



City of Chesterfield Bikeable Walkable Community Plan February 2010



In partnership with:



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Chapter 1: Introduction

Over the past several years, interest in cycling and walking has increased in the City of Chesterfield, 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 destinations in and around the community, just like automobile drivers. This plan represents the City's commitment to ensuring that bicyclists and pedestrians of all ages and abilities can safely and conveniently travel throughout the City.

1. Benefits of a Bikeable and Walkable Community

The development of a bicycle and pedestrian master plan for the City of Chesterfield is an acknowledgement of the many benefits of bicycle and pedestrian friendly environment for residents, workers, and visitors. 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-centric land use and 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 of adults (72 million) 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 influence community health. Incorporating bicycle and pedestrian infrastructure into local transportation and recreation systems can provide opportunities for community members to reach the recommended 30 to 60 minutes of moderately intense physical activity through active

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

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. With half of all trips in America within a 20-minute bike ride, and a quarter of all trips within a 20-minute walk, many opportunities exist to leave the car behind and get around town by bike or foot.³ However, the choices we make are limited by the choices available, and many cities throughout the metropolitan area lack the infrastructure necessary to facilitate safe and convenient walking and cycling trips. Improving a city's non-motorized transportation facilities encourages people to consider non-motorized transportation options as desirable. With an improved crosswalk or a new bike route, a previously uninviting trip to the grocery store for walkers and bikers is transformed into a safe and welcoming journey. The result is less travel by automobile, which in turn reduces traffic congestion and lowers greenhouse gas emissions. These results are even more significant when coupled with an effective public transit network to increase accessibility to destinations beyond reasonable walking and cycling distances.

Economic Benefits. For individuals and businesses, the economic benefits of bicycle and pedestrian infrastructure improvements are multi-faceted:

- Improving non-motorized transportation infrastructure increases access for residents of all ages and abilities to reach local businesses and services without a car.
- AAA estimates the average cost of driving in 2009 between \$7,067 and \$9,055.⁴ Individuals choosing to bike or walk and connect to public transit will save money on both automobile maintenance and gas costs.
- Desirable community amenities like multi-use trails and greenways raise nearby home values. Both empirical studies and community surveys have shown that there are real and perceived benefits of trails and greenways as transportation and recreation amenities. A study on the economic impacts and uses of long-distance trails examined property values along Burke-Gilman Trail in Seattle and found that properties near the

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).

⁴ AAA. *Your Driving Costs, 2009 Edition* (2009).

trail sold for an average of 6 percent more than comparable properties elsewhere, while properties located adjacent to the trail sold for roughly 6.5 to 7 percent more.⁵ In Minnesota, 87 percent of survey respondents felt that nearby trails either increased their property value or had no impact at all.⁶

- Increased property values lead to an increase in tax revenue for local governments. In Boulder, Colorado, the aggregate property value for one neighborhood adjacent to one of the city's greenbelts was \$5.4 million greater than if there had been no green belt at all. The increase in property value led to an increase of \$500,000 in property tax revenue for the city.⁷ Another study found that, upon the completion of the New Brunswick Provincial Trail System in the Canadian province of New Brunswick, increase in adjacent property values led to a \$100,000 increase in property tax revenue for the province.⁸
- 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, by increasing foot traffic

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 sense of place 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. In addition, walking is the major way we encounter our neighbors and build the social capital and social connections that strengthen our community.

Quality of Life. All these factors converge to create an overall quality of life. Improved health, increased mobility and transportation options, improved air quality, and a strong sense of

⁵ Moore, R. L. & Barthlow, K. *The Economic Impact of Long-Distance Trails - A Case Study of the Overmountain Victory National Historic Trail*. Raleigh, NC: United States Department of the Interior, National Parks Service (1998).

⁶ *Ibid.*

⁷ Rivers and Trails Conservation Assistance, National Parks Service. *Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors: A Resource Book, 4th Ed.* (1995).

⁸ Drisdelle, A.A. *Provincial Trails System Using the Abandoned Railways System*. Fredericton, NB, CA: Drisdelle & Associates (1993).

community are all highly desirable qualities that contribute a community's character. All of these characteristics come to the fore through the implementation of a bicycle and pedestrian plan.

2. Plan Origins

Walkability and bikeability are more than just buzzwords; 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, the City of Chesterfield has set out to identify and prioritize short- and long-range infrastructure improvements and supporting programs to enhance bicycle and pedestrian conditions throughout the City.

Chesterfield has partnered 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). Chesterfield now joins over fifteen municipalities throughout the metropolitan area that have created master plans to strategically address bicycle and pedestrian mobility and safety. As more and more cities recognize the importance of bicycling and walking to a community's health, mobility, recreational opportunities, and quality of life, local and regional efforts will soon connect to create a region-wide system of interconnected facilities that move people not just within their communities, but also throughout the greater St. Louis metropolitan area.

3. 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 City of Chesterfield and formulates a vision, goals and objectives addressing both recreational and

transportation needs. The plan connects residents, employees, and visitors with 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.

4. Plan Scope

Study Area. The planning study area covers the city limits of Chesterfield and immediate vicinity. Located in west St. Louis County, Missouri, Chesterfield encompasses roughly 33 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 typically phased over a ten to fifteen year period and is dependent on the convergence of several factors, including available funding, both internal and external, coordination with county, regional and state entities, and the scheduling of other capital improvements and roadway projects. While the plan does not establish a definite timeline for the implementation of recommended projects included herein, the City of Chesterfield should undertake projects as these factors align.

5. Planning Process

Three key factors have driven the planning process: municipal considerations, public participation, and sound planning and design principles.

Municipal Considerations. A technical advisory committee comprised of representatives of the City's parks and recreation, planning, and public works departments, representatives from both MoDOT and St. Louis County Department of Highways and Traffic, and three Chesterfield residents provided oversight and guidance throughout the project. This group met on several

occasions during the study period to discuss issues, needs, existing plans and opportunities to guide the effort.

Public Participation. In order to gain public input throughout the City, the planning team created a number of engagement opportunities to be undertaken during the course of the project. These public engagement components of the plan raised awareness of bicycle and pedestrian facilities as important elements to the City's multi-modal transportation network and provided opportunities for the public to actively participate in the planning process. Elements of the public involvement process included two public forums, a walkability audit, and a community survey, available in print and on-line.

- **Public Forums.** The two public forums offered residents the opportunity to learn more about the importance of bicycle and pedestrian facilities as important components of the transportation and recreation networks and to provide input on existing conditions and desired routes and improvements.

The first public forum was held on June 17, 2009 in the Council Chambers at City Hall. The purpose of this meeting was four-fold:

1. Introduce the plan background and planning process to attendees;
2. Frame the context of the public forum through the Five E's (engineering, planning and evaluation, education, encouragement, and enforcement), and how each one contributes to a bikeable and walkable community;
3. Provide an overview of the existing socio-economic and physical features that shape bicycling and walking issues in Chesterfield;
4. Solicit input regarding bicycling and walking activity, desires, and ideas.

With more than 30 residents, stakeholders, and interested persons in attendance, the forum imparted a general understanding of the planning process and the potential outcomes of the plan. In addition, a great amount of information was gathered regarding currently used facilities, dangerous intersections and corridors for walking and cycling, and ideas for on-street and off-street routes to connect residential areas to significant community destinations.

The second public forum was held on September 16, 2009, also in the Council Chambers. At this forum, the planning team shared with residents and stakeholders the work-to-date and the initial recommendations for improvements. Separate maps detailing recommended bicycle and pedestrian improvements were laid out for comments and markings to guide the final recommendations. Over 25 residents and stakeholders attended the forum and provided input on the plan's recommendations. Feedback gathered at the second public forum was incorporated into revisions to the recommended improvements and the final plan.



Illustration 1: Chesterfield residents and city staff sharing ideas during a brainstorming session at the second public forum. (Image: Jennifer Allen)

- **Walkability Audit.** On Saturday, July 25, 2009, Trailnet and City of Chesterfield staff led 15 Chesterfield residents on a walkability audit to capture and document the typical walking experience along busier arterial and collector roads in Chesterfield. The 1.5-mile route began and ended at the West County YMCA (16464 Burkhardt Place), traveling along Burkhardt, Chesterfield Parkway, and Justus Post. Following the walk, the group reconvened at the YMCA to discuss their experience and observations.
- **Community Survey.** The value of local knowledge is a critical component of the plan. Local residents and stakeholders have first-hand knowledge and insight relating to the built environment and social networks relating to bicycle and pedestrian issues. In order to solicit this local knowledge, the planning team developed and administered a survey addressing bicycle and pedestrian activities and infrastructure, both existing and desired.



Illustration 2: Attendees at the walkability audit examined some of the challenges facing pedestrians throughout the City. (Image: Kevin Neill)

Ninety-five responses were collected, ten of which were completed manually at the public forums. The responses were used to identify critical gaps in the bicycle and pedestrian networks and guide recommendations for infrastructure improvements and programming.

Public Outreach. The planning team, in conjunction with the Technical Advisory Committee, identified a number of outlets for dissemination. The intent of public outreach was to inform local residents and businesses of the planning process and alert them of events related to the project in a timely manner. In addition to the outlets listed below, information regarding upcoming events was emailed to attendees of earlier planning related events, survey respondents who provided email addresses, and Trailnet e-newsletter recipients in the 63017 and 63005 Chesterfield zip codes.

- **Web Pages.** Both Trailnet and the City of Chesterfield developed plan-specific web pages on their websites to promote the plan, provide information regarding plan-related events, both past and future, and encourage residents and interested persons to complete the on-line survey regarding bicycle and pedestrian issues. Chesterfield’s website included download links for public forum presentations, plan documents, and plan maps.
- **Newsletter Pieces.** The planning team produced two articles for *The Chesterfield Citizen*, a quarterly newsletter published by the City of Chesterfield. The first article, which appeared in the Summer 2009 issue, introduced the planning process to Chesterfield residents and businesses and advertised the first public forum, which occurred roughly two weeks after the release of the newsletter. The second newsletter article appeared in the Fall 2009 issue of *The Chesterfield Citizen*, updating local citizens on the progress of the planning process and encouraging attendance at the second public forum.
- **“Save the Date” Handouts.** 4.25” x 5.5” postcard-size handouts were distributed to raise awareness for the plan and encourage residents and interested persons to attend the first public forum. The handouts provided an overview of the plan and identified a number of opportunities for residents to become involved in the planning process. Four hundred handouts were printed and distributed to the City of Chesterfield, which made the

handouts available at City Hall, the Chesterfield Valley Athletic Complex, Central Park and the Chesterfield Family Aquatic Center, and the West County YMCA.

Principles and Practices. The planning process followed current planning principles and practices to create an up-to-date, responsive plan that best meets the needs of the City. 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 Chesterfield bicycle and pedestrian network.

The implementation phase, the most important element of any plan, prioritizes recommended projects to improve conditions for cyclists and pedestrians throughout the City. 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.

6. 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 and desires 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 incorporates infrastructure recommendations and implementation strategies to assist City staff and elected officials in the prioritization and selection of bicycle and pedestrian improvements. Recommended bicycle and pedestrian facilities are listed, including trails, on-street bicycle facilities, and pedestrian improvements. The implementation strategy included in this section incorporates an opinion of cost for proposed facilities, prioritization of key recommended improvements, and a description of potential funding sources. 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 to encourage use of the new facilities. The recommendations in this plan are intended to function as a tool to assist City staff and elected officials in prioritizing and selecting projects to improve conditions for cycling and walking in the city.

Chapter 2. Existing Conditions and Analysis

A. Socio-Economic Factors

This study begins with an examination of selected demographic characteristics that will help to set the stage for the formulation of a plan to create a system of bikeable and walkable facilities to meet the City of Chesterfield's present and future needs, and to help ensure that the City continues to grow and prosper.

The analysis covers (1) population change; (2) age groups; (3) household income; (4) educational attainment; (5) journey to work information; (6) non work-related local travel patterns including mode of travel; and (7) area opportunities/interest in cycling.

In this analysis, Chesterfield is compared to six adjacent communities including Maryland Heights to the north, Town and Country and Creve Coeur to the east and Ballwin, Clarkson Valley and Wildwood on the south side of Chesterfield. These cities generally have age, income and educational attainment similar to Chesterfield. The map to the right shows the City's context in the region.



Illustration 3: Chesterfield in its regional context.

1. Population

In the year 2000, the City of Chesterfield had a total population of 46,802. There were 18,796 dwelling units in the City of which 12,056 (64 percent) were single family and 6,740 were duplexes, townhouse or apartments. Chesterfield's largest decade of residential growth was in the 1970's when 6,796 housing units were built – a rate of nearly 700 units per month. Robust growth continued thereafter. This activity is summarized by decade in the table at the top of the following page:

Table 1: Housing units by decade.

Decade	Housing Units Built	Total Housing Units	Percent Change
Before 1959	558	558	
1960 to 1969	2,208	2,766	396%
1970 to 1979	6,796	9,562	246%
1980 to 1989	5,468	15,030	57%
1990 to 1999	3,766	18,796	25%

Source: US Census

Vehicle ownership among the City’s 18,976 housing units is shown in Table 2 below. With just over three percent of households without a vehicle, a considerable portion of the population must rely on transit, walking and cycling as their primary means of transportation, and therefore require an adequate network of bicycle and pedestrian facilities to reach local destinations and transit stops.

Table 2: Vehicle ownership.

Number of Vehicles	Households	Percent of Households
No vehicles	553	3.1%
One vehicle	4,765	26.3%
Two vehicle	9,185	50.8%
Three or more vehicles	3,588	19.8%

Source: US Census

Chesterfield’s residential base, coupled with a robust office and retail environment, makes the City a prime candidate to establish a system of walkable/bikeable trails for both transportation and recreational use.

Population growth rates in Chesterfield have generally mirrored the trend in housing construction, showing a considerable increase of 8,811 residents from 1990 to 2000. Among Chesterfield’s neighboring communities, only Ballwin experienced a greater increase during that time period, as shown in Table 3 at the top of the following page. With a population of 46,802 in 2000, Chesterfield ranks among the largest cities in St. Louis County.

Table 3: Comparison of Change in Population, 1990 to 2000.

Cities	Population		Increase	Percent Increase
	1990	2000	1990-2000	
Chesterfield	37,991	46,802	8,811	23.2
Ballwin	21,816	31,283	9,467	43.4
Clarkson Valley	2,508	2,676	168	0.9
Creve Coeur	12,304	16,500	4,196	29.3
Maryland Heights	25,407	25,756	349	1.4
Town and Country	9,519	10,894	1,375	6.9
Wildwood*	-	32,194	-	-

* Wildwood was not yet incorporated in 1990. Consequently, a census was not undertaken.

Source: US Census

2. Age Groups

Broad age groups for the seven cities are shown in Table 4, based on the 2000 U.S. Census. Chesterfield had 25.1 percent of its total population in the “25-44” age group. Research shows this is to be an age cohort in which bicycle usage is relatively high. Wildwood had 31.5 percent in this group and Maryland Heights had 37.3 percent. In the “45-54” age group - also a higher bicycle use group - Clarkson Valley had the highest ratio at 23.9 percent. Chesterfield was the next highest group at 18.0 percent. Those most likely to commute to work with a bicycle are in the “25 to 44” and “45 to 54” age groups, given the presence of an adequate infrastructure and other conditions for cycling.

Table 4: Comparison of Age Groups as Percent of Population, 2000.

Cities	Percent of Population by Age Group				
	Under 5	5 to 24	25 to 44	45 to 54	55 and over
Chesterfield	5.6	24.9	25.1	18.0	26.4
Ballwin	7.3	26.2	29.9	14.8	21.8
Clarkson Valley	4.6	28.9	19.1	23.9	23.5
Creve Coeur	4.9	32.0	29.3	7.6	22.6
Maryland Heights	5.9	25.4	37.3	12.9	18.5
Town and Country	4.2	26.0	16.9	17.8	39.1
Wildwood	8.2	29.7	31.5	17.6	13.0

Source: US Census

Chesterfield's residential base is close to many office and commercial uses – job centers that can provide opportunities for people to commute to work. A 20-minute bike ride at 10 miles per hour covers just over three miles. A substantial part of Chesterfield's 46,000 people live within a few miles of a job center.

3. Household Income

Chesterfield had a median income of \$83,802 in the year 1999. Clarkson Valley had a median income of \$153,933, and Town and Country was at \$139,967. Income levels in this range are very high - possibly among the highest in the County and the greater St. Louis Region. Clarkson Valley, Town and Country and Ballwin had the greatest gains in Median Household Income between 1989 and 1999, as shown in Table 5.

Table 5: Comparison of Median Household Income, 1989 to 1999.

Cities	Household Income		Gain	Percent Gain
	1989	1999		
Chesterfield	\$75,237	\$83,802	\$8,565	11.4
Ballwin	46,654	\$66,458	\$19,804	42.5
Clarkson Valley	\$106,295	\$153,933	\$47,638	44.8
Creve Coeur	\$59,913	\$75,032	\$15,119	25.2
Maryland Heights	\$39,211	\$30,046	\$8,858	22.6
Town and Country	\$101,750	\$139,967	\$38,017	37.3
Wildwood*	-	\$94,006	-	-

*Wildwood was not yet incorporated in 1990. Consequently, a census was not undertaken.

Source: US Census

Although it is believed that individuals will consider walking and bicycling for economic reasons, research shows that individuals in moderate and upper income categories will also consider such modes of travel if certain environmental and physical conditions are present.

4. Educational Attainment

There is a direct relationship between educational attainment and income, and this is reflected in Chesterfield. In 2000, twenty-four percent of the population in Chesterfield had a graduate

degree, as shown in Table 6. Clarkson Valley, Creve Coeur and Town and Country had percentages between 28 and 31 percent.

Table 6: Comparison of Educational Attainment as Percent of Population, 2000.

Cities	Less than 9 th Grade	High School	Associate Degree	Bachelor Degree	Graduate Degree
Chesterfield	1.4	15.5	22.6	36.6	24
Ballwin	1.4	22.5	29.5	30.5	16.2
Clarkson Valley	0.5	12.7	26.1	31.8	28.9
Creve Coeur	0.9	14.6	21.8	34.6	28.3
Maryland Heights	4.4	30.4	26.5	26.6	12.1
Town and Country	2.5	13.8	17.4	35.4	30.8
Wildwood	1.5	14.6	26.5	38.9	18.5

Source: US Census

In 2000, the percent of the population that had a bachelor degree was 36.6 in Chesterfield, the second highest for all of the compared cities. Town and Country was close with 35.4 percent of the population with a Bachelor Degree and Wildwood was the highest with 38.9 percent. It is of note that the combination of Bachelor and Graduate Degrees in Chesterfield was 60.6 percent, 62.9 percent in Creve Coeur and 57.4 percent in Wildwood.

Nationally, there is a significant correlation between income, educational attainment, and bicycling/walking/running for recreation and fitness. This suggests that there are relatively high levels of bicycling and walking for recreation in Chesterfield, and this has been observed through field work during the course of the study. With the provision of adequate facilities, connections between residential and commercial areas, and programs to encourage such activities, further increases are possible for recreation, fitness and possibly practical purposes as well.

5. Journey to Work

A study of travel time to work is an important element of this socio-economic analysis, as it identifies the potential for bikeable/walkable facilities to support commuting. The U.S. Census Bureau tracks bicycling in its “Means of Commuting to Work” computations. Bicycling is included in its “Other” category, which also includes motorcycles and taxis. To provide a

further understanding of the relative size of each component in this category, in 2007 St. Louis County’s total “Bicycle” mode share was 0.2 percent, whereas the “Taxicab, motorcycle or other means” mode share was 1.2 percent.

In addition to the Decennial U.S. Census, the U.S. Census Bureau produces the American Community Survey (ACS) on a continuous basis. ACS data from 2007 was used to provide more up-to-date information on the Journey to Work, albeit trading off some level of precision due to the sampling techniques used by the ACS. This information is shown in Tables 7a and 7b on the following below.

Table 7a: Means of Commuting to Work (Persons Commuting).

Municipality	Chesterfield	Ballwin	Clarkson Valley*	Creve Coeur	Maryland Heights	Town & Country	Wildwood
Total Commuters	23,610	15,502	1,261	8,184	16,522	4,337	17,195
Drove Alone	19,739	13,471	1,113	6,999	13,414	3,701	14,260
Carpooled	1,246	1,146	45	443	1,493	237	1,081
Public Transportation	26	0	0	70	141	5	65
Walked	163	148	9	162	788	125	110
Other (Bike)	226	54	8	52	39	29	404
Worked at Home	2,210	683	86	458	647	240	1,275

Sources: 2005-2007 American Community Survey, * 2000 US Census.

Table 7b: Means of Commuting to Work (Percentage).

Municipality	Chesterfield	Ballwin	Clarkson Valley*	Creve Coeur	Maryland Heights	Town & Country	Wildwood
Total Commuters	23,610	15,502	1,261	8,184	16,522	4,337	17,195
Drove Alone	83.6	86.9	88.3	85.5	84.8	85.3	83.3
Carpooled	5.3	7.4	3.6	5.4	9.4	5.5	6.2
Public Transportation	0.1	0.0	0.0	0.9	0.9	0.1	0.4
Walked	0.7	1.0	0.7	2.0	0.5	2.9	0.6
Other (Bike)	1.0	0.3	0.6	0.6	0.2	0.7	2.3
Worked at Home	9.4	4.4	6.8	5.6	4.1	5.5	7.3

Sources: 2005-2007 American Community Survey, * 2000 US Census.

Chesterfield, at 23,610, has by far the greatest number of total commuters when compared to its neighboring cities. Over 83 percent of its commuting residents drove alone to work. This represents the second-lowest rate of single-occupant vehicle (S.O.V.) commuting among the comparison cities, with only Wildwood registering a slightly lower rate. While the reasons for

this low S.O.V. commuting rate are not known, it may reflect relatively higher percentages in other journey-to-work categories including the use of alternative modes of travel to work and working at home. This is further examined below.

Carpooling is not a preferred alternative in Chesterfield, as six of its neighboring cities had higher rates of vehicle sharing. The reasons for the relatively low level of carpooling in the City (5.3 percent) are unknown. In terms of public transit as a commute-to-work mode, Chesterfield, at 0.1 percent, ranks lower than many of its neighbors. This may be a reflection of a real or perceived lack of transit options in the City. In the walk-to-work mode, Chesterfield is at the midpoint of the range of the comparison cities for the number of workers who use this mode (0.7 percent).

Significantly, the City has the second-highest percentage of commuters (1.0 percent), who used “Other Means” to get to work in the 2005-2007 ACS data. This category includes the bicycle mode option. Because this mode split is relatively high, the prospects are relatively strong that an improved system of bicycle facilities would result in a higher level of usage in this category and therefore more bicycle usage as well.

The average driving time to work for the comparison cities ranges from a high of 29.4 minutes in Clarkson Valley and Wildwood to a low of 20.5 minutes in Maryland Heights, as shown in Table 8. Chesterfield, at 23 minutes, is toward the low end of the commute time range. Chesterfield’s relatively low average travel time to work means that work destinations are relatively close to the City for many residents, and this proximity represents another indication of the potential for bicycling to play a stronger role in the commute to work.

Table 8: Mean Commuting Time.

Municipality	Chesterfield	Ballwin	Clarkson Valley*	Creve Coeur	Maryland Heights	Town & Country	Wildwood
Mean Travel Time	23.0	25.0	29.4	21.6	20.5	21.7	29.4

Sources: 2005-2007 American Community Survey, * 2000 US Census.

The number of households with no vehicle is another important measure of bicycling potential, and Chesterfield has by far the greatest number of residents in this category (606) among the comparison cities. Table 9 on the following page shows the number of households with no vehicle for Chesterfield and its neighboring communities. This raw number is more than twice

Table 9: Households with No Vehicle.

Municipality	Chesterfield	Ballwin	Clarkson Valley*	Creve Coeur	Maryland Heights	Town & Country	Wildwood
Total Households	19,225	11,733	888	6,931	12,087	3,567	11,973
Households w/o Vehicle	606	170	0	272	201	163	167
Percent of Households	3.2	1.4	0.0	3.9	1.7	4.6	1.4

Sources: 2005-2007 American Community Survey, * 2000 US Census.

as high as that of the next-highest city (Creve Coeur at 272). It dwarfs the fact that the City is only third highest in terms of the percentage of total households in this category.

The number of people that use a bicycle for their journey to work in the United States has been shown to increase with the provision of adequate infrastructure and programs to encourage usage. More recently, the bicycle mode share has further increased given fuel price volatility, greater awareness of environmental and climate issues, and heightened sensitivity to the role of petroleum in geopolitics. This trend is apparent in Chesterfield as well, where discussions with personnel at three bicycle shops suggest that bicycle commuting has been on the rise. Obviously the automobile will continue to play a prominent role in the commute to work, but the potential for bicycling and walking as alternative transportation modes is increasingly being demonstrated in communities across the country.

6. Non Work-Related Local 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. With the presence of high-activity retail and office land uses offering virtually all goods and services, there is a significant potential for walking and cycling to such facilities. This potential can be estimated based on the number of housing units in the City.



Illustration 4: A group of teens leaving retail and shopping destinations at Clarkson and Baxter Roads. (Image: Kevin Neill)

There were a total of 18,860 households in Chesterfield with an average household size of 2.59 individuals. It is assumed that four trips per day are generated per household for non-work (or school) related purposes – most of which are to nearby destinations. This suggests that more than 75,000 short-distance trips are occurring per day, at least a portion of which could be undertaken by walking or bicycling, particularly with the existence of a walkable-bikeable transportation system.

7. Area Opportunities and Interest in Recreational Cycling and Walking

Chesterfield has a very substantial community of active bicycle riders who can already enjoy a variety of riding options. The City has been both a destination and a corridor for cycling activity for decades. The Smoke House once served as a major launching point for routes leading west and also as a stopover for cyclists traveling from more eastern locations. Today, it still serves as a start and finish point and rest stop for such riders.



Illustrations 5, 6, 7, Left to Right: Fitness cyclists heading toward Ghisallo Sports for a morning ride (rather than driving to the destination); weekly women's ride; riders heading toward the Chesterfield-Monarch Levee Trail along Edison Road, which is already a popular key bicycle street. (Images: Steve Sleet)

Chesterfield currently has three bicycle shops with two in the valley. Ghisallo Sports and St. Louis Bicycle Company are located in Chesterfield Valley and Sunset Cyclery is located in the northeastern section of the City. Ghisallo hosts two weekly bike rides (pictured above) from April through November with participant numbers ranging from ten well into the sixties. Because it offers amenities to athletes, it also serves as an informal meeting place and the owners cite typical daily events involving approximately twenty riders on a weekday up to approximately 100 on Saturdays (representing events not sponsored by Ghisallo). St. Louis Bicycle Company also offers a weekly ride and cites ridership into the thirties. Although

Sunset Cyclery does not promote any organized rides, it does serve as a meeting place and destination for a number of informal rides.

Both shops in the valley indicate that business is holding its own during the current recession. This economic resilience is a good example not only of the popularity of cycling in the area, but also of the relative stability of the cycling market. Ghisallo, in fact, is said to be planning a store expansion to meet a perceived demand resulting from the Monarch Chesterfield Trail expansion that is currently underway.

On May 20th, Great Rivers Greenway held the "Monarch Chesterfield Levee Trail Hike It or Bike It" to promote the opening of the new four-mile section of the trail. Other bicycling events have been held in previous years including the "Rumble To The River" bike race for charity and the "Rally In The Valley" fundraiser. As mentioned previously, many informal rides start or navigate through Chesterfield including a recent Tour de Cure Training Ride. Much of this is due to tradition, the flat roads of the valley and challenging, winding hills of west St. Louis County. In the future this activity is expected to increase as a result of the continuing development of the Chesterfield-Monarch Levee Trail, the Missouri River Greenway, and the interconnected bikeway system that will result from the present planning effort.

Many individuals also presently ride their bicycles on the streets of Chesterfield. Among the routes used are those displayed in the table to the right, provided by Chesterfield resident William Dowdy. While most major and minor arterials and collectors are present on this list, Clarkson Rd. and Olive Rd. are not, due to their high traffic volumes, high traffic speeds, and lack of dedicated bicycle facilities. These routes will be during the planning phase of work for their potential to be incorporated into a designated bikeway system.

Table 10: Currently Used Bikeways in Chesterfield.

1. Country Ridge/Schoettler Valley Drive
2. Federal Way
3. Valley Ridge Drive/Isleview Drive
4. Clarkson Woods Drive/Park Forest Drive
5. Baxter Road
6. Kehrs Mill Road
7. River Valley Drive
8. Ladue Road
9. Conway Road
10. Chesterfield Airport Road
11. Wild Horse Creek Road
12. Edison Road
13. Spirit of St. Louis
14. North Outer Forty
15. Woods Mill Road
16. White Road
17. Green Trails North & South
18. Chesterfield Parkway

Routes provided by William Dowdy

B. Existing Physical Features and Land Uses

This section of the report examines existing physical features and land uses in the City of Chesterfield, Missouri and their potential relationship to the ultimate development of a unified walkable-bikeable transportation system that also addresses related needs, including recreation, fitness, and wellness. (Refer to the Existing Conditions Map of the study area, Illustration 23, which can be found on Page 39 at the end of this section)

1. Streets, Roads and Highways

Description. Chesterfield has a well-developed network of highways, arterials, collectors and residential streets. This system has evolved and grown – first gradually and then rapidly - since the City’s formation in the 1800’s as several distinct communities. In addition to the streets that are maintained by the City itself, others are maintained by the St. Louis County Department of Highways and the Missouri Department of Transportation (MoDOT). This subsection provides an overview and analysis of the overall system focusing on highways, arterials and collector roads.

The City has adopted the Roadway Functional Classification System used by East-West Gateway Coordinating Council, the Missouri Department of Transportation (MoDOT) and the Federal Highway Administration. This system is also in use throughout the St. Louis Metropolitan Region. Its purpose is to identify routes for the National Highway System, to provide a consistent framework for ongoing assessment of the highway system, and to determine funding eligibility of transportation projects under the Federal-Aid Highway Program and the Transportation Equity Act for the 21st Century (TEA-21) and its successor programs. The road classifications are defined as follows:

- *Major arterials* are interstates, expressways, or freeways with restricted access that provide for the longest trip lengths and highest traffic volumes within an urban area. Also included are other Principal Arterials that serve the long-distance intra-urban demands in larger urban areas by connecting the regional activity centers not served by the above arterials.
- *Minor arterials* interconnect with and augment the urban major arterial system. They provide service for trips of moderate length at a somewhat lower level of mobility than

major arterials. Emphasis is on the distribution of vehicles to higher and lower roadway classes and land uses.

- *Collectors* bring traffic from local access streets and channel it onto larger arterials. Collectors provide both traffic circulation and land access, distributing trips from arterials to local streets and ultimate destinations.
- *Residential Collectors*, much like other collector streets, take traffic from local access streets and channel that traffic onto minor or major arterial streets. Residential collectors differ in that they often penetrate residential neighborhoods.
- *Local streets* provide the greatest access to land uses, but have the least mobility. Through traffic on local streets is often deliberately discouraged.

These roads are shown on the following map:

Illustration 8: Functional Road Classification

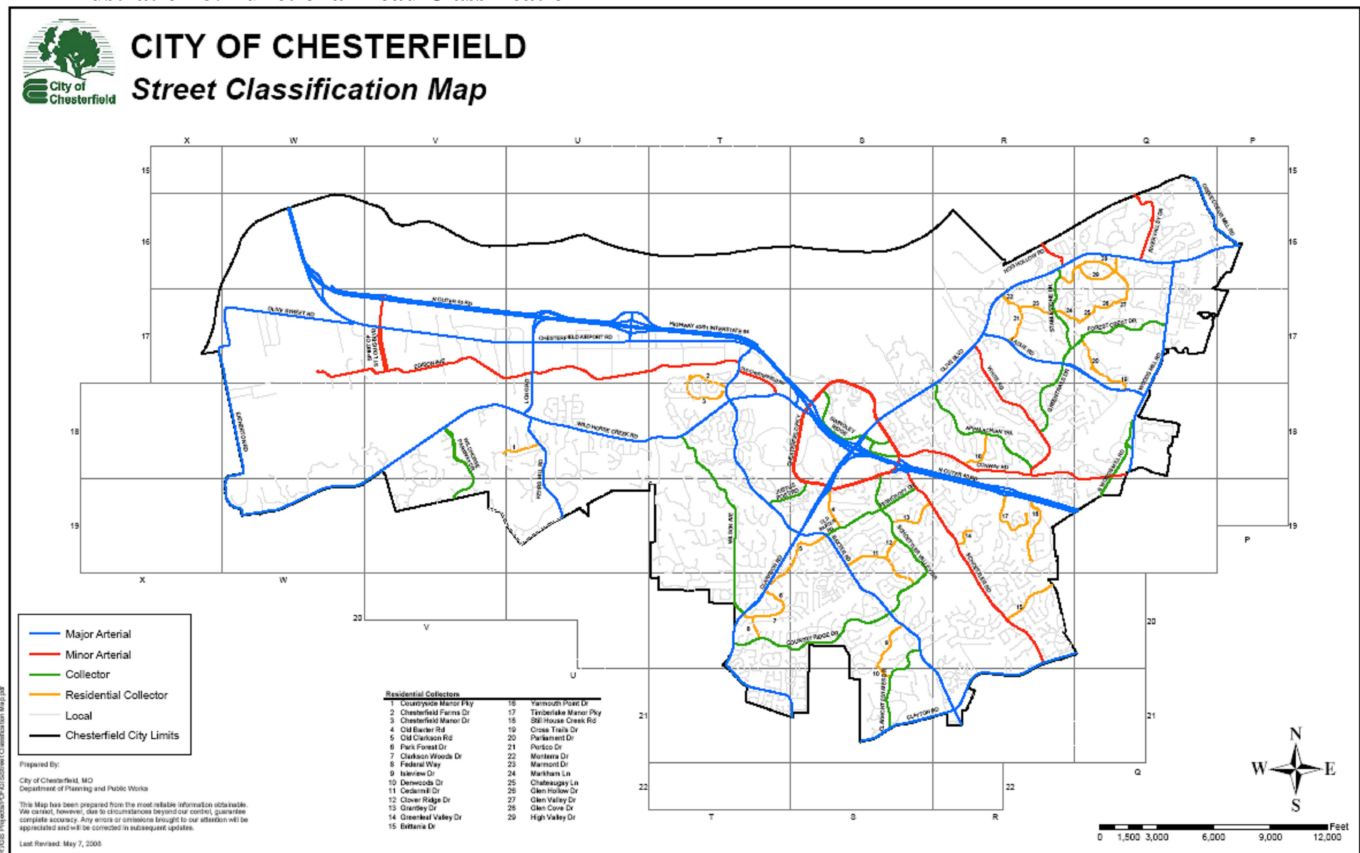


Image Source: Chesterfield Comprehensive Plan

Bicycle and pedestrian traffic is prohibited on the interstate routes. Bicycling and walking are permitted on the county- and City-maintained residential, collector and arterial roads, and these modes are frequently seen. Conditions for bicycling and walking along arterials and many collectors are generally less than adequate due to a variety of factors relating to traffic volume, truck/bus traffic, outer lane widths, and a lack of specific design elements that would facilitate bicycle and pedestrian movement. Nevertheless, cyclists are frequently seen on these roads and can be classified into two groups: Those using bicycles for practical transportation (often during weekdays), and recreational or fitness riders who primarily use the system on weekends or at other times when traffic is lighter. Pedestrians can also frequently be seen, not only on the sidewalk system but also on road shoulders when sidewalks are not present.

Residential Street Assessment. Chesterfield’s residential streets and their related sidewalk system already provide for some level of non-motorized movement. Children and adults generally encounter bike-friendly streets that are easy to use for localized bicycle and pedestrian travel. However, through-movement to further destinations including commercial areas, institutions and other neighborhoods is hampered by a significant number of cul-de-sacs, collector roads and arterials. While cul-de-sacs form physical barriers, collectors and arterials that presently do not have bicycle and pedestrian-friendly features often present psychological obstacles.

Arterial and Collector Road Assessment. Field reconnaissance has shown that, during weekday traffic periods, Chesterfield’s arterials and collectors tend to be used by a narrower range of cyclists. They are generally more experienced commuting and fitness riders who are comfortable with, or at least tolerant of, conditions on these roads. During weekends, a



Illustrations 9 and 10: (Above) Children and young teens feel comfortable using low volume residential streets to travel about the City. Clarkson Road (below), a major arterial in the City of Chesterfield, carries over 40,000 vehicles a day. (Images: Kevin Neill)



wider range of riders is seen on this system. This usage pattern is common in many other nearby communities as well.

Because arterials and collectors are intended to efficiently move higher levels of traffic including trucks and buses, it is not surprising that they are not considered to be bicycle-friendly for the broader grouping of cyclists including adult recreational riders, adolescent cyclists and child riders. When these cohorts consider riding a bike, the desire is often accompanied by decision to make a motor vehicle trip to a nearby park or trail rather than simply going out the front door and walking or riding. Similarly, arterials and many collectors are no more appealing for a practical bicycle trip to a store or for commuting to work. Non-motorized movement is also affected by other man-made and natural barriers including I-64 and the bluff line that separates the valley from the rest of the City.



Illustrations 11: White Road (below), a minor arterial, carries far fewer vehicles and provides access to collector streets and residential neighborhoods. (Images: Kevin Neill)

In communities where there is a network of on-street bicycle and pedestrian facilities, non-motorized travel is more appealing and bicycle and pedestrian activity is higher. Such a system would be well received in Chesterfield and is possible through a series of physical improvements to the public right-of-way. Specific recommendations relating to this will be presented in the plan chapter.

Table 11 on the following page provides a nominal assessment of current traffic conditions on streets within the City. A nominal Level of Service (LOS) analysis was applied that was based on a visual observation of street conditions. (A traffic engineering-level LOS analysis was not



Illustrations 12, 13, 14: Bicycling and walking are frequently seen on City streets and sidewalks. (Images: Steve Sleet)

a part of this study.) The approach used here is intended to form a preliminary baseline for 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.

Table 11: Highways, Arterials and Collectors in the City of Chesterfield

Class	Street Name(s)	Mileage	LOS
Major Arterial	Baxter Road	4.9	A-B
Major Arterial	Chesterfield Airport Road	4.0	C-D
Major Arterial	Clarkson Road	2.6	A-B
Major Arterial	Clayton Road	2.4	A-B
Major Arterial	Creve Coeur Mill Road	0.9	A-B
Major Arterial	Eatherton Road	2.4	C-D
Major Arterial	Highway 40/61 Interstate 64	8.9	A-B
Major Arterial	Ladue Road	2.0	A-B
Major Arterial	Long Road	0.7	A-B
Major Arterial	North Outer 40 Road	7.0	A-B
Major Arterial	Olive Boulevard	4.7	A-B
Major Arterial	Olive Street Road	1.1	A-B
Major Arterial	South Outer 40 Road	2.0	A-B
Major Arterial	Wild Horse Creek Road	6.2	A-B
Major Arterial	Woods Mill Road	2.2	A-B
Minor Arterial	Chesterfield Parkway	3.4	A-B
Minor Arterial	Conway Road (east of Chesterfield Pkwy E)	2.4	A-B
Minor Arterial	Edison Avenue	4.4	A-B
Minor Arterial	Hog Hollow Road	0.3	A-B
Minor Arterial	Old Chesterfield Road	0.5	A-B
Minor Arterial	River Valley Drive	0.9	A-B
Minor Arterial	Spirit of St. Louis Boulevard	0.8	A-B
Minor Arterial	White Road	1.7	A-B
Collector	Appalachian Trail	1.5	A-B
Collector	Claymont Estates Drive	1.0	A-B

Continued on the following page

Table 11: Highways, Arterials and Collectors in the City of Chesterfield, Continued.

Class	Street Name(s)	Mileage	LOS
Collector	Conway Road (west of Chesterfield Pkwy E)	0.4	A-B
Collector	Country Ridge Drive	2.4	A-B
Collector	Forest Crest Drive	1.2	A-B
Collector	Greentrails Drive	1.3	A-B
Collector	Highcroft Drive	0.9	A-B
Collector	Justus Post	0.5	A-B
Collector	Old Baxter Road	0.6	A-B
Collector	Schoettler Valley Drive	1.2	A-B
Collector	South Woods Mill Road	0.8	A-B
Collector	Stablestone Drive	1.0	A-B
Collector	Swingley Ridge	1.1	A-B
Collector	Wildhorse Parkway Drive	0.9	A-B
Collector	Wilson Avenue	2.0	A-B

2. Sidewalks

Chesterfield has a well-developed sidewalk system, which has been designed and built according to the historical model described above. In residential areas, sidewalk widths are typically three-to-five feet, whereas in commercial areas there are some wider sidewalks. The City’s last full Comprehensive Plan recommends requiring sidewalks in all new developments and encourages them along existing roads.

Sidewalk Policy. The City of Chesterfield requires sidewalks on both sides of all streets except for:

- Cul-de-sacs with eight or fewer single-family lots including corner lots;
- The circular portion of said cul-de-sacs;
- R-1 Districts where minimum lot front frontage is 125’ on loop streets of not more than 26 lots and on cul-de-sac streets of not more than 13 lots;
- Large lot subdivisions;
- Non-Urban District subdivisions using the density development procedure.

Strengths. A new key element of the City’s existing pedestrian system is the Pathway on the Parkway, a 3.4-mile long pedestrian facility adjacent to the Chesterfield Parkway. Positive elements of the pathway include tree-lined sidewalks along both sides of the roadway,

improved crossings with pedestrian signals, striped crosswalks, and colored tactile warning surfaces on curb ramps leading to marked crosswalks. Similar improvements have been made to a number of intersections throughout the City. There is a XX mile segment from Clarkson northeast to Conway Road that has yet to be completed.

Another positive element to the pedestrian environment is the streetscape along River Valley Drive, a minor arterial connecting Olive Road to the Maryland Heights. A 0.6-mile stretch of River Valley Drive has been designed with ADA accessible curb ramps, red brick pavers to demarcate pedestrian crosswalks, and other traffic calming elements that create a welcoming environment for neighborhood residents and school children walking to and from River Bend Elementary.



Illustrations 15 & 16: Landscaping, lighting, and other design features along Chesterfield Parkway create a welcoming environment for pedestrians. Along River Valley Drive, red brick pavers, pedestrian refuge islands, accessible curb ramps, and attractive lighting enhance the pedestrian experience and improve safety for local school children. (Images: Kevin Neill)

Weaknesses. There are gaps in the pedestrian network, identified through field analysis and by Chesterfield residents through numerous public engagement processes. Specific locations of pedestrian barriers and obstacles have been compiled, analyzed and classified into the following groups:

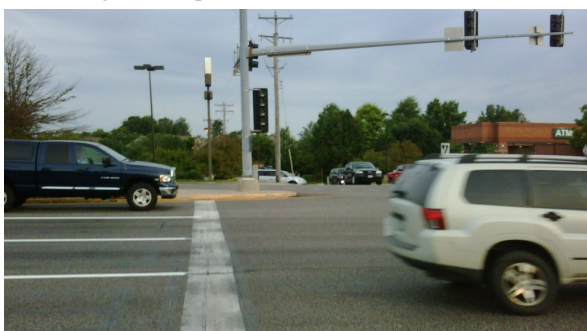
- *Discontinuous sidewalks along some arterials, minor arterials and collectors.* When asked what prevented Chesterfield residents from walking to nearby destinations, over 58 percent of survey respondents answered that disconnected sidewalks and sidewalks that end abruptly prevented them from walking to nearby destinations. These disconnected sidewalk segments are most prevalent along Wild Horse Creek Road and Olive Boulevard, but can also be found in other locations throughout the City.
- *Lack of adequate facilities over and under Interstate 64.* At a number of locations along

the Interstate 64 corridor, pedestrian mobility is limited by a lack of adequate facilities. Crossings at Chesterfield Parkway East and Clarkson Road/Olive Blvd provide the largest obstacles to pedestrian travel. While a large concentration of commercial activity and residential population are within walking distance of these intersections, the lack of sidewalks along these busy arterials discourages pedestrian usage and limits access to these nearby commercial destinations.

- *Lack of connectivity between residential neighborhoods and commercial areas.* Many Chesterfield residents are comfortable walking for recreational purposes, but often restrict their walks to within their neighborhoods or subdivisions. In some cases, as noted by survey respondents, distances from many subdivisions to other destinations in the City are too far to travel by foot, but dangerous intersections and a lack of sidewalks



Illustrations 17, 18, 19: The intersection of Clarkson/Olive and Interstate 64 (pictured above) provides few pedestrian accommodations, with no sidewalks, crosswalks, or pedestrian signals to facilitate safe, predictable pedestrian movement. Looking across Clarkson Road at Lee Oaks Drive (below, left), little design features exist to facilitate safe pedestrian crossing of these wide seven lanes of traffic. A lack of sidewalks on Baxter Road over Bonhomme Creek (below, right) creates a barrier between retail and office destinations in Chesterfield Valley and residential neighborhoods south of the creek. (Images: <http://www.bing.com/maps>, Gil Sherman, Kevin Neill)



along major streets also dissuade many residents from utilizing the sidewalk network for transportation-related purposes. In instances where residential subdivisions abut commercial land uses, enhanced pedestrian connections can encourage residents to walk for shorter trips.

- *Inadequate facilities at some signalized intersections along major arterials.* Dangerous intersections are a concern for many Chesterfield residents, as indicated at the public forums and the on-line survey. Nearly 57 percent of survey respondents felt that dangerous intersections inhibited their ability to reach local destinations within walking distance from their homes. A number of intersections in the City of Chesterfield lack pedestrian signals, crosswalk striping, and other streetscape elements that create a safer pedestrian environment. The lack of sidewalks at some of these intersections further detracts from pedestrian safety.

In Chesterfield, as with most communities, sidewalks have been designed for pedestrian-related activity only, although children are almost universally encouraged by parents to ride their bicycles on sidewalks. Basic sidewalk design typically includes concrete construction with numerous expansion joints, narrower widths (often ranging from 30-60-inches), and squared or sharply angled turns – elements that do not lend themselves well to use by bicyclists.

3. Accident Data

An examination of accident data provides a better understanding of safety issues as they relate to pedestrian and bicycle travel.

The Chesterfield Police Department reported 1,406 motor vehicle accidents in 2008. Of these accidents, the vast majority (1,395) involved single or multiple motor vehicles exclusively, while only 7 involved pedestrians and 4 involved bicycles. This is an exceptionally low bicycle and pedestrian accident rate and suggests that cycling and walking are not common modes of transportation in Chesterfield.

Motor vehicle accidents by road in the City of Chesterfield are summarized in Table 12 on the following page. The accident frequencies reported in the City of Chesterfield can generally be correlated to road classification, road length, average daily traffic, and specific road alignment/

**Table 12: Summary of Motor Vehicle Accidents by Road, 2008
(All Roads Except Interstates).**

Road (Cumulative, All Intersections)	Number of Accidents (Property Damage, Injuries or Fatalities)
Olive Street Road and Olive Boulevard	148
Clarkson Road	91
Woodsmill Road	77
Clayton Road	66
Chesterfield Parkway	50
Chesterfield Airport Road	46
Baxter Road	43
Wildhorse Creek	40
Long	27
Schoettler Road	15
Edison Boulevard	12
Boone's Crossing	10
Conway Road	10
Kehrs Mill Road	9
Wilson Road	8
Eatherton Road	7
Ladue Road	7
White Road	4
Whitree Lane	4
Cedarmill Drive	3
Country Ridge Drive	3
Highcroft Drive	3
River Valley	3
Schoettler Valley Drive	3
Appalachian Trail	2
Highway 109	2
Hog Hollow Road	2
Hunters Way Drive	2
Lea Oak Drive	2
Public Works Drive	2
Spirit of St. Louis Boulevard	2
Swingley Ridge Road	2
Amstell Court	1
Appalachian Trail	1
Argos Manor Court	1
Arrowhead Estates Lane	1
Beaver Creek Road	1
Braefield Drive	1
Broadmoor	1
Brook Hill Drive	1
Carriage Crossing Lane	1
Cedar Forest Court	1
Chesterfield Business Parkway	1
Chesterfield Manor Drive	1

Continued on the following page

**Table 12: Summary of Motor Vehicle Accidents by Road, 2008
(All Roads Except Interstates), Continued.**

Road (Cumulative, All Intersections)	Number of Accidents (Property Damage, Injuries or Fatalities)
Chesterfield Ridge Drive	1
Clarkson Woods Drive	1
Clayville Court	1
Crystal Springs Drive	1
DeJournette Drive	1
Duxbury Way	1
Fontaine Drive	1
Hickory Drive	1
High Valley Drive	1
Highland Park	1
Hunter's Hill Drive	1
Isleview Drive	1
Justus Post Road	1
Keystone Trail Drive	1
Lydia Hill Drive	1
Old Olive Street Road	1
Post Road	1
Primwood Driv	1
Ridge Crest Drive	1
Savonne	1
Toreador	1
Twin Estates Circle	1
Wildhorse Parkway Drive	1
Woodchase Lane	1
Woodlake Village Drive	1

Source: Chesterfield Police Department

4. Rail Lines and Utility Corridors

An 8-mile long Ameren UE railroad alignment is located in Chesterfield below the bluff line. It is part of a longer (Rock Island) alignment extending from Marine Avenue in Maryland Heights south and west well beyond the St. Louis region into outstate Missouri. Within the Valley, the rail corridor follows the base of the bluff line between Centaur Road and Baxter Road, and then proceeds eastward. Discussions with Ameren are continuing through the Great Rivers Greenway District (GRG) to share a 15 mile-long section of this rail corridor from Centaur Road to Marine Avenue (rail-with-trail). A portion is to be incorporated into the 17-mile long Chesterfield-Monarch Levee Trail system, the second phase of which is currently under construction.

Beyond the Levee Trail, which forms a large loop around Chesterfield Valley, portions of the rail corridor both to the east and west have strong potential to be incorporated into the long-distance Missouri River Greenway, which is currently under development, by GRG. This project would provide a trail connecting Chesterfield to Wildwood, Maryland Heights, and the Katy Trail.

An Ameren utility corridor is also located in Chesterfield. It extends from Clarkson Road near the City's southwest corner and exits the City near Ladue Road and Highway 141. Although it contains the utility's transmission towers, the corridor is very wide and, with its extensive vegetation, has visually appeal as a natural area. It shows strong potential as a location for a multipurpose trail that could provide connectivity to important destinations both within the City and to its neighbors.

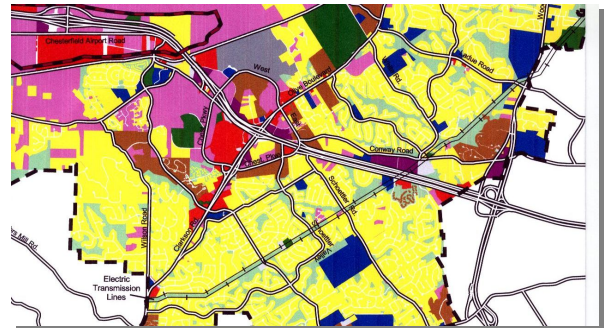


Illustration 20: The Ameren Utility corridor shows potential as a site for a major new multipurpose trail. (Map source: Chesterfield Comprehensive Plan)

5. Principal Public Facilities and Institutions

The City's public facility and institutional infrastructure is well-developed. Its open space alone comprises more than 380 acres of parkland, beautification areas, public lands and other

areas maintained in partnership with the Parkway School District. Major Parks include the 176-acre Chesterfield Valley Athletic Complex located in the Valley north of Chesterfield Commons; Central Park, a recently developed facility that includes an aquatic center, playground, pavilion, a stream walk and linear open space (40 acres); W.F. Dierberg Meditation Park (2-acres); Railroad Park (33-acres under development); recently acquired Eberwein Property, located at the corner of Baxter and Old Baxter; wetlands totaling 43 acres; Conway Cemetery (2.5 acres); and small parks located within the grounds of several elementary schools. The City is also home Faust Park a St. Louis County facility and its noted Butterfly House, a popular regional attraction. Other public facilities and institutions include the City's new City Hall located on Chesterfield Parkway; a new parks and maintenance facility east of the Athletic Complex; first-responder facilities including fire and police stations; a St. Louis County library branch; thirteen elementary, middle and high schools, churches; cultural facilities; and a hospital.

6. Natural Features

Chesterfield's natural setting is defined by a rolling-to-hilly upland area and a large flood plain protected by a mostly-completed 500-year levee system. The two areas are separated by a prominent bluff line extending northeast to southwest. The Missouri River with its Johnson and Howell Islands define the City's northern edge and are key features of this setting.



Illustrations 21 & 22: The rolling hills of Chesterfield (left) are best seen along the Ameren Utility Corridor, looking southwest from Schoettler Valley Drive. A view of the bluff line (right) looking westward near the intersection of Edison and Baxter Roads. (Images: Kevin Neill)

7. Existing Land Uses

Chesterfield’s existing land use categories include residential (single family and multifamily), commercial, office, industrial/warehousing, research, institutional, common ground, park/recreation, and vacant/agricultural. A majority of the vacant/agricultural land is located within Chesterfield Valley to the north of a line roughly formed by an improved 500-year levee, Bonhomme Creek and the Ameren railroad line, and west of Chesterfield Airport. City land uses and their area are summarized in the following table.

Table 13: Land Uses in Chesterfield.

Land Use	Acreage	Percentage of Coverage
Single-Family Residential	6,570	30.5
Multi-Family Residential	788	3.6
Commercial	633	2.9
Office	270	1.3
Institutional	2,059	9.6
Industrial/Utility	576	2.7
Research and Development	203	0.9
Common Ground	1,481	6.9
Parks/Recreation	525	2.4
Vacant/Agriculture	5,818	27
Transportation ROW	2,606	12.1
Total	21,529	99.9

Source: Chesterfield Comprehensive Master Plan

The City has a high daytime worker population (approximately 2,000 businesses and 30,000 jobs), coupled with a high residential population. The demographic information reported in Section A also indicates a high percentage of relatively affluent residents, suggesting a significant number of people who would benefit from an improved bicycle-pedestrian system with strong prospects to use it for alternative transportation. This will be further examined in Section D.

8. Previous or Pending Plans

Chesterfield's last full comprehensive plan was completed ten years ago. Amendments to the plan were adopted by the Planning Commission in July of 2009. The plan contains numerous recommendations relating to bicycle and pedestrian movement, many of which have been implemented or are being implemented. The following are key recommendations from the plan:

- *Multi-Modal Transportation Design. Sites should be designed for all types of transportation choices including pedestrian, bicycle, mass transit, and vehicular. Sites should be designed to provide for pedestrian, bicycle, mass transit, and vehicular interconnectivity to adjacent sites. (Transportation Policies, Section 7.2, p. 39.)*
- *Encourage Sidewalks. Sidewalks should be required of all new developments and encouraged along existing roads in the City of Chesterfield, allowing creative placement to protect the natural environment. (Transportation Policies, Section 7.2.4, p. 39)*
- *Multimodal Transportation Choices. Sites in the Urban Core should be designed for all types of transportation choices including pedestrian, bicycle, mass transit, and vehicular. Sites should be designed to provide for pedestrian, bicycle, mass transit, and vehicular interconnectivity to adjacent sites. (Transportation Policies, Section 7.2.10, p. 40)*
- *Alternative Transportation. Alternative forms of transportation should be expanded to provide local traffic relief without expanding existing roads to serve the employment needs in the Urban Core, Chesterfield Valley, and other major commercial developments. (Transportation Policies, Section 7.3.1 p. 40)*
- *Transportation Enhancement Projects. Alternative forms of transportation and access, such as pedestrian and bicycle paths, and expanded right-of-way acquisition without adding pavement to preserve green space and buffer the adjacent land uses from the impacts of the road, should be incorporated into transportation enhancement and improvement projects. (Transportation Policies, Section 7.3.3 p. 40)*
- *Trail System. A trail system should be developed utilizing existing street right-of-ways, common ground when available, utility easements, flood plain areas, and additional property acquisition or private easements. Consideration should be given to cooperating with neighboring municipalities in developing portions of the trail system. Trail systems could include walking, jogging, bicycle, and equestrian trails. This system should be fully integrated with and connected to the transportation network. (Parks and Open Space Policies, Section 10.2.3 p. 45)*

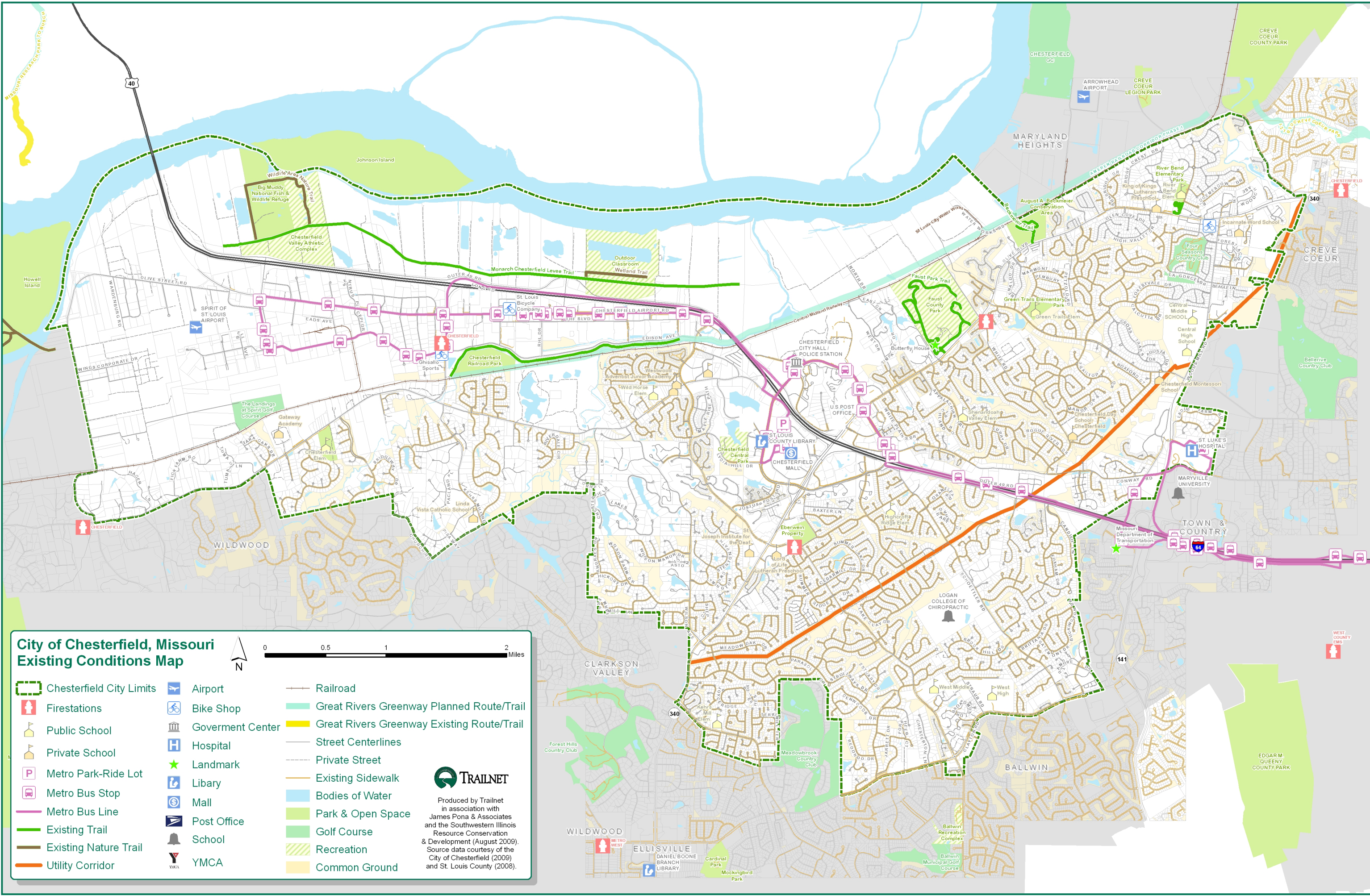
- *Neighborhood Transportation. The neighborhood transportation network refers to residents' access to and circulation within individual subdivisions and neighborhoods and the accessibility of the individual neighborhoods to non-motorized means of transportation. The neighborhood transportation network includes residential streets, sidewalks and pedestrian/bicycle paths. Most of the residential streets within Chesterfield were built just prior to construction of houses by the developer of the individual subdivisions and later turned over to Chesterfield for municipal ownership and maintenance. As a result, the residential streets do not follow an established citywide plan, but rather, they are a result of independent site plans that adhere more to traditional subdivision layout. The traditional layout of subdivisions in West St. Louis County incorporates curvilinear streets, cul-de-sacs, and restriction of through-traffic. Pedestrians have access to most residential streets in Chesterfield. Current subdivision regulations require sidewalks along all streets with the exception of cul-de-sacs, large-lot residential subdivisions, subdivisions in the Non-Urban District using density development procedures, and industrial developments. As a result, most of the local streets and collector roads have sidewalks adjacent to them. However, given that land use patterns call for distinct separation of uses and the road network in general is not composed of straight routes, distances are generally too great to encourage residents to walk to destinations within the City. Therefore, sidewalks are used mostly for internal circulation within subdivisions. (Transportation Element, p 64.)*
- *Trail System. A trail system should be developed utilizing existing common ground, utility easements, flood plain areas, and additional property acquisition or private easements. Consideration should be given to cooperating with neighboring municipalities in developing portions of the trail system. Trail systems could include walking, jogging, bicycle, and equestrian trails. This system should be fully integrated with and connected to the transportation network. (Transportation Element, p 73.)*

The planned Chesterfield Riparian Trail is an outgrowth of the parks element of the Comprehensive Plan summarized above. Working closely with the U.S. Army Corps of Engineers and an architectural and engineering firm, this trail will travel from Central Park northward, connecting to the Chesterfield Monarch Levee Trail System. It will be roughly 1.5 miles in length and will have a natural surface. The planned trail will extend along Chesterfield Creek, and will take into account the sensitive environmental conditions of the stream corridor through the incorporation of low-impact design features that minimize disturbance to the area's ecological system. Once complete, the Chesterfield Riparian Trail will offer visitors and residents not only an off-street connection to local destinations (Central Park, West County

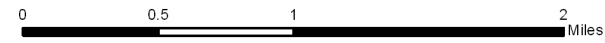
YMCA, the Sachs Branch of the Saint Louis County Library, the Family Aquatic Center, and new restaurants and retail as part of the future Downtown Chesterfield development) but also an opportunity to enjoy the natural features and wildlife prevalent along this stream corridor.

The current bikeable-walkable study represents a concerted effort on the part of the City to develop a specific master plan for the implementation of many of the general bicycle and pedestrian recommendations appearing in the Comprehensive Plan, complementing them with supportive elements.

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City of Chesterfield, Missouri Existing Conditions Map



- | | | |
|--------------------------|-------------------|--|
| Chesterfield City Limits | Airport | Railroad |
| Firestations | Bike Shop | Great Rivers Greenway Planned Route/Trail |
| Public School | Government Center | Great Rivers Greenway Existing Route/Trail |
| Private School | Hospital | Street Centerlines |
| Metro Park-Ride Lot | Landmark | Private Street |
| Metro Bus Stop | Library | Existing Sidewalk |
| Metro Bus Line | Mall | Bodies of Water |
| Existing Trail | Post Office | Park & Open Space |
| Existing Nature Trail | School | Golf Course |
| Utility Corridor | YMCA | Recreation |
| | | Common Ground |



Produced by Trailnet
in association with
James Pona & Associates
and the Southwestern Illinois
Resource Conservation
& Development (August 2009).
Source data courtesy of the
City of Chesterfield (2009)
and St. Louis County (2008).

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C. Existing Bicycle Facilities in the Area and Elsewhere

1. 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.

Warning Accommodation. 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 or where there are limitations that do not allow the necessary space for 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.



Illustration 24: 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 still be, used by bicyclists.

Bicycle Route (Class III Bikeway). 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.

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

Shared-Use Path (Class I Bikeway). 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. While designed primarily with bicyclists' and pedestrians' safety in mind, shared-use paths often attract other users, including runners, dog walkers, families pushing strollers, in-line skaters, and persons in wheelchairs. Shared-use paths are often referred to as multi-purpose trails.

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

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



Illustration 25: Standard signage for local bike routes.



Illustration 26: Bicycle lane treatment. (Image: PBIC, Dan Burden)



Illustration 27: Shared-use paths are often utilized by cyclists, pedestrians, in-line skaters, and other non-motorized users. (Image: Kevin Neill)

2. Existing Bicycle Facilities in the Area and Elsewhere

This section examines longer bikeways within or close to the City of Chesterfield to which new facilities to be ultimately recommended in this study could be connected. Shorter loop trails are not included here due to their limited usefulness in an interconnected citywide system. Major existing bikeways here include:

- The Chesterfield-Monarch Levee Trail, a 17-mile long loop trail that will encompass the majority of commercial, industrial and recreational land uses in Chesterfield Valley, is currently under construction, with a four-mile segment already complete. Principal funding was provided by the City of Chesterfield and the Great Rivers Greenway District (GRG). The Chesterfield-Monarch Levee Trail will become a component of the Missouri River Greenway, a fifty-mile long trail which is also under development by GRG in several locations along the project corridor.



Illustrations 28 and 29: Left: Chesterfield-Monarch Levee Trail has become Chesterfield's principal bicycle - pedestrian facilities. (Image 28: JPA). Right: GRG's Missouri River Greenway is currently under development and will connect with the Levee Trail. (Image: GRG)

- The Pathway on the Parkway, a 3.4 mile pedestrian facility along Chesterfield Parkway, is an outgrowth of the City's existing Comprehensive Plan. The Pathway is partially complete, with improvements from Clarkson northeastward to Olive along Chesterfield Parkway East yet to be constructed. Its wide concrete walks coupled with intensive design elements including benches, landscaping, sculpture and lighting essentially create a pedestrian promenade. Connections to multiple neighborhoods, commercial destinations, and public facilities such as the Sach's Branch of the St. Louis County Library, the West County YMCA, Chesterfield Aquatic Center, and Central Park, make the Pathway on the Parkway one of the most heavily utilized pedestrian facilities in the City.



Illustration 30: Pedestrians, cyclists, automobiles and public transit all share the recently redesigned parkway. (Image: Kevin Neill)

Looking at a wider area within the vicinity of Chesterfield, there are a growing number of major bicycle facilities. The City of Wildwood, located south and west of Chesterfield, has a growing network of multi-use trails totaling more than 12 miles. The network serves both recreational and transportation purposes, linking neighborhoods, commercial areas, and recreation corridors.



Illustration 31: The Wildwood Greenway bridge over Manchester Road/Hwy 100 stands as a symbol of Wildwood’s commitment to enhancing the quality of life for the community’s residents through the provision of bicycle and pedestrian facilities. (Image: City of Wildwood website)

Additional facilities in the vicinity of Chesterfield include: a network of more than 6.5 miles of loop trails in Creve Coeur Park, with a 2.8-mile connector path and bridge over the Missouri River to the Katy Trail; the Katy Trail itself in St. Charles County (230 miles); the Mississippi Riverfront Trail in the City of St. Louis (11 miles); the Old Chain of Rocks Bridge (1 mile); Grant’s Trail in South St. Louis County (8 miles) and its recently-opened extension to Kirkwood (2 miles). Excluding portions of the Katy Trail not located in St. Charles County, and proposed projects, St. Louis’s major bicycle facilities total approximately 55 miles.

Expansions and improvements to many existing St. Louis facilities – as well as major new stand-alone facilities are being funded through GRG on the Missouri side of the region and by the Metro East Park and Recreation District (MEPRD) which is GRG’s Illinois counterpart. 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 also 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 shared-use path, which will connect St. Louis’ Riverfront Trail to Metro East’s extensive existing trail system.

3. Metro East Bicycle Facilities

Within Madison County, Madison County Transit (MCT) has developed eight major shared-use paths that collectively exceed 85 miles and provide significant connections between major communities throughout the county. They include the following:

- MCT Schoolhouse Trail (pictured, Illustration 25), 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.

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.⁹



Illustration 32: The Schoolhouse Trail looking west at I-255. (Image: MCT Trails)

⁹ “Trail now connects to popular park;” by Terry Hillig. St. Louis Post Dispatch, May 18, 2006.

Within St. Clair County, the principal trail facility is the Metro Bike Link, a 4 mile long shared-use 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.

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 shared-use 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 has had 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 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 percent) had increased the size of their investment since the Trail had opened.”¹⁰

4. 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 reviewed here with a focus on economic impacts.

¹⁰ “The Economic Benefits of Trails;” American Hiking Society.

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.



Illustration 26: Ohio's Buckeye Trail System logo. (Image: Buckeye Trail Website)

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.¹¹

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.¹²

¹¹ Public Choices and Property Values: Evidence from Greenways in Indianapolis; School of Public and Environmental Affairs, Indiana University. December 2003. Page 9.

¹² NBPC Technical Brief: “The Economic and Social Benefits of Off-Road Bicycle and Pedestrian Facilities.” September 1995.

- As of 1992, approximately 170,000 individuals visited the Tallahassee-St. Marks Trail in Florida every year, with daily expenditures averaging \$11.00.¹³
- 135,000 people visit the Heritage Trail in Iowa, and spend an average of \$9.21.¹⁴
- “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...”¹⁵

From the preceding, and given Chesterfield’s substantial progress to date in the development of the Pathway on the Parkway and the Chesterfield-Monarch Levee Trail projects, it is clear that the City would greatly benefit from an expanded and interconnected bicycle and pedestrian system with both trail and on-street components. Such a system would not only link existing institutional, commercial and retail infrastructure within the City, but it would also connect its neighborhoods and facilitate non-motorized access to many destinations.

¹³ Ibid.

¹⁴ NBPC Technical Brief: “The Economic and Social Benefits of Off-Road Bicycle and Pedestrian Facilities.” September 1995.

¹⁵ Economic Impacts of Trails. National Trails Training Partnership website.

D. Existing Bicycle Usage and Projected Bicycle Facility Needs

1. An Estimate of Existing Bicycle Usage

Measurable data on existing bicycle usage within the City of Chesterfield is not available. However, observed activity both here and in other communities has shown that when bicycle and pedestrian facilities are developed to connect residential areas with local destinations and activity generators, they are well used for both recreational and practical purposes. 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 segment of the Grant's Trail and estimates for the entire facility indicates that between 120,000 and 200,000 people use the trail annually.

Notwithstanding these observations, a more detailed assessment of existing bicycle usage in the City is important to this study. The following section presents a methodology for the development of a reasonable estimate of present bicycling and related activity on Chesterfield's roads and trails.

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 percent of the households walked or jogged regularly; 47 percent regularly visited nature areas; 27 percent regularly engaged in bicycling and/or BMX activities; 20 percent hiked regularly; and 16 percent regularly ran.¹⁶

The MEPRD methodology has applicability to the Chesterfield study. From its multi-county household survey data and using the given percentages, estimates of probable participation by households within the City of Chesterfield in activities likely to be undertaken on a trail/

¹⁶ Long Range Development Plan, April 2003. Metro East Park & Recreation District (MEPRD). Page 50.

greenway can be made. These estimates are shown in the table below, using the City’s Year 2000 population (46,802) and household number (18,060), which results in an average household size of 2.59 individuals (Table 14).

Table 14: Estimated Regular Participation by Residents of Chesterfield in Activities Likely to be Undertaken on a Trail or Greenway.

Leisure Activity	MEPRD’s Multi-County Percentage of Households who Regularly Participate	Probable Chesterfield Participation in Activities Compatible with Trail Facilities
Walking/Jogging	65%	11,739
Visiting Nature Areas	47%	8,488
Bicycling/BMX	27%	4,876
Hiking	20%	3,612
Running	16%	2,890
Total Participation Events	n.a.	31,605

* 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.

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 Chesterfield participated most often in the same activities and that an individual in the City would participate in such events about six times per year, then this represents approximately 4,184 residents of the City regularly and most often 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. (Note: In order to apply the most conservative methodology, i.e. the one most likely to conservatively estimate potential usage in Chesterfield, the study team used only the first three trail-compatible activities – those identified by residents in the MEPRD study as being participated in “*most often.*” Two trail-compatible activities – hiking and running, were therefore not included in the present estimate.)

It is not unreasonable to assume that this approach identifies an initial “market” of users who would become patrons of an expanded bikeway system in Chesterfield. This figure therefore represents a potential beginning point from which to define a user base for the bicycle and pedestrian system. Additional factors in the estimation of the probable user base are discussed below.

Elementary and Secondary School Children Likely to Use Bicycles on Streets and Sidewalks for Transportation and/or Recreational Activity. From field reconnaissance at local schools, there appears to be some bicycle usage even without improved bicycle facilities. An estimate of this usage can be made based on the existing population of elementary and secondary school-age children in Chesterfield, and by making assumptions of how many children are likely to ride bicycles regularly, either to school or for other practical purposes.

Elementary and secondary school children between the ages of 10 and 14 are believed to be the group using bicycles most intensively. They are most likely to consider the bicycle as a practical transportation option for school or other local trips. (Children younger than 10 are assumed to be using bicycles only on sidewalks or other paved areas close to home.) Children in the 10-14 grouping are often considered by their parents to be old-enough to ride bicycles without close supervision. This cohort is readily measurable in the Census data.

The 2000 Census reported 3,536 children in the 10-14 year old age category who reside within the City. For purposes of this study, it will be conservatively assumed that 20 percent of the cohort (707 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 actually much higher.



Illustration 33: On a warm day in May, a lone bicycle rests against the bike rack at Kehrs Mill Elementary. While the lone bicycle suggests few students regularly bike to school, the helmet hanging from the handlebars suggests that those students that do ride are adhering to recommended safety requirements. (Image: Kevin Neill)



Illustration 34: A group of young teens walking with their bicycles along Schoettler Valley. (Image: Kevin Neill)

Older children are also seen riding bicycles in the City. 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 1,389 15-16 year-olds residing in the City in 2000. Because we believe they ride bikes substantially less than their younger counterparts, it will be assumed that 10 percent, or about 139 individuals, 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 are doing 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 reasons.

Although no residents reported using a bicycle as part of the journey to work in the Year 2000 Census, anecdotal information including observations during field reconnaissance indicate that there is some bicycle usage related to commuting. Indeed, members of the study team observed such cyclists (see image) on virtually every field reconnaissance trip. Given the costs of fuel (both financial and political), environmental and other factors that were not in effect in 2000, it is likely that the number of Chesterfield commuters using a bicycle to get to work is significant.



Illustration 35: Commuter traveling on Kehrs Mill at Strecker Road, despite the lack of any designated facility for cyclists. (Image: Steve Sleet)

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 percent of the American work force regularly *rode a bicycle or a motorcycle to work*.¹⁷ In another study of eight cities known to have high bicycle usage rates (Chicago, Los Angeles, San Francisco, New York, Phoenix,

¹⁷ “Table 1-35: Principal Means of Transportation to Work.” U.S. Department of Housing and Urban Development, American Housing Survey: various years.

Boston, Sacramento, & Seattle), from 0.3 percent to 1.4 percent of the population rode bicycles to work in the year 2000. Although the data spans several years, they are still believed to be useful in gaining an insight into probable on-street bicycle activity at the local level.

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 has included bicycling in its “other” category). In 1997, the percentage of Americans who regularly rode a bicycle *as a travel mode* was 1.0 percent.¹⁸ “Travel” refers to any trip purpose including shopping, errands, recreation, and getting to work. (This nationwide average is substantially exceeded in university communities.) The average is also exceeded in areas where longer trails exist, such as the Chesterfield-Monarch Levee Trail and the Missouri River Greenway which are currently under development. The Chesterfield-Monarch Levee Trail, although only four miles are currently open, is already receiving significant usage (pictured). Study team members note that on the second phase of the trail which is under construction but not yet open, cyclists have already been observed on the facility.

Based on all of the considerations above, the usage percentages from other studies will be standardized to 1.2 percent in order to develop an estimate of total adult on-street bicycle usage in Chesterfield for any trip purpose. Using the City’s Year 2000 adult population of 46,802 persons, it is estimated that approximately 562 adults residing in Chesterfield ride bikes regularly on streets throughout the City..

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 Table 15 on the following page.

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 probable “starter group” that would benefit from a more comprehensively developed municipal bikeway system. Moreover, these estimates are based on year 2000 Census data. Present

¹⁸ “Percent of Trips by Travel Mode, as of 1997 (all trip purposes)” Table by John Pucher, Transportation Quarterly, 98-1.

Table 15: Summary of Estimated Existing Participation by Residents of Chesterfield in Activities Likely to be Undertaken on Trails, Greenways, and On-Street Bikeways.

Activity	Event	Number
People Engaging in Activities Likely to be Undertaken on Area Trails and Greenways (Walking/jogging, visiting natural areas, bicycling/bmx activities)	25,103*	4,184**
Elementary/Secondary School Children (10-14) Regularly Riding Bicycles on Streets/Sidewalks	n.a.	707
Older School Children (15-16) regularly Riding Bicycles on City Streets/Sidewalks	n.a.	139
Adults Regularly Riding Bicycles on Streets	n.a.	562
Total Estimated Existing Participation	n.a.	5,592

* Probable number of times that 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 two assumptions: 1) that residents of Chesterfield 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 2) that they would engage in such activities at least 6 times per year. (Refer to text, page 40)

figures, though unknown, are apt to be higher because of heightened interest in the development of politically and environmentally sound methods of alternative local travel. In addition, it is highly likely that the new long-distance Missouri River Greenway and its connection to the regional trail system being developed by GRG will attract still more usage both by residents and by visitors who will be attracted to the City as a result. Such increases in usage have been reported elsewhere after the completion of longer-distance trails and connecting on-street networks. 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.¹⁹

2. 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 0.5 miles of each type of trail

¹⁹ “Transportation and Urban Trails.” American Trails.org.

facility per 1,000 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 Chesterfield, 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 0.5 miles of each type of multipurpose trail per 1,000 population (1.0 miles total), and using the City's Year 2000 population of 46,802, there was a need for just under 47 miles of multipurpose trails at that time. For the future through 2015, a growth rate of 10 percent will be assumed (less than one-half of the rate of growth that occurred between 1990 and 2000.) Therefore, a population of 51,482 persons is projected for the year 2015. Accordingly, the projected multipurpose trail need will be 51 miles.

Specialized Nature Trails and Mountain Bike Trails. In terms of nature trails (the third type of trail defined in the NRPA standards), Chesterfield presently has approximately 3 miles. The City is also planning to develop the 1.5 mile long Chesterfield Riparian Trail which will extend north from Central Park to the Chesterfield Monarch Levee Trail. 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 (0.5 miles of nature trail per 1,000 population), therefore, results in a projected need for 18.5 (23 less 4.5 existing and planned) miles of nature trails in Chesterfield 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 City as well. Therefore, it is probable that off-road riding would increase if more specialized facilities existed. For this study, 0.1 mile of MTB trail per 1000 population is assumed to be adequate. Therefore, a total of 5 miles of MTB trails for Chesterfield by the year 2015 is appropriate.

On-Street (Shared Roadway) Bicycle Facility Needs. Per capita-based mileage benchmarks are not used in the assessment of need for on-street bicycle facilities. This is the case 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 legally 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 bike at home 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, including the following:

- The need to create additional transportation options to help shift some local trips away from automobile use.
- As a strategic element of public health and fitness.
- 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. At other locations 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, it was found that although the City has a fairly well-developed sidewalk system, there are nevertheless gaps that need to be filled, as discussed earlier in this report. In addition to connectivity, additional investment in pedestrian facilities, especially at signalized intersections along major arterials, can have a significant impact on the real and perceived safety of potential users. The lack of striped crosswalks, countdown pedestrian signals, and other pedestrian features provides a major deterrent to residents and employees in the City and confines the majority of pedestrian activity to local residential streets.

3. Conclusion

This report examined existing conditions in the City of Chesterfield as they relate to walkability and bikeability. It found that pedestrian facilities are essentially well-developed with the need for some improvements and in particular for improved connections between cul-de-sacs and at transitions with commercial-retail areas.

The analysis has also shown the need for substantial and coordinated bikeway improvements to meet an evolving and increasingly sophisticated set of resident needs including, transportation, recreation and wellness. 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 becomes more, pronounced. The need relates to on-street facilities, additional multipurpose trails, interconnections between neighborhoods, institutions, and commercial-retail areas, and for a variety of supportive bikeway enhancements. The next chapter will present a specific plan to address these needs and to help make Chesterfield more bikeable and walkable.

Chapter 3. Bikeable-Walkable Community Plan

In this chapter, a plan is presented for the establishment of an improved system of bicycle and pedestrian facilities in Chesterfield. 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 Chesterfield. The plan presents goals and objectives, delineates bicycle and pedestrian facility components, and concludes with a detailed implementation strategy.

A. Goals and Objectives

1. Develop Bike/Pedestrianways as a Functional Element in Chesterfield's Transportation and Recreation System

- a. Selectively modify existing City streets when financially feasible, to include bicycle facilities that are appropriate to traffic conditions; and add sidewalks and non-motorized connectors between cul-de-sacs and other barriers as appropriate. Bicycle improvements should include not only the designation of roadways as bicycle facilities, but also the incorporation of bicycle-friendly elements such as horizontal stormwater drainage grates and bicycle detection systems to the transportation network.
- b. Strive to ensure that new local, collector, and arterial roads are not only adequate for motor vehicles but also include provisions for bicycle and pedestrian movement.
- c. 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.

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

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

f. Coordinate development activity to maximize the partnering benefits available through the Transportation Enhancements Program and other funding sources.

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

a. Encourage City staff and an existing committee or board to oversee development of programs and materials that promote effective usage of the bicycle and pedestrian network.

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

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.

d. Educate cyclists on the safe usage of roads and trails.

e. Educate both bicyclists and motorists on road-sharing techniques.

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

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

B. Bicycle and Pedestrian Facility Components

1. Introduction

The physical elements of the Chesterfield Bikeable-Walkable Community Plan are identified in this section. The principal components – trails, on-street bicycle facilities, sidewalks and Pedestrian Improvement Zones - are shown on the plan maps on pages 69 and 71 at the end of Section B. The first of these maps depicts existing and proposed bicycle facilities, and the second existing and proposed pedestrian facilities.

2. Trails

Notwithstanding the fact that the City is already relatively well developed, several greenway and trail opportunities exist and should be developed, as identified in the table below and on the bicycle and pedestrian plan maps. Major opportunities are along the Ameren/UE rail corridor as well as on Ameren’s transmission corridor. 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. The table below shows projects recommended by the planning team and projects already in some phase of planning, design or engineering by the City and its partners.

Table 16: Planned and Recommended Trails.

Name	Type	Status	Lgth (ft.)	Mi.	Limit To	Limit From
Ameren Trail North	Multi Use Trail	Recommended	17,400	3.3	Interstate 64	Olive
Ameren Trail South	Multi Use Trail	Recommended	17,000	3.2	Clarkson	Interstate 64
Chesterfield Village Trail	Multi Use Trail	Planned	9,300	1.8	Riparian Trail	Riparian Trail
Eatherton-Howell Island Connector	Multi Use Trail	Recommended	700	0.1	Howell Island Parking Lot	M.C.L.T. West
Faust Park-Ameren Greenway Connector	Multi Use Trail	Recommended	600	0.1	Ameren Greenway	Faust Park Trail
Lake Trail	Multi Use Trail	Planned	4,600	0.9	Around Lake	Around Lake
Monarch Chesterfield Levee Trail Future Ameren	Multi Use Trail	Planned	21,000	4.0	M.C.L.T. Future West	Existing Trail

Continued on the following page

Table 16: Planned and Recommended Trails, Continued.

Name	Type	Status	Lgth (ft.)	Mi.	Limit To	Limit From
Monarch Chesterfield Levee Trail Future East	Multi Use Trail	Planned	7,800	1.5	Existing Trail	Existing Trail
Monarch Chesterfield Levee Trail Future West	Multi Use Trail	Planned	20,500	3.9	M.C.L.T. Future Ameren	Existing Trail
Spring Valley Connector	Multi Use Trail	Recommended	100	0.02	Spring Valley	Spring Valley
Straub Hill-High School Connector	Multi Use Trail	Recommended	200	0.03	High School	Straub Hill
Riparian Trail	Nature Trail	Planned	7,900	1.5	Baxter	Chesterfield Village Trail
Trail Totals:			107,100	20.2		

The planned trail/greenway system is more than 20 miles in length. With connectivity to the Monarch Chesterfield Levee Trail currently under development by the City in partnership with GRG, the overall system could become a major civic and tourism asset. It would also help to sustain the City’s historically strong property values, an outcome that is occurring elsewhere where longer trail systems exist.

3. On-Street Bikeways

Purpose and Intended Users. Chesterfield’s on-street bikeway system will consist primarily of treatments intended to make conditions safer for bicycle travel and to facilitate connectivity to destinations including local and county parks, other public facilities, retail areas, job centers and others. The primary intended users of this system are experienced and basic 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 some motor vehicle trips to trails. For each selected street segment shown in the following illustration, a recommendation

Illustration 36: On-Street Treatment Typology.


Treatment Type	Applicability	Design Treatment
<p>Accommodation on Shared Roadway.</p> 	<p>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.</p>	<p><u>Urban Section</u> (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.</p> <p><u>Rural Section</u>: (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.</p> <p><u>Warning Signage</u>: “Share the Road with Bicycles” signs every 1/4-mile.</p>

Illustration 36: On-Street Treatment Typology, Continued.

Treatment Type	Applicability	Design Treatment
<p data-bbox="245 344 454 411">Bicycle Lane (Class II Bikeway)</p>  <p data-bbox="331 665 367 680">R3-17</p> 	<p data-bbox="521 344 935 716">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.)</p> <p data-bbox="521 764 935 982">“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.</p>	<p data-bbox="958 344 1419 527"><u>Urban Section</u> (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.</p> <p data-bbox="958 575 1419 753"><u>4-lane Rural Section</u>: Min. 8’+ shoulders with 5’ striped bicycle lanes (5’, 3’, 12’, 12’, 12’, 3’, 5’). Widen shoulder to provide more separation between motor vehicle lane and bike lane.</p> <p data-bbox="958 802 1419 1020"><u>2-lane Urban Section</u>: 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.)</p> <p data-bbox="958 1068 1419 1287"><u>4-lane Urban Section</u>, 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.)</p>
<p data-bbox="212 1346 490 1451">Bicycle Route - Signed Shared Roadway (Class III Bikeway)</p>  <p data-bbox="337 1686 363 1696">D11-1</p>	<p data-bbox="521 1346 935 1644">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.</p>	<p data-bbox="958 1346 1419 1413">14’ outside lanes, “Bicycle Route” and “Share the Road with Bicycles” signs.</p>

is made regarding whether to use a formal bikeway treatment or an accommodation treatment, using the typology identified in the illustration on the following pages..

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 A). The typology is also based on information provided by the Pedestrian and Bicycle Information Center (PBIC). 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 design practices. It should be noted that 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.

The full listing of Chesterfield street segments and recommended treatments keyed to this typology is provided in the Section C: Implementation Strategy (p 73), with pre-engineering cost estimates for each recommended project. Also refer to the bicycle and pedestrian plan maps on pages 69 and 71. This listing includes state/county-maintained roads, and it is recommended that the City encourage the development of bicycle facilities on these roads as well.

4. Pedestrian Facilities

Improving pedestrian connectivity, safety, access and convenience is a key component of the plan. In order to prioritize pedestrian improvements, criteria have been developed based upon analysis of current pedestrian infrastructure and public input gathered throughout the planning process. Feedback received at the public forums and through the on-line survey points to a number of general and specific concerns related to the pedestrian environment. In addition, survey respondents have also shared the types of improvements they feel to be important to improving the pedestrian environment. Pedestrian improvements should focus on the following categories:

- New trails to enhance community connectivity and provide additional recreational opportunities;
- Projects that improve pedestrian safety and comfort over and under Interstate 64;
- Projects that provide continuous pedestrian facilities (sidewalks, crosswalks) along major arterials, minor arterials and collector streets;
- Projects that connect residential neighborhoods to new and existing significant community destinations and services;
- Projects that improve pedestrian safety, comfort and accessibility at signalized intersections along major arterials.

Taking these criteria into account, the City of Chesterfield should focus its efforts to improve pedestrian mobility in eight Pedestrian Improvement Zones. Enhancements in these Pedestrian Improvement Zones will connect to existing sidewalks and existing, recommended, and planned trails in order to create a safe, interconnected network of pedestrian facilities to meet the transportation and recreation needs of Chesterfield residents, employees and visitors. In most cases, improvements in these zones will require coordination with county and/or state transportation departments.

Wild Horse Creek West (Tara Oaks Drive to Wildhorse Parkway Drive). Gaps in the sidewalk network limit pedestrian connectivity from residential subdivisions to the nearby Chesterfield Elementary, Chesterfield Elementary Park, and Gateway Academy. Additional sidewalk connections are recommended along Wild Horse Creek Road to eliminate pedestrian gaps.

Wild Horse Creek Central (Long Road/Kehrs Mill Road to Riverdale Drive). Intermittent sidewalk facilities discourage pedestrian activity and travel to nearby commercial services in Chesterfield Valley and the planned Monarch-Chesterfield Levee Trail system. The City should complete the sidewalk network along Wild Horse Creek Road and Long Road to encourage pedestrian transportation.

Wild Horse Creek East (Woodcliffe Place Drive to Planned Riparian Trail). Segments of sidewalk are missing at various points along Wild Horse Creek Road and Baxter Road. It is recommended that the City connect the existing sidewalk segments to provide adjacent neighborhoods with safe and accessible connections to Wild Horse Elementary, Westwood Adventist Junior Academy, Early Childhood Preparatory School, Ascension Catholic Elementary School, and the planned Riparian Trail.

Clarkson/Olive (Baxter Road to Olive Blvd and Chesterfield Parkway). Discontinuous segments of sidewalk, inadequate crossing facilities at signalized intersections, and heavy automobile traffic make this 1.3-mile stretch of arterial road an underutilized pedestrian route. The City of Chesterfield should coordinate pedestrian improvements with MoDOT throughout this area to increase pedestrian mobility and access to adjacent commercial activity.

Olive Blvd West (Appalachian Trail to Hog Hollow Road). The lack of interconnected sidewalks on this arterial road limits pedestrian access from nearby residential neighborhoods to local destinations, including Faust County Park and the planned trail connection from Faust County Park to the Missouri River Greenway, Beckmeier Conservation Area, Shenandoah Valley Elementary, Green Trails Elementary, and significant commercial activity further west along Olive Blvd. The City of Chesterfield should coordinate with MoDOT to complete the sidewalk network, improving conditions to allow Olive Blvd to function adequately as a pedestrian arterial.

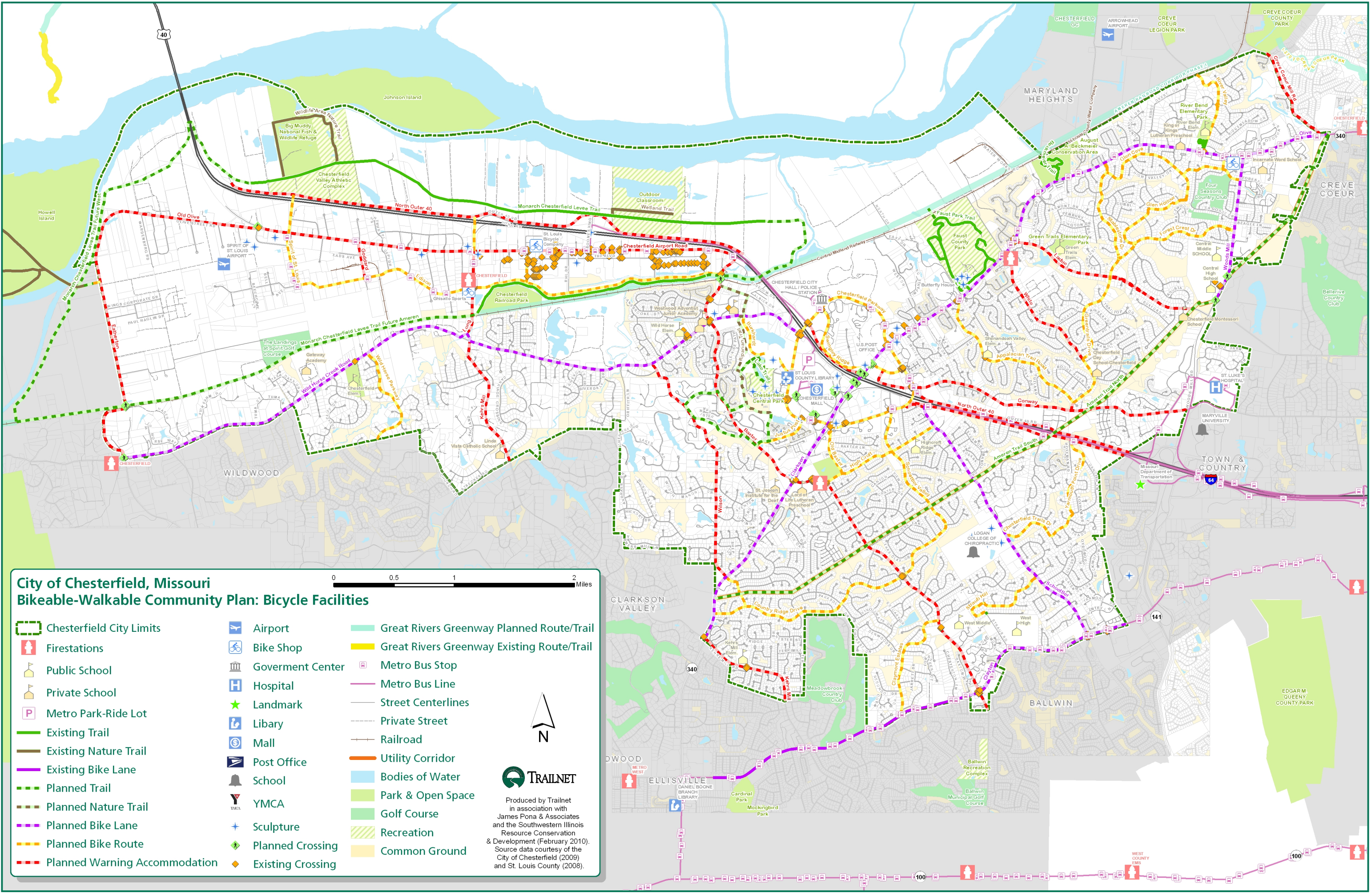
Olive Blvd East (River Valley Drive to Creve Coeur Mill Road). This 1.0-mile segment of Olive Blvd connects residential neighborhoods to shopping and retail activity, River Bend Elementary, Incarnate Word Parish Catholic Church and School (K-8), King of Kings Lutheran Church and Preschool, and W.F. Dierberg Meditation Park. Current conditions, including intermittent sidewalks and the lack of pedestrian striping and signaling at the intersection of Olive Blvd and North Woods Mill Road (Hwy 141), limit pedestrian activity in the area. The City should coordinate improvements with MoDOT and St. Louis County Highways and Traffic to increase pedestrian access to these community destinations along Olive Blvd.

Wilson Road (Wilson Woods Court to Planned Chesterfield Village Trail). The current lack of sidewalks along northern Wilson Road will limit access to the Planned Chesterfield Village Trail, which will connect residents in subdivisions along Wilson Road and Baxter Road to the Riparian Trail, Chesterfield Central Park, the Lake Trail, and other services and public facilities in the area that will become Downtown Chesterfield. The City of Chesterfield should continue the sidewalk northward along the east side of Wilson Road to connect to the Planned Chesterfield Village Trail.

Chesterfield Parkway (Clarkson Road to Conway Road). This 0.9 mile stretch of the minor arterial loop provides an important connection for pedestrians crossing over Interstate 64, but current conditions prohibit safe travel. No sidewalks exist on either side of Chesterfield

Parkway over Interstate 64, with only a three-foot shoulder between the outer lanes and the outer bridge walls provided for pedestrian mobility. Signalized intersections at both the north and south ends of the Chesterfield Parkway East bridge lack pedestrian signals, making it difficult for walkers to navigate safely across the bridge. The City of Chesterfield should coordinate with MoDOT to provide safe and convenient pedestrian access across Interstate 64. In addition, the City should continue the boulevard design along Chesterfield Parkway from Clarkson Road to Olive Road in order to complete the Pathway on the Parkway.

In addition to the eight Pedestrian Improvement Zones listed above, other pedestrian improvements are recommended throughout the City to achieve a complete, interconnected pedestrian network. These additional facilities include sidewalks along South Woods Mill Road from Conway Road to Brooking Park Drive, Claymont Estates Drive from Woodsbluff Drive south to the existing sidewalk (approximately 0.1 miles), and along Adgers Warf Drive from Harleston Village Drive northwest to Chesterfield Trails Drive. Improvements like these strengthen the pedestrian system by providing additional safety and connectivity within neighborhoods and from neighborhoods to local destinations. The City of Chesterfield should also utilize the pedestrian categories identified at the top of page 66 to identify additional projects.



City of Chesterfield, Missouri Bikeable-Walkable Community Plan: Bicycle Facilities

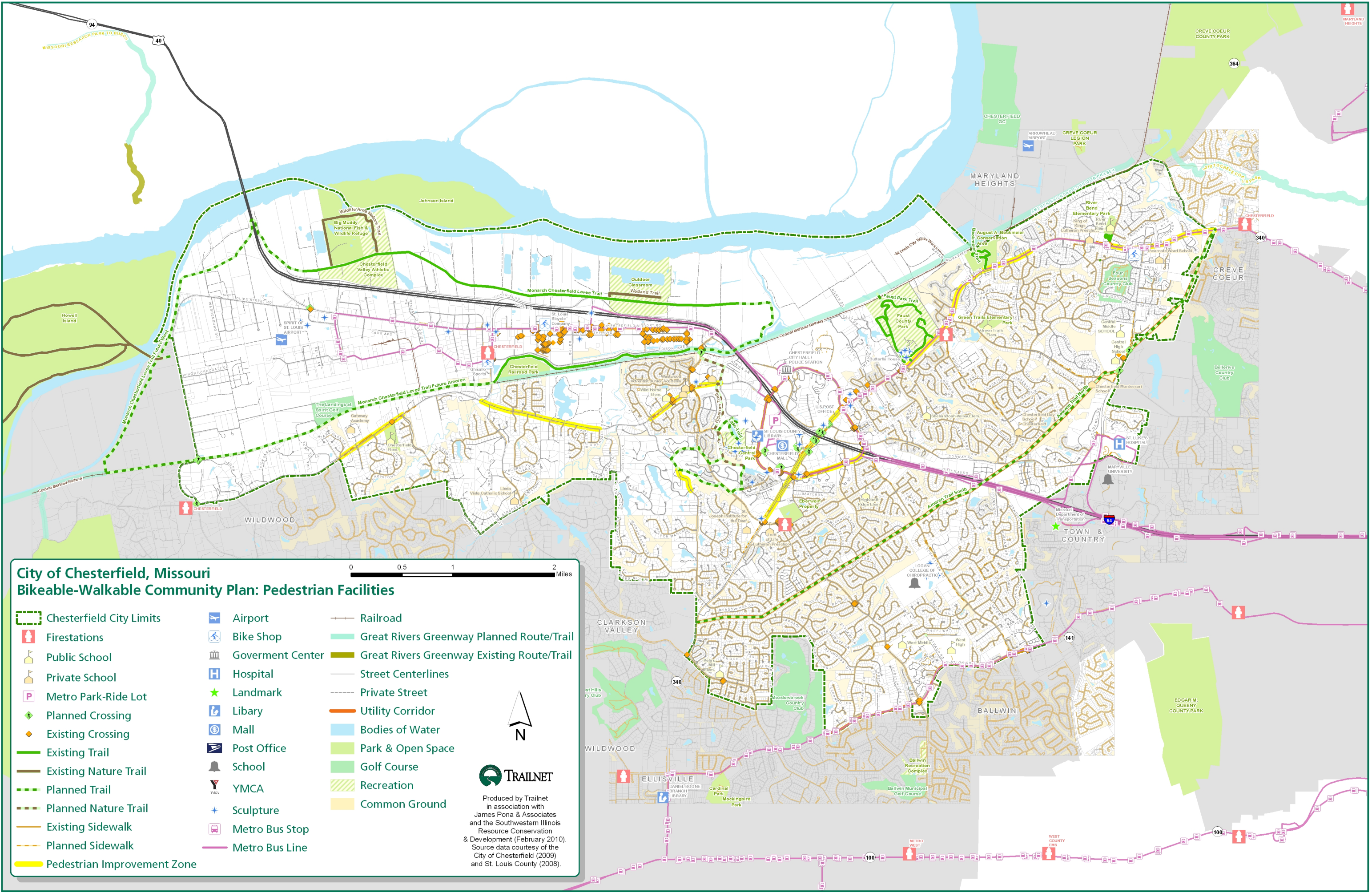
0 0.5 1 2 Miles

Chesterfield City Limits	Airport	Great Rivers Greenway Planned Route/Trail
Firestations	Bike Shop	Great Rivers Greenway Existing Route/Trail
Public School	Government Center	Metro Bus Stop
Private School	Hospital	Metro Bus Line
Metro Park-Ride Lot	Landmark	Street Centerlines
Existing Trail	Library	Private Street
Existing Nature Trail	Mall	Railroad
Existing Bike Lane	Post Office	Utility Corridor
Planned Trail	School	Bodies of Water
Planned Nature Trail	YMCA	Park & Open Space
Planned Bike Lane	Sculpture	Golf Course
Planned Bike Route	Planned Crossing	Recreation
Planned Warning Accommodation	Existing Crossing	Common Ground

TRAILNET

Produced by Trailnet in association with James Pona & Associates and the Southwestern Illinois Resource Conservation & Development (February 2010). Source data courtesy of the City of Chesterfield (2009) and St. Louis County (2008).

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**City of Chesterfield, Missouri
Bikeable-Walkable Community Plan: Pedestrian Facilities**

- | | | |
|-----------------------------|-------------------|--|
| Chesterfield City Limits | Airport | Railroad |
| Firestations | Bike Shop | Great Rivers Greenway Planned Route/Trail |
| Public School | Government Center | Great Rivers Greenway Existing Route/Trail |
| Private School | Hospital | Street Centerlines |
| Metro Park-Ride Lot | Landmark | Private Street |
| Planned Crossing | Library | Utility Corridor |
| Existing Crossing | Mail | Bodies of Water |
| Existing Trail | Post Office | Park & Open Space |
| Existing Nature Trail | School | Golf Course |
| Planned Trail | YMCA | Recreation |
| Planned Nature Trail | Sculpture | Common Ground |
| Existing Sidewalk | Metro Bus Stop | |
| Planned Sidewalk | Metro Bus Line | |
| Pedestrian Improvement Zone | | |



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C. Implementation Strategy

1. Pre-Engineering Opinion of Cost to Develop the Chesterfield Bikeway System

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. 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. Cost estimates for pedestrian facilities have not been developed for this study, as variations in site layout, project scope, materials, right-of-way acquisition, and other factors limit the effectiveness and reliability of pre-engineering cost estimates.

Table 17: Rough-Order of Magnitude Cost Estimate by Facility Type.

Facility Type	Number of Facilities	Length (ft)	Length (mi)	Cost (retro)	Cost (new)
Warning Accommodation	16	175,900	33.3	\$75,700	-
Bicycle Route	38	155,100	29.2	\$102,200	-
Bicycle Lane	6	99,100	18.7	\$328,400	\$6,508,800
Multi-use Trail	11	99,200	18.7	-	\$5,956,900
Nature Trail	1	7,900	1.5	-	\$1,600,00
Total Facilities	72	537,200	101.4	\$506,300	\$12,465,700

Table 18a: Preliminary Opinion of Cost Detail - Warning Accommodation Treatment

Label	Length (ft)	Length (mi)	Limit To	Limit From	Cost (retro)	Cost (new)	Jurisdiction	Street Type
Baxter	26,000	4.9	Chesterfield Airport Rd	City Limit	\$11,200	\$0	County	Major Arterial
Chesterfield Airport Road	21,000	4.0	Old Olive	Baxter	\$9,000	\$0	County	Major Arterial
Conway	14,500	2.8	City Limit	Swingley Ridge	\$6,200	\$0	County	Minor Arterial
Creve Coeur Mill Rd	4,500	0.9	City Limit	Olive	\$1,900	\$0	County	Major Arterial
Eatherton	12,700	2.4	Wild Horse Creek	Old Olive	\$5,500	\$0	County	Major Arterial
Goddard	1,600	0.3	Edison	Chesterfield Airport	\$700	\$0	County	Local
Kehrs Mill (North)	5,900	1.1	Wild Horse Creek	City Limit	\$2,600	\$0	County	Major Arterial
Kehrs Mill (South)	5,000	0.9	Clarkson	City Limit	\$2,100	\$0	County	Major Arterial
Ladue	10,400	2.0	Ameren Corridor North	Olive	\$4,500	\$0	County	Major Arterial
Long	3,700	0.7	Wild Horse Creek	Chesterfield Airport Rd	\$1,600	\$0	County	Major Arterial
North Outer 40	36,800	7.0	West Terminus	East Terminus	\$15,800	\$0	State	Major Arterial
Old Olive	6,000	1.1	Eatherton	Chesterfield Airport Rd	\$2,600	\$0	County	Major Arterial
South Outer 40	10,600	2.0	City Limit	Chesterfield Parkway	\$4,600	\$0	State	Major Arterial
White	6,000	1.1	Green Trails Dr	Olive	\$2,600	\$0	County	Minor Arterial
White	400	0.1	Conway	Appalachian Trail	\$200	\$0	County	Minor Arterial
Wilson	10,800	2.0	Clarkson	Wild Horse Creek	\$4,600	\$0	Chesterfield	Collector
Warning Accommodation Totals:	175,900	33.3			\$75,700	\$0		

Table 18b: Preliminary Opinion of Cost Detail - Bicycle Routes.

Label	Length (ft)	Length (mi)	Limit To	Limit From	Cost (retro)	Cost (new)	Jurisdiction	Street Type
Adgers Wharf	300	0.1	Harleston Village Dr	Trail Connection	\$200	\$0	Chesterfield	Local
Appalacian Trail Road	7,800	1.5	White	Olive	\$5,100	\$0	Chesterfield	Collector
Broadmoor	3,100	0.6	Spring Valley	Woods Mill	\$2,000	\$0	Chesterfield	Local
Brook Hill	1,400	0.3	Schoettler	White Lane	\$900	\$0	Chesterfield	Local
Burkhardt	3,800	0.7	Wild Horse Creek	Chesterfield Parkway	\$2,500	\$0	Chesterfield	Local
Chateaugay	1,200	0.2	Forest Crest	Glen Hollow	\$800	\$0	Chesterfield	Residential Collector
Chesterfield Parkway	17,900	3.4	circular	circular	\$11,800	\$0	County	Minor Arterial
Chesterfield Trails Connection	100	0.1	Chesterfield Trails	Adgers Wharf	\$25	\$0	Chesterfield	Local
Chesterfield Trails Dr	2,200	0.4	Trail Connection	Schoettler	\$1,500	\$0	Chesterfield	Local
Clarkson Woods	500	0.1	Clarkson	Federal Way	\$400	\$0	Chesterfield	Residential Collector
Claymont Estates	5,300	1.0	Baxter	Clayton	\$3,500	\$0	Chesterfield	Collector
Country Ridge Drive	12,600	2.4	Clarkson	Schoettler Valley	\$8,300	\$0	Chesterfield	Collector
Edison	19,600	3.7	Spirit of St. Louis	Baxter	\$12,900	\$0	County	Minor Arterial
Federal Way	1,200	0.2	Clarkson Woods	Country Ridge	\$800	\$0	Chesterfield	Residential Collector
Forest Crest Dr	6,200	1.2	Chateaugay	Woods Mill	\$4,100	\$0	Chesterfield	Collector
Glen Cove	5,900	1.1	Stablestone	Glen Valley	\$3,900	\$0	Chesterfield	Residential Collector
Glen Hollow	1,200	0.2	Chateaugay	Glen Valley	\$800	\$0	Chesterfield	Residential Collector
Glen Valley	600	0.1	Glen Cove	Glen Hollor	\$400	\$0	Chesterfield	Residential Collector
Greentrails Drive	6,900	1.3	White	Forest Crest Dr	\$4,600	\$0	Chesterfield	Collector
Harleston Village	1,500	0.3	Yarmouth Point	Adgers Wharf	\$1,000	\$0	Chesterfield	Local
Highcroft	4,600	0.9	Old Baxter	Schoettler	\$3,000	\$0	Chesterfield	Collector
Highland Park	600	0.1	Broadmoor	Olive	\$400	\$0	Chesterfield	Local
Howell Island Parking Lot	300	0.1	Eatherton	Trail Connection	\$200	\$0	Chesterfield	Local
Justus Post	2,500	0.5	Baxter	Chesterfield Parkway	\$1,600	\$0	Chesterfield	Collector
Long	1,500	0.3	N Outer 40	Chesterfield Airport Rd	\$1,000	\$0	State	Major Arterial

Table 18b: Preliminary Opinion of Cost Detail - Bicycle Routes, Continued.

Label	Length (ft)	Length (mi)	Limit To	Limit From	Cost (retro)	Cost (new)	Jurisdiction	Street Type
Old Baxter	3,200	0.6	Hedgford Dr	Baxter	\$2,100	\$0	Chesterfield	Residential Collector
Public Works	1,400	0.3	Edison	Chesterfield Airport Rd	\$900	\$0	Chesterfield	Local
River Valley	4,900	0.9	City Limit	Olive	\$3,200	\$0	Chesterfield	Minor Arterial
Schoettler Valley	6,100	1.2	Country Ridge	Chesterfield Parkway	\$4,000	\$0	Chesterfield	Collector
Spirit of St. Louis	4,100	0.8	Edison	N Outer 40	\$2,700	\$0	County	Minor Arterial
Spring Valley	600	0.1	Burning Tree	Glen Cove	\$400	\$0	Chesterfield	Local
Stablestone Dr	5,400	1.0	Green Trails Dr	Olive	\$3,500	\$0	Chesterfield	Collector
Straub Hill	1,400	0.3	School Access Trail	White Lane	\$1,000	\$0	Chesterfield	Local
Swingley Ridge	6,000	1.1	Chesterfield Parkway	Chesterfield Parkway	\$4,000	\$0	Chesterfield	Collector
White	2,500	0.5	Appalachian Trail	Greentrails	\$1,600	\$0	County	Minor Arterial
White Lane Dr	2,000	0.4	Brook Hill	Straub Lane	\$1,300	\$0	Chesterfield	Local
Wild Horse Parkway	5,000	0.9	City Limit	Wild Horse Creek	\$3,300	\$0	Chesterfield	Collector
Yarmouth Point Drive	3,700	0.7	S Outer 40	Harleston Village Dr	\$2,500	\$0	Chesterfield	Residential Collector
Bike Route Totals:	155,100	29.5			\$102,200	\$0		

Table 18c: Preliminary Opinion of Cost Detail - Bicycle Lanes.

Label	Length (ft)	Length (mi)	Limit To	Limit From	Cost (retro)	Cost (new)	Jurisdiction	Street Type
Clarkson	13,500	2.6	City Limit	Olive	\$44,800	\$888,300	State	Major Arterial
Clayton	8,400	1.6	City Limit	Hatteras	\$27,900	\$552,700	State	Major Arterial
Olive	25,100	4.7	Clarkson	City Limit	\$83,200	\$1,648,400	State	Major Arterial
Schoettler	12,700	2.4	Clayton	S Outer 40	\$42,000	\$831,600	County	Minor Arterial
Wild Horse Creek Road	32,800	6.2	Chesterfield Parkway	Eatherton	\$108,800	\$2,156,200	State & County	Major Arterial
Woods Mill	6,600	1.2	Ameren Corridor	Olive	\$21,800	\$431,500	State	Major Arterial
Bicycle Lane Totals:	99,100	18.7			\$328,500	\$6,508,700		

Table 18d: Preliminary Opinion of Cost Detail - Multi-Use Trails.

Label	Length (ft)	Length (mi)	Limit To	Limit From	Cost (retro)	Cost (new)
Ameren Trail North	17,400	3.3	Interstate 64	Olive	\$0	\$868,400
Ameren Trail South	17,000	3.2	Clarkson	Interstate 64	\$0	\$846,100
Chesterfield Village Trail	9,300	1.8	Riparian Trail	Riparian Trail	\$0	\$464,600
Eatherton-Howell Island Connector	700	0.1	Howell Island Parking Lot	Monarch Chesterfield Levee Trail	\$0	\$36,000
Faust Park-Ameren Greenway Connector	600	0.1	Ameren Greenway	Faust Park Trail	\$0	\$30,400
Lake Trail	4,600	0.9	Around Lake	Around Lake	\$0	\$100,000
Monarch Chesterfield Levee Trail Future Ameren	21,000	4.0	M.C.L.T. Future West	Existing Trail	\$0	\$1,750,000*
Monarch Chesterfield Levee Trail Future East	7,800	1.5	Existing Trail	Existing Trail	\$0	\$450,000*
Monarch Chesterfield Levee Trail Future West	20,500	3.9	M.C.L.T. Future Ameren	Existing Trail	\$0	\$1,400,000*
Spring Valley Connector	100	0.1	Spring Valley	Spring Valley	\$0	\$4,000
Straub Hill-High School Connector	200	0.1	High School	Straub Hill	\$0	\$7,400
Trail Totals:	99,200	18.9			\$0	\$5,956,900

* Cost estimate provided by the City of Chesterfield.

Table 18c: Preliminary Opinion of Cost Detail - Nature Trails.

Label	Length (ft)	Length (mi)	Limit To	Limit From	Cost (retro)	Cost (new)
Riparian Trail	7,900	1.5	Baxter	Chesterfield Village Trail	\$0	\$1,600,000
Nature Trail Totals:	7,900	1.5			\$0	\$1,600,000

* Cost estimate provided by the City of Chesterfield.

2. Bicycle Project Prioritization

While each recommended project will play an important role in creating a comprehensive, interconnected system of bicycle and pedestrian facilities, certain projects carry greater importance in improving safety and accessibility, providing connections between residential neighborhoods and community destinations, and meeting the stated needs of the community. Bicycle facility projects have been prioritized according to weighted criteria identified during the planning process, which include proximity, connectivity, public feedback, and ease of implementation. This ranking system should not be used as a chronological schedule for project implementation; if the opportunity arises to undertake a recommended project, the City of Chesterfield should capitalize on that opportunity regardless of project rank.

Proximity. Facilities in close proximity to local schools, transit stops, commercial activity centers, and public facilities such as parks and libraries are essential in creating a functional bicycle transportation network. These facilities provide access to community destinations and encourage residents to incorporate bicycling and walking, rather than driving, into their daily routines, whether it be walking to school or bicycling to the library or park.

Adjacent Residential Population (2.1). Bicycle and pedestrian infrastructure in and around residential neighborhoods offers people an alternative mode of transportation to many of the previously mentioned community destinations. Recommended projects are scored according to their adjacent residential population, with greater importance given to projects that have the potential to affect a greater number of people.

Connectivity (3.1 through 3.4). Facilities that close an existing gap in the network, link to other routes, provide the most direct route choice, and connect Chesterfield residents to regional destinations enhance the network's coverage and efficiency while also improving safety for cyclists and pedestrians.

Public Feedback (4.1). Through the public engagement process, residents of Chesterfield have vocalized their priorities, goals and ideas for improving the bicycle and pedestrian environment throughout the City. Priority is given to projects that have garnered considerable public support and to projects that address safety, access and connectivity issues identified by the public.

Ease of Implementation (5.1). A number of projects involve St. Louis County, MoDOT, utility and railroad rights-of-way. These projects will require additional coordination with both governmental and non-governmental entities with regard to property or easement acquisition, design standards, project funding, or other considerations. There is also a significant number of projects located on rights-of-way currently operated and maintained by the City of Chesterfield, and as such will be easier to implement. Many of the projects under City jurisdiction are located on neighborhood collector streets and will be important bikeways on which a large share of transportation-oriented bicycle trips will occur.

Table 19 on the following page displays the priority rankings for bicycle improvements. Segments over one mile in length, as well as shorter segments that warrant prioritization, have been included in the prioritization matrix. Project criteria described above are listed as 1.1 through 5.1.

Table 19: Bicycle Project Prioritization Matrix.

Project	Status	Project Type	Length (mi)	Jurisdiction	Projected Cost	1.1	1.2	1.3	1.4	2.1	3.1	3.2	3.3	3.4	4.1	5.1	Total Score
Olive	R	BL	4.7	MoDOT	\$1,648,400	100	15	20	100	50	0	130	10	10	45	0	480
Ameren Trail (South)	R	MT	3.2	N/A	\$846,100	175	15	20	25	50	25	100	10	0	60	0	480
Baxter	R	WA	4.9	County	\$11,200	150	15	20	75	50	0	110	10	10	30	0	470
Wild Horse Creek	R	BL	6.2	County, MoDOT	\$2,156,200	125	15	20	100	30	25	70	10	10	60	0	465
Chesterfield Parkway	R	BR	3.4	County, MoDOT	\$11,800	25	15	20	125	50	25	110	0	0	60	0	430
Clarkson	R	BL	2.6	MoDOT	\$888,300	75	15	20	75	50	0	60	10	10	45	0	360
Woods Mill	R	BL	1.2	Chesterfield	\$431,500	100	15	20	50	30	0	50	10	10	30	20	335
Green Trails/ Stablestone/ Forest Crest	R	BR	3.5	Chesterfield	\$12,200	100	15	0	50	50	0	50	0	0	30	20	315
Monarch Chesterfield Levee Trail Future West	P	MT	3.9	N/A	\$1,400,000	50	15	0	75	20	25	40	0	10	60	0	295
Monarch Chesterfield Levee Trail Future Ameren	P	MT	4.0	N/A	\$1,750,000	50	15	0	75	20	25	40	0	10	60	0	295
Country Ridge/ Schoettler Valley	R	BR	3.5	Chesterfield	\$12,300	75	15	0	25	50	0	60	0	0	45	20	290
Ladue	R	WA	2.0	County	\$4,500	100	15	0	50	30	0	30	10	10	15	0	260
River Valley	R	BR	0.9	Chesterfield	\$3,200	50	15	0	50	20	25	10	10	0	60	20	260
Monarch Chesterfield Levee Trail Future East	P	MT	1.5	N/A	\$450,000	75	15	20	0	20	25	30	0	10	60	0	255

Project Prioritization Criteria

- 1.1: Proximity to schools (K-12); 1.2: Proximity to transit stops; 1.3: Direct access to commercial destinations; 1.4: Proximity to public facilities;
- 2.1: Adjacent residential population; 3.1: Completes gap in bicycle network; 3.2 Connected existing and planned routes; 3.3 Directness of route;
- 3.4 Regional route; 4.1 Public feedback & support; 5.1: Ease of implementation

Abbreviations

Status: R=Recommended; P=Planned. Project Type: WA=Warning Accommodation; BR=Bicycle Route; BL=Bicycle Lane; MT=Multi-Use Trail; NT=Nature Trail

Table 20: Bicycle Project Prioritization Matrix, Continued.

Project	Status	Project Type	Length (mi)	Jurisdiction	Projected Cost	1.1	1.2	1.3	1.4	2.1	3.1	3.2	3.3	3.4	4.1	5.1	Total
Ameren Trail (North)	R	MT	3.3	N/A	\$868,400	100	15	20	0	30	0	20	10	0	60	0	255
Schoettler	R	BL	2.4	County	\$831,600	50	15	0	0	50	25	60	10	0	45	0	255
North Outer 40	R	WA	7.0	State	\$15,800	0	15	20	75	30	0	60	10	0	30	0	240
Clayton	R	BL	1.6	MoDOT	\$552,700	50	15	20	25	50	0	30	10	10	15	0	225
Chesterfield Village Trail	P	MT	1.8	N/A	\$464,600	25	15	0	50	30	25	40	0	0	15	0	200
Wilson	R	WA	2.0	Chesterfield	\$4,600	50	0	0	0	30	0	30	10	0	60	20	200
Appalachian Trail	R	BR	1.5	Chesterfield	\$5,100	25	15	0	50	30	0	20	10	0	30	20	200
Conway	R	WA	2.8	County	\$6,200	25	15	0	50	30	0	40	10	10	15	0	195
Long/Kehrs Mill (North)	R	WA	1.8	County	\$4,200	25	15	20	25	20	0	40	10	10	30	0	195
White	R	WA	1.2	County	\$2,800	50	15	0	25	30	0	30	10	0	15	0	175
Creve Coeur Mill	R	WA	0.9	County	\$1,900	0	15	20	0	20	25	30	10	10	30	0	160
South Outer 40	R	WA	2.0	MoDOT	\$4,600	25	15	0	0	30	0	40	10	0	30	0	150
Kehrs Mill (South)	R	WA	0.9	County	\$2,100	50	0	0	0	20	0	10	10	10	30	0	130
Old Olive	R	WA	1.1	County	\$2,600	0	15	0	25	5	0	40	10	10	15	0	120
Chesterfield Airport	R	WA	4.0	County	\$9,000	25				20	0	50	10	0	15	0	120
Eatherton	R	WA	2.4	County	\$5,500	0	0	0	25	5	0	40	10	10	15	0	105

Project Prioritization Criteria

- 1.1: Proximity to schools (K-12); 1.2: Proximity to transit stops; 1.3: Direct access to commercial destinations; 1.4: Proximity to public facilities;
- 2.1: Adjacent residential population; 3.1: Completes gap in bicycle network; 3.2 Connected existing and planned routes; 3.3 Directness of route;
- 3.4 Regional route; 4.1 Public feedback & support; 5.1: Ease of implementation

Abbreviations

Status: R=Recommended; P=Planned. Project Type: WA=Warning Accommodation; BR=Bicycle Route; BL=Bicycle Lane; MT=Multi-Use Trail; NT=Nature Trail

3. Funding Sources, Uses, and Project Phasing

The estimated costs to construct Chesterfield'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.

Transportation Enhancements Program. As required by the Safe, Accountable, Flexible, Efficient Transportation & Equity Act: A Legacy for Users (SAFETEA-LU), ten percent of Missouri's Surface Transportation Program federal funds is required to be set aside for enhancement projects. There are 10 categories of enhancements, including non-motorized and tourist-related categories such as trails and greenways. This federal funding source requires a 20 percent 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. The new highway authorization is expected to be enacted during 2010 and it is possible that the enhancement program will be continued therein. Enhancement funding through the SAFETEA-LU program is very competitive.

Contact: 314-421-4220 or <http://www.ewgateway.org>

Surface Transportation Program (STP). The STP program is also administered by MoDOT through EWCOG on an annual basis, to fund local road and bridge projects. Bike and pedestrian facilities are both allowable expenses. Eligible applicants providing improvement or service must be consistent with the regional priorities outlined in Legacy 2030, the long-range transportation plan for the St. Louis. Projects require a 20 percent match.

Contact: 314-421-4220 or <http://www.ewgateway.org/>

Land & Water Conservation Fund (LWCF). Grants are available to cities, counties and school districts for outdoor recreation facilities, including trails. Projects require a 55 percent match. Funded facilities must remain for the purpose of public outdoor recreation in perpetuity. The grant application period ends in November and is administered by the Missouri Department of Natural Resources-Division of State Parks. The funding is provided through US Department of Interior, National Park Service.

Contact: 573-751-0848 or <http://www.mostateparks.com/grantinfo.htm>

Recreational Trails Program. Grants are available for motorized and non-motorized trail development, renovation, and preservation for cities, counties, schools, and all business types. Projects require a 20% minimum match. The grant application period ends in August and is administered by the Missouri Department of Natural Resources-Division of State Parks. The funding is provided through the Federal Highway Administration.

Contact: 573-751-3442 or <http://www.mostateparks.com/grantinfo.htm>

Parks/Stormwater Tax. Since 1995, more than 90 Missouri communities and counties have passed legislation allowing a local Stormwater/Parks Sales Tax. The program permits the imposition of a sales tax of not more than 1/2 percent 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.

Contact: Missouri Parks and Recreation Association, 573-636-3828.

Municipal Park Grant. This program provides \$3 million annually for the 91 municipalities throughout St. Louis County to fund regional and local parks initiatives. Funds are administered through the St. Louis County Municipal League.

Contact: 314-726-4747 or <http://www.muniparkgrants.org/>

Safe Routes to School. Funding is available annually through the Department of Transportation targeting public and private schools, grades K 8. Infrastructure and non-infrastructure (education and encouragement) projects are eligible and funding may cover up to 100 percent 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.

Contact: 800-800-2358 or <http://www.modot.mo.gov/safety/SafeRoutestoSchool.htm>

Robert Wood Johnson Foundation. The Robert Wood Johnson Foundation (RWJF) is offers a wide range of funding opportunities dealing with healthy and active living. Anyone is eligible

to apply, but check the website to make sure that you meet requirements per grant. For more information, check the website periodically for new calls for proposals.

Contact: 877-843-7953 or <http://www.rwjf.org/applications/solicited/cfplist.jsp>

Local Funds. Approaching bikeway and pedestrian facility 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 external funding. At the very least, for every three dollars of local investment, the community can receive seven dollars in external funding to build the non-motorized transportation system. Another important measure of return-on-investment relates to the fact that Chesterfield 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 be a more efficient parks and roads system.

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, as described later in this section, should be a central element of the funding strategy relating to any new residential or commercial activity.

4. Plan Adoption and Regulatory Actions

The following steps should be taken to implement the Chesterfield Bikeable-Walkable Community Plan:

- a. Local adoption by City Council. Adoption of the plan as a guide for local policy development will help to ensure its implementation.

- b. Park Land Dedication Program. The City 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:

- 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.²⁰
- (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....'²¹
-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.²²
- (Greenways in general) ...increased tax revenues are usually generated by an increase in property values on land near the greenway....²³
- 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.²⁴

²⁰ Greenways for America, by Charles Little. 1990. The John Hopkins University Press; p. 185.

²¹ Ibid. P. 186.

²² Trails for the Twenty-First Century, second edition, by Charles Flink, Christine Olka, and Robert Searns. 2001, Island Press, p. 40.

²³ Greenways: A Guide to Planning, Design, and Development, Loring LaB. Schwarz, editor. 1993, Island Press, p 69.

²⁴ Urban Parks and Open Space, by Alexander Garvin and Gayle Berens. 1997, Urban Land Institute, p. 59. Quote by David Fisher, Supt., Minneapolis Park Board.

- ‘I strongly believe that the development of Downtown Park (Bellevue, 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 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.’¹⁷
- (Pinellas Trail/Greenway, Pinellas County, Florida) ...In Oldona, adjacent to the trail, an upscale townhome 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.’¹⁸

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.

c. 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.

²⁵ Ibid. P 78.

²⁶ Ibid. P. 176.

- **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-throughs (similar to crosswalks but somewhat wider) should be required so that adjacent neighborhoods can be interconnected.

- **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 City.

5. 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 1983.²⁷ 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 Chesterfield. The recommendations are principally derived from several sources including Michael Replogle²⁸ and the Bicycle Federation of America.²⁹ 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 Chesterfield:

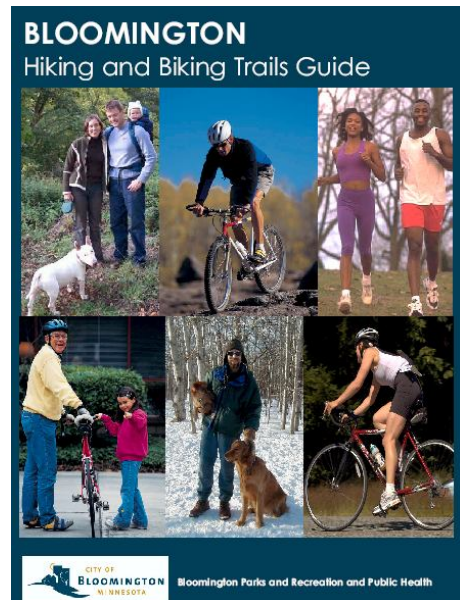


Illustration 39: Bloomington, MN's Hiking and Biking Trails Guide provides maps and information about local trails and links to online resources promoting walking and bicycling. (Image: <http://www.ci.bloomington.mn.us>)

²⁷ Bicycling Reference Book; 1993-1994 Edition. Bicycle Institute of America, page 6.

²⁸ Bicycles and Public Transportation, by Michael A. Replogle. 1988; the Bicycle Federation, page 27.

²⁹ Non-Motorized Travel Facilities Integration Project: Summary Recommendations. Bicycle Federation of America; June 30, 1991.

a. Designate an existing board or committee and select City staff from various departments to provide ongoing guidance concerning implementation, safety, education, and promotion, and encourage involvement of other public, institutional and private parties.

b. Brochures. Develop and distribute a brochure, which includes a map of the bicycle-pedestrian system and park system, safety tips for adults and children, and links to information on the City's website.

c. Special Events. Sponsor special bicycle and walking events designed to use facilities being developed. Charity runs, walks and bicycle rides, Sunday Parkways, national bike to work day, and other events can promote bicycle and pedestrian activity for both Chesterfield residents and visitors.

d. Safe Routes to School. Work with local public and private schools to support and encourage walking and bicycling to and from school, including walking school buses, bicycle trains and other safe routes to school activities.



Illustration 40: A walking school bus heads to Northridge Elementary in London, Ontario. (Image: <http://saferoutestoschool.ca>)

e. 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-to's 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 Saint Louis 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. 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.

- a. Incorporate basic education/safety language into brochures and maps.
- b. Incorporate bicycle-pedestrian education/safety messages into other literature produced by the Parks and Recreation Department.
- c. Stock and distribute copies of bicyclist safety material.

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

- a. Establish basic rules and regulations for trails under the City's jurisdiction.
- b. Obtain and distribute copies of appropriate bicycle-pedestrian safety information produced by one of the referenced sources.
- c. Stock supplies of bicycle-pedestrian safety material, maps, and rules of the road at kiosks or other stations within parks.
- d. Establish police, park ranger, or volunteer patrol presence on trails. Issue courtesy slips to trail users who are not aware of rules.
- e. Continue 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.
- f. Coordinate enforcement with education programs. Grade schools are an excellent starting point for these programs. Include elements on bicycle registration and lighting.

- g. Change the view of bicycle related law enforcement as a "non-essential" program.
- h. Consider establishment of a bicycle registration requirement.
- i. Establish a police bicycle patrol. Bike patrols enhance neighborhood police visibility and are also useful in the enforcement of non-bicycle related responsibilities.

6. Monitoring and Evaluation

The implementation of the Chesterfield Bikeable-Walkable Community Plan should be monitored by representatives of the City, working closely with the Bicycle Pedestrian Task Force and with other elements of the community.

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. MoDOT Project Development Policy Manual - Bicycle Excerpts

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 is 4 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 [m²] 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.*"

B. 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/interstction
- 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/interstction
- 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. $\$45/\text{lf} \times 5,280 = \$237,600/\text{mile}$

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 $\$15/\text{lf}$ or $\$79,200/\text{mile}$.

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 $\$6,350/\text{mile}$.

5. Concrete Walk - Recommended improvements feature 8’ wide concrete walks. $8' \times \$5/\text{sf} = \$40/\text{lf}$ or $\$211,200/\text{mile}$.

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

C. Additional Resources

Provided below is a list of additional resources and documents to help in the implementation of the Chesterfield Bikeable Walkable Community Plan.

Association of Pedestrian and Bicycle Professionals - Bicycle Parking Guidelines.

http://www.apbp.org/resource/resmgr/publications/bicycle_parking_guidelines.pdf

St. Louis County Bicycle Facilities Plan

<http://www.co.st-louis.mo.us/hwyweb/Publications/Bike%20Policy/Bike%20Facility%20Plan.pdf>

St. Louis Regional Bicycling and Walking Transportation Plan.

<http://www.ewgateway.org/pdffiles/library/trans/bike-ped/bikeplan-05/BikePlan-CompleteDoc.pdf>