



City of Muskogee Trails Master Plan

Prepared for the City of Muskogee
July 15, 2004

City of Muskogee Trails Master Plan

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Trails Master Plan

Acknowledgments

From the very beginning, the overriding goal of this master planning endeavor has been to facilitate the actual construction of as many trails in Muskogee as possible; to ensure those trails are safe and located where they are needed and will be used; and to connect the major destinations within the city. This was a tall order from the start, and could not have been accomplished without the support, cooperation, hard work, and enthusiasm for the citywide trails concept that we received throughout the development of the Muskogee Trails Master Plan. The enthusiasm for the project didn't come from just one group or entity. It received across the board support from citizens and city representatives, so many in fact, that it will be difficult to single out all the individuals whose extra effort and involvement fanned the flame to give the concept its wide spread support and momentum.

The 4 steering committee workshops, 2 public workshops and the presentations to the Parks Board and the City Commission were attended by numerous citizens throughout Muskogee. We would like to express our appreciation to these people who contributed their insight, ideas, and suggestions. Community input is the backbone of the plan and has provided the impetus and vision that will make these planned trails a reality, improving the quality of life for all concerned.

Another thank you goes to the 7 member steering committee, whose clear understanding of the needs of the diverse trail user groups was invaluable to the direction and development of the trails master plan. Many of these members spent time well beyond the scheduled meetings to further the cause of safe trail development within Muskogee.

We must applaud the City of Muskogee and its exceptionally talented staff who worked closely with the consultant throughout the master planning process. This group provided a thorough evaluation of our work during the planning process, helping to ensure the final result was a realistic plan.

Finally, for his outstanding contribution to the project, we would like to thank Mark Wilkerson, Director of Parks and Recreation. His efforts were above and

beyond the call of duty. He attended every meeting conducted in the planning process, provided final editing on all written material, reviewed master plan maps, coordinated the many meetings and provided the consultant with all the information we requested in a timely fashion. Mark's commitment and dedication to this project helped ensure the master plan will become a living document.



Trails Master Plan

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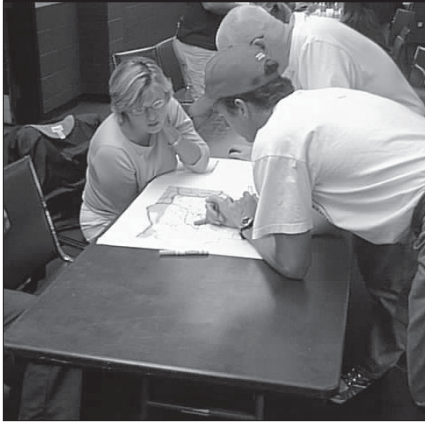
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Muskogee Trails



Trails Master Plan

Executive Summary

Overview

The Muskogee Trails Master Plan offers recommendations for improving community access to outdoor resources by building a network of off-road multi-purpose paved trails. The purpose of this Master Plan is to address the trail needs of community residents related to recreation, transportation, and economic pursuits. The plan addresses policies, programs, and physical improvements that should be implemented to improve access to recreation resources and improve transportation efficiency throughout the community. It identifies 26 corridors throughout the City of Muskogee that should be developed in the next 15 years. The Trails Master Plan was developed by Muskogee in association with a steering committee of citizens, a trail planning consultant, and residents of the area. It responds to specific needs that were defined by residents through a series of public workshops. This executive summary describes the process that was used to prepare the Muskogee Trails Master Plan, as well as the major findings and recommendations of the plan.

How This Plan Was Developed

In August 2003, the City of Muskogee employed a trail planning consultant, *LandPlan Consultants, Inc.* of Tulsa, Oklahoma, to begin work with a steering committee to prepare the Muskogee Trails Master Plan. The work of the consultant was funded in part through a Transportation Equity Act for the 21st Century (TEA-21) grant that was obtained by the City of Muskogee from the Oklahoma Department of Transportation. The consultant began their work with an extensive field analysis and evaluation of existing physical features, economic factors, and social issues that served to define both opportunities and constraints for trail development throughout the metropolitan area. Of special interest in the planning process were the number of “attractors” or destinations that could be accessed and served through trail facility development. The consultant closely examined a variety of corridors of land that extend throughout the City of Muskogee including streams and rivers, abandoned railroads, electrical transmission lines, and roadways. Of particular interest to local residents was the issue of safety, especially as it applies to the safety of “on-road” linkages and trail uses on trails that parallel roadways.

Involving Muskogee Residents

The consultant worked very closely with the Muskogee Trails Steering Committee during the past ten months in preparing this master plan. The consultant has also conducted public workshops, public meetings, and has worked very closely with Muskogee to ensure the proposed trail system enhances the quality of life for city residents.

In October 2003, the first of two public workshops was facilitated by the consultant to invite the public to participate in the planning process. Meetings were held in the Muskogee Civic Center. At these meetings, residents defined appropriate goals, objectives and policies for improving access to outdoor resources throughout the city. Participants were asked to describe issues and concerns related to trail development. They were also provided with an opportunity to define, on maps of the city, specific areas where they currently walk, ride a bike, hike, and rollerblade, as well as areas where they would like to see trail improvements made. The results of this workshop and the consultant's efforts were summarized in a series of reports termed "Draft Chapters" and provided to Muskogee and the steering committee for review and comment. Results were also described in a series of newsletters that were published by the consultant and widely distributed throughout the City of Muskogee.

In February 2004, a second public workshop was conducted to present the results of the October meeting. The consultant also presented a draft network of trail corridors that would serve as the basis for a city-wide trails system. Workshop participants were asked to comment on the results of the prior meeting and carefully critique the initial network of trail corridors. In addition, a draft phasing plan was also presented for review and comment. The results of these workshops were again summarized in "Draft Chapters".

On July 14, 2004 the trails master plan was presented to the Park Board for review and comment. The Park Board unanimously approved the document and recommended it to City Council for approval. On August 3, 2004 a final public presentation was made to the Muskogee Public Works Committee of the Muskogee City Council for an overview of the master planning process to date. The Public Works Committee and the public were asked to review and comment on the Trails Master Plan Report and all aspects of the master plan. The Public Works Committee approved the trails master plan and recommended it for approval at the August 9th City Council meeting. On August 9th, 2004 the Muskogee City Council adopted the Muskogee Trails Master Plan.

Defining the Muskogee Trails System

Using the information gathered during the public workshops and other available information, the consultant worked for three months to define a comprehensive citywide system of trail corridors that would support a variety of trail uses and

meet the needs that were described by residents. A draft of this Proposed Trail System Plan was presented on May 7, 2004 to the steering committee which recommended approval by the Parks Board. Drafts of the plans and chapters were also reviewed by Muskogee staff.

Key Components of this Plan

The “draft chapters” produced by the consultant during the past ten months make up the eight chapters of this Plan. Chapter One, *The Benefits of Trails*, defines the wide range of benefits to the City of Muskogee that would come as a result of implementing the trails plan. Chapter Two, *Evaluation of Existing Conditions*, defines the background data collected by the consultant. Chapter Three, *Vision, Goals and Objectives*, reflects the input of city residents and establishes the basis for many of the recommendations provided within the Plan. Chapter Four, *Design Guidelines*, offers development criteria for building various types of trail facilities recommended throughout the Plan. Chapter Five, *Description of Proposed Trail System*, describes the corridors that make up the Muskogee Trails System. Chapter Six, *Funding Resources*, describes a variety of local, state and federal sources of funding for developing bicycle and pedestrian facilities. Chapter Seven, *Implementation Plan*, recommends how the Muskogee Trails System should be developed during the next fifteen years. Chapter Eight, *Operations and Management*, describes the needed elements to successfully manage and maintain the Muskogee Trails system.

Key Recommendations of the Plan

This Plan recommends the implementation of a 52.72 mile network of off-road multi-purpose trails (including existing and funded trails) throughout the City of Muskogee as depicted on the Trail Route Plan (Map ES.1). The system is extensive and comprehensive, and at the same time provides a realistic program for satisfying the needs of local residents regarding access to outdoor resources and linkage to popular destinations. Building the system will take many years. The overall system is divided into three phases (not including existing and funded trails) as depicted in the Trail Phasing Plan (Map ES.2). In the Near-Term phase (0-5 years), it is envisioned that local government agencies will work in partnership with neighborhoods and private sector organizations to develop an estimated 15.80 miles of trail projects. Near-Term projects would begin development in Calendar Year 2004. During the Mid-Term phase (5-10 years), an additional 11.94 miles of trail projects would be developed, and the Long-Term (10-15 years) phase envisions that the remaining 15.77 miles of trail projects would be implemented.

The plan proposes a 14.97 mile system of on-road “linkages” throughout the City of Muskogee, which is divided into two phases. In the Near-Term phase, it is envisioned that 10.57 miles of “linkages” would be constructed. The remaining 4.40 miles would be implemented in the Mid-Term phase.

How Much Will It Cost to Develop the Metro Trails System

Near-Term trail projects are estimated to cost somewhere between \$4.1 - \$4.9 million to fully develop. The projects included in the Near-Term phase are shown in the tables below. Each of these projects will require a more detailed corridor alignment/design development study to determine the availability of land, location of trail facilities, and the public and financial resources that are available to support project development. These conceptual planning studies can and should begin right away, beginning in 2004 with the highest priority project corridors.

Near-Term on-street "linkages" are estimated to range in cost from \$210 - \$338 thousand to fully develop. The Mid-Term "linkages" are estimated to range from \$374 - \$599 thousand to fully develop.

A generalized unit cost estimate for the development of each corridor is provided in Chapter Seven. Chapter Six lists sources of funding that have been used locally, throughout the State of Oklahoma, and nationally, to build and maintain trail/linkage corridor projects.

Trails Cost

The following cost estimates for trail facilities are general in nature and based on State of Oklahoma averages for multi-use trails constructed over the last five years. More detailed cost estimates should be prepared as site specific plans are developed for each corridor.

Near Term Trails Cost

Rank	ID	NAME	LENGTH (mi)	FACTOR	LOW COST	HIGH COST
5	4	Centennial Trail Ph 2 North	3.77	0.80	\$ 754,000.00	\$ 904,800.00
6	10	Honor Heights Trail	1.72	1.15	\$ 493,062.50	\$ 591,675.00
7	14	Coody Creek East Trail	6.48	1.00	\$ 1,620,750.00	\$ 1,944,900.00
8	18	Texas and Pacific North Trail	3.83	1.25	\$ 1,197,187.50	\$ 1,436,625.00
		TOTAL NEAR TERM CORRIDORS	15.80		\$ 4,065,000.00	\$ 4,878,000.00

All costs based on 2004 dollars.

Mid Term Trails Cost

Rank	ID	NAME	LENGTH (mi)	FACTOR	LOW COST	HIGH COST
9	15	Turnpike Trail	6.59	1.15	\$ 1,895,200.00	\$ 2,274,240.00
10	12	Robinson-Sallie Trail	0.85	1.00	\$ 211,500.00	\$ 253,800.00
11	8	Border Trail	1.38	1.00	\$ 345,250.00	\$ 414,300.00
12	16	MKT Railroad Trail	3.13	1.00	\$ 781,250.00	\$ 937,500.00
		TOTAL MID TERM CORRIDORS	11.94		\$ 3,233,200.00	\$ 3,879,840.00

All costs based on 2004 dollars.

Long Term Trails Cost

Rank	ID	NAME	LENGTH (mi)	FACTOR	LOW COST	HIGH COST
13	7	54th St. Trail	0.77	1.00	\$ 192,250.00	\$ 230,700.00
14	11	Texas Pacific South Trail	4.26	1.20	\$ 1,277,100.00	\$ 1,532,520.00
15	13	Indiana Trail	0.92	1.00	\$ 229,250.00	\$ 275,100.00
16	6	West Trail	1.59	1.00	\$ 396,250.00	\$ 475,500.00
17	9	Missouri Pacific Trail	1.16	1.00	\$ 290,000.00	\$ 348,000.00
18	17	North Trail	7.08	1.00	\$ 1,769,750.00	\$ 2,123,700.00
		TOTAL LONG TERM CORRIDORS	15.77		\$ 4,154,600.00	\$ 4,985,520.00

All costs based on 2004 dollars.

Linkages Cost

The on-street linkages identified as a part of the trails master plan are intended to provide linkages between various off street trails and allow greater access to the overall city trail system. The cost estimates for these types of facilities are general in nature and based on national industry or State of Oklahoma averages. The estimates include items such as share the road signs, bike route signs, bicycle activated traffic signals, on street share the road pavement markings, replacement of drainage grates and other minor street construction items.

Since a detailed evaluation of the recommended linkages has not been performed by the consultant team, a detailed evaluation of each corridor must be completed prior to designating the corridor for on-street use. A detailed evaluation might indicate the need for additional pavement width to provide a designated striped bicycle lane for safety reasons. Additional pavement width is not calculated into the cost estimates below. In some cases it might be necessary to reduce the vehicular speed limit prior to designating a particular corridor for on-street use.

Near Term Linkages Cost

Rank	ID	NAME	LENGTH (mi)	FACTOR	LOW COST	HIGH COST
1	24	Arlene-Elgin Linkage	1.91	1.00	47,750.00	76,400.00
2	26	Martin Luther King Linkage	1.71	1.00	42,650.00	68,240.00
3	25	Broadway St. Linkage	4.81	1.00	120,325.00	192,520.00
4	19	Gibson St. Linkage	2.14	1.00	53,400.00	85,440.00
		TOTAL NEAR TERM CORRIDORS	8.43		\$ 210,725.00	\$ 337,160.00

All costs based on 2004 dollars.

Mid Term Linkages Cost

Rank	ID	NAME	LENGTH (mi)	FACTOR	LOW COST	HIGH COST
5	20	Osage-Haskell Linkage	1.47	1.00	36,700.00	58,720.00
6	22	East Side Blvd. Linkage	0.93	1.00	23,200.00	37,120.00
7	21	Augusta Ave. Linkage	1.20	1.00	30,000.00	48,000.00
8	23	12th St. Linkage	0.81	1.00	20,125.00	32,200.00
		TOTAL MID TERM CORRIDORS	14.97		\$ 374,150.00	\$ 598,640.00

All costs based on 2004 dollars.

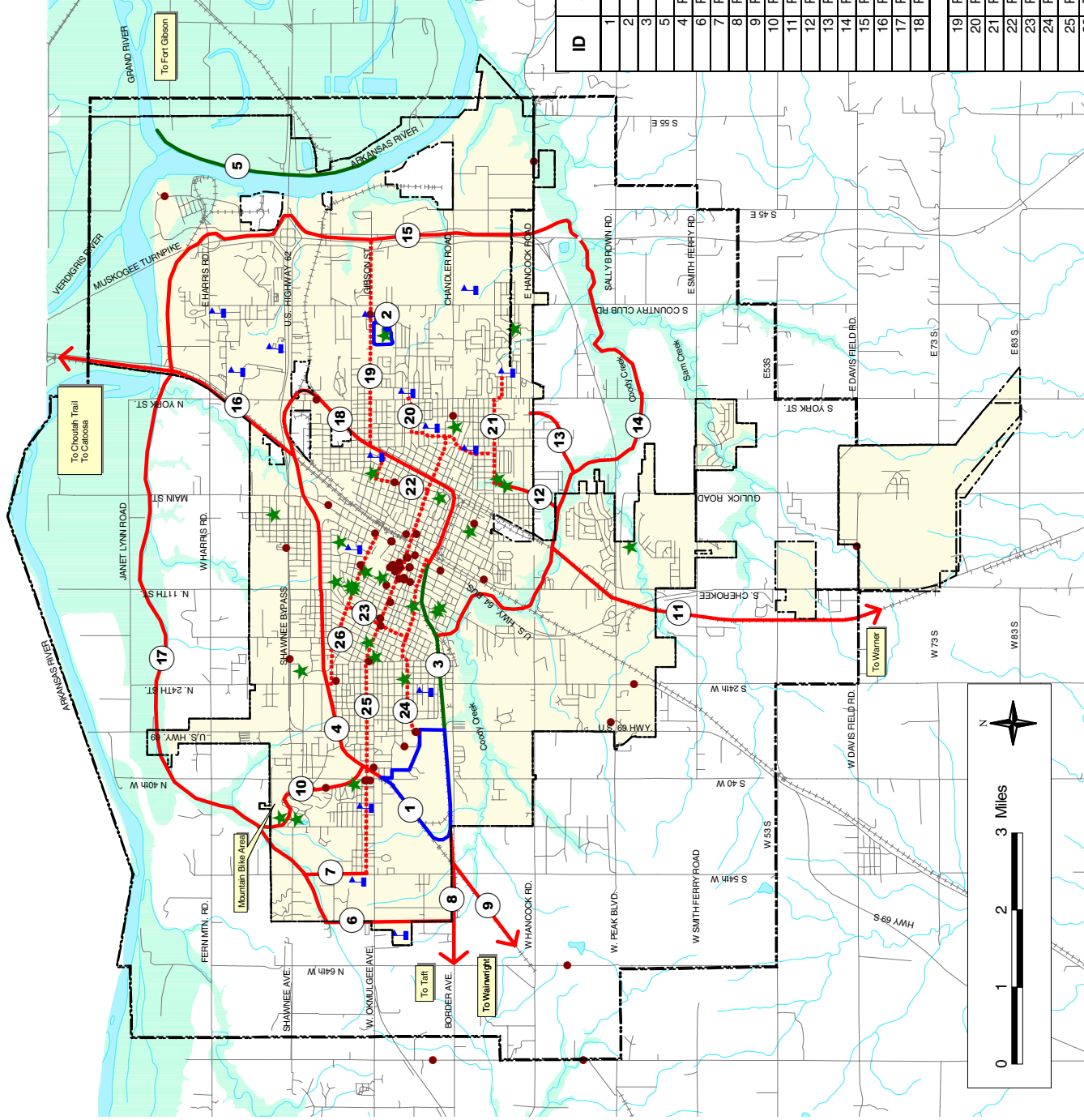
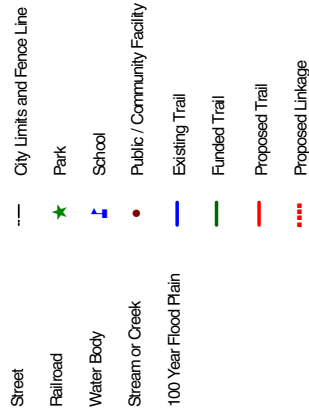
What's the Next Step in the Process

This master plan will be reviewed and approved by the Muskogee Parks Board and the Muskogee City Council. Once it becomes an official component of the Comprehensive Plans, the projects that are defined herein will be eligible for development. Muskogee encourages local governments, private businesses and residents to become partners in the development of the Muskogee Trails System.

You can show your support for this Plan by encouraging the implementation of specific trail or "linkage" segments. For further information on how you can become involved, you can contact the Muskogee Parks Department, the Muskogee Planning Department, your local public officials, running club, walking club, or cycling club.

Muskogee Trails Plan

prepared for
City of Muskogee, Oklahoma



ID	Status	Trail Name	Length (Miles)
1	Existing	Centennial Trail	3.42
2	Existing	Civitan Park Trail	1.16
3	Funded	Centennial Trail Ph 2 South	1.79
5	Funded	Three Forks Port Trail	2.84
4	Proposed	Centennial Trail Ph 2 North	3.77
6	Proposed	West Trail	1.59
7	Proposed	54th St. Trail	0.77
8	Proposed	Border Trail	1.38
9	Proposed	Missouri Pacific Trail	1.16
10	Proposed	Honor Heights Trail	1.72
11	Proposed	Texas Pacific South Trail	4.26
12	Proposed	Robinson-Sallie Trail	0.85
13	Proposed	Indiana Trail	0.92
14	Proposed	Coody Creek East Trail	6.48
15	Proposed	Tumpke Trail	6.59
16	Proposed	MKT Railroad Trail	3.13
17	Proposed	North Trail	7.08
18	Proposed	Texas and Pacific North Trail	3.83
Total Trail Length (Miles)			52.72
19	Proposed	Gibson St. Linkage	2.14
20	Proposed	Osage-Haskell Linkage	1.47
21	Proposed	Augusta Ave. Linkage	1.20
22	Proposed	East Side Blvd. Linkage	0.93
23	Proposed	12th St. Linkage	0.81
24	Proposed	Arlene-Egin Linkage	1.91
25	Proposed	Broadway St. Linkage	4.81
26	Proposed	Martin Luther King Linkage	1.71
Total Linkage Length (Miles)			14.97
Total System Length (Miles)			67.69

4/27/04

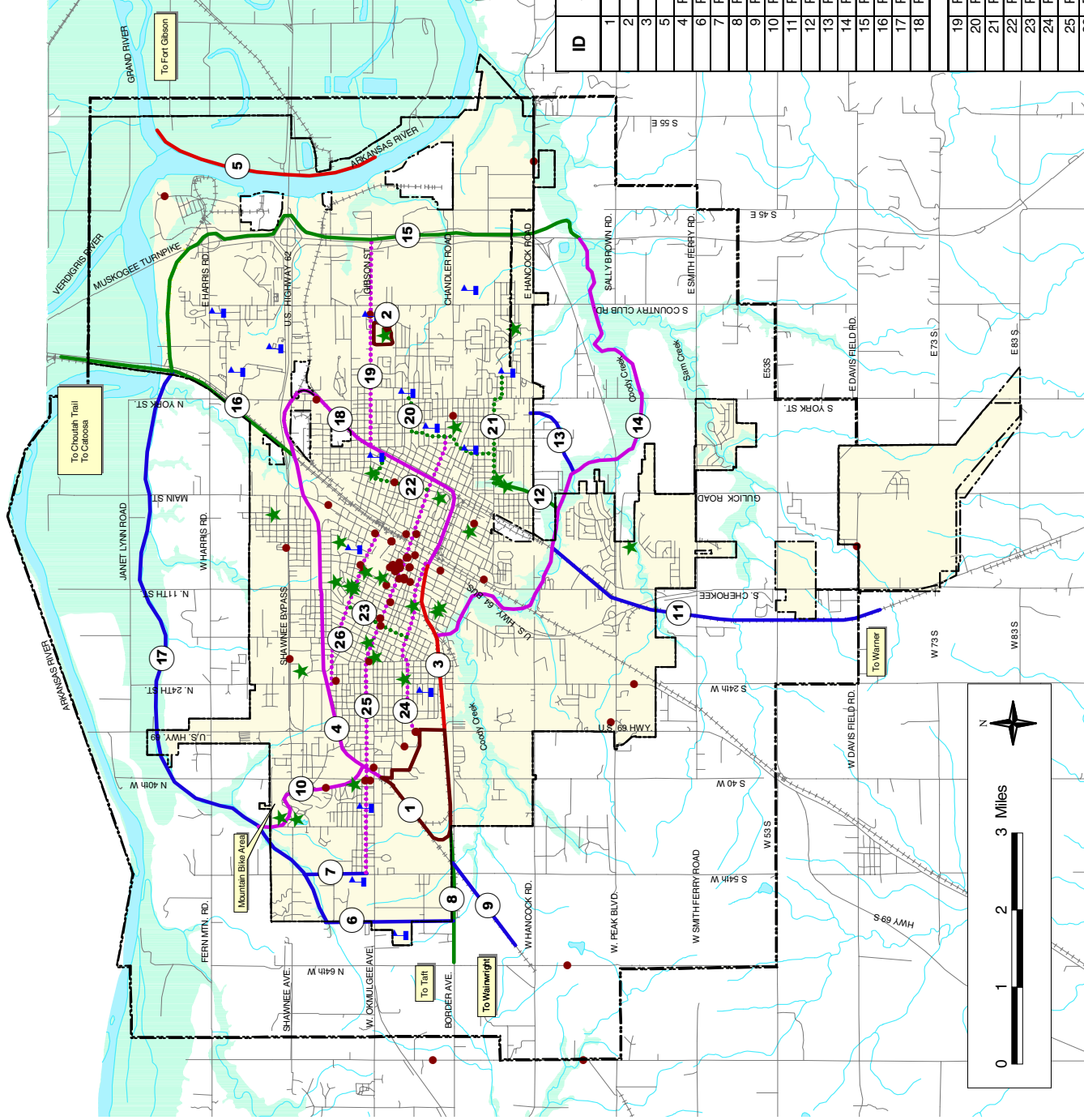


Map ES.1 - Trail Route Plan

Muskogee Trails Plan

prepared for
City of Muskogee, Oklahoma

- Existing Trail
- Funded Trail
- Near Term Trail
- Near Term Linkage
- Mid Term Trail
- Mid Term Linkage
- Long Term Trail
- City Limits and Fence Line
- Park
- School
- Public / Community Facility
- Street
- Railroad
- Water Body
- Stream or Creek
- 100 Year Flood Plain



ID	Status	Trail Name	Length (Miles)
1	Existing	Centennial Trail	3.42
2	Existing	Civilian Park Trail	1.16
3	Funded	Centennial Trail Ph 2 South	1.79
5	Funded	Three Forks Port Trail	2.84
4	Proposed	Centennial Trail Ph 2 North	3.77
6	Proposed	West Trail	1.59
7	Proposed	54th St. Trail	0.77
8	Proposed	Border Trail	1.38
9	Proposed	Missouri Pacific Trail	1.16
10	Proposed	Honor Heights Trail	1.72
11	Proposed	Texas Pacific South Trail	4.26
12	Proposed	Robinson-Sallie Trail	0.85
13	Proposed	Indiana Trail	0.92
14	Proposed	Coody Creek East Trail	6.48
15	Proposed	Tumpike Trail	6.59
16	Proposed	MKT Railroad Trail	3.13
17	Proposed	North Trail	7.08
18	Proposed	Texas and Pacific North Trail	3.83
Total Trail Length (Miles)			52.72
19	Proposed	Gibson St. Linkage	2.14
20	Proposed	Osage-Haskell Linkage	1.47
21	Proposed	Augusta Ave. Linkage	1.20
22	Proposed	East Side Blvd. Linkage	0.93
23	Proposed	12th St. Linkage	0.81
24	Proposed	Arlene-Egin Linkage	1.91
25	Proposed	Broadway St. Linkage	4.81
26	Proposed	Martin Luther King Linkage	1.71
Total Linkage Length (Miles)			14.97
Total System Length (Miles)			67.69

4/27/04



Map ES.2 - Trail Phasing

Chapter 1



Trails Master Plan

The Benefits of Trails

Introduction

A multi-objective trail system for Muskogee can address and resolve many community issues that affect the future environmental and economic health of the area. Trails and greenways have been implemented by other communities to provide recreation and alternative transportation, control flooding, improve water quality, protect wetlands, conserve habitat for wildlife, and buffer adjacent land uses. Greenways typically incorporate varying types and intensities of human use, including trails for recreation and alternative transportation. Trails have also been shown to increase the value of adjacent private properties as an amenity to residential and commercial developments. These, and other benefits of a Muskogee trail and greenway network are described in the following text.

Transportation Benefits

In past years, most American communities have grown in a sprawling, suburban form as a result of dependence upon the automobile as the sole means of transportation. Americans have abandoned some traditional forms of transportation (such as passenger train service), and have been slow to improve other forms of transportation (bicycle and pedestrian networks, bus systems, local train service). In order to provide relief from congested streets and highways in Muskogee, and air quality problems associated with congestion, future transportation planning and development should focus on providing a choice in the mode of travel to local residents. These mode choices should offer the same benefits and appeal currently offered by the automobile: efficiency, safety, comfort, reliability and flexibility.



Bicycling and walking can take the place of short automobile trips to work as well as other destinations such as ATMs.

Multi-use trail corridors throughout Muskogee can serve as extensions of the roadway network, offering realistic and viable connections between origins and destinations such as offices, schools, libraries, parks, shopping areas, and tourist attractions. Off-road trail facilities are most effective for certain travel distances. National surveys by the Federal Highway Administration have shown that Americans are willing to walk as far as two miles to a destination, and bike as far as five miles. It is easily conceivable that destinations can be linked to multiple origins throughout the region through a system of off-road trails.

Air Quality Benefits



Ozone Alert for Tulsa County July 15, 1998

Trails as alternative transportation corridors could serve to reduce traffic congestion, helping to improve local air quality. Since the majority of automobile trips are less than two miles in length, offering viable, alternative transportation choices through trails would encourage people to bicycle and walk more often, especially on short trips, thereby reducing traffic congestion and automobile emissions. Although Muskogee is able to meet air quality standards at present, the region could have problems with high ozone levels at some point in the future. The development of alternative transportation facilities will help ensure the continuation of “attainment” status by improving air quality.

Health & Recreation Benefits



Trails provide a place for family outings as well as personal fitness training.

Trails encourage more people to walk or bike to short distance destinations, which improves the health of residents. Studies have shown that as little as 30 minutes a day of moderate-intensity exercise (such as bicycling, walking, in-line skating or cross-country skiing) can significantly improve a person’s mental and physical health and prevent certain diseases. Providing opportunities for participation in these outdoor activities, close to where people live and work, is an important component of promoting healthy lifestyles for residents of Muskogee.

In 1987, the President’s Commission on Americans Outdoors released a report that profiled the modern pursuit of leisure and defined the current quality of life for many Americans. Limited access to outdoor resources was cited as a growing problem throughout the nation. The Commission recommended that a national system of greenways could provide all Americans with access to linear open space resources.

Economic Benefits



Trails often serve to increase property values for adjacent land owners.

Trails offer numerous economic benefits to Muskogee, including higher property values, increased tourism and recreation related revenues, and cost savings for public services. Trails have been shown to raise the value of immediately adjacent properties by as much as 5 to 20 percent. Many home buyers and corporations are seeking real estate that provides direct access to public and private trail systems. Trails are viewed as amenities by residential, commercial and office park developers who, in turn, are realizing higher rental values and profits. Additionally, greenways in the Muskogee area can also save local tax dollars by utilizing resource-based strategies for managing community stormwater and hazard mitigation, thus placing into productive use landscapes that would not normally be developable in a conventional manner.

The development of trails could work to enhance the tourism industry in Muskogee. Tourism is currently ranked as the number one economic force in the world. In several states, regional areas, and localities throughout the nation, greenways have been specifically created to capture the tourism potential of a regional

landscape or cultural destination. The State of Missouri, for example, spent \$6 million to create the 200-mile KATY Trail, which, in its first full year of operation, generated travel and tourism expenditures of more than \$6 million.

Water Quality & Water Quantity Benefits



Trails corridors, by protecting linear open space, can improve water quality and reduce the impacts of flooding down stream.

Greenway trail corridors often preserve wooded open spaces along creeks and streams which absorb flood waters and filter pollutants from stormwater. Flooding has historically been a problem in many parts of Muskogee. In some instances, buildings and other land uses have encroached into flood prone areas. By designating floodplains as greenways, these encroachments can be better managed, and in some cases, replaced with linear open space that serves as an amenity to local residents and businesses whose property lies adjacent to the greenway, as well as providing important flood water storage capacity.

As a flood control measure, greenway corridors serve as primary storage zones during periods of heavy rainfall. The protected floodplain can also be used during non-flood periods for other activities, including recreation and alternative transportation. In conjunction with existing stormwater management policies and programs implemented in the area, greenway lands can be established as development occurs.

Greenway trail corridors also serve to improve the surface water quality of local rivers and creeks. The floodplain forests and wetlands contained within greenway corridors filter pollutants from stormwater. These pollutants are not removed if stormwater is collected in pipes and discharged directly into local streams and rivers. Improving surface water quality in streams not only benefits local residents, but also numerous forms of wildlife that depend on streams for their habitat.

Plant & Animal Benefits



Greenway trail corridors can protect important plant and animal habitat.

Greenway trail corridors can serve as viable habitat for many species of plants and wildlife. Trail corridors can provide essential food sources and, most importantly, access to water that is required by all wildlife. Additionally, greenway trail corridors in Muskogee could become primary migratory corridors for terrestrial wildlife, serving to help maintain the integrity of many plant and animal gene pools. Some wildlife biologists have extolled greenways as future “gene-ways” and determined that migration routes are essential to maintaining healthy wildlife populations. Greenways can also serve as “gene-ways” for plant species, which migrate with changes in climate and habitat. These “gene-ways” often follow river and stream corridors that have long served as transportation routes for animals and humans. Greenways in Muskogee can be targeted as a primary habitat for many species of plants and animals. Programs can be established to not only protect the valuable existing forested and wetland areas of the area, but also to reclaim and restore streams to support higher quality habitat.

Quality of Life Benefits



Trails can serve as community gathering places for organized events

Communities with trail facilities and high levels of walking and bicycling are rated as some of the best places to live in America. Residents enjoy an increased quality of life defined by a greener, safer, and more interactive community. Successful trail projects across the United States have served as new “main streets,” where neighbors meet, children play, and community groups gather to celebrate. For cities and towns large and small, these trails have become a cultural asset and focal point for community activities. Some communities sponsor “trail days” to celebrate the outdoors and local traditions. Various walking and running events are also held on trails to support charity or extend traditional sporting events. Additionally, many civic groups adopt segments of trails for cleanup, litter removal and environmental awareness programs.

Safety Benefits



Trails can serve as classrooms for children of all ages.

Many Americans are concerned with crime. Some of the most successful deterrents to criminal activity have involved increased neighborhood awareness by citizens and participation in community watch programs. Trails have proven to be an effective tool to encourage local residents to participate in neighborhood watch programs. Some trails have even been developed as part of efforts to deter criminal activity in a neighborhood. Crime statistics and reports from law enforcement officials have shown that parks and greenway trails are typically land uses with the lowest incident of reported criminal activity. As a recreation resource, alternative transportation corridor, or area where fitness activities can take place, most trails provide a much safer and more user-friendly resource than other linear corridors, such as local roads. Trails typically attract local residents, who use the facility frequently, creating an environment that is virtually self-policing.

Education Benefits

A trails system could enhance and protect many of the natural and cultural resources in Muskogee. Interpretive displays and outdoor classrooms along trails can provide information to people of all ages on such topics as hydrology, history, ecology and the use of recycled materials. These educational elements of trails will serve to increase awareness and appreciation of important local resources. Opportunities exist for local schools to educate students about the natural environment along greenway trail corridors.

Chapter 2



Trails Master Plan

Evaluation of Existing Conditions

Introduction

This chapter of the Muskogee Trails Master Plan inventories and evaluates the environmental features, cultural features, and attractions of the city. This evaluation will serve as a basis in developing a system of pedestrian and bicycle trails that meet the recreation, transportation, and economic needs of the local residents. By evaluating the existing conditions, trail corridors and destinations can be defined and later preserved through future city planning policies.

Description of the Study Area

Muskogee encompasses an area of approximately 37 square miles (see Existing Conditions Map 2.1). Located 44 miles southeast of Tulsa along the Muskogee Turnpike, the city enjoys its own community identity.

As of 2000, Muskogee had grown to include a total population of 38,310 people exhibiting a wide economic range. The Oklahoma Department of Commerce projects the 2005 population count to be approximately 38,610 and the 2020 population count to be approximately 40,430. Like most areas, dependence on the automobile for transportation has influenced growth trends and patterns. Strip shopping centers, fast food restaurants, and other automobile oriented land uses have emerged along the main thoroughfares. Opportunities for choosing a mode of transportation other than the automobile have decreased due to longer distances between origins and destinations, a lack of facilities that support alternative modes of transportation, and barriers to walking and biking such as wide arterial roadways and highways.

With a growing population, Muskogee has begun to lose open space and the rural character that defines portions of the city (see Land Use and Land Cover Map 2.2). The Muskogee Trails Master Plan will examine ways to preserve corridors of land that provide outdoor recreational resources and transportation alternatives close to where people live and work. These corridors can link neighborhoods to the larger environmental outdoor resources as well as to primary everyday destinations.

Muskogee's most identifiable environmental features include the Arkansas River and its adjacent floodplain as well as creeks and streams woven throughout

Muskogee which naturally preserve greenspace due to restricted development along the floodplains (see Existing Conditions Map 2.1). Although rivers and creeks generally create barriers for bicycle and pedestrian travel, these features alone often preserve many acres of potential locations for bicycle and pedestrian trails. Muskogee's relatively mild winters and warm summers make most of these areas potentially accessible year round.

The Arkansas River is located along northeast Muskogee, and Coody Creek is located through southwest Muskogee.

Large scale man-made features that cross Muskogee's landscape include railroads and highways. The MKT railroad bisects Muskogee diagonally southwest to northeast, while the Texas and Pacific railroad parallels the MKT approximately three-quarters of a mile southeast with an additional branch into west Muskogee. Also in west Muskogee is a portion of the Missouri Pacific. The St. Louis - San Francisco railroad exits the system in the east.

US Hwy 69 runs north/south through west Muskogee while the Muskogee Turnpike parallels US 69. Between these two and also running generally north/south is US Hwy 64 which turns into Main Street in downtown Muskogee. Running east/west through the center and northern portion of Muskogee, US Hwy 62 intersects these three highways. In the south, SH 165 also runs east/west connecting US 69, US 64 and the Muskogee Turnpike.

Existing Attractors

The following is a list of public and private origins and destinations that are most likely to attract people who might choose to walk or ride a bicycle to accomplish a task. These destinations, or attractors, are divided into several categories.

Lakes and Rivers

The Arkansas River borders Muskogee along its northern boundary and weaves through the western portion of the city. The Port of Muskogee sits on the Arkansas River, which serves as a major waterway that runs to the Gulf of Mexico via the McClelland-Kerr Navigational system.

Coody Creek in southern Muskogee currently contains Coody Creek Park, an undeveloped 122-acre primitive greenway located between Gulick Street and 6th Street.

There are no lake destinations within the city limits of Muskogee, although the city is located near five regional lakes that are used for recreation (Fort Gibson Lake, Greenleaf Lake, Tenkiller Lake, Eufaula Lake, Webber's Falls Reservoir).

Historic Downtown

Muskogee's downtown is located along Broadway Street between Main Street and 12th Street including the area north to Martin Luther King Street and south to

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Columbus Avenue, serves as an attraction that provides tourists as well as the community many unique places to shop within a main street environment. The renovated Roxy Theatre has become the center of downtown cultural activities. Travel by bicycle through these areas should be encouraged as well as pedestrian/bicycle access to the downtown from surrounding areas.

Urban Activity Corridors

Muskogee has several urban activity corridors within its boundary. An example of this type of corridor is along US Highway 62. Along these corridors reside strip shopping centers, a variety of restaurants, retail centers, and strip business centers. Urban activity corridors generally do not accommodate walking or bicycling due to the high speed, heavy automobile traffic and lack of sidewalks. However, these corridors provide a majority of desired goods and services to both residents and tourists. Therefore, off-road pedestrian/bicycle routes are needed as one solution to accessing these corridors in a safe manner.

Residential Neighborhoods

Residential neighborhoods within Muskogee are located throughout the city radiating from the downtown area (see National Land Cover Data 1992 Map 2.2 and the 2000 Population Density Map 2.3). New residential neighborhoods in Muskogee appear to already be pushing towards the outskirts of the city. In order for a trail system to best serve the people of Muskogee, access to and from residential neighborhoods must be provided. This can be accomplished by providing off-road trails through and between neighborhoods, winding along creeks and public right-of-ways. In addition, low volume streets can provide linkages to the trail system by accommodating on-street bikeways with adjacent sidewalks for pedestrians. Older residential neighborhoods and historic neighborhoods often serve as destinations to many tourists as well as citizens.

Community/Neighborhood Parks

Local parks typically serve as primary destinations for many residents in Muskogee although pedestrian and bicycle access to these areas is generally limited to sidewalks (see Existing Conditions Map 2.1). The following is a list of parks within Muskogee. Any of these parks would be greatly enhanced by providing pedestrian/bicycle trails to connect and possibly wind through the park:



Centennial Trail

Beckman	Fink
Bill Pool	Grandview
Civitan	Gulick
Cook	Honor Heights
Delaware	Jackson
Douglas	Junction
Elks	King
Elliot	Kirschner
English	Langston

Maxey
 Optimist
 Palmer
 Robinson
 Rooney

Rotary
 Sallie
 Spaulding
 Turner Hill

Other Public/Private Facilities, Special Use Areas, and Attractions

There are many public facilities and special use areas in Muskogee. They are scattered throughout the area and are currently accessed primarily by automobile. Making connections to the pedestrian/bicycle system will provide residents and tourists with an alternative way of accessing the following facilities:
























Connors State College

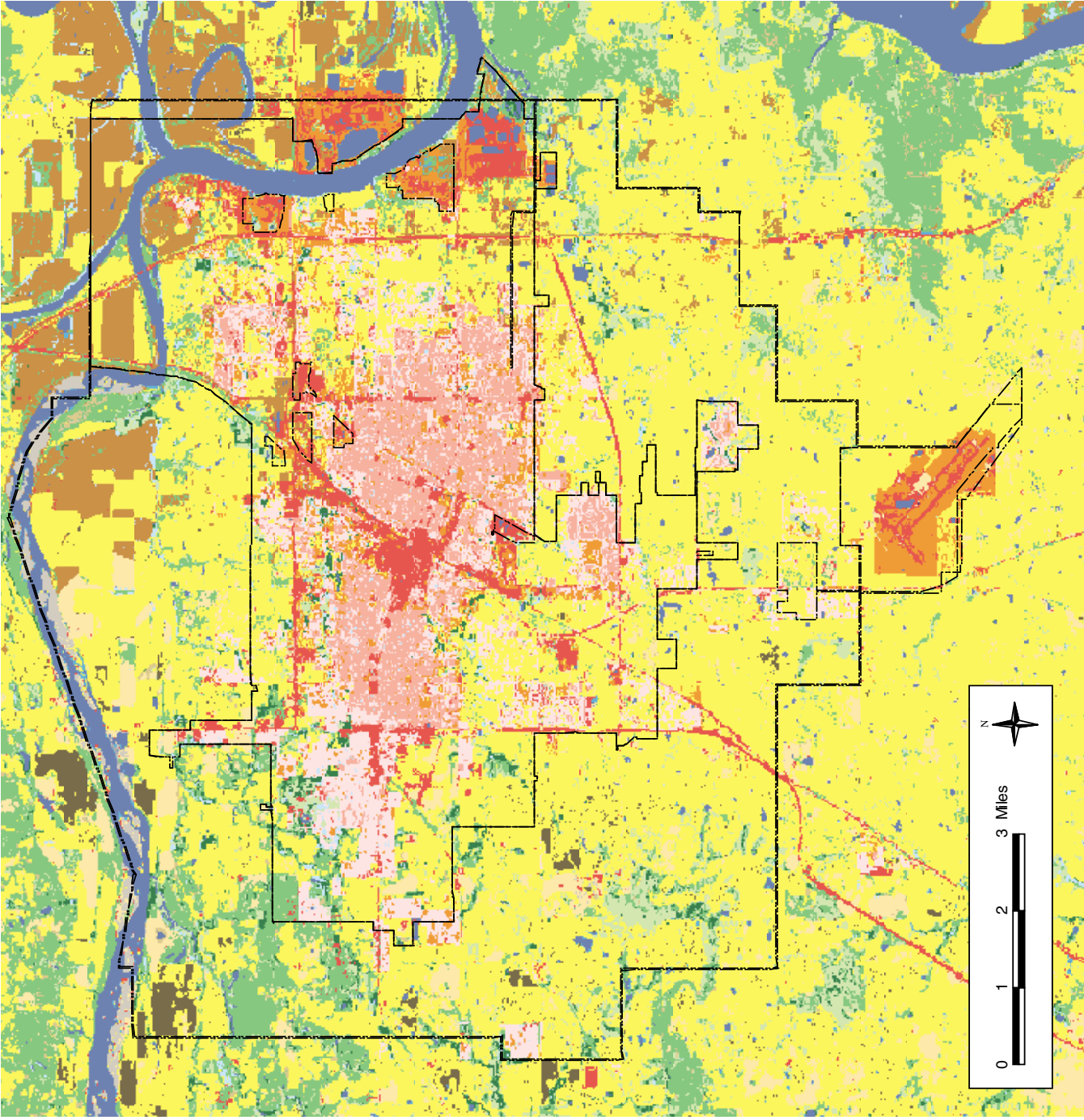
Agency Hill	Muskogee County Emergency Mgmt.
Air Show Oklahoma	Muskogee County Fire Dept.
American Legion	Muskogee County Juvenile Center
Ataloa Lodge Museum	Muskogee County Rural Fire
Azalea Festival	Muskogee County Sheriff
Bios The Provider	Muskogee Emergency Management
Civil Air Patrol	Muskogee Farmer's Market
Consolidated Grain & Barge	Muskogee Fire Dept.
County Treasurer	Muskogee Habitat For Humanity
Eastern Workforce Investment	Muskogee Little Theatre
Federal Bureau-Investigation	Muskogee Police Dept.
Five Civilized Tribes Museum	Muskogee Public Library
Garden of Lights	Muskogee Water Treatment Plant
Golden Rule Industries, Inc.	National Guard Armory
Green Country Behavioral Health	Okahoma Music Hall of Fame
Highway Patrol Headquarters	Pollution Control Plant
Honor Heights Park	Port Of Muskogee Office
Human Services Dept.	Rehabilitation Services Dept.
Love-Hatbox Sports Complex	Salvation Army
Marc, Inc.	Swap, Inc.
Marine Corp Recruiting Station	Tag Agent
Municipal Police Court Clerk	The 42nd Rainbow Division Memorial
Muskogee Indian Community Center	Amphitheater
Muskogee Animal Control	The Castle
Muskogee City Hall	The Roxy Theatre
Muskogee City Water Dept.	Three Rivers Museum
Muskogee County Purchasing Dept.	U.S.S. Batfish
Muskogee County Assessor	United Way
Muskogee County Child Support	US Air Force
Muskogee County Clerk	US Army Corps Of Engineers
Muskogee County District Attorney	US Army Recruiting
Muskogee County Drug Task Force	US Army Reserve Training Center
Muskogee County Election Board	US Attorney

Muskogee Trails Plan

prepared for
City of Muskogee, Oklahoma

National Land Cover Dataset Classification System Legend

Color Key	Class Number and Name
	11 - Open Water
	12 - Perennial Ice/Snow
	21 - Low Intensity Residential
	22 - High Intensity Residential
	23 - Commercial/Industrial/Transportation
	31 - Bare Rock/Sand/Clay
	32 - Quarries/Strip Mines, Gravel Pits
	33 - Transitional
	41 - Deciduous Forest
	42 - Evergreen Forest
	43 - Mixed Forest
	51 - Shrubland
	61 - Orchards/Vineyards
	71 - Grasslands/Herbaceous
	81 - Pasture/Hay
	82 - Row Crops
	83 - Small Grains
	84 - Fallow
	85 - Urban/Recreational Grasses
	91 - Woody Wetlands
	92 - Emergent Herbaceous Wetlands



2/16/04

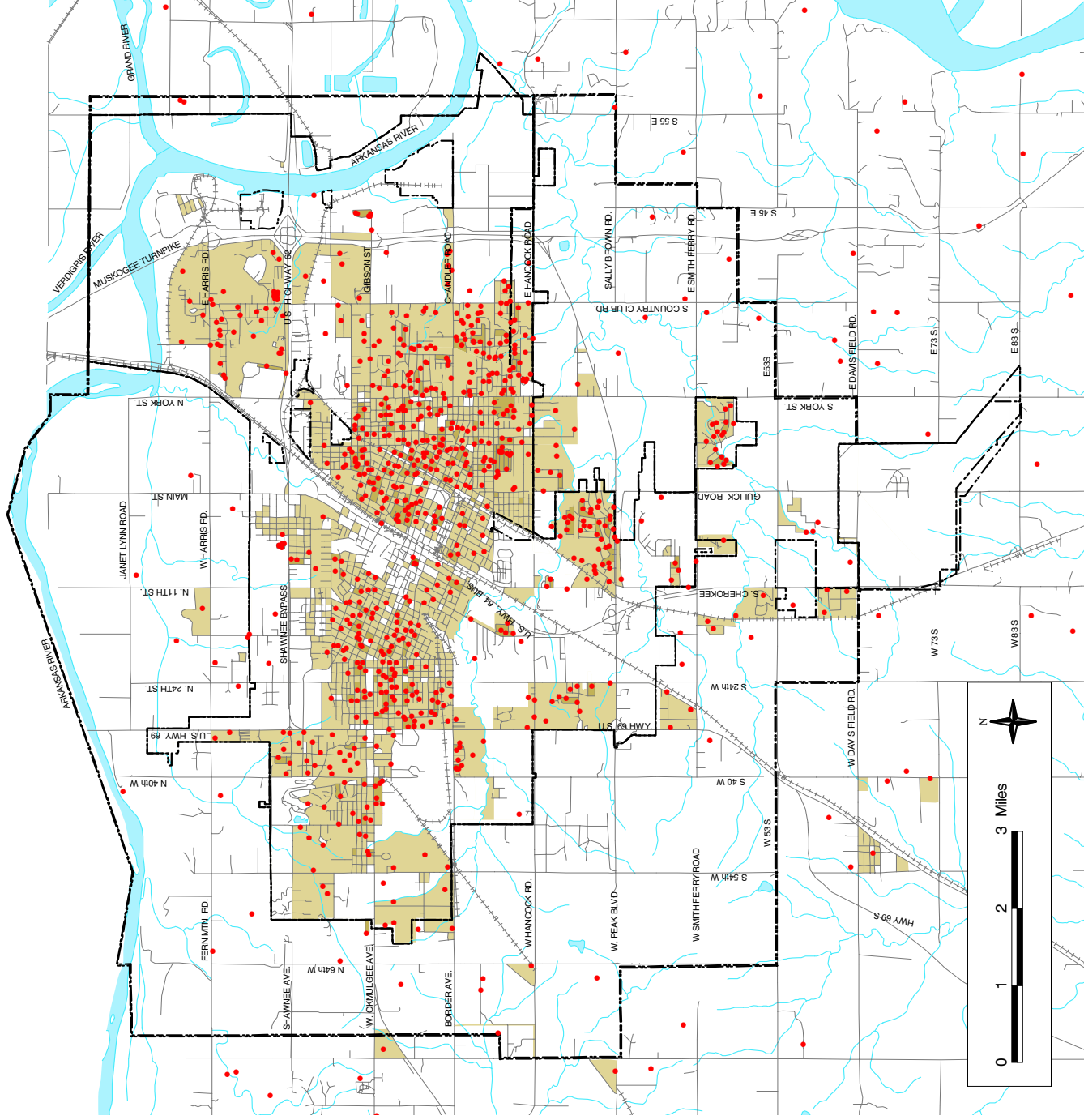
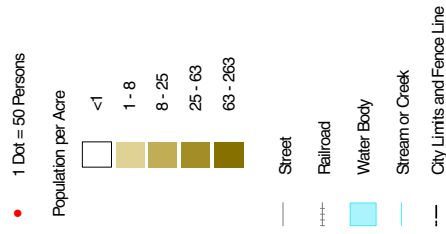
* An Eros Data Center Preliminary Product - consists of NLCD 92 data (based primarily on the unsupervised classification of Landsat TM (Thematic Mapper) 1992 imagery) for which accuracy assessment is not complete.



Map 2.2 - National Land Cover Data 1992 (NLCD 92)*

Muskogee Trails Plan

prepared for
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2/16/04



Map 2.3 - 2000 Population Density

US Consolidated Farm Svc Agency
US Cooperative Extension Service
US General Service Administration
US Indian Affairs Bureau
US Interior Dept.
US Justice Dept.

US Marshal Dept.
US Post Office
US Social Security Administration
Veterans Of Foreign Wars
Volunteers Of America-Muskogee
Women In Safe Home

Schools, Colleges, and Vocational Schools

Schools serve as primary destinations for a large portion of Muskogee's population, from children to adults. A pedestrian/bicycle trail or route could create a safer environment for children and adults who wish to walk or bike to the following schools:

Agape Christian Academy
Alexander Driver Training
Alice Robertson Middle School
Bacone College
Boulevard Christian School
Cherokee Elementary
Connors State College
Creek Elementary School
Eastern Workforce Investment
Ben Franklin Science Academy
Graham Hall Christian School
Grant Foreman Elementary School
Harris Jobe Elementary School
Hilldale Lower Elementary School
Hilldale Middle School
Hilldale High School

Indian Capital Technology Center
Irving Elementary School
Living Water Christian Academy
Mentor Clinical Care
Muskogee Area Literacy Council
Muskogee High School
Northeastern State University
Oklahoma School Of Real Estate
Oklahoma State University
Pershing Elementary School
Sadler Arts Academy
St Joseph Catholic School
Tony Goetz Elementary School
Virgil's Beauty College
Whittier Elementary School



Indian Capital Technology Center

Shopping Centers

Shopping centers in Muskogee are generally oriented towards the automobile. Large parking lots with little or no space for walking or for storing a bike deter walking or bicycling to the facilities. These places serve as major destinations for many people. Providing pedestrian/bicycle facilities might encourage the customer who would like to walk or bike to the Muskogee shopping centers. Examples of shopping centers include Arrowhead Mall, Curtis Shopping Center, and the Honor Heights Shopping Center.

Hospitals and Medical Centers

Many hospitals and medical centers provide little or no pedestrian/bicycle access to the facilities. Medical workers and patients could benefit from the development of off-road facilities for exercise and transportation to hospitals and medical centers. The Muskogee Regional Medical Center (MRMC) has 336 beds with over

200 physicians on staff. There are 70 MD's, 8 DO's, 28 Dentists, 4 Optometrists, 3 Podiatrists, 8 Chiropractors and 4 clinics located in Muskogee. MRMC offers full service in-patient and outpatient services. Veterans Affairs Medical Center has 50 beds, primary care providers, and outpatient services. Some of these medical centers are listed below:

Advance Urology Wellness Center	Muskogee Bone & Joint & Sports
Cancer Center	Muskogee Clinical Laboratory
Candace Stewart Optometry	Muskogee Community Dialysis
Cardiology Clinic Of Muskogee	Muskogee Dental Group
Children's Clinic	Muskogee Dialysis Center
Christian Counseling Assoc, Inc.	Muskogee Digestive Center
Community Home Health	Muskogee Heart Center, Inc.
First Care Medical Clinic	Muskogee Lung Clinic
Foot Clinic Of Muskogee	Muskogee Plasma Center
Gastroenterology Clinic, Inc.	Muskogee Pulmonary Clinic, Inc.
Grace Living Center	Muskogee Regional Medical Center
Green Country Behavioral Health	Muskogee Urology Clinic
Healthsouth Rehabilitation Center	Muskogee Women's Clinic, Inc.
Healthsouth Three Rivers	Nephrology Associates
Hines Clinic	Oklahoma Oncology
Hometown Hospice	Park Boulevard Care Center
Honor Heights Tower	Port City Dental Lab
Hospice, Inc.	Providence Radiology
Housecalls Home Health Service, Inc.	Soper Eye Center
Internal Medicine	Traci Wilkerson Audiology
Kate Frank Apartments	University Heights Medical Clinic
Kelly B Todd Cerebral Palsy	US Veterans Medical Center
Maternal & Family Practice	Wade Pediatrics
Muskogee Allergy Clinic	

Major Employers

Employers serve as destinations everyday to Muskogee's residents. A pedestrian/ bicycle trail or route could allow employees to walk or ride to work, which would improve their health and the air quality. Employers could provide bicycle parking and shower facilities to encourage pedestrian and bicycle commuting while benefitting from a more alert and healthy work force. The following is a list of major employers within Muskogee:

Georgia Pacific	Grant Prideco
Muskogee Regional Medical Center	American Foundry
Trucks For You	Love Bottling
Whitlock Packaging	Smurfit Stone Container Corp.
OG&E Electric	Custom Seating
Owens-Brockway, Inc.	Anderson Wholesale
Yaffe Iron & Metals	

Existing Transportation System

With the improvement and addition of existing and new roadways, the opportunity exists to include bicycle and pedestrian facilities within the rights of way from the preliminary phase. By implementing them into the design and construction of the roadways, the bicycle and pedestrian facilities will become an integrated amenity rather than an after thought and may be constructed at a significantly lower cost.

Pipeline Systems

Since access to pipelines must be maintained at all times, the easements are typically not developable for general construction. However, it is possible that in some cases, if a public use easement could be obtained, these corridors might be used for bicycle/pedestrian trails.

Existing Trails and Bicycle Facilities

The City of Muskogee has two existing trails, the Centennial Trail and Civitan Park Trail. The Civitan Park Trail is a 6' wide concrete trail and the Centennial Trail is a 10' wide asphalt trail. A third trail, the Port Trail, is currently under construction and Phase 2 of the Centennial Trail is funded and planned for construction in 2004.



Centennial Trail

Chapter 3



Trails Master Plan

Vision, Goals & Objectives

Introduction

The following is the vision statement crafted for Muskogee as an overall guide to developing the proposed trail system. Goals which support this vision, and a series of objectives that would be implemented to achieve each goal, are also presented. The vision, goals and objectives were publicly discussed and refined to reflect the needs and desires of local residents. This was accomplished through a public workshop which took place on October 28, 2003. At least 20 local residents attended this meeting in Muskogee.

Vision

Muskogee's trail system will provide safe and convenient facilities for walkers, joggers, bicyclists, in-line skaters, and wheelchair users. It will connect residential areas to significant outdoor recreation areas, including area lakes, parks and schools. The system will offer citizens an enhanced alternative to automobile travel, providing routes to popular destinations, including employment centers, retail establishments, tourist attractions, medical facilities, universities and schools. Since trails promote nonpolluting forms of transportation, the trail system will improve air quality and reduce congestion in the area. Greenway trail corridors will also improve water quality and reduce the impacts of flooding by preserving floodplain lands and streamside buffers. The local economy will also benefit from trail development through increased tourism revenues, property values and business attraction. In all, the Muskogee Trails System will make the region a cleaner, greener and better place to live, work and play for generations to come.

Goals & Objectives

The following goals and objectives serve to support the vision statement. Goal categories are representative of the benefits outlined in the previous chapter. Goals are not listed in order of priority.

Safety

Goal: Trails will be designed and managed so as to maximize safety and security of users.



Workshop participants listen to trails presentation

Objectives:

- Increase visibility to the trail from adjacent roads.
- Clear out brush and prune the lower tree limbs within the trail corridor.
- Keep area clear of new trees with yearly brush hog.
- Remove or limit structures along the corridor that could provide places for hiding.
- Route trail to an adjacent road with a signalized crossing where possible; install pedestrian heads for the trail crossing.
- Reduce speed limits on adjacent or intersecting roads.
- Establish curfew for trails without lights.
- Provide good lighting for trails that are open at night;
- Provide safe crossings at intersections with roadways;
- Design trails that accommodate a variety of users and reduce user conflicts;
- Provide a code of conduct for trail users;
- Reduce liability issues through good design and maintenance;
- Construct trails to national standards for user safety;
- Provide vandal proof restrooms and amenities when installed.
- Provide emergency access to trails;
- Restrict unauthorized motorized vehicle access;
- Minimize the potential for user conflicts through proper design, education and maintenance.

Recreation/Fitness

Goal: Trail corridors will improve opportunities for safe, close-to-home recreation in Muskogee.

Objectives:

- Provide recreation trail amenities such as distance markers, drinking fountains, fitness stations, benches, litter receptacles and lighting where appropriate;
- Provide sponsorship program for mile markers like in Tulsa by businesses who would place their logo on the marker;
- Paint Km markers and sign Mile markers, or vice versa;
- Link recreation destinations such as parks, picnic areas, and other landmarks within Muskogee;
- Provide trailheads at schools, parks, and other locations where parking and other facilities currently exist;
- Provide a trail connection to mountain bike area at Honor Heights Park;
- Connect to fitness centers including the Healthplex and Muskogee Recreation Center
- Provide trails for a variety of users including runners, walkers, strollers, bicyclists, hikers, skaters, and wheelchair users;
- Provide areas for rest and socialization along trails;
- Provide trails for the elderly and handicap users;
- Promote health/fitness benefits of trail use.



Workshop participants review maps and discuss trails master plan

Maintenance & Management

Goal: Trails in Muskogee will be properly managed and maintained to increase user safety and enhance the quality of facilities.

Objectives:

- Design trails and amenities for low maintenance and vandal resistance;
- Promote an Adopt-A-Trail program to assist with certain types of ongoing maintenance such as litter control;
- Identify a single agency responsible for trail maintenance and fund adequately;
- Uniformly maintain all trails by developing a maintenance program which ensures that trails are inspected and maintained on a regular schedule;
- Provide litter receptacles at appropriate intervals along the trail;

Economic

Goal: Trails in Muskogee will improve the economic health of the area by increasing property values and potentially providing tourism revenue.

Objectives:

- Link major employers with retail areas, residential areas, schools and major attractions including Super Wal-Mart, the V.A. Hospital, Fort Howard and Georgia Pacific;
- Provide bicycle access on roadways;
- Promote economic incentives for property owners who donate land for trails;
- Increase values of adjacent property by developing high quality trails;
- Emphasize Muskogee's trails as a quality of life magnet to attract new business;
- Improve the city's image through the development of quality trails;
- Encourage developers to include trails/access in future development.



Workshop participants review maps and discuss trails master plan

Education

Goal: Trail corridors will highlight and enhance significant historical and natural resources in the area. Trail users and potential supporters will be made aware of the trail system and its rules and benefits.

Objectives:

- Promote the education of motorists, bicyclists, and other trail users about safe behavior and proper conduct;
- Establish signage along the trails to educate the public about local ecology, history, geology and wildlife;

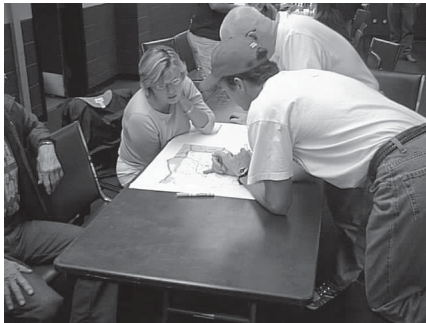
- Create wetland educational areas along railroad corridors with drainage issues.
- Educate motorists that bicyclists have a right to use the road in addition to the proposed trails;
- Promote the education of Muskogee's residents to the value of trails through school programs and other citywide promotions;
- Promote education of Muskogee's youth about the benefits of trails.

Transportation

Goal: Trail corridors will provide more opportunities for alternative transportation facilities for residents and visitors to the City of Muskogee.

Objectives:

- Link neighborhoods, parks, businesses, lakes, schools, libraries, public attractions and shopping centers within the city;
- Link major employers to residential neighborhoods;
- Use roadway ROW's for trails
- Use wide shoulders, share the road facilities, or marked bike lanes to provide needed linkages between trails;
- Provide connections between trails and sidewalks;
- Provide bicycle parking at appropriate locations;



Workshop participants review maps and discuss trails master plan

Environment

Goal: Greenway trail corridors in Muskogee will enhance the local environment by improving air and water quality, conserving floodplain ecosystems, restoring landscapes and protecting wildlife habitat.

Objectives:

- Protect environmentally sensitive lands to support plant and animal habitat;
- Provide areas for wildlife, including beavers.
- Improve the visual quality of the city through the plantings;
- Improve air quality and reduce noise levels by promoting non-motorized forms of transportation;
- Align trails to minimize the impact on the environment;
- Promote environmental awareness through the Adopt-A-Trail program.

Chapter 4



Trails Master Plan

Design Guidelines

Introduction

This chapter provides guidelines to both public and private entities for the development of trail facilities throughout Muskogee. The regional guidelines herein are based on the best practices in use throughout the United States, as well as accepted national standards for trail facilities.



Bollards mark the entrance to a trail in Bixby, Oklahoma

The general attributes of the Muskogee trail system have been determined through the master planning process. These attributes include, but are not limited to: 10' wide (minimum) paved trails with a center line stripe, a comprehensive signage system, grade separated crossings where feasible, safe at grade crossings where necessary, and trail heads with drinking fountains, benches, and landscaping at appropriate intervals. Some trails may have phased construction, being built initially with limestone screenings as the surface with asphalt or concrete being installed later as the permanent surface.

The guidelines should be used with the understanding that each trail project is unique, and that design adjustments may be necessary in certain situations in order to achieve the best results. Such projects should be evaluated on a case-by-case basis, in consultation with local or state bicycle and pedestrian coordinators, a qualified landscape architect, and/or an engineer.

Trail Development Corridors

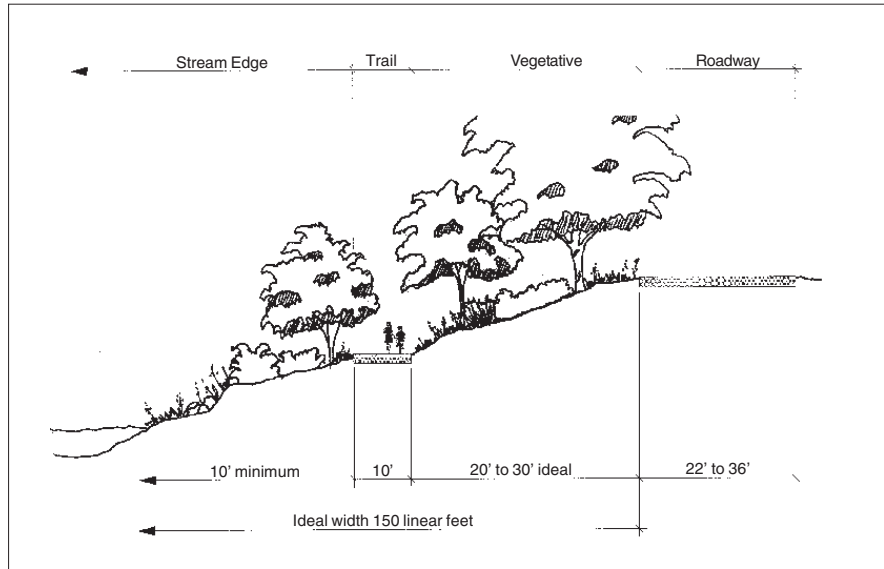
There are several different corridor types that can potentially serve as trail development corridors. These include floodways, utility easements, drainage easements, abandoned railroad corridors, existing railroad corridors, and expressway or turnpike rights-of-way. Trail development planning in each of these corridor types must consider the unique set of variables that each type presents. The following section contains information on trail development within different corridors.

Floodway Trail with Buffer Zone

The design of trails developed within floodplains must consider the preservation of buffer zones adjacent to streams. These vegetated buffers are important in preserving water quality and wildlife habitat. These vegetative zones work to filter

pollutants from stormwater runoff before it reaches streams or rivers. Preserving these buffers also serves wildlife by providing important habitat adjacent to streams and rivers. This habitat preservation is especially important in urban

settings where habitats are threatened. The accompanying graphic illustrates how trails should be developed within floodprone areas, including minimum width requirements.



Typical Cross Section: Trail Within A Floodway

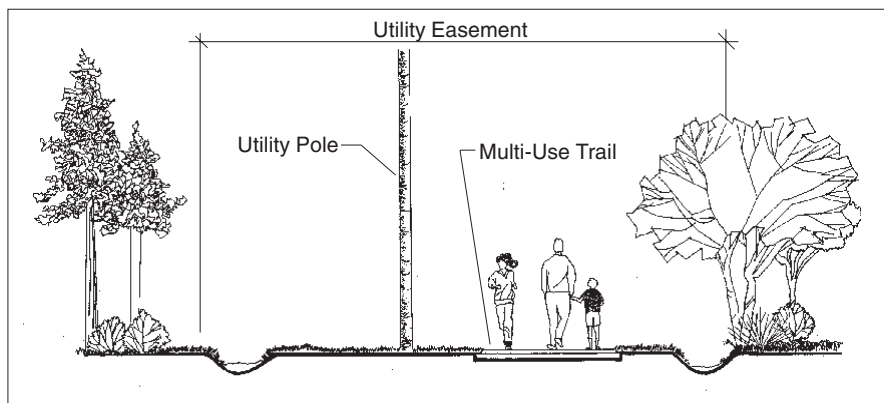
use trails, there should be a 2-foot minimum (3-foot preferred) shoulder separating the trail tread from any utility structure. These trails need to be designed to withstand the weight of maintenance vehicles used to service the utility line.

Utility Easement Trail

Utility corridors, similar to railroad corridors, can be utilized for multi-use trail development. Trails can be successfully implemented within overhead electric, sewer, fiber optic, cable and gas line easements. Typically, the utility line is placed under, or parallel to, the trail tread. These utility easements can accommodate both paved and unpaved trail treads and can serve a variety of users. Like all multi-

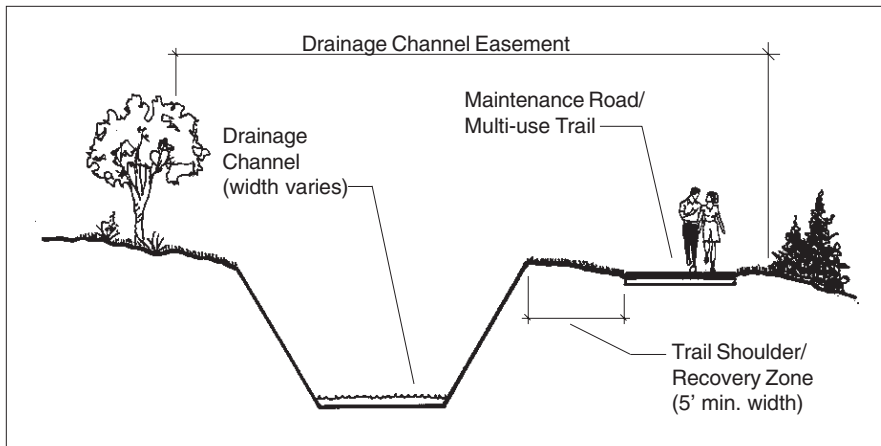
Drainage Easement Trail

Networks of drainage ways present a unique opportunity for trail development. Many drainage ways have an existing adjacent unpaved pathway or road that serves as maintenance vehicle access. Often these maintenance roads can double as multi-use trails with little or no improvements, while others may require more development. While some drainage ways have no existing maintenance road, there is often adequate easement width to accommodate multi-use trails.



Typical Cross Section: Utility Easement Trail

Trails utilizing drainage easements should be placed as far away (5' suggested min.) from the channel as the easement allows. This will provide a recovery zone between trail users and the channel if a cyclist should lose control on the trail. Drainage easement trails that are part of the regional network should be paved. In



Typical Cross Section: Drainage Easement Trail

some instances, an unpaved trail can be developed as Phase I of trail development, and paved at a later date.

These trails should be developed in close coordination with the Public Works Department in order to establish a safe and user friendly trail environment without obstructing maintenance access to the channel. These trails should be built to withstand the periodic use of heavy trucks and maintenance vehicles.

Abandoned Railroad R-O-W

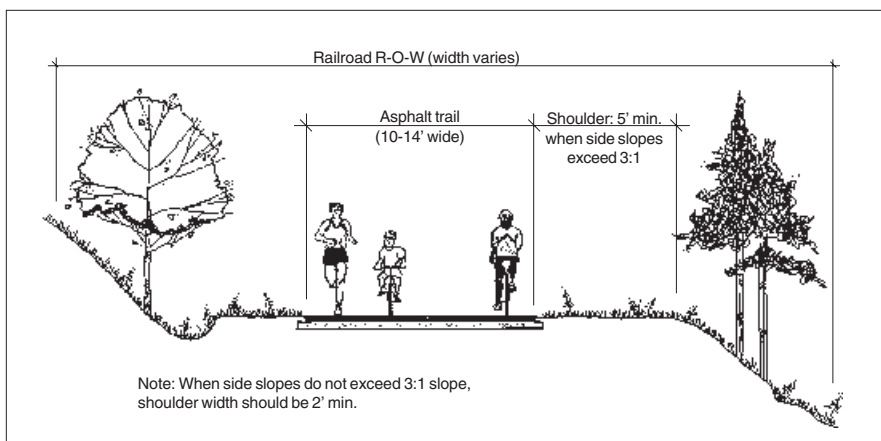
One popular movement in this country is the conversion of abandoned railroad corridors into multi-use trails. These corridors can be ideal for recreation and transportation facilities, as the grades required for railroad use provide slopes that are well within range for ADA accessible, transportation-oriented trails. They can also be excellent locations for paved and unpaved trails due to the existence of a continuous linear right-of-way. Additionally, railroad structures, such as trestles and historic depots, along the corridor can be adapted for trail use as bridges, concession stands and information centers.

A design issue that may especially affect rail trails is that of side slopes, due to the

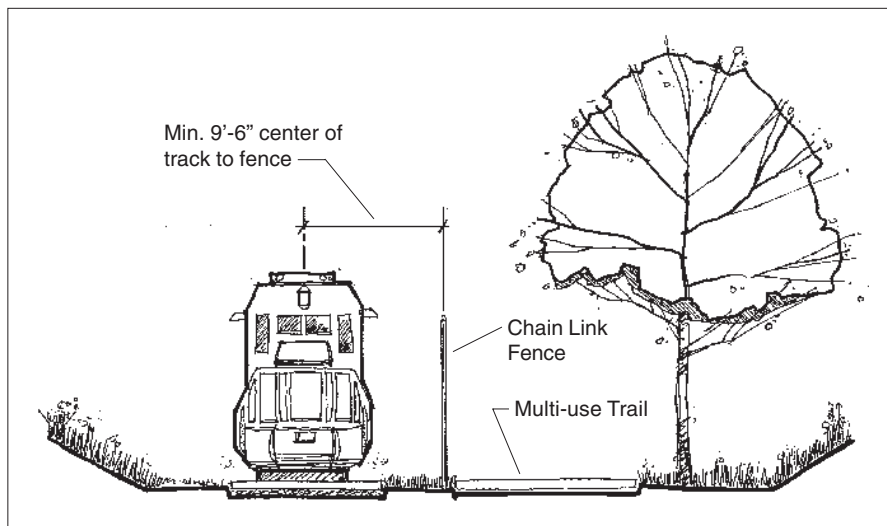
drainage swales that are typically found along many railroad routes. As with any multi-use trail, proper slopes must be developed adjacent to the trail to ensure the safety of users. A minimum 2-foot wide shoulder (3 feet is preferred) should be in place between the edge of trail and top of bank when the slope is less than 3:1. If the slope is greater than 3:1, there must be a 5-foot wide shoulder between the edge of trail and top of bank. If this is not possible, a railing must be installed that is at least 2 feet away from the edge of trail.

This railing, according to current

AASHTO standards, should be 54 inches in height. However, the AASHTO guidelines that are soon to be released indicate a minimum railing height of 42 inches.



Typical Cross Section: Trail Within an Abandoned Railroad Right-Of-Way



Cross Section: Minimum Rail-With-Trail Clearances per American Railway Engineering Association (AREA) standards

Trails and Active Railroad Corridors

Another method of utilizing railroad corridors for trail development is rails-with-trails—installing a trail within a railroad right-of-way, adjacent to active tracks. This strategy has been successfully employed in many communities. Proper design is key to developing a safe facility for trail users and minimizing liability risks for the railroad. According to a study of 37 rail-with-trails completed by the Rails-to-Trails Conservancy, these facilities typically include the following design features:

- Grade separation which isolates the active track from the trail;
- A buffer between the tracks and trail;
- Few at-grade trail/track crossings;
- Fencing or vegetative screening which serves as an attractive barrier; and
- Warning and explanatory signs posted

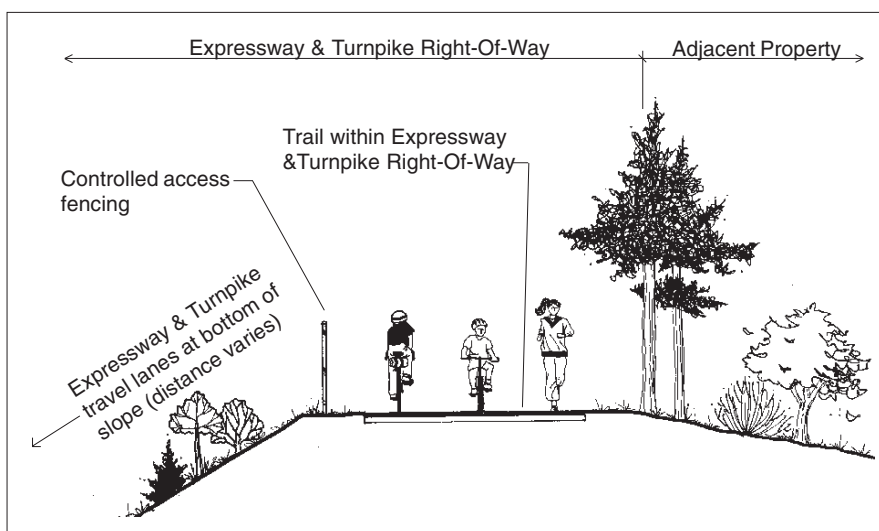


Trail within Turnpike R-O-W

Expressway & Turnpike R-O-W Trail

Expressway and turnpike rights-of-way are excellent trail corridor resources because they are linear, well separated from the roadway, and intersect with relatively few driveways and cross streets.

The Oklahoma Turnpike Authority (OTA) has supported the concept of trails utilizing the right-of-way space located outside controlled access fencing. For example, the recently constructed 3.5 mile Creek Turnpike Trail in Tulsa, Oklahoma is located within the Turnpike corridor. This trail is separated from the turnpike by controlled access fencing. In addition, the Oklahoma Department of Transportation has recently agreed to consider the placement of a paved multi-use trail within the US 169 corridor in Tulsa, Oklahoma.



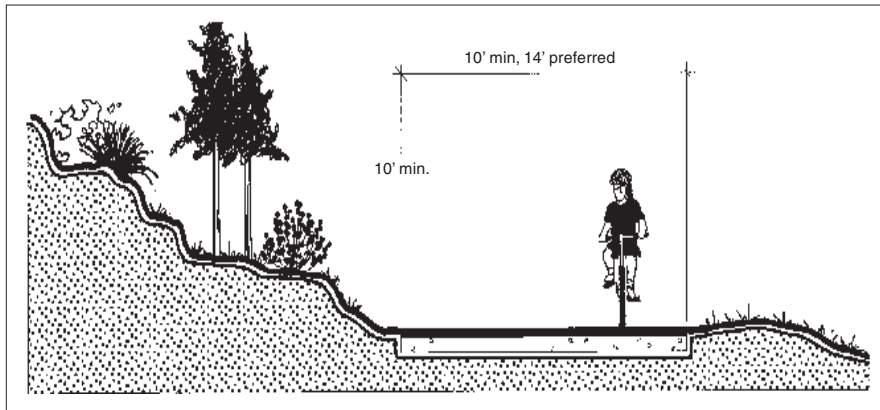
Typical Cross Section: Expressway & Turnpike R-O-W Trail

Trail Types

Each of the aforementioned trail development corridors can be host to one of many different trail types. Some of these trail types include, but are not limited to: hiking trails, unpaved or paved multi-use trails, boardwalk trails, and multiple tread trails. These trail types are described in the following section.

Paved Multi-use Trails

Typical pavement design for paved, off-road multi-use trails should be based upon the specific loading and soil conditions for each project. These trails, typically composed of asphalt or concrete, should be designed to withstand the loading requirements of occasional maintenance and emergency vehicles. In areas prone to frequent flooding, it is recommended that concrete be used for its excellent durability.



Typical Cross Section: Paved Multi-Use Trail

One important concern for asphalt multi-use trails is the deterioration of trail edges. Installation of a geotextile fabric beneath a layer of aggregate base course (ABC) can help to maintain the edge of a trail. It is also important to provide a 2' wide graded shoulder to prevent trail edges from crumbling.

The minimum width for two-directional trails is 10', however 14' widths are preferred where heavy traffic is expected. Centerline stripes should be

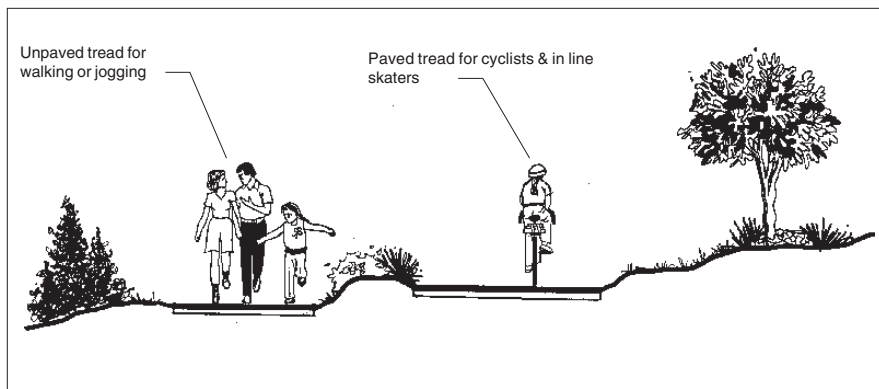
considered for paths that generate substantial amounts of pedestrian traffic. Possible conflicts between user groups must be considered during the design phase, as cyclists often travel at a faster speed than other users.

Asphalt concrete 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.

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. Most often, concrete is used for intensive urban applications. Of all surface types, it is the strongest and has the lowest maintenance requirement if it is properly installed.

Dual Tread Trail

On trail corridors where anticipated usage is high, or user conflict is a concern, dual or multiple trail treads may be desired. Multiple treads allow for multiple use within the same right-of-way but on separate treads. This generally requires a wider right-of-way to accommodate the diversity of users. For example, a hard



Typical Cross Section: Dual Tread Trail Corridor

surfaced trail could be developed for bicycle use, a walking or jogging path could meander along an unsurfaced earth trail, and a boardwalk could be extended into riparian areas. With proper signage to direct trail users, all of these trail treads could be developed parallel to one another within a given corridor.

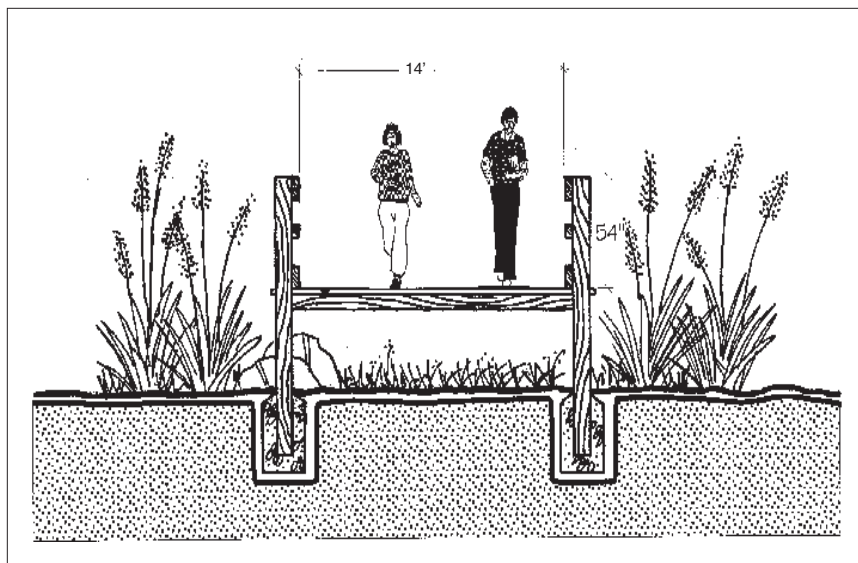
For example, Lake Hefner Trail in Oklahoma City has dual treads on the

easter side of the lake. Its high usage and frequent user conflict problems have been alleviated through dual tread development. Dual trail treads provide one tread exclusively for wheeled users and leave one for pedestrians and joggers, therefore eliminating user conflicts between these trail user groups.

Boardwalk Trails

Boardwalks, or wood surface trails, are typically required when crossing wetlands or poorly drained areas. While boardwalks can be considered multi-use trails, the surface tends to be slippery when wet, and so is not well suited for wheeled users.

Boardwalks intended for use by bikes, pedestrians, in-line skaters, etc. should be a minimum of 14' wide. However, boardwalk trails limited to pedestrian use can be as narrow as 8'.



Typical Cross Section: Boardwalk Trail

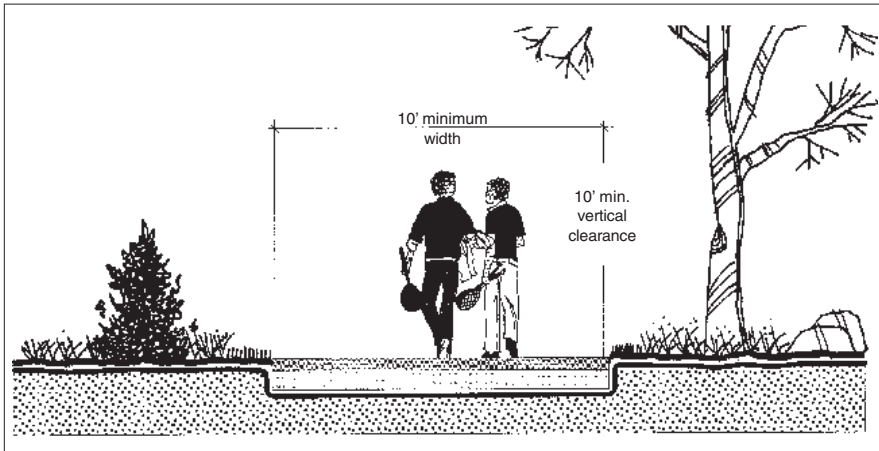
Wood surfaced trails are usually composed of wooden planks or lumber that forms the top layer of a bridge, boardwalk or deck. The most commonly used woods for trail surfacing are exposure- and decay- resistant species such as pine, redwood, fir, larch, cedar, hemlock and spruce. Wood is a preferred surface type for special applications because of its strength and comparative weight, its aesthetic appeal and versatility. Synthetic wood, manufactured from recycled

plastics, is now available for use as a substitute in conventional outdoor wood construction. While these products are more expensive than wood lumber, recycled plastic lumber lasts much longer, does not splinter or warp and will not discolor.

Unpaved Multi-Use Trail

The unpaved multiuse path is intended to accommodate a variety of users, including walkers, joggers, bicyclists, and others. These pathways, intended for use in upland environments, do not withstand the effects of flooding well. While

cheaper to install, unpaved trails typically have higher maintenance costs than paved trails and require more frequent repairs. Careful consideration should be given to the amount of traffic the specific trail will generate, as these surfaces tend to deteriorate with excessive use. These trails should also meet all other standards within this manual, and within AASHTO's Guide for the Development of Bicycle Facilities (1991).



Typical Cross Section: Unpaved Multi-Use Trail

Materials that can be used to surface a trail include natural materials, soil

cement, graded aggregate stone, granular stone, and shredded wood fiber. The soft surface materials are less expensive to install and compatible with the natural environment, however, they do not accommodate certain users, such as in line skaters and disabled persons. Soft surface trails are preferred, however, by some runners and mountain bicyclists. Soil cement will support most user groups, though bicyclists and horseback riders should only have restricted use. Soil cement surfaces last longer if installed on top of a properly prepared subgrade and subbase.

Graded aggregate stone material suitable for trail surfacing includes colored rock, pea gravel, river rock, washed stone and coarse sand. This surface will often need to be kept in place with wood or metal edging. Because it is a loose, uncompacted surface, graded aggregate stone is limited in application to flatter slopes.

Granular stone includes a broad range of aggregate stone, such as limestone, sandstone, crushed rock, pit gravel, chat, cinders, sand 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 wheelchair accessible trail development. This type of trail surface serves well as a base for future paving.

Shredded wood fiber is usually composed of mechanically shredded hardwood and softwood pulp, pine bark chips or nuggets, chipped wood pieces, or other by-products of tree trunks and limbs. This type of surface is favored by joggers and runners, equestrians and walkers because it is soft and blends with the natural

environment. However, shredded wood fiber decays rapidly and must be installed on flat subgrades.

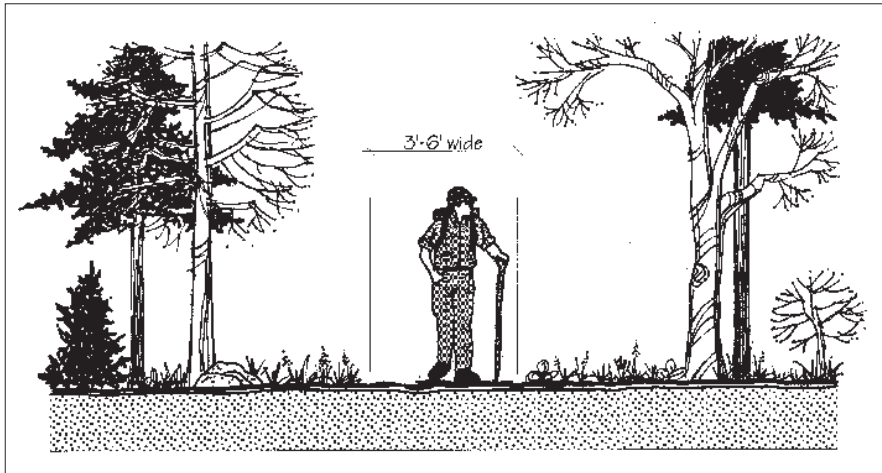
Footpath/Hiking Trail

Footpaths or hiking trails are designed to accommodate pedestrians and are not intended for cyclists or other wheeled users. These natural surface trails typically make use of dirt, rock, soil, forest litter, snow, ice, pine mulch, leaf mulch and

other native materials for the trail surface. Preparation varies from machine-worked surfaces to those worn only by usage. This is the most appropriate surface for ecologically sensitive areas.

These pathways, often very narrow, sometimes follow strenuous routes and may limit access to all but skilled users. Some hiking trails may permit equestrian use. Construction of these trails mainly consists of providing positive drainage for the trail tread and should not involve extensive removal of

existing vegetation. These trails vary in width from 3' to 6' and vertical clearance should be maintained at 9' (12' when equestrian use is allowed).



Typical Cross Section: Footpath/Hiking

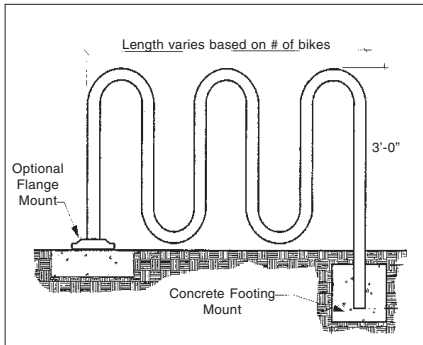
Trail Components

In addition to trail width and surface type, there are many other trail components that should be considered during facility design to ensure safe, well designed trails. The following design guidelines address features such as bike racks, site furnishings, landscaping, lighting, and signage. While these components will not be required on all trail facilities, they should be considered in the design of each facility.

Bike Racks

It is important to choose a bicycle rack design that is simple to operate. Bicycle racks should be designed to allow use of a variety of lock types. It may be difficult initially to determine the number of bicycle parking spaces needed. Bicycle racks should be situated on-site so that more racks can be added if bicycle usage increases.

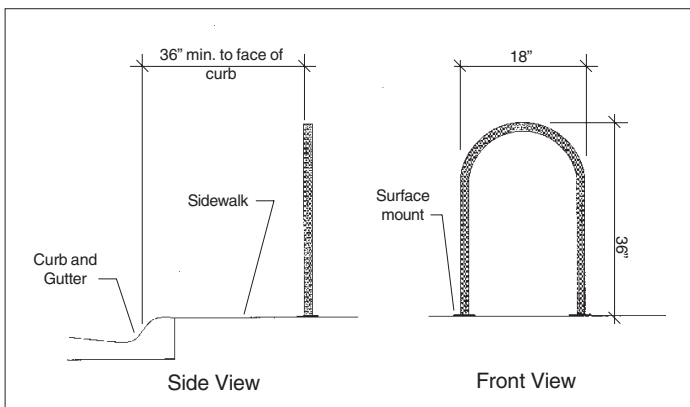
The designs shown have proven popular and effective in numerous communities. They are inexpensive to fabricate locally, easy to install, vandal resistant, and work well with the popular high-security locks. In addition, they can be installed as a single unit on a sidewalk, or in quantity, as at a major recreation center.



Typical "Loop" Bike Rack Design

The location criteria included below are a mix of those developed by the cities of Denver and Seattle for siting bicycle racks, and are recommended for Muskogee:

- Racks should be located within 50' of building entrances (where bicyclists would naturally transition into pedestrian mode).
- Racks should be installed in a public area within easy viewing distance from a main pedestrian walkway, usually on a wide sidewalk with five or more feet of clear sidewalk space remaining (a minimum of 24" clear space from a parallel wall, and 30" from a perpendicular wall).



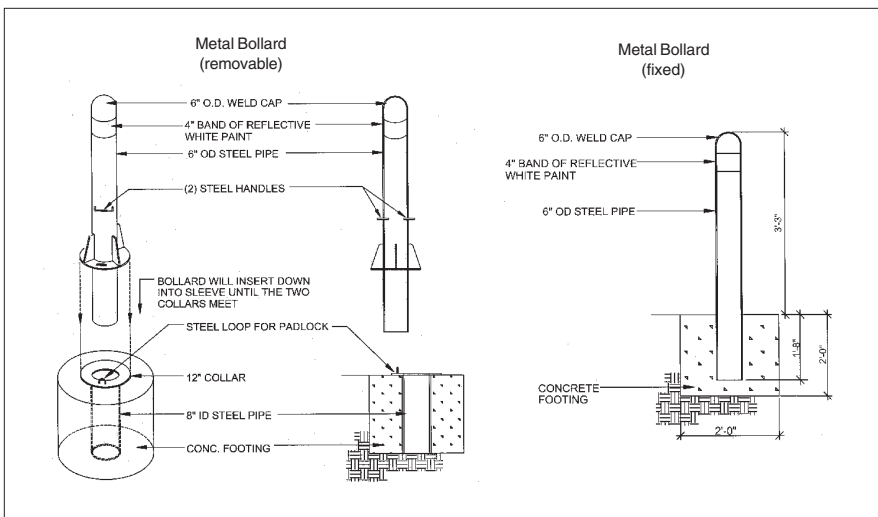
Typical "Inverted U" Bike Rack Design

- Racks should be placed to avoid conflicts with pedestrians. They are usually installed near the curb and at a reasonable distance from building entrances and crosswalks.
- Racks can be installed at bus stops or loading zones (only if they do not interfere with boarding or loading patterns and there are no alternative sites). Many communities across the Country including Phoenix, AZ, Portland, ME and Denver, CO, have installed racks on their buses to facilitate bike-on-transit travel.

Bollards

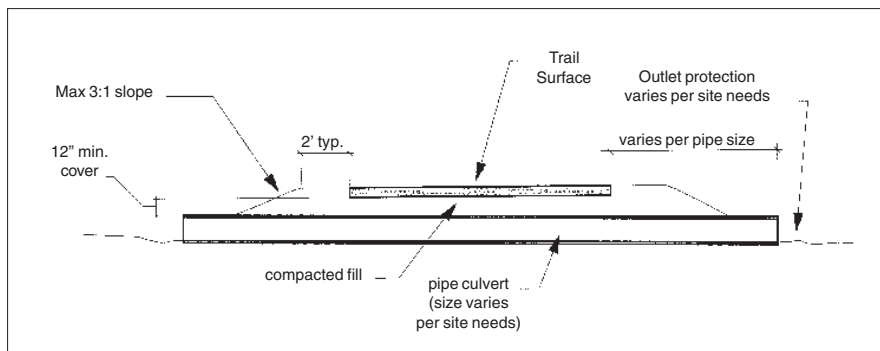
Bollards are intended to provide separation between vehicles and trail users, and are typically used at trail/roadway intersections. They are available in a variety of shapes, sizes, and colors and come with a variety of features. Lighted bollards are intended to provide visitors with minimum levels of safety and security along trails which are open after dark. Bollards should be chosen according to the specific

needs of the site and should be similar in style to the surrounding elements. The graphic illustrates a typical bollard often used in Oklahoma.



Typical Bollard Design

The contractor is to provide proper footings and anchors for bollard installation, according to manufacturers specifications. Typical construction materials for bollards include painted steel or aluminum, with halogen or metal halide lights in weather tight casings. Removable bollards can be installed to provide trail access for emergency and maintenance vehicles.



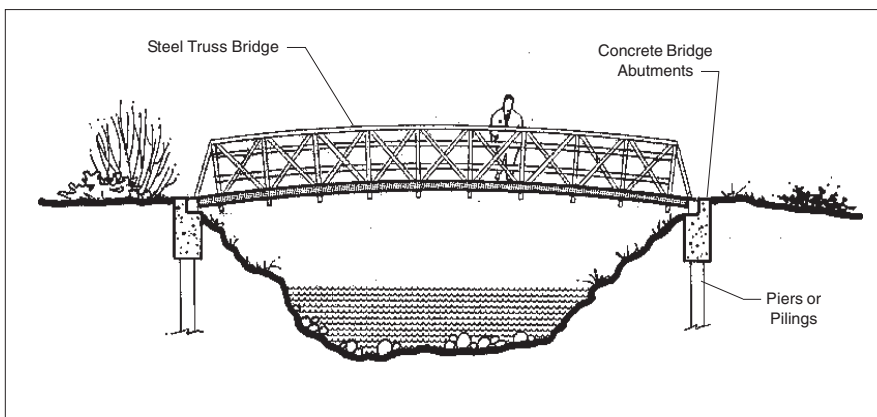
Typical Cross Section: Trail Culvert

Trail Culverts

Installation of trail culverts is important to insure proper stormwater drainage, trail user safety, and longevity of the trail surface. Pipe length, diameter, and material specifications will vary depending on specific site needs. Two materials typically used for trail culverts are reinforced concrete pipe (typically required when the trail is within roadway or utility easements), and High Density Polyethylene (HDPE) recycled plastic pipe. Plastic pipes are typically less expensive on a per foot basis. The included graphic outlines proper installation parameters for trail culverts.

Bridges

Bridges are an important element of almost every trail project. They are required at crossings of larger drainage or water ways and can sometimes be used to cross roadways. The type and size of bridges can vary widely depending on the trail type and specific site requirements. Some bridge types often used for multi-use trails include suspension bridges, prefabricated span bridges (illustrated), and concrete bridges. When determining a bridge design for multi-use trails, it will be important to consider the issue of emergency vehicle access. Trail bridges intended for occasional vehicular use must be designed to handle such loads safely.

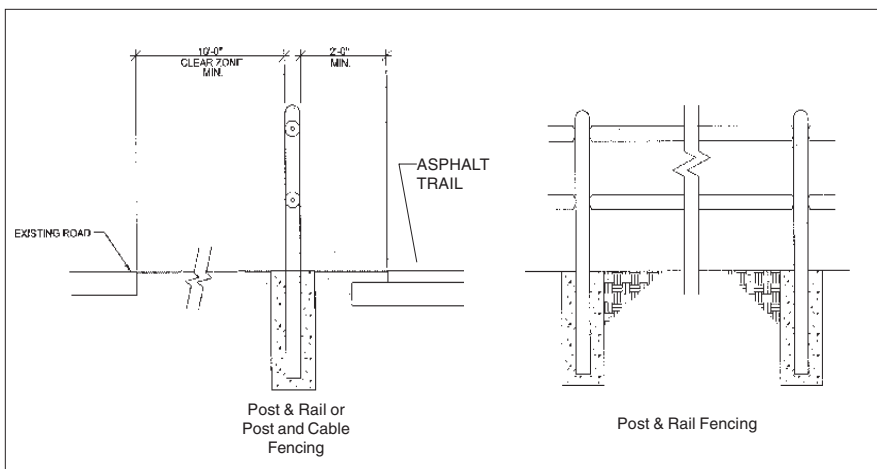


Typical Prefabricated Steel Span Bridge

used for multi-use trails include suspension bridges, prefabricated span bridges (illustrated), and concrete bridges. When determining a bridge design for multi-use trails, it will be important to consider the issue of emergency vehicle access. Trail bridges intended for occasional vehicular use must be designed to handle such loads safely.

Fencing

Fencing and railings are often needed on trail projects for safety purposes or to serve as barriers. They can consist of many different materials and, depending on the specific site needs, can be a variety of heights. Many different fence types, including post and rail, chain link, post and cable, and lumber privacy fences, can be used to create a barrier between the trail and adjacent properties. Safety railings often consist of pipe railings, or treated



Typical trail Fencing

lumber rails. The need for fencing or safety railings on trail projects will vary and should be determined on a site by site basis. Some locations where fencing or railings may be needed include: along elevated pathways or boardwalks, along expressway/turnpike trails, along trails with steep side slopes, and trails in close

proximity to parking lots or roadways. Aesthetics should be carefully considered when determining a type of fence or railing. The materials used should blend with those used in the surrounding area.

Trail Underpasses

Trail underpasses can be used to avoid undesirable at-grade intersections of trails and roadways. These underpasses typically utilize existing overhead roadway bridges or culverts under the roadway that are large enough to

accommodate trail users. There are several key issues that must be addressed in the design of a roadway underpass:

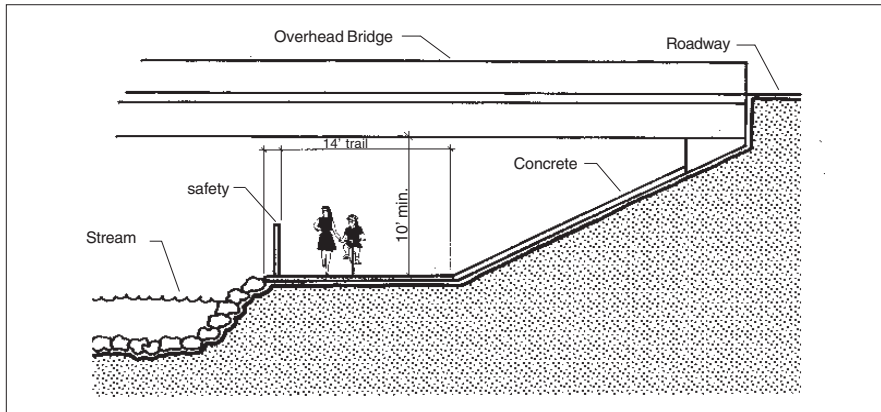
1. The vertical clearance of the underpass must be at least 10';
2. The width of the underpass must be at least 12';
3. Proper drainage must be established to avoid pooling of stormwater inside the underpass; and
4. It is recommended that underpasses be lighted for safety.

Roadway underpasses that utilize box culverts can sometimes be installed as part of a roadway improvement or construction project at greatly reduced cost.

Trail/Roadway Intersections

Trail/Roadway intersections can be dangerous conflict areas if not carefully designed. For at-grade intersections, there are several primary design objectives:

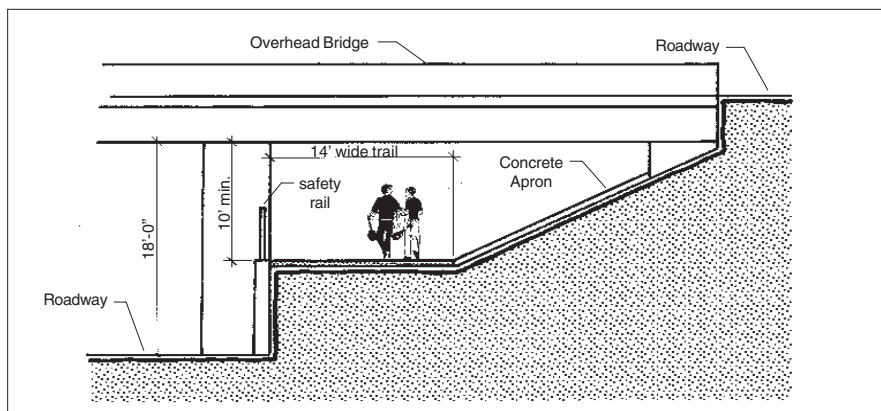
1. Site the crossing area at a logical and visible location;
2. Warn motorists of the upcoming crossing;
3. Inform trail users of the upcoming intersection; and
4. Maintain visibility between trail users and motorists.



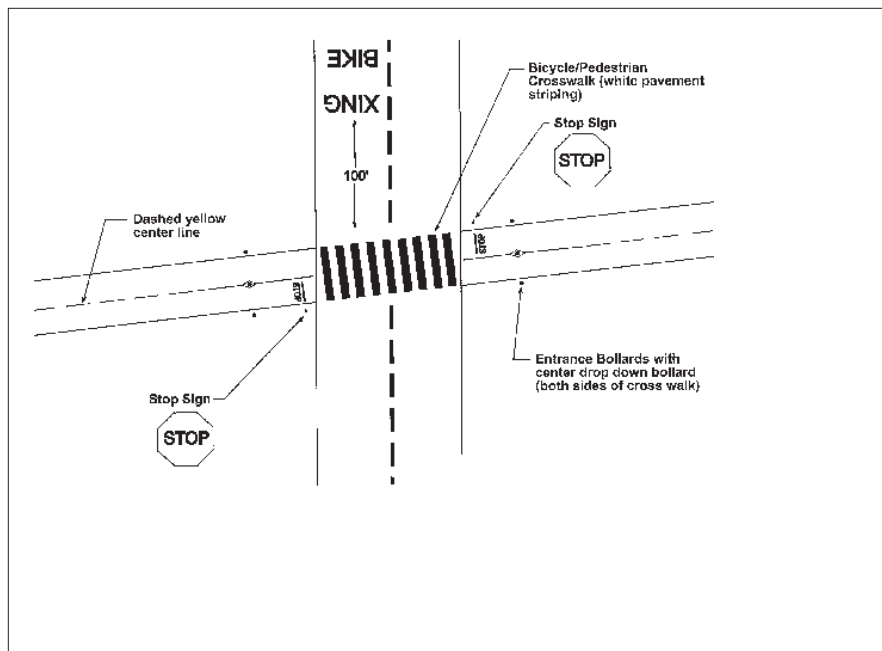
Typical Trail Underpass Adjacent to a Stream



Trail Underpass with Railing



Typical Trail Underpass Adjacent to a Roadway



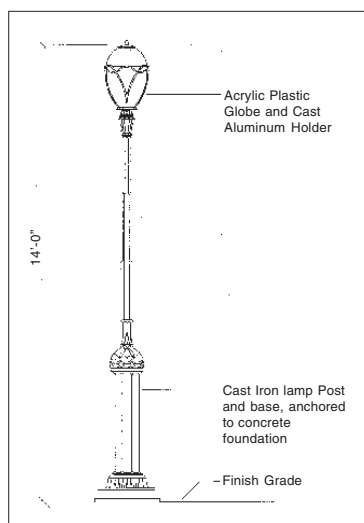
Typical At-Grade Trail/Roadway Intersection

Intersections and approaches should be on relatively flat grades. In particular, cyclists should not be required to stop at the bottom of a hill. If the intersection is more than 75 feet from curb to curb, it is preferable to provide a center median refuge area, per ADA (Americans with Disabilities Act) or ANSI (American National Standards Institute) standards. If crossing traffic is expected to be heavy, it may be necessary to provide a traffic signal that can be pedestrian/cyclist activated.

The accompanying graphic illustrates a typical trail/roadway intersection and shows the proper placement of signage, bollards, and pavement markings.

Trail Lighting

Particularly during winter months, when trips to and from work are made in the dark, adequate lighting can make the difference in a person's choice to bicycle or walk. However, due to liability and security concerns, many off-road bicycle paths are closed at night, and therefore unlit. Lighting for multi-use trails should be considered on a case-by-case basis, with full consideration of the maintenance commitment lighting requires. Included here is an example of a popular pedestrian-scale light fixture that could be used in a trail environment.



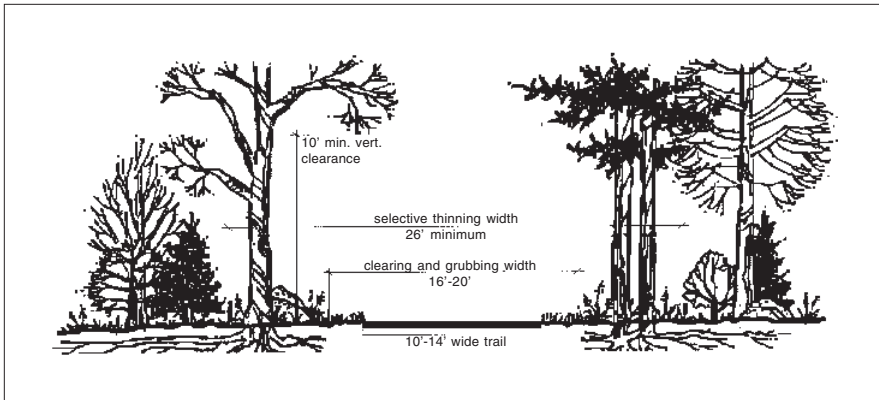
Typical Pedestrian Scale Lighting

In Muskogee, the city has a lighting lease program which has proven very popular and cost effective within its Parks System. The city will design a system to illuminate the trail with either cobra type or post top fixtures. General spacing for the cobra heads is approximately 150 feet between fixtures, but will vary depending on site conditions. The spacing for the post top fixtures is generally closer than the cobras, but both provide an average of 0.5 footcandles on the trail.

The city will lay the conduit, wire the trench (provided by the owner), and install the poles and fixtures. The owner pays a set monthly price per fixture with the City providing all maintenance for the fixtures.

Vegetative Clearing

Vegetative clearing refers to the amount of vegetation removal that is required for various levels of trail development. The amount of vegetative clearing required for any one trail will depend on the type of trail being developed. While footpaths or



Typical Vegetative Clearing Dimensions

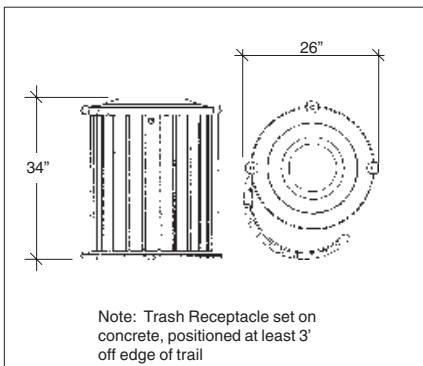
hiking trails require little or no vegetation removal, paved pathways may require more.

Single-tread, multi-use trails are the most common type of trail in the nation. These trails vary in width, can accommodate a wide variety of users, and are especially popular in suburban and urban areas. While the vegetative clearing needed for these trails varies with the width of the trail, the graphic outlines typical requirements.

Landscape Plantings

The amount of landscaping needed for trails will vary from project to project. While some projects will require little or no plantings, others may require it for vegetative screening, habitat restoration, erosion control or aesthetics.

Trees and shrubs are important to greenways and trails for both aesthetic and environmental reasons. Not only do they contribute to the appearance of a trail, their shade cools the environment for trail users and provides habitat for wildlife. When choosing trees and shrubs for use in greenway corridors, it is recommended that indigenous and well adapted species be used. This will reduce the need for chemical and water applications as a part of long term maintenance. Generally, most indigenous and ornamental trees are acceptable for planting near a trail. The use of certain trees that drop debris and have aggressive surface roots should be avoided in close proximity to the trail.

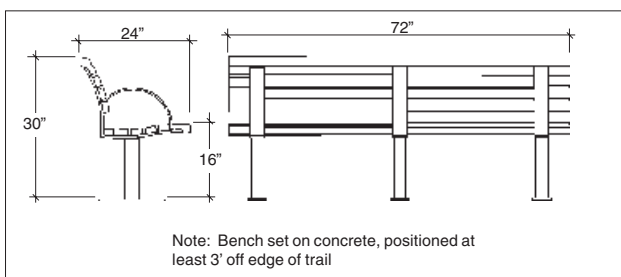


Typical Trail Trash Receptacles

Site Furnishings

Trash containers are recommended along most trails. They can be attractive as well as functional and should be selected based on the amount of trash expected, overall maintenance program of the trail, and types of users. Trash cans need to be accessible to both trail users and maintenance personnel. At a minimum, 22-gallon or 32 gallon containers should be located at each entranceway and at each bench seating area. They should be set back three feet from the edge of the trail.

The location of additional trash cans will depend upon the location of concessions, facilities adjacent to the trail and areas where trail users tend to congregate.



Typical Trail Bench

Benches along trails allow users to rest, congregate or contemplate. Trail benches should comfortably accommodate the average adult. They should be located at the primary and secondary entrances to the trail and at regular intervals, and should be set back three feet from the trail edge on a concrete pad.

The included graphics illustrate a bench and trash receptacle that are manufactured using recycled plastic lumber instead of conventional treated wood lumber. Prefabricated furnishings may also use painted or vinyl coated metal. These prefabricated units cost more initially but last longer and require little or no maintenance.

Drinking Fountains

Drinking fountains are important amenities for this trail system, given the hot summer seasons in Muskogee. Fountains are typically located at major trail heads and trail entrances, and at regular intervals (approximately 1-

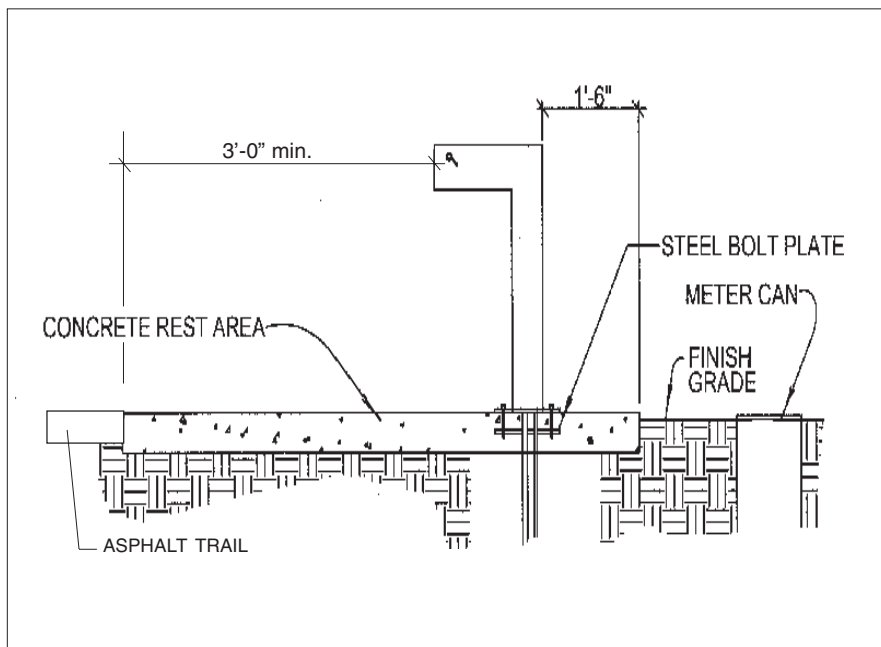
1.5 miles on heavily used trails, and 3-5 miles on more remote trails) along the trail.

Drinking fountains should be set back at least 3' from the trail edge, and should be wheelchair accessible. They should also be designed and installed to be freeze proof. Drinking fountains with water bottle fillers are also desirable.

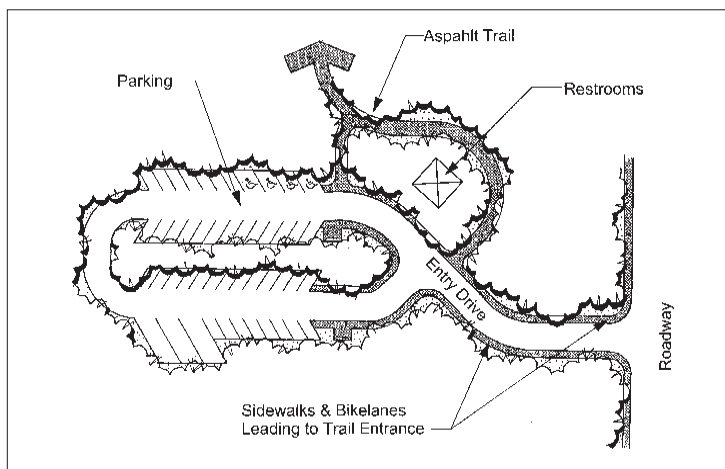
Trail Heads

Trail heads will be required throughout the trails system to provide easy access to the trails. Typically

trail heads fall into two categories: primary and secondary. Primary trail heads usually provide a wide range of amenities including: parking, restrooms, drinking fountains, picnic areas, benches, trash receptacles, lighting, all types of signage, and bike racks. Restroom buildings at primary trail heads can often serve a dual purpose and provide storage space for supplies and maintenance equipment needed to service the trail. Primary trail heads are typically found at key destination points or trail endpoints but can also be incorporated into existing municipal parks when trail routing is suitable. Along heavily used trails in densely populated areas, primary trail heads should be provided every five miles.



Typical Drinking Fountain



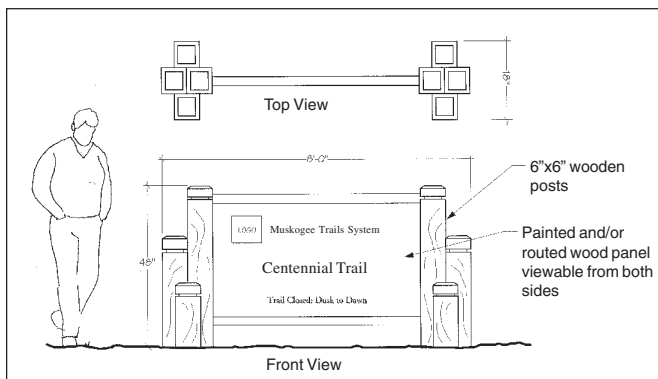
Typical Primary Trail Head Layout

Secondary trail heads are needed more frequently than primary trail heads, and do not provide as wide a variety of amenities. Typically, secondary trail heads are characterized as rest stops located between major destination points and can include such amenities as: signage, benches, trash receptacles, picnic tables, and sometimes parking. These trail heads are often placed at or near major roadway intersections, or periodically along longer trail segments. On more popular trails, secondary trail heads should be provided every 1-2 miles.

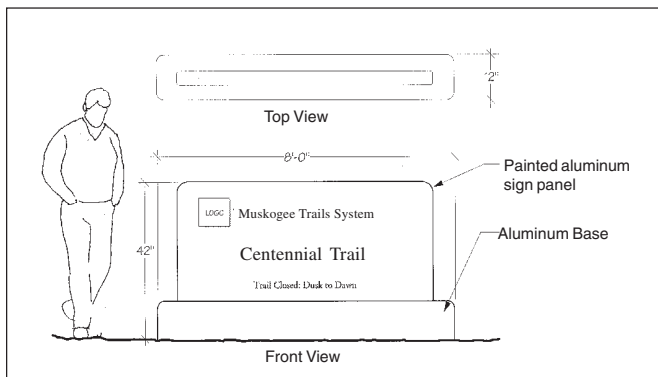
Signage

A comprehensive signage plan throughout the trail system will be needed to insure that information is provided to trail users regarding the safe and

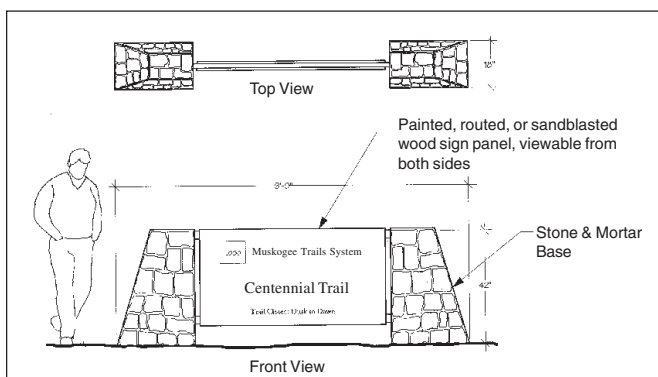
appropriate use of all facilities. Trail signage is typically divided into information signs, directional signs, regulatory signs, and warning signs. Trail signage should be developed to conform to the Manual on Uniform Traffic Control Devices (MUTCD) and the American Association of State Highway Transportation Officials (AASHTO) manual. Signage should be legible to all trail users including those with disabilities, i.e. braille text should be incorporated where appropriate, specifically on signage at trail heads and mile markers.



Entry Sign with Wood Post Base



Entry Sign with Aluminum Base

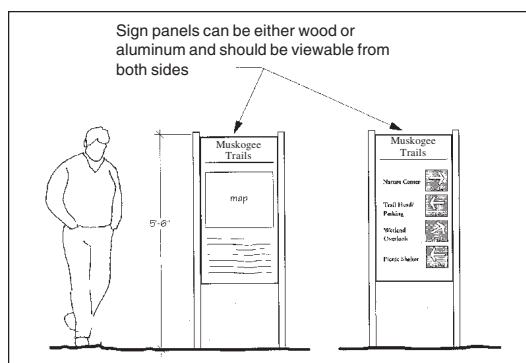


Entry Sign with Stone Masonry Base

Included in this section are graphics that illustrate some typical trail signage types. The different signage types can be constructed using one of several different base designs. Shown here are three different sign base types including: wood posts, stone, and aluminum. Each of these bases can be adapted for use with each sign type, including entry signs, information signs, directional signs, etc. This will allow different communities to choose different sign base types while the actual signage panels will remain uniform throughout the region.

Major Entry Signage

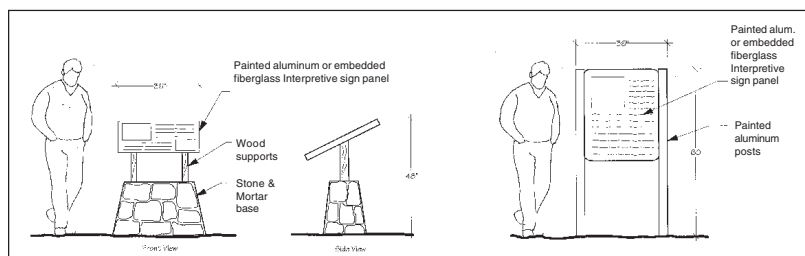
Major entry signage is typically placed at trail heads and trail/roadway intersections. These signs are typically the largest of all signage types, and designed to be seen from a vehicle as well as by trail users. These signs typically include the trail name and often include a map of the trail and the surrounding area.



Directional/Informational Signs on Metal Post Base

Directional/Informational Signage

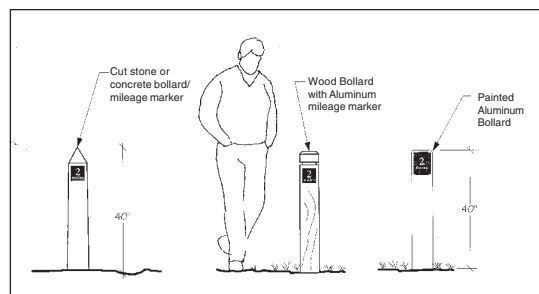
Directional and informational signage is typically found at trail heads, as well as trail/trail and trail/roadway intersections. This type of signage is typically built at a pedestrian scale and is no more than 40" high. The information often provided on these signs includes: maps, trail rules and regulations, trail etiquette, mileage to destinations, directions to destinations, and directions to amenities such as restrooms or water fountains. The included graphic shows a directional/informational sign mounted on metal posts. The same panel will also work well mounted on wood posts or a stone base.



Educational/Cultural Signs on Stone Masonry & Metal Post Bases

Educational/Cultural Signage

Educational or cultural signage is used when an element or feature with educational or cultural merit exists within or in close proximity to a trail corridor. These elements may include but are not limited to wetland or other environmental features, and historical structures or locations. These signs are designed to be viewed by pedestrians, can be mounted either vertically or angled, and may include photos, maps, and text information.



Bollard Style Mileage Markers

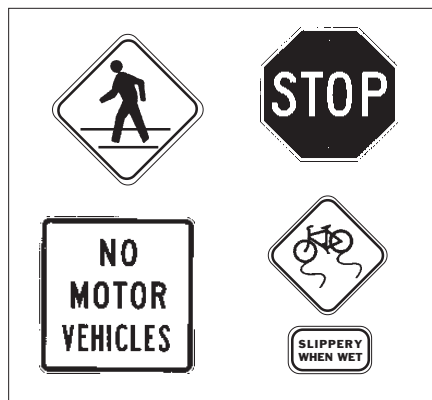
tion.

Distance Markers

Distance markers typically consist of a post or a pavement marking displaying the distance from the beginning of the trail to the mileage marker. These are usually placed in 1/2 mile and 1 kilometer increments to indicate to the trail user how far they have traveled. The standard for the Muskogee Trail System is 1/2 mile posts and kilometer pavement markings. The graphic to the left illustrates bollard style mileage markers using three different construction materials including concrete, wood, and metal.

Regulatory & Warning Signage

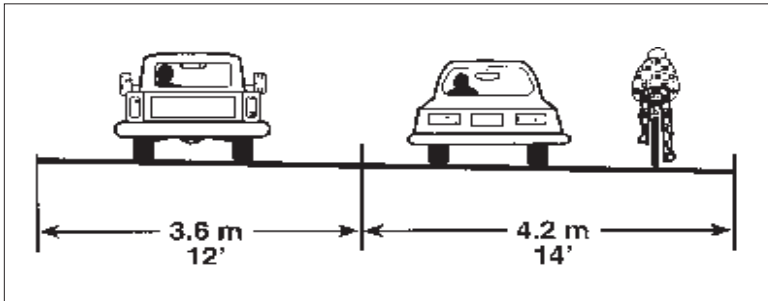
Regulatory and warning signs display rules, regulations and warnings regarding trail use and include standard signs such as stop, yield, sharp turn, etc. Like all trail signage, these signs should conform to the Manual on Uniform Traffic Control Devices (MUTCD). These signs are typically mounted on either wood or metal posts.



Regulatory and Warning Signs

On Street Linkages

In order for a trail system to function as a complete component of the overall transportation system, proper linkage with the roadway system is required. Since it is not possible to provide off-road trails to every destination in the community, on-road facilities must be used as linkages to “fill in the gaps”. The following guidelines offer ways to safely link the trail system with on road bicycle and pedestrian facilities.



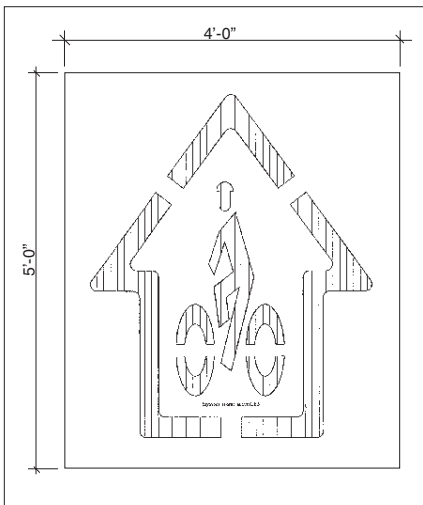
Wide Outside Curb Lane

Wide Curb Lanes

There are three types of on-road bicycle facilities: wide curb lanes, paved shoulders, and bike lanes. Wide curb lanes, or outside lanes, are wider than the standard 12' travel lane and can provide more space for cyclists and easier passing for motorists. Under most conditions, automobiles and bicycles can coexist in a 14' wide curb lane, without the need for the motorist to move into the next adjacent lane to pass a cyclist.

Location and Width

Wide curb lanes best accommodate advanced cyclists, as these riders are more comfortable operating directly in traffic. The wide curb lane is always the furthest right-hand lane, and should optimally be 14' - 16' wide, not including the gutter pan (curb lanes that are wider than 16' are not recommended). Wide curb lanes are not required to have curb and gutter.



Pavement Marking to be Used With Wide Outside Lanes



"Share The Road" Signage

In order to achieve the extra space needed for a 14' wide outside lane, the roadway may either be physically widened or restriped to reduce the lane width of inner lanes and increase the width of outer lanes. Re-striping proposals should be reviewed by a traffic engineer to ensure adequate safety for the motorists as well as bicyclists.

Signage

There is no special "wide curb lane" sign, however on high volume urban arterials, the designer may choose to install "Share the Road" warning signs (standard bicycle warning plate with a subplate stating SHARE THE ROAD).

Intersection Design

When wide curb lanes approach intersections with turning lanes, the 14' wide lane should continue through the intersection as the outside through-lane.

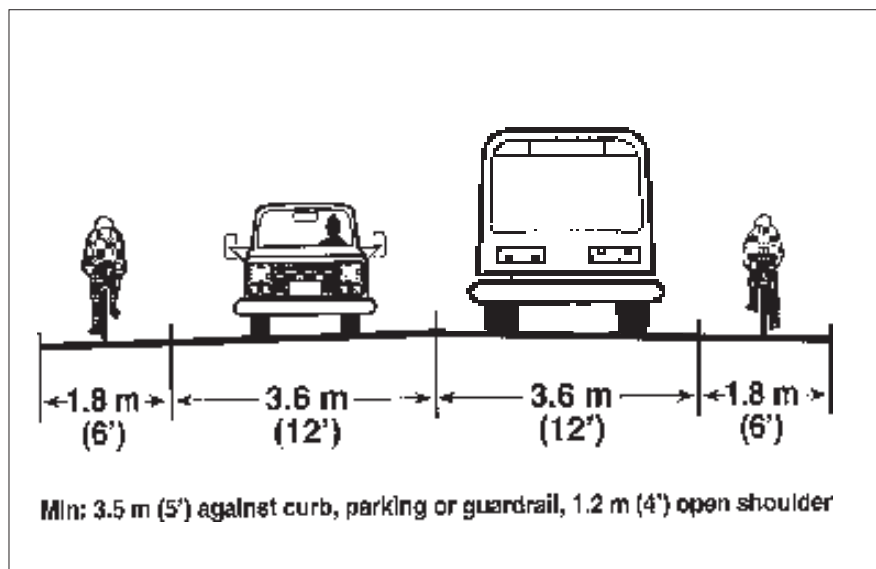
Design Issues

Acceptance: Bicycle programs in numerous communities have found that less experienced bicyclists seldom see a difference when wide curb lanes are provided. Therefore, if the desired outcome is greater numbers of bicyclists or a visible “Pro Bicycle” statement, this option will not satisfy the need.

Traffic speeds: Wider curb travel lanes may tend to increase motorist speeds. Whether a marginal increase in speeds is important in a particular situation should be a subject for analysis.

Paved Shoulders for Bicycle Use

Paved roadway shoulders are not only an excellent way to accommodate bicycles, they are also beneficial to the motoring public. Paved shoulders eliminate problems caused when the pavement edge begins to deteriorate, therefore extending the life of the road surface and requiring less maintenance. Paved shoulders also provide a breakdown area for motor vehicles.



Paved Shoulders

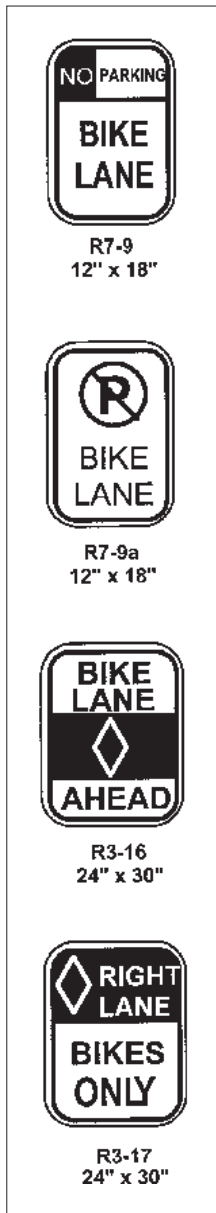
Location and Use

Paved shoulders for bicycles serve the needs of all types of cyclists in rural areas. In urban areas, paved shoulders may be preferable to riding in a traffic lane for advanced cyclists on arterial roadways with high speeds (over 45 mph). Paved shoulders in rural areas have the additional benefit of providing an area for pedestrian use where sidewalks are not present.

Width

Shoulders should be a minimum of 4' wide to accommodate cyclists, depending upon the speed and volume of motor vehicle traffic. Paved shoulders for bicycles can be designed according to typical roadway cross sections for bicycle lanes, with the exception of pavement decals or bicycle lane signage.

Although 4' of width is preferable, certainly any additional shoulder width is preferable to none at all. Shoulders that are 2'-3' wide can improve conditions and are recommended in cases where 4' widths cannot be achieved. However, shoulders less than 4' wide should not be designated as bicycle facilities. “Share the Road” signs would be acceptable in these locations, as they would serve to warn motorists of the likely presence of bicyclists.



Bike Lane Signage

As with bicycle lanes, paved shoulders should have the same pavement thickness and subbase as the adjacent roadway, and should be regularly swept and kept free of potholes.

Signage

Paved shoulders can include standard bicycle route warning signs, as shown on the previous page. As described above, these "Share the Road" signs may be installed on roads with paved shoulders that are less than 4' in width.

Bike Lanes

Bicycle lanes in Muskogee should conform to the standards in AASHTO's Guide for the Development of Bicycle Facilities (1991). Bicycle lanes are an on-road type of facility. They should not be separated from other motor vehicle lanes by curbs, parking lanes, or other obstructions. General standards for width, striping, and intersections are provided below.

Location and Use

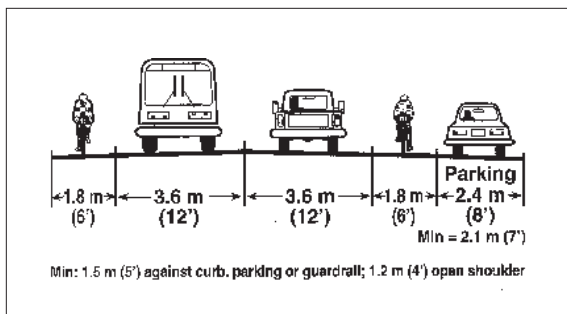
Bicycle lanes serve the needs of experienced and inexperienced bicyclists in urban and suburban areas, providing them with their own travel lane. Bicycle lanes are always located on both sides of the road (except when they are constructed on one-way streets). By this design, cyclists are encouraged to follow the rules of the road, which require them to travel in the same direction as adjacent motor vehicle traffic.

Width

The minimum width of bike lanes should be 4', exclusive of the gutter pan. On roads with parallel parking, bike lanes should be a minimum of 5' wide, and should be installed adjacent to the motor vehicle lanes, rather than between the parking lane and the curb. Along streets in Muskogee with higher motor vehicle speeds (45 mph or greater) and traffic volumes, 6' wide bike lanes are recommended.

Signage

The MUTCD specifies standard signage for bicycle lanes. According to section 9B-8, the R3-16 sign should be used in advance of the beginning of a designated bicycle lane to call attention to the lane and to the possible presence of bicyclists (see graphic this page). The MUTCD requires that the diamond lane symbol be used with both the R3-16 and R3-17 signs. According to Section 9B-11 of the MUTCD, the R7-9 or R7-9a signs can be used along streets where motorists are likely to park or frequently pull into the bike lane.



Bike Lanes

Striping

Bicycle lane stripes should be solid, 6" wide white lines. Care should be taken to use pavement striping that is skid resistant. Bicycle-shaped pavement symbols and directional arrows should be placed in the bicycle lane to clarify its use. Pavement letters that spell "ONLY BIKE" are also highly recommended. Symbols should be installed at regular intervals, immediately after intersections, and at areas where bicycle lanes begin.

Bike lane striping at intersections is challenging. Traffic has a tendency to mix at intersections: motorists who are turning right must cross paths with cyclists who wish to continue straight, and cyclists who wish to turn left must cross into left-hand turn lanes. Several intersection striping patterns are provided by AASHTO's [Guide for the Development of Bicycle Facilities \(1991\)](#) and the [MUTCD](#).

Bicycle Routes

A bicycle route is a "suggested way" for a cyclist to get from a point of origin to a destination. Bike routes do not necessarily require physical improvements in order to accommodate bicyclists, given that they meet minimum safety criteria in their present condition (see below). Bike routes can be preferable for bicycling for a number of reasons including directness, scenery, less congestion and lower speed limits.

Location and Use

Bicycle routes may be used by all types of cyclists. In urban areas they are most often designated on collector or residential streets with low traffic volumes, and are typically used to direct cyclists to a destination within the community, or to provide a through-route for bicyclists. In rural areas, bike routes are most often designated on roadways that are popular touring routes for recreational cyclists, or long-distance commuting routes for advanced cyclists.

Safety Criteria

A street does not necessarily have to be physically widened in order to be designated as a bicycle route. A road with standard 12' wide lanes (or less) can be designated as a bike route with the appropriate signage, given that each condition below is met:

- In its present state (or with planned improvements), the roadway sufficiently accommodates cyclists. The evaluation should take into account roadway width and traffic volumes. Candidate bike routes should have good sight distances and adequate pavement conditions. In addition, traffic should not regularly exceed posted speed limits.



Bike Route Signage

- All bicycle hazards have been removed from the roadway or otherwise remedied, including unsafe drainage grates and angled railroad crossings.
- The bicycle route is designated as one segment within an interconnected system of bicycle facilities.
- Traffic signals are either timed or are activated by bicycles.

Signage

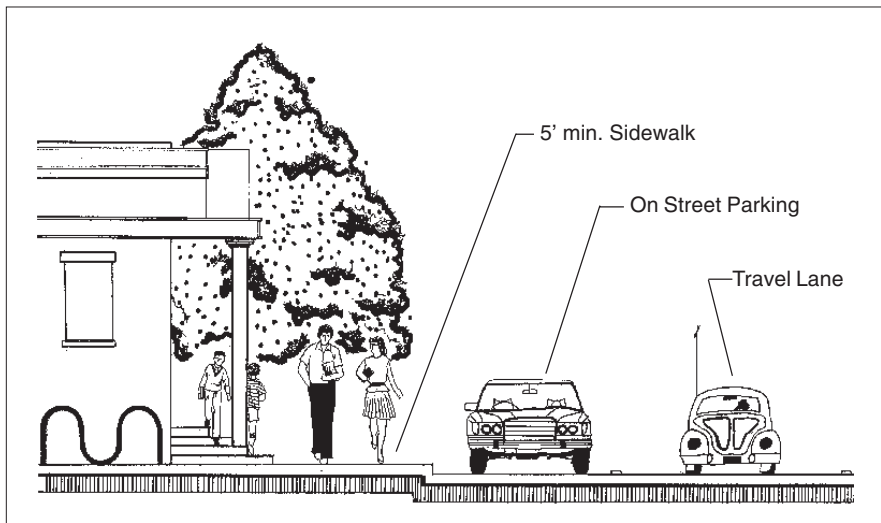
Bicycle route signage should be used according to the standards in the MUTCD, which provides several choices in styles. Bicycle route signs should be placed at all areas where new traffic enters the roadway. In urban areas, it is helpful to include directional arrows and captions that indicate nearby destinations, particularly at intersections.

Sidewalks

Sidewalks are a critical need in Muskogee. They not only encourage walking, but they also improve the safety of pedestrians. An individual's decision to walk is as much a factor of convenience as it is the perceived quality of the experience.

Therefore, pedestrian facilities should be designed with the following factors in mind:

- Sufficient width: Sidewalks should accommodate anticipated volumes based on adjacent land uses, and should at a minimum allow for two adults to walk abreast (5' min.).
- Protection from traffic: High volume and/or high speed (>35 mph) motor vehicle traffic creates dangerous and uncomfortable conditions for pedestrians. Physical (and perceptual) separation can be achieved through a combination of methods: a grassy planting strip with trees, a raised planter, bicycle lanes, on-street parallel parking, and others.



Typical Urban Sidewalk Cross Section

- Street trees: Street trees are an essential element in a high quality pedestrian environment. Not only do they provide shade, they also give a sense of enclosure to the sidewalk environment which enhances the pedestrian's sense of security.

- Pedestrian-scaled design: Large highway-scale signage and lighting reinforces the general notion that pedestrians are out of place. Signage should be designed to be seen by the pedestrian. Street lighting should likewise be scaled to the level of the pedestrian (14' tall), instead of providing light poles that are more appropriate on high-speed freeways.
- Continuity: Pedestrian facilities are often discontinuous, particularly when private developers are not encouraged to link on-site pedestrian facilities to adjacent developments and nearby sidewalks or street corners. New development should be designed to encourage pedestrian access from nearby streets. Existing gaps in the system should be placed on a prioritized list for new sidewalk construction.
- Clearances: Vertical clearance above sidewalks for landscaping, trees, signs and similar obstructions should be at least 8'. In commercial areas and the downtown, the vertical clearance for awnings should be 9'. The vertical clearance for building overhangs which cover the majority of the sidewalk should be 12'.
- Conformance with national standards: Sidewalk design should be consistent with Americans with Disabilities Act requirements and/or ANSI requirements. Specific guidance is provided by the Architectural and Transportation Barriers Compliance Board's American's with Disabilities Act Accessibility Guidelines.

Sidewalk Obstacles

Street furniture and utility poles create obstacles to pedestrian travel when located directly on the sidewalk. At a minimum there should be 5' of clear sidewalk width to allow wheelchairs to pass. Where possible, utilities should be relocated so as not to block the sidewalk. Benches should not be sited directly on the sidewalk, but set back at least 3'.

The design of new intersections or re-design of existing intersections presents an opportunity to improve pedestrian circulation. Street furniture located near intersections can block sight lines. In general, the designer should consider the impact on sight distance for all features located in the vicinity of roadway intersections.

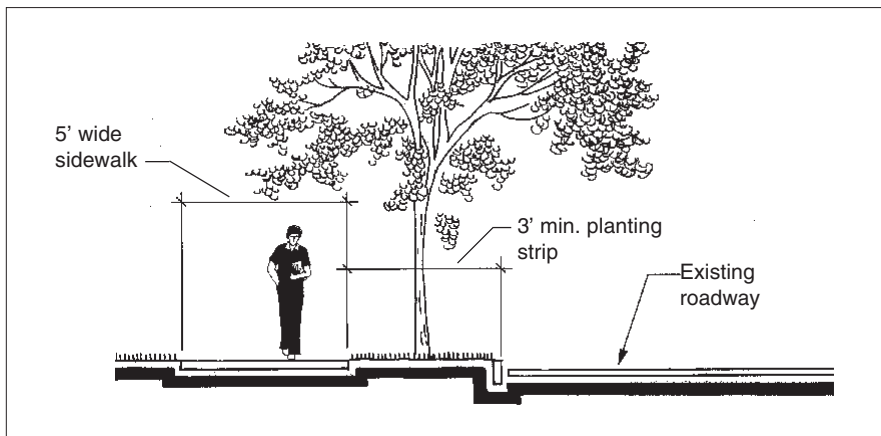
Sidewalk Pavement Design

Sidewalks and roadside pathways should be constructed of a solid, debris-free surface. Regardless of the type of surface chosen, it must be designed to withstand adequate load requirements. Standard depth of pavement should consider site specific soil conditions, and is therefore left to local discretion. Brick and concrete pavers are popular materials for more decorative sidewalks. The use of stylized surfaces is encouraged, however they must be installed properly or they will deteriorate over time.

Sidewalk Width and Setback Guidelines

It is important to note that there are some areas that warrant wider sidewalks than the minimum 5 feet. For example, sidewalks in and around local universities and colleges must accommodate a much higher volume of pedestrians, and therefore warrant additional width. The recommendations below are based upon standards used by pedestrian-friendly communities in the U.S.

By following the recommendations below, Muskogee can ensure that basic needs of pedestrians are addressed in developing areas. In existing residential and commercial areas that lack sidewalks, new sidewalk construction (independent of new development) should occur first in locations that demonstrate the highest need.



Typical Residential Area Sidewalk Cross Section

Sidewalks on local streets in residential areas: Five foot wide sidewalks are recommended on at least one side of the street, with a 3' wide planting strip. The planting strip may need to be slightly wider to accommodate the roots of street trees, if they are included in the design. Sidewalks are not necessary on cul-de-sacs that are less than 500' in total length.

Sidewalks on collector streets in residential and commercial areas: Five foot wide sidewalks are recommended on both sides of the street. Another option is to install a 6' wide sidewalk on just one side of the street (in this case, the sidewalk should be installed on the side that generates the most activity). A 5' wide planting strip is recommended.

Sidewalks on arterial streets in residential and commercial areas: Six foot wide sidewalks are recommended on both sides of the street, with 8' wide planting strips.

Sidewalks on streets within 2000' of schools: Width and setback should be based on the specific roadway type as described above. For all roadway types, however, sidewalks should be installed on both sides of the road, and should include well-marked crosswalks and school crossing signs.

Sidewalks on streets with no curb and gutter: The setback requirements in this section are based on roadway cross sections that include curb and gutter. Sidewalks located immediately adjacent to "ribbon pavement" (pavement with no curb and gutter) are not recommended. However, if no other solution is possible, sidewalks adjacent to ribbon pavement have a much greater setback requirement,

depending on roadway conditions. Engineers should consult the AASHTO Policy on Geometric Design of Highways and Streets for more specific guidelines.

Sidewalks in rural areas: In most rural areas, the low volume of pedestrians does not warrant sidewalk construction. In most cases, 4'-6' wide paved shoulders can provide an adequate area for pedestrians to walk on rural roadways, while also serving the needs of bicyclists. Exceptions should be made in areas where isolated developments such as schools, ballparks, or housing communities create more pedestrian use. For example, motorists might regularly park along a rural road to access a nearby ballpark. A sidewalk may be warranted in this circumstance so that pedestrians can walk separately from traffic. Sidewalks in rural areas should be provided at a width based on anticipated or real volume of pedestrians, with 5' being the minimum width.

Additional Guideline Sources

Facility design is a broad topic that covers many issues. This chapter provides guidelines for design development, and is not a substitute for standards. For more in-depth information and design development standards, the following publications should be consulted:

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 1991 by the American Association of State Highway Transportation Officials (AASHTO). Available from FHWA or AASHTO.

Manual on Uniform Traffic Control Devices (MUTCD). Published by the U. S. Department of Transportation, Washington, DC

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

Construction and Maintenance of Horse Trails. Published by Arkansas State Parks

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

In all cases, the recommended guidelines in this report meet or exceed national standards. Should these national standards be revised in the future and result in discrepancies with this chapter, the national standards should prevail for all design decisions.

Chapter 5



Trails Master Plan

Description of Proposed Trail System

Introduction

This chapter provides descriptions of the twenty-six specific trails and linkages identified as part of the Muskogee Trails Master Plan. These trails and linkages were selected based on their potential to accommodate bicycle and pedestrian facilities, as well as their location as part of the overall trail system. The proposed system which totals over 67 miles provides access to many of Muskogee's schools, parks, neighborhoods, retail, employment and recreation areas.

A goal established by the citizens at the initial public workshop was to provide a trail within 0.50 miles of the majority of homes in an effort to serve most of the residents within Muskogee. The Trail Coverage Plan (Map 5.2) shows a 0.50 mile buffer around each trail. Eighty-seven percent of the population within Muskogee will be served by a trail or linkage within 0.50 miles of their home.

Proposed Off-road Trails

Eighteen off-road trails have been identified as part of the Muskogee Trails Master Plan. Two of these trails are existing and two are funded for construction. Fourteen additional trails are proposed. These trails would be aligned along roadways with ample rights-of-way that would accommodate a bicycle/pedestrian trail, along the edges of creeks within the floodplain, or within existing utility or railroad rights-of-way. The trail corridors identified in this plan should be considered the spine of the trail system and should accommodate bicycles, in line skaters, and joggers, as well as pedestrians. Additional trails, such as nature trails or trails with alternative surfaces for horseback riding, jogging, or mountain biking, are considered secondary to the overall trail system and may be identified in the future. In addition, feeder trails providing connections to the main trail system or serving a particular destination such as a trail around a park or neighborhood would also be identified in the future. The destinations identified in the following descriptions are located within a quarter of a mile (1,320') of the trails. Trail corridors are not listed in priority order and are shown graphically on the Trail Route Plan (see Trail Route Plan Map 5.1).



Centennial Trail within Love Hatbox

1. Centennial Trail is an existing trail in west Muskogee that begins at the funded *Centennial Trail Phase 2 South* at the intersection of South 32nd Street and the Texas and Pacific Railroad. The trail extends west along the Texas and Pacific Railroad right of way, connects to *Border Trail* before curving northward towards the Missouri Pacific Railroad. There it extends northeast along the Missouri Pacific Railroad right of way connecting to *Centennial Trail Phase 2 North*, turns southeast following South 40th Street, Denver Street, and South 43rd Street, continues east where it connects to *Arline-Elgin Linkage* before turning south along South 32nd Street to its point of origin. Destinations served include American Legion, Eastern Workforce Investment, Human Services Department, Muskogee City Health Unit, and Veterans of Foreign Wars.

2. Civitan Park Trail is an existing trail in east Muskogee encircling Civitan Park connecting to *Gibson Street Linkage*. Destinations served include Civitan Park and School for the Blind.



Centennial Trail Phase 2 South at 24th Street

3. Centennial Trail Phase 2 South is a funded trail in central Muskogee extending from Centennial Trail at South 32nd Street, east along the Texas and Pacific Railroad right of way connecting to the Coody Creek East Trail, and eventually connecting to *Texas and Pacific North Trail* and *Arline-Elgin Linkage* at South Main Street. Destinations served include Maxey Park, Douglas Park, Gulick Park, Cherokee Elementary, Muskogee City Hall, Salvation Army, US Post Office, US Social Security Administration, and Volunteers of America-Muskogee.

4. Centennial Trail Phase 2 North is a proposed trail in north central Muskogee that begins at the *Centennial Trail* at South 40th Street, extends northeast intersecting *Broadway Linkage* and connecting to *Honor Heights Trail*, curves east at North 24th Street travelling briefly along a Missouri Pacific Railroad right of way, and finally curving back northeast to a point just south of the Shawnee Bypass where it connects to *MKT Railroad Trail* and *Texas and Pacific North Trail*. Destinations served include American Legion, Veterans of Foreign Wars, Day Treatment Facility, and Muskogee County Community.

5. Three Forks Port Trail is a funded trail in east Muskogee that begins near the city limit line where Grand River merges with the Arkansas River. The trail extends south for approximately 3 miles along the eastern bank of the Arkansas River.

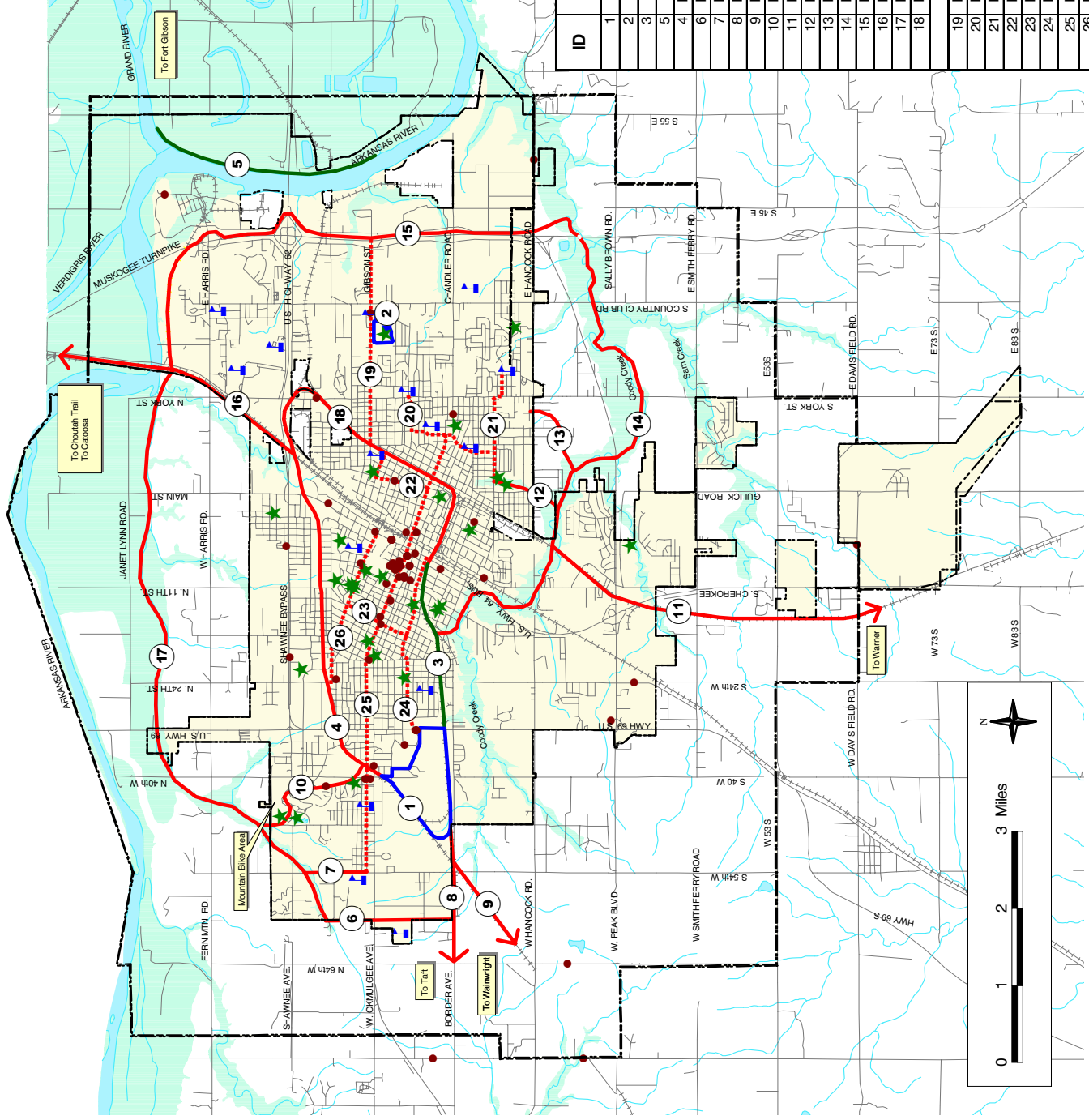
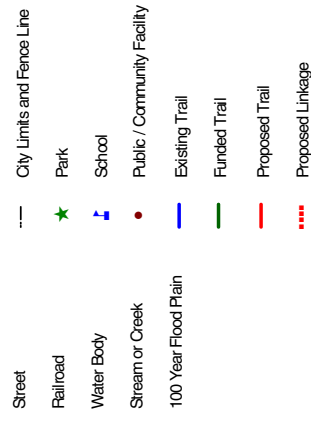


Centennial Trail Phase 2 North at 11th Street

6. West Trail is a proposed trail in west Muskogee that begins at the *North Trail* within the floodplain near Rolling Oaks Lane and extends south primarily along the city limit line to West Border Avenue where it connects to *Border Trail*. Destinations include Ben Franklin Science Academy.

Muskogee Trails Plan

prepared for
City of Muskogee, Oklahoma



ID	Status	Trail Name	Length (Miles)
1	Existing	Centennial Trail	3.42
2	Existing	Civitan Park Trail	1.16
3	Funded	Centennial Trail Ph 2 South	1.79
5	Funded	Three Forks Port Trail	2.84
4	Proposed	Centennial Trail Ph 2 North	3.77
6	Proposed	West Trail	1.59
7	Proposed	54th St. Trail	0.77
8	Proposed	Border Trail	1.38
9	Proposed	Missouri Pacific Trail	1.16
10	Proposed	Honor Heights Trail	1.72
11	Proposed	Texas Pacific South Trail	4.26
12	Proposed	Robinson-Sallie Trail	0.85
13	Proposed	Indiana Trail	0.92
14	Proposed	Coody Creek East Trail	6.48
15	Proposed	Tumpke Trail	6.59
16	Proposed	MKT Railroad Trail	3.13
17	Proposed	North Trail	7.08
18	Proposed	Texas and Pacific North Trail	3.83
Total Trail Length (Miles)			52.72
19	Proposed	Gibson St. Linkage	2.14
20	Proposed	Osage-Haskell Linkage	1.47
21	Proposed	Augusta Ave. Linkage	1.20
22	Proposed	East Side Blvd. Linkage	0.93
23	Proposed	12th St. Linkage	0.81
24	Proposed	Arlene-Egin Linkage	1.91
25	Proposed	Broadway St. Linkage	4.81
26	Proposed	Martin Luther King Linkage	1.71
Total Linkage Length (Miles)			14.97
Total System Length (Miles)			67.69

4/27/04

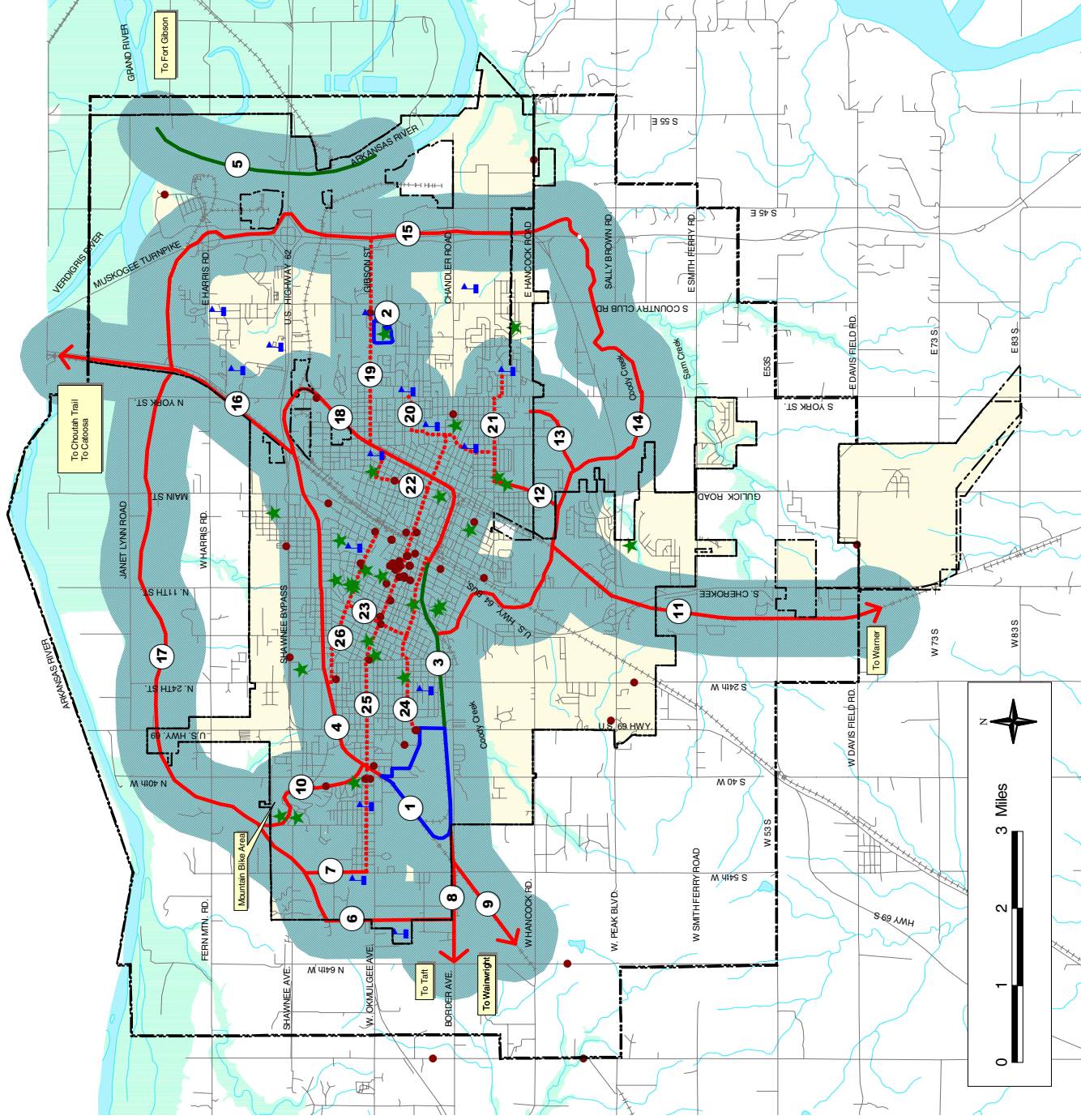


Map 5.1 - Trail Route Plan

Muskogee Trails Plan

prepared for
City of Muskogee, Oklahoma

4/27/04



Map 5.2 - Trail Coverage Plan



54th Street Trail Corridor

7. 54th St. Trail is a proposed trail in north Muskogee that begins at *North Trail* within the floodplain approximately 1/8 mile south of Shawnee Street and extends south along 54th Street to *Broadway Street Linkage*. Destinations include Pershing Elementary.

8. Border Trail is a proposed trail in west Muskogee that begins at *Centennial Trail* near the city limit line and extends west along West Border Avenue connecting to *West Trail* and continuing on to South 64th Street or beyond.

9. Missouri Pacific Trail is a proposed trail in west Muskogee that begins at *Border Trail* at the intersection of Missouri Pacific and Texas & Pacific Railroads. The trail extends southwest along the Missouri Pacific Railroad right of way to a point 1/4 mile east of South 64th Street and beyond.

10. Honor Heights Trail is a proposed trail in west Muskogee that begins at the *North Trail* within the floodplain, winds southeast past the mountain bike area and through the Honor Heights area, and ends at *Centennial Trail Phase 2 North* just north of West Broadway Street and east of North 40th Street. Destinations include Honor Heights Park, Kirschner Park, Palmer Park, American Legion, Veterans of Foreign Wars, and Five Civilized Tribes Museum.



Texas and Pacific South Trail Corridor

11. Texas and Pacific South Trail is a proposed trail in south Muskogee that begins at the *Coody Creek East Trail* where the Texas and Pacific Railroad intersects the Coody Creek floodplain, extends south along the Texas and Pacific Railroad right of way, and ends just south of the city limit line.

12. Robinson-Sallie Trail is a proposed trail in south central Muskogee beginning at *Coody Creek East Trail* within the floodplain west of Gulick Street, extending northeast along a floodplain, and connecting with Augusta Avenue Linkage. Destinations include Robinson Park and Sallie Park.

13. Indiana Trail is a proposed trail in south central Muskogee that begins at *Coody Creek East Trail* within the floodplain east of Gulick Street and extends northeast to Nebraska Avenue.

14. Coody Creek East Trail is a proposed trail in southeast Muskogee that begins at *Centennial Trail Phase 2 South*, follows the Coody Creek floodplain southeast while connecting to *Texas and Pacific South Trail*, *Robinson-Sallie Trail*, and *Indiana Trail*, and ends at *Turnpike Trail* approximately 1/2 mile south of East Hancock Road. Destinations include Muskogee County Rural Fire Department.



Coody Creek Bridge at Cherokee Street

15. Turnpike Trail is a proposed trail in east Muskogee that begins at *Coody Creek East Trail* approximately 1/2 mile south of East Hancock Road, extends north along the Muskogee Turnpike right of way connecting to *Gibson Street Linkage*, turns west along an unnamed railroad right of way north of East Harris Road, and connects to the *MKT Railroad Trail* and *North Trail* 1/4 mile east of North York Street.



Turnpike Trail Corridor

16. MKT Railroad Trail is a proposed trail in northeast Muskogee beginning at *Centennial Trail Phase 2 North* and *Texas & Pacific North Trail* just south of the Shawnee Bypass and extending northeast along the MKT Railroad right of way where it connects to *North Trail*, *Turnpike Trail* and beyond.

17. North Trail is a proposed trail in north Muskogee that begins at West Trail, extends east along a creek and the Arkansas River floodplains connecting to 54th Street Trail, Honor Heights Trail, and ends at MKT Railroad Trail and Turnpike Trail 1/4 mile east of North York Street.

18. Texas and Pacific North Trail is a proposed trail in central Muskogee that begins at Centennial Trail Phase 2 North and MKT Railroad Trail just south of the Shawnee Bypass, curves around to follow a general southwestern direction along the Texas and Pacific Railroad right of way connecting to Gibson Street Linkage and Eastside Boulevard Linkage, intersects Broadway Street Linkage, and ends at Centennial Trail Phase 2 South and Arline-Elgin Linkage at South Main Street. Destinations include Spaulding Park, Irving Elementary, Muskogee City Hall, Salvation Army, US Social Security Administration, and the US Army Reserve Training Center.



MKT Railroad Trail Corridor

Proposed On-road Linkages

Eight on-road bike linkages have been identified. These corridors have the potential to be converted to accommodate on-road bike facilities. The corridors also contain room within the rights-of-way for the addition or improvement of sidewalks. The access to important destinations that these links provide will help tie the Muskogee Trails Master Plan together into a complete system. The destinations identified in the following descriptions are located within a quarter of a mile (1,320') of the linkages.

19. Gibson Street Linkage is a proposed linkage in west Muskogee that begins at *Texas and Pacific North Trail* near the intersection of Summit Street and Gibson Street and extends east along Gibson Street to *Turnpike Trail* at the Muskogee Turnpike. Destinations include Civitan Park, Irving Elementary, and School for the Blind.



Texas and Pacific North Trail Corridor

20. Osage-Haskell Linkage is a proposed linkage in central Muskogee that connects to the *Augusta Avenue Linkage* at the intersection of Osage Street and East Augusta Avenue and extends in a general northeasterly direction along Osage Street, South "R" Street, Chandler Road, North "S" Street, Chestnut Street, and Haskell Boulevard to North York Street connecting to *Broadway Street Linkage* along the way. Destinations include Deleware Park, 7th and 8th Grade Center, Whittier Elementary, and Tony Goetz Elementary.

21. Augusta Ave. Linkage is a proposed linkage in central Muskogee beginning at *Robinson-Sallie Trail* near Sycamore Street and East Augusta



Arline-Elgin Linkage Corridor at 24th Street

Avenue, extending east along Augusta Avenue where it connects to *Osage-Haskell Linkage*, and continuing along South York Street, and Hilltop Avenue to Bacone Street. Destinations include Robinson Park, Sallie Park, and Grant Foreman Elementary.

22. East Side Blvd. Linkage is a proposed linkage in central Muskogee connecting to *Broadway Street Linkage* and extending north and east along East Side Boulevard to *Texas and Pacific North Trail*. Destinations include Spaulding Park, King Park, Irving Elementary, and Marc Inc.

23. 12th St. Linkage is a proposed linkage in central Muskogee that begins at the *Arline-Elgin Linkage* and extends northeast along 12th Street intersecting *Broadway Street Linkage* and connecting to *Martin Luther King Linkage*. Destinations include Cook Park, Federal Bureau of Investigation, US Attorney, and the US Justice Department.

24. Arline-Elgin Linkage is a proposed linkage in central Muskogee that begins at Arline Street and South 32nd Street connecting to *Centennial Trail*, extends east along Arline Street, South 15th Street and Elgin Street connecting to *12th Street Linkage* and ending at *Centennial Trail Phase 2 South* and *Texas and Pacific North Trail* near South Main Street. Destinations include Gulick Park, Rotary Park, Cherokee Elementary, Eastern Workforce Investment, Muskogee City Hall, Salvation Army, US Cooperative Extension Service, US General Service Administration, US Marshal Department, US Post Office, US Social Security Administration, Volunteers Of America-Muskogee.



Broadway Street Linkage Corridor at Okmulgee

25. Broadway St. Linkage is a proposed linkage across central Muskogee that begins at *54th Street Trail* and extends east and southeast along Broadway Street intersecting *Centennial Trail Phase 2 North* and *12th Street Linkage*, connecting to *East Side Boulevard Linkage*, intersecting *Texas and Pacific North Trail*, and ending at *Osage-Haskell Linkage* at North "S" Street. Destinations include Beckman Park, Delaware Park, Elks Park, Junction Park, Spaulding Park, Palmer Park, 7th and 8th Grade Center, Pershing Elementary, Muskogee Alternative Program, American Legion, County Treasurer, C.R.C.S. Intake Office, Federal Bureau of Investigation, Marine Corp Recruiting Station, Muskogee City Hall, Muskogee County Purchasing Department, Muskogee County Assessor, Muskogee County Clerk, Muskogee County District Attorney, Muskogee County Drug Task Force, Muskogee County Election Board, Muskogee County Emergency Management, Muskogee County EMS, Muskogee County Sheriff, Muskogee Habitat For Humanity, Muskogee Public Library, Swap Inc., Tag Agent, United Way, US Air Force, US Army Recruiting, US Attorney, US Cooperative Extension Service, US General Service Administration, US Interior Department, US Justice Department, US Marshal Department, US Post Office, US Social Security Administration, Veterans Of Foreign Wars, Volunteers Of America-Muskogee, and the YMCA.

26. Martin Luther King Linkage is a proposed linkage in central Muskogee beginning at *Centennial Trail Phase 2 North* at North 24th Street and extending southeast along Martin Luther King Street to North Main Street connecting to *12th Street Linkage* along the way. Destinations include Cook Park, English Park, Fink Park, Jackson Park, Sadler Elementary, American Red Cross, Green Country Behavioral Health, Marine Corp Recruiting Station, US Air Force, US Army Recruiting, and Women In Safe Home.

Chapter 6



Trails Master Plan

Funding Sources

Introduction

The most successful method of funding trails is to combine private sector funds with funds from local, state and federal sources. Many communities involved with trail implementation will seek to leverage local money with outside funding sources to increase resources available for trail acquisition and development. To implement trails in Muskogee, local advocates and government staff should pursue a variety of funding sources. Funding for specific trails may involve a variety of sources. Local governments and project sponsors should review available sources to determine the best funding for specific projects based on funding availability, application deadlines, and probability of success. The funding sources listed in this chapter represent some of the trail funding opportunities that have typically been pursued by other communities.

Federal Public Funding Sources

Several federal programs offer financial aid for projects that aim to improve community infrastructure, transportation, housing, and recreation programs. Some of the federal programs that can be used to fund trails in Muskogee include:

Transportation Equity Act for the 21st Century (TEA21)

The primary source of federal funding for trails is through the Transportation Equity Act of 1998 (TEA21), formerly the Intermodal Surface Transportation Efficiency Act (ISTEA). ISTEA provided millions of dollars in funding for bicycle and pedestrian transportation projects across the country and will provide millions more as TEA21.

There are many sections of TEA21 that support the development of bicycle and pedestrian transportation corridors. The Oklahoma Department of Transportation (ODOT) can utilize funding from many of these subsets of TEA21. Those sections that apply to the creation of trails and greenways include:

Surface Transportation Program (STP) funds

These funds can be used for bicycle and pedestrian facility construction or non-construction projects such as brochures, public service announcements,

and route maps. The projects must be related to bicycle and pedestrian transportation and must be part of the Long Range Transportation Plan.

Two primary subsets of these funds are Statewide STP funds and the Urbanized Area STP funds. ODOT is responsible for programming the Statewide STP funds which total approximately \$70 million a year. ODOT programs most of these funds for the state highway system. Additionally, TEA21 expanded the use of STP Safety set-aside funds to include bicycle improvements. Hazard Elimination (part of this set-aside) funds can also now be used for pedestrian and bicyclist public pathways and trails and facilities.

National Highway System (NHS)

A state may spend NHS funds on “construction of bicycle transportation facilities on land adjacent to any highway on the National Highway System (other than the Interstate System)”. Oklahoma receives approximately \$65-\$70 million per year for the NHS program. Two types of projects are covered by this source. First, trail facilities can be constructed as an incidental part of a larger NHS project, such as the trail facilities built along I-70 in Colorado. These facilities are constructed at the same time as the larger project. Second, facilities that are constructed adjacent to an NHS route, but are built as an independent project, are also eligible.

Transportation Enhancements Program

Ten percent of Oklahoma’s annual STP funds (approximately \$10-\$12 million per year) are available for Transportation Enhancements, which include projects such as trails, greenways, sidewalks, signage, bikeways, safety education and wildlife undercrossings. A portion of these funds are available to all cities and counties in the State of Oklahoma. There are several key requirements that projects must meet in order to receive these funds:

1. Be related to the Intermodal Transportation System. The required relationship must be one of “function, proximity, or impact”.
2. Meet at least one of the eleven enhancement categories.
3. Involve activities that are over and above normal transportation activities.
4. Be open for public access in perpetuity (project must be owned by the sponsor or involve a permanent easement.)
5. Include a local match of at least 20% of the total project cost.
6. Be submitted by a local or tribal government or public agency.

Application deadlines are set periodically by ODOT. ODOT now mandates 2 phases for application. Phase I, termed the Pre-Application Submission, or

PAS, consists of a preliminary review of all proposals to provide applicants with a technical and eligibility review of the proposed projects.

The Special Projects Branch will accept applications for the PAS review beginning May 15, 2004, and continuing through October 1, 2004. Phase II is the Final Application Submission (FAS). Applications that receive a PAS approval must be submitted no later than January 3, 2005. Contact ODOT's Special Projects Branch at (405) 521-2454 for more information.

National Recreational Trails Fund Act (NRTFA)

A component of ISTEA and TEA21, the NRTFA is a funding source to assist with the development of non-motorized and motorized trails. The Act uses funds paid into the Highway Trust Fund from fees on non-highway recreation fuel used by off-road vehicles and camping equipment. This money can be spent on the acquisition of easements and fee simple title to property, trail development, construction and maintenance.

Through state agencies, "Symms Act" grants are available to private and public sector organizations. NRTFA projects are 80 percent federally funded, and grant recipients must provide a 20 percent match. Federal agency project sponsors or other federal programs may provide additional federal share up to 95 percent. Local matches can be in the form of donations of services, materials or land. Projects funded must be consistent with the Statewide Comprehensive Outdoor Recreation Plan. (See Oklahoma Recreational Trails Fund Program under "state funding sources" later in the chapter.)

Congestion Mitigation and Air Quality Improvement Program (CMAQ)

The CMAQ program was created to reduce traffic congestion and improve air quality. Funds are available to communities designated as "non-attainment" areas for air quality, meaning the air is more polluted than federal standards allow. Funds are also available to "maintenance" areas, former non-attainment areas that are now in compliance. Funds are distributed to states based on population and the severity of air quality problems. A 20 percent local match is required. ODOT currently receives \$6-\$7 million per year of CMAQ funds from the Federal Highway Administration.

Community Development Block Grant Program

The U.S. Department of Housing and Urban Development (HUD) offers financial grants to communities for neighborhood revitalization, economic development, and improvements to community facilities and services, especially in low and moderate-income areas. Approximately \$20 million per year is appropriated to the Oklahoma Dept. of Commerce for which other cities and counties compete for funding.

Land and Water Conservation Fund (LWCF) Grants

This federal funding source was established in 1965 to provide park and recreation opportunities to residents throughout the United States. Money for the fund comes from the sale or lease of nonrenewable resources, primarily federal offshore oil and gas leases and surplus federal land sales. LWCF funds are used by federal agencies to acquire additions to National Parks, Forests, and Wildlife Refuges. In the past, Congress has also appropriated LWCF moneys for so-called “state-side” projects. These “state-side” LWCF grants can be used by communities to acquire and build a variety of park and recreation facilities, including trails and greenways.

“State-side” LWCF funds are annually distributed by the National Park Service through the Oklahoma State Tourism and Recreation Department. Communities must match LWCF grants with 50 percent of the local project costs through in-kind services or cash. All projects funded by LWCF grants must be used exclusively for recreation purposes, in perpetuity. Funding for this program has not been available for several years, although funds could be allocated in the future.

**Watershed Protection and Flood Prevention
(Small Watersheds) Grants**

The USDA Natural Resource Conservation Service (NRCS) provides funding to state and local agencies or nonprofit organizations authorized to carry out, maintain and operate watershed improvements involving less than 250,000 acres. The NRCS provides financial and technical assistance to eligible projects to improve watershed protection, flood prevention, sedimentation control, public water-based fish and wildlife enhancements, and recreation planning. The NRCS requires a 50 percent local match for public recreation, and fish and wildlife projects. For more information, contact Gary Bishop at (918) 744-0283.

Urban and Community Forestry Assistance Program

The USDA provides small grants of up to \$10,000 to communities for the purchase of trees to plant along city streets and for trails and parks. To qualify for this program, a community must pledge to develop a street tree inventory; a municipal tree ordinance; a tree commission, committee or department; and an urban forestry-management plan. Contact Mark Bayes at (405) 521-3864 for more information.

**State Public Funding
Sources**

The State of Oklahoma has two primary sources of trail funding. Both the TEA21 and Recreational Trails Fund Program are funded through federal initiatives, but distributed by the State of Oklahoma.

Oklahoma Department of Transportation

See TEA21 text above.

Oklahoma Recreational Trails Fund Program

The Oklahoma Recreational Trails Fund Program was created to expand moneys funded by the National Recreational Trails Fund Act (NRTFA). This act was part of TEA21 (see above text).

The NRTFA is a state administered federal aid program managed through the Federal Highway Administration in consultation with the Department of the Interior. Half of the funds available to states are allocated equally among eligible states. The other half of the funds are allocated in proportion to the amount of non-highway recreational fuel use in each eligible state. The state can grant these funds (approximately \$500,000 per year) to both private and public sector organizations. In Oklahoma, NRTFA projects are 80 percent federally funded, and grant recipients must provide a 20 percent match. Projects funded must be consistent with the Statewide Comprehensive Outdoor Recreation Plan (SCORP). Interested parties should contact Susan Henry with the Oklahoma State Tourism and Recreation Department at (405) 521-2904.

Oil Revenues

In the past, oil royalties and the stripper well oil overcharge refund have been used for development of the Avery Drive bike lanes in the Tulsa Metro Area. This could be another valuable source of funding for trails, although funding is limited. It is administered through the Oklahoma Department of Commerce.

Local Sources of Public Funding

Many local governments have obtained funding for trail projects through local initiatives. Public support for projects is essential to the success of local public funding sources. Therefore, information on the benefits of a proposed trail system should be distributed prior to implementing such initiatives.

Local Sales Taxes

In the past, local sales taxes have been a successful means of raising funds for a variety of capital improvement projects in cities across the state. In the City of Tulsa, every five years, voters decide whether to renew the 3rd penny sales tax which generates more than \$60 million per year. In 1996, Tulsa voters approved the most recent sales tax extension, which included \$2.4 million for trail development to the year 2001. Other cities in the Oklahoma have implemented similar programs.

Impact Fees

Impact fees are monetary one-time charges levied by a local government on new development. Unlike required dedications, impact fees can be applied to finance greenway facilities located outside the boundary of development. The purpose of impact fees is not to raise general revenue, but to ensure that adequate capital facilities will be provided to serve and protect the public. They can be levied through the subdivision or building permit process. Impact fees are used sparingly in the Oklahoma at present.

Bond Referendums

The City of Tulsa and other communities have successfully placed propositions on local ballots to support trail development. In 1989, \$600,000 of G. O. bond funds were issued and used as a match for ISTEA funds. This resulted in more than \$2.5 million for the design and construction of trails in Tulsa. The Charlotte-Mecklenburg County, NC, area passed four consecutive referendums that generated more than \$3 million for greenways. Guilford County, NC also passed a referendum that appropriated \$1.6 million for development of the Bicentennial Trail. Since bond funding relies on the support of the voting population, an aggressive education and awareness program will need to be implemented prior to any referendum vote.

Local Capital Improvements Program

Some local governments have initiated a yearly appropriation for greenway and trail development in the capital improvements program. In Raleigh, NC, greenways continue to be built and maintained, year after year, due to a dedicated source of annual funding, that has ranged from \$100,000 to \$500,000, administered through the Parks and Recreation Department.

Local Private Funding Sources

Many communities have solicited trail funding from a variety of private sources, including corporations and other conservation-minded benefactors. As a general rule, local businesses and individuals will have a greater interest in and will be more likely to fund local projects. These local sources should be approached first, before seeking funds outside the community.

Local Businesses

Local industries and private businesses may agree to provide support for development of trails in Muskogee through:

- donations of cash for a specific trail segment or trail head facility;
- donations of services by corporations to reduce the cost of trail implementation, including equipment and labor to construct and install elements of a trail;

- reductions in the cost of materials purchased from local businesses which support trail implementation and can supply essential products for facility development.

This method of raising funds requires a great deal of staff coordination. One example of a successful endeavor of this type is the Swift Creek Recycled Greenway in Cary, NC. A total of \$40,000 in donated construction materials and labor made this trail an award-winning demonstration project. (Some materials used in the “recycled trail” were considered waste materials by local industries!)

Trail Sponsors

A sponsorship program for trail amenities allows for smaller donations to be received both from individuals and businesses. The program must be well planned and organized, with design standards and associated costs established for each amenity. Project elements which may be funded can include wayside exhibits, benches, trash receptacles, entry signage, and picnic areas. Usually, plaques recognizing the individual contributors are placed on the constructed amenities or at a prominent entry point to the trail.

Volunteer Work

Community volunteers may help with trail construction, as well as fund raising. Potential sources of volunteer labor in Muskogee could include high school or college students, user groups (running, walking and cycling clubs), local historical groups, neighborhood associations, local churches, conservation groups, school groups, local civic clubs such as Kiwanis, Rotary and Lions Clubs, and United Way Day of Caring.

A good example of a volunteer greenway program is Cheyenne, Wyoming, which generated an impressive amount of community support and volunteer work. The program has the unusual problem of having to insist that volunteers wait to begin landscaping trails until construction is completed. A manual for greenway volunteers was developed in 1994 to guide and regulate volunteer work. The manual includes a description of appropriate volunteer efforts, request forms, waiver and release forms, and a completion form (volunteers are asked to summarize their accomplishments). Written guidelines are also provided for volunteer work in 100-year floodplains.

To better organize volunteer activity, Cheyenne developed an “Adopt-a-Spot” program. Participants who adopt a segment of trail are responsible for periodic trash pick-up, but can also install landscaping, prune trail-side vegetation, develop wildlife enhancement projects, and install site amenities. All improvements must be consistent with the Greenway Development Plan and must be approved by the local Greenway Coordinator. Adopt-a-Spot volunteers are allowed to display their names on a small sign along the adopted section of trail.

“Buy-a-Foot” Programs

“Buy-a-Foot” programs have been successful in raising funds and awareness for trail projects across the country. Under local initiatives, citizens are encouraged to purchase one linear foot of the trail by donating the cost of construction. An excellent example of a successful endeavor is the High Point Greenway “Buy-a-Foot” campaign, in which linear greenway “feet” were sold at a cost of \$25 per foot. Those who donated were given a greenway T-shirt and a certificate. This project provided an estimated \$5,000 in funds.

Local Foundations

Communities can leverage public and other private dollars with grants from local foundations. The following is a listing of foundations located in the Muskogee area and/or Oklahoma which have the potential to fund trail projects.

Kerr Foundation

The Kerr Foundation is a private foundation that funds programs, organizations and institutions which provide new or enhanced opportunity to all Oklahoma residents, particularly the young, in the areas of education, health, cultural development and community service. Preference is given to organizations and institutions that have a beneficial impact on the economic, social and cultural growth and development of Oklahoma. One-year grants of up to \$3,500 and two to three-year grants of up to \$7,500 are awarded. Normally, the organization or institution approved for a grant must raise or secure 100% matching funds within one year of the approval date. Applications are accepted year-round. For more information, contact Alan Ware, Director of the Kerr Center, at (918) 647-9123.

Sarkeys Foundation

The Sarkeys Foundation is a private, charitable foundation that provides support to non-profit organizations and institutions in the State of Oklahoma. During 1995, the Foundation awarded \$500,000 to projects and programs related to conservation and the environment. Grant proposals are considered at the April and October meetings of the Board of Trustees. For more information, contact Lori Atkinson at (405) 364-3703.

Samuel Roberts Noble Foundation, Inc.

This Foundation is based in Ardmore, Oklahoma, and is rated as one of the largest private, charitable foundations in the country. Although the Foundation’s main focus is on research, grants are made when additional funds are available. Grant proposals from tax-exempt organizations in the state of Oklahoma are accepted. In the past, funds have been awarded in the areas of quality of life, community affairs and public affairs. For more information, contact Donna Windel, Grants Manager, at (580) 223-5810.

The Tree Bank Foundation of Oklahoma

This Foundation is dedicated to improving the quality of life in Oklahoma through tree planting and proper maintenance. The foundation facilitates the planting of trees on the grounds of non-profit groups and on public land by providing large trees (five to ten feet tall) at low cost. To date, more than 40,000 trees have been distributed to cities and towns across Oklahoma through the Foundation. For more information, contact the Tree Bank Foundation at 5005 N. Penn, Suite 301, Oklahoma City, OK, 73112, or call (405) 842-3320.

Zink Foundation

This foundation awards grants to nonprofit organizations located primarily in the Tulsa area. Grants range from \$50,000 to \$100,000 in the areas of arts, education and community services. No formal application form is required. Requests should be made in written or verbal form. Contact Jacqueline Zink at (918) 749-1261 for more information.

The Oxley Foundation

The Oxley Foundation grants range to \$250,000 to pre-selected charitable organizations primarily within the Tulsa area and Oklahoma, but also gives out of state. Emphasis of grants is education, community service and religious support. Contact John Oxley at (918) 584-1978.

Bank of Oklahoma Foundation

This foundation supports 501(c)(3) organizations, with an emphasis on health and human services, education, culture and the arts, and civic and community needs. No specific application form is required, however, written requests are necessary. The deadline for requests is September. Contact Becky Frank for more information at (918) 588-6831.

National Foundations

In addition to local foundations, national foundations can also be approached for trail funding assistance. Three of these are listed below.

American Greenways DuPont Awards

The Conservation Fund's American Greenways Program has teamed with the DuPont Corporation and the National Geographic Society to award small grants (\$250 to \$2,000) to stimulate the planning, design and development of greenways. These grants can be used for activities such as mapping, conducting ecological assessments, surveying land, holding conferences, developing brochures, producing interpretive displays, incorporating land trusts, building trails, and other creative projects. Grants cannot be used for academic research, institutional support, lobbying or political activities. For more information, contact the Conservation Fund at (703) 525-6300.

REI Environmental Grants

REI (Recreational Equipment Incorporated) awards grants to organizations in protecting and enhancing natural resources for outdoor recreation. Grants of up to \$2,000 are available through this program and can be used for:

1. Preservation of wildlands and open space;
2. Advocacy-oriented education for the general public on conservation issues;
3. Building the membership base of a conservation organization;
4. Direct citizen action (lobbying) campaigns for public land and water recreation issues; and
5. Projects that serve to organize a trails constituency or enhance the effectiveness of a trail organization's work as an advocate.

Grants cannot be used for trail construction and maintenance. For more information, call REI's Grantline at (253) 395-7100.

Trust for Public Land

The Trust for Public Land is a nonprofit organization that works nationwide to conserve land for people. Founded in 1972, TPL specializes in conservation real estate, applying its expertise in negotiations, finance, and law to protect land for public use. Usually TPL steps in to negotiate the purchase of real estate and holds the land until a public agency can acquire it. Working this way, TPL has helped to protect more than 1,400 special places nationwide for parks, greenways, recreation areas, historic landmarks, forests, watersheds, and wilderness. TPL recently turned over all Oklahoma projects to Land Legacy (see below). Contact the TPL National Office at (415) 495-4014 for more information.

Land Legacy

Formerly the Trust for Public Land's Oklahoma State Office, Land Legacy was established in December of 2002 in partnership with the Kerr Center for Sustainable Agriculture. Located in Tulsa, Oklahoma, Land Legacy serves the South-central United States to preserve natural resources that enhance the quality of life in both urban and rural communities. They work with landowners, public agencies, and other conservation organizations to establish conservation goals and develop plans to reach them.

Land Legacy preserves natural resources and open space by acquiring, through purchase or donation, important properties that are at risk of being forever lost. Their urban work includes parks, trails, and greenbelts. In rural communities, they preserve working agricultural lands and other natural resources that add to quality of life and local economies. Contact Robert Gregory, Executive Director at (918) 587-2190.

Chapter 7



Trails Master Plan

Implementation Plan

Overview

The Muskogee Trails System offers tremendous potential to improve the quality of life for community residents. The trails system will improve access to outdoor resources, link people to their favorite destinations, stimulate economic growth, expand opportunities for education, and shape community growth into the 21st Century. All of this is possible as the trail system is successfully developed during the coming years. The key to this success is implementation. This chapter describes a strategic plan for building, managing, and operating the Muskogee Trails System.

Building the Muskogee Trails System

Preparation of this Master Plan is only the initial step in the future development of the Muskogee Trails System. More detailed design work is required before actual trail tread is constructed and residents are able to use the trail corridors. Therefore, the continued involvement of citizens, businesses, and neighborhoods is vital to the ongoing development of a successful design. This section of the chapter and Chapter 4, Design Guidelines are intended to provide a step-by-step process for building segments of the Muskogee Trails System.

Each trail corridor and/or segments of each corridor will require a more detailed site design to determine the appropriate alignment of the actual trail tread. Additionally, the location of trail amenities, such as trail furniture, landscaping, drinking fountains, parking, and lighting need to be defined and located throughout the corridor.

This Master Plan proposes the development of an interconnected system of asphalt/concrete paved trails and on-street linkages within each of the 26 corridors defined in Chapter 5, Description of Trail System. Detailed site plans and design development documents should be prepared for all trail segments. Staff resources and/or professional design consultants with previous experience in trail/on-street bike route design and construction should be employed to prepare the necessary detailed design documents for each of the corridors.

Phasing Strategy for the Muskogee Trails System

With limited trail resources and over 67 miles of proposed multiuse trails and on-street linkages, it is important to determine a logical order for the implementation of the trails and linkages. In an effort to evaluate each corridor objectively, criteria were developed to assist in determining the order of multiuse trail and linkage development for the next 10 to 15 years. The consultant worked closely with the Muskogee Trails Master Plan Steering Committee to identify and utilize the most critical evaluation factors for future development of corridors. The Steering Committee devoted a substantial amount of time and effort toward the development of these criteria and reached a consensus regarding the relative importance of each. The following section defines the terminology utilized in the evaluation of the proposed corridors.

Right of Way Availability: *the availability of rights of way or easements to construct trails is a critical cost and timing factor. If rights of way or easements cannot be secured voluntarily to construct a trail within a corridor, the trail cannot be built unless rights can be purchased. Purchasing rights of way can be very expensive and in many cases can make constructing a trail cost prohibitive. Corridors which have necessary rights of way in the public domain have the highest ranking.*

Timeliness and Opportunity: *in some instances the trail corridors identified are the same corridors in which other public improvements will be or have been built, such as a street, highway, expressway, turnpike, waterline, or drainage channel, etc. In cases where a trail can be constructed in conjunction with these types of projects, the trail construction will be expedited and great costs savings can result. In some cases, if a trail is not designed in conjunction with the public improvement, it can be very difficult and expensive to try to construct a trail at a later date. Corridors in which future public improvements are funded or planned receive higher ranking than those corridors without such public improvements.*

Recreation/Destinations Served: *trails which connect major parks and recreation destinations can offer the public a safe opportunity to access these facilities and they can serve as trail heads. The higher the number of parks and recreation destinations served by a trail corridor the higher the ranking.*

Effective Link: *trails which provide an effective link to existing destinations and have the potential for higher utilization by trail users will provide greater benefit to the community. The more effective the link the higher the ranking.*

Total Population Served: *one of the best indicators of how many people will utilize the trail is the number of people living in close proximity to the trail along its entire length. For this evaluation the population within one-quarter mile of the trail corridor was used.*

Average Population Served: Another method of looking at the potential number of trail users is the average population served per mile of trail. Again, the population within one-quarter mile of the trail corridor was used. Shorter trails within densely populated areas rank highest.

Schools Served: trails which connect schools offer the communities a safe opportunity for children to walk or ride their bikes and can serve as logical trail heads. The higher the number of schools served by a trail corridor the higher the ranking.

Near Term Phase: is used to describe those corridors for which the design can be started within two years and constructed within a period of 5 years. Most trails in this category have high scores in the first three evaluation criteria.

Mid Term Phase: is used to describe those corridors for which design can commence within the next five years and constructed within 10 years.

Long Term Phase: is used to describe those corridors for which design can commence within the next 10 years and constructed within 15 years.

Trail Phasing

With 52+ miles of proposed trails within Muskogee, the first question is inevitably, “Which trail gets built first?” The following “Trail Phasing Evaluation Matrix” applies the above criteria to each of the 18 proposed trail corridors. Each corridor is objectively compared to all other corridors with the resulting ranking order established for all trails. The various phases described in the following matrix are meant to provide a relative time frame only and are not absolute. The process of implementing trails within the city will be dynamic, and as opportunities arise and conditions change corridors may be developed in a different order than indicated in the phasing matrix (see also Trail Phasing Map 7.1).

Trail Phasing Evaluation Matrix

RANK	ID	NAME	EXISTING OR FUNDED	ROW AVAILABILITY	TIMELINESS AND OPPORTUNITY	RECREATION DESTINATION SCORE	EFFECTIVE LINK	TOTAL POP. SCORE	AVE. POP. PER MILE SCORE	TOTAL SCHOOL SCORE	TOTAL SCORE	PHASE
1	1	Centennial Trail	60	24	0	3	12	2	2	0	103	Existing
2	2	Civitan Park Trail	60	24	0	3	0	2	2	1	92	
3	3	Centennial Trail Ph 2 South	30	24	0	0	6	3	3	0	66	Funded
4	5	Three Forks Port Trail	30	24	0	0	0	1	1	0	56	
5	4	Centennial Trail Ph 2 North	0	24	0	0	6	3	2	0	35	Near Term
6	10	Honor Heights Trail	0	12	0	9	6	2	2	0	31	
7	14	Coody Creek East Trail	0	18	0	0	6	2	1	0	27	
8	18	Texas and Pacific North Trail	0	0	0	0	12	3	3	1	19	
9	15	Tumpike Trail	0	12	0	0	0	1	1	0	14	Mid Term
10	12	Robinson-Sallie Trail	0	0	0	6	0	2	3	0	11	
11	8	Border Trail	0	0	0	0	6	1	1	0	8	
12	16	MKT Railroad Trail	0	0	0	0	6	1	1	0	8	
13	7	54th St. Trail	0	0	0	0	0	1	2	1	4	Long Term
14	11	Texas Pacific South Trail	0	0	0	0	0	2	1	0	3	
15	13	Indiana Trail	0	0	0	0	0	1	2	0	3	
16	6	West Trail	0	0	0	0	0	1	1	0	2	
17	9	Missouri Pacific Trail	0	0	0	0	0	1	1	0	2	
18	17	North Trail	0	0	0	0	0	1	1	0	2	

Linkage Phasing

With 15 miles of proposed on-street linkages within Muskogee, developing priorities for implementation is needed. The following spreadsheet applies the same criteria utilized for trails to each of the 8 various on-street linkage corridors. Since each on-street linkage is within existing or proposed road rights of way, all corridors received the maximum score on right of way availability. Since the cost to construct an on-street linkage is considerably less than the cost of trail development, the 8 corridors were grouped into two implementation phases: Near Term and Mid Term Phases (see also Trail Phasing Map 7.1).

Linkage Phasing Evaluation Matrix

RANK	ID	NAME	EXISTING OR FUNDED	ROW AVAILABILITY	TIMELINESS AND OPPORTUNITY	RECREATION DESTINATION SCORE	EFFECTIVE LINK	TOTAL POP. SCORE	AVE. POP. PER MILE SCORE	TOTAL SCHOOL SCORE	TOTAL SCORE	PHASE
1	24	Arlene-Elgin Linkage	0	0	0	6	12	3	3	0	24	Near Term
2	26	Martin Luther King Linkage	0	0	0	9	6	3	3	0	21	
3	25	Broadway St. Linkage	0	0	0	6	6	4	3	1	20	
4	19	Gibson St. Linkage	0	0	0	0	6	3	3	1	13	
5	20	Osage-Haskell Linkage	0	0	0	3	0	3	4	3	13	Mid Term
6	22	East Side Blvd. Linkage	0	0	0	3	0	3	4	1	11	
7	21	Augusta Ave. Linkage	0	0	0	3	0	3	0	1	7	
8	23	12th St. Linkage	0	0	0	0	0	3	4	0	7	

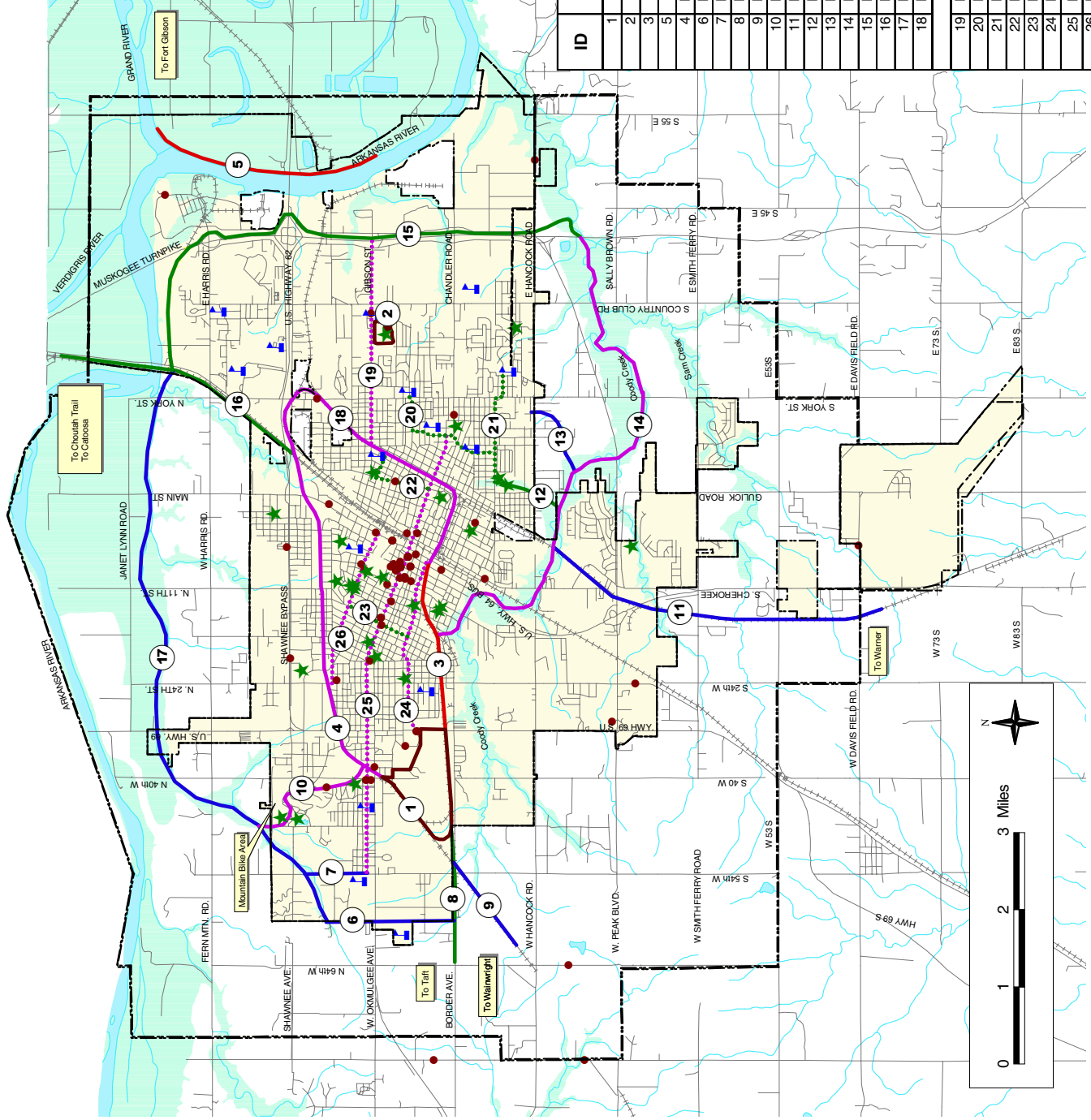
Estimated Costs for Facility Development

The consultant has prepared cost estimates for all of the corridors defined within this Master Plan. The cost estimates are general in nature and are based on national industry or State of Oklahoma averages. A listing of the industry averages that were used to determine “low” or “high” estimates are provided on the following pages. The purpose of these cost estimates is to provide general guidance for the purpose of budgeting and developing trail segments. The estimates are reliable to the extent that a general expectation can be derived from their use. Specific site development factors unique to each corridor will influence final design development costs. More detailed costs should be developed as a part of corridor specific conceptual plans. Final construction cost estimates should be based on final design plans.

Muskogee Trails Plan

prepared for
City of Muskogee, Oklahoma

- Existing Trail
- Funded Trail
- Near Term Trail
- Near Term Linkage
- Mid Term Trail
- Mid Term Linkage
- Long Term Trail
- City Limits and Fence Line
- Park
- School
- Public / Community Facility
- Street
- Railroad
- Water Body
- Stream or Creek
- 100 Year Flood Plain



ID	Status	Trail Name	Length (Miles)
1	Existing	Centennial Trail	3.42
2	Existing	Civitan Park Trail	1.16
3	Funded	Centennial Trail Ph 2 South	1.79
5	Funded	Three Forks Port Trail	2.84
4	Proposed	Centennial Trail Ph 2 North	3.77
6	Proposed	West Trail	1.59
7	Proposed	54th St. Trail	0.77
8	Proposed	Border Trail	1.38
9	Proposed	Missouri Pacific Trail	1.16
10	Proposed	Honor Heights Trail	1.72
11	Proposed	Texas Pacific South Trail	4.26
12	Proposed	Robinson-Sallie Trail	0.85
13	Proposed	Indiana Trail	0.92
14	Proposed	Cody Creek East Trail	6.48
15	Proposed	Turnpike Trail	6.59
16	Proposed	MKT Railroad Trail	3.13
17	Proposed	North Trail	7.08
18	Proposed	Texas and Pacific North Trail	3.83
Total Trail Length (Miles)			52.72
19	Proposed	Gibson St. Linkage	2.14
20	Proposed	Osage-Haskell Linkage	1.47
21	Proposed	Augusta Ave. Linkage	1.20
22	Proposed	East Side Blvd. Linkage	0.93
23	Proposed	12th St. Linkage	0.81
24	Proposed	Arlene-Elgin Linkage	1.91
25	Proposed	Broadway St. Linkage	4.81
26	Proposed	Martin Luther King Linkage	1.71
Total Linkage Length (Miles)			14.97
Total System Length (Miles)			67.69

5/6/04



Map 7.1 - Trail Phasing

Typical Costs for Off-Road Trail Facilities

Preliminary construction cost budgets are provided in tabular form on pages 64 and 65 of this Chapter for the Near-Term, Mid-Term and Long-Term trail and linkage projects. The unit costs defined below and on the following pages are provided for budgeting purposes only. Adjustments will have to be made to these costs on a project-by-project basis to compensate for changes in unit price trends over time.

Category/Description of Facility	Unit	Unit Costs
<u>Trail Treads</u>		
6-foot Bare Earth Hike/Mtn. Bike Trail	linear feet	\$5.00
8-foot Bare Earth Equestrian Trail	linear feet	\$7.50
8-foot Woodchip Pedestrian Trail	linear feet	\$10.00
10-foot Soil-Cement Trail	linear feet	\$12.00
10-foot Aggregate/Stone Trail	linear feet	\$15.00
10-foot Asphalt Multi-Purpose Trail	linear feet	\$35.00
10-foot Concrete Multi-Purpose Trail	linear feet	\$45.00
10-foot Wood Deck/Boardwalk Trail	linear feet	\$250.00
<u>Signage</u>		
Information Signs	each	\$1,000.00
Direction Signs	each	\$200.00
Warning Signs	each	\$200.00
Mile/Kilometer Markers	each	\$250.00
<u>Furniture/Furnishings</u>		
Benches	each	\$600.00
Trash Receptacles	each	\$400.00
Removable Bollards	each	\$600.00
Bicycle Racks	each	\$500.00
Fencing (Board-on-Board)	linear feet	\$20.00
Gates	each	\$750.00
Emergency Phones	each	\$1,000.00
Drinking Fountains	each	\$2,500.00
Restrooms	each	\$60-90,000.00
Landscaping	per mile	\$25,000.00
<u>Parking Lots</u>		
	Unit	Gravel Lot* Asphalt Lot
10 cars	each	\$7,500.00 \$14,000.00
20 cars	each	\$15,000.00 \$28,000.00
40 cars	each	\$30,000.00 \$56,000.00

*Gravel lots are prohibited in some jurisdictions

Typical Costs for Bicycle and Pedestrian Facilities

In limited circumstances, it may be necessary to install on-road bicycle facilities in order to connect the off-road trail system defined by this Plan. Itemized below are costs for facilities that would most likely be needed to provide linkage.

Restriping

Conducted as part of a regularly scheduled roadway resurfacing project and does not include right-of-way acquisition and changes to signal actuation.

Bicycle Lanes	\$7,200/mi
Wide Outside Lanes	\$6,450/mi

Independent Projects

The following listing is for development of various facility types as independent projects. These costs do not include right-of-way acquisition. Real estate values fluctuate dramatically and will need to be adjusted on a parcel-by-parcel basis as right of way is needed.

Share the Road Bike Routes (signage, pavement symbols, bicycle actuated signals)	\$20,000/mi
Urban Bike Lanes (4' wide, both sides)	\$300,000/mi
Rural Bike Lanes (4' wide, both sides)	\$110,000/mi
Paved Shoulders (4' wide, both sides)	\$110,000/mi
Wide Curb Lane (14' wide, both sides)	\$130,000/mi

Other Bicycle Facilities

Class I Bicycle Parking (Bicycle Lockers - per 2 bicycles)	\$500-\$1500
Class II Bicycle Parking (Secure wheels and frame-per bike)	\$65-\$150
Class III Bicycle Parking (Inverted U's or rail racks- per bike)	\$65-\$80
Bike Route/"Share the Road" sign (each)	\$250

Typical Costs for Pedestrian Facilities

Sidewalks (6' wide, 2 sides)	\$180,000/mi
Pedestrian Signal Heads (for 2 corners)	\$1,800/ea
Pedestrian Signal Heads (for 4 corners)	\$3,700/ea

Other Pedestrian Facilities

Prefabricated Pedestrian Bridge/Overpass	\$100/sq ft
Constructed Bridge/Overpass	\$ 65/sq ft
Crosswalk Striping	\$250 each
Curb Extensions	\$4,500 each

Developing the Trails Master Plan

If the momentum generated by the Muskogee Trails Master Plan is sustained over the next 15 years, the opportunity exists to implement a total of 67 miles of multiuse trails and on-street linkages (includes existing and funded trails). The phased development for proposed trails and linkages breaks down as follows: Near-Term projects consisting of 15.8 miles of multiuse trails and 8.4 miles of on-street linkages; Mid-Term projects consisting of 11.9 miles of multiuse trails and 14.9 miles of on-street linkages; and the Long-Term projects totaling 15.7 miles of multiuse trails.

Trails Cost

The following cost estimates for trail facilities are general in nature and based on State of Oklahoma averages for multiuse trails constructed over the last five years. More detailed cost estimates should be prepared as site specific plans are developed for each corridor.

Near Term Trails Cost

Rank	ID	NAME	LENGTH (mi)	FACTOR	LOW COST	HIGH COST
5	4	Centennial Trail Ph 2 North	3.77	0.80	\$ 754,000.00	\$ 904,800.00
6	10	Honor Heights Trail	1.72	1.15	\$ 493,062.50	\$ 591,675.00
7	14	Coody Creek East Trail	6.48	1.00	\$ 1,620,750.00	\$ 1,944,900.00
8	18	Texas and Pacific North Trail	3.83	1.25	\$ 1,197,187.50	\$ 1,436,625.00
		TOTAL NEAR TERM CORRIDORS	15.80		\$ 4,065,000.00	\$ 4,878,000.00

All costs based on 2004 dollars.

Mid Term Trails Cost

Rank	ID	NAME	LENGTH (mi)	FACTOR	LOW COST	HIGH COST
9	15	Turnpike Trail	6.59	1.15	\$ 1,895,200.00	\$ 2,274,240.00
10	12	Robinson-Sallie Trail	0.85	1.00	\$ 211,500.00	\$ 253,800.00
11	8	Border Trail	1.38	1.00	\$ 345,250.00	\$ 414,300.00
12	16	MKT Railroad Trail	3.13	1.00	\$ 781,250.00	\$ 937,500.00
		TOTAL MID TERM CORRIDORS	11.94		\$ 3,233,200.00	\$ 3,879,840.00

All costs based on 2004 dollars.

Long Term Trails Cost

Rank	ID	NAME	LENGTH (mi)	FACTOR	LOW COST	HIGH COST
13	7	54th St. Trail	0.77	1.00	\$ 192,250.00	\$ 230,700.00
14	11	Texas Pacific South Trail	4.26	1.20	\$ 1,277,100.00	\$ 1,532,520.00
15	13	Indiana Trail	0.92	1.00	\$ 229,250.00	\$ 275,100.00
16	6	West Trail	1.59	1.00	\$ 396,250.00	\$ 475,500.00
17	9	Missouri Pacific Trail	1.16	1.00	\$ 290,000.00	\$ 348,000.00
18	17	North Trail	7.08	1.00	\$ 1,769,750.00	\$ 2,123,700.00
		TOTAL LONG TERM CORRIDORS	15.77		\$ 4,154,600.00	\$ 4,985,520.00

All costs based on 2004 dollars.

Linkages Cost

The on-street linkages identified as a part of the trails master plan are intended to provide linkages between various off street trails and allow greater access to the trail system. The cost estimates for these types of facilities are general in nature and based on national industry or State of Oklahoma averages. The estimate includes items such as share the road signs, bike route signs, bicycle activated traffic signals, on street share the road pavement markings, replacement of drainage grates and other minor street construction items.

Since a detailed evaluation of the recommended linkages has not been performed by the consultant, a detailed evaluation of each corridor must be completed prior to designating the corridor for on-street use. A detailed evaluation might indicate the need for additional pavement width to provide a designated striped bicycle lane for safety reasons. In some cases it might be necessary to reduce the vehicular speed limit prior to designating a particular corridor for on-street use.

Near Term Linkages Cost

Rank	ID	NAME	LENGTH (mi)	FACTOR	LOW COST	HIGH COST
1	24	Arline-Elgin Linkage	1.91	1.00	47,750.00	76,400.00
2	26	Martin Luther King Linkage	1.71	1.00	42,650.00	68,240.00
3	25	Broadway St. Linkage	4.81	1.00	120,325.00	192,520.00
4	19	Gibson St. Linkage	2.14	1.00	53,400.00	85,440.00
		TOTAL NEAR TERM CORRIDORS	8.43		\$ 210,725.00	\$ 337,160.00

All costs based on 2004 dollars.

Mid Term Linkages Cost

Rank	ID	NAME	LENGTH (mi)	FACTOR	LOW COST	HIGH COST
5	20	Osage-Haskell Linkage	1.47	1.00	36,700.00	58,720.00
6	22	East Side Blvd. Linkage	0.93	1.00	23,200.00	37,120.00
7	21	Augusta Ave. Linkage	1.20	1.00	30,000.00	48,000.00
8	23	12th St. Linkage	0.81	1.00	20,125.00	32,200.00
		TOTAL MID TERM CORRIDORS	14.97		\$ 374,150.00	\$ 598,640.00

All costs based on 2004 dollars.

Operations and Management

Operating, maintaining and managing the Muskogee Trails System will require a coordinated effort among city departments, private sector organizations and individuals. Key elements of the operation and management program include trail access easements, trail facility operational policies, land management, safety and security, trail rules and regulation, an emergency response plan, and a risk management plan. This information is defined in greater detail in Chapter 8 of this report.

Maintenance and management of all trail segments will be the responsibility of Muskogee and its partners. It is anticipated that these maintenance and management duties can be shared among trail supporters in the public and private sectors.

Maintenance and management of the Muskogee Trails System will require the City to establish an operations budget for that purpose. The following maintenance and management costs are provided as a guide to establishing a budget for the operation, maintenance and management of trail segments within the Muskogee Trails System. It may be possible to substantially lower the cost of maintaining one mile of paved trail through the development of an Adopt-a-Trail Program. Volunteers have been proven effective in performing some of the routine maintenance activities that are listed below. Savings of 50% of the estimated cost per mile defined below are possible through a coordinated and well run Adopt-a-Trail Program, and some of these costs are already being covered along highways, roads and parks and other areas. A pilot Adopt-a-Trail Program is recommended to be implemented by the Muskogee Parks Department to determine local effectiveness.

Typical Maintenance Costs (For a 1-Mile Paved Trail)

Drainage and storm channel maintenance (4 x/year)	\$700.00
Sweeping/blowing debris off trail tread (24 x/year)	\$1,600.00
Pick-up and removal of trash (24 x/year)	\$1,600.00
Weed control and vegetation management (10 x/year)	\$1,350.00
Mowing of 3-ft grass safe zone along trail (24 x/year)	\$1,750.00
Minor repairs to trail furniture/safety features	\$500.00
Maintenance supplies for work crews	\$300.00
Equipment fuel and repairs	\$800.00
Estimated Maintenance Costs Per Mile of Paved Trail	\$8,600.00

Re-Surfacing

Re-Surfacing of Asphalt Trail Tread (10 year cycle)	\$50,000-60,000/mile
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Muskogee Trails Trust Fund

A Muskogee Trails Trust Fund should be established to help pay for some of the costs for maintenance and management of Muskogee trail segments. The Fund

would be established by soliciting funds from both public and private sector sources. The principal balance of the fund would provide two benefits: 1) the interest generated from the fund would be used to aid in the funding of annual maintenance activities; 2) in the event of expensive short term maintenance needs, the principal balance could be tapped to support these activities.

Muskogee Trails System Governance Structure

Implementing the Muskogee Trails System will require a coordinated effort among city departments and private sector groups, organizations and agencies. The Plan presented in this report is ambitious, yet it is very achievable. Other communities have accomplished similar efforts. The following chart summarizes the trails systems of other communities and defines the current management structure.

As illustrated by the following chart, the trails system proposed within Muskogee is smaller in size to some other systems in operation in other American communities. One thing that all successful systems have in common, however is a lead authority with the responsibility for implementing, operating and maintaining their system. The Muskogee Parks Department should be the lead authority assisted by the Muskogee Parks Board, which supports the development and operation of the trails system. The Parks Board will support the cooperation and coordination of activities, resources and development objectives. A management structure is important to guide the process of implementation. The Muskogee Parks Board would be responsible for making development, operations and maintenance recommendations to the Muskogee Parks Department. The Parks Department would have the responsibility to coordinate all needed services for the Muskogee Trails System.

Name of Metro Area	Size of System	Lead Developer/Manager
Chicago Greenway System	676-mile system in 6 counties	Public-private partnership led by Chicago Open Lands Project, non-profit group supported by local governments
Denver Metro Greenway System	250-mile system in 4 counties	Public-private partnership, South Suburban Foundation, where both sectors serve as developers and managers of metro system
Chattanooga Greenway System	75-mile system in 8 counties	Private-public partnership led by RiverValley Partners, Inc., a for-profit development group. Management is by public agencies.
Oklahoma City Metro Trails	208-mile system in 1 county	Establishing a Metro Trails organization that will be a public-private partnership
Portland (OR) Metro Greenways	150-mile system in 4 counties	Public-agency partnership, Metro Trails and Greenways, that has issued bonds to support development and management
Minneapolis Metro Greenways	200-mile system in 7 counties	Administered by public-sector partnership, managed by Metro Council of Governments

Public Private Partnerships

The Muskogee Trails System will require the services of the local agency and non-governmental staff in order to be successful. However, in order to successfully keep pace with the multitude of development, operation and management requirements of this trail system, the private sector will be called upon to share the burden and participate in the development and stewardship of the trails system where appropriate. The following are some suggestions for how the City and the private sector can assist with the implementation of the Muskogee Trails System.

Role of the City

Muskogee should assist with the detailed planning, design and development of the Muskogee trails system. The Parks Department can assist the Parks Board with information, coordination, communication, implementation and management services. The City can take on the responsibility for completing detailed design development plans for individual segments of the trail system and can review detailed design plans prepared by private developers for compliance to the approved design guidelines. They can also implement management plans for each trail segment, in partnership with private sector groups. The City should make applications for funding in accordance with the recommendations defined in Chapter Six of this Plan and aggressively pursue local, public, foundation and federal funding sources including the Enhancement Program.

Role of the Private Sector

The private sector has a vital role to play in the design, development, management, operations and maintenance of the Muskogee Trails System. The private sector includes developers, businesses, merchants, corporations, civic organizations and individuals. The private sector has a wealth of resources to offer toward the implementation of the Muskogee Trails System and will be the primary beneficiaries of a successfully developed and managed system. The following defines three specific private sector roles, and then suggests generic roles that other organizations and groups might have in the development of the Muskogee Trails System.

Private developers should be required to construct the trails and linkages identified on the Trail Route Map when a segment is within their proposed development. The trail design should be in conformance with the design guidelines iterated in Chapter 4 of this report to ensure a consistent level of service is maintained throughout the system. The responsibility of operations and maintenance should be negotiated on a case by case basis, but in all instances should be maintained at the same level as the overall trail system.

Local businesses and corporations might consider sponsoring a segment of trail for development. Under trail naming guidelines a 50% or greater contri-

bution of the total value of trail segment or trail head construction would enable the sponsored trail to be named after the business or an individual. Businesses and corporations might also consider a gift or donation of construction material, finished products that could be used on the trail, or labor to help build the trail. Additionally, businesses and corporations could provide reduced cost materials, finished products, machinery and/or labor to assist in trail project development. Employers can provide incentives for employees who commute using the trails system. Among the incentives are bike racks, showers, lockers and cash reimbursements in lieu of employer paid parking subsidies.

Role of Civic Organizations

Local civic groups and organizations, including the Junior League, Boy Scouts, Girl Scouts, Garden Clubs, YMCA's, YWCA's, to name a few, can play a vital role in the development and management of the Muskogee Trails System. Civic organizations and trail user groups can contribute the time and labor of their members to assisting the Parks Department with staffing trails events, adopting segments of the trail for maintenance and management, sponsorship of trail segments for construction of trail tread, boardwalks, education exhibits and rest areas. Some of these user groups include the Muskogee Triathlon Club, Cherokee Wheelmen Bike Club and others. There are endless ways in which local civic groups can become involved with the Muskogee Trails System, and the best way is to match the goals and objectives of the organization to the needs of the trails system.

Role of Muskogee Residents

Muskogee residents interested in the development and management of the Muskogee Trails System can offer their time, labor and expertise to the Muskogee Parks Board or the Parks Department. Individuals might partner with a friend or neighbor to volunteer their services as Deputy Trail Rangers, to help patrol trails during the daytime. Individuals could volunteer to plant native trees, shrubs and groundcovers along the trail to improve the appearance of a newly developed trail segment. Individuals could volunteer to keep a particular stretch of trail segment clean of debris, litter and trash. All volunteer efforts should be recognized by the Muskogee Parks Board through an appropriate community-wide program.

Chapter 8



Trails Master Plan

Operations, Maintenance & Management

Overview

Over the course of time a variety of operational and management issues will be encountered that are important to the successful management and operation of the Muskogee Trails System. The following policies are defined to assist the City and the Muskogee Parks and Recreation Board in responding to typical trail implementation issues. More specific problems and issues may arise during the long-term development of the trail system that result in additional policies being considered and adopted.

Muskogee Trails System Map Policy

The official Muskogee Trails System Plan, as prepared by LandPlan Consultants, Inc. of Tulsa, OK was approved by the Muskogee Trails Master Plan Steering Committee on May 7, 2004, the Muskogee Council on Month Day, 2004 and is on display at Parks Department and the City Engineering Department. The Parks Department is vested with the responsibility of keeping the map current with respect to completed trail segments, and additions or deletions to the overall system. The official map illustrates two important aspects of the Muskogee Trails System: One, trail corridors that warrant further study for early implementation; and two, trail corridors that are part of the longer term phased development strategy.

Public Access Easement Policy

A good portion of land that is included within the Muskogee Trails System corridors is currently owned by the city, but some land is owned by private individuals. For those lands that are in private ownership and developed, Muskogee will negotiate with the property owner(s) for the use of their land for trail purposes. For planned trail corridors within the limits of proposed subdivisions, the City should require that trail easements are provided by the developer during the platting process. For planned trails through those properties which are platted and currently undeveloped, the City should require a public access easement as a part of the site plan review process. Muskogee or certain non-profit organizations can accept donation of public access easements for the Muskogee Trails System that is contained within the

corridors defined on the official Trails System Map in accordance with existing policies and codes pertaining to the acquisition of parkland, transportation corridors and land for water and wastewater facilities. The City should consider requiring public access provisions in all new easements.

Private Construction of Trails Policy

Construction of planned trails within all new development should be considered the responsibility of the developer. In the same way that a developer is required to construct utilities to his site, he should be responsible for the construction of the trails through his development which are a part of the Muskogee Trail System. The developer should be required to conform to trail design standards as iterated in Chapter 4 "Design Guidelines".

Right of Public Access and Use of Trail Lands Policy

The general public shall have free access to and use of all trail lands that are owned by Muskogee. All access and use is governed by existing local city policies and shall also be governed by the Muskogee Trails Ordinance. The use of all trails is limited to non-motorized uses (except maintenance vehicles), including hiking, bicycling, running, jogging, wheelchair use, skateboarding, rollerblading, mountain biking, and other uses that are determined to be compatible with Muskogee Trails.

Trail Naming Policy

The majority of trails within the Muskogee Trails System shall be named for the significant natural or cultural features that are found within the trail corridor. Trails can be named after an individual or individuals if these persons are truly distinguished within the community, or if these persons have contributed a gift equal to more than 50% of the value of trail development within that corridor segment.

Fencing and Vegetative Screening Policy

The City should work with landowners on an individual basis to determine if fencing and screening is required and appropriate. The City may agree to fund the installation of a fence or vegetative screen, however, it shall be the responsibility of the adjacent property owner to maintain the fence or vegetative screen in perpetuity, including the full replacement of such fence or screen in the event of failure or deterioration due to any circumstances.

Adopt-a-Trail Program Policy

An Adopt-a-Trail Program should be established by the Muskogee Parks and Recreation Board to encourage community groups, families, businesses, school groups, civic clubs and other organizations to join in managing the Muskogee Trails System. The Muskogee Parks and Recreation Board will

need to work closely with Leisure Services to ensure that all Adopt-a-Trail Program groups manage and maintain trails in a manner that is consistent with other land use objectives. The Muskogee Parks and Recreation Board should develop written agreements for each Adopt-a-Trail entity and keep a current record of this agreement on file with the City. Adopt-a-Trail entities will be assigned a specific section of the Muskogee Trails System, defined by location or milepost. The activities of each organization shall be monitored by the City. Agreements for management can be amended or terminated at any time by either party, giving 30 days written notice.

Management Agreements

Management Agreements should be established between the City and private organizations wishing to assist with the management of designated segments of the Muskogee Trails System. The objective of these agreements is to define areas of management that are compatible with existing land management activities, especially where the Muskogee Trails System intersects with public or private properties and/or rights-of-way. Management agreements spell out specific duties, responsibilities and activities of the City and public or private organization that wishes to assist the City with management activities. They can be amended or terminated at any time by either party, giving 30 days written notice.

Cross Access Agreements Policy

The City can use cross access agreements to permit private landowners that have property on both sides of a trail corridor access to and use of a trail corridor to facilitate operation and land use activities. Adjacent landowners generally have the right to use the access at any time. However, access cannot block the right-of-way for trail users other than for temporary measures such as permitting livestock to cross, or transporting equipment. Adjacent landowners are responsible for acts or omissions which would cause injury to a third party using the trail. If a landowner must move products, materials, livestock or equipment across the trail on a regular basis, appropriate signage will be installed to warn users of the trail to yield for such activities.

Crossing of abandoned or active rail lines, utility corridors and/or roads and highways will require the execution of agreements with companies, local, state or federal agencies and organizations that own the rights-of-way. These crossings must provide clearly controlled, recognized, and defined intersections in which the user will be warned of the location. In accordance with the American Association of State Highway Transportation Officials (AASHTO) and the Manual on Uniform Traffic Control Devices (MUTCD), the crossing will be signed with appropriate regulatory, warning and information signs.

Land Management

Trail facilities should be maintained in a manner that promotes safe use. All trail facilities shall be managed by the Muskogee Parks Department. Trail heads, points of public access, rest areas and other activity areas should be maintained in a clean and usable condition at all times. The primary concern regarding maintenance should always be public safety. Trail Maintenance should include the removal of debris, trash, litter, obnoxious and unsafe man-made structures, and other foreign matter so as to be safe for public use. Removal of native vegetation should be done with discretion, removal of exotic species should be accomplished in a systematic and thorough manner. The objective in controlling the growth of vegetation should be to maintain clear and open lines of sight along the edge of the trail, and eliminate potential hazards that could occur due to natural growth, severe weather or other unacceptable conditions.

All trail surfaces should be maintained in a safe and usable manner at all times. Rough edges, severe bumps or depression, cracked or uneven pavement, gullies, rills and washed out treads shall be repaired immediately. Volunteer vegetation occurring in the tread of the trail should be removed in such a manner so that the trail surface is maintained as a continuous, even and clean surface. The Parks Department shall strive to minimize the number of areas where ponding water occurs, however they cannot be held liable for public use through areas of casual or ponded water.

Property owned or used by the City for the Muskogee Trails System should be maintained in a condition that promotes safety and security for trail users and adjacent property owners. To the extent possible, the property should also be maintained in a manner that enables the trail corridor to fulfill multiple functions (i.e. passive recreation, alternative transportation, stormwater management and habitat for wildlife). Vegetation within each trail corridor should be managed to promote safety, serve as wildlife habitat, buffer public trail use from adjacent private property (where applicable), protect water quality, and preserve the unique aesthetic values of the natural landscape. To promote safe use of the trail system, all vegetation should be clear cut to a minimum distance of three (3) feet from each edge of a trail. Selective clearing of vegetation should be conducted within a zone that is defined as being between three (3) to ten (10) feet from each edge of a trail. At any point along a trail, a user should have a clear, unobstructed view, along the centerline of a trail, 300 feet ahead and behind his/her position. The only exception to this policy should be where terrain or curves in a trail serve as the limiting factor. The City or its designated agents shall be responsible for the cutting and removal of vegetation. Removal of vegetation by an individual or entity other than The City or its designees should be deemed unlawful and subject to fines and/or prosecution

Safety and Security

Safety is a duty and obligation of all public facilities. In order to provide a standard of care that offers reasonable and ordinary safety measure, the City should develop and implement a Safety and Security Program for all segments of the Muskogee Trails System. This program should consist of well defined safety and security policies: the identification of trail management, law enforcement, emergency and fire protection agencies; the proper posting, notification and education of the trail user policies; and a system that offers timely response to the public for issues or problems that are related to safety and security. Safety and security of the Muskogee Trail System will need to be coordinated with local law enforcement officials, local neighborhood watch associations, and Adopt-a-Trail organizations.

Important components of the safety and security program should include:

- 1) Work with law enforcement agencies in the City to establish a Muskogee Trails Safety and Security Committee that can meet regularly to discuss management of the trail system.
- 2) Prepare a Trail Safety Manual and distribute this to management agencies and post it at all major trail heads.
- 3) Post User Rules and Regulations at all public access points to the trail.
- 4) Work with the management agencies to develop Trail Emergency Procedures.
- 5) Prepare a Safety Checklist for the trail system, and utilize it monthly during field inspection of trail facilities.
- 6) Prepare a Trail User Response Form for complaints and compliments and provide copies at all trail heads.
- 7) Work with management agencies to develop a system for accident reporting analysis.
- 8) Conduct a regular Maintenance and Inspection Program, and share the results of these investigations with all management agencies.
- 9) Institute a Site Design and Facility Development Review Panel, made up of city departments so that all design development recommendations can be reviewed prior to installation.
- 10) Coordinate other Public Information Programs that provide information about trail events and activities that city residents can participate in.
- 11) Conduct an ongoing evaluation of trail program objectives. It would be best to have this evaluation conducted by Muskogee Parks and Recreation Board and local trail user groups.

Trail Rules and Operation Regulations

The Muskogee Trails System shall be open 365 days a year to any person wishing to use the facility for transportation or recreation purposes — subject to the terms of the Muskogee Trails Ordinance that governs all use. No organization shall be permitted to use any portion of the Muskogee Trails System for a commercial purpose unless written permission has been obtained from the Parks Department. The City should always discourage the general

public from using any segment of a trail that is under construction. Trail segments shall not be considered officially opened for public use until such time as a formal dedication ceremony and official opening has been completed. Individuals who use trail segments that are under construction, without written permission from the City shall be deemed in violation of this access and use policy and treated as a trespasser.

The Muskogee Trail System shall be operated like all other parks within the local jurisdiction, open for public use from sunrise to sunset, 365 days a year, except as specifically designated. Individuals who are found to be using unlighted facilities after dusk and before dawn should be deemed in violation of these hours of operation and treated as trespassers. Where trails are lighted for nighttime use, the rules established within the Trail Ordinance shall govern permitted uses and activities.

Trail Ordinance

Multiuse conflict is a national problem for community and regional trail systems. Typically, conflicts are caused by overuse of a trail, however, other factors may be problematic including poorly designed and engineered trail alignments, inappropriate user behavior, or inadequate facility capacity. The most effective conflict resolution plan is a well conceived safety program that provides the individual user with a Code of Conduct for the Trail, sometimes called a Trail Ordinance. Several communities across the United States have adopted progressive trail ordinances to govern public use and keep trails safe for all users. The following Rules and Regulations shall be implemented for the Muskogee Trails System. These rules should be displayed both on brochures and information signs throughout the trails system.

- 1) Be Courteous: All Trail users, including bicyclist, joggers, walkers, wheel-chairs, skateboarders and skaters, should be respectful of other users regardless of their mode of travel, speed, or level of skill. Never spook animals; this can be dangerous for you and other users. Respect the privacy of adjacent landowners!
- 2) Keep Right: Always stay to the right as you use the Trail, 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 and 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. Faster traffic should always yield to slower on-coming traffic.
- 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 your left!" or "Cyclist on your left!" Always be courteous when providing the audible signal - profanity is unwarranted and unappreciated.

- 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: Lack of attention, even for a second, can cause disaster - always stay alert! Maintain a safe and legal speed at all times.
- 7) Do Not Block the Trail: When in a group, including your pets, use no more than half the trail, so as not to block the flow of other users. If your group is approached by users from both directions, form a single line or stop and move to the far right edge of the Trail to allow safe passage by these users.
- 8) Yield when Entering or Crossing Trails: When entering or crossing the Trail at uncontrolled intersection, yield to traffic already using the other trail.
- 9) The Use of Lights: (where permitted) When using the Trail after dawn or before dusk be equipped with proper light. Cyclists should have a white light that is visible from five hundred feet to the front, and a red or amber light that is visible from five hundred feet to the rear. Other Trail users should use white lights (bright flashlights) visible two hundred fifty feet to the front, and wear light or reflective clothing.
- 10) Do not Use this Trail Under the Influence of Alcohol or Drugs: It is illegal to use this Trail 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 or other wheeled vehicle.
- 11) Clean-up Your Litter: Please keep this Trail clean and neat for other users to enjoy. Do not leave glass, paper, cans or any other debris on or near the Trail. Please clean up after your pets. Pack out what you bring in - and remember to always recycle your trash.
- 12) Keep Pets on Leashes: All pets must be kept on secure and tethered leashes. Keep pets off of adjacent private property. Failure to do so will result in a fine.
- 13) Prohibition on Camp Fires: Fires, for any purpose, are prohibited within the Trails System. Any person caught lighting a fire for any purpose will be prosecuted to the fullest extent of the law.

Emergency Response Plan

In order to effectively patrol the Muskogee Trails System and respond to the potential for fire, floods and other natural or human-caused disasters, Muskogee shall adopt a trails emergency response plan. This plan defines a cooperative law enforcement strategy for the trail based on services required and those that are typically provided by police, sheriff, fire and EMS agencies. Specifically, all trails shall be provided with an address system that denotes specific locations along the length of a trail corridor. A site plan that illustrates points of access to each trail corridor shall be produced and kept on file. Each trail shall be designed to permit access for law enforcement, fire and EMS agencies and vehicles that are not in excess of 6.5 tons gross vehicle weight. A system of cellular-type emergency phones located in remote sections of the trail system, providing users with access

to the area 911 Emergency System should be considered by the Muskogee Parks and Recreation Board.

The emergency response plan shall also define the agencies that 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 Trail System shall be designed and develop to support a minimum gross vehicle weight of 6.5 tons.

Risk Management Plan

The purpose of a Risk Management Plan is to increase safety for the users of the Muskogee Trails System and reduce the potential for accidents to occur within the system or on lands adjacent to the system. While it is impossible to guarantee that all risk will be eliminated by the completion of a Risk Management Plan, implementation of a plan is in fact a critical step that is necessary to reduce liability and improve safety. A Risk Management Plan establishes a methodology for trail management that is based on current tort liability and case law in the United States related to the development, operation and management of public use trail lands and facilities.

The ultimate responsibility for managing the Muskogee Trails System, as defined within this Plan, rests with Muskogee. Muskogee is considered the Risk Management Coordinator for the trail system. A Risk Management Plan has as its major goals:

- 1) Risk Identification: determining where risk (threat to safety or potential loss) exists within the corridor.
- 2) Risk Evaluation: conducting appropriate examination of areas defined as a risk and determining the factors that contribute to risk.
- 3) Risk Treatment: defining and implementing an appropriate solution to the area of risk in accordance with one of the four options:
 - a) risk avoidance-prohibiting use of a risk area.
 - b) risk reduction-limit use of area and repair risk area immediately.
 - c) risk retention-obtain waivers from all potential users of the risk area.
 - d) risk transfer-transfer risk area (property) to an agency better suited to manage the area.

The following sixteen step plan should be considered for implementation by Muskogee in establishing Risk Management Plans for the Muskogee Trails System.

- 1) Develop a policy statement about risk management
- 2) Conduct a needs assessment of Muskogee as an organization.
- 3) Determine goals and objectives for risk management - what is acceptable and not acceptable management levels.

- 4) Develop specifications for site and facility development.
- 5) Establish a clear and concise program for risk management.
- 6) Define supervision and responsibility for risk management.
- 7) Define appropriate rules and regulations that govern the use of the trail system.
- 8) Conduct routine/systematic inspections and investigations of the trail system.
- 9) Develop an accident reporting and analysis system.
- 10) Establish procedures for handling emergencies.
- 11) Develop appropriate releases, waivers and agreements for use and management.
- 12) Identify best methods for insuring against risk.
- 13) Develop a comprehensive in-service training program for employees of Muskogee.
- 14) Implement a public relations program that can effectively describe the risk management program and activities.
- 15) Conduct periodic reviews of the Risk Management Plan by outside agents to ensure that the plan is up to date.
- 16) Maintain good legal and insurance representation.

Liability

The design, development, management, and operation of the Muskogee Trails System must be carefully and accurately executed in order to provide a resource that protects the health and welfare of the public. Liability may occur when a facility has been underdesigned to handle its intended volume of use, when management of the facility is poor, or when unexpected accidents occur because the trail manager failed to recognize the possibilities of a potentially hazardous situation. To reduce the possibility and exposure to liability, the City should have in operation the following measures prior to opening the first segment of the trail:

- 1) a thorough 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 system, and as necessary adjacent landowners;
- 3) a comprehensive working knowledge of public use laws and recent case history applicable in Oklahoma.

Existing municipal insurance programs should be adequate to protect the City from financial loss that might occur through the development and operation of a public use trail system. Trails are no greater liability to the community than park and recreation resources. The City should review their current policies and check coverages to be certain that all aspects of its policies are up to date.

Muskogee should exercise reasonable care in the design and construction of all trail facilities to reduce hazardous, public nuisance and life threatening

situations. Recreational Use Statutes in Oklahoma serve to reduce the exposure to liability that adjacent landowners might expect to realize from the proximity of the trail to private property. In fact, it is very difficult to find any case law in the United States where an adjacent property owner has been sued because a trail user strayed onto the adjacent private property and fell victim to an accident that was caused by the adjacent landowner. Some landowners have claimed that their insurance rates would go up because of the presence of a trail abutting their property. Once again, there is no case history among insurance companies to support this claim — provided the landowner has not gone out of their way to create an attractive nuisance and lure trail users onto their property.

It is also important that the City not charge a fee to use any portion of the Muskogee Trails System facility, because typically this may impact the way in which the recreational use statutes in Oklahoma apply to the use of the system. A voluntary donation applied to the trail system, will generally not affect the recreational use statute.