miles
- Hilly terrain
- Connection to back of YMCA
- East-West connection to Iroquois Park
- Scenic route
- Potential cooperation from the Louisville Water Company to allow trail on their property

Segment Name: Pendleton Road
Symbol: E-2
Length: 2.5 miles
- Soft surface equestrian trail adjacent to roadway
- Lower traffic and lower speeds along roadway
- Provide connections between trail along railroad corridor and JMF and Pond Creek trail
- Connection to Trail Center in Medora

Segment Name: Palatka Road
Symbol: E-3, W-2
Length: 7.5 miles
- Soft-surface, low impact trail along Pond Creek
- Create more loop opportunities between JMF and Iroquois Park

Final Master Plan Routes Map

Each alternative route was reviewed in detail with the client and by the consultant team. The feasibility of each route was revisited through field verification and review of inventory and analysis mapping and reports. Each route considered both the opportunities and constraints of each segment in terms of physical terrain, impacts to the environment and the number of users that could be reached. The team reviewed the alternative routes to re-evaluate their impact on ecologically and historically sensitive areas. Routes were reviewed in terms of their impact to local residents and to evaluate their effectiveness in providing connections to local destinations identified in the inventory phase of the project including schools, recreation facilities, business centers and parks.

This review culminated in the development of the master plan routes map. The master plan routes map includes primary and secondary routes along with soft surface trails for equestrian use and water trails for paddlecraft. Suggested trailhead/park locations are shown for the project area.

The master plan routes map also identifies locations for interpretive signs with a historical/cultural and ecological focus. These locations were determined from the inventory reports of these resources. Interpretive signs will be used to tell the story of this area of the county and to educate trail users on the ecological, historical and cultural resources near the trail.

The master plan routes map illustrates the web of trails that will connect different areas of this portion of the county including schools, recreation centers, business centers, tourist destinations, community centers, and transit bus routes. This map also identifies the hierarchy of each trail within the system. The primary routes are shown in orange. The secondary routes are in purple. Soft surface trails are shown with a green dash. The water trails are shown with a blue dashed line. The Louisville Loop is shown in a solid red and red dash (proposed location) line. Trail Centers are depicted on this map with a yellow dashed circle. Icons on the map show the location of current amenities and facilities as detailed in the map legend.

Small Area Concept Plans

Following the final master plan routes map are the small area concept plans. The small area concept plans were developed to demonstrate the amenities that could be provided within certain types of trailheads/centers. The concept plans were developed based on a particular user group focus but encompass amenities for all user groups along the trail, including local residents and tourists alike.

Greenway Trail Center Concept Plan (See Page 105)

This concept plan demonstrates the typical uses and amenities that might be found at a Trail Center along the greenway system. The Trail Center includes retail uses oriented towards trail users and might include "pop-up" retail uses in addition to permanent structures and uses. Uses could include a coffee shop, restaurant, bike shop, ice cream shop and convenience store. Amenities for trail users should also be provided at the Trail Centers, including bike parking, trash collection, water, seating, shade, bathrooms and wayfinding information. When space is available, parking should be provided at Trail Centers to serve as trailhead entry points for the greenway system. Trail Center locations shall be coordinated with TARC and shall be near TARC stops when possible.

Greenway Trailhead at Existing Parking Center Concept Plan (See Page 106)

This concept plan proposes the use of an existing government parking area. There is an existing recreational use (tennis courts) located at this parking area. The concept suggests expanding the current sidewalk system to provide connections to the greenway trail system. In addition, the typical amenities of a trailhead are located at two points off of two spurs of the trail allowing a larger group of trail users access to the amenities. Wayfinding and mapping of the greenway system are also provided at this location.

Equestrian Trailhead Center Concept Plan (See Page 107)

This concept plan introduces a Trail Center focused on the equestrian user. With parking and camp sites configured for the equestrian user (including larger parking areas, horse spray-off areas, mounting blocks, corrals and stables) this Trail Center would connect with the

Greenway Master Plan

Jefferson Memorial Forest and a spur of the greenway system leading into JMF. The equestrian campground would be a tourist destination for equestrian users wishing to explore both the greenway system and the Jefferson Memorial Forest. In addition, parking provided for vehicles and trailer parking would make this center a convenient trailhead location for local users to access the greenway system.

Adaptive Reuse Concept Plan (See Page 108)
The Adaptive Reuse Concept Plan illustrates potential uses for a vacant property. This property was previously used as a roadside motel. The concept plan recommends renovating the current buildings to provide rooms for overnight stays for greenway users, a visitors/education center and a cafe/convenience store. The concept plan provides uses for both tourist, and local residents. The education center could be used for field trips for schools from throughout the county. The variety of uses would provide a destination which could be used in association with the greenway trail system or separate from the greenway system.

Greenway Trailhead Concept Plan (See Page 109)
This concept plan shows a larger-scale development. Suggested uses for a current sand quarry owned by Louisville Metro Parks Department. The plan would provide a trailhead associated with the greenway system and the water trail system along Pond Creek. No roadways would be utilized for vehicles traveling into the property, access would be for bicycle and pedestrian users only. This concept plan suggests a potential use for the remaining park area of this property as open space. In addition to the paddlecraft amenities, this particular trailhead also provides a convenient location for users to access the greenway trail system and the Louisville Loop. With an existing tunnel under the Gene Snyder Freeway that will be used for a trail crossing, this location will give access to trail users wanting to connect with both the northern portions of the trail and the southern portions leading to Jefferson Memorial Forest.

Master Plan Greenway Route

Legend

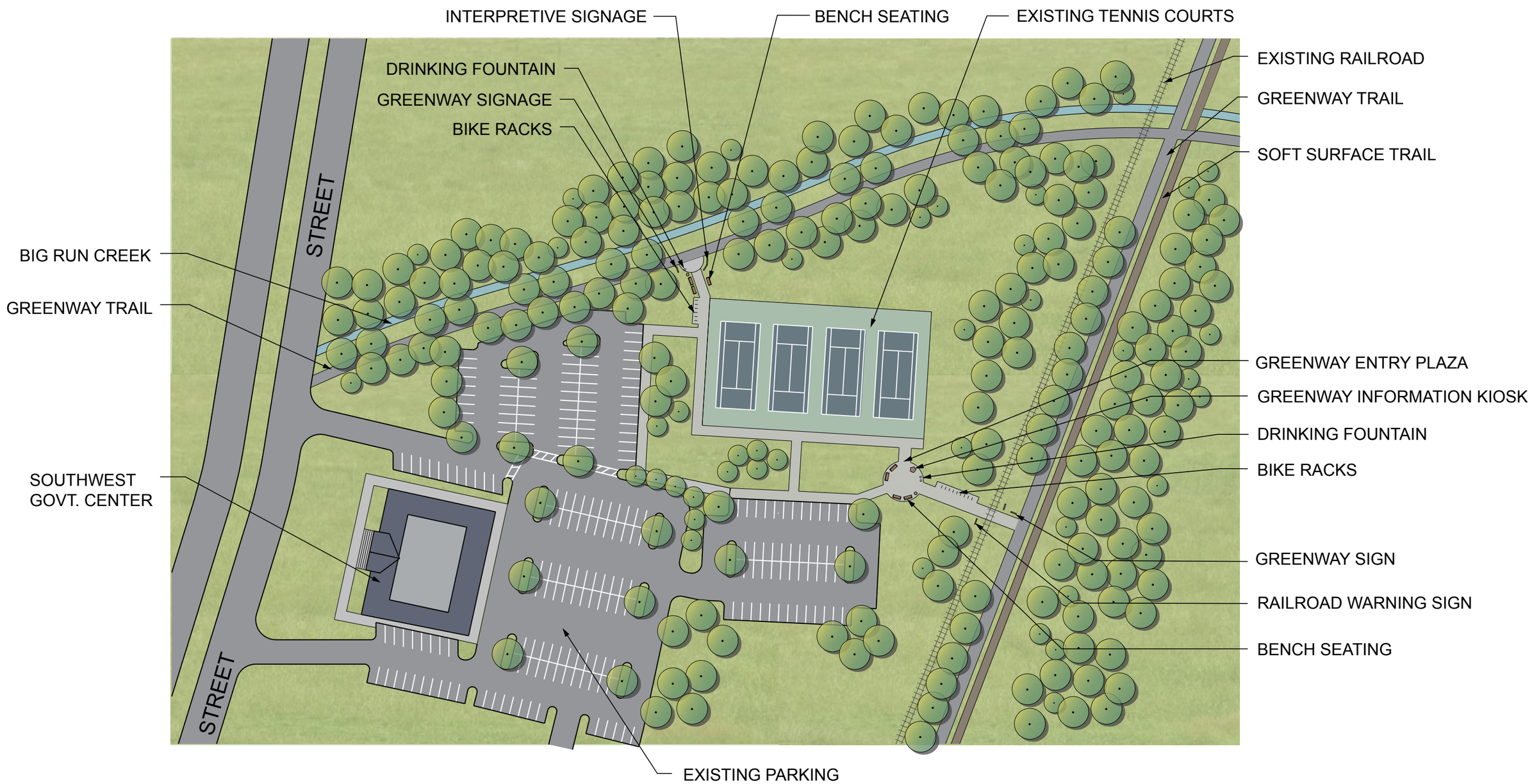
- 100 Yr. W/O BFE
- 100 Yr. With BFE
- Floodway
- Metro Parks
- JCPS Properties
- KYState Properties
- LOJIC cid
- Lou Jeff Properties
- LG&E Properties
- Lou Landbank Properties
- Lou MSD
- Louisville Water Co
- Lou County Gov
- Jefferson County Boundary
- Sub District Boundary
- Existing Louisville Loop
- Proposed Louisville Loop
- Hard Surface Trail - Primary
- Hard Surface Trail - Secondary
- Alternative - Secondary
- Soft Surface - Equestrian
- Water Trail
- Trailhead/Park - Water Focus
- Trailhead/Park
- Trail Center
- Interpretive Signage -Historical/Cultural
- Interpretive Signage - Ecological
- Schools
- Parks
- Golf Courses
- Community Centers
- Hospital
- Cemetery
- Library
- Hiking Trails
- Equestrian Trails
- Mountain Bike Trails
- Canoe Launch
- Campground

Louisville Metro Parks Southwest Greenways Master Plan
Master Plan Trail Route Lengths

Trail Type	Trail Name	Length (Mi.)
Primary Trail	A-1	8.1
	A-2	3.9
	A-3	5.8
	A-4	4.7
	A-5	13.7
	A-6	1.1
	A-7	3.7
	A-8	3.9
	A-9	5
	A-10	3.8
Secondary Trail	C-1	3.9
	C-2	4.9
	C-3	3.3
	C-4	2.2
	C-5	1.5
	C-6	2.6
	C-6A	3.2
	C-6B	1.1
	C-7	2.1
	C-9	3.3
	C-9A	4.4
	C-9B	1
	C-10	3.2
	C-11	3.3
	C-12	1.6
	C-13	2.1
	C-14	2
	C-15	2
Soft Surface - Equestrian/Mountain Bike	E-1	13.5
	E-2	4.5
	E-3	7.5
	E-4	7.6
	E-5	1.6
	E-6	6.1
Water Trail	W-1	9.8
	W-2	16.3

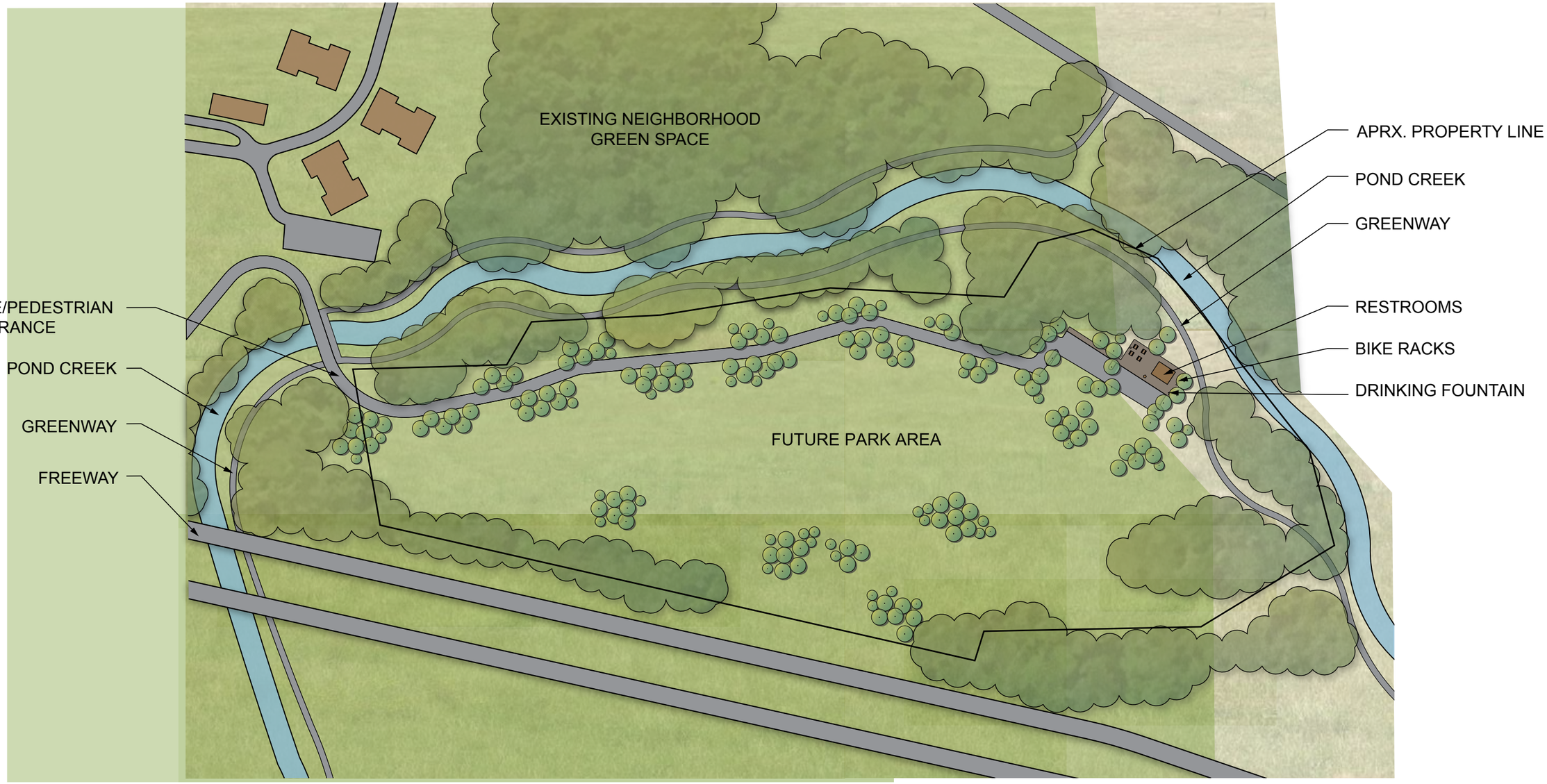
BICYCLE PARKING
TRAIL MAP/SIGNAGE
ICE CREAM/COFFEE SHOP
GREENWAY
OUTDOOR SEATING
BIKE SHOP
CAFE
STREET
BIOSWALE
STREET
BIOSWALE

Greenway Trailhead at Existing Parking Center



Equestrian Campground/Trailhead

RENOVATED MOTEL
PARKING
VISITORS / EDUCATION CENTER
OUTDOOR SEATING
CAFE / TRAIL CONVENIENCE STORE
STREET
STREET
BIKE RACKS
DRINKING FOUNTAIN
GREENWAY INFORMATION KIOSK
GREENWAY SIGNAGE
BENCH SEATING
HITCH RAIL / WATER
MOUNTING BLOCKS
PICNIC TABLES
SHELTER WITH PICNIC TABLES
SOFT SURFACE TRAIL
GREENWAY TRAIL
TRAILER PARKING
EXIT ONLY


EXISTING NEIGHBORHOOD
GREEN SPACE
FUTURE PARK AREA
APRX. PROPERTY LINE
POND CREEK
GREENWAY
RESTROOMS
BIKE RACKS
DRINKING FOUNTAIN
BIKE/PEDESTRIAN
ENTRANCE
POND CREEK
GREENWAY
FREEWAY

Marketing Statement

Objective

Reach potential users of the trail with targeted messages that support the overall project goals.

Audience Definition

Based on survey data and consensus from the team charrette, the following audiences for the greenway system were defined.

Primary Audience: Local/Louisville Residents

Behavior: May use trail frequently or even daily

Motivation: Exercise, travel between destinations, social interaction, exploration, entertainment

Secondary Audience: Regional/just outside of Louisville

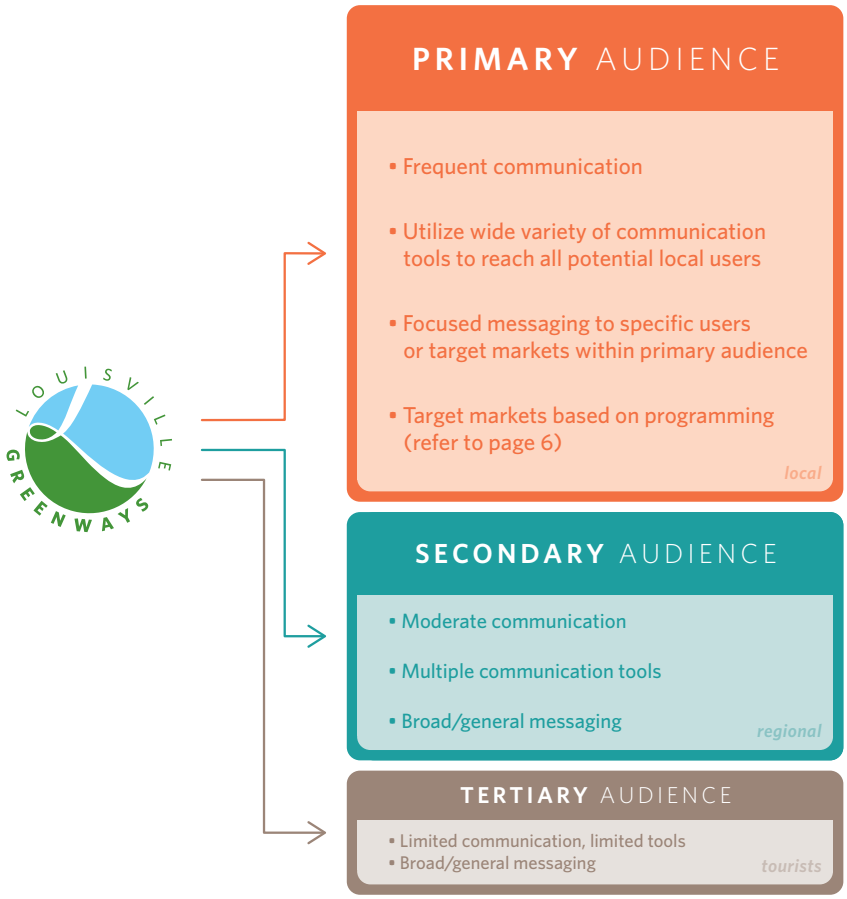
Behavior: May use trails on occassion

Motivation: Travel between destinations

Tertiary Audience: Tourists

Behavior: May use trails infrequently

Motivation: Opportunity



Communication Tools

The Physical Media and Digital Media tables show a comprehensive list of branding opportunities that could be used to communicate messages to a variety of users. Certain tools may not be appropriate for all users or messages.

PHYSICAL MEDIA

Product	*Objectives*
Funding Request Packet	Share the vision of the project, request funds for specific portions and the entire system
Trail Signage	identity, wayfinding, safety, regulatory, interpretive
Banner/Poster	program promotion, event announcements (large format)
Flyer	program promotion, event announcements
Pocket Guide	trail map, general information
Postcard	general information, program promotion, event announcements, user-generated promotion
Recreation Guide	general information, program promotion, event announcements
Newsletter	general information, program promotion, event announcements
Button/Patch	brand recognition, program promotion
Print Ads	general information, program promotion, event announcements

DIGITAL MEDIA

Product	*Objectives*
Website	general information, program promotion, event announcements, maps
Mobile Web/App	general information, program promotion, event announcements, maps, user sharing
Interactive Map	mark destinations, trail types, identify routes and distances *(utilize existing map technology customized for greenway system – Central Park example:* centralparknyc.org/maps*)*
Twitter & Facebook	general information, program promotion, event announcements, user-generated promotion
QR Code	connect users with specific information through their mobile devices
Photo Sharing	user-generated promotion
Newsletter	general information, program promotion, event announcements
Email	general information, program promotion, event announcements, maps

Programs and Messaging

Programs are recommended for promoting different aspects of the trail to different users. Recognizing that all media types could potentially be used to promote a program, the following charts suggest those that might best support a particular marketing effort.

PROGRAM: Project Fundraising

OBJECTIVE Secure support and funds to pursue greenway master plan

TARGET MARKET Potential funders and government officials

MESSAGES *"Louisville Greenways – Join Our Vision for a Sustainable Network"*

MEDIA master plan, funding request packets, brochure, ads, website, social media

PROGRAM: Greenway Launch

OBJECTIVE Build community awareness for the greenway system

TARGET MARKET Entire primary audience (local/Louisville residents)

MESSAGES *"PARK IT. Get out and walk, ride, hike, paddle, run, learn, explore!"*

MEDIA website, social media, posters/flyers, recreation guide, newsletter, signage, print ads, pocket guide

PROGRAM: Multi-Destination Pass

OBJECTIVE Cross-promote greenway system and local destinations by offering admission to destinations on or near trails

TARGET MARKET Families, students, tourists

MESSAGES *"South Points Pass – Your Link to Southwest Louisville"*

MEDIA website, social media, pocket guide, printed pass *(reference: White River State Park Pass)*

PROGRAM: Trail Transportation

OBJECTIVE Encourage everyday trail use as alternative transportation

TARGET MARKET Young professionals with active lifestyle; alternative commuters

MESSAGES *"To Work. To Play. Your path for everyday" and "100-miler"*

MEDIA web, button/patch, social media

PROGRAM: Group Activities

OBJECTIVE Increase trail usage; promote health & wellness; promote the trails as a social experience

TARGET MARKET Families, seniors, youth

MESSAGES *examples: "Stroller Saturdays" or "Senior Sundays"*

MEDIA web, social media, recreation guide, posters/flyers

PROGRAM: Adopt-A-Trail

OBJECTIVE Engage community; facilitate donations; encourage trail maintenance

TARGET MARKET Community partners and local businesses

MESSAGES *"Adopt-A-Trail / Louisville Greenways / [Donor Name]"*

MEDIA donation request letters, website, signage

Sample Graphic Templates

The following templates are intended as references for layouts of common communication tools. Templates may serve as a guide for placement and message hierarchy.

Greenway Marketing/Identity

Implementation Plan

The implementation plan presented is intended as a guide for implementing the communication tools, programs and messaging. A detailed schedule should be developed closer to trail construction.

Phase 1 - Immediate

Intent

- Project advancement
- Initial trail promotion

Programs

- Project fundraising
- Greenway launch

Media Distribution

- Immediate

Phase 2 - Continuous

Intent

- Remind users of the trail
- Refresh content as needed

Media

- Adopt-a-Trail
- Trail transportation
- Historic, Cultural, & Environmental Education

Media Distribution

- Continuous

Phase 3 - Periodic

Intent

- Promote seasonal or featured activities. events, or campaigns

Programs

- Group activities
- Multi-destination pass

Media

- Periodic

Greenway Identity Objective

Create a unique identity that represents the greenway system for use in marketing material and on-trail communication.

Greenway Identity Considerations

What audiences will see this logo most often? The logo will primarily be seen by local Louisville residents. Regional residents (outside of Louisville) and tourists may also be exposed to it.

What words describe the brand personality? Commute, cultural history, wilderness, connectivity, discovery and network.

Where will this logo appear most often? Trail signage, web, maps, flyers and social media.

Are there any must-have items? Colors from nature, distinct mark and circular expression preferred.

Who are your competitors (and collaborators)? The greenway system will connect to the Louisville Loop- a separate but linked trail initiative. Consideration of the Louisville Loop and Metro Parks logos will ensure that these identities can work together, and not against each other.

Greenway Identity Terminology

The project team expressed concern about the term “southwest” as an identifier for the greenway system. It has different meanings to local residents - some may identify themselves as “south-end” rather than “southwest”.

Keeping growth in mind, the identity uses a broad term for the system, “Louisville Greenways,” which allows for expansion beyond the south and southwest area. South and Southwest Louisville would be presented as the priority area for initiating the greenway system, due to census data regarding health and transportation issues. The system is a network of trails, connecting neighborhoods and destinations. Each trail should be named, either by historic or geographic terms (recognizable by the public), to support wayfinding and build brand recognition.

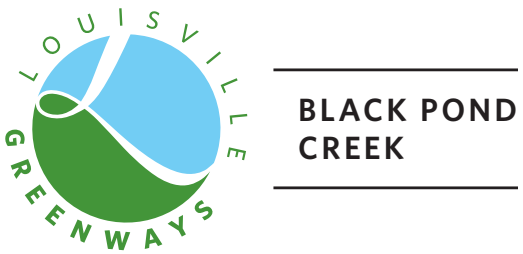
Logo

The logo design represents both land and water, while curved forms imply movement and suggest the journey on the trail. A subtle "L" shape within also references Louisville.

The simplicity of the logo enables it to translate will across various media (print, web, signage, maps). See following section, Design Guidelines, for additional detail concerning design standards for the use of the logo in various types of media.

Logo

Logo with sample trail segment name (horizontal)



Logo with sample trail segment name (vertical)

GREENWAY DESIGN GUIDELINES

Section 5

Greenway System Design Guidelines

The design guidelines are intended to provide the minimum standards for development of the greenway system. These standards will create a unified system upon completion regardless of the phasing of construction of greenways within the system. The purpose of the guidelines is to provide a complete system with a variety of trail types to meet the needs of a variety of users in a safe and healthy environment.

A comprehensive set of design guidelines was developed as a part of the Louisville Loop Master Plan. The design details developed for the Louisville Loop will be utilized for construction of trails within the South and Southwest Greenway system. Applicable details are listed in the following text. Additional standard details not contained within the Louisville Loop Design Guidelines have been developed and follow the list of Loop Design Details.

Applicable Standard Details from Louisville Loop Design Guidelines (reference latest addition)

F1	Shared-use path in natural corridor
F2	Parallel active rail line
F3	Parallel interstate right-of-way
F6	Parallel Street - Shared use path with bike lanes
X1	Crossing Standards
X2	Crossing - shared-use path and rail crossing
X3	Crossing - Shared-use path and natural feature crossing
T1	Major trailhead
T2	Primary and secondary access points
T3	Rest Areas
S1-S7	Signs
C1-C4	Cultural Integration
C-5	Environmental/Geological programming
A1	Bike Rack
A2	Bench
A3	Trash/Recycle
A4	Lighting
A5	Bollards
A6	Mile Markers
A7	Emergency Call Box
A8	Drinking fountains
A9	Access control/handrail/fence
A10	Ped./bike control devices
A11	Environmental management

Section 6 - Soft Surface Typical Sections

Page 7	Shared-use trail single tread
Page 8	Shared-use trail dual tread
Page 11	At-grade Crossing at Road Intersection

a. Single Use Equestrian Trail
   i. Parallel to hard surface multi-use path
   ii. Adjacent to street
b. Mountain Bike Trail

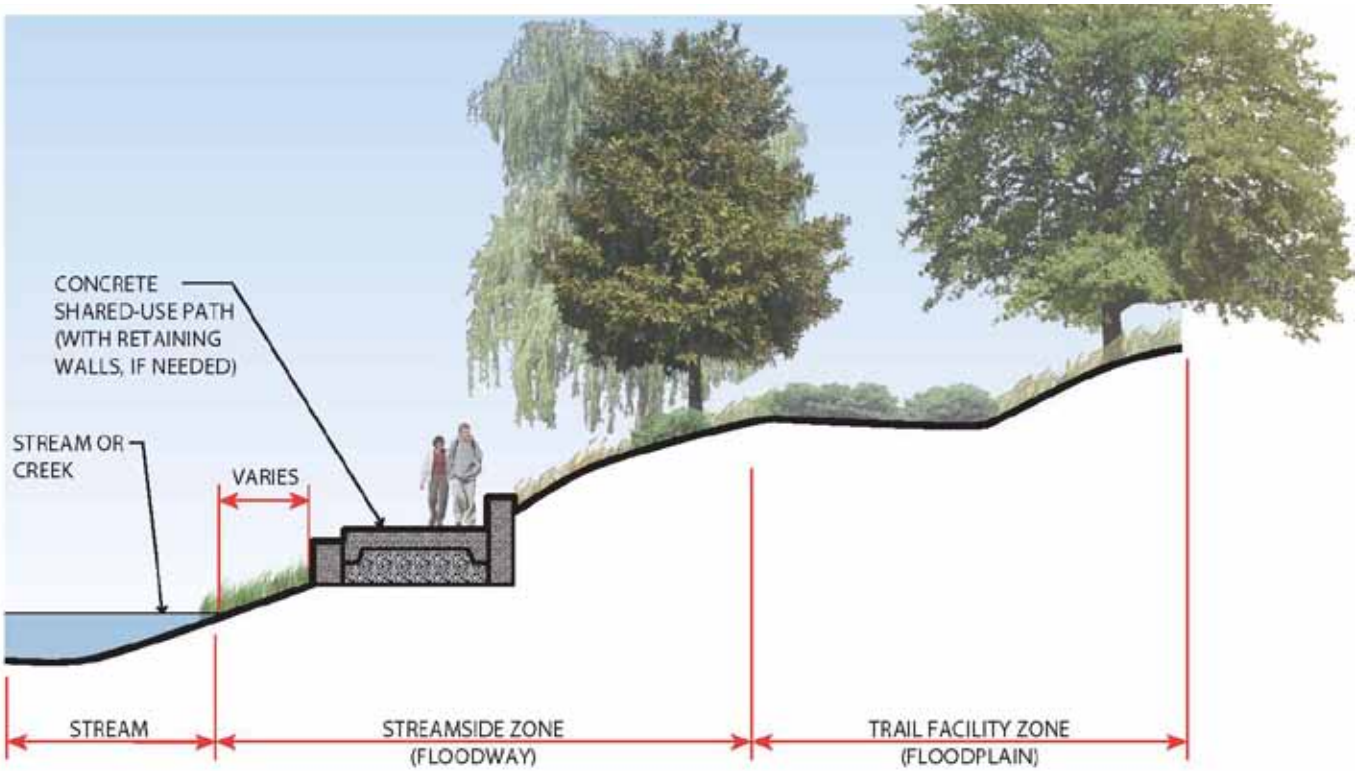
5. Soft Surface Crossing Standards
   a. Soft surface path and roadway
   b. Soft surface path and hard surface path (i.e., Loop)

6. Soft Surface Support Facilities
   a. Trailheads (including trailer parking)
   b. Signage
   c. Rest areas (watering)
   d. Amenities

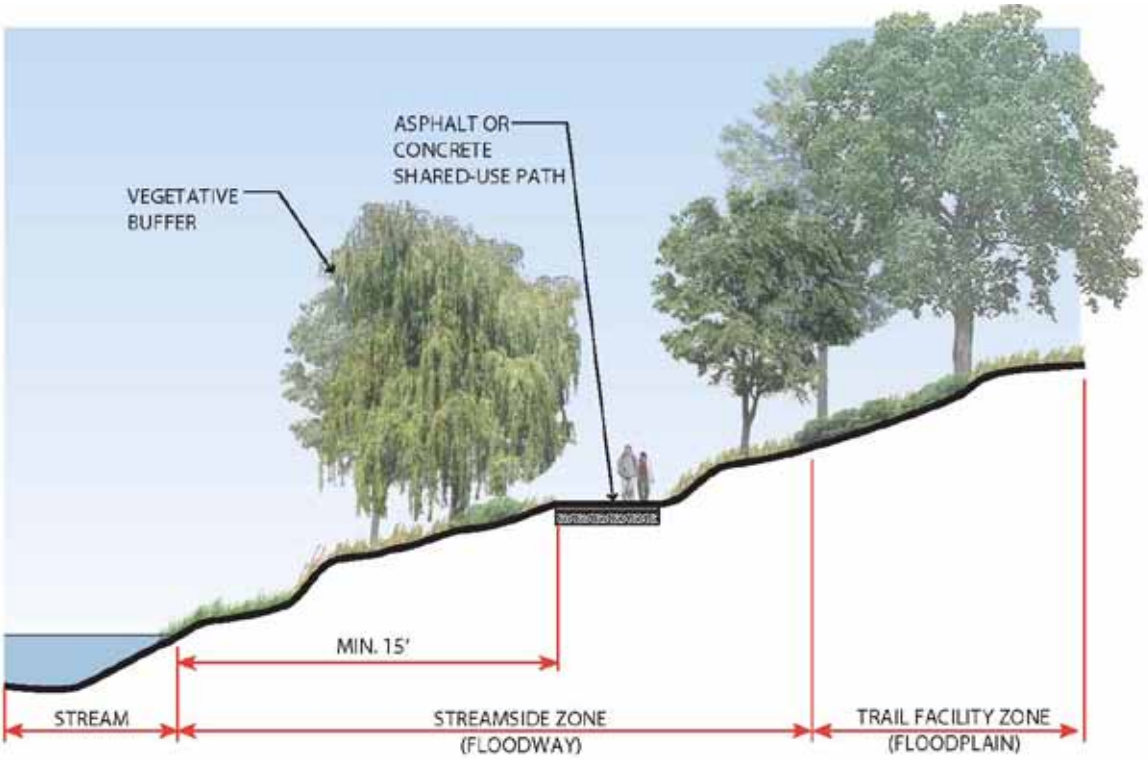
South and Southwest Greenways Typical Sections

Typical sections developed for the South and Southwest Greenways Master Plan are illustrated in the following pages and include:

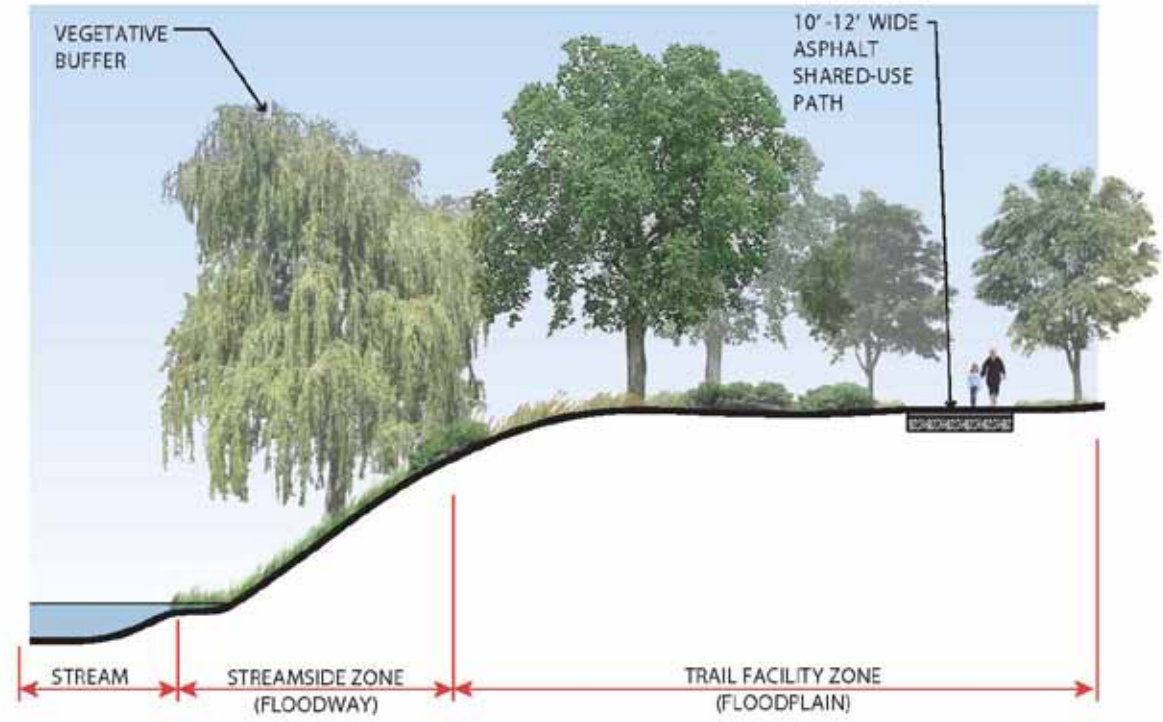
GF1	Greenway Streamside Trail
GF2	Greenway within Floodway Trail
GF3	Greenway within Floodplain Trail
GF4	Greenway Neighborhood Entrance
GF5	Greenway Parallel to Street
GF6	Greenway Trailhead Entrance
GF7	Soft Surface Trail Amenities
GF8	Paddlecraft Support Facilities



GF1 - Greenway Streamside Trail



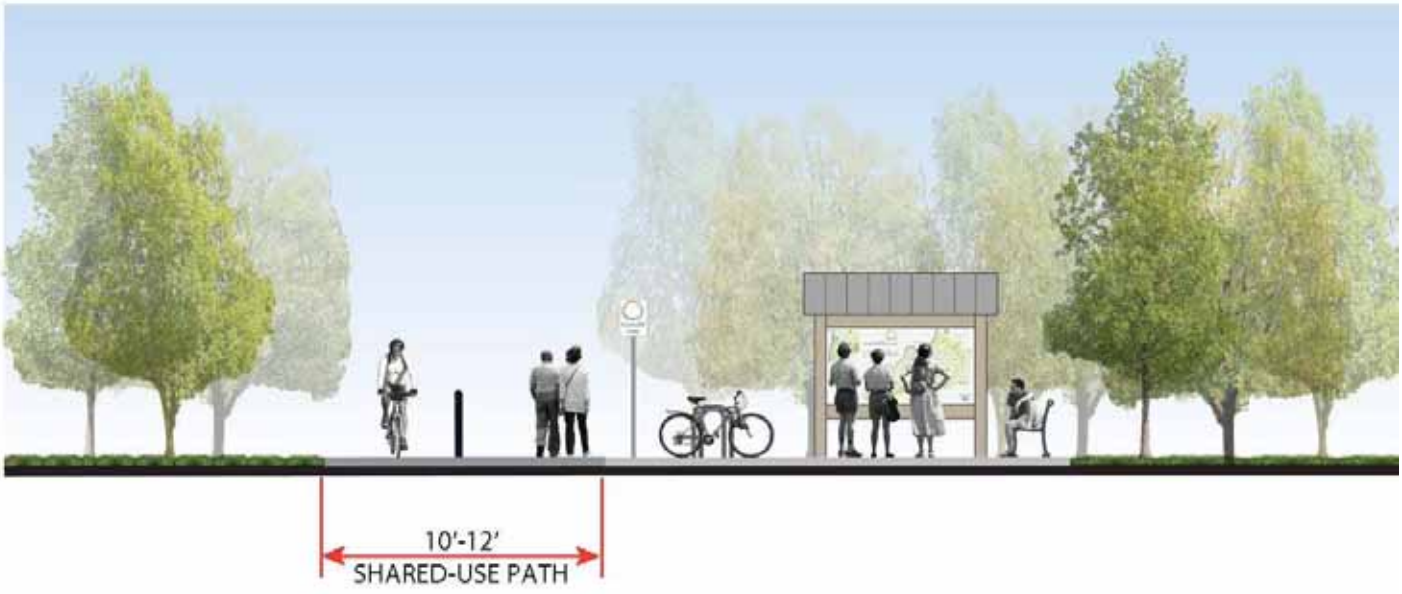
GF2 - Greenway within Floodway Trail



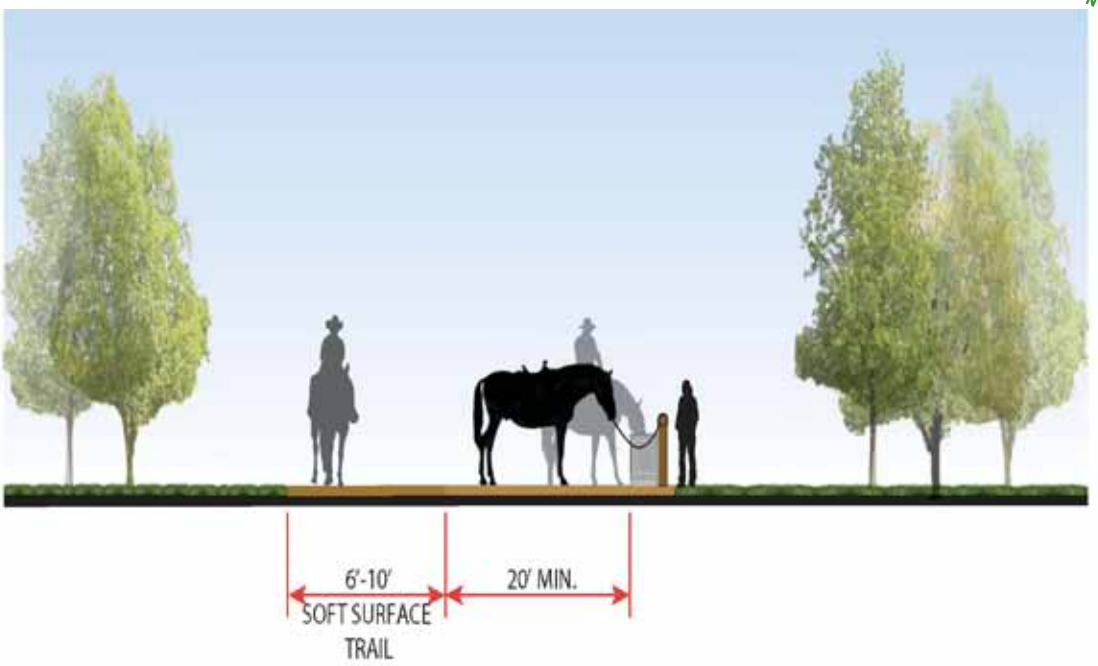
GF3 - Greenway within Floodplain Trail

GF4 - Greenway Neighborhood Entrance

GF5 - Greenway Parallel to Street



GF6 - Greenway Trailhead Entrance



GF7 - Soft Surface Trail Amenities

GF 8 - Paddlecraft Trail Support Facilities

Identity Standards

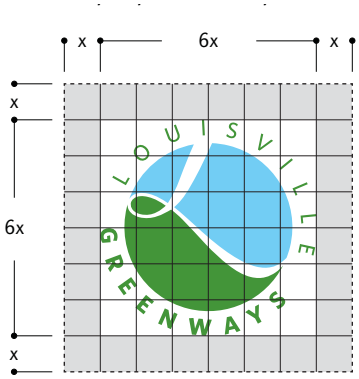
A logo is often the first identifier an individual encounters while exploring that organization, either in print, online or in the built environment. For this reason it is important to follow identity standards closely to build a strong image, and ultimately strong relationships.

The identity standards provided in this document help to ensure quality and consistency when graphically representing the greenways. These standards will guide the creation of all Louisville Greenways communication methods.

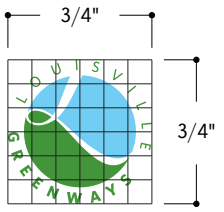
Graphic Guidelines

Clear Space - a consistent amount of clear space should be maintained between the logo and any other elements, to ensure the integrity of the logo.

The logo is exactly 6 squares wide by 6 squares high. At a minimum, an additional square should surround the logo on each side for proper clear space.



Minimum Size - to maintain proper legibility, the logo should be no less than 3/4”.



Correct Logo Uses

Full Color Logo - for use on white, light background colors, or light photographic areas. When using the logo with photographs, the logo should be placed in an uncluttered area.

White Logo - for use on black, dark background colors, or dark photographic areas. When using the logo with photographs, the logo should be placed in an uncluttered area.

Incorrect Logo Uses

In order to maintain the integrity of the brand, the logo should not be altered. Original vector artworks should be used whenever possible

Do not change the typeface

Do not change the colors

Do not remove elements

Do not stretch the logo disproportionately

Do not place shapes around the logo

Do not angle or skew the logo

Color

Color Palette - colors that make up the logo. These should not be changed.

PMS 363

C	68	**R**	67
M	0	**G**	149
Y	100	**B**	57
K	24		

PMS 297

C	49	**R**	114
M	1	**G**	205
Y	0	**B**	244
K	0		

Accent Palette - developed for use in marketing material, including print and web. For precise color matching, refer to a Pantone guide.

yellow

C	0	**R**	255
M	15	**G**	214
Y	75	**B**	92
K	0		

light green

C	40	**R**	150
M	0	**G**	188
Y	100	**B**	51
K	10		

teal

C	70	**R**	31
M	0	**G**	158
Y	30	**B**	160
K	20		

red-orange

C	0	**R**	243
M	70	**G**	112
Y	80	**B**	67
K	0		

Typography

Whitney - typeface designed for both print and signage applications. Variety of weights for use across multiple communications tools. Pre-assembled indices ideal for marketing destinations on a map. Samples shown below.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890[{(-+,_.@!?#$%&*"=)}]

Whitney Light
Whitney Light Italic
Whitney Book
Whitney Book Italic
Whitney Medium
Whitney Medium Italic
Whitney Semibold
Whitney Semibold Italic
Whitney Bold
Whitney Bold Italic
Whitney Black
Whitney Black Italic

1 2 3 4 24 38 19 A B C D A1 B3 C8
Ⓐ Ⓑ Ⓒ Ⓓ Ⓐ1 Ⓑ3 Ⓒ8 1 2 3 4 24 38 19

Additional Marketing Recommendations

Marketing efforts as a whole could be largely geared toward areas with high concentration of health disparities.

Increased media distribution recommended for zip codes: 40272, 40219, 40208, 40222, 40223, 40241, 40243, 40059, 40242, 40206, 40204, 40214, 40213, 40299, 40291.

Group activities program could be heavily marketed to less "active" areas of the city. Increased media distribution recommended for zip codes 40203 and 40212.

Trail Transportation program could be heavily marketed to more "active" areas of the city who may already use alternative transportation for commutes. Increased media distribution recommended for zip codes: 40208, 40217, 40204, 40205, 40299, 40245, 40242.

Adopt-A-Trail program could be more actively marketed in higher income areas. Increased media distribution recommended for zip codes: 40291, 40299, 40245, 40233, 40222, 40205, 40207, 40241, 40242, 40241, 40059.

Marketing efforts should include areas with low rates of health care coverage - to aid in reducing health disparities. Increased media distribution recommended for zip codes: 40212, 40211, 40210, 40215, 40204, 40213, 40203, 40218, 40216, 40118, 40272.

PRELIMINARY COST OPINION

Section 6

Preliminary Cost Opinion

Preliminary Cost Opinion

Trail construction costs can vary due to a variety of factors, including local conditions, trail type, and support services that will be included. This cost analysis, therefore is a general guideline for the purpose of preliminary estimation of trail costs and should be considered a relative range of costs. More detailed cost estimation should be performed at other phases of the implementation process, particularly at the time of application for funding, during preliminary design, and prior to bidding for construction. Contingencies are included in all trail costs and account for localized increases in materials, increases in labor due to time of year and contractor availability, and other unforeseen cost increases.

The following preliminary cost opinions are based on the routes shown on the Greenways Master Plan Routes Map and are based on year 2012 costs.

Preliminary costs include:

- clearing and grading for the width of the trail
- trail construction (surfacing and base)
- wayfinding signage along the trail
- drainage directly associated with the trail
- seeding and mulching within trail disturbance areas
- professional design fees

Preliminary costs exclude the following:

- property or right-of-way acquisition
- utility relocation
- bridges- including renovation of historic bridges and pre-fab
- additional soil implementation caused by adverse soil conditions
- extreme erosion problems
- stream or bank stabilization
- ecological/environmental restoration/preservation
- boardwalk construction
- advanced grading issues

Table 3 represents the cost associated with a certain type of trail segment based on the application of a typical section. Refer to the typical sections presented in the Design Guidelines section for details. Each trail segment was analyzed for the appropriate application of typical section to each of the trails.

Table 4 depicts the cost of each trail segment without amenities. Each trail segment was analyzed to determine the appropriate typical section which would be applied to that trail. The cost for the typical section was then applied to the length of the trail. This demonstrates the base trail cost for each trail without the addition of amenities such as the trailheads and restroom facilities. This provides another level of detail for the trail during funding requests.

Table 5 illustrates the total preliminary cost opinion for each trail. This cost includes the added amenities along the greenway segments as identified within the master plan. Amenities are listed in each of the segment detail charts and include: trailheads, crosswalk and intersection improvements, at-grade crossings, improvements to existing parking and new parking areas.

Trail Type	Cost per L.F.	Cost per Mile	Trail Feature
F1 - Shared Use Path in Natural Corridor	$125.00	$660,000	12-foot asphalt multi-purpose trail
	$9.47	$50,000	Restoration
		$710,000	Subtotal
		$35,500	Other Costs (5%)
		$71,000	Contingency (10%)
		$816,500	**TOTAL**
F2 - Shared Use Path Parallel active Rail Line	$125.00	$660,000	12-foot asphalt multi-purpose trail
	$56.82	$300,000	Railroad Division Barrier
		$960,000	Subtotal
		$48,000	Other Costs (5%)
		$96,000	Contingency (10%)
		$1,104,000	**TOTAL**
F6 - Shared Use Path with Bike Lanes	$125.00	$660,000	12-foot asphalt multi-purpose trail
	$2.84	$15,000	Bicycle Lane Striping
		$675,000	Subtotal
		$33,750	Other Costs (5%)
		$67,500	Contingency (10%)
		$776,250	**TOTAL**
GF1- Greenway Streamside Trail	$160.98	$850,000	10-foot concrete multi-purpose trail
	$28.41	$150,000	Retaining wall
		$1,000,000	Subtotal
		$50,000	Other Costs (5%)
		$100,000	Contingency (10%)
		$1,150,000	**TOTAL**
GF2 - Greenway within Floodway Trail	$125.00	$660,000	12-foot asphalt multi-purpose trail
		$50,000	Bridge Underpass Conversion
		$710,000	Subtotal
		$35,500	Other Costs (5%)
		$71,000	Contingency (10%)
		$816,500	**TOTAL**
GF3 - Greenway within Floodplain Trail	$125.00	$660,000	12-foot asphalt multi-purpose trail
		$50,000	Bridge Underpass Conversion
		$710,000	Subtotal
		$35,500	Other Costs (5%)
		$71,000	Contingency (10%)
		$816,500	**TOTAL**
GF5 - Greenway Parallel to Street	$125.00	$660,000	12-foot asphalt multi-purpose trail
		$660,000	Subtotal
		$33,000	Other Costs (5%)
		$66,000	Contingency (10%)
		$759,000	**TOTAL**
6-7 - Soft Surface Shared Use; Single Tread	$15.15	$80,000	8-foot bare earth equestrian trail
		$80,000	Subtotal
		$4,000	Other Costs (5%)
		$8,000	Contingency (10%)
		$92,000	**TOTAL**
6-8 - Soft Surface Shared Use; Separated Tread	$11.36	$60,000	6-foot bare earth equestrian trail
	$62.50	$330,000	6-foot asphalt multi-purpose trail
		$390,000	Subtotal
		$19,500	Other Costs (5%)
		$39,000	Contingency (10%)
		$448,500	**TOTAL**
6-11 - At-grade Crossing at Road Intersection		$150,000	Crosswalk with signal
		$150,000	Subtotal
		$7,500	Other Costs (5%)
		$15,000	Contingency (10%)
		$172,500	**TOTAL**

Table 3 - Schematic Cost Estimate - Typical Sections

Preliminary Cost Opinion

Trail Name	Length (Mi.)	Trail Type	Cost (Mi.)	Estimated Cost
Primary Trail				
A-1 Black Pond Creek – Lower Hunter's Trace	8.1	GF2	$816,500	$6,613,650
A-2 Mill Creek Cut-off – Big Run Creek	3.9	GF2	$816,500	$3,184,350
A-3 Greenwood Road	3.3	GF5	$759,000	$2,504,700
Big Run Creek	2.5	GF1	$1,150,000	$2,875,000
A-4 Johnsontown Road – Stonestreet Road	4.7	GF5	$759,000	$3,567,300
A-5 Railroad Corridor Adjacent to Dixie Hwy.	13.7	F2	$1,104,000	$15,124,800
A-6 Gagel Avenue	1.1	GF5	$759,000	$834,900
A-7 New Cut Road	3.7	F6	$776,250	$2,872,125
A-8 Northern Ditch	3.9	GF3	$816,500	$3,184,350
A-9 Southern Ditch	5	GF2	$816,500	$4,082,500
A-10 Keys Ferry Road – Mitchell Hill Road	3.8	GF5	$759,000	$2,884,200
Secondary Trail				
C-1 Garrison Ditch – Mill Creek	2.7	GF2	$816,500	$2,204,550
Rockford Lane	1.2	GF5	$759,000	$910,800
C-2 Mill Creek North	4.9	GF2	$816,500	$4,000,850
C-3 Valley Creek	3.3	GF2	$816,500	$2,694,450
C-4 Ashby Lane – Valley Station Road	2.2	GF5	$759,000	$1,669,800
C-5 Palatka Road	1.5	GF5	$759,000	$1,138,500
C-6 Overhead Electric Easement	2.6	F1	$816,500	$2,122,900
C-6A East Pages Lane	3.2	GF5	$759,000	$2,428,800
C-7 3rd Street Road	2.1	GF5	$759,000	$1,593,900
C-9 Pond Creek	3.3	GF1	$1,150,000	$3,795,000
C-9A Pond Creek Extension	4.4	GF1	$1,150,000	$5,060,000
C-9B Pond Creek Extension	1	GF1	$1,150,000	$1,150,000
C-10 Woodlawn – Crittenden Drive	3.2	GF5	$759,000	$2,428,800
C-11 Blevins Gap Road	3.3	GF5	$759,000	$2,504,700
C-12 Valley Station Road	1.6	GF5	$759,000	$1,214,400
C-13 Mount Holly Road	2.1	GF5	$759,000	$1,593,900
C-14 Cardinal Hill	2	GF1	$1,150,000	$2,300,000
C-15 Wilson Creek	2	GF1	$1,150,000	$2,300,000
Soft Surface - Equestrian/Mountain Bike				
E-1 Railroad Corridor Adjacent to Dixie Hwy.	13.5	6-8	$448,500	$6,054,750
E-2 Pendleton Road - Forest West	4.5	6-8	$448,500	$2,018,250
E-3 Pond Creek	7.5	6-8	$448,500	$3,363,750
E-4 JMF East	7.6	6-8	$448,500	$3,408,600
E-5 CID South	1.6	6-7	$92,000	$147,200
E-6 Southpark Road - JMF East	6.1	6-11	$172,500	$1,052,250

Table 4 - Schematic Cost Estimate - Trail Segment

Preliminary Cost Opinion

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
A-1 Black Pond Creek – Lower Hunter's Trace			
Trail Cost	1	$6,613,650	$6,613,650
At grade crossing (6-11)	5	$172,500	$862,500
Neighborhood Intersection	16	$1,500	$24,000
Crosswalk with Ped/Bike Signal	1	$5,000	$5,000
Restroom	3	$40,000	$120,000
Improvements to Ex. Parking for Trailhead	1	$25,000	$25,000
Interpretive Signage	2	$2,500	$5,000
TOTAL Trail Segment A-1			**$7,655,150**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
A-2 Mill Creek Cut-off – Big Run Creek			
Trail Cost	1	$3,184,350	$3,184,350
At grade crossing (6-11)	5	$172,500	$862,500
TOTAL Trail Segment A-2			**$4,046,850**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
A-3 Greenwood Road/Big Run Creek			
Trail Cost Greenwood Road	1	$2,504,700	$2,504,700
Trail Cost Big Run Creek	1	$2,875,000	$2,875,000
At grade crossing (6-11)	3	$172,500	$517,500
Neighborhood Intersection	28	$1,500	$42,000
Crosswalk with Ped/Bike Signal	6	$5,000	$30,000
Improvements to Ex. Parking for Trailhead	1	$25,000	$25,000
TOTAL Trail Segment A-3			**$5,994,200**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
A-4 Johnsontown Road – Stonestreet Road			
Trail Cost	1	$3,567,300	$3,567,300
Neighborhood Intersection	17	$1,500	$25,500
Crosswalk with Ped/Bike Signal	3	$5,000	$15,000
Improvements to Ex. Parking for Trailhead	1	$25,000	$25,000
TOTAL Trail Segment A-4			**$3,632,800**

Preliminary Cost Opinion

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
A-5 Railroad Corridor Adjacent to Dixie Hwy.			
Trail Cost	1	$15,124,800	$15,124,800
Restroom	2	$40,000	$80,000
Trailhead with Parking	3	$50,000	$150,000
Neighborhood Intersection	33	$1,500	$49,500
Crosswalk with Ped/Bike Signal	8	$5,000	$40,000
Interpretive Signage	4	$2,500	$10,000
TOTAL Trail Segment A-5			**$15,454,300**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
A-6 Gagel Avenue			
Trail Cost	1	$834,900	$834,900
Neighborhood Intersection	3	$1,500	$4,500
Crosswalk with Ped/Bike Signal	1	$5,000	$5,000
TOTAL Trail Segment A-6			**$844,400**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
A-7 New Cut Road			
Trail Cost	1	$2,872,125	$2,872,125
Restroom	1	$40,000	$40,000
Trailhead with Parking	1	$50,000	$50,000
Neighborhood Intersection	16	$1,500	$24,000
Crosswalk with Ped/Bike Signal	4	$5,000	$20,000
Interpretive Signage	1	$2,500	$2,500
TOTAL Trail Segment A-7			**$3,008,625**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
A-8 Northern Ditch			
Trail Cost	1	$3,184,350	$3,184,350
Neighborhood Intersection	3	$1,500	$4,500
At grade crossing (6-11)	3	$172,500	$517,500
Interpretive Signage	1	$2,500	$2,500
TOTAL Trail Segment A-8			**$3,708,850**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
A-9 Southern Ditch			
Trail Cost	1	$4,082,500	$4,082,500
Trailhead with Parking	1	$50,000	$50,000
Neighborhood Intersection	11	$1,500	$16,500
At grade crossing (6-11)	3	$172,500	$517,500
Interpretive Signage	2	$2,500	$5,000
TOTAL Trail Segment A-9			**$4,671,500**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
A-10 Keys Ferry Road – Mitchell Hill Road			
Trail Cost	1	$2,884,200	$2,884,200
Trailhead with Parking	1	$50,000	$50,000
Neighborhood Intersection	4	$1,500	$6,000
Crosswalk with Ped/Bike Signal	3	$5,000	$15,000
TOTAL Trail Segment A-10			**$2,955,200**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-1 Garrison Ditch – Mill Creek/Rockford Lane			
Trail Cost Mill Creek	1	$2,204,550	$2,204,550
Trail Cost Rockford Lane	1	$910,800	$910,800
At grade crossing (6-11)	2	$172,500	$345,000
Neighborhood Intersection	14	$1,500	$21,000
Crosswalk with Ped/Bike Signal	4	$5,000	$20,000
TOTAL Trail Segment C-1			**$3,501,350**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-2 Mill Creek North			
Trail Cost	1	$4,000,850	$4,000,850
Trailhead with Parking	1	$50,000	$50,000
Neighborhood Intersection	3	$1,500	$4,500
At grade crossing (6-11)	4	$172,500	$690,000
Interpretive Signage	3	$2,500	$7,500
TOTAL Trail Segment C-2			**$4,752,850**

Preliminary Cost Opinion

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-3 Valley Creek			
Trail Cost	1	$2,694,450.00	$2,694,450.00
Restroom	1	$40,000.00	$40,000.00
Neighborhood Intersection	6	$1,500.00	$9,000.00
At grade crossing (6-11)	4	$172,500.00	$690,000.00
TOTAL Trail Segment C-3			**$3,433,450.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-4 Ashby Lane – Valley Station Road			
Trail Cost	1	$1,669,800.00	$1,669,800.00
Trailhead with Parking	1	$50,000.00	$50,000.00
Neighborhood Intersection	6	$1,500.00	$9,000.00
Crosswalk with Ped/Bike Signal	3	$5,000.00	$15,000.00
Interpretive Signage	1	$2,500.00	$2,500.00
TOTAL Trail Segment C-4			**$1,746,300.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-5 Palatka Road			
Trail Cost	1	$1,138,500.00	$1,138,500.00
Neighborhood Intersection	6	$1,500.00	$9,000.00
Crosswalk with Ped/Bike Signal	3	$5,000.00	$15,000.00
TOTAL Trail Segment C-5			**$1,162,500.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-6 Overhead Electric Easement			
Trail Cost	1	$2,122,900.00	$2,122,900.00
Neighborhood Intersection	6	$1,500.00	$9,000.00
TOTAL Trail Segment C-6			**$2,131,900.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-6A East Pages Lane			
Trail Cost	1	$2,428,800.00	$2,428,800.00
Neighborhood Intersection	10	$1,500.00	$15,000.00
TOTAL Trail Segment C-6A			**$2,443,800.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-7 3rd Street Road			
Trail Cost	1	$1,593,900.00	$1,593,900.00
Neighborhood Intersection	8	$1,500.00	$12,000.00
Crosswalk with Ped/Bike Signal	2	$5,000.00	$10,000.00
TOTAL Trail Segment C-7			**$1,615,900.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-9 Pond Creek			
Trail Cost	1	$3,795,000.00	$3,795,000.00
Trailhead with Parking	1	$50,000.00	$50,000.00
Restroom	1	$40,000.00	$40,000.00
At grade crossing (6-11)	2	$172,500.00	$345,000.00
Interpretive Signage	1	$2,500.00	$2,500.00
TOTAL Trail Segment C-9			**$4,232,500.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-9A Pond Creek Extension			
Trail Cost	1	$5,060,000.00	$5,060,000.00
At grade crossing (6-11)	1	$172,500.00	$172,500.00
Trailhead with Parking	1	$50,000.00	$50,000.00
Interpretive Signage	1	$2,500.00	$2,500.00
TOTAL Trail Segment C-9A			**$5,285,000.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-9B Pond Creek Extension			
Trail Cost	1	$1,150,000.00	$1,150,000.00
TOTAL Trail Segment C9B			**$1,150,000.00**

Preliminary Cost Opinion

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-10 Woodlawn – Crittenden Drive			
Trail Cost	1	$2,428,800.00	$2,428,800.00
Trailhead with Parking	2	$50,000.00	$100,000.00
Neighborhood Intersection	6	$1,500.00	$9,000.00
Crosswalk with Ped/Bike Signal	2	$5,000.00	$10,000.00
Interpretive Signage	1	$2,500.00	$2,500.00
TOTAL Trail Segment C-10			**$2,550,300.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-11 Blevins Gap Road			
Trail Cost	1	$2,504,700.00	$2,504,700.00
Neighborhood Intersection	4	$1,500.00	$6,000.00
Crosswalk with Ped/Bike Signal	1	$5,000.00	$5,000.00
TOTAL Trail Segment C-11			**$2,515,700.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-12 Valley Station Road			
Trail Cost	1	$1,214,400.00	$1,214,400.00
Neighborhood Intersection	6	$1,500.00	$9,000.00
Crosswalk with Ped/Bike Signal	1	$5,000.00	$5,000.00
TOTAL Trail Segment C-12			**$1,228,400.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-13 Mount Holly Road			
Trail Cost	1	$1,593,900.00	$1,593,900.00
Neighborhood Intersection	8	$1,500.00	$12,000.00
Crosswalk with Ped/Bike Signal	4	$5,000.00	$20,000.00
TOTAL Trail Segment C-13			**$1,625,900.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-14 Cardinal Hill			
Trail Cost	1	$2,300,000.00	$2,300,000.00
Neighborhood Intersection	2	$1,500.00	$3,000.00
Crosswalk with Ped/Bike Signal	3	$5,000.00	$15,000.00
TOTAL Trail Segment C-14			**$2,318,000.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
C-15 Wilson Creek			
Trail Cost	1	$2,300,000.00	$2,300,000.00
Neighborhood Intersection	2	$1,500.00	$3,000.00
At grade crossing (6-11)	1	$172,500.00	$172,500.00
Interpretive Signage	1	$2,500.00	$2,500.00
TOTAL Trail Segment C-15			**$2,478,000.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
E-1 Railroad Corridor Adjacent to Dixie Hwy.			
Trail Cost	1	$6,054,750.00	$6,054,750.00
Neighborhood Intersection	4	$1,500.00	$6,000.00
Crosswalk with Ped/Bike Signal	2	$5,000.00	$10,000.00
TOTAL Trail Segment E-1			**$6,070,750.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
E-2 Pendleton Road - Forest West			
Trail Cost	1	$2,018,250.00	$2,018,250.00
Neighborhood Intersection	2	$1,500.00	$3,000.00
Crosswalk with Ped/Bike Signal	3	$5,000.00	$15,000.00
Interpretive Signage	1	$2,500.00	$2,500.00
TOTAL Trail Segment E-2			**$2,038,750.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
E-3 Pond Creek			
Trail Cost	1	$3,363,750.00	$3,363,750.00
Trailhead with Parking	2	$50,000.00	$100,000.00
At grade crossing (6-11)	3	$172,500.00	$517,500.00
Interpretive Signage	2	$2,500.00	$5,000.00
TOTAL Trail Segment E-3			**$3,986,250.00**

Preliminary Cost Opinion

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
E-4 JMF East			
Trail Cost	1	$3,408,600.00	$3,408,600.00
Neighborhood Intersection	2	$1,500.00	$3,000.00
Crosswalk with Ped/Bike Signal	2	$5,000.00	$10,000.00
TOTAL Trail Segment E-4			**$3,421,600.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
E-5 CID South			
Trail Cost	1	$147,200.00	$147,200.00
Trailhead with Parking	1	$50,000.00	$50,000.00
Neighborhood Intersection	12	$1,500.00	$18,000.00
Interpretive Signage	2	$2,500.00	$5,000.00
TOTAL Trail Segment E-5			**$220,200.00**

Trail Segment/Amenity	No.	Cost (Ea)	Estimated Cost
E-6 Southpark Road - JMF East			
Trail Cost	1	$1,052,250.00	$1,052,250.00
Neighborhood Intersection	5	$1,500.00	$7,500.00
Crosswalk with Ped/Bike Signal	1	$5,000.00	$5,000.00
TOTAL Trail Segment E-6			**$1,064,750.00**

Implementation Priorities

A greenway network must be implemented over time as resources become available. There are many factors that may weigh into decisions concerning the sequencing of implementation including availability of funds, the funding source, user needs, land ownership, and political will to name just a few.

General priorities have been recommended for implementation of the master plan as follows:

1. Proposed greenways on publicly owned sites: Access to the land where a greenway facility is planned, either through fee simple ownership or through easement rights is obviously critical to implementation. Greenway segments proposed on publicly owned sites, such as Louisville Metro's CID lands or in conjunction with public Rights of Way should be given high priority.

2. Proposed greenways associated with other public or private improvements: Planned improvements to sites or along corridors where greenways have been proposed often times provide opportunities for implementation. As plans are developed by Louisville Metro or the Kentucky Transportation Cabinet for road improvements where a greenway has also been proposed, multiuse trails and on-road bike facilities may be incorporated into the planned roadway improvements such as along Greenway Road between X and X. Opportunities may also exist where new private development is being proposed through the planning and zoning process.

3. Primary Hard Surface Trails: Primary hard surface trails, as depicted on master plan, represent vital connections within the overall greenway network. These connections include:
   - connections to the Louisville Loop
   - north/south connections (i.e., parallel to the P&L rail line)
   - connections between area neighborhoods and destinations
   - connections between destinations (i.e., Waverly Park and Iroquois Park)

4. Primary Soft Surface Trails: Primary soft surface trails, as depicted on the master plan, represent key trail routes for equestrian users that may also be utilized by hikers or other users looking for a more passive trail experience. Generally speaking, priority for implementing these trails would be given to those planned parallel to and in conjunction with a primary hard surface trail or based on user demand.

These general priorities should be considered as guidelines, with opportunity often playing a major role in determining actual implementation. Opportunity can come in many forms including the funding source (i.e., grant, dedication of land, endowment, etc.). Timing of related projects, both public and private, may also open the door for implementation of a specific greenway segment that otherwise may have been lower on the priority list. See Table 6 - Implementation Priority Chart on following page for specifics.

Implementation Priorities

Segment	Description	Priority	Total Cost
A-1	Black Pond Creek – Lower Hunter's Trace	1, 2, 3	$7,080,150
A-2	Mill Creek Cut-off – Big Run Creek	2, 3	$3,471,850
A-3	Greenwood Road/Big Run Creek	2, 3	$5,649,200
A-4	Johnsontown Road – Stonestreet Road	2, 3	$3,632,800
A-5	Railroad Corridor Adjacent to Dixie Hwy.	3	$15,454,300
A-6	Gagel Avenue	2, 3	$844,400
A-7	New Cut Road	2, 3	$3,008,625
A-8	Northern Ditch	3	$3,363,850
A-9	Southern Ditch	2, 3	$4,326,500
A-10	Keys Ferry Road – Mitchell Hill Road	3	$2,955,200
C-1	Garrison Ditch – Mill Creek/Rockford Lane	3	$3,271,350
C-2	Mill Creek North	1, 3	$4,292,850
C-3	Valley Creek	3	$2,973,450
C-4	Ashby Lane – Valley Station Road	3	$1,746,300
C-5	Palatka Road	3	$1,162,500
C-6	Overhead Electric Easement	3	$2,131,900
C-6A	East Pages Lane	3	$2,443,800
C-7	3rd Street Road	2, 3	$1,615,900
C-9	Pond Creek	3	$4,002,500
C-9A	Pond Creek Extension	3	$5,170,000
C-9B	Pond Creek Extension	3	$1,150,000
C-10	Woodlawn – Crittenden Drive	2, 3	$2,550,300
C-11	Blevins Gap Road	3	$2,515,700
C-12	Valley Station Road	3	$1,228,400
C-13	Mount Holly Road	3	$1,625,900
C-14	Cardinal Hill	3	$2,318,000
C-15	Wilson Creek	3	$2,363,000
E-1	Railroad Corridor Adjacent to Dixie Hwy.	4	$6,070,750
E-2	Pendleton Road - Forest West	1, 4	$2,038,750
E-3	Pond Creek	4	$3,641,250
E-4	JMF East	1, 4	$3,421,600
E-5	CID South	1, 4	$220,200
E-6	Southpark Road - JMF East	4	$363,250

Legend

	Priority 1
	Priority 2
	Priority 3

Table 6 - Implementation Priority Chart

OPERATIONS AND MANAGEMENT PLAN

Section 7

Operations and Management Plan

1.0 Overview

1.1 Project Description and Objectives

The mission of this Operations and Management Plan is to promote a well-maintained, sustainable, safe, secure and enjoyable greenway system in South and Southwestern Louisville. The Greenways must be an asset to Louisville Metro and a good neighbor to surrounding public and private properties, businesses and landscapes. The standard of care will be consistent across the scope of the project area/Greenways. Louisville Metro Parks proposes to serve as the lead department and will work in partnership with other public and private sector partners to operate and maintain the South and Southwest Greenways to the appropriate standards and duty of care defined herein. This operations and management plan has specific application for the South and Southwest Greenways, and may be used as a guideline establishing O&M practices for a network of greenways in Louisville.

The term operations and management refer to specific day-to-day tasks as well as the long-term remedial functions and programs performed to assure resources and facilities of the South and Southwest Greenways are kept in good usable condition. This begins with sound design, durable components, and a comprehensive management plan. In addition, community groups, residents, business owners and other stakeholders will continue to be engaged in the long-term stewardship of the resources preserved and enhanced by the South and Southwest Greenways.

The South and Southwest Greenways plan envisions a network of shared-use, non-motorized greenway trails, water trails, on-road bicycle facilities, TARC routes, sidewalks and roadside trails that are linked together to accommodate bicyclists, pedestrians, in-line skaters, wheelchairs and other human-propelled uses. The proposed greenways system extends approximately 141 miles throughout the project area. The greenways system includes and incorporates: parks, open spaces, streams and wetlands, places of work, schools, community centers, retail centers, as well as cultural and interpretive elements.

1.2 The Jurisdictions and Partners

The South and Southwest Greenways system will be managed and maintained by a partnership of public and private sector agencies and organizations, including the Metro Government Mayor's Office, Louisville Metro Parks, the Louisville and Jefferson County Metropolitan Sewer District (MSD), and Louisville Metro Public Works Department. Private sector partners could include, but not necessarily be limited to the following organizations: Friends of the Louisville Loop, South and Southwest Dream Team, Kentucky Mountain Bike Association, Louisville Bike Club, Riverside, Farnsley-Moremen, Kentucky Waterway Alliance and Metro Parks Foundation.

Most of the Greenways will consist of off-road shared-use trails, soft surface equestrian trails and water trails, while some portions of the Greenways will be on-road accommodating bicycles on the roadway in bike lanes or designated bike routes and pedestrians on sidewalks. Because the greenway system includes streets, streams, parks and other spaces, multiple agencies and organizations must also be engaged, including police and fire/rescue agencies.

A key to a sustainable quality greenway system is the consistent application and implementation of standards, along with interagency and public-private cooperation and coordination. While some of the managing agencies and organizations already have a history of greenway management, for others the South and Southwest Greenways may represent their first major trail/greenway maintenance obligation and there will be a need for capacity building and diversification of skills and resources to meet this challenge. Metro Parks, as lead operations and management partner for the Greenways, will work with project partners to establish an appropriate set of care and maintenance standards.

1.3 Guiding Principles of Quality/Cost-Effective Trail Management

The South and Southwest Greenways system should be viewed and maintained as a first-class public resource. Indeed, it will become infrastructure similar to the street system, park system or utility networks, serving the communities for generations to come. The following guiding principals will help assure the preservation of the Greenways:

1. Good maintenance begins with sound planning and design. Foremost protect safety, property and the environment.
2. Promote and maintain a quality outdoor recreation and transportation experience.
3. Conduct regular inspections.
4. Develop a management plan that is reviewed and updated annually with tasks, operational policies, standards, and routine and remedial maintenance goals.
5. Conduct regular inspections and keep complete records.
6. Maintain an effective, responsive public feedback system and promote public participation and use. Discourage inappropriate use.
7. Be a good neighbor by limiting impact to adjacent properties.
8. Operate a cost-effective program with sustainable funding sources.
9. Establish, adopt and implement a uniform plan and level of commitment amongst all respective agencies and jurisdictions throughout the entire South and Southwest Greenway System.

The operations and management plan for the South and Southwest Greenways provides baseline information for tasks that need to be undertaken by the managing agencies and project partners. This plan recommends a series of work items and tasks that need to be completed in order to maintain the South and Southwest Greenway system as an attractive, safe, and enjoyable amenity. The following defines key aspects of facility management, beginning with operational policies, followed by facility management, land management, safety, security, emergency response and risk management.

The South and Southwest Greenways traverse different environments, including parkland owned by local governments, waterways that support public use, urban land that is either within public ownership or will be acquired as public access and use easements, and private land where greenway easements have been or will be acquired for the purpose of public access.

2.0 Operations and Maintenance Functions

2.1 Public Access and Use Policy

Residents and visitors shall have access to and use of the South and Southwest Greenways during normal hours of operation as defined herein. All access and use is governed by a Trail Ordinance (described in 6.3). The use of the trail system is limited to non-motorized users, including but not limited to hiking, bicycling, equestrian (where designated) in-line skating (where permitted), running, jogging, and wheelchair use. The only motorized vehicles permitted to use the pathway are for maintenance and emergency purposes and vehicles for people with disabilities.

2.2 Hours of Operation Policy

The South and Southwest Greenways will be operated as a non-lighted (except where Metro Parks has installed and maintains trail lighting) linear park, health and wellness, and transportation system that supports commuter travel, and shall be open for public use from dawn to dusk, 365 days a year, except as specifically designated by the Louisville Metro Parks.

2.3 Care and Management of the Trails Policy

Metro Parks and its partners shall be responsible for the care and upkeep of the trails and all lands, drainage features, signage, fences, bridges, trail heads, landscape plantings and trail amenities. (May require formal agreement among agencies in the form of an MOU)

2.4 Fencing and Vegetative Screening Policy

Metro Parks and its designee will work with adjacent landowners on an individual basis to determine fencing and vegetative screening requirements to buffer adjacent property from elements of the South and Southwest Greenways. The care of fences and screening outside of the trail right-of-way or not on publicly owned lands is the responsibility of the adjacent landowner.

2.5 Drainage Management Policy

MSD will maintain all drainage channels, ditches and streams that bisect or intersect with the Greenways to ensure that all of these drainages are free-flowing and unimpeded. Management of drainage channels and structures includes the removal of vegetation, trash and debris that would serve to block the flow of sur-

face waters. Under no circumstances should the trail obstruct flow so as to cause storm water to pond for more than 2 hours on adjacent property.

3.0 Operations and Maintenance Functions

The South and Southwest Greenways will be managed through a coordinated set of operations, management and maintenance programs.

3.1 Maintenance—Routine, Remedial and Seasonal Defined

Routine Maintenance refers to the day-to-day regime of trail sweeping, trash and debris removal, sign replacement, weed control, tree and shrub trimming, ice or snow removal and other regularly-scheduled activities. Routine maintenance also includes minor repairs and replacement such as fixing cracks and potholes or repairing a broken handrailing.

Remedial Maintenance refers to correcting significant defects as well as repairing, replacing or restoring major components that have been destroyed, damaged, or significantly deteriorated during the life of the project. Some items ("minor repairs") may occur on a five to ten year cycle such as repainting, seal coating asphalt pavement or replacing signage. Major reconstruction items will occur over a longer period or after an event such as a flood. Examples of major reconstruction remedial maintenance include stabilization of a severely eroded hillside, repaving a significant stretch of the trail surface, repaving a street used for biking or replacing a footbridge. Remedial maintenance should be part of a long-term capital improvement plan.

Seasonal Maintenance—In addition to the routine and remedial categories there are seasonal tasks that should be performed as needed. Designated maintenance crews should remove leaf debris, snow, and ice, etc. from all Greenway facilities as designated by Metro Parks as soon as possible.

3.2 Components That Are Maintained

Following are the key components of the South and Southwest Greenways:

- Off-Street Shared-Use Trails
- Soft surface trails (single track and shared use)
- Sidepaths (located adjacent to roadways)
- Water Trails
- Trail-Related Corridors (such as landscaping, vegetation and viewsheds adjacent to the trail.)
- On-Street Bicycle and Pedestrian Facilities (such as bike lanes, cycle tracks and bike routes)
- Associated Natural Resource Areas (such as streams, woodlands, wildlife corridors, wetlands and other natural resources)
- Trailheads and Access Points
- Trail-Related Park and Feature Areas (integral to the trail system)
- Associated Sidewalks (interconnecting with or adjacent to trails and on-street routes.)
- Associated Streetscapes

3.3 Typical operations and maintenance tasks include:

In General

- Trail User Rules and Regulations/Posting Hours of Operation
- Conflict Reduction and Resolution (among trail users)
- User Safety and Risk Management
- Prompt graffiti and vandalism repair
- Pest Management
- Programming and Events
- Stewardship and Enhancement
- Coordinate volunteer and adopt-a-trail/street activities
- Oversight and Coordination
- User/Neighboring Property Feedback and Response

Off-Street Shared-Use Trails

- Inspection
- Trail Surface Maintenance
- Sweeping
- Snow and ice removal (on designated sections of the Greenway System)
- Vegetation Management including tree and branch trimming and fallen tree removal
- Erosion Control
- Litter and Trash Removal
- Repair Trail Structures
- Fixture and Furnishings Maintenance

- Signage and Displays, Public Art
- Lighting and signal maintenance
- Toilet Facility Service
- Remedy "Social Trails" (such as shortcuts)
- Address Detours/Disruptions
- Patrol and Security Services
- Accident and Incident Data Tracking
- User Feedback and Follow-up

Trail-Related Corridors and Associated Resource Conservation Areas

- Inspection
- Resource Management/Conservation
- Stream Channel/Riverbank Maintenance
- Litter and Trash Removal
- Pest Management
- Vegetation Management including Weeds and Invasive Plants
- Waterfowl and Hunting Regulation
- Monitor Dumping and Filling
- Fire Prevention
- Patrol and Security Services
- User Feedback and Follow-up

** Trail related corridors include open land immediately next to, or integral with, the trail corridor. This open space may include stream corridors or other open landscapes. Resource conservation areas include wetlands, riparian areas, woodlots and other open spaces that have been set aside along the trail system.*

Natural Surface Trails (such as foot paths, single-track "mountain" bike, equestrian and nature trails)

- Inspection
- Surface Repair
- Vegetation Management including tree and branch trimming and fallen tree removal
- Litter and Trash Removal
- Repair Structures
- Fixture and Furnishings Maintenance
- Remedy Social Trails
- Patrol and Security Services
- Accident and Incident Data Tracking
- User Feedback and Follow-up

Water Trails

- Trailhead and launch pad maintenance and repair
- Signage system development and maintenance
- Portages (not part of trailheads)

On-Street "Trails" (bike routes, cycle tracks and bike lanes)

- Street Surface Upkeep and Repair
- Street Sweeping and Snow and Ice removal
- Repaving and Pavement Overlays
- Signage, Striping and Lighting
- Vegetation Management (including boulevards and medians)
- Bike/Pedestrian Education and Enforcement
- Lighting, striping, and signal maintenance
- Detours/Disruptions (promptly)
- Accident and Incident Data Tracking
- User Feedback and Follow-up

Trail-Related Park and Feature Areas

- Inspection
- Sign Installation and Management
- Mowing/Vegetation Management
- Fixture and Furnishings Maintenance
- User Feedback and Follow-up

Sidewalk and Streetscape

- Inspection Repair
- Sweeping and Snow and Ice Removal
- Fixture and Furnishings Maintenance
- Signage and Displays, Public Art
- Lighting and signal maintenance
- Vegetation management including tree and branch trimming and fallen tree removal
- User Feedback and Follow-up

Other Management Functions

- Programming and Events
- Oversight and Coordination

4.0 Trail Facility Management

All elements of the South and Southwest Greenways should be classified as a "linear park" and will be maintained in a manner that is consistent with other Metro Parks facilities.

Maintenance includes the removal of all debris, trash,

litter, obnoxious and unsafe human-made structures, vegetation and other foreign matter. Trail heads, points of public access, rest areas, and other activity areas will be maintained in a clean and usable condition at all times. The primary concern for pathway maintenance should always be public safety.

Metro Parks and its partners will, from time to time, officially close certain sections of the Greenways in order to conduct repairs and upgrades to greenway facilities. At such times, Metro Parks and its partners will post signs and install barriers that stipulate trail closure. Closed trails are not open for public use and individuals that are found using closed trails shall be considered trespassers and may be subject to prosecution and appropriate monetary fines.

All officially opened trail facilities should be maintained in a safe and usable manner during hours of operation. Rough edges, severe bumps or depressions, cracked or uneven pavement, gullies, rills and washed out tread surface should be repaired immediately. Volunteer vegetation occurring in the trail tread should be removed in such a manner so that the trail surface is maintained as a continuous, even and clean surface.

5.0 Land Management

Parkland that is owned by Metro Government and used for the South and Southwest Greenways shall be governed by Metro Parks operations policies, procedures and programs. Other public rights-of-way and private property that is accessed and used for the Greenways, as the result of a greenway easement, should be maintained in a condition that promotes safety and security for users and adjacent property owners.

Vegetation within the trail corridor should be managed to promote safety, serve as habitat for wildlife, buffer public use from private property, enhance water quality and preserve the unique aesthetic values of the natural landscape. Removal of native vegetation should be done with clear purpose and discretion. The objective in controlling growth of vegetation should be to maintain clear and open lines of sight along the trail at all times, at intersections with roadways and driveways, and along roadways. Vegetation removal within the trail development zone (typically the width of the trail tread plus a maintained shoulder on either side of the trail tread) should be accomplished to eliminate potential hazards that could occur from natural growth, specifically to maintain adequate sight lines along the trail.

The removal of non-native and invasive vegetation requires specific action and management. Metro Government should develop and implement a plan for the systematic removal of non-native and invasive species from the South and Southwest Greenway system lands and waters to improve sight lines and visibility, reduce competition with native vegetation, improve public safety, and restore ecological health.

To promote safe use of the trail, all vegetation should be clear-cut to a minimum distance of 3 feet from the edge of the trail tread. Selective pruning of vegetation should be conducted, in cooperation with Metro Parks, within a zone that is defined as being between three to ten feet from the edge of the pathway. At any point along the trail, a user should have an unobstructed view, along the centerline of the pathway, 250 feet ahead and behind his/her position. The only exception to this policy is where terrain or trail curvature is a limiting factor.

Removal of vegetation within the trail right-of-way by an individual or agency other than the Metro Parks or Public Works (depending on the responsible agency) or its designee is deemed unlawful and subject to fines and/or prosecution.

Ecological Restoration

Metro Parks and its partners will also engage in the ecological restoration of degraded, disturbed, damaged or destroyed ecosystems, habitats and environments that are found within the corridors that comprise the South and Southwest Greenways. This scope of work may include, but not necessarily be limited to, erosion control, reforestation, replanting of native species in disturbed landscapes, removal of invasive species, removal of weeds, daylighting of streams, reintroduction of native habitat and the restoration of streams. The goal of this work is to restore to a native or original condition, to the extent practical, ecosystems, native

plant and animal species and historically significant landscapes. It is also a goal to create or improve wildlife habitat and wildlife corridors wherever possible.

Specifically, Metro government and MSD are working in partnership with the U.S. Army Corps of Engineers to conduct ecological restoration work within the Pond Creek and Mill Creek corridors.

Invasive Species and Pest Management Program
Metro Parks and its partners will work to eradicate, to the extent possible, invasive plant and animal species from the corridors, waters and landscapes that comprise the South and Southwest Greenways. Invasive species are defined as alien or non-native species whose presence within the landscape threatens native species and/or are likely to cause environmental or economic harm and/or harm to human health. For the South and Southwest Greenways, Metro Parks will lead an effort to identify where substantial amounts of invasive plant and animal species are found within the Greenways, devise a control, management and/or eradication plan and determine methods for implementing the plan.

5.1 Accurate and Organized Record Keeping

Good record-keeping techniques are essential to a comprehensive operations and maintenance program, particularly when multiple jurisdictions are involved. This information can be used to eliminate overlap or gaps in maintenance services provided, identify levels of use, and prioritize management needs. Hand-held digital devices and applications with GPS capability carried by field inspectors and maintenance personnel may help expedite and facilitate a more effective record keeping system where data are fed into a central source. The record keeping template should include:

- Schedule of routine and remedial maintenance tasks
- Inspection reports
- Hazards, incidents, safety issues observed and action taken
- Prioritization of remedial maintenance projects
- Trail user input and feedback (complaints, comments, suggestions, etc.)
- Annual maintenance budgets and costs
- Projected costs for subsequent years (short term, medium term, and long-term)

- Internal working database for existing, planned, or proposed projects for each system—greenway, off-street, on-street, bicycle, and pedestrian
- Snow and/or debris removal

6.0 Safety and Security

Safety is a duty and obligation of all public facility managers, therefore, as trail construction documents for elements of the South and Southwest Greenways are completed, appropriate local and state agencies should review these plans and specifications to ensure that they meet all current local, state and federal safety regulations.

6.1 Security and Public Safety, Risk Management and Liability Considerations

Promoting safety and security of trail users and the security of adjacent properties should be the foremost objective of the South and Southwest Greenways. This should begin with a comprehensive risk management plan and program. Metro Parks should establish such a plan and designate operations staff to promote a uniform standard of care and exchange information and resources with System partners. Elements of this plan include:

- Working with Metro Parks risk management specialists and legal counsel to routinely review trail and greenway plans, operations and issues and incidents.
- Keeping good records of O&M activities and including documenting accidents, incidents, damage to adjoining properties and incidents. This would be greatly facilitated using GPS locations of problems and incorporating with GIS mapping systems. Good mapping could help identify possible “problem areas” and “incident clusters”. Cooperation by police and fire/rescue personnel is vital to good documentation.

Key considerations in promoting public safety and security include:

- Have good, current, data—Implement a data base

management system, a crime tracking system, with police for tracking the specific locations and circumstances of all incidents, such as accidents, crime and vandalism, and create a safety follow-up group to address any problems that develop.

- Monitor the condition of facilities—Schedule and document frequent inspections to determine the amount of use, location, age, type of construction, and condition of railings, bridges, trail surfaces, signage, etc. Evaluate and remove all obstacles or objects that could impede facility usage such as debris, rumble strips, etc. and provide solutions such as alternative routing, removal of obstacle, etc. Follow-up with the appropriate corrective measures in a timely manner.
- Preventative maintenance—Watch for and identify potential safety problems such as a missing curve or stop sign, a damaged trail surface, a missing railing, leaf litter, snow and ice build-ups (especially hidden ice and snow), flash flood issues, storm water drainage and/or erosion issues. Important to check for these after events like storms or construction along the trail corridor.
- Safety and security features through planning and design—Adhere to state-of-the-standards such as the AASHTO Guide to the Development of Bicycle Facilities, the Manual of Uniform Traffic Control Devices, ADA, OSHA, etc. Incorporate good lines of sight, trimming vegetation and other measures to avoid hiding places and other Crime Prevention through Environmental Design techniques to help reduce crime and accidents. Removal of invasive plant species can improve sight lines along trails and the safety of trail use.
- Multi-disciplinary plan review—All proposed plans and construction drawings should be circulated amongst the various agencies and organizations and staff including public works, police and fire/rescue, and MSD staff.
- User courtesy and conflict reduction—Post signs, equip patrol persons, use brochures and Internet to educate public on trail etiquette including bicycle yield, equestrian courtesies, dog on leash and safe practices.
- Wayfinding and location identification—Include clear trail blazes, street signs at cross streets readily visible from the trail and "mile markers" located at least every 1/4 mile giving the location based on a north to south or west to east numbering starting at a single "point zero" such as a major cross street.
- Patrol and enforcement—Field a bicycle-mounted (or horse mounted where applicable) trail ranger patrol. This can be a multi-jurisdictional patrol with wireless communication capability and first aid training, such as the Louisville Loop Watch program.
- Protecting adjacent properties—Work with adjacent landowners, tenants, and businesses to assure the trail is a good neighbor. This may include, where appropriate, security barriers, "do not trespass" signage, and communication with impacted neighbors.
- Medical emergencies and rescue, response and access—Work with police and fire/rescue for optimal emergency response, including design for rescue and vehicle (to accommodate up to 6.5 tons) access, incident reporting by location using GPS, and location identification.
- Address system—Have in place an "address system" such as mile markers to identify locations for all off-road greenway facilities. On-road facilities should make use of the existing street names and adjacent property addresses. Each local emergency response office/unit should have an up-to-date map of all greenway, bicycle, and pedestrian facilities.
- Surveillance Technologies—With the advent of low cost "webcams" and similar video technology it may be advantageous or necessary to position solar powered wireless "webcams" that transmit visual images of the trail to project partners, increasing the number of "eyes" on the trail.
- Homeless Encampments – One of the challenges for the South and Southwest Greenways will be to manage and remove the homeless encampments that have been a historical problem within portions of the SW Louisville landscapes that now are designated as greenway corridors. Metro Parks and partners should work proactively with police and social service organizations to monitor the locations of these encampments and remove them as they are established.

Summary Checklist for Safety and Security:

1. Establishment of a safety committee and/or coordinator,
2. Preparation of a trail safety manual,
3. Establishment of user rules and regulations,
4. Development of trail emergency procedures,
5. Preparation of a safety checklist for the trail,
6. Preparation of a trail-user response form,
7. A system for accident reporting and analysis,
8. Regular maintenance and inspection programs,
9. Site and facility development and review,
10. Public information programs,
11. Employee training programs for safety and emergency response
12. Ongoing research and evaluation of program objectives.

The program should discourage the general public from using any segment of the Greenways that is under construction. Trail segments should not be considered open for public use until a formal dedication ceremony has been staged and authorized agents of Metro Parks have declared the trail open. Individuals who use trail segments under construction without written permission from an authorized agent shall be deemed in violation of the South and Southwest Greenways operation policy.

6.2 Conflict Reduction

User conflicts are bound to occur along the trail, especially as the trail system becomes increasingly popular and more crowded. Planning, designing and managing ahead of the curve can help reduce conflicts and promote a safer, more enjoyable trail experience. Steps to promote conflict reduction include:

- Anticipate issues—This may include reckless and unsafe behavior; incompatible uses; trespassing; disturbances and adverse environmental impacts. Respond to illegal or disturbing activities quickly.
- Consider varied user goals—Recognize the different goals of different users, such as equestrians and bicyclists, and separate where feasible.
- Educate—Provide user education through signage, patrol, volunteers, brochures, and media. Promote trail etiquette and techniques such as educating bicyclists and hikers on how to pass horses using subdued voice cues rather than bells, horns, or sudden loud noise that might startle a horse.
- Enforce—Post user courtesy signs and speed limits for bicyclists. Cite and if necessary ticket reckless behavior including excessive bicycle speeds, dogs of leash, etc.
- Anticipate the need for adequate capacity—Provide adequate trail mileage and bicycle, pedestrian, and greenway acreage to accommodate user populations.
- Solicit input from user groups—Provide contact information to report problems and respond promptly and effectively to complaints, concerns, or suggestions.
- Monitor problems—Track, document, and log problem areas and address problems through design and management.

6.3 Shared-Use Trail User Rules and Regulations (Trail Ordinance)

The following rules and regulations should be implemented for the South and Southwest Greenways. These rules should be displayed in brochures and on information signs throughout the trail system. It is recommended that these regulations be reviewed by appropriate authorities and adopted by Metro Parks and its partners.

1. **Be Courteous:** All trail users, including bicyclists, joggers, walkers, and equestrians should be respectful of other users regardless of their mode of travel, speed or level of skill. Respect the privacy of adjacent landowners.
2. **Keep Right:** Always stay to the right as you use the path or stay in the lane that has been designated for your user group. The exception to this rule occurs when you need to pass another user.
3. **Pass on the Left:** Pass others going in your direction on their left. Look ahead and behind to make sure that your lane is clear before you pull out an around the other user. Pass with ample separation. Do not move back to the right until you have safely gained distance and speed on the other user.
4. **Give Audible Signal When Passing:** All users should give a clear warning signal before passing. This signal may be produced by voice, bell or soft

horn. Voice signals might include "Passing on the Left!" or "Cyclist on the left!" Always be courteous when providing the audible signal.

5. **Be Predictable:** Travel in a consistent and predictable manner. Always look behind before changing position on the trail regardless of your mode of travel.
6. **Control Your Bicycle:** Inattention, even for a second, can cause disaster —always stay alert! Maintain a safe and legal speed at all times.
7. **Don't Block the Trail:** When in a group, including your pets, use no more than half the pathway so as not to block the flow of other users. If users approach your group from both directions, form a single line or stop and move to the far right edge of the path to allow safe passage by these users.
8. **Yield When Entering or Crossing Trails:** When entering or crossing a path at uncontrolled intersections, yield to traffic already using the other path.
9. **The Use of Lights:** When using the trail during periods of low visibility, each cyclist should be equipped with proper lights. Cyclists should have a white light that is visible from 500 feet to the front and a red or amber light that is visible from 500 feet to the rear. Other path users should use white lights (bright flashlights) visible 250 feet to the front, and wear light or reflective clothing.
10. **Don't Use this Path Under the Influence of Alcohol or Drugs:** It is illegal to use this path if you have consumed alcohol in excess of the statutory limits, or if you have consumed illegal drugs. Persons who use a prescribed medication should check with their doctor or pharmacist to ensure that it will not impair their ability to safely operate a bicycle.
11. **Clean Up Your Litter:** Please keep this path clean and neat for other users to enjoy. Do not leave glass, paper, cans or other debris on or near the path. Please clean up after your pets. Pack out what you bring in —and remember always to recycle your trash.
12. **Keep Pets on Leashes:** All pets must be kept on a secure and tethered leash. Failure to do so will result in fines.
13. **Use the Buddy System:** Metro Parks encourages Greenways users to always use the trail system with a friend!
14. **Vegetation Removal:** It is illegal to remove vegetation of any type, size, or species from the pathway. Please contact Metro Parks should you have concerns about noxious weeds, poisonous vegetation, dying or dead vegetation or other concerns about vegetation growth in the pathway.
15. **Share the Path!** Always exercise due care and caution when using the pathway!

6.4 Rules of the Trail – For Mountain Bike Trails

Additionally, specifically for Mountain Bike Trail users, the International Mountain Bike Association provides its own, suggested, Rules of the Trail, which are worth publishing and distributing for the off-road biking portions of the South and Southwest Greenways project.

These guidelines for trail behavior are recognized around the world. IMBA developed the "Rules of the Trail" to promote responsible and courteous conduct on shared-use trails. Keep in mind that conventions for yielding and passing may vary, depending on traffic conditions and the intended use of the trail.

1. Ride On Open Trails Only

Respect trail and road closures. Seek clarification if you are uncertain about the status of a trail. Do not trespass on private land. Obtain permits or other authorization as may be required. Be aware that bicycles are not permitted in areas protected as state or federal wilderness.

2. Leave No Trace

Be sensitive to the dirt beneath you. Wet and muddy trails are more vulnerable to damage than dry ones. When the trail is soft, consider other riding options. This also means staying on existing trails and not creating new ones. Don't cut switchbacks. Be sure to pack out at least as much as you pack in.

3. Control Your Bicycle

Inattention for even a moment could put yourself and others at risk. Obey all bicycle speed regulations and recommendations, and ride within your limits.

4. Yield to Others

Do your utmost to let your fellow trail users know you're coming -- a friendly greeting or bell ring are good

methods. Try to anticipate other trail users as you ride around corners. Bicyclists should yield to all other trail users, unless the trail is clearly signed for bike-only travel. Bicyclists traveling downhill should yield to ones headed uphill, unless the trail is clearly signed for one-way or downhill-only traffic. Strive to make each pass a safe and courteous one.

5. Never Scare Animals
Animals are easily startled by an unannounced approach, a sudden movement or a loud noise. Give animals enough room and time to adjust to you. When passing horses, use special care and follow directions from the horseback riders (ask if uncertain).

6. Plan Ahead
Know your equipment, your ability and the area in which you are riding -- and prepare accordingly. Strive to be self-sufficient: keep your equipment in good repair and carry necessary supplies for changes in weather or other conditions. Always wear a helmet and appropriate safety gear.

6.5 Police Patrol and Emergency Response System

In order to provide effective patrol and emergency response to the needs of trail users and adjacent property owners, Metro Parks and partners should develop a specific patrol and emergency response plan for the South and Southwest Greenways. This plan should define a cooperative law enforcement strategy for the trail based on the capabilities of different agencies and services typically required for the facility, which agencies should respond to 911 calls, and provide easy-to-understand routing plans and access points for emergency vehicles. Local hospitals should be notified of these routes so that they may also be familiar with the size and scope of the project. The entire pathway system should be designed and developed to support a minimum gross vehicle weight of 6.5 tons to allow emergency vehicle access.

All phases should illustrate: points of access to the pathway; approved design details for making these access points safe, secure, and accessible to law enforcement officials, and potential locations for a system of cellular-type emergency phones.

6.6 Crime Prevention Through Environmental Design (CPTED)

"CPTED is the proper design and effective use of the built environment which may lead to a reduction in the fear and incidence of crime, and an improvement of the quality of life." - National Crime Prevention Institute

Crime Prevention Through Environmental Design (CPTED) theories contend that law enforcement officers, architects, city planners, landscape designers and resident volunteers can create a climate of safety in a community, right from the start. CPTED's goal is to prevent crime through designing a physical environment that positively influences human behavior. People who use the South and Southwest Greenways regularly will need to perceive it as safe, and would-be criminals should view the trail as a highly risky place to commit crime. Crime prevention through environmental design (CPTED) is a multi-disciplinary approach to deterring criminal behavior through environmental design. CPTED strategies rely upon the ability to influence offender decisions that precede criminal acts.

CPTED is based on four principles: natural access control, natural surveillance, territorial reinforcement, and target hardening.

6.6.1 Natural surveillance

Natural surveillance increases the threat of apprehension by taking steps to increase the perception that people can be seen. Natural surveillance occurs by designing the placement of physical features, activities and people in such a way as to maximize visibility and foster positive social interaction among legitimate users of public space. Potential offenders feel increased scrutiny and limitations on their escape routes.

- Use adjacent roadways and the passing vehicular traffic as a surveillance asset.
- Create landscape designs that provide surveillance, especially in proximity to designated points of entry and opportunistic points of entry.
- Use the shortest, least sight-limiting fence appropriate for the situation.
- When creating lighting design, avoid poorly placed lights that create blind-spots for potential observers and miss critical areas. Ensure potential prob-

lem areas are well-lit: pathways, stairs, entrances/exits, parking areas, children's play areas, recreation areas, storage areas, dumpster and recycling areas, etc.
- Avoid too-bright security lighting that creates blinding glare and/or deep shadows, hindering the view for potential observers. Eyes adapt to night lighting and have trouble adjusting to severe lighting disparities. Using lower intensity lights often requires more fixtures.
- Place lighting along pathways and other pedestrian-use areas at proper heights for lighting the faces of the people in the space (and to identify the faces of potential attackers).
- Natural surveillance measures can be complemented by mechanical and organizational measures. For example, closed-circuit television (CCTV) cameras can be utilized.
- Remove invasive species of plants to improve sight lines and visibility for trail users.

6.6.2 Natural access control

Natural access control limits the opportunity for crime by taking steps to clearly differentiate between public space and private space. By selectively placing entrances and exits, fencing, lighting and landscape to limit access or control flow, natural access control occurs.
- Use a single, clearly identifiable, point of entry
- Use low, thorny bushes to keep people out of sensitive areas.
- Use waist-level, picket-type fencing to control access and encourage surveillance.
- Natural access control is used to complement mechanical and operational access control measures, such as target hardening.

6.6.3 Natural territorial reinforcement

Territorial reinforcement promotes social control through increased definition of space and improved proprietary concern. An environment designed to clearly delineate private space does two things. First, it creates a sense of ownership. Owners have a vested interest and are more likely to challenge intruders or report them to the police. Second, the sense of owned space creates an environment where "strangers" or "intruders" stand out and are more easily identified. By using buildings, fences, pavement, signs, lighting and landscape to express ownership and define public, semi-public and private space, natural territorial reinforcement occurs. Additionally, these objectives can be achieved by assignment of space to designated users in previously unassigned locations.

- Maintain premises and landscaping such that it communicates an alert and active presence occupying the space.
- Provide trees in residential areas. Research results indicate that, contrary to traditional views within the law enforcement community, outdoor residential spaces with more trees are seen as significantly more attractive, safer, and more likely to be used than similar spaces without trees.
- Restrict private activities to defined private areas.
- Display security system signage at access points.
- Avoid cyclone fencing and razor-wire fence topping, as it communicates the absence of a physical presence and a reduced risk of being detected.
- Place amenities such as seating or refreshments in common areas in a commercial or institutional setting to help attract larger numbers of desired users.
- Schedule activities in common areas to increase proper use, attract more people and increase the perception that these areas are controlled.
- Territorial reinforcement measures (identify points of access, clearly delineate public and private landownership, install appropriate signage, etc.) make the normal user feel safe and make the potential offender aware of a substantial risk of apprehension or scrutiny.

There are four primary obstacles to the adoption of CPTED.

First is a lack of knowledge of CPTED by environmental designers, land managers, and individual community members. For this reason, allocating substantial resources to community educational programs are often required.

The second major obstacle is resistance to change. Many specifically resist the type of cooperative planning that is required to use CPTED. Beyond that, skep-

tics reject the research and historic precedents that support the validity of CPTED concepts.

The third obstacle is the perception that CPTED claims to be a panacea for crime that will be used to displace other more traditional approaches rather than a small, but important, complementary tool in deterring offender behavior.

The fourth obstacle is that many existing built areas were not designed with CPTED in mind, and modification would be expensive, politically difficult, or require significant changes in some areas of the existing built environment.

7.0 Risk Management and Liability

The design, development, management and operation of the South and Southwest Greenways must be carefully and accurately executed in order to provide a resource that protects public health, welfare, and safety. To reduce the exposure to liability, Metro Parks and its partners should have in place the following measures prior to opening the first phase of the trail:

1. A complete maintenance program that provides the appropriate duty or level of care to greenway users,
2. A risk management plan that appropriately covers all aspects of the trail,
3. A comprehensive working knowledge of public use laws and recent case history applicable in Kentucky.

Public use of the Greenways should be covered under existing Metro Parks policies for the use of park and public spaces. Metro Parks and partners are charged with the care of the Greenways and should exercise reasonable care in the managing all Greenway facilities to reduce hazards, public nuisances and life threatening situations.

8.0 Anticipated Needs, Administrative Considerations, and Costs

8.1 Overview

Throughout its length, the South and Southwest Greenways will pass through myriad types of landscapes from urban to suburban to rural. The greenway trail system will follow streams, roads, parks, commercial areas and other settings. When fully completed, the Greenways will consist of approximately 110 miles of paved and soft surface 10' to 12' wide shared use trails.

Clearly because of its unique characteristics, stewardship of the South and Southwest Greenways will differ from those of a traditional park and require a non-traditional and uniquely cooperative approach to management to remain a first class amenity, recreational, health, wellness and transportation facility.

8.2 Establishing an Operations and Management Team

To assure the South and Southwest Greenways sustains a level of excellence over the long term, it is important to have an agreed-upon, effective multi-jurisdictional operations and management structure. Metro government has already begun to establish a management approach for trails and greenways throughout Louisville. Coordination will occur between the following Metro government agencies: Mayor's office, Metro Parks, Metro Public Works and MSD. This forms the nucleus of management for the Greenways.

A draft document entitled Louisville Loop Management Agreement defines an agreement between Louisville Metro Parks, the Metropolitan Sewer District and Public Works to establish a "maintenance committee" that would oversee development, operations and maintenance of the Louisville Loop Trail. The proposed Greenways encompasses more than the facilities and trails associated with the Louisville Loop. Nevertheless, the draft management agreement establishes a model for what should be agreed upon by the broader set of partners associated with the larger greenway system.

The South and Southwest Greenways Management team should be comprised of the following:

Mayor's Office – Greenways and Trails Administrator
Metro Parks – Natural Areas Operation Manager
MSD – Maintenance/Operations Manager
Public Works – Maintenance/Operations Manager

9.0 Labor and Equipment Needs

With phased development of the South and Southwest Greenways, new personnel and equipment will be needed to undertake the day-to-day management of the trail. It should be understood that trail management and operations is separate from other land management responsibilities currently associated with drainage, parks and public streets. As such, the following offers guidance for how labor and equipment should be assigned for the care and management of the Greenways.

9.1 Operations and Management Staff

Some of the staff required to operate and manage the 110-mile network of greenways can be drawn from existing agencies. As the South and Southwest Greenways is developed and becomes a functional system, Metro Parks will establish trail crews to care for the daily management of the system.

Two (2) three-person trail crews (total of six employees) should be employed by Metro Parks specifically to carry out daily maintenance, management and stewardship of the Greenways, including trailhead facilities, signage systems, furniture (benches, picnic tables, etc.) and furnishings (signage, water fountains, lighting), landscaping and vegetation, and other elements of the system.

Trail management by the two (2) three-person crews shall be performed by subdividing the Greenways into management zones. It is recommended that Metro Parks create five (5) management zones, containing approximately 20 miles per management zone. The trail crews employed by Metro Parks would perform complete management activities within each management zone on a five-day rotational basis, including mowing, invasive species management, emptying trash receptacles, repair of trail tread, furniture and furnishings, vegetation management and drainage channel management. The trail crews will also coordinate their O&M activities with MSD and Public Works, and work with the Mayor's office to coordinate O&M activities with volunteers.

The trail crews will report directly to the Metro Parks infrastructure and Use Experience manager, who will establish daily work schedules and priorities. Trail crews will be furnished with equipment, supplies, tools, machinery and other operations needed to carry out their responsibilities. One member of the three-person trail crew will be defined as the trail crew leader.

The minimum annual salary for the trail crew leader should be $37,000 plus associated competitive benefits. The minimum annual salary for each trail crew member should be $33,000 plus associated competitive benefits.

9.2 Equipment to Maintain Greenways

Metro Parks has established a list of equipment needs that are necessary to manage the Louisville Loop Trail. Below is a list of recommended equipment required to manage mowing and other land management activities associated with the South and Southwest Greenways. The assumption is that this is new equipment that is required and would be in addition to other stated needs for maintaining and managing Metro Park lands and facilities.

1 Ford Escape Hybrid for trail manager
$34,500.00
1 Ford F-350 with extended crew cab for 3-person trail crew $45,000.00
2 John Deere EZTrack Zero Turn Mowers
$12,000.00
2 Poulan Pro PP333 gasoline powered trimmers
$500.00
2 Poulan Pro PPBP30 gasoline powered blowers
$300.00
2 Poulan Pro 18-inch blade chain saw
$350.00
Hand shovels, pick axe, rakes, pruning shears
$1,000.00

In addition to labor and equipment, it is recommended that an annual budget of $50,000 be set aside to pay for annual costs for fuel, materials, repair to equipment, and other miscellaneous charges and costs for completing the maintenance and management of the Greenways.

9.3 Use of Volunteers

Park/Trail mangers often use volunteers for routine

trail maintenance, trail construction and even recreational and educational programming. What happens if the volunteer is injured while performing trail-related work. The use of volunteers are currently addressed and covered under Metro government employment policies and insurance.

9.4 Adopt-A-Greenway Program

An Adopt-a-Greenway program is an excellent way for Metro government to engage local citizens in the care and maintenance of the South and Southwest Greenways. The Adopt-a-Greenway Program would be operated by Metro Parks with the goal of maintaining the environmental and aesthetic quality of the Greenways by generating a strong sense of ownership among the citizens. Through the Adopt-a-Greenway program, residents, businesses, greenway users, and various community groups can have an active role in maintaining the lands and facilities of the trail system. Volunteers will work with Metro Parks staff to participate in various projects, which may include:

- Litter Pickup
- Leaf Raking
- Graffiti Removal
- Spreading of mulch, gravel
- Maintenance of paved trails
- Removal of exotic invasive plants
- Landscaping installation
- Reporting of safety hazards, illegal dumping, injured or dead animals, storm damage, and other issues
- Tree donation and commemorative recognition program (according to current Metro Parks policies)

9.5 Trail Watch Program

A Trail Watch program for the South and Southwest Greenways will help to promote safety and appropriate trail use by providing information and assistance to all trail users. Trail Watch Volunteers observe and document safety issues requiring attention, serve as a positive presence on the trail and would assist Metro Parks and the Louisville Metro Police Department to keep the Greenways safe and well maintained.

The Louisville Loop Watch program offers an excellent model to emulate for the rest of the Greenways. The Loop Watch program is based on citizen involvement, creates additional "eyes and ears" for the Loop Trail and provides opportunity to train residents on how to be an advocate for safety and security.

10.0 Programming Greenway Lands

Greenways offer lands that are capable of being programmed with a wide variety of activities. As such, with proper planning and execution, Greenways may become a source of revenue generated from these activities, which may in turn be used to offset the cost of operations and management.

Greenways can serve many different functions and purposes that extend beyond traditional recreation and alternative transportation. Greenways can become outdoor educational facilities and an extension of indoor laboratories dedicated to scientific exploration and study. Greenways may be used as corridors for education in both natural and cultural resources. A wide range of community events and programs can be conducted on greenways. The following is a list of possible greenway events and programs that could take place within the South and Southwest Greenways:

- National Trails Day
- National Public Lands Day
- Earth Day
- Bike-to-Work Day
- Arbor Day
- Mountain-Bike Race
- Short and long-distance walks and runs
- Greenway Day
- Outdoor recreational offerings (e.g. Canoeing, fishing, paddle trail training)
- Public programs such as Winter Wildlife Tracks Tour
- Support of Louisville ECHO and other reserved environmental education programs.

Many of these programs and events could charge an admission, entrance or user fee. A portion of the fees charged could be used to offset operation and management costs. Other communities have used this strategy to generate millions in revenues, much of which is devoted to pay the costs associated with operations, maintenance and management of greenway facilities and systems.

Public Art on Greenways
The South and Southwest Greenways will contain enough land and facilities to support the development and implementation of a public outdoor art program. The purpose of the program would be to feature the work of outdoor artists and their works in the Greenway.

11.0 Additional Information and Material

The following additional information provides a more detailed examination of private property impacts, the importance of Recreational Use Statutes and the level of care that is due trail users.

11.1 Studies of Trail Liability

A study by the Rails to Trails Conservancy (RTC) provides a primer on trail-related liability issues and risk management techniques. The report was co-authored by RTC in cooperation with the National Park Service: Rivers, Trails, and Conservation Assistance Program.

11.2 Concerns and Solutions

There are two primary categories of people who might be concerned about liability issues presented by a trail: the trail managing and owning entity (typically a public entity) and private landowners. Private landowners can be divided into two categories, those who have provided an easement for a trail over their land and those who own land adjacent to a trail corridor.

Similarly, there may be a pre-existing corridor traversing or lying adjacent to their property such as a former rail corridor that has been converted to a trail. In either situation, private landowners may have some concerns about the liability should a trail user stray onto their land and become injured. In the first instance, where an easement is granted, the concern may be over injuries on both the granted right-of-way as well as injuries that may occur on land under their control that is adjacent to the trail. Under the latter condition, where the landowner has no ownership interest in the trail, the landowner will only be concerned with injury to trail users wandering onto their property and getting hurt or perhaps a tree from their property falling onto the trail.

In general, people owning land adjacent to a trail -- whether the trail is an easement granted by them or is held by separate title -- foresee that people using the trail may be endangered by a condition on their land. Potential hazards such as a pond, a ditch, or a dead tree may cause the landowner to worry about liability for a resulting injury. The landowners may reduce their liability by taking the following actions.

- Work with trail designers to have the trail located away from hazards that cannot be corrected,
- Make it clear that trail users are not invited onto the adjoining land. This can be aided by having the trail designer develop signs, vegetative screening, or fencing,
- If a hazardous condition does exist near the trail, signs should be developed to warn trail users of the hazard if it cannot be mitigated.

Of particular concern to adjacent landowners are attractions to children that may be dangerous, such as a pond. Many states recognize that children may trespass to explore an attractive nuisance. These states require a legal responsibility to children, even as trespassers, that is greater than the duty of care owed to adults.

If a landowner provides an easement for a public-use-trail, the easement contract should specify that the managing agency will carry liability insurance, will design the trail to recognized standards and will develop and carry out a maintenance plan. The landowner may also request that an indemnification agreement be created in their favor.

Abutting property owners frequently express concerns about their liability to trail users. In general, their liability, if any, is limited and is defined by their own actions in relation to the trail. If an abutting property owner possesses no interest in the trail, then he or she does not have any right or obligation to warn trail users about defects in the trail unless the landowner creates a dangerous condition on the trail by his own act or omission. In that event, the abutting landowner would be responsible for his own acts or omissions that caused the injury to a third party using the trail, just as the operator of one car is responsible to the operator

of another for an accident he caused on a city street.

11.3 Forms of Protection

There are three legal precepts, either alone or in combination, that define and in many cases limit liability for injury resulting from trail use. The first is the concept of duty of care, which speaks to the responsibility that a landowner (private or public) has to anyone on his or her land. Second is the Recreational Use Statute (RUS), which is available in all 50 states and provides protection to private landowners and some public landowners who allow public free access to land for recreational purposes. For those public entities not covered by a RUS, states tend to have a tort claims act, which defines and limits governmental liability. Third, for all private and public parties, liability insurance provides the final line of defense. Trail owners can also find much protection through risk management.

11.4 Duty of Care

Tort law, with regard to finding fault for an incident that occurs in a particular location is concerned with the "class" of person who incurs the injury, and the legal duty of care that a landowner owes a member of the general public varies from state to state but is generally divided into four categories. In most states, a landowner's responsibility for injuries depends on the status of the injured person. A landowner owes increasingly greater duties of care (i.e.; is more at risk) if the injured person is a "trespasser", a "licensee", an "invitee", or a "child".

Trespasser -- a person on land without the landowner's permission, whether intentionally or by mistaken belief that they are on public land. Trespassers are due the least duty of care and therefore pose the lowest level of liability risk. The landowner is generally not responsible for unsafe conditions. The landowner can only be held liable for deliberate or reckless misconduct, such as putting up a trip wire. Adjacent landowners are unlikely to be held liable for injuries sustained by trespassers on their property.

Licensee -- a person on land with the owner's permission but only for the visitor's benefit. This situation creates a slightly higher liability for the landowner. For example, a person who is permitted to hunt on a farm without paying a fee, if there were no RUS, would be classified as a licensee. If the landowner charged a fee, the hunter would probably be classified as an invitee. Again, the landowner is not responsible for discovering unsafe conditions; however, the landowner must provide warning of the known unsafe conditions.

Invitee -- a person on the owner's land with the owner's permission, expressly or implied, for the owner's benefit, such as a paying customer. This is the highest level of responsibility and therefore carries the highest level of liability. The owner is responsible for unknown dangers that should have been discovered. Put in a different way, the landowner has a duty to:

1. Inspect the property and facilities to discover hidden dangers;
2. Remove the hidden dangers or warn the user of their presence;
3. Keep the property and facilities in reasonably safe repair: and
4. Anticipate foreseeable activities by users and take precautions to protect users from foreseeable dangers.

The landowner does not insure the invitee's safety, but must exercise reasonable care to prevent injury. Generally, the landowner is not liable for injuries caused by known, open, or obvious dangers where there has been an appropriate warning. For example, customers using an ice rink open to the public for a fee would be invitees.

Children -- even if trespassing, some states accord children a higher level of protection. The concept of "attractive nuisance" is particularly relevant to children. Landforms such as ponds can be attractive to children who, unaware of potential danger, may be injured if they explore such items.

Prior to the widespread adoption of RUS' by the states, this classification system defined the liability of adjacent landowners. Even now, trail managers or private landowners who charge a fee are at greater risk of liability because they owe the payee a greater responsibility to provide a safe experience.

Thus, where no RUS exists or is unavailable, trail users would be of the licensee class, provided the trail manager does not charge an access fee. If a trail manager charges a fee, the facility provider tends to owe a greater duty of care to the user and thus has a greater risk of liability if a trail user is injured due to a condition of the trail.

11.5 Recreational Use Statutes (RUS)

The Council of State Governments produced a model recreational use statute (RUS) in 1965 in an effort to encourage private landowners to open their land for public recreational use by limiting the landowner's liability for recreational injuries when access was provided without charge.

Recreational use statutes are now on the books in all 50 states. These state laws provide protection to landowners who allow the public to use their land for recreational purposes. The theory behind these statutes is that if landowners are protected from liability they would be more likely to open up their land for public recreational use and that, in turn, would reduce state expenditures to provide such areas. To recover damages, an injured person must prove "willful and wanton misconduct" on the part of the landowner, essentially the same duty of care owned to a trespasser. However, if the landowner is charging a fee for access to the property, the protection offered by the recreational use statue is lost in most states.

The preamble of the model RUS is clear that it was designed for private landowners but the actual language of the model legislation does not differentiate between private and public landowners. The result is that while some states have followed the intent of the model statute and limited the immunity to private landowners, other states have extended the immunity either to cover public landowners legislatively or judicially.

Under the Federal Tort Claims Act, the federal government is liable for negligence like a private landowner under the law of the state. As a result, RUS's intended for private individuals have been held applicable to the federal government where it has opened land up for public recreation.

Under lease arrangements between a public agency and a private landowner, land can be provided for public recreation while the public agency agrees to defend and protect the private landowner. The private landowner may still be sued but the public agency holds the landowner harmless, taking responsibilities for the cost of defending a lawsuit and any resulting judgments.

While state RUS's and the court interpretations of these laws vary somewhat, a few common themes can be found. The statues were created to encourage landowners to make their land available for public recreation purposes by limiting their liability provided they do not charge a fee. The RUS limits the duty of care a landowner would otherwise owe to a recreational licensee to keep his or her premises safe for use. It also limits a landowner's duty to warn of dangerous conditions provided such failure to warn is not considered grossly negligent, willful, wanton, or reckless. The result of many of these statues is to limit landowner liability for injuries experienced by people partaking in recreational activities on their land. The existence of a RUS may also have the effect of reducing insurance premiums for landowners whose lands are used for recreation.

These laws do not prevent somebody from suing a trail manager/owner or a private property owner who has made his or her land available to the public for recreational use, it only means the suit will not advance in court if certain conditions hold true. Thus, the trail manager/owner may incur costs to defend himself of herself. Such costs are the principal reason for purchasing liability insurance.

11.6 Risk Management

All of the above-mentioned forms of protection aside, perhaps the best defense a trail manager has are sound policy and practice for trail maintenance and usage. Developing a comprehensive technique is the best defense against an injury-related lawsuit.

Trails that are properly designed and maintained go a long way to ward off any potential liability. There are

some general design guidelines (AASHTO and MUTCD) that, if adhered to, can provide protection by showing that conventional standards were used in designing and building the trail. Trails that are designed in accordance with recognized standards or "best practices" may be able to take advantage of any design immunities under state law. Within the spectrum of public facilities, trails are quite safe, often less risky than roads, swimming pools and playgrounds.

The managing agency should also develop a comprehensive maintenance plan that provides for regular maintenance and inspection. These procedures should be spelled out in detail in a trail management handbook and a record should be kept of each inspection including what was discovered and any corrective action taken. The trail manager should attempt to ward off or eliminate any hazardous situations before an injury occurs. Private landowners that provide public easements for a trail should ensure that such management plans are in place and used to reduce their own liability. Key points include:

During trail design and development:

- Develop an inventory of potential hazards along the corridor;
- Create a list of users that will be permitted on the trail and the risks associated with each;
- Identify all applicable laws;
- Design and locate the trail such that obvious dangers are avoided. Warnings of potential hazards should be provided, and mitigated to the extent possible;
- Trail design and construction should be completed by persons who are knowledgeable about design guidelines, such as those listed in AASHTO and MUTCD documents;
- Trail regulations should be posted and enforced.

Once the trail is open for use:

- Regular inspections of the trail by a qualified person who has the expertise to identify hazardous conditions and maintenance problems.
- Maintenance problems should be corrected quickly and documented. Where a problem cannot be promptly corrected, warnings to trail users should be erected.
- Procedures for handling medical emergencies should be developed. The procedures should be documented as well as any occurrence of medical emergencies.
- Records should be maintained of all inspections, what was found, and what was done about it. Photographs of found hazardous conditions can be useful.

These risk management techniques will not only help to ensure that hazardous conditions are identified and corrected in a timely manner, thereby averting injury to trail users, but will also serve to protect the trail owner and managing agency from liability. Showing that the agency had been acting in a responsible manner can serve as an excellent defense in the event that a lawsuit develops

12.0 Anticipated Costs of Operations and Management

12.1 Annual Budget

Cost planning should take into account routine maintenance and remedial maintenance over the life cycle of the improvements and on-going administrative costs for the program. Depending on myriad factors, costs can vary significantly for operations and maintenance of trail, greenways and associated open space facilities. Considerations include types of facilities offered, size, cost of utilities such as irrigation water and other factors. However, as a planning benchmark, typical unit costs can be helpful in planning. To that end, Table 7 (see following page) offers cost information based on costs nation-wide. It is important to stress that these numbers should be taken only as an order-of-magnitude measure. More project-specific costs should be calculated working with local jurisdictions in a case-by-case basis when budgeting for each improvement.

There are many factors that influence the cost of managing the South and Southwest Greenways system. The estimate of probable costs itemized herein is based on trail industry averages using contract labor, materials and industry practices. The purpose of providing these costs is to enable Metro Parks and partners to define a budget for the long term care of the Greenway System.

13.0 Funding O&M Programs

Several types of funding sources can be identified and

Amenity	Typical Unit Cost Per Year Range	Comment
Paved Shared Use Path	$4,000 to $15,000/mile	Depending on intensity of development, fixtures and standard of maintenance. Crew sizes range from
Natural Surface Path	$200 to $1,800/mile	Depending on level of use and development
Greenway with Trail	$7,000 to $20,000/mile	Includes trail and related green spaces such as a stream corridor. Depends on level of development and width of corridor maintained.
On-Road Bicycle	$0-$250/mile	Part of street maintenance. Depends on improvements
Sidewalks	$0-$100/mile	Typically property owners maintain sidewalks though special landscaped upgraded walks linking to trails may be maintained by the municipalities.
Natural Open Space Park	$250-$350/ac	Larger natural area preserves associated with the greenway. Depends on level of development and maintenance.
Active Park (Turf Grass or Feature Area)	$4,000 to $6,000/ac	These areas would likely be minimal along the greenway or managed as separate components.

Table 7 - Typical annual O&M cost Factors

it is likely that a combination will offer the best solution. Following are potential funding sources:

- Budget Allocation Commitments (City Councils, Home Owners Associations HOA's, other Jurisdictions)
- Multi-Objective Partnerships (With other agencies such as highways, utilities, drainage, etc.)
- Dedicated Tax and Special District Funds
- Creating an Endowment
- Earned Income
- Outside Funding Sources
- In-Kind Services

13.1 Budget Allocations

These funds come directly from annual budget allocations by the respective municipality. Typically, this is the most reliable revenue source for project management, operations and maintenance. This is the most common and likely source of O&M funding. Note that on most projects around the nation, private donors or other potential partners will want to see a strong long-term public side commitment to management as a condition of awarding grants for capital trail improvements and management programs.

13.2 Multi-Objective Partnerships

Some the elements of the program serve multiple public and private benefits including access for floodway and stream bank upkeep, promotion of local businesses, utility access, school facilities, road maintenance and enhancement of adjacent private properties. This may provide a number of opportunities for task sharing and cost sharing among the various beneficiaries. These options should be vigorously and creatively explored. In addition, area businesses may have a vested interest in sponsoring and participating in trail maintenance along segments of the corridor.

Madison, WI Public Works Department partners in maintenance of on-street facilities. In Denver CO, the Urban Drainage and Flood Control District partners with parks and greenway agencies in maintaining trail

corridors because trails also serve as floodway access routes.

13.3 Dedicated Tax and Special District Funds

A number of communities have specific dedicated tax programs in place such as open space sales tax or special districts with property tax based funding. To implement such a program it will be important to have a specific visionary plan in place and build broad based public support and partnerships with park, recreation and open space advocacy groups. Pursuing this process should begin with an examination of the potential property, sales, lodging and other potential tax bases.

For example, Johnson County Park and Recreation District in Shawnee Mission, KS raises approximately $1 million annually through a mill levy with 50% going to construction and maintenance of trail and open space facilities. Jefferson County, CO passed a ½ cent Open Space Tax in the late 1970's. This tax generates over $14 Million annual for acquisition and maintenance of open spaces, trails and local park facilities. Voters in the St. Louis area approved a bi-state regional park district effort. They created the multi-county Metropolitan Park and Recreation District on the Missouri side and the Metro East District on the Illinois side. With a 1/10-cent sales tax allocation the two districts raise approximately $10 million annually ($9 million on Missouri side and $1.5 million on the Illinois side). A portion of the funds will go toward building and maintaining an extensive regional trail and greenway system.

13.4 Creating an Endowment

An endowment is a set-side account held strictly to generate revenue from investment earnings. The endowment could be held by a non-profit. Funding of the endowment could come from a percent of capital grants and from an endowment campaign. The endowment could also be funded by bequests and deferred giving such as donations of present or future interests in stock or real estate. To have an effective impact the endowment should have several million dollars in its "corpus" (asset holdings). This endowment could be built up gradually in tandem with project development. Some private organizations, such as the Yakima River Greenway Foundation in Washington State, earn funds through bingo and special events.

13.5 Earned Income and User Fees

This is a revenue stream created by the use of the amenities such as a user permit for trails and open space facilities. This might be an annual pass that can be purchased on the Internet or at grocery stores, etc. Cannon Falls, MN raises funds through a "Wheel Pass " program where users 18 and older must purchase a user permit providing funds for trails maintenance. Another community near Saratoga, NY, a $35/year membership fee subsidizes trail maintenance. Another option would be leasing trail rights-of-way for fiber-optic and other utility corridors. The Niagara River trail (Canadian side) and the W&OD Trail Corridor in Virginia (Northern Virginia Regional Park Authority) receive several hundred thousand dollars annually in lease revenue for telecommunications cable license fees.

In most cases, however, earned income revenue streams are not likely to fund more than a fraction of the total management costs, though the fraction could be substantial. Note that these programs have an administrative cost. Furthermore, it is also important to avoid compromising or commercializing the quality of the trail.

13.6 Outside Contributions

Outside contributions include outside public and private sector grants that can be applied toward management including routine and remedial maintenance. Presently the Federal ARRA "Stimulus" program has funded trail replacement projects in a number of locations though availability of such programs in the future are hard to predict. Private contributors might help fund seasonal youth "trail ranger" programs or purchase equipment such as a sweeper. Creation of a trail advocacy/land conservancy non-profit might offer a way to raise money through "membership" donations. Note, however, that with the exception of remedial projects, generally, private donors are not interested in funding operations and maintenance. Many forms of outside funding may be unpredictable year after year and therefore is "uncontrollable income".

13.7 In-Kind Services

Management services might be supported and en-

hanced by available non-cash resources such as volunteers, youth, student labor, user groups (such as bicyclist associations), correctional services and seniors. In-kind support may also include donations of materials and equipment. Consider also adopt-a-trail programs. Services clubs might be encouraged to "adopt" a park or a trail and hold annual fundraisers. The corridor might also be eligible for youth programs such as AmeriCorps.

Note, however, that volunteer and in-kind participation will likely meet only a fraction of the operations and maintenance needs and funding of these programs may be sporadic. The management program will still need a base of trained professionals and proper equipment. These programs require staff time to co-ordinate.