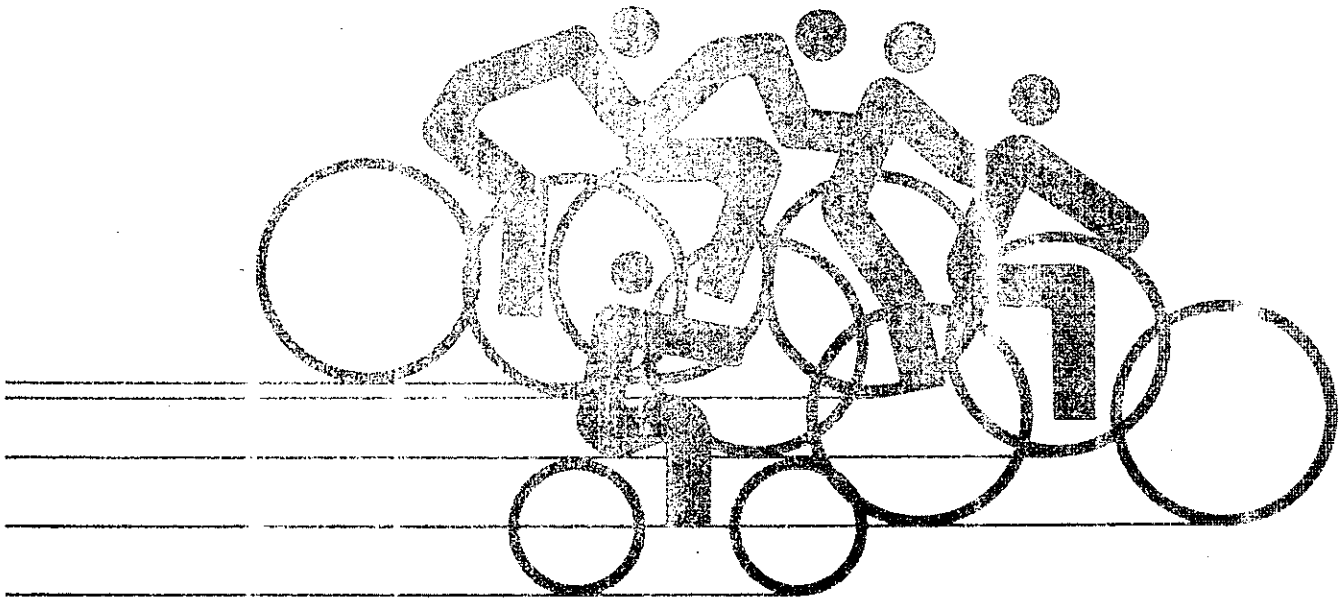
ENCOURAGING BICYCLE USE IN NORTHEASTERN ILLINOIS

PLANNING AND IMPLEMENTATION TECHNIQUES



A Guide for Local Officials

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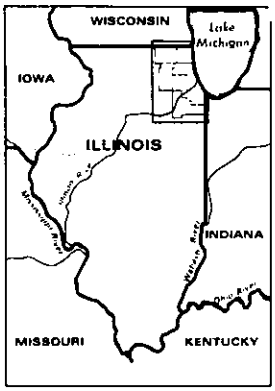

Northeastern Illinois is diverse in its land use and complex in its political structure. It has some of the most productive farms on earth — also one of the world's greatest cities. It contains 3,714 square miles of land and 38 square miles of water. It is home to 7 million people, organized in more than 1,250 units of government.

In 1957, following a decade of rapid urbanization in the Chicago suburban area, the Illinois General Assembly created the Northeastern Illinois Planning Commission (NIPC) to conduct comprehensive planning for the six-county greater Chicago region.

The Commission has three statutory charges: conduct research and collect data for planning; assist local government; and prepare comprehensive plans and policies to guide the development of the counties of Cook, DuPage, Kane, Lake, McHenry and Will.

By necessity, regional planning deals with general development policies not local land use detail. NIPC supports and coordinates county and municipal planning. The Commission has advisory powers only and relies upon voluntary compliance with its plans and policies.

northeastern illinois planning commission

400 West Madison Street Chicago, Illinois 60606 (312)454-0400

ENCOURAGING BICYCLE USE

IN

NORTHEASTERN ILLINOIS:

PLANNING AND IMPLEMENTATION TECHNIQUES

SEPTEMBER, 1983

Price: $4.00

NORTHEASTERN ILLINOIS PLANNING COMMISSION
400 West Madison Street
Chicago, Illinois 60606

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PLANNING AND IMPLEMENTATION TECHNIQUES

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INTRODUCTION

Bicycling has come of age in the United States within the past decade. Before 1970, only 11 percent of all bicycles sold were bought by persons over the age of 16. Until that year most bicycles were used as toys and as neighborhood transportation for children. Within one year (1969-1970) the percentage of adult sized bicycles sold doubled, indicating a major shift in the age of the cycling population. Not only did adult use of bicycles increase, but also during the early 1970's, total bicycle use boomed to unprecedented levels. Bicycle ridership increased from 35.2 million in 1960 to over 100 million, 50% of the American population, in 1976.[1]

Bicycling has become an important transportation alternative as well as a popular recreational activity for adults and children. Surveys and information obtained from the 1975 Travel-to-Work Supplement conducted by the Bureau of the Census indicate that at least half, and possibly three-quarters, of all bicycle trips are for utilitarian purposes.[2] During the years 1971 through 1974, more bicycles were sold than cars. Sales hit an all time high (15.3 million) in 1973, the year of the oil embargo, indicating a new awareness of the transportation potential of bicycles.[3]

Northeastern Illinois' flat terrain and variable, but not extreme, climate are conducive to bicycling. Local, regional, and state governments took note of the increased interest in cycling during the 1970's, and planning for bicycles in the six county region (Cook, DuPage, Kane, McHenry, Lake, and Will counties) has been going on for many years. Twenty-two communities and four counties or forest preserve districts had published bikeway studies or plans by 1978.[4] Some elements of these plans have been implemented; some plans have been shelved. In the years since 1978, additional local governments and agencies have become involved in planning for bicycles.

The sharing of information is an important aspect of planning for bicycles. On April 10, 1981, the Northeastern Illinois Planning Commission (NIPC) sponsored a workshop on bicycle use. Sixty-one people attended, including planners of transportation and recreation facilities; traffic engineers; local officials; law enforcement officers; bicyclists, and representatives of the bicycle industry. Ideas were presented and exchanged and a local network of interested individuals was established.

The purpose of this report is to respond to the continuing interest in the encouragement of bicycling, especially as a transportation alternative. Bicycle use neither pollutes the air nor depletes non-renewable resources. When bicycles are used instead of cars for short trips, significant savings occur: financially, for the individual; and environmentally, for the community.

Planning for bicycle use, a field less than fifteen years old, has evolved greatly. This report summarizes and discusses new directions in the planning and implementation of facilities and strategies to accommodate bicycle use, as well as the pitfalls of previous approaches. Planning for bicycle use involves, first knowing the local bicycling

public, and then determining needs and opportunities for the provision of facilities. Ways to define and involve the bicycling public and to analyze facility needs are discussed.

Experience and research have demonstrated the problems and benefits associated with the provision of bikeways. New bikeway design guidelines and other transportation improvements that help to accommodate bicycle use are described in this report. Strategies to make bicycling safer and more accessible, including education, law enforcement, and mapping, are also covered. Potential federal and state participation in the funding of bicycle facilities is discussed, along with local strategies to pay for and maintain facilities.

In addition to presenting current information on the changing field of bicycle planning, the Northeastern Illinois Planning Commission collects information about existing and proposed bikeways in the northeastern Illinois region. Major publicly administered facilities are described in this report along with basic information about bikeway development in the region.

No one publication can fully summarize the variety of experience, perspectives and research in the field of bicycle planning. Numerous helpful resources exist, including publications; workshops and short courses; and government and private agencies wholly or partly involved in bicycle planning. These are summarized at the end of this report in the hope that the exchange of ideas begun at the 1981 workshop will continue, and that bicycle use will be encouraged and accommodated in northeastern Illinois for its contribution to health and the efficiency of the transportation system.

Footnotes to Chapter 1

[1]Bicycle Manufacturers Association of America, Some Facts About Today's American Bicycle Market, 1976.

[2]U.S. Department of Transportation, Bicycle Transportation for Energy Conservation, Washington, D.C. April 1980, pp 26-27.

[3]Bicycle Manufacturers Association of America.

[4]Northeastern Illinois Planning Commission, Bikeways in Northeastern Illinois, Chicago, 1978.

Chapter 2

BICYCLES AS A TRANSPORTATION ALTERNATIVE

The encouragement of bicycle travel has been supported by national energy goals and as a transportation control measure for air quality improvement. The National Energy Conservation Policy Act of 1978 and the 1977 Clean Air Act amendments mandated the study of bicycle transportation for its current and potential impact on national energy goals and local air quality goals, respectively. An increase in bicycle travel can, at times, increase the efficiency and effectiveness of the existing transportation system by reducing the number of vehicles on congested roadways. Improved use of the existing transportation system is one of the goals of the urban transportation planning process, as promulgated by federal transportation planning requirements. Bicycles have come to be considered as an important transportation alternative by national legislators and federal agencies for many reasons. The bicycle will be compared to other modes of transportation in this chapter and the integration of bicycle travel into the transportation planning process in this and other parts of the country will be discussed.

A. ENERGY SAVINGS AND AIR QUALITY BENEFITS

The only way in which bicycles can save energy, or help improve air quality is when bicycle trips substitute for other less efficient modes, primarily automobiles. Obviously, bicycles have certain limitations as substitute vehicles. A limiting factor for the majority of bicyclists is distance. The average bicycle trip is two to two-and-one-half miles in length, although regular commuters often travel farther. It can be assumed that bicycle use can substitute for only short car trips. This fact increases rather than decreases the value of this substitution. Automobile motors are most inefficient and dirty during the first eight minutes of operation, a period called "cold start." All parts of the vehicle resist motion at first and engine lubricants perform best when warmed up. Cold engines emit approximately twice as many pollutants as do warm engines,[1] and they are energy inefficient. Automobiles get only 35 percent of their average fuel economy on trips of approximately two miles.[2] If average fuel economy is 20 mpg, these short trips are averaging only 7 mpg. In northeastern Illinois, approximately 55 percent of all home based trips are under two miles in length and most of these trips are by car.[3] A conversion of more of these trips to bicycles in combination with other strategies to increase automobile efficiency (carpooling, combining numerous small trips into one longer trip) could bring about significant energy savings and air quality improvements.

Detailed comparisons of the energy consumption of bicycles and automobiles were conducted by Eric Hirst in 1974. He found that the total energy expenditure required for bicycling amounts to 1,340 Btu (British thermal units) per passenger mile. In comparison, automobile use for trips of five miles or less requires an average of 11,200 Btu per passenger mile, or 23,000 Btu per vehicle mile. Bicycle use is at least ten times more energy efficient than automobile use. These estimates include the energy comparisons for the manufacture, transport, sale, and maintenance of cars and bikes, as well as

additional fuel requirements: gasoline for cars and extra food for cyclists.[4]

The U.S. Department of Transportation (DOT) publication, Bicycle Transportation for Energy Conservation, reports that 470,000 people commuted to work by bicycle on any given day in 1975, according to Bureau of the Census figures. When factors such as distance, time, auto dependency, physical limitations and environmental conditions are considered, the report estimates that 3.8 million workers could have commuted by bicycle in 1975. The National Energy Conservation Policy Act of 1978 required U.S. DOT to set a target goal for bicycle commuting. This goal was set as 1.5 - 2.5 million bicycle commuters by 1985. If such a shift were to occur, the report estimates that automobile travel would be reduced by 8.3 to 16.5 million miles daily, with a resulting energy savings of from 55,000 to 77,000 barrels per day, or 7.9 to 15 million barrels per year. To put these energy savings into perspective, the daily figure can be compared to expected savings of 262,000 barrels per day from ridesharing and 302,000 barrels per day from the 55 mph speed limit.[5] The DOT report discussed the many obstacles to bicycling which exist and articulated activities which federal, state, and local governments could initiate to encourage more bicycling. Primary among their recommendations is the allocation of more federal, state and local funds to bicycle projects and the integration of bicycle considerations into regular transportation planning and projects.

The Clean Air Act amendments of 1977 require that northeastern Illinois, along with all other non-attainment areas in the country, reduce levels of concentration for each of six air pollutants. Private automobiles are a major source of three of these pollutants: hydrocarbons, carbon monoxide and oxides of nitrogen. The Clean Air Act amendments list 19 possible Transportation Control Measures for reducing automobile emissions. Among these are bicycle facilities, public transportation improvements, traffic flow improvements, and ridesharing.

The air quality impact of bicycle use is even more difficult to assess than the energy impact. Air pollution takes a variety of forms, some localized, like carbon monoxide, and some regional, like hydrocarbons and ozone. National and regional air quality impacts (of bicycle use) have not been calculated, but the cost-effectiveness of bicycle facilities as an air quality measure was estimated in a recent study of a local bicycle facility. It was determined that while the facility (bicycle parking facilities at a Wilmette, Illinois commuter station) or facilities like it, do not have a major air quality impact, their impact is comparatively cost-effective.[6] Studies have indicated that a ton of hydrocarbon (HC) emissions could be reduced by public transportation improvements at a cost of between $13,319 - $895,349. Park n' Ride lots were determined to reduce HC emissions at costs ranging from $98,918 to $731,256 per ton. A study of the Wilmette facilities found that the cost-effectiveness figures of bicycle parking facilities ranged from $47,200 to $86,230 per ton of HC reduction.[7]

One limitation on bicycling, its seasonality, is, like distance, a virtue as well as a drawback. Just as the bicycle trip replaces the most inefficient part of automobile use, bicycling is most attractive during the time of year when air quality problems are most severe. Ozone is formed by chemicals from motor vehicle exhaust which react together with sunlight. High temperatures and minimal wind are prime conditions for ozone formation. It is a serious health hazard and, although strenuous bicycling during an ozone alert is not advisable, regular cycle-commuting during the spring and summer can help to

prevent the pollution responsible for ozone formation.

As an air quality measure, bicycling may never have an enormous impact, but given the cost-effectiveness of bicycle facilities and the many benefits attributable to bicycling, bicycle facilities should be included in the package of transportation control measures agreed upon by northeastern Illinois communities.

B. TIME AND COST COMPARISONS

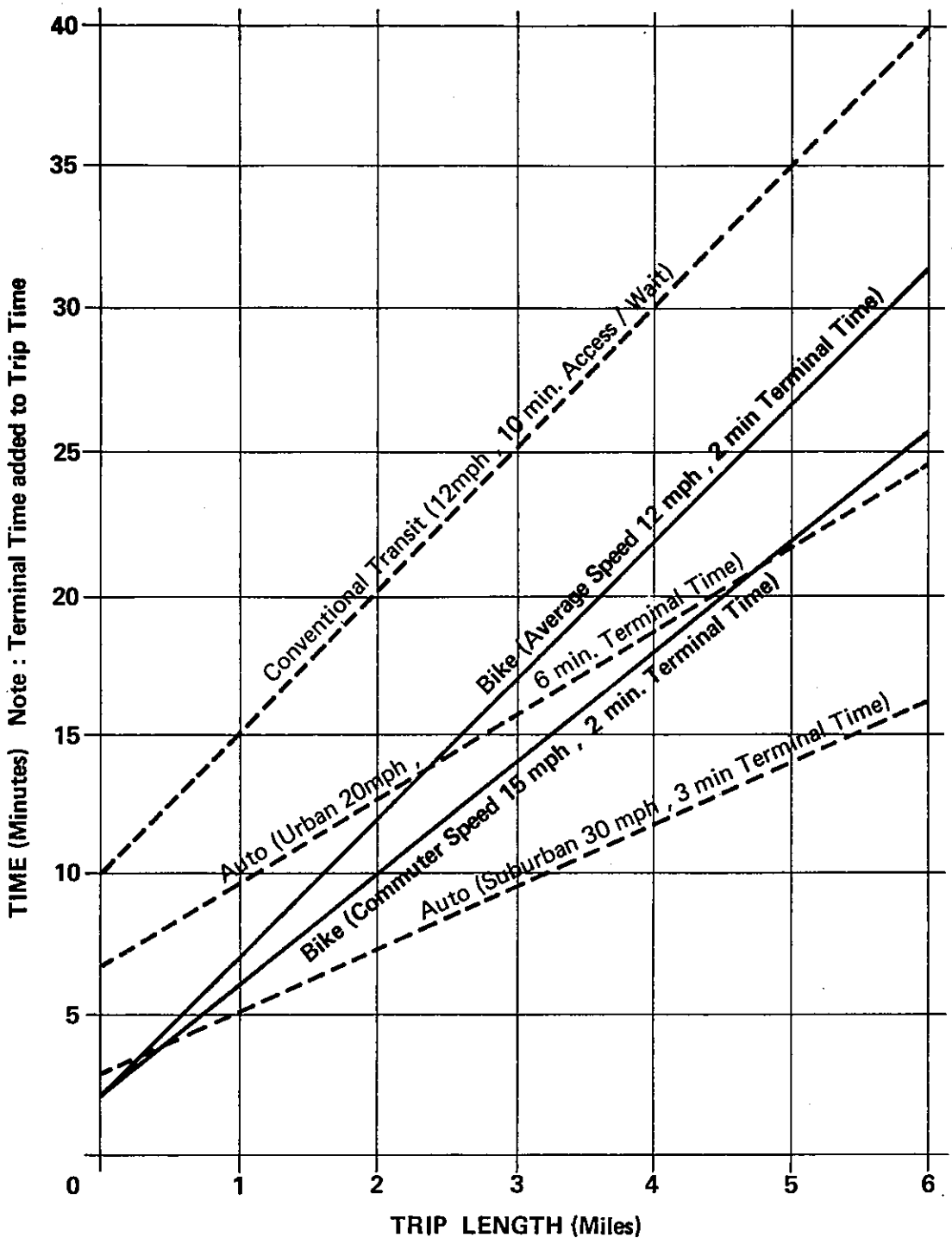
The use of a bicycle as a mode of transportation is economical, energy efficient and, in urban areas, faster than an automobile for short trips. Studies of modal choice (the choice of one type of transportation over another) have found that two important determinants are time and cost. Recent studies indicate that time is even more important than out of pocket costs for most people.[8] Because of its flexibility and the ease with which traffic can be avoided, a bicycle can be faster than a car or bus for trips up to four miles in length through congested urban areas.[9] Figure 1 shows the relationship for three modes: conventional transit, automobiles, and bicycles in urban and suburban traffic. Terminal time (i.e., parking and walking) is taken into account for cars and bikes and access and waiting time for transit. The bicycle is reasonably competitive with cars for very short trips in suburban areas and has a distinct advantage for short trips in urban areas. Bicycles are faster than transit for even longer distances.

The cost of owning and operating a bicycle is, of course, far less than for an automobile. The majority of adult bicycle users probably also own cars and in that situation it is primarily operating costs that are saved. Regular use of a bicycle for short trips and commuting can sometimes prevent the need for a second car and also saves wear and tear on the family car. Various analyses have been done to determine just how much money is saved by using a bicycle instead of a car. The Federal Highway Administration estimates that driving a car is at least fifteen times more expensive than bicycling.[10] A 1974 study by Michael Everett calculated detailed cost estimates for cars and bicycles. He assigned a cost to time spent commuting and compared costs when a car is already owned, as well as when neither a car nor a bicycle is owned and one or the other would have to be purchased. For those who value their bicycling time as a benefit (exercise or recreation) rather than a cost (time spent commuting), and for those who use a bike instead of purchasing a first or second car, bicycle commuting saved between $450 and $1,050 per year in 1974.[11] Everett's calculations were based on the assumptions that all trips would be faster by car. If the probability that many trips in urban areas could be made more quicky by bicycle than by car were taken into account, bicycling would appear to be even more economically advantageous.

C. INTEGRATION INTO THE TRANSPORTATION PLANNING PROCESS

The first wave of bicycle planning activity in the early 1970's primarily addressed the need for recreational facilities. The use of bicycles for transportation was recognized but by emphasizing the separation of bicycles from the normal flow of traffic (usually for reasons of safety), implementing agencies tended to spend more money

FIGURE 1 : TRAVEL TIME COMPARISONS



on facilities that were best used for recreation. The distinction between recreation and transportation facilities blurs in some cases. The City of Chicago Lake Front Bikeway is heavily used for recreation and yet many commuters use it as a bicycle freeway on workdays, cutting over to the Loop on local streets. The fact that many major bikeways in northeastern Illinois follow abandoned railroad rights of way is a further indication of their potential (and former) usefulness as transportation corridors. Nevertheless, an important distinction exists between the purpose of a recreational facility and a transportation oriented bicycle system. The primary purpose of any facility planned for recreation is the experience. The focus of the transportation trip is the destination. A recreational facility should be pleasant and attractive or, at least, interesting or challenging to the cyclist. On the other hand, cyclists expect the transportation system to accommodate their need to get from one place to another as efficiently as possible.

The funding and administration of facilities is also related to the purpose of the facility. Facilities have been built with recreational funds such as the Land and Water Conservation Program grants from the Department of the Interior. Park districts and forest preserve districts also build and maintain recreationally oriented bikeways.

The federal transportation funding process officially recognized bicycles as a fundable transportation alternative in the 1973 Surface Transportation Act which provided the states with the right to use $2.5 million each out of federal matching grants for bicycle facilities. Theoretically, this act should have had a dramatic impact on bicycle facilities. In some states, it did; in others, including Illinois, the impact has been minimal because bicycle projects are in competition with so many other road improvement projects. Only in those states that have legislatively set aside a percentage of their transportation budget for bicycle facilities (such as California, Michigan, Oregon, and North Carolina) has the 1973 legislation made a big difference.* For other states, bicycle facility planning has remained a somewhat haphazard activity following the ebb and flow of special federal grants for bicycles.

The 1982 Surface Transportation Act has even greater provision for bicycle projects than did the 1973 Act. Whereas the 1973 Act allowed bicycle projects to be built using the same matching formula as provided for other road improvements (from 75 percent federal and 25 percent local to 90 percent federal and 10 percent local) the 1982 Act provides for a 100 percent federal share up to $4.5 million of a state's share of Federal-Aid Highway Funds. Bicycle projects would be in competition for these funds with many other road improvements. This fact could preclude the use of these funds for bicycles except where a local match was unavailable for available federal funds. If, however, some of the improvements discussed in Chapter 4 of this report are considered, many improvements for bicycles could be implemented in combination with other

*A minimum percentage of the state gasoline tax of the Department of Transportation budget is set aside for bicycle facilities in California, Oregon, and Michigan. California and North Carolina have special bicycle facility offices, staffed with people who coordinate bicycle related research and planning with other state departments and local governments.

projects. The Act also permits the use of these funds for bicycle projects that are not within a highway right of way if they serve a transportation need.

Illinois supports a limited bicycle coordinating function in the Illinois Department of Transportation (IDOT). IDOT's bikeway coordinator in Springfield has a small percentage of his time assigned to bicycle related issues. His office, with assistance from IDOT's regional offices, administers some of the federal grants that have been available for bicycle facilities. They have also sponsored a FHWA training course on planning bicycle facilities and helped to establish a number of bicycle education and enforcement programs. The Illinois Secretary of State's Office is also involved in bicycle safety program development and education. (This program is described in Chapter 4.)

In 1974 a bill was introduced in the Illinois General Assembly to require that one percent of the State's motor fuel tax revenues be spent on bicycle facilities. This requirement was dropped but legislation was passed that mandated the appropriation of funds for the provision of bikeways. Motor fuel funds are commonly used for bikeway signs. Since bicycle projects must compete with all other road projects, very little state money is spent on bikes in Illinois compared to some other states. This lack of support is usually justified on the basis of a lack of interest. Of course, interest, especially latent interest, is hard to accurately measure. If bicycles were more adequately accommodated on roads and at parking lots, and if motorists and cyclists were better educated about their rights and responsibilities, there might be more bicycling.

Some communities in northeastern Illinois have committed themselves to bicycling as a mode of transportation as well as recreation. The Schaumburg Bikeways Plan is an element of their Comprehensive General Plan and will be implemented by a staged series of improvements. Plan objectives include the funding of the plan by the regular capital improvements program when state and federal funds are not available. The Schaumburg plan integrates many elements of a good bicycle plan, including an understanding of local needs, an emphasis on connections to major destinations and activity centers and integration with other community and forest preserve bikeway plans. It is also unusual in its emphasis on the provision of bicycle facilities in combination with other transportation projects and its commitment to implementation within the regular capital improvement program if special grants are not available.

There is currently very little federal funding allocated specifically for bicycle related projects (see Chapter 4, H), but the Department of Transportation has developed a bicycle policy which was articulated in their 1980 report, Bicycle Transportation for Energy Conservation. It is now the policy of the U.S. DOT to:

- promote the safe, increased use of bicycles for transportation,
- integrate bicycle transportation into all appropriate departmental programs and activities, and
- require the consideration of bicycle use in all appropriate DOT-funded transportation projects.[12]

The policy encourages the use of federal-aid highway grants for bicycle facilities and has revised its policies to provide for the active promotion of bicycle use and the integration and consideration of bicycle transportation in appropriate DOT programs and DOT funded transportation projects.

Many communities, as part of their commitment to clean air and energy efficiency and the health and pleasure of their citizens, are interested in improving the bicycling environment. The following chapters are intended to help communities make the most of their transportation dollars, as well as money they may have specifically put aside for bicycle facilities.

Footnotes to Chapter 2

[1]U.S. Environmental Protection Agency, MOBILE I: Mobile Source Emission Model, 1982 factors.

[2]T.C.Austin, and K.H.Helman, "Passenger Fuel Economy as Influenced by Trip Length," a paper presented at the Automobile Engineering Congress, Detroit, 1975.

[3]Chicago Area Transportation Study, 1970 Travel Characteristics - Purpose, Mode and Time of Day. Chicago, 1970

[4]Eric Hirst, "Bicycles, Cars and Energy," Traffic Quarterly, Vol. 28, No. 4, October 1974, pp. 573-583.

[5]U.S. Department of Transportation, Bicycle Transportation for Energy Conservation, Washington, April, 1980, pp. 26-32.

[6]Northeastern Illinois Planning Commission, "Transportation Control Measure Analysis: Bicycle Facilities," June 30, 1980.

[7]Chicago Area Transportation Study. "Effectiveness of Air Quality Related Transportation Control Measures and Potential for Implementation in Northeastern Illinois" January, 1981.

[8]Jack C. Page. "Speed is the Name of the Game" Technology Review, Vol. 82, No. 8, August/September, 1980, pp. 43-52.

[9]U.S. Department of Transportation, Federal Highway Administration, A Bikeway Criteria Digest - The ABCD's of Bikeways, Washington, Reprinted, April 1979, p. 7.

[10]Ibid, P. 9

[11]Michael Everett, "Commuter Demand for Bicycle Transportation in the United States," Traffic Quarterly, Vol. XXVIII, No. 4. October, 1974. pp. 585-601.

[12]U.S. Department of Transportation. Bicycle Transportation for Energy Conservation, p. 36.

Chapter 3

PLANNING FOR BICYCLES

Planning for bicycle use involves the gathering of information and the development of strategies to accommodate and encourage bicycling. Planning specifically for bicycles is a new and changing field. Past mistakes are regularly discovered and new directions are evolving.

The planning of bicycle facilities involves:

- o a knowledge of the laws affecting bicycle use;
- o an understanding of the characteristics of bicycle users and bicycle use patterns;
- o an assessment of facility and program needs;
- o the involvement of citizens; and
- o an implementation strategy.

In addition to the pitfalls and new directions affecting bicycle planning, this chapter will discuss the legal status of bicyclists; bicycle user groups and use patterns; facility needs; and, citizen involvement. Specific techniques and strategies to implement improvements for bicyclists will be discussed in Chapter 4.

A. PITFALLS AND NEW DIRECTIONS

Bicycle planning used to be thought of as the development of a plan to provide a bikeway system, preferably an interconnected grid of paths, lanes and signed routes that would meet the recreational as well as the transportation needs of bicyclists. One of the goals of this approach was to solve the "bicycle problem" which consisted of the inconvenience, fear, and occasional accidents resulting from the mix of bicycles and automobiles. Common to this approach to bicycle planning was a bias in favor of separate bicycle paths called Class I bikeways, with Class II striped lanes next in line of preference and bike routes (Class III, designated by signing only) used when the others could not be provided. Experience and a tight economy have brought this approach into question. Additionally, research has indicated that in some circumstances the provision of bikeways actually reduces safety. (See Chapter 4.)

Most communities quickly found that such plans were prohibitively expensive and tried to provide a scaled down version. As a result, good recreational bikeways and limited transportation routes were sometimes provided. Too often, however, bikeways have been constructed piecemeal, where the opportunity exists, rather than as part of an implementable system; linear systems have been partly constructed leaving gaps which

greatly limit their usefulness; or, bikeways have been provided to divert traffic from busy streets on to routes that might be safer but don't go anywhere.

Devising ambitious bikeway plans, waiting for federal grants (which are always very competitive) to finance them, and then, building piecemeal demonstration projects, does little to accommodate bicycles as a transportation alternative. A bikeways system cannot, in most communities, provide for the diverse travel needs of most bicyclists.

It is now widely acknowledged that the existing road system, augmented by bikeways, must serve the travel needs of bicyclists, as well as other vehicles. Bicycle planning should be coordinated with planning for other transportation modes. The Federal Highway Administration's (FHWA) proposed "Design and Construction Criteria for Bikeways" and the Guide for Development of New Bicycle Facilities published in 1981 by the American Association of State Highway and Transportation Officials (AASHTO) are the official expression of this new approach to bicycle planning. The FHWA proposal states that, "Plans for implementing bicycle projects must be in harmony with a community's overall goal for transportation improvements,"[1] and the AASHTO Guide furthermore points out that, "To varying extents, bicycles will be ridden on all highways where they are permitted. All new highways, except those where bicycles will be legally prohibited, should be designed and constructed under the assumption that they will be used by bicyclists."[2]

AASHTO has traditionally been accepted by highway engineers as the arbiter of design specifications for roadway improvements. This new guide summarizes planning and design principles that have evolved over the last ten years and represents a fundamental shift in the consideration of bicycles as a transportation mode. Each state is examining the new bicycle guide and Illinois will soon decide whether or not to endorse it. The Illinois Department of Transportation (IDOT) currently endorses the old AASHTO design standards and expects to adopt the new guide with the possible exception of some facility design specifications. Adoption of the AASHTO guide means that it would be sited in the IDOT Bureau of Location and Environment Manual of Policy and Procedures (Section 3-240) as the basic design guide for the development of bicycle facilities built in conjunction with new and reconstructed roadways. It would be enforceable for all projects using state and federal funding. The AASHTO guide, however, should be consulted for planning and design considerations by communities considering improvements for bicycles, regardless of the source of funding.

If the bicycle is to be accepted and encouraged as a transportation alternative, an integrated approach to planning is a necessity. The AASHTO guide states that:

> "Existing highways, often with relatively inexpensive improvements, must serve as the base system to provide for the travel needs of bicyclists. Bicycle paths and lanes can augment this existing system in scenic corridors or places where access is limited."[3]

A Bicycle Element for the Year 2000 Transportation System Development Plan* was adopted by the Northeastern Illinois Planning Commission on September 22, 1983. The main principle of this proposal is that:

- Bicycles should be routinely considered when transportation improvement and maintenance decisions are made.

In addition to the use of the existing transportation system, bicycle planning can take advantage of other available opportunities to improve the bicycling environment:

- planning should be coordinated with adjacent communities and jurisdictions;
- special opportunities such as available linear corridors should be assessed for potential as bikeways; and
- the need for continuity should be recognized whenever bikeways are planned.

Other planning considerations affect, and can be affected by, bicycle use as well. Certain land use patterns have been found to be the primary determinant of the level of bicycle use in communities. A recent study by Barton-Aschman Associates for the Federal Highway Administration evaluated strategies that could encourage a shift away from automobile use.[4] The factor or strategy that most positively influenced bicycle use and walking was compact land use. Other strategies considered, in decreasing order of importance, were congestion fees, fuel price increases, and pedestrian and bicycle facilities. These findings illustrate the interdependency of our transportation and land use decisions. If communities wish to encourage a greater mix of transportation alternatives, the pattern of business, retail and residential development, may have as much impact as decisions about transportation investments.

There is a great deal of material available on bicycle planning. A course called Pedestrian and Bicycle Considerations in Urban Areas produced for the Federal Highway Administration (FHWA), is very worthwhile. The course is no longer sponsored by FHWA but is still offered at the Northwestern University Traffic Institute by one of its developers, Alex Sorton. Although it is most useful in the context of the course, the notebook produced for the course is helpful to planners. Other excellent sources of information for planners, engineers and citizens are Bicycle Forum, a quarterly publication covering many aspects of bicycle planning and Pro Bike News, a monthly newsletter. The publication of the League of American Wheelmen, American Wheelmen is another valuable resource, especially for its information on the legal and legislative aspects of bicycling. (See Appendix D for information on these and other publications.)

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*The Year 2000 Transportation System Development Plan articulates the policies and priorities that will guide transportation planning in the six county region of northeastern Illinois.

B. LEGAL STATUS OF BICYCLES IN ILLINOIS

The legal status of a bicycle is outlined in the Illinois Motor Vehicle Code and summarized in Bicycle Rules of the Road, (available from the Secretary of State's Office). Although the vehicle code does not define the bicycle as a vehicle, it does give the bicyclist on the roadway most of the same rights and responsibilities of the operator of a vehicle. The bicyclist is required to ride on the right side of the road, obey all traffic laws and to have certain equipment on his bicycle. All planning for bicycles should, and to comply with federal funding must, comply with the state vehicle code and local ordinances.

The Uniform Vehicle Code on which most state vehicle codes are modelled was revised in 1975 to define a vehicle as:

> "Every device in, upon, or by which any person or property is or may be transported or drawn upon a highway, excepting devices used exclusively upon stationary rails or tracks," (UVC, Supp. II, 1976, Sec. 1-184),

a definition that would include the bicycle. Illinois has not as yet changed its vehicle code to comply with this change. Many cyclists think that defining the bicycle as a vehicle would reinforce the acceptance of bicycles on the road.

Compliance with the law to ride on the right side is sometimes inadvertently impeded by the provisions of a two-way bikeway adjacent to a road. Since the bikeway usually extends for a limited distance, the bicyclist must at some point reenter the roadway. At this point those travelling against traffic must either cross the road or enter on the wrong side. Frequently, this problem is compounded by bikeways which do not end at intersections. Two-way bikeways adjacent to roads are not recommended, but where there there is no alternative, an attempt should be made to end the bikeway at an intersection and provide signing to remind bicyclists to reenter traffic on the correct side of the road. Wrong-way riding is a major cause of bicycle/motor vehicle accidents and every attempt should be made to clarify and enforce riding on the right.

One of the biggest controversies surrounding the provisions of the vehicle code which relate to bicycles is the requirement that, "wherever a usable path for bicycles has been provided adjacent to a roadway, bicycle riders shall use such path and shall not use the roadway." The requirement is unpopular with certain cyclists who maintain that many bikeways are unsafe. These cyclists would prefer to choose between using the road and using a bikeway. The League of American Wheelmen (LAW) has recommended that this section of the vehicle code be either deleted or amended to limit the requirement to bicyclists under the age of 13 years, unless the child is accompanied by an adult. The LAW argues that where the path is superior, most bicyclists will choose to use it without being required to do so. If the bikeway is poorly designed or maintained, or if conflicts with pedestrians are common, the bicyclist would be safer using the road. This provision has recently been repealed in Virginia and Wisconsin.[5]

Changes to the Illinois Vehicle Code were recently made by the Illinois legislature (Public Act 83.0132). The new provisions do not alter the requirement that bicyclists

must use bike paths when they are provided, although there was considerable support for that change. The law does, however, include new specifications for bicycles on the roadway. A bicycle is still required to travel "as close as practicable to the right-hand curb or edge of the roadway," but provisions have been added for those circumstances in which a bicyclist might ride in a regular traffic lane. These circumstances include turning left and traffic lanes too narrow for the safe accommodation of a bicycle with another vehicle.

The Illinois Secretary of State's Bicycle and Pedestrian Sub-Committee monitors bicycle and pedestrian issues. It suggests changes to the Illinois Vehicle Code, and the Bicycle Rules of the Road to improve safety. The committee meets monthly and its recommendations are reported to the Illinois Traffic Safety Council and are sometimes introduced as bills for legislative consideration. Suggestions from local government and citizens are welcomed by the committee which can be reached through the Pedestrian and Bicycle Safety Division, Illinois Secretary of State's office, 5401 N. Elston, Chicago, Illinois 60630.

An issue of great concern to local communities is their liability when an accident occurs on a public facility. This is a complicated issue. A bill was introduced in the Illinois legislature that would eliminate the liability of adjacent landowners for accidents that occurred on publicly designated trails that cross their properties. It was defeated but might be reintroduced. Similar legislation to limit or define the liability of communities for accidents involving bicycle facilities could be considered. However, variations in facilities might make such legislation impossible.

The vehicle code provision requiring mandatory use of bikeways, as well as local ordinances concerning similar requirements, should be examined in light of liability, as well as safety considerations. Liability might be greatly increased where a bicyclist is required to use a less than adequate facility. Personal choice might both increase rider safety and decrease the liability of local jurisdictions.

C. USER GROUPS AND BICYCLE USE PATTERNS

The goal of planning for bicycles is the provision of improvements, facilities and programs which will help to accommodate safe bicycle use. The first question to address concerns the types of bicyclists and bicycle trips that need to be accommodated. What is the age and ability of the range of bicyclists in your community? What types of trips do they make, at what distance and frequencies, and to what destinations?

1. The National Picture

National surveys provide general information about user groups and the type of bicycling they do. Summarizing data from a number of surveys, the FHWA course Pedestrian and Bicycle Considerations in Urban Areas estimated that there are 70-90 million bicyclists in the United States. It is one of the most popular sports in the country and a significant form of transportation, as well. Long term sales trends and surveys seem to indicate a continual increase in the rate of participation.[6] One national survey found

that participation increased from 32 to 36 percent of the population between 1973 and 1976.[7] A recent survey conducted for the Huffy Corporation estimates that there are currently as many as 100 million people (or almost half the population) who bicycle in the United States.[8]

Bicyclists can be divided into three general groups:

- o children under the age of 16;
- o average and casual adult bicyclists; and
- o expert bicyclists.

Approximately three-quarters of all children bicycle and this group accounts for close to half of all bicyclists. Children are involved in 75 percent of all bicycle/motor vehicle accidents.[9] The Huffy Corporation survey found that 40-45 percent of bicyclists between the ages of twelve and seventeen (the youngest group surveyed) use their bicycles for transportation purposes and that 43 percent of 14-17 year olds use their bicycles every day. Much of the bicycling of children is local, using residential streets and off-street bikeways.

The average adult (over 16) rider makes up most of the other half of the bicycling population. Most of this group rides occasionally, usually preferring local streets and off-street bikeways. This is the group among which bicycling participation is growing fastest. Between 1973 and 1976, participation increased by 30 percent among adult women and by 18 percent among adult men.[10] Most of the bicycling among this group is recreational, but the Huffy survey found that while younger people more often claimed to use their bicycles for transportation, 28 percent of adults between 18 and 54 also claimed this reason for bicycling. Among bicycle owners between the ages of 18-22, 29 percent said they road every day and 31 percent said they rode all year round.

Approximately 10 percent of adult bicyclists can be categorized as expert. Included among this group are regular bicycle commuters and touring bicyclists. These bicyclists make longer trips and use their bicycles for more work and school trips than do other bicyclists.[11] Although they represent a small number of individuals, the length, regularity and purpose of their trips make this group a significant constituency for transportation oriented bicycle improvements. They are also a significant group because they set an example and show what is possible for less experienced bicyclists. Their experience often gives them a realistic perception concerning possible and economical improvements. Accommodating the needs of this group might encourage casual bicyclists to bicycle more frequently and safely as obstacles are removed.

Extensive surveys at the national and state levels also give an indication of the types of trips made by bicyclists. Bicycle trips are generally divided between utilitarian and recreational. There is overlap between these trip types and confusion about how to categorize them. If the trip has some destinational purpose, it is probably fair to say that it has a transportation component. Destination specific trips include trips for work, school, errands and personal business. Also included are trips to recreational facilities and for recreational purposes such as social visits. Utilitarian trips make up roughly half of all bicycle trips. The other half are recreational trips where the primary purpose is

the bicycling activity rather than the destination. Bicycle touring, bicycling for exercise, tension release, and general enjoyment fall within this category.[12]

In an analysis of reasons for bicycling rather than types of trips, the Huffy survey found that 30 percent of all bicyclists gave transportation as one reason they bicycle. They also found that bicycles are used more for errands than for commuting. The percentage of bicyclists claiming various reasons for bicycling in the Huffy survey are summarized in Table 1.[13]

The average length of most bicycle trips has been found to be two to two and one-half miles. However, regular bicyclists average much longer trips. The members of the League of American Wheelmen who were surveyed by Kaplan made trips that averaged four miles for work or school and eleven miles for recreation. Some of the implications of the substitution of bicycle trips for short automobile trips are discussed in Chapter 2.

National surveys and surveys conducted in other states offer very general statistics which can serve as rough guidelines concerning local bicycling patterns, but cannot be relied upon for detailed planning. If the information from the surveys mentioned above is extrapolated for the northeastern Illinois region it can be assumed that 3 million people bicycle in the six counties. If 30 percent of these people sometimes use their bicycles as a form of transportation, then close to one million or one out of seven people use a bicycle for transportation purposes in this region. Many planners believe that the transportation use of bicycles is insignificant. What is known about bicycling use patterns would suggest otherwise. Table 2 summarizes some of the information on bicyclists that current surveys have yielded.

The available data about bicyclists and bicycle use patterns indicates that there are different types of bicyclists with different needs. Clearly, the emerging group of experienced commuters and tourists are better able to integrate with automobile traffic than are children and inexperienced adults. Experienced riders travelling at 16-20 mph would actually constitute a hazard on many separate bikeways which are shared by bicyclists, runners, strollers and roller skaters. They are often better accommodated on the street. Flexibility and knowledge about local bicyclists and use patterns are needed for local planning.

2. Assessing Local Bicycle Use

When planning bicycle improvements, it is important to have information about the local bicycling population and trip patterns. Surveys and other data collection techniques can be helpful.

The most frequently used survey techniques are:

- o home interviews;
- o telephone surveys;
- o mail-out surveys; and
- o spot surveys at trip generators.

TABLE 1

REASONS FOR BICYCLING, AGES 14-54

Exercise	Fun	Outdoor Enjoyment	Tension Relief	Transportation	Family/Social Activity
60 %	50 %	40%	31 %	30 %	25 %

TABLE 2[14]

BICYCLISTS' COMPOSITE

	Total No. in U.S.- (million)	No. in Northeastern Illinois- (million)	Average Bicycling Speed- (mph)	Preferred Bicycling Environment	Average Trip Length- (miles)
All Bicyclists	70-100	3			
Children (under 16)	40	1.4	6-12	local streets, sidewalks, separate bikeways	2-3
All Adults	45	1.6	6-12	local streets, separate bikeways	2-3
Expert Adults (10% of Adults)	4.5	160,000	16-20	major arterials	4-11

Home interviews are most costly and provide the best opportunity to gain in-depth information. Telephone surveys are very effective for obtaining basic information about the frequency of bicycle use, trip purpose and length. Mail out surveys are inexpensive but response rates are often low. Spot surveys at trip generators are helpful in determining average trip distances and frequencies. Spot surveys must usually be very brief. Other methods of data collection include:

- o counts of bicycles parked at major generators;
- o use of bicycle registration information;
- o surveys of selected populations at schools or employment centers; and
- o inclusion of bicycling in origin destination surveys and traffic counts and analyses conducted by regional, state, and local transportation planning agencies.

Counting bicycles at major generators, especially before and after a facility is provided or improved, is a very quick and inexpensive technique. Counts can and should be performed to document actual use change. This information can be used to assess the value of investments in bicycle facilities and to project potential use. Bicycle registrations can provide minimum estimates of bicycle use although people often do not register their bicycles. Bicycle registration can also provide an opportunity to briefly survey bicyclists. Where there is some indication of interest in bicycle improvements, selected populations can be surveyed to assist with the planning process. This can generally be done inexpensively and can be useful in determining the value of a specific investment. Local, regional and state planning agencies regularly collect information on transportation needs and traffic patterns. Data about bicycle use could be gathered at minimal expense along with the information currently generated by these efforts. A report by the California Department of Transportation (CALTRANS) discusses the use of classifying counters, normally used to count trucks, to count bicycles.[15]

There is no one best survey design that has been developed for local bicycle planning efforts, but reliable sampling techniques[16] and careful design should be used. The key variables about which information should be gathered include:

- o the length and frequency of bicycle trips;
- o the purpose of bicycle trips with respect to destination or non-destination orientation and recreational or utilitarian purpose; and
- o the age group of bicyclists by trip length, frequency and purpose.

Other variables of interest for bicycle planning include:

- o bicycle ownership;
- o bicycle accidents: numbers and location;
- o bicycle thefts;
- o deterrents to bicycle use;
- o attitudes toward bicycle use and perceptions concerning safety and increased usage;
- o suggestions for particular improvements; and
- o demographic characteristics of respondents.

The analysis of survey data for a given local area or trip generator should provide a summary of the magnitude and frequency of bicycle use by age group and trip purpose. The average yearly, seasonal, monthly and daily use levels should also be calculated if data is available. Significant age groupings are:

- o children - through age 15;
- o young adults, ages 16-44;
- o older adults, 45 and older.

Some surveys use smaller age increments but the FHWA course, Pedestrian and Bicycle Considerations suggests, and most surveys use, these general categories because they represent distinct travel options (children under 16 do not have access to cars), and important variations in lifestyle.

Projecting future bicycle use is very difficult except as a variable of changing population. Sometimes calculating a range of potential use can be valuable. If average bicycle trip length and frequency can be established (through a survey) and if data is available on residential patterns and total numbers of trips to a particular generator, then a range of possible bicycle trips to that generator can be calculated. The largest possible number of trips would be all trips to that generator within average bicycling distance. The smallest number of trips would be those currently being made by bicycle to the generator. This method provides very rough parameters within which the potential for bicycling trips would fall. Such a projection could be further refined by accounting for other known factors affecting bicycle activity in the area. For instance, climate, age distribution, the nature of the trip generator and known obstacles to bicycle use would all affect potential use.

Whatever method is used to project future use, it is very important that assumptions concerning future conditions and circumstances affecting bicycling be clearly defined and reasonable. Moderate rather than extreme assumptions should be used. For instance, one of the most widely used studies of bicycling conducted in the early 1970's projected use on the basis of a complete half mile grid of bikeways. It is now clear that such a network is not the most desirable way to accommodate bicycles and would be im-

possibly expensive. Even at the time, this assumption must have seemed fairly unrealistic. The value of identifying characteristics of local bicycle users and use patterns is that an objective assessment can be made of the need for greater attention to bicycle planning.

D. FACILITIES NEEDS ANALYSIS

Once a community has an understanding of bicycle users and use patterns, this information can be combined with an assessment of the bicycling environment to define the need for improved facilities and programs to accommodate bicycling. To analyze the need for improvement, the following steps should be taken:

- o identify bicycle trip generators - current and potential;
- o identify opportunities for linear bicycle trail development;
- o identify accident locations and patterns; and
- o evaluate streets for bicycle suitability.

1. Bicycle Trip Generators

Bicycle trip generators include the same range of destinations as for other modes. Certain destinations, however, because of their distance from residential areas are more likely to be reached by bicycle. These include trips to:

- o schools,
- o local shopping areas,
- o transit stations,
- o some places of work,
- o parks and recreation centers, and
- o major recreational bikeways.

A capture area based on average (national or locally determined) bicycling distances for various purposes can be drawn around trip generators to delineate priority planning areas.

2. Bicycle Trail Opportunities

Opportunities for linear bicycle trail development should be identified in a bicycle plan so that steps can be taken to preserve the corridor. Examples of such opportunities include:

- o river banks and flood plains;

- o abandoned railroad rights of way; and
- o utility corridors.

The acquisition and development of these corridors often requires years of planning, negotiations, and complex inter-jurisdictional agreements. Two examples of proposals that have been planned and studied for some time, but not yet developed, illustrate some of the problems. A section of the East Branch of the DuPage River in DuPage County has been under consideration for trail and eventual bikeway development for a number of years. It would provide a useful connection between the Churchill Woods Forest Preserve, the Illinois Prairie Path (which it would intersect) and the Morton Arboretum. A number of local municipalities, park districts, and the county development department and forest preserve district, as well as the Illinois Department of Transportation and the Northeastern Illinois Planning Commission, have been involved in the proposal and evaluation of plans for the corridor. Some agreements have been worked out for hiking trail implementation as a result of a year long project called the East Branch Open Space Management Study, and a Commonwealth Edison right of way adjacent to the river has been identified for possible development as a bikeway. Further funding and maintenance agreements will be required before it can be implemented.

Another very good opportunity for bikeway development is an abandoned railroad right of way, the Penn Central in southern Cook and northern Will counties. The proposal to use the corridor for bikeway development has existed since the 1976 publication of the Will County Bike Trail report. The project has been held up by difficulty with acquisition and concern over proper title transference if the property is acquired. Over the years, it has been difficult to maintain financial commitments from the numerous municipalities and agencies involved as local needs change. Planning and implementation of major bikeway facilities requires plenty of time and difficulties are common. Opportunities for such developments are, however, limited and each step toward implementation is worth pursuing because valuable corridors might otherwise be lost to other types of development. Many valuable bicycle trails have been successfully implemented in northeastern Illinois (see Chapter V). With foresight, remaining opportunities will not be lost.

3. Accident Patterns

Bicycle accidents and concerns about safety are two of the most commonly mentioned deterrents to bicycling. Safety is a major concern of bicyclists and planners, and with good reason. The National Safety Council reports that motor vehicle/bicycle accidents result in approximately 1,000 fatalities and 40,000 disabling injuries every year. The number of injuries is probably greatly underestimated because only those injuries that are reported to police are included. The age distribution of bicyclists involved in these accidents has changed with the changes in bicycle use that have occurred. Twenty years ago more than three-quarters of all bicycle accident fatalities were children aged 14 years and under. By 1975 that age group represented roughly half of all fatalities,[17] a tragic reality, and one that might be preventable. The National Highway Traffic Safety Administration (NHTSA) sponsored a four year study which identified basic bicycle accident types, causal factors and target population groups. The first part of the study entitled, "Bicycle/Motor Vehicle Accident Types," by Kenneth Cross, found that

bicyclists were at fault 60 percent of the time, and that most of the types of errors made would seldom be committed by a reasonably knowledgeable and safety conscious bicyclist.[18] The second part of the NHTSA study has recently been published. It is a three volume report called Identification and Development of Countermeasures for Bicyclist/Motor Vehicle Problem Types by Richard Blomberg, et al. of Dunlap and Associates. The countermeasures include a 20 hour school program for 4th graders, a parents pamphlet and an enforcement brochure (Volume I); various media messages for television and printed communications (Volume II); and eight model ordinances which address traffic behavior (Volume III). The various measures have not yet been tested and only lesson plans rather than the complete curriculum for the fourth grade program are included. The three volumes are available from:

- National Technical Service
  Springfield, Virginia 22161
- Price: $11.50 for each volume
- Request document numbers PB83223917, PB83223925, and PB83223933, for Volumes I, II, and III, respectively.

Planners can use the Cross methodology or a similar approach when investigating the bicycle accidents in their community. Bicycle accident locations can be inspected to identify any physical hazard which may have contributed to the accident. Traffic patterns, time of day, age and experience of the cyclist should all be noted, along with a description of the accident. The accidents may then begin to fall into types or categories based on common causes. Once these similarities are recognized, preventive measures can be developed. The preventive measures can be physical improvements such as installing safe sewer grates, stricter enforcement of traffic laws, or an improved bicycle skills and safety education program.

A third part of the NHTSA study is producing materials helpful to this effort. An accident typing kit is available, and a program assessment kit to evaluate the relevance of a safety education program to the most common types of bicycle accidents occurring in a community should soon be available. The accident typing kits are called CAT/MAT for "Computer Accident Typing," and "Manual Accident Typing." They are available from:

Office of Program Assistance
National Highway Traffic Safety Administration
400 7th Street, S.W.
Washington, D.C. 20590
202/426-1760

Motor vehicle/bicycle accidents account for only one percent of all bicycle related accidents. The overwhelming majority of bicycle accidents involve falls of various sorts, the best protection for which are probably helmets and increased skill on the part of the bicyclist.

4. Evaluation of Streets for Bicycle Suitability

As a consequence of an analysis of bicycle use patterns and consultations with local bicyclists, general street corridors in greatest demand or in need of improvement for bicycle use can be identified. These corridors will generally be identified by currently high bicycle use and/or intersection with trip generators. Typically, a corridor to be analyzed for bicycle suitability would cover an area from two to six blocks in width and any number of blocks or miles in length. Generally bicyclists, just like motorists, look for direct, convenient and reasonably safe routes to common destinations. "Traditionally, bicyclists have not proven to be readily divertable to bike route facilities beyond a two to four block distance."[19] Therefore, the street system must be evaluated, and if certain routes are to be recommended, they must respect the desire for directness while at the same time identifying those factors which make one street a better choice than another for bicyclists.

The primary factors that determine a street's bicycle suitability are:

- o traffic volumes,
- o traffic speed, and
- o pavement width.

These factors, and others, are interrelated such that one can modify the impact of another. A street having generous width can more safely accommodate bicycles along with high motor vehicle volumes and speeds than can a narrower street. Other conditions affecting on-street bicycle use include:

- o cross-traffic conflicts at
  - intersections,
  - driveways, and
  - alleys;
- o parking (automobile) conditions, including
  - type: both sides, alternate side, restricted time, and
  - occupancy;
- o pavement conditions, including
  - surface type and irregularities, and
  - sewer grates: type and location;
- o sight distance considerations, including
  - signs, hedges, parking, driveways;
- o traffic mix considerations, including
  - bus and truck traffic as deterrents;
- o grade conditions;

- o bicycle volumes;
- o street maintenance, including
  - cleaning schedule, and
  - resurfacing schedule;
- o obstacles, including
  - bridges,
  - railroads,
  - traffic bottlenecks,
  - rivers, and
  - limited access highways;
- o Amenities, including
  - bicycle parking,
  - attractive route, and
  - bicycle repair shops.

Consistent, generally applicable guidelines have not been developed for these factors. Attempts have been made to standardize acceptable traffic volumes and other conditions for various types of bikeways.[20] Such standards are limited in their applicability to various situations and no system of standards has yet been developed that accounts for the interaction of all the conditions that affect the bicycle suitability of streets.

The goal of bicycle planning should be a subjective, but informed decision about the bicycle suitability of all or selected streets within the identified corridors. Data should be collected and organized on the factors and conditions listed above. Information on traffic volumes and speeds and pavement and lane widths is usually available from local traffic engineers, county highway departments, or the Illinois Department of Transportation. Information on some of the other conditions will be available from the same sources and information on other conditions can be gathered through on-sight observation. Conditions such as pavement irregularities, street maintenance, and the seriousness of certain obstacles can best be evaluated from a bicycle. Local bicyclists, through clubs, shops, or advisory groups, can be very helpful for some aspects of this evaluation.

Appendix A presents a description of five major types of streets developed by John Williams. A street evaluation methodology presented in Pedestrian and Bicycle Considerations in Urban Areas is presented in Appendix B. The two phase approach to street evaluation and the rating form, or a variation of it, can be usefully applied in most situations. Lacking a definitive methodology, the approach described here and in Appendix B will yield a framework within which decisions can be made. Bikeway development could be the goal of a street evaluation, but not necessarily. The accommodation of bicyclists should become a regular consideration in road improvement programs as previously discussed. Other projects, including the production of maps for bicyclists (see Chapter 4) can make use of suitability information. Knowledge about local streets must be part of the types of improvements and accommodations to be implemented.

E. CITIZEN INVOLVEMENT

The success of a plan to encourage and accommodate bicycling depends on citizen involvement. In addition to the planners, traffic engineers, police, and public works staff who have traditionally been involved in bicycle planning, many other groups should be involved. Some of these are:

- bicycle clubs,
- school boards,
- PTA's,
- chambers of commerce,
- service groups,
- environmental groups,
- student organizations, and
- neighborhood groups.

Citizen involvement is needed for the development of ideas and goals; plan and project review; and assistance with implementation. The traditional reasons for citizen involvement such as the development of consensus and minimization of future conflict are valid in the case of bicycle planning. Also, bicycle planning is a new and changing area. Consistent standards and accepted approaches are still evolving. Many situations call for individualized solutions and informed decision-making. The experience and needs of various groups are really necessary to discover the best approaches and solutions.

Some of the activities that citizens can help with include:

- identification of needs and opportunities;
- identification of bicycle use patterns and problems through observation or assistance with surveys and inventories;
- on-bike evaluation of streets for bicycle suitability;
- formulation and review of plan proposals;
- sponsorship of special events and public information drives; and
- fund raising.

An important resource for planners exists in the network of bicycle clubs throughout the six counties of northeastern Illinois. These clubs sponsor regularly scheduled rides using local roads and biketrails. Their members are well acquainted with local roads and their potential for bicycle use and with local obstacles and impediments. The clubs represent a group of bicyclists who can be readily consulted through their presiding officers and regular members. Local bicycle shops sometimes serve as a meeting place and focus of organization for clubs. A list of bicycle clubs can be obtained from the League of American Wheelmen (see Appendix D).

School boards and PTA's are often interested in bicycling because of the many children who ride their bicycles to school. Schools are frequently in touch with police departments because of "Officer Friendly" and bicycle rodeo programs, but this involvement should extend to facility planning, enforcement and the drafting of local ordinances affecting bicycle use.

Chambers of commerce, service groups, and bicycle clubs can be very effective at raising funds for bicycle planning and facilities. The Miami Valley Regional Bicycle Committee in Dayton, Ohio, raised more than $126,000 for bicycle programs through a bike-a-thon in the spring of 1980. This effort was organized with the assistance of the local chamber of commerce.

Most communities with successful bicycle planning efforts have used bicycle advisory groups made up of citizens, officials, and representatives of various agencies and departments that might be interested in bicycle planning. Such groups can provide continuity and coordination for planning efforts. They provide a liaison between government and interested citizens and a format for the discussion of problems and issues. Bicycle planning and programs often lack coordination. In one community the park district, a number of departments of municipal government, the police department, and the schools, can be involved in bicycle programs without each knowing what the other is doing. Also, bicycle considerations are often ignored or forgotten when decisions about road improvements and traffic management strategies are made. A bicycle advisory group could not only coordinate existing programs, but also remain informed about elements of the transportation planning process that affect bicycle use.

Northeastern Illinois has adopted, through regional planning agencies, a long range transportation plan called The Year 2000 Transportation System Development Plan (TSD) and a short range list of programmed improvements called the Transportation Improvement Program for Northeastern Illinois (TIP). These set the overall goals for transportation and list all planned improvements which involve federal funding. The bicycle element of the Year 2000 Plan was reviewed at public hearings in August of 1983, and was considered by the councils of mayors (subregional groups of mayors whose task it is to decide on the allocation of transportation funding in the region), in September of 1983. Interested citizens should continue to express their concerns to local officials.

Many of the projects listed in the TIP impact bicycles. Local bicycle advocacy groups and interested citizens should become informed about these federally funded improvements, as well as locally funded projects, and let their local officials know about their concerns.*

Bicycle planning efforts can and should be affected in two ways by citizen involvement. The planning effort can be improved and citizens can become better informed about the existing planning processes affecting bicycling.

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*Information about the regional transportation planning process is available from the Chicago Area Transportation Study and the Northeastern Illinois Planning Commission.

Footnotes to Chapter 3

[1]Federal Highway Administration, U.S. Department of Transportation, "Design and Construction Criteria for Bikeway Construction Projects," Federal Register, Vol. 45, No. 151, Monday, August 4, 1980.

[2]American Association of State Highway and Transportation Officials, Guide for Development of New Bicycle Facilities, Washington, 1981, p. 8.

[3]Ibid, p. 3.

[4]Barton-Aschman Associates, Feasibility of Demand Incentives for Non-Motorized Travel, U.S. Department of Transportation, Federal Highway Administration, 1981.

[5]Ralph Hirsch, "Bicycle Legislation Passes; League Sets 1981 Priorities." American Wheelmen, Vol. 17, No. 1, January, 1981.

[6]Schwinn Bicycles, U.S. Bicycle Market Statistics, 1895-1981, March, 1982.

[7]Barton-Aschman Associates, Inc., Bicycling in Pennsylvania: An Inventory of Users, Facilities and Programs, Pennsylvania Department of Transportation, March, 1976.

[8]Private Survey for the Huffy Corporation by Yankelovich, Stelley and White, 1980, unpublished.

[9]Traffic Institute of Northwestern University, Pedestrian and Bicycle Considerations in Urban Areas, U.S. Department of Transportation, Federal Highway Administration pp. 14-5 - 14-6.

[10]Ibid, p. 14-6.

[11]Jerrold A. Kaplan, Characteristics of the Regular Adult Bicycle User, FHWA-R6-76-7, July, 1975.

[12]Traffic Institute of Northwestern University, p. 14-7.

[13]Huffy Corporation Survey.

[14]Information for table is a composite of data from the Kaplan, Barton-Aschman and Huffy Corp. surveys and the FHWA course.

[15]CALTRANS, "Bicycle Counting Using Classifying Counters," available from Office of Bicycle Facilities, CALTRANS, 1120 N. Street, Sacramento, California 95814.

[16]For a discussion of sampling techniques see, Susan Hanson and Perry Hanson, "Problem in Integrating Bicycle Travel into the Urban Planning Process," Transportation Research Record 570, Washington, 1976; and Jesse Blatt, "Bicycle

Program Surveys," Proceedings Pro Bike '80, The Bicycle Federation, Washington, D.C., 1980.

[17]Dan Burden, "Bicycle Accident Facts," Bicycle Forum, Vol. 1, Spring 1978, p. 12-6.

[18]Kenneth Cross, "Bicycle/Motor Vehicle Accident Types," Bike Ed '77, A Conference Report, DOT/FHWA/HHI-2, February 1980. For further information on the NHTSA bicycle safety research program, contact: Office of Driver and Pedestrian Research, NRD-40, NHTSA, Washington, D.C. 20590.

[19]Barton-Aschman Associates, Inc., A Pilot Plan for Harrisburg, Pennsylvania, Pennsylvania Department of Transportation, 1976.

[20]Ibid, and "Australian Approach to Analyze Bicycle Transportation Opportunities," a summary of the Geelong, Australia Bike Plan, 1977. The Traffic Institute, Northwestern University, Stock No. 3787.

Chapter 4

IMPLEMENTATION TECHNIQUES

A comprehensive program to implement improvements for bicycling would make use of a variety of strategies. Facilities such as bikeways and parking improvements might be part of the planned program, as would road improvements like widening of the outside lane or replacing dangerous sewer grates with safer models. Bicycle safety education and enforcement of traffic laws pertaining to bicycles are important to a complete program, as well. These techniques and others to encourage and accommodate bicycling will be discussed in this chapter. For detailed engineering guidelines refer to the publications listed in Appendix D.

A. BIKEWAYS: DESIGN CONSIDERATIONS

Bikeway facilities are generally divided into three classes:

- Class I - off-street bikeways, with their own right of way, constructed independently;
- Class II - on-street bikeways, either unprotected bike lanes which are striped for exclusive or semi-exclusive bike use or protected bike lanes with physical barriers separating them from motor vehicle lanes.
- Class III - signed streets which are called "bike routes" on shared roadways.

The use of these categories has been criticized because some bikeways (such as those on sidewalks or shoulders) do not fit into any category. In some contexts, bikeways are simply described as within or outside of a given roadway right of way.

The planning of bikeways should be part of a comprehensive approach to accommodating bicycles as described in Chapter III. The design of bikeways should follow the 1981 AASHTO Guide for Development of New Bicycle Facilities which gives design specifications for lane and bike path widths, curve radii, sight distance and intersections. The Illinois Department of Transportation might publish some modifications to this guide as discussed in Chapter III.

Bikeways are a relatively new phenomenon, most of them having been built in the last twenty years. Experience and research have given planners some indication of the value of various bikeway designs and applications.

Experience has shown that Class III routes are useless unless well planned. Low traffic volumes and slower speeds are an advantage to bicyclists only when the streets designated as bikeways lead to desirable destinations, reasonably directly. All of the considerations mentioned in the section on evaluating streets for bicycle use should be

applied to the implementation of Class III routes.

Research and experience have shown that Class II bikeways can be valuable in some situations, but are subject to a variety of problems. One study analyzed nearly 3,000 separate observations (using films and photographs) of car/bike interactions on roads in the Sacramento-Davis, California area.[1] Observations were divided between bike lane and no bike lane streets with a variety of speed limit categories. Swerving and other types of displacement of both cars and bicycles was considerably less on the streets where bike lanes were being used. Bike lanes establish expected travel corridors which, the authors argue, reduce the probability of conflict. The authors acknowledge that turning practice on streets with or without bike lanes is often unpredictable.

Bicyclists and some traffic engineers[2] claim that Class II bikeways actually aggravate the confusion of turning at intersections, the most common site of bicycle accidents. Bike lanes often end abruptly at or before intersections without any guidance for bicyclists or motorists. Since merging of the two types of traffic is generally necessary, some type of pavement markings or signs should be used. The AASHTO Guide suggests some approaches to this problem. Opponents of bike lane striping believe that transportation dollars for bicycles are better spent on projects to widen the outside lane and encourage vehicle code enforcement for bicyclists as well as motorists. The value of striping must be assessed separately for each situation.

The provision of barrier type Class II bikeways has proven to be even more problematic. Although they give a sense of security to bicyclists and when implemented have significantly increased bicycle commuting, practical problems have come up. Maintenance of the bikeway portion of the road is difficult because street cleaning equipment is too wide for the lane. Also, the barrier may give bicyclists and motorists a false sense of separateness and merging at intersections can be even more confusing than with striped lanes. In New York City, barrier lanes were constructed at great expense following a transit strike, and abruptly removed three months later. Bicycling increased while the lanes were in place, but conflicts with pedestrians and parked vehicles resulted in pressure on the city for their removal. Perhaps the extremely intense use of the busy Manhattan streets chosen for the lanes accounted for an unusual level of conflict concerning these lanes. Generally, barrier type Class II bike lanes are not recommended because of the expense, upkeep problems and merging difficulties associated with them.

The value of Class I bikeways, like Class III bikeways is very much determined by planning considerations. Design guidelines are covered by the AASHTO guide. Some of the problems common to these facilities in northeastern Illinois include inadequate design and inadequate signing for warnings and information. It is especially important that bicyclists be warned of upcoming intersections with roadways. Also, information about bikeway length and distance to upcoming destinations is very helpful. Many Class I facilities are too short to be valuable and/or do not connect well with a useable street system.

Class I facilities, including the sidewalk variety (discussed in Chapter III) that are adjacent to roadways, can be problematic. Sight distances are often poor at driveways and alleys and the emergence of a high speed bicycle into an intersection is unanticipated by motorists. Collisions with pedestrians might also occur because of differences in

speed and directional mobility; pedestrians change direction with great ease and do not expect to meet a fast moving vehicle. Two-way bikeways exacerbate these problems and encourage wrong way riding. Again, hard and fast rules are difficult to justify and Class I bikeways adjacent to roadways have provided good opportunities and important alternative routes for bicyclists. If good design is implemented and common sense used, many potential problems can be avoided. Even sidewalk/bikeways have some applicability under special circumstances. One such circumstance is the opportunity for a sidewalk/bikeway along a roadway that is uninterruped by cross streets and driveways for long stretches and is lightly used by pedestrians. If the bicycle use of the walkway is clearly marked, sight distances are good and care is taken with warning bicyclists and motorists of intersections, this type of multi-use can sometimes be acceptable.[3]

B. BIKEWAYS: COSTS

The cost of constructing a bikeway varies greatly from project to project. A few variables can affect costs dramatically. Some factors are land acquisition costs, material costs, special facilities desired, the class of bikeway to be built and the length of the project. It is difficult to estimate cost without detailed engineering specifications.

It is convenient to have rough estimates for per mile costs, but ever-changing prices must be taken into account. Components such as signs, lights, labor, land and materials, are all subject to inflation. Asphalt, a common bikeway surface, is especially vulnerable to inflation as it is a petroleum product. For this reason the date of an estimate is important when evaluating costs.

Design features and special amenities can also raise the price of a bikeway. A 200 foot expressway overpass can cost $500,000[4], whereas bike-lane striping would be somewhere around $100 per mile[5]. Some items that can affect cost are:

- o class of bikeway,
- o surface type,
- o lighting,
- o drainage modifications,
- o signs, pavement markings,
- o grade separation,
- o railroad crossings, and
- o sewer grate replacement.

Examples of past project costs can be informative, although every project must be evaluated separately. Examples of a few projects are given in Table 3.

TABLE 3

COMPARATIVE COST ESTIMATES FOR BIKEWAYS

BIKEWAY TYPE	DESCRIPTION	SOURCE	DATE OF ESTIMATE	COST PER MILE
Bike path with exclusive right of way through ungraded forest preserve	6-inch stone base, 1.5 inch asphalt surface; 11 feet wide with drainage modifications and landscaping	Forest Preserve District of Cook County[6]	1980	$75-100,000
Bike path along one side of road right of way	Asphalt surface; 8 feet wide to accommodate two way traffic on one side of Kirk Road	Kane County Highway Department*	1982	$58,080
Bikeway on widened road. Shoulder with barrier; bridge and railgate included	4-inch stone base, 2-inch asphalt surface; 8 feet wide with bridge and railgate on Lake-Cook Road in Deerfield	Ciorba, Spies, Gustafson and Company[7]	1980	$90,000
Paved shoulders on both sides of roadway	Asphalt surface; 5 feet wide	DuPage County Highway Department*	1982	$80,950
Bike path along one side of road right of way	Crushed limestone screenings; 8 feet wide	Village of Schaumburg	1981	$33,792
Bike path along both sides of road right of way	crushed limestone screenings; 5 feet wide	DuPage County Regional Planning Commission*	1983	$42,240
Striping on road for bike lane		Maryland Department of Transportation[8]	1980	$100
Signing for bike route		Maryland Department of Transportation	1980	$50

*These estimates provided by the DuPage County Regional Planning Commission, assume little grading and no bridges required.

C. TRANSPORTATION IMPROVEMENTS

Many road improvements and traffic management strategies can be implemented to aid bicycle movement at relatively low cost. Transportation improvements for bicycles also include improved parking and the possibility of bicycles on public transit vehicles. Many of the improvements to the transportation system not only help bicyclists, but also directly or indirectly aid motor vehicle traffic.

1. Road Improvements

Clearly, on-road bikeways and the intersection guidance that should be implemented with them are one type of road improvement. Other types of improvements can be integrated into the community's transportation improvement program at little or no additional cost by coordinating bicycle planning with road improvement schedules. Opportunities for bicycle improvements include new road construction, subdivisions and other land developments, as well as roadway resurfacing, restriping, bridge and underpass construction and transit station improvements. For example, if a road suitable for bicycle use is scheduled to be resurfaced, it can be improved by widening and paving the shoulders. Plans for major highway construction should routinely include the consideration of safe bicycle access. Routine maintenance projects and intersection modifications can also be adapted for bicycle needs. Following is a list of road improvements which can be implemented to better accommodate bicycle use. These improvements can be implemented in conjunction with the signing, striping, and/or mapping of recommended bike routes or as regular considerations in the local transportation improvement program:

- o widening of the street when resurfacing;
- o widening of the outside lane when restriping;
- o paving of the shoulders for bicycle use;
- o replacement of dangerous (i.e., parallel) sewer grates;
- o improvement of railroad crossings;
- o improvement of surface and elimination of irregularities and potholes;
- o increasing the frequency of street cleaning where warranted by bicycle use levels.

The first three of these measures would all provide more space for the bicyclist on the road. The additions of 4-5 feet of width to the typical 10-12 foot outside traffic lane makes the critical difference between extreme hazard and reasonable safety according to many bicycle specialists.[9]

Many of the older highways were built too narrow for bicycles to begin with and the

newer streets and highways that were originally wide enough to accommodate both bicycles and motor vehicles have been made unsafe for bicycles by restriping. A street designed for two lanes of traffic when restriped to carry four lanes by making the lanes narrower, eliminates the space for bicycles.

Experienced cyclists have been recommending that the width of the outside traffic lane plus shoulder be not less than 15 feet to accommodate bicycles and motor vehicles.[10] However, this is not easily achieved, especially along roads with a fixed right of way. When additional right of way cannot be acquired, other traffic lanes or the median would have to be narrowed or street parking prohibited.

The Baltimore (Maryland) County Department of Traffic Engineering has been experimenting with low-cost improvements for bicycles. One such improvement provides an outside lane of 13-15 feet by reducing adjacent lanes to 11-12 feet. (Reducing lane width to 11 feet is permitted by AASHTO standards.) The 13-15 foot outside lane would not accommodate a Class II bikeway and a traffic lane, but would nevertheless represent an important margin of safety for bicyclists where standard bikeways are not appropriate or possible.[11]

Providing additional width or paving the shoulders of roadways is also an important safety measure. In a study conducted by the Texas Transportation Institute, a two lane rural highway with paved shoulders had a lower motor vehicle accident rate than another two lane highway without paved shoulders. The study concluded that full-width shoulders (six or more feet wide) are effective in reducing all acccident rates on rural highways.[12]

Many cyclists are concerned about the type of paved shoulders that do exist. Recently, some of these shoulders have been surface treated with rumble strips. The purpose of this surface treatment is to provide shoulder stability and an audible warning to motorists who leave the traffic lane. However, once a shoulder has been surface treated, the riding surface is unsuitable for bicycle use. The Maryland Department of Transportation, in response to numerous complaints from bicyclists who were unable to ride on the surface treated shoulders of the highways, began to look for an alternative to the traditional surface treatment. The State Highway Administration prepared a research report on the use of asphalt slurry for highway shoulders. The asphalt slurry seal was a surface material that had been used for deteriorating roadway surfaces. Due to the low cost, ease of application and previous experience with asphalt slurry as a surface treatment, the highway administration found that the asphalt slurry produced an economical, durable and satisfactory road shoulder, while providing a good riding surface for bicycles.[13] Some county highway shoulders in northeastern Illinois have rumble strip surfaces and, as a result, are unsuitable for bicycle use. Many bicycle clubs are concerned because this practice is reducing the number of roads that can be used by bicycles. Highway departments should reconsider the overall value of rumble strips. Another practice, the paving of a shoulder on only one side of the road, is also bad for bicycle safety. Wrong way riding is encouraged as cyclists enter and exit the paved shoulder. Both shoulders should be paved.

Sewer grates with the bars parallel to the roadway are dangerous for bicyclists. Bicycle wheels can get caught between the bars resulting in serious accidents. On new roadways, curb inlets should be used wherever possible to eliminate this hazard. Parallel

grates should be replaced with available bicycle safe models or cross bars should be welded perpendicular to the parallel bars.

Railroad crossings should ideally be at a right angle to rails to avoid the problem of bicycle wheels getting caught in the flangeway. Also, the roadway should be at the same elevation as the rails. Bike lanes or roadway width can sometimes be widened to allow bicyclists to cross the tracks at a right angle and available flangeway fillers currently used at some newly reconstructed crossings are helpful to bicyclists as well as motorists.

Pavement surface irregularities, potholes and excessive debris not only cause an unpleasant ride, but also contribute to accidents. Bicycles are more sensitive than cars to gaps between pavement slabs and holes or drops in the pavement. Priority consideration should be given to surface conditions on streets that are chosen as bike routes or identified as having high levels of bicycle use.

2. Traffic Management Techniques

There are several ways to alter traffic patterns to improve bicycling safety and access. Some of these techniques are discussed in the AASHTO guide. Most signs and traffic control devices should follow those described in the Manual of Uniform Traffic Control Devices (MUTCD). Options to improve the bicycling environment include:

- the control of automobile speeds;
- the diversion of traffic to selected streets;
- the prohibition of parking on some streets;
- the provision of contraflow bus/bike lanes;
- the creation of one-way streets;
- the barring of motorized vehicles from some streets; and
- the provision of preferential traffic controls.

Decreasing the speed differential between motor vehicles and bicycles will often reduce traffic volumes because motor vehicles will divert to other routes with higher speed limits.

Special designs can also be utilized to divert traffic to selected streets. Streets can be made unattractive to motor vehicles by installing speed bumps with narrow "bicycle slots." Planters can also be used to block streets, forcing all traffic except local traffic and bicycles to detour.[14]

Parking may be prohibited or restricted on certain streets to provide extra space for bicyclists. This measure can improve traffic capacity and sight distances for motorists, as well as bicyclists.

In some situations contraflow bus lanes can be used as bike lanes as well. Madison, Wisconsin has devised a bike-lane for one of its major streets, University Avenue. University is a one-way street with a regular bike-lane on the right side of the road. However, it also has a "contraflow" (other way) bus lane that is closed to cars but open to bikes. The contraflow lane is wide enough for bikers to pass stopped buses.[15] The safety and practicality of this design has recently come into question. The buses and bicycles play leapfrog alternately passing each other. The bicyclist is sometimes not visible to the bus driver, a potentially hazardous situation.

Developing a one-way street frees a lane or a portion of one lane for bicycling. It may also improve traffic movement and safety. However, increased speed and volumes on the one-way streets may reduce bicycling safety, especially if motor vehicles use all available lanes. One variant of this design would provide two narrowed lanes for automobiles and one four to five foot lane for bicycles, all moving in one direction. The City of Chicago Department of Streets and Sanitation recommends that bicyclists travel with traffic on the left side of a one-way street to avoid conflict with buses travelling on the right.

Bike-only streets are common in Europe. Selected streets may be closed to motor vehicle traffic on weekends for recreational bicycling and during peak commuter hours. This traffic management technique would, however, require a great deal of local support before it could be implemented.

Signalization or preferential signing may be used to aid bicyclist movement. Some examples include:

- o all red clearance phase for bicyclists;
- o early bicycle stop to permit right turns for motorists;
- o exclusive signal phases for bicyclists;
- o demand actuation for bicycles; and
- o signals tuned according to bicycle speeds.

3. Facilities to Remove Barriers

Barriers are a major deterrent to bicycle use. Highways, bridges, rivers, tunnels, and major rail lines are all potential barriers to bicycle use. Access across these barriers can be accomplished by the construction of a pedestrian/bicycle overpass or underpass, usually at great expense. The provision of a bike lane on a motor vehicle bridge or the reconstruction of abandoned railroad bridges for pedestrian/bicycle use can usually be accomplished at much less expense. Buses or vans equipped with bicycle racks have also been used to transport bicycles across major bridges.

4. Bicycle Parking

The lack of adequate, secure bicycle parking facilities is a major deterrent to the use of bicycles as a mode of transportation. Bicyclists need a safe place to park their bikes when they reach their destination. Although 8 to 15 bicycles can be stored in the space it takes to park an average American car,[16] many schools, shopping centers and transit stations have insufficient bicycle parking.

Parking facilities are divided into three classes in the order of security provided (See Figure 2):

- o Class I: High-security, bike lockers or roofed parking areas with attendant offer complete protection from vandalism and weather.
- o Class II: Medium-security parking secures both wheels and the frame with a simple user-supplied lock, without the need for bulky cables or chains.
- o Class III: Minimum-security "bike rack" or fixed object holds a bike in conjunction with a user-supplied cable, chain, and lock.

Cyclists want parking facilities at both shopping and employment areas and at mass transit stops so they can ride their bicycles to buses, trains, and subways. Generally, the longer a bicycle is to be parked, the greater the security needed.[17]

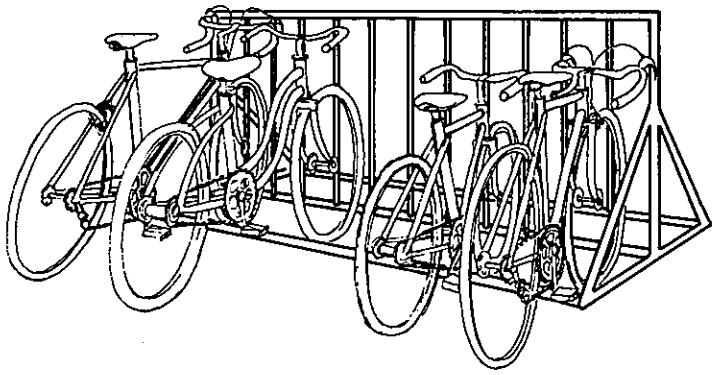
Class III facilities, or standard steel racks, are most commonly available and least expensive. These racks are inadequate for many bicyclists because it is difficult to lock the three major components of the bicycle (front wheel, back wheel, and frame) without the use of a long, heavy chain or cable and padlock.

The new bicycle rack designs which enable the rider to lock the three major components using only a padlock or a U-shaped high security lock usually employ a hitching post type of design--a wood or steel post with a 4 to 5 foot case hardened steel chain, cable or clamp attached. These racks are very appealing because they provide high security at relatively low cost and are generally attractive and unobtrusive. Prices vary from about $30 for a single unit to approximately $200 for a five bicycle unit.[18] Some of the disadvantages of both the common steel rack and the hitching post variety are that the bicycles are still subject to theft or theft of components and the bicycle is still exposed to adverse weather conditions. A roofed structure can be provided at the parking site for weather protection and the placement of facilities in well trafficed areas reduces the opportunity for theft.

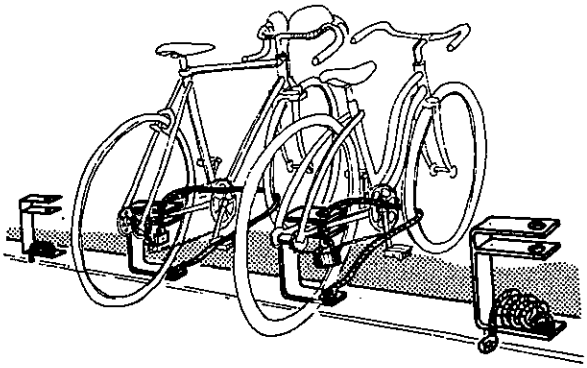
The installation and use of bicycle lockers provides the highest security and the best weather protection for bicycles. Each fiberglass or steel locker is divided in half and will hold two bicycles or small motorbikes. Twenty-four bicycles or mopeds can be parked in lockers in an area necessary for three car parking spaces. The cost of a locker varies depending upon the type and manufacturer, but is generally around $400 per unit installed.[19]

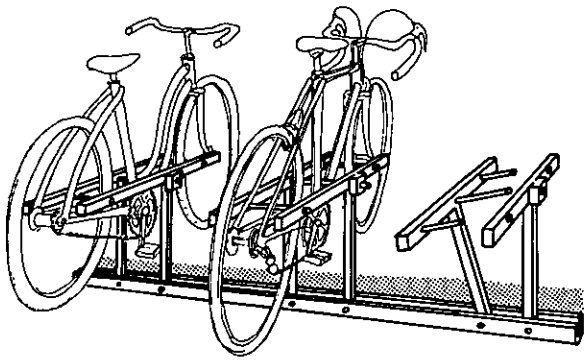
FIGURE 2 : BICYCLE PARKING

STANDARD RACK

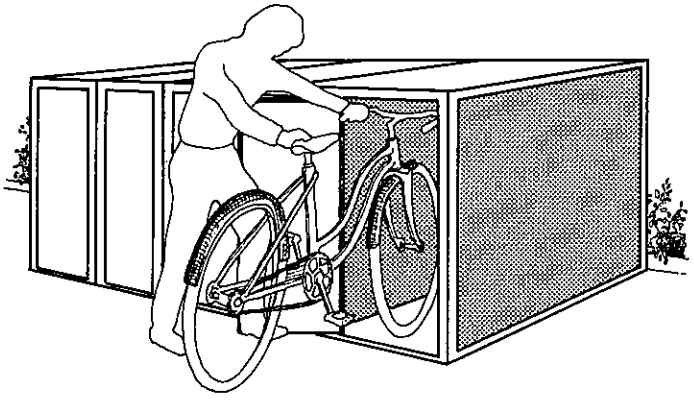


MEDIUM SECURITY LOCK-UPS





HIGH SECURITY LOCKERS



Two types of locking mechanisms are seen on bicycle lockers. One is a key lock which requires permanent ownership or a month to month lease. The other is a coin-operated unit for multiple use areas such as transit stops, shopping centers, and recreational areas. The expense of lockers can be justified when security is a high priority and where bicycles are left for fairly long periods of time. The initial expense can sometimes be offset by rental fees. One manufacturer estimates that the cost of a locker can be recouped in five to six years, at a rental rate of $80 per year, or less than $7 per month.[20] Such a rate would compete favorably with automobile parking at most transit stations.

Bicycle lockers are currently in use at transit stations in San Francisco, Philadelphia, Washington, D.C., and Atlanta.

While most cities have local ordinances that require the development of adequate automobile parking, few have ordinances governing bicycle parking. Schaumburg, Illinois requires that all property owners in business and manufacturing zones who provide more than 20 car parking spaces, also provide bicycle parking.[21] The initiative for increased bicycle parking can come from private business, as well as through public planning. Bicycle parking can be provided to save space and money or as part of an employee fitness program.

Two good sources of information on the types, manufacturers and price ranges of bicycle parking facilities are available from Bicycle Forum. One is an article that discusses bicycle parking ordinances, and design, and summarizes the results of a University of Maryland Planning Department study of high security racks and lockers:

> "The Bicycle Parking Link," by John J. Protopappas and Joseph Anderson, Bicycle Forum, Vol. II, 1978.

The other is a pamphlet on various types of parking devices and reasons for having them available from Forum Emporium at the address listed in Appendix D.

5. Bicycles on Public Transit

The use of bicycles for commuting purposes is often restricted by long distances, inadequate or unsafe routes, and physical barriers, such as bridges, tunnels, and expressways. Allowing bicycles on public transit can alleviate some of these problems and facilitate bicycle commuting.

Many cities have equipped buses with bicycle racks to carry bicycles across bridges. Seattle, San Francisco, and San Diego, offer pedal hopper service on buses or vans equipped with bike racks or trailers. Bicyclists load their bikes, pay a single fare, and ride across the bridge with the other passengers. The Urban Mass Transportation Administration has published a report on a Santa Barbara, California demonstration project, to test the feasibility of combining bikes and buses. The primary goal of the project, to increase bus ridership, was achieved. A secondary goal was to decrease total travel time for mass transit users.[22] Information on the project is available from:

Mr. Paul Fish
UPM-31
Urban Mass Transportation Administration
USDOT
400 7th Street, S.W.
Washington, D.C. 20590

Subway systems in San Francisco (BART) and New York/New Jersey (PATH), allow bicycles on the rear car during non-rush hours.[23] Washington D.C.'s Metro system has conducted a successful experiment with bikes on subway cars. The Washington experience is described in-depth in an article in the April, 1982 issue of Mass Transit Magazine. The Washington experience was apparently influential in the decisions of three other cities to allow bicycles on mass transit: Montreal, Miami (when the system is completed) and Boston.[24]

In northeastern Illinois, most of the commuter railroads do not permit passengers to board with bicycles because the trains are not equipped to carry them. The Chicago South Shore and South Bend Railroad will carry bicycles, but the bicycles must be taken apart and put in a box, which is not practical for bicycle commuting. The Chicago and North Western Railroad permits bicycles on their trains at the discretion of the conductor. There are no special fees, but bicyclists are advised to board before or after the peak hours. In practice, few bicyclists would test such an arbitrary policy.

Allowing bicycles on the commuter railroads would benefit both the commuter and the recreational cyclist. Northeastern Illinois has many major trails and bikeways which are accessible from the suburban train stations. The Illinois Prairie Path and the Great Western Trail are near several Chicago and North Western stations. Taking the C&NW to Waukegan would put a cyclist within reach of the Wisconsin bikeway system. Riders could also take their bikes to the city to enjoy the Chicago Lakefront Bike Path. There are many other opportunities for transporting bicycles on trains to reach forest preserves, state parks, and other major attractions like the Chicago parks and museums. Before these ideas could become a policy of the various commuter railroad companies, safe means for carrying bicycles would have to be explored and schedules and fares determined.

D. MAPPING

There are a variety of approaches to mapping bicycle routes and a map for bicyclists can accomplish many different things. There are four basic approaches to bicycle map-making.

- A bicycle map can show existing designated bikeways only.
- It can show bikeways and also indicate appropriate streets which are not signed as bikeways, but serve as connections between designated bikeways.

- o A map can selectively rate streets of varying degrees of suitability for bicycling.

- o A fourth type of bicycle map shows the complete street pattern for a geographic area and rates every street for its bikeability.

There are advantages and disadvantages to each approach. NIPC's bikeway map package and many available maps of local bike routes are of the first type. Since NIPC provides information about the entire six-county region of northeastern Illinois, the map package needs to address a very large and diverse area. The package shows major bikeways in the region at a glance and local routes in more detailed subregional maps. A map of this kind can serve as an inventory of existing facilities and an aid to both recreational and transportation oriented bicycling. Many municipalities, counties, and park districts offer maps of local bikeways or of major facilities within their jurisdiction. The usefulness of all such maps is ultimately limited by the quality of the bikeway system shown. A map of a poorly planned or incompletely implemented system may not be useful at all. On the other hand, a map of a single major facility such as those available of the Great Western Trail in Kane County or the Prairie Path in DuPage County can be a valuable aid because it can show many points of interest along the trail.

The Bicycle Access Map of Denver is a good example of the second type of map. Many areas of Denver have fairly extensive bikeways, but these bikeways are not always continuous. Recommended street routes are mapped to show connections between existing routes. This approach would be useful for municipalities with a good but incomplete system. This type of map introduces a new research and planning element to the mapping process. Recommended routes can be mapped only after being chosen by one method or another. A street rating system as discussed in Chapter III could be used to identify appropriate connections. However, first hand bicycling experience is an invaluable tool for mapping connecting or supplementary routes. Local bike clubs can be a good source of volunteers to try out and rate proposed routes.

The third and fourth types of maps rely heavily on a consistent and reliable rating system for streets. A bicycle map of Minneapolis shows selectively chosen streets with varying degrees of suitability for bicycling. Off-road bikeways are shown but the map primarily relies on the rating of certain streets from good to unsatisfactory for bicycling. A map like this can be highly subjective because of the number of streets completely omitted from the rating system. Again, the value of the routes depends on all the elements of good planning discussed earlier.

The ultimate suitability rating map is the fourth type of bicycle map. The Portland Bicycle Map has been called the ultimate bike map because it rates every street in the city. This approach is time consuming and possibly more ambitious than many cities would undertake. A map that rates every street is, of course, very valuable to serious cyclists who want to plot their own route. By definition, no destinations (except those totally surrounded by unsuitable streets) are excluded and much of the planning involved in the usual bikeway effort is left up to the individual. On the other hand, a map like this can be confusing to a novice or occasional cyclist who wants more specific direction.

The Portland Map was created with the assistance of many active bicyclists who rode and assisted in the rating of the streets.[25] Consultation with bicyclists helps greatly with choosing bike routes or connections and it is almost essential for a suitability mapping project of any size.

One of the great values of suitability mapping, whether of the complete road system or part of it--is that once this information is available it can be very useful for planning. Obvious obstacles to bicycling can be seen and plans made to circumvent them by way of a separated bikeway, bridge or other improvement.

Not only can maps become an important element of the planning process, they are also an implementation technique in and of themselves. Maps encourage bicycling and suitability maps can actually substitute for signed routes. Where the budget for bikes is low a suitability map may be the most cost-effective measure a municipality can provide to encourage bicycling. Liability for the safety of bicyclists is more limited with a map than with a signed or striped route. The value of a map can be enhanced by the supplementary information offered. Bicycling can be encouraged by including the locations of important cultural, educational, and transportation facilities. Recreational destinations and shopping areas can also be included. The purpose of a map can often be defined by the supplementary information included: schools, shopping, and train stations define a transportation oriented map. Cultural attractions and parks give a recreational flavor. Both can be combined, of course. The Portland map includes another very useful bit of information: dangerous intersections. This information can usually be easily deduced from police records. A map is also a very good place to communicate safe cycling tips, local ordinances, and traffic laws.

The mapping process can serve many purposes: route definition, planning, the encouragement of bicycling, and education.

E. BICYCLE SAFETY EDUCATION

Bicycle safety education has traditionally been directed at children. Most of the basic educational programs consist of learning the Bicycle Rules of the Road and having a police officer discuss bicycle safety in classrooms once or twice a year. Bicycle rodeos are another popular feature of local bicycle safety programs. In a bicycle rodeo, children display their bicycle handling skills by riding through a series of courses.

Research has indicated that these programs are inadequate. Behavioral studies have shown that safety education in school should not be a one time effort. Unless safety education is provided on a continual basis, the student's actions will tend to revert back to preexisting conditions. Critics of bicycle rodeos also point out that the typical community bicycle rodeos are simply once a year contests which leave out essential skills training.

In her article, "Some New Thoughts on Bicycle Safety,"[26] Colette O'Leary identified three basic problems with the traditional bicycle safety programs for children:

(1) Most children's safety programs are based on the theory that children only play

on their bikes. This assumption leads one to view a child's bicycle use as strictly recreational and fun. O'Leary maintains that children use their bikes for transportation too, and therefore require serious instruction in bicycle riding skills, not just "rules of the road."

(2) School safety programs are usually limited to classroom instruction. There is a need for schools to teach children **how** to ride their bicycles safely in traffic in real-life situations.

(3) Since bicycling has been viewed as a play activity, most educational programs have been designed with a humorous format. While humor should not be eliminated from educational programs, too much "fun and games" can dilute the safety message beyond the point of effectiveness. If children do use bicycles for transportation, they should be able to accept instructions that are not sugar-coated.

Although there are criticisms of existing programs, no one recommends discontinuing bicycle safety education in the school. Some modifications have been suggested. Teaching children how to ride their bikes through practical, on-street training, is highly promoted as the most useful kind of safety education. However, there is a problem with taking children out on the streets and exposing them to dangerous traffic situations. A lot of school administrators would hesitate to take on the legal responsibility in the event of an accident. Teachers would also require training and a certification system may have to be instituted. These are all costly and time-consuming measures which are difficult to implement without strong community support. Schools in Milwaukee, Missoula, Montana, and some communities in Oregon have developed on-road bicycle training courses. These efforts are summarized in Bicycle Forum.[27]

Another approach to these problems simulates real-life situations in the classroom. Dr. Ken Cross, co-author of the national study on bicycle/motor vehicle accidents mentioned previously, developed an educational program in Santa Barbara, California. One of the elements of this program was a magnetic board which could be used to create various types of traffic contexts such as intersections of streets, driveways, and sidewalks. Cars and bicycles were designed to the scale of 1 to 40. Children learned about the dynamics of a traffic context. They learned where accidents occur and why they occur. Slides and films of traffic situations can also be used to alert children to hazards and to show them how to safely maneuver in traffic.

Bicycle rodeos can be modified to provide more effective skills training. Instead of holding a rodeo once a year, they can be repeated for perhaps four weekends in a row. Practice in skills under real-world situations could be stressed and tested. The Bicycle Manufacturers Association has prepared a 20-page booklet, "Bicycle Safety Tests and Proficiency Course" which includes a number of helpful procedures and ideas designed to upgrade the standard rodeo. For further information and a free copy of this pamphlet write to:

Bicycle Manufacturers Association
1101 15th Street, N.W.
Washington, D.C. 20005

Directing the safety program toward the proper user is also important. Programs designed for first and second grades will not interest twelve year olds, much less the growing number of adult cyclists. For example, the City of Berkeley, California, had a large cycling population and a high accident rate. Berkeley's Bicycle Education Enrichment Program was funded for $10,000 by the Office of Traffic Safety of the State of California. The program was described as a wide ranging safety effort, consisting of school visits, liaison with police, rodeos in the parks, publicity campaigns, maintenance classes, etc. The program was administered by the City's Park and Recreation Department which proved to be a mistake. Seventy percent of the cyclists in Berkeley are college students who will not be reached through schools and rodeos. What was needed was increased police enforcement of traffic laws. The police should have been given part of the money to participate in the safety program. The program sponsors should have consulted city officials, police officers, and cyclists, to determine who the bicycle users were. They then could have designed a program to meet the needs of the major cycling population, while also training school age cyclists through a long-term program.

While most communities do not have an adult cycling population the size of a college town like Berkeley, they do have a mixture of age groups and experience levels. For this reason, education classes should not be limited to a school program with Officer Friendly. The growing number of adult cyclists also need bicycle skills training. The needs of a casual cyclist who uses a bicycle for weekend recreation will differ from those of the "hard-core" bicycle commuter. Cyclists who are interested in touring and racing may require yet another version of safety education.

Fortunately, an adaptable bicycle safety program for cyclists 14 years and older, has already been developed. John Forester, a professional engineer, former college professor and avid cyclist, has designed an adult bicycle safety program called "Effective Cycling." The basic course material and outline are taken from Forester's book, Effective Cycling, available for $10.00 from:

Custom Cycle Fitments,
726 Madrone Avenue.
Sunnyvale, CA 94086

The Effective Cycling program combines bicycling theory, maintenance, repair and riding technique instruction with a strong emphasis on practical, on-the-road training. Courses are designed to meet a wide range of skill levels and to teach basic topics such as touring, cyclo-commuting, or racing, depending on the interest of the class.

Effective Cycling has been endorsed by the League of American Wheelmen, and is available nationwide. The instructors are League members and are certified through the League's Effective Cycling Committee. Courses have been sponsored by a variety of local organizations, including bicycle clubs, recreation departments, universities and community colleges, companies, bike shops, and local American Youth Hostels and 4H groups. Effective Cycling has also been adapted for the younger rider and is now sometimes taught in schools. For further information on the Effective Cycling program, write to:

Bill Frey, Chairman
L.A.W. Effective Cycling Committee
443 Roland Road
Grosse Pointe Farms, MI 48236
313/881-4555

A bicycle safety program would still be incomplete if it did not include motorists. Motorists should share a portion of the responsibilitiy for creating a safe bicycling environment. Including bicycle safety in drivers' education programs is one method of alerting motorists to the rights and needs of bicyclists. Bicycle clubs recommend that questions relating to bicycles in traffic be incorporated into the Illinois driver's license examination. Basic questions, such as what side of the road bicyclists should ride on, could improve motorist awareness.

An excellent source of information for communities that are developing bicycle safety education programs is the State of Illinois, Secretary of State's Office. This office has prepared many pamphlets relating to bicycle safety, including the popular Bicycle Rules of the Road, printed quizzes to test children on the Rules of the Road, guidelines for licensing and registering bicycles, and a guidebook for holding bicycle rodeos. They also provide participants in bicycle rodeos with Certificates of Achievement awards and medals.

The Secretary of State's office is willing to give advice and technical assistance to any community interested in developing a bicycle safety program. Speakers are available for meetings to make presentations on bicycle safety and films can be provided for schools and other gatherings. For more information contact the Bicycle Safety Program of the Secretary of State's Office at the address listed in Appendix C.

Most bicycle safety education programs require funds to operate. Staff time, printed materials, and visual aids all cost money. Federal funding is available for safety education programs. Highway Safety Funds from the United States Department of Transportation have been used for safety programs by many communities in northeastern Illinois.

The Highway Safety Program Funds (402) administered by the National Highway Traffic Safety Administration were, until recently, available for a wide variety of bicycle safety program activities. Bicycle projects have now been dropped from the list of qualifying applicants for 402 funds. Many safety programs in northeastern Illinois were begun with 402 funds and this impetus to bicycle safety will be difficult to replace.

F. ENFORCEMENT

Bicycle safety education should be integrated with an effective enforcement program. Bicycle riders must first be taught what the bicycle rules of the road are and why these laws were formulated before they can be held responsible for obeying them. Enforcement programs support this safety education and reinforce the idea that a bicycle is a vehicle which must conform to motor vehicle law when using the street.

Although an enforcement program is a vital part of bicycle safety, the attitude of parents, school officials, and police officers may sometimes make enforcement of bicycle laws difficult. Many parents may inadvertently give children the idea that a bicycle is a plaything by teaching a child how to ride a bicycle and then leaving him to fend for himself on the streets, without further instruction in laws, ordinances and rules of the road. Those schools that do offer bicycle safety education have sometimes presented it in a humorous fashion, with comic books and cartoons. Again, children are left with the impression that a bicycle is for fun and that laws are not to be taken seriously. Police officers may also contribute to this notion by not ticketing for bicycle violations of the traffic laws. The police officers may feel the children have not been properly instructed in the rules of the road, and therefore giving tickets is a waste of time. In addition, the officers may feel that giving tickets to young offenders is bad for the public image of the police. For these reasons, it is important to generate community support for a bicycle enforcement program. The community should be made aware of the program through publicity campaigns in the schools and newspapers. Ideally, public awareness of the program's goals and objectives will foster a spirit of cooperation and a willingness to provide financial support on a continuing basis.

Some communities in northeastern Illinois have developed successful, well-accepted bicycle enforcement programs. The Village of Skokie in northern Cook County, has had a bicycle enforcement program since 1976. The program was initiated when the Village recognized that it was having a problem with bicycle/automobile related accidents. At first the Police Department tried to have officers write warning tickets to bicyclists who violated the law. This technique was unsuccessful because it was bad for the police image and it was too time consuming.

Skokie then decided to try a patrol team enforcement program which had been successful in neighboring towns. The program that Skokie eventually adopted consists of trained college students who patrol the streets on bicycles to enforce bicycle rules of the road. The ten college students who are selected attend four training courses. They are each equipped with uniforms, jackets with identifying emblems, police radios, and identification. Two students are assigned to a team. One team is assigned to one-quarter of the town and they are rotated on a daily basis. The teams patrol the streets between 11:00 a.m. and 8:00 p.m. They have the option of giving either a verbal or written warning or an actual ticket. If the team has stopped a repeat offender, they are more likely to give a ticket.

If a ticket is issued, the bicyclist has to appear before a court consisting of volunteer college students. If the offender is found guilty, the judge can request one of the following: that the parents take the bicycle away for a number of days; that the offender write a 2000 word essay on bicycle safety; or that the offender pay a maximum fine of one dollar.

The program was amended as of the summer of 1981. The patrol teams then issued citations on village ordinances to bicycle riders who violated the rules of the road. The offender had to appear with his parents in traffic court before a real judge.

Bicycle safety education is also incorporated into the Skokie enforcement program. Approximately 2000 Bicycle Rules of the Road pamphlets are handed out by the teams

every year. In addition to the patrol teams, the Village has an Officer Friendly program which stresses bicycle safety in schools. Bicycle rodeos have also been held by the Village in cooperation with the Park District.

The enforcement program is operated by the Skokie Police Department. The first three years of the Skokie bicycle safety enforcement program were funded through 402 funds. The program is now budgeted through the Police Department.

There are a number of different kinds of enforcement programs which can serve as models for your community. The Illinois Department of Transportation's Division of Traffic Safety is available to answer questions and give technical assistance to communities considering a bicycle safety and enforcement program. For further information, contact the Safety Projects Section of IDOT, listed above.

G. REGISTRATION AND LICENSING

The rapid increase in bicycle thefts has become an acute problem throughout the United States. Many communities are instituting bicycle registration programs as a deterrent to bicycle thefts. The Illinois Secretary of State's office has prepared a brochure on "Guidelines for Licensing and Registration of Bicycles" which includes a set of objectives for the registration of bicycles and a model ordinance for communities who wish to implement a registration and licensing program.

The model ordinance includes provisions for the mandatory registration of all bicycles with the police department. The police department issues a license tag and a registration number which is kept on file. These registration numbers are helpful when locating the owners of lost or stolen bicycles. A license fee is collected at the time of registration.

The advantage of using a consistent registration system, such as the State of Illinois' model ordinance, is that it provides a uniform record keeping system among jurisdictions. Many local registration programs lack this uniformity, which makes the exchange of information with other jurisdictions difficult.

Another advantage of mandatory bicycle registration is that it provides an indicator of bicycle ownership for planning purposes. The increase in the number of bicycles can be monitored and a profile of the bicycling population can be maintained.

Further incentives for bicycle registration have come from the private sector. Manufacturers of certain bicycle lock devices have guaranteed that if the owner of the lock's bicycle is stolen while the lock is in use, the bicycle will be replaced by the manufacturer. The guarantee is, however, conditioned on the fact that the bicycle is registered with the police department. A computerized service that registers bicycles with many police departments in the Chicago area is now offered through bicycle shops. For a fee of approximately $5.00 a bicycle can be registered with:

Bike Central Registration, Inc.
P.O. Box 156
River Forest, Illinois 60305

H. FUNDING

A comprehensive bicycle facilities program requires funding for both planning and implementation. These funds can come from a variety of sources. The NIPC bikeway inventory indicates that communities, park districts, and forest preserve districts have utilized local, state, and federal funding, as well as private gifts and fees, to plan and implement their bicycle facilities.

However, the future of many of these funding sources is uncertain. Local governments are cutting expenditures and many federal programs are being reduced or eliminated. As a result, municipalities interested in providing bicycle facilities and related activities, such as safety education, must seek alternative sources of funding and innovative programming measures. Many improvements for bicycles can be accomplished in conjunction with normal road projects at minimal expense as discussed earlier in this chapter. A description of some funding alternatives follows.

1. Local

Municipalities interested in providing bicycle facilities have several options. In 1980, NIPC conducted an inventory of regional trails and bicycle facilities. Municipalities, park districts, and forest preserve districts were asked what funding sources were used to purchase and maintain their bicycle facilities. There were a number of different responses. Communities had funded their bicycle facilities with federal grants from the Illinois Department of Conservation, the Illinois Department of Transportation, the Federal Departments of Agriculture, and Housing and Urban Development. Other communities had paid for their bicycle facilities out of general revenues. In some cases, the park district had purchased and maintained the bikeways. Motor fuel tax funds were another source of local revenue. The Village of Schaumburg incorporated its bikeway plan into the capital improvements program. The Village's 1981-1985 five-year capital improvements program earmarked $50,000 to $70,000 annually for bike path construction.[28]

Schaumburg also amended its subdivision control ordinance to require all subdividers to comply with the bikeway plan for their developments. As a result, forty percent of the total bikeway system will be provided by the private sector at no expense to the village government.

Local governments can find other ways to utilize private sources of funding. The Schaumburg Bikeway Plan mentions levying special assessments against owners of property adjoining proposed bikeways. Gifts, donations, and conservation easements are other options. A not-for-profit organization, formed in the interest of the Illinois Prairie Path, assesses membership dues which are used to cover some maintenance costs. Also volunteers from civic groups can provide valuable manpower for the maintenance of major trails and Class I bikeways.

2. State and Federal

Many of the federal programs which have provided funds for bicycle facilities have been reduced or eliminated. Several of these programs are still authorized, but funds were not appropriated for fiscal years 1980 and 1981. The Section 141 Bikeway Construction Program, the only federal grant program exclusively for bicycle facility construction, was not funded for fiscal year 1981 and will probably not be funded again. Funds for the Rails to Trails Program were reduced or excluded from recent federal budgets. A program called Land and Water Conservation Grants (LAWCON) has been significantly reduced but not altogether eliminated. Two and one half million dollars has been available within Illinois through this program. The program is administered by the Illinois Department of Conservation. Contact:

Mark Yergler
Division of Technical Services
Illinois Department of Conservation
524 South Second Street
Springfield, Illinois 62706

Budget cuts have limited the number of federal programs that have funds available for bicycle facilities. For this reason, more local governments are planning bicycle facilities in conjunction with other transportation projects.

The Federal-Aid Highway program makes funds available, at state discretion, for the construction of bicycle and pedestrian paths which complement the federal highway system. Under this program, bicycle and pedestrian facilities may be either incidental or independent construction projects. An incidental bikeway project would be constructed concurrently with a highway improvement. The bikeway would be located within the normal highway right of way, including land acquired for traffic improvements and scenic enhancement programs. Incidental construction projects may be financed with the same type of federal-aid funds used for the basic highway project and are not subject to the funding limitations for independent bikeway projects.

Independent bikeway construction projects may be built on existing highway right of way or on special right of way or easements acquired for this purpose. These bicycle facilities must serve bicycle traffic which would normally desire to use the federal-aid highway route. The federal share of independent bicycle projects is now 100 percent. (See Chapter 2) A state may spend up to $4.5 million of its federal-aid funds in a fiscal year for independent bicycle facilities, but these funds are not reserved exclusively for this purpose. Instead bicycle projects must compete with highway projects for funding.

Planning for bicycle facilities may also be funded under the federal-aid program. Highway Planning and Research Funds (HP&R) and Planning Funds (PL) can be used to fund planning and research activities that are necessary for the development and implementation of highway projects, including bicycle and pedestrian facilities. HP&R projects may be located anywhere in the state and are selected by the Illinois Department of Transportation. In northeastern Illinois, the Chicago Area Transportation Study selects the projects to be financed with PL funds.

A brochure on the Federal-Aid Highway Program is available from:

United States Department of Transportation
FHWA Division Administrator
320 W. Washington Street, Room 700
Springfield, Illinois 62701
Telephone: 217/492-4615

As previously mentioned, state motor fuel taxes are also sometimes spent on bicycle related projects. Many communities have used a portion of their motor fuel tax allocation to purchase signs for bike routes. Chapter 121, Section 602 of the Illinois Revised Statutes established a state bikeways program. Section 603 mandates the appropriation of funds (no specific amount) for the development of bicycle paths and a state bikeways program. Very little of such a program has been implemented for bicycle projects by the State. Local interest might initiate more state activity in this area.

Footnotes to Chapter 4

[1]Bonnie Kroll and Melvin R. Ramey, "Effects of Bike Lanes on Driver and Bicyclist Behaviors," Transportation Engineering Journal of ASCE, Vol. 103, No. TE2, March, 1977, pp. 243-256.

[2]Robert Alexander, "Pros and Cons of Bike Lane Striping," Traffic Engineering, June, 1975, pp. 18-19.

[3]Daniel T. Smith, Jr., "Planning and Design of Bicycle Facilities: Pitfalls and New Directions," Transportation Research Record 570, Washington D.C., 1976, pp. 3-8.

[4]Forest Preserve District of Cook County, 1980.

[5]Steve McHenry, Maryland Department of Transportation, 10/81.

[6]Forest Preserve District of Cook County, 10/81.

[7]Ciorba, Spies, Gustafson and Co., "FAUS Project: Bicycle Path along Lake-Cook Road, Forestway Drive to Waukegan Road," Deerfield, June 1980.

[8]Steve McHenry, 10/81.

[9]Harold C. Munn, "Bicycles and Traffic," Transportation Engineering Journal, November 1975, p. 759.

[10]Ibid.

[11]Gregory M. Jones, On-Road Improvements for Bicyclists Implemented in the State of Maryland, Baltimore County Department of Traffic Engineering, August, 1978.

[12]Daniel B. Fambro, Ramey O. Rogness, Daniel S. Turner, The Effects of Paved Shoulders on the Accident Rates for Rural Texas Highways, Texas Transportation Institute, Texas A&M University, January 1981.

[13]Maryland State Highway Administration, Evaluation of Asphalt Slurry for Bikeways Maryland Department of Transportation, March, 1978.

[14]Peter Harnick, "Creative Alternatives," The Energy Consumer, U.S. Department of Energy, Office of Consumer Affairs, September, 1980.

[15]Ibid.

[16]Walter L. Wheeler, "Bicycles and Mass Transit," Traffic Engineering, March 1977.

[17]U.S. General Accounting Office, Actions needed to Increase Bicycle/Moped Use in the Federal Community, January 19, 1981.

[18]Mike Bullock, Ellen Fletcher Bicycle Parking, Santa Clara Bicycle Association, Los Gatos, California, 1979, p. 3.

[19]Ibid.

[20]Owen Reese, Cycle Safe Division of the Phillip Johnson Corporation.

[21]Schaumburg Bikeways Plan, Schaumburg Park District and The Village of Schaumburg.

[22]Peter Harnick, "Creative Alternatives" The Energy Consumer, U.S. Department of Energy, Office of Consumer Affairs, September 1980.

[23]Pro-Bike News, Bicycle Federation, January, 1982, p 1.

[24]Pro-Bike News, Bicycle Federation, July, 1982, p 3.

[25]Janet Schaeffer, "Suitability Mapping: the Portland Experience," Bicycle Forum, No. 5, 1980, pp. 28-33.

[26]Colette O'Leary, "Some New Thoughts on Bicycle Safety Education," Bicycle Forum, No. 2, 1978, pp. 13-15.

[27]Bicycle Forum, Nos. 6, 7 and 8.

[28]Bill Rotolo, "The Schaumburg Bikeway Plan," Planning, Vol. 47, No. 6, pp. 22-25. For further information on the Plan, contact the Village of Schaumburg, Department of Planning.

Chapter 5

BIKEWAYS IN NORTHEASTERN ILLINOIS

Forty communities and all six counties in northeastern Illinois have bikeways. Bikeways have been built by municipalities, park districts, forest preserve districts and county governments. The Northeastern Illinois Planning Commission has since 1978 collected information about bikeways in the six county region. The NIPC inventory of bikeways will be updated in late 1983.

A. BIKEWAYS INVENTORY

In 1978, the Northeastern Illinois Planning Commission (NIPC) published a study, Bikeways in Northeastern Illinois for which information was collected on existing and proposed bikeways in Cook, DuPage, Kane, Mc Henry, Lake and Will counties. Two years later, under contract to the Illinois Department of Conservation, NIPC conducted an inventory of all trails in the six county northeastern Illinois region. Information was collected at the same time to update the NIPC bikeway inventory.

1. Methodology

A combined trails and bikeways survey called the "Illinois Trails Inventory," was sent in December of 1979 to all northeastern Illinois municipalities, park districts, forest preserve and conservation districts, county planning agencies and a number of private associations and land owners. In addition to questions specified by the Illinois Department of Conservation for their trails inventory, NIPC added an additional page of questions dealing with bicycle trails and bikeways. The survey requested that the respondents use a map to indicate the location of any bikeway within their jurisdiction, along with recognized access points, class designation*, hazards, terrain, support facilities, points of interest, surface and access to public transportation, schools, central business districts, and places of employment. The survey also requested that planned bikeways be indicated on the map. In addition to the map, the survey asked for information about funding sources and any local studies of bicycling that had been conducted.

All potential respondents who either returned incomplete information or did not return a survey form were contacted by phone to assure as complete an inventory as pos-

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*Class designation:

Class I - separated right of way designated for exclusive or semi-exclusive use of bicycles.

Class II - bicycle lane on shared right of way; conflicts minimized by land and pavement marking and signs.

Class III - bicycle routes on shared right of way; designated by signing only.

sible. This inventory did not include questions about bicycle registration and bicycle ordinances. Some information about bicycle registration requirements was supplied during the telephone follow-up. This data, along with information from the 1978 inventory is included in the current inventory.

The returned maps and information gathered by phone served to both update the bikeway inventory and as a basis for NIPC's bikeway map package published in April, 1981.

2. Results and Discussion

The northeastern Illinois region has approximately 620.5 miles of existing bikeways and 646.5 miles of proposals. Table 4 summarizes the breakdown by county. Some changes have occurred in the mileage approximations between the 1978 and 1980 inventories. In 1978 a total of 532.3 miles of existing bikeways were recorded along with 848.65 miles of proposals. These totals are based on a combination of known and estimated mileage since many units of local government do not know the exact bikeway mileage within their jurisdiction. Class I facilities are relatively stable and are generally expanding throughout the region. On the other hand, Class II and III facilities have in some places increased and in others decreased. On-street facilities, involving signing and striping, are easy to initiate and equally easy to remove. The past decade of experience with increased bicycle use has been an experimental period. In some cases, municipalities have found that previous efforts at bikeway provision have not accomplished what was expected.

Bikeway proposals had dropped dramatically in the three years between 1978 and 1981. This is primarily due to the shelving of a number of ambitious intermunicipal and county bikeways proposals. Funding limitations is the most frequent reason given for the shelving of these proposed plans. Although bikeway system plans have in some cases been set aside, a number of major new bicycle trails have been constructed and a number of additional proposals appear to be promising. The Great Western Trail in Kane County*, a new trail along the Des Plaines River in Lake County, and an extension of the North Branch Trail by the Forest Preserve District of Cook County, are important additions to the regional opportunities for bicycling. New land acquisition by the Prairie Path and a proposal to develop the abandoned Penn Central Railroad right of way in Will County represent significant opportunities for bikeway development in the future.

B. MAJOR BIKEWAYS IN NORTHEASTERN ILLINOIS

The major bikeways in the six counties of northeastern Illinois are an important resource for local cyclists. Those that now exist, in combination with major proposed bikeways (see Figure 3), constitute a potentially important recreational attraction to the

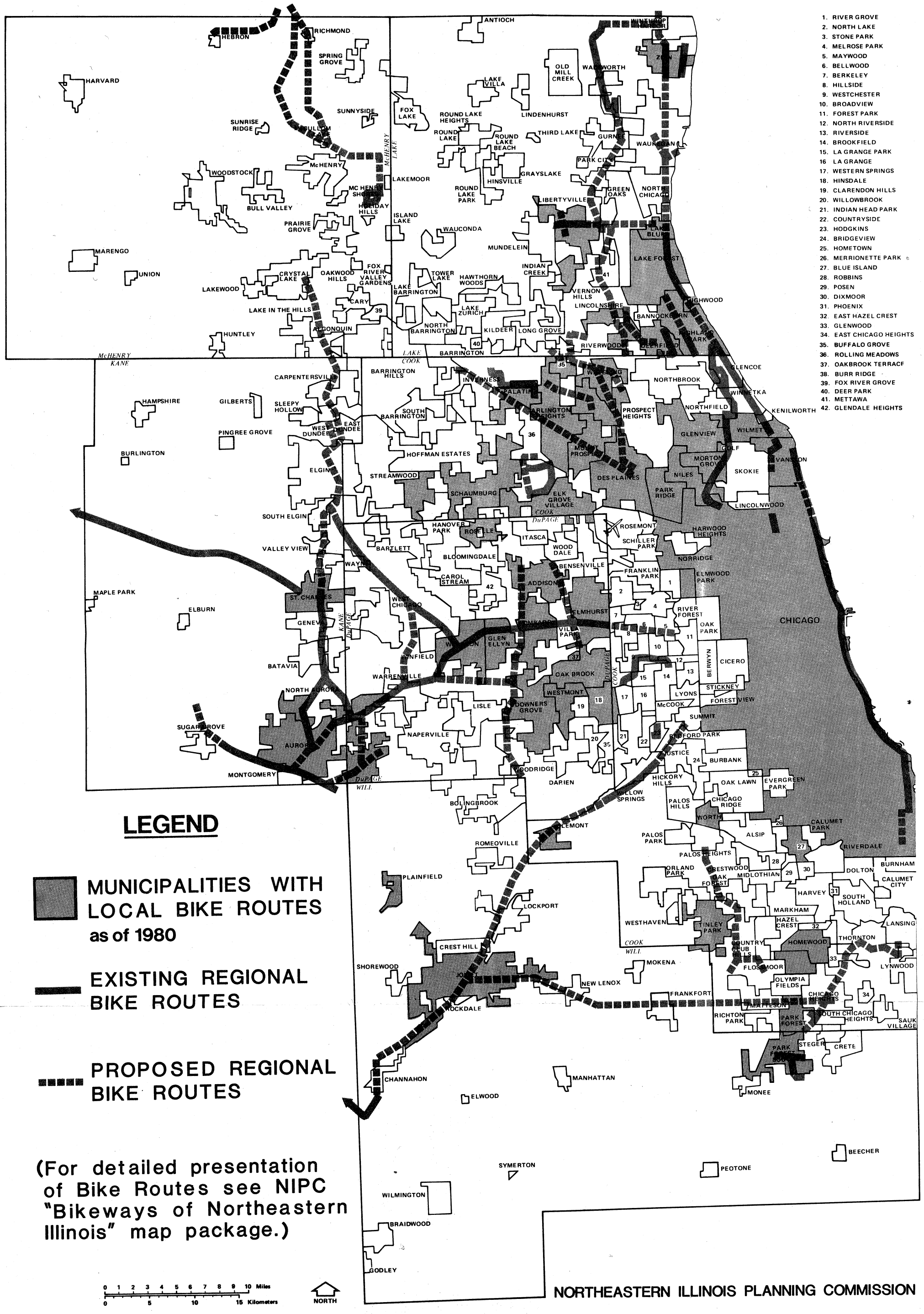
*Portions of the Fox River Bikeway in Kane County have been completed since 1981.

TABLE 4

COUNTY BIKEWAY MILEAGE FOR NORTHEASTERN ILLINOIS

COUNTY	EXISTING BIKEWAYS (MILEAGE BY CLASS)				PROPOSED BIKEWAYS (MILEAGE BY CLASS)			
	I	II	III	SUB-TOTAL	I	II	III	SUBTOTAL
COOK	146	13.5 II+III:27	212	387.5	105 I+III:5	30	45	186
DuPAGE	35	4	51	90	45.5	40 II+III:8	21	114.5
KANE	30	--	2.5	32.5	32.5	--	--	32.5
LAKE	49.5 I+III:2.5	--	20.5	72.5	90.5	1	7	98.5
McHENRY	11	--	--	11	30	--	--	30
WILL	27	--	--	27	85	--	--	85
SIX COUNTY AREA TOTAL	298.5 I+III:2.5	17.5 II+III:27	286.0	620.5	388.5 I+III:5	71 II+III:8	73	546.5

FIGURE 3: BIKEWAYS OF NORTHEASTERN ILLINOIS



LEGEND

MUNICIPALITIES WITH LOCAL BIKE ROUTES as of 1980

EXISTING REGIONAL BIKE ROUTES

PROPOSED REGIONAL BIKE ROUTES

(For detailed presentation of Bike Routes see NIPC "Bikeways of Northeastern Illinois" map package.)

0 1 2 3 4 5 6 7 8 9 10 Miles
0 5 10 15 Kilometers

NORTH

NORTHEASTERN ILLINOIS PLANNING COMMISSION

northeastern Illinois region. Planning for bicycles should include access to and interconnections with major regional facilities whenever possible. A summary by county of bikeways and bikeway proposals of regional significance follows.

1. Cook County

The foremost provider of Class I recreational bikeways in Cook County is the Forest Preserve District. Major bikeways have also been constructed by the Chicago Park District and the inter-community effort that resulted in the Green Bay Trail. The Cook County Forest Preserve District has built and maintains six bikeways. Four of these are asphalt surfaced and two have gravel surfaces. Major extensions are planned for three existing trails and a new bikeway is planned for the Tinley Creek Forest Preserve area.

a. Arie Crown Forest Preserve and Illinois/Michigan (I/M) Canal Bikeways

These are the two gravel surfaced bikeways within the Cook County Forest Preserve system. Both are in the southwest part of the county. Although a gravel surface is not very good for thin tires, many cyclists use and enjoy these trails. Both trails are used for hiking and cross-country skiing, as well as bicycling. Both have adjacent parking. Shelters, benches, and washrooms, are available at the Arie Crown Forest Preserve.

b. Salt Creek Bikeway

The Cook County Forest Preserve District has constructed and maintains a six-mile Class I bike trail along the portion of Salt Creek in Cook County, from Bemis Woods near the Tri-State Tollway to Brookfield Woods in Brookfield. This was the first paved bike trail constructed by the Cook County Forest Preserve District. The trail connects the communities of Western Springs, LaGrange Park, Westchester, North Riverside, and Brookfield.

This trail was developed independently of the Salt Creek Basin Bikeway System Plan proposed for DuPage County and there is no plan to connect the two systems. The Cook County Salt Creek Bicycle Trail has an asphalt surface and amenities such as benches, shelters, trash facilities, motorist warning and bicyclist guide signs, auto parking, and washroom facilities.

c. North Branch Bicycle Trail

This Class I bicycle trail traverses the forest preserves along the North Branch of the Chicago River. Currently, the trail extends 17.6 miles from Devon and Caldwell Avenues in Chicago north to Dundee Road at the Chicago Botanic Gardens in Glencoe. Using the service drive within the Garden, one can ride 1.2 miles

further north to Lake/Cook Road. The Forest Preserve District plans to extend the trail east to connect with the Green Bay Trail. The trail connects the communities of Chicago, Niles, Morton Grove, Skokie, Glenview, Wilmette, Northfield, Winnetka, and Glencoe.

The forest preserves along the North Branch Bicycle Trail are the most intensively used of all Cook County Forest Preserves. Traffic counts along the existing trail indicate use by approximately 3,000 cyclists per day during summer weekends and holidays.

The existing bike trail connects many points of interest and intersects local bikeways in Glenview, Niles, and Chicago. Amenities such as benches, shelters, trash facilities, motorist warning and bicyclist guide signs, auto parking and washroom facilities are available.

d. Ned Brown Forest Preserve Bike Trail

Seven and one-half miles of a proposed ten and one-half mile bike trail has been built in the Ned Brown Forest Preserve area. Parking, shelters and washrooms are available. Plans exist to connect the Ned Brown Bike Trail to the Village of Schaumburg's bikeways system.

e. Thorn Creek Bicycle Trail

Three and one-half miles of the proposed 17.5 mile Thorn Creek Bicycle Trail has been constructed. When completed, the trail will follow Thorn Creek and North Creek through the communities of Park Forest, Chicago Heights, and Glenwood to Lansing. This bike trail will cross many highways and railroads along its route. A study of potential obstacles has been conducted and pedestrian signals or overpass structures appear to be warranted at five locations (Western Avenue, Sauk Trail Road, Lincoln Highway, Dixie Highway, and Halsted Street). Bicyclist guide signs and warning signs for motorists will also be needed. The existing section of this trail is asphalt paved. Auto parking, water, and washrooms are adjacent to it.

In addition to the above bikeways, the Cook County Forest Preserve has proposed an extensive (15 miles) bikeway along Tinley Creek in southern Cook County. Poplar Creek Preserve, Paul Douglas Preserve, and the Des Plaines River corridor, are also considered to be potential sites for future bikeway development.

f. Green Bay Trail

The Green Bay Trail was initiated in 1962 when approximately twenty individuals from the villages of Winnetka and Glencoe organized the Green Bay Trail Committee to urge the village boards to purchase and utilize the abandoned North Shore Railroad right of way as a bicycle and nature trail. The project was widely

supported by residents of both villages and in 1965 Winnetka and Glencoe purchased the property.

The Green Bay Trail Committee was incorporated at village request in 1965 so that it might lease the right of way from the villages and be responsible for the entire expense of developing, operating, and maintaining the trail. Development initiated by the Committee to date has been limited to building a recreational trail, although municipal parking and other needs may be accommodated and provided by the villages along the trail.

The first two mile section of the trail was built in 1969 between Harbor Street in Glencoe and Ash Street in Winnetka. An expenditure of $28,000 was required to grade, roll, pave, and fence the path. Funding for this original development came primarily from private donations made to the trail committee by over 1,600 Winnetka and Glencoe families. A $3,000 donation was made by the Chicago & North Western Railroad.

The trail is presently 14 miles in length. Most of the trail is Class I, built directly upon the abandoned railroad right of way. Intermittent sections of the trail are connected by Class II or Class III routes designated by local communities. From the Village of Wilmette the trail extends northward through Kenilworth, Winnetka, Glencoe, Highland Park, Lake Forest, and Lake Bluff.

g. Chicago Lakefront Bikeway

The Chicago Lakefront Bikeway, managed by the Chicago Park District, is about 28 miles in length. The south end of the trail begins at Jackson Park (67th Street), and extends northward through Burnham, Grant, and Lincoln Parks, to Bryn Mawr Avenue. Other points of interest on the route include the Museum of Science and Industry, Buckingham Fountain, and the Lincoln Park Conservatory. Directional signs are provided for bicyclists and on-street routes can be used to continue northward to the Evanston Lake Front Bikeway and the Green Bay Trail.

2. DuPage County

The major bikeway in DuPage County is the Illinois Prairie Path, a trail of national as well as regional significance. The Prairie Path is the only major existing Class I bikeway in DuPage County but the County Development Department has recently completed a bicycle study intended to spur bikeway development. The study identifies existing and proposed bikeways in the County and recommends the formation of a county system which would provide access to central business districts, schools, recreation facilities, commuter railroad stations and large employment centers. The DuPage County Development Department is working with municipalities to coordinate plans for such a system. The Illinois Prairie Path will be an integral part of any bikeway development in the County.

a. Illinois Prairie Path

The Illinois Prairie Path is a 45 mile trail along the former Chicago, Aurora, and Elgin Railroad right of way. The trail is located predominantly in DuPage County, but has branches that extend into Kane and Cook Counties. The trail is used for hiking, bicycling, and horseback riding, as well as for nature studies. It is surfaced with limestone screenings throughout much of its length, although some municipal portions are paved with asphalt.

When service on the Chicago Aurora, and Elgin Railroad was discontinued in 1959, all of the railroad equipment, including the rails, ties, and most of the bridges, were dismantled and sold. Only a continuous easement through the center of the county remained, which was purchased by the DuPage County Highway Department in 1965. Illinois Prairie Path, Inc., a non-profit organization, was established in 1966. A major portion of the trail was designated as a Recreational Trail of the National Trail System in 1971.

In July of 1977, the State of Illinois approved an amendment to the Illinois Department of Conservation budget, allocating $350,000 for acquisition of the 4.5 mile Cook County extension. This budget allocation provided the match for a grant from the U.S. Bureau of Outdoor Recreation.

The Prairie Path is also supported by membership dues and donations, which provide funds for signs, maps, mailings, maintenance, and other overhead expenses. The trail is maintained and developed under the guidance of a board of directors.

The municipalities of Elmhurst, Villa Park, Lombard, Glen Ellyn, Wheaton, and Warrenville, have an agreement to maintain the portions of the path within their boundaries.

b. East Branch Bikeway Proposal

While several forest preserves are already accessible from the Prairie Path, plans to connect the multi-use trail with other major open space areas in the county have also been proposed. A potential bikeway linkage between the Prairie Path and the Morton Arboretum exists along the East Branch of the DuPage River. Much of the land along the river is presently owned by the Forest Preserve District of DuPage County, the villages of Glen Ellyn and Lombard, and the Morton Arboretum. It has been suggested that the trail begin in the Churchill Woods Forest Preserve, continue through the Morton Arboretum and end in the Greene Valley Forest Preserve. The municipalities along the river, the Morton Arboretum, the County Forest Preserve District, and the DuPage County Development Department have all expressed their interest in cooperating in the study of this corridor through the East Branch Open Space Management Study discussed in Chapter 3.

c. Salt Creek Bikeway Proposal

The original DuPage County Forest Preserve District proposal for a bikeway system along Salt Creek called for the development of a continuous bikeway system over the entire basin, including over 40 miles of Class I, II and III bikeways. Such an ambitious proposal is not likely to be implemented but several groups have been acquiring land along Salt Creek for open space and flood control. The possibility now exists to develop a bicycle and hiking trail along the creek from the Lake Street/ Route 83 intersection to Roosevelt Road. The Forest Preserve District and the City of Elmhurst would be the major agencies involved in the trail development. The proposed Salt Creek Trail would intersect with the Illinois Prairie Path.

3. Kane County

The western part of Kane County is primarily agricultural, but the eastern part of the county, along the Fox River, is heavily developed. The county has a long, existing major bike trail, and a number of other existing and proposed trails.

The Batavia, Geneva, St. Charles, and Fox Valley park districts, in cooperation with the Kane County Planning Department, and the Forest Preserve Commission of Kane County are responsible for the major existing and proposed bikeways in the county.

a. Fox River Bikeway

The Fox River Bikeway, when fully implemented, will be over 35 miles long and will connect the communities of Aurora, North Aurora, Batavia, Geneva, St. Charles, South Elgin, Elgin, East Dundee, and Carpentersville, in the Fox River Valley. Portions of this trail have been completed and additions are proposed by the Kane County Planning Department, the Fox Valley Park District, and the Geneva Park District. Eventually, this trail could connect with the Prairie Path at three places forming a very large, three county bicycling network.

b. Great Western Trail

The Great Western Nature Trail is located along the abandoned right of way of the Chicago and Great Western Railroad. The trail begins at the Le Roy Oakes Forest Preserve, adjacent to the City of St. Charles, and extends west to the Town of Sycamore in De Kalb County. The trail is 17 miles in length (14 are in Kane County), and is constructed of compacted limestone screenings.

The area contains scattered subdivisions, farmland, and natural areas such as forest preserves, prairie and marshes. In addition to bicycling, the trail is used for hiking, nature studies and cross country skiing. Support facilities, including bicycle and ski rental shops, are readily accessible to the trail.

The portion of trail in Kane County is administered by the Kane County Forest Preserve Commission.

c. Virgil L. Gilman Nature Trail

The Virgil L. Gilman Nature Trail in Kane County is about 8 miles long, and includes the abandoned rights of way of the Elgin, Joliet, and Eastern Railroad and the Chicago, Milwaukee, St. Paul and Pacific Railroad.

The Trail, surfaced with limestone screenings, passes through urban, suburban, and rural areas. Waubonsee Creek intersects the trail near its southeast end. There are wetlands in this area that provide habitat for many species of birds. Small sections of native prairie plants border the trail here. The mid-section of the trail passes through the City of Aurora's east side. Many of the buildings and factories in this area were built around the turn of the century. At the Fox River, the trail crosses over a double truss bridge designed in 1934 for the Elgin, Joliet, and Eastern Railroad. All portions of the trail are administered by the Fox Valley Park District.

4. Lake County

Bikeway development in Lake County is concentrated in the busy urbanized areas and forest preserves in the eastern part of the County. The Green Bay Trail extends into Lake County with some interruptions from Lake-Cook Road to Lake Bluff. The agency most actively planning and implementing major bikeways is the Lake County Forest Preserve District with development of the Des Plaines River Bikeway and interest in the North Shore Bikeway Proposal (the extension of the Green Bay Trail).

a. Des Plaines River Bikeway

Six and one-half miles of a planned 40 mile bikeway has been constructed along the Des Plaines River by the Lake County Forest Preserve District. Most of the land along the river is owned by the forest preserve district and a completed trail could potentially extend into Cook County where the Des Plaines River corridor might someday be developed as a trail.

b. North Shore Bikeway Proposal

The Lake County North Shore Bikeway proposal, if constructed, would connect the Green Bay Trail with an existing Class I bikeway in Zion and continue to the Wisconsin border. The abandoned North Shore Railroad right of way would be used for this trail, as it was for the Green Bay Trail. Construction of this bikeway would require the cooperation of the Lake County Department of Planning, the Lake County Forest Preserve District and the communities of Highland Park, Highwood, Lake Bluff, Lake Forest, North Chicago, Waukegan, Winthrop Harbor, and Zion.

5. McHenry County

McHenry County is largely rural except in the southeastern townships where municipalities are relatively close together and growing quickly. With the exception of the bikeway in Moraine Hills State Park, the county has no existing, publicly administered bikeways. The McHenry County Conservation District has proposed three major bikeway developments which would provide 30 miles of additional bikeways in the county.

a. Moraine Hills State Park

Moraine Hills State Park is located about 3 miles southeast of the City of McHenry. The park, which borders on the Fox River, occupies an area of 1,668 acres. This area is unique because of its glacial topographic features, such as bogs, hilly moraines, and kettle lakes. These features allow for an area diverse in plant and wildlife habitats.

The 11 miles of meandering bicycling and hiking trails are surfaced with crushed limestone and offer a scenic view of the park.

b. McHenry County Conservation District Bikeway Proposals

The Conservation District has proposed that approximately six miles of bikeways be constructed along abandoned Chicago and North Western Railroad right of way (currently known as the Heuvelman Trail) from Hebron to the Wisconsin border. Another bikeway might be built along the Chicago and North Western Railroad right of way between the towns of Richmond and McHenry. Passenger service has been discontinued on this portion of the CNW system. A third bikeway has been proposed for construction in conjunction with an Illinois Department of Transportation highway project, FAP 420. Lack of funds may preclude construction of both the highway and bikeway in which case the highway right of way might still be considered for trail development.

6. Will County

Although agriculture dominates the land use in Will County, there are several established urban areas. Bikeway development in the county is still in the planning stage except for scattered municipal efforts and the Illinois and Michigan Canal State Trail.

In 1976, the Will County Board adopted the Bike Trail Plan as an element of the Will County General Plan. The Plan was prepared with the cooperation of the Will County Regional Planning Commission, the Will County Forest Preserve District, and several municipalities and park districts. Since its adoption, the Forest Preserve District has been unsuccessful in seeking funds for implementation. However, it still serves as a guide for future trail development in the county.

The Bike Trail Plan includes major trail proposals which follow river valleys, the Illinois and Michigan Canal, and railroad rights of way. One proposal would connect with a Cook County proposed trail along the Des Plaines River and I/M Canal. This proposal would coordinate with the regional, state and federal effort to identify and develop the I/M Canal from Summit through Joliet as a National Heritage Corridor for recreation and historic preservation. Another proposal along the abandoned Penn Central Railroad from Frankfort to Joliet is currently being studied for implementation.

a. Illinois and Michigan Canal State Trail

The Illinois and Michigan Canal Trail is located along an historic and scenic area. The canal, completed in 1848, was built to provide a navigable waterway from Lake Michigan to the Illinois River at La Salle, a distance of 96 miles.

Currently two sections of trail have been completed for bicycling. A 15 mile trail extends from the Village of Channahon (Will County), through Illinois and Michigan State Park, to Gebhard Woods State Park at Morris (Grundy County). This section is accessible to various support facilities.

A five-mile section of trail also runs from Utica to La Salle. These two trails are administered by the Illinois Department of Conservation. There is another bicycle trail along the Illinois and Michigan Canal in Palos Hills that is administered by the Cook County Forest Preserve District. All of these segments would eventually be connected if the I/M Heritage Corridor plan is implemented.

b. Penn Central Trail Proposal

The Penn Central Corporation has abandoned 22 miles of right of way in Cook and Will counties from Chicago Heights to Joliet. The right of way passes through a large number of governmental districts including the communities of Chicago Heights, Park Forest, Matteson, Frankfort, Mokena, New Lenox, and Joliet, several park districts, and the forest preserve districts of Cook and Will counties.

The right of way is ideally suited for recreational uses such as hiking, biking, and/or horseback riding. It is adjacent to and would connect many local parks, schools, historic and business districts, as well as several county forest preserves and two Illinois Natural Areas. The right of way is currently designated as a trail on the comprehensive plans for Matteson, Park Forest, and Joliet, and on the Will County Land Use Plan, the Will County Bike Trail Plan, and the NIPC Regional Open Space and Recreation Policy Plan.

Various governments are working with Corlands on negotiating the sale with the Penn Central. Corlands is a privately funded, non-profit corporation that takes temporary title to lands that eventually will be used for public open space purposes.

Chapter 6

CONCLUSION

Bicycling is a popular sport and a significant transportation alternative in northeastern Illinois. Municipal, park district and county interest in providing facilities for bicyclists has steadily increased during the past decade. Public interest seems to be on the increase as new bicycle clubs are formed and various organizations attempt to coordinate bicycling interests within the region.

Three primary strategies are required for the further accommodation and encouragement of bicycling in northeastern Illinois. First, useable corridors for Class I recreational bikeways should continue to be developed. The better facilities of this type are well-used in this region and some provide a substantial transportation route as well as a valuable recreational resource. Secondly, bicycles should be routinely considered when transportation improvements are planned. The potential for the use of bicycles as a low cost, environmentally sound transportation alternative has been documented. The popularity of this use is increasing. Such routine consideration, however, is a new idea that will need effort and support from interested citizens and communities before it becomes automatic in the planning processes for this region. Thirdly, the ability and willingness of bicyclists to ride safely in traffic must be increased through education and the enforcement of traffic laws. Motorists must also be encouraged to respect the rights of bicyclists to "share the road."

By referring to the many excellent resources available on bicycle planning, consulting with interested citizens and coordinating with other jurisdictions and government agencies, communities can provide a safer and more accessible bicycling environment. Eventually bicycles will be routinely considered in regional transportation planning, but initial efforts will have to come from the local level.

The following appendices include additional information on evaluating streets for bicycle use and, lists of agencies, organizations and publications which might be helpful for local planning efforts.

APPENDIX A

The following workshop on roadway types is excerpted from Pro Bike '80, the proceedings of the national conference for bicycle program specialists.

WORKSHOP 2*
HOW TO ASSESS THE FACILITY NEEDS OF BICYCLISTS
JOHN WILLIAMS

OBJECTIVE:

The purpose of the workshop was to describe some differences between roadway types in terms of their suitability and to discuss possible improvements needed. The primary message was that no one strategy will suit every class of street.

MAJOR TOPICS:

The topics included: low-volume residential streets; low-volume through streets; collector streets; minor arterial streets; major arterial streets.

Low-volume residential streets. These streets tend not to provide direct routes for through travel and the type of cycling typically found here is short distance recreation. People ride around their neighborhoods for leisure in the evenings and weekends. Kids are prevalent.

Thus, it should come as no surprise that many of the safety problems of low-volume residential streets involve young riders coming out of driveways and alleys and running stop signs at intersections. One of the major physical factors is poor sight distance. Bushes, trees, parked cars, and other objects keep the bicyclists and motorists from seeing each other. One approach to this problem is to enforce strong laws governing bush height, encroachment, set-back, and parking near intersections. Another worthwhile approach is to put up only those stop signs that are needed. Many citizens pressure government into installing stop signs at each block with a negative effect on compliance.

Low-volume through streets. Some low-volume residential streets actually provide alternatives for through bicycle traffic. Many cyclists--particularly those who are afraid of auto traffic--prefer these routes. If such routes can be identified, they should be modified to suit bicycle traffic better. Some ways to accomplish this include: modifying traffic controls at intersections to give priority to the bicycle route; improving surface quality and maintenance; cleaning up any sight-distance restrictions; replacing any dan-

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gerous utility covers and drainage grates.

If the street is residential in character but is being used as a "surrogate collector" street by syphoning traffic off the main streets, thought should be given to blocking the street off to through auto traffic. Some cities have tried this approach by installing barriers at intersections that allow bicyclists to go through but restrict motorists to turning maneuvers.

Collector streets. Collector streets serve to take auto traffic to the arterials. This is not the function they serve for bicycle traffic. For many bicyclists, collector streets are preferred riding environments--particularly for through trips. Since most bicycle trips are on the order of five miles or less, cyclists do not necessarily need to use the main arterials, unless there is no alternative. They can often take care of their businesses by using less traveled routes.

The cyclists who use such streets tend to be more experienced than those who simply cruise around the neighborhoods. They tend to be more regular users and trip purposes are more likely to be utilitarian. The improvements most desired on collector streets include better maintenance and surface quality, extra width in the right-most lane (perhaps even bike lanes if there is sufficient width), replacement of unsafe utility covers and drainage grates, improvement of sight distance at intersections, improvement of intersection controls, and parking limitations.

Minor arterial streets. Minor arterial streets carry more traffic than collector streets and are often multi-lane with signalization. Unless they go through areas where one might expect bicycle traffic (e.g., university and school zones, shopping districts), they will not draw much bicycle traffic except for the commuters, most of whom are adults. On the other hand, if the arterial is the only street that crosses a barrier, it may be used by a variety of bicyclists, from youngsters going to school to adults going to work.

In dealing with such streets, one must be careful not to create "attractive nuisances." If bicycle lanes or paths are built adjacent to heavily traveled streets, they may attract casual cyclists who may not be prepared to deal with the traffic. This is particularly worrisome when such bicycle facilities end up crossing the street system.

Probably the best that can be done for such streets is to improve them for motor traffic (better traffic controls), remove bottlenecks (where the outside lanes narrow or disappear), widen the outside traffic lanes to 14 feet, improve maintenance and surface quality, remove dangerous utility covers and drainage grates.

Major arterial streets. These are the primary trunk lines for motor traffic. They tend to be multi-lane with separate lanes for different movements (e.g., turns) and are generally signalized at all significant crossings. The bicyclists who use these streets tend to be very experienced commuters who prefer the through nature of the arterials. They often ride long distances (7-15 miles each way).

To provide special bicycle facilities on such streets may be the worst thing to do, since they may attract novice and child cyclists. The "attractiveness nuisance" concept

applies strongly here.

Some improvements that may ease conflict between bicyclists and motorists include providing wide outside traffic lanes (14-16 feet, depending on the traffic speed), paving shoulders, sweeping the outside lanes well, removing bottlenecks, replacing drainage grates and other surface hazards, and improving conditions for motorists (e.g., installing better signalization). Such improvements will make things better for those bicyclists who have to use the street but will not necessarily attract those who have neither the need nor the ability to be there.

One improvement to signalization may be useful for cyclists. If the demand-actuated signals are not sensitive enough to pick up bicycles, they should be modified to do so. At least one county has been sued for installing actuators that didn't pick up bicycles. (The case involved a cyclist who was killed when running a red light that would not change for him.)

APPENDIX B

The following methodology is excerpted from the FHWA course notebook, Pedestrian and Bicycle Considerations in Urban Areas. It is based on a methodology developed for The Harrisburg Area Pilot Bikeway Plan by Barton-Aschman Associates, Inc. for the Pennsylvania Department of Transportation, 1976.

I. EVALUATION OF POTENTIALS FOR ON-STREET BIKEWAY DEVELOPMENT

A. Use of existing streets and roadways for bikeway development often represents the most reasonable means to provide bicycle facilities.

1. However, traffic conditions, roadway geometrics and a number of other factors must be considered to ensure that on-street bikeway development is both safe and does not unduly compromise traffic carrying capacity.

2. The present state of the art in bicycle facility planning gives very little direction in establishing either a truly reliable set of uniform standards or a methodology for how these factors are to be systematically aggregated and applied to allow a single judgment to be made on the feasibility of various bicycle improvements.

B. The ideal process by which to evaluate the existing street system might be viewed in terms of the following four steps:

1. selection of those physical roadway conditions which are most significant in affecting safe and pleasurable bicycle use;

2. evaluation of the suitability of all street segments to accommodate bicycle use based on the conditions identified above;

3. determination of bicycling demands on all street segments in relation to the suitability of those street segments for accommodating bicycle traffic;

4. selection and ranking of all street segments based on (a) the need for future improvements necessary to accommodate estimated levels of bicycle traffic, and (b) the type, cost, and political feasibility of various improvements and facilities.

C. In view of the many demands on local public agency staff personnel, there is a need to streamline this process to allow for the development of an accurate rating and evaluating mechanism with minimum possible effort. Accordingly, the rating process generally outlined in the four steps above can be approached through a two-phased process (see Graphic 1).

1. Phase I - A rapid, initial assessment of major bicycling corridors to subjectively determine the general implications of bike route development on candidate streets.

2. Phase II - A detailed, objective evaluation of selected conditions on alternative routes within a corridor to determine the final feasibility of specific bike route improvements.

D. A detailed street rating and evaluation method must be simple and direct enough to:

1. Allow quick application without excessive manpower or dollar expenditures.

2. Make maximum use of the available data without requiring substantial additional data gathering and manipulation.

3. Remain flexible enough in terms of findings to allow sound professional judgment, peculiar local conditions and local goals and policies to play a part in arriving at bike route locational decisions.

E. As a first step, evaluation of prospective on-street bikeways should be based on the assessment of two primary factors and several secondary factors (see Graphic 2).

1. The two primary JUDGMENTS include:

a. The advisability of on-street bikeway improvements based on traffic volumes*.

b. The advisability of on-street bikeway improvements based on pavement width conditions.

2. Preliminary JUDGMENTS with respect to these two key factors are then confirmed or revised based on the subsequent observations of a variety of other conditions affecting on-street bicycle use including:

a. Cross traffic conflicts;

b. Impact of parking conditions;

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*Although not included in this methodology, one might also want to consider the speed at which automobile traffic is travelling.

c. Other factors.

3. The fundamental principle underlying the application of the methodology is to allow feedback to take place which potentially alters or revises previous judgments based on each succeeding judgment or observation until a final recommendation has been developed reflecting all relevant conditions and sound professional judgment.

F. Analysis of a specific roadway with respect to these factors should ideally be made based on a set of guidelines which indicate what conditions are acceptable or unacceptable. However, no wholly acceptable guidelines have yet been developed.

G. As a result, evaluation must be made on a more subjective basis, using judgments which indicate generally whether or not a particular condition is:

1. Compensating, or more than adequate to make up for other questionable conditions (for example, excessive width may make up for higher than acceptable traffic volumes.)

2. Acceptable, or generally meeting available guidelines.

3. Conditional, or only acceptable if appropriately compensated for by other conditions or factors.

4. Unacceptable.

H. Graphic 3 illustrates a sample form that has been developed to assist in recording evaluation findings.

1. The top entries are intended to convey, at a glance, the results of the evaluation on a particular street or street segment, including a short written statement on the final decision regarding the feasibility of a specific bikeway improvement or, bikeway improvements generally.

2. The bottom entries record specific conditions with respect to the major factors outlined previously and provide a comparison with available guidelines.

3. The results of these comparisons will generally be a statement of findings (qualified or unqualified in the "comment" area) indicating the level of acceptability of various observed conditions.

I. Again, the intent of the process and rating sheet is to introduce sound logic rather than arbitrary standards into locational decisions, thereby allowing decision-makers and staff to:

1. Focus on the most critical factors in a given situation, while

2. remaining flexible with respect to the infinite combination of conditions that may be encountered.

GRAPHIC NO.1

STREET RATING AND EVALUATION PROCESS

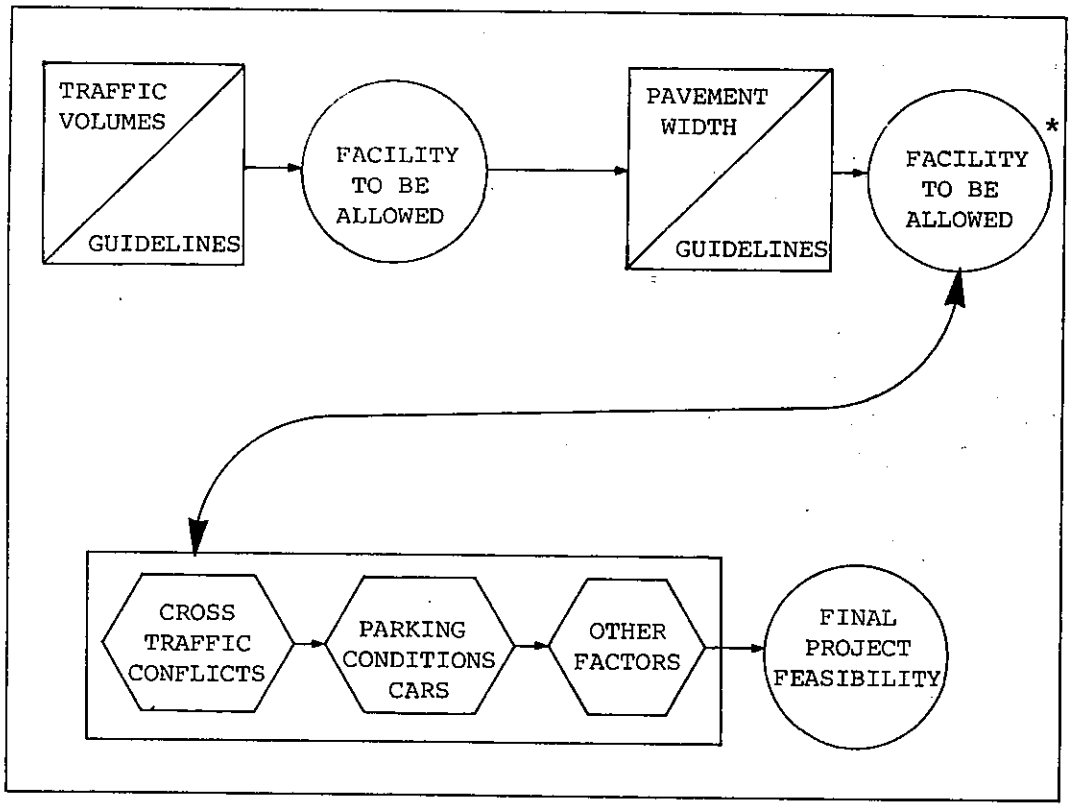
PHASE I

PRELIMINARY ASSESSMENT

FACTORS IN SUBJECTIVE ANALYSIS	FINDINGS OF PHASE I STREET ANALYSIS
TRAFFIC VOLUMES	A-SURFACE WITH NO PHYSICAL ALTERATION
VEHICLE OPERATING SPEEDS	B-SURFACE WITH ALTERATION IN STREET FUNCTION OR OPERATING CONDITIONS
PAVEMENT WIDTH	C-SUITABLE ONLY WITH MAJOR RECONSTRUCTION
ROUTE CONTINUITY	
ROUTE AMENITY	D-NOT SUITABLE FOR BICYCLE USE
GRADE CONDITIONS	

PHASE II

DETAILED EVALUATION



*A third factor, VEHICLE OPERATING SPEED, should be added.

GRAPHIC NO. 2

DECISION SEQUENCE AND CRITERIA FOR DETAILED STREET RATING AND EVALUATION

	JUDGMENT 1[1]	JUDGMENT 2[1]	Observation 1	Observation 2	Observation 3
Principal Factor to be Considered	Traffic volume and flow conditions	Width and clearance requirements at various speeds	Potential cross traffic conflicts	Impact of parking conditions on bicycle use	Other factors
Purpose	To identify the location and feasibility of various bike route treatments with respect to traffic volume conditions	To identify the feasibility of various bike route treatments in view of traffic conditions and necessary lateral separation	To identify the level of potential intersection related hazards on candidate routes	To identify the degree of hazard represented by parking and lane configuration conditions	Record and analyze conditions with respect to a number of secondary conditions affecting potential bicycle use and safety
Measure	Average Daily Traffic (ADT) by roadway type for specific bike route improvements	Pavement widths, lane widths and right-of-way widths	Cross traffic volumes at various intersections by type of control and number of conflict points	General observation on parking intervals, duration and occupancy	General frequency or nature of selected conditions
Design Values					

[1] The difference between the two initial JUDGMENTS and succeeding OBSERVATIONS is critical. The judgments relate to the most important factors, traffic volume and pavement width, for which some generally reliable guidelines and accompanying rationale can be identified. The observations relate to various conditions whose importance is largely determined (but which also affect) the judgments made previously and for which few, if any, reliable guidelines can be identified.

GRAPHIC NO. 3

STREET RATING EVALUATION FORM

SUMMARY

CANDIDATE STREET/ROADWAY: _____ FROM: _____ TO: _____

BIKE ROUTE TREATMENT
UNDER CONSIDERATION: _____ DATE: _____ BY: _____

EVALUATION SUMMARY: _____

EVALUATION FINDINGS

FACTOR AND MEASURE	OBSERVED VALUE OR CONDITIONS	GUIDELINE VALUE	ANALYSIS	COMMENTS
TRAFFIC VOLUME				
ADT				
STREET WIDTH				
PAV'T & SHOULDERS*				
CROSS TRAFFIC CONFLICTS				
NUMBER/AMOUNT CONTROL				
PARKING CONDITIONS				
TYPE				
OCCUPANCY				
OTHER FACTORS				
BICYCLE VOLUMES				
PAVEMENT CONDITIONS				
SIGHT DISTANCE				
BUS AND TRUCK TRAFFIC				
GRADE CONDITIONS				
AMENITIES				

COMMENTS:

* LANE WIDTH SHOULD ALSO BE NOTED

References to Appendix B

(1) Barton-Aschman Associates, Inc., Bicycling in Pennsylvania: Planning Principles for Evaluating Bicycle Facility Investments, Pennsylvania Department of Transportation, 1976.

(2) Barton-Aschman Associates, Inc., A Pilot Plan for Harrisburg, Pennsylvania Department of Transportation, 1976.

(3) Deleuw, Cather & Co., Safety and Locational Criteria for Bicycle Facilities, FHWA-RD-75-112, October, 1975.

(4) Forester, John, Basic Concepts in Cycle Traffic Engineering, Palo Alto, California, 1976.

APPENDIX C

AGENCIES AND ORGANIZATIONS INVOLVED IN THE PLANNING, IMPLEMENTATION, OR PROMOTION OF BICYCLE FACILITIES

REGIONAL

DuPage County Regional Planning Commission
421 N. County Farm Road
Wheaton, IL 60187
Phone: 312/682-7230

Forest Preserve District of Cook County
516 N. Harlem Avenue
River Forest, IL 60305
Phone: 312/261-8400

Forest Preserve District of DuPage County
P.O. Box 2339
Glen Ellyn, IL 60137
Phone: 312/790-4900

Illinois Prairie Path
P.O. Box 1086
Wheaton, IL 60187
Phone: 312/665-5310

Kane County Forest Preserve District
Kane County Government Center
719 Batavia Avenue
Geneva, IL 60134
Phone: 312/232-1242

Lake County Forest Preserve District
2000 N. Milwaukee Avenue
Libertyville, IL 60048
Phone: 312/367-6640

McHenry County Conservation District
6501 Harts Road
Ringwood, IL 60072
Phone: 815/338-1405

Northeastern Illinois Planning Commission
400 W. Madison Street
Chicago, IL 60606
Phone: 312/454-0400

Will County Forest Preserve District
Cherry Hill Road and Rt. 52 (R.R.#4)
Joliet, IL 60431
Phone: 815/729-8401

STATE

Division of Planning
Illinois Department of Conservation
524 South Second Street
Springfield, Illinois 62706
Phone: 217/782-3884

Bicycle Coordinator
Region I
Illinois Department of Transportation
1000 Plaza Drive
Schaumburg, IL 60196
Phone: 312/884-4126
312-884-4417
312-884-4100

State Bicycle Coordinator
Illinois Department of Transportation
2300 S. Dirksen Parkway
Springfield, IL 62704
Phone: 217/785-2937
217/782-7820

Bicycle Safety Program
Secretary of State
State of Illinois
5401 N. Elston
Chicago, Illinois 60630
Phone: 312/282-4000

FEDERAL

Bike Coordinator
U.S. Department of Transportation
Environmental Division, P-37
400 W. 7th Street, S.W.
Washington, D.C. 20590
Phone: 202/426-4366

Bicycle Program Coordinator
Environmental Protection Agency
Office of Transportation and Land Use Policy
Air, Noise and Radiation (ANR-445)
401 M Street, S.W.
Washington, D.C. 20460
Phone: 202/382-7756

National Highway Traffic Safety Administration
NTS-31
U.S. Department of Transportation
400 W. 7th Street, S.W.
Washington, D.C. 20590
Phone: 202/426-1760

BICYCLE TOURING

Cycling Program
American Youth Hostels
3712 N. Clark Street
Chicago, IL 60613
Phone: 312/327-8114

Bicycle Touring Group of America
3509 Grove Avenue
Richmond, VA 23221
Phone: 804/353-BIKE

Bikecentennial Routing Service
P.O. Box 8308-K
Missoula, Montana 59807
Phone: 408/721-1776

League of American Wheelman -
its affiliated bicycle clubs, and
regional headquarters also provide
touring information.

BICYCLE SALES AND CONSUMER INFORMATION

Bicycle Manufacturers Association
of America
1101 15th Street, N.W. - Suite 304
Washington, D.C. 20005
Phone: 202/452-1166

Chicago Area Bicycle Dealers Association
5940 W. Touhy Avenue
Chicago, IL 60648
Phone: 312/763-7350

National Bicycle Dealers Association
435 N. Michigan Avenue
Suite 1717
Chicago, IL 60611
Phone: 312/644-0828

BICYCLE PROMOTION AND PLANNING

American Bicycling Council
5887 S.W. 73rd Street
South Miami, Florida 33143
Phone: 305/661-8846

Bicycle Federation
1101 15th Street, N.W.
Suite 309
Washington, D.C. 20005
Phone: 202/659-5540

League of American Wheelmen
P.O. Box 998
Baltimore, Maryland 21203
Phone: 301/727-2022

League of American Wheelmen
Region 8 Headquarters
C/o Jack Coleman
523 Cowles Avenue
Joliet, Illinois 60435
Phone: 815/723-4654

APPENDIX D

BICYCLE PROGRAM PLANNING AND ENGINEERING PUBLICATIONS

The following publications are important references for bicycle facility planners. Many other resources are noted in the text and footnotes of this report.

PLANNING

American Association of State Highway and Transportation Officials. Guide for Development of New Bicycle Facilities Washington. 1981.

A summary of planning and design principles for bicycle facilities. Available from: AASHTO, Suite 225, 444 N. Capitol St., N.W., Washington, D.C. 20001. $2.50 plus $1.50 postage.

Bicycle Federation, Proceedings: Pro-Bike '80 (The Regional Conference for Bicycle Specialists, November, 1980.)

Available for $10.00 from Bicycle Federation, 1101 15th Street, N.W., Suite 309, Washington, D.C. 20005. The Bicycle Federation also has available a national directory of bicycle specialists.

Bicycle Federation. Pro-Bike News. Washington.

A monthly newsletter summarizing current events, legislation, programs and publications dealing with many aspects of bicycle planning and promotion. Available from: Bicycle Federation, Suite 309, 1101 15th Street, N.W. Washington D.C. 20005. $12.00 per year.

Bicycle Forum, Inc. Missoula. Bicycle Forum

A quarterly journal for the exchange of ideas and information on bicycle programs and issues. Available from: Bicycle Forum, P.O. Box 8311, Missoula, Montana 59807. $14.00 per year. Also available from the same address: Bicycle Forum Emporium, through which tags, stickers, posters, and pamphlets covering a broad range of topics of interest to cyclists and promotors of bicycling may be obtained.

League of American Wheelmen. American Wheelmen. Baltimore.

Monthly bulletin of the L.A.W., an organization representing and promoting bicycling interests. Available from: League of American Wheelmen, P.O. Box 988, Baltimore, Md. 21203.

David J. Luebbers, 1981 Bicycle Resource Guide.

Available for $15.00 from the author at 78 South Jackson, Denver, Colorado 80209. This is a guide to a broad range of literature dealing with bicycles.

North Carolina Department of Transportation Bicycle Program.

Many materials have been developed by this program, especially on bicycle safety. Available from: Curtis Yates, Bicycle Coordinator, N.C. D.O.T., P.O. Box 25201, Raleigh, N.C. 27611.

Northeastern Illinois Planning Commission. 1981. Bikeways of Northeastern Illinois. Chicago.

A map package of the public bikeways in the six counties of northeastern Illinois. Available from: NIPC, 400 W. Madison Street, Chicago, Illinois 60606. $4.00.

U.S. Department of Transportation. 1980. Bicycle Transportation for Energy Conservation.

Available from U.S. D.O.T., Office of the Secretary, Washington, D.C. 20590.

U.S. Department of Transportation, Federal Highway Administration. 1981. "Bicycle and Pedestrian Facilities in the Federal-Aid Highway Program." Washington.

This pamphlet summarizes the provisions whereby federal highway money can be spent on bicycle facilities. Available from: U.S. D.O.T., F.H.W.A., Division Administrator, 320 W. Washington Street, Room 700, Springfield, Illinois 62701. Free.

ENGINEERING

California Department of Transportation, Planning and Design Criteria for Bikeways in California CALTRANS, 1978

This is one of the most respected guides to bicycle facility engineering.
John Forester, Handbook of Cycling Traffic Engineering, Palo Alto, 1976.

Availabe from Custom Cycle Fitments, 726 Madrone Avenue, Sunnyvale, CA 940860.

This handbook includes many useful engineering ideas combined with Forester's particular perspective which is generally anti-bikeways and emphasizes informed and competent cyclists as part of the traffic mix.

North Carolina Department of Transportation, The Bicycle Puzzle: Putting the Pieces Together. N.C. D.O.T. Bicycle Program, January, 1979.

This is a notebook which covers bicycle planning principles and engineering specifics in a combination outline/prose format. Although a great deal of valuable information is summarized, some of it is difficult to follow without the context of the course in which it was originally presented.

U.S. Department of Transportation, Federal Highway Administration, The ABCD's of Bikeways, Washington, D.C., reprinted February, 1980.

The approach and design specifications of this document are somewhat outmoded but it offers a good summary of design and planning considerations for a bikeway. Use new AASHTO standards when in doubt.

U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices, Part IX. "Traffic Controls for Bicycle Facilities."

The MUTCD specifies correct and commonly used signs and traffic controls. It is available in many libraries and from the Government Printing Office.

U.S. Department of Transportation, Federal Highway Administration, Pedestrian and Bicycle Considerations in Urban Areas.

Developed in cooperation with, and available as, a course and publication from the Traffic Institute of Northwestern University. This notebook is similar in content and approach to The Bicycle Puzzle which was modeled on the FHWA course.

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