St. Louis Regional Bicycling and Walking Transportation Plan

East West Gateway Council of Governments

July 2005

HNTB

The Great Rivers Greenway District

East-West Gateway Council of Governments
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This document was produced in collaboration with the Great Rivers Greenway District , which assisted in providing a portion of the matching funds for the plan. The Greenway District is the public organization leading the development of a region-wide system of interconnected greenways, parks and trails, known as the River Ring, which will join two states and cover an area of 1,216 square miles. The Greenway District was established in November 2000 by the successful passage of the Clean Water, Safe Parks and Community Trails Initiative (Proposition C) in St. Louis City, St. Louis and St. Charles Counties in Missouri.

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CHAPTER 1 – INTRODUCTION

Plan Background

The *St. Louis Regional Bicycling and Walking Transportation Plan* is an outgrowth of the region's transportation plan, *Legacy 2030*. *Legacy 2030* is a long-range vision for how our region's surface transportation system will develop over the next 25 years. The plan recognizes that the central purpose of transportation investment is to improve the quality of life of the citizens of the region. The adopted goals that guide *Legacy 2030*, and the region's transportation planning process, are accomplished by creating and/or sustaining:

- *A strong position in the national and global marketplace, ensured through strategic economic development, competitive employment opportunities, a well-trained workforce, and responsible asset management.*
- *A sustainable and growing economy grounded in the wise and coordinated use of physical, environmental, social, and agricultural resources.*
- *A clean and healthy environment.*
- *Safe neighborhoods, communities, and thoroughfares.*
- *Resources for learning and personal development, accessible at every point of the life cycle.*
- *Varied and valued outlets for recreation and cultural expression.*
- *A growing, diversified population, with equity, choice, and opportunity for all citizens.*
- *Efficient and balanced patterns of growth and development that respect the land, the citizenry, the history, and the strategic location of the St. Louis region.*

The eight goals that guide the St. Louis region's transportation planning process, especially as they relate to the quality of life of the citizens of the region, play an integral part in the development and eventual implementation of the *St. Louis Regional Bicycling and Walking Transportation Plan.*

A major component of *Legacy 2030* is the planning, design, and development of the region's transportation system with the aim of improving mobility and safety while increasing travel choices. Continuing that theme, the *St. Louis Regional Bicycling and Walking Transportation Plan* departs from conventional master plans, which often focus on the development of priority corridors for bicycling and walking improvements and instead places emphasis on defining the nature of bicycling and walking environments and providing guidance on the elements common to model bicycling and walking facilities. In other words, rather than specify where facilities should be located, the plan serves as a "how-to and when-to" resource document for communities developing facilities.

The plan recognizes that bicycling and walking accommodation projects are generally implemented at the community level and that a regional plan should therefore set the standards that will subsequently lead to a coordinated regional transportation system. A compilation of resources, including suitability checklists, model ordinances, and project review materials, are provided through the plan to allow communities to develop bicycle and pedestrian facilities in a standardized manner regardless of expertise or federal funding participation.

Approach and Goals

Walking, bicycling, and other forms of non-motorized transportation account for approximately six percent of the nearly 9.5 million daily person trips in the region. The desirability of non-motorized modes is greatly affected by land use patterns and the physical attributes of the transportation system.

As noted in *Legacy 2030*, travel choices are influenced by many factors: speed, cost, ease of use, quality of service, affordability, comfort, access, and independence. What most often affect choice are the limits of the transportation system itself. Roadways that fail to provide access to bicycles or fail to include adequate sidewalks and crosswalks limit choice. The lack of accessibility of transit stops or other transportation facilities by people with disabilities limits choice. The primary way, in which the transportation system limits choice, is in the lack of consideration of human factors, rather than vehicle factors.

Decisions made in the planning and design processes affect capacity, mobility, and safety in significant ways. Past practice has been to add lanes and build new roads to accommodate growth in travel, address congestion, and improve accessibility. With the emergence of concepts like street-diets, routine accommodations, and context-sensitive design, there is more emphasis on increasing the transportation system's capacity to move people by adding choices to the system rather than lanes. These concepts are not broad-brush approaches that ignore community needs, land uses, and physical environments, but they are design options available to increase mode choice, safety, efficiency, and system capacity. They consider moving people as well as moving vehicles, and they help the transportation system work more seamlessly with adjacent land uses.

- Goal and Objective Themes -

- Developing a safe system
- Understanding the relevance of bicycle- and pedestrian-friendly land-use and development
- Assigning equal attention to bicycling and walking as that afforded to other elements of the transportation system
- Promoting education
- Encouraging enforcement
- Incorporating proper engineering
- Developing a connected system of on- and off-road facilities
- Providing quality of place
- Creating attractive destinations
- Identifying schools as community centers
- Providing a system accessible to all users
- Promoting alternative transportation
- Providing a convenient system
- Developing an attractive system
- Considering cost and economic factors
- Understanding the importance of system long-term maintenance

The development of goals and objectives for bicycling and walking transportation in the St. Louis region revolve around several themes identified by the Technical Advisory Committee (TAC) and in citizen comments given at the various public meetings and public outreach efforts performed during plan development.

Identified themes also tend to mirror national and local best practices from existing regional- and city-scale bicycle and/or pedestrian plans. Although the goals and objectives of the plan focus on various themes, the vision guiding the development of the *St. Louis Regional Bicycle and Walking Transportation Plan*, and its implementation, is hinged on one common theme - - choice.

The goals and objectives for bicycling and walking transportation in the St. Louis region, although very pointed, are rooted in the eight goals that guide *Legacy 2030*, and the region's transportation planning process. Those goals and objectives for developing a bicycle and walking transportation system in the St. Louis region are:

A Safe Transportation System

A transportation system based on concise design standards, guidelines, and ordinances that provides safe and secure bicycling and walking environments and facilities.

Objectives: Safe, adequately placed and properly dimensioned, sidewalk systems.
Safe, adequately placed and properly dimensioned, bicycle facilities.
Safe bicycling- and walking-friendly crosswalks and intersections.
Adequate time and signage for pedestrian crossings at traffic signals.
Traffic calming considerations in arterials and local roads that encourage safe bicycling and walking activity.
Safe overpasses and underpasses where necessary.
Proper lighting for bicycling and walking areas.

Land-Use that Encourages Bicycling and Walking

Land-use that promotes transit-, bicycle-, and pedestrian-oriented communities where people have choices between transportation alternatives as part of their routine activities.

Objectives: Commercial developments that encourage bicycling and walking.
Land use that reduces trip distances.
Land use that allows transportation alternatives.
Neighborhood-oriented standards for residential areas.
Mixed-use developments.
Transit-oriented developments.
Pedestrian-scale amenities in developments.
Neighborhoods that provide bicycling and walking access to schools.

A Complete Transportation System

A transportation system that provides bicycling, walking, and motorized connections and access to activity areas and regional destinations.

Objectives: Bicycling and walking facilities in all road projects, unless exceptional circumstances are demonstrated.
Bicycling and walking facilities that provide access through physical barriers such as bridges and other structures.
Bicycling and walking facilities in all transit projects, unless exceptional circumstances are demonstrated.

An Informed Transportation System User

Educational programs that inform bicyclists, pedestrians, the motoring public, the engineering community, and the law enforcement community about safety, awareness, proficiency, and the benefits of bicycling and walking.

Objectives: Programs that enhance bicycling skills through training and presentations at elementary and middle schools.
Employer programs that encourage bicycling and walking among employees.
Efforts by bicycling and walking advocacy groups in developing and conducting educational programs.
Emphasis of bicycle and pedestrian rights and responsibilities during driver's education and license examinations.
Media campaigns to raise awareness about bicycling, walking, and public health.

Enforcement of Laws and Regulations

Enforcement of the laws and regulations that protect bicyclists, pedestrians, and the motoring public.

Objective: Programs that target the enforcement of right-of-way rules in the transportation system, stressing the relative vulnerabilities of the diverse multi-modal system users.

A Properly Designed Transportation System

A transportation system that is designed in consultation with accepted federal, state, and local engineering standards.

Objective: The design of bicycling and walking transportation facilities in strict adherence to federal, state, and local standards for geometric design, signing, traffic control, and accessibility.

A Continuous Transportation System

A transportation system that provides connectivity to the regional trails and greenways by way of bicycling and walking facilities between neighborhoods and recreational destinations.

Objectives: The development of bicycling and walking transportation projects that emphasize linkages between residential and commercial developments and the region's trails, greenways, and recreational destinations.
Transportation projects that are sponsored by multiple communities and provide bicycling and walking connections across jurisdictional boundaries.

An Accessible Transportation System

A transportation system that provides access to all levels of ability and age.

Objectives: An accessible path of travel to and from the transit system.
Accessible shelters and other amenities at transit stops.
Accessible path of travel in the system of sidewalks.
Retrofitting of existing areas with accessible design options.
Accessible design for all new development.

A Well-maintained Transportation System

Properly maintained transportation facilities that ensure safe and comfortable bicycling and walking.

Objectives: Adequate snow removal for bicycling and walking facilities.
Sufficient maintenance intervals throughout the year for bicycling and walking facilities to ensure removal of debris, gravel, and other obstructions.
Sufficient maintenance of bicycling and walking amenities such as bicycle racks, benches, shelters, and lighting to ensure function and safety.

Encourage Bicycling and Walking

Programs that increase the visibility of bicycling and walking transportation to attract larger portions of the population to its benefits.

Objectives: Bicycling and walking amenities such as showers, clothing storage facilities and bicycle parking at destinations and activity areas.
Efforts by regional bicycling and walking advocacy organizations to organize and promote bicycling- and walking-related events.
Programs that reward communities and agencies for enhancing - bicycling and walking environments.

The development of maps and informational materials about the regional bicycling and walking transportation system to provide users with support in route planning.

Existing St. Louis Regional Bicycling Transportation System

The existing bicycling transportation system in the St. Louis region can be considered to be in an early, fast-growing, stage of development. In the past 5 to 10 years a number of off-road trails and on-road facilities have been implemented with others currently in the planning stage. It is therefore timely to produce this master plan so that the system grows in an orderly fashion and within consistent criteria.

Appendix A illustrates the existing bicycling transportation facilities in the St. Louis region. These include on-street official routes composed of treatments ranging from dedicated bicycle lanes to bicycle route signing, and off-street mixed-use trails along recreational areas, parks and the region's system of rivers. The exhibit also shows streets not officially designated as bicycle routes but nevertheless frequently traveled by bicyclists. This set of frequently used routes was developed by a focus group of area bicyclists.

It is evident from the regional map that several opportunities exist for connecting existing stand-alone facilities to provide a continuous transportation system interconnecting regional destinations.

With respect to a system of bicycling facilities for utilitarian and commuting trips, significant progress was recently made by the implementation of the first phase of Bike St. Louis in the City of St. Louis. This 20-mile system connects regional destinations such as Forest Park and the Arch with various neighborhoods in 6 participating Aldermanic wards. A highlight of the project is the cooperation among multiple entities during the development of the network. Bicycling and walking projects that are supported by and benefit multiple jurisdictions not only result in better transportation solutions but also gather aggregate political and public support that facilitates their deployment.

Given this existing system, the *St. Louis Regional Bicycling and Walking Transportation Plan* sets forth guidance pertaining to planning, design, and implementation, as well as public education and program marketing, with the overall goal to complete the region's transportation system by better accommodating bicycling and walking.

CHAPTER 2 – BICYCLING AND WALKING ACTIVITY IN THE ST. LOUIS REGION

Of principal importance in achieving an exemplary regional bicycling and walking transportation system is a thorough understanding of the characteristics of the average bicycling and walking activity in the St. Louis region. As such, the following sections illustrate the results of a bicycling and walking activity user survey, to which six-hundred and two (602) St. Louis region residents responded. The geographical distribution of the places of residence and places of work for the respondents is illustrated in Exhibit 1, Appendix B.

SURVEY QUESTIONS AND ANALYSIS OF RESULTS

1. How much bicycling do you do?

Over one-third (34%) of respondents ride their bicycles at least once a week. Twenty-nine percent (29%) ride nearly every day.

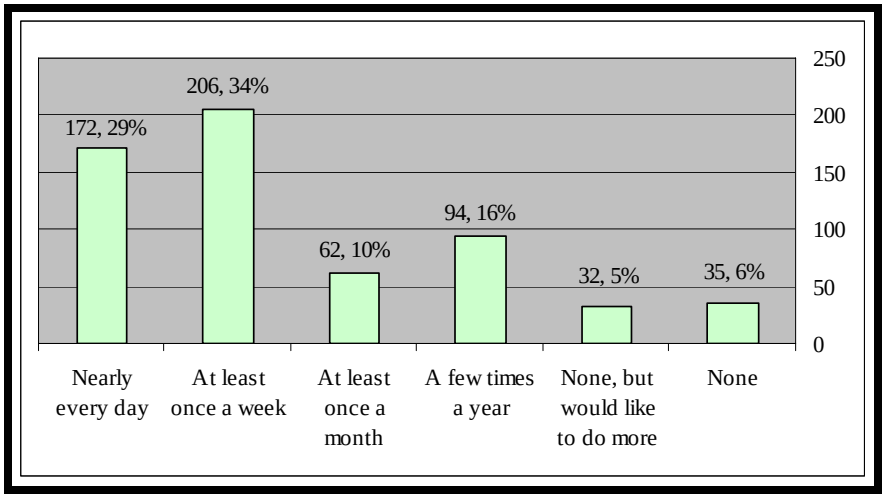


Figure 2.1 - Frequency of bicycling

However, almost three-quarters (71%) of respondents reported ride their bicycles once a week or less. The significance of this response is that it shows that the typical survey respondent is most likely an average rider. An experienced rider who rides nearly every day may be more likely to accept the types of conditions that might

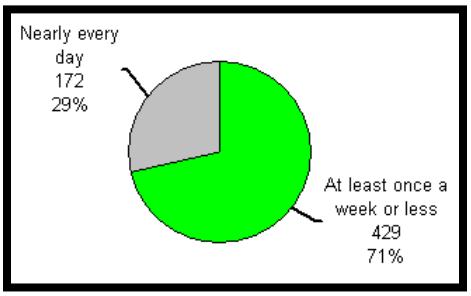
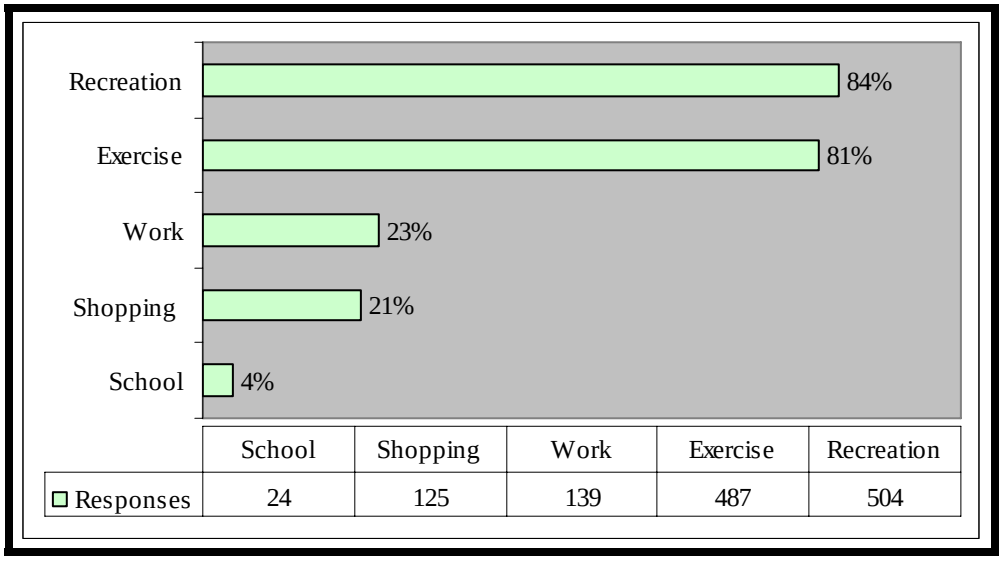


Figure 2.2 – Frequency of bicycling (summary)

discourage the beginner or average rider. Therefore, the responses to the survey could be considered as representative of a wide cross-section of the general population.

2. Why do you bicycle?

The most popular reasons to bicycle are recreation and exercise. Approximately 8 out of every 10 respondents ride their bicycles for recreation (84%) and exercise (81%). Respondents were allowed to choose multiple reasons, which results in totals exceeding 100%.



	School	Shopping	Work	Exercise	Recreation
Responses	24	125	139	487	504

Figure 2.3 – Reasons why people bicycle

It is interesting to note that bicycling to school received only a four percent (4%) response. Typically, schools, and especially universities, generate significant bicycle activity. The reason for the low percentage may be due to the lack of respondents who were students. Students, who tend to be a transitional population, may not have been aware of the survey. The lack of response from students may indicate an opportunity for increasing education and advocacy efforts to this segment of the population.

3. How much walking to a specific destination do you do?

The amount of walking to a destination was very similar to that for frequency of bicycling. Nearly a third (30%) walk to a destination at least once a week, while 1 in 4 (27%) walk to a destination nearly every day.

An important statistic shows that over a quarter of respondents (28%) walk to a destination only a few times a year or less. This finding is similar to those in studies

such as by the Center for Disease Control and Prevention, which noted that 29% of American adults are inactive and 44% are not regularly active.

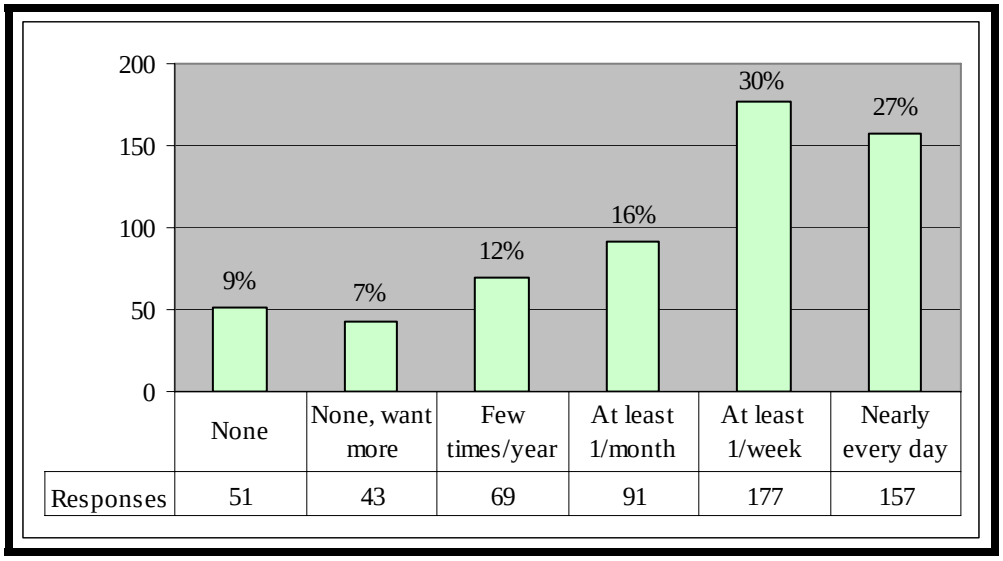


Figure 2.4 - Frequency of walking

4. Why do you walk?

The most popular reasons for walking to a destination are for exercise and recreation. Seventy-one percent (71%) of respondents walk for exercise and sixty-five percent (65%) walk for recreation. Respondents were allowed to choose multiple reasons, which results in totals exceeding 100%.

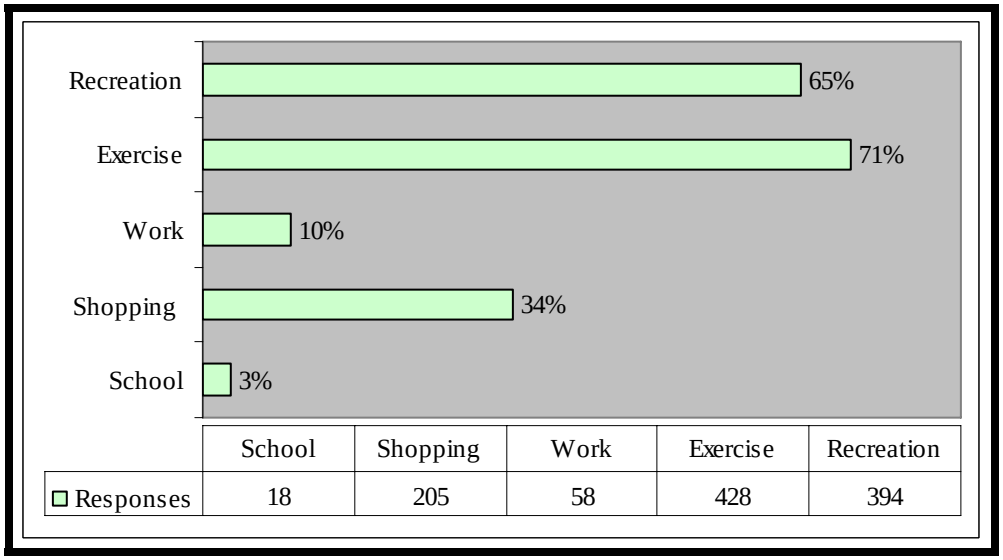


Figure 2.5 – Reasons why people walk

Comparing walking to bicycling responses, exercising and recreation are the top two choices for both bicycling and walking. The biggest difference between the two was the percentage of trips related to work and shopping. Twenty-three percent (23%) bicycle to work, while only ten percent (10%) walk to work. Twenty-one percent (21%) bicycle to shop, while thirty-four percent (34%) walk to shopping destinations.

5. How much do the following conditions discourage you from bicycling more often?

The following table illustrates conditions that discourage users from bicycling more often, as well as to what degree.

Table 2.1 – Conditions that discourage bicycling

	Very Much	Somewhat	Not Much	Not at All	Total
Travel distance	16% (89)	33% (183)	28% (156)	24% (133)	561
Poor bicycling skills	3% (18)	8% (46)	16% (89)	73% (405)	558
Heavy traffic/speeding	48% (273)	33% (191)	12% (71)	7% (38)	573
Streets too narrow	36% (208)	37% (212)	17% (99)	9% (51)	570
Lack of on-road facilities (bike lanes, paved shoulders, etc.)	52% (302)	28% (163)	13% (73)	7% (38)	576
Lack of off-road facilities (multi-use paths)	30% (170)	30% (171)	25% (141)	15% (88)	570
Poor maintenance of existing facilities	16% (88)	33% (185)	34% (192)	18% (99)	564
Lack of support facilities (bike racks, showers, changing facilities, etc.)	23% (129)	28% (161)	33% (188)	16% (94)	572
Flexible work related requirements/hours/etc.	12% (67)	21% (118)	32% (178)	36% (200)	563
Bad weather	26% (150)	41% (236)	26% (149)	6% (37)	572

Figure 2.6 illustrates the types of conditions that “very much discourage” or “somewhat discourage” more frequent bicycling. The top three conditions are lack of on-road facilities (77%), heavy traffic/speeding (77%), and narrow streets (70%).

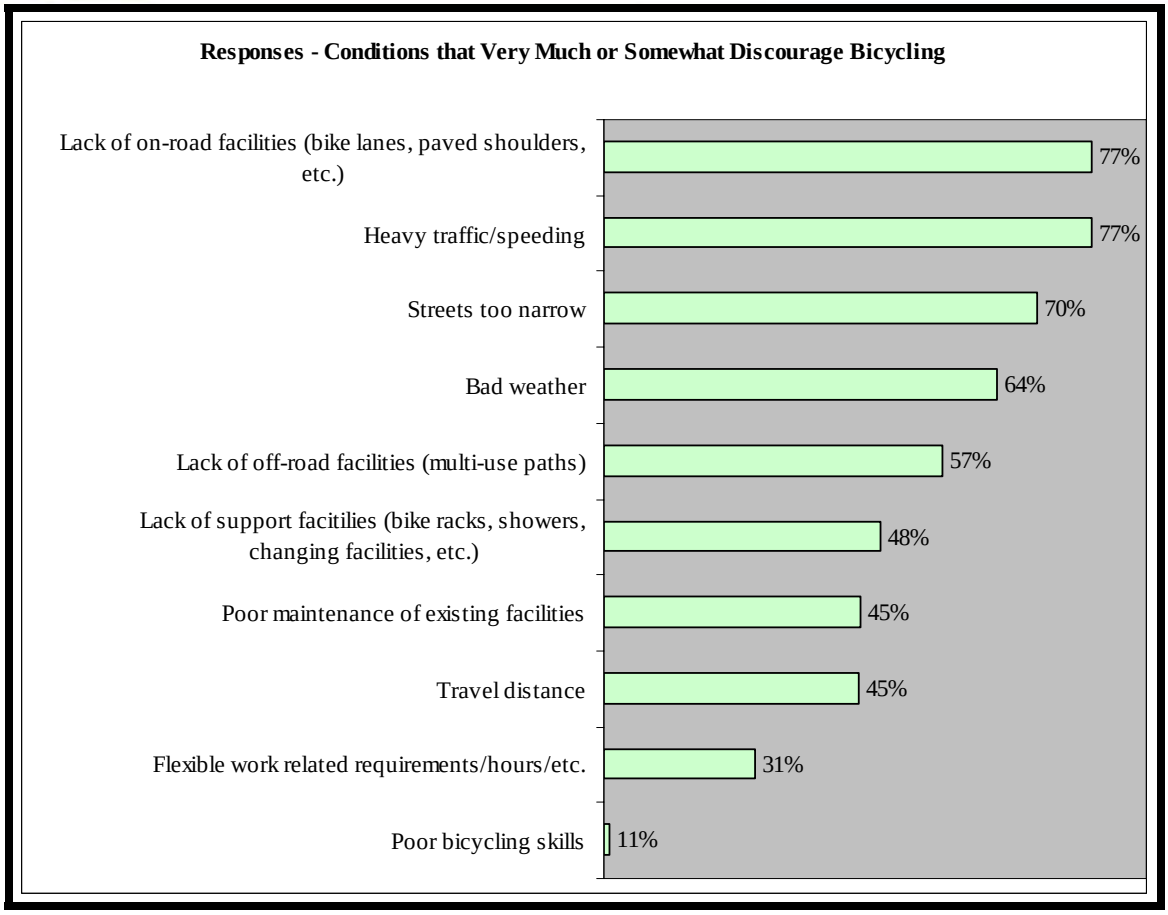


Figure 2.6 – Conditions that very much or somewhat discourage bicycling

6. How much do the following conditions discourage you from walking more often?

The following conditions discourage users from more frequent walking to a destination, as well as to what degree.

Table 2.2 – Conditions that discourage walking

	Very Much	Somewhat	Not Much	Not at All	Total
Travel distance	26% (147)	33% (184)	25% (136)	16% (88)	555
Lack of sidewalks	28% (154)	31% (173)	28% (156)	13% (72)	555
Heavy traffic / speeding	35% (190)	31% (168)	24% (131)	11% (61)	550
No crosswalks / unsafe intersections	32% (176)	31% (173)	26% (147)	11% (61)	557

Table 2.2 – Conditions that discourage walking					
Sidewalk / path too close to road	18% (99)	25% (141)	35% (194)	22% (121)	555
Poor maintenance of existing facilities	14% (74)	27% (148)	40% (219)	20% (107)	548
Flexible work related requirements/hours/etc.	9% (49)	19% (102)	33% (181)	39% (214)	546
Bad weather	25% (137)	37% (206)	31% (170)	8% (44)	557

Figure 2.7 illustrates the types of conditions that "very much discourage" or "somewhat discourage" more frequent walking. The most frequent conditions are heavy traffic/speeding (59%), no crosswalks/unsafe intersections (58%), bad weather (57%), travel distance (55%), and lack of sidewalks (54%).

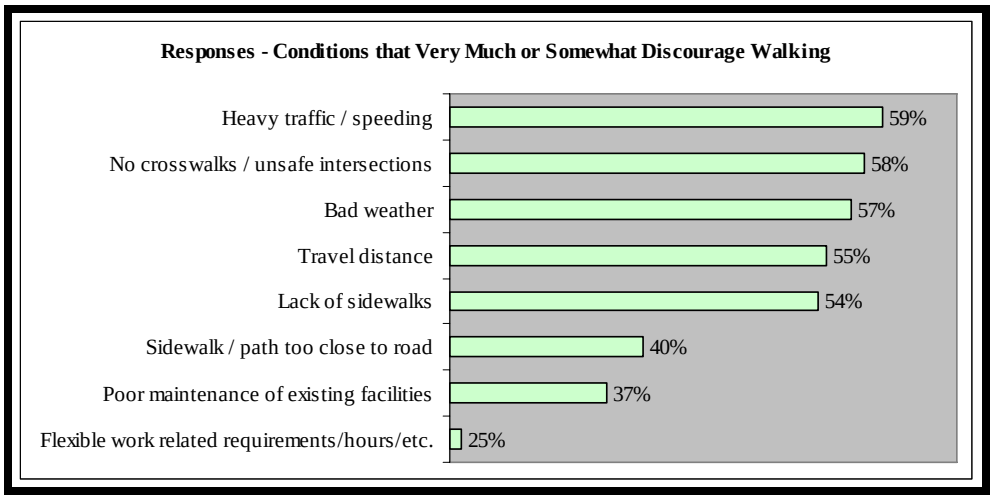


Figure 2.7 – Conditions that very much or somewhat discourage walking

7. How important are bicycling improvements to your way of life?

An overwhelming majority feels that bicycling improvements are important to their way of life. Sixty-four percent (64%) consider bicycling improvements very important. Nine out of ten respondents (90%) consider bicycling improvements as very important or somewhat important to their way of life.

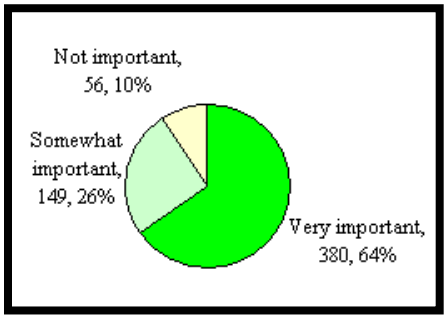


Figure 2.8 – Importance of bicycling improvements

8. How important are walking improvements to your way of life?

Forty percent (40%) feel that walking improvements are very important to their way of life, while forty-six percent (46%) consider walking improvements as somewhat important.

Figure 2.10 shows that although feelings about bicycling and walking improvements vary somewhat, overall 85%-90% feel that bicycling and walking improvements are somewhat or very important to their way of life.

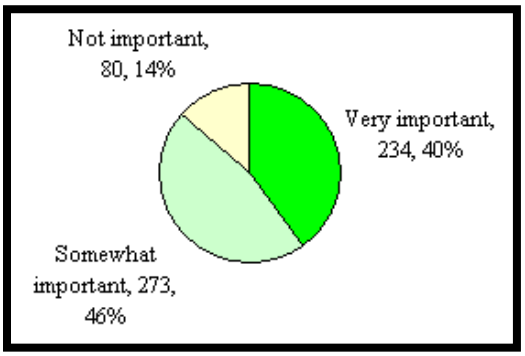


Figure 2.9 – Importance of walking improvements

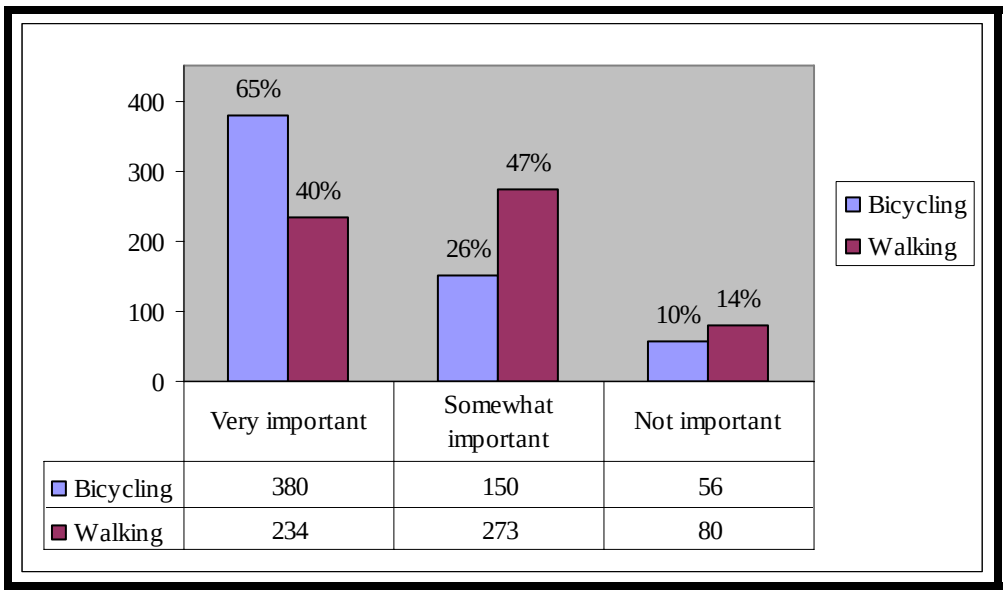


Figure 2.10 – Importance of bicycling versus walking improvements

9. Would you support a designated bicycle route on your street?

An overwhelming majority (92%) would support a designated bicycle route on their street.

This is an important finding related to gauging the support for bicycling facilities through residential areas, support that has been difficult to obtain in other regions.

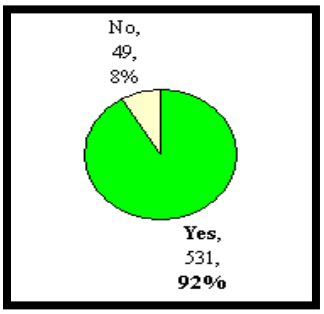


Figure 2.11 – Support for designated bicycle routes on local streets

10. Please tell us if you think the following are desirable places to ride your bicycle:

The following table illustrates locations that are considered desirable to ride a bicycle, and to what degree.

Table 2.3 – Desirable places to ride a bicycle

	Extremely Desirable	Quite Desirable	Slightly Desirable	Not at All Desirable	Response Total
Major arterial roads without special provisions	3% (17)	6% (35)	19% (112)	71% (411)	575
Minor arterial roads without special provisions	4% (25)	22% (124)	47% (268)	27% (154)	571
Local streets without special provisions	11% (61)	43% (244)	36% (205)	11% (61)	571
Roads with "Share the Road" signs	22% (128)	32% (186)	37% (211)	9% (49)	574
Wide outside motor vehicle lanes	31% (177)	34% (190)	28% (161)	7% (38)	566
Paved shoulders	42% (243)	39% (224)	16% (90)	3% (20)	577
Designated bike lanes	74% (430)	19% (113)	5% (31)	1% (6)	580
Separated paved multi-use paths	73% (425)	18% (102)	6% (35)	3% (18)	580
Off road soft trails	36% (208)	24% (140)	28% (162)	11% (64)	574

Figure 2.12 identifies the locations that respondents considered “extremely desirable” to ride a bicycle. Designated bike lanes (71%) and separated paved multi-use paths (71%) are clearly favored as extremely desirable places to ride a bicycle. Minor and major arterials were considered extremely undesirable places for bicycling by respondents.

The findings are consistent with results from other questions. Results from question number five, related to conditions that discourage bicycling, showed that heavy traffic and lack of on-road facilities such as bicycle lanes and paved shoulders are conditions that discourage more frequent bicycling. Minor and major arterial roads, which often lack such facilities, usually experience heavy traffic and vehicular speeds.

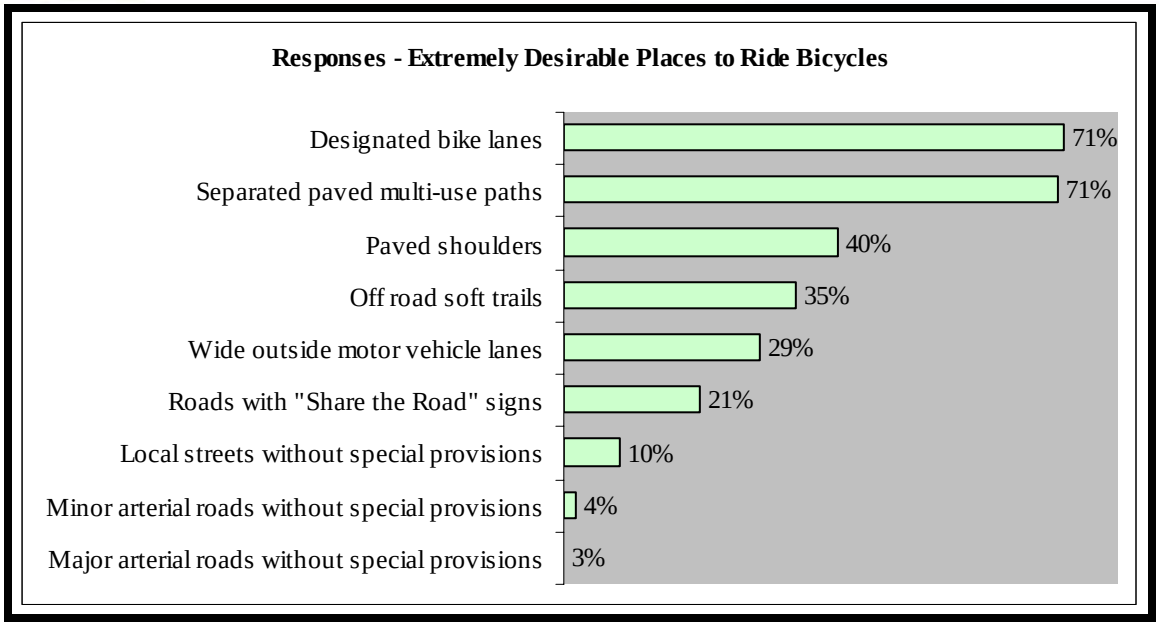


Figure 2.12 – Extremely desirable places to ride a bicycle

11. Please tell us if you believe the following are important reasons to support bicycling and walking facilities.

The following table identifies reasons to support the development of bicycling and walking facilities, as well as what degrees of importance users associate with each reason.

Table 2.4 – Reasons to support bicycling and walking facilities

	Extremely Important	Quite Important	Slightly Important	Not at All Important	Response Total
Good form of recreation	81% (468)	16% (95)	2% (14)	0% (1)	578
Good form of transportation	60% (347)	25% (141)	14% (80)	1% (7)	575
Improve air quality	62% (356)	21% (124)	14% (83)	2% (14)	577
Reduce congestion	60% (416)	20% (117)	16% (91)	4% (22)	575
Make cities more livable	72% (416)	19% (109)	7% (43)	2% (9)	577
Reduce health costs	64% (371)	23% (133)	10% (60)	2% (13)	577

All the listed reasons are rated by eighty percent (80%) or more of the respondents as extremely or quite important to support bicycling and walking facilities. A 'good form of recreation' is the most important reason, with ninety-five percent (95%) feeling that recreation is an extremely or quite important reason to support the development of these facilities.

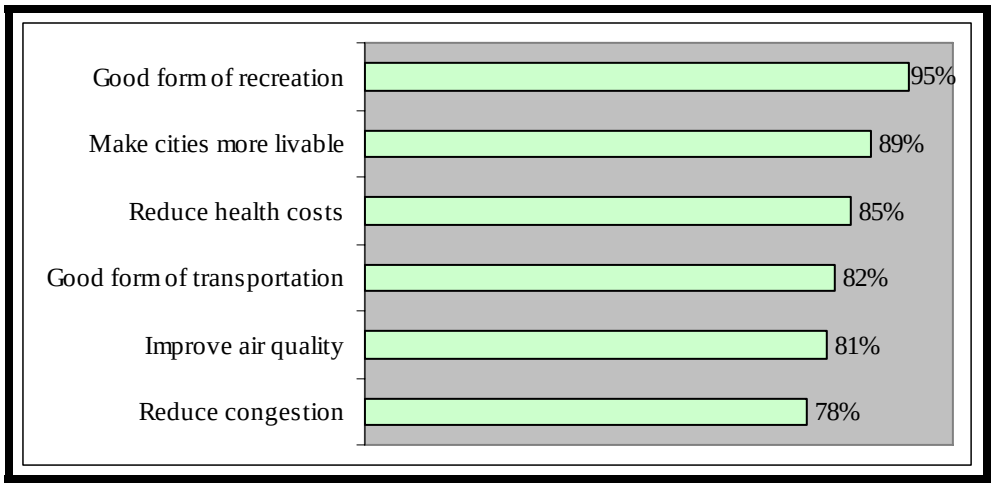


Figure 2.13 – Reasons to support bicycling and walking facilities

12. To which of the following destinations would you like to walk or ride a bicycle, or do so more often:

Parks (86%) are the destination that users would most like to bicycle or walk to. However, except for schools, all the noted destinations are places, to where over half of the respondents would like to bicycle or walk more often. As previously noted, there may have been a low response rate for students, and therefore it is logical that schools ranked less than expected in the set of responses. The figure below illustrates that significant demand exists for bicycling and walking to destinations that today may not provide adequate facilities for bicycling and walking.

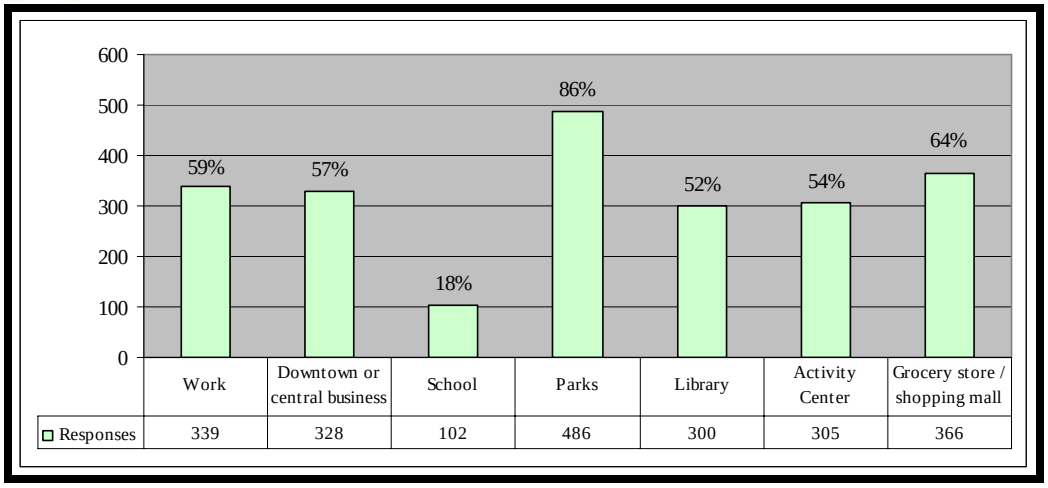


Figure 2.14 – Desired destinations for more frequent bicycling or walking

13. What is the farthest distance you would be willing to ride your bicycle to a destination?

Three out of four (76%) users are willing to ride their bicycle five (5) or more miles to a destination. Ninety-five percent (95%) are willing to ride at least three (3) miles.

Considering that a typical threshold between a relative short and long bicycle trip is five (5) miles, it seems that users are prepared to utilize facilities that are intended to provide longer connections.

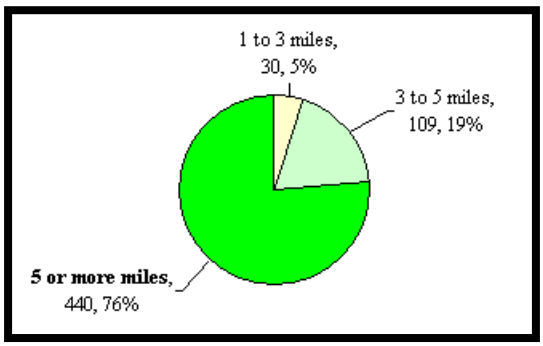


Figure 2.15 – Farthest distance to bicycle

14. What is the farthest distance you would be willing to walk to a destination?

An equal number of individuals, forty-one percent (41%) are willing to walk 1 to 2 miles or 2 to 3 miles to a destination. Therefore, eighty-two percent (82%) are willing to walk at least one (1) mile to a destination.

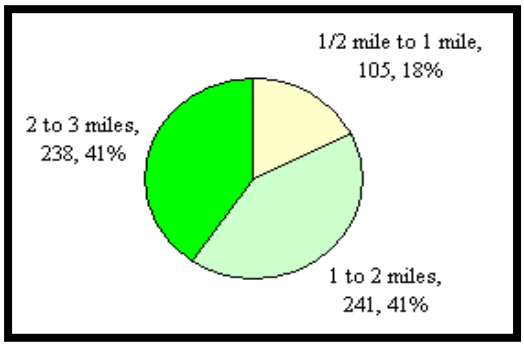


Figure 2.16 – Farthest distance to walk

15. Your local community should spend more money to make it easier and safer for people to bicycle and walk.

The majority (80%) strongly agrees that their local community should spend more money to make it easier and safer for people to bicycle and walk.

A total of ninety-six percent (96%) strongly or somewhat agree.

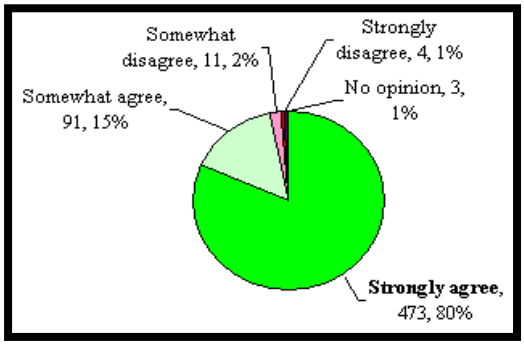


Figure 2.17 - Agreement to more money for bicycling and walking

18. and 19. What suggestions for bicycle connections or initiatives would you like to see implemented in the St. Louis region? Other comments?

These were open-ended questions to allow survey respondents to share comments or suggestions that may not have been adequately addressed elsewhere in the survey. Over 60% of the survey respondents made suggestions or comments. Below are a list of some of the most common types of suggestions and comments.

A. Increase number of bike lanes, wider shoulders to accommodate bicyclists on street.
   - "Wider lanes or paved shoulders would be a major help for cyclists in the St. Louis area."
   - "Add bike lanes to streets that used to contain old street car tracks."

B. Increase number of bike paths and multi-use trails.
   - "Mandatory bike lanes and wide asphalt multi-use trails/sidewalks for all new developments."
   - "Multi-use trails everyone can use and enjoy."

C. Increase maintenance of bicycle facilities, especially sweeping debris off of path and trails.
   - "Improved roadway sweeping and maintenance."
   - "Debris cleanup from shoulders (including sweeping of gravel, etc)."

D. Increase education about bicycle and pedestrian safety and regulations for motorist, bicyclists, and pedestrians.
   - "Television commercials promoting bicycles as transportation and discussing share the road principles."
   - "More publicity on bike safety and more awareness about increasing road bikers on the road."

E. Make connections.

"Continue to tie existing trail networks on both sides of the river, and expand the networks."

"I'm dreaming, but a non-stop network of trails connecting all of the major areas of St. Louis."

"I would like to see all the parks be connected by a greenway system like the Emerald Necklace in Boston."

F. Enforce traffic laws for both motorists and bicyclists.

"More effective responses from the police to accidents involving cars/bicycles and to 'road rage' assaults by car drivers on bicyclists."

"I also believe cyclists contribute to their own problems by not following traffic laws for cyclists."

G. Increase number of bicycle facilities

"Downtown bike racks in all the parking garages."

"I would ride to work about once a week, but would do so every day if I could just take a shower."

H. Specific locations

"I would like to be able to go from O'Fallon to Maryville using trails or at least a shoulder on Highway 162."

"Bike lanes on Jeffco Blvd/Lemay Ferry from South County across Meramec River."

MUNICIPAL SURVEY - BICYCLING AND WALKING

Bicycling and walking transportation projects are often developed at the "grass roots" level. That is, local municipalities often generate the initial interest for bicycling and walking improvements. Therefore, it is important to understand the resources available to local communities for bicycling and walking improvements as well as their perceptions of current system deficiencies and ways to mitigate them. This chapter provides a regional snapshot of municipal consideration to bicycling and walking, as illustrated by 35 communities who responded to a survey. The communities range from small, to medium, to large-scale municipalities. The geographical location of the communities within the St. Louis region is shown in Appendix B. The following table notes the communities included in this assessment.

Table 2.5 – Municipal survey respondents

Missouri	Illinois
City of Bridgeton	City of Freeburg
City of Chesterfield	City of Lebanon
City of Clarkson Valley	City of Mascoutah
City of Cottleville	City of O'Fallon
City of Ellisville	City of Alton
City of Eureka	Village of Shiloh
City of Greendale	Village of St. Libory
City of Kirkwood	Village of Swansea
City of Maplewood	
City of Maryland Heights	
City of Normandy	
City of Oakland	
City of Pasadena Hills	
City of Portage des Sioux	
City of St. Charles	
City of St. Clair	
City of St. John	
City of St. Paul	
City of Sullivan	
City of Vinita Park	
City of Weldon Spring	
City of Wellston	
City of Wentzville	
Village of Caverton Park	
Village of Marlborough	
Village of Parkdale	
Village of Twin Oaks	

Municipal Consideration of Bicycling Elements

As illustrated in Table 2.6, municipal consideration of bicycling elements is as follows:

1. The majority of communities do not produce stand-alone bicycling master plans.
2. Most include bicycling elements in comprehensive master plans and transportation plans, and roughly half in park and/or recreation plans.
3. Most communities have not adopted strategies, policies, or goals and objectives specifically related to bicycling transportation.
4. Approximately half of the communities have planned bicycling facilities.
5. The majority does not currently operate off-road bicycling facilities, on-road bicycle facilities, or on-street marked routes.
6. Most do not provide a process for including bicycling facilities in roadway design or support electronic inventories of bicycling facilities.
7. The majority of communities do not require developers to include bicycling facilities in development projects.
8. Most communities do not provide bicycle parking.
9. The majority of communities do not conduct formalized marketing or education campaigns related to bicycling promotion or safety.
10. Approximately two-thirds of communities do not provide ordinances or regulations pertaining to child bicycle helmets.
11. None of the communities include bicycle detection at signals.

Table 2.6 – Municipal consideration of bicycling elements

	YES	NO	Omitted
Bicycle transportation plan	7 (20%)	28 (80%)	0
Comprehensive plan including bicycling elements	11 (31%)	22 (63%)	2 (6%)
Transportation plan including bicycling elements	8 (23%)	27 (77%)	0
Park or recreation plan with bicycle elements	19 (54%)	15 (43%)	1 (3%)
Adopted strategies, policies, or goals and objectives for bicycle transportation	11 (31%)	24 (69%)	0
Planned bicycle facilities (e.g., paths, bike lanes, bike parking)	17 (49%)	18 (51%)	0
Existing off-street bicycle routes	8 (23%)	27 (77%)	0
Existing on-street bicycle facilities (e.g., bike lanes or wide curb lanes for bikes)	8 (23%)	27 (77%)	0
Existing on-street marked routes	7 (20%)	28 (80%)	0
Process to accommodate bicycles in roadway design (construction/reconstruction)	8 (23%)	25 (71%)	2 (6%)

Table 2.6 – Municipal consideration of bicycling elements			
	YES	**NO**	**Omitted**
Electronic map of bicycle facilities (GIS/CAD/Other)	2 (6%)	30 (86%)	3 (9%)
Requirement that developers build bicycle facilities with new development or redevelopment	5 (14%)	29 (83%)	1 (3%)
Bicycle parking (racks or lockers)	10 (29%)	25 (71%)	0
Promotion of bicycle travel	7 (20%)	27 (77%)	1 (3%)
Bicycle safety education	11 (31%)	20 (57%)	4 (11%)
Child bicycle helmet ordinance or regulation	10 (29%)	22 (63%)	3 (9%)
Bicycle detection at traffic signals	0	32 (91%)	2 (6%)

Municipal Consideration of Walking Elements

Similarly, as illustrated in Table 2.7, municipal consideration of walking elements is as follows:

1. Communities usually do not produce stand-alone pedestrian master plans.
2. Most include pedestrian elements only in park or recreation plans.
3. The majority have not adopted strategies, polices, or goals and objectives specifically related to the pedestrian transportation.
4. Most have planned for sidewalks or paths and do not maintain an electronic inventory of pedestrian facilities.
5. A larger portion of the communities undergo sidewalk reconstruction programs, accommodate pedestrian crossings in roadway design, and require developers to address pedestrian concerns in design.
6. Most communities do not perform pedestrian system marketing or education programs.
7. Enforcement of pedestrian-related laws is not prevalent.
8. Roughly half of the traffic signals incorporate pedestrian timing.
9. Less than half of the communities incorporate official school crossing guard programs.
10. The majority of the communities incorporate Americans with Disabilities Act (ADA) compliant design in sidewalk construction.
11. Sidewalks currently exist in approximately half of the street system.
12. Of these sidewalks, approximately sixty percent include curb cuts.

Table 2.7 – Municipal consideration of walking elements			
	YES	**NO**	**Omitted**
Pedestrian transportation plan	6 (17%)	28 (80%)	1 (3%)
Comprehensive plan including pedestrian elements	13 (37%)	20 (57%)	2 (6%)
Transportation plan including pedestrian elements	10 (29%)	24 (69%)	1 (3%)
Park or recreation plan including pedestrian elements	25 (71%)	8 (23%)	2 (6%)
Adopted strategies, policies, or goals and objectives for pedestrian transportation	11 (31%)	23 (66%)	1 (3%)
Planned sidewalks or paths	26 (74%)	8 (23%)	1 (3%)
Electronic sidewalk inventory (GIS/CAD/Other)	3 (9%)	29 (83%)	3 (9%)
Sidewalk construction program	18 (51%)	16 (46%)	1 (3%)
Sidewalk reconstruction/replacement program	21 (60%)	13 (37%)	1 (3%)
Process to accommodate pedestrian crossings in roadway design	20 (57%)	12 (34%)	3 (9%)
Requirement that developers build sidewalks with new development or redevelopment	24 (69%)	10 (29%)	1 (3%)
Program to promote walking	4 (11%)	29 (83%)	2 (6%)
Pedestrian safety education	6 (17%)	25 (71%)	4 (11%)
Enforcement of pedestrian right-of-way laws by police	16 (46%)	12 (34%)	7 (20%)
Ped phase in traffic signals and/or ped-activated signals	16 (46%)	17 (49%)	2 (6%)
School crossing guards	15 (43%)	19 (54%)	1 (3%)
Policy for ADA compliance in sidewalk construction	27 (77%)	5 (14%)	3 (9%)

Table 2.8 – Municipal consideration of walking elements (Continued)				
	< 50%	**50%-75%**	**75%-95%**	**>95%**
What percentage of the roadway system under your jurisdiction has adjacent sidewalks?	17 (49%)	10 (29%)	5 (14%)	3 (9%)
	<50%	**50%-75%**	**75%-95%**	**>95%**
Approximately what percent of your crosswalks have curb ramps?	15 (43%)	6 (17%)	7 (20%)	7 (20%)

REGIONAL DEMAND ASSESSMENT

Regional transportation systems, including those for bicycling and walking, exist to address regional demand for travel. It is therefore important to understand, at the regional level, the current level of bicycling and walking activity, particularly related to the use of these modes for commuting purposes. This chapter illustrates the results of a planning-level regional estimation of bicycling and walking travel demand activity in the St. Louis region.

Applicability of the Estimate

Given the regional nature of the demand estimate, its findings are most relevant to broader issues such as:

- Projecting future bicycling and walking activity (work, school, shopping) in the St. Louis region;
- Identifying increases in mode share due to the completion of all or part of a bicycling and/or walking master plan;
- Determining alternative funding allocations by measuring the relative benefits of investment on bicycling and walking projects versus other modes;
- Identifying quantifiable benefits due to improving the bicycling and walking environments, as they relate to reduced vehicle trips, reduced vehicle miles traveled, enhancing public health, and improvements in air quality characteristics.

Understanding Model Accuracy

The modeling results illustrated herein incorporate a number of assumptions based on US Census 2000 data, local information, and national averages for commute choices. A recent Federal Highway Administration (FHWA) report notes that modeling demand for bicycling and walking has yielded limited success, due primarily to the lack of empirical data about bicycling and walking demand and use.

The model discussed in forthcoming sections represents the best available approach to gauge present demand at the regional level, and furthermore offers a technique that is preferable to others that rely on purely theoretical assumptions.

In light of the above constraints, it is therefore important to understand that the regional model provides an adequate departing point for discussions about regional demand. It does not incorporate detailed origin-destination and density measures. As more specific information, such as ground counts of bicycling and walking use, becomes available, the regional demand model should be updated. In those cases where an

understanding of more localized demand is required, alternative methods should be used.

Model Assumptions

The most common measurement for determining bicycle commute mode share at the regional level is through the U.S. Census Journey-to-Work data. However, this data set has been demonstrated to underreport bicycle and pedestrian commuters for the following reasons:

1. The Census includes only employed adults ages 16 and over in the modal analysis. This naturally omits a large bicycling and walking population including students.

2. In some cases, bicyclists and pedestrians who ride or walk to transit service identify themselves on the Census as transit users, given that a greater portion of their total trip (including bicycling and walking) is spent on the transit system.

3. Utilitarian bicycle and walking trips for shopping and other reasons are not reflected in the U.S. Census figures, even though these trips were the highest trip purpose cited in the National Household Transportation Survey (2001).

Given the above constraints, the approach for the estimation of regional demand in the St. Louis region incorporated a number of enhancements to the U.S. Census database. The analysis includes students, transit users, and utilitarian trips, which were added to the baseline estimate as follows.

The U.S. Census statistics were supplemented by the inclusion of school children. The total school aged population (ages 6-14) from the U.S. Census is factored by the estimated percent of school children who currently bicycle and walk as their primary mode of transportation to school. In most communities, walking trips vary between 10% and 20% of all students and bicycle trips vary between 2% and 10% of all trips (various sources and surveys).

College students are also identified in the estimate. For most college communities, the bicycle mode share is expected to be between 5% and 20%. For example, the National Bicycling and Walking Study, FHWA, 1995, Case Study No. 1 reported an average college student bicycle commute rate of 10%. Similarly, pedestrian activity varies greatly depending on the characteristics of the college campus and its student body. At some universities, walking may be used for 90% of the trips. At other more commuter oriented schools, walking may account for 50% of trips. It is important to note that not all local schools and universities were included in the estimate due to lack of data. Addition of these data points would significantly increase the estimate.

Commuters who connect with bus or rail transit also represent a pool of undercounted commuters. RTD of Denver completed a bike-n-ride survey in 1999 that reported 1.4% of total boarding individuals were passengers with bicycles. However, since data could not be identified for this use for the MetroLink system in St. Louis, this component was omitted from the estimate. Nevertheless, since transit users are also pedestrians, the estimate of pedestrian trips included the number of daily transit users as reported by Metro in 2003.

Estimate of Regional Demand

Application of the above modeling framework to the area covered by the East-West Gateway Council of Governments resulted in the estimate of bicycling activity illustrated in Table 2.8 and the estimate of pedestrian activity illustrated in Table 2.9.

Table 2.8 shows that the cumulative of Census data and the estimate of school children and college students, for both commuting and other utilitarian trip types, results in a regional estimate of 89,300 daily trips by bicycle.

Similarly, Table 2.9 shows that the aggregate of Census data, school children, and college students, for both commuting and other utilitarian trip types, coupled with the transit user pedestrian assumption, yields a regional estimate of 741,300 daily trips by pedestrians.

These estimates provide an analytical departure point for discussions in the St. Louis Regional Bicycling and Walking Transportation Plan pertaining to the explicit need for bicycling and walking improvements in the St. Louis region.

Table 2.8 – Regional estimate of bicycling activity

Table

Aggregate Estimate of Existing Bicycling Activity in St. Louis Region

	Madison	Monroe	St. Clair	Franklin	Jefferson	St. Charles	St. Louis	St. Louis City	TOTAL	Calculations
Employed Adults, 16 Years and Older										
a. 2000 Total Population /1	258,941	27,619	256,082	93,807	198,099	283,883	1,016,315	348,189	2,482,935	
b. 2000 Employed Persons /1	121,852	14,392	113,479	45,363	98,030	149,111	498,319	140,747	1,181,293	
c. 2000 Bicycle Commute Share Pct. /1	0.11	0.15	0.10	0.00	0.01	0.00	0.10	0.35	0.12	
d. 2000 Bicycle Commuters /1	140	21	108	0	5	76	481	489	1,244	(b*c)
School Children										
e. 2000 Population, Ages 6-14 /1	33,200	3,929	37,345	13,665	28,523	42,826	133,880	47,294	340,662	
f. 2000 Est. Bicycle Commute Share /2	2%	2%	2%	2%	2%	2%	2%	2%	2%	
g. 2000 Bicycle School Commuters	664	79	747	273	570	857	2,678	946	6,813	(e*f)
College Students										
h. 2000 Full-Time College Population /3							39,192		39,192	
i. 2000 Bicycle Commute Share /4							10%		10%	
j. 2000 Bicycle College Commuters							3,919		3,919	(h*i)
School and Work Commute Trips Sub-Total										
k. Subtotal Daily Commuters									11,976	(d+g+j)
l. Subtotal Daily Commute Trips									23,953	(k*2)
Other Utilitarian and Discretionary Trips										
m. Ratio of "other" trips in relation to commute trips /5									2.73	(ratio)
n. Estimated non-commute trips									65,391	(l*m)
Total Estimated Daily Bicycle Trips in Region									**89,300**	**(l+n)**

Notes and Sources:

/1 2000 U.S. Census, STF3 for seven counties in region. Note: The East-West Gateway Council of Governments estimates that the regional population increased by 2.4% from 2000-2004

/2 National Safe Routes to School Surveys, 2003. Estimated school children who commute by bicycle, as of 2000

/3 Full-time enrollment from 4 local universities: Saint Louis University, Washington University, Webster University, University of Missouri-St. Louis

/4 Review of bicycle commute share in seven unversity communities.
National Bicycling & Walking Study, FHWA, Case Study No. 1, 1995.

/5 National Household Transportation Survey, 2001 - 27% of all trips are commute trips

Table 2.9 – Regional estimate of walking activity

Table 2

Aggregate Estimate of Existing Pedestrian Activity in St. Louis Region

	Madison	Monroe	St. Clair	Franklin	Jefferson	St. Charles	St. Louis	St. Louis City	TOTAL	Calculations
Employed Adults, 16 Years and Older										
a. 2000 Population /1	258,941	27,619	256,082	93,807	198,099	283,883	1,016,315	348,189	2,482,935	
b. 2000 Employed Persons /1	121,852	14,392	113,479	45,363	98,030	149,111	498,319	140,747	1,181,293	
c. 2000 Pedestrian Commute Share Pct. /1	1.89	0.79	1.77	1.16	0.82	0.01	1.25	4.04	1.71	
d. 2000 Pedestrian Commuters /1	2,300	113	2,014	525	801	1,184	6,231	5,685	18,853	(b*c)
School Children										
e. 2000 Population, Ages 6-14 /1	33,200	3,929	37,345	13,665	28,523	42,826	133,880	47,294	340,662	
f. 2000 Est. Pedestrian Commute Share /2	11%	11%	11%	11%	11%	11%	11%	11%	11%	
g. 2000 Pedestrian School Commuters	3,652	432	4,108	1,503	3,138	4,711	14,727	5,202	37,473	(e*f)
College Students										
h. 2000 College Population /3							39,192		39,192	
i. 2000 Pedestrian Commute Share /4							60%		60%	
j. 2000 Pedestrian College Commuters /4							23,515		23,515	(h*i)
School and Work Commute Trips Sub-Total										
k. Subtotal Daily Commuters									79,841	(d+g+j)
l. Subtotal Daily Commute Trips									159,682	(k*2)
Other Utilitarian and Discretionary Trips										
m. Ratio of "other" trips in relation to commute trips /5									2.73	(ratio)
n. Estimated non-commute trips									435,932	(l*m)
Transit Users										
o. average daily bus/rail boardings /6									145,712	
Total Estimated Daily Pedestrian Trips in Region									**741,300**	**(l+n+o)**

Notes and Sources:

/1 2000 U.S. Census, STF3 for seven counties in region. Note: The East-West Gateway Council of Governments estimates that the regional population increased by 2.4% from 2000-2004

/2 National Safe Routes to School Surveys, 2003. Estimated school children who commute by bicycle, as of 2000

/3 Full-time enrollment from 4 local universities: Saint Louis University, Washington University, Webster University, University of Missouri-St. Louis

/4 Based on an unofficial estimates from the four major St. Louis Universities

/5 National Household Transportation Survey, 2001 - 27% of all trips are commute trips

/6 Metro (St. Louis) Transit Boardings, 2003. For this demand estimate, all trasit users are considered pedestrians.

CHAPTER 3 – BICYCLING AND WALKING CONDITIONS AT TRANSIT FACILITIES

Transit connections offer an extension to the bicycling and walking trip, making it possible to travel for longer distances than those that would be covered without the transit connection. It is therefore important to define existing conditions as baseline information for the development of the future bicycling and walking transportation system. This chapter illustrates the general characteristics of bicycling and walking within the St. Louis regional transit system.

Regional Transit System

Established in 1949, Metro was created to link Missouri and Illinois and serve the region with a primary mode of public transit. According to the agency's web site, Metro has grown to own and manage 15,200 bus stops, 585 non-advertising bus shelters and 323 advertising bus shelters in the bi-state region. It also established MetroLink, the metropolitan light rail transit system in 1993. MetroLink now serves 27 stations with numerous connections to MetroBus stops. In addition, the Cross County MetroLink expansion will add nine additional stops and will extend the system through the Clayton business district and into South County. In 2003, the transit system carried 46,025,179 passengers on MetroLink, MetroBuses and Call-A-Ride vans.

Bicycle Parking at MetroLink Stations

A number of Metrolink stations provide facilities that accommodate bicycles, including:

- North Hanley
- UMSL North
- UMSL South
- Wellston
- Delmar
- Forest Park
- Central West End
- Union Station

Policies on Bicycle use on Regional Transit System

MetroLink and MetroBus have established a series of rules and protocols pertaining to bicyclists using the transit system. These include:

MetroBus

- There is no special permit required when transporting a bicycle on MetroBus. Bicyclists must be 13 years and older.
- No additional fare purchase is required for individuals who wish to transport their bicycles on MetroBus.
- If both racks are occupied on the MetroBus, bicyclists are not allowed to bring their bicycle in the passenger area, and must instead wait for the next bus.
- Buses equipped with bicycle racks are only available in Missouri and Madison County in Illinois. St. Clair County currently does not have buses equipped with bicycle racks.

MetroLink

- Bicycles are able to be transported on all MetroLink vehicles in Missouri and Illinois.
- Bicyclists must walk their bicycle on the station platform.
- Bicyclists must enter the train at the beginning or end vehicle, closest to the operator's enclosure. Entering at any other location is prohibited.
- Bicyclists must wait until all other individuals without bicycles have entered the train before they are allowed to board.
- Bicyclists must stand directly beside their bicycle and are prohibited from using the kickstand.
- Soiled bicycles are not prohibited on the train.
- No additional fare purchase is required for individuals that choose to transport their bicycles on MetroLink.

- There is currently no age limit for individuals who transport their bicycles on MetroLink.
- There are no time of day restrictions on transporting bicycles on MetroLink.

Usage of Bicycle Racks on MetroBus

Metro collects data pertaining to the use of bicycle racks on MetroBus vehicles. This information, as illustrated in Figure 3.1, shows a significant increase in use since the program was conceived. It is worthy of note that during the winter months there is sustained relative use of the bicycle racks on MetroBus.

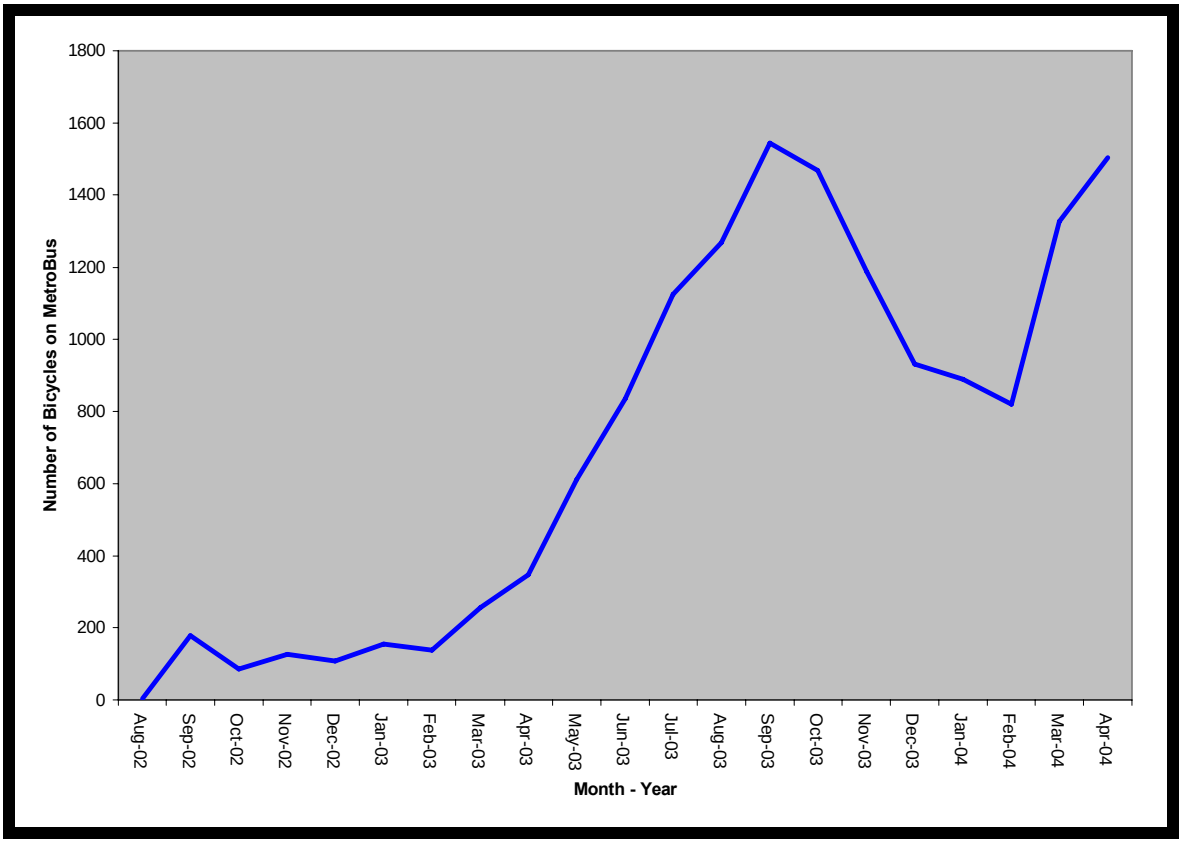


Figure 3.1 – Bicycles on MetroBus: August 2002 to April 2004

Source: Metro.

Analysis of Existing Conditions at Selected Stations

Several MetroLink stations and MetroBus stops/transit facilities were selected at random for further investigations to gain a perspective on the existing conditions for bicycling and walking. The following paragraphs illustrate the sample findings.

Forest Park

Given that this station is below ground, an elevator is provided for accessibility by those with mobility challenges. The elevator can also be used by bicyclists desiring to ride MetroLink with their bicycle. Stationary bike racks are located at the top of the stairs leading to the platform. Ample space for waiting pedestrians is provided on a large concrete sidewalk in the bus stop, which is also located at the top of the stairs. The station serves as the beginning point for the Cross County MetroLink extension.

Delmar Station

The Delmar Station is equipped with a series of stairs and ramps, making it accessible for all pedestrians, including those with mobility complications as well as cyclists. The station is easily accessible from the MetroBus stop, approximately 40 feet from the eastbound platform. The MetroBus stop includes a bike racks and adequate shelter from the elements for pedestrians. Like the Forest Park station, the Delmar station is situated on a wide sidewalk, making it easy for pedestrians with and without bicycles to stand comfortably while waiting for the bus.

Rock Road

The Rock Road MetroLink station platform is at ground level. The bus stop is adjacent to the MetroLink and its park-n-ride facility, and provides ample space for pedestrians with and without bicycles. A stationary bike rack is available with enough room for four bikes.

Grand Station

Grand Station is located below the Grand Blvd. street level and serves several MetroBus routes. Staircases and elevators provide access between the MetroBus stop at Grand Blvd. and the MetroLink station. A MetroBus station is also

located below Grand. There are no bike racks available at this MetroLink station. The pedestrian environment is complicated by narrow sidewalks on Grand and a relatively small staircase leading to and from the MetroLink station platform. The pedestrian area on Grand is particularly difficult since there are no pullout bays for vehicles to pick up passengers.

St. Louis Community College - Meramec Campus

The Meramec College Transfer Center provides two bus shelters as well as a stationary bicycle rack. The location of the transit center makes it an access point for the student population. Waiting space for pedestrians is adequate, although some of the connecting sidewalks are in poor condition. A parking lot is also located near the station that could serve as a park-n-ride for individuals living near the area who use MetroBus to commute downtown or other business districts.

Central and Forsyth Center

Located in downtown Clayton, this transit center serves a series of buses that provide a connection to downtown and St. Louis County. Seating is available and ample, but no shelters or bicycle racks exist, thereby deterring bicycling and walking activity. The sidewalk system is of adequate width to accommodate pedestrian travel.

Ballas MetroBus Transit Center

This transit center serves several MetroBus routes. The station provides an indoor ticket station, park-n-ride facilities, and ample seating in the vicinity of each bus stop. There is one bicycle rack, suitable for two bicycles. The facility was recently constructed and therefore includes proper attention to accessibility and walking space. However, given the location of the transfer center, it seems that a greater number of bicycle racks could attract higher use by bicyclists.

Assessment of Overall Conditions

The existing conditions in the Metro transit system present a combination of adequate treatment and areas where improvements could be made. Some MetroLink stations and MetroBus transfer centers provide an environment that invites walking and bicycling, while others make this use difficult. It is encouraging that all MetroBus vehicles are equipped with bicycle racks and their use has been demonstrated to be continually increasing. Given the assessment of existing conditions it is likely that future enhancements to the bicycling and walking environment within the regional transit system could include:

1. Ensuring that bicycling and walking considerations are included in the design of future extensions to the MetroLink network and bus-related improvements.
2. Addressing bus stops that are currently situated in grassy or earthy areas that do not provide adequate space for those waiting for buses.
3. Considering the importance of locating bus stops in a manner that minimizes unsafe mid-block pedestrian crossings.
4. Enhancing the policies and facilities provided for carrying bicycles on MetroLink.
5. Considering the importance of demand analysis in the strategic placement of bicycle facilities at MetroLink stops and MetroBus transfer centers.
6. Investigating the applicability of higher-order bicycle storage facilities such as bicycle lockers.
7. Determining appropriate design parameters for adequate bicycle racks at MetroLink stations.
8. Defining the proper design of bus shelters to incorporate adequate space for those with mobility challenges.
9. Addressing bus driver and bicyclist training with regards to appropriate protocols for picking up bicyclists at bus stops.
10. Conducting training for bus drivers and bicyclists regarding proper operations near locations where bicycle lanes and bus stops coexist.
11. Identifying specific goals to attract more pedestrian and bicyclists to use the regional transit system.
12. Providing neighborhood connections to transit transfer stations.
13. Integrating best practices from other transit agencies. Examples include "Recommendations for Pedestrian, Bicycle and Transit Friendly Development Ordinances" from the Oregon chapter of the American Planning Association and compilations such as those available in www.bicyclinginfo.org.

CHAPTER 4 – BICYCLING AND WALKING ENVIRONMENTS

As noted in *Legacy 2030*, the transportation system should provide choices to people and be safe, convenient, efficient and accessible for all users. To achieve these goals, every road project should provide routine accommodations. As a matter of standard practice the transportation system should be designed, built, and maintained in a manner that accommodates not only automobiles but transit vehicles and non-motorized modes of travel as well. Accommodating travel by all modes in this way expands the capacity of the road and the ability to serve everyone who travels, be it by private vehicle, public transit, foot, bicycle, or other means.

States, counties, and cities have built many miles of streets that are safe and comfortable for automobiles. However, these roadways often lack consideration for transit and sidewalks, have lanes too narrow to share with bicyclists, and feature few, poorly marked, or dangerous pedestrian crossings. A Bureau of Transportation Statistics survey found that about one-quarter of walking trips take place on roads without sidewalks or shoulders, and bike lanes are available for only about 5 percent of bicycle trips[1].

Routine accommodations are essential for access by people who cannot or choose not to drive. Roads without safe access for non-motorized transportation represent barriers for people who use wheelchairs and for older people and children. About one-third of Americans do not drive,[2] and approximately half of all trips in urbanized areas are three miles or less[3]. Streets without safe places to walk and bicycle put people at risk. While 10 percent of all trips are made by foot or bicycle, more than 13 percent of all traffic fatalities are bicyclists or pedestrians.[4] More than 5,000 pedestrians and bicyclists die each year on U.S. roads.

Routine accommodations encourage more walking and bicycling. One study found a 23 percent increase in bicycle traffic after the installation of a bicycle lane[5]; another found that residents were 65 percent more likely to walk in a neighborhood with sidewalks.[6] Streets that accommodate other modes give people choices and increase the overall capacity of the transportation system.

When planning and designing the region's transportation system, planners and engineers need to design roads to move people and goods rather than designing roads simply to move vehicles. Consideration needs to be given not only to the user but also

[1] Bureau of Transportation Statistics, 2002 National Survey of Pedestrian and Bicyclist Attitudes and Behaviors.
[2] Highway Statistics, 2001.
[3] Clarke, A. National Household Transportation Survey, original analysis.
[4] 2001 National Household Travel Survey; Fatality Analysis Reporting System.
[5] Macbeth, A.G. (1999) Bicycle Lanes in Toronto ITE Journal 38-46.
[6] Giles-Corti, B., & Donovan, R.J. (2002). The relative influence of individual, social, and physical environment determinants of physical activity. Social Science & Medicine, 54 1793-1812.

to potential users of the system. Additionally, consideration should be given to the environment being served by the facility. Accommodations in a rural area may look quite different from those in a highly urban area, a residential area, or a commercial area. While treatments may vary by environment, all facilities should be designed to balance safety and convenience for everyone using the road.

The future bicycling and walking transportation system for the St. Louis region will be an interconnected system of on- and off-road facilities that provide an alternative transportation option for utilitarian and recreational trips. Given that the system is currently in its infancy, it is of most critical importance to understand that facilities exist within transportation environments and that the characteristics of these environments either attract or discourage bicycling and walking transportation. As such, this chapter illustrates environment conditions and parameters that must be considered in planning, design, operation and maintenance of walking and bicycling facilities. The sample environments provide a common reference for the use of toolkit solutions that municipalities, agencies, and the public can utilize to develop, promote, and enhance the bicycling and walking transportation system in their communities. Furthermore, a set of checklists is presented which provide a tool for consistency in project development , from planning to evaluation, implementation, and operation.

Criteria

Communities across the St. Louis region remain diverse in their heritage, identity, function and contextual setting. To classify the diverse landscape into environmental typologies, a set of criteria was applied based on development and streetscape features. The categories of criteria explored for the purpose of creating a framework for the bicycling and walking environments:

- Land use
- Traffic conditions
- Type of travel way or intersection
- Travel way or intersection geometry
- Streetscape features
- Density

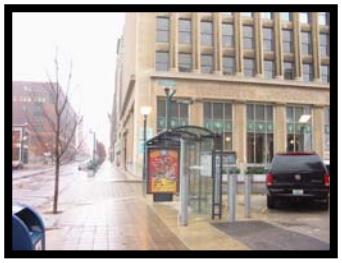
Environments

Applying the above criteria, five typologies of environments were identified. Urban environments typically have higher densities and more integrated land use. Such environments are found not just in central cities, but also in most older communities. Suburban environments typically have lower densities and more dispersed land use, but again are throughout the region, even within older jurisdictions, but usually in newer development. Commercial environments tend to have higher traffic volume and wider streets and intersections than residential environments. Finally, rural environments are those mostly agrarian and undeveloped. The resulting five are:

- Urban: Commercial
- Urban: Residential
- Suburban: Commercial
- Suburban: Residential
- Rural

Common characteristics of each environment include:

Urban Commercial



- High density
- Little to no building setback
- High traffic volumes
- Mixed-use

Urban Residential

- High density
- Low to moderate traffic volumes
- Moderate setbacks

Suburban Commercial

- Moderate to high traffic volumes
- Moderate to high traffic speeds
- Wide setbacks

Suburban Residential

- Low to moderate traffic
- Moderate to wide setbacks
- Low to moderate densities

Rural

- Farmland and open space
- Low density
- Moderate to high traffic speeds

DEFINING A PREFERRED BICYCLING AND WALKING ENVIRONMENT

Appendix B provides a number of environment checklists that define ideal and preferred characteristics for good bicycling or walking conditions. The checklists should be used to either evaluate existing bicycling and walking conditions within a subject area or as a guide for incorporating design into a new transportation project that promotes good bicycling and walking environments. The following terms and definitions apply to the environment checklists.

Development Characteristics

Land use

Commercial environments should be mixed-use. Residential environments should be predominately residential use. Rural environments should be predominately farmland, woodland, or other open space with limited development.

Building setbacks

Setback is the distance a building is set back from the street edge or street right-of-way. In ideal bicycling and walking environments buildings are set relatively close to the street right-of-way with little to no setback. Buildings with a far setback can make bicyclists and pedestrians feel isolated. Also, far setbacks inhibit bicyclists and pedestrians from accessing buildings directly from the street.

Far Right: Examples of little to no setback in urban commercial (top) and residential (bottom) settings. Right: Example of a wide setback in a commercial setting.

Consistent building outline

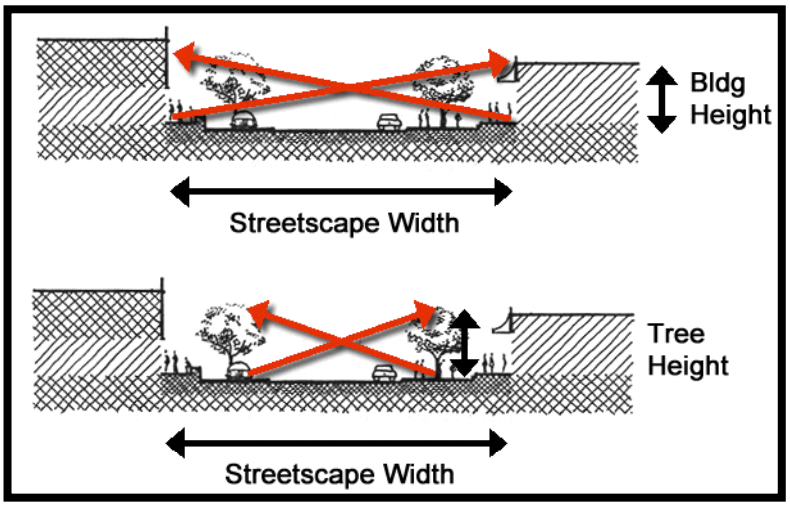
Street edges should have a consistent building outline without the interruption of parking lots or vacant ground. Ideally, parking should be located behind buildings. When parking is located adjacent to the street right-of-way, walls, fencing, or landscaping should be placed to continue the vertical line of adjacent buildings.

Above Right: Parking lots and access drives break the continuity of the streetscape. Below Right: A consistent building outline gives definition to the streetscape.

Definition

Definition is the ratio of the streetscape width and the height of vertical elements at the edge of the streetscape. The streetscape width consists of the street, sidewalks, parking lots, and other elements within the streetscape that may or may not be within the street right-of-way. The vertical edge is usually comprised by buildings, however, other vertical elements such as street trees can provide the vertical edge.

In general, a minimum ratio of 1:2 to 1:4 between the streetscape width and vertical edge height



Above: Buildings usually provide the vertical edge for streetscape definition; however, other vertical elements such as street trees can also provide a strong vertical edge.

provides a comfortable bicycling and walking environment. For example, if the streetscape width was 80', the vertical edge should be at least 20'-40' in height. Higher vertical edges are acceptable, especially in commercial areas.

Transparent edge

A transparent edge is a visual transition zone between the public street right-of-way and a private land use. A transparent edge can also be referred to as "transparency" or "permeable edge". A transparent edge may consist of one or more of the following: windows, awnings, porches, planters, landscaping, and architectural detailing.

Left: A streetscape edge with little transparency.
Below: Buildings with awnings, large windows, porches, and landscaping provides for a vibrant pedestrian environment and a visual transitional zone from the public street to the private buildings.

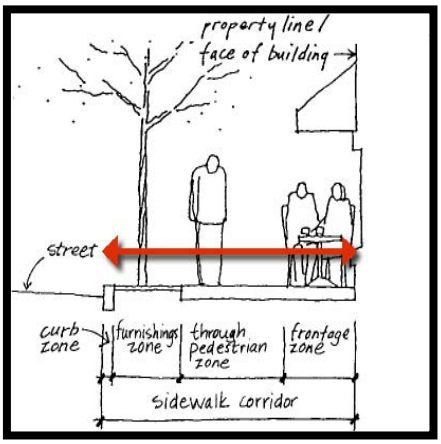
Support facilities at public and private locations

Public and private facilities should accommodate bicyclists and pedestrians by providing amenities including bicycle parking, changing rooms, easily accessible entrances, and signage. In commercial areas, support facilities should be provided at both public locations (e.g. bus/transit stations, street right-of-way, parks) and private locations (e.g. retail and office buildings). Support facilities should be provided at public locations within or near residential areas (e.g. schools, parks, and libraries).

Sidewalk Characteristics

Sidewalk zone width and through pedestrian zone

The sidewalk zone width is the width of the space from the face of the curb to the face of the building or property line. Within the sidewalk zone there are three sub-zones: the furnishings zone, the through pedestrian zone, and the frontage zone. The furnishings zone is also referred to as the "street tree" or "utility" zone. This zone is where elements such as street trees, light fixtures, parking meters, and fire hydrants are located. The through pedestrian zone is the area that is free of obstacles and is accessible for pedestrian travel. The frontage zone, or "shy distance" zone, is the area near the building or property line, and may include landscape planters and seating, or also be free of obstacles. Recommended minimum widths for the sidewalk zone and the trough pedestrian zone are shown in Table 4.1.



Left: The sidewalk zone is from the face of curb to the face of the building or property line.

Right: The through pedestrian zone is obstacle free and the accessible route for pedestrians.

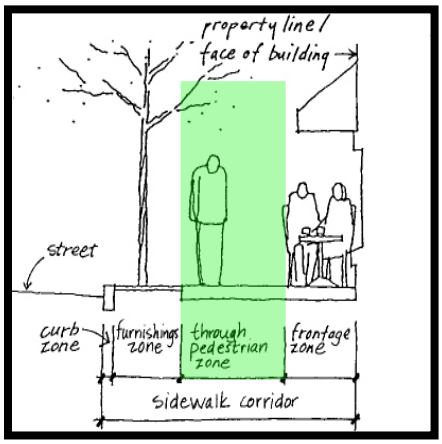


Table 4.1 – Minimum widths for sidewalk zone and through pedestrian zone

Environment	Sidewalk Zone (feet)	Through Pedestrian Zone (feet)
Urban Commercial	15	8
Urban Residential	10	5
Suburban Commercial	15	8
Suburban Residential	10	5

In rural environments where either adequate demand is determined or connectivity is desired a multi-use trail with a minimum width of 10 feet is recommended.

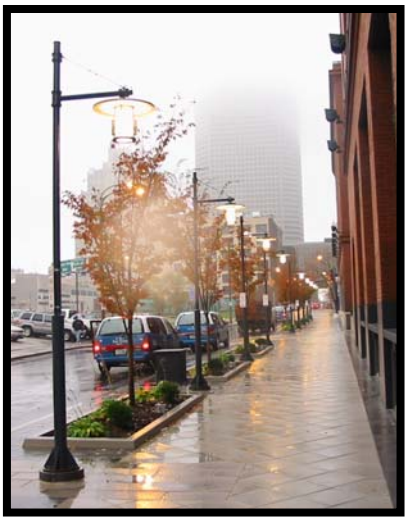
Accessibility

Sidewalks and paths should be free of obstacles and provide a safe, accessible path of travel, for users of all abilities and ages. Clearances should meet all minimum criteria as set forth by the American with Disabilities Act.

Right: A non-accessible sidewalk.

Lighting

Street lights should generate, at a minimum, sufficient amount of light to provide a safe and secure environment for bicyclist and pedestrians. Additional lighting, such as ornamental street lights, enhances visibility, safety, and the bicycling and walking experience. Additional lighting is most appropriate for commercial environments. While levels of lighting may vary for different locations, uniform lighting levels should be used to avoid areas of glare.



Right: Ornamental light fixtures not only provide a safer lighting condition, but additionally compliment nearby architecture while also enhancing the streetscape.

Well-maintained sidewalks

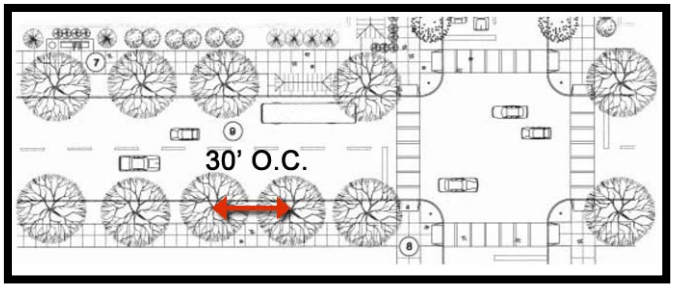
Sidewalks should be well maintained by removing litter and debris. The sidewalk surface should be in good condition and without major deformations, crumbling, or deterioration.

Left: A poorly maintained sidewalk.

Right: A well maintained sidewalk.

Street trees

Street trees are an important component of the streetscape environment. Street trees provide comfort to bicyclists and pedestrians by providing shade, a buffer from vehicular traffic, and good definition. Environmental benefits include reduced storm water runoff and increased air quality. The recommended spacing of street trees is not an exact science. Factors such as streetscape width, building heights, and the presence of other streetscape elements can affect the recommended spacing of street trees. A good rule of thumb is 15 to 30 feet spacing on center (o.c.).



For commercial and residential environments, a street tree spacing of 30 feet on center is recommended. For rural environments, existing trees should be preserved wherever possible.

Multi-use trails

Multi-use trails provide a path of travel for bicycling and walking transportation that is separated from vehicular traffic. While multi-use trails may be located in commercial and residential areas, they are most applicable for rural environments, connections to parks and other recreational systems, and as transportation compliments to limited access facilities such as freeways. Multi-use trails should provide a minimum travel width of 10 feet. Separate trails for bicycling and walking are highly desirable.

Above: A multi-use trail provides a facility for bicycling and walking transportation that is separated from vehicular traffic.

Roadway

Buffer from traffic

Physical separation between traffic and the sidewalk provides a more comfortable environment for walking transportation. Common treatments include on-street parking, street trees, and lawn strips. Such buffering techniques often result in an additional traffic calming effect. Where on-street parking or street trees are not feasible, wider sidewalks provide a similar comfort level by increasing the distance from the pedestrian and vehicular traffic.

Although the traffic calming influence of on-street parking also benefits bicyclists, the presence of parked vehicles may also create a safety hazard, due to what is often termed the “door zone”. Unless the vehicular lane closest to the parking area is of appropriate width, the bicyclist may be within the area covered by an opening car door. A minimum additional dimension of 3 feet beyond the required travel lane width is recommended.

Low traffic speeds

Low traffic speeds create a more manageable and comfortable environment for both bicycling and walking transportation. Evaluations of traffic speeds for adequacy should take into account both the posted speed limit as well as the average travel speed, as determined by field studies. Traffic calming measures such as on-street parking, narrower lanes, special pavements, and striping are effective in slowing down traffic. The implementation of traffic calming measures should consider impacts to emergency response as well as not impeding or creating safety concerns for bicyclists.

Infrequent curb cuts

Poor access management, as evident from frequent curb cuts, generates excessive vehicular turning movements. This creates conflict points not only for turning and through vehicles but also for bicycling and walking transportation. It is very difficult for operators of turning vehicles to look behind and to the right to be able to detect on-coming pedestrians.

Similarly, although not recommended and often illegal, bicyclists sometimes ride on sidewalks, which creates another observation need for turning vehicles. On-coming bicyclists and pedestrian on the sidewalk are not able to detect a turning vehicle until is it too late to take corrective action. Even when bicyclists are utilizing the street, a turning vehicle creates the need for the bicyclist to pass the vehicle, sometimes requiring encroachment on a second lane or the opposite direction when on one-lane facilities.

Therefore, proper access management, which results in consolidated curb cuts only where needed, creates a safer and more comfortable environment for bicycling and walking transportation.

Infrequent heavy vehicle traffic

Large trucks and other vehicles of larger than usual widths create an uncomfortable and often unsafe condition for bicycling and walking transportation. Heavy vehicles include semi-tractor trailers, garbage trucks, dump trucks, and other large trucks. In commercial environments, heavy vehicle traffic exceeding 2 to 5% of the vehicle mix affects the "look and feel", as well as the capacity, of transportation facilities, thereby reducing the comfort level for bicycling and walking transportation. In residential areas, a lower threshold of 0-2% has an equivalent effect.

The impact of heavy vehicle traffic on the bicycling and walking environment can be mitigated by measures such as traffic calming, dedicated bicycle lanes, wider sidewalks, truck restrictions in residential areas, and increased buffer distance for pedestrians from vehicle traffic.

Above: Although there is a dedicated bicycle lane, the presence of the semi-tractor trailer creates an uncomfortable and potentially unsafe bicycling condition. Note: the bicycle lane symbol shown is not in adherence with current standards.

Low traffic volumes

Low traffic volumes reduce the potential for conflict between motorists, bicyclists and pedestrians. This reduction in turn creates a more manageable and comfortable environment for bicyclists and pedestrians. Where higher traffic volumes are necessary to maintain traffic flow, conditions can be improved by measures such as traffic calming, dedicated bicycle lanes, wider sidewalks, and increased buffering between pedestrians and vehicular traffic.

Striped bicycle lanes

A striped bicycle lane provides dedicated space for bicycling transportation. It also results in the additional benefit of increasing the buffer distance between pedestrians and vehicular traffic. Striped bicycle lanes should be a minimum of 4 feet wide, although a 5-foot dimension is recommended. In areas where on-street parking is allowed, striped bicycle lanes should be a minimum of 5 feet wide, although a 6-foot dimension is recommended.

Bicycle lane dimensions and typical treatments should be in adherence with the latest standards set forth by the American Association of State Transportation Officials' *'Guide to the Development of Bicycle Facilities'*. Furthermore, signing and striping of bicycle facilities should also be in adherence with the *'Manual of Uniform Traffic Control Devices'* (MUTCD). Adherence to these requirements is especially important when federal funding is sought for the construction of the facilities.

Wide outside lanes

As an alternative to a striped bicycle lane, a wide outside travel lane can be used to provide additional space for bicycling transportation. For this type of treatment, a minimum width of 14 feet is recommended. The aforementioned standard documents also address the proper design of wide outside lanes.

Well-maintained road surfaces

Loose gravel, debris, litter, uneven pavement, utility covers, and storm water inlet grates can be impediments for proper bicycling transportation. Road surfaces and bicycle lanes should be well maintained and in good condition.

Above Left: An inlet grate can be a hazard for bicyclists especially if the openings are parallel to the direction of travel. Above Middle: Uneven pavements are often located at the edge of two types of pavement, in this case asphalt pavement and a concrete curb and gutter. Above Right: Although a shoulder exists, gravel and other debris may cause it to be unsuitable for bicyclists.

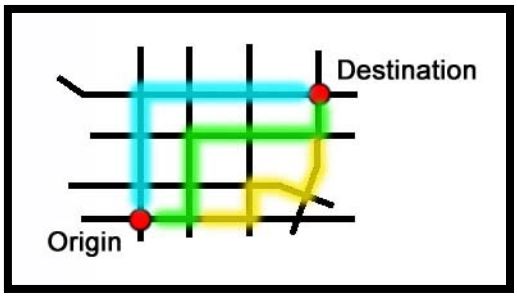
Directional/informational signage

Signage orients, directs, and provides information to users of the bicycling and walking transportation system. Signage should be scaled and designed as appropriate for the intended user. Signage can also alert motorists to be aware of the presence of bicyclists and pedestrians.

The applicability, physical dimensions, and coloring schemes of directional and informational signage should adhere to federal, state, and local standards and ordinances, such as the guidance provided at the national scale by the *'Manual of Uniform Traffic Control Devices'* (MUTCD).

Opportunities for alternative routes

Exemplary bicycling and walking transportation systems, like those for vehicular travel, provide ample choices for alternative routes between desired destinations. Transportation facilities that take advantage of grid patterns provide the greatest flexibility for bicyclists, pedestrians, and motor vehicles.



Because bicyclists and pedestrians command less physical space and travel at lower operating speeds it is simpler and less-costly to provide route flexibility to the bicycling and walking transportation system than it is for the vehicular counterpart. Furthermore, investigating alternative routes, away from primary vehicular routes, often results in more efficient use of resources allocated to the bicycling and walking transportation system since the required improvements to lower volume roads are often less expensive. As long as the total travel time is relatively the same and connections to desired destinations are provided, such routing is often an excellent use of resources.

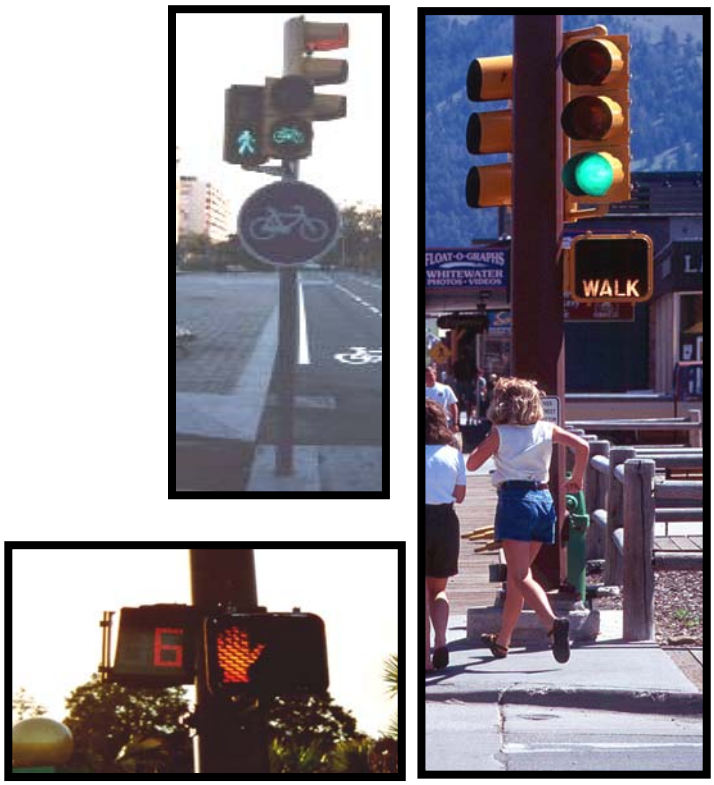
Intersections

Pedestrian actuated signals, bicycle actuated signals, and stop signs

Intersections in commercial environments should include pedestrian actuated signals that provide adequate crossing time. Options include "countdown" signals, which show the time left for crossing, and audible signals, which provide audio indications.

Normally, bicyclists cross intersections using the same signal phase as that provided for motor vehicles. Important enhancements to intersection signals include the ability for vehicle detectors to also detect the presence of bicycles. The inclusion of bicycle actuated signals for left turns or through movements provides a greater level of safety for bicyclists at high volume intersections.

Intersections in residential and rural environments should include stop signs, where conditions warrant the installation of these traffic control devices. Stop signs provide a controlled crossing for bicyclists and pedestrians. Under certain conditions, especially in mid-block crossings on high-volume roads, actuated pedestrian-only signals may be appropriate.



Top Left: Bicycle and pedestrian actuated signal. Bottom Left: Pedestrian actuated signal with "countdown" feature. Right: Pedestrian actuated signal

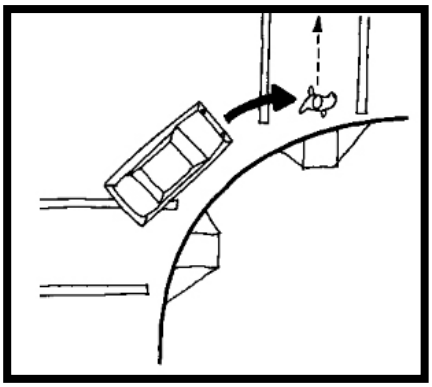
Striped bicycle lane and left turn bicycle lane

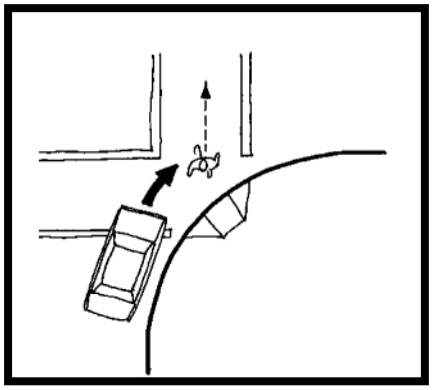
Striped bicycle lanes should continue through intersections to provide a designated route for bicyclists. A dedicated left turn bicycle lane provides an additional level of safety for bicyclists in high-volume intersections.

Left: Bicycle lane before and after intersection. Center: Left turn bicycle lane. Right: Bicycle signal actuation. Note: Diamonds are no longer in adherence to accepted striping standards.

American with Disabilities Act (ADA) compliant ramps

Intersections should include at least one ramp that complies with American with Disabilities Act (ADA) requirements. However, it is recommended that two ramps are located at each corner, one for each direction of travel. When only one ramp is provided, pedestrians are often forced into the oncoming traffic lane to access the ramp.

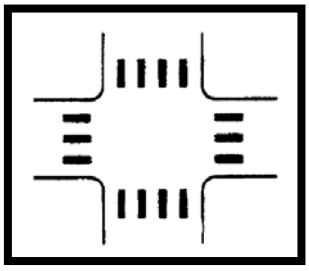




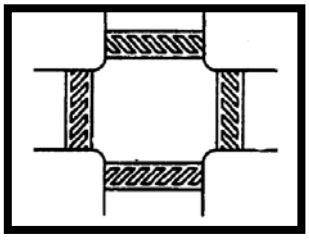
Top Right: Two ADA ramps, one for each direction of travel, are preferred. Bottom Right: Single ramps often force pedestrians into conflict with vehicles to order to access the ramp.

Striped crosswalk

Striped crosswalks provide a designated area for pedestrians to safely cross the intersection. Striped crosswalks can range from single lines to hatched and solid patterns. While more elaborate striping creates greater visibility for pedestrians, the elaborate striping is more expensive to install and maintain.

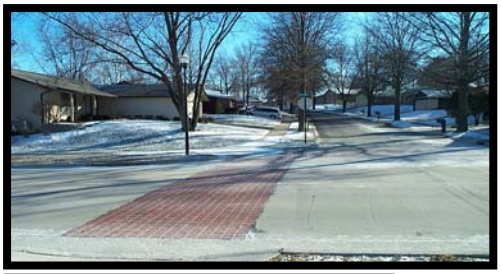


However, intersections that are key links to destinations or in which a high volume of pedestrian activity is expected may justify the use of more elaborate striping.



Enhanced crosswalks

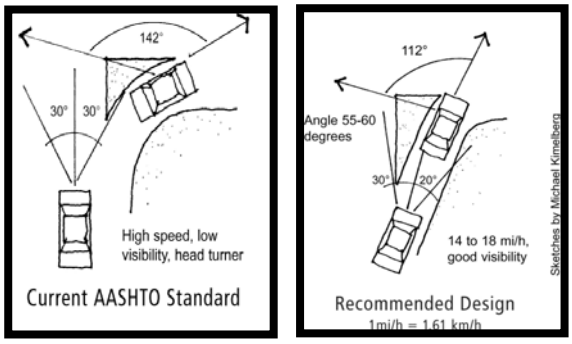
Enhanced crosswalks utilize special paving, changes in color and texture, and other improvements to provide an enhanced pedestrian crossing at intersections. The enhanced crosswalks create greater awareness of pedestrians by motorists. Special paving can also act as a traffic calming measure by forcing vehicles to slow down.



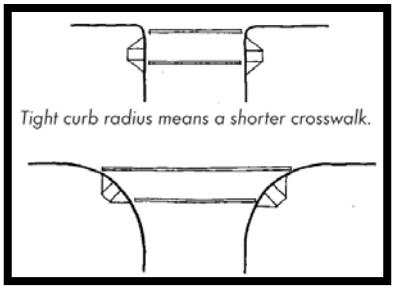
Enhanced crosswalks can also be an urban design tool that creates a sense of entry or gateway to business districts, entertainment centers, or other neighborhood zones.

No right turn slip lane and reduced radius corners

Right turn slip lanes often create an operational conflict between vehicles, bicyclists and pedestrians. Without a right turn slip lane, vehicles must come to a complete stop at the intersection, facilitating their interaction with crossing pedestrians. When a right turn slip lane is required to maintain traffic flow, small changes in corner radiuses reduce vehicular speeds and therefore improve visibility for motorists to detect pedestrians.

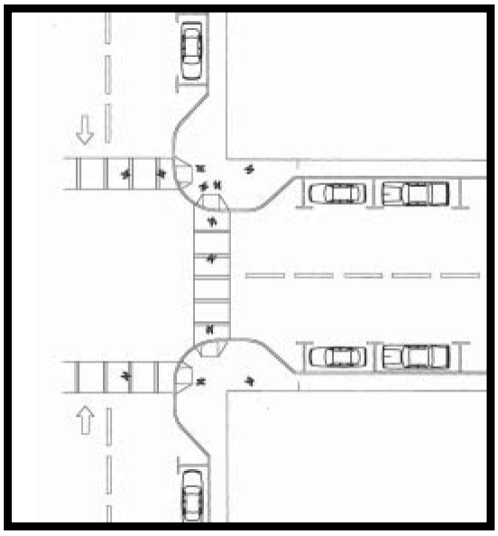


Reducing corner radiuses at intersections also creates a shorter crosswalk for pedestrians. The benefits of such treatments should be compared with subsequent impacts to intersection capacity to determine the optimal solution.



Curb extensions (bump outs)

Curb extensions or “bump outs” extend the sidewalk at an intersection thereby reducing the crossing distance for pedestrians. Curb extensions are also considered traffic calming solutions, since vehicles are forced to slow down, especially for right turns. Care must be taken in the design of the curb extensions so that they do not encroach on bicycle lanes or become a pinch point for bicyclists and motorists traveling in the same direction.

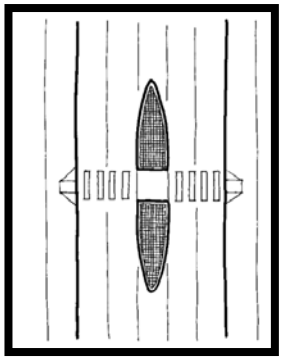


Maximum distance between intersections

Blocks less than 400’ in length are desirable in commercial and residential areas. Intersections at each end of blocks 400 feet or less in length provide control points for safe pedestrian crossing. Pedestrians tend to cross at mid-block points when the distance between intersections is greater than 400 feet.

Adequate Mid-Block Crossings

In commercial and residential areas, when blocks exceed 400 feet in length, mid-block crossings should be provided to accommodate the need for pedestrian travel across the roadway.

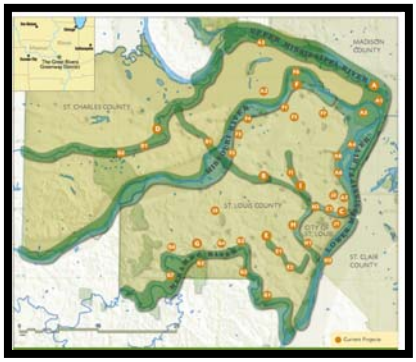


Mid-block crossings may also be needed where highly desirable destinations exists between intersections, or in locations where opposing transit stops generate high pedestrian traffic. Mid-block crossings should be evaluated for striping requirements and the need from pedestrian actuated signals.

General

Connected bicycling and walking transportation system

The St. Louis region's future bicycling and walking transportation system will be composed of on- and off-road facilities that provide a transportation alternative to the region's citizens. The connected system will include multiple alternatives for bicyclists and pedestrians to travel for leisure, commuting, and for local and regional trips. County and regional master plans should provide a framework and long term vision to assist the local communities in developing a connected and coordinated system between communities.



Links to parks, schools, and other destinations

Communities should provide safe and comfortable routes for bicyclists and pedestrians to access important community destinations such as parks, libraries, business centers, and schools. It is therefore important during planning exercises that bicycling and walking facilities and amenities be provided not only within destinations but also between the destinations and the expected points of trip origin.

Connections past barriers

Bridges, overpasses, underpasses, railroad tracks, ramps, and other major transportation nodes often act as physical barriers for bicyclists and pedestrians. Accommodations for bicycling and walking transportation should be included in the design of these facilities. Even if demand is not evident in the immediate area of these structures, they may be the only barrier crossing within a larger area.

Above: This overpass can be a barrier, in terms of both accessibility and perception of safety for bicyclists and pedestrians.

Transit access

Transit facilities, both rail and bus types, provide an extension to the bicycling and walking transportation system. Therefore, transit links should accommodate bicyclists and pedestrians by providing not only access to the facilities but also amenities such as bicycle parking, bicycle storage, bicycle racks, and adequate protection from the environment.

Community bicycle and pedestrian programs

Communities should encourage bicycle and pedestrian education programs that promote usage, awareness, and education for youth and adults. Programs should be targeted to motorists, bicyclists, and pedestrians. Resources between multiple communities could be combined to generate programs for wider audiences. Media campaigns are typically successful vehicles for distributing information on a regional scale.

Illustrative Definition of Bicycling and Walking Environments

It is often helpful when discussing bicycling and walking transportation facilities, especially with the public at large, to visualize how each of the aforementioned parameters functions and looks in actual facilities. Appendix C provides visual references for each of the noted environments. For each sample environment photographic examples of bicycling and walking conditions ranging from poor to good are shown. As items on the checklists are considered conditions improve.

It is important to note that within each environment, bicycling or walking conditions can vary independently of one another. Sometimes a variable that enhances the bicycling environment can have a negative effect on walking conditions, or vise-versa. For example, the presence of on-street parking, which enhances the walking environment due to additional buffer distance from traffic, may negatively impact the bicycling environment by introducing a safety conflict between opening car doors and bicyclists.

The rating arrows on the top and left margins of the displays indicate improving conditions for bicycling as the horizontal scale moves right and improving conditions for walking as the vertical scale moves down. As such, photographs in the upper left corner of the displays are examples of conditions that are poor for both walking and bicycling, while photographs in the lower right corner of the displays are examples of conditions that are considered good for walking and bicycling.

These illustrative examples provide visual reference for those evaluating bicycling and walking conditions. The photographs can be used as a source for sample treatments that either enhance or negatively affect bicycling and walking conditions.

Conclusion

The five (5) environments, Urban Commercial, Urban Residential, Suburban Commercial, Suburban Residential, and Rural compile the common characteristics of the elements within which bicycling and walking activity occur. Furthermore, the checklist of items derived for each environment provide a simple metric for the measurement of walking and bicycling conditions for each environment. The checklists are not intended to be a quantitative analysis of bicycling and walking conditions. Instead they provide a qualitative assessment to help evaluate existing bicycling and walking conditions and to promote best practices for bicycling and walking. The checklist and environments are to be used to find solutions and to provide connectivity and consistency for municipalities, agencies, and stakeholders involved in the bicycling and walking facilities project cycle. (See Appendix C)

CHAPTER 5 – BICYCLING AND WALKING SUITABILITY SYSTEMS

Determining the suitability of environments for bicycling and walking is a more refined process now than ever before. Several models are available to forecast the capacity of proposed designs or evaluate the suitability or adequacy of existing environments. Although there is some consistency between the criteria for determining bicycling and walking suitability, a greater emphasis has historically been placed on the needs of bicyclists, resulting in a limited number of criteria for evaluating walking environments.

Determining the suitability of environments for bicycling and walking use can help meet several objectives. Suitability determinations can aid in the prioritization of improvement projects for agencies with limited budgets. They may also help to identify incompleteness or deficiencies in bicycling networks. In addition, suitability determinations provide the capacity for evaluation of existing roadways for use by bicyclists and pedestrians.

BICYCLING SUITABILITY

The methods for determining bicycle suitability have evolved from the evaluation of bicycle-related stress level and interaction with hazards to the more recent level of service model and bicycle compatibility index. The various methodologies for determining bicycle suitability can be grouped according to the criteria used to make their determination. The three methodology types, as illustrated in table form below, are:[7]

1. *Stress Level Criteria*
   Determination based on three factors: curb lane vehicle speeds, curb lane vehicle volumes, and curb lane widths.

2. *Roadway Condition Index/Suitability-Based Level of Service*
   Determination based on a combination of factors including but not limited to: traffic volumes, curb lane width, speed limit, pavement factors and location factors.

3. *Capacity-Based Level of Service*
   Determination based on volume of traffic.

[7] Turner, Shawn M., C. Scott Shafer and William P. Stewart. *Bicycle Suitability Criteria: Literature Review and State-of-the-Practice Survey* (Texas Transportation Institute, College Station, 1997), 4-5.

Table 5.1 – Summary of bicycling suitability methodologies

Table 2-1. Summary of Bicycle Suitability Methodologies

Methodology \ Input Variables	Traffic Volume Per Lane	Curb Lane Width	Vehicle Speed	Speed Limit	Pavement Type/Condition	Parking/Turn Lanes	Grades	Sight Distance/Visibility	Driveway Frequency	Adjacent Land Use	Signalization/Intersections	Heavy Vehicles	Vehicle LOS	Maintenance	TDM/Multimodal Support	Provision/Type of Facility	Cyclist Input	Passing/Meeting Frequency	Service Volumes	Bicycle Density	Curve Radius	Total Delay	Average Bicycle Speed
Bicycle Stress Level-Based Criteria																							
Bicycle Stress Level (References 2,3,4,5,6)	✓[a]	✓	✓																				
Roadway Condition Index/Suitability-Based Level of Service Criteria																							
Bicycle Safety Index Rating (Ref. 7)	✓[b]	✓		✓	✓[c]	✓[d]	✓[d]	✓[d]	✓[d]	✓[d]	✓					✓[e]							
Bicycle Suitability, Davis (Ref. 8)	✓[b]	✓		✓	✓[c]	✓[d]	✓[d]	✓[d]	✓[d]	✓[d]						✓[e]							
Roadway Condition Index (Ref. 5,9,10)	✓[b]	✓		✓	✓[c]	✓[d]	✓[d]	✓[d]	✓[d]	✓[d]						✓[f]							
Modified Roadway Condition Index (Ref. 9)	✓[b]	✓		✓	✓[c]	✓[d]	✓[d]	✓[d]	✓[d]	✓[d]		✓				✓[f]							
Interaction Hazard Score (Ref. 5,11,12)	✓[b]	✓		✓	✓				✓	✓		✓											
Bicycle Level of Service, Landis et al. (Ref. 13)	✓[g]	✓[h]		✓	✓				✓	✓		✓					✓						
Gainesville Bicycle Map (Ref. 14)																✓[i]							

Notes:
[a] Peak hour curb lane vehicle volume.
[b] Average daily vehicle volume per lane.
[c] Includes drainage grates and railroad crossings.
[d] Variable contributes to a composite "location factor."
[e] Presence of paved shoulder.
[f] Presence of paved shoulder or bicycle lane.
[g] 15-minute directional vehicle volume per lane.
[h] Utilizes an "average effective curb lane width."
[i] Rates suitability by type or presence of bicycle facility (e.g., on-street vs. off-street vs. none).

4

Table 5.1 – Summary of bicycling suitability methodologies (continued)

Methodology \ Input Variables	Traffic Volume Per Lane	Curb Lane Width	Vehicle Speed	Speed Limit	Pavement Type/Condition	Parking/Turn Lanes	Grades	Sight Distance/Visibility	Driveway Frequency	Adjacent Land Use	Signalization/Intersections	Heavy Vehicles	Vehicle LOS	Maintenance	TDM/Multimodal Support	Provision/Type of Facility	Cyclist Input	Passing/Meeting Frequency	Service Volumes	Bicycle Density	Curve Radius	Total Delay	Average Bicycle Speed
City of Austin Bicycle Map[j] (Ref. 15)	✓	✓	✓		✓		✓	✓			✓					✓[f]	✓						
Middlesex County, New Jersey Bicycle Map (Ref. 16)		✓		✓																			
Gainesville Mobility Plan (Ref. 17)			✓[h]			✓			✓				✓[l]	✓	✓	✓[m]							
Bicycle Suitability, UNC (Ref. 18)	Research in progress.																						
Capacity-Based Level of Service Criteria																							
Bicycle Path LOS, Botma (Ref. 19)																		✓	✓				
Bicycle LOS, Navin (Ref. 20)							✓													✓			
Bicycle LOS, NCSU (Ref. 21) Uninterrupted																		✓					
Interrupted																					✓		
Combined																							✓

Notes: [j] All input variables were qualitative in nature (e.g., high vs. moderate vs. low).
[h] Speed differential between vehicles and bicycles.
[l] Vehicle level of service in adjacent lanes and/or number of lanes.
[m] Presence of wide outside lane or off-street facility.

Of these methodologies, the suitability-based level of service criteria considers the greatest number of factors in making the suitability determination. Capacity based level of service criteria, while considering a more limited number of factors, is the only methodology, which includes bicycle density and service volume, although often excluding other important factors. All methodologies aim to gauge the safety and comfort of bicyclists on the road, and no methodology has been identified as the most accurate determinant of suitability.

Bicycle Stress Level

The bicycle stress level criteria are intended to measure the level of comfort experienced by the bicyclist on their route. Because there are only three criteria for determining bicycle stress level, ease of use is a significant selling point for the stress level methodology. The methodology is easily explained to the layperson, and can be used to produce stress level maps of bicycle routes. Additionally, data used in stress level determination can be easily collected in a relatively limited amount of time. While bicycle stress level criteria may be appealing in their simplicity, the methodology has not been statistically proven when compared to bicyclists' actual experience. However, such comparison has shown a significant relationship between the amount of stress perceived while on the bicycle and the bicyclists' skill level and amount of experience.

Roadway Condition Index

Modified from the earlier Bicycle Suitability Rating, the Roadway Condition Index (RCI) was developed by planners in Broward County, Florida to assess the bicycle suitability of their major streets and highways. Using the RCI, the Florida planners have developed color-coded maps depicting the existing and proposed bicycle suitability of their streets. The maps show streets most in need of improvements, which allows for the prioritization of improvement projects.

Other Florida planners made later amendments to the RCI resulting in the Modified Roadway Condition Index (MRCI), also known as the Epperson-Davis modification. The modification primarily adjusted criteria to give them greater or lesser weight. For example, the MRCI places greater weight on vehicle speeds along narrow roadways.

Bicycle Level of Service

Developed by Bruce Landis, the Bicycle Level of Service (BLOS) Model has been applied by numerous departments of transportation in efforts to identify the quality of

service currently existing for bicyclists.[8] A refined version of his earlier Interaction Hazard Score, the BLOS employs such factors as roadway width, bike lane width, traffic volume, pavement surface condition, motor vehicle speed and type and parking configurations. Each factor is weighted to most accurately reflect the level of significance it has in the bicyclists' overall experience. In testing the accuracy of the BLOS model, Landis found that factors like the striping of the bike lane and the width of the striped section were reliable indicators of level of service. Landis also determined the significance of pavement condition in the bicyclists' experience to be greater than previously thought. The BLOS model allows its users to score the environments they are modeling and assign a level of service grade of A to F. The BLOS model is further detailed in the BLOS Formula section of this chapter.

Bicycle Compatibility Index

Most recently, the Federal Highway Administration has developed a Bicycle Compatibility Index (BCI) to determine the compatibility of an environment for bicycling.[9] Similar to the BLOS, the BCI utilizes lane width, traffic speed, traffic volume and presence of on-street parking to determine suitability. However, the BCI was designed to evaluate mid-block locations and does not account for major intersections. This means that the BCI may be particularly suited to evaluate certain locations, while others may be better served by the BLOS. Some BCI users may simply amend the index to meet their needs, as the Missouri Department of Transportation has done after finding that the needs of bicyclists on rural roads were not adequately addressed by the original BCI.[10] The BCI is also available for download in workbook form.

Bicycle Level of Service (BLOS) Formula

The previous sections share the range of tools available for assessing bicycling suitability. Though only one method out of many, BLOS has a universally applicable formula. The BLOS formula is further detailed below to expose transportation planners and engineers to its application.

BLOS factors concern the safety and comfort level of bicyclists, employing common roadway and traffic data. Formula factors include (common data):

- Effective travel width for bicyclists (driving lane and bike lane widths)
- On-street parking encroachments (parking lane widths)
- Volume of motor vehicles (average daily traffic)
- Speed of traffic (posted and observed speeds)

[8] Landis, Bruce W. et.al. "Real-Time Human Perceptions: Toward a Bicycle Level of Service" *Transportation Research Record 1578,* (Transportation Research Board, Washington DC, 1997).
[9] Federal Highway Administration, *The Bicycle Compatibility Index: A Level of Service Concept, Implementation Manual* (1998).
[10] http://www.mobikefed.org/files/BLOS-BCI-CBF-IDOTx4.xls

- Proportion of heavy vehicles (observed volume share)
- Pavement surface condition (applied rating scales)

The Bicycle Level of Service Model combines these cyclist comfort and safety factors into a formula. The formula applies coefficients, logarithms and exponents to variable factors based on their studied relationship to bicycling stress levels.

$$a_1*\ln(Vol_{15}/L) + a_2*SP_t(1+10.38HV)^2 + a_3(1/PC_5)^2 - a_4(W_e)^2 + C$$

Vol_{15} = volume of directional traffic in 15 minutes time period
L = total number of *through* lanes
SP_t = effective speed limit (see below)
SP_t = $1.12\ln(SP_P-20) + 0.81$
SP_P = Posted speed limit
HV = percentage of heavy vehicles
PC_5 = FHWA's five-point surface condition rating (or equivalent rating recalculated on a 5-point scale)
W_e = average effective width of outside through lane (feet)

Coefficients		*T-Statistics*
A_1	= 0.507	5.689
A_2	= 0.199	3.844
A_3	= 7.066	4.902
A_4	= 0.005	9.844
C	= 0.760	n/a

The lower the score produced from the BLOS formula, the lower the stress calculated for bicycling, and thus, higher level of service grade. The table below shares the range of BLOS formula scores and their corresponding grade.

BLOS Score	***LOS Grade***
≤ 1.5	A
> 1.5 and ≤ 2.5	B
> 2.5 and ≤ 3.5	C
> 3.5 and ≤ 4.5	D
> 4.5	F

To better understand how the variables influence BLOS, an *example street* is shared. Notice how the example street mirrors typical conditions.

Example Street
A two-lane road with 12,000 vehicles daily, 12-foot lanes, good pavement condition, 40 mph posted speed limit could score a resulting BLOS formula score of 4.1, or level D.

As shown in the formula and example, effective lane width is an important factor. To show the impact this variable has on the formula, the table below shows the effects of lane width and bike lane striping on BLOS.

Example of Effects of Lane Width and Lane Striping on BLOS

Through Lane (Bike Lane)	BLOS	% Change in "stress"
W_t = 10 ft	4.4	5 % increase
W_t = 11 ft	4.3	3 % increase
W_t = 12 ft – "example street" --------	4.1 ----------	no change
W_t = 13 ft	4.0	3 % reduction
W_t = 14 ft	3.9	6 % reduction
Wt = 15 ft (Wl = 3 ft)	3.7 (3.2)	9 % (22 %) reduction
Wt = 16 ft (Wl = 4 ft)	3.6 (2.9)	13 % (31 %) reduction
Wt = 17 ft (Wl = 5 ft)	3.4 (2.5)	17 % (41 %) reduction
Wt = 18 ft (Wl = 6 ft)	3.2 (2.0)	21 % (52 %) reduction

Applicability of Bicycling Suitability Models

Determining bicycling suitability can provide timely information for decision makers needing to prioritize improvement projects, update existing bicycle network plans, and generally provide bicyclists in their region with the best facilities and most relevant route information. The ability to model suitability for future developments can aid in long term planning efforts as well as in evaluating and refining designs for bicycle elements of proposed developments. Determining bicycle suitability can aid in developing the best possible plans for the future. However, such plans do not evolve without initial investments. All bicycle suitability models require the initial outlay of time, and possibly money, to collect the data, which will fill the models.

WALKING SUITABILITY

The suitability of walking environments is often determined in a more fundamental manner than the suitability of bicycling environments. Outside of the Pedestrian Level of Service Model, which went through numerous incarnations before reaching its current state, walking suitability has largely been determined by generalized surveys and checklists.

Walkable America Checklist

The Partnership for a Walkable America has made significant inroads with their *Walkable America Checklist*.[11] Easy to use, the *Checklist* has been digitized and automated by the Robert Wood Johnson Foundation. Users can input information about their walking experience, covering topics such as safety, sidewalk conditions and traffic conditions. Upon completion of the checklist, users are returned a percentage walkable rating. While the *Checklist* is accessible, the questions it poses are simplified and provide no capacity for modeling future walking environments.

Community Assessment Tool

The National Center for Bicycling and Walking is currently in the process of developing a more extensive checklist, the *Community Assessment Tool (CAT)*, to evaluate walking and bicycling environments.[12] The *CAT* is a more thorough checklist, but still provides little quantification of walking suitability. The National Center for Bicycling and Walking currently has a beta version of their *CAT* available for testing. Checklists, with their ease of use, may work well when employed by community outreach efforts to gauge the popular perception of the existing walking environment.

Pedestrian Level of Service

The Pedestrian Level of Service (PLOS) Model, also developed by Bruce Landis, has emerged as the primary determinant of suitability for pedestrian environments.[13] The PLOS Model is influenced by the work of Dan Burden which outlines the steps necessary to develop walkable communities. The PLOS Model incorporates many of Burden's steps as variables in the Model's formula. The PLOS Model intends to identify factors influencing the degree of safety and comfort that pedestrians feel while in the specific environment. Landis combined earlier methods of determining pedestrian suitability to develop the PLOS Model. These methods of evaluating the pedestrian environment focused on three factors: 1) sidewalk capacity, 2) quality of the walking environment, and 3) the pedestrian perception of safety or comfort with respect to motor vehicles. The PLOS model, like its bicycle counterpart, includes factors like walk area width and volume, peak hour pedestrian volume, travel patterns, ADA compatibility, aesthetic quality, number of lanes of traffic, speed and volume of traffic, heavy vehicle volumes and intersection wait time. Application of the model produces a score, ranging from A to E, with E considered not suitable for pedestrian travel.

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[11] http://www.walkableamerica.org

[12] http://www.bikewalk.org

[13] Landis, Bruce W., Venkat R. Vattijuti, Russell M. Ottenberg, Douglas S. Mc Leod, and Marten Guttenplan. *Modeling the Roadside Walking Environment: A Pedestrian Level of Service"* (Florida Department of Transportation, 2000).

Pedestrian Level of Service (PLOS) Formula

The previous sections share the range of tools available for assessing walking suitability. Though only one method out of many, PLOS has a universally applicable formula. The PLOS formula is further detailed below to expose transportation planners and engineers to its application.

PLOS factors concern the safety and comfort level of pedestrians, employing common roadway and traffic data. Formula factors include (common data):

- Lateral separation from street
  - Width of sidewalk (through zone width)
  - Buffers between sidewalk and motor vehicles (furnishing zone)
  - Presence of barriers and on-street parking (linear percent)
  - Width of outside travel lane (through lane width)
  - Width of shoulder and/or bike lane (combined width)
- Motor vehicle traffic volume (average daily traffic)
- Motor vehicle speed (posted and observed speeds)

The Pedestrian Level of Service Model combines these pedestrian comfort and safety factors into a formula.

$$1.2021*\ln(W_{ol} + W_l + f_p*\%OSP + f_b*W_b + f_{sw}*W_s) + 0.253*\ln(vol_{15}/L) + 0.0005*SPD^2 + 5.3876$$

W_{ol} = width of outside lane (feet)
W_l = width of shoulder or bike lane (feet)
f_p = on-street parking coefficient (=0.20 if present)
%OSP = percent of segment with on-street parking
f_b = buffer-area barrier coefficient (=5.37 for street trees)
W_b = buffer width (distance between edge of pavement and sidewalk)
f_{sw} = sidewalk presence coefficient (=6 – 0.3*W_s)
W_s = width of sidewalk (feet)
Vol_{15} = average traffic during a fifteen-minute period
L = total number of *through* lanes
SPD = average running speed of motor vehicle traffic (mph)

The lower the score produced from the PLOS formula, the lower the stress calculated for walking, and thus, higher level of service grade. The table below shares the range of PLOS formula scores and their corresponding grade.

PLOS Score	LOS Grade
≤ 1.5	A
> 1.5 and ≤ 2.5	B
> 2.5 and ≤ 3.5	C
> 3.5 and ≤ 4.5	D
> 4.5	F

To better understand how the variables influence PLOS, an *example street* is shared. Notice how the example street mirrors typical conditions.

Example Street
A two-lane undivided road with 12-foot lanes, no shoulder, 5-foot sidewalk, 10,000 ADT, 3% heavy trucks, street trees 40 feet on-center, and no on-street parking.

Such a street could produce a PLOS score of anywhere from A to F, depending on two remaining factors, buffer width and motorist speed. To show the impact these two variables have on the formula, the table below shows the effects of buffer width and motorist speed on PLOS.

Speed (mph)	Buffer Width (feet)						
	0	1	2	4	6	8	10
20	D	C	C	B	B	B	A
25	D	D	C	C	B	B	A
30	D	D	C	C	B	B	B
35	F	D	D	C	B	B	B
40	F	D	D	C	C	B	B

Applicability of Walking Suitability Models

In the process of making more exact determinations of suitability, the modeling capacity of the PLOS may prove most useful. However, the user-friendly checklists may be the best choice for a non-technical audience or for cursory evaluation of pedestrian environments.

CHAPTER 6 – MODEL ORDINANCES FOR BICYCLE SUPPORT FACILITIES

One of the most influential elements in the development of usable bicycling and walking transportation systems is a set of bicycling- and walking-friendly ordinances. Tremendous influence can be exerted by municipal governments as it relates to development and land-use ordinances. This chapter synthesizes best-practices in the types of ordinances that impact the bicycling and walking environments and, where appropriate, set forth numerical guidance for each type. The sample ordinances are provided as illustrations of the subject matter worthy of discussion in the development of bicycling and/or walking ordinances. Municipalities should use this guidance to develop customized ordinances in accordance with local protocols as well as the level of impact desired.

MODEL ORDINANCE FOR SITE PLAN REQUIREMENTS

Site plans submitted for municipal review shall contain all the elements necessary to demonstrate that requirements for bicycling and walking transportation are being fulfilled, and shall include but not be limited to the following:

(1) Location, dimensions and number of typical, compact and disabled parking spaces, including aisles, landscaped areas, wheel bumpers, directional signs and striping.

(2) On-site vehicular and pedestrian circulation.

(3) Access to streets, alleys and properties to be served, including the location and dimensions of existing and proposed curb cuts.

(4) Grading, drainage, surfacing and subgrading details.

(5) Exterior lighting, including the type, height and area of illumination.

(6) Location, type, and number of bicycle racks, and total resulting bicycle parking spaces.

MODEL ORDINANCE FOR BICYCLE PARKING

The number of bicycle parking spaces shall be provided for specified uses as set forth in Article 1, and shall meet the standards set forth in Article 2. Bicycle parking provided in parking lots to meet these requirements shall be visible and accessible, and not impede on-site pedestrian circulation.

Article 1 Bicycle Parking Standards

(1) Purpose

Bicycle parking is required in most zones and for most uses to encourage the use of bicycles by providing safe and convenient places to park and store bicycles. The required number of spaces is lower for uses that do not tend to attract bicycle riders and higher for those that do. For some uses, bicycle parking requirements are increased because of the opportunities to encourage more employee, student or customer-related bicycle use.

The main purpose of these design standards is to ensure that bicycle parking is conveniently located and provides sufficient security from theft and damage. Long-term bicycle parking space requirements are intended to accommodate employees, commuters, students, residents and others who expect to leave their bicycles for more than two hours. Short-term bicycle parking spaces accommodate visitors, customers, messengers, and others expected to depart within approximately two hours.

(2) Bicycle Parking Standards

(a) The minimum number of bicycle parking spaces for each principal use on the site is four spaces. Specific requirements for all uses are contained in Article 2. Additional bicycle parking spaces may be required at common use areas. Fractional numbers of spaces shall be rounded up to the next whole space.

(b) Each bicycle parking space shall be at least 2’ by 6’ with an overhead clearance of 7’, and with a 5’ access aisle beside or between each row of bicycle parking, and between parked bicycles and a wall or structure. The dimensions of commonly used bicycle racks are illustrated in Figure 6.1. Bicycles may be tipped vertically for storage but not hung above the floor.

(c) All required long-term bicycle parking spaces shall be sheltered from precipitation by means of a roof, canopy, building overhang or other method. Short-term bicycle parking is not required to be sheltered.

(d) Direct access from the bicycle parking to the public right-of-way shall be provided by means of access ramps, if necessary, and pedestrian access from the bicycle parking area to the building entrance also shall be provided.

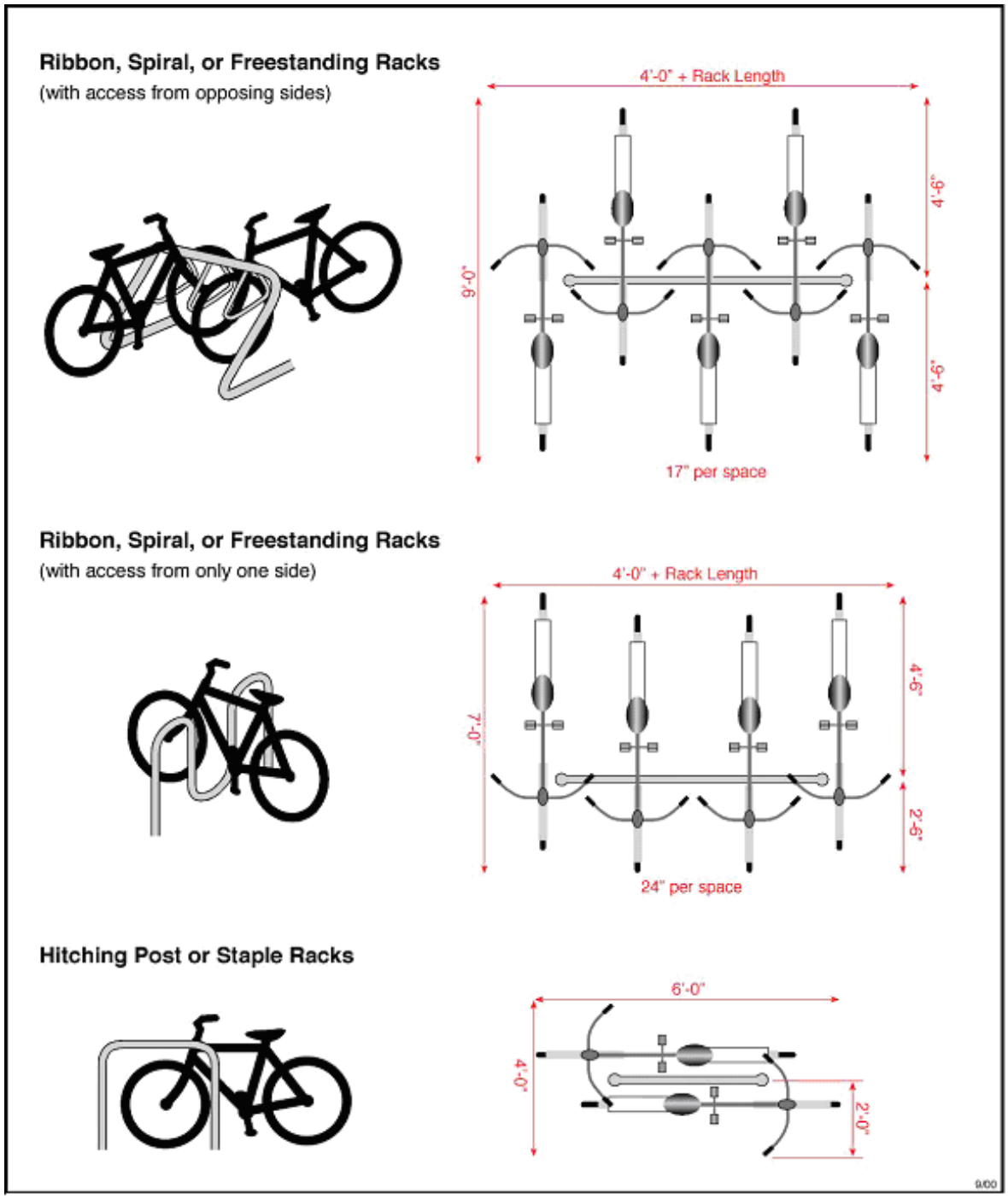


Figure 6.1 – Dimensions for commonly used bicycle racks

(3) Bicycle Parking Location and Security

(a) Bicycle parking shall consist of a securely fixed structure that supports the bicycle frame in a stable position without damage to wheels, frame or other components and that allows the frame and both wheels to be locked to the rack with the bicyclist's own locking device. Each required bicycle parking space shall be accessible without removing another bicycle.

(b) Bicycle parking shall be provided within a convenient distance of, and clearly visible from, the main entrance to the building as determined by the city, but it shall not be farther than the closest automobile parking space, excluding disabled parking. Bicycle parking racks, shelters or lockers must be securely anchored to the ground or to a structure.

(c) Bicycle parking shall be separated from motor vehicle parking by a barrier, curb or sufficient distance to prevent damage to parked bicycles by moving vehicles.

(d) Where bicycle parking facilities are not directly visible and obvious from the public right(s)-of-way, sign(s) shall be provided to direct bicyclists to the parking. Directions to sheltered facilities inside a structure may be posted or distributed by the employer, as appropriate.

(e) Bicycle parking may be located inside a building on a floor that has an outdoor entrance open for use and floor location that does not require stairs to access the space; exceptions may be made for parking on upper stories within multi-story residential buildings. Bicycle parking shall be provided on the ground floor of the structure unless an elevator is easily accessible to an approved bicycle storage area.

(f) Bicycle parking and bicycle racks shall be located to avoid conflict with pedestrian movement and access. Bicycle parking may be located on the public sidewalk or within the public right-of-way where this still leaves a minimum of 5' between the parked bicycle and the storefront and does not conflict with pedestrian accessibility.

Article 2 Bicycle Parking Numerical Standards

The minimum number of required bicycle parking spaces is presented in Table 6.1. In all cases, the minimum number of parking spaces is four, except where otherwise indicated.

Table 6.1 – Bicycle parking requirements by use type		
Uses	**Required Bicycle Parking** (Minimum 4 bicycle spaces required unless -0- is indicated)	**Type and % of Bicycle Parking**
Accessory Uses		
All uses in this category	-0-	NA
Agricultural, Resource Production and Extraction		
All uses in this category	1 per each 600 sq ft of floor area	100% short term
Eating and Drinking Establishments		
All uses in this category	1 per each 600 sq ft of floor area	25% long term 75% short term
Education		
Schools, Business or Specialized Educational Training (excludes driving instruction)	1 per 5 full-time students	25% long term 75% short term
Schools, Driving (including use of motor vehicles)	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Schools, Public or Private (elementary through high school)	1 per 8 students	25% long term 75% short term
Universities or Colleges	1 per 5 full-time students	25% long term 75% short term
Entertainment and Recreation		
Amusement Centers (arcades, pool tables, etc.)	1 per each 400 sq ft of floor area	25% long term 75% short term
Arenas, both indoors and outdoors	1 per 20 seats	25% long term 75% short term
Artist Galleries/Studios	1 per each 500 sq ft of floor area	25% long term 75% short term
Athletic Facilities and Sports Clubs		
Playing Courts	10% of auto spaces (minimum of 4)	25% long term 75% short term
Viewing Areas	1 per each 280 sq ft of floor area	25% long term 75% short term
Locker Rooms, Saunas, Whirlpools, Weight Rooms, or Gymnasiums	1 per each 750 sq ft of floor area	25% long term 75% short term
Lounge or Snack Bar Areas	1 per each 600 sq ft of floor area	25% long term 75% short term
Pro Shops or Sales Areas	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Swimming Pools	1 per each 2,000 sq ft of floor area	25% long term 75% short term
Athletic Field, Outdoor		
Ballet, Dance, and Gymnastic Schools/Academies/Studios	1 per each 400 sq ft of floor area	25% long term 75% short term
Bowling Alleys	1 per each lane	25% long term 75% short term
Clubs and Lodges of State or National Organization	1 per 20 fixed seats or 40 feet of bench length or every 200 sq ft where no permanent seats or benches are maintained in main auditorium	100% short term

Table 6.1 – Bicycle parking requirements by use type		
Uses	**Required Bicycle Parking** (Minimum 4 bicycle spaces required unless -0- is indicated)	**Type and % of Bicycle Parking**
Community and Neighborhood Centers	1 per 20 fixed seats or 40 feet of bench length or every 200 sq ft where no permanent seats or benches are maintained in main auditorium	25% long term 75% short term
Equestrian Academy and Stables	-0-	NA
Equestrian Trails	-0-	NA
Golf Course, Miniature Indoor	1 per each 400 sq ft of floor area.	25% long term 75% short term
Golf Course, Miniature Outdoor	1 per each 400 sq ft of floor area.	25% long term 75% short term
Golf Course, with or without country club	-0-	NA
Golf Driving Range	1 per each 400 sq ft of floor area	25% long term 75% short term
Libraries	1 per each 400 sq ft of floor area	25% long term 75% short term
Museum	1 per each 500 sq ft of floor area	25% long term 75% short term
Parks and Playgrounds	Per Willlamalane Park and Recreation District category list	
Race Tracks, including drag strips and go-cart tracks	1 per 20 seats	25% long term 75% short term
Theaters, Live Entertainment	1 per 20 seats	25% long term 75% short term
Theaters, Motion Picture	1 per 20 seats	25% long term 75% short term
Financial Services		
Automated Teller Machines (ATMs)	-0-	NA
Banks, Savings and Loan Offices, Credit Unions	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Government		
Government Services, not specifically listed in this or any other uses and permits table	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Lodging Services		
Bed and Breakfast Facilities	1 per 10 guest bedrooms	100% long term
Homeless Shelters	1 per 20 beds	75% long term 25% short term
Hotels, Motels, Youth Hostels and similar businesses providing overnight accommodations	1 per 10 guest bedrooms	25% short term 75% long term
Recreational Vehicle Parks, may include tent sites	-0-	NA
Manufacturing		
All manufacturing uses, excluding storage uses.	1 per each 3,000 sq ft of floor area	25% short term 75% long term
Storage	-0-	NA
Medical, Health, and Correctional Services		
Blood Banks	1 per each 3,000 sq ft of floor area	100% short term

Table 6.1 – Bicycle parking requirements by use type		
Uses	**Required Bicycle Parking** (Minimum 4 bicycle spaces required unless -0- is indicated)	**Type and % of Bicycle Parking**
Correctional Facilities, excluding Residential Treatment Centers	1 per 20 beds	25% short term 75% long term
Hospitals, Clinics, or other Medical Health Treatment Facilities (including mental health) in excess of 10,000 square feet of floor area	1 per each 3,000 sq ft of floor area	25% short term 75% long term
Hospitals, Clinics or other Medical Health Treatment Facilities (including mental health) 10,000 square feet or less of floor area.	1 per each 3,000 sq ft of floor area	25% short term 75% long term
Laboratories--Medical, Dental, X-Ray.	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Meal Services, Non-Profit	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Nursing Home.	1 per 15 beds	75% long term 25% short term
Plasma Centers	1 per 15 beds	75% long term 25% short term
Residential Treatment Center	1 per 15 beds	75% long term 25% short term
Motor Vehicle-Related Uses		
Car Washes	-0-	NA
Parking Areas	-0-	NA
Parking Garages, up to two levels	10% of auto spaces	100% long term
Parking Garages, three or more levels	10% of auto spaces	100% long term
Parts Stores	1 per each 3,000 sq ft of floor area	100% short term
Recreational Vehicles and Heavy Truck, Sales/Rental/Service	1 per each 4,000 sq ft of floor area	100% short term
Repair, includes paint and body shops	1 per each 6,000 sq ft of floor area	100% short term
Sales, excluding recreational vehicles and heavy trucks	1 per each 6,000 sq ft of floor area	100% short term
Service Stations, includes quick servicing	1 per each 6,000 sq ft of floor area	100% short term
Tires, Sales/Service	1 per each 6,000 sq ft of floor area	100% short term
Transit Park and Ride, Major or Minor, only when shared parking arrangement with other permitted use	Minimum 10 spaces, or 10% of auto spaces, whichever is greater	25% long term 75% short term
Transit Park and Ride, Major or Minor	Minimum 10 spaces, 10% of auto spaces, whichever is greater	25% long term 75% short term
Transit Station, Major or Minor	Minimum 10 spaces, 10% of auto spaces, whichever is greater	25% long term 75% short term
Office Uses		
All Office Uses	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Personal Services		
All Personal Services Uses, except Barber, Beauty, Nail, Tanning Shops and Laundromats	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Barber, Beauty, Nail, Tanning Shops	1 per each 2,000 sq ft of floor area	25% long term 75% short term

Table 6.1 – Bicycle parking requirements by use type		
Uses	**Required Bicycle Parking** (Minimum 4 bicycle spaces required unless -0- is indicated)	**Type and % of Bicycle Parking**
Laundromats, Self-Service	1 per each 2,000 sq ft of floor area	25% long term 75% short term
Religious Services		
Churches, Synagogues, and Temples, including associated residential structures for religious personnel	1 per 20 fixed seats or 40 feet of bench length or every 200 sq ft where no permanent seats or benches are maintained in main auditorium (sanctuary or place of worship)	100% short term
Residential		
One-Family Dwelling	-0-	NA
Secondary Dwelling (either attached or detached from primary one-family dwelling on same lot)	-0-	NA
Rowhouse (one-family on own lot attached to adjacent residence on separate lot with garage or carport access to the rear of the lot)	-0-	NA
Duplex (two-family attached on same lot)	-0-	NA
Triplex (three-family attached on same lot)	1 per dwelling.	100 % long term
Four-Plexes (four-family attached on same lot)	1 per dwelling.	100 % long term
Multiple Family (three or more dwellings on same lot)	1 per dwelling.	100% long term
Manufactured Home Park	-0-	NA
Controlled Income and Rent Housing where density is above that usually permitted in the zoning yet not to exceed150%	1 per dwelling.	100% long term
Assisted Living & Day Care		
Assisted Living (five or fewer people living in facility and three or fewer outside employees on site at any one time)	-0-	NA
Assisted Living (six or more people living in facility)	1 per 10 employees	100% long term
Day Care (three - 12 people served)	-0-	NA
Day Care (13 or more people served)	1 per 10 employees	100% long term
Rooms for Rent		
Boarding and Rooming House	1 per guest room.	100% long term
Campus Living Organizations, including Fraternities and Sororities	1 for each 2 occupants for which sleeping facilities are provided.	100% long term
Single Room Occupancy	1 per dwelling (4 single rooms are equal to 1 dwelling)	100% long term
University and College Dormitories	1 for each 2 occupants for which sleeping facilities are provided	100% long term
Trade (Retail and Wholesale)		
Agricultural Machinery Rental/Sales/Service	1 per each 4,000 sq ft of floor area	25% long term 75% short term
Appliance Sales/Service	1 per each 6,000 sq ft of floor area	25% long term 75% short term

Table 6.1 – Bicycle parking requirements by use type		
Uses	**Required Bicycle Parking** (Minimum 4 bicycle spaces required unless -0- is indicated)	**Type and % of Bicycle Parking**
Boats and Watercraft Sales/Service	1 per each 6,000 sq ft of floor area	25% long term 75% short term
Building Materials and Supplies	1 per each 6,000 sq ft of floor area	25% long term 75% short term
Convenience Stores	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Equipment, Light, Rental/Sales/Service	1 per each 4,000 sq ft of floor area	25% long term 75% short term
Equipment, Heavy, Rental/Sales/Service includes truck and tractor sales	1 per each 4,000 sq ft of floor area	25% long term 75% short term
Furniture and Home Furnishing Stores	1 per each 6,000 sq ft of floor area	25% long term 75% short term
Garden Supply/Nurseries	1 per each 6,000 sq ft of floor area	25% long term 75% short term
Garden Supply/Nurseries, including feed and seed stores	1 per each 6,000 sq ft of floor area	25% long term 75% short term
General Merchandise (includes supermarkets and department stores)	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Hardware/Home Improvement Stores	1 per each 6,000 sq ft of floor area	25% long term 75% short term
Liquor Stores	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Manufactured Dwelling Sales/Service/Repair	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Medical Equipment and Supplies	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Office Equipment and Supplies	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Plumbing Supplies and Services	1 per each 6,000 sq ft of floor area	25% long term 75% short term
Regional Distribution Center	1 per each 6,000 sq ft of floor area	25% long term 75% short term
Retail Trade when secondary, directly related, and limited to products manufactured, repaired, or assembled on development site	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Storage Facilities, Household/Consumer Goods	-0-	NA
Storage Facilities, Household/Consumer Goods, enclosed	-0-	NA
Shopping centers with at least two or more businesses and at least 50,000 square feet of gross floor area.	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Specialty Stores (examples include gift, computer or video store)	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Storage Facilities	-0-	NA
Warehouse Commercial Sales	1 per each 6,000 sq ft of floor area	25% long term 75% short term

Table 6.1 – Bicycle parking requirements by use type		
Uses	**Required Bicycle Parking** (Minimum 4 bicycle spaces required unless -0- is indicated)	**Type and % of Bicycle Parking**
Utilities and Communication		
All Uses in Utilities and Communication Category, except for Broadcasting Studios	-0-	NA
Broadcasting Studios, Commercial and Public Education	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Other Commercial Services		
Building Maintenance Services	1 per each 3,000 sq ft of floor area	100% short term
Catering Services	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Cemeteries, includes crematoria, columbaria, and mausoleums	-0-	NA
Civic, Social, Fraternal Organizations	1 per 20 fixed seats or 40 feet of bench length or every 200 sq ft where no permanent seats or benches are maintained in main auditorium	100% short term
Clubs and Lodges of State or National Organizations	1 per 20 fixed seats or 40 feet of bench length or every 200 sq ft where no permanent seats or benches are maintained in main auditorium	25% long term 75% short term
Collection Center, Collection of Used Goods	-0-	NA
Garbage Dumps, sanitary landfills	-0-	NA
Heliports and Helistops	-0-	NA
Home Occupations	-0-	NA
Kennel	-0-	NA
Model Home Sales Office	-0-	NA
Mortuaries	1 per each 280 sq ft in main auditorium	100 % short term
Photographers' Studios	1 per each 3,000 sq ft of floor area	100 % short term
Picture Framing and Glazing	1 per each 3,000 sq ft of floor area	100 % short term
Printing, Blueprinting, Duplicating	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Publishing Services	1 per each 3,000 sq ft of floor area	25% long term 75% short term
Temporary Activities	-0-	NA
Train Stations	1 per each 3,000 sq ft of floor area	75% long term 25% short term
Upholstery Shop	1 per each 3,000 sq ft of floor area	100% short term
Veterinarian Services	1 per each 6,000 sq ft of floor area	100% short term
Wildlife Care Center	1 per each 6,000 sq ft of floor area	100% short term

MODEL ORDINANCE FOR BICYCLE COMMUTER FACILITIES

Changing rooms and showers shall be provided in all new construction or reconstruction of buildings with 25 or more employees and that require the provision of long-term bicycle parking.

MODEL ORDINANCE FOR BICYCLE/PEDESTRIAN ACCESSWAYS

(1) Purpose

(a) Accessways are intended to link the following uses: a residential area, neighborhood activity center, an industrial or commercial center, a transit facility, a park, a school, open space, or a trail facility.

(b) Public street connections for cars, and bicycle and pedestrian circulation are preferable to accessways. Accessways should only be used to ensure connectivity to nearby activities in areas where no other public street options are available.

(c) Off-street bicycle paths in excess of 400 feet in length are not considered accessways.

(2) Criteria—Accessways shall be provided in the following situations:

(a) Bicycle and pedestrian connections are required between discontinuous street rights-of-way, where a new street is not feasible; through excessively long blocks; or wherever the lack of street continuity creates inconvenient or out of direction travel patterns for local pedestrian or bicycle trips.

(b) Pedestrian and bicycle access shall be provided as follows for all development:

1. To provide direct access to nearby bicycle/pedestrian destinations, transit streets or transit facilities to connect with all existing or approved accessways that abut the development site.

2. To provide direct connection of cul-de-sacs and dead end streets to the nearest available street or pedestrian/bicycle destinations.

3. To provide connections from local or cul-de-sac streets to collector or arterial streets.

4. Spacing between full street or accessway connections shall be no more than 330’ for residential and mixed-use development, and no more than 530’ for commercial and industrial development.

(3) Accessway Type and Purpose. When required, one of the following accessway types shall be provided as deemed appropriate by the city during development review:

(a) Neighborhood Accessway: Provides neighborhood connections through blocks, links various uses, and promotes direct non-motorized travel.

(b) Public/Private Integrated Accessway: Provides dual purpose as part of a private, on-site circulation pattern; with a public easement to link proximate streets, uses, and activities.

(c) Park/Natural Area Accessway: Provides neighborhood access to park and natural areas.

(4) An exception may be made when the city determines that construction of a separate accessway is not feasible due to physical or jurisdictional constraints. Such evidence may include, but is not limited to:

(a) Other Federal, State, or Local requirements prevent construction of an accessway;

(b) The nature of abutting existing development makes construction of an accessway impractical;

(c) The accessway would cross an area affected by a special purpose district overlay and the accessway is incompatible with the purposes of the special purpose district; and/or

(d) The accessway would cross topography where slopes exceed 30%.

(5) Street Entry: Except at the end of a cul-de-sac, entry points shall align where possible with safe pedestrian crossing points along adjacent streets and with adjacent street intersections.

(6) Accessways are subject to the following Design Standards:

(a) All rights-of-way for pedestrian and bicycle accessways shall be dedicated to the city for public use or may be approved as public access easements on private property. Accessways shall be maintained as part of the public right-of-way, or by the underlying landowner if constructed as public easements over private land.

(b) Right-of-Way or Easement Width

1. Shall be 10 to 12 feet.

2. The city may approve accessways exceeding 200 feet in length, with adequate right-of way or easement width to provide for safe pedestrian and bicycle travel.

(c) A minimum 15-foot width is required for accessways that also provide for public utility corridors. If an accessway also provides secondary fire access, a minimum 20-foot width is required.

(7) Approved easement accessways for public/private integrated use may be reduced to a minimum 8-foot width.

(a) A clear-vision triangle, the same as for a Residential Driveway, shall be provided at the ends of all accessways. Accessways shall be straight enough to allow both ends of the accessway to be seen from the adjacent public streets. On-street parking shall be prohibited within 15 feet of the intersection of an accessway and a public street to preserve safe sight distance.

(b) Accessways shall be lighted by pedestrian-scale lighting with a maximum standard height of 12 feet along the accessway unless existing on-site lighting or adjacent street lighting provides adequate accessway illumination as approved by the city. Lighting shall not shine into adjacent residences.

(c) The construction of stairways shall be avoided whenever possible. Where the path grade would exceed 12% slope, an accessway will be constructed as stairs for pedestrians. Based on local conditions, alternatives to stairs could be considered, including the use of switchbacks and alternative materials. If stairways are needed, they shall be at least 5 feet wide with handrails on both sides.

(d) Fencing & Screening: When required for buffering, accessways shall be fenced and screened along adjacent property lines. The area between the pathway and fences shall be planted with a combination of ground cover or low growing shrubs that will reach no more than 2 feet at maturity.

(e) Accessways shall be designed to prohibit motorized traffic.

(f) Accessway surfaces shall be designed to drain stormwater run-off to the side or sides of the accessway. Maximum cross slope shall be 2%.

(g) Pavement width shall generally be 10 to 12 feet. The cirector may approve an accessway of minimum 8-foot width based on specific site constraints. Park/natural area accessways may be hard or soft surface, based on natural area constraints and anticipated level of use.

MODEL ORDINANCE FOR BICYCLE/PEDESTRIAN TRAILS

(1) Developments abutting existing or proposed bikeways shall include provisions for the future extension of these facilities through the dedication of easements or rights of way. The developer shall bear the cost of bikeway improvements except when other property owners are benefited, other equitable means of cost distribution may be approved by the city. Minimum width for striped on-street bike lanes shall be 5'. Independent shared-use paths shall have a minimum width of 12' for two-way traffic.

(2) Developments abutting existing or proposed pedestrian trails identified shall provide for the future extension of such pedestrian trails through the dedication of easements or right of way. The developer shall be responsible for trail surfacing, as approved by the city, as appropriate. Trails shall be constructed to allow for adequate drainage and erosion control.

(3) In dedicating an easement or right-of-way for public trails, the owner shall demonstrate compliance with the following criteria:

(a) Trail easements or rights-of-way shall be 25'. This standard may be reduced if the city finds this standard to be impractical due to physical constraints. In all cases the adopted easement or right-of-way must accommodate trails built to the standards adopted by the city.

(b) Trail easements or rights-of-way shall allow for future construction of trails.

(c) Trail easements or rights-of-way shall be located within a site in such a manner as to allow the trail to be buffered (by means of fences, landscaping, berms, etc.) from existing and proposed dwellings on the site and on adjacent properties, and to maintain the maximum feasible privacy for residents.

(d) Trail easements or rights-of-way shall be located within a site so that future trails construction will avoid parking and driveway areas and other activity areas which might conflict with pedestrian movements.

(e) Site area included within a trail easement or right-of-way shall be counted as a portion of the landscaped and open space area required for the proposed development.

ADDITIONAL ORDINANCE EXAMPLES

For additional examples of ordinances, please refer to the following resources:

BICYCLE PARKING

Madison (Wisconsin) *Bike Parking Ordinance*
http://www.btww.org/commuting/Images/ZoningLaw.pdf

Cambridge (Massachusetts) *Bicycle Parking Requirements*
http://www.massbike.org/lawlegis/pcamb.htm

Denver (Colorado) *Bicycle Parking Rules and Regulations*
http://www.massbike.org/lawlegis/pdenver.htm

Santa Cruz (California) *Bicycle Parking Ordinance*
http://www.massbike.org/lawlegis/pscruz.htm

Vancouver (Canada) *By-laws Regulating Bicycle Parking*
http://www.city.vancouver.bc.ca/engsvcs/parking/bylaws.htm
http://www.city.vancouver.bc.ca/commsvcs/Bylaws/parking/sec06.pdf

Eugene (Oregon) *Land Use Regulations 9.6100 Bicycle Parking Standards*
http://www.ci.eugene.or.us/Cityreco/Citycode/ch9 temp/
Select: General Standards for All Development.pdf

BICYCLE PARKING IN PARKING GARAGES

San Francisco Planning Code. *Article 1.5, Off-Street Parking and Loading. §155.2. Bicycle Parking Required in City-Owned Parking Garages and Privately Owned Parking Garages*.
http://www.amlegal.com/sanfran/viewcode.htm
http://www.sfbike.org/biking_resources/garage_bike_parking/requirements.html

SHOWERS

San Francisco Planning Code. *Article 1.5, Off-Street Parking and Loading. §155.3. Shower Facilities and Lockers Required in New Commercial and Industrial Buildings and Existing Buildings Undergoing Major Renovations.*
http://www.amlegal.com/sanfran/viewcode.htm

Palo Alto Municipal Code. *Title 18, Zoning. Chapter 18.43. §18.43.070(e) Special requirements*. This example is for CC Community Commercial Districts although other districts have similar guidelines.
http://www.city.palo-alto.ca.us/government/municipalcode.html

BICYCLE PARKING IN PRIVATE DEVELOPMENTS

Iowa City (Iowa) *Ordinance to Require Bicycle Parking for MultiFamily Residential and Commercial Uses*.
http://www.jccn.iowa-city.ia.us/~bic/pordinance.html

Sunnyvale (California) *Ordinance Pertaining to the Creation of Incentives to Provide Bicycle Support Facilities in Private Development*.
http://www.ci.sunnyvale.ca.us/reports/1997-02/ord2555-97.htm

CHAPTER 7 – MARKETING AND EDUCATION

Citizens and public officials are realizing that people want to be able to ride their bicycles and/or walk to destinations within and between their communities. Whether for exercise, a greater connection to their neighbors and neighborhoods, or just a slower pace, more people are choosing to look at bicycling and walking as a form of transportation. This chapter offers assistance for communities to gather support for implementation of a bicycling and walking transportation system.

Getting there can be challenging. Moving from a car-based (whether perceived or real) community to integrating a diversity of modes of transportation may represent significant change. Since fear of the unknown is often the first and greatest obstacle to change (or even new ideas), a timely, solid marketing and education plan is key for implementing a bicycling and walking transportation system.

How would communities benefit from an enhanced bicycling and walking transportation system? A U.S. Department of Transportation policy statement calls the level of bicycle and pedestrian access an "important indicator species" for health of the community and adds, "People want to live and work in places where they can safely and conveniently walk and/or bicycle." Most states and communities are now encouraging modes of transportation like bicycling, walking, and mass transit. Reasons relevant to implementing such a vision include:

- Saving lives by creating safer conditions for bicyclists and as a direct consequence improve the safety of all other road users. Research shows that increasing the number of bicyclists on the street improves bicycle safety.
- Enhancement of health and recreational opportunities, especially for children, and further contribute to fitness levels and quality of life in the community.
- Increased opportunities for residents of all ages to participate socially and economically in the community, regardless of income or ability. Greater choice of travel modes also increases independence, especially among seniors and children.
- Enhancement of public safety and security by increasing the number of "eyes on the street" and providing more options for movement in the event of emergencies, natural disasters, and major public events.
- Less damage to the environment and living things through reduced pollution and noise, reduction of greenhouse gases, and improvement of the quality of public spaces.
- A reduction in congestion by shifting short trips (the majority of trips in cities) out of cars. A good bicycling and walking transportation system can help facilitate bicycles, pedestrians and motor vehicles to co-exist and lessen congestion.
- A boost to the economy by creating a community that is an attractive destination for new residents, tourists and businesses.

Approach

Marketing and education efforts should focus on clearing public information obstacles by responding to typical questions and concerns with adequate facts, educational opportunities and sources of further information. A better informed public may be more supportive of an transportation system that routinely accommodates bicycling and walking if the discussion is based upon proper information rather than misinterpreted information. Furthermore, the discussion should be based on the bicycling and walking modes of transportation being an integral part of the overall transportation system, not as independent corridors. Bicycling and walking benefits extend to the entire population, not just to those who choose these transportation alternatives. The following are considered the ten (10) most typical subjects of discussion related to bicycling and walking in the public domain:

"Top 10" Discussion Items

- My community can not afford bicycle & pedestrian facilities
- Bicyclists and pedestrians do not pay taxes; why should we spend funds on bicycle & pedestrian facilities?
- Bicycling and walking facilities command additional space and in turn force vehicles to slow down
- People should ride and walk in our parks, not in or around traffic
- Bicycles do not belong on the road
- Bicyclists should ride as close to the edge of road as possible
- Bicycles belong on the sidewalk
- Bicyclists do not obey traffic laws
- It is too dangerous for bicycles and motor vehicles to share the road
- Busier lifestyles have lead to more active lifestyles

My community can not afford bicycle and pedestrian falilities.

Facts:

- In 1991, the Inter-modal Surface Transportation Act, (ISTEA) was signed into law. ISTEA created the Transportation Enhancement Program. The program mandates that all states spend at least 10% of highway funds on "enhancement" projects. Projects eligible for funds include improvements such as bicycling and walking facilities and landscaping and scenic beautification. In addition, the Surface Transportation Program, which is used for larger transportation improvements, also allows the funding of bicycling and walking transportation system accommodations.
- Under the 1998 continuation of the program, $95.4 million was made available for enhancement projects for fiscal years 1998-2003.
- The next iteration of the transportation bill, currently in discussions within the U.S. Congress, continues the funding of bicycling and walking facilities.
- The Missouri and Illinois departments of transportation have awarded funds to local entities (typically city or county governments) for bicycling and walking improvements through a competitive process.

Educational Opportunities:

- Since 1991, transportation projects receiving federal funding have required the consideration of the needs of bicycling and walking transportation. States benefit

from this stipulation by preserving aspects of their history, making communities more attractive, offering options for disabled citizens and providing safe bicycling and walking routes to schools.
- Design improvements needed to enhance the bicycling and walking environments are generally relatively inexpensive, when included in the original construction or re-construction of transportation facilities. Roads constructed to modern design standards often include sufficient space for accommodating bicycles and pedestrians.

Resources:
- Missouri Department of Transportation: www.modot.gov
- Illinois Department of Transportation: www.dot.state.il.us
- Pedestrian and Bicycle Information Center: www.pedbikeinfo.org

Bicyclists and pedestrians do not pay taxes. Why should we spend funds on bicycle and pedestrian facilities?

Facts:
- According to the Federal Highway Administration (FWHA), 92% of the funds for local roads come from property, income, and sales taxes. As citizens, bicyclists and pedestrians pay these taxes. Furthermore, most also own motor vehicles and therefore also pay fuel and other motor vehicle-related taxes.
- Bicycling and walking currently account for nearly ten percent of trips and thirteen percent of traffic fatalities nationwide. However, less than two percent of federal safety funding is currently spent on bicycling and walking safety improvements.

Educational Opportunities:
- Bicycles and pedestrians impact roadway conditions at a very low rate. Studies have found that the impact on roadways by bicycles is approximately 0.2 cents per mile. The impact by motor vehicles is approximately 3.9 cents per mile, while motor vehicle operators pay an average of 2.5 cents per mile in user charges such as fuel taxes and motor vehicle registration fees.
- Bicycles contribute minimally to societal costs such as water and noise pollution, accident costs, insurance costs, parking costs, and congestion costs, which are primarily associated with motor vehicles.
- Approximately 57 million people nationwide, 27.3% of the population age sixteen or older, rode a bicycle at least once during the summer of 2002.

Resources:
- Federal Highway Administration: www.fhwa.dot.gov

Bicycling and walking facilities require additional space and force vehicles to slow down.

Facts:

- A parking space for a car requires two-hundred square feet, while that for a bicycle requires eighteen square feet.
- The total dimension required by a five-foot sidewalk and a five-foot bicycle lane is equal to the minimum space required by one single vehicular lane.
- A number of bicycling and walking facility enhancements, such as wider outside lanes and bump outs, can take place without changing the total dimension of existing facilities.
- A pedestrian utilizes approximately four square feet of space.

Educational Opportunities:

- Space and enhancements dedicated to bicycling and walking improvements often result in safer, more esthetically pleasing transportation facilities.
- There are numerous societal benefits associated with an improved bicycling and walking transportation system, including a reduction in noise and air pollution, a reduced dependence on fossil fuels, and increased overall physical fitness.
- An increasing number of bicyclists and pedestrians for utilitarian trips reduces the number of motor vehicle trips, thereby improving traffic conditions in the transportation system.

Resources:

- The National Center for Bicycling and Walking: www.bikewalk.org
- Pedestrian and Bicycle Information Center: www.walkinginfo.org

People should ride and walk in parks, not in or around traffic.

Facts:

- Driving to parks, versus riding a bicycle or walking to these destinations, adds vehicles to traffic congestion.
- Parks are not the only destination to which bicyclist and pedestrians travel.
- According to the U.S. census, approximately 10% of Missouri households do not own an automobile and approximately 25% of Missourians do not possess a driver's license.
- Parks and other recreational systems do not provide a regional connected transportation system for bicyclists and pedestrians.
- Multi-use paths cannot always safely accommodate non-recreational bicycle travel, speeds of which can often exceed twenty-five miles per hour.

Educational Opportunities:

- Bicycling and walking transportation are time-efficient means of exercising while at the same time traveling to destinations.
- Bicycling and walking transportation offset the additional costs of health club fees. Time that would otherwise be used in the sedentary activity of driving to work is instead used to exercise.
- According to the Centers for Disease Control and Prevention, if a 150 pound person walked briskly to a store or post office that was five blocks away every day for a year, that person would weigh 10 fewer pounds at the end of that year.
- Most pollution from automobiles is emitted during the first few miles of start up while the engine is cold. Replacing short vehicular trips with bicycling or walking trips would therefore reduce environmental pollution.

Resources:

- National Center for Chronic Disease Prevention and Health Promotion: www.cdc.gov/nccdphp/dnpa/physical/index.htm

Bicycles do not belong on the road.

Facts:

- Bicycles are legal vehicles with equal rights to the road. Every state allows on-street bicycling.
- Missouri Statute 307.188: *Every person riding a bicycle upon a street or highway shall be granted all of the rights and shall be subject to all of the duties applicable to the drivers of a vehicle as provided by chapter 304,RSMo**
- Illinois Statute 625 ILCS 5/11 1502: *Bicyclists riding on a highway are granted all of the rights and are subject to all of the duties applicable to the driver of a vehicle, with certain exceptions*.
- A number of courts across the country have considered fundamental the right to travel the public roadways on foot and bicycle.

Educational Opportunities:

- Bicycling and walking safety programs developed by community organizations, businesses, schools, and churches.
- Driver education and driving licensing classes to educate driving age audiences on the rules and responsibilities of all users.

Resources:

- *Street Smarts: Bicycling's Traffic Survival Guide** by John S. Allen. Adobe Acrobat version available at www.trailnet.org

Bicyclists should ride as close to the edge of the road as possible.

Facts:

- Missouri Statute 307.190: *Every person operating a bicycle or motorized bicycle at less than the posted speed or slower than the flow of traffic upon a street or highway shall ride as near to the right side of the roadway as safe, exercising due care when passing a standing vehicle or one proceeding in the same direction, except when making a left turn, when avoiding hazardous conditions, when the lane is too narrow to share with another vehicles, or when on a one-way street. Bicyclists may ride abreast when not impeding traffic.*
- Illinois Statute (625 ILCS 5/11 1505) (from Ch. 95 1/2, par. 11 1505) Sec. 11 1505. *Position of bicycles and motorized pedal cycles on roadways, riding on roadways and bicycle paths.*
    a) *Any person operating a bicycle or motorized pedal cycle upon a roadway at less than the normal speed of traffic at the time and place and under the conditions then existing shall ride as close as practicable to the right hand curb or edge of the roadway except under the following situations:*
        1. *When overtaking and passing another bicycle, motorized pedal cycle or vehicle proceeding in the same direction; or*
        2. *When preparing for a left turn at an intersection or into a private road or driveway; or*
        3. *When reasonably necessary to avoid conditions including, but not limited to, fixed or moving objects, parked or moving vehicles, bicycles, motorized pedal cycles, pedestrians, animals, surface hazards, or substandard width lanes that make it unsafe to continue along the right hand curb or edge. For purposes of this subsection, a "substandard width lane" means a lane that is too narrow for a bicycle or motorized pedal cycle and a vehicle to travel safely side by side within the lane.*
    b) *Any person operating a bicycle or motorized pedal cycle upon a one way highway with two or more marked traffic lanes may ride as near the left hand curb or edge of such roadway as practicable.*

Educational Opportunities:

- Education programs that identify the types of hazards bicyclists need to avoid and for which it is appropriate to utilize full vehicular lanes.
- Bicycles should cross railroad tracks at right angles.
- Drainage grates where openings are parallel to the direction of travel are a hazard for bicyclists.
- In areas of on-street parking opening car doors create a hazard for bicyclists.
- During foul weather driver visibility is reduced and slick surfaces like manhole covers or painted lines become hazardous for bicyclists.
- During windy conditions bicyclist may be indivertibly pushed away from the edge of the vehicle lane.

- During nighttime conditions drive visibility is reduced. Bicycles should be equipped with appropriate lighting and reflective equipment.
- Debris such as glass, tree limbs, and gravel, which often collect on the edge of the road, sometimes force bicyclists to travel in the middle of vehicular lanes.

Resources:

- Bicycle Safe.Com: www.bicyclesafe.com
- League of American Bicyclists BikeEd Program: www.bikeleague.org/educenter/education.htm
- Website hosted by John S. Allen, author of *Bicycling Street Smarts: Riding Confidently, Legally and Safely*: www.bikexprt.com/bicycle/index.html

Bicycles belong on the sidewalk.

Facts:

- In certain areas, it is illegal for bicycles to ride on the sidewalk. Riding on the sidewalk is statistically more dangerous than riding on the road.
- Missouri Statute 300.347: *No person shall ride a bicycle upon a sidewalk within a business district.*

Educational Opportunities:

- Motor vehicle operators executing a right turn do not expect vehicles on sidewalks traveling at speeds often attained by bicycles.
- It is particularly hazardous to ride a bicycle on a sidewalk in the opposite direction as motor vehicles, since operators of turning vehicles do not expect opposing bicycle traffic on the sidewalk. If sidewalk use by bicycle is required bicyclists should ride in the same direction as traffic, slow down at all driveways and intersections, and make eye contact with drivers before proceeding through the intersection or sidewalk.
- Shared use of sidewalks by bicyclists and pedestrians is also a hazardous condition, due to the large differential in traveling speeds and the presence of obstacles including curbs, driveways, refuse receptacles, and sign poles, which have to be negotiated by both users.

Resources:

- Pedestrian and Bicycling Information Center: www.pedbikeinfo.org

Bicyclists do not obey traffic laws.

Fact:

- Operators who do not obey laws and regulations exist in all modes of transportation.

Educational Opportunities:

- Programs that emphasize education about, and enforcement of, traffic laws and regulations.

Resources:

- Pedestrian and Bicycling Information Center: www.bicyclinginfo.org

It is too dangerous for bicycles and motor vehicles to share the road.

Facts:

- A recent Federal Highway Administration study found that 70% of bicycle accidents did not involve a motor vehicle.
- Share the road projects go through a rigorous investigation about the adequacy of shared use before implementation.

Education Opportunities:

- Educational programs targeted to both bicyclists and motorists that delineate proper operational procedures in share the road conditions.

Resources:

- League of American Bicyclists: http://www.bikeleague.org/educenter/factsheets/sharingtheroad.htm
- Esurance.Com: http://www.esurance.com/safe_auto_insurance/bikes.asp

Busier lifestyles have lead to more active lifestyles.

Facts:

- Thirty years ago, over 60% of children walked to school. Today, less than 13% of children walk to school.
- Over 60% of children and adults are overweight or obese.
- Over 40% of automobile trips cover less than two miles; over 22% of automobile trips cover one mile or less.

Educational Opportunities:

- Whether or not sidewalks exist will often influence a person's decision to walk for either transportation or recreation.
- People with physical disabilities or who are visually impaired require adequately placed and designed sidewalks.
- Physical education classes for 9th through 12th graders dropped from 42 percent in 1991 to 29 percent in 1997. A growing number of children are not exercising sufficiently in their daily routines.
- A sedentary lifestyle is contributing to the prevalence of childhood (and adult) obesity. Urban growth pattern studies link the lack of greenspace and bikeable/walkable communities to this unhealthy trend.
- Communities are seeking opportunities to create environments that promote a healthy, active lifestyle.

Resources:

- Coalition for a Healthy and Active America: www.chaausa.org
- Walkable St. Louis: www.sustainstl.org/walkablestl

CHAPTER 8 – PLAN IMPLEMENTATION

As noted earlier, the *St. Louis Regional Bicycling and Walking Transportation Plan* departs from conventional master plans which focus on the development of priority corridors for bicycling and walking improvements and instead places emphasis on defining the nature of bicycling and walking environments and providing guidance on the elements common to model bicycling and walking facilities. The plan is intended to serve as a "how-to and when-to" resource document for communities developing facilities.

As a "how-to and when-to" resource the plan allows communities to develop bicycle and pedestrian facilities in a standardized manner regardless of expertise or federal funding participation. What that means is that implementation of the plan is dependent on communities applying the planning, design, and development concepts and approaches as a matter of how they do business, not as another requirement to access funds. The planning and design concepts are intended as guidelines and do not supercede or serve as a substitute for any regulations or requirements associated with any funding sources used to implement bicycle and walking projects.

Federal transportation funding bills since 1992 have included policies and funding categories that can be used to plan and construct bicycle and pedestrian facilities. Traffic safety programs address non-motorized issues more comprehensibly than in the past and funding is also available to encourage bicycling and walking for recreation, transportation and better health.

That being said, bicycle and pedestrian planning efforts can be powerful tools for attracting funding. For example, in competitive project selection processes, projects included in local policy plans, such as comprehensive plans or bicycle, pedestrian or trails plans often have an edge over stand-alone projects. A strategy of combining federal and state funding with local and private dollars can be used to enlarge the pool of available resources. Whether a community is trying to implement a comprehensive multi-year bicycle plan or complete a specific project, the strategies and programs described below can help secure the needed resources.

Basically there are two ways in which to incorporate bicycle and walking improvements as part of the transportation system. 1) retrofitting an existing facility to accommodate bicycle and walking, 2) incorporate the bicycle and walking improvements as part of a new construction or reconstruction project, commonly referred to as "piggybacking."

It is generally more cost effective to include (piggyback) bicycle and pedestrian accommodations as part of a larger scale transportation, open space or development project than it is to retrofit.

Seek out opportunities to get involved in the early project planning stages.

Some strategies or techniques which apply piggybacking as a way to implement bicycle and walking projects include:

Road and Transit Projects - Refer to policies and proposed bicycle and pedestrian networks in local plans to help justify the accommodation of bicyclists and pedestrians in road projects. If a road is being resurfaced, the implementation agency could re-stripe it to include bicycle lanes, wide curb lanes, or paved shoulders and add sidewalks. If a bridge is being reconstructed, provisions to accommodate bicycling and walking transportation should be investigated. If a train station is being built, provisions should be made for bicycle and pedestrians access. These processes don't necessarily require special money for bicycle and pedestrian accommodations, but they do require working closely with the Missouri and Illinois Departments of Transportation, (MoDOT and IDOT), the East-West Gateway Council of Governments (EWGCOG), counties and local departments of public works. Participating in the early design stages of a project is highly recommended.

Development Projects - Another low-cost implementation strategy is to enact ordinances that require new developments to be designed in accordance with local bicycle and pedestrian plans. For example, ordinances and zoning can mandate including sidewalks, providing bicycle parking, designing streets that discourage speeding and building car parking facilities that minimize pedestrian conflicts at entrance and exit points.

Community development, open space, safety and environmental projects – Many of the funding programs described below are intended to fund projects for which the primary purpose might not be bicycle and pedestrian accommodation and safety. Nevertheless, many of these projects may include provisions and elements that serve non-motorized needs.

Funding Sources

Bicycling and walking transportation projects are broadly eligible for funding from almost all the major federal-aid highway, transit and safety programs. EWGCOG oversees the selection and programming of projects in the federal-aid highway funding programs most commonly used for bicycle and pedestrian projects, including Surface Transportation, Transportation Enhancements and Congestion Mitigation and Air Quality. Most of the other transportation funds are administered by the state departments of transportation, MoDOT and IDOT.

Other sources of funds available for implementation of bicycle and walking improvements, categorized by function (i.e., Parks and Recreation Programs, Environmental Programs**,** State Resources), are included in Appendix D.

Finally, there are several local and regional resources available to communities planning, designing, or developing bicycle and walking projects, plans or programs. Many of the resources provide educational materials as well as expertise in transportation, health, and recreational based bicycle and pedestrian issue. Also, there are several opportunities to partner with local, state, and national organizations to progress bicycle and walking initiatives in your community. A listing of those resources and a discussion of their areas of expertise follows. (Also see Appendix E)

Regional Resources

East-West Gateway Council of Governments is the Metropolitan Planning Organization for the St. Louis bi-state region. Much of the federal and state source transportation funding available to local communities is programmed through EWGCOC. Projects receiving federal source transportation funding must become part of the regional Transportation Improvement Program (TIP). The agency provides technical assistance to local governments seeking to plan and fund bicycle and pedestrian projects. ***The St. Louis Regional Bicycle and Pedestrian Advisory Committee (BPAC)*** was established by the East-West Gateway Council of Governments in July of 1995. The guiding mission of the BPAC is to enhance access and mobility throughout the region by encouraging the coordinated development of bicycle and pedestrian facilities, programs, and activities that will enhance safe access to major residential areas, educational, government and cultural institutions, employment and retail activity centers, as well as parks and recreational areas. Membership in the BPAC represents a cross-section of public, private, and non-profit representatives from the region.

The Great Rivers Greenway District was established in 2000 to develop an interconnected system of parks, greenways and trails. It is funded through a one-tenth of one-cent sales tax authorized by passage in 1999 of a proposition in St. Louis City, St. Louis County and St. Charles County. The District collaborates with municipalities, public agencies and non-profit organizations to fund the trail and greenway system. Funding has been provided for planning, construction and for acquiring property.

The Metro East Parks and Recreation District (MPRD) was similarly established in 2000 to develop an interconnected system of parks, greenways and trails. It is similarly funded by a dedicated sales tax authorized by passage in 1999 of a proposition in Madison and St. Clair Counties in Illinois. MPRD functions much like their Missouri partner, Great Rivers Greenway.

Partnerships

Trailnet is a non-profit organization that promotes bicycle and pedestrian activities and collaborates with the public and private sectors to ensure and enhance a premier trail system that enriches the bi-state St. Louis region .

Advocacy organizations can provide lobbying support, technical assistance and funding. Locally, ***The St. Louis Regional Bicycle Federation*** and ***Walkable St. Louis*** are citizen organizations that work to improve conditions for bicycling and walking respectively.

The national ***Bikes Belong Coalition*** welcomes grant applications from organizations and agencies within the United States that are committed to putting more people on bicycles more often. The grants program funds projects in three categories: facility, education, and capacity building. For the education and facility categories, Bikes Belong will accept applications from nonprofit organizations and from public agencies and departments at the national, state, regional, and local levels. For the capacity-building category, Bikes Belong will only fund organizations whose mission is expressly related to bicycle advocacy. Applicants can request up to $10,000.

Schools can promote the benefits of cycling and walking. A ***Safe Routes to School Program*** can become the focus of improved conditions for walking and bicycling to schools. Funding for such programs will probably become available with re-authorization of the federal transportation bill.

The American Hiking Society administers a ***National Trails Fund*** which distributes small grants of varying amounts each year to hiking groups, land trusts and other non-profit organizations to establish protect and maintain wilderness foot trails.

The Robert Woods Johnson foundation has established the ***Active for Life Program***. A national office has been established to offer technical assistance and direction to an $8.7 million grants program. The program introduces research-based programs into community settings, providing structured social marketing support and conducting independent evaluation to measure effectiveness.

Employers can create incentives for employees to walk or cycle by providing showers, bike parking, a guaranteed ride home in an emergency, flex time, and transit subsidies. ***Commuter Connections*** is a resource in Washington, DC with good advice for employers on promoting alternative commuting options including walking and bicycling.

Actions and Strategies

To assist communities in implementing the planning, design, and development concepts outlined in *the St. Louis Regional Bicycling and Waking Transportation Plan* the East-West Gateway Council of Governments will implement the following strategies to guide

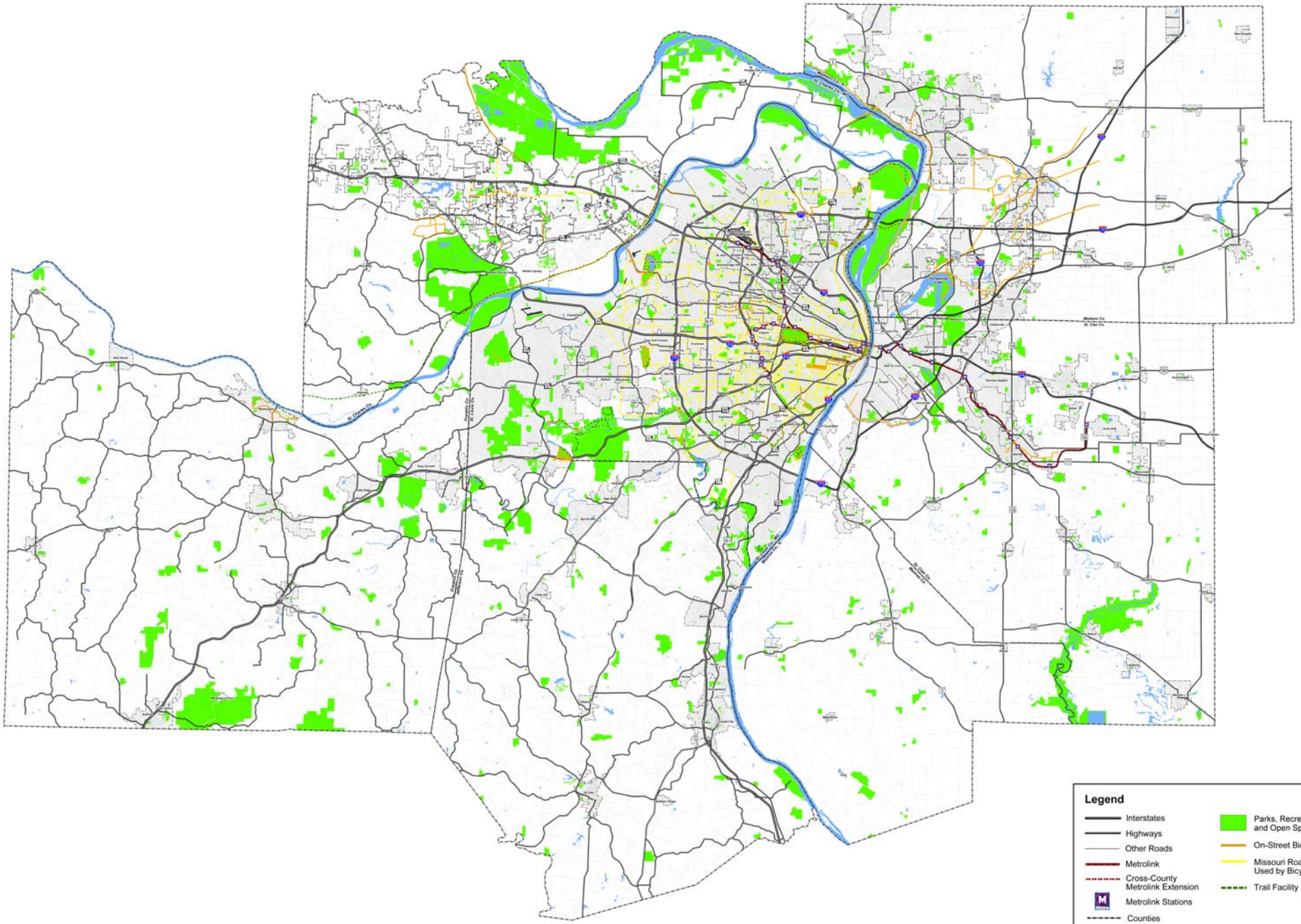
future Council efforts in the area of bicycle and walking system development and design:

- Require project sponsors to explicitly consider and include bicycle and pedestrian accommodations in developing projects for Transportation Improvement Program funding
- Conduct an Annual Non-motorized Transportation Planning Workshop.
- Implement technical assistance programs that will assist local governments with Bicycle and Walking issues
- Create arterial roadway design standards that allow for better integration of streets within communities, incorporate access management and context sensitive strategies, accommodate various modes of travel, and enhance mobility for all system users
- Create educational programs that explain transportation barriers and offer practical solutions for transportation planners, engineers, developers, funding agencies, managers, operators, and consumers
- Encourage programs that take a comprehensive view of access issues and seek to ensure that streets, sidewalks, space for bus stops, and crosswalks are built and maintained on a coordinated basis to allow seamless, safe movement from one area to the next by system.

▪

Appendix A –

Existing Regional Bicycle Facilities



St. Louis Regional Bicycling Transportation System

JULY 2005

ST. LOUIS REGIONAL BICYCLING AND WALKING TRANSPORTATION PLAN

SCALE:
0 2.5 5 10 MILES

APPENDIX B -Bicycle and Walking Environment Checklists and the Plan as a Resource

The St. Louis Regional Bicycling and Walking Transportation Plan is intended to be a resource for the various professionals involved in the planning, engineering, implementation, and advocacy of a bicycling and walking transportation system. As such, portions of the plan can be referenced during definitive stages of system development, including:

- Planning
- Engineering
- Implementation
- Advocacy

Planning

During the planning stage, the following references may be appropriate:

1. Consult the goals and objectives noted in Chapter 1 for a definition of the overall planning themes relevant to the development of a bicycling and walking transportation system.
2. Use the municipal survey in Chapter 2 to determine potential areas of improvement related to bicycling and walking transportation planning. For example target projects could address noted deficiencies in stand-alone bicycling master plans, defining official on- and off-road bicycle routes, bicycle parking programs, stand-alone pedestrian master plans, sidewalk improvements programs, pedestrian signal improvements, and others.
3. If bicycling projects are desired, consult the regional map provided as Appendix A to determine the nature of the existing regional system and to identify where facilities are needed for system connectivity and for providing access to destinations.
4. If transit-related improvements are desired, reference Chapter 3 for a description of existing accommodations and suggested areas of needed improvements for bicycling and walking transportation.
5. For projects with regional implications, use the regional demand assessment in Chapter 2 as a departure point for discussions pertaining to purpose and need for bicycling and walking programs and facilities.
6. For an understanding of the expectations and preferences of system users, consult the user survey in Chapter 2.
7. Reference the environments discussion in Chapter 4 and the checklists in Appendix B to determine effects of systems characteristics such as land use on the non-motorized transportation environment.

Engineering

During the engineering stage, the plans elements could be utilized in the following manner:

1. Reference the user survey in Chapter 2 to determine the types of facilities and improvements preferred by system users.
2. Review the environments discussion in Chapter 4 and the checklists in Appendix B to determine the elements of design that are most important for attracting and servicing non-motorized transportation within the type of environment to be improved.
3. Reference the suitability systems in Chapter 5 to calculate both the existing and planned level of service provided to the non-motorized user.
4. If the subject project provides facilities related to the public transit system, consult Chapter 3 for the nature of the existing connections as well as possible areas for improvement.

Implementation

Individuals involved in the implementation of bicycling and walking transportation projects could reference the plan as follows:

1. Consult the model ordinances in Chapter 6 for a definition of rules and regulations that encourage and support non-motorized transportation.
2. Review the plan implementation elements in Chapter 8 to determine options and strategies for the implementation of bicycling and walking improvements.
3. Reference federal, state, and partner funding sources and strategies in Appendix C to determine opportunities for funding non-motorized projects.
4. Consult the opportunities for partnering noted in Appendix D to secure local and regional support for bicycling and walking transportation projects.

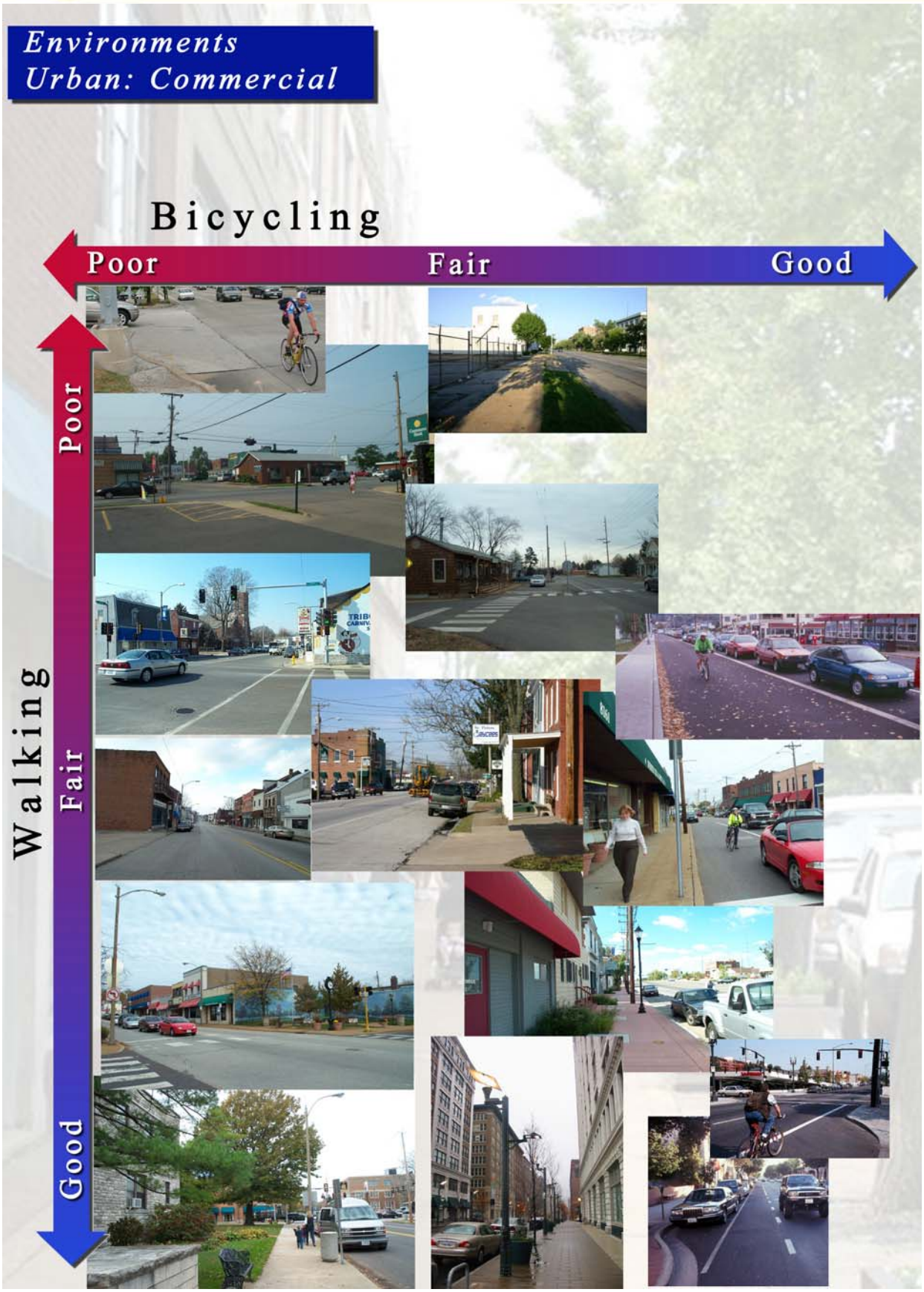
Advocacy

Individuals and groups involved in the advocacy for non-motorized transportation could enhance their efforts by utilizing the plan as follows:

1. Reference the user survey in Chapter 2 for a definition of preferences by system users related to destinations, conditions that encourage or discourage system use, and reasons to support non-motorized projects.
2. Utilize the marketing and education components of Chapter 7 to address misconceptions about bicycling and walking transportation and to define education programs targeted to the encouragement of non-motorized transportation.
3. Consult the local, regional, and partner contacts in Appendix D to leverage resources for advocating bicycling and walking transportation.

Environment : Urban Commercial

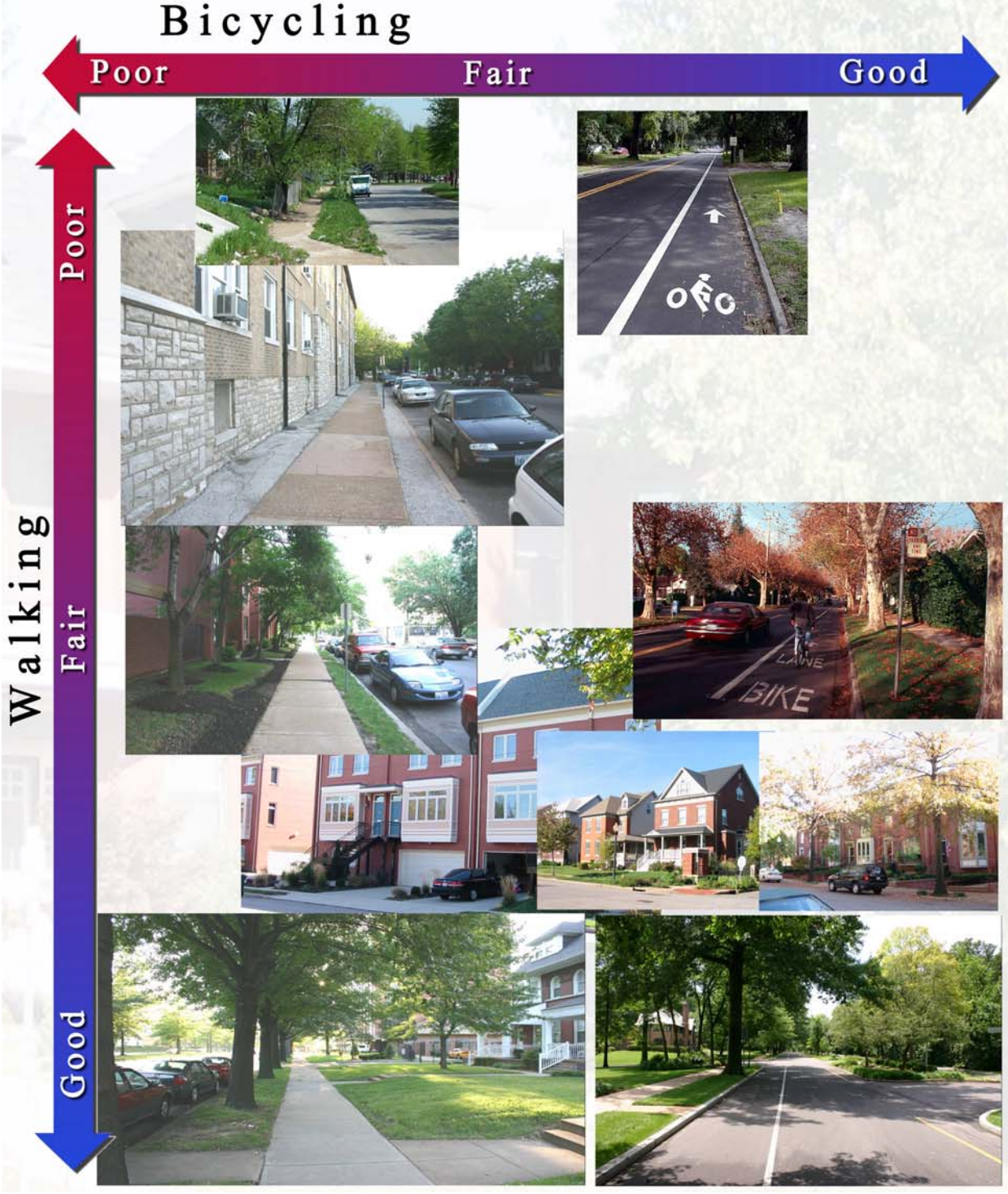
Walking	Bicycling	
		Development Characteristics
		Land Use
		Building Set-Back (zero to none)
		Transparent Edge (landscape plantings, porches, etc)
		Consistent Building Outline
		Definition
		Support Facilities at Private & Public Facilities (parking, changing, etc)
		Sidewalk Characteristics
	n/a	Sidewalk Zone & Through Pedestrian Zone Width
	n/a	Accessible (clearance)
		Lighting (Sidewalk and Roadway)
	n/a	Well Maintained Sidewalks (free of litter, good concrete, etc)
		Street Trees (30’ o.c. or less)
		Streetscape Furnishing (benches, art, bike racks, etc)
		Roadway
		Buffer from Traffic (on-street parking)
		Low Traffic Speeds (traffic calming)
		Infrequent Curb Cuts
		Infrequent Heavy Vehicle Traffic
		Low Traffic Volumes
n/a		Wide Outside Lanes (14’ Width Min.)
n/a		Striped Bicycle Lanes (5’ Width Min.)
n/a		Well Maintained Road Surfaces
		Directional / Informational Signage
		Opportunities for Alternative Routes
		Intersections
		Pedestrian & Bicycle Actuated Signals, Stop Signs
n/a		Striped Bike Lane & Left Turn Bike Lane
	n/a	American with Disabilities Ace (ADA) Compliant Ramps
		Striped Crosswalk
		Enhanced Crosswalks (special paving, etc)
		No Right Turn Slip Lane and Reduced Radius Corner
		Curb Extensions (bump outs)
	n/a	Maximum Distance Between Intersections – Less than 400’
	n/a	Adequate Mid-Block Crossing
		General
		Connected Bicycle and Walking Transportation System
		Links to Parks, Schools, and other Destinations
		Connections Past Barriers (ramps, railroads, bridges, etc)
		Transit Access
		Community Bicycle and Pedestrians Programs (safe routes to schools, bicycle training, master plans, etc)


Environments
Urban: Commercial
Bicycling
Poor
Fair
Good
Walking
Poor
Fair
Good

Environment : Urban Residential

Walking	Bicycling	
		Development Characteristics
		Land Use
		Building Set-Back (zero to none)
		Transparent Edge (landscape plantings, porches, etc)
		Consistent Building Outline
		Definition Ratio
		Support Facilities at Private & Public Facilities (parking, changing, etc)
		Sidewalk Characteristics
	n/a	Sidewalk Zone & Through Pedestrian Zone Width
	n/a	Accessible (clearance)
		Lighting (Sidewalk and Roadway)
	n/a	Well Maintained Sidewalks (free of litter, good concrete, etc)
		Street Trees (30’ o.c. or less)
		Streetscape Furnishing (benches, art, bike racks, etc)
		Roadway
		Buffer from Traffic (on-street parking)
		Low Traffic Speeds (traffic calming)
		Infrequent Curb Cuts
		Infrequent Heavy Vehicle Traffic
		Low Traffic Volumes
n/a		Wide Outside Lanes (14’ Width Min.)
n/a		Striped Bicycle Lanes (5’ Width Min.)
n/a		Well Maintained Road Surfaces
		Directional / Informational Signage
		Opportunities for Alternative Routes
		Intersections
		Pedestrian & Bicycle Actuated Signals, Stop Signs
n/a		Striped Bike Lane & Left Turn Bike Lane
	n/a	American with Disabilities Ace (ADA) Compliant Ramps
		Striped Crosswalk
		Enhanced Crosswalks (special paving, etc)
		No Right Turn Slip Lane and Reduced Radius Corner
		Curb Extensions (bump outs)
	n/a	Maximum Distance Between Intersections – Less than 400’
	n/a	Adequate Mid-Block Crossing
		General
		Connected Bicycle and Walking Transportation System
		Links to Parks, Schools, and other Destinations
		Connections Past Barriers (ramps, railroads, bridges, etc)
		Transit Access
		Community Bicycle and Pedestrians Programs (safe routes to schools, bicycle training, master plans, etc)

Environments
Urban: Residential



Environment : Suburban Commercial

Walking	Bicycling	
		Development Characteristics
		Land Use
		Transparent Edge (landscape plantings, porches, etc)
		Consistent Building Outline
		Definition
		Support Facilities at Private & Public Facilities (parking, changing, etc)
		Sidewalk Characteristics
	n/a	Sidewalk Zone & Through Pedestrian Zone Width
	n/a	Accessible (clearance)
		Lighting (Sidewalk and Roadway)
	n/a	Well Maintained Sidewalks (free of litter, good concrete, etc)
		Street Trees (30’ o.c. or less)
		Roadway
		Buffer from Traffic (on-street parking)
		Low Traffic Speeds (traffic calming)
		Infrequent Curb Cuts
		Infrequent Heavy Vehicle Traffic
		Low Traffic Volumes
n/a		Wide Outside Lanes (14’ Width Min.)
n/a		Striped Bicycle Lanes (5’ Width Min.)
n/a		Well Maintained Road Surfaces
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		Opportunities for Alternative Routes
		Intersections
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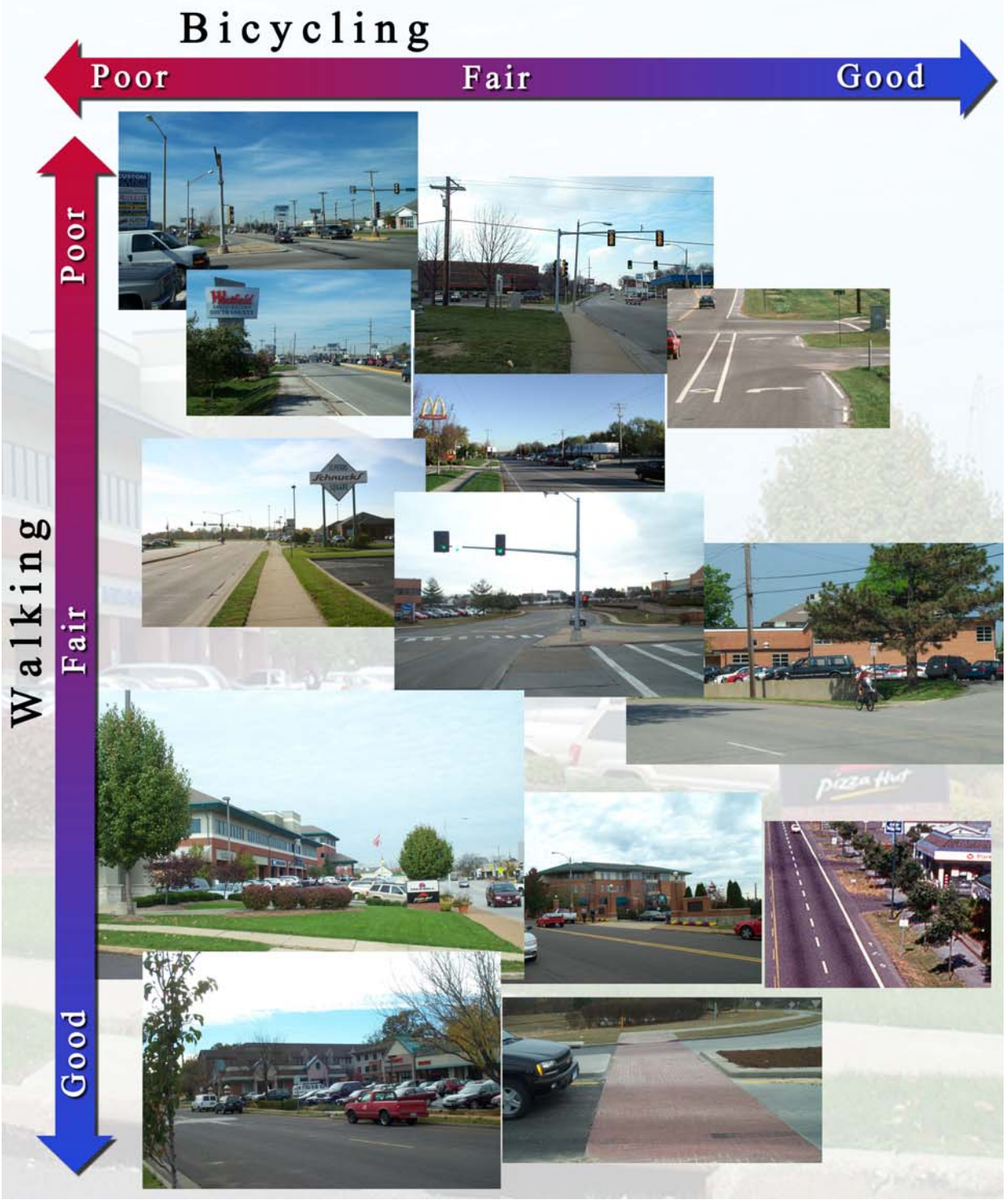
n/a		Striped Bike Lane & Left Turn Bike Lane
	n/a	American with Disabilities Ace (ADA) Compliant Ramps
		Striped Crosswalk
		Enhanced Crosswalks (special paving, etc)
		No Right Turn Slip Lane and Reduced Radius Corner
		Curb Extensions (bump outs)
	n/a	Maximum Distance Between Intersections – Less than 400’
		General
		Connected Bicycle and Walking Transportation System
		Links to Parks, Schools, and other Destinations
		Connections Past Barriers (ramps, railroads, bridges, etc)
		Transit Access
		Community Bicycle and Pedestrians Programs (safe routes to schools, bicycle training, master plans, etc)

Environments
Suburban: Commercial



Environment : Suburban Residential

Walking	Bicycling	
		Development Characteristics
		Land Use
		Transparent Edge (landscape plantings, porches, etc)
		Consistent Building Outline
		Definition
		Support Facilities at Private & Public Facilities (parking, changing, etc)
		Sidewalk Characteristics
	n/a	Sidewalk Zone & Through Pedestrian Zone Width
	n/a	Accessible (clearance)
		Lighting (Sidewalk and Roadway)
	n/a	Well Maintained Sidewalks (free of litter, good concrete, etc)
		Street Trees (30' o.c. or less)
		Roadway
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		Striped Crosswalk
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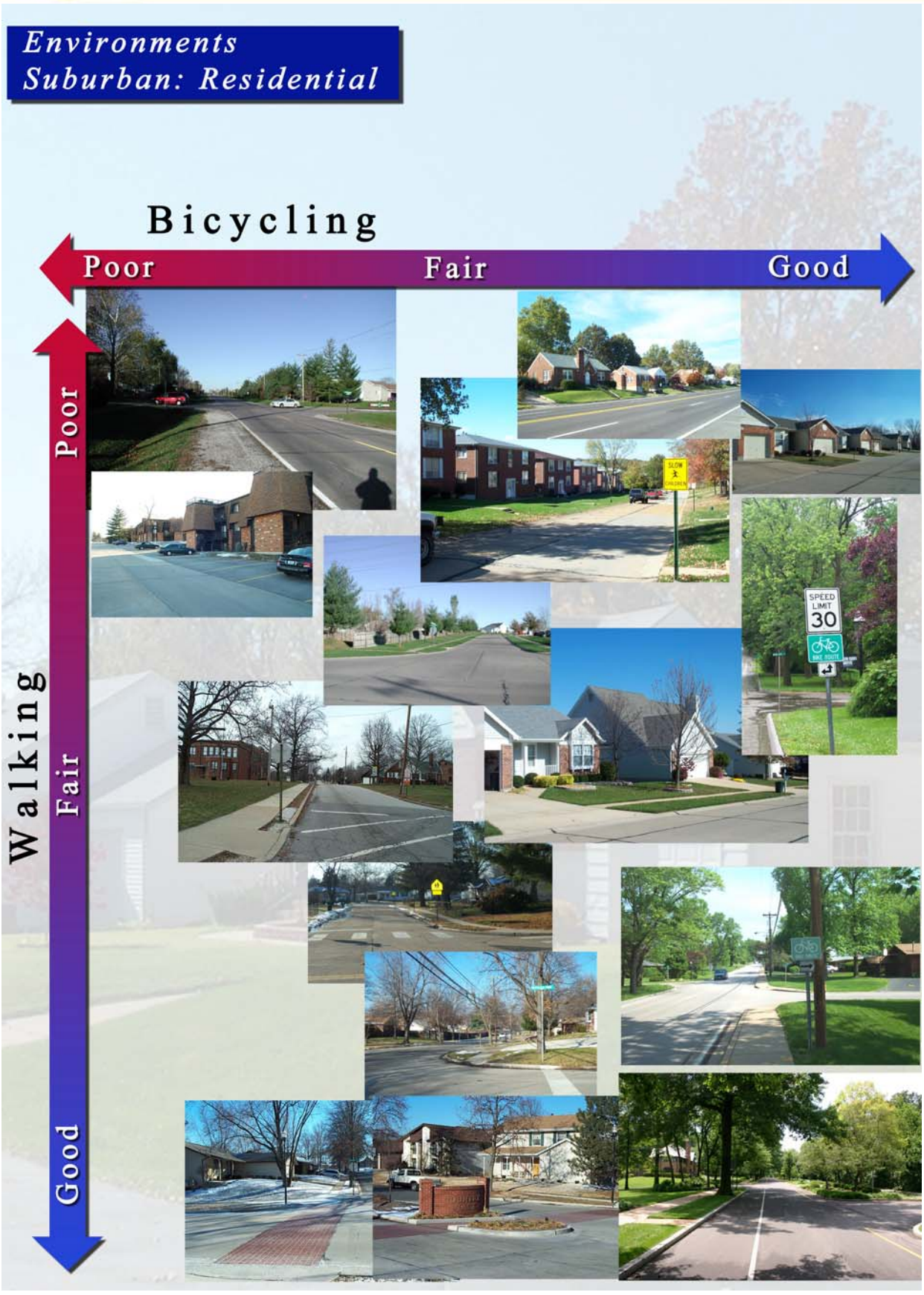
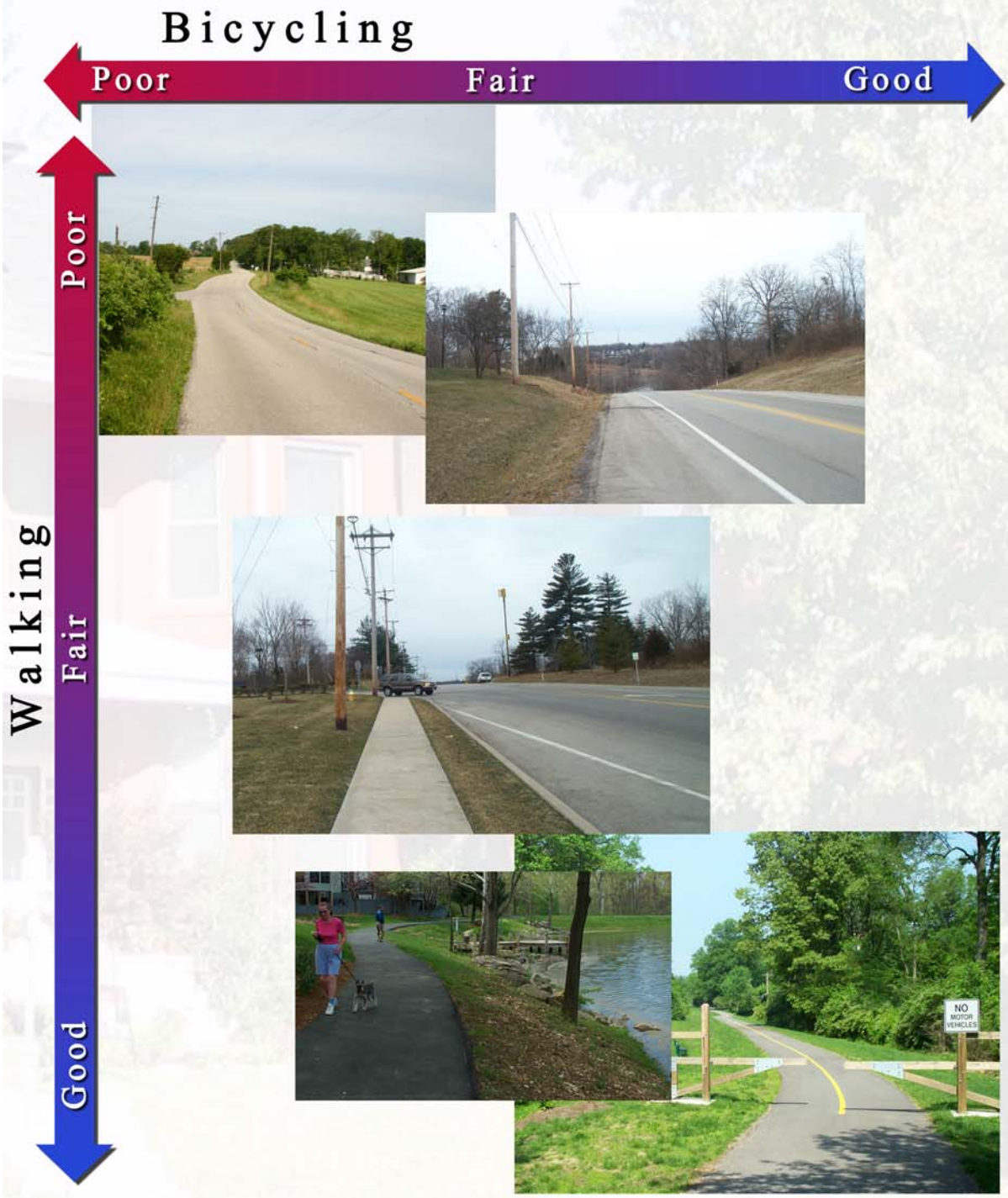
		No Right Turn Slip Lane and Reduced Radius Corner
		Curb Extensions (bump outs)
	n/a	Maximum Distance Between Intersections – Less than 400'
		General
		Connected Bicycle and Walking Transportation System
		Links to Parks, Schools, and other Destinations
		Connections Past Barriers (ramps, railroads, bridges, etc)
		Transit Access
		Community Bicycle and Pedestrians Programs (safe routes to schools, bicycle training, master plans, etc)


Environments
Suburban: Residential
Bicycling
Poor
Fair
Good
Walking
Poor
Fair
Good
SPEED LIMIT 30

Environment : Rural

Walking	Bicycling	
		Development Characteristics
		Land Use
		Sidewalk Characteristics
		Separated Multi-Use Path – 10’ Min Width
		Roadway
		Buffer from Traffic (tree lawn, open space)
		Low Traffic Speeds (traffic calming)
		Infrequent Heavy Vehicle Traffic
		Low Traffic Volumes
n/a		Wide Outside Lanes (14’ Width Min.)
n/a		Striped Bicycle Lanes (5’ Width Min.)
n/a		Well Maintained Road Surfaces
		Directional / Informational Signage
		Opportunities for Alternative Routes
		Intersections
		Stop Signs
n/a		Striped Bike Lane
	n/a	ADA Ramp Each Corner
		Striped Crosswalk
		No Right Turn Slip Lane
		General
		Connected Bicycle and Walking Transportation System
		Links to Parks, Schools, and other Destinations
		Connections Past Barriers (ramps, railroads, bridges, etc)
		Transit Access
		Community Bicycle and Pedestrians Programs
		(safe routes to schools, bicycle training, master plans, etc)

Environments
Rural



APPENDIX C – Federal, State, and Partner Funding Sources

FEDERAL SOURCE FUNDING

Federal-aid Highway Program

Bicycle projects funded through the Federal-aid Highway Program must be "principally for transportation, rather than recreation, purposes" and must be designed and located pursuant to the transportation plans required of states and Metropolitan Planning Organizations (MPO). In the St. Louis region, East-West Gateway Council of Governments is the MPO.

National Highway System funds may be used to construct bicycle transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System, including Interstate highways. *23 USC Section 217 (b)*

Surface Transportation Program (STP) funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects (such as maps, brochures, and public service announcements) related to safe bicycle use and walking. TEA-21 added "the modification of public sidewalks to comply with the Americans with Disabilities Act" as an activity that is specifically eligible for the use of these funds. *23 USC Section 217 (a)*

Ten percent of each State's annual STP funds are set-aside for **Transportation Enhancement Activities** (TEAs). The law provides a specific list of activities that are eligible TEAs which includes the "provision of facilities for pedestrians and bicycles, provision of safety and educational activities for pedestrians and bicyclists," and the "preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian and bicycle trails)." *23 USC Section 109 (a) (35)*

Another 10 percent of each State's STP funds are set-aside for the **Hazard Elimination and Railway-Highway Crossing** programs, which may address bicycle and pedestrian safety issues. Each State is required to implement a Hazard Elimination Program to identify and correct locations which may constitute a danger to motorists, bicyclists, and pedestrians. Funds may be used for activities including a survey of hazardous locations and for projects on any publicly owned bicycle or pedestrian pathway or trail, or any safety-related traffic calming measure. Improvements to railway-highway crossings "shall take into account bicycle safety." *23 USC Section 152*

The **Congestion Mitigation and Air Quality Improvement Program** funds projects designed to reduce congestion and improve air quality in the region. Eligible projects include transit station improvements, bicycle parking, bicycle lanes, pedestrian

walkways and non-construction projects (such as maps, brochures, and public service announcements). *23 USC Section 217 (a)*

Recreational Trails Program funds may be used for all various trail projects including the development/renovation of trail heads. Of the funds apportioned to a state, 30 percent must be used for motorized trail uses, 30 percent for non-motorized trail uses, and 40 percent for diverse trail uses (any combination). Projects require a minimum local match of 20 percent. All projects must be maintained for a period of 25 years. Grant requests up to $100,000 are eligible. Eligible applicants include cities and counties, schools, and private, non-profit and for-profit businesses.*23 USC Section 206*

National Scenic Byways Program funds may be used for "construction along a scenic byway of a facility for pedestrians and bicyclists." *23 USC Section 162 (c) (4)*

Job Access and Reverse Commute Grants are available to support projects, including bicycle-related services, designed to transport welfare recipients and eligible low-income individuals to and from employment. *TEA-21 Section 3037*

High Priority Projects and Designated Transportation Enhancement Activities identified by Section 1602 of TEA-21 have included numerous bicycle, pedestrian, trail, and traffic calming projects in communities throughout the country.

Federal Transit Program

Title 49 U.S.C. (as amended by TEA-21) allows the **Urbanized Area Formula Grants, Capital Investment Grants and Loans**, and **Formula Program for Other than Urbanized Area** transit funds to be used for improving bicycle and pedestrian access to transit facilities and vehicles. Eligible activities include investments in "pedestrian and bicycle access to a mass transportation facility" that establishes or enhances coordination between mass transportation and other transportation. *49 USC Section 5307*

TEA-21 also created a **Transit Enhancement Activity** program with a one percent set-aside of Urbanized Area Formula Grant funds designated for, among other things, pedestrian access and walkways, and "bicycle access, including bicycle storage facilities and installing equipment for transporting bicycles on mass transportation vehicles". *49 USC Section 5307(k)*

Highway Safety Programs

Bicycling and walking transportation safety remain priority areas for **State and Community Highway Safety Grants** funded by the Section 402 formula grant program. A State is eligible for these grants by submitting a Performance Plan (establishing goals and performance measures for improving highway safety) and a Highway Safety Plan (describing activities to achieve those goals). *23 USC Section 402* MoDOT and IDOT administer these programs. In Illinois, safety (402) funds have been used to produce educational materials, such as *Safe Bicycling in Illinois*.

A **Safe Routes to School Program** is proposed in both the House and Senate versions of the federal transportation bill in the 108th Congress, and is expected to be included when the bill is passed. The House version would dedicate one billion dollars over six years to help communities to build new routes, fix hazards, and slow traffic near schools while increasing safety through focused enforcement and education programs.

Federal/State Matching Requirements

In general, the Federal share of the costs of transportation projects is 80 percent with a 20 percent State or local match. However, there are a number of exceptions to this rule.

- Federal Lands Highway projects and Section 402 Highway Safety funds are 100 percent federally funded.
- Bicycle-related Transit Enhancement Activities are 95 percent federally funded.
- Hazard elimination projects are 90 percent federally funded. Bicycle-related transit projects (other than Transit Enhancement Activities) may be up to 90 percent federally funded.
- Individual Transportation Enhancement Activity projects under the STP can have a match higher or lower than 80 percent. However, the overall Federal share of each State's Transportation Enhancement Program must be 80 percent.
- The State and/or local funds used to match Federal-aid highway projects may include in-kind contributions (such as donations). Funds from other Federal programs may also be used to match Transportation Enhancement, Scenic Byways, and Recreational Trails program funds. A Federal agency project sponsor may provide matching funds to Recreational Trails funds provided the Federal share does not exceed 95 percent.

Parks and Recreation Programs

The Rivers, Trails and Conservation Assistance Program, also known as Rivers & Trails, works with community groups and local and State governments to conserve rivers, preserve open space, and develop trails and greenways.

The National Park Service's **Federal Lands to Parks Program** conveys surplus federal land to communities, usually at no cost, for public park and recreation purposes.

Land and Water Conservation Fund grants are available to cities, counties and school districts to be used for outdoor recreation projects. Projects require a 55 percent match. All funded projects are taken under perpetuity by the National Park Service and must only be used for outdoor recreational purposes. Development and renovation projects must be maintained for a period of 25 years or the life of the manufactured goods. Grant cap has been set by MDNR at $150,000.

Environmental Programs

The **EPA Brownfields Program** will fund bicycle and pedestrian facility development. Brownfields Cleanup Grants provide funding for a grant recipient to carry out cleanup activities at brownfield sites. An eligible entity may apply for up to $200,000 per site. Funds may be used to address sites contaminated by petroleum and hazardous substances, pollutants, or contaminants (including hazardous substances co-mingled with petroleum). Cleanup grants require a 20 percent cost share, which may be in the form of a contribution of money, labor, material, or services, and must be for eligible and allowable costs (the match must equal 20 percent of the amount of funding provided by EPA and cannot include administrative costs). A cleanup grant applicant may request a waiver of the 20 percent cost share requirement based on hardship. An applicant must own the site for which it is requesting funding at time of application or demonstrate the ability to acquire title. The performance period for these grants is two years.

STATE RESOURCES

Community Development Block Grant Program funds can be used to pay for the engineering and design of bicycle and pedestrian project elements. Priority is placed on the removal of barriers to comply with ADA requirements and with downtown revitalization. The Missouri Department of Economic Development administers this program.

The Illinois Department of Natural Resources administers ***Outdoor Recreation Grants-in-Aid Programs***. The ones most relevant for bicycle and pedestrian planning include:

- ***Bicycle Path Program***--helps with the acquisition, construction and rehabilitation of public, non-motorized bicycle paths and directly related support facilities. Applications are accepted between January 1 and March 1 of the calendar year.
- ***Recreational Trails Program***--provides up to 80% funding assistance for acquisition, development, rehabilitation and maintenance of motorized and non-motorized recreation trails. Applications are due March 1.
- ***Open Land Trust Grant Program***--provides grants to eligible local governments to protect open space and provide enhanced outdoor recreational opportunities. Land acquired form the program must be maintained in perpetuity for public open space and natural resource recreational purposes. The deadline for submitting applications is publicly announced each year.
- ***Open Space Lands Acquisition and Development and Land and Water Conservation Fund***-- assists local government agencies in the acquisition and development of land for public parks and open space. Applications are accepted between May 1 and July 1 of the calendar year.

Operation Greenlight funds, administered through IDOT's Department of Public Transit, can be used for capital projects that increase non-motorized access to transit.

The ***Corridor Planning Grant Program*** is a new, five-year, $15 million grant program administered by IDOT to help communities develop land use and infrastructure plans that promote efficient use of transportation facilities and improve quality of life. The program will fund planning activities that promote the integration of land use, transportation and infrastructure facility planning in major transportation corridors in Illinois.

Legislator Initiatives. State legislators have discretionary funds that can be used for projects of their choice. They can be powerful allies for pulling together and providing resources for projects that span municipalities.

APPENDIX D – Local, Regional, and Partner Contacts

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The Great Rivers Greenway
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Partnerships and Advocacy Organizations

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www.pedbikeinfo.org/sr2s/

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Commuter Connections
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