Brentwood, Clayton, Maplewood and Richmond Heights Bikeable Walkable Communities Plan

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TRAILNET
Promoting Active Living

In partnership with:

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TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

Over the past several years, interest in cycling and walking has increased in the Cities of Brentwood, Clayton, Maplewood and Richmond Heights, as well as in the greater St. Louis region, where more individuals are seen walking and using bicycles. Bicycle commuters, transit users, children going to and from school, and a variety of other pedestrians and bicyclists require safe, interconnected facilities to get from Point A to Point B, just like automobile drivers. This plan represents a coordinated effort on the part of these four cities to ensure that a wider range of residents, especially bicyclists and pedestrians, can safely and conveniently travel in and around their communities.

Benefits of a Bikeable and Walkable Community

The cities' commitment to developing a joint bicycle and pedestrian master plan is an acknowledgement of the many benefits of a more bicycle and pedestrian friendly environment for residents, workers, and visitors. Providing a safe, interconnected network of bicycle and pedestrian infrastructure can improve community health, reduce harmful auto emissions, increase transportation choices while reducing automobile traffic congestion, generate economic benefits for residents and businesses, foster a greater sense of community, and increase quality of life.

Health. Auto-dominant travel patterns, sedentary lifestyles and lack of healthy eating choices are a few of the key causes behind alarming health trends in the United States. Recent figures from the Center for Disease Control show that obesity rates have more than doubled for adults and more than tripled for children since 1980. Currently, more than one third (72 million) adults are obese, and 16 percent of children are now obese as well.[1]

Over the past two decades, academic research emphasizing the connection between the built environment and health has grown exponentially. Land use patterns, physical infrastructure conditions, and a variety of other environmental characteristics strongly

[1] National Center for Chronic Disease Prevention and Health Promotion, *Obesity: Halting the Epidemic by Making Health Easier.* (2009)

relate to community health. Incorporating bicycle and pedestrian infrastructure into local transportation and recreation systems can provide opportunities for community members to reach the recommended 30 minutes of moderately intense physical activity through active transportation (biking or walking instead of driving an automobile).[2] A safe, connected network of sidewalks, bike lanes and routes, and shared use paths can connect people to schools, public transit stops, parks, libraries, restaurants and retail, and a variety of other destinations.

Transportation/Environmental Impact. The choices we make are limited by the choices available. Improving a city's non-motorized transportation facilities will encourage people to consider their transportation options. With an improved crosswalk or a new bike route, a previously uninviting trip to the grocery store for walkers and bikers is transformed into safe and welcoming journey. The result is less travel by automobile, and therefore reduced greenhouse gas emissions. With half of all trips in America within a 20-minute bike ride, and a quarter of all trips within a 20-minute walk, there are plenty of opportunities to leave the car behind and get around town by bike or foot.[3]

Economic Benefits. For individuals and businesses, the economic benefits of bicycle and pedestrian infrastructure improvements are multi-faceted and range from subtle to fairly evident.

- Individuals choosing to bike or walk and connect to public transit will save money on automobile maintenance and gas costs. With gas prices sure to rise, the cost of driving will impact many commuter's transportation decisions.
- Desirable community amenities like multi-use trails and greenways can raise nearby home values.
- Improved health related to daily walking and bicycling reduces health care costs for individuals, employers, and health care providers.
- Trails and other bicycle and pedestrian improvements can stimulate economic activity, especially in the growing sectors recreation and eco-tourism.

[2] U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. *Physical activity and health: A report of the Surgeon General.* Washington, DC: Government Printing Office (1996).
[3] Federal Highway Administration. *National Household Travel Survey*. (2001)

Sense of Community. In an age when homogenization has permeated nearly all facets of life, development patterns - big box retail, strip commercial development and larger housing developments - have rendered many communities indistinguishable from one another. Unique characteristics in the built environment help create a distinctive personality that residents, businesses and municipalities can embrace and enjoy. Bicycle and pedestrian infrastructure, like historic buildings, cultural institutions and similar amenities, can enhance the sense of community and be a source of civic pride.

Quality of Life. All these factors converge to create an overall quality of life. Diverse and efficient municipal services, multiple transportation and commuting mode choices, commitment to environmental responsibility, access to recreational opportunities, and a strong sense of community are all highly desirable qualities that contribute a community's character. All of these characteristics can be incorporated into a city's appeal through the implementation of a bicycle and pedestrian plan.

Plan Origins

Walkability and bikeability are more than just buzzwords in the planning field; they are important elements that enhance a community's character and quality of life. In recognition of the added benefits of creating a more walkable and bikeable environment, these four communities joined together, as they have on other key urban initiatives, to develop a coordinated bicycle and pedestrian master plan that will guide future infrastructure improvements and supporting programs related to walking and biking.

The cities have partnered with each other and with Trailnet to develop a bicycle and pedestrian master plan with a focus on infrastructure improvements. Trailnet is a non-profit in St. Louis dedicated to leading the region in fostering healthy and active communities through innovative planning, programs and policies that promote walking and bicycling. Building on the St. Louis Regional Biking and Walking Transportation Plan, Trailnet's Bikeable Walkable Community Planning Program develops partnerships with municipalities throughout the region to create bicycle and pedestrian master plans, utilizing major funding from the Missouri Department of Transportation (MoDOT) and East West Gateway Council of Governments (EWCOG). These four cities now join over a dozen other municipalities throughout the metropolitan area that created master

plans to guide them in the development of more bikeable and walkable communities. As more and more cities recognize the importance of bicycling and walking to a community's health, mobility, recreational opportunities, and quality of life, these local efforts will soon connect to create a region-wide system of interconnected facilities that move people not just within their communities, but also to the broader St. Louis metropolitan area.

Purpose

The purpose of this study is to develop a comprehensive bicycle and pedestrian master plan that examines and analyzes existing conditions relative to bicycling and walking in the four-city area and formulates a vision, goals and objectives addressing both recreational and transportation needs. The plan connects residents, workers, and visitors to the communities to schools, transit, employment centers, parks, and other significant destinations.

This plan functions as a guide for the development of a system of interconnected trails and on-street bicycle facilities. It will be implemented over a period of time as funding opportunities and interest in particular segments coalesce. Demands on municipal funds will be minimized through leveraging to obtain financial assistance from outside sources. It is also hoped that volunteer support will be available to facilitate and enhance the effort.

Plan Scope

Study Area. The planning study area covers the municipalities of Brentwood, Clayton, Maplewood, and Richmond Heights. Located in the eastern central corridor of St. Louis County, Missouri, these communities have a total area of 8.3 square miles. While the plan focuses on connecting people to destinations within the community, consideration is given to connections with the greater St. Louis region through regional trails, Bike St. Louis routes, and Metro transit.

Time Range. Plan implementation is phased in over a ten year period, allowing municipalities adequate time to prioritize improvements and secure funding.

Planning Process

The process for the development of this plan was driven by three key factors: municipal considerations, public participation, and sound planning and design principles.

Municipal Considerations. A technical advisory committee comprised of representatives of the parks and recreation, planning, and public works departments of the four cities provided local project oversight. This group met on several occasions during the study period to discuss issues, needs, existing plans and opportunities to guide the effort.

Public Participation. To ensure the plan meets the needs of those it is intended to serve, the planning process incorporated a number of opportunities for public engagement and participation. The planning team held two public forums to inform the community members about the components of a bicycle and pedestrian master plan, empowering citizens to provide detailed and constructive input for both the analysis of existing conditions and the draft of the plan. As informed users of this bicycle and pedestrian network, public forum attendees and other contributing residents proved to be invaluable for their local knowledge of and familiarity with their communities. A short survey was also made available at these forums to encourage specific, written comments as to current and future assets, obstacles, and opportunities.

Principles and Practices. The planning process followed current planning principles and practices to create an up-to-date, responsive plan to best meet the needs of these four municipalities. An analysis of existing conditions incorporated considerable field reconnaissance and an extensive evaluation of socio-economic data, land use patterns, local and regional plans, regulations and ordinances affecting bicycle and pedestrian facilities, the overall transportation network and planned growth and development.

Vision, goals and objectives were developed through a combination of existing conditions and public input. These three components create a direction for the future of the four-city bicycle and pedestrian network.

The implementation phase, perhaps the most important element of any plan, directs the phasing of improvements. If community desires have been sufficiently obtained through the public engagement process and adequately reflected in the plan document, then prospects for successful implementation will have been greatly facilitated.

Plan Contents

The plan is composed of three sections. These components, described below, provide a comprehensive source of information regarding existing conditions and actions necessary to create the desired bicycle and pedestrian network, as well as supporting programs to enhance education, encouragement and enforcement. Following these three sections is an appendix providing supplemental information and resources.

Introduction. The introduction acquaints the reader with the origins, purpose, scope, process and components of the plan. This section also describes the advantages of walkable and bikeable communities. Attention is given to health benefits, environmental impact, traffic congestion, economic benefits, enhanced sense of community, and overall quality of life. A recognition of the far-reaching effects of transportation infrastructure and travel patterns further justifies the need for comprehensive, interconnected bicycle and pedestrian facilities.

Existing Conditions. An examination of all factors relating to bicycle and pedestrian needs, the Existing Conditions portion of the plan analyzes the following elements: socio-economic data; topography and natural features; transportation network; land use patterns and trip generators and destinations; policies, regulations and ordinances affecting bicycle and pedestrian transportation; municipal, county and regional plans affecting the study area; future development; existing bicycle and pedestrian facilities; existing and projected bicycle facilities needs; and public concerns regarding existing bicycle and pedestrian facilities.

Bikeable Walkable Community Plan. Building on the analysis of existing conditions and the public input gathered during the planning process, the plan component of this study outlines the goals and objectives that will guide these four municipalities in the creation of a comprehensive bicycle and pedestrian infrastructure system. Proposed

bicycle and pedestrian facilities are discussed, including trails, on-street bicycle facilities, and pedestrian improvements. The implementation strategy included in this section incorporates an opinion of cost for proposed facilities and potential project schedule that will assist the communities in the phasing of projects over the next ten years. In addition to infrastructure improvements, the plan chapter also offers guidance on programmatic elements to educate bicyclists and pedestrians about safe and proper travel and encourage use of the new facilities.

CHAPTER TWO:
EXISTING CONDITIONS

A detailed examination of current demographic characteristics, travel patterns, transportation infrastructure, land uses and similar data provides the foundation for the plan. Analyzing existing conditions reveals current strengths and weaknesses of the bicycle and pedestrian system and uncovers potential opportunities and directions for plan development.

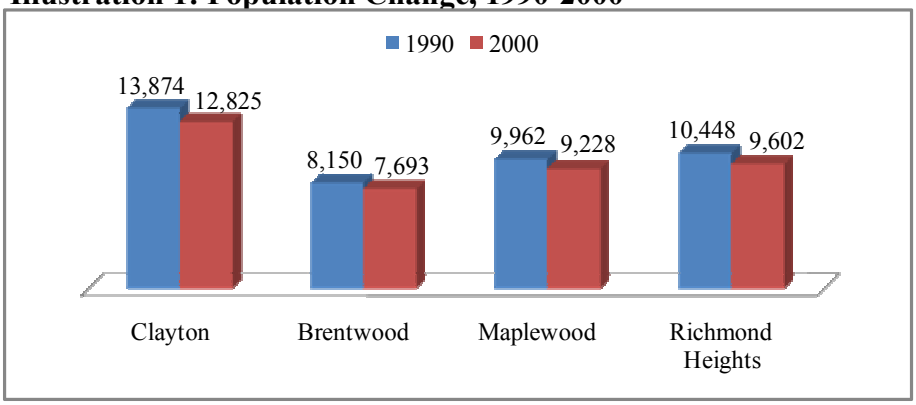
SECTION 2A: SOCIO-ECONOMIC FACTORS

Selected demographic characteristics are presented in this phase of the study, in preparation for the subsequent creation of the Bikeable-Walkable Community Plan for the cities of Brentwood, Clayton, Maplewood and Richmond Heights. An examination of population growth, age characteristics, educational attainment, and journey to work data and non work-related travel patterns can provide insight into these communities' transportation habits and needs.

Population

The combined population for the four cities in the year 1990 was 42,434. The number of families was 19,021 or 2.23 persons per family. The population change between 1990 and 2000 for the four combined cities was 39,348 which represents a loss of 7.3%, or 3,086 persons. Illustration 1 below displays the change in population growth from 1990

Illustration 1: Population Change, 1990-2000



to 2000 for the four cities. Decline in population was evident in all four cities, ranging from just 5.6% in Brentwood to 8.1% in Richmond Heights.

The population decline in first ring suburbs is a common trend, caused in part by smaller family sizes, removal of residential structures adjacent to expanding commercial areas, replatting, suburban expansion, and a number of other factors. But a more recent trend is also significant, as shown below. A population estimate for the Year 2006 is available from the U.S. Census Bureau which shows further population decline in Brentwood, Maplewood and Richmond Heights of 5.2%, 5%, and 3.9% respectively. Significantly, however, Clayton's population grew by 25% during this more recent period, reflecting the City's recent increase in residential development.

Looking at the wider region on the Missouri side of the river, the population of St. Louis County remained fairly constant from 1990 to 2006, showing just a 1% increase, but the three surrounding counties showed significant population growth that ranged from 24% to 59%. The booming housing industry found little room in St. Louis County to expand when compared to these high growth counties, pushing development further west and south and drawing on St. Louis County residents to populate growing suburban and exurban communities.

Age Characteristics

Age Groups. A close look at the communities' population in age groups can help identify and categorize potential user groups for the bicycle and pedestrian network. Population change by age groups for each of the four cities is shown in Illustration 2.

Illustration 2: Population Change by Age Group, 1990-2000

Age Groups	Clayton			Brentwood			Maplewood			Richmond Heights		
	1990	2000	Percent Change	1990	2000	Percent Change	1990	2000	Percent Change	1990	2000	Percent Change
Under 5	554	490	-12%	517	457	-12%	744	563	-24%	613	475	-23%
5 to 24	5,063	3,684	-27%	1,546	1,576	2%	2,382	2,342	-2%	2,372	2,257	-5%
25 to 44	4,125	4,143	0%	3,336	3,103	-7%	4,135	3,602	-13%	3,870	3,459	-11%
45 to 54	1,232	1,890	53%	693	890	28%	790	1,240	57%	922	1,294	40%
55 to 64	1,051	1,006	-4%	717	572	-20%	693	660	-5%	896	721	-20%
65 & over	1,448	1,836	27%	1,341	1,105	-18%	1,218	841	-31%	1,775	1,416	-20%
Totals	**13,874**	**12,825**	**-8%**	**8,150**	**7,693**	**-6%**	**9,962**	**9,228**	**-7%**	**10,448**	**9,602**	**-8%**

In the City of Clayton the age 5 to age 24 group dropped significantly, from 5,063 in 1990 to 3,684 in 2000. This age group in the other cities remained relatively stable. The age 65 and over group in Clayton dramatically increased from 1,448 to 1,836 persons, whereas it declined in the other cities. Although this countertrend is probably the result of several factors, a key reason could be that a significant amount of high-end condominiums have been completed in recent years, and this type of housing typically attracts older, more affluent buyers. Recent demographic trends have shown that this group has become more active and interested in healthy recreational pursuits such as walking and bicycling, and this aspect will be further examined in Chapter 2D.

The combined wider age grouping of 5-to-54 across all of the cities is interesting to note because, although it declined numerically between 1990 and 2000 (from 30,466 to 29,480), it grew as a proportion of the total population from 72% to 75%.

In the older age groupings of 55-64 and 65-and-over, there was a net decline across all of the cities between 1990 and 2000 (even with the significant gain in Clayton's 65-and-over population that was discussed above). The net decline was due to significant drops in Brentwood, Richmond Heights, and Maplewood in the proportion of residents in these older categories. In Brentwood and Richmond Heights, for example, there was a 20% decline for the period in the 55-64 age grouping. In the 65-and-over age grouping, Brentwood, Richmond Heights and Maplewood registered losses of 17.6%, 20%, and 31% respectively.

Median Age. The Year 2000 median age was significantly lower in the four study cities than for St. Louis County and several other cities as shown in the following table (Illustration 3). The median age for all four study cities was below the median age for nearby municipalities and St. Louis County. Among the study cities alone, the median age of Clayton's population is higher than that of the other cities. Median age for Maplewood's population is the lowest of the study cities. It is important to note that the difference in median age between the Clayton and Maplewood is less than three years.

Illustration 3: Median Age, 2000

City/County	Median Age
St. Louis County	38
Crestwood	44.9
Fenton	40.1
Kirkwood	41.1
Clayton	**36.7**
Brentwood	**35.6**
Maplewood	**33.8**
Richmond Heights	**35.8**

National demographics show that there is no "typical" walker or bicycle rider in terms of a narrow age grouping, as there are significant numbers of pedestrians and bicyclists across a wide age spectrum. And in the four study cities, it is clear that there is a significant population in all age ranges that would benefit from improved bicycle and pedestrian facilities.

Income

An examination of income can shed light on possible transportation needs and recreational habits. The median household income reported in the 2000 census for the four cities and St. Louis County is as shown in Illustration 4 below.

Illustration 4: Median Household Income, 2000

Area	Median Household Income
Clayton	$64,184
Brentwood	$50,643
Maplewood	$29,151
Richmond Heights	$50,557
Four-City Average	$48,634
St. Louis County	$38,127

There is a wide income range among the cities, with Clayton reporting the highest median household income, followed by Brentwood and Richmond Heights with roughly equal median incomes. A key factor in Maplewood's lower median income level is at least partially related to the fact that its population is "younger" than its neighbors with residents who may be in earlier stages of their job careers. The average median household income for the four cities was $48,634.00 which is higher than the average for St. Louis County at $38,127.00.

In the study communities, amenities such as bicycle facilities are considered important in enriching the quality of life and regarded positively by prospective residents. In addition and as with age demographics, there is no "typical' walker or bicyclist in terms of a narrow income range. Cyclists of all ages are frequently seen on the street system and on area trails.

Educational Attainment

The educational attainment for the population aged 25 and older in Clayton, Brentwood, Maplewood and Richmond Heights is presented in the table below (Illustration 5), based on the U.S. Census for the years 1990 and 2000. Closely related to income, educational attainment provides insight into potential walking patterns and bicycle usage.

Illustration 5: Educational Attainment, Ages 25 and Older, 1990 to 2000

	Brentwood				Clayton				Maplewood				Richmond Heights			
	1990		2000		1990		2000		1990		2000		1990		2000	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than 9th grade	207	3%	193	3%	101	1%	36	0%	702	10%	366	6%	477	6%	152	2%
Some high school	439	7%	252	5%	198	2%	277	3%	988	14%	598	9%	619	8%	321	5%
High school graduate (includes equivalency)	1,093	18%	861	15%	787	10%	985	11%	2,134	31%	1,531	24%	1,303	17%	875	12%
Some college, no degree	1,125	18%	1,020	18%	1,370	17%	1,179	13%	1,434	21%	1,675	26%	1,602	21%	1,429	20%
Associate degree	354	6%	185	3%	265	3%	209	2%	394	6%	489	8%	427	6%	275	4%
Bachelor's degree	1,826	30%	1,756	31%	2,819	34%	2,952	33%	814	12%	1,111	17%	1,822	24%	2,263	32%
Graduate or prof. degree	1,064	17%	1,328	24%	2,701	33%	3,217	36%	417	6%	648	10%	1,230	16%	1,730	25%

Over the ten year period from 1990 to 2000, each of these cities has seen at least some growth in educational attainment. Most noticeable has been the decrease in the percentage of the population 25 and older with a high school degree or less. Following county trends, three of the four cities have realized this decline, with Maplewood showing the greatest change. In just ten years, the percentage of the population with a high school degree or less decreased by 17 percentage points, from 56 percent to 39 percent. Richmond Heights also saw a significant decrease of 13 percentage points, falling from 32 percent in 1990 to 19 percent in 2000.

With the decrease in the percentage of the population with a high school degree or less has come a growth of those with bachelor's and advanced degrees. Each of the four study cities experienced growth in these two categories. In Richmond Heights, the percentage of the population with bachelor's or advanced degrees increased from 41 percent to 57 percent. Smaller increases of 9, 8 and 3 percentage points were seen in Maplewood, Brentwood and Clayton, respectively.

The City of Clayton, which experienced the least fluctuation, retained the most educated population, with more than two thirds of the population 25 and older (69 percent) holding a bachelor's degree or higher. In comparison, the City of Maplewood retained the lowest proportion of bachelor's and advanced degree residents at just 28 percent.

With a range of educational attainment across the study area, it will be necessary to consider the diverse range of current and potential users of the bicycle and pedestrian network.

Journey to Work Factors

Driving alone is the most common means of transportation to work, not only in the four cities, but also elsewhere in the metropolitan area and the entire county. According to the year 2000 Census, 84.5 percent of the study area's residents drove to work alone (84.9 percent for St. Louis County), while 7.0 percent used car pools (8.4 percent countywide). In 2000, 1.9 percent used public transportation, higher than the 1.6 percent using transit countywide. In all probability this percentage is significantly higher today, with the 2006 completion of the Metrolink route to Shrewsbury carrying 18,000 additional riders daily. Data from the 2000 Census is shown in the table below (Illustration 6).

Illustration 6: Journey to Work, 2000

Transportation Mode	Brentwood	Clayton	Maplewood	Richmond Heights
Drove Alone	3,916	4,910	4,332	4,722
Carpooled	242	446	526	266
Public Transportation	47	59	181	113
Walked	35	273	139	128
Other Means (Inc. Bicycling)	23	50	16	33
Worked at Home	163	280	69	171
Totals	4,426	6,018	5,263	5,433

A total of 575 people walked to work in all of the four cities (2.7 percent), whereas 122 used other means, including riding a bike to work (0.6 percent). Within the four cities, a total of 17,880 persons drove alone, representing approximately 84.5 percent of the total travelers, as shown in the following table (Illustration 7).

Illustration 7: Journey to Work Compared to St. Louis County, 2000

Mode of Transportation	Four City Study Area		St. Louis County	
	Total	Percent	Total	Percent
Drove Alone	17,880	84.58%	423,029	84.90%
Carpooled	1,480	7%	41,624	8.40%
Public Transportation	400	1.89%	8,624	1.70%
Walked	575	2.72%	6,231	1.30%
Other Means	122	0.58%	2,752	0.60%
Worked at Home	683	3.23%	16,059	3.20%
Totals	21,140	100%	498,319	100%

In the Year 2000 data, workers in the four-city study area had lower rates of driving alone, carpooling, and other means including bicycling than workers in the county as a whole. The relative percentage of residents in the study area who used public transportation and walking, however, was higher. When looking at similar data from elsewhere around the United States, it is probable that, with the development of a more comprehensive and practical bikeway system, the cycling mode split could be increased in the study area. As an example, Portland, Oregon - where transit and walking rates are higher - has a bicycle mode share above 4 percent.

More recent data show that the non-motorized mode share is already increasing. The U.S. Census Bureau provides annual regional updates of some information related to commuting. For example, its 2007 data showed that 90.9 percent of St. Louis metropolitan area adults commuted by car, truck or van. This includes driving alone and carpooling. Of that number, 82.4 percent drove to work in single-occupant vehicles. Carpooling was more popular than any of the alternatives, after driving alone: 8.6 percent of those surveyed carpooled in 2007, down from 9 percent in 2005.

In addition, 1.6 percent of the St. Louis region's commuters got to work by walking in 2007, compared with 1.3 percent in 2005. In the bicycling mode, 0.2 percent biked to work last year, up from 0.1 percent in 2005. Public transportation was the mode of choice for 2.6 percent of the region's commuters, up from 2.2 percent in 2005.

Although this information cannot be directly compared to the Year 2000 data for St. Louis County alone, it does suggest that walking and bicycling to work may be increasing as a general trend in the county and in the study area. It is also reasonable to project further increases in the usage of these non-motorized modes given the fact that fuel price volatility has become a major issue since 2007, and that this trend is expected to continue.

Travel time to work can vary widely between inner suburbs and the County. Travel time to work for the cities in the study area is compared below (Illustration 8).

Illustration 8: Travel Time to Work, Study Cities Compared to St. Louis County, 2000

Travel to Work Time	Brentwood	Clayton	Maplewood	Richmond Heights	St. Louis County
Less than 20 minutes	55%	62%	56%	61%	41%
20 minutes or more	45%	38%	44%	39%	59%

Travel times of less than 20 minutes were, in 2000, 55 percent and 62 percent respectively. In St. Louis County the percent was significantly lower at 41 percent. A twenty-minute or less auto ride could translate into a realistic bicycle trip for many residents. This suggests that the cities in the study area could develop bikeways and ancillary facilities that would attract riders. Many of these potential riders working in the four cities in the study area are fairly close to an adjacent city where there are additional close-to-home jobs.

Non-Work Related Travel Patterns

Non-work related local trips are defined as trips taken for practical purposes such as going to a store, post office, library, school and other non-work destinations. Without a

full-scale analysis, an assessment of non-work trips is not available. However, with the presence of heavily commercial areas offering a total array of goods and services, there is a significant potential for walking and cycling to these facilities. This type of activity can be estimated based on the number of housing units in the four study cities.

There were a total of 18,805 households in the Study Area with an average household size of 2.23 individuals. With an average of 10 trips per day per unit, it is assumed that four trips per day are generated each day for non-work (or school) related purposes. This suggests that four trips per day from 18,805 households are a potential short distance non-motorized transportation, with the existence of walkable-bikeable roads, walks and trails to facilitate such usage.

Commercial Activity as it Relates to Cycling

The close proximity of commercial and office areas to the residents of the Study Area means there are significant opportunities for residents to access work or shopping by walking or cycling. Increasing interest in healthy life styles, the high costs of motorized vehicle transportation, traffic congestion and other factors will encourage the use of bicycles or walking to work, shopping and other trips. All of this will contribute to the feasibility of bikeable-walkable community routes.

9 & 10. Commercial destinations like the Walgreen's at Clayton and Big Bend (above) and the Brentwood Commons (below) lack adequate bicycle parking facilities to accommodate all users.

Some very substantial shopping-office areas are located within the Study Area, such as downtown Clayton, the Central Business District and the Maplewood Commons in Maplewood, the Galleria and the Boulevard in Richmond Heights, and

the Brentwood Promenade and Brentwood Square in the City of Brentwood. There are extensive commercial and office developments along Maryland, Clayton Road and Manchester Road – all running east-west and on the north-south routes of Brentwood Boulevard, Hanley Road and Big Bend Boulevard. These destinations attract a significant amount of daily users, a number of whom travel by foot, bicycle and public transit. More end-of-trip facilities, like bicycle racks at commercial destinations and more extensive facilities like bicycle lockers, changing rooms, and even showers at office destinations and employment centers, will be needed.

Area Opportunities and Interest in Recreational Cycling and Walking

The cities of Brentwood, Clayton, Maplewood and Richmond Heights are at the very heart of cycling and walking in the St. Louis region. They are located in the central corridor of St. Louis County, where housing and businesses are concentrated, typical of inner ring suburbs. For example, entering an area address in walkscore.com will yield a score above 50, and show a wide range of amenities nearby. There is proximity to Clayton Road, easily the region's most popular bikeway, and to Forest Park, the destination for organized running and walking events, and hundreds of cyclists daily.

In addition, Metro has seven stops in the study area, meaning light rail is only a short walk or bike ride away for almost everyone. Most of these stops have bicycle parking facilities, which frequently used by multi-modal commuters during the weekdays. In addition, MetroLink allows bicycles on board the trains, making it even easier to reach recreational destinations outside the study area, such as Forest Park or the Riverfront Trail.

11. Bicycles parked at the Sunnen MetroLink Station are a common sight, especially during the weekdays.

Colleges and universities in the area are popular with cyclists, with bike racks usually brimming with bikes at Concordia Seminary (where there has been a loaner program called Holy Spokes), covered bike parking at Fontbonne University and widespread use

of bikes at Washington University.

People bike to work in St. Louis County's offices in Clayton, to all the area bike shops, the Plaza in Clayton, and Washington University's Hilltop Campus. Kaldi's has a popular cycling club and bikes are usually parked there. Even on a rainy, 36 degree morning, there are people biking to Walgreen's at Big Bend and Clayton.

12. Left: Bicycles fill the racks outside Hurd Hall on Washington University's Danforth Campus.
13. Right: Bicycles are almost always present at the bike rack outside Kaldi's Coffee House on DeMun.

Reflecting all the activity, three bike shops are located within the study area: Maplewood Bicycle, Mesa Cycles, and REI. They host regular bike rides, classes, special events and sponsor racing teams, drawing cyclists from around the region to their stores. They are actively involved in the community as well; for example REI recently provided a $5,000 grant to the St. Louis Regional Bicycle Federation for bike racks, and to all of the shops supporting Trailnet rides and races.

14, 15 & 16. The study area's three bicycle shops: (top) Maplewood Bicycle on Manchester Road west of Big Bend Blvd.; (below) Mesa Cycles on Big Bend Blvd. south of Clayton Road; (below, left) REI, located in Brentwood Commons at Brentwood Blvd. and Rose Avenue.

Organized walks, races and runs are another indication of strong local interest. Examples include the Race to the Square, a 5K event. The 3rd Annual Race in 2007 drew 122 participants to benefit the Brentwood Foundation for Educational Enrichment. The start and finish were at Brentwood Square Shopping Center. The Judy Ride has had 1 mile and 10 mile rides in past years. The Clayton Art Fair hosts valet bike parking. A group known as the Walking Ramblers held a 5K Walk at the Schlafly Bottleworks. Organized bicycle rides also regularly leave from the Brentwood Schnucks, heading to the Riverside Diner. Maplewood Bicycle and Mesa Cycles each host at least two rides weekly. Maplewood also hosts a popular Christmas Tree Walk.

17. The annual Race to the Brentwood Square 5K Run attracts runners from throughout the St. Louis Metro area.

With a central location, access to bike and pedestrian friendly destinations, proximity to transit, and a core of users already in place, the four cities in the study area have the potential to build a highly effective and widely used bike and pedestrian transportation network.

SECTION 2B: PHYSICAL FEATURES AND LAND USE

This section of the report examines existing physical features and land uses in the cities of Brentwood, Clayton, Maplewood and Richmond Heights, and their significance to the ultimate development of a walkable-bikeable transportation and recreation system. Topography, transportation networks, and land use patterns have a significant effect on the bicycle and pedestrian network, and require considerable attention. (Refer to the Existing Conditions map of the study area, Illustration 10.)

Topography and Terrain

The natural features that characterize these four communities have placed physical constraints on development since the earliest settlement in these four communities. With their low, rolling hills and winding creeks and streams, Brentwood, Clayton, Maplewood and Richmond Heights were well suited for idyllic, pastoral suburban development in the late 1800's and early 1900's. Because they are older communities, there is an extensive population of mature street trees that, in addition to their environmental/ecological value, also contribute to traffic calming. Deer Creek, a prominent ecological corridor and drainage feature, extends generally in a north-south direction in the western portion of the study area. Other significant creeks include Hampton Creek and Black Creek. Smaller creeks and streams in the area, such as Hampton Creek, have been channeled into concrete culverts to better manage stormwater drainage at the expense of aesthetics and natural drainage patterns.

18. The meeting of Black Creek and Hampton Creek, located immediately northwest of the intersection of Hanley and Manchester.

None of these natural features prohibit improvements to the bicycle and pedestrian network. On the contrary, the rolling hills, forested pocket parks, tree-lined boulevards and verdant stream corridors provide substantial opportunities for enhancing bicycling and walking facilities

in these four communities. Brentwood's Lee Wynn Trail along the Black Creek and the recently developed Deer Creek Greenway are prime examples of successful integration of a community's physical characteristics and its built environment.

Transportation System

Streets, Roads and Highways. Streets, like mighty rivers, well-worn paths or transcontinental railroads, provide the infrastructure for transporting people and goods from one place to another. The transportation system of any community consists of an interconnected network of different modes, such as automobile, bus, light rail, bicycle, walking, etc. In a complete system, these modes are well-connected and provide people with a variety of transportation options. Improvements to bicycle and pedestrian facilities will help support a diversity of transportation options that best meet the needs of all community members.

The majority of bicycling and walking trips in these four communities will take place on streets and their adjacent sidewalks. As such, considerable detail must be given to ensuring proper facilities are proposed that improve safety, accessibility, and connectivity.

Description. The Cities of Brentwood, Clayton, Maplewood and Richmond Heights are older communities with an extensive network of residential streets, collectors, arterials and highways that has been fully developed over a period of many decades. In addition to the streets that are maintained by the cities themselves, others are maintained by the St. Louis County Department of Highways, the Missouri Department of Transportation (MoDOT), and the City of St. Louis. Maintenance, repairs and reconstruction schedules of each entity should be coordinated to maximize efforts when incorporating bicycle and/or pedestrian facilities.

The road system is consistent with the following functional road classifications used by St. Louis County:

- Local Roads
- Minor Arterials

- Urban Collectors
- Rural Minor Collectors
- Rural Major Collectors
- Principal Arterials
- Freeways/Expressways
- Interstates

Principal north-south roads in this network include I-170, Skinker Boulevard, Bellevue, Sutton, Big Bend, Laclede Station, Hanley, Brentwood and McKnight. Key east-west highways, arterials and collectors include Highway 40/64, Forest Park Parkway, Forsyth, Waterman, Pershing, Wydown, Clayton, Dale, Litzinger, Manchester and Newport. It is important to note that bicycle and pedestrian traffic is not allowed on interstates and freeways/expressways.

Bicycling and walking are permitted on the county and city-maintained arterials, collectors and local roads. Conditions for bicycling along arterials are generally poor because of heavier traffic volumes coupled with high truck/bus traffic, narrower outer lane widths, and a lack of specific design elements that would facilitate bicycle movement. Nevertheless, cyclists are frequently seen on these roads and can be classified into two groups: Those using bicycles for practical transportation during weekdays, and recreational or fitness riders who primarily use the system on weekends or at other times when traffic is lighter.

Residential Street Assessment. The study cities contain a large integrated residential street grid with a sidewalk system that, on the whole, already provides for some level of non-motorized movement. Exceptions occur in some neighborhoods where there are cul-de-sacs and other impediments to through-travel. Traditional neighborhood street grids are the ideal raw material from which to develop an improved non-motorized transportation system because they provide users with a variety of routing options, in relatively low traffic conditions, from which to reach their destinations.

Arterial and Collector Road Assessment. Because the arterial and collector roads of the area are intended to carry higher levels of traffic including trucks and buses, they tend to be presently viewed as only minimally adequate by a narrower range of cyclists -

generally more experienced commuting and fitness riders who are comfortable or at least tolerant of conditions on busier roads.

These roads, especially during high traffic periods, are not considered to be bicycle-friendly by a broader grouping of cyclists. When children or adults, for example, want to walk or ride their bikes for recreation or exercise, the desire is often accompanied by a decision to climb into a motor vehicle and drive to a nearby park or trail, rather than simply going out the front door and walking or riding. Similarly, and for most cyclists, arterials and many collectors are no more appealing for a practical bicycle trip to a store or for commuting to work.

In communities where there is a network of on-street bicycle and pedestrian facilities, alternative modes of travel are more appealing and bicycle and pedestrian activity is higher. Such a system would be well received in the cities of Brentwood, Clayton, Maplewood, and Richmond Heights, and is possible through a series of physical improvements to the road system. These specific on-street recommendations will be presented in the plan chapter.

The tables shown on the following pages provide a nominal assessment of current traffic conditions on streets within the four-city study area (Illustration 19). The street listing was provided by St. Louis County. A nominal Level of Service (LOS) analysis was applied, based on visual observation only and known information about the roads. (An engineering-based LOS analysis was not a part of this study.) This is intended to form a preliminary baseline in order to make subsequent recommendations regarding the potential for streets to function as bikeways.

The LOS methodology is made up of a series of service-based benchmarks used by traffic engineers to evaluate traffic flow. A LOS in the A-B range is characterized by free flowing vehicular traffic that varies from no restrictions, to stable flows with the beginning of some restrictions, though negligible. LOS levels of C-D represent a range of traffic volumes and densities that restrict drivers in their speed and maneuvering options – to unstable flow with sudden speed variations. LOS levels in the range of E-F signify less stable flows and more frequent/intensive speed variations – to complete stops of traffic at times.

Illustration 19: Highways, Arterials and Collectors in the Cities of Brentwood, Clayton, Maplewood and Richmond Heights

Street Name	City Left	City Right	Speed Limit	Type	Est. LOS
AGNES AVE	BRW		25	Secondary	A-B
ANNALEE AVE	BRW		25	Secondary	A-B
BARNSTABLE CT	BRW		25	Secondary	A-B
BEDFORD DR	BRW		25	Secondary	A-B
BLUEBIRD TER	BRW		25	Secondary	A-B
BLUEJAY COVE	BRW		25	Secondary	A-B
BOBOLINK PL	BRW		25	Secondary	A-B
BOMPART AVE	BRW		25	Secondary	A-B
BRAZEAU AVE	BRW		25	Secondary	A-B
BRECKENRIDGE INDUS CT	BRW		25	Secondary	C-D
BREMERTON RD	BRW	RMH	25	Secondary	C-D
BRENTWOOD BLVD	BRW		25	Secondary	C-D
BRENTWOOD INDUS DR	BRW		25	Secondary	C-D
BRENTWOOD PL	BRW		25	Secondary	A-B
BRENTWOOD PROMENADE CT	BRW		25	Secondary	C-D
BRIDGEPORT AVE	BRW		25	Secondary	A-B
CANARY COVE	BRW		25	Secondary	A-B
CARDINAL TER	BRW		25	Secondary	A-B
CECELIA AVE	BRW		25	Secondary	A-B
COLLIER AVE	BRW		25	Secondary	A-B
COVINGTON CT	BRW		25	Secondary	A-B
CRICKET LN	BRW		25	Secondary	A-B
DOROTHY AVE	BRW		25	Secondary	A-B
DOUGLAS CT	BRW		25	Secondary	A-B
E PENDLETON AVE	BRW		25	Secondary	A-B
E SWAN CIR	BRW		25	Secondary	A-B
EULALIE AVE	BRW		25	Secondary	C-D
EVANS AVE	BRW		25	Secondary	A-B
FAWN AVE	BRW		25	Secondary	A-B
FAWN CT	BRW		25	Secondary	A-B
FLAMINGO CT	BRW		25	Secondary	A-B
FLORENCE AVE	BRW		25	Secondary	A-B
GARDEN CT	BRW		25	Secondary	A-B
GENEVIEVE AVE	BRW		25	Secondary	A-B
HANLEY INDUS CT	BRW		25	Secondary	C-D
HARRISON AVE	BRW		25	Secondary	A-B
HATTON LN	BRW		25	Secondary	A-B
HELEN AVE	BRW		25	Secondary	A-B
HENRIETTA AVE	BRW		25	Secondary	A-B
HERMELIN DR	BRW		25	Secondary	A-B
HIGH SCHOOL DR	BRW		25	Secondary	C-D
HILL AVE	BRW		25	Secondary	A-B
HILLDALE AVE	BRW		25	Secondary	A-B

Illustration 19: Cont.

Street Name	City Left	City Right	Speed Limit	Type	Est. LOS
HILTON AVE	BRW		25	Secondary	A-B
JOSEPH AVE	BRW		25	Secondary	A-B
KEMPTON LN	BRW		25	Secondary	A-B
KENILWORTH DR	BRW		25	Secondary	A-B
KENTLAND DR	BRW		25	Secondary	A-B
KEYSTONE DR	BRW		25	Secondary	A-B
LAVERNE CT	BRW		25	Secondary	A-B
LAWN AVE	BRW		25	Secondary	A-B
LAWNDELL DR	BRW		25	Secondary	A-B
LOUIS AVE	BRW		25	Secondary	A-B
MAGDALEN AVE	BRW		25	Secondary	A-B
MANDERLY DR	BRW		25	Secondary	A-B
MARBLEHEAD DR	BRW		25	Secondary	A-B
MARI KAY CT	BRW		25	Secondary	A-B
MARY AVE	BRW		25	Secondary	A-B
MELVIN AVE	BRW		25	Secondary	A-B
MERCANTILE DR	BRW		25	Secondary	A-B
MIDDLESEX DR	BRW		25	Secondary	A-B
MORITZ AVE	BRW		25	Secondary	A-B
N SWAN CIR	BRW		25	Secondary	A-B
NORTHCOTE RD	BRW		25	Secondary	A-B
ORIDLE LN	BRW		25	Secondary	A-B
ORIDLE PL	BRW		25	Secondary	A-B
PARKRIDGE AVE	BRW		25	Secondary	A-B
PATTON AVE	BRW		25	Secondary	A-B
PEACOCK LN	BRW		25	Secondary	A-B
PINE AVE	BRW		25	Secondary	A-B
POTER AVE	BRW		25	Secondary	A-B
POWELL AVE	BRW		25	Secondary	A-B
RADLEY CT	BRW		25	Secondary	A-B
RANKIN AVE	BRW		25	Secondary	A-B
REDBIRD COVE	BRW		25	Secondary	A-B
ROBIN CT	BRW		25	Secondary	A-B
ROSALIE AVE	BRW		25	Secondary	A-B
ROSE AVE	BRW		25	Secondary	A-B
RUSSELL AVE	BRW		25	Secondary	A-B
RUTH AVE	BRW		25	Secondary	A-B
S EAGER RD	BRW		25	Secondary	A-B
SALEM RD	BRW		25	Secondary	A-B
SONORA AVE	BRW		25	Secondary	A-B
SOUTHCOTE RD	BRW		25	Secondary	A-B
SPANISH DR	BRW		25	Secondary	A-B
ST CLAIR AVE	BRW		25	Secondary	A-B

Illustration 19: Cont.

Street Name	City Left	City Right	Speed Limit	Type	Est. LOS
STRASSNER DR	BRW		25	Secondary	C-D
STRATFORD LN	BRW		25	Secondary	A-B
SUSSEX DR	BRW		25	Secondary	A-B
SWALLOW DR	BRW		25	Secondary	A-B
THRUSH LN	BRW		25	Secondary	A-B
THRUSH TER	BRW		25	Secondary	A-B
TILLES DR	BRW		25	Secondary	A-B
URBAN DR	BRW		25	Secondary	A-B
VANMARK WAY	BRW		25	Secondary	A-B
W PENDLETON AVE	BRW		25	Secondary	A-B
W SWAN CIR	BRW		25	Secondary	A-B
WHITE AVE	BRW		25	Secondary	C-D
WHITEHALL CT	BRW		25	Secondary	A-B
WOODSEY DR	BRW		25	Secondary	A-B
WRENWOOD LN	BRW		25	Secondary	A-B
YORK HILLS DR	BRW		25	Secondary	A-B
YORKSHIRE LANE CT	BRW		25	Secondary	A-B
MADGE AVE	BRW/MPL	BRW/MPL	25	Secondary	A-B
EAGER RD	BRW/RMH	BRW/RMH	25	Secondary	C-D
S BRENTWOOD BLVD	BRW/RMH	BRW/RMH	25	Secondary	C-D
ABERDEEN PL	CLY		25	Secondary	A-B
ARCHIVES DR	CLY		25	Secondary	A-B
ARUNDEL PL	CLY		25	Secondary	A-B
ASBURY AVE	CLY		25	Secondary	A-B
AUDUBON DR	CLY		25	Secondary	A-B
BILTMORE DR	CLY		25	Secondary	A-B
BLAND AVE	CLY	CLY/UCT	25	Secondary	A-B
BONHOMME AVE	CLY		25	Secondary	C-D
BRENTMOOR PARK	CLY		25	Secondary	A-B
BRIGHTON WAY	CLY		25	Secondary	A-B
BROADVIEW DR	CLY		25	Secondary	A-B
BUCKINGHAM DR	CLY		25	Secondary	A-B
BYRON PL	CLY		25	Secondary	A-B
CARONDELET PLZ	CLY		25	Secondary	C-D
CARRSWOLD DR	CLY		25	Secondary	A-B
CARSWOLD DR	CLY		25	Secondary	A-B
CECIL AVE	CLY		25	Secondary	A-B
CLAVERACH DR	CLY		25	Secondary	A-B
CLAYTON LANE CT	CLY		25	Secondary	A-B
COLMAR DR	CLY		25	Secondary	A-B
COLORADO AVE	CLY		25	Secondary	A-B
CONCORDIA LN	CLY		25	Secondary	A-B
CORPORATE PARK DR	CLY		25	Secondary	C-D

Illustration 19: Cont.

Street Name	City Left	City Right	Speed Limit	Type	Est. LOS
COUNTRY CLUB CT	CLY		25	Secondary	A-B
CRANDON DR	CLY		25	Secondary	A-B
CRESCENT DR	CLY		25	Secondary	A-B
CRESTWOOD DR	CLY		25	Secondary	A-B
CROMWELL DR	CLY		25	Secondary	A-B
DARTFORD AVE	CLY		25	Secondary	A-B
DAVIS DR	CLY		25	Secondary	A-B
DAYTONA DR	CLY		25	Secondary	A-B
DE MUN AVE	CLY		25	Secondary	A-B
E POLO DR	CLY		25	Secondary	A-B
EAST DR	CLY		25	Secondary	A-B
EDGEWOOD DR	CLY		25	Secondary	A-B
EDINBURGH DR	CLY		25	Secondary	A-B
ELLENWOOD AVE	CLY		25	Secondary	A-B
FAUQUIER DR	CLY		25	Secondary	A-B
FOREST CT	CLY		25	Secondary	A-B
FOREST RIDGE PL	CLY		25	Secondary	A-B
GAY AVE	CLY		25	Secondary	C-D
GLEN RIDGE AVE	CLY		25	Secondary	A-B
HALIFAX DR	CLY		25	Secondary	A-B
HARCOURT DR	CLY		25	Secondary	A-B
HILLVALE DR	CLY		25	Secondary	A-B
KINGSBURY BLVD	CLY		25	Secondary	A-B
LANCASTER DR	CLY		25	Secondary	A-B
LANGTON DR	CLY		25	Secondary	A-B
LEE AVE	CLY		25	Secondary	A-B
MARK TWAIN CIR	CLY		25	Secondary	A-B
MARYLAND AVE	CLY		25	Secondary	C-D
MIDDLE POLO DR	CLY		25	Secondary	A-B
MOHAWK PL	CLY		25	Secondary	A-B
N BEMISTON AVE	CLY		25	Secondary	C-D
N BILTMORE DR	CLY		25	Secondary	A-B
N BRENTWOOD BLVD	CLY		25	Secondary	C-D
N FORSYTH BLVD	CLY		25	Secondary	C-D
N JACKSON AVE	CLY		25	Secondary	A-B
N LYLE AVE	CLY		25	Secondary	A-B
N MERAMEC AVE	CLY		25	Secondary	C-D
N ROSEBURY AVE	CLY		25	Secondary	A-B
N SEMINARY TER	CLY		25	Secondary	A-B
NORTH POLO DR	CLY		25	Secondary	A-B
NORTHMOOR DR	CLY		25	Secondary	A-B
NORTHWOOD AVE	CLY		25	Secondary	A-B
OAK KNOLL DR	CLY		25	Secondary	A-B

Illustration 19: Cont.

Street Name	City Left	City Right	Speed Limit	Type	Est. LOS
OAKLEY DR	CLY		25	Secondary	A-B
ORLANDO DR	CLY		25	Secondary	A-B
OXFORD DR	CLY		25	Secondary	A-B
PARKDALE AVE	CLY		25	Secondary	A-B
PARKSIDE DR	CLY		25	Secondary	A-B
PERSHING AVE	CLY		25	Secondary	A-B
POLO DR	CLY		25	Secondary	A-B
RIDGEMOOR DR	CLY		25	Secondary	A-B
RITZ CARLTON DR	CLY		25	Secondary	C-D
ROSILINE DR	CLY		25	Secondary	A-B
ROXBURGH DR	CLY		25	Secondary	A-B
S BEMISTON AVE	CLY		25	Secondary	C-C
S ROSEBURY AVE	CLY		25	Secondary	A-B
S SEMINARY TER	CLY		25	Secondary	A-B
SAN BONITA AVE	CLY		25	Secondary	A-B
SEMINARY PL	CLY		25	Secondary	A-B
SEMINOLE DR	CLY		25	Secondary	A-B
SENINARY PL	CLY		25	Secondary	A-B
SHAW PARK DR	CLY		25	Secondary	A-B
SHEPLEY DR	CLY		25	Secondary	A-B
SHIRLEY DR	CLY		25	Secondary	A-B
SOMERSET AVE	CLY		25	Secondary	A-B
SOUTHMOOR DR	CLY		25	Secondary	A-B
SOUTHWOOD AVE	CLY		25	Secondary	A-B
ST RITA AVE	CLY		25	Secondary	A-B
STRATFORD DR	CLY		25	Secondary	A-B
SUDBURY DR	CLY		25	Secondary	A-B
TOPTON WAY	CLY		25	Secondary	A-B
TUSCANY PARK	CLY		25	Secondary	A-B
UNIVERSITY AVE	CLY		25	Secondary	A-B
UNIVERSITY DR	CLY		25	Secondary	A-B
UNIVERSITY LN	CLY		25	Secondary	A-B
VENETIAN DR	CLY		25	Secondary	A-B
W BILTMORE DR	CLY		25	Secondary	A-B
W POLO DR	CLY		25	Secondary	A-B
WALINCA TER	CLY		25	Secondary	A-B
WALLACE CIR	CLY		25	Secondary	A-B
WATKINS DR	CLY		25	Secondary	A-B
WELLINGTON WAY	CLY		25	Secondary	A-B
WENNEKER DR	CLY	LAD	25	Secondary	A-B
WESTMORELAND AVE	CLY		25	Secondary	A-B
WESTWOOD DR	CLY		25	Secondary	A-B
WHITBURN DR	CLY		25	Secondary	A-B

Illustration 19: Cont.

Street Name	City Left	City Right	Speed Limit	Type	Est. LOS
WYDOWN BLVD	CLY		25	Secondary	C-D
WYDOWN TER	CLY		25	Secondary	A-B
YORK DR	CLY		25	Secondary	A-B
LYLE AVE	CLY/MPL	CLY/MPL	25	Secondary	A-B
FRANCIS PL	CLY/RMH	CLY/RMH	25	Secondary	A-B
HUNTER AVE	CLY/RMH	LAD/RMH	25	Secondary	A-B
ALAMEDA AVE	MPL		25	Secondary	A-B
ALICIA AVE	MPL		25	Secondary	A-B
ALICIA CT	MPL		25	Secondary	A-B
ANNA AVE	MPL		25	Secondary	A-B
ARBOR AVE	MPL		25	Secondary	A-B
ARSENAL ST	MPL		25	Secondary	C-D
BARTOLD AVE	MPL		25	Secondary	A-B
BARTOLO AVE	MPL		25	Secondary	A-B
BENTLEY DR	MPL		25	Secondary	A-B
BIG BEND INDUS CT	MPL		25	Secondary	C-D
BLAND PL	MPL		25	Secondary	A-B
BROMPTON SQ	MPL		25	Secondary	A-B
BURGESS AVE	MPL		25	Secondary	A-B
CAMBRIDGE AVE	MPL		25	Secondary	A-B
CANTERBURY AVE	MPL		25	Secondary	A-B
CHERRY AVE	MPL		25	Secondary	A-B
CIRCLE DR	MPL		25	Secondary	A-B
COLEMAN AVE	MPL		25	Secondary	A-B
COMFORT AVE	MPL		25	Secondary	A-B
COMMONWEALTH AVE	MPL		25	Secondary	A-B
CUTLASS WALK	MPL		25	Secondary	A-B
DOUGLASS AVE	MPL		25	Secondary	A-B
DRURY LN	MPL		25	Secondary	A-B
EDGAR AVE	MPL		25	Secondary	A-B
ELLIS AVE	MPL		25	Secondary	A-B
ELM AVE	MPL		25	Secondary	A-B
FLORA AVE	MPL		25	Secondary	A-B
FLORENT AVE	MPL		25	Secondary	A-B
FOLK AVE	MPL		25	Secondary	A-B
GAYOLA PL	MPL		25	Secondary	A-B
GERHARD AVE	MPL		25	Secondary	A-B
GREENWOOD BLVD	MPL		25	Secondary	A-B
HAZEL AVE	MPL		25	Secondary	A-B
HIGH ST	MPL		25	Secondary	A-B
HIGHT ST	MPL		25	Secondary	A-B
HOPE AVE	MPL		25	Secondary	A-B
JAGUAR TRL	MPL		25	Secondary	A-B

Illustration 19: Cont.

Street Name	City Left	City Right	Speed Limit	Type	Est. LOS
JAMES AVE	MPL		25	Secondary	A-B
JEROME AVE	MPL		25	Secondary	A-B
KENSINGTON AVE	MPL		25	Secondary	A-B
LACLEDE FOREST DR	MPL		25	Secondary	A-B
LANHAM AVE	MPL		25	Secondary	A-B
LINDEN PL	MPL		25	Secondary	A-B
LOHMEYER AVE	MPL		25	Secondary	A-B
LYNDOVER PL	MPL		25	Secondary	A-B
MANHATTAN AVE	MPL	MPL/STL	25	Secondary	A-B
MAPLE AVE	MPL		25	Secondary	A-B
MARGARETTE AVE	MPL		25	Secondary	A-B
MARIETTA AVE	MPL		25	Secondary	A-B
MARION CT	MPL		25	Secondary	A-B
MARSHALL AVE	MPL		25	Secondary	A-B
MARTINI DR	MPL		25	Secondary	A-B
MOLLER AVE	MPL		25	Secondary	A-B
MYRTLE AVE	MPL		25	Secondary	A-B
OAKVIEW TER	MPL		25	Secondary	A-B
OXFORD BLVD	MPL		25	Secondary	A-B
PICADILLY AVE	MPL		25	Secondary	A-B
RAILROAD ST	MPL		25	Secondary	A-B
RANNELLS AVE	MPL		25	Secondary	A-B
RICHMOND PL	MPL		25	Secondary	A-B
ROSELAND TER	MPL		25	Secondary	A-B
RULE AVE	MPL		25	Secondary	A-B
S RAILROAD ST	MPL		25	Secondary	A-B
SCODY DR	MPL		25	Secondary	A-B
SOUTH ST	MPL		25	Secondary	A-B
ST ELMO AVE	MPL		25	Secondary	A-B
STANLEY AVE	MPL		25	Secondary	A-B
SUNNEN DR	MPL		25	Secondary	C-D
SUSSEX AVE	MPL		25	Secondary	A-B
VALLEY AVE	MPL		25	Secondary	A-B
VALLEY DR	MPL		25	Secondary	A-B
VINE AVE	MPL		25	Secondary	A-B
W BLAND PL	MPL		25	Secondary	A-B
W BRUNO AVE	MPL		25	Secondary	A-B
WALTER AVE	MPL		25	Secondary	A-B
WEAVER AVE	MPL		25	Secondary	A-B
WESTFIELD CT	MPL		25	Secondary	A-B
WESTPOINT DR	MPL		25	Secondary	A-B
WILLIAMS CT	MPL		25	Secondary	A-B
WOODMONT LN	MPL		25	Secondary	A-B

Illustration 19: Cont.

Street Name	City Left	City Right	Speed Limit	Type	Est. LOS
ZEPHYR PL	MPL		25	Secondary	A-B
BERKLEY AVE	MPL/RMH	MPL/RMH	25	Secondary	A-B
BREDELL AVE	MPL/RMH	MPL/RMH	25	Secondary	A-B
LINDBERGH DR	MPL/RMH	MPL/RMH	25	Secondary	A-B
OAKLAND AVE	MPL/RMH	MPL/RMH	25	Secondary	A-B
WOODLAND AVE	MPL/RMH	MPL/RMH	25	Secondary	A-B
ALABAMA AVE	RMH	BRW/RMH	25	Secondary	A-B
ANTLER DR	RMH		25	Secondary	A-B
ARCH TER	RMH		25	Secondary	A-B
ARGUS AVE	RMH		25	Secondary	A-B
ARLINGTON DR	RMH		25	Secondary	A-B
ARTHUR AVE	RMH		25	Secondary	A-B
BANNEKER AVE	RMH		25	Secondary	A-B
BARGER PL	RMH		25	Secondary	A-B
BELLEVUE AVE	RMH		25	Secondary	C-D
BENNETT AVE	RMH		25	Secondary	A-B
BERKSHIRE DR	RMH		25	Secondary	A-B
BEULAH PL	RMH		25	Secondary	A-B
BOLAND PL	RMH		25	Secondary	A-B
BONETA AVE	RMH		25	Secondary	A-B
BOOKER PL	RMH		25	Secondary	A-B
BRAMLEY LN	RMH		25	Secondary	A-B
BROOKLINE TER	RMH		25	Secondary	A-B
BRUNO AVE	RMH		25	Secondary	A-B
BRYAN AVE	RMH		25	Secondary	A-B
BUCK AVE	RMH		25	Secondary	A-B
CENTER DR	RMH		25	Secondary	A-B
CHAFFORD WOODS ST	RMH		25	Secondary	A-B
CLAYTONIA TER	RMH		25	Secondary	A-B
COLLINS AVE	RMH		25	Secondary	A-B
COMMODORE DR	RMH		25	Secondary	A-B
COUNCIL PL	RMH		25	Secondary	A-B
DALE AVE	RMH		25	Secondary	C-D
DARST CT	RMH		25	Secondary	A-B
DEL NORTE AVE	RMH		25	Secondary	A-B
DELTA AVE	RMH		25	Secondary	A-B
DOUGLAS AVE	RMH		25	Secondary	A-B
DUMAS AVE	RMH		25	Secondary	A-B
E LINDEN AVE	RMH		25	Secondary	A-B
EDWARD TER	RMH		25	Secondary	A-B
EL MORO AVE	RMH		25	Secondary	A-B
ELINOR AVE	RMH		25	Secondary	A-B
ETHEL AVE	RMH		25	Secondary	A-B

Illustration 19: Cont.

Street Name	City Left	City Right	Speed Limit	Type	Est. LOS
EVERETT AVE	RMH		25	Secondary	A-B
FAIR OAKS CRESCENT CT	RMH		25	Secondary	A-B
FRANCIS AVE	RMH		25	Secondary	A-B
GALLERIA PKY	RMH		25	Secondary	C-D
GISSLER AVE	RMH		25	Secondary	A-B
GOFF AVE	RMH		25	Secondary	A-B
GRAY AVE	RMH		25	Secondary	A-B
GREENRIDGE DR	RMH		25	Secondary	A-B
HAMPTON PARK DR	RMH		25	Secondary	A-B
HANLEY DOWNS ST	RMH		25	Secondary	A-B
HAVERFORD TERRACE LN	RMH		25	Secondary	A-B
HAWTHORNE PL	RMH		25	Secondary	A-B
HIAWATHA AVE	RMH		25	Secondary	A-B
HICKS AVE	RMH		25	Secondary	A-B
HIGHLAND TER	RMH		25	Secondary	A-B
HILLSIDE DR	RMH		25	Secondary	A-B
HOOVER AVE	RMH		25	Secondary	A-B
HORNER AVE	RMH		25	Secondary	A-B
JONES AVE	RMH		25	Secondary	A-B
KURT AVE	RMH		25	Secondary	A-B
LA VETA AVE	RMH		25	Secondary	A-B
LAKE FOREST DR	RMH		25	Secondary	A-B
LAVINGTON DR	RMH		25	Secondary	A-B
LAY RD	RMH	LAD	25	Secondary	C-D
LAYMONT CT	RMH		25	Secondary	A-B
LAYTON TER	RMH		25	Secondary	A-B
LILE AVE	RMH		25	Secondary	A-B
LINDEN AVE	RMH		25	Secondary	A-B
LINDEN DR	RMH		25	Secondary	A-B
LITZSINGER RD	RMH	BRW	25	Secondary	C-D
LOVELLA AVE	RMH		25	Secondary	A-B
MABEL AVE	RMH		25	Secondary	A-B
MCCREADY AVE	RMH		25	Secondary	A-B
MCCUTCHEON RD	RMH		25	Secondary	C-D
MCKNIGHT ORCHARD LN	RMH		25	Secondary	A-B
MCKNIGHT WOODS ST	RMH		25	Secondary	A-B
MCMORROW AVE	RMH		25	Secondary	A-B
MITCHELL AVE	RMH		25	Secondary	A-B
MONMOUTH DR	RMH		25	Secondary	A-B
MOORLANDS DR	RMH		25	Secondary	A-B
MURPHY AVE	RMH		25	Secondary	A-B
NASHVILLE AVE	RMH		25	Secondary	A-B
PARK DR	RMH		25	Secondary	A-B

Illustration 19: Cont.

Street Name	City Left	City Right	Speed Limit	Type	Est. LOS
PLATEAU AVE	RMH		25	Secondary	A-B
PRINCETON PL	RMH		25	Secondary	A-B
RALPH TER	RMH		25	Secondary	A-B
RANKIN DR	RMH		25	Secondary	A-B
RED BUD AVE	RMH		25	Secondary	A-B
RIDGETOP DR	RMH		25	Secondary	A-B
RUPERT AVE	RMH		25	Secondary	A-B
S MCKNIGHT RD	RMH		25	Secondary	C-D
SARANAC DR	RMH		25	Secondary	A-B
SCARSDALE LN	RMH		25	Secondary	A-B
SEDOWICK PLACE DR	RMH		25	Secondary	A-B
SILVERTON PL	RMH		25	Secondary	A-B
SNOWDON AVE	RMH		25	Secondary	A-B
SOUTH DR	RMH		25	Secondary	A-B
ST ALBANS AVE	RMH		25	Secondary	A-B
STOCKARD AVE	RMH		25	Secondary	A-B
STONEBRIDGE DR	RMH		25	Secondary	A-B
SUNSET AVE	RMH		25	Secondary	A-B
SUNSET PL	RMH		25	Secondary	A-B
SURREY HILLS DR	RMH		25	Secondary	A-B
SUTTON AVE	RMH		25	Secondary	C-D
SUTTON BLVD	RMH		25	Secondary	C-D
TERRACE DR	RMH		25	Secondary	A-B
THOMAS AVE	RMH		25	Secondary	A-B
THORNDELL DR	RMH		25	Secondary	A-B
W PARK AVE	RMH		25	Secondary	A-B
W RANKEN AVE	RMH		25	Secondary	A-B
WARNER AVE	RMH		25	Secondary	A-B
WESTON PL	RMH		25	Secondary	A-B
WILLIAMS AVE	RMH		25	Secondary	A-B
WINZENBURG DR	RMH		25	Secondary	A-B
WISE AVE	RMH		25	Secondary	A-B
WOODLAND DR	RMH		25	Secondary	A-B
YALE AVE	RMH		25	Secondary	A-B
BLENDON PL	RMH/STL	MPL/RMH	25	Secondary	A-B
BIG BEND BLVD	CLY		45	Major Rd	C-D
S LACLEDE STATION RD	MPL		45	Major Rd	C-D
CLAYTON RD	RMH		45	Major Rd	C-D
LACLEDE STATION RD	RMH		30	Major Rd	C-D
S BIG BEND BLVD	RMH		45	Major Rd	C-D
S HANLEY RD	RMH		30	Major Rd	C-D

Illustration 19: Cont.

Street Name	City Left	City Right	Speed Limit	Type	Est. LOS
MANCHESTER RD	MPL		45	State Hwy	C-D
E I64 HWY	RMH		55	Interstate	C-D
N I170 HWY	RMH		55	Interstate	C-D
S I170 HWY	RMH		55	Interstate	C-D
W I64 HWY	RMH		55	Interstate	C-D

Sidewalks. All of the cities have well-developed sidewalk systems embedded in the transportation network. In residential areas, sidewalk widths are typically four-to-five feet, whereas in commercial areas there are some wider sidewalks. There are some voids in the pedestrian system. For example, in Brentwood Forest residents have reported a lack of pedestrian continuity between the residential area and the retail outlets in the Brentwood Promenade, and further eastward towards Dierberg's Market as well. Issues involving unlighted portions of the Metro ramp accessing Dierberg's have also been reported. The intersection of Manchester and Hanley suffers from a lack of sidewalks in a number of locations, as well as narrow sidewalks west of the intersection that limit pedestrian activity and impair access to the Manchester MetroLink Station to the east of the intersection. Problem intersections like these point to the need for municipalities to strategically improve pedestrian facilities in a manner that benefits the greatest number of users.

20. Dirt paths and a lack of curb cuts create less-than-suitable conditions for pedestrians to connect to the MetroLink.

Recent efforts have been taken by municipalities in the study area to improve pedestrian conditions. Brentwood has recently applied for federal funding through the American Reinvestment and Recovery Act to receive funding for sidewalk improvements on Rose Avenue, connecting Brentwood Square with the Brentwood Promenade, and on Litzsinger Avenue west of Brentwood Blvd., improving conditions for school children traveling on this well-used collector street. Clayton has a number of current and recently completed capital improvement projects to improve the pedestrian environment, the most visible of which is the Pedestrian Safety Improvement Project,

21. Improvements at a mid-block crosswalk on Wydown Blvd. in Clayton help define the pedestrian realm.

which enhanced a large number of intersections throughout the city, as well as all intersections within the Central Business District, by adding red brick pavers, replacing curb ramps, adding truncated domes, and installing audible signal heads at all signalized intersections. Maplewood has also completed a number of improvements in the Central Business District that improve the pedestrian environment. The new signalized intersections, improved striping and unique streetscape enhancements have created a warm and welcoming pedestrian environment that will help attract residents and visitors to the city's burgeoning downtown. Richmond Heights recently improved a number of intersections and mid-block pedestrian crosswalks with red brick pavers and new striping, helping to demarcate the pedestrian realm and improve safety at potential vehicle-pedestrian conflict points.

Existing Bicycle Facilities. Brentwood has an extensive biking and walking trail network. The Rogers Parkway, a 0.7 mile shared-use path creates the backbone of this off-street bicycle and pedestrian network, running north and south through the heart of eastern Brentwood. The Lee-Wynn Trail and neighborhood connectors act as the thread connecting Brentwood's neighborhood parks located along the Black Creek. While these facilities are heavily used by Brentwood residents for recreational purposes, their utilitarian potential is immense. These multi-use trails provide a great off-street alternative connecting neighborhoods to the commercial-heavy Manchester Road to the south and Brentwood Square and the Brentwood Promenade to the north.

Recently Clayton completed a bicycle "Share the Road" sign project. Bike St. Louis will provide signs marking a bike route from the City of St. Louis through Clayton to MetroLink passenger stations and Clayton's Shaw Park. To emphasize the route, the City of Clayton partnered with the Great Rivers Greenway on a banner program that promotes the benefits of cycling. The City has installed bike racks throughout the Clayton community. Maplewood has just added Bike St. Louis stencils on Manchester

Road. The City of Clayton has also added bicycle lanes to Jackson Road and Carondelet Plaza, providing a safe connection for eastern Clayton and University City residents to Downtown Clayton. Further discussion of specific facility types will be presented in Chapter 2C.

22. Bicycle lane and signage on Carondelet Plaza approaching Downtown Clayton.

Light Rail. Several rail lines are located within the study area. The most prominent is the recently-opened Cross County Extension of MetroLink that runs generally north and east from the southeast corner of Maplewood. The 8 mile corridor extends through all four cities and is heavily used. Bicycles are allowed on MetroLink trains and on most Metro buses serving this line (Illustration 23). The development of a comprehensive on-street bikeway network and further facilitation of pedestrian connections to MetroLink stops will be an important element of the plan to be developed in the next chapter.

23. Bicycle commuters wait to board the MetroLink.

Recently, St. Louis County has announced support for two new MetroLink extensions to the north and west from its existing alignment along I-170. The first extension would diverge from the I-170 corridor and share the Page Avenue right-of-way. The second extension would run to the north from a point where present MetroLink line intersects with I-70. These concepts should be closely examined to determine whether a multipurpose trail could be jointly developed along all or a portion of the proposed routing.

Freight Rail. An active Union Pacific rail line exists near Maplewood's southern boundary which, for a short distance shares a corridor alignment with the new MetroLink line before curving to the southwest and away from the city. The Maplewood portion is approximately 1.3 miles in length. Although this line is presently heavily used by Union Pacific and not likely to become available through the federal rails-to-

trails program, its status should nevertheless be monitored for possible conversion to a recreational trail. (The rails-to-trails program is discussed Chapter 2C.)

At the point where the Union Pacific corridor curves to the southwest, a .6 mile-long spur extends into Brentwood near that city's southern boundary. It is located along an east-west axis on a corridor that also includes a stream. It is possible that this section could be made available under rail-banking at some point, and would be useful as a short trail serving the study cities.

Accident Data

Accident information provided by the cities as well as the Traffic Safety Compendium of the Missouri Highway Patrol enables the development of an overview of safety issues as they relate to pedestrian and bicycle travel. Data provided by the cities, which varies in quality and time frame, is reported first, followed by a summary of the Highway Patrol compendium.

Brentwood. There was one fatal accident in the City of Brentwood in 2005, involving only one vehicle. The accident occurred on Brentwood Boulevard. No pedestrians were involved and alcohol was not a factor.

Clayton. One pedestrian fatality occurred in 2003 in the City of Clayton. It is the only fatality that occurred in any of the four cities for the period examined. There were about ten pedestrian accident injuries per year between 2002 and 2006. The accident injury rate for 2007 appears to be about the same as for previous years. Bicycle accidents resulting in injuries averaged roughly two to three per year, except that in 2005 there were eight such incidents. In 2007 there were no injuries.

Maplewood. The City of Maplewood reported traffic accident data from late 2004 through most of 2007. There was an average of 28 pedestrian accidents with injuries in the 36-month period. The year 2005 had the highest number of such accidents with 37. The majority of accidents with injuries occurred on Manchester, Hanley and Big Bend roads, with the greatest concentration on Manchester. No bicycle accident data was reported.

Richmond Heights. The Richmond Heights accident report covered the years 2002 through 2006. During this five-year period there were four fatal accidents, none involving bicyclists or pedestrians. Accidents involving personal injury ranged from a low of 212 in 2004 to a high of 267 in 2005. Auto accidents with bicycles totaled eleven during the five-year period, whereas auto accidents involving pedestrians ranged from three to seven per year, with a total of 24 such incidents. Less than 1% of all of the accidents in Richmond Heights involved pedestrians and bicyclists.

Missouri Traffic Safety Compendium. The Highway Patrol's 2007 Traffic Safety Compendium helps to shed light on relative accident rates across county and municipal jurisdictions in the state as a whole. (Pp 164-292.) For example, St. Louis County ranks second in the state in terms of accidents involving bicyclists – 18.7 percent of all reported accidents. According to the information reported above, then, the four cities have bicyclist-involved accident rates considerably lower than the county-wide rate. When looking at bicyclist-involved accident rates among Missouri cities, Richmond Heights ranked 12th in the state (7 accidents). Maplewood's ranking was 26th (4 accidents), and Clayton's ranking was 37th (3 accidents).

An examination of the Highway Patrol's 2007 information for pedestrian accidents indicates that St. Louis County ranks second-highest in the state for such accidents (289). Clayton ranking was 9th(14), while Maplewood's was 11th (13).

The Highway Patrol's 2007 raw data for accidents of all kinds in the four cities are as follows: Brentwood (336 total, 0 bike, and 3 pedestrian), Clayton (603, 3 and 14 respectively), Maplewood (228, 4 and 1 respectively), and Richmond Heights (765, 7 and 5 respectively).

Bicyclist and pedestrian safety is a constant concern of each of these communities. As such, this plan will address safety issues across a variety of platforms—from infrastructure and physical characteristics to education and enforcement. It is hoped that the bicycle and pedestrian system to be developed as a result of this Bikeable-Walkable Community planning study will help to reduce accidents involving pedestrians and bicyclists on a person-miles traveled basis.

Land Uses

The spatial distribution of different land uses - residential, commercial, industrial, open space - strongly shapes a community's transportation network. Proximity, access, convenience, and safety are principle factors to consider when developing a bicycle and pedestrian plan that connects people with other people and places in their communities. Are residential neighborhoods far away from schools, retail, parks, and other frequently visited community destinations? The closer these different land uses are located to one another, the more attractive walking and biking will be as transportation options. This subsection of the report focuses on types of land uses within the community and how they will shape the bicycle and pedestrian facilities network.

Brentwood. The City of Brentwood is characterized by a mix of land uses that create a desirable residential community, complete with a diversity of housing types, a neighborhood-based school system, a host of parks and other recreational opportunities, and a variety of retail outlets and nearby shopping destinations.

Like the other three communities in the planning area, the City of Brentwood is primarily residential, with 43 percent of all land uses composed of single- and multi-family residential uses. Most residential neighborhoods in the city are primarily single-family, with the exception of Brentwood Forest. Originally known as Audubon Park, Brentwood Forest consists of over 1,400 condominiums spread over 110 acres in the northwest area of the city.

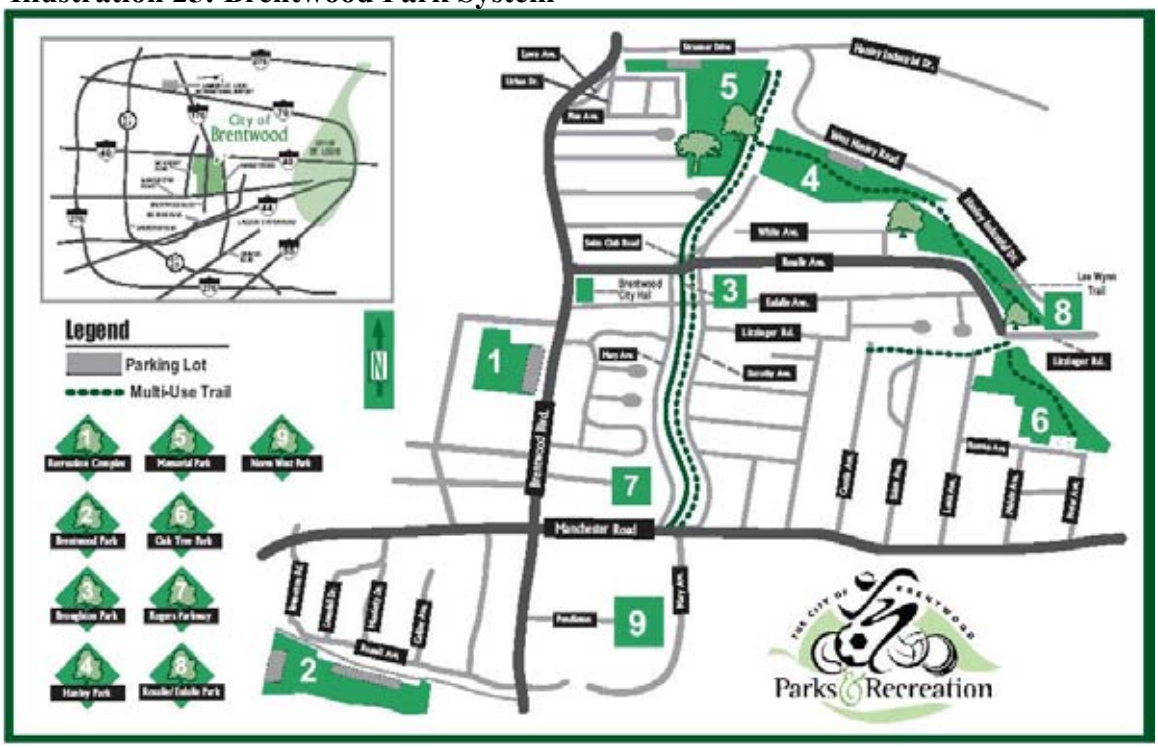
24. Children walking home from school past new residential infill development on Litzsinger Road east of McGrath Elementary.

Recent development has created a diverse commercial landscape that reflects the city's different periods of growth. Following regional commercial development patterns, big box retail has emerged in the northeast portion of the city along Brentwood Blvd, Eager Road, and Hanley Road. Older commercial development has still maintained a significant presence along Brentwood Blvd and Manchester Road, with a significant concentration at the intersection of these two arterial roads.

Located on the eastern edge of the city is Hanley Industrial Court, home to a number of industrial and other businesses, with over 1.7 million square feet of industrial space. With convenient access to Interstates 64 and 170, commercial development is closing in on the north and east borders of Hanley Industrial Court as these two land uses compete for desirable real estate.

In addition to these larger land uses, there are a number of institutional uses, open spaces and parks that constitute significant destinations within the community. The City of Brentwood currently maintains eight parks, including Brentwood, Hanley, Memorial, Oak Tree, Rosalie/Eulalie, Norm West, Brougthton, and the Rogers Parkway – Illustration 16 – (within which Broughton Park is situated). The 50 plus acres of parks in Brentwood offer a wide variety of amenities for outdoor recreation and congregation, including trails, tennis courts, pavilions, a roller hockey rink, and other unique features.. The Rogers Parkway is the only linear park in the system. It is .75 miles in length. The City also has a number of trails as part of a linear park system that separates residential neighborhoods to the south and west from the industrial, office and retail uses in Hanley Industrial Court.

Illustration 25: Brentwood Park System



Other public facilities include the Brentwood Community Center, which provides indoor recreation opportunities, fitness classes, adult activities, ice skating and ice hockey programs. The City is a member of the Parks and Recreation Cooperative (PARC), a recreational collaboration with Maplewood and Richmond Heights with approximately 72 acres of park lands. There are also several private facilities in the City including the Brentwood Swim Club, the Brentwood YMCA, and a variety of recreational facilities located within Brentwood Forest Condominiums.

The City's municipal facilities consist of City Hall, City Hall Annex, the Police Station and the Street Department building. The City Hall building also houses the City Library and the Fire Department. A number of other public facilities and institutions are also located within the City limits, including a variety of churches and private schools, and one of Metro's bus garages.

Brentwood is also home to the Brentwood School District, which includes Mark Twain Elementary, McGrath Elementary, Brentwood Middle School, and Brentwood High School. In 2004 the District enrollment was 858 students that included 220 Middle School students and 259 High School students.

The range of land uses in Brentwood suggest the community's ability to provide most daily needs within the city's 1.9 square miles. Because of the city's small geographic area and the close proximity of various land uses, Brentwood possesses a built environment already very supportive of bicycle and pedestrian activity. However, only with safe and interconnected supporting infrastructure will city residents and workers feel comfortable using non-motorized transportation to move throughout the community.

Clayton. Like the City of Brentwood, Clayton, the northernmost municipality in the planning area, possesses a healthy mix of land uses that are disbursed in a manner that promotes walking and bicycling. From tree-lined boulevards of DeMun Avenue, Wydown Boulevard and North Forsyth Boulevard to the well-designed pedestrian streetscapes in the Central Business District, the City of Clayton's built environment and aesthetic character combine to create an enjoyable bicycle and pedestrian atmosphere.

Public facilities in Clayton include Shaw Park, Oak Knoll Park and Concordia Park, which collectively comprise more than 80 acres. In addition to these larger parks, there are seven other neighborhood parks that dot the landscape in the City of Clayton. Shaw Park is the City's principal park and provides a wide range of recreational facilities and services including a large swimming complex, an ice rink, a tennis center, and the relatively new Center of Clayton, a major community center with indoor pool, running track and a variety of other recreational facilities. Shaw Park is also located adjacent to the Downtown Clayton Business District, which has a daytime population of approximately 50,000. Together, all of Clayton's park facilities provide a full range of recreation activities and programs.

Illustration 26: Photograph of the Clayton Park System Map, taken in Shaw Park.

Other public facilities and institutions include City Hall, Police and Fire facilities and the Clayton School District, which operates six schools with a total enrollment of 2,460 students, 906 of which are High School students. As the St. Louis County Seat, Clayton is also home to a number of county-level institutions, including numerous county governmental offices, the St. Louis County Circuit Courts, and St. Louis County Police Department Headquarters. The St. Louis County Library has a large facility in the City as does the U.S. Postal Service.

In addition to these public institutions, Clayton is well-known as an economic engine in the St. Louis Region, generating a substantial daytime population. Clayton's Central Business District, also known as Downtown Clayton, is home to many office and retail employers. Newer residential development has also sprouted in Downtown Clayton and has helped to fuel area's restaurants and nightlife.

The City also contains a number of private schools and churches. Significantly, it is home to Washington University, a nationally-known institution with more than 10,000 full time students and 2,500 part time students. The university's campus crosses municipal borders, with portions of the campus in Clayton, the City of St. Louis, and unincorporated St. Louis County. Fontbonne College, a well-known institution with an enrollment of 2,924 students, 2,061 of which are full-time, is positioned adjacent to the southern border of Washington University's Danforth Campus. Concordia Seminary, a Lutheran institution, is also located within the City limits and is the largest Lutheran seminary in the United States.

Maplewood. Land uses in the City of Maplewood have changed very little of the course of the city's history. The city has a resurgent business district on Manchester Road and Sutton Road that is characterized by its diverse retail, office and restaurant spaces, its historic architectural character and its walkable environment. Other commercial activity in the City of Maplewood is located along Manchester Road west of the business district, along Big Bend Road, and in Deer Creek Center. Residential neighborhoods in Maplewood are located within the grid of arterial streets, creating cohesive neighborhood character with schools and parks often serving as neighborhood anchors.

27. Playground facility at the 4 acre Lindberg Park in Maplewood.

Maplewood is a principal beneficiary of the Parks and Recreation Cooperative (PARC), a recreational collaboration with Brentwood and Richmond Heights. As a member of this entity, City residents enjoy access to the park facilities and programs of the Cooperative. Maplewood's park facilities include the Maplewood Tennis Complex, Ryan Hummert Memorial Park, Central Park, Deer Creek Park,

Greenwood Park, Kellogg Park, Lindbergh Park, and Trolley Park. Additional PARC facilities are listed in the Richmond Heights section below.

Maplewood's prominent public facilities consist of City Hall, one fire station, two police stations, the recently relocated public library, and the Maplewood Civic Center.

Richmond Heights. The City of Richmond Heights is the only city in the four-city study area that borders all three of the other cities. The city is primarily residential, with commercial corridors along Brentwood Blvd, Clayton Road, and Hanley Road. The largest commercial destinations in the City are the Galleria and the Boulevard on Brentwood Blvd., and a diverse mix of office and retail centered around the intersection of Clayton and Big Bend Roads. This commercial development is anchored by Schnucks Supermarket, Office Depot, and the Esquire Movie Theater. Immediately east of this commercial area is St. Mary's Hospital, a Sisters of St. Mary (SSM) Health Care facility with 2,100 employees and over 800 physicians on staff.

Richmond Heights offers a number of parks and one recreation facility within its own systems. Facilities include A.B. Green, Highland Park, Yale Park, and the City's new indoor recreation complex at The Heights. As a member of PARC, residents of Richmond Heights are entitled to use the facilities in neighboring Brentwood and Maplewood. In addition, the City's government and public service functions are housed at City Hall and at the Public Works facility.

Previous and Pending Plans

The City of Brentwood's last comprehensive plan was completed in 2006. Of relevance to the present planning effort, its vision statement includes references to the development of pedestrian-friendly places, and safe and efficient travel in a variety of transportation modes. It also articulates the goal to enhance safe pedestrian and bicycle connectivity throughout the City, to reduce traffic congestion and to provide multimodal transportation alternatives. Its infrastructure and community facilities goals include the provision of linkages to the regional bike/trail greenway system. Another goal is to provide improvements to the storm water system, which is supportive of the greenway goal.

Clayton's last master plan was completed in 1975, but the City has completed a number of area-specific plans in the intervening years. Goals related to the present plan include maximization of the quality of the environment for residential areas and a comprehensive, balanced and integrated transportation system.

The City of Richmond Heights completed its last comprehensive plan update in 1986. It did not contain any recommendations specific to bicycle and pedestrian facilities, although the City is presently interested in the planning and development of such facilities.

Similarly, in Maplewood – although the City has not recently completed a comprehensive planning process – the community has a keen interest in planning for and providing more bicycle and pedestrian facilities.

The previously-articulated plan recommendations and interests relating to bicycle and pedestrian facilities will be further developed in the plan chapter of this study, and will include specific recommendations for implementation.

SECTION 2C: EXISTING BICYCLE FACILITIES IN THE AREA AND ELSEWHERE

Within the Cities of Brentwood, Clayton, Maplewood and Richmond Heights, there are a number of existing bicycle facilities. This section of the report documents the different types of bicycle facilities in the four-city study area and also in the surrounding region.

Bicycle Facility Types

A variety of bicycle facility terms are used by the American Association of State Highway and Transportation Officials (AASHTO), the national group that disseminates guidelines for these facilities and by other authorities as identified below. Some or all of these terms will be used in this study.

Accommodation (28). A minimal treatment consisting only of "Share the Road with Bicycles" signage – a warning sign used in the Manual on Uniform Traffic Control Devices (MUTCD). This treatment may be appropriate for higher traffic situations including arterials and some highways where there is either already – or likely to be - some bicycle traffic and where there are limitations that do not allow for widening in conformance with an official bicycle facility such as a bike lane. This treatment uses the approach of warning both motorists and cyclists of a shared road condition on a busy road. The Missouri Department of Transportation (MoDOT) uses it on some of its roads.

28. Share the road sign pairing from the MUTCD.

Bicycle Facility. A generic term describing any marked or unmarked street route, bicycle lane or path.

Bikeway. Another generic term for any road or path which in some manner is specifically designed as being open to bicycle travel, regardless of whether the facility is

designated for the exclusive use of bicycles or is to be shared with other transportation modes.

Key Bicycle Street. A shared roadway which - though not designated by directional and informational markers, striping, signing, or pavement markings for the preferential or exclusive use of bicycle transportation - is or can be used by bicyclists.

Bicycle Route (29). A segment of a system of bikeways, designated by the jurisdiction having authority, with appropriate directional and informational markers - but without striping, signing, and pavement markings - for the preferential or exclusive use of bicyclists. (*Class III bikeway*.)

29. Standard signage for local bike routes.

Bicycle Lane (30). A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists. Lanes are arranged in couplets with each one in a different direction and adjacent to the outside through travel lane. (*Class II bikeway*.)

30. Bicycle lane treatment.

Bicycle Path (31). A path that is physically separated from motor vehicle traffic by open space or a barrier and either within the road right-of-way or within an independent right-of-way. (*Class I bikeway*.)

31. Bicycle paths are often shared with other non-motorized users.

Shared Roadway. A street or highway without bikeway designations. Most bicycle travel now occurs on such roadways.

Shared Use Path. A bicycle path which, although designed primarily with the bicyclist's safety in mind, is likely to attract other users such as pedestrians, joggers, dog walkers, people pushing baby carriages, persons in wheelchairs, skate boarders, in-line skaters and others. Most newer bike paths attract such users.

Signed Shared Roadway. Roadways designated by bike route signs, and which serve either to provide continuity to other bike facilities or designate preferred routes though high-demand corridors.

Major Existing Bikeways in or Near the Four-City Study Area

The purpose of this section is to examine longer bikeways within or close to the cities of Brentwood, Clayton, Maplewood, and Richmond Heights, to which new facilities to be ultimately recommended in this study could be connected. Shorter loop trails (less than one mile in length) have not been included. Major existing bikeways within or close to the cities include the following:

Manchester Road On-Street Accommodation. MoDOT has signed this corridor so that it can function according to minimal accommodation guidelines. The bikeway corridor extends along most of the distance of Manchester Road.

Bike St. Louis Bikeways. The Bike St. Louis project, which began as collaboration between the City of St. Louis and the Great Rivers Greenway District to connect residents to local parks and amenities and provide defined routes for commuter cyclists, has two routes that currently enter the study area. One route enters Maplewood from the east on Southwest Ave and continues on Manchester, Sutton, Greenwood, Sussex and Oxford before connecting to the Deer Creek Greenway. The second route emerges from Forest Park and enters Clayton Road on Wydown Blvd. before heading northward on Edgewood Drive, over Forest Park Parkway and into Downtown Clayton.

Clayton Road Bikeway. Clayton Road has been a major key bicycle street for many years. Over the years this long-distance bikeway has been incrementally improved with combinations of Share the Road signage, actual paved shoulders or bike lanes. Bicyclists are so common along Clayton Road that they have become an expectation in the eyes of many drivers.

Bellevue Avenue Key Bicycle Street. Similarly, Bellevue has been a regularly used key bicycle street for many years. It has become particularly useful as a north-south route by commuters and recreational riders alike.

Jackson Road and Carondelet Plaza Bicycle Lanes. Bicycle lanes installed on these streets provide for the safe travel of Clayton and University City residents crossing Forsyth Blvd. and entering Downtown Clayton from the east and northeast. In the entire four city study area, these are the only existing bicycle lanes.

Forest Park Bike Path. This multipurpose trail within Forest Park lies almost immediately adjacent to Richmond Heights as well as Clayton. It is a frequent recreational riding destination by many residents and is also an important commuting link for many cyclists.

Looking at a wider area within a reasonable distance of the four cities, there are a growing number of major bicycle facilities including: The Katy Trail in St. Charles and other counties along the Missouri River corridor (230 miles); the Riverfront Trail (11 miles); the Old Chain of Rocks Bridge (1 mile); Grant's Trail (8 miles) and its recently-opened extension to Kirkwood (2 miles); the Creve Coeur Lake Park Trail (3 miles); and the Page Connector bike facility (2 miles). Excluding portions of the Katy Trail which are not located in St. Charles County, and proposed projects, St. Louis's major bicycle facilities total approximately 55 miles. This system includes two important regional trail connectors: The Old Chain of Rocks Bridge, which connects the 11 mile long Riverfront Trail in the City of St. Louis to the Metro East trail system; and the Page Connector, which links St. Louis County bicycle facilities with the KATY Trail.

Expansions and improvements to many existing St. Louis facilities – as well as major new stand-alone facilities - are being funded through MEPRD's St. Louis counterpart, The Great Rivers Greenway Distict (GRG.) GRG's River Ring concept alone, when fully developed, will result in a substantial addition of trail mileage on the St. Louis side.

GRG is spearheading key new trail connections bridging the Mississippi, which will create new non-motorized commuting opportunities for Illinois cyclists who work in downtown St. Louis. The newest initiative is the McKinley Bridge, which is undergoing a major renovation and will include a 14-foot-wide bicycle path which will connect St. Louis' Riverfront Trail to Metro East's Confluence Trail.

Bicycle Facilities in the St. Louis Region

Within Madison County, Madison County Transit (MCT) has developed eight major bicycle paths that collectively exceed 70 miles. They include the following:

- MCT Schoolhouse Trail (pictured, Illustration 32), a 12-mile long asphalt multipurpose trail that connects the City of Collinsville to Maryville, Pontoon Beach and Granite City.

- MCT Nature Trail, another 12-mile long multipurpose trail forming a connection between Pontoon Beach and Edwardsville.

- MCT Nickel Plate Trail, an 8.2 mile multipurpose trail connecting Maryville, Glen Carbon and Edwardsville.

32. A bicyclist enjoys a ride on the MCT Schoolhouse Trail

In addition to those described above, other trails in Madison County include the Bluff Trail (1.7 miles); Confluence Trail (17.1 miles); the Watershed Trail (4.7 miles); the Delyte Morris Trail (2.3 miles); the Glen Carbon Heritage Trail (6.9 miles); and the Vadalabene River Road Trail (approximately 11 miles).

Several trails are interconnected either directly or indirectly through designated bicycle routes, to form a substantial bikeway system that already affords long-distance recreational and bicycle commuting opportunities to Illinois residents. Many of Madison County's larger cities also have recreational trails located within city parks.

The trails of Madison County have evolved into an extremely popular feature within the county, and are becoming a factor in the local economy. For example, local officials believe that homebuyer location decisions are actually being influenced by the proximity to this trail system, and that developers are considering the trails as they make decisions regarding development locations.[1]

Within St. Clair County, the principal trail facility is the Metro Bike Link, a 4 mile long bicycle path that extends from Southwestern Illinois College to North End Park in Belleville. Another facility is the Metro East Levee Trail (7.6 miles). Total major trail mileage in St. Clair County is currently more than 12 miles.

[1] "Trail now connects to popular park;" by Terry Hillig. St. Louis Post Dispatch, May 18, 2006.

Several cities within St. Clair County also have smaller recreational trails either within local parks, or as stand-alone linear trails. Presently there are no major bicycle paths in Monroe County. However, the county has many key bicycle roads that are extensively used by recreational cyclists for both individual and organized rides.

The Illinois Department of Transportation (IDOT) has underwritten the development of many Metro East facilities through the federal Transportation Efficiency Act for the 21st Century (TEA-21) and its predecessor program, ISTEA. This program is still operational.

IDOT also has a policy of bicycle accommodation on its road system, meaning that it tries to facilitate bicycle movement by posting "Share the Road with Bicycles" signs, and replacing dangerous drainage grates with bicycle-safe grates. Metro East roads have significantly benefited from this program.

The formation of the Metro East Park and Recreation District (MEPRD) represents a major new trail development opportunity for this area. Created as a special taxing district, MEPRD plans and funds major park and greenway efforts in both St. Clair and Madison Counties, utilizing proceeds from a district-wide sales tax.

The trail boom in the St. Louis Region is the result of a combination of factors, among which is their strong and growing popularity with local residents and tourists alike. Because of this popularity, there is a positive economic outcome. The Katy Trail itself (formerly called the Missouri River State Trail) is a case in point. The American Hiking Society reported the results of a study which found that, "After just one season, 61 businesses located along the (Trail) reported that (it) was having a positive effect on their businesses. Eleven of the businesses reported that the Trail had strongly influenced their decision to establish the business, and 17 (28%) had increased the size of their investment since the Trail had opened."[2]

[2] "The Economic Benefits of Trails;" American Hiking Society.

Selected Facilities in Other Parts of the Country

In order to gain further insight into the scope and impact of trails on local communities, selected bicycle facilities in other parts of the country will be highlighted here, with a focus on economic impact.

The State of Ohio's Buckeye Trail system is over 1,400 miles in length. It is actually a series of individual trails and bicycle route connectors throughout the state which are blanketed by the Buckeye Trail brand and marketed as a single trail asset by the state's tourism office. One of the trail elements is the Loveland-to-Morrow segment of the Little Miami Scenic Trail, which joins towns of the same name. Approximately 11 miles in length, this trail is heavily used by both residents and tourists, and is now an important regional and local economic asset. The facility – built on an old rail corridor - was developed with state resources and extensive support from both communities. A portion of Loveland's old downtown commercial district is located on the trail, and contains a number of prospering businesses that cater to trail users.

33. Logo for the popular Buckeye Trail system in Ohio.

The relationship between trails, recreational tourism and economic development has been demonstrated in many examples. The data suggest that a stronger economic future is possible for communities that develop longer trail systems where there are also attractions and a coordinated marketing strategy.

The Monon Trail in Indianapolis is one of many popular trails across the country. A study of this 10-mile long trail examined the "premium" that people are willing to pay for location along a greenway corridor. (Trails on separate rights of way are typically located within greenways.) All other factors being equal, it found that the typical house along a greenway sold for an average of $3,731 more than its non-greenway counterpart.[3]

[3] Public Choices and Property Values: Evidence from Greenways in Indianapolis; School of Public and Environmental Affairs, Indiana University. December 2003. Page 9.

Considerable additional information exists on the positive economic benefits of trails, as briefly summarized below:

- A 1992 study of the Oil Creek Bike Trail by Pennsylvania State University revealed that average visitor spending was $25.85 per day.[4]
- As of 1992, approximately 170,000 individuals visited the Tallahassee-St. Marks Trail in Florida every year, with daily expenditures averaging $11.00.[4]
- 135,000 people visit the Heritage Trail in Iowa and spend an average of $9.21.[4]
- "Nationally, trail-related expenditures range from less than $1 per day to more than $75 per day, depending on mileage covered. Generally, it's been found a [longer] trail can bring at least one million dollars annually to a community, depending on how well the town embraces the trail...."[5]

From the preceding, it is clear that the cities of Brentwood, Clayton, Maplewood, and Richmond Heights would significantly benefit from an interconnected bicycle and pedestrian system having both trail and on-street components. In addition to the linkage potential between institutional, commercial and retail infrastructure, trips could originate within neighborhoods for easy access to other neighborhoods and to these destinations.

[4] NBPC Technical Brief: "The Economic and Social Benefits of Off-Road Bicycle and Pedestrian Facilities." September 1995.

[5]Economic Impacts of Trails. National Trails Training Partnership website.

SECTION 2D: EXISTING BICYCLE USAGE AND PROJECTED BICYCLE FACILITY NEEDS

An Estimate of Existing Bicycle Usage

Direct data on existing bicycle usage within the cities of Brentwood, Clayton, Maplewood and Richmond Heights are non existent, nor have surveys been undertaken to measure this activity. However, experiences of other communities have shown that, when bicycle and pedestrian facilities are developed to connect residential areas with local destinations and activity generators, they are well used. For example, Washington Missouri's Rotary Riverfront Trail, which connects to an on-street bikeway system, became the most heavily-used park facility in the City's entire park system within a year of its opening, according to the City's Parks Director. Closer to home, a combination of actual counts by Trailnet on one part of the Grant's Trail and estimates for the entire facility indicate that between 120,000 and 200,000 people use the trail annually.

Notwithstanding this information from other facilities, an assessment of existing bicycle usage within the four cities is important to this study. A method exists for the development of a reasonable estimate of present bicycling and related activity on roads and trails in the area. This will be examined below.

Participation in Activities Likely to be Undertaken on a Trail or Greenway. The Metro East Park and Recreation District (MEPRD) completed its Long Range Development Plan in 2003. Through a detailed and statistically valid survey, it measured *rates of regular participation* by *households* in St. Clair and Madison Counties in a wide range of activities. Included in this survey were activities that are very likely to be undertaken on a trail or a greenway. For example, the results indicated that 65% of the households walked or jogged regularly; 47% regularly visited nature areas; 27% regularly engaged in bicycling and/or BMX activities; 20% hiked regularly; and 16% regularly ran. This methodology has applicability elsewhere.

From MEPRD's multi-county household survey data and using the given percentages, estimates of probable participation by households within the four-city study area in activities likely to be undertaken on a trail/greenway can be made. These estimates are

shown in the table below, using the cities' 2000 population estimate (39,348) and household number (18,761), which results in an average household size of 2.1 individuals (Illustration 34).

Illustration 34: Estimated Regular Participation of Study Area Residents in Activities Likely to be Undertaken on a Trail or Greenway [1, 2]

Leisure Activity	MEPRD's Multi-County Percentage of Households That Regularly Participate	Probable Component City Participation Events in Activities Compatible with Trail Facilities
Walking/Jogging	65%	12,195
Visiting Nature Areas	47%	8,818
Bicycling/BMX	27%	5,065
Hiking	20%	3,752
Running	16%	3,002
Total Participation Events	n.a.	32,832

The MEPRD survey also measured the *leisure activities in which the respondent households participated most often*. Of the activities that are very likely to be undertaken on a trail or a greenway, respondents participated *most often* in the following (in descending order):

- Walking/jogging
- Bicycling/BMX
- Visiting nature areas.

If it were assumed that the residents of Brentwood, Clayton, Maplewood, and Richmond Heights participated most often in the same activities and that an individual in these cities would participate in such events about six times per year, then this represents approximately 4,346 residents of the four cities regularly participating in events likely to be undertaken on a trail or greenway. This value was obtained by summing the three trail-compatible participation events (26,078) and dividing by 6 frequencies to arrive at the estimate. It is not unreasonable to assume that this represents an initial "market" of users who would become patrons of an expanded bikeway system here. This figure

[1] Long Range Development Plan, April 2003. Metro East Park & Recreation District (MEPRD). Page 50.
[2] Based on combined average multi-city household size of 2.42 persons and population of 52,713 in 2000. Total participation exceeds the city's population total because of participation by individuals in multiple activities.

therefore represents a potential beginning point from which to define a user base for the trail system. Additional factors in the estimation of the probable user base are discussed below.

The 2000 Census reported 2,184 children in the 10-14 year old age category who reside within the four cities. For purposes of this study, it will be conservatively assumed that 20% of the cohort – 437 children – either occasionally ride bicycles to school or use them for other local transportation trips such as going to a friend's house, shopping or for other practical trips. It is likely that this figure is much higher.

Older children are also seen riding bicycles in the component cities. However, while 15 and 16 year olds may ride bicycles, it is probable that their riding activity begins to decline as they become older and approach driving age. There were approximately 899 15-16 year-olds residing in the cities in 2000. Because we believe they ride bikes substantially less than their younger counterparts, it will be assumed that 10%, or about 90 individuals in this age cohort, occasionally ride bicycles either to school or for other practical transportation purposes.

Likely Adult Bicycle Usage on City Streets. There is no quantifiable local data on adult bicycle usage in the area. While there may be some overlap between the MEPRD data that estimates adults who presently ride bicycles on existing area trails as well as on city streets, it is believed that these are not widely overlapping groups. This is because many of the adults who ride bicycles on area trails do so as part of a recreational, social, or exercise experience, while those who ride bikes on the street system tend to do so as individuals either for exercise, practical transportation purposes, environmental reasons or combinations of these.

When looking at the commute-to-work, the year 2000 U.S. Census reported that 62 adult residents of Brentwood, Clayton, Maplewood, and Richmond Heights used "other means" than driving, carpooling or public transportation. While the Census Bureau does not place bicycling in an exclusive enumeration category, the mode is the principle component of the "other means" category; so this appears to be a valid measure of the role that bicycles played for commuting residents of the component cities in 2000. Given the cost of fuel and other factors not in effect in 2000, it is likely that the number of adult commuters using a bicycle to get to work is significantly higher today.

A separate source of data on *commuting to work* is also available. The U.S. Census transportation to work data indicates that in 2001, 0.7% of the American work force regularly *rode a bicycle or a motorcycle to work*. In another study of eight cities known to have high bicycle usage rates (Chicago, Los Angeles, San Francisco, New York, Phoenix, Boston, Sacramento and Seattle), from .3% to 1.4% of the population rode bicycles to work in the year 2000.[3] Although the data spans several years, they are still believed to be useful in gaining an insight into probable local on-street bicycle activity.

Looking at adult bicycling beyond the commute to work, and to gain a more comprehensive insight on the level of adult bicycle usage on streets, a brief review of national travel mode and trip purpose data is useful. Transportation planners measure travel activity in terms of five transportation modes, in order of their numerical prominence: car, public transit, walking, bicycle and 'other' (not to be confused with the Census data which includes bicycling in its "other" category). In 1997, the percentage of Americans who regularly rode a bicycle *as a travel mode* was 1%.[4] "Travel" refers to any trip purpose including shopping, errands, recreation and getting to work. This nationwide average is substantially exceeded in university communities such as the Clayton portion of the study area, where Fontbonne College and a portion of Washington University's Danforth Campus are located. The average is also exceeded in areas where longer trails exist, such as the Forest Park bike path which receives heavy usage by area residents and other visitors.

Accordingly, the information above will be standardized to 1.2% in order to develop an estimate of total a*dult on-street bicycle usage for any trip purpose* within the four-city service area. Using the component cities' Year 2000 adult population of 10,245 persons, it is probable that approximately 123 adults residing in the component cities ride bikes regularly on streets in the area.

Summary of Existing Usage. Current estimated existing bicycle usage, as well as other activities undertaken on trails and greenways and on city streets/sidewalks, is summarized in the table on the following page.

[3] "Table 1-35: Principal Means of Transportation to Work." U.S. Department of Housing and Urban Development, American Housing Survey: various years.
4 "Percent of Trips by Travel Mode, as of 1997 (all trip purposes)" Table by John Pucher, Transportation Quarterly, 98-1.

Illustration 35: Summary of Estimated Existing Participation by Study Area Residents in Activities Likely to be Undertaken on Trails, Greenways and On-Street Bikeways

Activity	Event	Number
People Engaging in Activites Likely to be Undertaken on Area Trails and Greenways (Walking/jogging, visiting natural areas, bicycling/BMX activites)	26,078*	4,346**
Elementary/Secondary School Children (10-14) Regularly Riding Bicycles on Streets/Sidewalks	n.a.	437
Older School Children (15-16) regularly Riding Bicycles on City Streets/Sidewalks	n.a.	90
Adults Regularly Riding Bicycles on Streets/Sidewalks	n.a.	123
Total Estimated Existing Participation	**n.a.**	**4,996**

* Probable number of times that component city residents engage most frequently in activities likely to be undertaken on trails and greenways, based on MEPRD's multi-county survey. (Refer to text for further information.)
** This estimate reflects the assumptions that residents of Brentwood, Clayton, Maplewood and Richmond Heights would engage in events likely to be undertaken on a trail/greenway at the same rate as the residents of MEPRD's service area; and that they would engage in such activities at least 6 times per year. (Refer to text, page 29.)

Although these estimates may seem modest in comparison with the number of individuals who drive cars or use public transit, they are nevertheless significant because they identify a reasonably-probable "starter group" that would benefit from a more comprehensively developed municipal bikeway system. Moreover, these estimates are based on year 2000 Census data and present figures, though unknown, are believed to be considerably higher because of population change and the other factors discussed above. In addition, it is highly likely that new bikeway facilities to be developed from this planning process will attract still more usage by residents within the cities and by visitors who will be attracted to the component cities as a result of improved local conditions for bicycling and walking. In fact, increased usage beyond original projections has been reported elsewhere after comprehensive bicycle and pedestrian systems were developed. For example, in a study conducted by the Humphrey Institute at the University of Minnesota, it was found that community bicycle usage increased when a practical bikeway transportation system was developed. (Source: "Transportation and Urban Trails." American Trails.org.)

Projected Bicycle and Pedestrian Facilities Needs

Multipurpose Trail Needs. The National Recreation and Park Association (NRPA) publishes standards for a variety of open space-related facilities, including three types of trails: Walking/jogging trails, bicycle paths, and nature trails. Its benchmarks are .5 miles of each type of trail facility per 1000 population. (It does not have standards for a relatively new type of bicycle facility, the ATB/mountain bike trail.)

From a practical and cost-efficiency perspective, if bicycle paths are designed to national standards for such facilities (including wide asphalt or concrete surfaces with soft mulch or gravel shoulders, longer turn radii), then they would also be more than sufficient for the needs of walkers and joggers, persons with disabilities, roller-bladers, and for a variety of other non-bicycling trail activities as well. Moreover, there has been a major external funding source for the development of facilities designed to bicycle path standards, whereas grant opportunities for walking/jogging trails and for nature trails are somewhat limited. (Funding sources will be more closely examined in the subsequent plan chapter of this study.)

In terms of projected trail needs for the cities of Brentwood, Clayton, Maplewood and Richmond Heights, therefore, two of the three NRPA facility categories could be combined and examined as one facility type: Multipurpose trails or paths that accommodate both bicycles, walking/jogging, and other related activities. According to the present NRPA standard of .5 miles of each type of multipurpose trail per 1000 population (1.0 miles total), and using the cities' Year 2000 population of 39,348, there was a need for just over 39 miles of multipurpose trails at that time. Because a continuation of the rate of population decline between 1990 and 2000 is not expected in the future, a no growth-modest growth pattern of zero-to-one percent will assumed here through the year 2015. Using a mid-point of .5% projected growth for the period, therefore, a population of 39,545 persons is projected for the year 2015. Accordingly, the projected multipurpose trail need will be 40 miles.

Specialized Nature Trails and Mountain Bike Trails. In terms of nature trails (the third type of trail defined in the NRPA standards), present mileage is negligible. Nature trails are narrower paths paved with natural materials such as packed earth, wood chips, or soft gravel and sited in more rustic and environmentally sensitive areas where any

activity other than walking would inflict environmental damage. Nature trails are intended primarily for walkers or hikers who desire a more natural experience, and are not suitable for any type of bicycle usage. Using the NRPA standard (.5 miles of nature trail per 1,000 population), therefore, results in a projected combined need for 20 miles of nature trails through 2015.

Mountain, or off-road, bicycling is another segment of the cycling market not addressed above. Mountain bikes (MTBs) have become a major part of the bicycling market. However, most of them are not substantially ridden on off-road trails. They tend to be ridden on conventional bicycle facilities and on streets. This probably relates to the fact that there is a general shortage of specially-designated trails for MTBs, and the deficiency is reflected within the four-city area as well. Therefore, it is probable that off-road riding would increase if more specialized facilities existed. For this study, .1 mile of MTB trail per 1000 population is assumed to be adequate. A combined total of 4 miles of MTB trails for the combined cities is therefore an appropriate goal for the year 2015.

On-Street (Shared Roadway) Bicycle Facility Needs. Per capita-based mileage benchmarks are not used by planners in the assessment of need for on-street bicycle facilities. The reason is that, because bicycles are a legitimate transportation mode and because they are subject to the same rules of the road as motor vehicles, they should continue to have access to all destinations and therefore to all streets (except where presently prohibited such as on interstate highways).

Many streets – primarily residential streets and larger streets with wider lanes, are currently sufficient for bicycle usage. But in order to establish a functional, efficient, and usable on-street bikeway system with access to most/all destinations, some city streets should receive bikeway treatments. This would create a useful network of key bicycle streets, bicycle routes, and bike lanes accessible to residents and connecting to most activity centers. This approach is not necessarily cost-prohibitive. (Potential costs will be addressed in the plan chapter.)

An on-street bikeway system is intended for a variety of residents including those who use bicycles for commuting or for short-distance utilitarian trips (to the store, library, etc.); and for recreational or workout riders who like the convenience of getting on their

bikes at the house and using the street system for a ride. It will also help to make streets safer for school children who already use them, and for additional children who would use them when they are built.

There are other important reasons to consider the development of a comprehensive on-street bikeway system. They include:

- The need to create additional transportation mode options to help shift some local trips away from automobile use.
- As a public health intervention strategy.
- The opportunity to create a more livable – and marketable – community that will help to attract younger professionals who increasingly consider the ready availability of health-related amenities in their location decisions.
- A means of interconnection with trails.

Improvements to establish an on-street bikeway system would require at least some level of treatment for a large portion of the city's existing streets. However in many locations it could involve improvements as basic as the placement of some signage, and at other locations it would require more intensive investment to establish bicycle routes and perhaps bicycle lanes. Elsewhere, cut-throughs at key cul-de-sacs might be appropriate in order to provide route continuity or a significantly more direct route, and to help eliminate motor vehicle trips to local destinations.

Pedestrian Facility Needs. In most communities, pedestrian facility needs are defined by the degree of completeness of the sidewalk system, rather than by local assessment of walking activity or other indicators. For this study, a windshield assessment of existing sidewalk facilities in the four-city area was undertaken. It was found that the cities have well-developed sidewalk systems with only some gaps that need to be filled both within residential areas as well as on collectors and arterials. However, there is also a need for the development of continued sidewalk repair and replacement programs.

Conclusion

This analysis examined existing conditions within the cities of Brentwood, Clayton, Maplewood, and Richmond Heights as they relate to the development of walkable and bikeable communities. It found that pedestrian facilities at the local level are essentially well-developed with the need for minor improvements, improved connections between cul-de-sacs and at transitions with commercial-retail areas.

The analysis has also shown the need for a substantial and coordinated bikeway improvement program to meet evolving and increasingly sophisticated recreational and transportation needs. For example, it is probable that residents will increasingly seek non-motorized transportation options for short-distance trips - a trend which is already occurring elsewhere as fuel price volatility continues and awareness of the need for local strategies to address climate change become more pronounced. The need relates to on-street facilities, additional multipurpose trails, interconnections between neighborhoods, institutions and commercial-retail areas, and a variety of supportive bikeway enhancements including parking facilities and lockers. The next chapter will present a specific bikeable-walkable communities plan including implementation elements to address these needs.

CHAPTER THREE: THE BIKEABLE-WALKABLE COMMUNITIES PLAN

This chapter presents the plan for the establishment of an improved system of bicycle and pedestrian facilities in Brentwood, Clayton, Maplewood, and Richmond Heights, Missouri. The plan is based on the information and analysis conducted in the previous chapter. It also reflects comments and input received from citizens at several public forums. Additional field reconnaissance over and above that which was undertaken during the existing conditions analysis, was conducted to examine and identify street segments in the system.

The purpose of this plan is to enhance the transportation, recreation and fitness infrastructure in Brentwood, Clayton, Maplewood, and Richmond Heights. The plan presents goals and objectives, delineates bicycle and pedestrian facility components, and concludes with a detailed implementation strategy.

GOALS & OBJECTIVES

1. Develop Bike/Pedestrianways as a Functional Element in Brentwood, Clayton, Maplewood, and Richmond Heights's Transportation and Recreation System

- **1.A** Establish a Bicycle/Pedestrian Facilities Committee (BPFC) or comparable group within each city comprised of department-level appointments, to oversee development and facilitate the ongoing operation of the system.
- **1.B** Hold regular meetings of the BPFC to develop and manage the system.
- **1.C** Develop annual budget levels that are appropriate to each city's needs as well as an implementation timetable.
- **1.D** Selectively modify *existing* city streets when financially feasible, to include bicycle accommodations that are appropriate to traffic conditions; and add sidewalks and non-motorized connectors between cul-de-sacs and other barriers as appropriate.

1.E Ensure that *new* local, collector, and arterial roads are not only adequate for motor vehicles but also include provisions for bicycle and pedestrian movement.

1.F Utilize, to the extent feasible, active and inactive rail corridors, utility/drainage corridors, and public lands for the development of multipurpose trails to help interconnect the system.

1.G Strive to ensure that the network of linear trails and on-street bikeways is sufficient to enable bicycle and pedestrian movement between most residential, institutional and commercial/retail land uses.

1.H Adhere to appropriate federal and state design guidelines and standards for the design of bicycle/pedestrian facilities.

1.I Coordinate development activity jointly, in order to maximize the partnering benefits available through the Transportation Enhancements Program and other funding sources.

2. Establish Programs to Effectively and Safely Use the Bike-Ped System

2.A Establish a Bike/Ped Program Task Force (BPPTF) within each city, made up of representatives from the Police Department, local schools, businesses and the community at large, to oversee development of programs promoting effective usage of the system. Solicit involvement from the General Motors Plant and other large employers in particular.

2.B Meet regularly to oversee the implementation of all programmatic aspects of the Bikeable-Walkable Community Plan.

2.C Support the Police Department in the enforcement of all applicable state laws regarding bicycle operation and road sharing, and in the development of additional local ordinances as appropriate.

2.D Educate cyclists on the safe usage of roads and trails.

2.E Educate both bicyclists and motorists on road-sharing techniques.

2.F Encourage bicycle usage and walking for transportation, recreation, health, and fitness purposes.

2.G Educate and encourage pedestrians regarding safe, healthy and effective walking habits.

2.H Coordinate activities among the four cities in order to achieve more efficient use of resources for programs and publications.

BICYCLE/PEDESTRIAN FACILITY COMPONENTS

Introduction

The physical elements of the Brentwood, Clayton, Maplewood, and Richmond Heights Bikeable-Walkable Community Plan are identified in this section. The principle components – trails and on-street facilities - are shown on the attached map (Illustration 36), with detailed elements as described below.

Trails

Notwithstanding the fact that these cities are highly developed inner-ring communities, several greenway and trail opportunities exist and should be developed, as identified on the following page. Major opportunities are present along stream corridors, and have already been identified as facilities in The Great Rivers Greenway District's (GRG's) master plan. Shorter additional trail opportunities are also shown.

The development of greenways and trails along these corridors reflects an increasing awareness of strong potential interrelationships between land uses such as storm water and drainage facilities, non-motorized transportation infrastructure, and natural areas that help to modulate the effects of climate change.

With connectivity to the existing Deer Creek Greenway and the proposed River Des Peres and Centennial Greenways planned by GRG in association with partner cities, the proposed trail/greenway system within Brentwood, Clayton, Maplewood, and Richmond Heights could also evolve into a significant bicycle tourism asset. The system would also help to sustain higher property values, an outcome that is being recorded elsewhere in the country where longer trail systems exist. The trail/greenways are in the table on the following page (Illustration 37).

Illustration 37: Planned Trails

Type	Street/Label	Length (ft)	Length (mi)	Limit To	Limit From
Brentwood					
Trail	Lee Wynn-Eulalie Connector	68.68	0.01	Lee Wynn Trail	Eulalie
Trail	Litzsinger Connector Trail	764.31	0.14	Litzsinger	Sidewalk
Trail	Litzsinger-Rogers Parkway Connector	24.12	0.00	Rogers Parkway	Litzsinger
Trail	Oak Tree-GRG Connector	192.89	0.04	Oak Tree Park Trail	GRG Planned Route
Trail	White Connector	122.75	0.02	White	White
Trail OR Bike Lane	Planned Street	847.76	0.16	Eager	Rose
6	**Brentwood Totals:**	**2,020.50**	**0.38**		
Clayton					
Trail	Gay-Metro Connector	491.85	0.09	Planned Railway Corridor	Gay
Trail	Kingsbury Connector	58.75	0.01	Kingsbury	Kingsbury
Trail	N Polo-Central Connector	376.79	0.07	Central	North Polo
Trail	Oak Knoll Connector	212.20	0.04	Oak Knoll Park	Clayton
Trail	Shaw Park Trail System	2,775.82	0.53	Shaw Park	Shaw Park
5	**Clayton Totals:**	**3,915.41**	**0.74**		
Maplewood					
Trail	Cherry-Elm Connector	746.94	0.14	Elm	Cherry
Trail	Jaguar-Deer Creek Greenway Connector	63.18	0.01	Deer Creek Greenway (GRG)	Jaguar
Trail	Kellogg Park Trail	1,283.50	0.24	Kellogg Park	Westpoint
Trail	Lindbergh Park Trail	1,759.81	0.33	Lindbergh Park/City Limit	Lindbergh
Trail	Sunnen Connector	514.33	0.10	Sunnen	Laclede Station
5	**Maplewood Totals:**	**4,367.76**	**0.83**		
Richmond Heights					
Trail	Eager-Everett Connector	393.12	0.07	Everett	Eager
Trail	The Heights Connector	686.93	0.13	The Heights	Dale
2	**Richmond Heights Totals:**	**1,080.05**	**0.20**		
18	**Four-Community Totals:**	**11,383.71**	**2.16**		

On-Street Bikeways

The on-street bikeway system for Brentwood, Clayton, Maplewood, and Richmond Heights will consist primarily of treatments and accommodations intended to make conditions safer for bicycle travel and to facilitate connectivity to destinations including city parks, commercial areas, and elsewhere. The primary intended users of this system are experienced and casual adult cyclists, and teenage riders who could most appropriately use an on-street bikeway system and who are comfortable sharing the road with motor vehicles. The arterials and collectors within this system are not intended for child riders who, under the supervision of their parents, should use other elements of the system including trails, sidewalks (in accordance with AASHTO bikeway guidance), and low volume residential streets.

An on-street system of bikeways should be developed to provide alternative transportation facilities providing interconnections to activity generators and to the planned trail system. The system would also help to reduce or completely eliminate the need for fuel-consuming vehicular trips to trails. For each selected street segment shown in the following tables, a recommendation is made regarding whether to use a formal bikeway treatment or an accommodation treatment, using the typology identified (Illustration 38).

This information can be used as a guide during the design-engineering process to develop the system. It is essentially consistent with the bicycle facility policy material and typical sections in the Missouri Department of Transportation's MoDOT Project Development Policy Manual. (Refer to Appendix C). The typology is also based on information provided by the Pedestrian and Bicycle Information Center (PBIC).[1] Selected speed-volume matrices and charts from the PBIC which form the basis of the typology have been included in Appendix D. Considerable portions of the MoDOT and PBIC material also reflect guidelines found in the Guide for the Development of Bicycle Facilities, published by the American Association of State Highway and Transportation Officials (AASHTO). They are also supported by bikeway signage standards defined in the Manual on Uniform Traffic Control Devices (MUTCD). This material comprises a substantial and growing body of information establishing acceptable on-street bikeway

[1]King, Michael. *Bicycle facility selection: A comparison of approaches*. Pedestrian and Bicycle Information Center, highway Safety Research Center, and University of North Carolina - Chapel Hill, 2002.

design practices. (Note: The level of documentation provided in the appendices is considered appropriate for a conceptual planning level of analysis. The actual source material must be consulted for specific and detailed guidance during the design/ engineering phase of work.)

Illustration 38: On-Street Treatment Typology

Treatment Type	Applicability	Design Treatment[1]
Accommodation on Shared Roadway.  	For busier roads with physical limitations that do not allow for widening in conformance with an official bicycle facility (such as a signed bike route or bike lane). Accommodation roadways use warning signage only and are intended for use by experienced bicyclists who are comfortable traveling on roadways.	Urban Section (i.e. with curbs): Wide outside lanes – 14' recommended, not including gutter pan. (A 13' wide outside lane would provide some level of accommodation when the preferred widths are not available.) 15' is preferred where extra space is required for maneuvering such as on steep grades or at railroad crossings, which are not perpendicular to the direction of travel. Widening can often be accomplished through lane re-striping, and by reducing the width of the inside lane or left turn lane. Rural Section: (i.e. no curbs) A paved shoulder of any width up to 4' is better than none at all; however, it cannot be signed as a bicycle facility. A width greater than 4' is preferred, excluding gutter pans and rumble strips. 5' is recommended from obstructions such as guardrails, signs, etc. Additional width is also recommended for higher bicycle traffic, motor vehicle speeds above 45 mph, and for higher truck/bus traffic. Warning Signage: "Share the Road with Bicycles" signs every 1/4-mile.

[2]Consult MoDOT Policy document, PBIC, AASHTO Guide, and MUTCD for specific design guidance and standards.

Illustration 38: On-Street Treatment Typology

Treatment Type	Applicability	Design Treatment[3]
Bicycle Lane (Class II Bikeway)  R3-17 	For busier roads with higher speeds and traffic volumes, including collectors and arterials with an urban or rural section. (Where roads may not be of sufficient width to enable the installation of bicycle lanes, consider reductions in vehicle speeds and/or traffic volumes to accommodate bicycles as per Type a treatment.) "Busier road" is defined as either a road with permitted speeds of up to 35 mph and volumes of 10,000 + vehicles per day, or permitted speeds of 40 mph+ and volumes of 1200+ vehicles per day.	Urban Section (i.e. with curbs): Min. 5' shoulders with 5' striped bicycle lanes (5', 12', 12', 5'). Widen shoulder on busier roads to provide more separation between motor vehicle lane and bike lane. 4-lane Rural Section: Min. 8'+ shoulders with 5' striped bicycle lanes (5', 3', 12', 12', 12', 12', 3', 5'). Widen shoulder to provide more separation between motor vehicle lane and bike lane. 2-lane Urban Section: Min. 5' striped bike lane, excluding gutter pan. With curb parking, add 5' bike lane between parking and motor vehicle lane. (Min. 13' between curb and motor vehicle lane, including gutter pan.) 4-lane Urban Section. Min. 5' striped bike lane, excluding gutter pan. With curb parking, add 5' for bike lane between parking and motor vehicle lane. (Min. 13' between curb lane and motor vehicle lane, including gutter pan.)
Bicycle Route - Signed Shared Roadway (Class III Bikeway)  	Bicycle routes should be so-marked if they are continuous and meet standards identified in the AASHTO publication, "Guide for the Development of Bicycle Facilities," and if they are at least one mile long. Shorter bike routes may be marked if they connect with other bike routes.	14' outside lanes, "Bicycle Route" and "Share the Road with Bicycles" signs.

[3]Consult MoDOT Policy document, PBIC, AASHTO Guide, and MUTCD for specific design guidance and standards.

The full listing of Brentwood, Clayton, Maplewood, and Richmond Heights street segments and recommended treatments keyed to this typology is provided below (Illustration 39-1 - 39-4). This listing includes state/country-maintained roads. The cities of Brentwood, Clayton, Maplewood, and Richmond Heights should promote and encourage bicycle accommodations on these facilities.

Illustration 39-1: Recommended Bikeway Treatments - Brentwood

Type	Street Name/Label	Length (ft)	Length (mi)	Limit To	Limit From
Brentwood					
Accommodation	Best Buy Driveway	1,334.04	0.25	Hanley	Eager
Accommodation	Brentwood	8,998.50	1.70	City Limit	City Limit
Accommodation	Brentwood Promenade	1,341.39	0.25	Hanley Industrial	Eager
Accommodation	Dierberg's Driveway	1,163.49	0.22	Hanley Industrial	Eager
Accommodation	Eager	4,820.50	0.91	Hanley	Brentwood
Accommodation	Eager	593.08	0.11	Brentwood	City Limit
Accommodation	Eulalie	3,034.60	0.57	Litzinger/Brentwood	Rosalie
Accommodation	Hanley	2,424.80	0.46	Bruno	City Limit
Accommodation	Hanley Industrial	1,920.12	0.36	Urban	Dierberg's Driveway
Accommodation	Kenilworth	1,691.93	0.32	Wrenwood	Eager
Accommodation	Litzsinger	4,020.81	0.76	Brentwood	McKnight
Accommodation	Litzsinger	866.63	0.16	Rosalie	Hanley
Accommodation	Manchester	6,487.00	1.23	City Limit	City Limit
Accommodation	McKnight	4,180.61	0.79	City Limit	Litzsinger
Accommodation	Rosalie	456.00	0.09	Eulalie	Litzsinger
Accommodation	Rose	1,376.63	0.26	Kenilworth	dead end
16	**Accommodation Totals:**	**44,710.13**	**8.47**		
Bike Route	High School	6,681.22	1.27	Manchester	Eager
Bike Route	Litzsinger	1,182.81	0.22	Sidewalk	Rogers Parkway
Bike Route	Strassner	2,546.34	0.48	City Limit	Urban
Bike Route	Swallow	211.58	0.04	Eager	Wrenwood
Bike Route	Urban	1,506.81	0.29	Strassner	Brentwood
Bike Route	White	4,062.15	0.77	McKnight	Brentwood
Bike Route	White	1,350.70	0.26	White Connector	Lee Wynn Trail
Bike Route	White	1,042.95	0.20	Brentwood	White Connector
Bike Route	Wrenwood	2,984.00	0.57	Swallow	Brentwood
9	**Bike Route Totals:**	**21,568.56**	**4.08**		
Trail OR Bike Lane	Planned Street	847.76	0.16	Eager	Rose
1	**Trail OR Bike Lane Totals:**	**847.76**	**0.16**		
26	**Total On-Street Treatments:**	**67,126.44**	**12.71**		

Illustration 39-2: Recommended Bikeway Treatments - Clayton

Type	Street Name/Label	Length (ft)	Length (mi)	Limit To	Limit From
Clayton					
Accommodation	Big Bend	4,675.94	0.89	City Limit	Clayton
Accommodation	Brentwood	3,036.03	0.58	Clayton	Shaw Park Dr
Accommodation	Brentwood	3,288.71	0.62	Bonhomme	City Limit
Accommodation	Clayton	14,044.79	2.66	City Limit	City Limit
Accommodation	Forsyth	4,323.10	0.82	Carondolet	City Limit
Accommodation	Hanley	5,545.95	1.05	Ckayton	City Limit
Accommodation	Maryland	5,710.75	1.08	City Limit	Gay
Accommodation	Parkside	635.55	0.12	Forsyth	Topton
8	**Accommodation Totals:**	**41,260.81**	**7.81**		
Bike Route	Archives	456.88	0.09	Seminary	Seminary
Bike Route	Ashbury	1,783.86	0.34	Forsyth	Wydown
Bike Route	Audubon	1,839.07	0.35	Hillvale	Waydown
Bike Route	Central	2,483.84	0.47	Clayton	N Polo-Central Connector
Bike Route	Central	1,453.87	0.28	Davis	Clayton
Bike Route	Corporate Park	1,311.92	0.25	Brentwood	Shaw Park Rd
Bike Route	Crestwood	666.14	0.13	Clayton	Hillvale
Bike Route	Dartford	1,133.54	0.21	Wydown	Seminary
Bike Route	Davis	2,741.69	0.52	Hanley	Brentwood
Bike Route	DeMun	3,618.31	0.69	Wydown	Clayton
Bike Route	Ellenwood	1,969.99	0.37	Wash U	Wydown
Bike Route	Gay	2,092.20	0.40	Shaw Park	City Limit
Bike Route	Hillvale	2,621.32	0.50	Audubon	Wydown
Bike Route	Kingsbury	2,534.19	0.48	Topton	City Limit
Bike Route	Mark Twain	801.17	0.15	Topton	Topton
Bike Route	Middle Polo	688.78	0.13	Polo	Polo
Bike Route	N. Rosebury	660.39	0.13	DeMun	City Limit
Bike Route	North Polo	364.09	0.07	N Polo-Central Connector	Polo
Bike Route	Orlando	750.02	0.14	Meramec	Brentwood
Bike Route	Oxford	1,865.07	0.35	Westwood	Crestwood-Oxford Connector
Bike Route	Polo	3,614.52	0.68	Hanley	Shirley/North Polo
Bike Route	Private	1,702.77	0.32	Gay	City Limit
Bike Route	S .Rosebury	668.03	0.13	DeMun	City Limit
Bike Route	Seminary	1,284.31	0.24	Archives	Clayton
Bike Route	Seminary	1,000.20	0.19	Dartford	Archives
Bike Route	Shaw Park Rd	240.81	0.05	Corporate Park	Shaw Park Trail System
Bike Route	Shirley	734.20	0.14	Hanley	Polo
Bike Route	Topton	2,725.37	0.52	Kingsbury	Parkside
Bike Route	Wellington	1,919.01	0.36	Audubon	Westwood
Bike Route	Westwood	2,008.90	0.38	Clayton	Wydown
30	**Bike Route Totals:**	**47,734.47**	**9.04**		
38	**On-Street Treatment Totals:**	**88,995.28**	**16.86**		

Illustration 39-3: Recommended Bikeway Treatments - Maplewood

Type	Street Name/Label	Length (ft)	Length (mi)	Limit To	Limit From
Maplewood					
Accommodation	Bartold	135.94	0.03	Jaguar	Hanley
Accommodation	Big Bend	7,971.47	1.51	City Limit	City Limit
Accommodation	Hanley	6,248.15	1.18	Laclede Station	City Limit
Accommodation	Jaguar	1,007.71	0.19	dead end	Bartold
Accommodation	Laclede Station	1,032.69	0.20	City Limit	Metrolink
Accommodation	Manchester	4,217.13	0.80	City Limit	Sutton
Accommodation	Manchester	1,275.30	0.24	Manchester	City Limit
7	**Accommodation Totals:**	**21,888.40**	**4.15**		
Bike Route	Bellevue	3,162.06	0.60	Southwest	City Limit
Bike Route	Canterbury	307.33	0.06	Greenwood	City Limit
Bike Route	Circle	149.39	0.03	Westpoint	Laclede Station
Bike Route	Greenwood	2,119.72	0.40	Existing Bike Route	Canterbury
Bike Route	James	956.62	0.18	Big Bend	Sutton
Bike Route	Laclede Station	5,348.02	1.01	Metrolink	City Limit
Bike Route	Laclede Station	627.82	0.12	City Limit	Metrolink
Bike Route	Lindbergh	875.84	0.17	Lindbergh Park Trail	City Limit
Bike Route	Manhattan	154.61	0.03	St. Elmo	City Limit
Bike Route	St. Elmo	1,308.51	0.25	Greenwood	Manhattan
Bike Route	Sunnen	1,961.68	0.37	Laclede Station	Big Bend
Bike Route	Westpoint	175.11	0.03	Kellogg Park Trail	Circle
Bike Route	Yale	2,533.29	0.48	Machester	City Limit
13	**Bike Route Totals:**	**19,679.98**	**3.73**		
20	**On-Street Treatment Totals:**	**41,568.38**	**7.87**		

Illustration 39-4: Recommended Bikeway Treatments - Richmond Heights & Four-Community Totals

Type	Street Name/Label	Length (ft)	Length (mi)	Limit To	Limit From
Richmond Heights					
Accommodation	Big Bend	4,434.40	0.84	City Limit	City Limit
Accommodation	Boland	3,140.91	0.59	Dale	City Limit
Accommodation	Brentwood	3,235.04	0.61	City Limit	City Limit
Accommodation	Clayton	1,856.10	0.35	City Limit	McKnight
Accommodation	Dale	7,358.78	1.39	City Limit	City Limit
Accommodation	Eager	2,501.80	0.47	Swallow	City Limit
Accommodation	Galleria	1,024.91	0.19	Galleria Mall	McMorrow
Accommodation	Hanley	4,304.96	0.82	City Limit	City Limit
Accommodation	McCutcheson	3,737.97	0.71	City Limit	Eager
Accommodation	McKnight	3,952.19	0.75	City Limit	City Limit
10	**Accommodation Totals:**	**35,547.06**	**6.73**		
Bike Route	Antler	450.84	0.09	McMorrow	Linden
Bike Route	Bellevue	4,488.69	0.85	City Limit	City Limit
Bike Route	Bruno	3,852.26	0.73	Strassner	Big Bend
Bike Route	Claytonia	3,901.45	0.74	Lindbergh	City Limit
Bike Route	Everett	1,298.63	0.25	Linden	Eager-Everett Connector
Bike Route	Laclede Station	3,863.93	0.73	City Limit	Wise
Bike Route	Lindbergh	1,904.72	0.36	Bruno	Big Bend
Bike Route	Lindbergh	1,393.91	0.26	Big Bend	Dale
Bike Route	Linden	2,941.33	0.56	Everett	Clayton/Central
Bike Route	McMorrow	1,182.49	0.22	Galleria	Antler
Bike Route	Wise	5,836.15	1.11	City Limit	Laclede Station
Bike Route	Yale	1,946.49	0.37	City Limit	Dale
12	**Bike Route Totals:**	**33,060.88**	**6.26**		
22	**On-Street Treatment Totals:**	**68,607.94**	**12.99**		
Four Community Totals					
41	**Accommodation Totals:**	**143,406.40**	**27.16**		
64	**Bike Route Totals:**	**122,043.89**	**23.11**		
1	**Trail OR Bike Lane Totals:**	**847.76**	**0.16**		
106	**On-Street Treatment Totals:**	**266,298.04**	**50.44**		

IMPLEMENTATION STRATEGY

Pre-Engineering Opinion of Cost

This section provides a preliminary opinion of cost to develop the bicycle facility system identified in the previous section. This is essentially a rough-order-of-magnitude (ROM) estimate using the segment data shown in the preceding illustrations. It is based on actual development costs of other bikeway projects in the St. Louis region. The level of estimation is considered to be appropriate for a planning study, which cannot reflect the more precise estimates that would be developed during the subsequent design/ engineering phase of work. Moreover, it cannot account for future conditions in the construction market, which will be a factor in determining actual price outcomes during the bid phase of work. (Refer to Illustration 40 below and Illustration 41 on the following pages.)

Illustration 40: Rough-Order-Of-Magnitude

Facility Type	Number of Facilities	Length (ft)	Length (mi)	Cost (retro)	Cost (new)
Brentwood	**31**	**68299.18**	**12.94**	**36275.15**	**$114,419.48**
Accommodation	16	44710.13	8.47	19225.35	$0.00
Bike Route	9	21568.56	4.08	14235.25	$0.00
Trail	5	1172.74	0.22	0.00	$58,637.19
Trail OR Bike Lane	1	847.76	0.16	2814.55	$55,782.29
Clayton	**43**	**92910.69**	**17.60**	**49246.90**	**$195,770.40**
Accommodation	8	41260.81	7.81	17742.15	$0.00
Bike Route	30	47734.47	9.04	31504.75	$0.00
Trail	5	3915.41	0.74	0.00	$195,770.40
Maplewood	**25**	**45936.14**	**8.70**	**22400.80**	**$218,387.90**
Accommodation	7	21888.40	4.15	9412.01	$0.00
Bike Route	13	19679.98	3.73	12988.79	$0.00
Trail	5	4367.76	0.83	0.00	$218,387.90
Richmond Heights	**24**	**69687.99**	**13.20**	**37105.42**	**$54,002.45**
Accommodation	10	35547.06	6.73	15285.24	$0.00
Bike Route	12	33060.88	6.26	21820.18	$0.00
Trail	2	1080.05	0.20	0.00	$54,002.45
Four Community Total	**123**	**276834.00**	**52.43**	**145028.27**	**$582,580.24**
Accommodation	41	143406.40	27.16	61664.75	$0.00
Bike Route	64	122043.89	23.11	80548.97	$0.00
Trail	17	10535.96	2.00	0.00	$526,797.95
Trail OR Bike Lane	1	847.76	0.16	2814.55	$55,782.29

Table 41-.1: Preliminary Cost Details - Brentwood

Type	Street Name/Label	Length (ft)	Length (mi)	Limit To	Limit From	Cost (retro)	Cost (new)
Brentwood							
Accommodation	Best Buy Driveway	1,334.04	0.25	Hanley	Eager	$573.64	$0.00
Accommodation	Brentwood	8,998.50	1.70	City Limit	City Limit	$3,869.36	$0.00
Accommodation	Brentwood Promenade	1,341.39	0.25	Hanley Industrial	Eager	$576.80	$0.00
Accommodation	Dierberg's Driveway	1,163.49	0.22	Hanley Industrial	Eager	$500.30	$0.00
Accommodation	Eager	4,820.50	0.91	Hanley	Brentwood	$2,072.82	$0.00
Accommodation	Eager	593.08	0.11	Brentwood	City Limit	$255.02	$0.00
Accommodation	Eulalie	3,034.60	0.57	Litzinger/Brentwood	Rosalie	$1,304.88	$0.00
Accommodation	Hanley	2,424.80	0.46	Bruno	City Limit	$1,042.66	$0.00
Accommodation	Hanley Industrial	1,920.12	0.36	Urban	Dierberg's Driveway	$825.65	$0.00
Accommodation	Kenilworth	1,691.93	0.32	Wrenwood	Eager	$727.53	$0.00
Accommodation	Litzsinger	4,020.81	0.76	Brentwood	McKnight	$1,728.95	$0.00
Accommodation	Litzsinger	866.63	0.16	Rosalie	Hanley	$372.65	$0.00
Accommodation	Manchester	6,487.00	1.23	City Limit	City Limit	$2,789.41	$0.00
Accommodation	McKnight	4,180.61	0.79	City Limit	Litzsinger	$1,797.66	$0.00
Accommodation	Rosalie	456.00	0.09	Eulalie	Litzsinger	$196.08	$0.00
Accommodation	Rose	1,376.63	0.26	Kenilworth	dead end	$591.95	$0.00
16	**Accommodation Total:**	**44,710.13**	**8.47**			**$19,225.35**	**$0.00**
Bike Route	High School	6,681.22	1.27	Manchester	Eager	$4,409.60	$0.00
Bike Route	Litzsinger	1,182.81	0.22	Sidewalk	Rogers Parkway	$780.66	$0.00
Bike Route	Strassner	2,546.34	0.48	City Limit	Urban	$1,680.59	$0.00
Bike Route	Swallow	211.58	0.04	Eager	Wrenwood	$139.64	$0.00
Bike Route	Urban	1,506.81	0.29	Strassner	Brentwood	$994.49	$0.00
Bike Route	White	4,062.15	0.77	McKnight	Brentwood	$2,681.02	$0.00
Bike Route	White	1,350.70	0.26	White Connector	Lee Wynn Trail	$891.46	$0.00
Bike Route	White	1,042.95	0.20	Brentwood	White Connector	$688.35	$0.00
Bike Route	Wrenwood	2,984.00	0.57	Swallow	Brentwood	$1,969.44	$0.00
9	**Bike Route Total:**	**21,568.56**	**4.08**			**$14,235.25**	**$0.00**
Trail	Lee Wynn-Eulalie Connector	68.68	0.01	Lee Wynn Trail	Eulalie	$0.00	$3,433.85
Trail	Litzsinger Connector Trail	764.31	0.14	Litzsinger	Sidewalk	$0.00	$38,215.36
Trail	Litzsinger-Rogers Parkway Connector	24.12	0.00	Rogers Parkway	Litzsinger	$0.00	$1,205.90
Trail	Oak Tree-GRG Connector	192.89	0.04	Oak Tree Park Trail	GRG Planned Route	$0.00	$9,644.64
Trail	White Connector	122.75	0.02	White	White	$0.00	$6,137.45
5	**Trail Total:**	**1,172.74**	**0.22**			**$0.00**	**$58,637.19**
Trail OR Bike Lane	Planned Street	847.76	0.16	Eager	Rose	$2,814.55	$55,782.29
1	**Trail OR Bike Lane Total:**	**847.76**	**0.16**			**$2,814.55**	**$55,782.29**
31	**Brentwood Totals:**	**68,299.18**	**12.94**			**$36,275.15**	**$114,419.48**

Table 41-2: Preliminary Cost Details - Clayton

Type	Street Name/Label	Length (ft)	Length (mi)	Limit To	Limit From	Cost (retro)	Cost (new)
Clayton							
Accommodation	Big Bend	4,675.94	0.89	City Limit	Clayton	$2,010.65	$0.00
Accommodation	Brentwood	3,036.03	0.58	Clayton	Shaw Park Dr	$1,305.49	$0.00
Accommodation	Brentwood	3,288.71	0.62	Bonhomme	City Limit	$1,414.15	$0.00
Accommodation	Clayton	14,044.79	2.66	City Limit	City Limit	$6,039.26	$0.00
Accommodation	Forsyth	4,323.10	0.82	Carondolet	City Limit	$1,858.93	$0.00
Accommodation	Hanley	5,545.95	1.05	Ckayton	City Limit	$2,384.76	$0.00
Accommodation	Maryland	5,710.75	1.08	City Limit	Gay	$2,455.62	$0.00
Accommodation	Parkside	635.55	0.12	Forsyth	Topton	$273.28	$0.00
8	**Accommodation Total:**	**41,260.81**	**7.81**			**$17,742.15**	**$0.00**
Bike Route	Archives	456.88	0.09	Seminary	Seminary	$301.54	$0.00
Bike Route	Ashbury	1,783.86	0.34	Forsyth	Wydown	$1,177.35	$0.00
Bike Route	Audubon	1,839.07	0.35	Hillvale	Waydown	$1,213.79	$0.00
Bike Route	Central	2,483.84	0.47	Clayton	N Polo-Central Connector	$1,639.34	$0.00
Bike Route	Central	1,453.87	0.28	Davis	Clayton	$959.55	$0.00
Bike Route	Corporate Park	1,311.92	0.25	Brentwood	Shaw Park Rd	$865.87	$0.00
Bike Route	Crestwood	666.14	0.13	Clayton	Hillvale	$439.65	$0.00
Bike Route	Dartford	1,133.54	0.21	Wydown	Seminary	$748.14	$0.00
Bike Route	Davis	2,741.69	0.52	Hanley	Brentwood	$1,809.51	$0.00
Bike Route	DeMun	3,618.31	0.69	Wydown	Clayton	$2,388.08	$0.00
Bike Route	Ellenwood	1,969.99	0.37	Wash U	Wydown	$1,300.19	$0.00
Bike Route	Gay	2,092.20	0.40	Shaw Park	City Limit	$1,380.85	$0.00
Bike Route	Hillvale	2,621.32	0.50	Audubon	Wydown	$1,730.07	$0.00
Bike Route	Kingsbury	2,534.19	0.48	Topton	City Limit	$1,672.57	$0.00
Bike Route	Mark Twain	801.17	0.15	Topton	Topton	$528.78	$0.00
Bike Route	Middle Polo	688.78	0.13	Polo	Polo	$454.59	$0.00
Bike Route	N. Rosebury	660.39	0.13	DeMun	City Limit	$435.86	$0.00
Bike Route	North Polo	364.09	0.07	N Polo-Central Connector	Polo	$240.30	$0.00
Bike Route	Orlando	750.02	0.14	Meramec	Brentwood	$495.01	$0.00
Bike Route	Oxford	1,865.07	0.35	Westwood	Crestwood-Oxford Connector	$1,230.95	$0.00
Bike Route	Polo	3,614.52	0.68	Hanley	Shirley/North Polo	$2,385.58	$0.00
Bike Route	Private	1,702.77	0.32	Gay	City Limit	$1,123.83	$0.00
Bike Route	S .Rosebury	668.03	0.13	DeMun	City Limit	$440.90	$0.00
Bike Route	Seminary	1,284.31	0.24	Archives	Clayton	$847.65	$0.00
Bike Route	Seminary	1,000.20	0.19	Dartford	Archives	$660.13	$0.00
Bike Route	Shaw Park Rd	240.81	0.05	Corporate Park	Shaw Park Trail System	$158.93	$0.00
Bike Route	Shirley	734.20	0.14	Hanley	Polo	$484.57	$0.00
Bike Route	Topton	2,725.37	0.52	Kingsbury	Parkside	$1,798.74	$0.00
Bike Route	Wellington	1,919.01	0.36	Audubon	Westwood	$1,266.55	$0.00
Bike Route	Westwood	2,008.90	0.38	Clayton	Wydown	$1,325.88	$0.00
30	**Bike Route Total:**	**47,734.47**	**9.04**			**$31,504.75**	**$0.00**

Table 41-2: Preliminary Cost Details - Clayton, Continued

Type	Street Name/Label	Length (ft)	Length (mi)	Limit To	Limit From	Cost (retro)	Cost (new)
Trail	Gay-Metro Connector	491.85	0.09	Planned Railway Corridor	Gay	$0.00	$24,592.50
Trail	Kingsbury Connector	58.75	0.01	Kingsbury	Kingsbury	$0.00	$2,937.34
Trail	N Polo-Central Connector	376.79	0.07	Central	North Polo	$0.00	$18,839.70
Trail	Oak Knoll Connector	212.20	0.04	Oak Knoll Park	Clayton	$0.00	$10,610.05
Trail	Shaw Park Trail System	2,775.82	0.53	Shaw Park	Shaw Park	$0.00	$138,790.81
5	**Trail Total:**	**3,915.41**	**0.74**			**$0.00**	**$195,770.40**
43	**Clayton Totals:**	**92,910.69**	**17.60**			**$49,246.90**	**$195,770.40**

Table 41-3: Preliminary Cost Details - Maplewood

Type	Street Name/Label	Length (ft)	Length (mi)	Limit To	Limit From	Cost (retro)	Cost (new)
Accommodation	Bartold	135.94	0.03	Jaguar	Hanley	$58.46	$0.00
Accommodation	Big Bend	7,971.47	1.51	City Limit	City Limit	$3,427.73	$0.00
Accommodation	Hanley	6,248.15	1.18	Laclede Station	City Limit	$2,686.70	$0.00
Accommodation	Jaguar	1,007.71	0.19	dead end	Bartold	$433.32	$0.00
Accommodation	Laclede Station	1,032.69	0.20	City Limit	Metrolink	$444.06	$0.00
Accommodation	Manchester	4,217.13	0.80	City Limit	Sutton	$1,813.37	$0.00
Accommodation	Manchester	1,275.30	0.24	Manchester	City Limit	$548.38	$0.00
7	**Accommodation Total:**	**21,888.40**	**4.15**			**$9,412.01**	**$0.00**
Bike Route	Bellevue	3,162.06	0.60	Southwest	City Limit	$2,086.96	$0.00
Bike Route	Canterbury	307.33	0.06	Greenwood	City Limit	$202.83	$0.00
Bike Route	Circle	149.39	0.03	Westpoint	Laclede Station	$98.59	$0.00
Bike Route	Greenwood	2,119.72	0.40	Existing Bike Route	Canterbury	$1,399.02	$0.00
Bike Route	James	956.62	0.18	Big Bend	Sutton	$631.37	$0.00
Bike Route	Laclede Station	5,348.02	1.01	Metrolink	City Limit	$3,529.69	$0.00
Bike Route	Laclede Station	627.82	0.12	City Limit	Metrolink	$414.36	$0.00
Bike Route	Lindbergh	875.84	0.17	Lindbergh Park Trail	City Limit	$578.05	$0.00
Bike Route	Manhattan	154.61	0.03	St. Elmo	City Limit	$102.04	$0.00
Bike Route	St. Elmo	1,308.51	0.25	Greenwood	Manhattan	$863.61	$0.00
Bike Route	Sunnen	1,961.68	0.37	Laclede Station	Big Bend	$1,294.71	$0.00
Bike Route	Westpoint	175.11	0.03	Kellogg Park Trail	Circle	$115.57	$0.00
Bike Route	Yale	2,533.29	0.48	Machester	City Limit	$1,671.97	$0.00
13	**Bike Route Total:**	**19,679.98**	**3.73**			**$12,988.79**	**$0.00**
Trail	Cherry-Elm Connector	746.94	0.14	Elm	Cherry	$0.00	$37,347.08
Trail	Jaguar-Deer Creek Greenway Connector	63.18	0.01	Deer Creek Greenway (GRG)	Jaguar	$0.00	$3,159.19
Trail	Kellogg Park Trail	1,283.50	0.24	Kellogg Park	Westpoint	$0.00	$64,174.76
Trail	Lindbergh Park Trail	1,759.81	0.33	Lindbergh Park/City Limit	Lindbergh	$0.00	$87,990.38
Trail	Sunnen Connector	514.33	0.10	Sunnen	Laclede Station	$0.00	$25,716.50
5	**Trail Total**	**4,367.76**	**0.83**			**$0.00**	**$218,387.90**
25	**Maplewood Total:**	**45,936.14**	**8.70**			**$22,400.80**	**$218,387.90**

Table 41-4: Preliminary Cost Details - Richmond Heights

Type	Street Name/Label	Length (ft)	Length (mi)	Limit To	Limit From	Cost (retro)	Cost (new)
Accommodation	Big Bend	4,434.40	0.84	City Limit	City Limit	$1,906.79	$0.00
Accommodation	Boland	3,140.91	0.59	Dale	City Limit	$1,350.59	$0.00
Accommodation	Brentwood	3,235.04	0.61	City Limit	City Limit	$1,391.07	$0.00
Accommodation	Clayton	1,856.10	0.35	City Limit	McKnight	$798.12	$0.00
Accommodation	Dale	7,358.78	1.39	City Limit	City Limit	$3,164.27	$0.00
Accommodation	Eager	2,501.80	0.47	Swallow	City Limit	$1,075.77	$0.00
Accommodation	Galleria	1,024.91	0.19	Galleria Mall	McMorrow	$440.71	$0.00
Accommodation	Hanley	4,304.96	0.82	City Limit	City Limit	$1,851.13	$0.00
Accommodation	McCutcheson	3,737.97	0.71	City Limit	Eager	$1,607.33	$0.00
Accommodation	McKnight	3,952.19	0.75	City Limit	City Limit	$1,699.44	$0.00
10	**Accommodation Total**	**35,547.06**	**6.73**			**$15,285.24**	**$0.00**
Bike Route	Antler	450.84	0.09	McMorrow	Linden	$297.55	$0.00
Bike Route	Bellevue	4,488.69	0.85	City Limit	City Limit	$2,962.54	$0.00
Bike Route	Bruno	3,852.26	0.73	Strassner	Big Bend	$2,542.49	$0.00
Bike Route	Claytonia	3,901.45	0.74	Lindbergh	City Limit	$2,574.96	$0.00
Bike Route	Everett	1,298.63	0.25	Linden	Eager-Everett Connector	$857.10	$0.00
Bike Route	Laclede Station	3,863.93	0.73	City Limit	Wise	$2,550.19	$0.00
Bike Route	Lindbergh	1,904.72	0.36	Bruno	Big Bend	$1,257.12	$0.00
Bike Route	Lindbergh	1,393.91	0.26	Big Bend	Dale	$919.98	$0.00
Bike Route	Linden	2,941.33	0.56	Everett	Clayton/Central	$1,941.28	$0.00
Bike Route	McMorrow	1,182.49	0.22	Galleria	Antler	$780.44	$0.00
Bike Route	Wise	5,836.15	1.11	City Limit	Laclede Station	$3,851.86	$0.00
Bike Route	Yale	1,946.49	0.37	City Limit	Dale	$1,284.68	$0.00
12	**Bike Route Total**	**33,060.88**	**6.26**			**$21,820.18**	**$0.00**
Trail	Eager-Everett Connector	393.12	0.07	Everett	Eager	$0.00	$19,655.93
Trail	The Heights Connector	686.93	0.13	The Heights	Dale	$0.00	$34,346.52
2	**Trail Total:**	**1,080.05**	**0.20**			**$0.00**	**$54,002.45**
24	**Richmond Heights Totals:**	**69,687.99**	**13.20**			**$37,105.42**	**$54,002.45**

Funding Sources, Uses, and Project Phasing

The estimated costs to construct Brentwood, Clayton, Maplewood, and Richmond Heights's proposed bikeway system are achievable with an appropriate funding and phasing strategy. The following is a listing of potential funding sources to implement this plan, along with an assessment of the degree of competitiveness.

Safe, Accountable, Flexible, Efficient Transportation & Equity Act: A Legacy for Users (SAFETEA-LU). Ten percent of Missouri's Surface Transportation Program funds are required to be set-aside for applicants to develop infrastructure in 10 non-motorized and tourist-related categories such as trails and greenways. Approximately 80:20 match. The program is administered by Missouri Department of Transportation (MoDOT) in cooperation with East West Gateway Council of Governments (EWCOG). The annual deadline has been in February. Very competitive. (314 526-3578)

Surface Transportation Program (S.T.P.) The S.T.P. program is also administered by MoDOT through EWCOG on an annual basis, to fund local road and bridge projects. Bike facilities are an allowable expense. 80:20 match. Competitive. (314 421-4220)

Land & Water Conservation Fund (LWCF). Grants are available to city, counties and school districts for outdoor recreation facilities including trails. Projects have required a 55% match and require that the facilities remain for the purpose of public outdoor recreation in perpetuity. Funding levels vary depending on budget constraints. Typically, funding proposals are due in October and Missouri Department of Natural Resources-Division of State Parks administers the program. The funding is provided through US Department of Interior, National Park Service. (573 751-0848)

Recreational Trails Program. Grants are available for motorized and non-motorized trail development, renovation, trailheads and maintenance equipment. Projects require a 20% match and are also administered by the Missouri Department of Natural Resources-Division of State Parks. Funding provided by Federal Highway Administration. Proposals for this past round (2006) were due in June. Grant requests up to $100,000 are eligible and applicants can include city, counties, schools, private, non-profit and for-profit businesses. Approximately $1.3 million was available last grant round. (573) 751-0848)

Parks/Stormwater Tax. Since 1995, more than 90 Missouri communities and counties have passed legislation allowing a local Parks/Stormwater Sales Tax. The program permits the imposition of a sales tax of not more than 1/2% on retail sales within a jurisdiction. The tax must be approved by a simple majority of local voters, and proceeds managed from a local parks and storm water control sales tax fund. This program has been a strong source for local matching funds to leverage additional state and federal grant funding, extending the impact of trail development dollars even further. For more information on the provision, contact the Missouri Parks and Recreation Association (573/636-3828).

Municipal Park Grant. This program provides development funds for parks and trails to municipalities and is administered through the St. Louis County Municipal League. (314 726-4747.)

Safe Routes to School. Funding is available annually through the Department of Transportation targeting public and private schools, grades K-8. Infrastructure and behavioral projects are eligible and funding may cover up to 100% of project expenses. This includes public awareness campaigns, traffic education and enforcement, sidewalk improvements, and bicycle and pedestrian facilities within a two-mile radius of the school. For more information contact IDOT, MoDOT, or Trailnet (314 416-9930).

Local Funds. Approaching bikeway development from the perspective of return-on-investment, the city can maximize the use of local tax revenue by utilizing it as a match to obtain Enhancements and other external funds. At the very least, for every three dollars of local investment, the community can receive seven dollars in external funding to build the bikeway system. Another important measure of return-on-investment relates to the fact that Brentwood, Clayton, Maplewood, and Richmond Heights will not only develop major infrastructure improvements to its park system, but road improvements for all types of users including automobiles can also be obtained. The net return to the taxpayer will therefore be a gain in the cost effectiveness of both systems.

Finally, bond issues can also be considered as a supplement to the city's funding strategy, to the extent that this is feasible.

Developer Contributions. Contributions or exactions from the developer community should be a central element of the funding strategy relating to any new residential or commercial activity. While there is land available for development in these four cities, redevelopment along commercial corridors has been highly active over the last ten to fifteen years, and will most likely continue through the plan's time frame of ten years.

These resources have been applied to specific facility improvements in the phasing matrix on the following page (Illustration 42). Projects should be developed in partnership with the neighboring municipalities or St. Louis County to maximize local resources and create stronger grant applications.

Plan Adoption and Regulatory Actions

The following steps should be taken to implement the Brentwood, Clayton, Maplewood, and Richmond Heights Bikeable-Walkable Community Plan:

Plan Adoption. Local adoption by the City Councils and Park Boards. Adoption of the plan as a guide for local policy development will help to ensure its implementation.

Park Land Dedication Program. The cities should consider establishment of a parkland set-aside or fee-in-lieu-of program, which would require developers to provide for not only the development costs of roads, but also to contribute toward the development of the bikeway system including greenways and trails. Greenways are essentially linear parks, and have long been recognized as important elements in the improvement of recreation and quality-of-life. They are a type of infrastructure that also directly supports transportation choices, health and vitality, and the residential and commercial environment in which they exist.

There is also considerable documented and anecdotal evidence that trails and greenways are good for the real estate development industry in that they positively affect property values. Examples include the following:

Illustration 42: Phasing and Potential Resources

The following represents an initial strategy to phase all planned improvements consistent with available resources. Work on each bikeway facility is phased to enable implementation of the entire plan over a multi-year period. Estimates incorporate a 5% annual inflation adjustment.

Facility Phasing	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**TOTAL**
1) Brentwood On-Street Impr.	$14,235				$19,225						$33,461
2) Brentwood Trails			$55,782				$20,422		$38,215		$114,419
3) Clayton On-Street Impr.	$15,752	$15,752	$17,742								$49,247
4) Clayton Trails				$138,790.81		$13,547		$18,840		$24,593	$195,770
5) Maplewood On-Street Impr.	$12,989		$9,412								$22,401
6) Maplewood Trails		$64,175			$87,990		$25,717		$37,347	$3,159	$218,388
7) Richmond Heights On-Street Impr.	$10,910		$10,910		$15,285						$37,105
8) Richmond Heights Trails							$34,347		$19,656		$54,002
Total All Improvements	$53,887	$79,927	$93,847	$138,791	$122,501	$13,547	$80,485	$18,840	$95,218	$27,752	$724,794
Infl. Adj. @ 5%/Yr.	100%	105%	110%	115%	120%	125%	130%	135%	140%	145%	
Infl. Adjusted Total	**$53,887**	**$83,923**	**$103,231**	**$159,609**	**$147,001**	**$16,934**	**$104,630**	**$25,434**	**$133,306**	**$40,240**	**$868,196**
Potential Resources											
Enhancement Program	$43,110		$33,496		$18,456		$47,985		$22,015	$32,192	$197,254
STP Funds		$13,232			$14,674						$27,905
Safe Routes to School								$25,434			$25,434
Rec. Trails Program		$53,907			$84,470				$84,629		$223,007
LWCF Grant				$71,824			$20,093				$91,917
Local Funds/Sales Tax	$10,777	$16,784	$39,027	$87,785	$29,400	$16,934	$36,552		$24,460	$4,024	$265,744
Other Funds											$0
Developer Contributions			$30,680								$30,680
Donations/Partnerships									$2,202	$4,024	$6,226
In-kind Contributions											$0
Total Resources	**$53,887**	**$83,923**	**$103,203**	**$159,609**	**$147,001**	**$16,934**	**$104,630**	**$25,434**	**$133,306**	**$40,240**	**$868,167**

Positive economic effects of a greenway corridor arise because of an increase in the value of taxable properties adjacent to the greenway. In an urban setting, this is almost beyond argument since the value of land for office buildings and apartment houses or condominiums will be enhanced to some degree by adjacency to any public amenity of this sort.[4]

(Burke Gilman Trail, Seattle, WA.) ... today, agents routinely advertise properties as being on or near the trail. According to the report (by the Seattle Engineering Department), 'property near ... the Burke-Gilman Trail is significantly easier to sell and, according to real estate agents, sells for an average of 6 percent more as a result of its proximity to the trail. Property....' [5]

....In suburban areas of Chicago, Tampa, Washington D.C. Seattle, and elsewhere, home-sale advertisements promote the properties' proximity to trails as a selling point.[6]

(Greenways in general) ...increased tax revenues are usually generated by an increase in property values on land near the greenway.... [7]

Downtown Minneapolis Central Riverfront is coming back, and it's parkland that's helping to make it happen. The $40 million we've spent on parkland acquisition and development in the central river area is leveraging nearly ten times that amount in private expenditures for housing, office space, and commercial development.[8]

'I strongly believe that the development of Downtown Park (Belleview, Washington) was a catalyst for the residential development around it,' said Matthew Terry, director of the Bellevue Department of Community Development. Developers confirmed this view. One property owner said that the close proximity of Downtown Park to his parcel was critical to his decision to buy the land. When Kevin Lynch bought his parcel in 1980, he thought he was lucky to be close to a major regional shopping mall. Then when

[4]Little, Charles. *Greenways for America*. John Hopkins University Press, 1990 (p 185).
[5]Ibid. p. 186
[6]Fink, Charles; Olka, Christine; Searns, Robert; Rails to Trails Conservancy. *Trails for the Twenty-First Century: Planning, design and management manual for multi-use trails*. Island Press, 2001 (p 40).
[7]Schwarz, Loring LaB., ed. *Greenways: A guide to planning, design, and development.* Island Press, 1993 (69).
[8]Garvin, Alexander and Berens, Gayle. *Urban parks and open space.* Urban Land Institute, 1997 (p 59).

Downtown Park was developed next to his site, 'that was like winning a lotto ticket,' said Lynch. 'It's a blue-ribbon location to be next to a regional mall and a park.' [9]

(Pinellas Trail/Greenway, Pinellas County, Florida) ....In Oldona, adjacent to the trail, an upscale town home community was developed that uses the word trail *in its name…. In addition, although firm figures on the trail's impact on nearby property values are not yet available, anecdotal evidence points to higher prices, which would yield higher tax receipts for the county. "Both houses and commercial property along the trail are certainly more marketable,' said Scott Daniels, president of Pinellas Trails, Inc. 'Real estate ads mention proximity to the trail as one of the selling points.'* [10]

It is clear that, if homeowners gain, then so do the industries that develop homes that are made more marketable because of the availability of bicycle and pedestrian facilities. Therefore, it is appropriate for developers to participate in the parkland dedication program as they already do in other communities.

Additional Land Use and Zoning Recommendations. A variety of additional regulatory changes should be considered including the following:

- **Broader Uses for Floodways and Floodplains**. A floodway/floodplain overlay should be considered in existing districts where there are creeks, streams, and other low-lying areas. Here, greenways, trails, and park nodes would be allowed as appropriate uses, as well as a variety of other uses that are entirely consistent with these areas, such as interpretive trails, nature preserves, wildlife refuges, ecological corridors, and other low impact uses. The overlay could allow such uses by right, or as special uses to be regulated on a case-by-case basis. The net effect of this designation would be to help facilitate the eventual use of floodways and floodplains for a wider variety of activities considered vital in today's progressive communities.

- **Limiting or Managing New Cul-de-Sacs.** Subdivision ordinances should discourage the use of cul-de-sacs. When they are used, non-motorized trail pass-

[9]Ibid. p 78.
[10]Ibid. p 78.

throughs (similar to crosswalks but somewhat wider) should be required so that adjacent neighborhoods are not balkanized from an absence of connectivity.

- **Review/Modify Street Specifications**. Street specifications in the Subdivision Code should reflect the signage and design typology shown in the plan, with the objective of including all new streets in the evolving bikeway system. Elements include the following, described by street type:

    - New four-lane collectors with no curbside parking should have **curb lane widths of at least fifteen feet** to permit lane sharing by both automobiles and bicyclists. Collectors with curb side parking should have parking lanes of at least sixteen feet to allow sufficient room for bicyclists to pass adjacent to opening car doors without the need to swerve into the motor vehicle lane.

    - New two-lane collector streets should be designed with **wide curb lanes**, and posted either with "Share the Road with Bicycles" signs, "Bicycle Route" signs, or with "Bicycle Lane" striping and appropriate signage.

    - Arterial streets should include **five-foot wide striped and stenciled bike lanes** as well as "Share the Road with Bicycles" signs and posted with lower speed limits consistent with published guidelines.

- **Review Pedestrian Facility Requirements.** Consider sidewalks on both sides of the street with minimum four-foot widths on residential streets, five-to-six foot widths on collectors and arterials, and wider sidewalks in higher-density commercial districts.

- **Sidewalk Buffers.** Residential streets should be separated from sidewalks by grass and landscaped strips to provide a more effective buffer from auto traffic. (Studies show that these buffers also have a traffic calming effect.)

- **Shorter Corner Radii.** Use shorter radius corners to slow vehicle turning movements and facilitate pedestrian crossing.

- **Ongoing Review of Best Design Practices.** Continue to review best design practices for multimodal transportation and traffic calming, as this is a rapidly evolving field.

All of these requirements should be communicated at the time of first contact with developers, and recommended pedestrian and bicycle facility improvements should be shown in all subdivision documents submitted to the cities.

Encouragement, Education and Enforcement

Bicycling has been one of the most popular forms of recreation in the United States for a considerable period of time. Well over 35 million American adults ride regularly, and this number has been steadily increasing since 1983.[11] Many of these riders use public streets for recreational, and some utilitarian/commuting activity.

A variety of programs related to the encouragement, education and enforcement of proper bicycling behavior have been developed to facilitate usage of bicycles by adults and children. This section describes and recommends incentives to increase the safety and enjoyment of bicycle usage in Brentwood, Clayton, Maplewood, and Richmond Heights. The recommendations are principally derived from several sources including Michael Replogle[12] and the Bicycle Federation of America.[13] It provides a framework within which bicycles can be more easily considered as a mode option when transportation choices are made, and provides ways in which their use can be regulated for public safety and protection.

Encouragement Activities. Encouragement refers to a variety of strategies to invite the use of bicycles and walking. The following specific recommendations are made for Brentwood, Clayton, Maplewood, and Richmond Heights:

- **Technical Advisory Committee.** Create a Bicycle Pedestrian Technical Advisory Committee to provide ongoing guidance to the Parks and Street

[11] *Bicycling reference book*. Bicycle Institute of America, 1994 (p 6).
[12] Replogle, Michael A. *Bicycles and public transportation.* Bicycle Federation of America, 1988 (p 27).
[13] *Non-motorized travel facilities integration project: summary recommendations*. Bicycle Federation of America, 1991.

departments concerning implementation, safety, education, and promotion, and encourage involvement of other public, institutional and private parties. Wide representation from government and the private sector should be included.

- **Brochure.** Develop and distribute a brochure, which includes a map of the bicycle-pedestrian system and park system.

- **Special Events.** Sponsor special bicycle and walking events designed to use facilities being developed.

- **Bike Lockers, Racks, and Shower Facilities.** Encourage larger employers to provide bike lockers or racks, and to install showers to promote commuting.

Education Activities. This category addresses the need to learn the how-tos of bicycling in order to provide cyclists with skills to use trails and streets. Many bicycle education programs are school based. The National Highway Traffic Safety Administration (NHTSA) as well as the State of Missouri has developed materials for various school-age groups. Pre-school children are not introduced to the traffic environment unless accompanied by an adult. Traffic safety programs begin at the kindergarten through lower grade school levels; they emphasize simple stop and look techniques at mid block and at corners. Programs for older grade school children introduce them to more complex traffic challenges.

The Bicycle Federation and Bike Centennial jointly developed a curriculum titled, Basics of Bicycling that is geared to the fourth grade. Education programs for older students are less prevalent, probably because busing programs prevent widespread use of bicycles as a primary mode of travel to schools, and because of the logistics involved in arranging after school training programs for these students. Many programs place emphasis on the common types of accidents associated with bicyclists: Ride outs from alleys, driveways and other mid-block locations; ride outs at controlled intersections; motorist drive outs and turn/merges at intersections; motorist overtaking; and bicyclist unexpected turns/swerves.

Another source of education material is advocacy groups, such as the League of American Bicyclists, which provides information on availability of new training

programs, legislative trends, etc. The following tasks should be undertaken to educate current and potential cyclists:

- Incorporate basic education/safety language into brochures and maps.
- Incorporate bicycle-pedestrian education/safety messages into other literature produced by the park department.
- Stock and distribute copies of bicyclist safety material at city hall, city parks and other public facilities

Enforcement Activities. The following enforcement recommendations are related to safety:

- Establish basic rules and regulations for trails under Brentwood, Clayton, Maplewood, and Richmond Heights's jurisdiction.
- Obtain and distribute copies of appropriate bicycle-pedestrian safety information produced by one of the referenced sources.
- Stock supplies of bicycle-pedestrian safety material, maps, and rules of the road at kiosks or other stations within parks.
- Establish police, park ranger, or volunteer patrol presence on trails. Issue courtesy slips to trail users who are not aware of rules.
- Establish police presence on streets. Communicate rights and responsibilities to motorists, bicyclists and pedestrians. Issue courtesy slips to road bicyclists who are not aware of the rules of the road. Issue traffic citations to bicyclists as appropriate.
- Coordinate enforcement with education programs. Grade schools are an excellent starting point for these programs. Include elements on bicycle registration and lighting.

- Change the view of bicycle related law enforcement as a "non-essential" program.

- Consider establishment of a bicycle registration requirement.

- Establish a police bicycle patrol. Bike patrols enhance neighborhood police visibility and are also useful in the enforcement of non-bicycle related responsibilities.

Monitoring and Evaluation

The implementation of the Brentwood, Clayton, Maplewood, and Richmond Heights Bikeable-Walkable Community Plan should be monitored by representatives of the cities, working closely with the Bicycle Pedestrian Task Force and with other elements of in the communities.

The utilization of local and external implementation resources managed by a realistic development timetable should be central elements in this monitoring process. Monitoring of facility usage should also occur, preferably on an annual basis. Regular progress reports to the City Council should be made including recommendations as to whether program resources, scoping, or timetables should be modified.

APPENDIX

A. Project Consultant Team

Kevin Neill, Trailnet - Project Manager
James Pona, AICP, James Pona & Associates – Project Planner
Megan Riechmann, GIS Coordinator - Southwestern Illinois RC&D

Technical Advisory Committee:
Michele Frankowski, Director of Parks and Recreation, City of Bretnwood
Patty DeForrest, Director of Parks and Recreation, City of Clayton
Anthony Traxler, Director of Public Works/Assistant City Administrator, City of Maplewood
Teresa Proebsting, Director of Parks and Recreation Cooperative (PARC), City of Richmond Heights

Additional input provided by the following:
Ellen Dailey, Director of Planning and Development/Assistant City Administrator, City of Brentwood
Rachelle L'Ecuyer, Director of Community Development, City of Maplewood
John Wulf, City Engineer, Department of Public Works, City of Clayton

B. Public Engagement

Two sets of two public forums were held as a part of the planning process leading to formulation of the Brentwood, Clayton, Maplewood and Richmond Heights Bikeable-Walkable Communities Plan.

The first two forums were held on September 29, 2007 at the Brentwood Community Center and the Heights in Richmond Heights, where presentations of the Draft Report on Existing Conditions and Analysis were given, and attendees provided input related to bicycling and walking needs in the community. Attendees also participated in a work session, adding comments to working maps of the City. Input included locations where traffic safety conditions were less than optimal for cyclists and pedestrians, as well as locations and routes preferred by attendees for riding and walking. This information was reviewed and addressed in the Plan.

Community members look over the plan draft map at the final public forum in Maplewood's recently relocated public library.

The second public forums were held at the Center of Clayton and the Maplewood Public Library on November 20, 2008, where attendees were provided with a briefing on the planning process as well as the Draft Bikeable-Walkable Community Plan, and asked to provide input on this document prior to finalization. A survey was also distributed at these forums to gather additional input. While the survey response size was too small to make any wider generalizations about the four-community study area, important information was gathered relating to dangerous pedestrian intersections, preferred bicycle routes, and similar observations.

The following pages include documents related to the public forums. Press releases from both sets of public forums, presentation slides and sign-in sheets from the November 20, 2008 forums, and survey responses.

Public Open House for Brentwood, Clayton, Maplewood & Richmond Heights Bikeable/Walkable Communities Plan

Thursday, November 29th- **two meetings**

- 4-6 pm, Brentwood Community Center, 2505 S. Brentwood, Brentwood, MO 63144
- 7-9 pm, The Heights, 8001 Dale Avenue, Richmond Heights, MO 63117

Public Forum announced for Brentwood, Clayton, Maplewood & Richmond Heights
Bikeable/Walkable Communities Plan

Two public forums to receive input concerning trails, bicycle & pedestrian facility needs within the communities of Brentwood, Clayton, Maplewood and Richmond Heights are planned. City staff and members of the planning team-Trailnet, James Pona and Associates, and the Southwestern Illinois Resource & Conservation Development office-will be present to highlight results of an existing conditions analysis and to discuss potential goals of the plan. Plenty of time for citizen comments and questions will be allowed during the breakout portion of the forum. Citizen input on potential location of trails, bike routes and sidewalk connections is critical information at this point.

As an outgrowth of this effort, a Bikeable-Walkable Master Plan will be drafted during the next phase of work for review and consideration by the cities. It will identify and plan connections to key destinations within the communities (schools, shopping areas, parks, other trail systems, employment centers) and the recommended trail, bike and pedestrian facilities to use. The planning process will be completed by Spring/Summer of 2008.

The communities and Trailnet urges all interested citizens to attend this Forum. For more information: **contact: Teresa Proebsting, Richmond Heights at 314/645-1476 or Dan Cross, Trailnet 314/416-9930, ext 108.**

Public Forum for Brentwood, Clayton, Maplewood & Richmond Heights
Bikeable/Walkable Communities Plan

Thursday, November 20th

Two meetings:

4-6 pm, Center of Clayton, 50 Gay Avenue, Clayton, MO 63105

7-9 pm, Maplewood Public Library, 7550 Lohmeyer Avenue, Maplewood, MO 63143

The Cities of Brentwood, Clayton, Maplewood and Richmond Heights are in the final stages of developing the Bikeable/Walkable Communities Plan in cooperation with Trailnet, Inc., James Pona & Associates, and the Southwestern Illinois Resource Conservation and Development. The plan identifies opportunities for these four communities to create and strengthen bicycle and pedestrian connections between people and places, linking residents to schools, shopping areas, employment centers, parks and trail systems, and public transportation.

The public forums will provide opportunities for attendees to learn more about the plan, view proposed infrastructure improvements for bicycle and pedestrian transportation, and provide feedback. In addition to a brief presentation, maps of proposed routes, improvements near schools, and other important elements will be on display.

The communities strongly urge all interested citizens to attend one of these two forums. For more information, please contact Kevin Neill at Trailnet. (314) 436-1324 ext. 118. kevinneill@trailnet.org.

BRENTWOOD - CLAYTON - MAPLEWOOD - RICHMOND HEIGHTS

Public Forum: Bikeable/Walkable Communities

PUBLIC FORUMS

Thursday,
November 20th

First Forum:

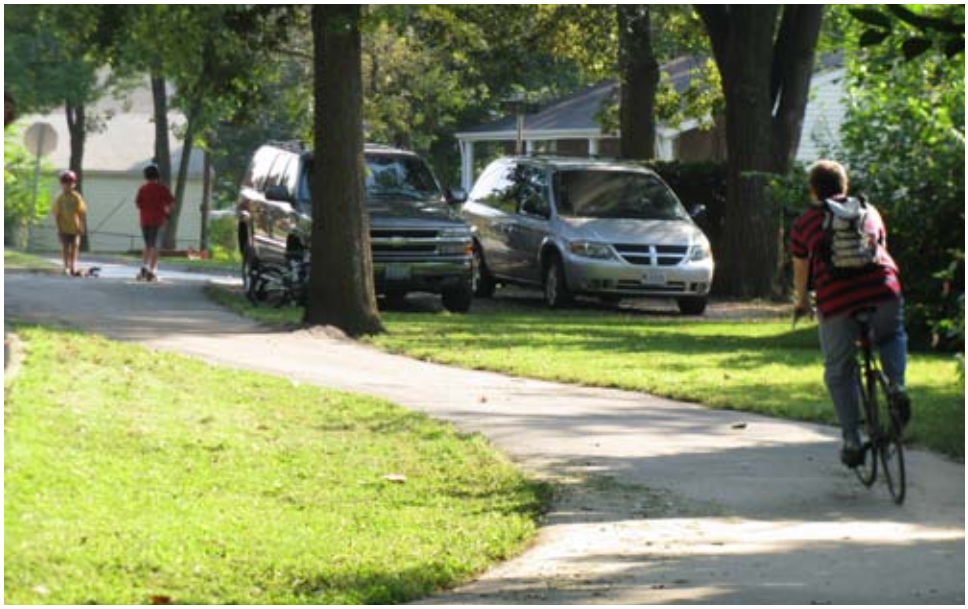
4:00pm-6:00pm
Center of Clayton
50 Gay Avenue

Second Forum:

7:00pm-9:00pm
Maplewood Public Library
7550 Lohmeyer Avenue

For More Information, Contact:

Kevin Neill, Trailnet
314.436.1324 ext. 118
kevinneill@trailnet.org



The Cities of Brentwood, Clayton, Maplewood and Richmond Heights (BCMRH) are in the final stages of developing a Bikeable/Walkable Communities Plan in cooperation with Trailnet, James Pona & Associates, and the Southwestern Illinois Resource Conservation & Development . You are invited to attend one of two final public forums on Thursday, November 20th, 2008 to learn more about the plan, view the proposed infrastructure improvements for bicycle and pedestrian travel and recreation, and have your questions and concerns addressed. Your participation is important and highly valued. Input from community members like yourself can ensure that the plan adequately meets the needs of those for whom it is created. Come see how you can play a part in making your community a more healthy and active place to live, work, and play.

Executive Summary

November 20, 2008 Public Forum

Contents

A. Goals and Objectives

1. Develop Bike and Pedestrianways as a Functional Element in the Transportation and Recreation System

a. Establish a BPTC to oversee *design, engineering, development, & operation.*
b. Regular meetings to develop and manage build-out of the system.
c. Develop appropriate budget levels and an implementation timetable.
e. Selectively modify *existing* streets as feasible, with bike accommodations appropriate to traffic; add sidewalks and connecting paths between barriers as appropriate.
f. Ensure that *new* local, collector and arterial roads include provisions for bicycle-pedestrian movement.
g. Utilize non-road corridors as available (rail, utility, drainage, etc.)
h. Ensure that the network of linear trails and on-street bikeways is sufficient to enable bicycle and pedestrian movement between residential, institutional and commercial/ retail land uses.
i. Adhere to federal and state design guidelines/standards.
j. Coordinate development activity jointly to maximize the partnering benefits.

Goals and Objectives (cont'd.)

PBIC Image

2. Establish Programs to Effectively and Safely Use the Bike-Pedestrian System.

a Establish a Bike/Ped Program Task Force (BPPTF) within each city with representatives of Police Department, local schools, businesses and the community at large to promote effective use of the system. Solicit involvement from large companies.
b. Meet regularly to oversee the implementation of programs.
c. Support the Police Department in the enforcement of all applicable state laws and local ordinance, and in the development of new ordinances as appropriate.
e. Educate cyclists on the safe usage of roads and trails.
f. Educate both cyclists and motorists on road-sharing techniques.
f. Encourage bicycle usage and walking for transportation, recreation, health, and fitness purposes.
d. Educate and encourage pedestrians regarding safe, healthy and effective walking habits.
e. Coordinate activities among the cities in order to more efficiently use resources for programs and publications.

B. Bicycle-Pedestrian Facilities Components

Trails - 2 miles

The Bikeable Walkable Community Plan for the Cities of Brentwood, Clayton, Maplewood Richmond Heights :
Chapter 6 Plan - November 10, 2008

27 Planned Trails

Type	Status	Street Name/Label	Length (ft)	Length (mi)	Limit To	Limit From
Brentwood Trails						
Trail	Planned	Lee Wynn Estate Connector	68.68	0.01	Lee Wynn Trail	Estate
Trail	Planned	Lionger Connector Trail	704.15	0.13	Lionger	Sidewalk
Trail	Planned	Lionger Rogers Parkway Connector	24.12	0.00	Rogers Parkway	Lionger
Trail	Planned	Oak Tree (Ofc) Connector	192.89	0.04	Oak Tree Park Trail	Ofc) Planned Route
Trail	Planned	White Connector	122.75	0.02	White	White
5		Trail Totals:	1,172.74	0.22		
Clayton Trails						
Trail	Planned	Central Meramec Connector	396.14	0.08	Meramec	Central
Trail	Planned	Crestwood Oxford Connection	353.84	0.07	Oxford	Crestwood
Trail	Planned	Day Metro Connector	491.85	0.09	Planned Railway Corridor	Day
Trail	Planned	Kingsbury Connector	58.75	0.01	Kingsbury	Kingsbury
Trail	Planned	N Polo Central Connector	376.79	0.07	Central	North Polo
Trail	Planned	Oak Knoll Connector	211.20	0.04	Oak Knoll Park	Clayton
Trail	Planned	Shaw Park Trail System	2,600.27	0.51	Shaw Park	Shaw Park
7		Trail Totals:	4,478.84	0.85		
Maplewood Trails						
Trail	Planned	Jaguar Deer Creek Greenway Connector	63.18	0.01	Deer Creek Greenway (DPR)	Jaguar
Trail	Planned	Kellogg Park Trail	1,243.50	0.24	Kellogg Park	Westpoint
Trail	Planned	Lindbergh Park Trail	1,759.81	0.33	Lindbergh Park/City Limit	Lindbergh
3		Trail Totals:	3,106.49	0.59		
Richmond Heights Trails						
Trail	Planned	Eager Everett Connector	693.12	0.07	Everett	Eager
Trail	Planned	The Heights Connector	686.94	0.13	The Heights	State
2		Trail Totals:	1,380.06	0.20		
17		RICHRH Totals:	9,837.72	1.86		

On-Street Bikeway System - Accommodations

Treatment Type	Applicability	Design Treatment[1]
A. Accommodation – Signed Shared Roadway. 	For busier roads with physical limitations that do not allow for widening in conformance with an official bicycle facility (such as a signed bike route or bike lane). Accommodation roadways are intended for use by experienced bicyclists who are comfortable traveling on roadways.	Urban Section (i.e. with curbs): Wide outside lanes – 14' recommended, not including gutter pan. (A 13' wide outside lane would provide some level of accommodation when the preferred widths are not available.) 15' is preferred where extra space is required for maneuvering such as on steep grades or at railroad crossings which are not perpendicular to the direction of travel. Widening can often be accomplished through lane re-striping, and by reducing the width of the inside lane or left turn lane. Rural Section: (i.e. no curbs) A paved shoulder of any width up to 4' is better than none at all; however, it cannot be signed as a bicycle facility. A width greater than 4' is preferred, excluding gutter pans and rumble strips. 5' is recommended from obstructions such as [illegible] vehicle [illegible] traffic. [illegible]s" [illegible]

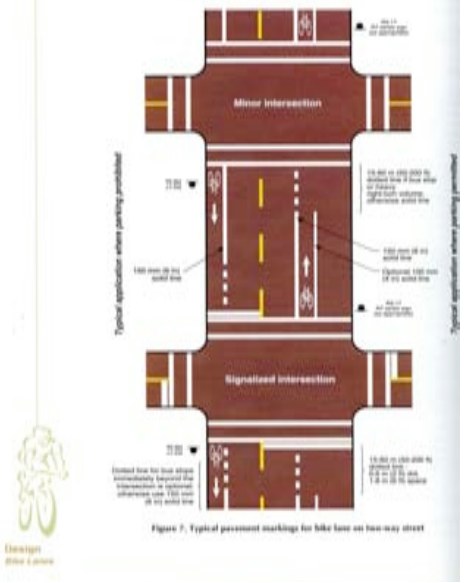
On-Street Bikeway System, cont'd. - Bicycle Lanes and Bicycle Routes

Treatment Type	Applicability	Design Treatment[1]
B. Bicycle Lane 	For busier roads with higher speeds and traffic volumes, including collectors and arterials with an urban or rural section. (Where roads may not be of sufficient width to enable the installation of bicycle lanes, consider reductions in vehicle speeds and/or traffic volumes to accommodate bicycles as per Type a treatment.) "Busier road" is defined as either a road with permitted speeds of up to 35 mph and volumes of 10,000 + vehicles per day, or permitted speeds of 40 mph+ and volumes of 1200+ vehicles per day.	Urban Section (i.e. with curbs): Min. 5' shoulders with 5' striped bicycle lanes (5', 12', 12', 5'). Widen shoulder on busier roads to provide more separation between motor vehicle lane and bike lane. 4-lane Rural Section: Min. 8'+ shoulders with 5' striped bicycle lanes (5', 3', 12', 12', 12', 12', 3', 5'). Widen shoulder to provide more separation between motor vehicle lane and bike lane. 2-lane Urban Section: Min. 5' striped bike lane, excluding gutter pan. With curb parking, add 5' bike lane between parking and motor vehicle lane. (Min. 13' between curb and motor vehicle lane, including gutter pan.) 4-lane Urban Section. Min. 5' striped bike lane, excluding gutter pan. With curb parking, add 5' for bike lane between parking and motor vehicle lane. (Min. 13' between curb lane and motor vehicle lane, including gutter pan.)
C. Bicycle Route (Signed Shared Roadway) 	Bicycle routes should be so marked if they are continuous and meet standards identified in the AASHTO publication, "Guide for the Development of Bicycle Facilities," and if they are at least one mile long. Shorter bike routes may be marked if they connect with other bike routes.	14' outside lanes, "Bicycle Route" and "Share the Road with Bicycles" Signs.

Accommodations

Cyclist on Manchester Road in Warson Woods.The arterial has been improved with bicycle accommodations by placing "Share the Road with Bicycles" signage at intervals. The road also includes bicycle-safe drain grates. The approach has applicability on most arterials in the St. Louis region. JPA photo.

Bike Lanes



Plan view of bike lanes, from the AASHTO Guide for the Development of Bicycle Facilities. Diagram shows both configurations for a bike lane without parking, and with parking. This treatment should be considered for application to any new or reconstructed collectors and arterials in New Haven, particularly if street work is associated with any real estate development activity. The mechanism to accomplish this would be through modifications to the subdivision and development codes.

Bike Route

AASHTO image depicting a bicycle route. Outside lanes of 14 feet in width can be signed as bicycle routes "….if they provide continuity with other bicycle facilities…, or designate preferred routes through high-demand corridors…." (Guide for the Development of Bicycle Facilities, p.7)

Primary Users of the On-Street Bikeway System

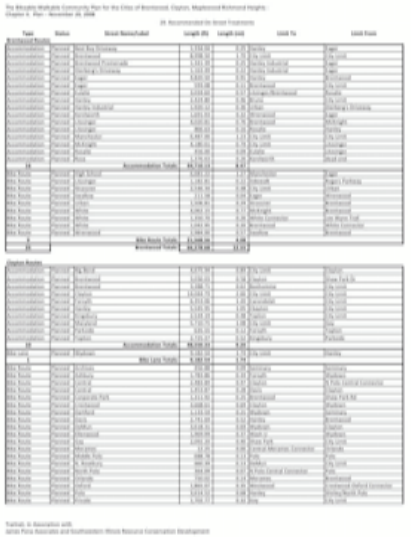
- Experienced and casual adult cyclists and teenage riders.
- Arterials and collectors are not intended for child riders who, under the supervision of their parents, might most appropriately use other elements of the system including trails, sidewalks (in accordance with AASHTO bikeway guidance), and low volume residential streets.

Concept photo - JPA

Recommended On-Street Bikeway Treatments

Refer to Handout Sheet for Detailed Information

- **Accommodations: 31 miles**
- **Bike Routes: 19 miles**
- **Bike Lanes: 1.7 miles**



C. Implementation Strategy

1. Preliminary Opinion of Cost

ROM estimate based on similar built projects:

PBIC Photo

Brentwood Accommodations: $19,225
Bike Routes: $14,235
Trails: $58,637
Total: $92,097

Clayton Accommodations: $20,876
Bike Routes: $25,283
Bike Lanes: $604,211
Trails: $223,922
Total: $904,779

Maplewood Accommodations: $12,759
Bike Routes: $7,363
Trails: $155,324
Totals: $175,447

Richmond Heights Accommodations: $16,946
Bike Routes: $19,269
Trails: $54,002
Total: $90,218

Preliminary Estimated Trail O. & M. Costs per Mile

(Reference: St. Louis County Parks; estimate makes assumptions about the frequency of O & M based on heavy usage)

Inspection, trash collection, maintenance/repair, signage repair, shoulder/turf maintenance, administrative and overhead (25%): $14,000 - $15,000

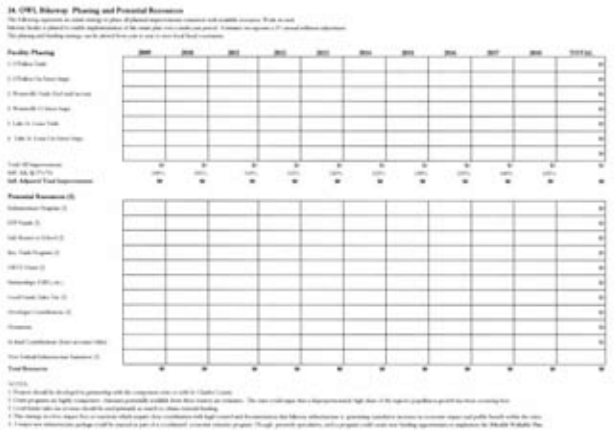
Trailnet Photo

2. Proposed Funding Sources

- Missouri Transportation Enhancements Program (SAFETEALU)
- Surface Transportation Program
- Land & Water Conservation Fund
- Municipal Park Grants
- Recreational Trails Program
- Safe Routes to School
- Local Funds
- Development leveraging

JPA Photo

Potential Sources and Uses of Funds (to be developed)



3. Plan Adoption and Regulatory Actions

- Local Adoption
- Overlay Zoning for Bicycle and Pedestrian Circulation
- Other Techniques

LAND DEDICATION AND FEE-IN-LIEU EXAMPLE:

•Ex: 200 single-family housing units - what is the parkland dedication requirement or fee in lieu?
•200 units x 2.83 (persons per household)= 566 residents
•566 residents x .006 = 3.396 acres of parkland
•3.396 acres x $59,000/acre = $200,364
•$200,364/200 units = $1001.82/unit fee- in lieu

Source: City of O'Fallon, Illinois

4. Encouragement, Education and Enforcement

A variety of programs related to the encouragement, education and enforcement of proper cycling and pedestrian behavior: Safety committees, brochures, special events, school presentations, bicycle rodeo, bicycle registration, etc

PBIC Photo

5. Organization, Management and Monitoring

- Plan Implementation Committee (comprised of city representatives, in coordination with Police Department, Bicycle Technical Advisory Committee, Board of Aldermen and related boards and commissions.)
- Adjust implementation to the ongoing availability of external and local funding resources.
- Annual monitoring with regular progress reports

C. Additional Public Comments

In addition to the public input received through the public engagement process, a number of comments were received through email communication regarding the plan. Following this page are a number of comments from residents and community stakeholders. The final attached comment, sent by Katherine Ponder, M.D., resident of Clayton, was extensive enough to warrant a separate response. This response follows Dr. Ponder's comments.

Subject: Richmond Heights
Date: Thursday, November 13, 2008 7:31 AM
From: Betty Burnett <bettyburnett@msn.com>
To: <kevinneill@trailnet.org>
Conversation: Richmond Heights

Hi, Kevin -
I am so glad you are working on making this area more walkable. I live in Richmond Heights near Big Bend & Clayton. I've given up my car - hallelujah - and walk everywhere I can. Crossing Clayton Rd. isn't bad, but crossing Big Bend anywhere is always iffy. Walking up the curving drive to Schnucks is very dangerous. That whole parking lot is difficult for pedestrians to maneuver.

Going the other direction, as Wise becomes Laclede Station, sidewalks are lost until passing under the highway. I really don't like to walk in people's yards, but have to sometimes when there's a lot of traffic. Crossing the exit ramp of 40/64 is a challenge but doable. The intersection of Dale & Hanley is impossible. I've crossed there, but it's pretty scary and won't do it now. Unfortunately, that keeps me from getting to the Metrolink station. It might be easier to get to the Forsyth station, but I haven't tried it.

ANYthing that can be done to make the area safer for little old ladies like me would be greatly appreciated.
Best,
Betty Burnett

Clayton High School
Parent Teacher Organization

#1 Mark Twain Circle · Clayton, Missouri 63105
Phone: 314-854-6600 · Fax: 314-854-6098
www.clayton.k12.mo.us/chs

Kevin Neill
Bike Walk Planner, Trailnet
1533 Washington Avenue
Saint Louis, MO 63103
January 15, 2009

Dear Kevin,

Thank you for your time on the phone yesterday and today and sharing your knowledge as to the issues, options and constraints for making the area around the high school more bike-able.

As mentioned on the phone, we are the co-presidents of the Clayton High School PTO. Last week at our monthly meeting we discussed the issue of cycling safety in Clayton and at the high school in particular. Several parents in attendance have either had their children actually hit by cars while biking in Clayton or nearly been hit.

The current number of bikers at the high school is not as high as we would like, no doubt in part due to cultural factors, but probably also somewhat do to the perception that biking to school is dangerous. Upon discussion, the PTO unanimously endorsed the creation of safe bicycle routes for children to use to bike to the high school and consideration of events such as "leave your car at home for the day" events, publishing of recommended bike routes on the school website, etc.

Some of the ideas that we liked were:

- a striped bicycle lane added to Corporate Park Drive from Brentwood Boulevard to Clayton Shaw Park, with the addition of crosswalks and stop signs at the junctions.

- something done to make Topton Way safer from the high school to the region north of Maryland Avenue. From among the options of creating bicycle lanes on the street and prohibiting parking on Topton Way between school commute time, marking the area as a bike route and your idea of making a bike path along Shaw Park, we liked the 3rd option: your idea of creating a mixed use path along Shaw Park and the high school, with the bike route marked North of Maryland.

- bicycle lanes added to Gay Avenue from the Clayton Center to the high school athletic fields.

We are aware that Trailnet is working on biking lanes on Wydown. We would encourage your support for extending this.

Thank you for your time and consideration.

Sincerely,

Jackie Militello
Ann Gold

Subject: RE: Help Trailnet plan safe and enjoyable biking and walking in the central corridor of St. Louis County on November 20
Date: Tuesday, January 6, 2009 10:28 AM
From: Ponder, Katherine <KPONDER@dom.wustl.edu>
To: Kevin Neill <kevinneill@trailnet.org>
Conversation: Help Trailnet plan safe and enjoyable biking and walking in the central corridor of St. Louis County on November 20

Kevin

Please find attached some maps of what I think would be good routes for kids to go to school in Clayton.

The files have some redundancy, as each was designed for a specific school.

There are a huge number of requests. Please see the text at the start of the description.

The PTOs should be sending you letters of support, but those will probably not arrive until next week (I am still meeting with various PTOs; I know that you have a meeting this Thursday).

I would like for Clayton to apply for a Safe Routes to School grant.

Thanks

Kathy

Katherine Ponder, M.D.
Division of Hematology
Box 8125
Department of Internal Medicine
Washington University School of Medicine
660 S. Euclid Avenue
St. Louis, MO
63110
Phone 314-362-5188
FAX 314-362-8813

Note for Trailnet

There are a series of streets and paths that are requested for changes to the schools. I do not think it is feasible to include all these, and building of bike paths would be contingent on getting Safe Routes to School Funds.

I feel strongly about the following:

1. Make Topton Way near Maryland safer by adding a bike lane and prohibiting parking before and after school.
2. Add a bike lane to Corporate Park Drive
3. Make Glenridge have no parking during the hours before and after school.
4. Prohibit parking on Wydown before and after school with the exception of the region very near Skinker and the region very near Hanley.
5. Move the crosswalk across Hanley at Wydown to the other side of the street (the south side of Hanley). There is much more traffic turning right off Wydown than turning left off Wydown. Very dangerous, and about 1 out of 2 cars totally ignore the no right turn on red sign when they turn right onto Hanley from Wydown.
6. Add signs signs on Orlando, Glenridge, Meremec, Corporate Park Drive as indidated.

Description of Proposed Bike Lanes or Paths to Meremec Elementary School

The goal of this plan is to create safes route to kids to get to Meremec school.

Bike Path Bike path designates a 2-way path that is separate from the road and would be built

School Bike Lane School Bike Lane designates a region of the existing (or widened) road that is marked as a bike lane; parking would be prohibited completely or restricted at 7:30 to 8:45 AM or 3 pm to 4 pm

Bike Lane Bike Lane designates a route that is currently wide enough and does not have parking where a bike lane would be added with striping on the pavement and signs added.

Route from north Clayton to Meremec

It is proposed that Topton Way be selected as one street to allow kids to cross Maryland safely and get to the park. It would be preferred if Topton Way would have “no parking from 7:30 to 8:45 and from 3 PM to 4 PM” on the side of the street that kids would take to get to school. As one approaches Maryland, the parking would be prohibited altogether and space for the bike lane would be created by eliminating the left turn signal. After crossing Maryland, it is proposed that the sidewalk be widened to accomodate bidirectional bike lanes and a walking lane. A ctop sign would be added at the entrance to the Clayton center. The bike path would continue past

the highschool, and the kids would get on the bike lane that goes to the south to cross the park. At the south end of the park, they would go under Forest Park expressway, which would be modified to have a stopsign and a bike lane, and then continue to the left on Corporate Park Drive, which would be modfied to have striped bike lanes. A request would be made for a cross walk guard at Brentwook and Corporate Park Drive (which turns into Orlando to the east). Orlando would be modified to prohibit parkign from 7:30 to 8:45. There would be a stop sign added at Orlando and Meremec. Kids would continue on the sidewalk over to Central, where there would be a stop sign and cross walk where the sidewalk emerges. This would enable the kids to cross the street to the bike path that is proposed. They would continue up the bikepath to the crosswalk, and enter the school and park their bikes.

Route from the region west of Brentwood and south of Forest Park Expressway.
There is already a bike path that cuts over from

ThisThis would continue Topton Way currently gets a lot of traffic, and some kids use the sidewalk. The addition of a separate bike path is proposed which would be built on the west side of the Topton Way and would allows bikes to go in both directions. This could be paid for with a grant from the Safe Routes to School program or possibly by the City of Clayton. This would be on land that either belongs to the school district or the City of Clayton, and would extend from the entrance to the Clayton Center parking lot to Field 3. This would also provide a way for Clayton citizens to get to the park. A stop sign would be added on Topton Way at the entrance to the Clayton center. Once one is north of the entrance to the Clayton center, there would be bike lanes marked on the street on both sides, that would extend past Maryland for at least one block. To create space, the left turn lanes on Topton Way at Maryland would be removed and the street would be designated no left turn. Cars have other ways to turn left onto Maryland, for example at Brighton Way. One potential addition would be prohibit parking on the street on Topton Way from 7:30 to 8:45 AM and from 3 pm to 4 pm. A bike path is proposed for the back of the parking lot that currently exists that would extend from Topton Way to Gay Avenue. This would allow citizens or kids to get from Topton Way to Gay Avenue, as might be done for sporting events. There is also a plan to treat Gay Avenue in a similar fashion to allow kids to get to the Athletic Fields.

Corporate Park Drive in the south
The best way for kids that are south of the Forest Park Expressway to get to the High School is come down Wydown, enter Polo, take the sidewalks over to Orlando, cross Brentwood at Orlando, and continue on Corporate Park Drive to the west of Brentwood. This is a wonderful road that is wide and gets little traffic. It then goes under the Forest Park Expressway and kids can get to the school via Clayton Shaw Park. The recommendation is to add bike lane striping to Corporate Park Drive which will continue until one gets to Clayton Shaw Park. Stop signs are suggested at the junctions that are near the expressway. The only problem area is Orlando. This has parking on the south side, and no parking on the north side. This is probably fine for high school kids, as it gets little traffic. Grade school kids coming from Meremec might benefit from a restriction to parking during hours when kids come and leave school.

Description of Proposed Bike Lanes or Paths to Captain Elementary School

The goal of this plan is to create one very safe route for kids to get to school from either the north or the south.

Bike Path Bike path designates a 2-way path that is separate from the road and would be built de novo or converted from an existing sidewalk by widening.

School Bike Lane School Bike Lane designates a region of the existing (or widened) road that is marked as a bike lane; parking would be prohibited completely or restricted at 7:30 to 8:45 AM or 3 pm to 4 pm

Demun Avenue

Demun gets a great deal of traffic to the south of the school, and kids are coming to Captain from across Clayton Road. Concordia Park belongs to the city and is west of part of Demun. A bike path that is separate from the road could be build using a Safe Routes to School Grant. Clayton might need get persmission from the church for part of this path. Alternatively, the city could simply widen the existing sidewalk and create bidirectional biking and pedestrian lanes. After DeMun crosses to the north to Arundel Place, it is proposed that the sidewalk on the west side of DeMun be widened and converted to a multiuse path with bike lanes that are birectional. This would extend to Fauquier Drive.

Arundel Place and Aberdeen Place

These are wide roads that currently have parking on both sides of the street. It is proposed that Arundel Place be modified to only allow parking on the south side of the road, and that a unidirectional and permanent bike lane be installed with signage and striping on the road that would allow bikes to travel from west to eact. For Aberdeen, parking would be modified to only allow parking on the north side of the road, and a unidirectional and permanent bike lane would be added that goes from the west to the east.

University Lane to the north
It is proposed that the sidewalk on the west side of the street be widened and converted into a multiuse path with a bidirectional bike lane. This would end at the baseball field by adding a short stretch of pavement to get down to the running path around the fields. Another short path would be added to get back to the sidwalk from the northeast edge of the ball fields. A stop sign would be placed at the junction of University Lane and Wydown during the hours before and after school to allow kids to get across Wydown to travel west on Wydown (used for kids to go to the high school).

Faquier Drive, San Bonita Avenue, and Highland Terrace
These would be modified to prohibit parking on the street from 7:30 to 8:45 or from 3 PM to 4 PM. Signade prohibiting parking during those hours would be place. A crosswalk guard would be placed at Clayton road unless one already exists.

Description of Proposed Bike Lanes or Paths to Glenridge Elementary School

The goal of this plan is to create one very safe route for kids to get to Glenridge school.

Bike Path Bike path designates a 2-way path that is separate from the road and would be built de novo or converted from an existing sidewalk by widening.

School Bike Lane School Bike Lane designates a region of the existing (or widened) road that is marked as a bike lane; parking would be prohibited completely or restricted at 7:30 to 8:45 AM or 3 pm to 4 pm

It is proposed that Glenridge participate in a grant from the Safe Routes to School program (awards of up to $250,000 for infrastructure) to pay for infrastructure. This would involve some participation from the school to take surveys before and after the program is started. This would be a city wide effort that would be submitted by the city or the schools (to be determined). Only elementary and middle schools can apply, so the high school would not be involved.

Glenridge Avenue
This is currently very dangerous for kids to bike to school on, as there is a lot of traffic that comes from the roads that are to the west of Glenridge where there are a lot of apartments and a high density of cars. It is proposed that the sidewalk on the east side of Glenridge be widened and converted to a multi-use path with a bidirectional bike path and a separate pedestrian portion. The east side would be safer than the west side. Stop signs would be added at each intersection during the hours before and after school, and the speed would be reduced to 20 mph before and after school.

Oxford Drive
It is proposed that the sidewalk on the southern part of the street be widened and converted to a multi-purpose trail from Glenridge to the eastern aspect of the school. There is only one driveway in this region, and this is the school parking lot, and would presumably be safe. As one continues on Oxford past the school, the residential region has many houses with driveways that exit to the street. It is proposed that the southern side of the street have no parking from 3 to 4 pm so that the entire right side of the street is clear and kids on bikes can be seen easily.

Wellington Way
It is proposed that the sidewalk on the northern part of the street be widened and converted to a multi-purpose trail from Glenridge to the eastern aspect of the school. For the region of Wellington Way from Audobon to the school, this is a residential region with many houses with driveways that exit to the street. It is proposed that the nouthern side of the street for the region that is east of the school have no parking from 7:30 to 8:45 AM so that the entire right side of the street is clear and kids on bikes can be seen easily.

Wydown
The region of Wydown that is between Glenridge and Westwood Drive/Edgewood has a lot of cars parked on the street due to the fact that there are apartments here. This poses a significant risk for kids to use a bike lane that is proposed to go between the traffic and the

parked cars. Riding on the sidewalk is an option, but there is a lot of pedestrial traffic and cars that emerge from the apartment parking areas. It is proposed that a bike lane be built in the median of Wydown to allow kids to go from Edgewood to Glenridge. This would be accompanied by a stop sign at the Wydown/Glenridge junction and addition of a cross walk guard at that spot before and after school.

Other neighborhoods:
Although other neighborhoods are less of a problem, there is still the problem that people who back out of driveways have trouble seeing due to cars on the street. One option would be for neighborhoods to restrict parking on the street between 7:30 and 8:45 AM, and between 3 PM and 4 PM. This could be a directional process (i.e. restrict parking on the side that goes towards the school in the morning, and restrict parking on the side that goes away from the school in the afternoon. This would make the streets wider when kids are going to school, and would make it easier for people that are backing out of driveways to see kids. This would need to have support of the neighborhood, which would involve canvassing of interested individuals to get support. The city would consider installation of the appropriate signs, but would not be willing to gather the support.

Description of Proposed Bike Lanes or Paths to Wydown Middle School

Bike Path Bike path designates a 2-way path that is separate from the road and would be built

School Bike Lane School Bike Lane designates a region of the existing (or widened) road that is marked as a bike lane; parking would be prohibited completely or restricted at 7:30 to 8:45 AM or 3 pm to 4 pm

Bike Lane Bike Lane designates a route that is currently wide enough and does not have parking where a bike lane would be added with striping on the pavement and signs added.

Route from north Clayton to Meremec

Wydown Boulevard
This is currently a pretty safe street that gets a lot of bike traffic. Much of this is a dedicated bike lane. It is proposed that stretches that currently allow parking on the street be modified to prohibit parking from 7:30 to 8:45 AM, and from 3 PM to 4 PM. This would be on both sides of the street, as there are kids going both directions on Wydown to get to various schools. The region around the school is dangerous for bikes. It is proposed that the stretch of Wydown in front of the school be modified to not allow drop off from cars; the road that goes by the front door would still allow drop off.

East and south of Wydown
It is proposed that University Lane be modified to widen the sidewalk on the west side to a multiuse path. Aberbeen and Arundel would be modified to a permanent bike lane going one direction on each street. DeMun would have a bike path on the west side of the street near Captain.

From North Clayton
There are 2 potential routes. One is from Topton Way and across Clayton Shaw park, and the other is down Pershing and across the bridge near the Ritz Carlton. It is proposed that Topton Way be selected as one street to allow kids to cross Maryland safely and get to Clayton Shaw Park. It would be preferred if Topton Way would have “no parking from 7:30 to 8:45 and from 3 PM to 4 PM” on the side of the street that kids would take to get to school. As one approaches Maryland, the parking would be prohibited altogether and space for the bike lane would be created by eliminating the left turn signal. After crossing Maryland, it is proposed that the sidewalk be widened to accommodate bidirectional bike lanes and a walking lane. A stop sign would be added at the entrance to the Clayton center. The bike path would continue past the highschool, and the kids would get on the bike lane that goes to the south to cross the park. At the south end of the park, they would go under Forest Park expressway, which would be modified to have a stopsign and striped bike lanes, and then continue to the left on Corporate Park Drive, which would be modified to have striped bike lanes. A request would be made for a cross walk guard at Brentwood and Corporate Park Drive (which turns into Orlando to the east). Orlando would be modified to prohibit parking from 7:30 to 8:45. There would be a stop sign added at Orlando and Meremec. Kids would continue on the sidewalk over to Central, where there would be a stop sign and cross walk where the sidewalk emerges. This would enable the

kids to cross the street to the bike path that is proposed to go on the east side of Central. They would turn right at the sidewalk that goes over to Polo, and cross Wydown. It is proposed that the stoplight be modified to have kids cross on the south side of the road. An alternative route from north Clayton is to ride east on Pershing, take Jackson to the Ritz Carlton, cross over the Forest Park Expressway, and down Edgewood to Wydown Boulevard.

Route from the region west of Brentwood and south of Forest Park Expressway.
There is already a bike path that cuts over from Frances Place to the junction of Forest Park Expressway and Corporate Park Drive. Kids would follow the bike route on Corporate Park Drive, cross Brentwood, and proceed as above on Corporate Park Drive to school.

Glenridge Avenue
It is proposed that Glenridge be modified to create a 2-way bike lane on the east side of the street, and parking be prohibited during school hours.

Lake Forest
There is already a path from Lake Forest to the Amoco station, and a cross guard to get across Clayton Avenue. These kids could cross at Linden, which turns into Central and proceed on the bike path.

Description of Proposed Bike Lanes or Paths for Clayton High School

The goal of this plan is to create one very safe route to kids to get to school from either the north or the south. The main focus is to allows kids from north Clayton to get to the high school via Topton Way, and for kids from the rest of Clayton to get to the high school via Corporate Park Drive and Clayton Shaw Park after crossing Brentwoof at Orlando and proceding through Polo to Wydown.

Bike Path Bike path designates a 2-way path that is separate from the road and would be built

School Bike Lane School Bike Lane designates a region of the existing (or widened) road that is marked as a bike lane; parking would be prohibited completely or restricted at 7:30 to 8:45 AM or 3 pm to 4 pm

Bike Lane Bike Lane designates a route that is currently wide enough and does not have parking where a bike lane would be added with striping on the pavement and signs added.

Topton Way to the north

Topton Way currently gets a lot of traffic, and some kids use the sidewalk. The addition of a separate bike path is proposed which would be build on the west side of the Topton Way and would allows bikes to go in both directions. This could be paid for with a grant from the Safe Routes to School program or possibly by the City of Clayton. This would be on land that either belongs to the school district or the City of Clayton, and would extend from the entrance to the Clayton Center parking lot to Field 3. This would also provide a way for Clayton citizens to get to the park. A stop sign would be added on Topton Way at the entrance to the Clayton center. Once one is north of the entrance to the Clayton center, there would be bike lanes marked on the street on both sides, that would extend past Maryland for at least one block. To create space, the left turn lanes on Topton Way at Maryland would be removed and the street would be designated no left turn. Cars have other ways to turn left onto Maryland, for example at Brighton Way. One potential addition would be prohibit parking on the street on Topton Way from 7:30 to 8:45 AM and from 3 pm to 4 pm. A bike path is proposed for the back of the parking lot that currently exists that would extend from Topton Way to Gay Avenue. This would allow citizens or kids to get from Topton Way to Gay Avenue, as might be done for sporting events. There is also a plan to treat Gay Avenue in a similar fashion to allow kids to get to the Athletic Fields.

Corporate Park Drive in the south

The best way for kids that are south of the Forest Park Expressway to get to the High School is come down Wydown, enter Polo, take the sidewalks over to Orlando, cross Brentwood at Orlando, and continue on Corporate Park Drive to the west of Brentwood. This is a wonderful road that is wide and gets little traffic. It then goes under the Forest Park Expressway and kids can get to the school via Clayton Shaw Park. The recommendation is to add bike lane striping

to Corporate Park Drive which will continue until one gets to Clayton Shaw Park. Stop signs are suggested at the junctions that are near the expressway. The only problem area is Orlando. This has parking on the south side, and no parking on the north side. This is probably fine for high school kids, as it gets little traffic. Grade school kids coming from Meremec might benefit from a restriction to parking during hours when kids come and leave school.

Review and Analysis of Comments by Cathy Ponder Pertaining to the Brentwood, Clayton, Maplewood, and Richmond Heights (BCMRH) Bikeable-Walkable Plan

March 02, 2009

Introduction and Background. The consultant team conducted a detailed review and analysis of comments regarding the Clayton portion of the draft BCMRH Bikeable-Walkable Plan submitted by Katherine Ponder, M.D. on January 6, 2008. Dr. Ponder attended the November 20, 2008 public forum in Clayton and had discussed her suggestions in subsequent e-mail and telephone conversations with the Kevin Neill, Project Manager of the consultant team. Dr. Ponder's detailed written comments and sketches have been attached to this appendix as a part of the public information record for the project. Subsequent comments have been submitted by Dr. Ponder, but project budget and time constraints warrant concentrated focus on comments as originally submitted.

Review and Analysis. Dr. Ponder's set of comments represents public sentiment concerned specifically with children's safety as they travel to and from school. The team examined each request, which included upgrading recommended bikeway treatments to bike lane status and the installation of stop signs at locations at or close to Clayton schools.

As a result of the analysis, several bikeways in the Draft Plan have been modified and some new bikeways added, as follows: Topton Way (modified), and the addition of routes on Audobon near Glenridge Elementary School, Wellington, and Oxford.

Many of the recommendations made by Dr. Ponder involved the upgrading of bikeways on residential streets from Accommodations or Routes to actual Bike Lanes. The team felt that such recommendations could have a cost-prohibitive outcome in terms of the following:

- the requirement for sufficient space to enable the installation of bike lane pairs;
- the number of residential streets in the city and the probable costs involved in right-of-way acquisition and development;
- the cost of additional striping and maintenance to streets that currently do not possess any striping;
- the setting of a precedent in other residential areas for similar expensive improvements.

In addition to the cost-prohibitive nature of bike lane installation on these roadways, current design standards for bicycle facilities do not support many of the recommended designs. The following six comments, which Dr. Ponder describes as those she feels most strongly about, are discussed at length and responded to below.

1A. Make Topton Way near Maryland Avenue safer by adding a bike lane.

Topton Way Not enough width in the current roadway for the addition of Bicycle Lanes. The current road width of Topton Way from curb face to curb face is roughly 35' between Maryland Avenue and the 60 degree turn 0.25 miles south of the intersection. With various parking treatments lining Topton Way, there is no space available for the addition of bicycle lanes. Removing parking from one side of the road would still leave insufficient room for the addition of bicycle lanes.

Dr. Ponder has also suggested the idea of a shared-use path parallel to Topton Way on the west side of the roadway. Such a treatment, while a highly visible sign of the community's support of bicycling and walking, is generally dissuaded by AASHTO standards. These sidepaths work best along roadways with minimal cross-streets, like limited access freeways. There are five ingress and/or egress points along this 0.25 mile stretch of Topton Way, three of which carry heavy traffic flows from Topton Way during school rush hours. Sidepaths are discouraged by AASHTO when parallel to roadways with frequent cross-streets that increase the potential for vehicle-bicycle conflicts. AASHTO points to a number of other conflicts resulting from this sidepath treatment, all of which lead to the conclusion that "[s]hared use paths should not be considered a substitute for street improvements even when the path is located adjacent to the highway."

1B. Prohibit parking before and after school on Topton Way.

Parking on the aforementioned stretch of Topton Way serves a number of purposes. On the east side of Topton, the majority of parking serves the residential population, and requires residential parking permits. On the west side of Topton, metered parking accommodates people visiting Clayton High School and Shaw Park. Many of the residential buildings on the east side of Topton Way are condominiums and require street parking.

2. Add a bike lane to Corporate Park Drive.

Dr. Ponder suggests adding bike lanes in Corporate Park to connect the Davis Place Neighborhood to Shaw Park. This connecting stretch of roadway is comprised of two roads: Corporate Park Drive and Shaw Park Drive. The segment of Corporate Park Drive lies between S Brentwood Blvd. to the east and Shaw Park Drive to the West, and is roughly 0.1 miles in length. Corporate Park Drive is a two-lane road divided by a median, with no parking allowed on either side. There is 18' of roadway width in each direction, giving sufficient room for bicycles and automobiles to travel side by side. Shaw Park Drive, between Shaw Park entrance and Corporate Park Drive, measures 0.17 miles in length and has an average width of roughly 25', with no center median and no parking allowed. There is also a significant amount of heavier truck traffic on these streets generated by the City of Clayton Parks & Recreation and Public Works maintenance facility. The narrower width on Shaw Park Drive is not sufficient to support a bi-directional pair of bike lanes, which would require a minimum 8' for two (2) bike lanes, and 22' for two (2) travel lanes, for a total of 30'.

In order to provide a consistent treatment for this 0.27 mile stretch of roadway, designation as a bicycle route is recommended. Such a treatment will offer adequate notice of bicycle presence to auto drivers as well as the necessary directional signage to guide bicyclists in and out of Shaw Park.

3. Make Glenridge have no parking during the hours before and after school.

Suggested prohibition of parking during school pick-up and drop-off times at Glenridge Elementary would again encroach on residential parking.

4. Prohibit parking on Wydown before and after school with the exception of the region very near Skinker and the region very near Hanley.

The City of Clayton will be restriping Wydown Blvd. in 2009 to incorporate the addition of a bicycle lane between the travel lane and parking lane. Making good use of the wide roadway, this improvement will provide a safe, delineated lane for bicycle travel, separate from both traveling and parked cars.

5. Move the crosswalk across Hanley at Wydown to the other side of the street (the south side of Hanley).

Dr. Ponder points to the lack of attention paid by motorists to two important features protecting pedestrians at this intersection. Signage indicates no right turn on red from Wydown to Hanley. There is also a separate pedestrian crossing phase in the traffic light cycle that prohibits right turns during the pedestrian crossing phase. These improvements to the pedestrian facilities at this intersection provide the infrastructure necessary to create a safe environment. This lack consideration is an enforcement issue rather than a design or engineering issue. Strategically timed monitoring of the intersection and enforcement of traffic regulations by the Clayton Police Department can help to decrease the neglect for traffic signs and signals at this intersection.

6. Add stop signs on Orlando, Glenridge, Meramec, and [Shaw Park Drive at the entrance to the Clayton Parks and Public Works Facility entrance and at the northern terminus of Shaw Park Drive entering the park].

Conclusion. Given the implication that these recommendations could have on the Bikeable/Walkable Community Plan, their cost in terms of construction, striping, maintenance, available residential parking, and traffic level of service are significant. The purpose of this study is to develop a conceptual master plan for the development of a bikeable-walkable system for the four cities. As such, significant attention is given to each project as it relates to the overall goal of creating a comprehensive, interconnected

network of various facilities to form a more bicycle and pedestrian friendly community. Decisions are based on an analysis of client needs, existing conditions (land uses, roadway and traffic conditions, accident data, etc.), public input, and nationally recognized design standards that determine the most suitable facility types. Dr. Ponder's set of comments represents public sentiment concerned specifically with children's safety as they travel to and from school.

D. MoDOT Project Development Policy Manual - Bicycle Excerpts

MoDOT has published a number manuals to assist local governmental agencies and project engineers of This manual provides municipalities with additional guidance materials for the design of roadways, This document contains design guidelines to assist engineers in the development of bicycle and pedestrian facilities and complements both national design standards contained in the American Association of State Highway and Transportation Officials' *Guide for the Development of Bicycle Facilities* and local guidelines contained in East West Gateway Council of Goverments' *St. Louis Regional Bicycling and Walking Transportation Plan.*

To access the complete Project Development Policy Manual, use the following link to MoDOT's website: http://www.modot.org/business/manuals/projectdevelopment.htm.

MoDOT Project Development Manual Policy

4-09.25 BICYCLE/PEDESTRIAN FACILITIES.

4-09.25 (1) POLICY. The district is encouraged to consider and to provide bicycle/pedestrian facilities when deemed appropriate. Consideration should be given to the provision of pedestrian and/or bicycle accommodations on improvement projects during preliminary studies, design and construction when any of the following exist:

- The local jurisdiction has adopted a bicycle/pedestrian policy or facilities plan or otherwise requested by the local jurisdiction.
- Bicycle/pedestrian traffic generators are near MoDOT transportation projects (generators include residential neighborhoods, employment centers, shopping centers, schools, parks, etc.).
- There is evidence of pedestrian and/or bicycle traffic and the local community supports the incorporation of facilities.
- The route provides access across a natural or man-made barrier, i.e., bridges over rivers, roadways or railroads or under access-controlled facilities and roadways.
- There is public support through local planning organizations for these facilities.

The design and installation of pedestrian and bicycle facilities is at the sole discretion of the director or their designee. Documentation should be developed on all projects to support the decision to provide or not provide pedestrian and/or bicycle accommodations.

Additional costs for new pedestrian and bicycle facilities, including right of way and construction and maintenance, may be funded by local jurisdictions, by Enhancement funds, other non-department sources, the department itself_and/or a combination of these. State road funding shall only be provided for those projects located on MHTC right of way. Funding arrangements and agreements will be handled on a case by case basis.

The department will include in normal right of way and construction costs the cost of restoration of existing bicycle/pedestrian facilities that are disturbed by a proposed improvement.

Agreements with local jurisdictions and/or others should be used to address maintenance issues for separate bicycle and/or pedestrian facilities constructed on or off of MoDOT right of way. The agency responsible for maintenance shall be established prior to construction. MoDOT assumes legal liability for bicycle/pedestrian facilities on MHTC right of way. This responsibility should be addressed by agreement, with MoDOT personnel performing regular inspections to ensure proper maintenance is performed as provided under terms of the agreement. Should maintenance not be performed as required by agreement, MoDOT should take necessary steps to ensure proper maintenance is provided.

4-09.25 (2) DESIGN CRITERIA. Numerous strategies are available to provide improved operating facilities for non-motorized travelers. These include sidewalks, pedestrian paths, bicycle paths, shared-use paths, bicycle lanes, and wide shared lanes any of

which may be on the shoulder or separated from the travelway. Typical roadway sections should be developed based on the typical roadway sections and information shown on Figure 4-09.12. The AASHTO publications *"Guide for the Development of Bicycle Facilities" and "Guide For The Planning Design and Operation of Pedestrian Facilities" along with* FHWA-RD-92-073 *"Selecting Roadway Design Treatments to Accommodate Bicycles"* provide guidance for pedestrian, bicycle and shared-use facilities. Design and Transportation Planning Division personnel can assist with further information. Table 4-09.3 provides guidance on the application of bicycle facilities with respect to roadway classification.

TABLE 4-09.3

BICYCLE FACILITIES

	Bicycle Path	Bicycle Lane	Wide Shared Lane	Bicycle Lane on, or Bicycle Usage of, Shoulder
Interstate	Permitted	Not Permitted	Not Permitted	Possible Solution*
Urban Freeway	Permitted	Not Permitted	Not Permitted	Possible Solution*
Principal Arterial	Permitted	Possible Solution	Possible Solution	Possible Solution
Urban Principal Arterial	Permitted	Possible Solution	Possible Solution	Possible Solution
Minor Arterial	Permitted	Permitted	Permitted	Permitted
Urban Minor Arterial	Permitted	Permitted	Permitted	Permitted
Collector	Permitted	Permitted	Permitted	Permitted
Local	Permitted	Permitted	Permitted	Permitted

Definitions:
Permitted: This design is allowed with this functional class.
Not Permitted: This design is not allowed with this functional class.
Possible Solution: This design may be considered but requires further analysis of geometrics and traffic characteristics to determine proper design for given conditions.
* This solution should only be considered when all other reasonable alternatives are not practical and this routing is needed to provide continuity of local and cross country bicycle routes.

4-09.25 (2) (a) SIDEWALKS. Sidewalks are constructed where existing sidewalks are disturbed by highway construction and may also be provided based on a needs assessment. Along arterial streets where outer roadways are to be constructed to connect local streets that would otherwise dead-end, and where such intersecting streets have sidewalks that formerly connected to cross streets with sidewalks, it is proper to consider sidewalk construction along the outer roadways on a needs basis as a replacement of existing facilities. In addition, where sidewalks are warranted:

- Sidewalks provided in developed areas should be separated from the travelway by a barrier curb (see Figure 4-07.2).
- In rural or low density developed areas (ADT > 1700), off road pedestrian paths separated from the roadbed by a green area, ditch or swale may be appropriate.
- In rural areas (ADT < 1700) where it is necessary to accommodate pedestrian access along the roadway shoulder a minimum shoulder width of 6 ft. (1.8m) should be provided.

It is important to remember that any designated sidewalk or pedestrian path must be accessible according to ADA guidelines.

Where the curb is separated from the parallel sidewalk by a parkway (border), all house walks shall be extended across the parkway (see Standard Plan 608.10). When provided, sidewalks should have a minimum width of 5 ft. [1.5 m] and thickness of 4 in. [100 mm]. Exceptions are as follows:

- If a 5 ft [1.5 m] sidewalk would be geometrically constrained or would produce excessive costs, a narrower width may be used. For sidewalk widths less than 5 ft [1.5 m], a 5 ft by 5 ft [1.5 m by 1.5 m] passing space is to be provided at intervals no greater than 200 ft [61 m]. Such features as driveways, building entrances and sidewalk intersections are considered acceptable intersections. The absolute minimum sidewalk width allowed by ADA guidelines is4 ft [1.2 m].
- Sidewalks across private approaches, street, sideroads, alleys or commercial approaches should be the same thickness as the paved approach.
- Housewalks shall be 4 in. [100 mm] thick and a minimum of 3 ft. [1.0 m] wide. Steps to house shall be a minimum of 3 ft. [1.0 m] wide. Steps and housewalks shall be a width to match the existing width. Steps other than house steps shall be a width to fit a particular condition.
- A sidewalk proposed within 2 ft. [0.6 m] of a curb should be adjacent to the curb, a minimum of 6 ft. [1.8 m] wide and located behind a barrier curb.
- A clear airspace of 7 ft [2.1 m] above the sidewalk should be maintained free of tree limbs, signs, fountains, poles or planters. Protrusions into the area of the sidewalk must not exceed 4 in. [100 mm].

4-09.25 (2) (b) CURB AND SIDEWALK RAMPS. Curb and sidewalk ramps shall be designed in accordance with the standard plans, or varied to fit the needs at a particular location. If a particular curb ramp differs from the standard plans, the ramp shall be detailed on the plans. The following criteria apply to all curb ramp situations:

- A pay item is included for curb ramps. The designer should estimate the square yardage [m^2] for each curb ramp and show the quantity on the 2B sheet(s).
- Curb ramps shall have a clear width of 5 ft. [1.5 m], exclusive of flared sides.
- If a sidewalk ramp has a rise greater than 6 in. [150 mm] or a horizontal length greater than 6 ft. [1.8 m], handrails shall be provided on both sides. The maximum rise for any ramp shall be 30 in. [750 mm]. See Figure 4-07.5. Handrails are not required on curb ramps.
- The least possible slope shall be used for any ramp. The maximum slope of a ramp in new construction shall be 12:1 [1:12].
- Ramps shall have a level landing at the top of each run. The landing shall have the

same width as the ramp and a minimum length of 5 ft. [1.5 m].

- Transitions from curb ramps to sidewalks, gutters or streets shall be flush and free of abrupt changes. Maximum slopes adjoining a curb ramp shall not exceed 20:1 [1:20].
- Raised islands in crosswalks shall be cut through level with the street or have curb ramps at both sides and a level area at least 4 ft. [1.2 m] long between the curb ramps.
- Sidewalk ramps should be provided at locations where steps occur, such as at the ends of bridges having sidewalks across the bridge or at pedestrian grade separations.
- In the case of retrofitting a curb ramp where pedestrians must walk across the ramp, the ramp shall have flared sides sloped at a maximum of 10:1 [1:10]. If a level landing cannot be constructed in a retrofit situation, then the flared sides shall have a 12:1 [1:12] maximum slope.

4-09.25 (2) (c) MID-BLOCK PEDESTRIAN CROSSING. The potential for pedestrians needs to cross multilane facilities with lengthy distances between signalized intersections should be considered in design. For instance, near schools, parks, hospitals, public buildings, or shopping centers, there may be high demand for pedestrians to cross a roadway between signalized intersections. A raised median, with curb cuts, might be the preferred approach to provide a safer crossing for pedestrians. A pedestrian underpass or overpass may also be considered.

4-09.25 (2) (d) BICYCLE PATH. A bicycle path is a bikeway, usually beyond the clear zone, physically separated from motorized vehicular traffic by an open space or barrier. It may be within the highway right of way or on an independent right of way. A bicycle path is appropriate in corridors not served directly by streets and highways, such as along rivers, lakes, abandoned utility or railroad right of way, parks, etc. Cross movement by motor vehicle traffic should be minimal. Sometimes, due to the multiple user types (e.g., walkers, rollerbladers, wheelchair users, etc.), they are referred to as multi-use paths. If pedestrian use is intended, a bicycle path in the public right of way should generally comply with ADA requirements for public sidewalks. Minimum bicycle path design criteria is given in Figure 4-09.11. A typical bicycle path section should be developed based on Form D-49.

4-09.25 (2) (e) BICYCLE LANES. A bicycle lane is a portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists. Bicycle lanes are appropriate where bicycle travel and demand is substantial and/or traffic volumes and speeds are relatively high. They are commonly located on urban collector and arterial routes.

4-09.25 (2) (f) WIDE SHARED LANES. A right through lane wider than the standard 12 ft. [3.6 m] width can better accommodate both bicycles and motorists in the same lane and thus is beneficial to both. This accommodation is most suited to urban and suburban roads. This treatment works best with low traffic volumes and low truck volumes and can be used in other situations where bike lanes are not feasible. A 14 ft. [4.2 m] lane is desired for shared use. This width generally will allow a motor vehicle and bicycle to be operated comfortably side by side within the lane. A traveled way less than 14 ft. [4.2 m] will require a design exception (see Subsection 2-01.8). Widths greater than 14 ft. [4.2 m] may encourage the undesirable operation of two motor vehicles in one lane.

4-09.25 (2) (g) BICYCLE LANE ON SHOULDER. Paved shoulders can serve the needs of bicyclists. This treatment is more suitable for rural design. When paved shoulders are signed and marked for use by bicyclists, a minimum 4 ft. [1.2 m] operating width should be provided.

4-09.25 (2) (h) PEDESTRIAN GRADE SEPARATIONS. It is not practical to develop warrants governing the construction of pedestrian grade separation facilities. Each situation must be considered on its own merits. Such facilities are generally warranted only at locations where exceedingly heavy volumes of pedestrian traffic must cross a heavy vehicular flow. When the construction of a pedestrian grade separation is considered, an investigation is to be made including studies of pedestrian crossing volumes, type of highway to be crossed, location of adjacent crossing facilities, the predominant type and age of persons who will use the facility, and the cost of constructing the pedestrian grade separation. A pedestrian grade separation should only be constructed when the need for the safe movement of pedestrians cannot be solved in some simpler and more economical manner. Experience has shown that in many instances, facilities of this type are not used by pedestrians. Where the facility offers a more convenient path than a crossing at street grade, the likelihood of general use by pedestrians is good. If the situation requires descending to a different level and then ascending to the original level, or ascending to a different level and then returning to the original level, the chance of general use is not good unless barriers are erected to force pedestrians to use the facility. Additional guidance concerning pedestrian grade separations can be found in an AASHTO publication entitled. *"Guide Specifications for Design of Pedestrian Bridges."*

CHAPTER IV
DETAIL DESIGN

Minimum Design Criteria for Two Way Bicycle Paths				
Functional Classification	Bicycle Path			
Bicycle Design ADT	<100	100 - 200	200 - 300	>300
Bicycle Design Speed	12 mph [20 km/h]	20 mph [30 km/h]	25 mph [40 km/h]	30 mph [50 km/h]
Typical Section	D-49			
Path Width	8 ft. [2.4 m]	10 ft. [3.0 m]	12 ft. [3.6 m]	12 ft. [3.6 m]
Shoulder Width	2 ft. [0.6 m]			
Cross Slope (1)	2%			
Foreslope	6:1 [1:6] for 2 ft. [0.6 m]			
Backslope	See Soil Report			
Ditch (min. depth)	0.33 ft. [0.3 m]			
Horizontal Curvature (min. R)	30 ft. [10 m]	90 ft. [24 m]	155 ft. [47 m]	260 ft. [86 m]
Superelevation	2%			
Grade (max) (2)	5%			

(1) 4% for aggregate surface

(2) Where terrain dictates, grades > 5% may be acceptable for short distances as follows:

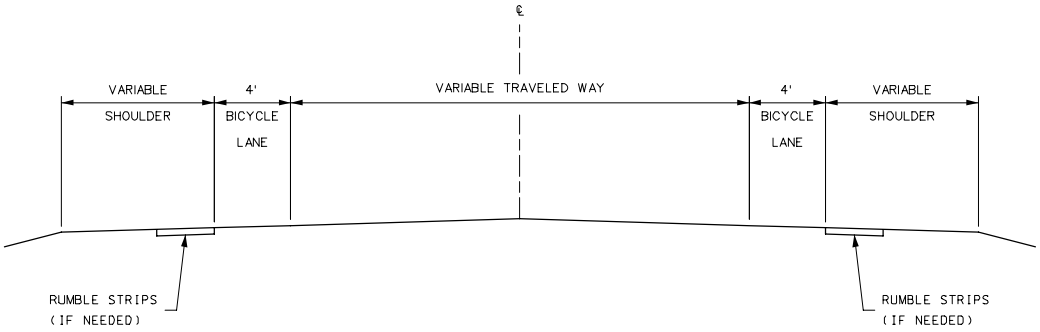
5% - 6% for up to 800 ft. [240 m]
7% for up to 400 ft. [120 m]
8% for up to 300 ft. [90 m]
9% for up to 200 ft. [60 m]
10% for up to 100 ft. [30 m]
11% + for up to 50 ft. [15 m]

Grades > 3% may not be practical for aggregate surface paths.

(3) For additional guidance, in particular vertical and horizontal clearances, refer to the AASHTO publication *"Guide for the Development of Bicycle Facilities"*.

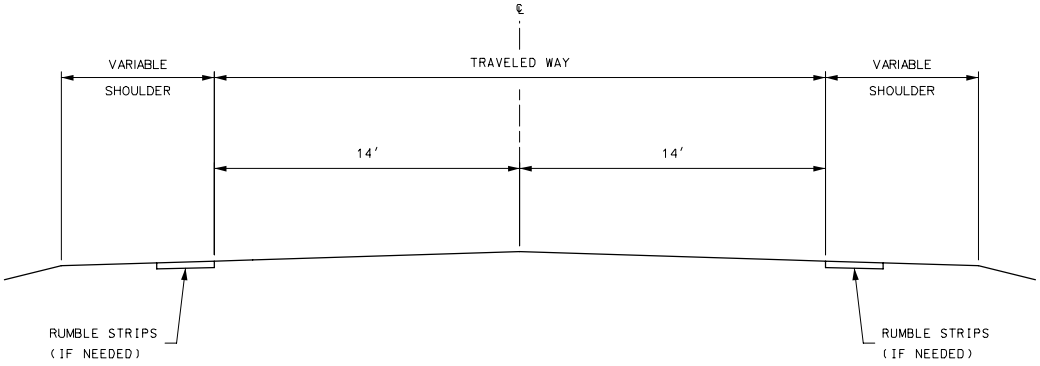
Bicycle Path Design Criteria

CHAPTER IV
DETAIL DESIGN



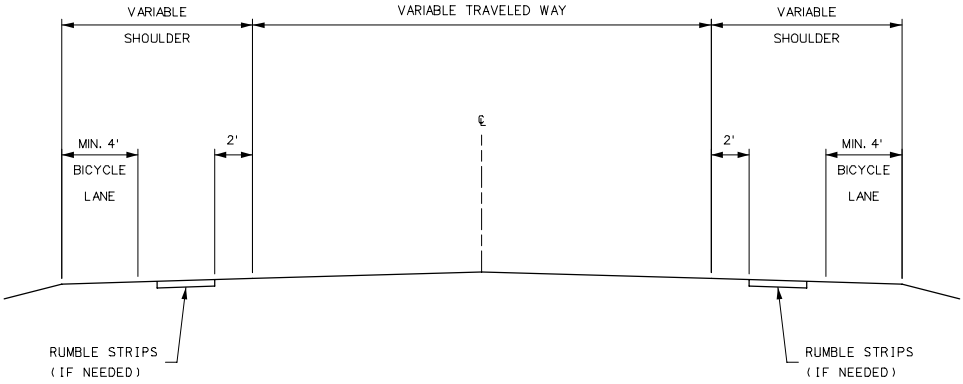
BICYCLE LANE ADJACENT TO TRAVELED WAY

BICYCLE LANE SHOULD BE THE SAME THICKNESS AS THE MAINLINE PAVEMENT.



WIDE SHARED LANE

WIDE SHARED LANES SHOULD BE THE SAME THICKNESS ACROSS THE ENTIRE WIDTH OF THE PAVEMENT.

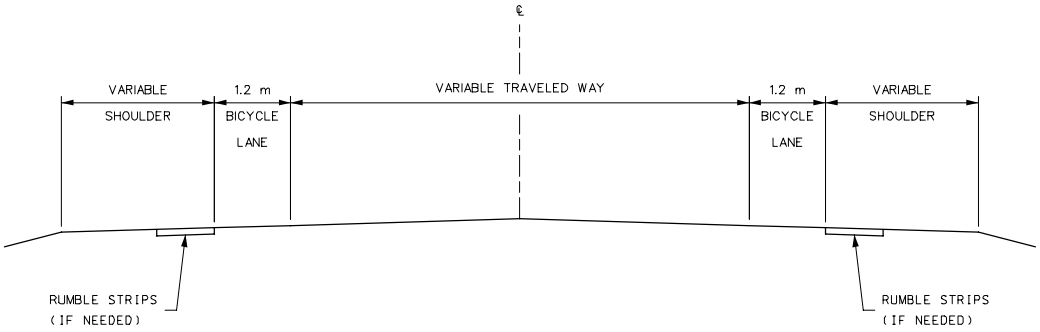


BICYCLE LANE ON SHOULDER

Bicycle Lanes

Figure 4-09.12

CHAPTER IV
DETAIL DESIGN



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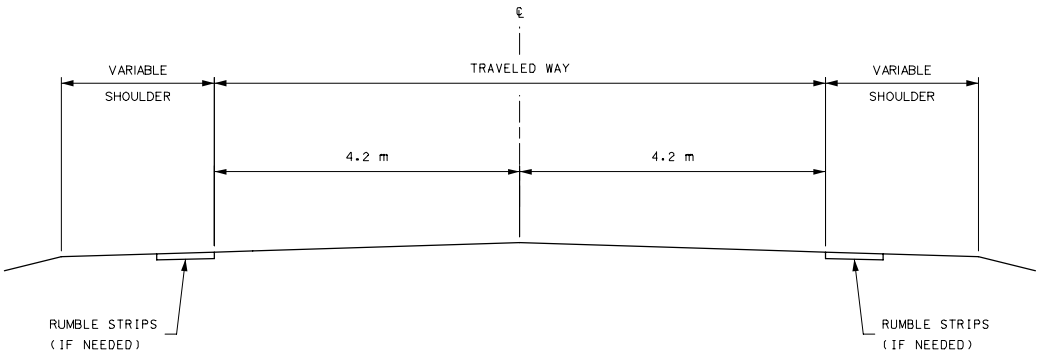

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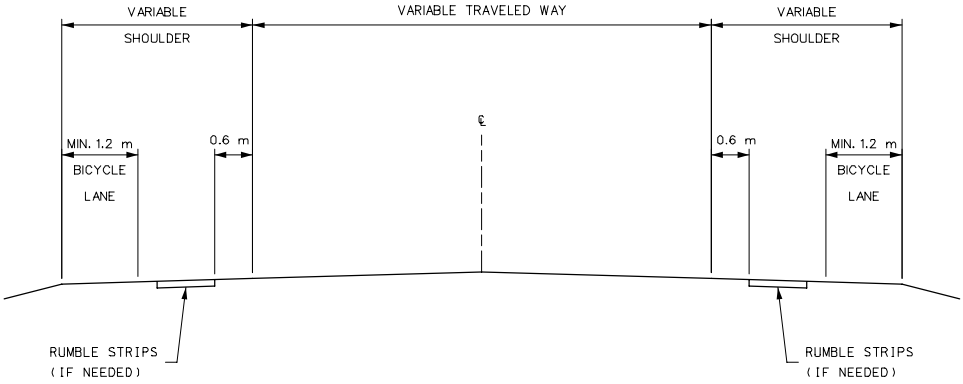

BICYCLE LANE ON SHOULDER

Bicycle Lanes

Figure 4-09.12

E. Bicycle Facility Selection Criteria - Other Selected Sources

In addition to state design guidelines, there are a number of other resources available to assist local municipalities to develop bicycle and pedestrian facilities design.

The most comprehensive resource document for bicycle facilities design is the American Association of State Highway and Transportation Officials' Design *Guide for the Development of Bicycle Facilities*, available in pdf format at www.sccrtc.org/bikes/ **AASHTO**_1999_BikeBook.pdf.

As part of the Federal Highway Administration's University Course on Bicycle and Pedestrian Transportation, Lesson 13: Selecting Bicycle Facility Types and Evaluating Roadways presents an overview of the Bicycle Compatibility Index (BCI) and the Bicycle Level of Service, two evaluative tools that examine the traffic and environmental conditions and appropriate complementary bicycle facilities (http:// www.tfhrc.gov/safety/pedbike/pubs/05085/chapt13.htm).

The *St. Louis Regional Bicycling and Walking Transportation Plan*, published in 2005 by the East West Gateway Council of Governments (EWG), serves as a "how-to and when-to" document to assist local municipalities in the planning, design and development of bicycle and transportation facilities. This resource is available at EWG's website: http://www.ewgateway.org/trans/bikeways/bikeways.htm.

F. Background Information on Cost Estimates

The pre-engineering opinions of cost developed in the Plan Chapter of this study were based on the experience of the planning consultants over the past ten years and took into consideration the planning, design, and development of many bikeway projects in the St. Louis Region and beyond. Because this is a planning document intended to precede the detailed plans, specifications and estimates (PS&E) to result during a subsequent development phase, they cannot reflect current conditions in the engineering and construction industry, or current market prices for materials used in the construction of such facilities.

Rough Order of Magnitude Bike/Ped Facilities Development Costs

Bike Accommodations. Recommended improvements are "Share the Road" signs every quarter to fifth of a mile. MODOT policy calls for use as a warning sign: "The Share the Road (W16-1) sign may be used with other appropriate warning signs to advise the motorists that other modes of transportation may be present on the same facility. This can include, but is not limited to, pedestrians, bicycles, horse drawn vehicles, etc. The (W16-1) sign shall not be used alone but always as a supplementary plaque under a W11 series sign." The W-11 sign may be used on its own to designate bike routes. 8-10 signs per mile and installation labor: $2,250/mile

Bike Routes. Recommended improvements for bike routes include installing "Bicycle Route" and "identification/directional" signs every 1/4-mile and at turns/intersections and installing new drainage grates. The cost estimate does not include bike stencils or striping which is only used when a bikeway is designated as a bike lane, as discussed in the next example.

A bike route system of bike routes may lend itself to community maps and guidance to areas of interests, as is used by Bike St. Louis, shown in the upper left image. Or it may simply utilize the standard "Bike Route" sign shown on the lower left.

- Average of 10 signs per mile and installation labor: $2,500/mile
- Allowance for grate improvements (lump sum): $1,000/mile
- Budget cost per mile: $3,500/mile

Bike Lanes on Existing Pavement. Recommended improvements include signage, drainage grate improvements, striping and bike route stencils (note: stencils will not be used on streets that will be chip and sealed). Where roads cannot be widened, but there is adequate lane width, some agencies are creating bike lanes without stripes. Some agencies narrow the inner lanes to provide additional outer lane width, for example creating a four lane road of 14' 10' 10' 14' rather than four 12' lanes.

- Average of 10-12 signs per mile & installation: $2,500/mile
- Thermoplastic striping (both sides of street, appr. $2/lf): $10,500/mile
- Allowance for grate improvements (lump sum): $1,000/mile
- Allowance for bike stencils (bike and lettering at intersections, 10/mile x $100): $1,000/mile
- Allowance for intersection striping (400' of bike slot striping and 8 stencils and "yield to bikes" signs): $2500/intersction
- Budget cost for bike lanes on existing pavement: $17,500/mile

Bike Lanes on pavement widened by 5 feet. Includes all of the above improvements and adds in new 5' wide bike lane construction. The 5' wide bike lane should meet AASHTO standards.

- Average of 10-12 signs per mile & installation: $2,500/mile
- Thermoplastic striping (both sides of street, approx. $2/lf): $10,500/mile
- Allowance for grate improvements (lump sum): $1,000/mile
- Allowance for bike stencils at intersection (bike and lettering, 10/mile x $100): $1,000/mile
- Allowance for intersection striping (bike slot, 400' of striping and 8 stencils and "yield to bikes" sign): $2,500/intersction
- Add $300,000-360,000/ mile for 5' wide lanes, both sides: $330,000/mile
- Budget cost per mile of widened pavement: $347,500/mile

Shared Use Paths, Nature Trails & Walks and Nature/Foot Paths.

1. Asphalt Trail with Improvements. Recommended improvements call for a 10-12' wide asphalt trail, grading/clearing, 8" of base rock and 4' of asphalt, some bridge work, signage and landscaping. $65/lf x 5280=$316,800/mile.

2. Asphalt Trail only with no other improvements-10-12 feet wide, 8" of base rock and 4" of asphalt, no signs, landscaping or bridges. Trail on grade w/ minimum excavation—basically for the trail bed only, 2' shoulders on each side. $45/lf X 5,280=$237,600/mile

3. Crushed rock trail -8-10' wide, trail on grade, minimum excavation—basically for the trail bed only, no signs, landscaping or bridges. Contracted price of $15/lf or $79,200/ mile.

4. Nature/Foot Path - Often times a scout or local community group can install wood chips as a service project at no charge to the community. For our purposes allow for $1.20 per lf or $6,350/mile.

5. Concrete Walk - Recommended improvements feature 8' wide concrete walks.8' x $5/sf= $40/lf or $211,200/mile.

6. Sidewalks along new subdivisions are recommended to be at least 5' wide.
5' wide x $5 sf = $25/lf or $132,000/mile. Note: Does not include land acquisition, engineering, design, construction management, inflation or maintenance.

Comparison of trail maintenance costs for asphalt and crushed rock trails.

	TRAIL MAINTENANCE	Labor Hours	$ Amount	
Trail (asphalt typically 12'wide)	Park Services-Park patrols, security, neighborhood liaison, trail administration	118/hrs./mile	4790.60	Compiled with assistance from St. Louis Co. Parks
	Trail Maintenance-signs, gates, fence, bollards, trash removal, some snow removal, landscape, trees & shrubs, asphalt paving/marking, repairs & supplies.	157/hrs./mile	4227.00	Total updated for 2005 $
	Trail Grounds Care-tractor mowing, trimming, turf care along trail, tree removal, trees & shrubs & supplies. Typically mow one mower width on each side of trail and brush hog corridor 2-3 times per year.	226/hrs./mile	5072.00	
	Total	501/hrs./mile/yr	14,948/ mile	
Trail (crushed rock)	Katy Trail type construction, 12 feet wide. Includes trash pickup, bridge repairs, surface repairs (minor), erosion control, administrative costs, equipment and supplies.			Compiled with assistance of Dept of Natural Resources Updated for 2005
	Equipment & supplies		1134.45	
	Maintenance		1271.01	
	Administration		867.64	
	Total	168 hrs.	3472/ mile	

Typical Trail Operations & Maintenance Costs
1/5/05

Estimated costs and expenditures for one mile of asphalt trail.

Manhours per year	Hours	
Inspect	81	
Trash/litter	42	
Maint & repair	106	
Sign repair	5	
Shoulders	53	
Total	287	
Allowance for Admin & Overhead 25%	72	
TOTAL HOURS	359	359/hours per mile

Cost per Year Area/Facility	Description	Mode of Care	Quantity/Unit	Total cost/year (by unit)	Annual Maint. Cost	Comments
Trail	Inspect	2	300	5	$1,500	
Trail	Trash/Litter	1	2	363	$726	
Trail	Maint & repair	2	52.8	118	$6,230	
Trail	Sign repair	Standard	2	50	$100	
Trail	Shoulders/ turf	(see below)	1	1172	$1,172	
			Sub-total for O&M		$9,728	
Admin & Overhead allowance 25%					$2,432	
				Total	$12,161 /per mile	

Trail Inspection: one time per day in season (April-October); 4 times per week (November-March)
Total-300 inspections/year x .33 hours x $15/hour (salary & benefits)

Trash/litter based on trash receptacle or pick up every 1/2 mile

Trail Maintenance & repair-(see Walkways & Paths) Cost is $118/MSF. Trail is equal to 52.8 MSF
Note: Includes power vac or blowing off trail (assume asphalt overlay-not included - will be capital).
Estimate about 2 hours per MSF per year.

Shoulders/turf:
Mowing-$25/acre x22 times = $550/acre/year
Spot trimming - 500 LF x .05/LF x 20 times= $500/acre/year
Spot overseed- $19/acre
Weed control- 2.37/MSF x 43.56 MSF per acre= $103/acre/year
Total-$1172/acre/year

Area is roughly 5-10 feet on either side of trail. In some areas there is no turf area or much of a shoulder
Mowing and trimming=20-24 times per year in season (approx. every 8-10 days).
No aeration, no fertilization, no irrigation. Spot overseed 1 time per 1000 sf.
Mowing is cutting two widths of a mower (one on either side of the trail.

Reference- St. Louis County Parks spends about $14,000-15,000 per mile on asphalt trail maintenance. MO Dept of Natural Resources spends about $3000-4000 per mile for their crushed rock trails.

G. Economic Impact of Trails - Selected Resources

The following resources support the development of multi-use trails as a stimulus for economic development. Similar resources are available at the National Trails Training Partnership's website: http://www.americantrails.org/resources/benefits/index.html.

Economic Impacts of Trails

Hosted by AmericanTrails.org

The Economic and Social Benefit of Trails

Trails are an important part of community well-being in many areas.

By Gary Sjoquist
Quality Bicycle Products

During warm weather months in Minnesota, nearly 1.5 million cyclists, inline skaters, and walkers use our nationally-recognized city, county, and state trails. In fact, these trails are a quality of life issue for residents, as well as luring tourists from neighboring states who don't have access to the number and variety of trails we have in Minnesota. Other than a quality of life issue, our trails are an economic boon to the state as well.

"Generally, it's been found a trail can bring at least one million dollars annually to a community."

Lanesboro, on the Root River Trail in Southeastern Minnesota, is an often-cited example of the economic impact a trail can have. Pre- and post-trail Lanesboro, a town of about 800 residents, differ dramatically. Post-trail Lanesboro boasts 12 B&Bs (with year-long waiting lists), 8 restaurants, an art gallery, a museum, and a thriving community theater well-off enough to offer housing to its actors. Economically speaking, the Root River Trail has been very, very good for Lanesboro.

A specific example from Lanesboro can provide further insight. The bike shop in Lanesboro, a small "mom and pop" kind of a place, sold 60 tandem bicycles in a single year (more than the Twin Cities largest multi-store bike retailer that same year). Now, few people would go to Lanesboro to specifically purchase a not-inexpensive tandem bicycle. Rather, this is an indication of people who are having a good time, want it to continue, and are willing to spend the money to spend quality time on the trail. This kind of "impulse" purchase bodes well for retailers along our trails.

Nationally, trail-related expenditures range from less than $1 per day to more than $75 per day, depending on mileage covered. Generally, it's been found a trail can bring at least one million dollars annually to a community, depending on how well the town embraces the trail. For a town like Lanesboro, a trail can mean an annual economic impact of more than five million dollars.

Another aspect has to do with how trails affect property values and the general attractiveness of an area. Studies have shown that 70% of landowners felt that overall, an adjacent trail was a good "neighbor," with positive impacts including 1) getting in touch with nature (64%), 2) recreational opportunity (53%), and 3) health benefits (24%).

Furthermore, 70% of real estate agents use trails as a selling feature when selling homes near trails. 80.5% of them feel the trail would make it easier to sell. In Minnesota, 87% of home owners believe trails either increased the value of their homes or had no impact. On Seattle's most popular trail, homeowners with properties near, but not adjacent to the trail, sold for an average of 6% more than comparable property elsewhere. Additionally, the U.S. National Parks Service notes that increases in property values range from 5 to 32% when adjacent to trails and greenways.

To better estimate potential economic impact, it's important to understand a demographic profile. Overall, trail users average about 48 years of age, are more likely to be male, have completed college, with annual household incomes between $35,000 and $75,000. In Minnesota, trail users have median incomes $10,000 higher than average; good news for the communities along the trail.

With trail users relatively affluent, mobile, and interested in spending quality time with families, trails provide a perfect "getaway" adventure. Having access to trails has changed how families

Economic impacts index

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Tools
Products & services

For more opportunities for training on trail design, construction, and management see the National Trails Training Partnership area.

recreate, with people taking shorter but more frequent "vacations" closer to home and with a more family-oriented focus.

Trails have also allowed these escapes to include a wider variety of family members. Thanks to our mostly paved trails, and the advent of bicycle trailers, "trail-a-bikes," and comfort bikes, it's not uncommon to see an entire extended family - children, teens, parents, and grandparents sharing an outdoor recreational activity. While not an "economic" benefit, necessarily, this is still an important "value added" component trails bring to our state.

For more information, contact the Parks & Trails Council of Minnesota at: 651-726-2457 or 1-800-944-0707 (outside Minnesota) 275 E. 4th Street #642, St. Paul MN 55101-1651 -- e-mail: info@parksandtrails.or

Other links:

MN Dept. of Natural Resources home page

Metropolitan Council Regional Parks

February 2003

Economic Impacts of Trails

Hosted by AmericanTrails.org

Economic Benefits of Greenways: Summary of Findings

Adapted by The Conservation Fund's American Greenways Program

For the complete text in downloadable PDF files see *Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors*, National Park Service, 1990.

Real Property Values

Many studies demonstrate that parks, greenways and trails increase nearby property values, thus increasing local tax revenues. Such increased revenues often offset greenway acquisition costs.

A. California's Secretary for the State Resources Agency estimated that $100 million would be returned to local economies each year from an initial park bond investment of $330 million (Gilliam, 1980).

B. A greenbelt in Boulder, Colorado increased aggregate property values for one neighborhood by $5.4 million, resulting in $500,000 of additional annual property tax revenues. The tax alone could recover the initial cost of the $1-5 million greenbelt in three years (Cornell, Lillydahl, and Singel, 1978).

C. In the vicinity of Philadelphia's 1,300 acre Pennypack Park, property values correlate significantly with proximity to the park. In 1974, the park accounted for 33 percent of the value of land 40 feet away from the park, nine percent when located 1,000 feet away, and 4.2 percent at a distance of 2,500 feet (Hammer, Coughlin and Horn, 1974).

Expenditures by Residents

Spending by local residents on greenway related activities helps support recreation related business and employment, as well as businesses patronized by greenway and trail users.

A. Residents are increasingly spending vacations closer to home, thus spending increasing am ounts of vacation dollars within the boundaries of the state (NPS 1990).

B. In 1988, recreation and leisure was the third largest industry in California. More than $30 billion is spent each year by Californians on recreation and leisure in their state. This amounts to 12 percent of total personal consumption (California Department of Parks and Recreation, 1988).

Commercial Uses

Greenways often provide business opportunities, locations and resources for commercial activities such as recreation equipment rentals and sales, lessons, and other related businesses.

A. Along the lower Colorado River in Arizona, 13 concessionaires under permit to the Bureau of Land Management generate more than $7.5 million annually, with a major spinoff effect in the local economy (Bureau of Land Management, 1987).

B. Golden Gate National Recreation Area has contracts with ten primary concessionaires. Total 1988 gross revenues for these concessionaires were over $16 million, over 25 percent of which was spent on payroll (NPS, 1990).

Tourism

Greenways are often major tourist attractions which generate expenditures on lodging, food, and recreation related services. Moreover, tourism is Maryland's second largest and most stable industry, and is projected to become its largest.

Economic impacts index

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Quotations
Glossary
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For more opportunities for training on trail design, construction, and management see the National Trails Training Partnership area.

A. A poll conducted by the President's Commission on Americans Outdoors found that natural beauty was the single most important criterion for tourists in selecting outdoor recreation sites (Scenic America, 1987). Maryland's Department of Economic and Employment Development estimated the annual value of tourism and commercial activities directly related to the Chesapeake Bay was $31.6 billion in 1989 (DEED 1989).

B. The San Antonio Riverwalk is considered the anchor of the $1.2 billion tourist industry in San Antonio, Texas. A user survey concluded that the Riverwalk is the second most important tourist attraction in the state of Texas (NPS 1990).

C. The Governor's Committee on the Environment reported in 1988 that the governors of five New England states officially recognized open space as a key element in the quality of life in their region. They credited that quality of life with bringing rapid economic growth and a multi-billion dollar tourism industry to the region (Governor's Committee on the Environment, 1988).

Agency Expenditures

The agency responsible for managing a river, trail or greenway can help support local businesses by purchasing supplies and services. Jobs created by the managing agency may also help increase local employment opportunities. Corporate Relocation Evidence shows that the quality of life of a community is an increasingly important factor in corporate relocation decisions. Greenways are often cited as important contributors to quality of life. The quality of life in a community is an increasingly important factor in corporate relocation decisions; greenways are often cited as important contributors to quality of life and to the attractiveness of a community to which businesses are considering relocating.

A. An annual survey of chief executive officers conducted by Cushman and Wakefield in 1989 found that quality of life for employees was the third most important factor in locating a business (NPS, 1990).

B. St. Mary's County, Maryland, has found over the last ten years that businesses which move to the county because of tax incentives tended to leave as soon as the incentives expire. However, businesses that move to the county because of its quality of life remain to become long term residents and taxpayers (NPS, 1990).

C. Site location teams for businesses considering San Antonio, Texas regularly visit the San Antonio Riverwalk. A location on the river-walk is considered very'desirable; A regional grocer, the HEB Company, relocated its corporate headquarters to a historic building oriented towards the river (NPS, 1990).

D. The Joint Economic Committee of the U.S. Congress reports that a city's quality of Life is more important than purely business- related factors when it comes to attracting new businesses, particularly in the high-tech and service industries (Scenic America, 1987).

Public Cost Reduction

The conservation of rivers, trails, and greenways can help local governments and other public agencies reduce costs resulting from flooding and other natural hazards. While greenways have many economic benefits it is important to remember the intrinsic environmental and recreation value of preserving rivers, trails and other open space corridors. Greenways along rivers can help reduce the cost of repairing flood damage and improving water quality.

A In a study of major land uses in Culpepper County, Virginia, it was found that "for every dollar collected from farm/forest/open space, 19 cents is spent on services' "(Vance and Larson, 1988).

B. In Yarmouth, Maine, an analysis of costs of providing municipal services to a specific parcel proposed for parks showed that the annual costs of those services exceeded revenues generated by taxes by $140,000 annually. This was compared to an annual cost of $76,000 over 20 years to purchase the property (World Wildlife Fund, 1992).

C. In Boulder, Colorado, the 1988 public cost for maintaining developed areas was estimated to be over $2,500 per acre. The cost for maintaining open space in the city was only $75 per acre, or less than three percent the cost of non-open space (Crain, 1988)

American Trails and NTTP support accessibility with Section 508: read more.

Updated August 17, 2008

H. Sample Policy and Zoning Techniques to Facilitate Development

Impact fees, land dedication ordinances, greenway overlay districts and similar policies can lay the foundation for a positive bicycle and pedestrian environment. Included in this section are sample policy and zoning techniques to assist municipalities in long-term policy changes to support the implementation of the plan.

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Not an Economic Drag:
New Evidence of the Role of Impact Fees on Sustaining Job Growth

Arthur C. Nelson, Ph.D., FAICP
Metropolitan Institute
Virginia Tech – Alexandria Center

Mitch Moody
Georgia Institute of Technology

A Discussion Paper prepared for the Brookings Institution Center on Urban and Metropolitan Policy

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ABOUT THE AUTHORS

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Comments on this paper can be sent directly to Dr. Nelson who may be reached at acn@vt.edu

Not an Economic Drag:
New Evidence of the Role of Impact Fees on Sustaining Job Growth

EXECUTIVE SUMMARY

Local governments are increasingly seeking other ways to help for public facilities and infrastructure without the acrimony of increasing local property taxes. Impact fees, which are one-time charges against new development to help pay for facilities needed to serve it, are one such financing tool.

However, conventional wisdom among some public officials is that these development impact fees are bad for local economic development. As such, the effect of impact fees on economic development is controversial. Some say that fees act as a "tax" on capital, stifling investment and job growth away from communities that charge them to those that do not or charge less. Others argue that economic growth can depend on the timely provision of new infrastructure and expansion of buildable land because impact fees are a form of investment in the community.

Given that impact fees have become a popular source of funds for public infrastructure projects, it is important to understand the relationship between impact fees and local economic development, defined here as local job growth.

This report addresses the controversy around impact fees by reviewing the literature concerning the effect of impact fees on employment and the economy generally. It then analyzes impact fee data, assembled for the period 1993 to 1999, for all the 67 counties in Florida. This unique dataset was used to analyze the relationship between impact fee collections and new jobs. To that end, the paper find that:

- **Impact fees are not are not a drag on local economies.** Conservatively, the findings of the analysis prove that there are no adverse economic impacts on local economies from impact fees. However, a liberal interpretation would argue that the imposition of impact fees typically results in substantial positive effects on local employment, at least in Florida during the 1990's.

- **Impact fees can be used to pay for a variety of local needs.** In Florida during the 1990's, nearly two-thirds of the impact fee revenue was spent on the physical infrastructure environment - particularly transportation. Revenue was spent for other

needs as well, such as recreation and public safety, but most of the impact fee revenue was spent in such a way as to directly stimulate local economy.

- **Impact fees are generally justified as they can stimulate economic growth and also serve to alleviate the burden on property taxes in paying for new infrastructure.** Numerous studies show that property taxes usually do not cover the full cost of new infrastructure needed to serve new development. As such, impact fees represent an investment in communities, rather than shifting economic development to communities that do not charge them.

- **However, impact fees are not a panacea.** Economic development and job growth depend on myriad of factors - not just the imposition of impact fees. However, given the right fiscal environment, impact fees can directly fund vital infrastructure improvements and indirectly promote local employment at the same time. Considering tax limitations and growing demand for investment, communities in growing regions that have impact fees may become more prosperous in the long run than communities in those regions that do not have them.

O'Fallon
ILLINOIS

Land Dedications for Parkland, Open Space and Trails in O'Fallon, Illinois

April 11, 2007

O'Fallon
ILLINOIS

Key Points of Land Dedication Ordinance

- The Dedication Requirements need to be supported by a legislative determination of impact and need as shown in the City's Parks Plan, Market Value Study, and Park Dedication Study
- This is done to ensure the requirements imposed are not more than those necessary to address impacts specifically attributable to the applicable subdivision.

O'Fallon
ILLINOIS

Key Points of Land Dedication Ordinance

- Purpose is to obtain land (first) or fees in lieu of land for parkland, open space, or trails (second).
- Developer/City Collaboration and Negotiation
- Dedication requirement extends into the unincorporated extra-territorial 1.5 mile jurisdiction
- Standard = 6 acres/1,000 new residents (or 353 new homes)
- Land Market Value = $59,000/developable acre, valued to include access to utility services/roads

O'Fallon
ILLINOIS

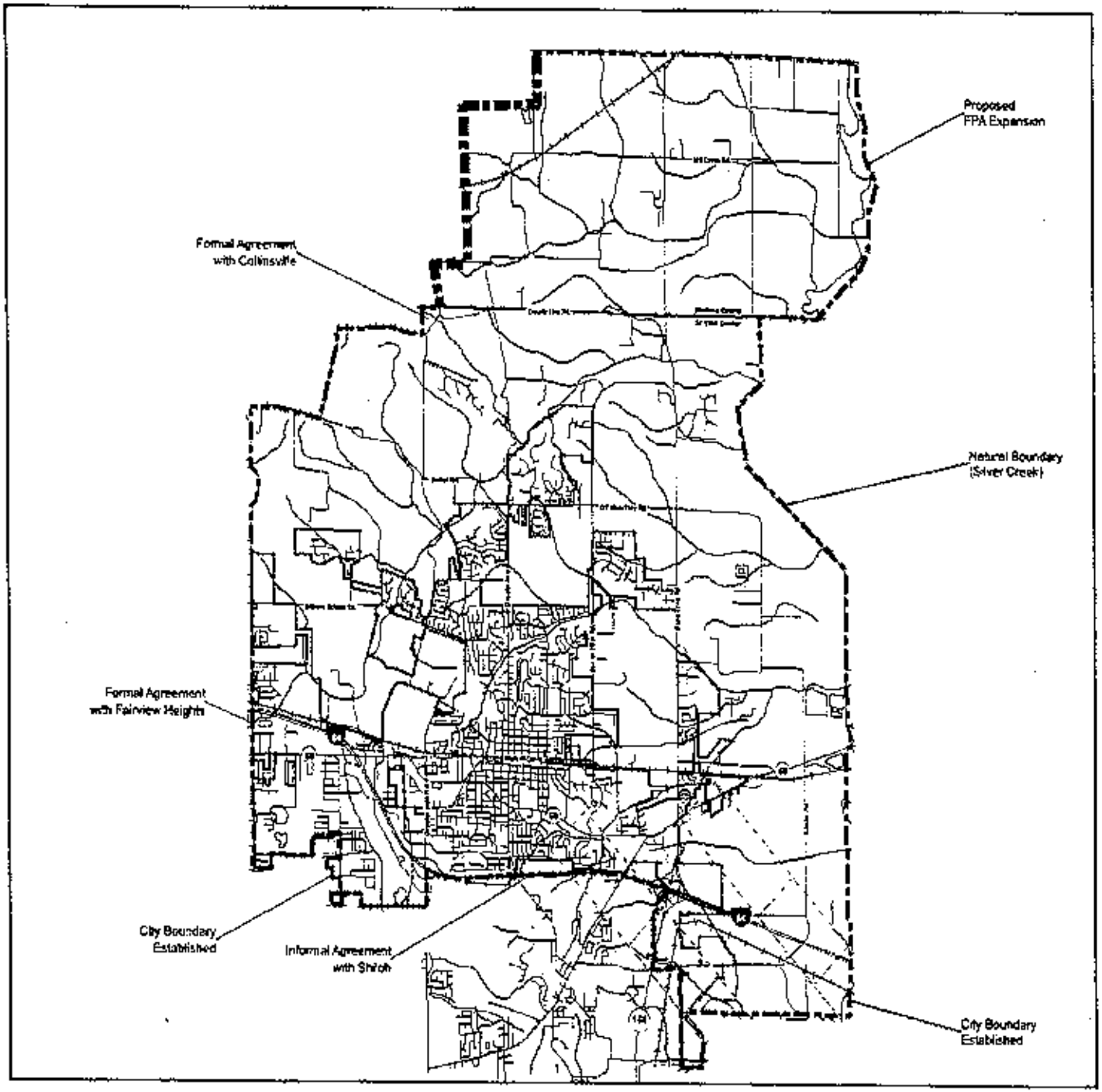
Key Points of Land Dedication Ordinance

- Land Dedication Required at Final Plat prior to platting of 50% of lots, or
- Fee in lieu payable at time of building permit (roughly $1,002/per unit), if no land is suitable on-site for dedication.
- Usually built into annexation agreements.
- Credit may be given for suitable private open space up to 50% of dedication requirement.

O'Fallon ILLINOIS

Land Dedication and Fee-in Lieu Example

- Ex: 200 SF housing units - what is the parkland dedication requirement or fee in lieu?
- 200 units x 2.83 (persons per household)= 566 residents
- 566 residents x .006 = 3.396 acres of parkland
- 3.396 acres x $59,000/acre = $200,364
- $200,364/200 units = $1001.82/unit fee- in lieu



O'Fallon, Illinois Comprehensive Plan Year 2006

Legend

- Current City Boundary
- Agreement Boundary

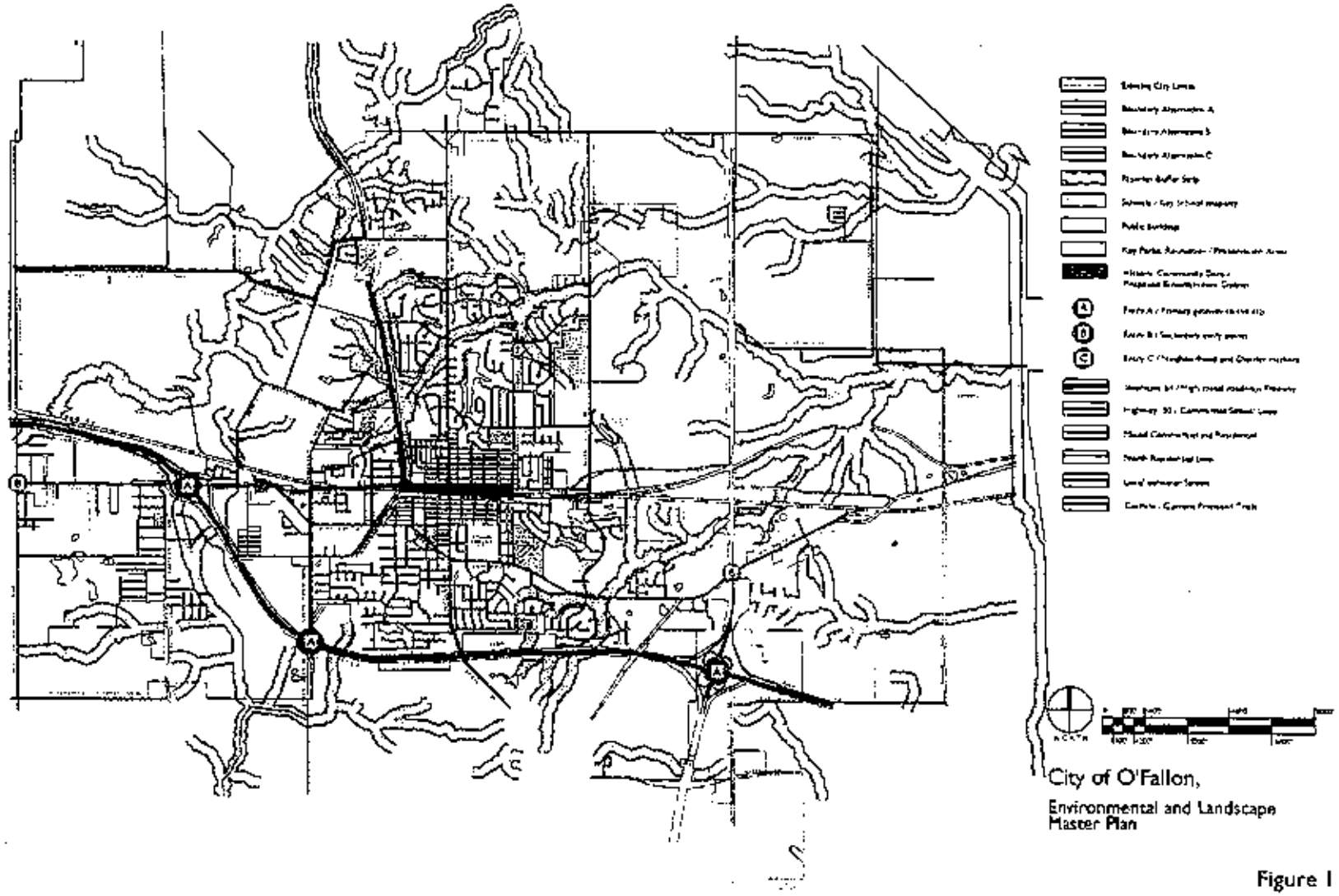
Jurisdictional Boundary Agreements

July 2006

1910 Pine Street, Suite 420
St.Louis, MO 63103
314.436.0865
www.woolpert.com

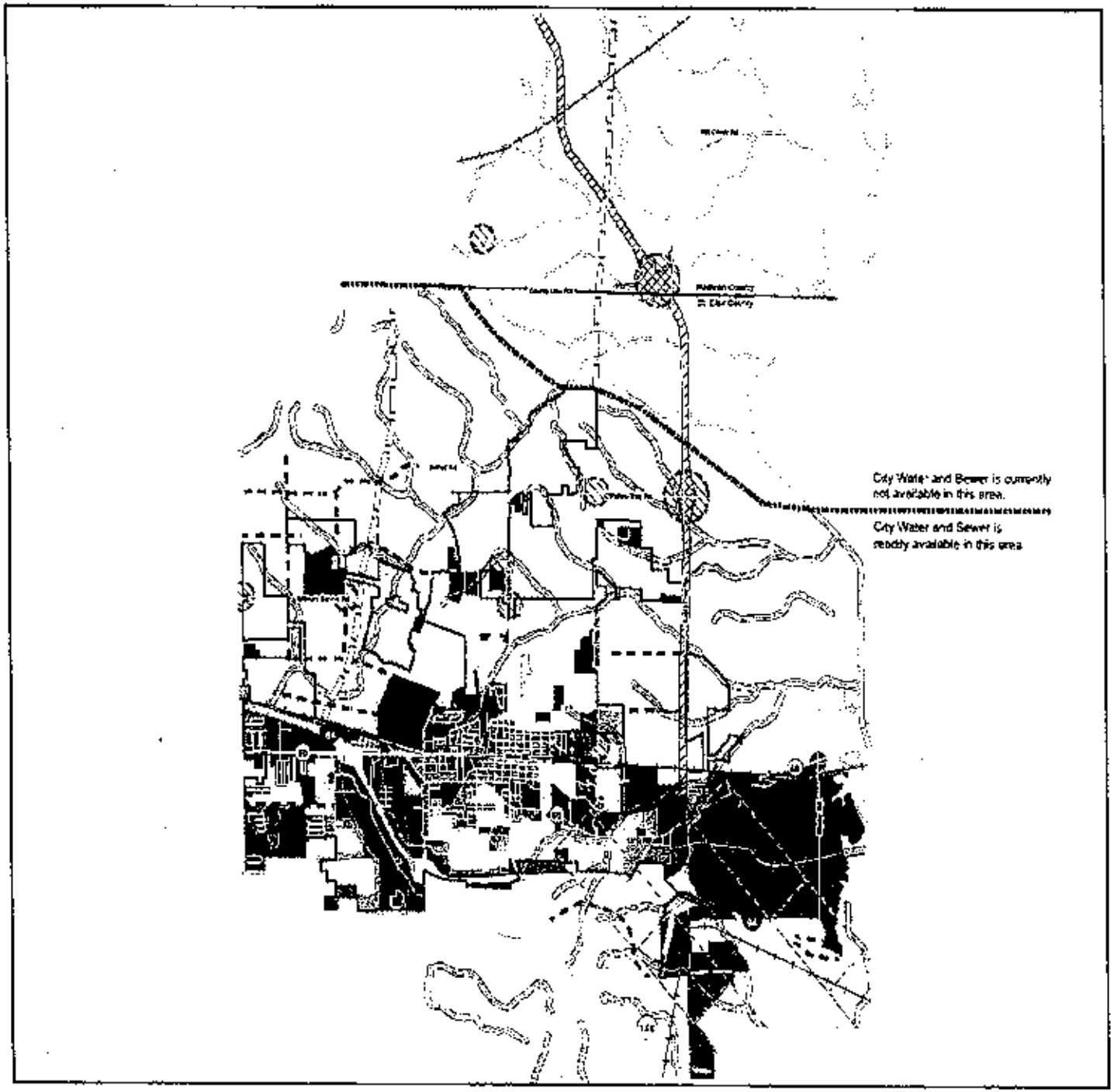
O'Fallon
ILLINOIS

Environmental Framework Plan



City of O'Fallon,
Environmental and Landscape
Master Plan

Figure 1



O'Fallon, Illinois Comprehensive Plan Year 2006

Map Attributes

- Airport Zone
- City Boundary
- Gateway Connector Corridor
- Proposed Future Road
- Proposed Road Corridor

Riparian Zones

- Zone "X"
- Zone "Y"

Proposed Land Use

- Agriculture/Open Space
- Rural Residential
- Single Family Residential
- Neighborhood Residential
- Multi-Family Residential
- Institutional
- Office/Service
- General Commercial
- Regional Commercial
- Heavy Commercial
- Business/Industrial Park
- Park
- Neighborhood Commercial District
- Regional Mixed Use District

Future Land Use

July 2006

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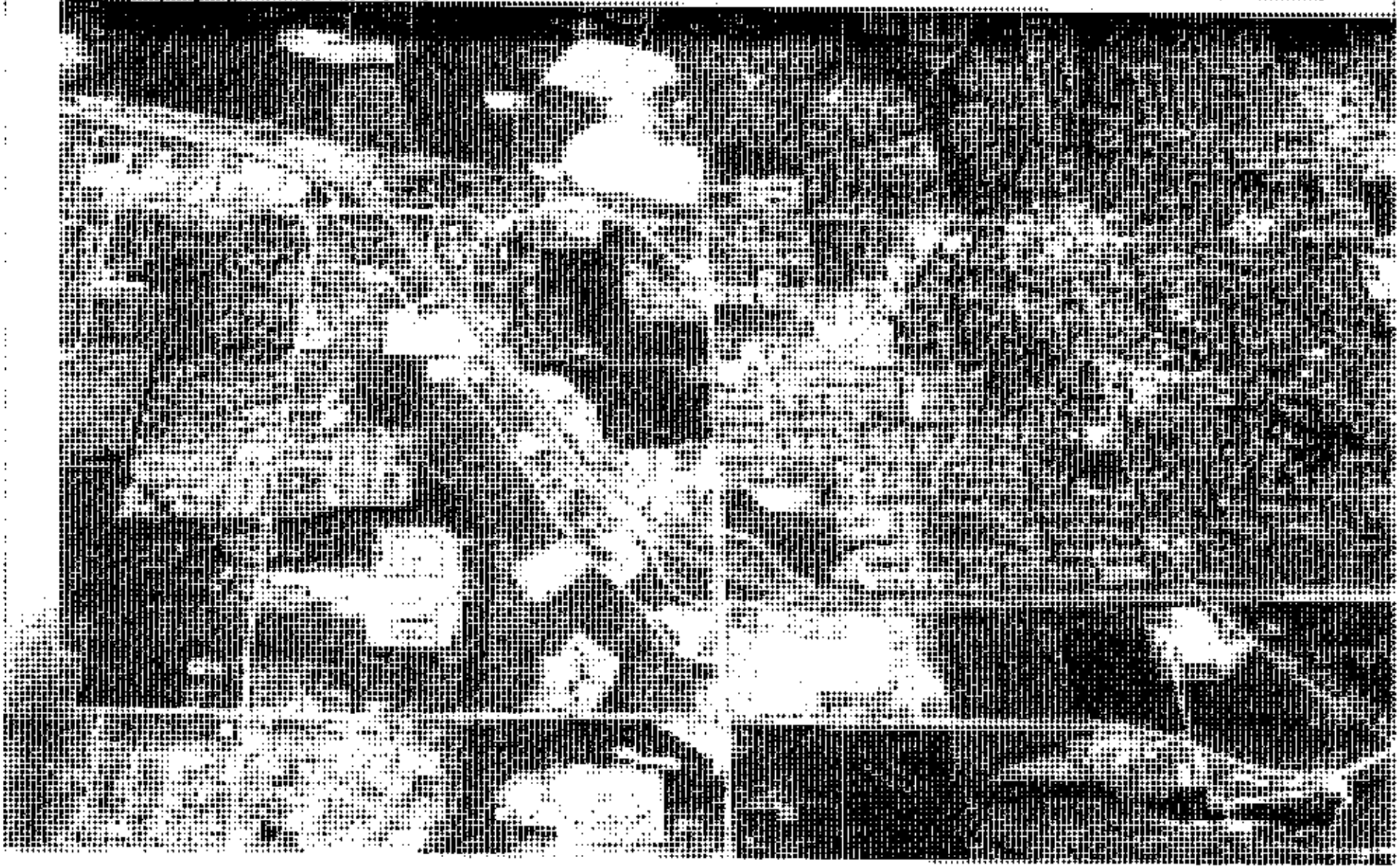
200 Acre O'Fallon Sports Park



ARTICLE 25

WG WILLAMETTE GREENWAY OVERLAY DISTRICT

ARTICLE 25

WG WILLAMETTE GREENWAY OVERLAY DISTRICT

25.010 GENERAL.

The regulations of WG Overlay District shall supplement the regulations of the underlying district. Where the regulations and permitted uses of an underlying district conflict with those of an Overlay District, the more restrictive standards shall apply.

25.020 DESCRIPTION.

It is the purpose of the WG Overlay District to protect and preserve natural scenic, historic and recreational qualities of lands along the Willamette River. This overlay district delineates the Willamette Greenway area for the City and establishes standards for the delineation of the Greenway Setback Area.

25.030 APPLICABILITY.

The WG Overlay District applies to all lands which are within 150 feet of the ordinary low water line on the channel of the Willamette River, or are adjacent to the river and are publicly owned for park and recreation purposes.

25.040 REVIEW.

(1) Development proposals shall be reviewed under Type III procedure (Discretionary Use) and shall be in accordance with Article 31, Site Plan Review Standards and the standards of this Article.

(2) A complete application together with all required materials shall be accepted by the Director prior to the review of the request in accordance with Section 3.050, Application Submittal.

(3) Notice shall be given to the Oregon Department of Transportation by immediately forwarding a copy of the application by certified mail, return receipt requested. Notice of final City action shall also be provided to the Oregon Department of Transportation.

25.050 PERMITTED AND DISCRETIONARY USES.

Except for uses within the Greenway Setback Area, uses allowed in the WG Overlay District are the same as those in the underlying districts (refer to Section 32.130 for siting standards and review process for certain wireless telecommunications systems facilities). Any change or intensification of use, or construction that has a significant visual impact requires Discretionary Use Approval.

25.060 GREENWAY SETBACK.

A Greenway Setback Line shall be established to protect, maintain, preserve and enhance the natural, scenic, historic and recreational qualities of the Willamette Greenway. Only water-dependent or water-related uses shall be permitted between the Willamette River and the Greenway Setback Line. The Greenway Overlay District shall substitute temporarily as the Greenway Setback Line for all properties within this Overlay District that do not have an established Setback Line. Establishment of this Setback Line may occur with or without a request for development approval, but any request for development approval on land without an established Setback Line must be accompanied by an application for establishment of the Greenway Setback Line. The location of the Greenway Setback Line shall be determined consistent with the following standards derived from Section C.3 of the Willamette River Greenway Goal 15:

(1) Local, regional and State recreational needs shall be provided for consistent with the carrying capacity of the land. The possibility that public recreation use might disturb adjacent property shall be considered and minimized to the greatest extent possible.

(2) Adequate public access to the river shall be provided.

(3) Significant fish and wildlife habitats shall be protected.

(4) Identified scenic qualities and view-points shall be preserved.

(5) The maintenance of public safety and protection of public and private property, especially from vandalism and trespass shall be provided for to the maximum extent practicable.

(6) The natural vegetative fringe along the river shall be enhanced and protected to the maximum extent practicable.

(7) The location of known aggregate deposits shall be considered. Aggregate extraction may be permitted outside the Greenway Setback Area subject to compliance with State law, the underlying district and conditions of approval designed to minimize adverse effects on water quality, fish and wildlife, vegetation, bank stabilization, stream flow, visual quality, quiet and safety and to guarantee reclamation.

(8) Developments shall be directed away from the river to the greatest possible degree; provided, however, lands committed to urban uses shall be permitted to continue as urban uses, including port, public, industrial, commercial and residential uses, uses pertaining to navigational requirements, water and land access needs and related facilities.

25.070 DEVELOPMENT STANDARDS.

In addition to Discretionary Use criteria specified in Section 10.030 of this Code, applications in the

WG Overlay District shall also meet the standards specified in Section 25.060 of this Article.

(Ord. 5466 3/6/89): Section 25.050.

(Ord. 5804 12/18/95): Section 25.040; 25.060.

(Ord. 5849 3/17/97): Section 25.050.