

# **Tulsa Transportation Management Area**

## **Trails Master Plan**

### **Approvals**

#### **Long Range Transportation Plan**

Recommended for approval by the Technical Advisory Committee.....4/21/99  
Approved by the Transportation Policy Committee.....4/29/99  
Endorsed by the INCOG Board of Directors.....5/13/99

#### **Comprehensive Plan**

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Approved by the Tulsa County Commission.....6/1/99

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# Tulsa Transportation Management Area 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 as many metro communities as possible; to ensure those trails are safe and located where they are needed and will be used; and to connect the trails and the communities they serve to a wider network. This was a tall order from the start, and could not have been accomplished without the support, cooperation, hard work, and enthusiasm for the metro trails concept that we received throughout the development of the TTMA 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 government representatives from every community involved in the plan, 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 19 public workshops were attended by hundreds of citizens throughout the metro area. We would like to express our appreciation to these people who contributed their insight, ideas, and suggestions. This 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 25 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, and improvements beyond the scope of the TTMA Trails Master Plan are underway because of their dedication to the concept.

Additionally, we would like to single out the chair and co-chair of the steering committee, Paul Coury and Michael Hairston, for special thanks. Paul contributed his efforts and valuable insight at critical points in the planning process. Michael attended most of the public workshops throughout the process and his upbeat personality and leadership motivated all involved.

Very special thanks are also in order for Charles Hardt, Director of the City of Tulsa Public Works Department and Jon Eshelman, City of Tulsa Traffic Engineer. Not only did they provide their invaluable experience and insight during the development of the master plan, they also concurrently initiated the development of a comprehensive on-street bikeway system throughout the City of Tulsa to interface with the developing trails network. Their efforts came at a crucial time during the planning process and the resulting plan demonstrates a real commitment to encouraging safe alternate modes of transportation in the City of Tulsa and surrounding metro area.

We must also tip our hats (or helmets, as the case may be) to INCOG and its exceptionally talented staff. We would especially like to recognize Rich Brierre, Deputy Director of INCOG, for his outstanding contributions to the project. Rich elevated this project to priority importance and offered countless hours of personal insight and critical review. Dianne Dessaur, Transportation Planner, worked tirelessly to coordinate the efforts of the many communities and groups involved in the master plan development process. Her effort definitely earns the designation "above and beyond" from the consultant team. Barbara Gibson, Data/GIS Analyst, strove to provide the highest level of timeliness and production quality in the report and the numerous newsletters and meeting notices that were distributed to the public.

Finally and most importantly, we thank those who have provided the funding that has made this master plan effort possible. The Oklahoma Department of Transportation provided an 80% match for this trails master plan through the ISTE A Enhancement Program. We would like to recognize the support we received within the Department from Secretary of Transportation, Neill McCaleb and Special Projects Branch Manager, Tim Gatz. Mr. Gatz and his staff were always available to us with their invaluable knowledge and experience. Special thanks also goes to those providing local funding for the master plan: City of Bixby, City of Broken Arrow, City of Jenks, City of Owasso, City of Tulsa, City of Sand Springs, City of Sapulpa and Tulsa County. These governments and their representatives have embodied the spirit of cooperation and forward thinking that has allowed the planning team to flourish and has given TTMA Trails Master Plan its regional character.



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Trails Master Plan

## Executive Summary

### Overview

The Tulsa Transportation Management Area (TTMA) 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 44 corridors throughout the metro area that should be developed in the next 15 years. The Trails Master Plan was developed by INCOG in association with a steering committee of citizens, a team of national and local consultants, and residents of the metro 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 TTMA Trails Master Plan, as well as the major findings and recommendations of the plan.

### How This Plan Was Developed

In June 1998, INCOG employed a consulting team, led by *LandPlan Consultants, Inc.* of Tulsa, Oklahoma, *Greenways Incorporated* of Cary, North Carolina, and *FHC, Inc.* of Tulsa, Oklahoma, to begin work with a steering committee to prepare the TTMA Trails Master Plan. The work of the consultants was funded through an Intermodal Surface Transportation Efficiency Act (ISTEA) grant that was obtained by The Indian Nations Council of Governments (INCOG) from the Oklahoma Department of Transportation. The consultant team began its 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 metro area 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 Metro Residents**

The consultant worked very closely with the Metro Trails Steering Committee during the past nine months in preparing this Plan. The consultant has also conducted numerous public workshops, public meetings, and made formal presentations of the plan to interested groups.

In late June and early July 1998, the first of three sets of public workshops was facilitated by the consultant to invite the public to participate in the planning process. Meetings were held in six locations throughout the Metro region. At these meetings, residents defined appropriate goals, objectives and policies for improving access to outdoor resources throughout the region. 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 region, 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 these workshops and the consultant's efforts were summarized in a series of reports, termed "Technical Reports," and provided to INCOG 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 metro region.

In August 1998, a second set of public workshops was conducted to present the results of the June/July meetings. The consultant also presented an emerging network of corridors of land that would serve as the basis for a metro-wide trails system. Workshop participants were asked to comment on the results of the prior meetings and carefully critique the initial network of trail corridors. Participants were also requested to indicate their priority trails by placing colored dots on the emerging trail corridor map. The results of these workshops were again summarized in a report and disseminated in a newsletter published by the consultant.

In November of 1998, a third set of public workshops was facilitated by the consultant to review the draft trail route plan, review the draft trail design guidelines and to discuss criteria that might be utilized for developing priorities for trail implementation. Also discussed was the need for a group or organization to be the champion of the trail plan and to assist communities with the construction of a quality trail system throughout the metro area.

### **Defining the Metro Trails System**

Using the information gathered during the public workshops and other available information, the consultant worked for three months to define a comprehensive community-wide system of trail corridors (Trail Route Plan Map 1) 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 in November 1998 to the steering committee for initial review and comment. Drafts of the plan were also reviewed by INCOG staff, as were five technical memorandums produced

by the consultant. From the comments received, the consultant revised aspects of the initial draft Trails System Plan, and produced a final implementation plan and this executive summary.

### **Key Components of this Plan**

The technical reports produced by the consultant during the past seven months make up the seven chapters of this Plan. Chapter One, The Benefits of Trails, defines the wide range of benefits to the metro area 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 Metro 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 Metro Trails System should be developed during the next fifteen years.

### **Key Recommendations of the Plan**

This Plan recommends the implementation of a 283-mile network of off-road multi-purpose trails throughout the metro area. 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 linkages to popular destinations. Building the system will take many years. The overall system is divided into three phases (Trail Phasing Plan Map 2). In the Near-Term phase, it is envisioned that local government agencies will work in partnership with neighborhoods and private sector organizations to develop an estimated 78 miles of trail projects. Near-Term projects would begin development in Calendar Year 1999. During the Mid-Term phase, an additional 77 miles of trail projects would be developed, and the Long-Term phase envisions that the remaining 127 miles of trail projects would be implemented.

The plan proposes a 207 mile system of on-road "linkages" throughout the Metro area, which is divided into two phases. In the Near-Term phase, it is envisioned that 99 miles of "linkages" would be constructed. The remaining 108 miles would be implemented in the Mid-Term phase. In addition, the City of Tulsa has prepared a conceptual on-street bike route map which may serve as the basis for a comprehensive Citywide bikeway system.

Near-Term trail projects are estimated to cost somewhere between \$17 and \$20 million to fully develop. Some of the projects included in the Near-Term phase include the Mingo Trail, Broken Arrow South Loop Turnpike Trail, River Parks East

## How Much Will It Cost to Develop the Metro Trails System

Bank Trail widening, Katy Downtown Trail, SKO Trail, Midland Valley Extension, Fry Ditch Trail, Jenks River Trail, River City Trail, Joe Creek Trail, River Parks Tulsa Bixby Trail, and Creek West Turnpike Extension. 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 1999 with the highest priority project corridors.

Near-Term on-street “linkages” are estimated to range in cost from \$1 - \$1.5 million to fully develop. The Mid-Term “linkages” are estimated to range from \$1.1 - \$1.6 million to fully develop.

A generalized 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.

This plan has been reviewed and approved by INCOG and various local governments in the metro region. It has been adopted, by INCOG, as an official component of the Long-Range Transportation Plan for the Tulsa Metro region, and as a part of the Comprehensive Plan by the Tulsa Metropolitan Area Planning CommThis

### Near Term Trails Cost

Rank	ID	NAME	LENGTH (mi)	LOW COST	HIGH COST
1	1	River Parks East Bank Trail	5.25	1,181,250	1,365,000
2	13	Mingo Trail	16.96	3,816,000	4,409,600
3	14	BA South Loop Trail	12.37	3,061,575	3,537,820
4	35	Katy Downtown Trail *	0.93	313,875	362,700
5	38	SKO Trail	14.90	3,352,500	3,874,000
6	37	Midland Valley Extension	1.45	407,813	471,250
7	18	Fry Ditch Trail	7.03	1,265,400	1,462,240
8	27	Jenks River Trail	4.80	1,080,000	1,248,000
9	34	River City Trail	1.60	396,000	457,600
10	29	Joe Creek Trail/Linkage	2.64	534,600	617,760
11	17	River Parks Tulsa Bixby Trail	5.01	1,014,525	1,172,340
12	26	Creek West Turnpike Extension	5.09	1,317,038	1,521,910
		<b>TOTAL NEAR TERM CORRIDORS</b>	<b>78.03</b>	<b>17,740,575</b>	<b>20,500,220</b>

All costs based on 1999 dollars.

\* Does not include the cost for the proposed Katy Trail Head development near Greenwood and Archer.

**Mid Term Trails Cost**

Rank	ID	NAME	LENGTH (mi)	LOW COST	HIGH COST
13	30	Mooser Creek Trail	3.55	798,750	923,000
14	36	Midland Valley North Trail	6.29	1,415,250	1,635,400
15	15	Creek East/Will Rogers Trail	10.86	2,443,500	2,823,600
16	46	Broken Arrow Creek Trail	6.62	1,489,500	1,721,200
17	32	Gilcrease West Trail	5.50	1,237,500	1,430,000
18	12	LaFortune Trail	1.82	307,125	354,900
19	28	Jenks Missouri Pacific Trail	3.25	621,563	718,250
20	43	Cooley Creek Trail	1.92	432,000	499,200
21	19	Haikey Creek Trail	9.10	2,047,500	2,366,000
22	33	Bigheart Trail	1.18	292,050	337,480
23	41	Owasso Trail	10.66	2,398,500	2,771,600
24	16	Chouteau NationalTrail	16.31	2,935,800	3,392,480
<b>TOTAL MID TERM CORRIDORS</b>			<b>77.06</b>	<b>16,419,038</b>	<b>18,973,110</b>

All costs based on 1999 dollars.

**Long Term Trails Cost**

Rank	ID	NAME	LENGTH (mi)	LOW COST	HIGH COST
25	19a	Haikey Creek Tulsa Tributary	3.29	740,250	855,400
26	39	Mohawk Trail	6.98	1,334,925	1,542,580
27	38a	SKO Trail	3.60	810,000	936,000
28	32a	Gilcrease Northwest Trail	6.31	1,419,750	1,640,600
29	64	Zink Ranch Trail	2.56	633,600	732,160
30	36a	Midland Valley North Trail	8.09	1,820,250	2,103,400
31	22	SH 67 Trail	2.66	478,800	553,280
32	19b	Haikey Creek BA Tributary	3.04	684,000	790,400
33	23	Missouri Pacific Trail	15.85	3,566,250	4,121,000
34	72	Mohawk/Port of Catoosa Trail	7.73	1,391,400	1,607,840
35	20	River Parks Bixby/BA Trail	8.13	1,829,250	2,113,800
36	31	Polecat Creek Trail	13.12	2,952,000	3,411,200
37	44	Adams Creek West Trail	4.15	933,750	1,079,000
38	25	Bixby River Trail	10.92	2,457,000	2,839,200
39	40	SKO Spur Trail	4.84	1,089,000	1,258,400
40	21	River Parks BA/Coweta Trail	9.75	2,193,750	2,535,000
41	45	Coweta Creek Trail	2.84	639,000	738,400
42	24	Posey Creek Trail	4.21	947,250	1,094,600
43	42	Elm Creek Extension	2.52	567,000	655,200
44	44a	Adams Creek East Trail	7.32	1,647,000	1,903,200
<b>TOTAL LONG TERM CORRIDORS</b>			<b>127.91</b>	<b>28,134,225</b>	<b>32,510,660</b>
<b>TOTAL ALL TRAIL CORRIDORS</b>			<b>283.00</b>	<b>62,293,838</b>	<b>71,983,990</b>

All costs based on 1999 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 regional trail system. The cost estimates for these types of facilities is 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 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)	LOW COST	HIGH COST
1	50	36th St Linkage	4.45	40,050	60,075
2	74	SW Blvd/Old Sapulpa Linkage	13.85	138,500	207,750
3	61	West 23rd Linkage	3.44	34,400	51,600
4	52	56th Street Linkage	4.29	53,625	80,438
5	75	West 41st Street Linkage	5.33	53,300	79,950
6	63	Wekiwa Linkage	8.21	82,100	123,150
7	49	Tulsa North/South Linkage	17.82	178,200	267,300
8	57	Elwood Linkage	10.06	100,600	150,900
9	62	Lake Keystone Linkage	8.78	87,800	131,700
10	60	SH 97 Linkage	9.48	71,100	106,650
11	51	46th St Linkage	3.29	32,900	49,350
12	67	SH 20 Linkage	10.44	104,400	156,600
<b>TOTAL NEAR TERM CORRIDORS</b>			<b>99.44</b>	<b>976,975</b>	<b>1,465,463</b>

All costs based on 1999 dollars.

**Mid Term Linkages Cost**

Rank	ID	NAME	LENGTH (mi)	LOW COST	HIGH COST
13	54	Eastland Linkage	9.37	107,755	161,633
14	64	Zink Ranch Linkage	17.72	150,620	225,930
15	53	76th St Linkage	5.24	52,400	78,600
16	56	Coweta Linkage	8.78	87,800	131,700
17	58	SH 67 Linkage	7.42	81,620	122,430
18	68	German Corner Linkage	4.27	42,700	64,050
19	59	SH 75A Linkage	4.55	45,500	68,250
20	65	Osage Linkage	8.62	86,200	129,300
21	73	Pine Linkage	5.93	59,300	88,950
22	55	Lynn Lane Linkage	3.05	30,500	45,750
23	71	Catoosa/Owasso Linkage	10.39	103,900	155,850
24	69	Sperry Linkage	7.28	72,800	109,200
25	70	Cherokee Linkage	3.60	36,000	54,000
26	66	Skiatook Lake Linkage	4.77	47,700	71,550
27	72a	SH 266 Linkage	7.15	71,500	107,250
<b>TOTAL LONG TERM CORRIDORS</b>			<b>108.14</b>	<b>1,076,295</b>	<b>1,614,443</b>
<b>TOTAL ALL LINKAGE CORRIDORS</b>			<b>207.58</b>	<b>2,053,270</b>	<b>3,079,905</b>

All costs based on 1999 dollars.

**Conceptual On Street Bikeways**

During the numerous public meetings the topic of providing on street bikeways in the region was frequently discussed. In fact, during the citizen mapping of trails and bikeways, over 1000 miles of on street routes were delineated for the TTMA region. Even though the purpose of this master plan is primarily for off street multiuse trails, it is important to recognize the need for on street bikeways in the area.

Within the City of Tulsa the concept of on street bikeways was further refined based on the needs of the cycling community. The City of Tulsa Public Works Department and Traffic Engineering have prepared a proposed network of on street bicycle routes which utilize collector streets as their primary corridors. Jon Eshelman, City Traffic Engineer, has field inspected many of the routes. In most cases the planned on street bicycle routes intersect primary arterial streets at traffic lights for safe crossings. Tulsa's on street bicycle route plan has been enthusiastically embraced by numerous members of the bicycling community and will be periodically updated as new connections are warranted and traffic conditions change.

Based on the on street bikeway corridors that were delineated during the citizen mapping process and the City of Tulsa's proposed on street bike routes the Conceptual On-Street Bike Route Plan (Map 3) has been compiled. It depicts 591 mile of proposed on street bike routes and 19 miles of existing routes. The proposed bike routes are recommended for further evaluation to determine their suitability as designated on street bike routes. It is anticipated that further refinement to the bike route plan will be made by various local governments from time to time as further field inspections are made and as traffic patterns change. Current copies of the on street bike route plan can be obtained from INCOG/TMAPC or the City of Tulsa Traffic Engineer.

### **What's the Next Step in the Process**

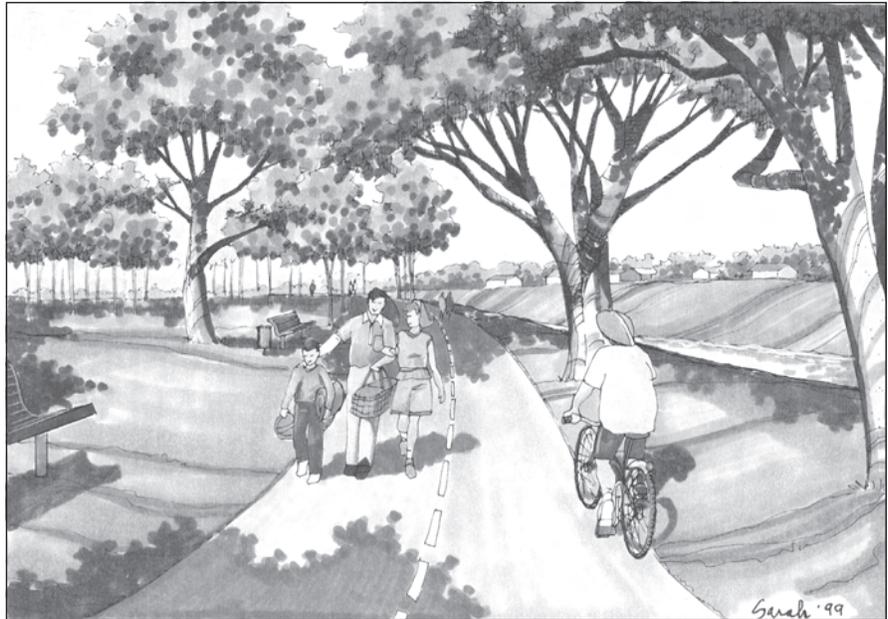
This plan has been reviewed and approved by INCOG and various local governments in the metro region. It has been adopted, by INCOG, as an official component of the Long-Range Transportation Plan for the Tulsa Metro region, and as a part of the Comprehensive Plan by the Tulsa Metropolitan Area Planning Commission. The plan is also being considered for adoption by other local planning commissions in the metro area for their respective jurisdictions. The projects defined herein are eligible for funding and development through local capital improvement programs and/or various federal grant programs. INCOG encourages local governments, private businesses and residents to become partners in the development of the Metro Trails System.

You can show your support for this Plan by encouraging the timely implementation of specific trail or "linkage" segments. For further information on how you can become involved, contact INCOG, River Parks, your local public officials, planning department, or local cycling, running or walking clubs.

## Conceptual Sketches

Some of the high priority Near-Term trail corridors have been investigated further to determine their suitability for early trail construction. The following sketches provide a graphic illustration of some of the Near-Term trail corridors.

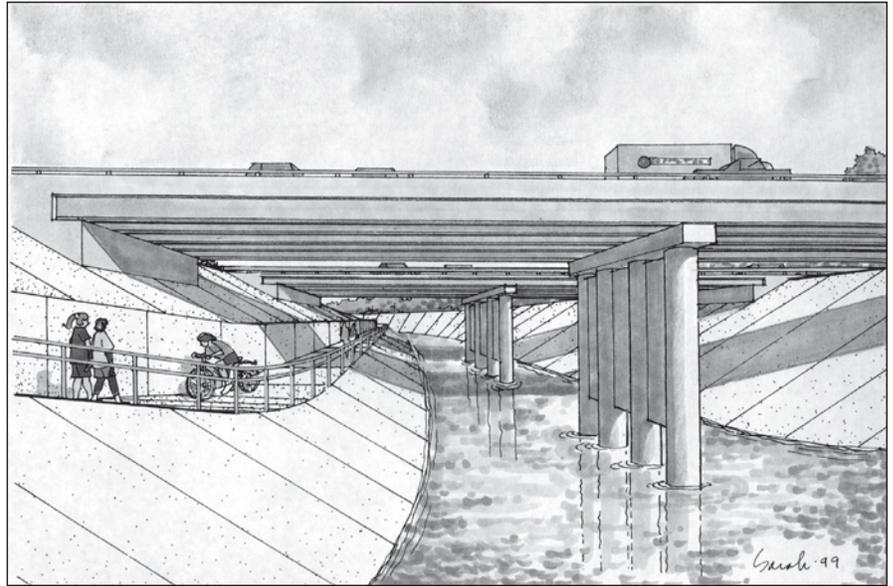
### Mingo Trail south of 11th Street



### Mingo Trail along US 169



**Mingo Trail under I-244 Bridges**



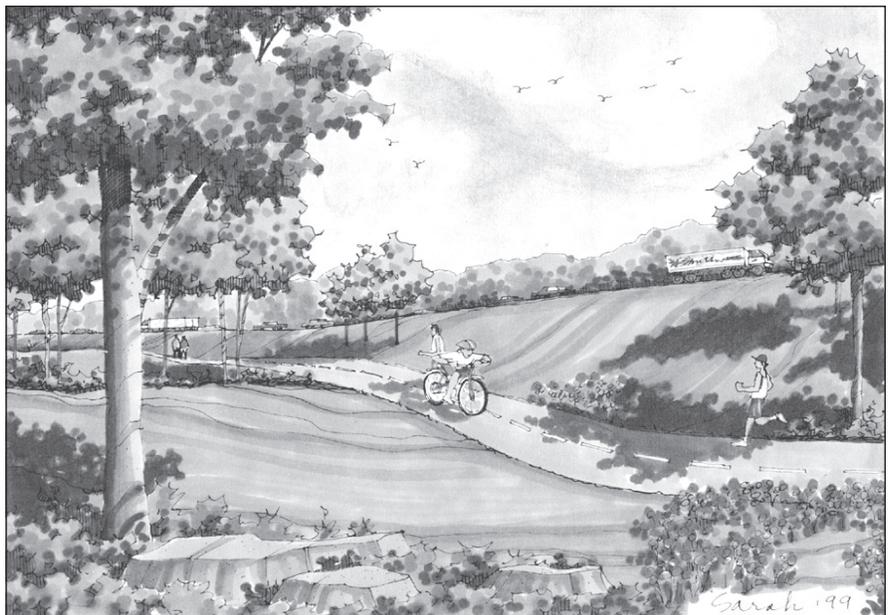
**River City Trail in Sand Springs**



**Jenks River Trail through Park West**



**Creek West Turnpike Trail near Sapulpa**



# Chapter 1



Trails Master Plan

## The Benefits of Trails

### Introduction

A multi-objective trail system for the Tulsa Transportation Management Area (TTMA) 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 TTMA trail and greenway network are described in the following text.

### Transportation Benefits



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

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 the TTMA, 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.

Multi-use trail corridors throughout the TTMA 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 the TTMA is able to meet air quality standards at present, the region does have problems with high ozone levels and has been designated as a federal “non-attainment” area in the past. 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 the TTMA.

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 the TTMA, 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 Tulsa 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 the TTMA. 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 the TTMA. 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 Region, 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 the TTMA 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 the TTMA 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 Region, 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 the TTMA. 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 Tulsa Transportation Management Area (TTMA) Trails Master Plan inventories and evaluates the area's environmental, cultural features, and attractions for the transportation management area and its communities. 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

The Tulsa Transportation Management Area (Existing Conditions Map 4) has grown to include a total population of approximately 609,800 people, exhibiting a wide economic range. 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, the TTMA has begun to lose open space and the rural character that defines some of the smaller cities. The TTMA 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 primary everyday destinations.

The TTMA's most identifiable environmental features include rivers, lakes and reservoirs and their adjacent floodplains. Secondary features include numerous creeks which naturally preserve greenspace due to restricted development in their floodplains throughout the TTMA (Regulatory Floodplain Map 5). Although rivers and creeks generally create barriers for bicycle and pedestrian travel, these features alone preserve many acres of potential locations for bicycle and pedestrian trails. The TTMA's mild winters and warm summers make most of these areas potentially accessible year round.



**Bixby Municipal Building**

The TTMA (Existing Conditions Map 4) encompasses many cities and towns, ranging in population from 3,167 in Catoosa to 378,491 in Tulsa. Located approximately 105 miles from Oklahoma City, 248 miles from Kansas City, 263 miles from Dallas, and 266 miles from Little Rock, the TTMA enjoys its own metropolitan identity while still retaining a sense of community. The following cities and towns comprise a majority of the populated areas within the TTMA. 1996 Bureau of Census estimates are the basis for population identified in each community.

### **Bixby**

Bixby is located south of Tulsa in the southern portion of the TTMA where it is bisected by the Arkansas River. In 1996, Bixby's population totaled 10,770, an increase of 13.3% from 1990. It is served by two state highways (US 64 & SH 67). Much of Bixby is located near or within the 100 year floodplain of the Arkansas River.

### **Broken Arrow**

Broken Arrow is located northeast of Bixby and adjacent to Tulsa in the southeast part of the TTMA; its southern boundary abuts the Arkansas River. The population count in 1996 was 69,175, an increase of 19.2% from 1990. Broken Arrow is crossed by the MK&T railroad and the Broken Arrow Expressway. The proposed Broken Arrow South Loop Turnpike and Creek East Turnpike will traverse through the south and east portions of the City. Haikay Creek's floodplain is located within Broken Arrow in the southwest.



**Broken Arrow Municipal Building**

### **Catoosa**

Catoosa is located adjacent to Tulsa just south of the Port of Catoosa in the northeast portion of the TTMA. A total population of 3,617 persons were estimated in 1996, up 15.4% from 1990. The Burlington Northern railroad crosses the northern portion of the city, the Will Rogers Turnpike passes just east of the city, and US 412 crosses the southern portion of the City. The northeast part of the city is within the floodplains of the Verdigris River and Bird Creek.

### **Collinsville**

Collinsville is located in the northern part of the TTMA. In 1996, the census totaled 3,796, an increase of 5.1% from 1990. The AT&SF railroad, US 169, and the floodplain of Blackjack Creek pass through the east half of the city. The floodplain of Horsepen Creek is just to the north.

### **Coweta**

Coweta is found in the southeast portion of the TTMA along the eastern boundary. Its population was at 6,514 in 1996 which is an increase of 5.8% from 1990. The city is bisected by the MK&T railroad and is served by State Highway 51. The narrow floodplain of Coweta Creek enters Coweta from the south.



Jenks City Hall

### Glenpool

Glenpool is located near Sapulpa and Jenks in the southern part of the TTMA along US 75. A total of 7,533 persons were estimated in 1996 reflecting a 12.6% increase from 1990. Coal Creeks floodplain seems to parallel US 75 through the middle of the city.

### Jenks

Jenks is in the southern half of the TTMA and is bounded by Tulsa, Bixby and Glenpool. It housed a population of 8,654 in 1996, increasing 15.5% from 1990. The Missouri Pacific Railroad and the Arkansas River run along its eastern boundary toward Tulsa. US 75 passes through Jenks along its western boundary. Across the northern portion of the city, Polecat, Hagar, Nickel, and Coal Creek create a floodplain that ties into the Arkansas River.

### Owasso

Owasso lies just north of Tulsa in the northwest quadrant of the TTMA. In 1996, its population was 13,430, an increase of 20.4% from 1990. The AT&SF Railroad wraps around east and south Owasso, while US 169 bisects the city. Ranch Creek joins with Bird Creek to create a large floodplain, located along the southeast boundary of Owasso.



Owasso City Hall

### Sand Springs

Sand Springs, located west of Tulsa in the western half of the TTMA, had a population of 16,770 in 1996, up 9.3% from 1990. Sand Springs spreads out both north and south of the Burlington Northern railroad, the Keystone Expressway, and the Arkansas River, with the proposed Gilcrease Expressway located just east of the City. Most of the floodplain within the City is along Fisher Creek to the south of the Arkansas River.

### Sapulpa

Sapulpa is located in the southwest quadrant of the TTMA, southwest of Tulsa. It had a total of 19,357 persons in 1996 increasing 7.1% from 1990. Sapulpa is crisscrossed by the Burlington Northern Railroad lines. It is also located along the Turner Turnpike with a proposed Creek West Turnpike planned northeast of the City. Rock and Polecat Creeks have floodplains located throughout the City.

### Skiatook

Skiatook is located close to the northern boundary of the TTMA, west of Collinsville. In 1996, Skiatook had a population of 5,197, an increase of 5.8% from 1990. The Missouri Pacific Railroad bisects the City north to south, and a proposed Osage Expressway will eventually connect to State Highway 20 which runs through the middle of Skiatook. A wide floodplain created by Bird Creek runs along the eastern boundary of Skiatook.



Sand Springs City Hall



Downtown Tulsa

### Sperry

Sperry is a small town located between Skiatook and Tulsa, also along the Missouri Pacific Railroad and the proposed Osage Expressway. Bird, Hominy, and Delaware Creeks create an extensive floodplain that is located in south and east Sperry.

### Tulsa

Tulsa is located in the center of the TTMA. It had a population of 378,491 within its boundaries in 1996, increasing 3.0% from 1990. It is served by railroad lines extending in six directions from downtown. The highways and expressways that serve Tulsa radiate from downtown or loop through the City include I-44, US 64, US 75, US 412, and US 169. Tulsa's largest floodplains are those of Mingo Creek and Bird Creek.

## 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 TTMA has the benefit of two regional lakes; it contains a portion of Keystone Lake along the west boundary and most of Skiatook Lake in the northwest corner (Existing Conditions Map 4). Keystone Lake has twenty-five recreation areas around 26,300 acres of lake including two state parks with varying facilities that include boat launching ramps, picnic areas, designated campsites, drinking water, group shelters, restrooms, showers, swimming beaches, a change house, nature trails, trailer dump stations, electrical hookups, and concession service. Sixteen of these recreation areas are U.S. Army Corps of Engineer projects which had a total of 751,886 visitors in 1997.



Corps of Engineers Lake Keystone

Skiatook Lake has nine recreation areas around 10,500 acres of lake with a variety of facilities that include all of those mentioned above plus courtesy docks, picnic areas, and a playground. Eight of these recreation areas are Corps projects which had a total of 392,230 visitors in 1997.

The TTMA also contains portions of two rivers, the Verdigris River along the northeast border and the Arkansas River which traverses diagonally across the TTMA. A portion of the Verdigris River in the TTMA is the last leg of the 445 mile McClellan-Kerr Arkansas River Navigation System. In 1997, a total of 2,160,948 tons of cargo passed through the Port of Catoosa which is the last destination along the McClellan-Kerr, a system that links Oklahoma with ports on the Missouri, Ohio, Illinois, and Mississippi river systems which lead to the Gulf Coast Intracoastal Waterway. The Verdigris River converges with the Arkansas River southeast of the TTMA near Muskogee. This waterway is used by fishermen for recreational purposes.



**Fry Ditch Creek in Bixby**

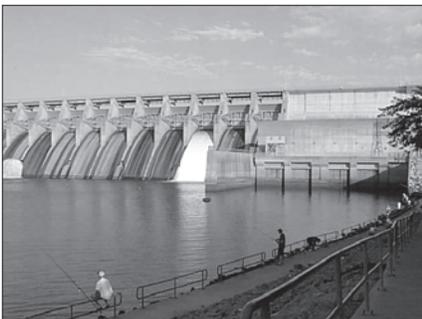
The portion of the Arkansas River within the TTMA is used primarily in conjunction with Keystone Lake for flood control rather than for navigation but is used for recreational purposes by fishermen. Much of its floodplain is controlled and maintained by the River Parks Authority which has built numerous park facilities with playgrounds, picnic areas, and fishing opportunities on both sides of the river. The parks include the River Parks Amphitheater and Festival Park, where major events attract large gatherings of people periodically throughout the year. River Parks also includes an extensive system of existing and funded bicycle and pedestrian trails which will become a part of the TTMA Trails Master Plan (Existing Trail System Map 6).

Listed below there are many other smaller lakes, rivers, and creeks that might be used for trail corridors throughout the TTMA:



**Trail under 71st Street bridge at Joe Creek**

- |                         |                     |
|-------------------------|---------------------|
| Adams Creek             | Fred Creek          |
| Anderson Creek          | Fry Ditch           |
| Battle Creek            | Goose Creek         |
| Berryhill Creek         | Green Creek         |
| Big Flag Lake           | Hager Creek         |
| Big Lake                | Haikey Creek        |
| Bird Creek              | Harlow Creek        |
| Bigheart Creek          | Hobbs Creek         |
| Biven Creek             | Hominy Creek        |
| Blackjack Creek         | Honey Creek         |
| Boggy Creek             | Horsepen Creek      |
| Broken Arrow Creek      | Horseshoe Lake      |
| Brookhollow Creek       | Joe Creek           |
| Brush Creek             | Joe Creek Channel   |
| Caney River             | Little Flag Lake    |
| Cedar Creek             | Little Sand Creek   |
| Chandler Lake           | Lost Creek          |
| Charley Creek           | Lynn Lane Reservoir |
| Cherry Creek            | Marina Lake         |
| Childres Creek          | Middle Duck Creek   |
| Coal Creek              | Mill Creek          |
| Concharty Creek         | Mingo Creek         |
| Coweta Creek            | Mooser Creek        |
| Delaware Creek          | Mossy Creek         |
| Dirty Butter Creek      | Mountain Creek      |
| Dog Creek               | Mud Creek           |
| Duck Creek              | Nickel Creek        |
| East Creek              | North Duck Creek    |
| East Prong Quapaw Creek | Owasso Lake         |
| Elm Creek               | Phillips Lake       |
| Euchee Creek            | Polecat Creek       |
| Fisher Creek            | Posey Creek         |
| Flatrock Creek          | Pretty Water Lake   |



**Arkansas River below Keystone Dam**



Mingo Creek with existing maintenance trail

- Quapaw Creek
- Ranch Creek
- Recreation Lake
- Rock Creek
- Sahoma Lake
- Salt Creek
- Samsel Lake
- Sand Creek
- Sand Springs Lake
- Sapulpa Reservoir
- Shell Creek
- Shell Lake
- Silver Lake
- Skalall Creek
- Skull Creek
- Skunk Creek
- Snake Creek
- Spunky Creek
- Sugar Creek
- Swan Lake
- Turkey Creek
- Tyner Creek
- Valley View Creek Channel
- West Prong Quapaw Creek
- Yahola Lake
- Yonkipin Lake

**State Parks**

Two state parks are located wholly or partially within the TTMA. Keystone State Park sits west of Sand Springs and just southwest of the Keystone Dam. Walnut Creek State Park sits northwest of Sand Springs near a town called New Prue. Keystone State Park has 714 park acres within the TTMA and features cabins with fireplaces, camping areas, campgrounds, a 1.4 mile hiking trail, a 1.4 mile fitness trail, boating access, bicycle rental, a marina, and a cafe.



Lake Keystone State Park

Walnut Creek State Park, with 1,429 park acres, lies on the border of the TTMA on the north side of Keystone Lake. This park features a swimming beach, boating, fishing, softball, a playground, 15 miles of equestrian trails, a game refuge, sandy beaches, primitive camping, picnic tables, a group shelter, RV hookups, showers, and dump stations.

**Main Streets**

Two towns within the TTMA, Sapulpa and Sand Springs, are official Main Street communities under the Oklahoma Main Street Program. The Main Street Program is a downtown revitalization program that provides training, resources, and technical assistance to active Main Street communities using a four point approach which includes organization, promotion, design, and economic restructuring. Sapulpa became a Main Street community in 1990 and is still actively continuing its downtown revitalization process by improving aesthetics and encouraging retail, offices, and housing to occupy space downtown.

Sand Springs became a Main Street community in 1992 but became inactive in 1997.

Although the pedestrian experience along the Main Streets have been enhanced by streetscape improvements, travel by bicycle through these areas should be encouraged as well as pedestrian/bicycle access to downtown from surrounding areas.



Sand Springs Main Street



71st Street and US 169

### Urban Activity Corridors

The TTMA has an abundance of urban activity corridors throughout its cities and communities. 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. Examples of these corridors in Tulsa are 71st Street between Memorial and U.S. 169, Charles Page Boulevard in Sand Springs, Memorial Drive in Bixby, Elm Street in Broken Arrow and 96th Street in Owasso. Therefore, off-road pedestrian/bicycle routes are needed as one solution to accessing these corridors in a safe manner.

### Residential Neighborhoods

Although the majority of the residential neighborhoods within the TTMA are located in the City of Tulsa, there are numerous residential neighborhoods in Bixby, Broken Arrow, Catoosa, Collinsville, Coweta, Glenpool, Jenks, Owasso, Sand Springs, Sapulpa, Skiatook, and Sperry (Population Density Map 7). The current growth trend for new residential neighborhoods in the TTMA is heavily to the southeast. In order for a trail system to best serve the people of the TTMA, 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 providing on-street bikeways with adjacent sidewalks for pedestrians. Older residential neighborhoods and historic neighborhoods can serve as destinations to many tourists as well as citizens.



Cherry Street Subdivision

### Community/Neighborhood Parks

Local parks typically serve as primary destinations for many residents in the TTMA, although pedestrian and bicycle access to these areas is generally limited to sidewalks (Schools and Parks Map 8). The following is a list of parks in the TTMA. Any of these parks would be greatly enhanced by providing pedestrian/bicycle trails to connect and possibly wind through the park:



Washington Irving Park and Arboretum in Bixby

#### **Bixby**

- Bixhoma
- Haikey Creek (County)
- Lagoon
- Quail Creek
- Charley Young

#### **Broken Arrow**

- Central
- Country Aire I
- Country Aire II
- Graham

- Haskell
- Hidden Springs
- Indian Springs
- Indian Springs Complex
- Lyons
- Ray J. Herral Nature Park
- Urbana

#### **Catoosa**

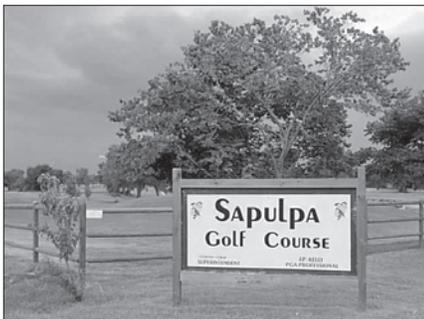
- Rogers Point
- Spunky Creek
- Hathaway



Jenks Municipal Park



Owasso City Park



Sapulpa Golf Course

Hanby  
Sports Complex  
PSO Soccer Fields

**Collinsville**

City Park  
Pioneer

**Coweta**

American Legion  
Coweta School  
G.W. Roland  
Northwest Elementary  
Coweta Sports Complex

**Glenpool**

Municipal  
Nichols  
W.A. Morris

**Jenks**

Lions  
Melody Lane  
Municipal  
Oakwood II  
Parks West  
South Lakes Golf Course (County)

**Owasso**

Ator Park  
Elm Creek  
Ram  
Rayola  
Sports Complex

**Sand Springs**

Angus Valley  
Cedar Ridge  
Civitan  
Douglas  
Freedom Field  
Hogatt  
Limestone  
Page  
Ray Brown  
River City  
Rotary  
Roy Moore  
Sand Springs Municipal Golf  
Whispering Creek

**Sapulpa**

Barlett Collins  
Berryhill

Booker T. Washington  
Charles Hamilton Municipal Golf Course  
City  
Davis  
Hollier  
Holmes  
Kelly Lane  
Lake Sahoma  
Liberty  
McCoy  
Pretty Water Lake  
Reynolds  
Salvation Army Recreation Center  
Senior Citizens Community Center  
Wickham  
Youth Sports Complex

**Skiatook**

City  
John Zink

**Tulsa**

Aaronson  
Adams  
Admiral  
Archer  
Ben Hill  
Bales  
Benedict  
Benton  
Berry  
Bishop  
Boot Adams  
Braden  
Bullette  
Carbondale  
Carl Smith Sports Complex  
Cathedral Square  
Central  
Challenger 7  
Chamberlain  
Cheyenne  
Clinton  
Council Oak

Cowan  
Crawford  
Crutchfield  
Darlington



**River City Park in Sand Springs**



**Owen Park in Tulsa**



**Johnson Park spray pool**

- Dawson
- East Side
- East Tract
- Explorer
- F. Johnson
- F. Reed
- Feldman
- Flat Rock Creek
- Florence
- Franklin
- Friendship
- Gary
- George E. Norvell
- Gilcrease-Stuart
- Graham
- Grotto
- Gunboat
- Hall
- Hawthorne
- Heller
- Helmerich
- Henthorne
- Hicks
- Highland
- Hinch Tract
- Holiday Hills
- Howard
- Hunter
- J.C. Leake
- James L. Maxwell
- Johnson-Atelier
- L.C. Clark
- Lacy
- LaFortune (County)
- Lakeview
- Langenheim
- Lantz
- Lloyd
- Loving
- Lubell
- M. Patrick
- Manion
- Maple
- McClure
- McCullough
- Mini Park 1
- Minshall
- Mitchell
- Mohawk
- Newblock
- Norberg
- North 56th Street Tract
- Oscar Schlegel
- Owen
- Paul Johnson
- Penny
- Philpott
- Plaza
- Plaza of the Americas
- Pratt
- Pratts Peak
- PSO Soccer Complex
- Redbud Valley
- Reed
- Riggs
- River
- Rose Dew
- Seminole Hills
- Shannon
- Skelly
- Spring Lake
- Springdale
- Standard Ind.
- Stunkard
- Swan Lake
- Terrace
- Terwilliger
- Torchia-Oliver
- Tracy
- Turner
- Ute
- Veterans
- Viking
- West Highlands
- West Tulsa
- Wheeling
- Whiteside
- Williams
- Williams Tract
- Woodland View
- Woodward
- Wright Tract
- Zeigler
- Zink



Springdale Park in Tulsa

**County**

Buford Colony  
 Chandler  
 Ol'Skoven  
 Lumpkin Tract  
 McCarty  
 O'Brian County

Ol'Skoven  
 Rodden City  
 Scotsdale  
 Shell Creek  
 Swift  
 Taylor

**Other Public/Private Facilities and Special Use Areas**

There are many public facilities and special use areas in the TTMA. 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:

**Bixby**

Bixby Cemetery  
 Bixby Library

**Broken Arrow**

BA Community Playhouse  
 Broken Arrow Library  
 Floral Haven  
 Park Grove Cemetery  
 Playhouse For Kidz  
 South Broken Arrow Library

**Catoosa**

Arkansas Waterway Museum

**Collinsville**

Collinsville Public Library

**Coweta**

Coweta Public Library

**Glenpool**

Glenpool Community Ctr  
 Glenpool Library

**Jenks**

Jenks Library  
 Jenks Sunbelt Railroad Museum  
 Washington Memorial Gardens

**Owasso**

Graceland Memorial  
 Owasso Aviation  
 Owasso Library

**Sand Springs**

Discoveryland  
 Harry Pratt Library  
 Page Memorial Library  
 Sand Springs Cultural Museum  
 Woodland Memorial

**Sapulpa**

Green Hills Memorial Gardens  
 Prettywater Softball  
 Sapulpa Community Theatre  
 Sapulpa Historical Museum  
 Sapulpa Public Library  
 South Heights Cemetery

**Skiatook**

Skiatook Museum  
 Skiatook Library

**Sperry**

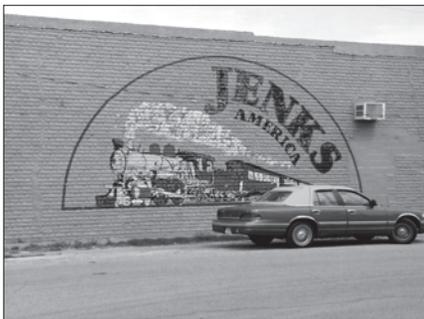
Oklahoma Guitar & Cowboy Museum  
 Sperry Library  
 Sperry Rest Haven Cemetery

**Tulsa**

301 Ranch Guitar & Cowboy Museum  
 American Indian Theater Co  
 American Theatre Co  
 Bell's Amusement  
 Big Splash Water  
 Brady Theater  
 Brookside Library  
 Calvary Cemetery  
 Celebration Station  
 Clark Theatre  
 Crown Hill Cemetery  
 Discovery Zone Inc  
 Drillers Stadium  
 East Second Library  
 Expo Square Pavilion  
 Fair Meadows  
 Family Memorial Planning Inc  
 Fenster Museum of Jewish Art



Jenks BMX track and race course



Downtown Jenks



Charles Page Library in Sand Springs



Rhema Bible College



Broken Arrow High School

- Florence Park Library
- Fun & Games
- Fun House
- Games People Play Inc
- Gilcrease Museum Shop
- Green Acres Memorial Gardens
- Green Country Air Frame
- Greenwood Cultural Ctr
- Hardesty South Library
- Harmon Science Ctr
- Harvey Young Airport Inc
- Heller Theatre
- Helmerich Library
- Ida Dennie Willis Doll Museum
- International Linen Registry
- Jolly Time Inc
- Junior Raceway Park
- Lasertrek
- Mabee Center
- Mac's Antique Car Museum
- Martin East Library
- Mason Lodge Hall
- Maxwell Park Library
- Memorial Drive Community Ctr
- Memorial Park Cemetery
- Nathan Hale Library
- Oaklawn Cemetery
- Paint'n Place
- Philbrook Museum of Art
- Regional Library
- Rose Hill Memorial Park
- Rudisill N. Regional Library
- Schusterman-Benson Library
- Skate World
- Skelly Stadium
- South Haven Community Ctr
- Suburban Acres Library
- Theatre North
- Theatre Tulsa
- Tilt
- Tulsa Central Library
- TCC Performing Arts Center
- Tulsa Historical Society Museum
- Tulsa International Airport
- Tulsa Opera Inc
- Tulsa Performing Arts Ctr
- Tulsa Speedway
- Tulsa Spotlighters Inc
- Tulsa Swingdance Club
- Tulsa Technology Ctr
- West Regional Library
- Wil-Lo Hall

**Schools, Colleges, and Vocational Schools**

Schools serve as primary destinations for a large portion of TTMA's population, from children to adults (Schools and Parks Map 8). 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:

**Berryhill**

- Berryhill Elementary
- Berryhill Junior High
- Berryhill High

**Bixby**

- Brassfield Elementary
- C E Gray Elementary
- George L Brown Primary Center
- Leonard Public
- Bixby Junior High
- Bixby Middle
- Bixby High

**Broken Arrow**

- Tulsa Technology Center (SE)
- Rhema Bible Training Center
- Grace Fellowship Christian
- Arrow Springs Elementary
- Arrowhead Elementary
- Country Lane Elementary
- H Cecil Rhoades Elementary
- Indian Springs Elementary
- Leisure Park Elementary
- Lynn Wood Elementary
- Oak Crest Elementary
- Park Lane Elementary



Jenks High School

Southside Elementary  
 Spring Creek Elementary  
 Vandever Elementary  
 Westwood Elementary  
 Wolf Creek Elementary  
 Andersen Elementary (Union)  
 McAuliffe Elementary (Union)  
 Tom Peters Elementary (Union)  
 Central Middle  
 Charles N Haskell Middle  
 Clarence G Oliver Middle  
 Ernest Childers Middle  
 North Intermediate High  
 Sequoyah Middle  
 South Intermediate High  
 Intermediate High (Union)  
 Broken Arrow Senior High  
 Community Education  
 Margaret Hudson  
 8th Grade Center (Union)

**Catoosa**

Catoosa Lower Elementary  
 Catoosa Upper Elementary  
 Richard J Wells Middle  
 Catoosa High

**Collinsville**

Washington Elementary  
 Wilson Elementary  
 Collinsville Middle  
 Collinsville High

**Coweta**

Central Elementary  
 Kindergarten Center  
 Northwest Elementary  
 Coweta Intermediate  
 Coweta Junior High  
 Coweta High

**Glenpool**

Glenpool Elementary K-4  
 Glenpool Elementary 5  
 Glenpool Middle  
 Glenpool High

**Jenks**

Central Elementary  
 West Elementary  
 Jenks High

**Liberty Mounds**

Liberty Elementary  
 Liberty Middle  
 Liberty High

**Owasso**

Ator Heights Elementary  
 Barnes Elementary  
 Jeff Mills Elementary  
 Larkin Bailey Elementary  
 Pamela Hodson Elementary  
 Smith Elementary  
 Owasso Middle  
 Owasso 8th Grade Center  
 Owasso 9th Grade Center  
 Owasso High

**Sand Springs**

TC C West Campus  
 Angus Valley Elementary  
 Central Elementary  
 Garfield Elementary  
 Keystone Public  
 Kindergarten Center  
 Limestone Elementary  
 Pratt Elementary  
 Twin Cities Elementary  
 Central Junior High  
 Clyde Boyd Junior High  
 Charles Page High

**Sapulpa**

Sapulpa Christian  
 Garfield Elementary  
 Jefferson Elementary  
 Liberty Elementary  
 South Heights Elementary  
 Washington Elementary  
 Woodlawn Elementary  
 Sapulpa Senior High  
 Sapulpa Middle  
 Sapulpa Junior High  
 Creek County Alternative

**Skiatook**

Central Elementary  
 Marris Elementary  
 Skiatook Middle  
 Skiatook High

**Sperry**

Sperry Elementary



Tulsa Community College West Campus



Sapulpa High School



OSU Tulsa Campus



Tulsa Community College Metro Campus



Central High School in Tulsa

Sperry Upper Elementary  
 Sperry Middle  
 Sperry High

**Tulsa**

Oral Roberts University  
 OSU College Of Osteopathic Medicine  
 OU College Of Medicine  
 OSU-Tulsa  
 University Of Tulsa  
 Spartan School Of Aeronautics  
 Tulsa Community College Conf Center  
 TCC Metro Campus  
 Tulsa Community College NE Campus  
 Tulsa Community College SE Campus  
 Tulsa Technology Center (Airpark)  
 Tulsa Technology Center - Peoria  
 Tulsa Technology Ctr (Lemley Campus)  
 Bishop Kelly High  
 Cascia Hall  
 Evangelistic Temple  
 Holland Hall  
 Holy Family  
 Marquette  
 Metro Christian Academy  
 Monte Cassino  
 St Mary's  
 St Pius X  
 Victory Christian  
 Wright Christian Academy  
 East Elementary (Jenks)  
 Southeast Elementary (Jenks)  
 Oakridge Elementary (Sapulpa)  
 Mitchell Elementary  
 Academy Central  
 Addams Elementary  
 Alcott Elementary  
 Anderson Elementary  
 Barnard Elementary  
 Bell Elementary  
 Bryant Elementary  
 Burroughs Elementary  
 Carnegie Elementary  
 Celia Clinton Elementary  
 Chouteau Elementary  
 Columbus Elementary  
 Cooper Elementary  
 Disney Elementary

Eisenhower Elementary  
 Eliot Elementary  
 Emerson Elementary  
 Eugene Field Elementary  
 Greeley Elementary  
 Grimes Elementary  
 Grissom Elementary  
 Hawthorne Elementary  
 Hoover Elementary  
 Houston Elementary  
 Jackson Elementary  
 Kendall-Whittier Elementary  
 Kerr Elementary  
 Key Elementary  
 Lanier Elementary  
 Lee Elementary  
 Lindbergh Elementary  
 Lindsey Elementary  
 MacArthur Elementary  
 Mark Twain Elementary  
 Marshall Elementary  
 Mayo Demonstration  
 McClure Elementary  
 McKinley Elementary  
 Park Elementary  
 Patrick Henry Elementary  
 Perry Elementary  
 Penn Elementary  
 Phillips Elementary  
 Remmington Elementary  
 Robertson Elementary  
 Roosevelt Elementary  
 Salk Elementary  
 Sandberg Elementary  
 Sequoyah Elementary  
 Skelly Elementary  
 Springdale Elementary  
 Whitman Elementary  
 Wright Elementary  
 Boevers Elementary (Union)  
 Briarglen Elementary (Union)  
 Cedar Ridge Elementary (Union)  
 Clark Elementary (Union)  
 Darnaby Elementary (Union)  
 Grove Elementary (Union)  
 Jarman Elementary (Union)  
 East Middle (Jenks)



**Roosevelt Elementary School**

- Byrd Middle
- Carver Middle
- Cleveland Middle
- Clinton Middle
- Edison Middle
- Foster Middle
- Gilcrease Middle
- Hamilton Middle
- Lewis and Clark Middle
- Madison Middle
- Monroe Middle
- Nimitz Middle
- Whitney Middle
- Wilson Middle
- Sixth & Seventh Grade (Union)
- Seventh & Eighth Grade (Jenks)
- Booker T. Washington High
- Central High
- Daniel Webster High
- East Central High
- Memorial High
- McLain High Career Academy
- Nathan Hale High
- Thomas A. Edison High
- Will Rogers High
- Union High (Union)
- Early Childhood Dev Center
- Ellis W Woods Annex
- Franklin
- Fulton
- Indian Pupil Education
- Margaret Hudson
- Pershing Center
- Project 12
- S E Williams Stadium
- Science Resource Center
- Turley**
- Cherokee Elementary



**Utica Square Shopping Center**

**Shopping Centers**

Shopping centers in the TTMA 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 facility. However, as 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 following TTMA shopping centers:

**Broken Arrow**

Town Centre

**Sand Springs**

- Harris Development
- Prattville Shopping Ctr
- Springs Village Shopping Ctr

**Tulsa**

- 51st Street Shopping Ctr
- America's Center
- Centre 71
- Country Club Plaza
- Eastland Mall
- Eton Square Shopping Ctr
- Farm Properties Inc
- Fikes Shopping Ctr

- Forum 21 Mall
- Garnett Plaza
- Lincoln Plaza
- London Square Ctr
- Mall 31
- Mayo Meadow Shopping Ctr
- Nidiffer Shopping Ctr Inc
- Northridge Shopping Ctr
- Plaza Shopping Ctr
- Sheridan Village Shopping Ctr
- Southroads Shopping Ctr
- Thirty-Six St North Corp
- Tulsa Promenade Shopping Ctr
- Utica Square Shopping Ctr
- Woodland Hills Mall



**St. John's Medical 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



**Broken Arrow Medical Center**

of off-road facilities for exercise and transportation to the following hospitals and medical centers:

**Broken Arrow**

Broken Arrow Medical Ctr

**Tulsa**

American Transitional Hospital  
 Brookhaven Hospital  
 Children’s Hospital-St Francis  
 Children’s Medical Ctr  
 Columbia Doctor’s Hospital  
 Columbia Homecare  
 Columbia Occupational Medicine  
 Columbia Pain Management Ctr  
 Columbia Specialty Hospital-Tulsa  
 Columbia Surgicare of Tulsa  
 Columbia Tulsa Regional Med Ctr

Continuous Care Ctr of OK  
 Hillcrest Medical Ctr  
 Laureate Psychiatric Clinic  
 Medical Inc  
 Memorial Medical Ctr  
 Northeast Oklahoma Rehab Hosp  
 Parkside  
 Rapha Treatment Ctr of Tulsa  
 Shadow Mountain Hospital  
 Southcrest Medical Center  
 St Francis Ambulatory Srgry  
 St Francis Hospital  
 St John Medical Ctr  
 US Veterans Outpatient Clinic



**Flight Safety International in Broken Arrow**

**Major Employers**

Employers serve as destinations everyday to TTMA’s residents. The Labor Force Density Map (Map 9) graphically depicts where employees live, while the Employment Density Map (Map 10) depicts where the employees work. 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. Employers would then benefit from a more alert and healthy work force. The following is a list of major employers within the TTMA relative to each city or town:

**Bixby**

American Foundry Group  
 Bixby Manor  
 Bixby Public Schools

**Broken Arrow**

Armin Plastics  
 Broken Arrow Medical Center  
 Broken Arrow Public Schools  
 Connect Work, Inc.  
 Dresser Rand  
 Flight Safety International  
 Gatesway Foundation  
 K-Mart  
 Midland Brake  
 O.K. Apple, Inc.  
 Oxford Healthcare  
 Paccar, Inc.

Price Mart  
 Wal-Mart  
**Catoosa**  
 Catoosa Public Schools  
 GEA Rainey  
 Sherwood Construction, Co.  
 Tank Supply, Inc.

**Collinsville**

Collinsville Public Schools  
 Collinsville Manor  
 Verdigris Valley Electric

**Coweta**

Coweta Public Schools  
 Wa-Ro-Ma Community Action  
 Wal-Mart

**Glenpool**

Glenpool Healthcare Center



**Sheffield Steel Corporation in Sand Springs**



**Ball Foster Company in Sapulpa**



**St. Francis Hospital**

Glenpool Public Schools

**Jenks**

Empire Construction  
 Jenks Public Schools  
 Kimberly-Clark Corp.  
 Riverside Health Care

**Owasso**

City of Owasso  
 Owasso Public Schools  
 Wal-Mart

**Sand Springs**

Allied Stamp Corp.  
 Cust-O-Fab  
 Fibercast Co.  
 Gary Henry Chevrolet  
 Oakdale Manor Nursing Home  
 Piping Engineering Co., Inc.  
 Rader Diagnostic & Eval. Center  
 Sand Springs Public Schools  
 Sheffield Steel Corp.  
 Stone Container  
 Webco Industries

**Sapulpa**

America National Bank  
 Bartlett-Collins Glass Co.  
 Bartlett Memorial Hospital  
 Bios Corporation  
 Harsco Corp/Paterson Kelly  
 Henry Vogt Machine, Co.  
 IMCO Recycling

John Christner Trucking  
 J & G Steel  
 Liberty Glass Co.  
 Medi-Plex Nursing Centers, Inc.  
 Paragon Industries, Inc.  
 Sapulpa Public Schools  
 Wal Mart

**Skiatook**

Skiatook Public Schools  
 Town of Skiatook  
 Wal-Mart

**Tulsa**

Arrow Trucking, Co.  
 American Airlines  
 Avis Rent-A-Car  
 Bank of Oklahoma  
 Boeing  
 Citgo Petroleum Corp.  
 City of Tulsa  
 Hillcrest Medical Center  
 St. Francis Hospital  
 St. John Medical Center  
 Tulsa Community College  
 Tulsa Public Schools  
 Union Public Schools  
 U.S. Postal Service  
 University of Tulsa  
 Williams

**Existing Transportation System**



**Interstate 44**

In 1990, INCOG adopted a plan called *2020 Foresight* to plan for the accommodation of future transportation needs based on projected growth of the Tulsa and its surrounding cities (2020 Roadways Element Map 11). In addition to showing expressways, turnpikes, and arterial streets that have plans for upgrading and future improvements, the plan also maps and describes proposed expressways and turnpikes that will help complete the roadway network which radiates out from downtown Tulsa and loops around the core urban areas.

These new expressways and turnpikes are intended to serve the growing populations in areas such as Bixby, Broken Arrow, Catoosa, Glenpool, Jenks, and Owasso which are predicted to have growth rates of approximately 50 percent or higher by 2020. Serving Sand Springs and North Tulsa, the expanded expressway system will complete the Gilcrease Expressway loop north, from I-44 to US 75. It will also connect Sperry and Skiatook to the system by extending the Osage Expressway to State Highway 20. To the south, Sapulpa will be served by an extension of the



Broken Arrow Expressway

Creek West Turnpike which will connect the Turner Turnpike to Jenks and Broken Arrow. Broken Arrow will also be served by a new loop created by the proposed B.A. South Loop and the Creek East Turnpike which will connect the Creek Turnpike to US 412 and the Will Rogers Turnpike near Catoosa.

With the planning of these new expressways and turnpikes, 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 proposed expressways and turnpikes, 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 System

The pipeline system through the TTMA consists of 155 miles of crude lines, 280 miles of gas lines, and 288 miles of production lines (Pipeline Routes Map 12). Of these 723 miles of pipeline, a total of 362 miles of pipeline (about half) are located west of the Arkansas River in west Tulsa, Sand Springs, Sapulpa, Glenpool, and Jenks. Several pipelines extend from the Sapulpa-Jenks area through Broken Arrow. Other pipelines are scattered north of Tulsa and mainly run east-west.

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 TTMA has 12 existing and 6 funded trails and bikeways (Existing Trail System Map 6). All of these trails will become a part of the TTMA Trails Master Plan. Below is a description of each trail segment.

### 4th Street Bikeway, Existing

The 4th Street Bikeway is a 6.68 mile on-street bike facility that is delineated by directional signs along its entire length. The bikeway connects the Tulsa downtown area with the Mingo Trail in east Tulsa. Beginning in downtown, the bikeway travels east along 3rd Street to Harvard where it crosses onto 4th St. At New Haven, the bikeway jogs onto 4th Pl. and eventually turns south on S. 73rd E. Ave. Three blocks later it turns east again onto 7th Street and ends when it meets up with the Mingo Trail along Mingo Creek. The 4th Street Bikeway comes within a quarter mile of Lindbergh Elementary School, Will Rogers High School, Kendall-Whittier School, Turner Park, and McClure Park.

### Archer Street Bikeway, Existing

The Archer Street Bikeway is a 1.15 mile on-street bikeway through downtown Tulsa that begins at N. Frisco Ave. at the east end of the K.A.T.Y. Trail. From there it extends 3 blocks southeast to W. Archer St., northeast to S. Elgin Ave., and then southeast again to 3rd St. where it connects to the 4th Street Bikeway. This bikeway is within a quarter of a mile of Owen Park.



Cyclist utilizes the Fourth Street Bikeway



**Bixby Trail**

**Greenwood/Mohawk Bikeway, Funded**

The Greenwood/Mohawk Trail will be an 8.91 mile on-street bikeway in north Tulsa connecting the downtown area with Mohawk Park. The bikeway will make a loop beginning at E. Brady St. and N. Greenwood Ave. and extending primarily north on N. Greenwood Ave. and N. Hartford Ave. where it intersects the Dirty Butter Creek Trail along the way, west on E. Mohawk Blvd., south primarily on N. Boston Pl. and N. Boston Ave., and east on E. John Hope Franklin St. back to N. Greenwood Ave. At the intersection of N. Hartford Ave. and N. Greenwood Ave., the bikeway will travel northeast along E. Mohawk Blvd. to N. Harvard Ave. and Lake Yahola. The bikeway is located within a quarter mile of OSU-Tulsa, Carver Middle School, Burroughs Elementary School, Emerson Elementary School, Lakeview Park, Cheyenne Park, Ben Hill Park, and Crawford Park.

**Bixby Trail, Existing**

The Bixby Trail is a 10' wide asphalt off-road trail approximately 1.3 miles in length. It includes center line striping and signage. This trail extends from the Daily Family YMCA, which is used as a trail head, south along Memorial Drive across the "bannana bridge" to the south side of the Arkansas River. The "bannana bridge", an abandoned pony truss type bridge was renovated for trail use. The phase two extension of this trail is funded and will connect to the Bixby Sports Complex along the south bank of the Arkansas River.



**Cherry Creek maintenance trail**

**Cherry - Redfork Trail, Existing**

The Cherry-Redfork Trail is a crushed limestone off-road trail and maintenance road that extends 1.15 miles. Due to its lack of connection to destinations or a primary trail system, this trail is infrequently utilized. The trail begins at the intersection of W. 41st St. and Cherry Creek, just east of highway 75. It follows Cherry Creek southeast to the west bank of the Arkansas River where it will intersect the West Bank Extension Trail.

**Creek Turnpike Trail, Existing**

The Creek Turnpike Trail is a very popular 4.01 mile asphalt trail located in south Tulsa. It is 10' wide with center line striping and signage. The Creek Turnpike Trail extends from the east bank of the Arkansas River east along Vensel Creek to the right of way of the Creek Turnpike, crosses Vensel Creek, Harvard Ave., Yale Ave., Fry Ditch, Sheridan Ave. and ends at Memorial Ave. All road crossings are at grade with only the Yale Ave. crossing signalized for pedestrians. The trail connects to Hunter Park serving as the primary trail head with ample parking and amenities. Secondary "make shift" trail heads are located at Sheridan Road and at the SpiritBank parking lot at 96th and Memorial Drive. Both of these trail heads have gravel parking areas.



**Joggers on the Creek Turnpike Trail**



**Jenks pedestrian bridge**

### **Dirty Butter Creek Trail, Existing**

The Dirty Butter Creek Trail is a short 0.78 mile 10' wide asphalt trail north of Downtown Tulsa. The beginning and end of this trail connect to the Greenwood/Mohawk Bikeway. The trail begins near the intersection of N. Greenwood Ave. and E. Oklahoma St., extends east to N. Hartford Ave., and then travels north to E. Virgin St. where it ends. The trail is located within a quarter mile of the Carver Middle School.

### **Jenks Bridge Trail, Existing**

The Jenks bridge was abandoned by the Oklahoma Department of Transportation when the new 96th Street Bridge was constructed. The bridge crosses the Arkansas River and has been converted for trail use with trail parking located on the west end. This bridge provides a safe trail connection between the City of Jenks and the River Parks Trail southerly extension.

### **KATY Trail, Existing**

The KATY Trail is a 6.70 mile asphalt trail beginning near S. Wilson Ave. and the railroad just south of State Highway 51 in Sand Springs and extends east along the railroad corridor to the Archer Street Bikeway in Downtown Tulsa at N. Frisco Ave. This trail is 10' wide with no center line striping. The KATY trail comes within a quarter mile of the Offices & Special Education Center, Central Junior High School, Pershing Center, and Roy Moore Park in Sand Springs, and the Madison Middle School, Roosevelt Elementary School, Zeigler Park, and Owen Park in Tulsa.



**KATY trail in Sand Springs**

### **LaFortune Park Trail, Existing**

The LaFortune Park Trail is a 3.00 mile crushed limestone trail located in central Tulsa around the perimeter of LaFortune Park. This trail is very popular and heavily used by walkers and runners due to its central location within Tulsa. The trail begins at E. 51st St. and S. Yale Ave. and loops around the park along S. Hudson Ave. and E. 61st St. Although it primarily serves LaFortune Park visitors, it is also within a quarter mile of Key Elementary School and Memorial High School.

### **Midland Valley Trail, Existing**

The Midland Valley Trail is a 1.49 mile long 10' wide asphalt trail located just south of Downtown Tulsa. The portion of the trail north of 21st street has center line striping and the south segment between 21st Street and the River Parks Trail has no center line striping. The trail follows an abandoned railroad corridor beginning at the pedestrian bridge at the River Parks Trail and travels east and north to E. 16th St. Midland Valley is a collector trail, used primarily by surrounding residents to access the River Parks system. The trail is within a quarter mile of Lee Elementary School and Veterans Park.



**Midland Valley trail in Tulsa**



Mingo Creek trail near Hicks Park

**Mingo Trail/Bikeway, Existing**

The Mingo Trail is a 5.80 mile trail/bikeway in east Tulsa with a 10' wide trail constructed of crushed limestone. The limestone trail begins near N. Admiral Pl. and S. Mingo Rd. traveling south along Mingo Creek, connecting to the 4th Street Bikeway, to S. 91st E. Ave. At S.91st E. Ave. the trail changes to an on-street bikeway to cross E. 11th St., then changes back to a limestone trail after the crossing continuing south along Mingo Creek connecting to the Pork Chop and Gateway Park Detention Ponds, to E. 16th St. where it turns west to S. 89th E. Ave. as an on-street bikeway. As a bikeway, it goes south on S. 89th E. Ave. to E. Skelly Dr. where it makes its way over I-44, east on E. 26th St., and then south on S. 94th E. Ave. Once it crosses E. 31st St., the on-street bikeway follows S. 93rd E. Ave. south to E. 37th St., jogs north on S. 94th E. Ave., east on E. 36th St., north on S. 96th E. Ave., east on E. 34th St. until it reaches Hicks Park. At Hicks park the bikeway changes to a crushed limestone trail, follows Mingo Creek and terminates at E. 41st St. The trail/bikeway is located within a quarter mile of Fulton School, Lindbergh Elementary School, Skelly Elementary School, Clark Elementary School, Hicks Park, and Skelly Park.



River Parks trail near 17th Street

**River Parks Trails, Existing**

Within the linear River Parks system, the trails include 7.35 miles of asphalt/limestone trail along the east bank of the Arkansas River and 1.99 miles of asphalt trail along the west bank south of Downtown Tulsa. This is Tulsa's most heavily used trail due to its location within a linear park along the Arkansas River, proximity to residential neighborhoods and the long continuous trail which has no at grade vehicular crossings. Trail users can utilize the entire trail completely separated from the adjacent roadways. Due to the popularity of the River Parks, at times this trail doesn't have the capacity to meet the demand by the wide variety of users.



River Parks trail on the west side of the Arkansas River

The east bank asphalt trail width varies from 8' to 10' and several miles along the east bank is asphalt with an adjacent limestone trail, which is used predominantly by walkers and runners. The asphalt section of trail has no center line striping. The east bank trail begins at Southwest Blvd. and Riverside Drive and extends south along Riverside Drive, past the east end of the pedestrian bridge and Midland Valley Trail, under I-44, and ends at 81st St. where it will connect to the River Parks Trails southerly extension. Trail heads are located at E. 17th St., the Model Park, E. 29th St., E. 41st St., E. 56th St., E. 67th St. and Helmerich Park. In addition to parking, most of these trail head locations have restrooms, drinking fountains and other recreational amenities. These east bank trails link the Model Park, Rivers Edge Cafe, low water dam, the Tulsa Rugby field, 41st St. Playground and frisbee course, F. Johnson Park and Helmerich Park.



**River Parks Southerly Extension corridor under construction**

The 8' wide west bank asphalt trail begins at Southwest Blvd. and Riverside Drive and extends west along across the Southwest Blvd. bridge, turns south along the west bank of the river, and ends at the west end of the pedestrian bridge. This trail passes within a quarter mile of the OSU College Of Osteopathic Medicine, West Tulsa Park, River Parks Festival Site, the Reynolds Amphitheater, the Tulsa Rowing Club and the Old West Playground.

**River Parks Trails Southerly Extension, Funded**

The River Parks Trails Southerly Extension will be a 1.38 mile 10' wide asphalt trail that will extend from 81st Street along the east bank of the Arkansas River to the Creek Turnpike trail. The section of trail between E. 91st St. and the Creek Turnpike trail is complete along with a new trail head located on the east side of the Jenks pedestrian bridge. The section of trail between E. 81st St. and E. 91st St. will be constructed in conjunction with the Riverside Drive Extension.

**West Bank Extension, Funded**

The West Bank Extension will be a 3.58 mile 10' wide asphalt trail with striping and signage. The trail will begin at the south end of the PSO Trail and extend south along the west bank of the Arkansas River, under the I-44 bridge, across Mooser Creek and then along the Burlington Northern railroad corridor to E. 71st St. where it will tie into the 71st St. Pedestrian Bridge and Trail. The trail will be adjacent to the PSO Soccer Complex which will serve as the primary trail head with ample parking and a drinking fountain. Another small parking lot with a drinking fountain will be located near W. 49th St. adjacent to the City of Tulsa overflow lagoons.



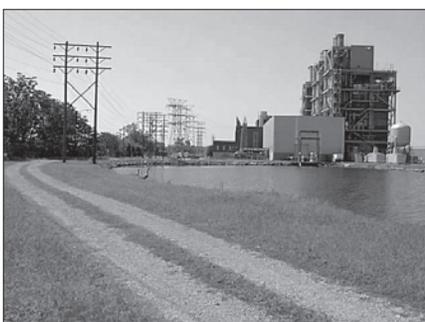
**West Bank Trail corridor**

**71st Street Pedestrian Bridge and Trail, Funded**

The 71st Street Bridge and trail will be a 0.36 mile 10' wide concrete and asphalt trail that will begin at the 71st St. bridge on the east bank of the Arkansas River at the River Parks Trail. The trail will cross the Arkansas River on the existing 71st St. bridge piers, connect to the future West Bank Extension along E. 71st St. and extend to Elwood Ave. At Elwood Ave. the trail will travel north approximately 1,300' to a future parking lot located at the southeastern portion of Turkey Mountain Park.

**PSO Trail, Funded**

The PSO Trail will be a 0.60 mile concrete trail that will link the existing River Parks Trail at the pedestrian bridge on the west bank of the Arkansas River to the West Bank Extension. This 10' wide trail will have center line striping and will extend through the PSO Power Generating Plant. This trail segment is a critical link to continue future trails along the west bank of the Arkansas River. The existing PSO pump station is planned to be converted to an overlook for trail users. Once complete the trail will link the PSO Soccer Complex to the River Parks Trail system. The PSO Soccer Complex will serve as the primary trail head for this segment.



**PSO Trail corridor**



**North River Parks Trail Extension under construction**

### **North River Parks Trail Extension, Funded**

The North River Parks Trail Extension will be a 1.38 mile 10' wide asphalt trail with center line striping and signage west of Downtown Tulsa. The trail will begin near Southwest Blvd. and Riverside Dr. connecting to the River Parks Trail. The trail will go under US 75, bridge the Burlington Northern Railroad, extend northwest along a drainage channel just south of W. Newblock Park Drive and connect with the K.A.T.Y. Trail.

## Chapter 3



Trails Master Plan

## Vision, Goals & Objectives

### Introduction

The following is the vision statement crafted for the Tulsa Transportation Management Area (TTMA) 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 series of six public workshops which took place in early July 1998. Over 100 local residents attended these meetings located in Bixby, Broken Arrow, Owasso, Sand Springs, and Tulsa.

### Vision

A trail system throughout the TTMA will provide safe and convenient facilities for walkers, joggers, bicyclists, skaters, and wheelchair users within 2.5 miles of their homes. It will connect residential areas to significant outdoor recreation areas, including area lakes and parks. The system will offer citizens an alternative to automobile travel, providing routes to popular destinations, including employment centers, retail establishments, tourist attractions, medical facilities and schools. Since trails promote non-polluting forms of transportation, the trail system will improve air quality and reduce congestion in the area. Greenway trail corridors will 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 attractions. In all, the TTMA 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.

#### Environment

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



Sand Springs workshop

**Objectives:**

- Promote the restoration of wetlands and disturbed landscapes, use of native vegetation for habitat purposes, and planting of trees in greenway corridors;
- Improve air quality in the region through promoting non-motorized forms of transportation.
- Promote the maintenance and restoration of natural streambanks and flood detention areas in greenway corridors to improve water quality;
- Promote the use of natural techniques in streambank stabilization;
- Incorporate the use of recycled materials in trail development;
- Protect, restore and maintain environmentally sensitive lands to support plant and animal habitat;
- Limit the use of chemicals in fertilizers and pesticides which are applied near riparian greenway corridors.

**Transportation**

**Goal:** Trail corridors will provide alternative transportation facilities for residents and visitors to the TTMA.



Steering Committee meeting

**Objectives:**

- Provide trails as safe linkages between neighborhoods, parks, businesses, schools and shopping areas within the region;
- Utilize on-road bicycle and pedestrian facilities to “fill the gaps” where off-road trail development is not feasible;
- Provide connections between trails and transit facilities to promote use of alternative transportation;
- Encourage implementation of bike-on-bus programs, and provision of bicycle support facilities (parking and showers) at businesses and retail establishments to increase trail use;
- Provide connections between trails and on-road bikeways and sidewalks;
- Provide temporary signage to alert users of trail construction or detours;
- Encourage connections between communities;
- Explore opportunities for utility trail, levee trail, rail-to-trail and rail-with-trail projects.

**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.



Owasso workshop

**Objectives:**

- Promote development of products which highlight trail locations and emphasize the benefits of trails (such as trail maps), for distribution to local residents through the visitors bureau, Chamber of Commerce, hotels, phone directories, etc.;
- Promote the trail system through bike-to-work days;
- Gain support of political leaders and the media through education efforts;



Workshop at Greenwood Cultural Center

- Educate motorists and trail users as to safe behavior and trail etiquette in order to reduce user conflicts;
- Establish “outdoor classrooms” and signage along trails to teach students about riparian and terrestrial ecology, hydrology and natural history;
- Provide interpretive signage along trails to highlight the historic and natural resources of the area.

### Recreation/Fitness

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

#### Objectives:

- Address the needs of a variety of trail users by providing a balance of paved and unpaved pathways;
- Link parks, picnic areas and other recreation facilities through trail development;
- Provide recreational trail amenities, such as picnic areas, mileage markers, drinking fountains, restrooms, benches, parking, fitness stations, fishing areas, and lighting where appropriate;
- Provide trail access to multiple users, including walkers, hikers, joggers, bicyclists, skaters and wheelchair users;
- Provide trails that are accessible to places where people live in the region;
- Provide trail heads at appropriate locations.



Public workshop in Sapulpa

### Safety

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

#### Objectives:

- Minimize the potential for user conflicts through proper design, education and maintenance;
- Build trails to national standards for user safety;
- Develop a uniform signage system for trails in the region to orient and educate trail users;
- Provide emergency cellular phones along trails to increase user security;
- Include lighting along trails which are open at night;
- Promote trails as “self-policing” facilities, where the potential for criminal activity is reduced due to the number of trail users and neighbors;
- Provide signs/signals for at grade street crossings;
- Provide grade separated crossings when possible.



Tulsa public workshop

### Economic

**Goal:** Trails in the TTMA will improve the economic health of the area through increasing property values, attracting businesses, providing tourism revenue and reducing the costs of flooding.



**Bixby workshop**

**Objectives:**

- Reduce exposure to future flooding and financial losses, and provide a more cost effective method for managing these resource lands, by providing greenways as a more appropriate use of floodplain lands;
- Encourage the formation of public-private partnerships to help manage and fund the trail system;
- Increase the value of nearby residential, commercial and industrial properties through trail development;
- Provide trails as magnets for businesses and individuals seeking to relocate;
- Establish trails as tourist destinations;
- Provide opportunities for economic growth through the creation of trail-related businesses (such as bike shops, restaurants, bed and breakfasts and plant nurseries).

**Maintenance & Management**

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

**Objectives:**

- Develop a maintenance program which ensures that trails are swept and repaired after storm or flooding events, and that any litter and graffiti are controlled;
- Consider the designation of a single governing authority for management of the primary trail system;
- Institute an adopt-a-trail program to involve volunteers in maintenance activities;
- Provide trash and recycling receptacles along trails;
- Provide suitable detours for users when trails are closed.



**Broken Arrow workshop**

## 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 the Tulsa Transportation Management Area (TTMA). 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

The general attributes of the TTMA regional 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.

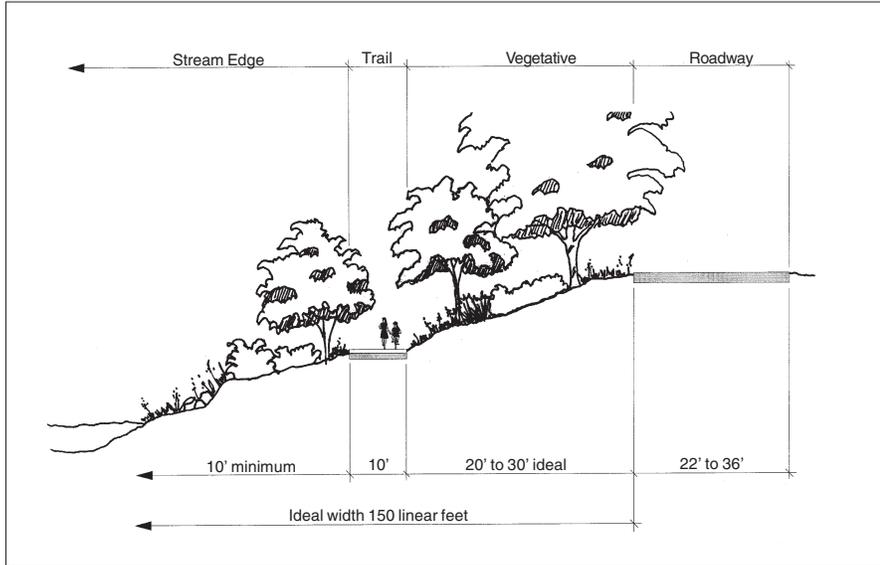
### Trail Development Corridors

There are several different corridor types within the Tulsa Transportation Management Area 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

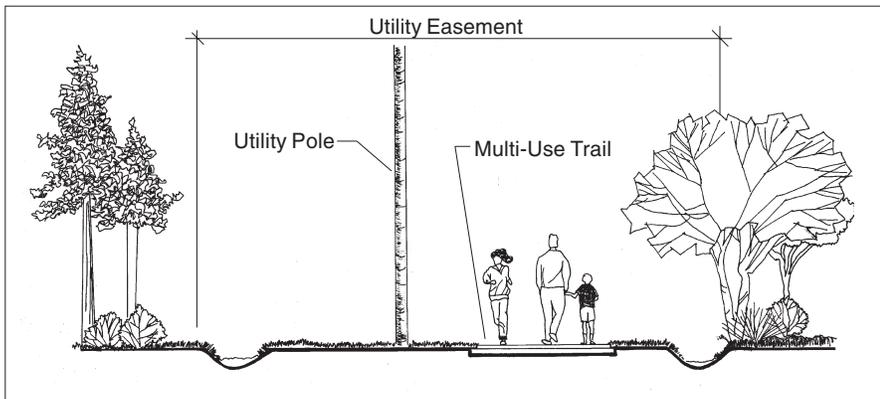
preserving water quality and wildlife habitat. These vegetative zones work to filter pollutants from stormwater runoff before it reaches streams or rivers. Preserving these buffers also serves wildlife by providing important habitat adjacent to streams and rivers. This habitat preservation is especially 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

corridors, similar to railroad easements, 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-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.

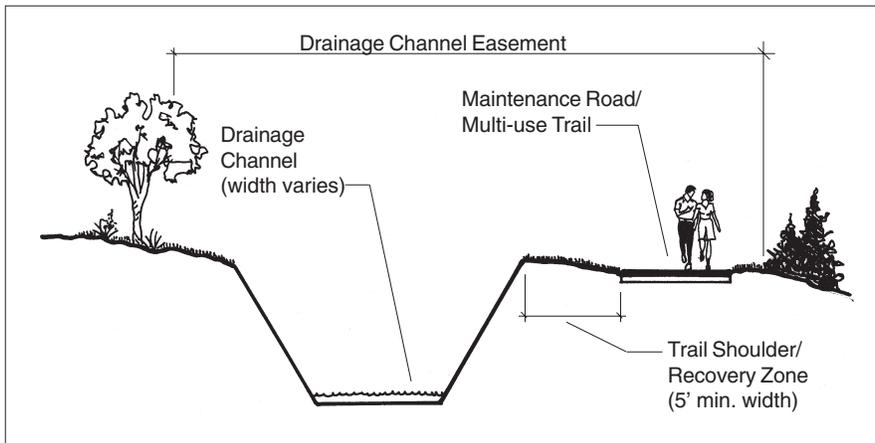


Typical Cross Section: Utility Easement Trail

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.

### Drainage Easement Trail

The network of drainage ways throughout the Tulsa Transportation Management Area presents a unique opportunity for trail development. Many of these drainage ways have an existing



Typical Cross Section: Drainage Easement Trail

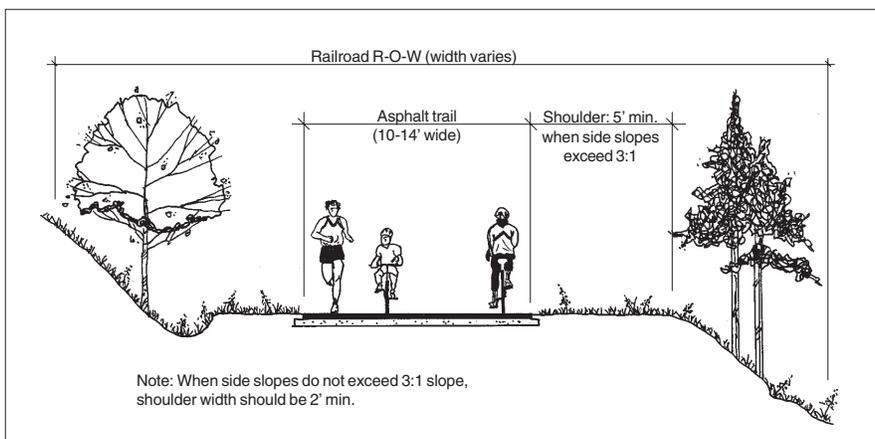
Trails utilizing drainage easements should be placed as far away (5' suggested min.) from the channel as the easement allows. This will provide a recovery zone between trail users and the channel if a cyclist should lose control on the trail. Drainage easement trails that are part of the regional network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

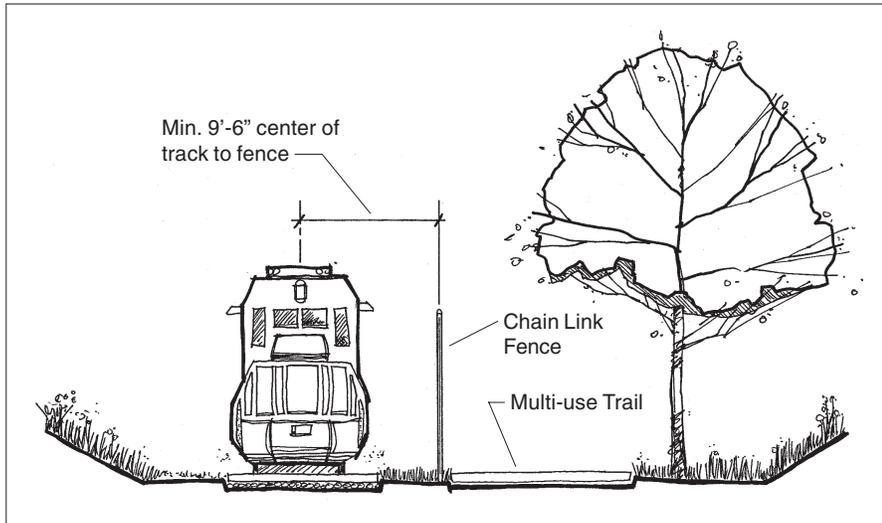
historic depots, along the corridor can be adapted for trail use as bridges, concession stands and information centers.



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

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



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

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

**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

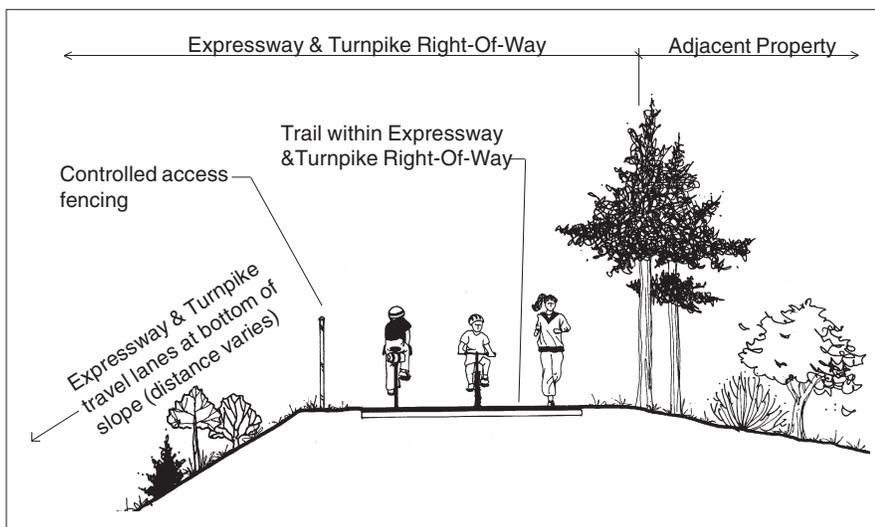


**Trail within Turnpike R-O-W**

**Expressway & Turnpike R-O-W Trail**

Expressway and turnpike rights-of-way in the TTMA 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.



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

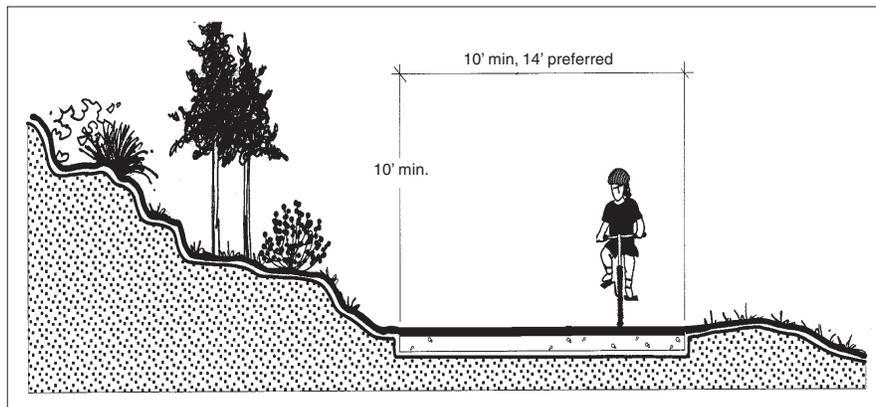
The recently constructed 3.5 mile Creek Turnpike Trail is located within the Turnpike corridor. This trail is separated from the turnpike by controlled access fencing. The Oklahoma Department of Transportation has recently agreed to consider the placement of a paved multi-use trail in the US 169 corridor.

## Regional 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

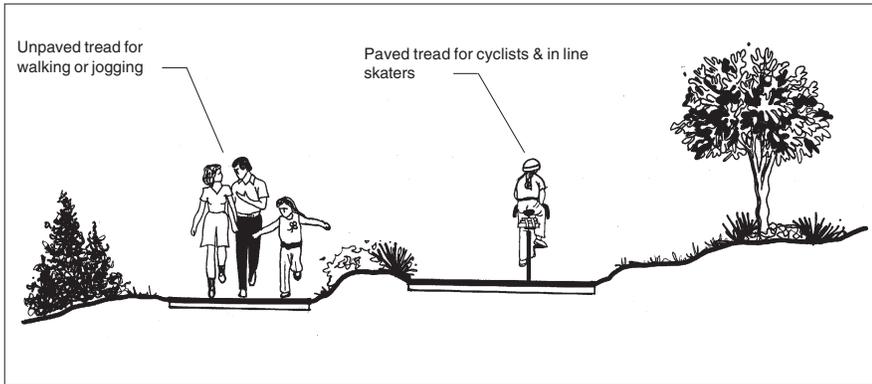
considered for paths that generate substantial amounts of pedestrian traffic. Possible conflicts between user groups must be considered during the design phase, as cyclists often travel at a faster speed than other users.

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.

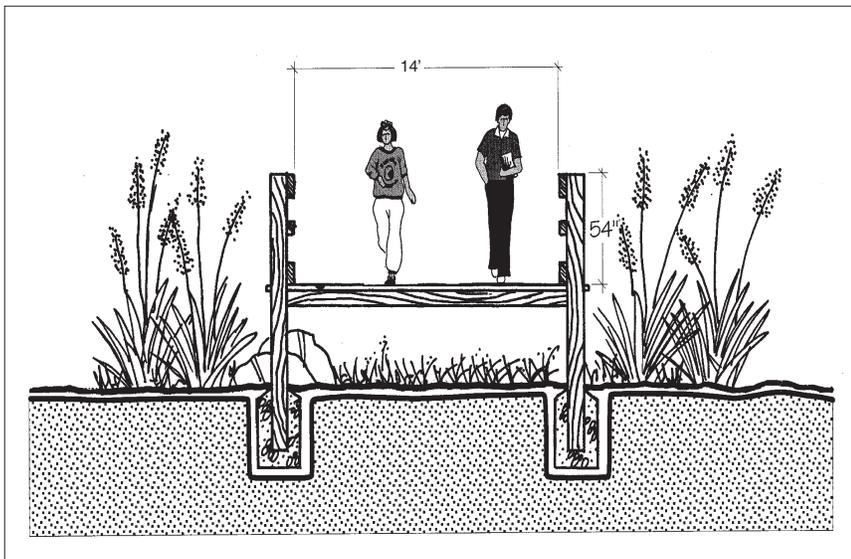
The River Parks corridor, from 21st to 71st Streets, is a good candidate for a

dual tread trail. Its high usage and frequent user conflict problems could be alleviated through dual tread development. Dual trail treads would 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

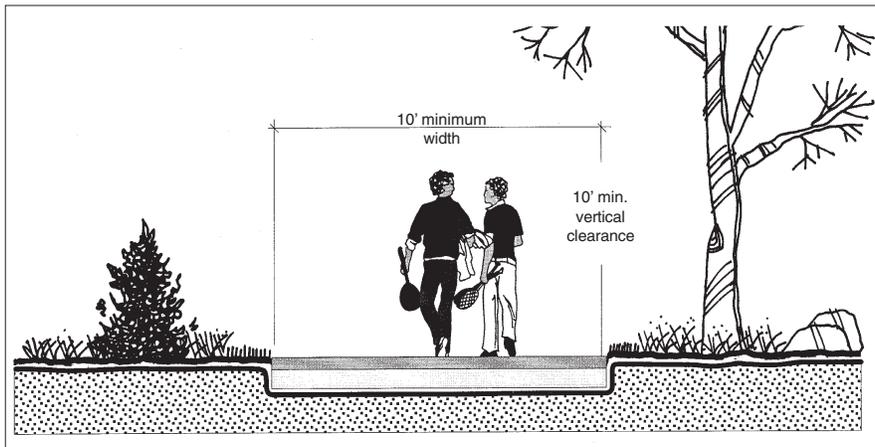
Wood surfaced trails are usually composed of wooden planks or lumber that forms the top layer of a bridge, boardwalk or deck. The most commonly used woods for trail surfacing are exposure- and decay- resistant species such as pine, redwood, fir, larch, cedar, hemlock and spruce. Wood is a preferred surface 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.

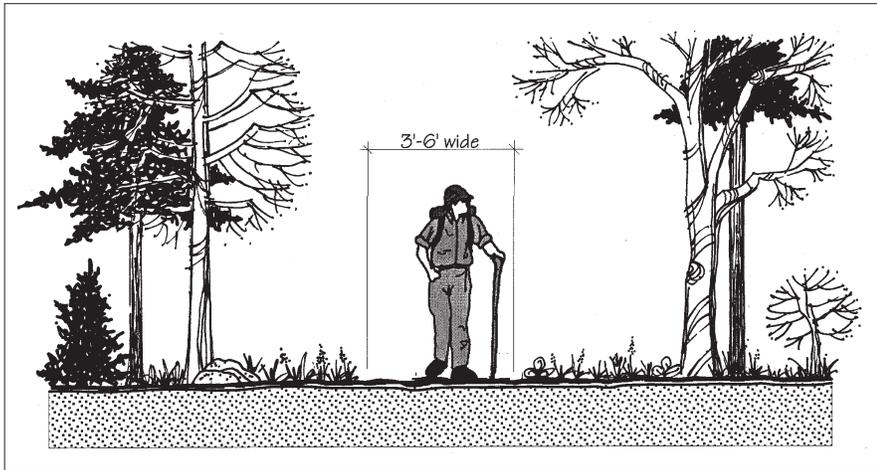
### Footpath/Hiking Trail

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

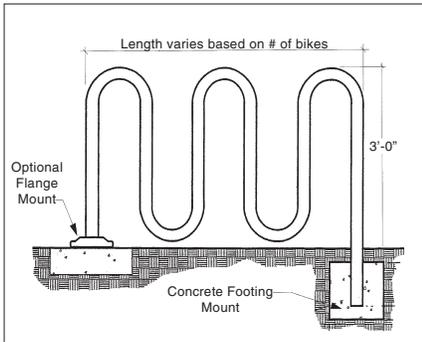
## Trail Components

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.

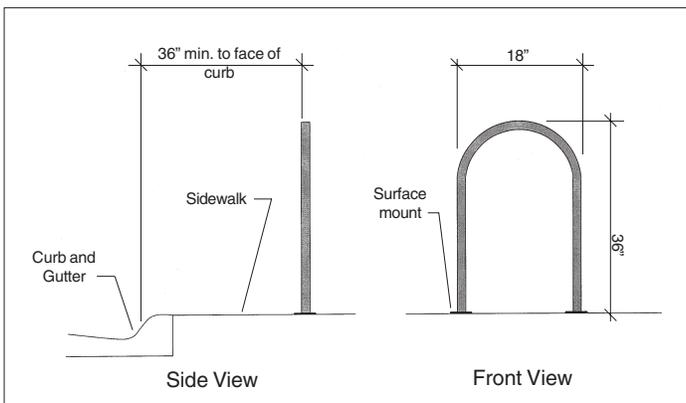
The designs shown have proven popular and effective in numerous communities. They are inexpensive to fabricate locally, easy to install, vandal resistant, and works well with the popular high-security locks. In addition, they can be installed as a single unit, on a sidewalk, or in quantity, as at a major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

- 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

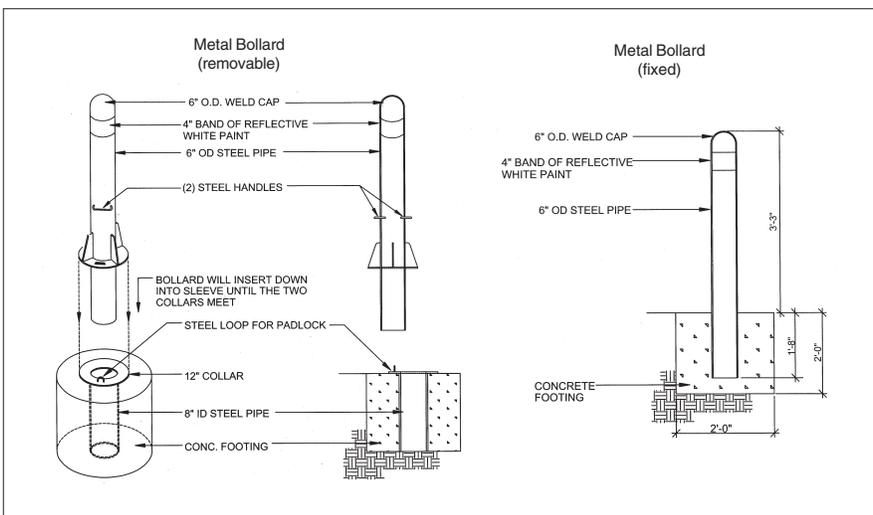
- Racks should be placed to avoid conflicts with pedestrians. They are usually installed near the curb and at a reasonable distance from building entrances and crosswalks.

- 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

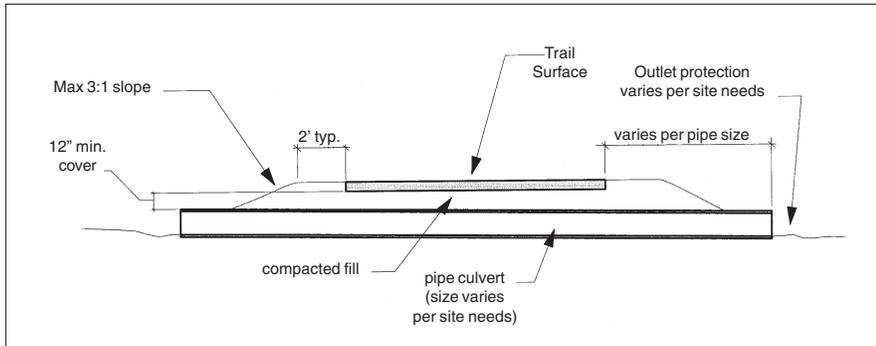
Bollards are intended to provide separation between vehicles and trail users, and are typically used at trail/roadway intersections. They are available in a variety of shapes, sizes, and colors and come with a variety of features. Lighted bollards are intended to provide visitors with minimum levels 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 the Tulsa area.

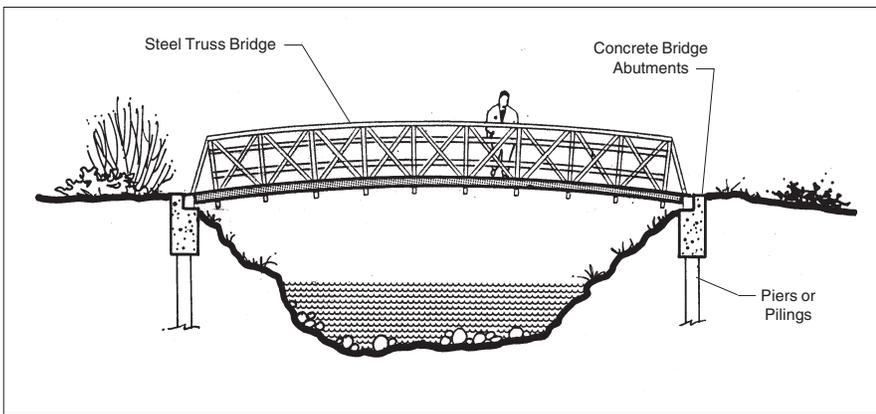


Typical Bollard Design

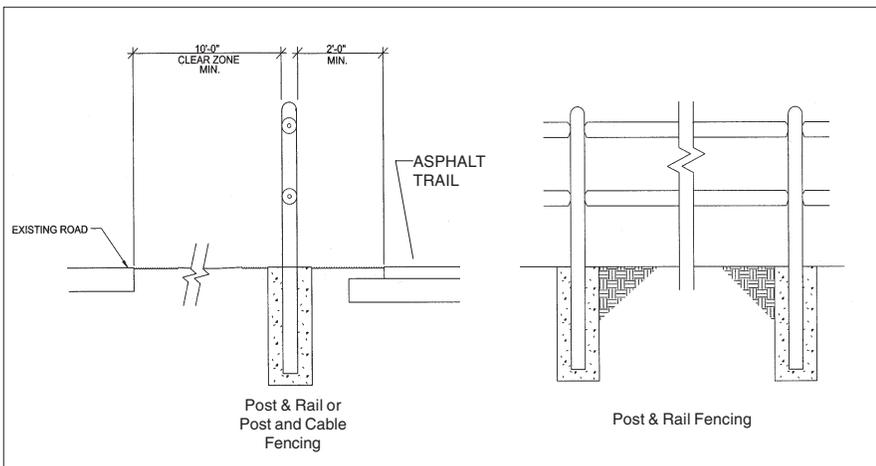
The contractor is to provide proper footings and anchors for bollard installation, according to manufacturers specifications. Typical construction materials for bollards include painted steel or aluminum, with halogen or metal halide lights in weather tight



Typical Cross Section: Trail Culvert



Typical Prefabricated Steel Span Bridge



Typical trail Fencing

casings. Removable bollards can be installed to provide trail access for emergency and maintenance vehicles.

**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**

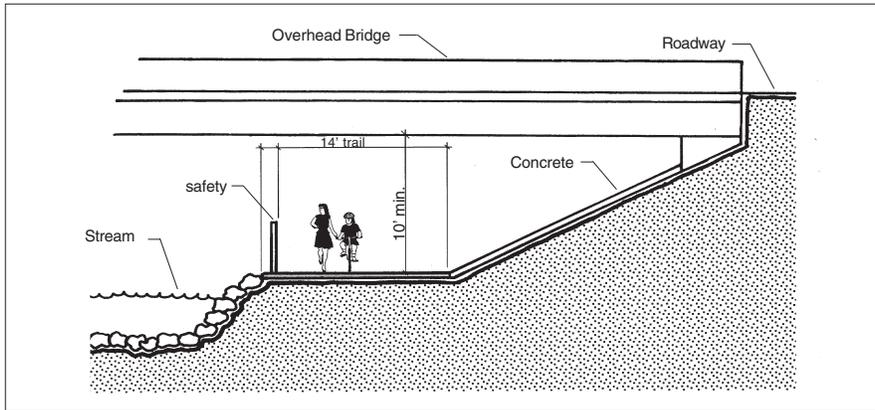
Bridges are an important element of almost every trail project. They are required at crossings of larger drainage or water ways and can sometimes be used to cross roadways. The type and size of bridges can vary widely depending on the trail type and specific site requirements. Some bridge types often 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.

**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 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.



Typical Trail Underpass Adjacent to a Stream

### Trail Underpasses

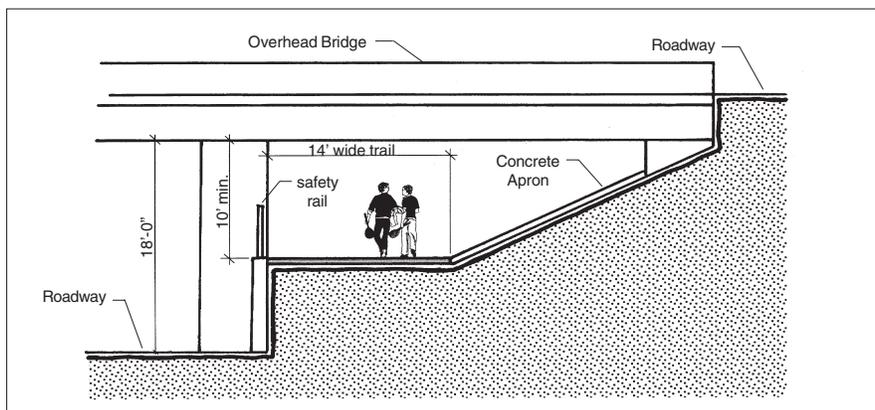
Trail underpasses can be used to avoid undesirable at-grade intersections of trails and roadways. These underpasses typically utilize existing overhead roadway bridges or culverts under the roadway that are large enough to accommodate trail users. There are several key issues that must be addressed in the design of a roadway underpass:



Trail Underpass with Railing

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.

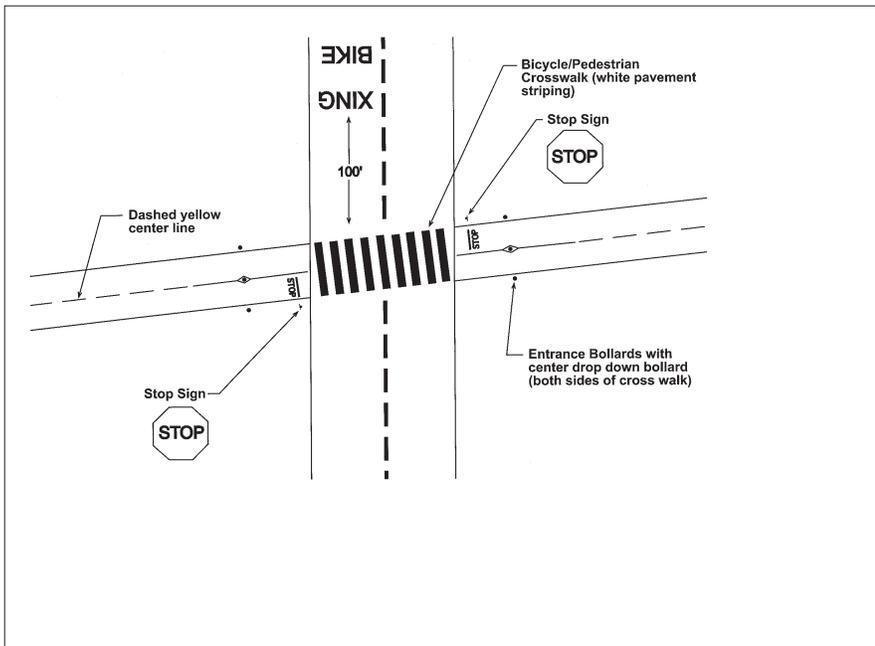


Typical Trail Underpass Adjacent to a Roadway

### 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



Typical At-Grade Trail/Roadway Intersection

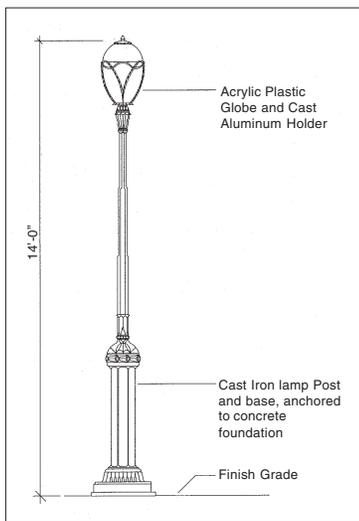
intersection; and  
 4. Maintain visibility between trail users and motorists.

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**

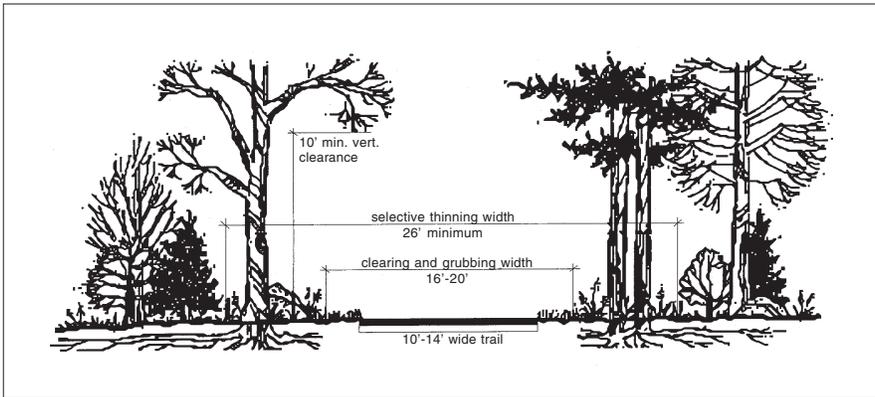
Particularly during winter months, when trips to and from work are made in the dark, adequate lighting can make the difference in a person’s choice to bicycle or walk. However, due to liability and security concerns, many off-road bicycle paths are closed at night, and therefore unlit. Lighting for multi-use 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

Within the Tulsa Metro Area, the Public Service Company of OK (PSO), has a lighting lease program which has proven very popular and cost effective within the River Parks Trail System. PSO 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.

PSO 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 PSO providing all maintenance for the fixtures.



Typical Vegetative Clearing Dimensions

### Vegetative Clearing

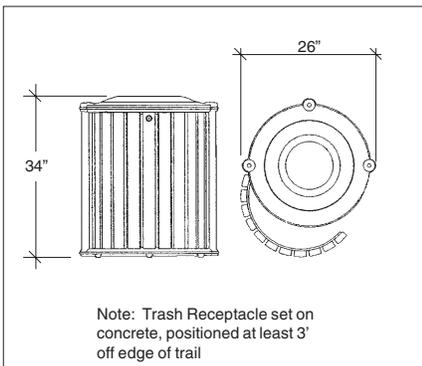
Vegetative clearing refers to the amount of vegetation removal that is required for various levels of trail development. The amount of vegetative clearing required for any one trail will depend on the type of trail being developed. While footpaths or hiking trails require little or no vegetation removal, 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.

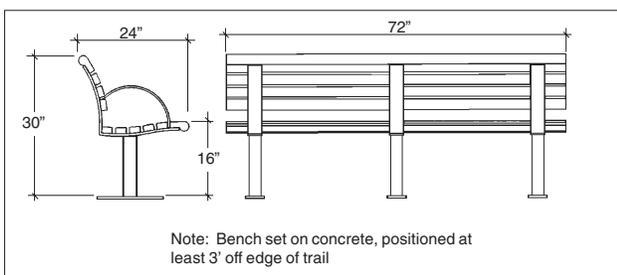


Typical Trail Trash Receptacles

### 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

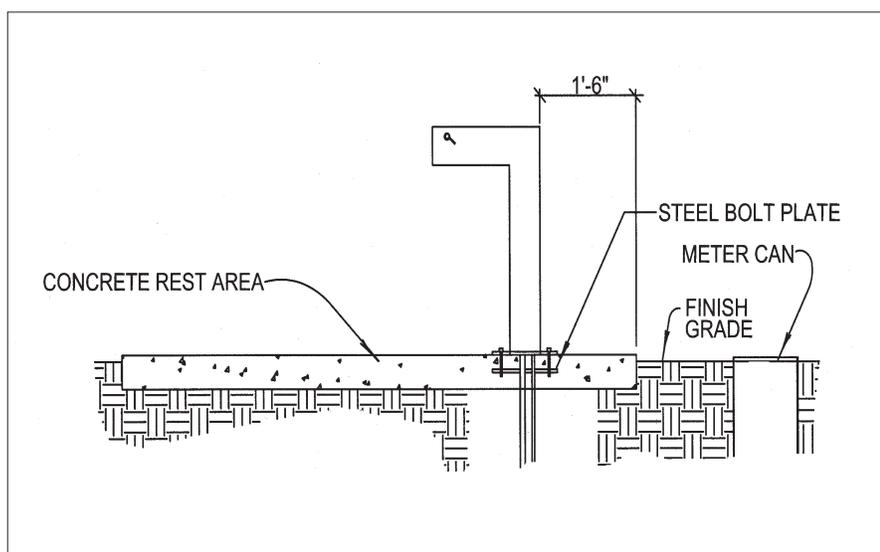
Benches along trails allow users to rest, congregate or contemplate. Trail benches should comfortably accommodate the average adult. They should be located at the primary and secondary entrances to the trail and at regular intervals, and should be set back three feet from the trail edge on a concrete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

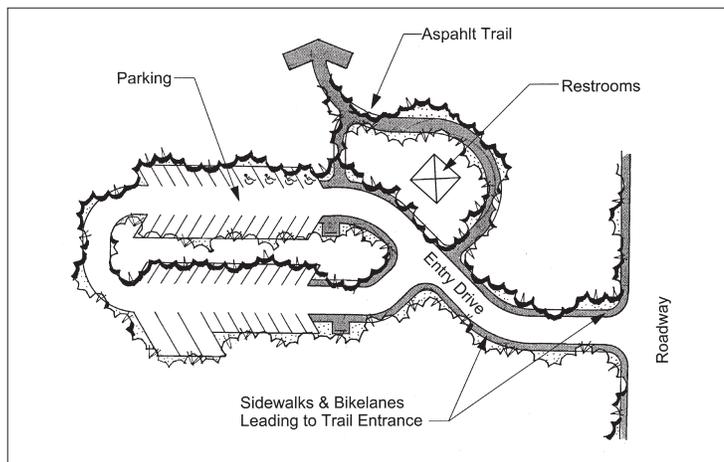


Typical Drinking Fountain

### 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 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.

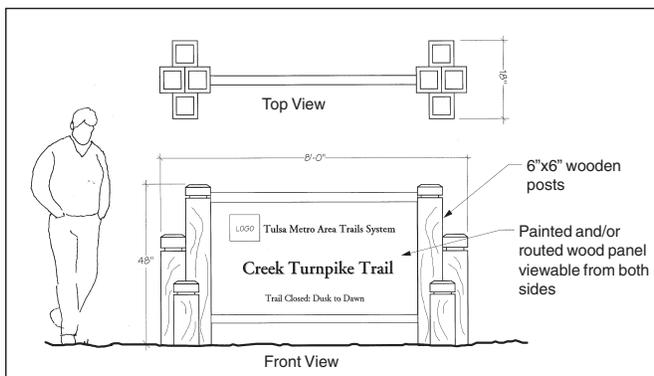
**Signage**

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.

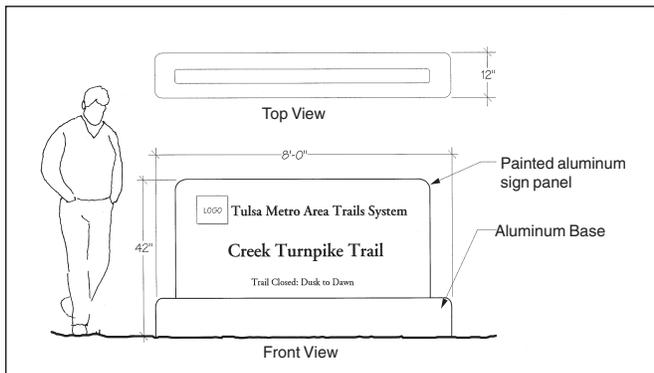
Included in this section are graphics that illustrate some typical trail signage types. The different signage types can be constructed using one of several different base designs. Shown here are three different sign base types including: wood posts, stone, and aluminum. Each of these bases can be adapted 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**

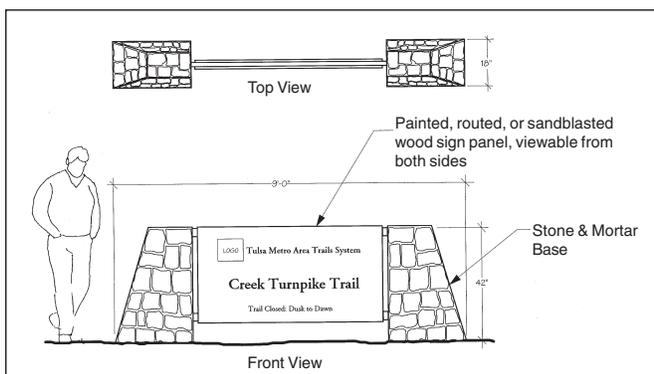
Major entry signage is typically placed at trail heads and trail/roadway intersections. These signs are typically the largest of all signage types, and designed to be seen from a vehicle as well as by trail users. These signs typically include the trail name and often include a map of the trail and the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



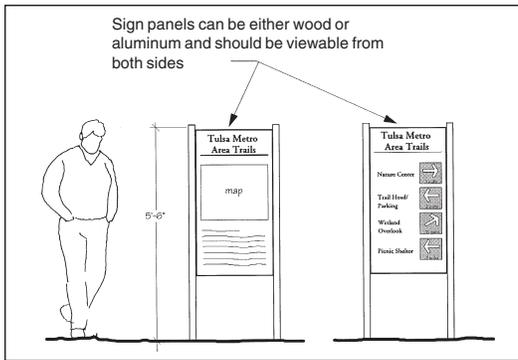
**Entry Sign with Wood Post Base**



**Entry Sign with Aluminum Base**



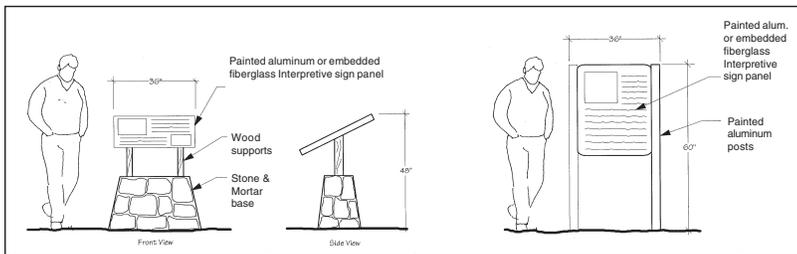
**Entry Sign with Stone Masonry Base**



Directional/Informational Signs on Metal Post Base

### Directional/Informational Signage

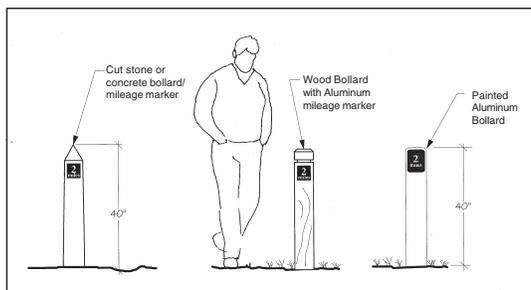
Directional and informational signage is typically found at trail heads, as well as trail/trail and trail/roadway intersections. This type of signage is typically built at a pedestrian scale and is no more than 40" high. The information often provided on these signs includes: maps, trail rules and regulations, 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

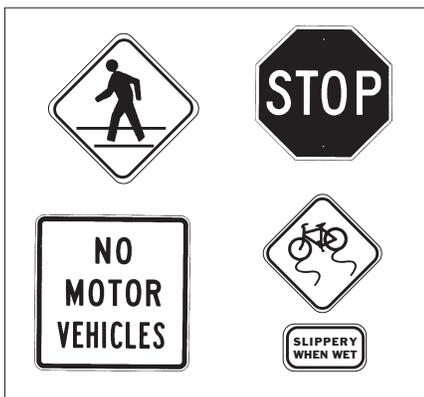
Educational or cultural signage is used when an element or feature with educational or cultural merit exists within or in close proximity to a trail corridor. These elements may include but are not limited to wetland or other environmental features, and historical structures or locations. These signs 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

### 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 Tulsa Metro 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.

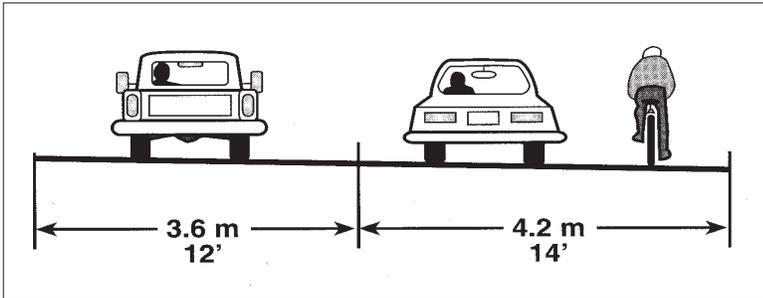


Regulatory and Warning Signs

### Regulatory & Warning Signage

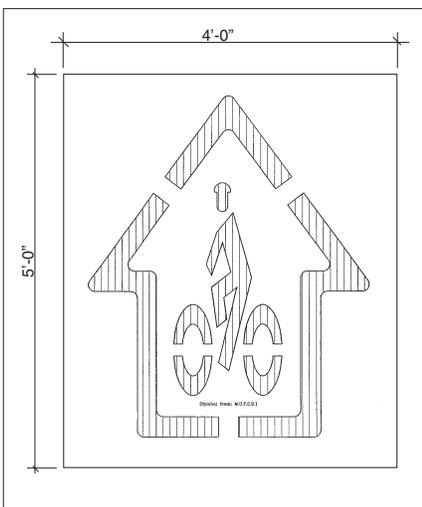
Regulatory and warning signs display rules, regulations and warnings regarding trail use and include standard signs such as stop, yield, sharp turn, etc. Like all trail signage, these signs should conform to the Manual on Uniform Traffic Control Devices (MUTCD). These signs are typically mounted on either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

### On Street Linkages



Wide Outside Curb Lane

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.



Pavement Marking to be Used With Wide Outside Lanes

#### 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.



“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.

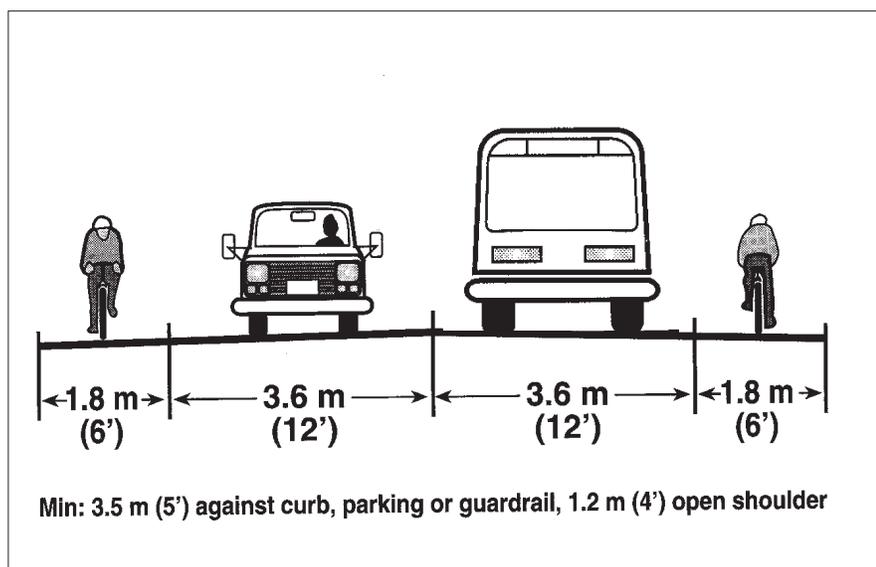
### Design Issues

**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

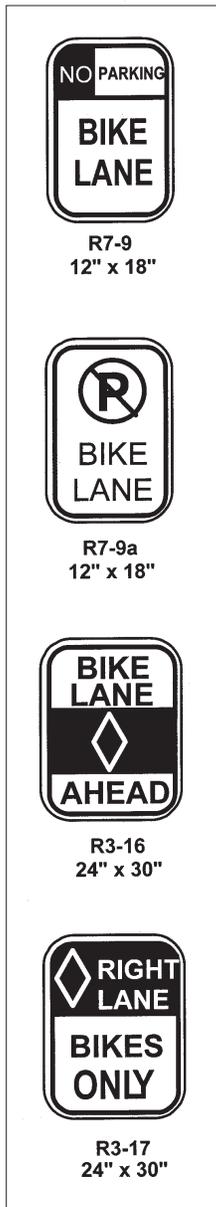
### Location and Use

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 the Tulsa Metro Area 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**

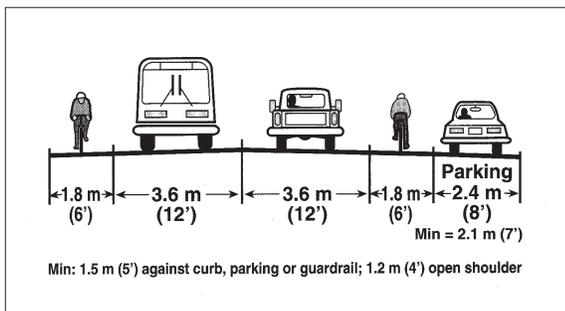
Bicycle lanes serve the needs of experienced and inexperienced bicyclists in urban and suburban areas, providing them with their own travel lane. Bicycle lanes are always located on both sides of the road (except when they are constructed on one-way streets). By this design, cyclists are encouraged to 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 the Tulsa area 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 necessary 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.
- All bicycle hazards have been removed from the roadway or otherwise remedied, including unsafe drainage grates and angled railroad crossings.



Bike Route Signage

- 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.

The City of Tulsa has developed a conceptual on-street bikeway plan which utilizes collector streets as bicycle routes. In addition to bicycle route signage, this bikeway plan proposes pavement markings (see graphic, page 47) and bicycle activated traffic signals.

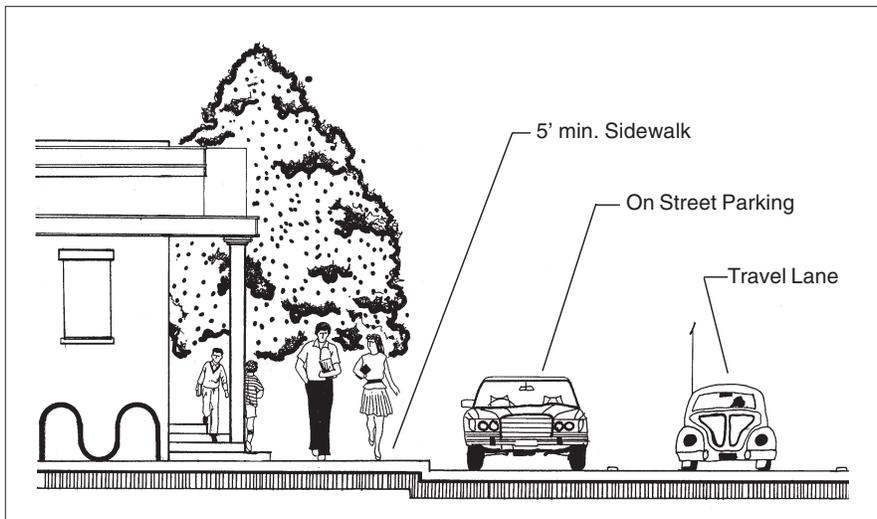
**Sidewalks**

Sidewalks are a critical need in the Tulsa Metro Area. 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



Typical Urban Sidewalk Cross Section

strip with trees, a raised planter, bicycle lanes, on-street parallel parking, and others.

- 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.

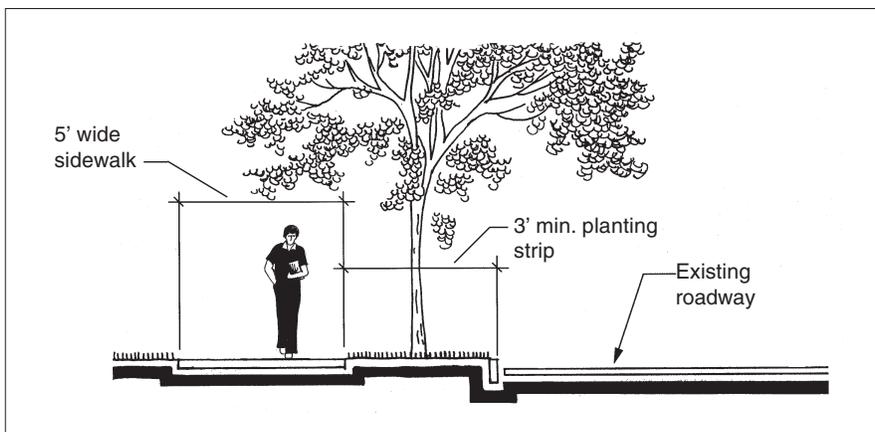
### **Sidewalk Pavement Design**

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, the Tulsa Metro Area communities 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 eighty-five specific trails and linkages that have emerged from the TTMA 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 509 miles provides access to many of TTMA's schools, parks, neighborhoods, retail and employment areas, as well as accomplishing the overall goal of linking the TTMA communities together.

A goal established by the citizens at the initial public workshops was to provide a trail within 2.5 miles of every home in an effort to serve all the residents within the Tulsa Transportation Management Area. The Regional Trail Coverage Plan (Map 13) on the following page shows a 2.5 mile and a 1.0 mile buffer around each trail. Ninety-eight percent of the population within the TTMA will be served by a trail or linkage within 2.5 miles of their home, and 87 percent will be served by a trail or linkage within 1.0 mile of their residence.

### Proposed Off-road Trails

Fifty-five off-road trails have been identified as part of the TTMA Trails Master Plan. Thirteen of these trails currently exist or are funded, while forty-two 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, 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 within the individual community trail plans. In addition, local trails providing connections to the regional system or serving a particular destination such as a trail around a park or stormwater detention area will also be identified within individual community trail plans. The destinations identified in the following descriptions are located within a quarter of a mile (1,320') of the trails. Corridors are not listed in priority order and are shown graphically on Map 1 "Regional Trail Route Plan" which is located in the executive summary.



River Parks trail near 56th Street



River Parks Trail near 91st Street



River Parks West Bank Trail

**1. River Parks East Bank Trail** is an existing trail that connects south Tulsa to Downtown Tulsa. Within the linear River Parks system, the trail includes 7.35 miles of asphalt/limestone trail along the east bank of the Arkansas River. This is Tulsa's most heavily used trail due to its location within a linear park along the Arkansas River, proximity to residential neighborhoods, and absence of at-grade vehicular crossings. The east bank asphalt trail width varies from 8' to 10' and has no center line striping. Several miles of the asphalt trail are flanked by an adjacent limestone trail, which is used predominantly by walkers and runners. The entire trail is completely separated from adjacent roadways. However, due to the popularity of the River Parks, at times this trail does not have the capacity to meet the demand by the wide variety of users. In an effort to alleviate the congestion and minimize potential accidents caused by the heavy use of this trail, a dual trail tread is proposed from 21st to 71st Streets that would provide a trail identified specifically for joggers and walkers (pedestrians) adjacent to a 10' wide striped trail for bicyclists and in line skaters. The dual trail treads on the east bank of River Parks should be designed and constructed in conjunction with the proposed improvements to Riverside Drive. In addition, a single tread trail has been proposed on the east side of Riverside Drive within the road right of way.

The east bank trail begins at Southwest Blvd. and Riverside Drive at the intersection of the *North River Parks Extension Trail*, the *River Parks West Bank Trail*, and the *Southwest Blvd./Old Sapulpa Linkage*. It extends south along Riverside Drive intersecting the pedestrian bridge, *Midland Valley Trail*, and the *36th Street Linkage*. It continues under I-44 intersecting *LaFortune West Linkage*, *Joe Creek Trail/Linkage*, and the *71st Street Bridge and Trail*. At 81st Street, the trail will include a 1.38 mile, 10' wide asphalt trail that will extend from 81st Street along the east bank of the Arkansas River to the *Creek Turnpike Trail*. The section of trail between E. 91st Street and the *Creek Turnpike Trail* is complete along with a new trail head located on the east side of the Jenks pedestrian bridge. The Jenks bridge was made available by the Oklahoma Department of Transportation when the new 96th Street Bridge was constructed. The bridge has been converted for trail use with trail parking located on the west end where it connects to the *Jenks River Trail* just north of Main Street. The section of trail between E. 81st Street and E. 91st Street will be constructed in conjunction with the Riverside Drive Extension. Trail heads are located at E. 17th Street, the Model Park, E. 29th Street, E. 41st Street, E. 56th Street, E. 67th Street and Helmerich Park. In addition to parking, most of these trail head locations have restrooms, drinking fountains and other recreational amenities. These east bank trails link to the Model Park, Rivers Edge Cafe, Zink Lake/low water dam, the Tulsa Rugby field, 41st Street Playground and Frisbee Course, F. Johnson Park, and Helmerich Park.

**2. River Parks West Bank Trail** is an existing trail that includes 1.99 miles of asphalt trail along the west bank of the Arkansas River south of Downtown Tulsa. The 8' wide west bank asphalt trail begins at Southwest Blvd. and the *River Parks East Bank Trail*, *North River Parks Extension Trail*, and the *Southwest Blvd./Old*



Midland Valley Trail near 18th Street

*Sapulpa Linkage* and extends west along the Southwest Blvd. bridge where it intersects the rest of *Southwest Blvd./Old Sapulpa Linkage*, turns south along the west bank of the river, and ends at the west end of the pedestrian bridge and the *River Parks West Bank Extension*. This trail passes within a quarter mile of the OSU College Of Osteopathic Medicine, West Tulsa Park, River Parks Festival Site, the Reynolds Amphitheater, the Tulsa Rowing Club, and the Old West Playground.

**3. Midland Valley Trail** is an existing 1.49 mile long, 10' wide asphalt trail located just south of Downtown Tulsa. The portion of the trail north of 21st street has center line striping, and the south segment between 21st Street and the River Parks Trail has no center line striping. The trail follows an abandoned railroad right-of-way beginning at the pedestrian bridge and the *River Parks East Bank Trail* and travels east and north to 16th Street where it connects to the *Midland Valley Extension*. Midland Valley is a collector trail, used primarily by surrounding residents to access the River Parks system. Destinations include Lee Elementary School, Maple Park, and Veterans Park.



Creek Turnpike Trail near Sheridan Avenue

**4. Creek Turnpike Trail** is an existing and popular 4.01 mile asphalt trail serving south Tulsa. It is 10' wide with center line striping and signage. The trail extends from the east bank of the Arkansas River east along Vensel Creek to the right-of-way of the Creek Turnpike and crosses Vensel Creek and Harvard Avenue intersecting the *Tulsa North/South Linkage*. It then crosses Yale Avenue, Fry Ditch, and Sheridan Avenue and intersects *Fry Creek Ditch Trail* just before it ends at Memorial Avenue. All road crossings are at grade with only the Yale Avenue crossing signalized for pedestrians. The trail connects to Hunter Park, which serves as the primary trail head with ample parking and amenities. Improvised and secondary trail heads are located at Sheridan Road and at the SpiritBank parking lot at 96th and Memorial Drive. Both of these trail heads have gravel parking areas.

**5. Bixby Trail** is an existing 10' wide asphalt trail approximately 1.3 miles in length that serves Bixby. It includes center line striping and signage. This trail extends from the *Fry Creek Ditch Trail* and the Daily Family YMCA, which is used as a trail head, south along Memorial Drive across the "banana bridge" to the south side of the Arkansas River where it connects to the *Bixby Extension Trail*. The "banana bridge", an abandoned pony truss type bridge, was renovated for trail use.

**5a. Bixby Extension** is a funded trail that serves Bixby. The trail begins where the *Bixby Trail* ends on the south bank of the Arkansas River and travels 4/5 of a mile east along the bank of the river to an area just north of Westminster Place where it connects with the Bixby Sports Complex and the *Bixby River Trail*. Destinations include Lagoon Park.



Bixby Trail across the Arkansas River

**6. Katy Trail** is an existing 6.70 mile asphalt trail beginning at Wilson Avenue, the *Wekiwa Linkage*, and the *SH 97 Bridge Trail* just south of State Highway 51 in Sand Springs and extending east along the abandoned railroad right-of-way to the



Katy Trail under US 75

Archer Street Bikeway and *Katy Downtown Trail* in Downtown Tulsa at the David L. Moss Criminal Justice Center. This trail is 10' wide with no center line striping. Destinations include Offices & Special Education Center, Central Junior High School, Pershing Center, and Roy Moore Park in Sand Springs, and the Madison Middle School, Roosevelt Elementary School, Zeigler Park, and Owen Park in Tulsa.

**7. SH 97 Bridge Trail** is an existing trail that serves Sand Springs and connects residents across the Arkansas River. The trail begins where the *Wekiwa Linkage* and the *Katy Trail* meet. It extends south along SH 97 right-of-way across the Arkansas River to Avery Drive where it connects to the *Lake Keystone Linkage*, *Avery Drive Linkage*, and *SH 97 Linkage*. Destinations include the Kindergarten Center, Rotary Park, and Roy Moore Park.

**8. River Parks West Bank Extension** is a funded 0.60 mile concrete trail that will begin at the southern end of the *River Parks West Bank Trail* and the pedestrian bridge and extend south along the west bank of the Arkansas River to the Public Service of Oklahoma Soccer Complex. This 10' wide trail will have center line striping and will extend through the PSO Power Generating Plant. This trail segment is a critical link to continue future trails along the west bank of the Arkansas River. The existing PSO pump station is planned to be converted to an overlook for trail users. Beginning at the soccer complex is a funded 3.58 mile 10' wide asphalt trail with striping and signage intersecting the *Cherry Creek Trail* and *Mooser Creek Trail*, and then continuing along the Burlington Northern railroad right-of-way (rail-with-trail) to 71st Street where it will tie into the *71st Street Bridge and Trail*. The trail will be adjacent to the PSO Soccer Complex, which will serve as the primary trail head with ample parking and a drinking fountain. Another small parking lot with a drinking fountain will be located near W. 49th Street adjacent to the City of Tulsa overflow lagoons. Destinations include Turkey Mountain Park and the PSO Soccer Complex.



SH-97 Bridge Trail

**9. Cherry Creek Trail** is a funded trail that serves west Tulsa. Currently, the corridor is a crushed limestone maintenance road that extends 1.15 miles. Due to its lack of connection to destinations or a primary trail system, this road is infrequently utilized for trail purposes. The trail begins at the intersection of W. 41st Street and Cherry Creek and the *Southwest Blvd./Old Sapulpa Linkage*, just east of Highway 75. It follows the Cherry Creek corridor southeast to the west bank of the Arkansas River where it intersects the *River Parks West Bank Extension Trail*. The final design for this trail is currently under contract with completion of the design in the Fall of 1999.



Cherry Trail underpass at Elwood Avenue

**10. 71st Street Bridge and Trail** is a funded 0.36 mile, 10' wide concrete and asphalt trail that will begin at the 71st Street bridge on the east bank of the Arkansas River at the *River Parks East Bank Trail*. The trail will cross the Arkansas River on the existing 71st Street bridge piers, connect to the future *West Bank Extension* along E. 71st Street, and the Elwood linkage at Elwood Avenue. At Elwood Avenue, the trail will travel north approximately 1,300' to a future parking



Mingo Trail corridor near 11th Street

lot located at the southeastern portion of Turkey Mountain Park. The 71st Street Trail project is funded and construction is scheduled to start in late summer 1999.

**11. North River Parks Extension** is a funded 1.38 mile, 10' wide asphalt trail with center line striping and signage west of Downtown Tulsa. The trail will begin near Southwest Blvd. and Riverside Dr. connecting to the *River Parks East Bank Trail*, *West Bank Trail*, and the *Southwest Blvd./Old Sapulpa Linkage*. The trail will be routed under US 75, bridge the Burlington Northern Railroad, extend northwest along a drainage channel just south of W. Newblock Park Drive and connect with the *Katy Trail* at Gilcrease Museum Road. This trail serves Newblock Park. This trail is currently under construction.

**12. LaFortune Trail** is an existing 3.00 mile, crushed limestone trail located in central Tulsa around the perimeter of LaFortune Park intersecting *LaFortune West Linkage* and *Tulsa North/South Linkage*. This trail is heavily used by walkers and runners due to its central location within Tulsa. The trail begins at 51st Street and Yale Avenue and loops around the park along Hudson Avenue and 61st Street. Although it primarily serves LaFortune Park visitors, other destinations include Key Elementary School and Memorial High School.



Mingo Trail corridor along US 169

**13. Mingo Trail** is a proposed trail that connects south Tulsa to Owasso and serves as a part of the main trail loop around Tulsa. The trail begins at Memorial Drive and the *Creek Turnpike Trail* within the right-of-way of US 169, extends east and then north intersecting *Haikey Creek Tulsa Tributary*, *BA South Loop Trail*, the *76th Street Linkage*, the *46th Street Linkage*, and crosses under the BA Expressway at Mingo Road. From 91st Street to Mingo Road the trail will be located on the west side of US 169. From the crossing under the BA Expressway at Mingo Road the trail begins to wind its way along the Mingo Creek corridor intersecting the *Eastland Linkage*, the *4th Street Linkage*, the *Cooley Creek Trail*, and the *Mohawk/Port of Catoosa Trail*. Destinations include the Cedar Ridge Elementary School, Clark Elementary School, the Union Sixth and Seventh Grade Center, Tulsa Community College SE Campus, Boeing Park, Hicks Park, Mohawk Park and the Tulsa Zoo. Design for a 1.5 mile segment along the channel through and north of the Nelson Stormwater Detention site is currently underway with design completion scheduled in the Fall of 1999.

**14. BA South Loop Trail** is a proposed trail that connects south Tulsa to Broken Arrow. The trail begins at the *Mingo Trail* near 91st Street and follows the right-of-way of the future BA South Loop Turnpike where it extends south, then east, and then north to 71st Street and the *Creek East/Will Rogers Trail*. The trail intersects the *Haikey Creek Trail* and the *Broken Arrow Creek Trail* along the way. The destinations served by this trail include the Ernest Childers Middle School, Grace Fellowship Christian School, Graham Park, the Tulsa Technology Center Broken Arrow Campus, the planned NSU Broken Arrow Campus, and Camp Russell.



BA South Loop corridor



Fry Ditch corridor in Bixby

**15. Creek East/Will Rogers Trail** is a proposed trail that connects Broken Arrow to Catoosa and the Verdigris River. The trail begins where the *BA South Loop Trail* ends at 71st Street and extends north and east within the rights-of-way of the Creek East Turnpike and the Will Rogers Turnpike to the *Verdigris River Trail*. This trail intersects the *Eastland Linkage*.

**16. Chouteau National Trail**, is a proposed trail that provides a future connection for communities east of the TTMA. The trail begins at the Port of Catoosa, extends along the bank of the Verdigris River intersecting the *Creek East/Will Rogers Trail*, and ends at the TTMA boundary. Destinations include Rogers Point Park.

**17. River Parks Tulsa/Bixby Trail** is a proposed trail that connects Jenks and south Tulsa to Bixby. The trail begins where the *Creek Turnpike Trail* meets the east bank of the Arkansas River. It extends south along the east bank intersecting the *Posey Creek Trail*, the *Fry Creek Ditch Trail*, and the *Bixby Trail*. Destinations include the planned Gracie and Charlie Cousins Park which will serve as a primary trail head.



River Parks Tulsa/Bixby corridor

**18. Fry Creek Ditch Trail** is a proposed trail that connects Bixby to south Tulsa. The trail begins at the *Creek Turnpike Trail* and extends south primarily following the Fry Ditch corridor to the *River Parks Tulsa/Bixby Trail*. The trail intersects the *Fry Ditch Extension Trail* and has a spur that connects to the existing *Bixby Trail*. A segment of this trail begins at the *Fry Creek Ditch Trail* midway between 121st and 131st Streets and extends east along the *Fry Ditch* corridor north to approximately 116th Street.

**19. Haikey Creek Trail** is a proposed trail that connects Bixby to Broken Arrow. The trail begins at the confluence of Haikey Creek and the Arkansas River and extends northerly along the Haikey Creek corridor to the *BA South Loop Trail*. The trail picks up again northwest of this point where Haikey Creek corridor continues north of the *BA South Loop Trail*. Near 129th East Avenue, the trail follows the Haikey Creek corridor east intersecting with the *Haikey Creek BA Tributary Trail*, and ends at Elm Place north of Washington Street. Here it connects with the *Broken Arrow Creek Trail*. Destinations include Lynn Wood Elementary School, Vandever Elementary School, Grace Fellowship Christian School, and Haikey Creek County Park.

**19a. Haikey Creek Tulsa Tributary Trail** is a proposed trail that serves southeast Tulsa. The trail begins at a point on *Mingo Trail* south of 91st Street between Mingo and Garnett where Haikey Creek forks to the northwest. The trail follows the Haikey Creek Tributary corridor to Kingston Avenue where it ends at the *76th Street Linkage*. Destinations include Minshall Park.

**19b. Haikey Creek Broken Arrow Tributary Trail** is a proposed trail that serves Broken Arrow. The trail begins at a point on *Haikey Creek Trail* west of



Haikey Creek Tulsa Tributary corridor



**Bixby/BA corridor passes under the US 64 (Memorial Drive) bridges**

129th East Avenue where Haikey Creek forks to the northeast. The trail follows the Haikey Creek Tributary corridor to Elm Place midway between Kenosha Street and Houston Street.

**20. River Parks Bixby/BA Trail** is a proposed trail that connects Bixby to Broken Arrow. The trail begins at the *River Parks Tulsa/Bixby* and the *Bixby Trail* at Memorial Drive and extends east along the north bank of the Arkansas River intersecting the *Fry Ditch Extension Trail* and ending at the *Broken Arrow Creek Trail*, *Coweta Linkage*, and the *River Parks BA/Coweta Trail* near 141st Street. Destinations include the Indian Springs Elementary School and the Indian Springs Sports Complex and the Indian Springs Country Club.

**21. River Parks BA/Coweta Trail** is a proposed trail that connects Broken Arrow to Coweta. The trail begins at the intersection of the *River Parks Bixby/BA Trail*, *Coweta Linkage*, and the *Broken Arrow Creek Trail* and extends generally east along the north river bank to the Coweta Creek Trail.

**22. SH 67 Trail** is a proposed trail that serves Bixby. The trail begins at the Posey Creek crossing between Harvard Ave. and Yale Ave. on SH 67. A 1.25 mile 10' wide concrete sidewalk on the south side of SH 67 from Memorial Drive to the Bixby Cemetery serves this area. The trail connects to the *SH 67 Linkage* and *Posey Creek Trail* and extends east along the right-of-way to the Missouri Pacific Trail.



**SH-67 corridor**

**23. Missouri Pacific Trail** is a proposed trail that connects Jenks to Bixby and provides a future connection from communities south of the TTMA. The trail begins at the intersection of the Creek Turnpike and the Missouri Pacific Railroad in Jenks. The trail connects to the *Creek Turnpike Extension Trail* and the *Jenks Missouri Pacific Trail* and extends south along the railroad right-of-way (rail-with-trail) intersecting the *Posey Creek Trail*, *SH 67 Trail* in Bixby, and the *Bixby River Trail*. The Missouri Pacific Trail extends to the boundary of the TTMA. Destinations include the George L. Brown Primary Center, Bixby High School, Bixby Junior High School, Bixby Middle School, Brassfield Elementary School, and Young Park.

**24. Posey Creek Trail** is a proposed trail that serves Bixby. The trail begins on the east bank of the Arkansas River at the *River Parks Tulsa/Bixby* directly south of Yale Avenue. It extends south across the River along a future Yale Avenue bridge to 131st Street and then east along the right-of-way to Yale Place. At this point it turns south and follows the Yale Place right-of-way to 141st Street where it begins to follow the Posey Creek drainage corridor intersecting the *SH 67 Trail* and *SH 67 Linkage* as it curves south and west to Harvard Avenue.



**Posey Creek corridor near SH 67**

**25. Bixby River Trail** is a proposed trail that serves Bixby. The trail begins at the end of the *Bixby Extension Trail* on the south bank of the Arkansas River and extends east along the bank of the river until it ties in with the *Missouri Pacific Trail*.



Jenks River corridor within Park West

**26. Creek West Turnpike Extension Trail** is a proposed trail that connects Jenks to Sapulpa. The trail begins at US 75, extends west along the Creek Turnpike right-of-way intersecting the *Polecat Creek Trail*, and ends at the Turner Turnpike.

**27. Jenks River Trail** is a proposed trail that connects Jenks to south Tulsa. The trail begins at the Jenks pedestrian bridge on the west bank of the Arkansas River and extends south along the bank of the river and west generally along the north side of the existing Creek Turnpike right-of-way intersecting the *Jenks Missouri Pacific Trail*, *Missouri Pacific Trail*, and the *Elwood Linkage*. The trail ends at US 75 and the *Creek West Turnpike Extension Trail*. Destinations include Lions Park, Veterans Park, Park West and the proposed Oklahoma Aquarium.

**28. Jenks Missouri Pacific Trail** is a proposed trail that connects Jenks to west Tulsa. The trail begins at the *71st Street Bridge Trail* just west of the Arkansas River and extends south along the Missouri Pacific Railroad right-of-way (rail-with-trail) to the *Missouri Pacific Trail* and the *Creek Turnpike Extension Trail*. Destinations include Jenks High School, 9th Grade Center, Central Elementary School, Lions Park, and Melody Lane Park.



Jenks Missouri Pacific corridor

**29. Joe Creek Trail/Linkage** is a proposed trail that serves southwest Tulsa. The trail begins at the *River Parks East Bank Trail* and Joe Creek corridor just north of 81st Street. The trail follows the creek corridor north to midway between 61st Street and 71st Street where it becomes an on-road linkage following Yorktown Avenue to 56th Street and the *LaFortune West Linkage*. Destinations include McClure Elementary School, Heller Park, Graham Park, and Helmerich Park.

**30. Mooser Creek Trail** is a proposed trail that serves west Tulsa. The trail begins just south of I-44 at the *River Parks West Bank Trail* and extends along the Mooser Creek corridor past 33rd West Avenue to 56th Street. It also has a spur that extends south between Union Avenue and 33rd West Avenue to 61st Street. Destinations include Remington Elementary, West Highlands Park, Lubell Park, Oscar Schlegel Park, and Riverfield Country Day School.

**31. Polecat Creek Trail** is a proposed trail that connects Sapulpa to Lake Sahoma. The trail begins at the *Creek Turnpike Extension Trail* east of the Turner Turnpike and extends south encircling Sapulpa along the Polecat Creek corridor to Lake Sahoma. The trail intersects the *SH 97 Linkage* and the *SH 75A Linkage* along the way. Destinations include Kelley Lane Park, Davis Park, City Park, Reynolds Park, and the Senior Citizens Community Center.



Mooser Creek corridor under I-44

**32. Gilcrease West Trail** is a proposed trail that connects west Tulsa to north-west Tulsa. The trail begins at the *Southwest Blvd./Old Sapulpa Linkage* just south of 51st Street and extends west and north along the right-of-way of the proposed Gilcrease Expressway. The trail intersects the *West 21st Linkage*, *Avery Drive Linkage*, and *Katy Trail* and connects to the *Gilcrease Northwest Trail* at SH 51.



River City Park corridor

This trail should be designed and constructed in conjunction with the planned Gilcrease Expressway. Destinations include Berryhill Elementary School and Terwilliger Park.

**32a. Gilcrease Northwest Trail** is a proposed trail that serves northwest Tulsa. The trail begins at the north end of the *Gilcrease West Trail* at SH 51 and curves north and east to the *Midland Valley North Trail* near 31st Street North. This trail should be designed and constructed in conjunction with the planned Gilcrease Expressway. Destinations include the Tulsa Technology Center and Williams Park.

**33. Bigheart Trail** is a proposed trail that serves Sand Springs. The trail begins at the *Katy Trail* just west of 81st West Avenue and extends northwest to Old North Road. Destinations include Douglas Park and Sand Springs Municipal Golf Course.

**34. River City Trail** is a proposed trail that serves Sand Springs. The trail begins at the *SH 97 Bridge Trail* on the north bank of the Arkansas River and extends northwest to *Wekiwa Linkage* and *Zink Ranch Trail/Linkage*. Destinations include River City Park.



Katy Downtown Trail corridor

**35. Katy Downtown Trail/Trail Head** is a proposed trail that serves Downtown Tulsa. The trail begins at the end of *Katy Trail* near Frisco Avenue and follows the railroad right-of-way (rail-to-trail) east intersecting the *4th Street Linkage* and the *Greenwood/Mohawk Linkage*. The trail ends at I-244 and the *Midland Valley North Trail*. The trail extends through the proposed Greenwood Entertainment District near Greenwood and Archer which has great potential for a primary trail head with 7 existing and proposed trails and linkages converging at that location. This trail head should be designed and constructed in conjunction with the Greenwood Entertainment District which could provide a popular destination for trail related establishments such as restaurants, outdoor cafes, coffee shops and sports/ bicycle shops. Additional parking, accessible restroom facilities, bicycle parking and drinking fountains should be constructed to make this a successful trail head location. Destinations include OSU Tulsa and the historic Greenwood district.

**36. Midland Valley North (Osage RR) Trail** is a proposed trail that connects Downtown Tulsa to Sperry and Skiatook and provides a future connection to communities north of the TTMA. The trail begins at I-244 and the end of *Katy Downtown Trail* and extends north along the railroad right-of-way (rail-with-trail) to the TTMA boundary. The trail intersects the *SKO Trail*, the *Greenwood/Mohawk Linkage*, the *Gilcrease Northwest Trail*, the *Osage and Cherokee Linkages*, *Sperry Linkage*, and the *Skiatook Lake and SH 20 Linkages*. Destinations include the Tulsa Technology Center, Sperry Elementary, Sperry Upper Elementary, Sperry Middle and High Schools, Cherokee Elementary, Hawthorne Elementary, Whitman Elementary, Carver Middle School, OSU-Tulsa, Lacy Park, Hawthorne Park, Chamberlain Park, City Park, and Crawford Park.



Midland Valley Extension corridor near 15th Street and the BA Expressway



SKO Trail corridor

**37. Midland Valley Extension** is a proposed trail that serves Downtown Tulsa. The trail begins at the end of *Midland Valley Trail* and 15th Street and extends northeast along highway right-of-way to Peoria Avenue. At Peoria, the trail crosses over SH 51 and turns west and north following highway right-of-way to the *4th Street Linkage*. Destinations include Maple Park, Tracy Park, Centennial Park, and Cherry Street.

**38. SKO Trail** is a proposed trail that connects Downtown Tulsa to Owasso and Collinsville and provides a future connection from communities north of the TTMA. The trail begins at the *Midland Valley North Trail* just north of downtown and extends northeast along the SKO Railroad right-of-way (rail-with-trail) intersecting *Gilcrease North Trail*, *Mohawk Trail*, *Port Road Linkage*, *Mingo Trail*, *Owasso Trail*, *SKO Spur Trail*, *Sperry Linkage*, *German Corner Linkage*, and the *SH 20 Linkage*. The trail continues to the TTMA boundary. Destinations include Barnes Elementary, Owasso Middle School, OSU-Tulsa, Franklin Park, Seminole Hills Park, Wheeling Park, Pioneer Park, Mini Park 1, Sports Park, and Bullette Park.



Mohawk corridor

**39. Mohawk Trail** is a proposed trail that serves north Tulsa. The trail begins at the end of *Greenwood/Mohawk Linkage* and Harvard Avenue. It extends east along the Mohawk Blvd. right-of-way to Mohawk Park where it makes a loop through the park. The trail exits the park at the eastern part of the loop and connects with the *Mohawk/Port of Catoosa Trail* and the *SKO Trail* along the 46th Street North right-of-way. An additional spur of the trail extends south along the Winston Avenue right-of-way just before the trail enters the park. This spur also connects with the *SKO Trail*.

**40. SKO Spur Trail** connects Owasso to the Cherokee Industrial Park. The trail is a rail-with-trail project that begins at a point on the *SKO Trail* midway between 76th and 86th Street North. The trail extends to the west along the railroad right-of-way intersecting the *Cherokee Linkage* and ending where the railroad right-of-way meets Yale Avenue just south of 66th Street North. Destinations include McCarty County Park.

**41. Owasso Trail** is a proposed trail that serves Owasso. The trail begins at the *Mingo Trail* and *SKO Trail* and extends east along the Elm Creek corridor looping just beyond 161st East Avenue, then northwest to 106th Street North, and returning southwest along the US 169 right-of-way to just south of 86th Street North. Destinations include Smith Elementary, Pamela Hodson Elementary, Rayola Park, and Friendship Park.



SKO Spur corridor

**42. Elm Creek Extension Trail** is a proposed trail that serves Owasso. The trail begins at the *Owasso Trail* where the trail loops just east of 161st East Avenue. The trail extends north to SH 20 and the *German Corner Linkage*.

**43. Cooley Creek Trail** is a proposed trail that serves northeast Tulsa. The trail begins just south of I-244 at *Mingo Trail* and extends east along the Cooley Creek



Cooley Creek Corridor

corridor to Admiral Place near 129th East Avenue. Destinations include the Wright Christian Academy.

**44. Adams Creek West Trail** is a proposed trail that serves Broken Arrow. The trail begins at the *Creek East/Will Rogers Trail* south of 61st Street and extends west along the Adams Creek corridor to 51st Street and the *Lynn Lane Linkage*. A spur of the trail extends south near 193rd East Avenue and ends midway between Albany Street and Kenosha Street. Destinations include Broken Arrow Senior High School and Westwood Elementary.

**44a. Adams Creek East Trail** is a proposed trail that serves Broken Arrow and provides a future connection from communities east of the TTMA. The trail begins at the *Creek East/Will Rogers Trail* south of 61st Street and extends east along the Adams Creek corridor to the TTMA boundary.

**45. Coweta Creek Trail** is a proposed trail that serves Coweta. The trail begins at the end of the *River Parks BA/Coweta Trail* and extends north along the Coweta Creek corridor to the *Coweta Linkage* east of 273rd East Avenue. Destinations include G.W. Roland Park.

**46. Broken Arrow Creek Trail** is a proposed trail that serves Broken Arrow. The trail begins at the intersection of the *River Parks Bixby/BA Trail*, *River Parks BA/Coweta Trail*, and the *Coweta Linkage* on the north bank of the Arkansas River and extends north along the Broken Arrow Creek drainage corridor and through some school and park lands to the *BA South Loop Trail*. The trail then begins again east of Lynn Lane Road and continues north along the Broken Arrow Creek corridor to connect with the *Haikey Creek Trail* on Elm Place. Destinations include Spring Creek Elementary, Ernest Childers Middle School, Oak Crest Elementary, Ray J. Herral Nature Park, Hidden Springs Park, Urbana Park, Central Park, and Graham Park.

## Proposed On-road Linkages



Fourth Street Bikeway near downtown Tulsa

Thirty on-road bike linkages have been identified. These corridors either have existing bikeways (shoulders or wide lanes) or have the potential to be converted to accommodate on-road bike facilities. These corridors also contain room within the rights-of-way for the addition or improvement of sidewalks. Many of these linkages are located in densely populated areas of the TTMA which would not accommodate a typical off-road bike/pedestrian trail due to site limitations. The access to important destinations that these links provide will help tie the TTMA 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.

**47. 4th Street Linkage** is an existing 6.68 mile on-street bikeway that is delineated by directional signs along its entire length. The bikeway connects the Tulsa downtown area with the *Mingo Trail* in east Tulsa. Beginning in downtown at the intersection of the *Katy Downtown Trail* and *Greenwood/Mohawk Linkage*, the



**Greenwood/Mohawk Linkage**

bikeway travels east along 3rd Street to Harvard where it crosses onto 4th Street. At New Haven, the bikeway jogs onto 4th Place intersecting the *Tulsa North/South Linkage* at Pittsburg Avenue and eventually turns south on 73rd East Avenue. Three blocks later it turns east again onto 7th Street and ends when it meets up with the *Mingo Trail* along Mingo Creek. Destinations include Lindbergh Elementary School, Will Rogers High School, Kendall-Whittier School, Turner Park, McClure Park, and Tulsa University.

**48. Greenwood/Mohawk Linkage** is a funded 8.91 mile, on-street bikeway in north Tulsa connecting the Downtown Tulsa to north Tulsa and Mohawk Park. The bikeway begins at the *Katy Downtown Trail* and *4th Street Linkage* intersection, extends primarily north on Greenwood Avenue and Hartford Avenue intersecting the *Dirty Butter Creek Trail*, west on Mohawk Blvd., south primarily on Boston Place and Boston Avenue, and east on John Hope Franklin Street back to Greenwood Avenue. At the intersection of Hartford Avenue and Greenwood Avenue, the bikeway will travel northeast along Mohawk Blvd. to Lake Yahola connecting to *Mohawk Trail* at Harvard Avenue. Destinations include OSU-Tulsa, Carver Middle School, Burroughs Elementary School, Emerson Elementary School, Lakeview Park, Cheyenne Park, B. Hill Park, and Crawford Park.



**Avery Drive Linkage**

**48a. Avery Drive Linkage** is an existing 3.43 mile bikeway that serves west Tulsa. The bikeway has 5' wide striped shoulders for bicycle travel. There are bicycle activated warning lights on both ends of this linkage. The bikeway begins at the intersection of *SH 97 Bridge Trail*, *Lake Keystone Linkage*, and *SH 97 Linkage* just south of the Arkansas River in Sand Springs. It extends east along Avery Drive to the *West 21st Linkage* and *Gilcrease West Trail*. Destinations include Chandler Park (county parks).

**49. Tulsa North/South Linkage** is a proposed linkage that connects north Tulsa to south Tulsa. The linkage begins at the *SKO Trail* and New Haven Avenue. The linkage extends south primarily on New Haven Avenue and Pittsburg Avenue to the *4th Street Linkage* on 4th Place. From the *4th Street Linkage*, it extends south on Pittsburg Avenue to SH 51, jogs west to New Haven Avenue and continues south to the *36th Street Linkage*. The linkage begins south again on Hudson Avenue at the end of *36th Street Linkage*, west on 41st Street, south on Darlington Avenue where it crosses under I-44. On the south side of I-44, the linkage continues south on Fulton Avenue intersecting the *46th Street Linkage*, east on 51st Street, and south on Hudson Avenue intersecting the *LaFortune Trail*. South of LaFortune, the linkage jogs over to Fulton Avenue, and then turns west on 66th Street, crosses Yale Avenue at 68th Street, and continues west on Toledo Avenue back to 66th Street. A north spur from 66th Street extends north primarily on Richmond Avenue and Pittsburg Avenue connecting with the *LaFortune West Trail* on 56th Street. The rest of the linkage continues south from 66th Street on Richmond Avenue, then on Oswego Avenue, Pittsburg Avenue, and Oswego Place until it turns east on 77th Street connecting with the *76th Street Linkage* at Quebec Avenue. Continuing south on Quebec Avenue, the



**Tulsa North/South Linkage**



36th Street Linkage

linkage turns west on 81st Street, south on Pittsburg Avenue, east on 88th Street, south on Quebec Avenue, west on 91st Street, and finally south on Harvard Avenue connecting with the *Creek Turnpike Trail*. Destinations include Promenade Mall, Southroads Shopping Center, Bishop Kelly High School, East Elementary, the Educational Service Center, Indian Pupil Education, Carnegie Elementary, Eisenhower Elementary, Jackson Elementary, Key Elementary, Phillips Elementary, Memorial High School, Will Rogers High School, Tulsa Community College NE Campus, Paul Johnson Park, Holiday Hills Park, Mitchell Park, Ute Park, Grotto Park, and Montessori-Undercroft School.

**50. 36th Street Linkage** is a proposed linkage that serves central Tulsa. The linkage begins at the *River Parks East Bank Trail* and extends east on 41st Street, north on Madison Avenue, and east on 36th Street intersecting the *Tulsa North/South Linkage* at both New Haven Avenue and Hudson Avenue. Destinations include Phillips Elementary, Eliot Elementary, Mitchell Park, Highland Park, Montessori-Undercroft School and Brookside. This linkage will be implemented as a pilot project by the City of Tulsa.



56th Street Linkage

**51. 46th Street Linkage** is a proposed linkage that connects central Tulsa to east Tulsa. The linkage begins at the *Tulsa North/South Linkage* on Fulton Avenue and extends east on 46th Street to Mingo Road where it continues east on 47th Place to the *Mingo Creek Trail*.

**52. 56th Street Linkage** is a proposed linkage that connects River Parks to central Tulsa. The linkage begins at the *River Parks East Bank Trail* and extends east on 51st Place, south on Detroit Avenue and Cincinnati Avenue, east on 56th Street (or 56th Place) intersecting *Joe Creek Linkage* and *Tulsa North/South Linkage*, north on Urbana Avenue, and east on 55th Place connecting with *LaFortune Trail*.

**53. 76th Street Linkage** is a proposed linkage that connects south-central Tulsa to southeast Tulsa. The linkage begins at the *Tulsa North/South Linkage* at Quebec Avenue and extends east on 78th Street, Sandusky Avenue, and 76th Street to Yale Avenue. At Yale the linkage continues east on 77th Street, Erie Avenue, 76th Street, Hudson Avenue, 75th Place intersecting the *Haikey Creek Tulsa Tributary Trail*, and 75th Street to Sheridan Avenue. At Sheridan the linkage continues east on 76th Street to Memorial Avenue, east on 75th Street, south on 88th East Avenue, and east at 78th Street eventually connecting with *Mingo Trail* at US-169. Destinations include Jarmen Elementary, J.C. Leake Park, and Minshall Park.



Eastland Linkage

**54. Eastland Linkage** is a proposed linkage that serves east Tulsa. The linkage begins at the *Mingo Trail* and 41st Street and extends northeast through the Mingo Creek corridor, north on 106th East Avenue, east on 36th Street and 35th Street, north on 136th East Avenue and 137th East Avenue, and east on 21st Street intersecting *Lynn Lane Linkage* and *Creek East/Will Rogers Trail* at the Creek East



Elwood Linkage

Turnpike. Destinations include Briarglen Elementary, Clark Elementary, Boevers Elementary, Williams Tract Park, East Tract Park, and Shannon Park.

**55. Lynn Lane Linkage** is a proposed linkage that connects Broken Arrow to east Tulsa. The linkage begins at the *Eastland Linkage* and 177th East Avenue and extends south on Lynn Lane Road connecting with *Adams Creek West Trail* at 51st Street. Destinations include East Side Park.

**56. Coweta Linkage** is a proposed linkage that connects Broken Arrow to Coweta. The linkage begins at the intersection of the *Broken Arrow Creek Trail*, *RP Bixby/BA Trail*, and the *RP BA/Coweta Trail* and extends east to the MKT Railroad right-of-way intersecting the *Coweta Creek Trail*. It continues southwest along the MKT Railroad right-of-way (rail-with-trail) and then east along SH 51 to the TTMA boundary and the Coweta Sports Complex beyond. Destinations include the Kindergarten Center, Coweta High School, Coweta Junior High School, Coweta Intermediate School, Central Elementary School and Park, Coweta School Park, and G.W. Roland Park.



SH-97 Linkage

**57. Elwood Linkage** is a proposed linkage that connects west Tulsa to Jenks and Glenpool. The linkage begins at the *71st Street Bridge and Trail* on Elwood Avenue and extends south on Elwood Avenue intersecting the *Creek Turnpike Extension Trail* and the *SH 67 Linkage*. The linkage ends at 171st Street.

**58. SH 67 Linkage** is a proposed linkage that connects Sapulpa to Glenpool and Bixby. The linkage begins at the end of *SH 75A Linkage*, extends east on SH 67 intersecting the *Elwood Linkage*, and ends at the *Posey Creek Trail* and the *SH 67 Trail* east of Harvard Avenue.

**59. SH 75A Linkage** is a proposed linkage that serves Sapulpa. The linkage begins at the intersection of *SH 97 Linkage* and *Polecat Creek Trail* and extends south and southeast along US 75A to the *SH 67 Linkage*. Destinations include South Heights Elementary and Kelly Lane Park.

**60. SH 97 Linkage** is a proposed linkage that connects Sapulpa to Sand Springs. The linkage begins at the intersection of *SH 97 Bridge Trail*, *Lake Keystone Linkage*, and *Avery Drive Linkage*, extends south along SH 97 intersecting the *SW Blvd/Old Sapulpa Linkage*, and ends at the *SH 75A Linkage* and *Polecat Creek Trail*. Destinations include Jefferson Elementary, Garfield Elementary, Cedar Ridge Park, Kelly Lane Park, and Freedom Field Park.



West 21st Linkage near Chandler Park

**61. West 21st Linkage** is a proposed linkage that connects west Tulsa to Sand Springs. The linkage begins at *Avery Drive Linkage* and *Gilcrease West Trail*, extends east along 21st Street to the *River Parks West Bank Trail*, and crosses the Arkansas River to connect with the *River Parks East Bank Trail*.

**62. Lake Keystone Linkage** is a proposed linkage that connects Sand Springs to Keystone Lake. The linkage begins at the *Wekiwa Linkage* at the



Lake Keystone Linkage

north end of the Keystone Dam and extends south on SH 151 across the dam, east on Old SH 51 then east on SH 51 to the *SH 97 Bridge Trail*, *Avery Drive Linkage*, and the *SH 97 Linkage*. Destinations include Lloyd E. Rader Center School, Swift County Park and Keystone State Park.

**63. Wekiwa Linkage** is a proposed linkage that connects Sand Springs to Keystone Lake. The linkage begins at the *Katy Trail* and *SH 97 Bridge Trail* just south of the Keystone Expressway, extends west intersecting the *River City Trail* and *Zink Ranch Trail/Linkage* and ends at the *Lake Keystone Linkage* at the north end of the Keystone Dam. Destinations include the Kindergarten Center, Roy Moore Park, and the Keystone Dam Watchable Wildlife and Observation Area.

**64. Zink Ranch Trail/Linkage** is a proposed trail and on street linkage that connects Sand Springs to Skiatook Lake and Skiatook. The trail/linkage begins at the *Wekiwa Linkage* and *River City Trail* and extends north on SH 97T and SH 97 to the intersection of the *Osage Linkage*. Between this point and Lake Road, the linkage extends north as a trail. Once at Lake Road, the linkage continues on-road north to the *Skiatook Lake Linkage*. The design and construction of this trail/linkage should be in conjunction with the development of the proposed SH 97 project.



Wekiwa Linkage

**65. Osage Linkage** is a proposed linkage that serves northwest Tulsa and Tulsa County. The linkage begins at *Zink Ranch Trail/Linkage* and extends east on 78th Street North and 75th Street North, south on 33rd West Avenue, and east on 62nd, 63rd, and 66th Streets North to the *Midland Valley North Trail* and *Cherokee Linkage*. Destinations include Greeley Elementary, Lumpkin Tract Park, and Viking Park.

**66. Skiatook Lake Linkage** is a proposed linkage that connects Skiatook to Skiatook Lake. The linkage begins at *Zink Ranch Trail/Linkage* at Skiatook Lake and extends east on Oak Street to the *Midland Valley North Trail* and *SH 20 Linkage*. Destinations include City Park.

**67. SH 20 Linkage** is a proposed linkage that connects Skiatook to Collinsville. The linkage begins at the *Midland Valley North Trail* and the *Zink Ranch Trail/Linkage* and extends east primarily on SH 20 to the *SKO Trail*. Design and construction of this linkage should be done in conjunction with the development of the proposed SH 20 widening project. Destinations include Wilson Elementary, Collinsville High School, Collinsville Middle School, Central Elementary, Marrs Elementary, Washington Elementary, and City Park.



German Corner Linkage

**68. German Corner Linkage** is a proposed linkage that serves Owasso. The linkage begins at the *SKO Trail* and extends east on 116th Street North to the *Elm Creek Extension Trail* just west of 177th East Avenue. Design and construction of this linkage should be done in conjunction with the development of the proposed SH 20 widening project. Destinations include the Owasso Sports Park.



Cherokee Linkage

**69. Sperry Linkage** is a proposed linkage that connects Sperry to Owasso. The linkage begins at *Midland Valley North Trail* and extends east on 106th Street North to the *SKO Trail*.

**70. Cherokee Linkage** is a proposed linkage that connects north Tulsa to Owasso. The linkage begins at *Midland Valley North Trail* and extends east on 66th Street North to the *SKO Spur Trail*. Destinations include Scotsdale County Park and O'Brian County Park.

**71. Catoosa/Owasso Linkage** is a proposed linkage that connects Catoosa to Owasso. The linkage begins at the *Owasso Trail* and extends east on 86th Street North, south on 177th East Avenue, east on 76th Street North, south on 193rd East Avenue intersecting the *Port Road Linkage* and connecting to the *Pine Linkage*. A spur extends east at Rollins Street to the railroad. Destinations include Shadow Valley Park.

**72. Mohawk/Port of Catoosa Trail** is a proposed trail that connects Mohawk Park to the Tulsa Port of Catoosa along the City of Tulsa owned Spavinaw water line corridor. The trail connects to the *Mohawk Trail* on the west and extends east along the Spavinaw water line to US 169, north to 56th Street North to cross to the east side of US 169. From this point the trail will extend south along 169 to the Spavinaw water line and will extend east to the Tulsa Port of Catoosa.



Mohawk/Port of Catoosa Trail

**72a. US 266 Linkage** is a proposed linkage that connects the Tulsa Port of Catoosa to the eastern limits of the TTMA providing opportunity for an on street connection to Claremore. The linkage begins at the Tulsa Port of Catoosa and extends east on SH 266 over the Will Rogers Turnpike to the TTMA boundary.

**73. Pine Linkage** is a proposed linkage that connects northeast Tulsa to Catoosa. The linkage begins at the *Cooley Creek Trail* and extends north on Garnett Road and east on Pine Street to the *Catoosa/Owasso Linkage*.

**74. Southwest Blvd./Old Sapulpa Linkage** is a proposed linkage that connects Downtown Tulsa to west Tulsa and Sapulpa. The linkage begins at the *Katy Trail* in downtown Tulsa and extends south to the intersection of the *North River Parks Extension Trail* and the *River Parks East Bank Trail* on the east bank of the Arkansas River. The linkage crosses the Arkansas River extending south from the *River Parks West Bank Trail* on Southwest Blvd and intersecting the *W. 23rd Street Linkage*, *Cherry Creek Trail*, and the *Gilcrease West Trail*. The linkage continues south and west on Frankhoma Road to the *SH 97 Linkage* just north of Keystone Avenue. Destinations include Eugene Field Elementary, Daniel Webster High School, Clinton Middle School, OSU College of Osteopathic Medicine, Owen Park, and Howard Park.

**75. West 41st Street Linkage** is a proposed linkage from Sand Springs to Tulsa along West 41st Street. The trail connects to the funded *Cherry Creek Trail* on the east and extends along West 41st Street and terminates at the proposed *SH 97 Linkage*. Destinations include Reed Park, Philpott Park and the Tulsa Community College West Campus.

**Conceptual On Street Bikeways**

During the numerous public meetings the topic of providing on street bikeways in the region was frequently discussed. In fact, during the citizen mapping of trails and bikeways, over 1000 miles of on street routes were delineated for the TTMA region. Even though the purpose of this master plan is primarily for off street multiuse trails, it is important to recognize the need for on street bikeways in the area.



**Bicycle with trailer near Sand Springs**

Within the City of Tulsa the concept of on street bikeways was further refined based on the needs of the cycling community. The City of Tulsa Public Works Department and Traffic Engineering have prepared a proposed network of on street bicycle routes which utilize collector streets as their primary corridors. Jon Eshelman, City Traffic Engineer, has field inspected many of the routes. In most cases the planned on street bicycle routes intersect primary arterial streets at traffic lights for safe crossings. Tulsa’s on street bicycle route plan has been enthusiastically embraced by numerous members of the bicycling community and will be periodically updated as new connections are warranted and traffic conditions change.



**Trails Steering Committee member Malcolm McCollam and Mayor Susan Savage dedicate the 36th Street Linkage**

Based on the on street bikeway corridors that were delineated during the citizen mapping process and the City of Tulsa’s proposed on street bike routes the “Conceptual On-Street Bike Route Plan” Map 3 in the Executive Summary has been compiled. It depicts 591 mile of proposed on street bike routes and 19 miles of existing routes. The proposed bike routes are recommended for further evaluation to determine their suitability as designated on street bike routes. It is anticipated that further refinement to the bike route plan will be made by various local governments from time to time as further field inspections are made and as traffic patterns change. Current copies of the on street bike route plan can be obtained from INCOG/TMAPC or the City of Tulsa Traffic Engineer.



## 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 the Tulsa Metro Area, 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 the Tulsa Metro Area 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. These projects must be approved by the Indian Nations Council Of Governments (INCOG) in the Transportation Improvement Program.

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. The Urbanized Area funds, which are allocated by ODOT to INCOG, total approximately \$8.5 million a year. These funds are programmed by INCOG and are used primarily for arterial streets in the TTMA. 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. Approval of INCOG (as the MPO) is required for projects located within their transportation planning area.

2. Funds require a 20% cash match. Other federal funds can be used for the match in some circumstances. In-kind services and donated properties are not eligible as matches.
3. Professional design and planning fees are eligible for Enhancement funding, but cannot be used as a match.
4. The sponsor is responsible for preparing construction documents and bid documents. The sponsor will also be responsible for environmental clearances, bidding the project, and construction inspections in accordance with FHWA guidelines.
5. Land acquisition, if any, must be in accordance with federal requirements (sponsoring agencies are required to follow certain procedures in acquiring lands, and must follow these procedures if they intend to apply for Enhancement funds).
6. Application deadlines are set periodically by ODOT.

These requirements reflect TEA21 legislation and draft rules prepared by ODOT. Final rules will be approved in early 1999. Contact the Oklahoma State Enhancement Funds Coordinator, Tim Gatz, 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. In the past, ODOT has appropriated \$500,000 per year to INCOG. INCOG has programmed these funds for various projects to improve air quality in the TTMA.

### **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. The City of Tulsa and Broken Arrow could use these funds to develop trails in low/moderate income neighborhoods. Contact Roy Marshall at (918) 596-2600 for more information. HUD appropriates approximately \$5 million per year to the city of Tulsa and \$500,000 per year to Broken Arrow. 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 the Tulsa Metro Area. 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 Tulsa Area have implemented similar programs.

### Stormwater Management Fees

These fees are levied on households regularly to fund stormwater management activities in the City of Tulsa. Portions of the funds are currently used to develop maintenance roads along drainage channels and creeks, which double as multi-use trails. This funding source could continue to help fund trail development in the future and could be used as local match for state and federal funding opportunities.

### 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 TTMA 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 Private Funding Sources

### 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.

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 the Tulsa Metro Area 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 Tulsa could include high school or college students, user groups (running, walking and cycling clubs), local historical groups, neighborhood associations, local churches, conservation groups (such as Up With Trees and the Metropolitan Environmental Trust), 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 Tulsa 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 Helmerich Foundation**

The Helmerich Foundation supports community service activities in the Tulsa area, focusing on large capital needs, such as trails. The average grant size is between \$10,000 and \$50,000. For application information, contact Walter H. Helmerich, III at (918) 742-5531.

### **The Helmerich Trust**

The Helmerich Trust awards grants between \$1,500 and \$2,000 to community service projects. First consideration is given to projects in the Tulsa area. For more information, contact Hans C. Helmerich at (918) 742-5531.

### **Founders & Associates**

Founders and Associates (formerly know as Doctor's Hospital Foundation) could also award grant money for trails in the Tulsa area. Applications are accepted on February 1st and August 1st. Call (918) 743-3525 for more information.

**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.

**Kaiser Foundation**

Based in Tulsa, the Betty and George Kaiser Foundation awards grants in the areas of social services, education and arts. The average grant size is between \$1,000 and \$10,000 and the geographic area is Oklahoma, primarily in Tulsa. Contact Frederic Dorwart with the Foundation for more information at (918) 583-5852.

**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.

**Nelson Family Foundation**

Another foundation based in Tulsa is the Nelson Family Foundation. Grants between \$1,000 and \$5,000 are awarded in the areas of community services and education. The geographic focus area for awards is the Tulsa area. No specific application form or deadlines exist. Ruth Nelson should be contacted for more information at (918) 491-4321.

**Chapman Charitable Trust**

The Trust awards grants of \$10,000 to \$25,000 to nonprofit organizations in the Tulsa area. Grants are primarily in the areas of education, health, community services and arts and science. Applications can be made by letter or conversation with foundation managers. Contact Ralph Abercrombie for more information at (918) 496-7882.

**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.

**Tulsa Community Foundation**

The Tulsa Community Foundation was created recently to serve as a funding vehicle for social service, educational, arts and civic organizations in northeastern Oklahoma. The Foundation has committed to placing \$5 million to \$10 million over the next ten years. They expect to accept applications in 1999. Call Phillip Lakin, Jr. at (918) 583-6933 for more information.

**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. Contact Herb Beattie for further information at (918) 585-5197.

## Chapter 7



Trails Master Plan

## Implementation Plan

### Overview

The Metro 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 an innovative and strategic plan for building, managing, and operating the Metro Trails System.

### Building the Metro Trails System

Preparation of this Master Plan is only the initial step in the future development of a Metro Trails System for the greater TTMA area. More detailed design development 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 6, Design Guidelines are intended to provide a step-by-step process for building segments of the Metro Trails System.

Each trail corridor and/or segments of each corridor will require a more detailed site design process to determine the appropriate routing and alignment of the actual trail tread. Additionally, the location of trail amenities, such as trail furniture, landscaping, restrooms, parking, 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 71 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 site plans and design development documents for each of the trail and on-street linkage corridors.

## Phasing Strategy for the Metro Trails System

With limited trail resources and over 500 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 multi-use trail and linkage development for the next 10 to 15 years. The consultant team worked closely with the TTMA 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 rankings.*

**Connections to Existing Trails:** *a proposed trail is considered more useful if it makes connections to other existing trails than one which makes no connections. Proposed trails which connect to existing trail facilities receive higher rankings.*

**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 other public improvements, (i.e. street widening, expressway construction, etc.) 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 rankings than those corridors without such public improvements.*

**Community Connectors:** *connecting communities within the TTMA is a significant benefit of the proposed trail master plan. Trails which connect communities receive higher marks than those which do not.*

**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 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 mile of the trail corridor was used. Shorter trails within densely populated areas rank highest.

**Jobs Served:** to help predict the potential use of the trail for commuting purposes, the average number of jobs served by the corridor was utilized. For this evaluation, jobs within one mile of the trail corridor were used.

**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.

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

**Scenic Quality:** the quality of the visual experience by trail users is considered important by most individuals. The better the potential scenic quality within a 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 283 miles of new proposed trails within the TTMA, the first question is inevitably, "Which trail gets built first?" The following "Trail Phasing Evaluation Matrix" applies the above criteria to each of the 44 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 region will be dynamic, and as opportunities arise and conditions change corridors may be developed in a different order than indicated in the phasing matrix.

**Trail Phasing Evaluation Matrix**

RANK	ID	NAME	ROW AVAILABLE	CONNECTION TO EXISTING TRAILS	TIMELINESS/OPPORTUNITY/PRIORITY	COMMUNITY CONNECTOR	TOTAL POPULATION SERVED	POPULATION SERVED PER MILE	JOBS SERVED PER MILE	SCHOOLS SERVED	PARKS SERVED	SCENIC QUALITY	TOTAL SCORE	PHASE
1	1	River Parks East Bank Trail	20	12	12	4	10	8	4	0	8	8	86	Near Term
2	13	Mingo Trail	15	8	24	4	10	5	4	6	2	6	84	
3	14	BA South Loop Trail	20	8	24	4	5	3	2	4	2	6	78	
4	35	Katy Downtown Trail	10	16	18	0	5	10	8	0	2	4	73	
5	38	SKO Trail	5	8	18	4	8	5	4	4	8	6	70	
6	37	Midland Valley Extension	20	12	0	0	5	10	8	2	8	4	69	
7	18	Fry Ditch Trail	15	16	12	4	5	5	2	0	2	6	67	
8	27	Jenks River Trail	20	8	18	4	3	3	2	0	4	6	67	
9	34	River City Trail	20	8	18	0	3	5	4	0	2	6	66	
10	29	Joe Creek Trail/Linkage	20	8	0	0	8	10	4	2	8	4	64	
11	17	River Parks Tulsa Bixby Trail	15	8	18	4	3	3	2	0	2	8	62	
12	26	Creek West Turnpike Extension	20	0	24	4	3	3	2	0	0	6	61	
13	30	Mooser Creek Trail	10	4	12	0	5	8	4	2	6	8	59	Mid Term
14	36	Midland Valley North Trail	5	8	0	8	8	8	4	6	8	4	58	
15	15	Creek East/Will Rogers Trail	20	0	24	0	3	3	2	0	0	6	57	
16	46	Broken Arrow Creek Trail	10	0	12	0	8	5	2	4	8	8	57	
17	32	Gilcrease West Trail	5	8	12	4	5	5	2	2	2	6	51	
18	12	LaFortune Trail	20	0	0	0	5	10	6	0	2	6	49	
19	28	Jenks Missouri Pacific Trail	5	8	0	4	5	5	2	4	4	6	43	
20	43	Cooley Creek Trail	15	0	6	0	3	8	4	2	0	6	43	
21	19	Haikey Creek Trail	10	0	0	4	8	5	2	4	2	8	43	
22	33	Bigheart Trail	5	8	0	0	3	8	4	0	4	8	39	
23	41	Owasso Trail	15	0	0	0	5	3	2	4	4	6	39	
24	16	Chouteau National Trail	20	0	0	0	3	3	2	0	2	8	37	
25	19a	Haikey Creek Tulsa Tributary	10	0	0	0	8	8	4	0	2	6	37	Long Term
26	39	Mohawk Trail	20	4	0	0	3	3	2	0	2	4	37	
27	38a	SKO Trail	5	0	12	4	3	3	2	0	4	4	36	
28	32a	Gilcrease Northwest Trail	5	8	0	0	5	5	2	2	2	6	35	
29	64	Zink Ranch Trail	20	0	0	0	3	3	2	0	0	6	33	
30	36a	Midland Valley North Trail	5	0	0	8	3	3	2	6	2	4	32	
31	22	SH 67 Trail	20	0	0	0	3	3	2	0	0	4	31	
32	19b	Haikey Creek BA Tributary	5	0	0	0	5	8	4	0	0	8	30	
33	23	Missouri Pacific Trail	0	4	0	4	3	3	2	6	2	6	29	
34	72	Mohawk/Port of Catoosa Trail	20	0	0	0	3	3	2	0	0	2	29	
35	20	River Parks Bixby/BA Trail	5	0	0	4	3	3	2	2	2	8	28	
36	31	Polecat Creek Trail	0	0	0	0	5	3	2	0	8	8	26	
37	44	Adams Creek West Trail	5	0	0	0	3	3	2	4	0	8	24	
38	25	Bixby River Trail	0	4	0	0	3	3	2	0	2	8	21	
39	40	SKO Spur Trail	5	0	0	0	3	3	2	0	2	6	20	
40	21	River Parks BA/Coweta Trail	0	0	0	4	3	3	2	0	0	8	19	
41	45	Coweta Creek Trail	0	0	0	0	3	3	2	0	2	8	17	
42	24	Posey Creek Trail	0	0	0	0	3	3	2	0	0	8	15	
43	42	Elm Creek Extension	0	0	0	0	3	3	2	0	0	8	15	
44	44a	Adams Creek East Trail	0	0	0	0	3	3	2	0	0	8	15	

### Linkage Phasing

With 208 miles of proposed on-street linkages within the TTMA, developing priorities for implementation is needed. The following spreadsheet applies the same criteria utilized for trails to each of the 27 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 27 corridors were grouped into two implementation phases: Near Term and Mid Term Phases.

### Linkage Phasing Evaluation Matrix

RANK	ID	NAME	ROW AVAILABLE	CONNECTION TO EXISTING TRAILS	TIMELINESS/OPPORTUNITY/PRIORITY	COMMUNITY CONNECTOR	TOTAL POPULATION SERVED	POPULATION SERVED PER MILE	JOBS SERVED PER MILE	SCHOOLS SERVED	PARKS SERVED	SCENIC QUALITY	TOTAL SCORE	PHASE
1	50	36th St Linkage	20	8	18	0	8	8	4	4	4	2	76	Near Term
2	74	SW Blvd/Old Sapulpa Linkage	20	8	12	4	8	5	4	6	4	4	75	
3	61	West 21st Linkage	20	16	12	0	5	5	4	2	4	2	70	
4	52	56th Street Linkage	20	16	0	0	8	8	4	6	6	2	69	
5	75	West 41st Street Linkage	20	8	12	4	5	5	2	4	4	4	68	
6	63	Wekiwa Linkage	20	8	18	0	3	3	2	2	2	6	63	
7	49	Tulsa North/South Linkage	20	16	0	0	0	8	4	0	8	2	58	
8	57	Elwood Linkage	20	4	12	8	5	3	2	0	0	4	58	
9	62	Lake Keystone Linkage	20	8	12	0	3	3	2	2	2	6	57	
10	60	SH 97 Linkage	20	8	0	4	5	5	2	4	6	2	56	
11	51	46th St Linkage	20	0	12	0	8	8	6	0	0	2	55	
12	67	SH 20 Linkage	20	0	12	4	3	3	2	6	2	4	55	
13	54	Eastland Linkage	20	0	0	0	8	8	4	4	6	2	51	Mid Term
14	64	Zink Ranch Linkage	20	0	12	0	3	3	2	0	0	6	45	
15	53	76th St Linkage	20	0	0	0	8	8	4	2	4	2	47	
16	56	Coweta Linkage	20	0	0	4	3	3	2	6	6	4	47	
17	58	SH 67 Linkage	20	4	6	4	3	3	2	0	0	4	45	
18	68	German Corner Linkage	20	0	12	0	3	3	2	0	2	4	45	
19	59	SH 75A Linkage	20	4	0	4	3	3	2	2	2	4	43	
20	65	Osage Linkage	20	0	0	0	3	3	2	2	4	6	39	
21	73	Pine Linkage	20	0	0	4	3	3	4	2	0	4	39	
22	55	Lynn Lane Linkage	20	0	0	4	3	3	2	0	2	4	37	
23	71	Catoosa/Owasso Linkage	20	0	0	4	3	3	2	0	2	4	37	
24	69	Sperry Linkage	20	0	0	4	3	3	2	0	0	4	35	
25	70	Cherokee Linkage	20	0	0	0	3	3	2	0	4	4	35	
26	66	Skiatook Lake Linkage	20	0	0	0	3	3	2	0	2	4	33	
27	72	SH 266 Linkage	20	0	0	0	3	3	2	0	0	2	29	

## Estimated Costs for Facility Development

The consultant team 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 below and 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.

Preliminary construction cost estimates are provided in tabular form on pages 92 and 93 of this Chapter for the Near-Term, Mid-Term and Long-Term trail 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

## Typical Costs for Off-Road Multi-Use Trail Facilities

Category/Description of Facility	Unit	Unit Costs
<u>Trail Treads</u>		
6-foot Bare Earth Hike/Mtn. Bike Trail	linear feet	\$5
8-foot Bare Earth Equestrian Trail	linear feet	\$8
8-foot Woodchip Pedestrian Trail	linear feet	\$10
10-foot Soil-Cement Trail	linear feet	\$12
10-foot Aggregate/Stone Trail	linear feet	\$15
10-foot Asphalt Multi-Purpose Trail	linear feet	\$25
10-foot Concrete Multi-Purpose Trail	linear feet	\$35
10-foot Wood Deck/Boardwalk Trail	linear feet	\$250
<u>Signage</u>		
Information Signs	each	\$1,000
Direction Signs	each	\$200
Warning Signs	each	\$200
Mile/Kilometer Markers	each	\$250
<u>Furniture/Furnishings</u>		
Benches	each	\$600
Trash Receptacles	each	\$400
Security Bollards	each	\$250
Bicycle Racks	each	\$500
Fencing (Board-on-Board)	linear feet	\$20
Gates	each	\$750
Emergency Phones	each	\$1,000
Drinking Fountains	each	\$2,500

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)	\$15,000/mi
Urban Bike Lanes (4' wide, both sides)	\$200,000/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 Parking (Bicycle Lockers - per 2 bicycles)	\$500-\$1500
Class II Parking (Secure wheels and frame-per bike)	\$65-\$150
Class III 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)	\$130,000/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 TTMA Trails Master Plan is sustained over the next 15 years, the opportunity exists to implement a total of 491 miles of multi-use trails and on-street linkages. The phased development breaks down as follows: Near-Term projects consisting of 78 miles of multi-use trails and 100 miles of on-street linkages; Mid-Term projects consisting of 77 miles of multi-use trails and 108 miles of on-street linkages; and the Long-Term projects totaling 128 miles of multi-use trails.

**Funded Trail Projects**

Four funded trail projects within the TTMA are at various implementation stages. The North River Parks Extension (1.37 mi.), a City of Tulsa ISTE A funded project has been let and construction is expected to be complete by fall of 1999. The 71st Street Bridge and Trail (1.55 mi.) and the PSO West Bank Trail (.75 mi.), both City of Tulsa ISTE A funded projects, are expected to let in May 1999 with projected completion in early 2000. The Cherry Creek Trail (2.09 mi.) and the River Parks West Bank Trail (4.19 mi.) are City of Tulsa projects which were funded by the 1996 sales tax extension and design work on both has started.

**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)	LOW COST	HIGH COST
1	1	River Parks East Bank Trail	5.25	1,181,250	1,365,000
2	13	Mingo Trail	16.96	3,816,000	4,409,600
3	14	BA South Loop Trail	12.37	3,061,575	3,537,820
4	35	Katy Downtown Trail *	0.93	313,875	362,700
5	38	SKO Trail	14.90	3,352,500	3,874,000
6	37	Midland Valley Extension	1.45	407,813	471,250
7	18	Fry Ditch Trail	7.03	1,265,400	1,462,240
8	27	Jenks River Trail	4.80	1,080,000	1,248,000
9	34	River City Trail	1.60	396,000	457,600
10	29	Joe Creek Trail/Linkage	2.64	534,600	617,760
11	17	River Parks Tulsa Bixby Trail	5.01	1,014,525	1,172,340
12	26	Creek West Turnpike Extension	5.09	1,317,038	1,521,910
<b>TOTAL NEAR TERM CORRIDORS</b>			<b>78.03</b>	<b>17,740,575</b>	<b>20,500,220</b>

All costs based on 1999 dollars.

\* Does not include the cost for the proposed Katy Trail Head development near Greenwood and Archer.

**Mid Term Trails Cost**

Rank	ID	NAME	LENGTH (mi)	LOW COST	HIGH COST
13	30	Mooser Creek Trail	3.55	798,750	923,000
14	36	Midland Valley North Trail	6.29	1,415,250	1,635,400
15	15	Creek East/Will Rogers Trail	10.86	2,443,500	2,823,600
16	46	Broken Arrow Creek Trail	6.62	1,489,500	1,721,200
17	32	Gilcrease West Trail	5.50	1,237,500	1,430,000
18	12	LaFortune Trail	1.82	307,125	354,900
19	28	Jenks Missouri Pacific Trail	3.25	621,563	718,250
20	43	Cooley Creek Trail	1.92	432,000	499,200
21	19	Haikey Creek Trail	9.10	2,047,500	2,366,000
22	33	Bigheart Trail	1.18	292,050	337,480
23	41	Owasso Trail	10.66	2,398,500	2,771,600
24	16	Chouteau NationalTrail	16.31	2,935,800	3,392,480
<b>TOTAL MID TERM CORRIDORS</b>			<b>77.06</b>	<b>16,419,038</b>	<b>18,973,110</b>

All costs based on 1999 dollars.

**Long Term Trails Cost**

Rank	ID	NAME	LENGTH (mi)	LOW COST	HIGH COST
25	19a	Haikey Creek Tulsa Tributary	3.29	740,250	855,400
26	39	Mohawk Trail	6.98	1,334,925	1,542,580
27	38a	SKO Trail	3.60	810,000	936,000
28	32a	Gilcrease Northwest Trail	6.31	1,419,750	1,640,600
29	64	Zink Ranch Trail	2.56	633,600	732,160
30	36a	Midland Valley North Trail	8.09	1,820,250	2,103,400
31	22	SH 67 Trail	2.66	478,800	553,280
32	19b	Haikey Creek BA Tributary	3.04	684,000	790,400
33	23	Missouri Pacific Trail	15.85	3,566,250	4,121,000
34	72	Mohawk/Port of Catoosa Trail	7.73	1,391,400	1,607,840
35	20	River Parks Bixby/BA Trail	8.13	1,829,250	2,113,800
36	31	Polecat Creek Trail	13.12	2,952,000	3,411,200
37	44	Adams Creek West Trail	4.15	933,750	1,079,000
38	25	Bixby River Trail	10.92	2,457,000	2,839,200
39	40	SKO Spur Trail	4.84	1,089,000	1,258,400
40	21	River Parks BA/Coweta Trail	9.75	2,193,750	2,535,000
41	45	Coweta Creek Trail	2.84	639,000	738,400
42	24	Posey Creek Trail	4.21	947,250	1,094,600
43	42	Elm Creek Extension	2.52	567,000	655,200
44	44a	Adams Creek East Trail	7.32	1,647,000	1,903,200
<b>TOTAL LONG TERM CORRIDORS</b>			<b>127.91</b>	<b>28,134,225</b>	<b>32,510,660</b>
<b>TOTAL ALL TRAIL CORRIDORS</b>			<b>283.00</b>	<b>62,293,838</b>	<b>71,983,990</b>

All costs based on 1999 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 regional trail system. The cost estimates for these types of facilities is 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 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)	LOW COST	HIGH COST
1	50	36th St Linkage	4.45	40,050	60,075
2	74	SW Blvd/Old Sapulpa Linkage	13.85	138,500	207,750
3	61	West 23rd Linkage	3.44	34,400	51,600
4	52	56th Street Linkage	4.29	53,625	80,438
5	75	West 41st Street Linkage	5.33	53,300	79,950
6	63	Wekiwa Linkage	8.21	82,100	123,150
7	49	Tulsa North/South Linkage	17.82	178,200	267,300
8	57	Elwood Linkage	10.06	100,600	150,900
9	62	Lake Keystone Linkage	8.78	87,800	131,700
10	60	SH 97 Linkage	9.48	71,100	106,650
11	51	46th St Linkage	3.29	32,900	49,350
12	67	SH 20 Linkage	10.44	104,400	156,600
<b>TOTAL NEAR TERM CORRIDORS</b>			<b>99.44</b>	<b>976,975</b>	<b>1,465,463</b>

All costs based on 1999 dollars.

**Mid Term Linkages Cost**

Rank	ID	NAME	LENGTH (mi)	LOW COST	HIGH COST
13	54	Eastland Linkage	9.37	107,755	161,633
14	64	Zink Ranch Linkage	17.72	150,620	225,930
15	53	76th St Linkage	5.24	52,400	78,600
16	56	Coweta Linkage	8.78	87,800	131,700
17	58	SH 67 Linkage	7.42	81,620	122,430
18	68	German Corner Linkage	4.27	42,700	64,050
19	59	SH 75A Linkage	4.55	45,500	68,250
20	65	Osage Linkage	8.62	86,200	129,300
21	73	Pine Linkage	5.93	59,300	88,950
22	55	Lynn Lane Linkage	3.05	30,500	45,750
23	71	Catoosa/Owasso Linkage	10.39	103,900	155,850
24	69	Sperry Linkage	7.28	72,800	109,200
25	70	Cherokee Linkage	3.60	36,000	54,000
26	66	Skiatook Lake Linkage	4.77	47,700	71,550
27	72a	SH 266 Linkage	7.15	71,500	107,250
<b>TOTAL LONG TERM CORRIDORS</b>			<b>108.14</b>	<b>1,076,295</b>	<b>1,614,443</b>
<b>TOTAL ALL LINKAGE CORRIDORS</b>			<b>207.58</b>	<b>2,053,270</b>	<b>3,079,905</b>

All costs based on 1999 dollars.

**Operations and Management**

Operating, maintaining and managing the Metro Trails System will require a coordinated effort among local government agencies, private sector organizations and individuals. Key elements of this operation and management program include trail facility operational policies, land management, safety and security, trail rules and regulations, an emergency response plan, and a risk management plan. This information is defined in greater detail in Appendix A of this report.

Maintenance and management of individual trail segments will be the responsibility of various local governments and their partners. It is anticipated that these maintenance and management duties can be shared among trail supporters in the public and private sectors. For example, currently the City of Tulsa owns the land where River Parks has developed the existing trails system. River Parks maintains the system of trails, even though the land is owned by Tulsa. Similarly, River Parks maintains the Katy Trail, which extends across land that is owned by the State of Oklahoma.

Maintenance and management of the Metro Trails System will require each community to establish operations budgets. 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 Metro 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 River Parks Authority 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	<u>\$800.00</u>

**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

**Metro Trails Trust Fund**

A Metro Trails Trust Fund should be established to help pay for some of the costs for maintenance and management of metro 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.

**Metro Trails System Governance Structure**

Implementing the Metro Trails System will require a coordinated effort among public and private sector groups, organizations and agencies. The Plan presented in this report is ambitious, yet it is very achievable. Other communities have accomplished or launched similar efforts. As illustrated by the following charts, the metro trails system proposed within Tulsa is not unlike the size of systems in operation within other American communities.

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

It is recognized that the Metro Trails System will need to be implemented through a phased approach based on cost and geographic scale of the ultimate system. In order to accelerate early actions and the development of the Near-Term projects defined in this Plan, it is recommended that interested communities and local government agencies work through INCOG. INCOG should continue its role as the Metropolitan Planning Organization for transportation planning and coordinate trail planning through the MPO structure. The Trails Master Plan and periodic updates should be adopted as a part of INCOG's Long-Range Transportation Plan and as elements of the local Comprehensive Plans by the respective Planning Commissions and local governments. INCOG should also continue to work with local governments and user groups through a committee or working group that might be known as the Metro Trails Alliance which would build upon the work of the Trails Master Plan Steering Committee.

### **Role of INCOG**

The Metro Trails Alliance through INCOG would be established initially with involvement of INCOG, the Cities of Bixby, Broken Arrow, Jenks, Owasso, Sand Springs, Sapulpa, and Tulsa; Creek and Tulsa Counties; and the River Parks Authority. The purpose of the Alliance would be to coordinate the short-term implementation of the Metro Trails Master Plan and to provide information to local governments, the private sector and area residents. The Alliance would be established as a loosely structured organization. The Alliance would have no power to regulate, raise taxes, acquire real estate, or construct projects. The Alliance would be principally an advocate for the implementation of the Plan. INCOG can also assist the Alliance with local and regional planning, information, coordination, communication, implementation and management services. The Alliance will work with member communities, groups and organizations to ensure coordination of implementation activities.

## **Public Private Partnerships**

The Metro Trails System will require the services of many partners to be successful. The most reliable source of these services will come from the local governments throughout the five-county area. However, in order to successfully keep pace with the multitude of development, operation and management requirements of this trail system, the private sector, civic and user organizations and individual citizens will be called upon to share the burden and participate in stewardship of the trails system where appropriate. The following are some suggestions for how the various sectors can assist with the implementation of the Metro Trails System.

### **Role of Local Governments**

Local governments throughout the Metro area will be the primary implementers of the trail system. As such they will be involved in the detailed planning, design and development of most of the metro trails system. Cities and counties can take on the responsibility for completing detailed design development plans for individual segments of the trail system. They can also implement management plans for

each trail segment, sometimes in partnership with private sector groups. Cities and counties 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 ODOT Enhancement Program. Local governments should also consider funding for trail development as a part of local capital programs including general obligation bond issues and sales tax programs. Also, each entity should advocate for appropriate legislation to facilitate implementation of the trails system such as the creation of regional trail districts.

### **Role of the Private Sector**

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

Local businesses and corporations might consider sponsoring a segment of trail for development. Under trail naming guidelines a 50% or greater contribution 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 Metro Trails System. Civic organizations and trail user groups can contribute the time and labor of their members to assist trails organizations and local governments 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 Tulsa Running Club, Tulsa Walking Club, Tulsa Bicycle Club and others. There are endless ways in which local civic groups can become involved with the Metro 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 Metro Residents**

Metro residents interested in the development and management of the Metro Trails System can offer their time, labor and expertise to the Trails Alliance or Authority and local governments. 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 through an appropriate community-wide program.

Individual, civic and corporate contributions can also be donated to accelerate trail development and enhance trail maintenance. Entities are in place, through such non-profit organizations as Park Friends, or can be established to channel tax deductible contributions toward trail projects. Finally, residents can also simply serve as advocates and/or users of the trail system further encouraging timely implementation of the plan by the local public and private sectors.





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 TTMA Metro Trails System. The following policies are defined to assist local government agencies and trails organizations 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.

### Metro Trails System Map Policy

The official Metro Trails System Map is illustrated on a 1-inch to 1-mile scale drawing, as prepared by LandPlan Consultants, Inc. of Tulsa, OK. The plan was approved by INCOG on May 13, 1999, and is on display at INCOG. INCOG 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 three important aspects of the Metro Trails System; one, trails that are currently developed and open for public access and use; two, trail corridors that warrant further study for early implementation; and three, trail corridors that are part of the longer term phased development strategy.

### Land Acquisition Policy

The majority of land that is included within the Metro Trails System corridors is currently publicly owned or under some public control. For those lands that are in private ownership, local governments will negotiate with individual property owners for the use of their land for trail purposes. Local governments or certain non-profit organizations can accept donation of property or easements for the Metro 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.

**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 local governments. All access and use is governed by existing local government policies. The use of all trails is limited to non-motorized uses, including hiking, bicycling, running, jogging, wheelchair use, skateboarding, in-line skating, mountain biking, and/or other uses that are determined to be compatible with Metro Trails.

**Naming of Trails Policy**

The majority of trails within the Metro Trails System should be named for the significant natural features that are found within the trail corridor. Some trails may be named for historic routes of travel throughout the Metro Area. 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 substantial gift to develop a trail segment.

**Fencing and Vegetative Screening Policy**

Local governments should work with landowners on an individual basis to determine if fencing and screening is required and appropriate. Local governments 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 to encourage community groups, families, businesses, school groups, civic clubs and other organizations to join in managing the Metro Trails System. Trail sponsors will need to work closely with the local governments to ensure that all Adopt-a-Trail Program groups manage and maintain trails in a manner that is consistent with other land use objectives. Written agreements for each Adopt-a-Trail entity should be developed and a current record of this agreement should be on file with local governments. Adopt-a-Trail entities will be assigned a specific section of the Metro Trails System, defined by location or milepost. The activities of each organization shall be monitored by the local governments. Agreements for management can be amended or terminated at any time by either party, giving 30 days written notice.

Management Agreements should be established between local governments and private organizations wishing to assist with the management of designated segments of the Metro Trails System. The objective of these agreements is to define areas of management that are compatible with existing land management activities, especially where the Metro 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**

Local governments 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. An example of a cross access agreement is on file with INCOG, which can serve as a model for how cross access can be obtained and maintained by local governments and adjacent property owners. This cross access agreement is based on case law of the United States and specific experiences from other trail systems throughout the United States. Adjacent landowners generally have the right to use the access at any time. However, access can not 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 should 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 and Transportation Officials (AASHTO) and the Manual on Uniform Traffic Control Devices (MUTCD), the crossing will be signed with appropriate regulatory, warning and information signs.

Trail facilities should be maintained in a manner that promotes safe use. All trail facilities shall be managed by cities, counties or their designees. 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 depressions, 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. Local governments 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.

## **Land Management**

Property owned or used by local governments for the Metro 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. Local governments or their designated agents shall be responsible for the cutting and removal of vegetation. Removal of vegetation by an individual or entity other than local governments or their 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 measures, local governments should develop and implement a Safety and Security Program for all segments of the Metro 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 Metro 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 cities and counties to establish a Metro 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 complements 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 INCOG, local trail user groups or other local trail related organizations.

## **Trail Rules and Operation Regulations**

The Metro 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 local ordinances that govern system use. No organization shall be permitted to use any portion of the Metro Trails System for a commercial purpose unless written permission has been obtained from the appropriate local government. Local governments 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 permission from a local government shall be deemed in violation of access and use policy and treated as a trespasser.

The TTMA Metro Trail System shall be operated like all other parks within local jurisdictions. Hours for public use shall generally be 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 may be deemed in violation of these hours of operation and treated as trespassers. Where trails are lighted for

nighttime use, the rules established for specific trails shall govern permitted uses and activities.

## Trail Ordinances

Multituse 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 adopted as 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 are recommended for the TTMA Metropolitan 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, wheelchairs, 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 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 an 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 the Trail Under the Influence of Alcohol or Drugs: It is illegal to use the 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 the Trails 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 may 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 may be prosecuted to the fullest extent of the law.

## **Emergency Response Plan**

In order to effectively patrol the Metro Trails System and respond to the potential for fire, floods and other natural or human-caused disasters, local governments should 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 should 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 should be produced and kept on file at each of the local communities. Each trail should 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 phone may be located in remote sections of the system, providing users with access to the area 911 Emergency System.

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 developed 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 Metro 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 Metro Trails System, as defined within this Plan, rests with the local communities within the metro area. Local communities are considered the Risk Management Coordinators 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 implemented by local communities in establishing Risk Management Plans for the Metro Trails System.

- 1) Develop a policy statement about risk management.
- 2) Conduct a needs assessment.
- 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 involved in trail management and operations.
- 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 Metro 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 under designed 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, local governments should have in operation the following measures prior to opening a segment of the trail system:

- 1) a thorough Maintenance Program that provides the appropriate duty or level of care to trail 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 local governments 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. Local governments should review their current policies and check coverages to be certain that all aspects of its policies are up to date.

Local governments 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 local governments not charge a fee to use any portion of the Metro 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.