TRAIL ACQUISITION AND DEVELOPMENT

Overview

Greenbelts, greenways, and trails have been identified for many years as one of Columbia's most valued recreation resources. The 2010 citywide citizen survey revealed that 70% of Columbia households use the trails provided by Parks and Recreation. Trails also ranked number one as the recreation facility Columbia households have a need for and the recreation facility that was most important to them. (See Chapter 6 - Public Input.)

MKT Trail

From 2001-2011, Columbia's population increased by 27 percent, University of Missouri's enrollment grew by 43 percent, and Columbia added about 10 square miles to its boundaries. As Columbia's population continues to grow and city limits expand, the need to connect more residential areas, schools, and businesses to the trail system will also increase.

The need to continue trail acquisition and development in Columbia can also be seen by the *existing* trail mileage deficiencies identified in Chapter 5 - Facility Standards. According to the State of Missouri Statewide Comprehensive Outdoor Recreation Plan (SCORP) standards, Columbia is actually 93 miles short of meeting the bike/pedestrian trail standards of a city with the same population of Columbia. (See Chapter 5 - Facility Standards for more information on the trail type definitions, recommended mileage for each type of trail, and how Columbia's trail system measures up in comparison to the SCORP standards.) There are residential areas, schools, and businesses in Columbia that currently do not have access to the trail system, leaving many citizens underserved.

Columbia is 93 miles short of meeting SCORP bike/pedestrian trail standards.

This chapter evaluates needs and priorities for future trail acquisition and development. The development of a Trails Plan is key to achieving the overall goal of having a trail system that serves recreational to nonmotorized travelers and connects citizens with parks, neighborhoods, schools and businesses. The 2013 Trails Plan proposes an approximately 30 mile long trail loop around Columbia, consisting of the MKT Trail, Hinkson Creek Trail, Bear Creek Trail, and the proposed Perche Creek Trail. In addition, the plan includes multiple connecting trails that link back to this main loop so that the trail system can be accessible to the majority of Columbia residents and resolves many of the current underserved areas.

70% of Columbia households use the trails.

Early Planning Efforts

The long term planning and identification of the recreation trails and greenbelt network officially began with the 1935 Columbia Land Use Plan which showed a greenbelt in portions of the city.

The 1935 plan, using the term "parkway" to identify greenbelt areas, described parkways as "usually elongated park areas, often preserving a natural stream valley, and usually providing, either through the area, or on the borders, roadways for pleasure driving." This plan also recognized other values to parkways citing benefits including, but not limited to, "preserving natural water channels, thus often avoiding the cost of storm sewers; and also providing local recreation areas for adjacent property."

In the early 1970's, the national Rails-to-Trails movement and the desire to preserve open space received further attention when the city adopted a comprehensive greenway plan. This plan inventoried all available open spaces, concentrating on undeveloped watersheds and laid the ground work for the future MKT Trail. From the late 1970's through the 1980's various citywide land use plans were created that included greenbelts and trails. It was during this period that the MKT Trail was constructed and completed, with the final phase officially dedicated in 1991.

In 1993 and 1995, the City of Columbia passed policy resolutions on greenbelts that provided further protection assistance to stream corridors. The resolution states, "The primary goal of the greenbelt plans is to maintain and preserve open space along major stream corridors. This goal should be accomplished preferably by private ownership or action, or by public acquisition of land or flood plain regulations." Another stated goal was the construction of trails within specific portions of the greenbelt corridor where "appropriate and feasible."

In 1994, the Parks and Recreation Department contracted with Landplan Engineering of Missouri to produce a comprehensive Parks, Recreation and Open Space Master Plan. In addition to parks, recreation facility and staffing recommendations, this 1994 plan evaluated and recommended a 1994 Trails Plan. This plan emphasized further MKT Trail-type development on property owned by the University of Missouri and promoted a trail connection between Columbia Cosmopolitan Recreation Area and Albert-Oakland Park.

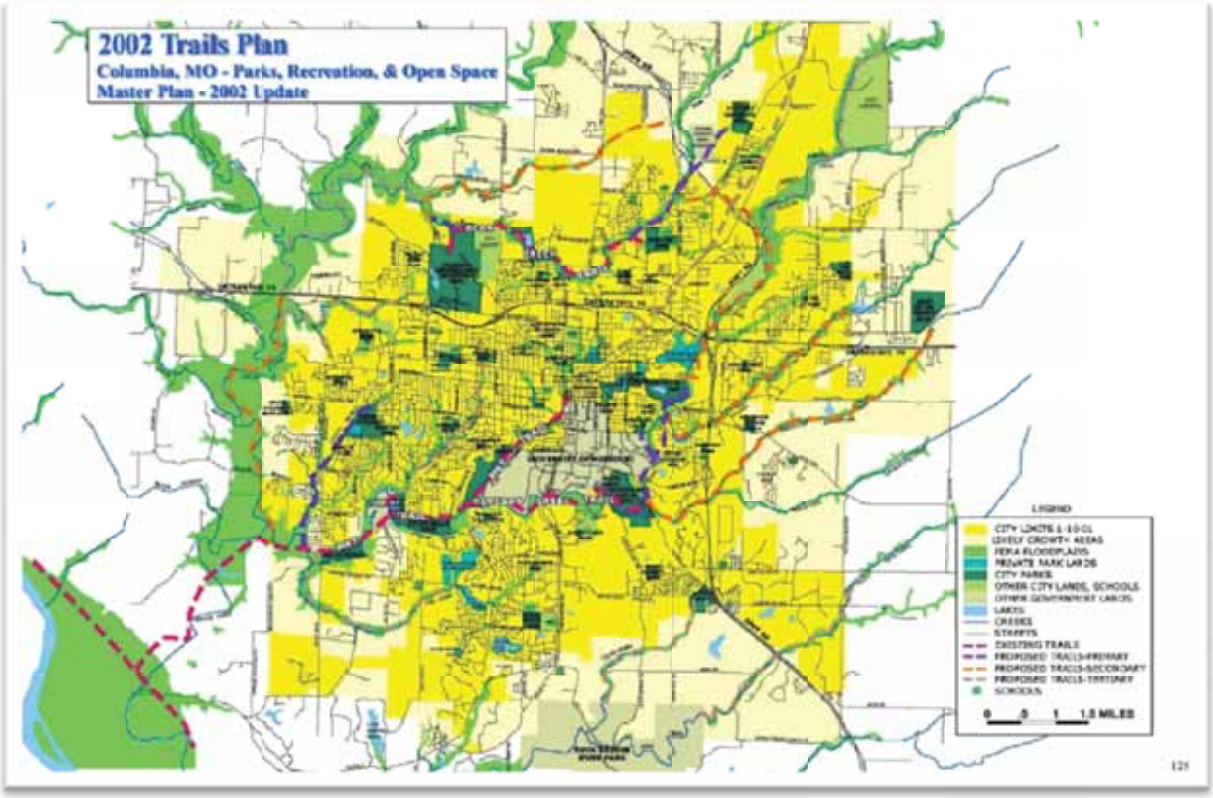
1994 Trails Plan by Landplan Engineering of Missouri

In their evaluation of future trails, Landplan proposed the development of a trail network encircling the city that would allow residents the opportunity to experience natural beauty and wildlife located in the stream greenbelts and provide a connection to Columbia's major parks.

In 2000, the 4.25 mile Hinkson Creek Trail was completed, connecting the Grindstone Nature Area in southeast Columbia to the MKT Trail. In 2001, the 4.8 mile Bear Creek Trail was completed, connecting Albert-Oakland Park in northeast Columbia with the Columbia Cosmopolitan Recreation Area in northwest Columbia.

In 2000 and 2001, the City of Columbia acquired the 90-acre Bonnie View Nature Sanctuary and the 116-acre Stephens Lake Park. The need to develop a master plan for these two sizable parks was the impetus for updating the "facility needs" portion of the *1994 Comprehensive Parks, Recreation and Open Space Master Plan.* As part of this update, ETC Institute/Leisure Vision conducted a citywide survey in 2001 to assess the recreation facility needs and inventory the public's support for various recreation opportunities in Columbia. One area that consistently generated strong support was the development of more recreation trails that could be used for a wide range of activities. Results of this survey indicated that "walking/jogging" was the number one leisure activity of Columbia citizens with 69% of households reporting participation in this activity. Additionally, the highest used recreation facility was Columbia's trails with 67% indicating that they have used one of Columbia's walking or biking trails within the past 2 years.

It was during the development of the *2002 Facility Needs Update* that a comprehensive trails plan was developed. The 2002 Trails Plan laid out the basic route for the Columbia perimeter "loop" system.



Over the next three years, park planners updated this plan as sections of the trail were developed and as the geographical area of Columbia grew. In 2005, the City Council approved an updated Trails Plan. Five years later the revision process continued and a revised Trails Plan was approved by Council in 2010.

GetAbout Columbia, CATSO 2025 and PedNet

In 2006, Columbia was selected as one of four communities in the nation to participate in the Federal Highway Administration's Non-Motorized Transportation Pilot Program. Columbia's designation as a pilot city came with $22.4 million in federal funds over a four-year period to help build infrastructure and establish national standards for public awareness and willingness to use active modes of transportation. The City of Columbia Public Works Department was appointed to administrate the Federal Highway funds, and a separate program was created for that purpose. This program, GetAbout Columbia, consists of Public Works staff who works closely with members of the Parks and Recreation Department. Of the $22.4 million, approximately $8 million was set aside for trail development, with the remaining being used for street, intersection, pedway infrastructure improvements and educational programs. Pedways are wide paths (8'+) along limited access roadways, allowing for bicycle and pedestrian traffic separated from adjacent road traffic. In 2012, the Federal Highway Administration extended the highway bill to include an additional $5.9 million for Columbia, as well as the other 3 pilot communities, to continue non-motorized infrastructure and education projects. Columbia is in the process of determining how to spend the additional money.

Columbia was one of four cities in the nation to receive $22.4 million in federal funds for the Non-Motorized Transportation Pilot Program.

South Providence Trail - GetAbout Project

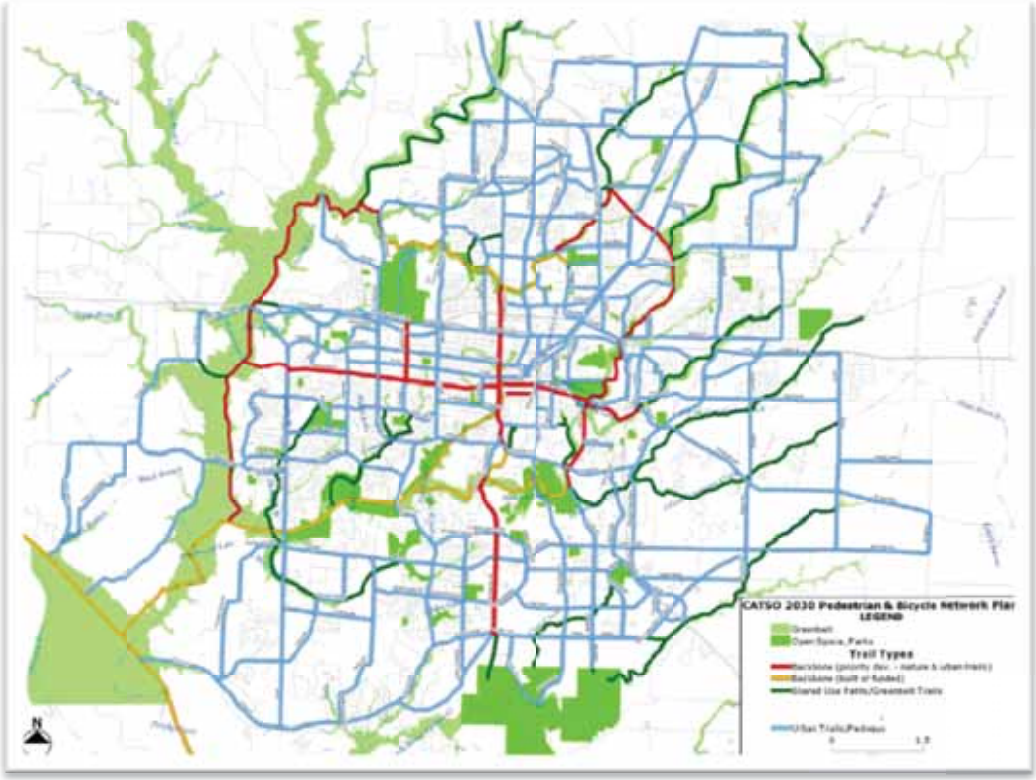
In addition to the development of trails citywide, city planners are placing an increased emphasis on providing space for non-motorized forms of transportation within the roadway corridors. City staff has proposed a comprehensive network of shared-use trails and urban pedways that blend the recreation trails with the development of the roadway bike lanes and sidewalks as one non-motorized transportation network. The goal is to integrate trails into the overall city's infrastructure planning, allowing for safe non-motorized transportation to all parts of Columbia. Park users generally prefer a trail route that is in a natural setting, along a creek corridor, with few if any road crossings. However, at times this is not possible. In these situations the pedway system can fill the gaps, allowing for a safe route along a roadway between trail sections.

This development effort is intended to provide an effective system of inter-connectivity between residential subdivisions, employment centers, businesses, parks, schools (including the University of Missouri and other local colleges), the public library, the Activity & Recreation Center (ARC), and downtown. It will enable pedestrians, cyclists, wheelchair

users, in-line skaters, and skateboarders to travel safely between these locations while enjoying a pleasant experience.

Various transportation plans have been developed for the Columbia area. These include:

- PedNet Master Plan - a transportation network for bicycle, pedestrian, and wheelchair use
- CATSO 2030 - a 20-year comprehensive intermodal transportation plan that contains elements covering roadways, transit, bicycles, and pedestrian facilities and incorporates the PedNet Master Plan



- GetAbout Columbia Plan - Federally funded additions and improvements to infrastructure and educational components to promote non-motorized transportation
- Trails Plan - Long-range plan for trail development for recreational and non-motorized transportation use

All of these plans are coordinated among the various city departments and incorporate trails as an integral part of the city transportation planning and can be found on the City's website at www.GoColumbiaMo.com. The potential benefits of this proposed comprehensive trail system are numerous. The pedestrian-friendly corridors offered by the Trails Plan will provide a more efficient and safe method for people to travel by non-motorized means within the city. The beautiful settings of the trail corridors along creeks and in wooded areas will promote healthy recreation and hopefully encourage residents to drive less and utilize active transportation more often.

TRAIL ACQUISITION AND DEVELOPMENT

Current Status

Existing Trails and Trail Connectors
In an effort to satisfy the public's desire for trails and make progress in accomplishing the goals set forth in the Trails Plan, the Columbia Parks and Recreation Department has diligently pursued the development of a wide range of trails and trail connectors. (Some of these trail developments were accomplished with federal funding through GetAbout Columbia.)

MKT Trail

Of the four major trails on the Trails Plan that make up the proposed trail loop around the city, the MKT Trail and portions of the Hinkson Creek and Bear Creek Trails are completed. Other destination trails and connectors have also been constructed. Below is a list of completed major trails and connectors in the City of Columbia's trail system:

- The **MKT Nature/Fitness Trail** is an 8.9 mile trail running from downtown Flat Branch Park to the southwest where it connects to Missouri's cross-state Katy Trail. It was the first railroad conversion project in Missouri and serves as an excellent example of a destination trail, offering opportunities to exercise, commute or simply enjoy nature in a beautiful setting.
- In 2001, the City completed the 4.8 mile **Bear Creek Trail** in the northern part of Columbia extending from Columbia Cosmopolitan Recreation Area (aka Cosmo Park) to Albert-Oakland Park.
- The **Hinkson Creek Trail** was a joint effort between the City of Columbia and the University of Missouri to connect Grindstone Nature Area to the MKT Trail at the 1.9 mile marker.
- The **County House Trail** connects Twin Lakes Recreation Area/MKT Trail to the north side of Stadium Boulevard.
- The **South Providence Trail** is the beginning of a major north-south connector, connecting Rock Bridge State Park to the Hinkson Creek Trail.
- The **Garth Avenue Connector** links Lathrop Rd. and Clarkson Rd. to the MKT Trail.
- **Blue Ridge Rd. Connector** links Blue Ridge Rd. to the Bear Creek Trail.
- **Python Court Connector** links the western portion of the Vanderveen Subdivision to the Bear Creek Trail.

Blue Ridge Connector - GetAbout Project

Current Development
Several new trails and trail connectors are currently under various stages of design, engineering and/or under construction. They are:

- **The Hominy Creek Trail** extends from Stephens Lake Park under Highway 63 and Interstate 70 to Clark Lane in northeast Columbia.
- The **Scott's Branch Trail** connects Bonnie View Nature Sanctuary through Dublin Neighborhood Park to Scott Blvd.
- The proposed **Grindstone Creek Trail** will connect the Grindstone Nature Area to Maguire Boulevard.
- The **Greenbriar Connector** is part of the route that connects Rock Bridge State Park to the Hinkson Creek Trail at the MU Tennis Complex.
- The **Katy Place Apt. Connector** will link the apartment complex and the Forum Shopping Center to the MKT Trail.
- The **pedway connecting Grindstone Nature Area to Stephens Lake Park** was widened in 2011 and GetAbout staff is working on constructing the trail connections at both ends.

These ongoing projects, as well as several smaller links that connect various neighborhoods to the trail system, represent a continued effort to develop a loop trail around Columbia with connecting links to the main loop.

Other trails that have become very popular in the parks range from the natural surface nature trails found at Grindstone Nature Area to the 12 ft.-wide, hard-surface fitness trail located at Cosmo Park. Trail designs vary depending on surrounding park elements and the intended purpose of the trail. A loop exercise trail is often one of the main elements park planners include when designing neighborhood parks in Columbia. Each trail offers unique qualities contributing to the overall trail system. Several of these recreation loop trails can also provide connecting links to the overall trail system. Interestingly, the concrete trails within Stephens Lake Park ranked second only to the MKT Trail as the most used trails in the park system according to the 2011 Park User Survey.

The Grindstone Creek Trail is the last proposed trail development project to be funded with the 2010 Park Sales Tax. Currently, the City Council is working on determining which projects will be funded by the second round of federal funds from the Non-Motorized Transportation Pilot Project. The amount that will be allocated to trail projects and which trail projects will be selected for funding have not yet been determined.

Lake Trail at Stephens Lake Park

TRAIL ACQUISITION AND DEVELOPMENT

Acquisition Priorities

Determination of Priorities
The Columbia Parks and Recreation Department is committed to acquiring green space for the construction and preservation of trails, greenways, and greenbelts. These areas will provide quality and diverse recreational opportunities for an ever-growing population. As an added benefit, these green spaces can also help provide areas for storm water control, utility corridors, and wildlife habitat.

Hinkson Creek Trail

For the *2002 Facility Needs Update*, a priority ranking of the targeted acquisitions was prepared. Four factors were used to determine this ranking:

- The part the trail section plays in the overall goal to complete a "loop trail" around Columbia.
- Areas currently or soon to be under development. Properties may become unavailable or prohibitively expensive, if not acquired soon.
- The need to serve areas of expanding residential population.
- Current feasibility of acquisition.

As mentioned earlier, the addition of the GetAbout Columbia funds has shifted some of the focus from trails that primarily serve recreational use to trails that provide users with an alternative active mode of transportation. Thus, the development of shorter connector trails that allow residents to bike or walk to a major trail or pedway has become a higher priority. With the passing of various City Council legislation to help protect streams, greenbelts and watersheds, further emphasis should be placed on trails that may utilize greenbelts and greenways. This allows the protection of these corridors, while also allowing for passive recreational use of the property. Finally, consideration should be given to trail routes that utilize existing public owned land and/or utility easements, combining two uses into one corridor.

For the 2010 Trails Plan, the priority for a connectivity component was added to the factors that determine acquisition and development priorities:

- Connecting existing or developing neighborhoods to major multi-use trails and pedways. Non-motorized transportation, wellness, and healthy lifestyles are becoming more important to citizens and trails that connect neighborhoods help promote outdoor recreation opportunities.
- The part the trail section plays in the overall goal to complete a "loop trail" around Columbia. Since large portions of the loop trail are located in stream corridors, acquisition and protection may be viewed as a higher priority, while the actual trail construction may be secondary.

- Areas currently or soon to be under development. If developed, properties may become unavailable or prohibitively expensive.
- Utilization of the greenbelt plan to provide a system of links between parks, University of Missouri recreational facilities, and other open spaces. Priority targets may include greenbelt acquisition projects that protect key areas of open space and sensitive watersheds.
- Feasibility of acquisition, including willingness of property owners, purchase prices and cost of future development (bridges, topography, etc.). This includes areas that allow for the potential for a combination sewer utility and trail easement acquisition.

Trail Acquisition Priorities
The proposed acquisition targets are not limited to a ten-year plan. These acquisition targets fit into the overall trail network goal for Columbia. Hence, the proposed trail acquisitions are prioritized into three categories:

Primary Acquisition Targets
The primary targets represent important pieces of the overall trail system with an emphasis on those that connect and provide access to the highest number of citizens and/or connect to key destination areas. Primary targets also include routes that are or may come under threat of development where the opportunity to acquire may be limited or non-existent if not acted upon. These targets also include those routes that are located in greenbelt areas where acquisition may provide environmental protection. Development priorities include those trails that are on land that is currently owned by the City of Columbia or represent properties that may have willing sellers.

Secondary Acquisition Targets
The secondary targets are under less development pressure than the primary targets. While critical to the overall plan, there may be additional time available for acquisition. There may also be access to alternate routes that allow these secondary acquisition targets to be delayed. However, it is important that these linkages eventually become integrated into the trail system.

Tertiary Acquisition Targets
These properties are either under little development pressure or not feasible to purchase at this time. Factors such as opposition by neighbors and residents and construction difficulty may influence the timing of acquisition. It is important to monitor the status of these linkages and more actively pursue them as they become available or threatened by development. Projects may also be deemed tertiary acquisition targets because they serve a small part of Columbia's population.

The Parks and Recreation Department has presented a draft version of the 2013 Trails Plan to the Parks and Recreation Commission, the Bicycle/Pedestrian Commission and the Planning and Zoning Commission. Their recommendations were taken under consideration in preparing the 2013 Trails Plan and the Recommended Acquisition List that are included in this chapter.

TRAIL ACQUISITION AND DEVELOPMENT

Trail Acquisition and Development Costs

Overview

Trail planners nationwide have looked at various types of locations for building trails where users can safely get exercise and commute through a city in an aesthetically pleasing setting. The standard for trail development has become utilizing creek corridors and for good reason. Creek corridors are typically the last remaining undeveloped parts of a community. Because creek corridors flood periodically, permanent buildings cannot be built there. Road crossings are minimal, because road bridges over creeks are costly. Creek corridors also are where one finds the steep slopes with attractive rock formations and wooded hillsides still intact and protected from development. Corridors adjacent to a creek are typically flat, creating the desired topography for walkers and bikers who desire to avoid hills whenever possible. Nature enthusiasts are also among those that prefer trail routes along stream corridors. Many of Columbia's trail users walk or bike the trails to de-stress and observe nature. Columbia is fortunate to have an abundance of creeks that are relatively undeveloped and provide the natural setting that is ideal for trails. This separation from the built environment is a very important aspect of choosing a trail location that will attract and be used by as many trail users as possible. Many trail users on the MKT Trail marvel that they feel like they are in the middle of nowhere as they travel through the protected Flat Branch and Hinkson Creek valley, when in reality they are passing through the middle of town.

MKT Trail

The City of Columbia passed a Stream Buffer Ordinance in January 2007, which defined buffer areas and established appropriate uses. As identified in Section 12A-231 of Columbia's Code of Ordinances, there are 12 purposes and benefits of the stream buffer ordinance, including "furnishing scenic value and recreational opportunity." Allowed uses within the Stream Buffer Ordinance is identified in Section 12A-237 and specifically included "paths and recreation trails (but use of the outer zone is preferred)."

Bottom Land Stream Corridor
with Sewer Utility Easement

Trails located in stream buffer zones often follow utility easements, such as sewer, water and electric lines. Stream corridors are often separated from busy streets, providing a safe route for families and young children. And as stewards of the environment, park planners often

design trails to restore degraded stream corridors and other habitats.

Trail Design Standards

Columbia has taken advantage of best practices in use throughout the United States, as well as accepted national standards for development of trail facilities. Although the technical aspects of trail design are not addressed in this document, the following publications can be consulted for more in-depth information and design development standards.

Greenways. A Guide to Planning, Design and Development
Published by Island Press, 1993
Authors: Charles A. Flink and Robert Searns

Trails for the Twenty First Century
Published by Island Press, 1993
Edited by Karen-Lee Ryan, Rails-to-Trails Conservancy

Guide to the Development of Bicycle Facilities
Updated in 2012 by the American Association of State Highway Transportation Officials. Available from AASHTO or FHWA.

Manual on Uniform Traffic Control Devices
Published by the US Department of Transportation, Washington, DC
Chapter 3

Mountain Bike Trails: Techniques for Design, Construction and Maintenance
Published by Bike-Centennial, Missoula, MT

Universal Access to Outdoor Recreation: A Design Guide
Published by PLAE, Inc., Berkeley, CA, 1993

Trail Surfaces

Columbia has different types of trails constructed out of various surfaces. Materials that can be used to surface a trail include natural materials, granular stone, shredded wood mulch, asphalt and concrete. Surface materials are categorized as hard or soft, depending on their ability to absorb moisture. Soft surface materials are less expensive to install and are often appropriate in rugged natural areas. Soft surface trails are often preferred by runners and mountain bicyclists; however, they do not accommodate certain users, such as rollerbladers and disabled persons. Hard surface materials are more practical for multi-use urban and suburban trails and require less maintenance.

The first widely-used trail in Columbia was the MKT Trail. This trail was built on the old MKT Railroad bed that was built at a time before EPA laws prohibited filling in a floodplain. The trail functions well as a gravel trail because it is built up above the common flood areas adjacent to most creeks. It is important to note that new trail development does not allow for filling soil into flood areas, so new trails are built at the existing soil elevation. Consideration for areas that have steep grades or that are prone to flooding should be given during trail

design to protect nearby streams from sediment deposits and avoid chronic maintenance problems.

The following five trail surfaces have been predominately utilized in Columbia's trail system.

- **Natural surface** trails make use of dirt, rock, soil, forest litter, leaf mulch and other native materials. Preparation varies from machine-worked surfaces to those worn only by usage. This is often an appropriate surface for ecologically sensitive areas. In Columbia's trail system, natural surface trails are usually located within a park or nature area. Since major destination trails are not typically constructed with natural surface materials, the cost for the development of this type of trail will not be addressed in this chapter.

Rhett's Run Mountain Bike Trail

- **Granular stone (gravel)** includes a broad range of aggregate stone, such as limestone, sandstone, crushed rock, pit gravel and fine gravel. This is one of the best surface types for greenway trails because it can be densely compacted and is compatible with the natural environment. If properly constructed, granular stone can support bicycle and handicapped accessible trail development. It should be noted that increased compaction results in decreased perviousness. Granular stone trails are not well-suited for floodplain trails or trails with steep grades. Annual maintenance expenses should also be considered when choosing this type of trail surface.

Hinkson Creek Trail (Gravel)

Gravel Washout on Bear Creek Trail

- **Asphalt** is a hard surface material that is popular for a variety of rural, suburban and urban trails. It is composed of asphalt cement and graded aggregate stone. It is a flexible pavement and can be installed on virtually any slope. The asphalt trail should be coated with a special sealant, particularly where it is exposed to the sun for long periods of time. To reduce the unraveling of the pavement edges, the trail should be re-compacted periodically by a mechanical roller. Asphalt trails are impervious to water and can readily accommodate a variety of uses, as long as the trail remains in good repair. Asphalt trails are usually cheaper than concrete to install initially; however, they do not last as well and require more maintenance. The Department is not recommending asphalt as a surface for major destination trails.

Cosmo Fitness Trail (Asphalt When New)

Cosmo Fitness Trail (After 12 Years)

- **Concrete** surfaces are capable of withstanding the most powerful environmental forces. They hold up well against the erosive action of water, root intrusion and subgrade deficiencies, such as soft soils. Concrete is most often used for urban applications, in flood areas, on steep slopes, and in locations where all season commuting is desirable. Concrete trails might also be considered in areas where nearby property owners do not want to contend with maintenance vehicle traffic on the trail. When properly installed, it is the strongest and has the lowest maintenance requirement of all the surface types. Concrete trails can readily accommodate a variety of uses and are the most likely to be devoid of maintenance problems. Concrete trails are impervious to water and initial construction costs are higher than natural surface, granular stone, or asphalt.

Concrete Lake Trail at Stephens Lake Park

20-Year-Old Albert-Oakland Concrete Trail

- **Concrete with gravel side path** trails use a combination of two popular trail surfaces, providing two options for users. The concrete portion provides the benefits of hard surface - an all-weather, consistent surface that can serve a variety of users. The gravel side path provides an option for runners that prefer a softer surface. This combination of trail surfaces can be a solution when there are conflicting user preferences, but can be the most expensive to install and does not alleviate the need for regular maintenance on the gravel portion.

County House Trail
(Concrete with Gravel Side Path)

Each trail project is unique and should be evaluated on a case-by-case basis in consultation with a qualified engineer and/or a landscape architect. When selecting the trail surface, trail designers should take into consideration the intended use, citizen preferences, location, environment, effect on surrounding property owners, maintenance costs, development costs, available funding, along with any other related items. Columbia historically has used granular stone, concrete, or a combination of both of these as the preferred surfaces for major destination trails. Therefore, the estimated trail development costs in this chapter will address both concrete and granular stone.

Acquisition Costs

The following estimated acquisition costs are based on the purchase of a 30 to 50-ft.-wide trail right-of-way corridor in the Columbia area. The minimum width of 30 ft. is used to establish a minimum standard for trail corridor development. While a 50 ft.-width is preferable, trail corridor width may vary for each site. There are many factors that influence land cost, and the purchase price for trail right-of-way can vary greatly. Some of the properties being targeted for trail development are located in flood plains, which have limited

development potential. This is some of the least expensive land in the city. The upper range of cost for trail land would include land that is better suited for development, thus more valuable on the open market.

The estimated acquisition cost for a one mile long by 50-ft.-wide trail corridor would range from $72,000 to $180,000. This represents a per acre cost estimate range from $12,000 to $30,000 per acre at approximately 6 acres per mile.

Development Costs

The actual trail development costs per mile will also vary with each piece of land. Because of the time and costs associated with trail design and engineering, a detailed trail design and a detailed cost estimate are typically not done for proposed trails until funding is secured and the proposed trail project is moving forward for development.

For the primary trail acquisition targets, cost estimates have been prepared for preliminary trail routes. When calculating development costs, staff evaluates five primary factors as follows:

- design/engineering fees
- bridge design and costs
- grading
- trail route and surface construction
- trail signs

When any of these projects move forward for development and a detailed trail design is completed, the amount budgeted for the trail project may need to be adjusted.

Bridge Costs

Historically, bridge construction has the most dramatic variation in cost per mile when calculating the cost for trail construction. Boone County has many local streams, which provide beauty and interest; however, the need for bridges over these streams increases the cost per mile for trail construction.

Free Span Bridge at Hinkson Creek Trail

The number of bridges needed for any particular trail development cannot be determined until the exact trail route has been decided. Trail planners try to keep a proposed trail route on one side of the stream whenever possible, whereas it may be suitable for utilities (such as sewer lines) to cross a creek numerous times. In looking at previous trail projects such as the Bear Creek and Hinkson Creek Trails, an average of just over one bridge per mile was typical. With this as a guide, one bridge per trail mile will be used for estimating the cost of proposed trails.

Free span bridges are the ideal method of crossing streams and creeks, where feasible. However, in some cases a low profile bridge could be appropriate. Often these span streams with low flow or in residential or commercial areas where a bridge itself is aesthetically intrusive. In these situations, low profile bridges have proven to be quite successful. Low profile bridges are economical, often costing in the $100,000-$200,000 range. However, for the purpose of calculating a standard cost per mile for trails, the use of low water bridges will not be included.

Low Profile Bridge at County House Trail

Bridge costs can vary greatly based on the size of the creek to be crossed. Bridge costs are not only affected by the increasing cost of materials and labor, but also in relation to the increasing complexity of design and engineering required by state and federal agencies. Based on the recent costs for bridges along Hinkson Creek, Hominy Creek and County House Trails, an estimated bridge cost range of $300,000 to $600,000 could be appropriate. While a bridge over Perche Creek would likely cost $500,000, a pedestrian overpass over a major highway such as Interstate 70 or Highway 63, could easily cost over $1 million.

The estimated cost that will be used for bridge construction, including installation, survey, architectural, and engineering fees, is $600,000 per trail mile.

Trail Amenities

The next cost factor that varies from trail to trail is the amenities located at the primary access points. Destination trails such as the MKT and Hinkson Creek Trails, often have one or more access points that include support amenities, such as parking lots, restrooms, drinking fountains, and fitness equipment designed for pre or post workout. Often these amenities are located in existing parks and in many cases have already been constructed. For example, Stephens Lake Park provides numerous support amenities for the Hinkson Creek Trail and the Hominy Creek Trail. For the purpose of estimated trail construction costs, these amenities are not included.

Trail Construction

A 12' wide concrete trail, along with grading, base rock, drainage pipes and incidentals is estimated to cost $100 per lineal foot, or $528,000 per mile.

Gravel trail development costs about $120,000 per mile less than concrete, making an estimated cost of $408,000 per mile.

Based on all of the above, the following can be used to estimate the average cost of future trail acquisition and development, based on 2013 prices:

Concrete: $1,200,000 - $1,308,000 per mile **Gravel:** $1,080,000 to $1,188,000 per mile

TRAIL ACQUISITION AND DEVELOPMENT

Trail Projects

LOCATION DESCRIPTION	APPROX. MILEAGE
Projects under Construction	
Hominy Creek Trail Green Valley Dr. to Woodridge Drive	1.2 miles
Scott's Branch Trail Rollins Rd. to Scott Blvd.	1.5 miles
Greenbriar Connector (GetAbout) Greenbriar Rd. to Hinkson Creek Trail (at Green Tennis Complex)	0.4 miles
Hinkson Creek Trail (GetAbout) North and South Connections for Grindstone Nature Area to Stephens Lake Park	0.8 miles
Projects Funded	
Gans Creek Recreation Area Trail Loop trail through the park	1.6 miles
Grindstone Creek Trail Grindstone Nature Area to the Maguire Blvd.	1.75 miles
Hominy Creek Trail (phase 2) (GetAbout) Woodridge to Clark Lane	1.4 miles
Primary Acquisition Targets	
Bear Creek Trail Blue Ridge Road to Smiley Lane/Lange Middle School *Estimated cost in concrete: $950,000; estimated cost in gravel: $806,000*	1.2 miles
Bear Creek Trail Smiley Lane/Lange Middle School to north end of Boone County Fairgrounds *Estimated cost in concrete: $2,600,000; estimated cost in gravel: $2,468,000*	1.1 miles
Bear Creek Trail CCRA to Blackfoot Road *Estimated cost in concrete: $500,000; estimated cost in gravel: $440,000*	0.5 miles
Hominy Creek Trail Old 63 to Green Valley Dr. *Estimated cost: $800,000; estimated cost in gravel: $704,000*	0.8 miles

Wilson Park Connector — 0.7 miles
Wilson Park to Old 63 Roadside Park (route TBD)
Estimated cost in concrete: $1,740,000; estimated cost in gravel: $1,656,000

North Fork of Grindstone Trail (phase 1) — 2.7 miles
Confluence to Eastport Park

North Fork of Grindstone Trail (phase 2) — 2.6 miles
Eastport Park to Battle Ave. Park

Hinkson Creek Trail — 2.5 miles
Stephens Lake Park to Vandiver Pedway
Estimated cost in concrete: $2,700,000; estimated cost in gravel: $2,400,000

Hinkson Creek Trail/ Colt Connector — 0.8 miles
Vandiver Pedway to Colt Railroad
Estimated cost: $1,300,000; estimated cost in gravel: $1,204,000

Starke Lane Connector — 0.8 miles
Boone County Fairgrounds to Brown Station Park
Estimated cost in concrete: $800,000; estimated cost in gravel: $704,000

Colt Railroad South (phase 1) — 1.5 miles
Columbia College to Vandiver
Estimated cost in concrete: $3,000,000; estimated cost in gravel: $2,820,000

Colt Railroad South (phase 2) — 1.5 miles
Vandiver to Hwy 63
Estimated cost in concrete: $2,200,000; estimated cost in gravel: $2,020,000

Colt Railroad South (phase 3) — 0.7 miles
Hwy 63 to Brown Station Park
Estimated cost in concrete: $800,000; estimated cost in gravel: $716,000

Cow Branch Trail — 1.4 miles
Providence Rd. to Auburn Hills Park
Estimated cost in concrete: $1,820,000; estimated cost in gravel: $1,652,000

Cosmo Trail Connections — 0.8 miles
Intersection at Stadium Blvd. to Bear Creek Trail
Estimated cost in concrete: $700,000; estimated cost in gravel: $604,000

Perche Creek Trail (phase 1) — 1.2 miles
Chapel Hill to MKT
Estimated cost in concrete: $2,000,000; estimated cost in gravel: $1,856,000

Perche Creek Trail (phase 2) — 1.5 miles
Chapel Hill to future Broadway/Perche bridge
Estimated cost in concrete: $2,800,000; estimated cost in gravel: $2,620,000

Perche Creek Trail (phase 3) 1.4 miles
Future Broadway/Perche bridge to I-70
Estimated cost in concrete: $2,600,000; estimated cost in gravel: $2,432,000

Note: Estimated costs per mile on primary acquisition targets vary due to site specific conditions, such as the amount of acquisition needed and number of bridges anticipated. These figures are generated in 2013 dollars. An inflation factor should be considered when funding is in future years.

Secondary Acquisition Targets

Cow Branch Trail west 2.6 miles
Blackfoot Rd. to Providence Rd.

Parkside Drive Connector 0.8 miles
Trail connecting Cosmo Park along Parkside Drive to Texas Ave.

Perche Creek Trail (phase 4) 2.0 miles
Connecting from Bear Creek Trail at Black foot Rd. to Route E

Perche Creek Trail (phase 5) 2.5 miles
Route E to Interstate 70

Blue Ridge Connector (phase 2) 0.4 miles
Blue Ridge Rd. to Providence Rd.

Colt Railroad North 2.3 miles
Brown Station Park to Heller Rd.

South Fork of Grindstone Trail 2.2 miles
Confluence to Co. Rd. WW at Rolling Hills Rd.

Nifong Park/Philips Lake Connector 0.9 miles
Nifong Blvd. to Philips Lake Trail

Cosmo-Bethel Connector 0.7 miles
Bedford Walk at Bethel Rd. to South Providence Trail

County House Trail West 0.6 miles
Stadium and College Park to Rollins Rd.

County House Trail East 0.6 miles
Stadium and College Park to Cowan Drive

Harmony Creek Trail 2.9 miles
Perche Creek Trail to Cosmo Park

Tertiary Acquisition Targets

Proctor Park Connector 0.4 miles
Proctor Road to Bear Creek Trail

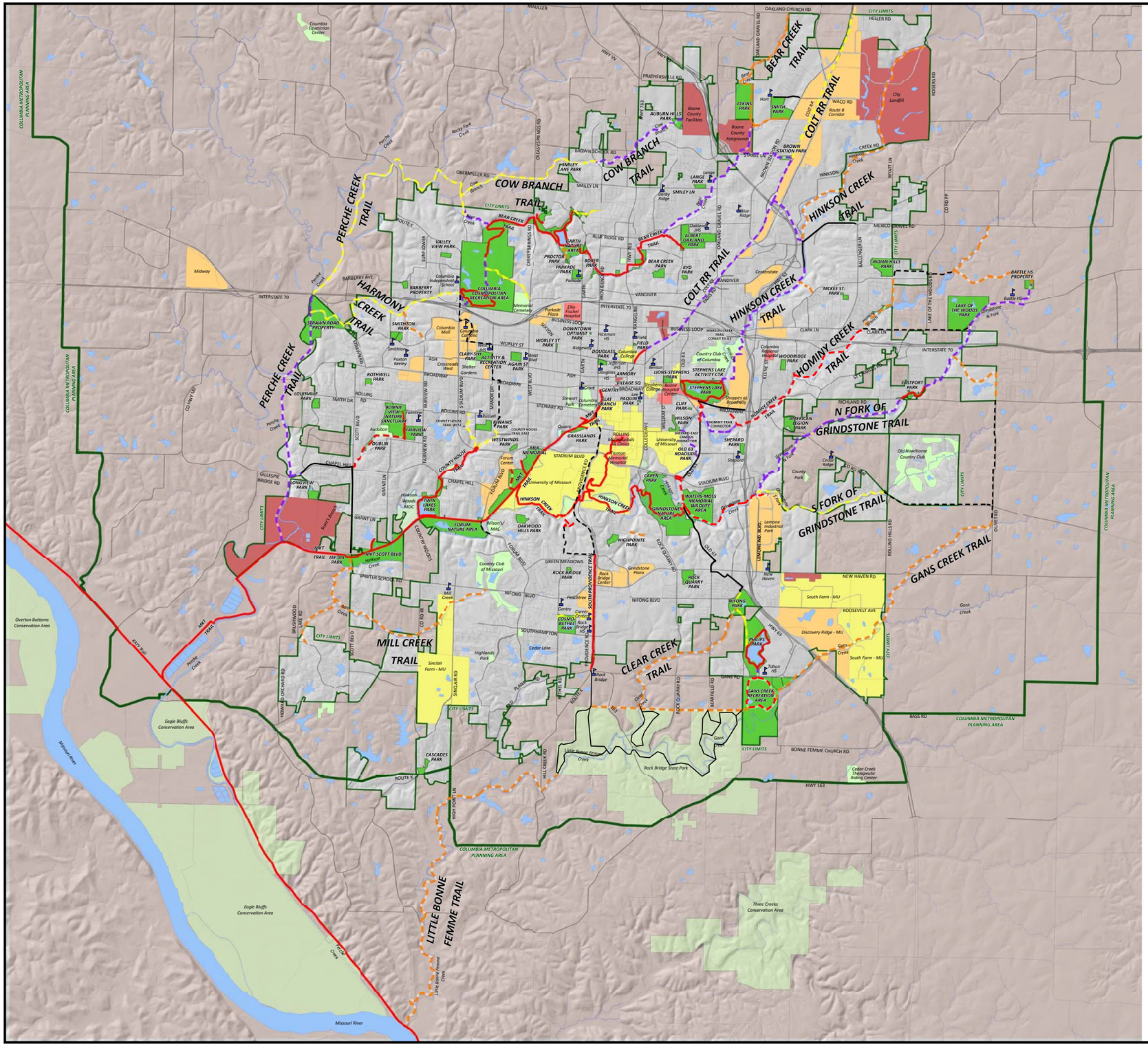
Norma Smith Park Connector to Bear Creek Trail Boone County Fairgrounds to Norma Smith Park	0.6 miles
Bear Creek Trail North Boone County Fairgrounds to Oakland Church Rd.	2.2 miles
Hinkson Creek Trail Northeast Mexico Gravel Rd. to north end of City Landfill	4.0 miles
Hominy Creek Trail Molly Lane to Mexico Gravel Rd.	1.0 mile
Hominy to Battle Ave. Connector Molly Lane to Battle Ave. Park	1.3 miles
Hominy Creek Trail Clark Lane to Rice Rd.	1.2 miles
Rice Rd. to Hinkson Creek Trail Connector Rice Rd. to Hinkson Creek Trail	0.4 miles
North Fork of Grindstone to Olivet Connector North Fork of Grindstone to Olivet Rd.	1.3 miles
Gans Creek Trail (phase 1) Gans Creek Recreation Area to Rolling Hills Rd.	2.1 miles
Gans Creek Trail (phase 2) Rolling Hills Rd. to Olivet Rd.	2.5 miles
Rock Bridge State Park North Trail Gans Creek Recreation Area to Rock Bridge Elem. Connector	2.3 miles
Clear Creek Trail (phase 1) Nifong Park to Rock Quarry Rd.	1.4 miles
Clear Creek Trail (phase 2) Rock Quarry Rd. to north end of Rock Bridge State Park	1.3 miles
Seven Oaks to Rolling Rock Connector West end of Rolling Rock Rd. to east end of Norman Drive	0.3 miles
Little Bonne Femme Trail (phase 1) Rock Bridge State Park to High Point Lane	2.2 miles
Little Bonne Femme Trail (phase 2) High Point Lane to Woodie Proctor Rd.	2.4 miles
Little Bonne Femme Trail (phase 3) Woodie Proctor Drive to Katy Trail	2.2 miles

Mill Creek Trail (phase 1) MKT to Scott Blvd.	1.2 miles
Mill Creek Trail (phase 2) Scott Blvd. to Co. Rd. KK	1.2 miles
Mill Creek Trail (phase 3) Co. Rd. KK to Nifong	1.3 miles
Thornbrook Connector Thornbrook Pkwy. to Mill Creek Trail	0.9 miles
Harmony Creek Connector Worley St. to Harmony Creek Trail	0.6 miles

Did you know?

The University of Cincinnati studied the effects the Little Miami Scenic Trail had on residential values and found that homeowners were willing to pay a $9,000 premium to be located 1,000 feet closer to the trail.

Bear Creek Trail Boardwalk - Photo by Randy Hughes


BEAR CREEK TRAIL
COLT RR TRAIL
COW BRANCH TRAIL
PERCHE CREEK TRAIL
HINKSON CREEK TRAIL
HARMONY CREEK TRAIL
HOMINY CREEK TRAIL
N FORK OF GRINDSTONE TRAIL
S FORK OF GRINDSTONE TRAIL
GANS CREEK TRAIL
MILL CREEK TRAIL
CLEAR CREEK TRAIL
LITTLE BONNE FEMME TRAIL
COLUMBIA METROPOLITAN PLANNING AREA
Missouri River
Eagle Bluffs Conservation Area
Overton Bottoms Conservation Area
Three Creeks Conservation Area
Rock Bridge State Park
University of Missouri
Columbia Regional Hospital
Boone County Fairgrounds
City Landfill
Columbia Mall
Stephens Lake Park
Cosmo Park
Gans Creek Recreation Area
Phillips Park
Grindstone Plaza
Shopping Center
Cedar Creek Therapeutic Riding Center
Old Hawthorne Country Club
Country Club of Columbia
Country Club of Missouri
Lake of the Woods Park
Battle HS Property
Indian Hills Park
Lake Ann Park
Cosmopolitan Recreation Area
Bonnie View Nature Sanctuary
Twin Lakes Park
Forum Nature Area
Grindstone Nature Area
Waters-Moss Memorial Wildlife Area
Earth Walk Park
Rock Bridge Park
Rock Quarry Park
Highpointe Park
Oakwood Hills Park
Longview Park
Cascades Park
Sinclair Farm - MU
South Farm - MU
Discovery Ridge - MU
Lemone Industrial Park
Tolton HS
Battle HS
Hickman HS
Rock Bridge HS
Douglass HS
Jefferson HS
Shepard HS
Oakland HS
Gentry HS
Cosmo-Bethel Park
Hinkson Woods MDC
Highlands Park
Cedar Lake
Little Bonne Femme Creek
Hinkson Creek
Gans Creek
Mill Creek
Perche Creek
Bear Creek
Grindstone N Fork
Katy Trail
MKT Trail
Jay-Dee Park
Scott's Branch
Midway
Boone County Facilities
Boone County Fairgrounds
Columbia Equestrian Center
Columbia Independent School
Columbia Mall
Columbia Regional Hospital
Country Club of Columbia
Country Club of Missouri
Cosmopolitan Recreation Area
Gans Creek Recreation Area
Lake of the Woods Park
Lake Ann Park
Indian Hills Park
Battle HS Property

TRAIL ACQUISITION AND DEVELOPMENT

Conclusion

The adoption of this 2013 P&R Master Plan by the City Council also includes the adoption of the 2013 Trails Plan. Having an approved Trails Plan provides city planners and local developers with the information they need when platting a new neighborhood or commercial project. An approved Trails Plan enables the Parks and Recreation Department to request a trail easement be donated or set aside when the City's concept review stage is reached. It also helps planners and developers to use planned future trails to attract buyers for their development.

Hinkson Creek Trail

Because acquiring land and/or trail easements is less expensive and less intrusive before property is developed, a proactive approach is needed to acquire the land and/or trail easements needed for future trail development. The Department should focus on obtaining key parcels in the primary targets, while paying attention to opportunities that may become available for secondary and tertiary targets.

MKT Trail

Also of note is the multi-agency partnership planning effort the City of Columbia is currently engaged in to develop an open space/green infrastructure plan for Columbia and Boone County. In 2012, the City executed a contract with Greenbelt Land Trust for Mid-Missouri for the development of this plan to be known as "Our Natural Legacy." This planning effort is in support of Goal 5.2 of the City's Vision Plan that states, "Land will be preserved throughout Columbia and Boone County to protect farmland, scenic views, natural topographies, rural atmosphere, watersheds, healthy streams, natural areas, native species, and unique environmentally sensitive areas." Identified strategies under this goal include the need to evaluate land preservation areas in Columbia and Boone County and to develop funding mechanisms to finance land preservation. It should be noted that the results of these efforts could impact future trail planning.

Once the trail projects are selected for the last round of GetAbout federal funding, all remaining proposed trail projects will have an "unfunded" status. Whether or not Columbia will be able to preserve land for future trails or construct any of the unfunded proposed trails will most likely depend on the voters' approval of the extension of the 1/8-cent Park Sales Tax used for land acquisition and capital improvement projects. This portion of the Park Sales Tax is set to expire

March 31, 2016. It is anticipated that the extension will be put on a ballot in 2015, pending City Council approval.

Trails are indeed a valued resource in this community. Good trail planning and development can truly enhance the quality of life in Columbia. As stated on the American Trails website:

> "There are many benefits of trails and greenways that planners, funders, and the public need to know about: they make our communities more liveable; improve the economy through tourism and civic improvement; preserve and restore open space; and provide opportunities for physical activity to improve fitness and mental health."

Bear Creek Trail at Garth Nature Area

Local surveys reveal that the majority of Columbia citizens use the trails, and trails rank as the most important Parks and Recreation facility for Columbia households. Columbia's trail connection to the state Katy Trail is an avenue to attract visitors to Columbia from across the state. And, as Columbia's trail system continues to develop, it has the potential to draw even more events and become a visitor attraction that can generate tourism dollars for the community. With an approved Trails Plan in place, Columbia is poised to fulfill the Community Visioning goals set for trails and greenways as expressed below.

Imagine Columbia's Future - Trails Goal

"An extensive, safe network of trails will accommodate a variety of users ranging from recreational to nonmotorized travelers. This network may include roadway and public transportation infrastructure to connect parks, neighborhoods, schools and businesses."

Imagine Columbia's Future - Greenways Goal

"An extensive network of greenways will play a significant role in providing transportation options, protecting wildlife corridors, watersheds, and floodplains, and increasing public access to natural and open spaces.