



Morris County Master Plan

Bicycle and Pedestrian Element

Adopted: December 3, 1998

Morris County Master Plan

Bicycle and Pedestrian Element

Prepared by:

Morris County Department of Planning and Development

Division of Transportation Management

In cooperation with:

Morris County Planning Board

ADOPTED: December 3, 1998

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Gene Cass

Morris County Master Plan

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ADOPTED: December 3, 1998

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1999

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William Chegwidden	Wharton Borough

MORRIS COUNTY PLANNING BOARD

Resolution No. 98-4

RESOLUTION ADOPTING THE 1998 BICYCLE AND PEDESTRIAN ELEMENT

WHEREAS, the Morris County Planning Board is charged with the responsibility of adopting a master plan for the physical development of the county; and

WHEREAS, a draft Bicycle and Pedestrian Element of the Morris County Master Plan was approved by the Planning Board for printing and distribution for review by municipalities on October 1, 1998; and

WHEREAS, the said draft was distributed to all municipalities in the county on or about October 5, 1998; and


WHEREAS, the Morris County Planning Board held public hearings on November 12 and December 3, 1998 and solicited written statements on the above draft; and

WHEREAS, the Morris County Planning Board has reviewed the comments received and has amended the draft Element to incorporate corrections and appropriate changes.

NOW, THEREFORE, BE IT RESOLVED that the Morris County Planning Board hereby formally adopts the 1998 Bicycle and Pedestrian Element, as amended through the date hereof, as part of the Morris County Master Plan.

VOTE	Aye	Nay	Abs.
Edward Bennett	✓		
Douglas Cabana	✓		
Patrick Donofrio	✓		
Frank Druetzler			
Joseph Falkoski	✓		
Lois Fox			
William Mathews	✓		
Steve Rattner	✓		
Matthew Sprung	✓		

I hereby certify that the foregoing is a true and complete copy of a resolution adopted by the Morris County Planning Board at a meeting held December 3, 1998.


Director, Morris County Planning Board

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Executive Summary

It has been over 20 years since Morris County published the 1977 Bikeway Element of the Morris County Master Plan. That plan examined bicycle issues and projected that a bicycle network would be created that would traverse the county. At the time the plan was written, the gasoline crisis was occurring and it was anticipated that automobile usage would remain at lower levels.

The time has come to reexamine the relevance of bicycle travel issues and to also consider pedestrian travel issues. Now, as both the decade and the century come to a close, alternative and auxiliary methods of transportation are gaining in popularity.

Recreational bicycle and pedestrian travel, by both adults and children, is a major trip purpose for these travel modes. Increasing health consciousness has spurred a resurgence in the popularity of bicycling and walking.

Morris County's location in a major metropolitan area, natural beauty, recreational opportunities, available real estate, access to major interstate highways, and a high quality of life are factors which have attracted people to the area for residential and commercial purposes. The low density dispersed pattern of development has made the automobile the

principle mode of transportation in Morris County.

Although the automobile is the primary means of travel, alternative modes of transportation are being encouraged. Reasons for this include traffic congestion, air pollution, increased health concerns, and a desire for an improved quality of life. Federal and state legislation, such as the Clean Air Act Amendments of 1990, the Intermodal Surface Transportation Efficiency Act of 1991 known as ISTEA, the Transportation Equity Act of the 21st Century of 1998 known as TEA 21, and the New Jersey Transportation Trust Fund have fostered a renewed focus on bicycle use and pedestrian travel.

The development of this Bicycle and Pedestrian Element to the Morris County Master Plan enables Morris County and its municipalities to identify facilities and to consider improvements for non-motorized transportation. It will also encourage coordination between the various levels of government to enhance planning and funding efforts.

An integral component in the development of this document was the formation of the Morris County Bicycle and Pedestrian Public Advisory Committee also known as the BiPED PAC. The BiPED PAC is comprised of volunteers from the county's 39 municipalities, as well as volunteers from agencies and organizations such as the Morris County Park Commission, Biking is Kind to the Environment, Board of Transportation of Morris County, and Morris County Rides, Inc.

The BiPED PAC identified safety as their primary concern for both bicyclists and pedestrians. Young children are particularly vulnerable to safety factors, as they are more difficult for motorists to see and they may not exercise proper judgement in all situations.

This Element provides municipalities with an opportunity to fill in the gaps in their municipal plans by providing the following guidance and recommendations:

- Individual Municipal Data Sheets containing pertinent information on existing bicycle and pedestrian facilities, parks and open space, journey to work information, and recommendations.
- A countywide map and detailed regional maps showing existing and proposed facilities.
- Design guidelines and standards for bicycle and pedestrian facilities.
- Funding information from federal, state, county, and municipal sources.
- Resources for public education and community outreach.
- Goals, objectives, and implementation strategies.
- Identification of liability and safety concerns.

CHAPTER ONE

Introduction

Although it may be difficult for many New Jersey residents to visualize, there are parts of the world where automobiles are not the primary mode of transportation. Citizens of other countries predominantly use bicycling and walking as their travel modes. However, when we think of this subject as a reality in our own area, our perceptions become somewhat skewed. A great deal more bicycle and pedestrian trips occur in our state, county, and municipalities than most people believe. Bicycle and pedestrian travel issues are significant and should be examined and addressed appropriately.

Morris County is located in the north-central portion of New Jersey, midway between New

York City and Pennsylvania. Factors that have attracted people to the area for residential and commercial purposes include natural beauty, recreational opportunities, location in a major metropolitan area, available real estate, access to major interstate highways, convenient commuter rail service, and a high quality of life. Many opportunities for biking and walking exist within the county. Major employment centers and residential housing are dispersed throughout the county. Therefore, the automobile has become the principle mode of transportation in Morris County.

New Jersey municipalities are not required by the Municipal Land Use Law to include a

Bicycle and Pedestrian Element as a component of their Master Plans. Although county and municipal governments certainly have many important topics to address, bicycle and pedestrian issues also need to be examined. Contrary to the popular conception that bicycle and pedestrian planning implies designated or separate bikeways and walking trails, facilities can be incorporated into the existing infrastructure. It is beneficial to raise public awareness of bicycle and pedestrian issues.

Populations inclined towards bicycling include children, families without automobiles, and persons with revoked motor vehicle licenses. Perhaps one of the first associations that comes to mind when people think about bicycles is an image of children riding their bicycles. Learning to ride a bicycle has had a powerful association as a childhood rite of passage. Even the popular phrase, "it's like riding a bike" has come to mean that once a skill is learned, it is easily remembered even after years of disuse.

Walking has seen a resurgence in its popularity as a form of recreation. This can be partially attributed to increased health consciousness. At its most basic level, walking is a "built-in" form of transportation which may be attained by most segments of the population. Safety is a valid concern for both bicyclists and pedestrians, as many popular bicycle/pedestrian routes are not separated from motor vehicle right-of-ways.

Various pieces of government legislation have been passed within the last decade that encourage further facilitation and exploration of bicycle and pedestrian issues. Initiatives include the Clean Air Act Amendments of 1990, the Intermodal Surface Transportation Equity Act of 1991 known as ISTEA, the Transportation Equity Act of the 21st Century of 1998 known as TEA 21, the New Jersey

Transportation Trust Fund, and the New Jersey Bicycle Helmet Law.

In her 1998 Inaugural Address, New Jersey's Governor Christine Todd Whitman recommended \$15 million be used for the creation of approximately 2,000 miles of bicycle paths in both urban and rural areas. Pedestrian paths around schools and senior centers are also to be improved. She announced that her transportation plan for the state, New Jersey First – A Transportation Vision for the 21st Century, addresses the relief of traffic congestion through increased bus and train service, bridge repairs, and safety improvements. This bodes well for the future of all transportation, but especially for young and elderly bicyclists and pedestrians.

1.1 Bicycle and Pedestrian History

Ancient cities were planned with walking in mind, and designs provided means of separating pedestrian and vehicular traffic, including vehicle-free areas at centers of activity, and sheltered walkways that guarded pedestrians from the elements. Modern cities and suburbs have changed their focus from walking to the automobile. It seems natural that pedestrian travel is taken for granted and even overlooked by many, except when citing pedestrian accident statistics.

There is no doubt that the bicycle took tremendous innovation and creative spirit to conceive, fashion, and produce. Perhaps the roots of bicycle evolution have helped lead to its widespread popularity. In terms of transportation progress, the bicycle made a significant contribution to the freedom offered to travelers. Elizabeth West stated in Hovel in the Hills that, "Progress should have stopped when man invented the bicycle." This reflects just how great an impact this mode of travel has had on civilization.

It all began when German agricultural engineer Baron Karl Freidrich Drais von Sauerbronn developed his "laufmaschine" ("running machine") in 1817. The device had two wooden wheels connected with a wooden beam which held an upholstered seat. By 1818, the Parisians had dubbed the conveyance as a "velocipede." During the 1860's, cranks and pedals were added to the front wheel of the original device. "Velocipede fever" spread to England and the United States by 1869. Certain manufacturers began setting aside space for indoor riding schools, so that enthusiasts could learn the basics of riding in a more predictable environment than in the rutted, crowded streets. During this era, it was the men of the upper classes who primarily benefited from the new-found freedom of movement which velocipedes allowed.

Although manufacturers continued to improve velocipedes, with features such as larger front wheels for speed, smaller rear wheels for lightness and mounting ease, and all-metal suspension wheels with solid rubber tires, they could not alter other design flaws and the rickety road conditions. The excitement faded in France and the United States around 1870, though England continued to make improvements and eventually developed the "High Wheeler." Starley and Hillman patented a high wheeler they dubbed "Ariel." High wheelers were extremely dangerous because any road irregularity could cause the wheel to brake and propel the unwary rider over the handlebars.

In logical progression, the next high wheeler variants were "safety" bicycles, designed to keep riders from being tossed over the handlebars. Rear-wheel chain drives were eventually added, and the term "safety" became associated with bicycles that are essentially similar to today's modern machine. The development of pneumatic tires in 1888 by Dunlop was the first dramatic improvement in bicycle technology. This was to be the summit

of technological development for the time being.

These bicycle prototypes were easy to handle, fairly affordable, and easy to maintain. Members of the general population now had access to this mode of transportation. The first American bicycle poster was printed by Albert A. Pope of the Pope Bicycle Manufacturing Company. On this poster, the bicycle is depicted as, "...the ever-saddled horse that eats nothing and requires no care," showing the advantages of this travel mode. However, the golden age of bicycles only lasted until about 1900. The newest contender in the contest for "transportation darling" was to be the horseless carriage known as the automobile.

Bicycles did manage to continue to add features and to become more efficient. For instance, in the 1920's, children's bicycles were introduced by manufacturers like Montgomery Ward and Sears Roebuck to revive the bicycle industry. These designs, now called "classic" featured automobile and motorcycle elements that appealed to children who presumably, would rather have had a motorized vehicle.

Design prototypes did not alter significantly until the 1950's when designs emulated jet airplanes and rockets. By the 1960's leaner and simpler machines were constructed. English three-speed bicycles became the desired consumer model in the 1960's, but before the decade ended, ten-speed racing bikes would come to the forefront of the American market.

The 1970's marked events which lent themselves to renewed interest in bicycles. Among the significant events of the decade which influenced awareness of alternative travel modes were the first Earth Day, the gasoline shortage, and the resultant high gasoline prices. Many bicycle enthusiasts were born out of necessity and became devout

believers. One notable fact was that in 1978, more bicycles were sold than cars in the United States. By this time, triple chain-ring cranks were standard, enabling bicyclists to travel longer distances. Acceptance of bicycling as a travel mode for commuting, recreation, and touring was increased during the health conscious 1980's. Bicycles' rear gear clusters saw the addition of more cogs, and the number of available speeds increased from 15 to 18. A new breed of rugged terrain bicycles known as mountain bikes were developed in the 1980's and saw a dramatic rise in popularity throughout the 1990's. Lightweight materials were introduced to bicycle manufacturing in the 1990's, as well.

1.2 Morris County Transportation History

After the county's charter by the King of England in 1739, Morris County found its economic niche in the mining of iron ore, primarily found in the hilly countryside of Dover, Jefferson, and Rockaway. As noted in the history of bicycle development, road conditions before 1900 were poor and travelers were generally restricted in their choice of travel mode. In actuality, walking and horses were the only choices until the mid 1800's when railroads were developed. In 1798, the county's first stage coach began running from Morristown to Jersey City. Once there, it met the ferry to Manhattan. It was an "arduous journey" since the stage coach made stops in Madison, Chatham, and Newark and it took most of the day to make its trip.

In the early part of the nineteenth century, private companies built toll roads to meet the demand for improved roads. In 1801, the Morris Turnpike was chartered and connected Morristown with Elizabethtown (Elizabeth). It is only reasonable that there would be some resistance to the paying of tolls. The "Shunpike" was built as a toll free, parallel alternative road which allowed travelers to

shun the pike. Today, sections of most of the turnpikes built during this time period remain parts of the federal, state, and county road networks.

Society's search for faster, more comfortable and efficient means of transportation continued, until railroads became a key component of Morris County's transportation system. By 1838, railroads were carrying passengers and freight between Newark and Morristown, and by 1848, the line was extended to Dover. To serve the county's iron mines, farms, and residents, new branches were built over the next 50 years.

Trolley operations began in 1904, with the Morris County Traction Company. Lines were built in the county to serve the towns and villages of Lake Hopatcong, Ledgewood, Wharton, Rockaway, Denville, Mountain Lakes, Boonton, Morris Plains, Morristown, Madison, and Chatham. Outside the county, lines continued east on to Newark and Elizabeth. Buses replaced trolley service in 1928. During this time period, the popularity of the automobile had already begun to grow.

1.3 Element Methodology

The Morris County Bicycle and Pedestrian Element has been developed as an element of the Morris County Master Plan. The Element takes into account previous departmental studies, as well as national studies, municipal, county, and state documents. This Element serves as an update to the 1977 Morris County Bikeway Element.

The American Association of State Highway and Transportation Officials (AASHTO) recommends conducting an inventory of existing conditions. AASHTO states that problems, deficiencies, safety concerns, and the needs of bicyclists and pedestrians must be cataloged. Existing roads and potential bicycle and pedestrian facilities should be analyzed for suitability for use. Any obstructions on

existing roads should be considered, as to how they may effect bicycle and pedestrian travel.

Natural features such as rivers, should be given consideration as to how they may fit into the scheme of bicycle and pedestrian opportunities. Special consideration is to be given to areas close to bicycle and pedestrian traffic generators such as schools, parks, and shopping areas. Transit should be accessible for bicyclists and pedestrians. Accident locations for bicycle and pedestrian incidents should be reviewed, to determine if there are physical features contributing to the accidents. Appendix C provides a detailed list of selection criteria for facility development, taking into account that different trip purposes will also need to be considered to decide on facility type, location, and priority.

An integral component in the development of this document was the formation of the Morris County Bicycle and Pedestrian Public Advisory Committee, also known as the BiPED PAC. NJDOT's Statewide Bicycle and Pedestrian Master Plan encourages counties to create citizen's advisory committees as part of the bicycle and pedestrian planning process, as does the American Association of State and Highway Transportation Officials (AASHTO). The BiPED PAC is comprised of volunteers from the county's 39 municipalities, as well as volunteers from agencies and organizations such as the Morris County Park Commission, Biking Is Kind to the Environment (B.I.K.E.), Board of Transportation of Morris County, and Morris County Rides, Inc. (MC RIDES).

The Morris Museum hosted the first meeting while they were displaying an exhibit on the history of bicycles. Well attended, the BiPED PAC's first meeting served to introduce members to the goals of the Element and also to enable Morris County Division of Transportation Management (MCDOTM) to understand what participants felt were the most important issues. Almost unilaterally,

members expressed concern for bicycle and pedestrian safety, children's issues, route connectivity between municipalities, and increased public awareness.

The second BiPED PAC meeting served as a vehicle to review existing bicycle and pedestrian routes, and to bring to the attention of the MCDOTM any other information relating to bicycle and pedestrian travel. The second BiPED PAC meeting also served as an excellent forum for municipalities to network with one another on bicycle and pedestrian issues.

Based on routes which BiPED PAC members identified, MCDOTM staff undertook intensive field investigations. Purposes of the fieldwork were to determine the feasibility of routes; to catalog physical features such as shoulder and roadway widths, speed limits, and hazardous conditions; and to classify route types such as shared roadways, trails, and bicycle lanes. Other fieldwork was undertaken by MCDOTM staff to inventory characteristics of the various park and ride lots, such as presence of sidewalks and other amenities.

Demographic information including current conditions and journey-to-work data were gathered utilizing the Morris County Data Book and US Census Transportation Planning Package data. Many recommendations for actual bicycle and pedestrian routes were collected from BiPED PAC member suggestions, and the resultant fieldwork. Other sources included Morris County Park Maps, a series of articles in The Daily Record titled "25 Great Walks in Morris County," and books listing bicycling and hiking trails.

Specific municipal information relating to bicycle, pedestrian, and recreational plans was gathered from municipal master plans on file with the Morris County Planning Board. An inventory of the sidewalks located along county roads was undertaken using county

road films and field investigation. Municipal accident statistics were gathered from municipal Police Department Safety Officers.

1.4 Element Organization

The following information represents an overview of the organization of this Element. The significant topics covered in each chapter are summarized.

Chapter One, Introduction provides an overview for the need of this Element, the history of bicycle and pedestrian travel, the basics of Morris County Transportation history, and the methodology for the development of the Element. **Chapter Two, Laws, Plans, and Regulations**, details the Federal, State, and County influences and studies which have impacted and shaped the need for bicycle and pedestrian facilities. Summaries are included of Bicycle and Pedestrian plans, taken from existing Municipal Master Plans. **Chapter Three, Bicycle and Pedestrian Travel** identifies the types of trips bicyclists and pedestrians make, examines opportunities for intermodal connections, and describes recreational travel, including facilities, amenities and organizations. **Chapter Four, Facility Types** defines the various types of bicycle and pedestrian facilities that are addressed in the Element, and includes associated skill levels and trip purposes. **Chapter Five, Safety**, reports on bicycle and pedestrian safety issues including children's issues, accident statistics, accident types, and countermeasures for accident prevention. **Chapter Six, Design**, discusses a wide range of topics which relate to design for bicycle and pedestrian facilities. Multi-use trails for use by both bicyclists and pedestrians are discussed, as are shared roadways, bicycle design guidelines, pedestrian compatible design guidelines (including sidewalks), and alternatives for pedestrian crossing problems. Traffic calming basics are reviewed. **Chapter Seven, Public Education and Outreach**, emphasizes the

importance of public education, especially for children. Programs for drivers and for communities are described. **Chapter Eight, Overview of Municipal Facilities by Region**, provides an overview of what bicycle and pedestrian facilities are in each region, and includes municipal data sheets that list all existing bicycle and pedestrian facilities, recommendations, and other information. The first map shows the entire Morris County network of existing and proposed bicycle and pedestrian facilities. For this Element, the county was divided into six regions. The remaining maps show existing and proposed facilities by region. **Chapter Nine, Liability and Costs**, provides definitions for liability and negligence, and gives the basic criteria for determining negligence. Trouble shooting and maintenance strategies to decrease liability exposure are included. Some of the basic costs for construction and maintenance are reviewed. **Chapter Ten, Funding Sources**, includes information on major sources of funding which may be available from federal, state, county and municipal sources. **Chapter Eleven, Goals, Objectives and Implementation Strategies**, lists the goals, objectives, and implementation strategies that have been evolved, as a result of drafting this Element.

A glossary of terms, including a list of acronyms can also be found at the end of this document. A full listing of sources may be found in the bibliography section of this Element.

CHAPTER TWO

Laws, Plans, and Regulations

The movement toward the establishment of bicycle and pedestrian facilities at all levels of government is evident in recent government initiatives. This has assisted the Morris County Division of Transportation Management (MCDOTM) to update the Bicycle and Pedestrian Element. Major related findings from these initiatives are summarized below.

2.1 Federal Legislation

2.1.1 Clean Air Act Amendments (CAAA) of 1990

This act focused on the reduction of ozone and carbon-monoxide as they relate to mobile source emissions. It called for various alternative transportation measures to be

undertaken to decrease automobile use and, therefore, diminished pollution. Increased bicycle and pedestrian trips for the purpose of non-recreational trips is one way to reduce vehicle emissions and manage congestion.

Three of the sixteen Transportation Control Measures (TCM) cited in the act were designed to reduce automobile emissions, and address bicycle and pedestrian issues directly. They are as follows:

- Programs for new construction and major reconstruction of paths, tracks, or areas solely for use by pedestrian or other non-motorized means of transportation when economically feasible and in the public interest.

- Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use by non-motorized vehicles or pedestrians, both as to time and place.
- Programs for secure bicycle storage facilities and other facilities including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas.

2.1.2 Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991

ISTEA linked transportation to CAAA goals. It allotted needed funding to projects that promoted improved air quality and increased use of intermodal options within the existing transportation network. ISTEA required states and metropolitan planning organizations (MPOs) to incorporate bicycle and pedestrian programs and facilities when developing transportation plans.

2.1.3 Transportation Equity Act of the 21st Century (TEA 21)

On May 22, 1998, the House and the Senate both approved the \$216 billion plan to continue the nation's highway and transit programs through the year 2003. It was signed into law by the President on June 6. This transportation authorization bill continues the work begun by ISTEA and represents the largest public works bill in United States history. TEA 21 increases funds for the Congestion Mitigation and Air Quality (CMAQ) and Transportation Enhancements, which will include some bicycle and pedestrian project allocations.

2.2 State Plans and Policies

2.2.1 New Jersey Department of Transportation (NJDOT) Statewide Bicycle & Pedestrian Master Plan

In 1995, with the assistance of a multitude of other organizations, the NJDOT completed

their Statewide Bicycle & Pedestrian Master Plan. The Plan was developed in response to the ISTEA mandate, as well as NJDOT's policy to identify bicycle and pedestrian issues. Other products which address these issues were also developed, such as the Bicycle Compatible Planning and Design Guidelines and the Pedestrian Compatible Planning and Design Guidelines. Basically, the Plan conceived a vision for the state, set targets, and identified current conditions and needs. An action plan with goals and objectives was created, with the five major goals being as follows:

- Create a bicycle and pedestrian friendly transportation system in New Jersey.
- Ensure community destinations, transit services and recreation facilities are easily accessible by foot and bicycle.
- Maximize opportunities for walking and bicycling.
- Improve bicycle and pedestrian safety through education and enforcement.
- Promote bicycling and walking as desirable and legitimate ways to travel.

This Plan recognizes that to accomplish the goal of creating a bicycle-friendly and walkable state, a comprehensive effort will be required by all those who have a role in bicycling and walking.

The following responsibilities are suggested for counties and municipalities:

Develop local bicycle and pedestrian facility plans.

- Appoint a contact person for bicycle and pedestrian issues.
- Establish a citizens advisory committee.

Adopt bicycle and pedestrian friendly comprehensive plans.

- Require that bicycle and pedestrian facilities are provided through revised planning codes, building regulations, and subdivision ordinances.

- Include bicycle and pedestrian facilities in transportation, schools and recreation facilities developed and improved by the county.

2.2.2 The New Jersey State Development and Redevelopment Plan

The State Plan, first adopted in 1992 by the State Planning Commission, proposes to direct all future growth into centers. These centers are discrete compact forms of mixed-use development which would be designed to be conducive to bicycle and pedestrian travel as well as mass transit. During the development of the Bicycle and Pedestrian Plan Element, the 1992 State Plan was reexamined and was being revised through a cross-acceptance process.

2.2.3 Residential Site Improvement Standards

The Site Improvement Act empowered the Department of Community Affairs to establish uniform statewide standards for residential development. The Residential Site Improvement Standards superseded and automatically replaced all municipal site plan ordinances with regard to streets, parking, water supply, sanitary sewers and stormwater management on June 3, 1997. The rules include standards for sidewalks and bicycle facilities, which are detailed in Chapter Six, Design. Unless granted a waiver, all municipalities are required to utilize these standards in reviewing and approving plans for development. These standards do not pertain to non-residential development and do not affect county land development standards.

2.3 County Initiatives

2.3.1 1977 Bikeway Element Morris County Master Plan

The Element, "...establishes a philosophy for governmental construction and delineation of a county-wide bikeway system and designates

such an inter-municipal continuous system. The designated system is intended to be implemented over a 20-25 year period as funds become available and as construction is done on the designated roads."

At the time the 1977 element was completed, it was anticipated that bicycle funding for transportation and recreational purposes would become more plentiful. Another assumption was that bicycles would increasingly be utilized as a major mode of transportation to work, partially due to the existing gasoline crisis. Sections of this document included bikeway definitions, national and local trends and statistics, reasons for providing bikeways, and bicycle storage facilities.

Finally, the 1977 element unveiled the vision for a 28 segment, county-wide bikeway system. A map and detailed descriptions of the various routes accompany the text. Although the plan included some municipal bikeways, its purpose was not viewed to be of service to all local travelers. It is interesting to note that the narrative does state, "...changed conditions in the future may make variations desirable." This Element proposed practical responses to expressed problems. Solutions cited were better educational programs for drivers and bicyclists for increased safety enforcement, improved laws for bicycle use, provision of hazard-free roads and streets, and the development of bikeways.

Overall, the goal was to develop a coordinated, inter-municipal system of bikeways in the county. Pedestrian issues were addressed. The 1998 effort to develop a new element recognizes that the 1977 element did not plan for pedestrians, and did not account for impediments to a regional trail network, such as costs, climate, topography, and land use characteristics.

2.3.2 1992 Morris County Master Plan Circulation Element

Prior to the development of the Circulation Element, there was no comprehensive plan to guide the development of an efficient transportation system throughout the county. It provides standardized guidance to all levels of government and consists of goals and objectives which were developed to be consistent with state and county master plan elements. Policies were developed so that the goals and objectives could be reached, and were supported by short term (1995) and long term (2010) suggestions. The main **Policies and Proposals** which mention bicycle and/or pedestrian issues are as follows:

Policy: Preserve, maintain, and improve NJ Transit's passenger rail facilities.

Proposal: Encourage municipalities and NJ Transit to install bicycle storage facilities at selected stations.

Policy: Expand and develop new park and ride facilities.

Proposal: Install bicycle storage facilities at selected park and ride locations.

Policy: Encourage the elimination of on-street parking in congested areas during the peak periods.

Proposal: Encourage municipalities to install bicycle parking facilities in downtown business districts.

Policy: Improve the safety of the roadway system.

Proposal: Review roadway improvement projects to identify possible concurrent improvements for non-motorized transportation.

Proposal: Install bicycle-safe bridge expansion joints and storm water grates on roadway improvement projects, where applicable.

Policy: Evaluate, maintain, and improve existing facilities before considering construction of new facilities.

Proposal: Include the addition of bicycle lanes in the design of roadway and bridge reconstruction projects, where applicable.

Proposal: Include the paving of shoulders for bicycle and pedestrian use for roadway resurfacing projects, where feasible.

Policy: Develop and encourage the use of traffic mitigation strategies.

Proposal: Reduce peak hour traffic by encouraging businesses to use Travel Demand Management (TDM) strategies.

Update and revise the 1977 Bikeway Element of the Morris County Master Plan.

Policy: Reduce vehicular energy consumption.

Proposal: Reduce Vehicle Miles Traveled (VMT) through TDM techniques.

Proposal: Encourage use of alternatives modes of transportation as opposed to the single occupancy vehicle.

Proposal: Support non-vehicular oriented development.

Policy: Coordinate sound land use and transportation planning.

Proposal: Review subdivisions and site plans to ensure that they are designed with consideration for bicycle and pedestrian access.

2.3.3 1993 Air Quality Plan for Mobile Source Emissions: Analysis of Transportation Control Measures

As a county in an ozone non-attainment area, Morris County was required to prepare this plan by the CAAA of 1990 to assist the NJDOT with an analysis of Transportation Control Measures (TCMs).

It was determined that the county's role in the implementation of bicycle and pedestrian TCMs was for, "Encouragement of bicycle and

pedestrian facilities at transit stations, park and ride lots, Central Business Districts (CBDs), business developments, and in new subdivisions.”

It was also noted that, “A key component of the majority of TCMs for the county is guidance and assistance to the municipalities.” This is compatible with the plans for development of the Element.

2.4 Municipal Initiatives

The planning of bicycle and pedestrian facilities should be part of the comprehensive planning process. Bicycle and pedestrian facilities can make a community more attractive, especially if landscaping and other amenities are included. Policy statements relating to bicycle and pedestrian needs should be included in state, regional, county, and especially in municipal master plans. This will acknowledge that a need exists for planning these facilities at the municipal level.

Although planning for bicycle and pedestrian facilities is important, many municipalities have not formally addressed these issues in their master plans. It should be noted that bicycle and pedestrian elements are not required by the Municipal Land Use Law (NJSA 40:55D-1 et. seq.). Most municipalities in Morris County do not have a specific bicycle and pedestrian element. In fact, the following municipalities make no mention of bicycle and pedestrian issues in their master plans: Town of Boonton, Town of Dover, East Hanover Township, Florham Park Borough, Hanover Township, Lincoln Park Borough, Mendham Borough, Mount Olive Township, Riverdale Borough, and Rockaway Township. However, many communities are reexamining their master plans and were active in the development of this Element.

The remaining municipalities have incorporated bicycle and pedestrian planning in a variety of ways within their master plans.

The following are summaries of the information contained within the plans on bicycle and pedestrian issues.

2.4.1 Boonton Township

This community desires informal bicycle and pedestrian facilities, in keeping with their rural, low density character. Safety issues are a concern, and the township encourages and promotes the planning of new trails. Powerville Road and Elcock Avenue in Del’s Village is a location where future bicycle and pedestrian facilities have been identified for construction. Another possibility for pedestrian interconnectivity is an informal pathway through the surrounding neighborhoods of Rockaway Valley School and Leonard Park.

2.4.2 Butler Borough

The document made several observations concerning pedestrian travel for the community. For example, at the time the plan was adopted in 1977, there were no pedestrian signals and only ten percent of the intersections were marked with crosswalks. Safety concerns with pedestrian travel along NJ 23, from Kiel Avenue to Boonton Avenue were also noted. Roads mentioned where sidewalks would be beneficial were Boonton Avenue from NJ 23 to Belleview Avenue, Kakeout Road, and Valley Road. Sidewalk additions are needed on Roosevelt Avenue from NJ 23 to Kiel Avenue, and on Terrace Avenue.

2.4.3 Chatham Borough

Although the Borough addresses the need for a separate bikeway system, there are no specific plans for future development of such a system. The Borough is concerned with the safety of bicyclists on the county and state roads due to the high volumes of traffic.

2.4.4 Chatham Township

The Township has proposed several bikeways and walkways that are part of the Heritage Greenway:

- from Ferndale Road west through the rear of the Long Hill Chapel property to Shunpike Field and continuing across Southern Boulevard to Nash Field and the County Road (CR) 646 along the sewer interceptor,
- from Southern Boulevard west of Woodmont Drive, south to CR 638 along the sewer interceptor,
- from River Road west of the firehouse south to CR 647 along the Passaic River, and
- along the River Road hillside from Fairmont Avenue, throughout the Shale Pit Recreation Area, to Southern Boulevard, with a connecting link from the Shale Pit Recreation Area along the PSE&G right-of-way to Fairmont Avenue opposite the proposed CR 638.

2.4.5 Chester Borough

The Borough plan advocates adding sidewalks to their community. The following modifications are proposed:

- a concrete sidewalk to the east side of US 206 between Maple and Main Street,
- a concrete sidewalk on east side of US 206 between Main Street and the GPU right-of-way,
- a concrete sidewalk on one side of Perry Street,
- a concrete sidewalk on the north side of Oakdale Road, and
- a pedestrian walkway adjacent to the shopping center on CR 517, west of US 206.

The general objective of the 1983 Sidewalk Study was to place sidewalks on all roads classified as "rural arterials", "rural major collectors" and "rural minor collectors." The beautification of the sidewalks on Main Street

is proposed from Seminary Avenue to Oakdale Road.

2.4.6 Chester Township

The Township desires to become involved with constructing more extensions of Patriots' Path through their community.

2.4.7 Denville Township

The plan does not state any specific alterations to the township's existing bicycle and pedestrian facilities, other than repairing and maintaining the current sidewalks.

2.4.8 Harding Township

The Township describes future greenways between Jockey Hollow and the Great Swamp.

2.4.9 Kinnelon Borough

This document discusses acquiring the Felkay Tract for open space. This tract sits on 1,300 acres originally zoned for a golf course, however, the town amended the zoning. If preserved, the Borough would conserve two square miles, which could be used for various bicycle and pedestrian activities.

2.4.10 Long Hill Township

The plan encourages the construction of new sidewalks with creative design. The Township would like to develop a trail system that creates links to residential, business, and park areas.

2.4.11 Madison Borough

The Borough recommends the placement of sidewalks along Woodland Road from Noe Avenue to the Chatham Township border. The plan discusses establishing bikeways on the remaining large, developable parcels of land.

2.4.12 Mendham Township

Proposed paths at the extensions of Old Orchard Road and Hamilton Drive are designated for access to the Mendham Middle School.

2.4.13 Mine Hill Township

The circulation plan supports the creation of more sidewalks.

2.4.14 Montville Township

There are three proposed recreational paths:

- Morris Canal, extending from I-287 near Boonton to the Lincoln Park line,
- a north-south route located adjacent to Changebridge Road, extending from the Canal Route to Woodmont Road, and
- power line and gas easements, which parallel Changebridge Road.

Montville would also like to install separated landscaped buffers to create walkways along its main arterials.

2.4.15 Morris Plains Borough

The Borough stated a specific goal of providing a pedestrian overpass near the railroad station.

2.4.16 Morris Township

The Township has assessed the needs for sidewalks in their plan and has determined that Martin Luther King Avenue and Cleveland Avenue need sidewalk extensions.

2.4.17 Morristown

The plan informally addresses pedestrian safety issues on Early Street.

2.4.18 Mt. Arlington Borough

The Borough has identified the area between MacGregor Avenue and Howard Boulevard which contains steep, wooded land as having potential for trail development.

2.4.19 Mountain Lakes Borough

The Borough has proposed a bikeway over the rail line bridge on Fanny Road at the Parsippany-Troy Hills Township boundary leading to the YMCA.

2.4.20 Netcong Borough

Netcong is primarily interested in proposing a safe bikeway and walkway across the rail line at Railroad Avenue near the Netcong Sports Club, then connecting with Stoll Street. This will allow access to the Netcong Cove Recreation Area.

2.4.21 Parsippany-Troy Hills Township

The plan proposes a bicycle and pedestrian path along the Erie and Lackawanna Railroad Line, as well as, another path along the north branch of Troy Brook.

2.4.22 Pequannock Township

The proposed NYS&W bicycle and pedestrian right-of-way traverses through portions of Pequannock Township. When constructed, Pequannock proposes to name their portion the Pete Standish Memorial Bicycle and Pedestrian Path. Other points the plan acknowledges are the need for more sidewalks and pathways within the community.

2.4.23 Randolph Township

Randolph Township proposes to link Patriots' Path with points of regional significance, and to link bicycle routes to the future Town Center. The plan states that future residential and commercial development be interconnected with bicycle and pedestrian paths.

Specific future road enhancements were also noted. Calais Road is documented as needing drainage grates. Sussex Turnpike, Hanover Avenue, Church Road, Millbrook Avenue, Carrell Road, and Center Grove Road are classified as roads needing three foot shoulders. Randolph Township is the only municipality in the county that uses a classification for bikeways.

2.4.24 Rockaway Borough

The plan briefly addresses strategies for future bicycle and pedestrian travel. These include providing secure bicycle racks, signing bicycle and pedestrian routes, and installing showers and lockers at places of employment.

2.4.25 Roxbury Township

The Township recommends the creation of bicycle paths on the 340 acre former AT&T tract. The construction of sidewalks is proposed in areas near schools, public uses, and parks.

2.4.26 Victory Gardens Borough

The Borough addresses its need to provide sidewalk maintenance and beautification.

2.4.27 Washington Township

The Township intends to build pedestrian linkages to Long Valley, Schooley's Mountain Park, Rock Spring Park, and the library. Another goal is to produce a Washington Township map of trails, including connections to Patriots' Path.

2.4.28 Wharton Borough

The "Commercial Land Use Element," describes plans for streetscape designs, including sidewalks within the central business district.

2.5 Government Role

Municipalities should also include specific recommendations for pedestrian facilities, such as sidewalks, recreational paths and trails, and non-recreational paths for purpose trips. Municipal ordinances should also specify standards and guidelines for sidewalk installation, including funding sources. Regulations for subdivisions will have an especially great impact on the location and design of sidewalks and will help to encourage developers to add these facilities. Finally, a checklist should be created to help municipal staff and developers to identify what types of

pedestrian facilities are to be included in development. An example of a Site Design Criteria for Pedestrian Facilities is shown as Appendix E.

NJDOT's Pedestrian Compatible Planning and Design Guidelines, give some illustrations of what municipalities may incorporate into their land use ordinances, to encourage pedestrian-friendly land development. Municipalities who wish to undertake bicycle and pedestrian planning efforts should utilize the above document for guidelines and recommendations.

CHAPTER THREE

Bicycle and Pedestrian Travel

To create a comprehensive bicycle and pedestrian plan for Morris County, it is necessary to understand where people live, work, and travel, and where these activities may occur in the future. Knowledge of travel habits can guide the development of bicycle and pedestrian facilities.

There has been a steady increase in bicycling and walking nationwide. This may be attributed to increased awareness of health benefits and greater availability of affordable quality equipment. Figure 3.1 shows the national increase in bicycle use from 1983 to 1991.

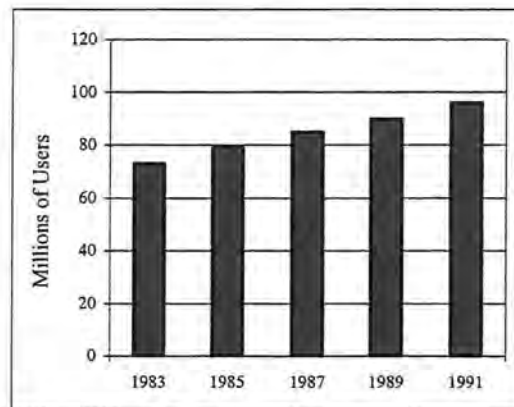


Figure 3.1 Bicycle Use: 1983-1991

Source: Bicycle Institute of America Reference Book

Most bicyclists and pedestrians can only endure short trips. In Morris County, approximately 72 percent of bicycling and walking trips are less than 15 minutes in duration. Twenty seven percent of trips are one mile or less and 40 percent are two miles or less on a national basis. Land use planning should reflect connectivity between major destinations for bicycle and pedestrian trips, since long distances may be a deterrent. Land uses that generate bicycle and pedestrian trips are summarized in Table 3.1.

completed a non-recreational bicycle trip. Work trips are more constrained in terms of distance, attire, urgency, and time of day.

Many non-recreational trips are short in length. Children undertake the majority of non-recreational trips because of their dependence on bicycling and walking. One third of all pedestrian trips in the United States are made by children traveling to school. In Morris County information on children's travel to school is not collected by local school districts.

3.1 Types of Trips

3.1.1 Non-recreational Trips

Examples of non-recreational trips include those taken to work, local shopping centers, and schools. The National Bicycling and Walking Study (NBWS) uses the term "utilitarian" to describe non-recreational trips. If someone rides their bicycle to work on a trail, then they have

3.1.2 Recreational Trips

A recreational trip is defined as travel without a predetermined destination. These types of trips are the most frequent. People who bicycle and walk for enjoyment and exercise often take recreational trips.

**Table 3.1
Major Destinations of Bicycle and Pedestrian Trips**

Destinations	Comments
Schools	Schools attract a large amount of bicycle and pedestrian use because they are typically located near residential areas.
Libraries	Libraries are frequented by a broad spectrum of people including children and the elderly who may not drive.
Hospitals	Typically located in urbanized areas automobile parking may be limited.
Commercial Areas	Typically, such areas are designed to encourage easy access by automobile. This does not eliminate bicycle and pedestrian access, however, precautions must be taken to ensure the safety of bicyclists and pedestrians.
Downtown Areas	Historically these areas are pedestrian oriented. Providing secure bicycle storage will attract bicyclists to downtown areas.
Railroad Stations and Bus Terminals	Parking is usually limited for automobiles and waiting lists are common. Safe routes and bicycle storage are essential to encouraging bicycle and pedestrian travel to railroad stations.
Recreation Areas	These facilities are natural magnets for bicyclists and pedestrians. It is important to provide safe and convenient access to facilities from adjacent areas.
Scenic, Historic, and Cultural Sites	These sites should accommodate bicyclists and pedestrians.
Employment Centers	Employers should provide incentives to encourage employees to bicycle and walk. Access to employment areas on highways and busy roads should be safe.
Residential Areas	Linking these areas with all of the above destinations is the key to a successful plan. If clear, direct bicycle and pedestrian routes are designed, people will use them. Many residential streets can provide links to major destinations since traffic is usually lighter.

Source: Middlesex County Bicycle-Pedestrian Plan, March 1995

3.2 Bicycling and Walking to Work

The most common mode of travel to work is the single occupancy vehicle, chosen by 81 percent of commuters in Morris County. Only one percent bicycle to work and two percent walk. Table 3.2 displays the modal choice for Morris County workers. Reasons for the low modal share for bicycling and walking are the distance between residential development and employment centers, regional topography, climate, safety, and traffic concerns.

Provision of showers, lockers, and bicycle storage facilities at employer worksites may further encourage employees to utilize alternatives modes of transportation. Financial incentives may also assist employers in promoting bicycling and walking to work. Morris County Rides, Inc. (MC RIDES) is the transportation management association for Morris County and other northern New Jersey counties. They can encourage and recommend strategies for employers to develop bicycle and pedestrian friendly work sites. MC RIDES also develops employee surveys and holds corporate on-site programs relating to various alternative transportation issues.

3.2.1 Journey to Work

When Morris County is compared to the North Jersey Transportation Authority (NJTPA) region, similar journey to work patterns exist as seen in Table 3.3. The NJTPA region includes 13 of New Jersey's northern counties, as well as Jersey City and Newark. Morris County's modal share for bicycling and

Table 3.2
Mode to Work

SOV	187,681
Carpool (two or more)	22,783
Public Transportation	7,981
Motorcycle	142
Bicycle	434
Walk	5,120
Other	898
Worked at Home	6,054
Total Workers	231,093

Source: 1990 Census

walking is similar to the entire NJTPA region. Within the NJTPA region two percent of workers bicycle and four percent walk. In neighboring Somerset County that has similar development and topography, 0.19 percent of workers bicycle to work and 1.9 percent walk.

The 1990 Census provide information on work destinations for county residents. Table 3.4 shows the places of work for Morris County workers age 16 and older. Of the 231,093 workers in Morris County, 18 percent work within the municipality in which they live. This group of workers is the most likely to bicycle or walk to work because their trip distances are the shortest. This is especially true in the urban municipalities such as Dover, Madison, and Morristown. These towns have a large number of residents working within their borders, small land areas, and well-developed sidewalk networks. For example, in Morristown and Madison 7.5 percent of their commuters bicycle and 10 percent walk.

Table 3.3
Bicycling and Walking as Modes to Work for the NJTPA Region

County	Number of Bicyclists	Percent of Bicyclists	Number of Walkers	Percent of Walkers	Total Number of Commuters
Bergen	865	0.20	14,844	3.46	429,102
Essex	441	0.12	17,648	4.95	356,562
Hudson	341	0.13	27,715	10.55	262,745
Hunterdon	69	0.12	1,320	2.29	57,721
Middlesex	783	0.22	11,260	3.18	353,628
Monmouth	810	0.30	8,257	3.01	274,238
Morris	434	0.19	5,120	2.22	231,093
Ocean	602	0.34	4,151	2.32	178,966
Passaic	342	0.16	11,270	5.11	220,595
Somerset	258	0.19	2,639	1.96	134,390
Sussex	88	0.13	1,186	1.78	66,593
Union	681	0.28	9,597	3.88	247,205
Warren	74	0.16	1,680	3.74	44,891
Total	5,788	0.20	116,687	4.08	2,857,729

Source: 1990 Census

Table 3.4
Places of Work of Morris County Workers 16 Years of Age and Over

Municipality	Worked at Home	In Municipality of Residence	In County of Residence	Out of County	Out of State
Boonton	108	911	3,092	1,231	188
Boonton Twp	66	125	1,152	484	136
Butler	49	483	1,313	2,511	233
Chatham Boro	117	610	1,639	1,714	631
Chatham Twp	176	403	1,854	2,106	778
Chester Boro	22	163	446	196	12
Chester Twp	159	214	2,026	972	129
Denville	180	1,179	5,098	2,084	477
Dover	182	1,859	6,933	1,046	140
East Hanover	80	1,261	2,564	2,737	258
Florham Park	131	880	2,464	1,942	278
Hanover	141	1,454	4,136	1,892	191
Harding	132	222	996	602	278
Jefferson	271	1,673	6,191	3,363	472
Kinnelon	178	526	1,569	2,582	369
Lincoln Park	146	764	1,932	3,581	600
Long Hill	127	695	1,428	2,592	359
Madison	132	2,171	4,983	2,561	713
Mendham Boro	143	441	1,468	894	146
Mendham Twp	135	217	1,376	700	185
Mine Hill	28	72	1,437	322	35
Montville	266	1,392	3,773	3,792	732
Morris Twp	496	1,809	7,185	2,825	920
Morris Plains	34	469	2,018	716	169
Morristown	252	2,895	6,860	1,907	394
Mountain Lakes	76	275	964	590	270
Mount Arlington	48	130	1,472	489	88
Mount Olive	181	1,898	8,333	3,644	410
Netcong	58	262	1,308	433	50
Par-Troy Hills	653	6,724	17,202	10,066	1,601
Pequannock	135	1,580	2,565	3,929	401
Randolph	234	1,549	7,395	2,781	467
Riverdale	28	145	427	785	75
Rockaway Boro	27	574	2,492	888	103
Rockaway Twp	194	1,105	7,395	3,153	603
Roxbury	319	2,202	7,965	2,550	359
Victory Gardens	2	19	636	108	12
Washington	321	987	4,402	3,151	346
Wharton	27	298	2,461	548	68
Morris County	6,054	40,636	138,950	78,467	13,676

Source: 1990 Morris County Databook

3.2.2 Opportunities for Intermodal Connection

Morris County has a well-established rail and bus system including 17 railroad stations and 22 bus routes. NJ Transit operates three rail lines, the Morris and Essex Line, the Boonton Line, and the Gladstone Branch. The Morris County Metro bus system provides intra-state service, both urban and rural, throughout Morris County. A number of other bus carriers including NJ Transit, Community Coach, and Lakeland Bus (to New York City) also provide bus service. Complementing these transit options are 33 park and ride lots throughout the county. Connecting bicycle and pedestrian facilities to transit-related systems adds depth to the entire transportation network, without additional automobile use.

Most train stations, park and rides, and bus stops offer some opportunities for intermodal connections for bicyclists and pedestrians. None of the railroad stations within Morris County currently have bicycle lockers or bicycle lanes in close proximity to the stations. Also, fewer than half have sidewalks, crosswalks, or bicycle racks. Table 3.5 lists the railroad stations and park and rides within the county, the municipalities in which they are located, bicycle and pedestrian facilities available at each station, and whether there are fees to park at them. An additional bonus worth noting for bicyclists and pedestrians is that it is free to “park and ride.”

Adequate bicycle and pedestrian access to railroad stations, park and rides, and bus stops is the link to connect bicyclists and pedestrians with transit and work. According to national statistics, 53 percent of people live within two miles of some sort of public transit. The national median “kiss and ride” trip length is 1.3 to 1.6 miles, while it is 2.3 to 2.5 miles for park and rides. These ranges of trip lengths are well suited for bicycle and pedestrian travel. Adding sidewalks, bicycle lanes, and bicycle storage facilities near these multi-

modal areas may increase bicycling and walking and reduce the need for additional automobile parking.

NJ Transit has a program called “Bike Aboard” that allows standard frame bicycles on board the Morris and Essex rail line trains during specified off-peak hours. Collapsible bicycles are permitted on trains at all times.

**Table 3.5
Bicycle and Pedestrian Facilities at Park and Rides (including railroad stations)**

Municipality	Location	Parking Fees	Sidewalks	Crosswalks	Bicycle Racks
Boonton	Main Street & Plane Street		●	●	
	Main Street & Lathrop Avenue	●	●		
	Boonton railroad station	●	●	●	
Butler	Boonton Avenue & Kiel Avenue		●	●	
Chatham Boro	Chatham railroad station	●	●		●
Denville	Savage Road	●		●	
	Denville railroad station	●			
	Mount Tabor railroad station	●			
Dover	Dover railroad station	●	●	●	●
	Dover Bus Terminal				
Kinnelon	Meadtown Shopping Center				
Lincoln Park	Lincoln Park railroad station				
Long Hill	Gillette railroad station	●			●
	Millington railroad station	●	●	●	●
	Stirling railroad station	●			●
Madison	Madison railroad station	●	●	●	●
Mendham Twp	Ralston Fire House		●	●	
Montville	Towaco railroad station				
Morris Plains	Morris Plains railroad station	●	●	●	
Morris Twp	Convent Station railroad station	●			●
Morristown	Morristown railroad station	●	●		●
Mount Olive	Mount Olive railroad station				
Mountain Lakes	Boulevard & Lake Drive		●	●	
	Mountain Lakes railroad station	●			
Netcong	Netcong railroad station	●	●		
Parsippany-Troy Hills	US 46 & Baldwin Road				
	US 46 & Grange Road				
	US 46 & Beverwyck Road				
Pequannock	Newark-Pompton Turnpike		●	●	
Rockaway Boro	Municipal Lot #1	●	●		
Rockaway Twp	Rockaway Townsquare Mall		●		
	Dover Bus Terminal				
Roxbury	Lake Hopatcong railroad station				
Washington Twp	US 46, west of Reservoir Road				

Source: 1996 Morris County Rail Station Inventory and 1996 Morris County Transit Guide

3.3 Bicycling and Walking for Pleasure

Morris County offers a wide variety of recreational travel opportunities for bicycling, walking, and hiking through its diverse geographic landscape. The southeastern portion, where the Great Swamp is located, is relatively flat with rolling hills. The northwestern area of the county is quite mountainous. This region contains the highest point in the county at 1,395 feet above sea level.

Bicycling and walking are listed in the top five popular outdoor recreational activities, according to the New Jersey Open Space and Outdoor Recreation Plan Summary. Figure 3.2 displays the purposes of bicycling and walking trips nationwide. The chart shows that recreational trips are the most common type of trip. Bicycling and walking are healthy modes of transportation that incorporate exercise into daily life.

When planning for recreational travel three classifications of bicyclists must be considered. Advanced bicyclists are highly experienced riders, who are comfortable in a variety of road environments and travel long distances. Basic bicyclists are casual riders who travel at slower speeds and for shorter distances. Young children create the final group of bicyclists.

3.3.1 Facilities and Amenities

Unlike travel to work, recreational travel is not constrained by predetermined destinations. Recreational travel options are determined by the types of available facilities and classification of bicyclists. Facilities that are easily accessible, safe, provide points of

interest, and offer amenities for the bicyclist and pedestrian will attract the most users.

The county offers many different types of bicycle and pedestrian facilities. Some riders enjoy bicycling on shared roadways, such as Pocono Road in Denville Township. Others prefer to ride on a separate multi-use path, such as the Traction Line Recreational Trail, which is utilized by bicyclists, pedestrians, and other users of non-motorized transportation.

Trails and paths through parks, greenways, and other open space areas are popular with recreational travelers. Morris County is well known for its extensive system of parks and recreational areas that offer a variety of facilities for walkers, hikers, mountain bicyclists, and casual riders. Map 3.1 depicts the major recreational facilities within Morris County. Patriots' Path is a recreational facility that permits bicycling, walking, and hiking. Patriots' Path begins in East Hanover and currently extends to Mendham Township with some missing segments. Proposed plans will link Schooley's Mountain Park, Hacklebarney State Park, and Black River Wildlife Management Area. The Morris County Park Commission also plans to extend Patriots' Path west to the Hunterdon County line, and east to the Passaic River.

Amenities that assist travel along recreational facilities help to promote bicycling and walking, by understanding the needs of bicyclists and pedestrians. Travelers often desire route markers, drinking fountains, rest room facilities, and seating areas. Bicycle and pedestrian support amenities are classified as major and minor. Major amenities include bicycle storage facilities, rest areas, and parking areas. Minor amenities, include shade shelters and informational maps.

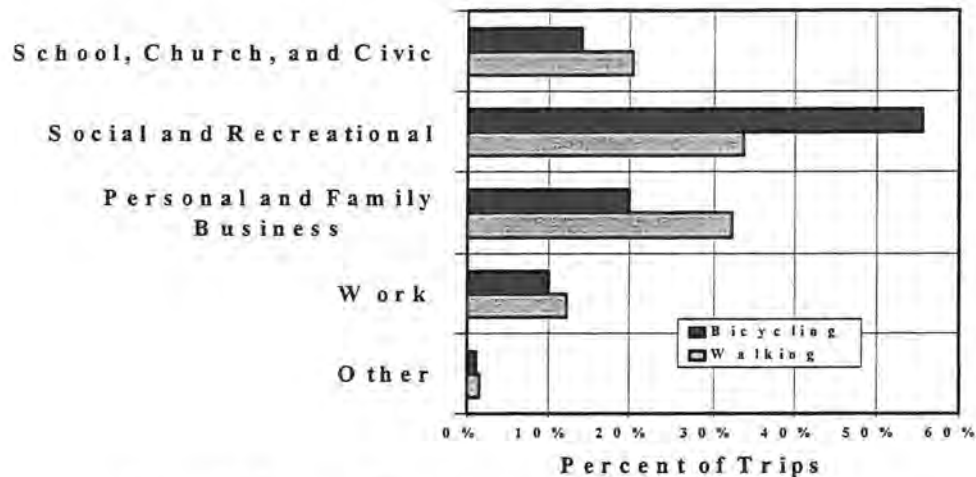


Figure 3.2 National Bicycling and Walking Trips by Purpose
 Source: National Bicycling and Walking Study (1992)

A secondary benefit of increased recreational activity is economic investment in the county. In areas near recreational facilities, there is potential for new commercial development and revitalization, because of the increased business users may bring. Equipment shops, restaurants, trail-side cafés, and new jobs may be generated as part of this economic investment.

3.3.2 Bicycling and Hiking Organizations

The popularity of bicycling and hiking is evidenced by organizations devoted to them in Morris County.

There are many active bicycle clubs established in the Morris County area, including the Central Jersey Bicycle Club and the Morris Area Freewheeler Bicycle Club. Club activities include developing routes, organizing rides, and classifying them by difficulty. Bicycle clubs promote bicycling for transportation, fitness, and fun.

The New York - New Jersey Trail Conference is a prominent hiking club that promotes hiking and conservation in New York and New

Jersey. They also maintain a network of hiking trails, covering 1,200 miles throughout the bi-state region. The organization works with municipalities to include trails in their planning efforts. Twenty-five percent of the existing system occupies private land.

Currently, the Conference is planning several trails including the Highland Trail, which will connect the Delaware and Hudson Valleys via trail connections with Morris County. The Four Birds Trail is a new twenty mile trail that begins near Green Pond in Rockaway Township, and extends north to the border of Morris and Passaic Counties. Four Birds Trail will become part of the Highland Trail System, connecting to Farney State Park, Pyramid Mountain, and Mahlon Dickerson Reservation.

The Conference is involved with the acquisition of the Picone Tract in Kinnelon Borough. This 30 acre parcel will provide missing links to a greenway in Montville Township, Kinnelon Borough, and Rockaway Township. The Farney Highlands trail runs through this greenway. All of the trail projects are important to recreational travel because they draw the local parks trails into a broader network of facilities.

CHAPTER FOUR

Facility Types

Morris County bicycle and pedestrian facilities are located in a variety of areas such as parks, residential roadways, major roads, and other rights-of-way. Bicycling and walking are becoming popular recreational activities as they incorporate fitness into daily life. This increased interest in recreation will create a high demand for future bicycle and pedestrian facilities. Identifying and categorizing bicycle and pedestrian facilities by skill level and facility type is important to the user.

Various facilities require different skill levels and are used for different trip purposes. The skill levels used to classify bicyclists are advanced, basic, and young children. The two classifications of trip purposes are utilitarian

and recreational. Development of proposed bicycle and pedestrian facilities should be based on both the skill level and trip purpose of the projected user.

The classifications of bicycle and pedestrian facilities discussed in this element include the following:

- multi-use trails
- pedestrian trails
- shared roadways
- bicycle lanes
- multi-use paths
- pedestrian paths
- sidewalks

Each facility is described in this chapter.

Desirable characteristics for all types of bicycle and pedestrian facilities include: direct connections, appropriate land-uses, and suitable amenities. Travelers find routes with certain amenities, such as food, water, and restrooms, to be beneficial.

Due to topography, existing development, and other constraints, it may not always be possible to construct desired facilities. In these cases, facilities that require less attention to surroundings should be considered. For example, where a multi-use path is not possible a multi-use trail may sometimes be considered if it meets appropriate design standards.

4.1 Skill Levels

Morris County bicyclists are a diverse population with varied needs and interests. The three categories used to classify bicyclists are advanced, basic, and young children. The advanced bicyclist is highly experienced, rides frequently, often has special training, and is confident in all traffic conditions. Basic bicyclists are less comfortable in traffic and ride less often. Basic bicyclists form the largest group of adult bicyclists. Young children have not yet developed adequate judgement and do not usually ride on streets unless supervised by an adult. Young children are the most frequent users of bicycles.

4.2 Trip Purposes

In addition to having varied skill levels, bicyclists and pedestrians also have different purposes for undertaking trips. The two classifications of bicycle and pedestrian trips are non-recreational and recreational. Non-recreational trips are those trips that are made to reach a specific destination. For example, trips to the post office or to a school are non-recreational trips. Non-recreational bicyclists find direct connections very important in

completing their traveling goals. Recreational trips are usually not made with a specific destination in mind. Recreational travelers place more importance on the beautiful landscape and scenic vistas along their trip. Recreational trips often take place on trails within parks.

4.3 Facility Classifications

The classifications for bicycle and pedestrian facilities are the following:

- multi-use trails
- pedestrian trails
- shared roadways
- bicycle lanes
- multi-use paths
- pedestrian paths
- sidewalks

Some of these classifications may overlap. For example, a road may have a bicycle lane and a sidewalk. Separate classifications for bicycling and walking facilities exist for the cases in which only pedestrians are permitted.

Figures 4.1 through 4.5 illustrate the bicycle and pedestrian facility classifications. These figures are examples of the facility types but may need modifications due to constraints. The widths and materials may also vary in some cases.

The above classifications are used for the mapping of facilities within the county, which are displayed on Maps 1 through 7 and are discussed in Chapter Eight.

4.3.1 Multi-Use Trails

Multi-use trails are utilized by different modes. Mountain bicyclists are one of the main groups of people who use multi-use trails. Most multi-use trails are located in state, county, or municipal parks. Trails are unpaved, and usually built with earthen materials. Figure 4.1 shows an example of a typical multi-use trail. Bicyclists and pedestrians have the opportunity

to enjoy these exclusive trails, which are out of the automobile right-of-way. An example of such a trail can be found in Lewis Morris Park, where many of the trails permit both bicycling and hiking. These facilities are best for advanced and basic bicyclists. Young children may sometimes use these trails, depending on the topography and width of the trails. Recreational travelers are the primary users of multi-use trails.

4.3.2 Pedestrian Trails

Pedestrian trails are similar to multi-use trails, but are for the sole use of pedestrians. Pedestrian trails include both hiking and walking trails. Hiking trails usually have some type of geographic constraint such as uneven surfaces, very steep climbs, or streams. Walking trails are usually wider and have fewer geographic constraints. Figure 4.1 is also an example of a pedestrian trail.



Figure 4.1 Example of a Typical Trail
Source: Photo by MCDOTM

4.3.3 Shared Roadways

A shared roadway is a road that bicyclists and pedestrians are currently using that does not have a designated bicycle lane, sidewalk, or path along it. These roads are necessary components of the larger network of bicycle and pedestrian facilities because they provide connections. A shared roadway is designated along a roadway through signs that usually contain a yellow background and a black silhouette of a bicycle or a pedestrian with the slogan "Share the Road." These signs do not designate a bicycle lane, but serve to alert drivers to bicycle and pedestrian use. Shared roadways are illustrated in Figure 4.2.

Shared roadways are often associated with advanced and more confident bicyclists.

The design features of the road may make it possible for a proficient bicyclist to safely share the road with motor vehicles. The speed, traffic volumes, and environmental surroundings may vastly differ for shared roadways.

Pedestrians may also use shared roadways. However, since the skill level required for walking or running along a shared roadway is less than that of a bicyclist, there are not as many design concerns for pedestrians on shared roadways. Shared roadways are used for both recreational and utilitarian purposes, depending on the user and the roadway.

4.3.4 Bicycle Lanes

Bicycle lanes are used solely for bicycle travel and are commonly marked with pavement striping and signage. This type of facility brings more formal attention to bicycle activity. Bicycle lanes may also improve rider safety and increase ridership, by providing a separate and distinct right-of-way adjacent to the roadway. Those bicyclists who are hesitant about riding with

traffic may also feel more comfortable utilizing this type of facility. This type of facility is appropriate for the basic and the advanced bicyclist, for both recreational and non-recreational trips. There is only one existing official bicycle lane in Morris County, located in Randolph Township on Calais Road. Figure 4.3 illustrates a bicycle lane.

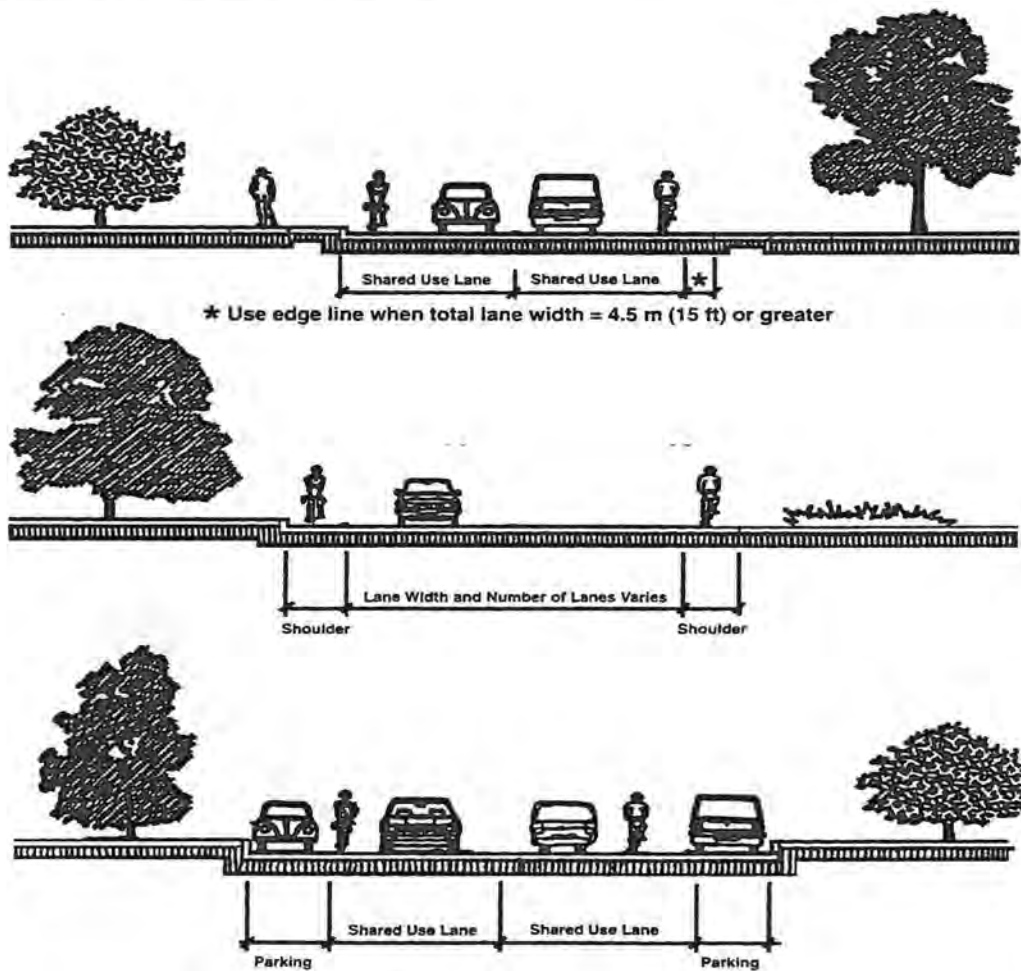


Figure 4.2 Typical Shared Roadways
Source: Greenways Incorporated

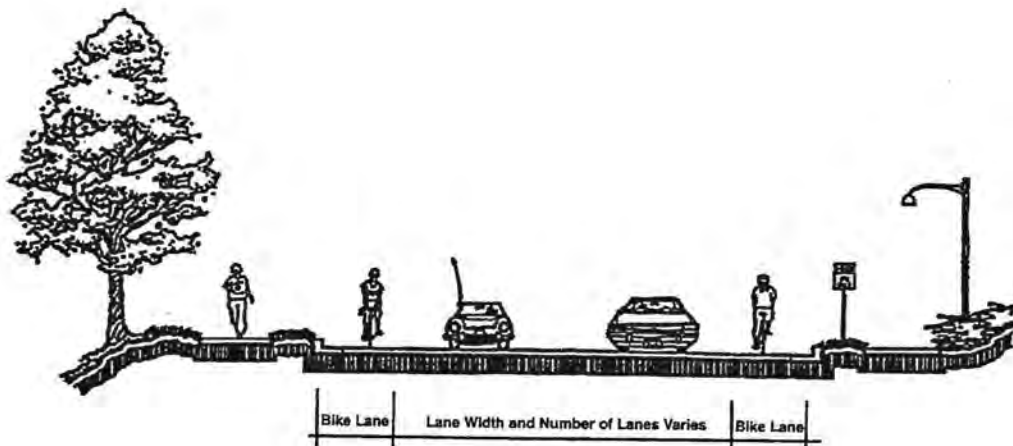


Figure 4.3 Bicycle Lane
 Source: Greenways Incorporated

4.3.5 Multi-Use Paths

Multi-use paths are completely separated from motor vehicle traffic and are paved or improved. They may be adjacent to a road right-of-way. Figure 4.4 illustrates a multi-use path. Multi-use paths may travel through private property, often following along a utility right-of-way. Some examples are the Giralda Farms Path, portions of Patriots' Path, and the Traction Line

Recreational Trail that lies within a railroad right-of-way. Because bicycle paths are completely separate from the automobile travelway, all levels of bicyclists feel comfortable using these facilities. Multi-use paths also serve recreational and non-recreational trip purposes, depending on their location.



Figure 4.4 Example of Path on Separated Right-of-Way
 Source: Photo by MCDOTM

4.3.6 Pedestrian Paths

Pedestrian paths are also completely separated from the motor vehicle travelway and are similar to sidewalks, but many pedestrian paths are not adjacent to roads. Figure 4.4 is a typical example of a pedestrian path. Recreational travelers are more frequent users of pedestrian paths than non-recreational travelers. Some non-recreational trips may be made on pedestrian paths, depending on the location and geography of the path.

4.3.7 Sidewalks

According to the NJDOT's Pedestrian Compatible Planning and Design Guidelines, a sidewalk is the portion of a road right-of-way designed for preferential or exclusive use by pedestrians. Figure 4.5 displays a typical sidewalk. Both non-recreational and recreational travelers utilize sidewalks. Sidewalks should not be used by bicyclists, with the exception of young children. Sidewalks are primarily used for non-recreational trips due to their frequent proximity to schools, shopping areas, and other destinations.



Figure 4.5 Example of Typical Sidewalk

Source: Photo by Morristown Partnership

CHAPTER FIVE

Safety

One of the most frequent reasons people cite for not commuting by bicycle or on foot is their concern for safety. Proper design of bicycle and pedestrian facilities can minimize, if not eliminate, this problem. The American Association of State Highway and Transportation Officials (AASHTO) has noted a number of specific safety issues that affect bicycling and walking, including route alignment, bicycle compatibility, conflict with motor vehicles, and surface hazards.

The BiPED PAC members identified safety and public education as primary concerns to be addressed in this plan.

Much popular and technical bicycle and pedestrian literature is devoted to the discussion

of safety issues. Much of the information is negative, such as accident and death statistics. For instance, New Jersey has the second highest rate of pedestrian fatalities in the country, this is partially attributed to New Jersey's urban densities.

There is a considerable amount of research available that describes factors that may be helpful to avoid accidents, such as improved design considerations and increased public education. Government has responded with legislation, regulations, and policies designed to reduce accidents and injuries. For example, the National Bicycling and Walking Study sets a goal of reducing the number of bicyclists or pedestrians killed or

injured in traffic crashes by 10 percent. New Jersey enacted Helmet Laws in 1992 requiring mandatory helmets for riders under age 14.

NJDOTs Statewide Bicycle and Pedestrian Master Plan has a goal to “develop education and enforcement programs that will result in a reduction of accidents and a greater sense of security and confidence for bicyclists and pedestrians.” Accidents are only one concern in achieving comprehensive improvements in safety. Issues discussed in this document include physical obstructions and hazards; the need to match facility types with bicyclists skill levels; the types of safety equipment to be used while riding; and the separation of different modes of transportation.

Public education is a critical part of improving safety. Without proper publicity and outreach efforts for bicyclists, pedestrians, as well as motorists, there may continue to be low awareness of proper procedures for safe bicycle and pedestrian activities. Positive changes related to behavior modification begin with information and education about bicycle and pedestrian issues.

A specific safety related technique receiving significant attention is traffic calming. According to “Slowing Down the Shortcuts - How Traffic Calming Can Help Your Town,” traffic calming employs different methods including infrastructure changes as well as passive methods to reduce vehicle speeds, such as better marking of pedestrian crosswalks. The intent is to return the streets to shared use by bicyclists, pedestrians, children, and motor vehicles.

5.1 Children’s Issues

Children comprise the majority of the bicycling and walking population. Their smaller size and lack of judgement make them more vulnerable to accidents. Therefore, this segment of the population deserves special attention.

Children tend to be somewhat fearless, so they must be instructed as to acceptable practices for bicycling and walking. When bicycling or walking, children must be aware that it is more difficult for a motorist to see them and this increases their likelihood of being struck by a vehicle.

The safest bicycle trips for young children are those on residential sidewalks, on school property, and in parks. These types of trips allow children to gain experience and increase their skill levels with minimal interaction with motor vehicles. Caution must be applied to all types of trips involving children. For instance, an adult backing out of a driveway must be alert and cautious for children utilizing the sidewalk.

Accident statistics demonstrate that safety issues must be addressed by parents and government. According to the Bicycle Helmet Statistical Institute (BHSI):

- Bicyclist injury rates are highest for ages five to 15.
- Bicycle death rates are highest for ages 10 to 14.
- Bicyclists with head injuries are 20 times more likely to die.

Federal Highway Administration safety statistics for pedestrians indicate that:

- Pedestrians ages 10 to 15 have the highest nonfatal injury rates.
- Pedestrian deaths account for 33 percent of traffic deaths for three to nine year olds.
- From 1975 to 1995, pedestrian deaths have decreased for nine years and under by 65 percent, and by 48 percent for 10 to 19 year olds.

To protect children from serious head injury, New Jersey enacted the 1992 Helmet Law. The law requires all bicycle riders under age 14 and their passengers to wear safety helmets. This is rational because bicycle

injury rates are highest for riders aged five to 15, and bicyclist death rates are highest for riders aged 10 to 14. It should be reiterated that the largest number of bicyclists are in the age range of five to 15 and therefore have a greater proportion of accidents.

Riders traveling on a road that is closed to motor vehicle traffic, such as a trail, route, special course, boardwalk, or area specially designated for the sole use of bicycles are exempt from the law. Trails and other areas adjacent to motor vehicle traffic, must be protected by barriers or geographic elements to be exempt from the helmet law.

The NJ Bicycle Manual provides “tips for safe bicycling” for children and adults including:

- Always wear a helmet.
- Obey all traffic rules.
- Keep right, ride with traffic, not against it.
- Watch out for drain grates, loose stones, rocks, sand, and soft shoulders.
- Ride in a straight path at least three feet out from parked cars.
- Every time you approach an intersection, look for slowing or turning cars. Many times motorists will not see you.
- Use hand signals to indicate turning.
- Protect yourself at night with reflectors, reflective clothing and lights.
- Always keep your bike mechanically sound.
- Always lock your bike.
- Stay alert and watch out for others.

The National Highway Traffic Safety Association (NHTSA) has a model ordinance to handle the problem of children running out to the street to reach ice cream or vending trucks. The ordinance requires drivers to stop before passing a vending truck and it also restricts the areas allowable for use of these trucks. Cited in the National Bicycling and Walking Study is an example of how Detroit, Michigan implemented this model ice cream truck ordinance in the late 1970's and as a result, reduced associated child

pedestrian accidents by an impressive 77 percent.

Safe routes are essential for children's travel to and from school. When sidewalks are being added, intersections are being improved, signal timings adjusted, and signage improved, bicycle and pedestrian needs should be considered. Crossing guards should be placed where children must cross streets to reach schools.

Additionally, secure places for young pedestrians to travel are crucial to safety. The enforcement of “pedestrian-safe zones” surrounding schools could encourage less speeding and other motor vehicle infractions through higher penalties and increased police presence.

5.2 Accident Statistics

Accident statistics provide important information on when, where, how, and why accidents occur. They also offer insights into accident prevention. When examining bicycle and pedestrian safety, it is important to note that according to AASHTO, only one in five motor vehicle-bicycle crashes get reported. For non car-related crashes, only one in twenty are reported.

5.2.1 Bicycle Accidents

According to the Bicycle Helmet Statistical Institute (BHSI), nationally there are about 1.8 billion bicycle trips per year. Of these trips, there are approximately 300 injuries per million trips and about 0.5 deaths for every million trips. Approximately 900 bicyclists per year are killed. If head injuries are involved, there is a 20 percent greater risk of death.

It is interesting to note that while bicycle injury rates per trip are highest for ages five to 15 years, bicycle death rates per trip are highest above age 50. However, the majority of bicycling deaths occur in the 10 to 14 age

range, because the largest number of bicyclists fall within this age group.

The Journal of the American Medical Association states that the universal use of helmets by all bicyclists could potentially prevent one death per day and one head injury every four minutes. This is a powerful incentive for enforcement of existing bicycle helmet laws and perhaps a reason to look at an expansion of those laws to encompass a greater segment of the population.

Table 5.1, listed below, relates Bicycle Injury Accidents in Morris County by frequency for 1994. Municipalities not shown in this table did not report any accidents in 1994. It can be observed that of a total of 86 bicycle accidents occurred, and 18 accidents or 21 percent occurred in Morristown. After this, the numbers significantly decrease, with the next highest percentage of accidents occurring in Parsippany-Troy Hills with eight accidents or nine percent. This correlates with the fact that more accidents tend to occur in urban centers.

5.2.2 Pedestrian Accidents

Children under age 16 are most likely to be struck by a motor vehicle. Pedestrians age 65 and older have the highest pedestrian death rates. As might be expected, the greatest risk for pedestrians is in urban areas where such activity is concentrated. Urban settings account for 72 percent of pedestrian deaths, but death rates are higher in rural settings due to the higher impact speeds experienced on rural roads. According to Highway Safety statistics, fatal pedestrian/motor vehicle crashes often occur between 6 PM and 9 PM. For nonfatal injuries, the highest concentration occur at about 4 PM, and more pedestrian deaths occur on Fridays and Saturdays.

Table 5.1
Bicycle Injury Accidents in Morris County
by Frequency 1994

Municipality	Accident Frequency
Morristown	18
Parsippany Troy Hills	8
Dover	6
Pequannock	5
Roxbury	5
Madison	4
Chatham Twp	3
Hanover	3
Long Hill	3
Rockaway Boro	3
Butler	2
Denville	2
Harding	2
Lincoln Park	2
Montville	2
Mt. Olive	2
Rockaway Twp	2
Washington Twp	2
Boonton Town	1
Chatham Boro	1
East Hanover	1
Jefferson	1
Kinnelon	1
Morris Plains	1
Morris Twp	1
Mt. Arlington	1
Netcong	1
Randolph	1
Riverdale	1
Wharton	1
TOTAL:	86

Source: NJ Highway Traffic Safety 1996

Many pedestrian injuries occur at intersections, especially in urban areas. Vehicles making left-turns also seem to account for a large percentage of accidents. Accidents also occur at non-intersection locations and are often more serious in nature, since the vehicle speeds are higher and driver response times are lower. One example of this type of pedestrian/motor

vehicle collision is known as a “dart-out”, occurring when the pedestrian suddenly appears from the side of the road and does not allow adequate driver response time.

Table 5.2 shows the most common types of pedestrian accidents for urban areas, and how they occur. The table only lists accidents types which accounted for four percent or more of pedestrian accidents.

**Table 5.2
Pedestrian Accident Types
(Urban Areas)**

Type	Cause
Dart-Out - First Half of Intersection (24%)	<ul style="list-style-type: none"> • Midblock (not at intersection) • Sudden appearance and short time exposure (driver doesn't have time to react) • Pedestrian crossed less than halfway
Dart-Out - Second Half of Intersection (10%)	<ul style="list-style-type: none"> • Same as above except pedestrian gets out halfway or more before being struck
Midblock Dash (8%)	<ul style="list-style-type: none"> • Midblock (not at intersection) • Pedestrian running but NOT sudden appearance or short time exposure as above
Intersection Dash (13%)	<ul style="list-style-type: none"> • Intersection • Same as dart out except happens at intersection
Vehicle Turn-Merge with Attention Conflict (4%)	<ul style="list-style-type: none"> • Vehicle turning or merging into traffic • Driver is attending to traffic in one direction and hits pedestrian from another direction
Turning Vehicle (5%)	<ul style="list-style-type: none"> • Vehicle turning or merging into traffic • Driver attention NOT documented • Pedestrian NOT running
Other (23%)	<ul style="list-style-type: none"> • Unusual circumstances • NOT countermeasure corrective

Source: Florida Pedestrian Safety Plan, FDOT, 1992

Table 5.3 shows Pedestrian Injury Accidents in Morris County by frequency for 1994. Municipalities not shown in this table did not report any accidents in 1994. According to these accident statistics, Dover had the highest number of accidents, 18 out of 99 accidents or 18 percent, with Morristown having 17 percent. This reinforces the fact that more pedestrian accidents occur in urban areas. The larger concentrations of

pedestrians in these areas increases the overall likelihood of accidents.

The conditions of a specific facility site, as well as safety factors should both be utilized when selecting pedestrian road improvements.

**Table 5.3
Pedestrian Injury Accidents
by Frequency 1994**

Municipality	Accident Frequency
Dover	18
Morristown	17
Madison	5
Mt. Olive	5
Roxbury	5
Boonton Town	4
Denville	4
East Hanover	3
Jefferson	3
Lincoln Park	3
Montville	3
Parsippany-Troy Hills	3
Rockaway Boro	3
Chatham Boro	2
Chatham Twp	2
Hanover	2
Morris Plains	2
Morris Twp	2
Netcong	2
Pequannock	2
Wharton	2
Boonton Twp	1
Butler	1
Florham Park	1
Mountain Lakes	1
Riverdale	1
Rockaway Twp	1
Washington Twp	1
TOTAL:	99

Source: NJ Highway Traffic Safety, 1996

The following Tables 5.4 and 5.5, show the relationship between various types of pedestrian accidents and a number of countermeasures, both engineering and educational, aimed at their correction.

**Table 5.4
Pedestrian Accident Types and Potential Engineering Countermeasures**

Countermeasures	Accident Type																			
	Intersection Dart-Out (First Half)	Intersection Dart-Out (Second Half)	Midblock Dash	Intersection Dash	Turn-Merge Conflict	Turning Vehicle	Multiple Threat	Bus Stop Related	School Bus Stop Related	Ice Cream Vendor	Trapped	Backup	Walking on Roadway	Result Vehicle-Vehicle Crash	Hitchhiking	Working in Roadway	Disabled Vehicle Related	Nighttime Situation	Handicapped Pedestrians	
Barrier: Median	●	●	●																	
Barrier: Roadway/Sidewalk	●	●	●										●							
Barrier: Street Closure																				
Bus Stop: Relocation								●	●											
Crosswalk: Intersection				●							●									
Crosswalk: Midblock	●	●	●																	
Diagonal Parking-1 Way Street	●	●																		
Grade Separation				●	●	●	●				●									
Facilities for Handicapped																				●
Lighting: Crosswalk				●			●												●	●
Lighting: Street				●			●						●		●				●	●
One-Way Streets		●																		
Reflective Materials													●		●				●	
Safety Islands		●	●	●							●									
Sidewalk/Pathway													●							
Signal: Pedestrian (Shared)								●			●									
Signal: Pedestrian (Delayed)				●	●	●	●				●									
Signal: Pedestrian (Separated)				●	●	●	●				●									
Signal: Traffic							●													
Signs and Markings				●						●			●	●		●	●			
Urban Pedestrian Environment	●	●	●				●	●												
Vehicular Traffic Division	●	●	●																	

Source: NJDOT Pedestrian Compatible Planning and Design Guidelines

**Table 5.5
Pedestrian Accident Types and Potential Educational Countermeasures**

		Accident Types											
		Intersection Dart-Out (First Half)	Intersection Dart-Out (Second Half)	Intersection Dash	Turn-Merge Conflict	Turning Vehicle	Multiple Threat	Bus Stop Related	School Bus Stop Related	Backup	Pedestrian Safety in General		
Countermeasures	Pre-School	Parental Guidance										•	•
		Traffic Safety Clubs											•
		Television Programs											•
		Walking In Traffic Safety											•
		Watchful Willie	•	•									•
	Elementary School	Officer Friendly							•	•			•
		Demonstrations by Patrols											•
		Education Within the Curriculum											•
		Green Pennant Program											•
		“Big Wheel” Spot											•
		Willie Whistle Program	•	•									
		Child Intersection Dash Spot			•								
	High School	“And Keep on Looking”			•	•	•	•					
		Assemblies											•
		Drivers Education											•
	General Public	Your Traffic Court											•
		Talks to Groups											•
		Community Action Program											•
		Use of Mass Media											•
		Multiple Threat Spot							•				
		Vehicle T/M Spot				•							
	Elderly	Adult Intersection Dash Spot			•								
		Safety Courses											•
		Talks to Groups											•
		Community Contact Programs										•	

Source: NJDOT Pedestrian Compatible Planning and Design Guidelines

CHAPTER SIX

Design Considerations

It is the intent of this Element to provide some general design guidelines, as well as some local examples of good design principles. Design guidelines not covered in this chapter may be found in NJDOT's Bicycle Compatible Planning and Design Guidelines and NJDOT's Pedestrian Compatible Planning and Design Guidelines.

The information contained in this chapter is based on the guidelines in the aforementioned documents. Much of this chapter is based on NJDOT's bicycle and pedestrian design guidelines. These documents have taken their information from the following sources, which are recognized as the industry standards: American Association of State Highway and

Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities (1991); NJDOT Design Manuals for Roadways and Bridges; Federal Highway Administration's (FHWA) Manual for Uniform Control Devices; and U.S. Architectural & Transportation Barriers Compliance Board's, Accessibility Guidelines for Buildings and Facilities (1994); FHWA's Planning, Design and Maintenance of Pedestrian Facilities; and Institute of Transportation Engineer's (ITE) Traffic Engineering for Neo-Traditional Neighborhood Design.

6.1 General Design Considerations

There are certain factors that can affect the development of bicycle facilities, the first of which is location. Bicycle facilities should be located where trip generators, such as schools, employment centers, recreation areas, and transit centers exist. To encourage the use of bicycle facilities, the distance between trip origins and these generators should be relatively short.

The second factor affecting facility development is physical constraints. For example travel obstacles, such as restricted lane widths or narrow overpasses, on a road that will be used as a bicycle facility must be accommodated. Additional traffic factors that may intimidate bicyclists include limited sight distance, conflict areas along the roadway, and traffic congestion.

In designing pedestrian facilities, several factors need to be considered. Ideally, all roads should contain some form of walking facilities adjacent to the motor vehicle right-of-way to provide a safe place for pedestrians. A separate walkway is preferable, however, roadway shoulders may also provide adequate pedestrian access.

The design of pedestrian facilities in activity centers is more pedestrian friendly for users if they contain certain characteristics. Main Street (NJ 124) in Madison is an example of a well-planned pedestrian facility within an activity and business center. The width of the sidewalks allow people with wheelchairs, shopping carts, or strollers to comfortably move past each other, and also provide adequate waiting space for pedestrians outside of shops or standing on street corners. If other non-motorized modes of travel, such as in-line skating, are taken into account, sidewalk

facilities may be designed with the intent of multiple uses.

6.2 Multi-Use Trails

In designing multi-use trails, special consideration must be given to a number of factors including adjacent property owners, location, and security.

6.2.1 Adjacent Property Concerns

Constructing trails or paths (used interchangeably in this discussion) for bicycle and pedestrian usage is not always a popular idea, according to Scott D. Boettger's article in the Land Trust Alliance Exchange ("Some Design Considerations for Community Trails," Winter 1996). People within a community or region may strongly desire trail facilities, however, the residents whose property is adjacent to the proposed facility may not respond as positively.

Property owner concerns include security on the trail and privacy from the trail users. One method for alleviating some of these concerns is separating and distancing the trail from the property. Furthermore, it may be desirable to construct the trail at a different elevation from the property. Plantings and fencing can help to deter trespassing on private property. If a trail is planned around existing natural or manmade barriers, such as rocky areas, bodies of water, stone walls, or marshy areas, there will be some built-in definition of the boundaries between the trail and private property. If views, parks and other interesting features are present on the trail, they will further help to detract attention from backyards.

6.2.2 Location

Multi-use trails may be located in parks, adjacent to road right-of ways, or in easements. If multi-use trails are parallel to roadways rather than in remote locations, there are advantages in terms of heightened safety for

users, flexibility in design, and more privacy for landowners.

According to Boettger's article, "...floodplains provide an opportunity for multi-purpose greenways, where open space, protection, transportation, recreation, and wildlife habitat protection can all come together." He also mentions that "...cleared and maintained corridors for power lines and other utilities (can provide) natural links between communities." A utility company may be looking to enhance community relations, and may therefore be willing to open their property to trail development. They may also be willing to provide trail maintenance and security.

Among utilities that may provide such facilities are railroads. Rails-to-Trails projects began in the 1960's and have helped advance bicycling and walking. The projects involve converting rail corridors into public paths. In 1991, the National Bicycling and Walking Study (NBWS), estimated 27 million people used rails to trails per year. Nationally, only an estimated two percent of the total number of abandoned rail lines have been converted to trails. According to the NBWS there are 150,000 miles of abandoned rail. This is a tremendous source to draw from, especially in urban areas where land for trails is scarce. Trails within a rail right-of-way do not need to be very long, especially if they connect schools, parks, or other areas of benefit to children.

An example of a rails-to-trails project in Morris County is the Traction Line Recreational Trail. It is an intermodal transportation connector as well as a multi-use path. It is located on the abandoned Morris County Traction Company trolley line that parallels New Jersey Transit's (NJT) Morris and Essex Rail Line. The facility currently extends from Morristown to Madison. Future expansion opportunities are possible through Madison and Chatham Boroughs.

Another rails-to-trails project is proposed on the right-of-way of the Pompton Branch of the New York, Susquehanna and Western (NYS&W) Railroad adjacent to the tracks. The proposed bicycle and pedestrian facility would traverse Riverdale Borough, Pequannock Township, and Wayne Township. Bicyclists and pedestrians presently use this right-of-way as an informal trail, which connects the Mountain View Railroad Station in Wayne to other public facilities, such as schools, libraries, and parks. The Morris County Division of Transportation Management has received funds from New Jersey Transportation Planning Authority (NJTPA) to proceed with a study to analyze the development of this corridor as a formal bicycle and pedestrian facility.

6.2.3 Security

Safety on a trail is intricately linked with its' design. It is desirable to locate a trail so that it is visible from a nearby road or close to buildings. Having amenities such as shopping, restaurants, places to lodge, or other commercial activity near a trail not only adds to its desirability but also increases security. Active areas will also encourage trail use. Parking for trails should be situated in safe locations. Boettger's article states that liability will be reduced if trail heads and parking areas open an hour after sunrise and close an hour before sunset. If a trail is in a high-density urban area that is well patrolled, it may be able to remain open during the evening.

If there is a need for added security, a trail's design must allow sufficient width to accommodate vehicle, equestrian, or mountain bicycle security patrols. If vehicles will be patrolling, consideration should be given to creating level grades, turn around areas, eliminating dead-ends, increasing visibility to public roadways, and including entrances with locking gates. Boettger has a very useful suggestion regarding locking gates, "...combination locks can be used to allow

access for emergency and security personnel, as well as for physically challenged persons.” Lock combinations can be given out to groups and individuals who need special access and the combinations can be easily changed if abuse occurs.”

Lighting can allow trail users to feel safer, however, it should be installed correctly so that shadows do not provide an advantage for criminal activity. They should be installed where there is no thick vegetation on the sides of the trail.

One way to enhance safety is to design a trail that will be utilized by multiple types of user groups, and will then allow trail users to look out for one another. However, as mentioned elsewhere in this chapter, it is important to attempt to avoid conflicts that result from differences in the speeds of the trail users. Elderly people, pedestrians, and young children travel at different speeds than experienced, high-speed bicyclists. Consideration should be given to separating these types of users on heavily used trails. The International Mountain Bicycling Association’s (IMBA) “Multiple Use Trail Guidelines” is shown in Figure 6.1. In addition, the IMBA “Rules of the Trail” are shown in Appendix G.

6.3 Shared Roadways

As previously discussed, a shared roadway is defined as a place where people are currently bicycling or walking along with motor vehicles. Most existing roadways were not planned or constructed with bicycle or pedestrian use in mind. Nevertheless, accommodation for bicyclists and pedestrians is possible without requiring large expenditures to create a safe shared roadway. This is especially valid if existing pavement widths and road conditions permit safe bicycle or pedestrian usage.

6.3.1 Signs

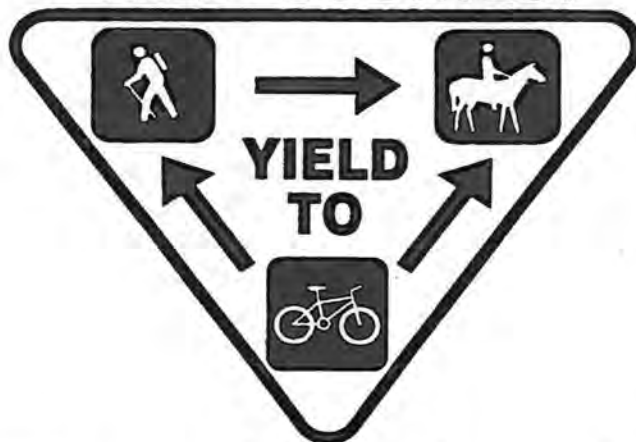
One example of a low cost improvement, which is beneficial to bicyclists, pedestrians, and motorists is the installation of “Share the Road” signs. These signs are especially useful for shared lanes with speeds of 40 mph or greater; shared lanes with limited sight distances; and where non-motorized facilities merge with motor vehicle travel lanes. NJDOT’s “Share the Road” sign is shown in Figure 6.2.

NJDOT developed guidelines for the use of shared roadways in August 1997. It is noted that “Share the Road” signs are not meant to substitute for improvement projects that would provide enough road width for a more substantial facility. According to the NJDOT guidelines, “Share the Road” signs should be considered for the following situations:

- Where a designated bicycle lane ends and bicycle traffic continues along a road that does not have a wide paved shoulder, (i.e., along a road with no paved shoulder or where there is a narrow paved shoulder). This would apply where the travel lane is wide enough to accommodate shared use by bicycle, pedestrian, and motor vehicle traffic (14 feet or greater); and especially where the travel lane is narrow and the bicycle traffic must “take the lane”.
- Where a wide, paved shoulder utilized by bicycle traffic ends, and bicycle traffic must begin to share the travel lane with motor vehicle traffic, (i.e., utilize a roadway with no shoulder or only a narrow shoulder).

MULTIPLE USE TRAIL GUIDELINES

TRAIL COURTESY



BICYCLISTS

Ride on open trails only.
Leave no trace.
Control your bicycle.
Always yield trail.
Never scare animals.
Plan ahead.



EQUESTRIANS

Control your horse.
Avoid cross-country riding.



HIKERS

Yield trail to equestrians.
Allow equestrians and bicyclists to pass.
Don't cut switchbacks.

ALL USERS

For Your Safety Please:
Observe Rules And Regulations
Stay On Designated Trails
Be Alert And Courteous
Avoid Muddy Areas

© INTERNATIONAL MOUNTAIN BICYCLING ASSOCIATION, P.O. BOX 7578, BOULDER, CO 80306



Figure 6.1 Example of "Multiple Use Trail Guidelines"
Source: International Mountain Bicycling Association, Boulder CO

- Where a paved shoulder is dropped to provide for an auxiliary lane and bicycle traffic must share the auxiliary lane or a through lane with motorized traffic.
- Where a paved shoulder is dropped to provide space for turning lanes, and bicycle traffic must share the turning lanes or through lane with motorized traffic.
- Along roads where there is no paved shoulder or where the paved shoulder is less than three feet in width and bicycle traffic must share the travel lane with motorized traffic, especially along collector or arterial roads. This is especially valid if that road is designated or signed as a bicycle facility, or has been identified in a plan or on a bicycle map as a bicycle facility.
- Along local access streets that are designated or signed as bicycle facilities or have been identified in a plan or bicycle map as bicycle facilities.
- Along any other roadway where bicycle traffic may be present or that is commonly used by bicycle traffic; especially where there is no designated bicycle lane or a wide paved shoulder in good condition, thus causing bicycle traffic to share the travel lane with motorized traffic.



Figure 6.2 Example of "Share the Road" Sign

Source: NJDOT Bicycle Compatible Roadways and Bikeways: Planning and Design Guidelines

6.3.2 Other measures

Other measures may help to provide safe shared roadways. Travel lanes may be striped to narrow existing car lanes that exceed AASHTO standards, thus providing an adequate paved shoulder. Stormwater grates on roadways should be bicycle safe.

6.3.3 Roadway Widths

There are general rules relating to pavement width for shared roadway use by bicycles, pedestrians, and motor vehicles. A basic requirement is the provision of a smoothly paved surface of sufficient width. What is an appropriate pavement width for shared use? This depends on a number of factors including traffic volume, speed, sight distance, grade, and the number of trucks and larger vehicles utilizing the roadway. Table 6.1 includes guidelines for dimensions of shared roadway lanes based on the traffic volume standard known as Annual Average Daily Traffic (AADT). Dimensions are exclusive of the added width for parking, which is assumed by NJDOT's standard to be eight feet. Where parking already exists and is only intermittently utilized, the lane width can be reduced. On lanes where curbs are present, width should be increased by one foot.

Roadways with AADT of less than 1,200 vehicles per day present low risks to bicyclists, even when motor vehicle speeds are relatively high. This is due to a high chance of sufficient passing width for a motor vehicle. These roadways can easily accommodate bicyclists, pedestrians, and motorists and have little need for widening.

Roadways with AADT of 1,200 to 2,000 vehicles per day are also appropriate for bicycle use and do not usually warrant a lane widening. There is, however, an increased risk of two opposing automobiles meeting at the same time, when attempting to overtake a bicyclist. Therefore, it is advisable to provide

additional space at the edge of the roadway, especially on higher speed roadways.

Once AADT exceeds 2,000 vehicles per day, a vehicle overtaking a bicycle has a higher prospect of meeting another opposing vehicle. Room for bicyclists should be provided at the edge of the outside lanes of these roadways. Also, the higher the roadway speed, the more space that needs to be provided to increase comfort levels for passing. When AADT is in excess of 10,000 vehicles per day, it is imperative that bicyclists on these roads have separate space to ride safely. In these cases, improvements to the shoulder area and roadside border will also be quite beneficial to motorists as well.

Highways which have an AADT of over 20,000 vehicles per day, or whose traffic consists of greater than five percent of truck traffic, need shoulders not only for bicyclists but also for the well-being of the motor vehicle traffic.

There are conditions where additional space for bicyclists is warranted:

- If sight distance is not adequate.
- If truck volumes exceed five percent.
- If there is significant tourist or campground travel.
- If truck traffic exceeds 15 percent (an additional one foot of width should be added).

**Table 6.1
Bicycle Compatible
Roadway Pavement Widths**

SH = Shoulder SL = Shared Lane

AADT 1200*-2000 vehicles/day

	Urban w/ parking	Urban w/o parking	Rural
<30 mph	SL: 12 ft	SL: 11 ft	SL: 10 ft
31-40 mph	SL: 14 ft	SL: 14 ft	SL: 12 ft
41-50 mph	SL: 15 ft	SL: 15 ft	SH: 3 ft
>50 mph	N/A	SH: 4 ft	SH: 4 ft

• For volumes less than 1200 vehicles per day a shared lane is acceptable

AADT 2000-10,000 vehicles/day

	Urban w/ parking	Urban w/o parking	Rural
<30 mph	SL: 14 ft	SL: 12 ft	SL: 12 ft
31-40 mph	SL: 14 ft	SL: 14 ft	SH: 3 ft
41-50 mph	SL: 15 ft	SL: 15 ft	SH: 4 ft
>50 mph	N/A	SH: 6 ft	SH: 6 ft

**AADT over 10,000 vehicles/day
or Trucks over 5%**

	Urban w/ parking	Urban w/o parking	Rural
<30 mph	SL: 14 ft	SL: 14 ft	SL: 14 ft
31-40 mph	SL: 14 ft	SH: 4 ft	SH: 4 ft
41-50 mph	SL: 15 ft	SH: 6 ft	SH: 6 ft
>50 mph	N/A	SH: 6 ft	SH: 6 ft

Note: NJDOT minimum shoulder width of 8 feet should be provided, wherever possible, on roadways having an AADT greater than 10,000 vehicles.

Source: NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines

- If the bicyclist will be required to ascend or descend a steep grade; if descending grade more than six percent, signing should be installed to alert motorist and bicyclist alike, if grade is greater than five

percent, a five foot shoulder width in urban areas is suggested.

6.3.4 Roadway Hazards

Alterations to other design elements are recommended to enhance safety for bicyclists and motorists utilizing shared roadways. Road surface is obviously an important issue. Rumble strips are useful in keeping motorists alert, however, they may present a hazard to bicyclists. These devices are incompatible with shared roadway use. If raised roadway reflectors are used on the edge of the pavement line, they can create an uneven riding surface, and should only be used along the interior lane lines or center lines.

When possible during construction, nothing should be left projecting above the level of the pavement surface. If a road is repeatedly resurfaced without adjustments for bicycle travel, hazards, often referred to as "black holes," will exist. Adjustments should be made to utility covers and drainage grates, so that they are flush with the roadway surface.

Parallel drainage grate inlets are especially dangerous, as they can cause loss of bicycle control and injury to the rider. These grates should be replaced with bicycle-safe and hydraulically efficient grates. According to the AASHTO Guide for the Development of Bicycle Facilities, a temporary solution is to "...weld steel cross straps or bars perpendicular to parallel bars to provide a maximum safe opening between straps." Once again, the seriousness of the potential danger these grates may pose to bicyclists cannot be underestimated. Efforts should be made to identify existing grates and to correct them permanently.

Railroad grade crossings, should be designed at a right angle to the rails. The more deviation there is from this angle, the higher the probability that a bicyclists will lose control. According to the AASHTO Guide for

the Development of Bicycle Facilities, "If the crossing angle is less than 45 degrees, consideration should be given to widening the outside lane, shoulder, or bicycle lane to allow bicyclists adequate room to cross the tracks at a right angle." Abandoned tracks should be removed or filled with a compressible flangeway to make travel smoother for bicyclists. Warning signs and pavement markings should be installed in accordance with the Manual for Uniform Traffic Control Devices (MUTCD).

6.3.5 Intersections

Traffic control devices should factor bicycles into the signal timing on shared roadways. Under normal conditions a bicycle can cross an intersection within the same signal phasing as a motor vehicle, but in the case of multi-lane roads, short traffic signal intervals should not be used. If needed, an all-red, signal phase can be utilized to provide intersection clearance. When detectors are used for traffic-actuated signals, they should be located in the route of the bicyclist, inclusive of left-turn lanes. Pedestrian actuated buttons may be a preferred alternative to detectors, as long as they do not require a bicyclist to get off of their bicycle or to lean over excessively. Signal heads must be visible from the perspective of a bicyclists and pedestrians on the road.

6.3.6 Road Maintenance

Roads for bicycle use require a higher level of maintenance than those used solely by motor vehicles. Items which may be small inconveniences to motorists can be serious hazards for bicycle travel, as they may cause the bicyclist to lose control of their bicycle or to come into conflict with motor vehicle traffic. This translates to the avoidance of potholes, bumps, corrugations, seams, unraveled pavement edges, glass, gravel and other debris or obstacles in the right-hand part of the outside travel lane. Unfortunately, this area of the roadway is often less aggressively maintained. The goal is to provide a smooth

riding surface for bicyclists. Changes in the type of maintenance activities are not usually required, however the focus of maintenance practices does need to be altered to achieve this goal. AASHTO recommends the following actions for the safe operation and maintenance of bicycle facilities:

- Maintain a smooth surface free of potholes and debris.
- Eliminate drop-offs from pavement edges.
- Inspect pavement conditions - do not allow unraveled pavement edges.
- Inspect signs making certain that signs do not intrude into bicycle travel space.
- Control growth of trees, shrubs, and vegetation.
- Supply trash and recycling receptacles and be sure they are regularly emptied.
- Mow areas in vicinity of bicycle paths.
- Enforce and prevent motor vehicles from using the path.
- Maintain bicycle and shoulder lane stripings and markings.
- Establish an agency responsible for control, maintenance, and policing of bicycle facilities.

6.4 Bicycle Compatible Design

There are some basic differences between the needs of the bicyclist and those of the pedestrian. Generally speaking, bicycles are better acclimated to traveling on a portion of the roadway rather than on the sidewalk, due to the greater size and speed of the bicycle and the bicyclist. Widened shoulders or increased dimensions on the outside of the "travel lane" are well suited to this specification. Bicycle and pedestrian facilities may be shared if adequate width is provided and use is not overly intense.

6.4.1 Bicycle Lanes

Beneficial to motorists and bicyclists, bicycle lanes can boost bicyclist confidence and may also keep motorists from straying into a

bicycle's "travel space." AASHTO recommends that a bicycle lane be provided on each side of the road so that bicyclists can travel in the same direction as motor vehicles. Riding against the flow of traffic is a cause of bicycle accidents. As a rule, on one-way streets, bicycle lanes should be located on the right side of the street.

Lane Width

Ideally, the minimum width for bicycle lanes should be four feet, according to AASHTO. However, there are cases which warrant more width, as shown in Figure 6.3, Typical Bicycle Lane Cross Sections. Examples are given for widths for curbed streets with or without parking and streets without curbs. For curbed streets with parking in urban areas, bicycle lane width should be five feet. Bicycle lanes should always be situated between the parking lane and the motor vehicle lane. Placing the lane between the curb and parking lane may create hazards for bicyclists, such as opening car doors, limited visibility at driveways and intersections, and difficult left turns for bicyclists.

Where a parking lane is not provided but parking is allowed on the street, the combination lane for bicycle use and motor vehicle parking should be at least 12 feet wide. If there is a strong probability that the combination lane will be used by motor vehicles for travel purposes, than it is desirable to separate parking from bicycle lane. In either situation, if parking volume is high, an additional one to two feet of width is recommended for optimal safety.

Because of the possibility of hitting debris or the curb itself with a pedal, bicyclists do not usually ride close to the road curb. If a bicycle lane is located off of the curb, it should have a minimum width of five feet from the curb face.

Bicycle lanes on a road without a curb should be located between the motor vehicle lane and

the road shoulder. If the shoulder can provide width for additional maneuvering, a four foot bicycle lane width is acceptable. However, a bicycle lane of five feet or more width is preferable. If there are significant amounts of truck traffic, or if road speeds exceed 35 miles per hour, wider bicycle lanes are recommended.

Motor Vehicle and Bicycle Turning Conflicts

Bicycle lanes can complicate turning movements for all users of the road. Bicyclists are typically to the right of motorists travelling in the same direction. A conflict arises when a bicyclist makes a left turn while a motor vehicle continues straight or turns right.

Left turns are less problematic if bicyclists have the option of making a left turn in two different ways. The first method, called a "vehicular style" left turn, is where the bicyclist merges into the lane used by the motor vehicle turning left. The alternative is a "pedestrian style" left turn, where the bicyclist proceeds through the intersection and then turns left at the far side of the intersection. In cases where a significant number of bicyclists will be turning left, The Manual for Uniform Traffic Control Devices (MUTCD) indicates that a separate turning lane should be considered.

A conflict also occurs where a bicyclist wants to continue straight across while a motorist is making a right turn. To facilitate smooth transitions, striping and signing that is placed well in advance of such a crossing and which indicates merging is preferable. According to AASHTO, the pavement markings presented in Figure 6.4 are appropriate for marking bicycle lanes which approach motor vehicle right-turn-only lanes.

Bicycle lane design should include adequate signage to minimize conflicts between bicyclists and motorists. Other factors to

consider when designating a bicycle lane are quality of pavement, bicycle-safe grates, and safety at railroad crossings. Traffic signals that are responsive to bicyclists should be included on roads with bicycle lanes.

6.4.2 Multi-Use Paths

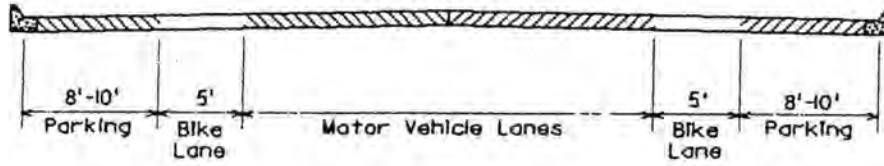
Multi-use paths are paved and separated from motor vehicle traffic. They are most often utilized by multiple types of non-motorized users because they are safe and convenient. Usually, multi-use paths are within a road right-of-way or on a separate or independent right-of-way.

Commuting or purpose oriented bicyclists and pedestrians may use these paths as shortcuts to

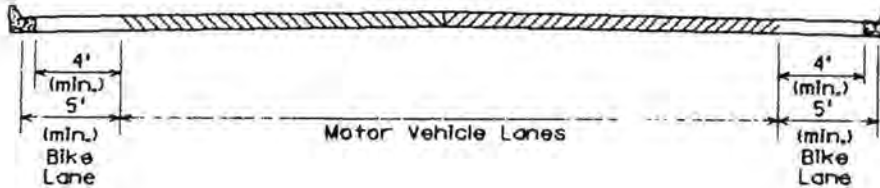
their destinations. In parks, along abandoned railroad right-of-ways, along riverbanks, or in similar environments, multi-use paths can provide good recreational opportunities. These paths often supplement the road system enabling the bicyclist or pedestrian to travel to formerly inaccessible areas. These facilities can be especially valuable to basic bicyclists and young children.

Linkage paths between adjoining residential developments, between schools and neighborhoods, and between shopping areas and well-traveled streets can dramatically improve the circulation for pedestrians.

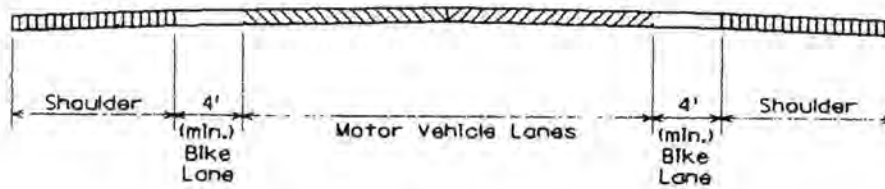
(a) CURBED STREET WITH PARKING



(b) CURBED STREET WITHOUT PARKING



(c) STREET OR HIGHWAY WITHOUT CURB OR GUTTER



(Not to Scale)

Figure 6.3 Typical Bicycle Lane Cross-Sections
Source: AASHTO Guide for the Development of Bicycle Facilities

Such linkage paths are usually short in distance and light in use, therefore they may be utilized by multiple types of users, even if path width is somewhat narrow. For instance, a path that is about 400 feet long may be able to be constructed to a width of only five feet, as long as adequate sight distance is provided, so that a bicyclist will have enough time to stop if they come upon another bicyclist or a pedestrian. Municipalities should incorporate policies in their master plan land use elements, circulation elements, or on the official municipal map to provide for linkages.

Two-way bicycle paths immediately adjacent to a road are not recommended for a variety of reasons. The main reason is that one direction of bicycle traffic will have to ride against motor vehicle traffic, which is in conflict with the established "rules of the road."

AASHTO recommends the width for most two-directional, paved bicycle paths should be 10 feet. There are cases where a minimum width of eight feet is acceptable. Examples include cases where bicycle traffic is low; where pedestrian use is minimal; and where horizontal and vertical alignments allow safe passing opportunities. On the other hand, if there will be high bicycle usage; significant use by pedestrians and joggers; use by large maintenance vehicles; or steep grades where bicycles may be required to ride side-by-side, the minimum path width should be increased to at least 12 feet.

If there is a reason a bicycle path must be constructed within a road right-of-way, a wide separation should be placed between the bicyclist and the motor vehicle, to reinforce that the bicycle path acts as an independent road for bicycle travel. Visual buffering, such as landscaping is also recommended by the NJDOT's Bicycle Compatible Planning and Design Guidelines, however if the distance between the bicycle path and the edge of the road is only five feet or less, a physical divider

is recommended. The divider should be at least 4.5 feet high, and designed so that it does not become its own potential traffic hazard.

When there is a choice, intersection locations which provide the most favorable conditions for bicycles are preferred. Crossing of high-volume, high speed roadways require the construction of a grade-separated structure, and unless bicycles are prohibited from traveling on that particular roadway, turning movements should also be accounted for. If an intersection crossing occurs at grade, the major concern is establishing which direction of traffic flow has the right of way. Whether traffic control consists of a signal, stop sign, yield sign or other measure, it should conform with MUTCD standards, for both type of device and placement location. Signage and markings should be for the purpose of alerting both the bicyclist on the bicycle path and the motorist at the intersection to potential and upcoming interaction between modes. There is an additional concern as to whether the pavement marking materials used are skid resistant.

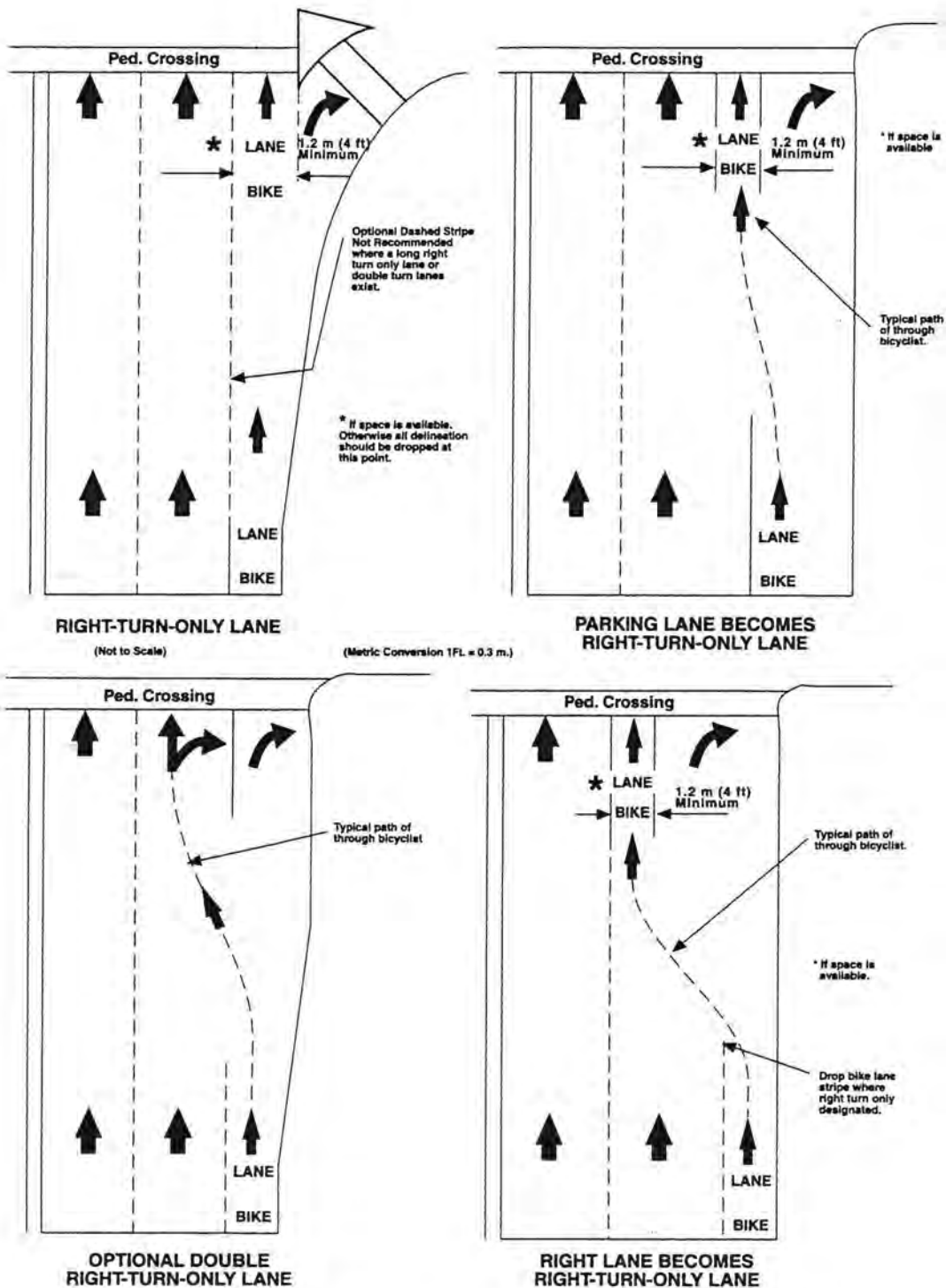


Figure 6.4 Bicycle Lanes Approaching Motorist Right-Turn-Only Lanes
Source: AAHSTO Guide for the Development of Bicycle Facilities

When it is expected that a bicycle path will be frequently utilized at night, it is imperative that proper lighting be provided. Instances of nocturnal use include paths serving colleges, serving commuters, at highway intersections, near transit stations, or in areas where safety may be a concern such as underpasses and tunnels. The scale used for lights and poles should be appropriate for bicycle and pedestrian use. Horizontal illuminations maintained may range from 0.5 foot candles (five lux) to two foot candles (22 lux), depending on location. The recognized standards should be followed, and further guidance may be gained from NJDOT's Bicycle Advocate.

6.5 Pedestrian Compatible Design

A very small amount of money is expended on pedestrian facilities in this state yet, 2.2 percent of workers in Morris County and 4.1 percent of all New Jersey residents walk to work, according to the 1990 census. Moreover, money that is spent is more than likely to be used to facilitate pedestrian travel rather than to encourage or foster it. Walking to school accounts for at least one third of all pedestrian trips in the United States, according to the National Bicycling and Walking Study. Overall, the average use of walking for shopping trips is nine percent. Social and recreational trips have increased, as people have been seeking the health benefits associated with walking. Approximately 12 percent of all pedestrian trips are recreational.

New Jersey's Governor Christine Todd Whitman has proposed 2,000 miles of bicycle trails as well as improvements to pedestrian facilities. The focus of the pedestrian improvements will be targeted to areas around schools and senior centers. There appears to be wonderful potential to increase the number of pedestrian trips, as the National Personal Transportation Survey shows that more than

25 percent of trips are one mile or less and 40 percent are one half mile or less. About 53 percent of all people surveyed live less than two miles from the nearest public transportation route. Therefore, a multi-modal trip could potentially be created by people bicycling or walking to a transit station.

Selecting appropriate pedestrian facilities greatly depends on land use and physical geography. The conditions of a specific facility site, as well as safety factors should both be utilized when selecting pedestrian road improvements. These are the two guiding factors stated in the NJDOT Pedestrian Compatible Planning and Design Guidelines.

There are some basic factors to consider when providing for pedestrian facilities. Where applicable, roads should provide an area to walk which is out of the motorized traveled way. If a separate walkway is not possible, a shoulder is much safer than the road. Efforts should be made to provide connections between residential developments and activity centers, not only in new developments, but also when analyzing improvement for existing areas. Although the paradigm, "Sidewalks tend to be built where people walk and people tend to walk where there are sidewalks" may seem simplistic, it is nevertheless true. It is however, difficult to ascertain volumes of pedestrian movements, as the majority of agencies do not collect pedestrian volumes. In some cases, development density may be analyzed to determine if sidewalk installation is warranted. Land use patterns, types, and densities may also play an important role in determining sidewalk need. For example, local collector streets, especially those with cul-de-sacs, may contain high rates of pedestrian activity, because they have little vehicular traffic. If minor collector streets are not connecting an important origin to a busy destination (i.e. a large residential development to a shopping area or school), they may have lower pedestrian activity rates. When these

collectors do serve as key linkages, however, pedestrian use may be higher than would otherwise be anticipated and may warrant sidewalks on both sides of the street.

As a rule, sidewalks should be situated, where applicable, on streets within one mile of a transit station. In areas of commercial activity, sidewalks should be provided along developed frontages of arterial streets. Because schools are a major focus for pedestrian activity, collector and arterial roads that are close to any schools should have sidewalks, to increase safety for children walking to and from school.

6.5.1 Sidewalks

When pedestrian facilities are discussed, sidewalks commonly are the first feature which is brought to mind. Although five feet is the minimum clear width recommended by the Pedestrian Guidelines for most sidewalks, exclusive of curb, the Residential Site Improvement Standards requires a minimum four foot width in new residential developments. A minimum clear width means that it is free from obstructions. This suggested minimum width will assist pedestrians, as well as the disabled, with satisfactory travel conditions. When the width is met, the sidewalk may function as a collector, and also allow people in wheelchairs or those pushing strollers or shopping carts to readily pass one another. It also makes it possible for two people to travel side-by-side, to pass one another when traveling in opposite directions, or for children playing with wagons, skates or the like to safely pass pedestrians. When a sidewalk is directly adjacent to a curb, it is viewed as uncomfortable for pedestrian travel, and should only be used in extreme cases where sufficient right-of-way is lacking. If a sidewalk is installed next to a parking lane so car doors may open, an additional two feet should be allowed.

Every effort should be made to keep obstructions out of the sidewalk right-of-way. If obstructions such as signs are to be placed on the sidewalk, the sidewalk should be widened to compensate for these obstructions. There are instances, especially in downtowns, where the minimum clear width for a sidewalk should be larger than five feet. FHWA's A Pedestrian Planning Procedures Manual notes that the auxiliary walkway width, which includes clearance requirements for buildings, curbs, trees, parking meters, and fire hydrants should be added to the basic walkway width to add up to the total sidewalk width. Obviously, areas adjacent to schools or other busy pedestrian activity areas have greater volume and movement needs.

The distance that a sidewalk is set back from the roadway is important to safety and design. Pedestrians may be wary of traveling on a sidewalk that is too close to a traffic area with high speeds because of the perceived danger, as well as noise levels. If wider setbacks are able to be used, this will raise the effectiveness of the sidewalk, due to a heightened sense of security. It must also be noted that if the choice is between no sidewalk or a sidewalk on the edge of the road, any sidewalk for pedestrian use is better than none at all. Four feet is the minimum space suggested between the sidewalk edge and the curb, however eight feet or greater is highly recommended on most roads, unless low traffic volumes are encountered. By utilizing the wider width, snow storage may be accommodated, most obstacles can be accounted for, and grade changes, especially at driveways may be minimized.

6.5.2 Shoulders

If sidewalks are not possible, a paved shoulder of at least four feet of width is often considered to be sufficient. There are instances where increasing the minimum shoulder width is recommended, such as when motor vehicle travel speeds are greater than 40 mph, or if

there are more than five percent of trucks, buses and recreation vehicles in the travel mix. Other reasons for increasing shoulder width include cases where there is regular bicycle use of the shoulder, or where pedestrian use is high and frequently consists of groups traveling together (e.g., schoolchildren).

Shoulder width may potentially be decreased to less than four feet on highways with AADTs of 2,000 vehicles or less, locations where pedestrian traffic is infrequent, or places where travel speeds are under 40 mph. This would only be advisable if a width reduction was deemed necessary by supporting data, such as accident reports, and existing and future motor vehicle and pedestrian demand. According to the Pedestrian Guidelines, minimum width shoulders are recommended within five miles of an urban area, but if it is not possible to provide the minimum shoulder width, then separate pathways should be constructed for pedestrian travel.

6.5.3 Residential Site Improvement Standards

The Residential Site Improvement Standards is a document published by the New Jersey Department of Community Affairs (DCA), and is part of New Jersey's Administrative Code. The document covers many areas of development concern for new residential construction. Of concern to this Element are the regulations relating to sidewalks and bikeways. The following information is taken directly from the above referenced document.

5:21-4.5 Sidewalks and Graded Areas

- (a) Sidewalks and/or graded areas shall be required, depending on road classification and intensity of development in accordance with the requirements set forth in Appendix D.
- (b) Sidewalks shall be provided where graded areas are specified in Appendix D when the conditions described in (b) 1 or 2 below exist:

1. The net density of the development or project exceeds one dwelling unit per acre; and
 - i. the development or project is located within 2,500 feet of a train station, public or school bus route;
 - ii. the development or project is located within 2,500 feet of an existing recreational, business, or retail use or a site where such use is permitted by existing zoning; or,
 - iii. where the proposed streets connect to or extend existing streets which have sidewalks on both sides; or
2. The net density of the development exceeds 0.5 dwelling unit per acre and the development is located within two miles of a school.

(c) Notwithstanding (b) 1. and 2. above, sidewalks shall only be required on one side of rural streets or rural lanes and shall not be required in alleys.

(d) Sidewalks shall be placed parallel to the street, unless an exception has been permitted to preserve topographical or natural features, or if required to provide visual interest, or unless the applicant shows that an alternative pedestrian system provides safe and convenient circulation (e.g., planned development).

(e) Pedestrian-way easements at least 10 feet wide may be required by the municipal approving authority through the center of blocks more than 600 feet long. In providing circulation or access to schools, playgrounds, shopping, adjoining residential areas, or other community facilities, the municipality shall consider and may require pedestrian-way easements.

(f) Sidewalk width shall be four feet; wider widths may be necessary near pedestrian generators and employment centers. Where sidewalks abut the curb and cars overhang the sidewalk, widths shall be six feet. In

high-density residential areas when sidewalks abut the curb, a sidewalk/graded area of at least six feet in width shall be required.

(g) Sidewalks and graded areas shall be constructed according to the specifications set forth in New Jersey Administrative Code (N.J.A.C.) 5:21-4.18.

5:21-4.6 Bikeways

(a) Separate bicycle paths and lanes shall be required only if such paths and lanes have been specified as a part of a municipality's adopted master plan and/or official map.

(b) Bicycle lanes, where provided, shall be placed in the outside lane of a roadway, adjacent to the curb or shoulder. When on-street parking is permitted, the bicycle lane shall be between the parking lane and the outer lane of moving vehicles. Lanes shall be delineated with markings, preferably striping. Raised reflectors or curbs shall not be used.

(c) The construction of bikeways shall comply with specifications set forth in N.J.A.C. 5:21-4.18.

5:21-4.18 Sidewalks and Bikeways Construction Standards

(a) The following apply to sidewalks and graded areas:

1. Sidewalks of concrete shall be four inches thick except at points of vehicular crossing, where they shall be at least six inches thick. At vehicular crossings, concrete sidewalks shall be reinforced with welded wire fabric mesh or an equivalent.

2. Concrete air-entrained sidewalks shall be Class C concrete, having a 28-day verification strength of 4000 p.s.i.. Other materials may be permitted, depending on the design of the development.

3. Graded areas shall be planted with grass or treated with other suitable ground cover, and their width and cross slope shall correspond to that of the sidewalks.

(b) The following apply to bikeways:

1. The paved width of the bicycle path shall be established by the municipal master plan.

i. Choice of surface materials, including bituminous mixes, concrete, compacted gravel, soil cement, stabilized earth, and wood planking shall depend on use and users of the path.

ii. Gradients of bicycle paths should generally not exceed five percent.

2. Bicycle-safe drainage grates shall be used in the construction of all residential streets.

6.5.4 Intersections

Intersections are a major concern for all traffic, and especially for pedestrian traffic flow and safety. Motor vehicles cross traffic and turning movements are often impediments to the smooth flow of pedestrian movement, and may create danger for pedestrians. At these locations, the goal is to ensure that pedestrians may move efficiently and may safely wait to cross. Chapter 13 of the Highway Capacity Manual (Transportation Research Board Special Report No., 209) explains how to calculate pedestrian storage and crosswalk areas, if large concentrations of pedestrians exist. To reduce unused pavement, intersections should be kept fairly small. This should reduce pedestrian exposure to vehicles, as well as the distance that a pedestrian has to travel to cross an intersection.

There is evidence that vehicles turning right-on-red increase pedestrian accident rates, partially because motorists will often focus their attention to the left, and may not be aware of a pedestrian crossing on the right. It is not surprising then, that 67 percent of right turn-

on-red accidents involve this situation. For this reason, a right turn-on-red prohibition may be warranted at intersections where pedestrian traffic is heavy.

When a pedestrian is required to traverse a distance of 60 feet or more, a median with a pedestrian refuge should be provided and should include pushbuttons and sidewalk ramps. A refuge island should ideally be six feet, but no less than four feet, in width. Pedestrian buttons to activate traffic signals, should be placed in accordance with DOT Standard Index #17784 where they are called for at signalized crosswalks and in medians. If pushbuttons are installed on separate poles, disabled and sight impaired individuals will be better able to use them, according to the Pedestrian Guidelines. One design hazard is drainage structures in the curb area which pedestrians may be in danger of tripping over.

Another recommendation of the Pedestrian Guidelines is that parking near signalized intersections be prohibited within 60 feet of the approach and 30 feet of the departure from such an intersection. This is to assure that a driver's view of an approaching pedestrian will not be obstructed by parked vehicles. Streets that allow on-street parking need to accommodate pedestrian queuing, allow for short crossing distances, and for sufficient visibility. If full corner and half corner sidewalk flares, otherwise known as bulbouts, are correctly provided to either new roads or to existing downtowns during revitalization, motor vehicle capacity will not be reduced. However, traffic will be slowed. Caution should be exercised so that the roadway width is not so narrow as to impede bicycle traffic.

When planning locations for bus stops, they should be located on the departure or far side of an intersection, so that pedestrians exiting the bus are not blocked from the view of traffic, as they prepare to make their way across the street. Signal timing should allow

enough time for a pedestrian to clear an intersection, so re-timings may be needed to meet this goal. In cases where intersections are frequently used by handicapped or elderly pedestrians, the signal should be adjusted accordingly.

6.5.5 Crosswalks

For crosswalks to be most efficient, it is important that they do not become, "too much of a good thing." In other words, if there are an excessive number of crosswalks which are not warranted within a given area, motorists may lose respect for the crosswalks, as well as for other pedestrian regulations. To avoid safety consequences, and to keep costs for installation and maintenance reasonable, the Pedestrian Guidelines recommend that crosswalks be placed in the following locations:

- All signalized intersections with pedestrian signal heads.
- At locations where a school crossing guard is normally stationed to assist children in crossing the street.
- At locations within 0.25 mile of a school or transit station.
- Situations where a designated pedestrian trail crosses a road at a mid-block location where pedestrian travel would not otherwise be anticipated.
- At other locations where the preferred crossing locations need to be clarified or would otherwise be confusing.
- At locations in areas, urban and non-urban, where development on both sides of the road results in concentrated pedestrian volumes crossing the road and there is no intersection, such as when shopping and eating areas are across the road from a workplace.

Judgement should be exercised in suburban areas, especially examining the existing and proposed land use development. These

patterns will generally be helpful in telling whether a crosswalk would be necessary.

Installation of crosswalks should occur at 90 degree angles, whenever possible, so that pedestrians have the shortest distance to cross the road. Crosswalks should meet the preferred width of six feet, but are even more effective when they are 10 feet wide. Stop lines installed at crosswalks with traffic signals or stop signs help keep motor vehicles from projecting too far into the pedestrian space. When utilized, stop lines should be situated four feet before and parallel to the crosswalk.

According to the regulations of the Architectural and Transportation Barriers Compliance Board, there are situations which require that a ramp or curb ramp be installed. Examples are where a sudden change in grade of 0.5 inch or more occurs, where the slope on a pedestrian route is more than five percent, or where there is no other accessible means of vertical access provided. The original function of these curbs and curb ramps was to ensure accessibility to buildings for the physically impaired. It was found that these devices are beneficial to all pedestrians, as changes in vertical road height are a common cause of injuries that result from falling. Ramps or curb ramps also are helpful for those pushing baby carriages or strollers. A number of studies have shown that when ramps or curb ramps are provided along pedestrian routes, most pedestrians will use them. The Americans with Disabilities (ADA) regulations call for curb ramps to be a minimum width of 36 inches to accommodate a wheelchair. NJDOT, however, requires 48 inches of width.

6.5.6 Islands

Pedestrians crossing the road can be assisted by the use of islands as refuges. Islands should be at least six feet wide to keep pedestrians from being forced into a traffic lane. If they are narrower than this width, pedestrians may feel uncomfortable because they are so close to

the motor vehicle traffic. The length should be at least 12 feet or the width of the crosswalk, whichever is more. The island should be raised to prevent water from pooling.

6.5.7 Overpasses and Underpasses

Crossing high volume highways or arterial roadways can be very dangerous for pedestrians. Separating vehicles by grade is, of course, the most effective way to segregate pedestrians from motor vehicles, but they are very expensive to build and maintain, and often are not used to their fullest capacity. A pedestrian might have to travel farther to access the grade separated structure, rather than to make an unsafe crossing. Unfortunately, convenience often wins out over safety. Areas that might be appropriate for grade separation are those with features such as heavily traveled schools, shopping areas, recreational centers, or other activities that are segregated by arterial roadways from residential areas. To make this type of construction more cost-effective, it is recommended that it be combined with other land development projects, roadway construction projects or other large redevelopment projects. An ideal overpass or underpass should be on the path that a pedestrian would normally utilize, and thereby make a pedestrian trip more convenient, by eliminating problems with road crossing. To encourage pedestrians to use it, railings, fencing, and median barriers may be needed. This is also to keep pedestrians from crossing at other unsafe locations which may be perceived as more direct.

Overpasses are more widely used than underpasses. They require more of a vertical separation to allow trucks to clear the structure. This translates to a need for more right-of-way in order to achieve ADA compliant ramp slopes and placement of access stairs. Clearance height for an underpass, seven to eight feet, may be less than half of that that called for an overpass.

Underpass structures may, however, require utilities to be relocated, may have drainage difficulties, and may be perceived to be unsafe. This may be countered by creating openings in the roofs and walls of the underpass, to allow natural light to filter in, as well as the addition of significant amounts of artificial lighting, and the maintenance of the underpass to keep it clean. Depending on the frequency of use for an underpass, the width of the walking space can be eight feet, to allow for both wheelchairs and pedestrians.

The following guidelines shown in Table 6.2 (as referenced in the Pedestrian Guidelines) are based on an intensive national study of how grade crossing facilities are used by pedestrians. This can assist in making decisions where such structures should be provided on existing roads. When major reconstruction or new construction occurs, there are different opportunities for changing of grades, so these guidelines would not apply.

Safe crossing areas within 600 feet of signalized intersections or grade separated crossings, generally do not require the construction of a pedestrian structure. However, if pedestrian volumes are significantly higher than those of the guidelines, or if grade variations are such that a pedestrian structure could be easily installed, a grade-separated structure might be considered. Locations that are especially well-suited to these grade separated crossings are crossings near transit stops, schools, major recreation areas, or at major activity centers.

The NJDOT Pedestrian Compatible Planning and Design Guidelines state that overpasses and underpasses should provide lighting of at least 10 foot candles in illumination to increase

Table 6.2
Grade Crossing Facility Use

Facility Type	Ped. Volume	Vehicular Volume	
	Total for 4 hours	Same 4 hours	AADT
Freeway	100	7,500	25,000
Arterial	300	10,000	35,000

Source: NJDOT Pedestrian Compatible Planning and Design Guidelines

perceived safety, and should be accessible by ramps that conform with ADA standards. Stairs may also be provided, as long as they are not the sole method of access to the structure. Ideally, overpasses and underpasses should be constructed where there are minimum differences in elevation, otherwise design elements should be incorporated to give the impression that there is not a large change in elevation needed to cross the overpass or underpass. As stated earlier, these facilities should be situated to give pedestrians the most direct access route.

Physical barriers may be considered to stop pedestrians from crossing at grade, when traffic volumes exceed those in Table 6.2, when conditions limit sight distance, or in other cases where unsafe conditions are present. However, a better approach may be to design the overpass or underpass to receive the greatest possible use, so that pedestrians are not tempted to make at-grade road crossings.

6.5.8 Other Options for Pedestrian Crossing Problems

Because of the cost and other factors involved in constructing a grade-separated structure solely for pedestrian use, there are some alternatives which may be appropriate. Each situation will warrant careful analysis to the specific conditions and constraints. Listed below are the alternatives, as detailed in the Pedestrian Guidelines.

Mid-block Crossing

An available median that is more than 10 feet wide may create a safe pedestrian refuge. Therefore an at-grade, mid-block pedestrian crossing may be an acceptable option.

New Street Crossing

Crossing an overpass or underpass which includes a street will often add a measure of security to crossing pedestrians, as they will feel safer if motorists are present in case an emergency arises. Also, the inclusion of a street will usually translate to wider structure width and a flatter grade. Logically, if large numbers of pedestrians wish to cross a road, there may also be a demand for motor vehicles to cross the road as well. Therefore it will make sense to properly integrate this type of crossing into the existing street network, so that it can provide better linkages with nearby land uses for pedestrians.

Widened Structure

In some cases, stream crossings or railroad crossings can be altered to include a pedestrian facility. Because stream crossings may be linked into a greenway plan for the surrounding community, they may be very well-suited to this purpose. Railroad structures which go over or under streets may allow for similar opportunities for pedestrian crossings.

Pedestrian Refuge Islands

These islands are fairly low-cost and only have minimal impact on motor vehicles. These islands are well-suited to areas where continuous medians can not be provided, motor vehicle speeds are less than 45 mph, pedestrian crossing volumes are greater than 100 people per day, or incidence of pedestrian accidents is high. This is especially valid when accidents are related to insufficient road widths or short crossing times. Careful evaluation should be applied to mid-block crossings on roads with speeds above 45 mph. These scenarios may be better suited to pedestrian overpasses or traffic signals. A

refuge area may have stanchions, and will then provide a low-cost solution while providing high-visibility for pedestrians.

Although two-way left-turn lanes are generally safe and effective for motor vehicles, they impact pedestrian crossings by creating an uneasy and potentially unsafe situation. Pedestrians are not only required to watch two directions of traffic, but must also simultaneously pay attention to two directions of left turning traffic.

Two-way left-turn lanes are typically installed in areas of strip commercial development and residential areas. However, it is these same generators that also create a higher demand for pedestrian use. In situations with five lane or seven lane roads, pedestrians may be forced to use the center lane for safety, but are then subjected to two directions of vehicles making turns. A median that has frequent openings is a good solution, yet it is not always feasible.

A series of well-defined pedestrian refuge islands which are strategically situated is an alternative. In each specific case, the number of driveways and their locations must be considered when planning for refuge island spacing, however a distance of 330 to 500 feet works, in principle. According to the Pedestrian Guidelines, "The best way to locate refuge islands is to plot all turning radii into and out of the driveways from both sides of the road. Non-conflict areas are candidate locations for refuge islands. Refuge islands should be as long as possible without interfering with vehicular turning movements or limiting possible future driveway locations."

6.6 Traffic Calming

Although traffic calming has been in place in several European countries for quite some time, it is relatively new to the United States. Traffic calming seeks to reduce the dominance and speeds of motor vehicles, mainly through physical design alterations to horizontal and vertical road alignments, in urban or suburban areas, as well as to changes to vehicle mode priorities. It is a different concept, in that it plans for bicycle and pedestrian traffic in integrated designs over large areas. Some existing residential neighborhoods have been retrofitted with traffic calming measures, with a goal to eliminate excessive through traffic. An example in Morris County is the Town of Dover. Many new planned developments incorporate the designs associated with traffic calming, rather than conventional roadway planning designs.

Proponents of traffic calming ascertain that it can result in less accidents and casualties. Improved driver discipline, reduced fuel consumption, reduced vehicle emissions, and reduced noise may also result. Also, plantings and other aesthetically pleasing features are often incorporated into the traffic calming designs. Techniques may also be employed on main urban thoroughfares, however, they differ from the calming techniques for minor residential streets. There are a greater variety of features available on more minor roadways, because speed control will not as greatly affect road levels of service. For example, a highway is not an appropriate place to narrow the road, because of the volumes of traffic and the speeds traveled on the roadway.

Both the NJDOT Bicycle and Pedestrian Compatible Planning and Design Guidelines caution that traffic calming is most effective when applied on an area-wide basis. If it is only used on a particular street, there is potential to shift accidents, pollution and traffic into neighboring areas. Both the Bicycle and Pedestrian Guidelines state that

traffic calming will fulfill its greatest potential to create a safer and more attractive urban environment, when it is used as part of a wider, longer-term strategy to reduce motor vehicle dependence and promote a shift in mode use to bicycling, walking, and public transit use.

The Bicycle and Pedestrian Guidelines both caution that poorly designed traffic calming measures which do not account for a bicyclist's needs can actually discourage bicycles from using speed-reduced areas. When possible, bicyclists should be given alternatives to get around physical obstacles, such as chicanes or ramps, with a minimum width recommendation for a bicycle pass of 27 inches. If a reduced roadway width is utilized as a traffic calming measure, careful thought should be given to how bicyclists and motorists will be able to safely share the narrower road. Surface materials, especially in the case of ramps, should be skid-resistant, but textured surfaces should not be so rough as to threaten the stability of a bicyclist or seriously graze the rider if a fall should occur. Smooth transitions should be provided for ramps to enter and exit and the grade should not exceed 16 percent and should be clearly signed. Traffic calming features should be closely spaced if speeds of less than 20 mph are needed, to discourage acceleration and braking. It is important to have adequate signs to alert drivers that they are entering a restrained traffic area. Public awareness campaigns can greatly assist with acceptance of reduced speeds.

Selecting the correct traffic calming techniques for a particular area largely depends on the physical setting, professional judgement, creative design, as well as community acceptance. Accident rates for bicycles, motor vehicles, should be examined in areas where traffic calming is being considered.

The following are the ten basic types of traffic calming measures, according to an ITE Journal article by John D. Leonard II and Jeffery Davis ("Urban Traffic Calming Treatments: Performance Measures & Design Conformance," Aug. 1997). This list gives an overview of major ideas involved in these road treatments. More detailed descriptions, and more extensive planning details and considerations may be found in the NJDOT Guide for Pedestrian Compatible Planning and Design Guidelines.

1. Intersection Diverters: partial diverters used to create right-in right-out only traffic movements at "T" intersections; uses raised curbs, islands, physical barricades and other visual components. Figure 6.5 shows two examples of intersection diverters.

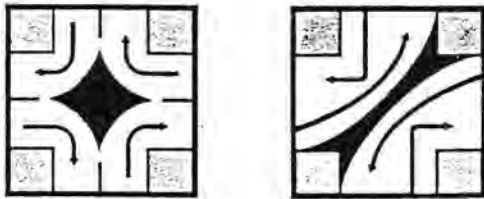


Figure 6.5 Star and Diagonal Diverters
Source: NJDOT Pedestrian Compatible Planning and Design Guidelines

2. Roundabouts: traffic circle, create circular flow patterns, roundabouts and mini-roundabouts which use yield signs rather than stop signs. Figure 6.6 shows an example of a roundabout.

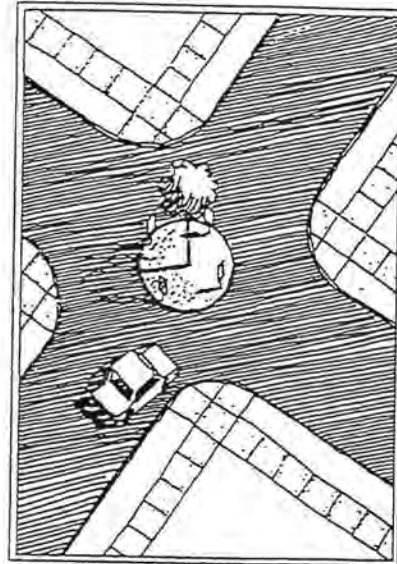


Figure 6.6 Roundabout

Source: State of the Art Report: Residential Traffic Management, FHWA, 1980

3. Channelization: include pedestrian refuge islands and mid-block median islands; horizontally alter path of motor vehicles and restrict some intersection turning movements. Figure 6.7 shows a channelization curb diverter.

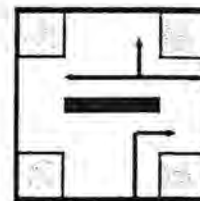


Figure 6.7 Channelization Curb Diverter
Source: NJDOT Pedestrian Compatible Planning and Design Guidelines

4. Street Narrowing: also called slow points or chokers; include modifications to curb, channelizations, and sometimes landscaping to narrow a road to its minimum width. Can be used at intersections. Figure 6.8 shows an example of a choker.

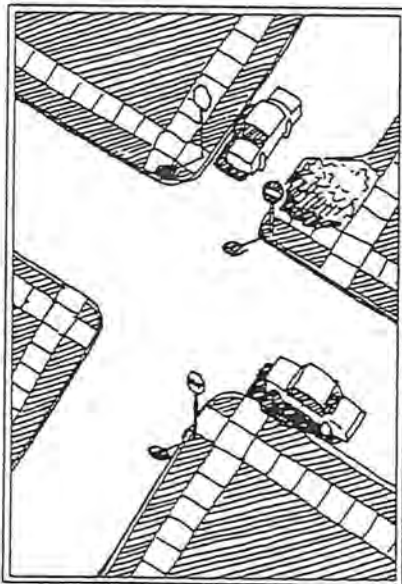


Figure 6.8 Choker

Source: State of the Art Report: Residential Traffic Management, FHWA, 1980

5. Angle Points/Chicanes: constructed along the road edge similar to street narrowing, create a more pronounced horizontal deflection for motor vehicles trying to pass. For most effective speed reduction, should extend laterally to centerline of road. Figure 6.9 shows a typical chicane.

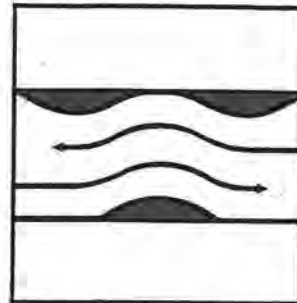


Figure 6.9 Chicane

Source: NJDOT Pedestrian Compatible Planning and Design Guidelines

6. Gateway/Perimeter Treatments: various visual and physical design aspects used to alert driver that they are entering a special district within the road system. Can include signs, narrowed intersections, and landscaping alone or in a variety of combinations. Figure 6.10 shows some common signs used for traffic calming.



Figure 6.10 Signs

Source: NJDOT Pedestrian Compatible Planning and Design Guidelines

7. Street Closure: used in new subdivisions by creating cul-de-sacs, eliminated neighborhood "cut-through" traffic. Very hard to implement on existing roads. Figure 6.11 shows two cul-de-sacs created by a street closure.

8. Speed Humps: designed to restrict motor vehicles to a certain speed; placed at intervals along a street. Speed humps are similar to traditional speed bumps but are safer for bicyclists and motorists because they have a less dramatic slope. Figure 6.12 shows a speed hump and a speed bump.

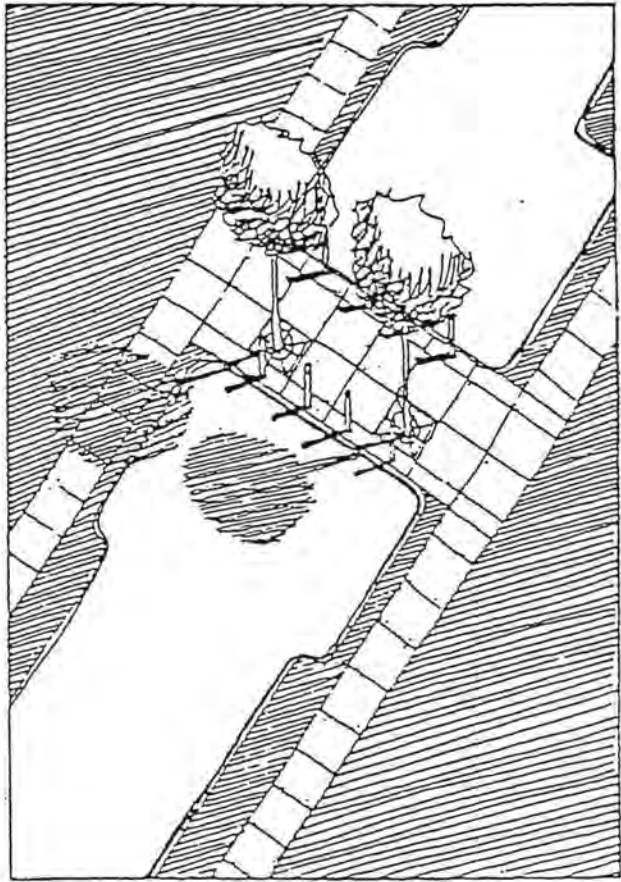
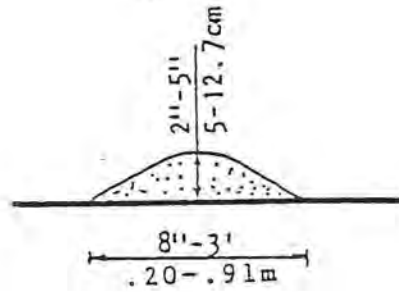


Figure 6.11 Street Closure
Source: The Northwestern University Traffic
Institute Pedestrian Planning and Design Workshop
Notebook

Speed Bump



Speed Hump

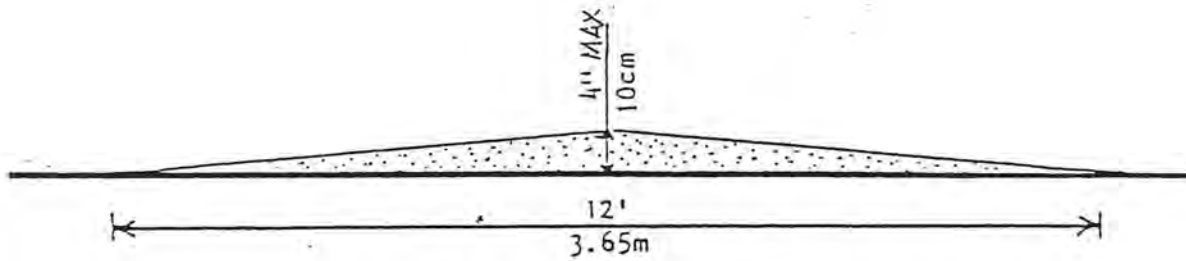


Figure 6.12 Speed Bump vs. Speed Hump

Source: The Northwestern University Traffic Institute Pedestrian Planning and Design Workshop Notebook

9. Speed Tables: similar to speed humps but have a flat portion that can double as a pedestrian crosswalk.

Other traffic calming measures may include speedwatch programs, increased signage, and irregular or textured surfaces.

CHAPTER SEVEN

Public Education and Outreach

To encourage the use of bicycle and pedestrian facilities the public must be made aware of their availability and benefits. In addition public education should also emphasize the laws governing their use and safety. According to the National Biking and Walking Study (NBWS), there are important considerations for the successful development and implementation of bicycle and pedestrian programs including, "...the institutionalization of biking and walking considerations in the routine planning, design, construction and operations of government agencies."

According to the Statewide Bicycle and Pedestrian Master Plan, education is not just important for individuals who bicycle and

walk, but also for planning and enforcement officials to set policy that may implement techniques, such as traffic calming and improved speed enforcement. People are often confused as to which side of the road should be used by bicyclists and which by pedestrians. Bicycles are governed by the same basic laws and basic rules of the road as motor vehicles. Pedestrians should walk against traffic.

NJDOT and other organizations such as Biking is Kind to the Environment (B.I.K.E.), and Transportation Management Associations (TMAs) such as MCRIDES, have publicized this information through "Share the Road" campaigns, which inform the travelers of their

responsibilities when utilizing the various travel modes.

In 1990, *Bicycling* magazine named Seattle the "Best City for Bicycling in North America." One component of their program that is simple and effective, is the "Bike Spot Improvement Program." Postage-paid cards were made available at bike shops and municipal buildings in the Seattle region soliciting suggestions for improvements. Responses that were implemented include filling potholes, upgrading sewer-grates, replacing signs, and installing bicycle racks.

Boulder, Colorado began a program called "Go Boulder" that combined coordination activities for bicycling, walking, and public transit. The city employs, a full-time bicycle and pedestrian coordinator, a Bike-Week coordinator, and a bicycle education specialist at the University of Colorado formed a Citizen's Advisory Committee. The city set a goal to reduce single occupancy vehicle (SOV) trips by 15 percent by the year 2000. They also appointed a pedestrian coordinator to transform the downtown area into a pedestrian-friendly zone. Infrastructure improvements such as building missing sidewalk segments, providing more pedestrian shelters at transit stops, adding benches, installing a pedestrian mall downtown, creating a greenbelt area, and completing a network of bikeways.

Safety, design, and public education are all crucial elements of a bicycle and pedestrian plan, especially as it relates to children. The New Jersey Bicycle Manual, published by the Division of Motor Vehicles, states that children under the age of seven are too young to understand the rules and responsibilities associated with riding on a street. Children aged seven to nine should not be allowed to ride on public or busy streets without supervision by an adult or other responsible party, and should only ride during the day. Through public education, parents are

encouraged to consider the maturity and ability of their children to obey traffic regulations. There is also a parental responsibility to teach children proper safety and riding skills.

Bicycle shops are important in educating the public, especially children who may go in to buy equipment and accessories for their bicycles. Information that emphasizes the importance of wearing helmets, riding on the correct side of the road, and using hand signals are often made available at bicycle shops.

School systems should be a major participant in properly educating children in safety practices when bicycling or walking. The Los Angeles school system has a program called SAFE MOVES, which reportedly has reached close to one million elementary school children. The city of Milwaukee holds a summer "safety fest," for school-age children which has an attendance of about 30,000.

There is a significant amount of material produced by the National Highway Traffic Safety Administration (NHTSA), much of which is used in school-based programs. Their "Stop and Look with Willy Whistle" program is intended for children from kindergarten through third grade. This program teaches young people how to properly cross the street and has been associated with a 12 percent reduction in collisions for children as pedestrians. It also has resulted in a 21 percent reduction in motor vehicles hitting children running between parked cars at midblock.

Similar programs were instituted by NJ Transit, such as "Chicken on the Tracks," which teaches children about the dangers of walking along railroad tracks and "Operation Life Saver" which alerts children to the dangers of railroad crossings. "Safety Town" is another successful program which teaches children basic safety principles.

Another video called "And Keep On Looking" is for children in fourth through sixth grade. It reviews the procedure called "stop and search," which has helped reduce the number of dart-out accidents at intersections. It also teaches children how to cross intersections with traffic lights, pedestrian "walk" signals, and where motorists and pedestrians may not be able to easily see one another.

"The Basics of Bicycling," a bicycle safety program developed by the Bicycle Federation of America and the North Carolina Department of Transportation, is oriented to fourth graders. The program teaches basic bicycling skills.

Schools are not the only participants that should be involved in educating children on safety. Police, health, medical, and organizations such as AAA, the Boy Scouts, Girl Scouts, and 4-H Clubs should also reinforce the message. Bicycle and pedestrian coordinators are a source for support activities and materials. Additionally, these organizations can inform dog owners that their animals should be kept on leashes when using trails, paths, and sidewalks.

A basic component of all driver education programs is to teach students about the safety needs of bicyclists and pedestrians. According to the National Biking and Walking Study, the following bicycle and pedestrian elements should be included in driver education courses:

- Legal rights and responsibilities of bicyclists and pedestrians.
- Traffic signs pertinent to bicyclists and pedestrians.
- Special roadway-surface and traffic flow problems that affect the bicyclist.
- Precautions to be taken in areas with children.
- The importance of "stop and search" procedures for bicyclists and pedestrians, exercising caution near bicyclists and pedestrians, and communicating one's intentions to motorists.

Biking Is Kind to the Environment (B.I.K.E.) is a bicycling advocacy organization. They assist both recreational and commuter bicyclists by providing maps and information on safe bicycling habits. B.I.K.E. also has provided educational materials and presentations to schools and other civic organizations. They have produced "Share the Road Share the Air," "So You're Going to Leave Your Car At Home Today," and the "South-East Morris County Bicycle Suitability Map."

Morris County Rides, Inc. (MC RIDES), Morris County's transportation management association, publicizes and markets alternative transportation options. MC RIDES distributes "share the road" literature, Commuter Survival guides that include bicycle and pedestrian safety information, and a calendar that increases children's awareness of transportation alternatives.

Morris County will continue the public outreach efforts initiated in the process of developing this Element, such as retaining the Bicycle and Pedestrian Public Advisory Committee (BiPED PAC). Bicycle and pedestrian compatibility maps will also be developed for public use.

Morris County Bicycle and Pedestrian Facilities

Existing Facilities

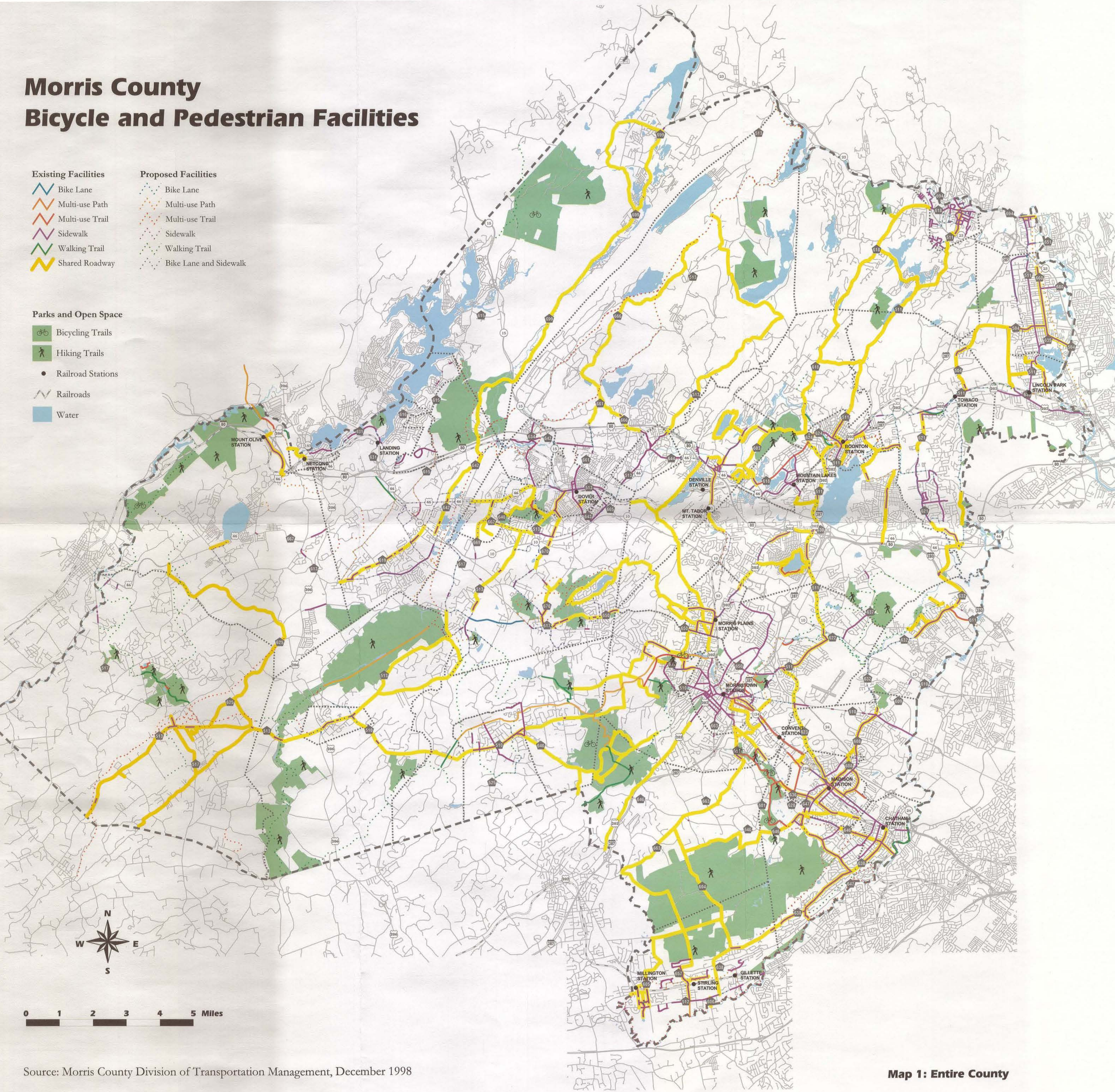
-  Bike Lane
-  Multi-use Path
-  Multi-use Trail
-  Sidewalk
-  Walking Trail
-  Shared Roadway

Proposed Facilities

-  Bike Lane
-  Multi-use Path
-  Multi-use Trail
-  Sidewalk
-  Walking Trail
-  Bike Lane and Sidewalk

Parks and Open Space

-  Bicycling Trails
-  Hiking Trails
-  Railroad Stations
-  Railroads
-  Water



8.1 Region One

Municipalities:

- Jefferson Township
- Rockaway Borough
- Rockaway Township

Description:

Region One contains two of the largest municipalities in Morris County as well as Rockaway Borough, which is a smaller, more densely developed community. Jefferson Township and Rockaway Township have large amounts of vacant land and open space with development activity concentrated in the southern portions of these municipalities along the NJ 15 and I-80 corridors. In this region, sidewalks are predominantly found in Rockaway Borough, while recreational facilities are more common in the townships.

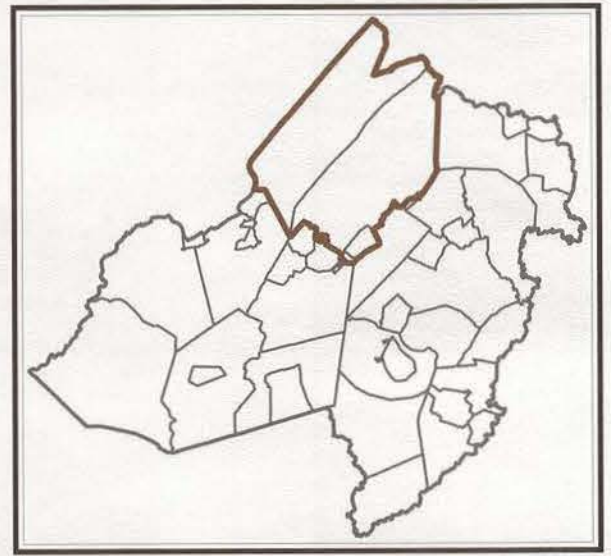
Map Two



Figure 8.2 Map Region One

Source: MCDOTM

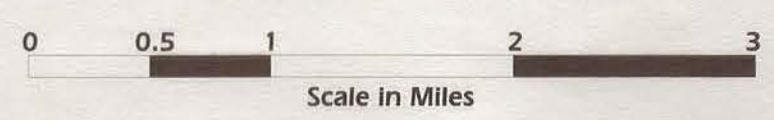
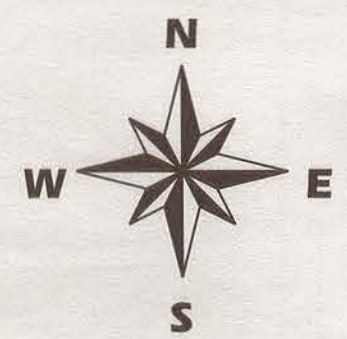
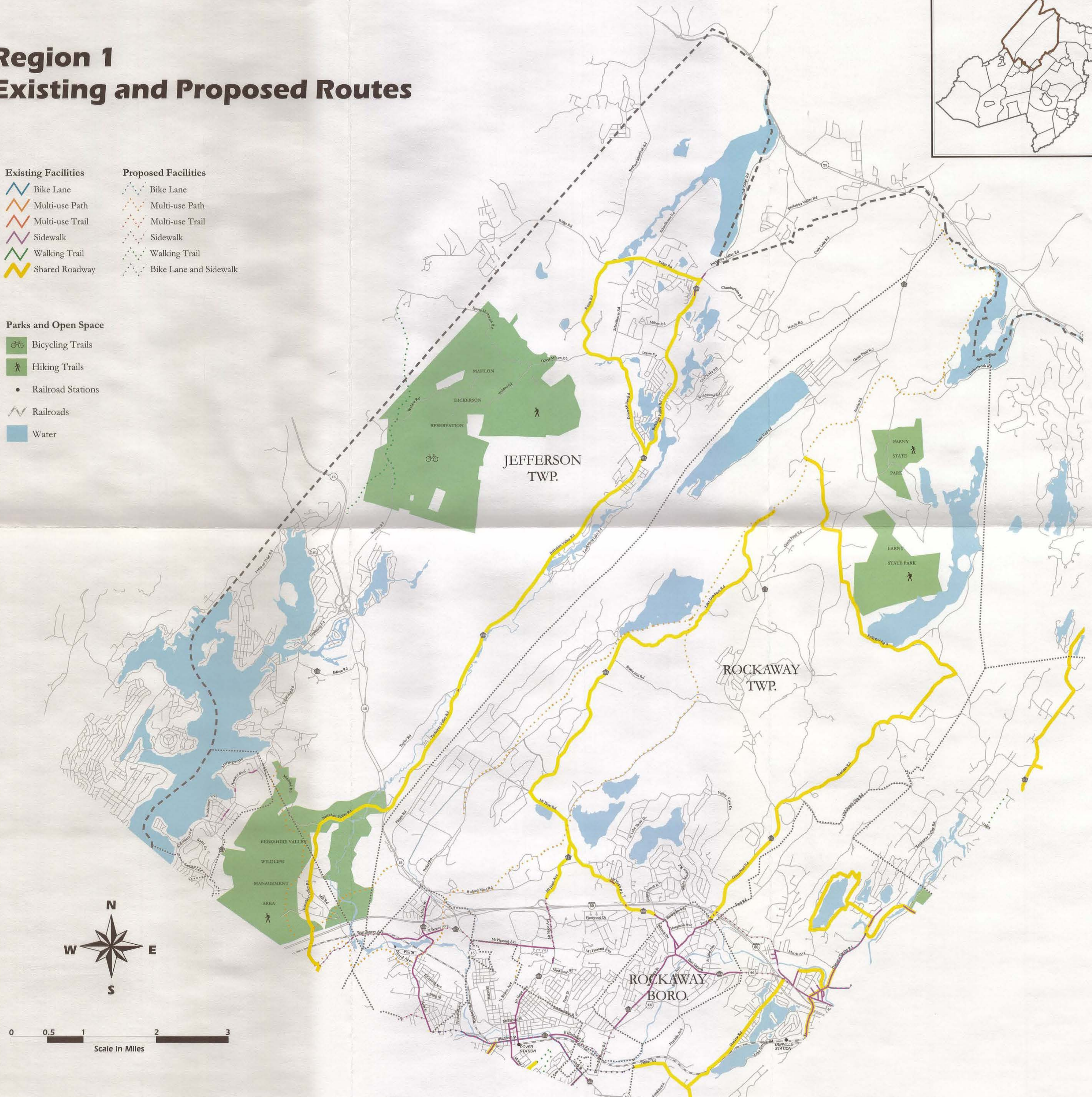
Region 1 Existing and Proposed Routes



- | Existing Facilities | Proposed Facilities |
|---------------------|------------------------|
| Bike Lane | Bike Lane |
| Multi-use Path | Multi-use Path |
| Multi-use Trail | Multi-use Trail |
| Sidewalk | Sidewalk |
| Walking Trail | Walking Trail |
| Shared Roadway | Bike Lane and Sidewalk |

Parks and Open Space

- Bicycling Trails
- Hiking Trails
- Railroad Stations
- Railroads
- Water



Jefferson Township



• MUNICIPAL SUMMARY

Due to the large size and mountainous topography, bicycle and pedestrian facilities are not common. The rugged terrain is conducive to hiking and mountain bicycling. Many of the roads are not suitable for the shared roadway classification, as they contain sharp curves, steep grades, or insufficient road widths. However, Berkshire Valley Road (CR 699), a major road within the Township, is a shared roadway. Russia Road and Dover-Milton Road are also shared roadways. Trails are proposed through the Berkshire Valley Wildlife Management Area and along the abandoned Wharton and Northern Railroad. Mahlon Dickerson Reservation is a major recreation area that includes passive and active recreation including bicycling and walking trails.

• LAND AREA*

40.72 square miles

County

Mahlon Dickerson Reservation
Minisink County Park

• POPULATION*

17,825

Municipal

Brady Park
Camp Jefferson
Chamberlain Road Recreation Area
Children's Park at Prospect Point Park
Creative Playground
Dogwood Park
East Shore Park
Lakeside Recreation Area
Longwood Lake Park
Ridge Road Park
White Rock

• POPULATION AGES 5-14*

2,468

• INTERMODAL LOCATIONS

NONE

• MODE TO WORK*

Number of bicycle commuters 0
Number of pedestrian commuters 55
Number of total commuters..... 10,026

• PARKS AND OPEN SPACE

State

Berkshire Valley Wildlife Management Area
Hopatcong State Park
State Wildlife Management Area
Jefferson/Sparta Preserve

*=1990 Census

EXISTING FACILITIES

- **Sidewalks**

Berkshire Valley Road

- **Shared Roadways**

Berkshire Valley Road

Dover-Milton Road

Ridge Road

Russia Road

RECOMMENDATIONS

- **Sidewalks**

West Dewey Avenue

- **Multi-Use Trails**

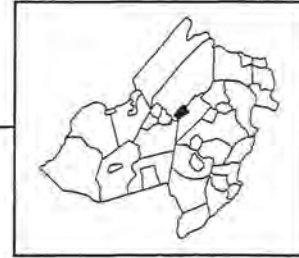
Berkshire Valley Wildlife Management Area

Abandoned Wharton and Northern Railroad

- **Walking Trails**

Mahlon Dickerson Reservation Trails

Rockaway Borough



• MUNICIPAL SUMMARY

This municipality contains a well-defined network of sidewalks to service the downtown and residential areas. The topography is quite steep in some areas. US 46 crosses through the municipality, carrying fairly significant traffic volumes.

• LAND AREA*

2.09 square miles

• POPULATION*

6,243

• POPULATION AGES 5-14*

759

• INTERMODAL LOCATIONS

Municipal Lot #1 Park and Ride

• MODE TO WORK*

Number of bicycle commuters 0

Number of pedestrian commuters 102

Total number of commuters 3,483

• PARKS AND OPEN SPACE

Municipal

Jackson Avenue River Park

Lincoln Avenue Ballfield

Memorial Park

Park Lakes

* = 1990 Census

EXISTING FACILITIES

• Sidewalks

Academy Street

Church Street

East Main Street

Ford Road

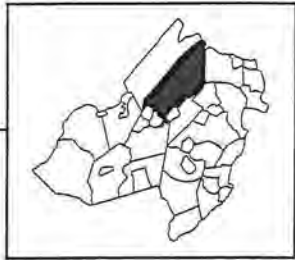
Halsey Avenue

Hibernia Avenue

Wall Street

West Main Street

Rockaway Township



• **MUNICIPAL SUMMARY**

Most residential and commercial development has occurred in the southern portion of this large municipality. The area in the vicinity of the Rockaway Townsquare Mall has experienced rapid growth in the last 10 years. The mountainous topography of the Township results in many steep road grades. Mount Hope Road / Lake Denmark Road / Valley Road (CR 666) is a shared roadway which travels north-south through a great portion of the Township. The central and northern portions of the Township contain vast tracts of open space, providing opportunities for bicycling and hiking. The West Morris Greenway, a multi-use trail, is proposed along a part of the abandoned Mount Hope Mineral Railroad right-of-way, which travels from Wharton, through Rockaway Township, and into Jefferson Township.

• **LAND AREA***

42.16 square miles

County

Mount Hope Park
Patriots' Path/West Morris Greenway

• **POPULATION***

19,572

Municipal

Ball Field
Copperas Tract
Fleetwood Park
Ford Faesch House
Lake Ames
Mount Hope Pond
Norway Park
Oak Meadows
Park Lake
Peterson Field
Route 80 Park
Sherbrook Park
Upper Hibernia Tract
Willow Neighborhood Park

• **POPULATION AGES 5-14***

2,523

• **INTERMODAL LOCATIONS**

Rockaway Townsquare Mall.....Park and Ride
Dover Bus Terminal.....Park and Ride

• **MODE TO WORK***

Number of bicycle commuters 20
Number of pedestrian commuters 93
Total number of commuters 11,151

• **PARKS AND OPEN SPACE**

State

Farny State Park
Wildcat Ridge Wildlife Management Area

* = 1990 Census

EXISTING FACILITIES

- **Sidewalks**

Mount Hope Avenue
Mount Hope Road
Mount Pleasant Avenue

- **Shared Roadways**

Belt Road
Green Pond Road
Lake Denmark Road
Lyonsville Road
Meridian-Lyonsville Road
Mount Hope Avenue
Mount Hope Road
Spilt Rock Road
Upper Hibernia Road
Valley Road

RECOMMENDATIONS

- **Sidewalks**

Dover-Rockaway Road
East Blackwell Street
Hibernia Avenue
Morris Avenue
Mount Hope Avenue
West Dewey Avenue

- **Multi-Use Trails**

Abandoned Wharton and Northern Railroad
West Morris Greenway (Patriots' Path Trail System)

8.2 Region Two

Municipalities:

- Town of Boonton
- Boonton Township
- Butler Borough
- Kinnelon Borough
- Lincoln Park Borough
- Montville Township
- Pequannock Township
- Riverdale Borough

Description:

Region Two is characterized by older and more traditionally developed municipalities adjacent to lower density residential communities. The downtown areas in the Town of Boonton, Butler, Lincoln Park, and Pequannock have substantial sidewalks. The Town of Boonton has trails that are essentially “hidden gems”, as they would not necessarily be expected in such a dense area. General proposals for this region include extending existing sidewalks and adding bicycle lanes, as none currently exist. There is a proposal to create a bicycle and pedestrian path along a section of the New York, Susquehanna & Western (NYS&W) rail line through Riverdale, Pequannock, and to Wayne at the Mountain View railroad station.

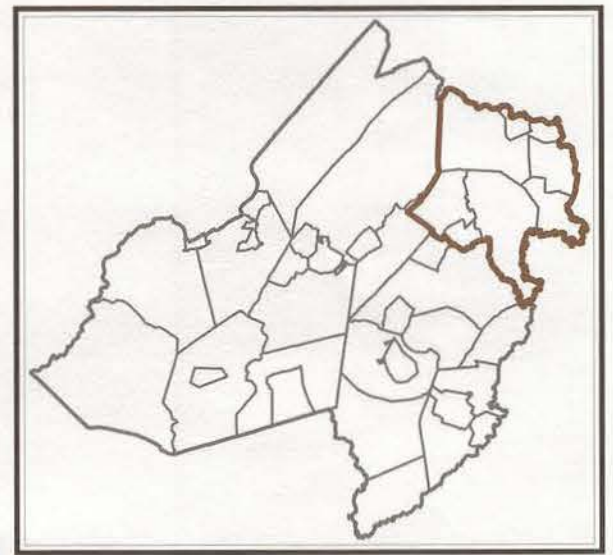
Map Three



Figure 8.3 Map Region Two

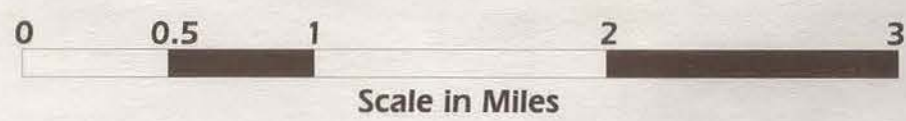
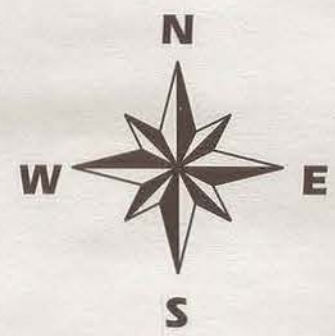
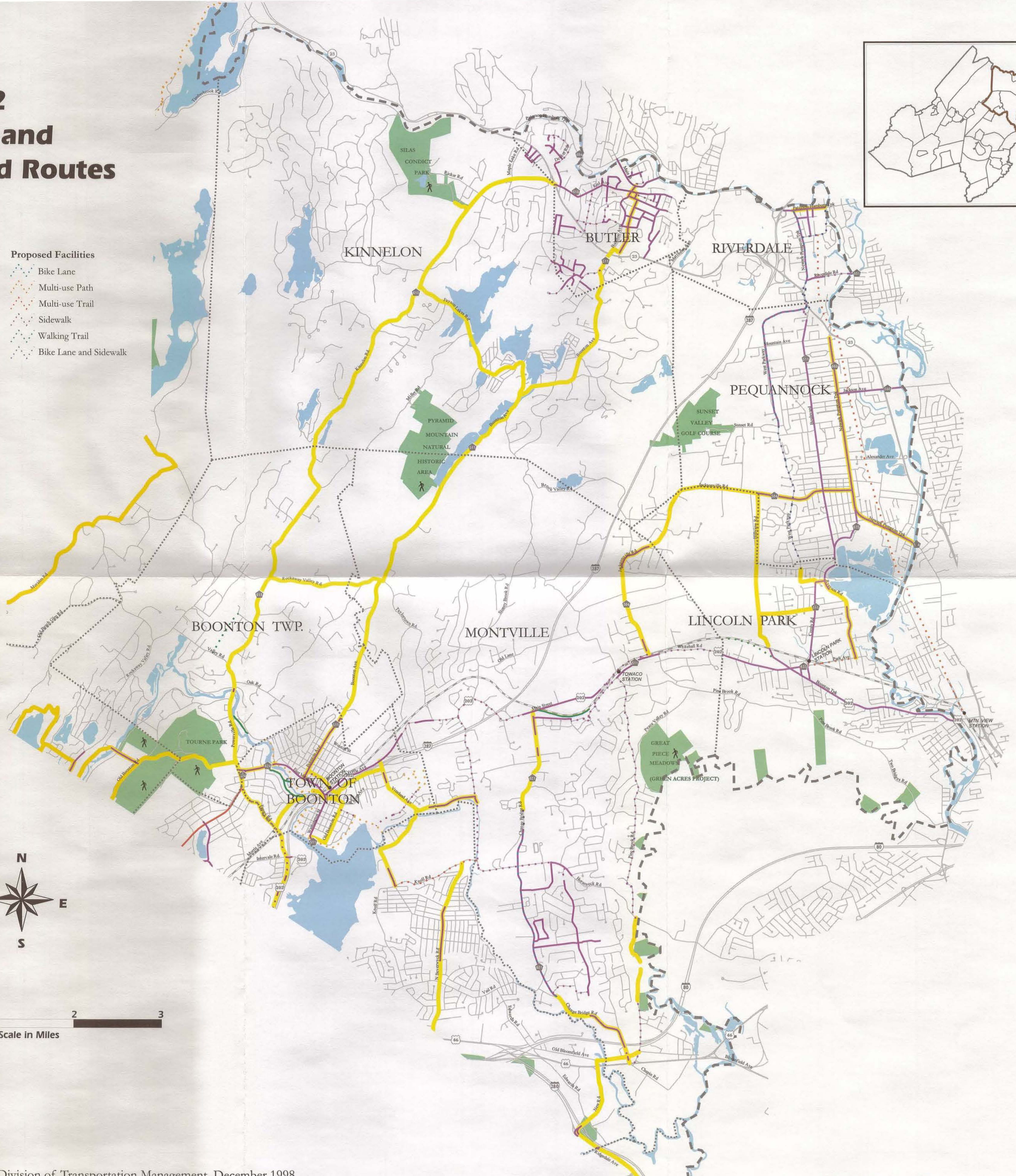
Source: MCDOT

Region 2 Existing and Proposed Routes



- | Existing Facilities | Proposed Facilities |
|---------------------|------------------------|
| Bike Lane | Bike Lane |
| Multi-use Path | Multi-use Path |
| Multi-use Trail | Multi-use Trail |
| Sidewalk | Sidewalk |
| Walking Trail | Walking Trail |
| Shared Roadway | Bike Lane and Sidewalk |

- Parks and Open Space**
- Bicycling Trails
 - Hiking Trails
 - Railroad Stations
 - Railroads
 - Water



Town of Boonton



• **MUNICIPAL SUMMARY**

This densely developed, urban area is characterized by a downtown area that includes a railroad station. I-287 and US 202 intersect the small municipality, bringing traffic through the Town. A trail suitable for hiking traverses through Grace Lord Park. Other trails are proposed through Veterans Park and along the Jersey City Reservoir and Morris Canal.

• **LAND AREA***

2.37 square miles

• **POPULATION***

8,343

• **POPULATION AGES 5-14***

884

• **INTERMODAL LOCATIONS**

- Boonton Rail Station
- Main Street and Plane Street Park and Ride
- Main Street and
Lathrop Avenue Park and Ride

• **MODE TO WORK***

- Number of bicycle commuters 9
- Number of pedestrian commuters 151
- Number of total commuters 4,511

• **PARKS AND OPEN SPACE**

Municipal

- Canalside Park
- Grace Lord Park
- Grace Lord Park Extension
- Jinella Court
- Lathrop Avenue Park
- Municipal Beach/Morris Canal
- Park Avenue/Kanouse Street
- Pepe Field
- Veterans Memorial Park
- Washington Street Park

* = 1990 Census

EXISTING FACILITIES

• **Sidewalks**

- Boonton Avenue
- Ely Street
- Main Street
- Myrtle Avenue
- Vreeland Avenue
- Washington Street
- West Main Street

• **Walking Trails**

- Grace Lord Park Trails

• **Shared Roadways**

- Birch Street
- Boonton Avenue
- Elcock Avenue
- Ely Street
- Fanny Road
- Greenbank Road
- Lathrop Avenue
- Maple Avenue
- Morris Avenue
- Old Boonton Road

EXISTING FACILITIES (continued)

- **Shared Roadways (continued)**

Park Avenue
Reservoir Drive
Vreeland Avenue
West Main Street

RECOMMENDATIONS

- **Sidewalks**

Church Street
Cornelia Street
Crown Road
Dorian Road
Fanny Road
Monroe Street
William Street

- **Multi-Use Trails**

Grace Lord Park Trails
Jersey City Reservoir Trail
Morris Canal Trail
Veterans Park Trail

Boonton Township



• MUNICIPAL SUMMARY

Primarily low density residential, this municipality has shared roadways along Powerville Road (CR 618), Boonton Avenue (CR 511), and Rockaway Valley Road. These roads are popular with recreational bicyclists, due to the gently rolling terrain and scenic views. A portion of the Tourne, a county park, is located in this municipality. A shared roadway, McCaffrey Lane, traverses the park.

• LAND AREA*

8.59 square miles

• POPULATION*

3,566

• POPULATION AGES 5-14*

366

• INTERMODAL LOCATIONS

NONE

• MODE TO WORK*

Number of bicycle commuters 0

Number of pedestrian commuters 34

Number of total commuters..... 1,772

• PARKS AND OPEN SPACE

County

Tourne Park

Municipal

Forest Park

Griffith Park

Johanson Memorial Fields

Leonard Park

Rockaway Valley Airdrome Fields

Sheep Hill Park

Tumble-In (Beaver Brook)

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Powerville Road

• Walking Trail

Morris Canal Trail

• Shared Roadways

Boonton Avenue

McCaffrey Lane

Powerville Road

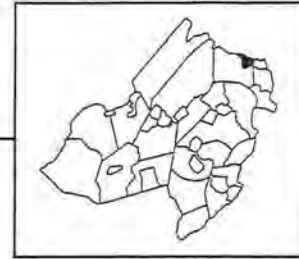
Rockaway Valley Road

RECOMMENDATIONS

• Walking Trail

Marotta Trail

Butler Borough



• MUNICIPAL SUMMARY

This small, densely populated community is characterized by steep terrain and many narrow streets. A well-developed sidewalk network serves the downtown business area, with additional segments proposed. There are few suitable shared roadways, with the exception of a portion of Boonton Avenue (CR 511) and Bartholdi Avenue.

• LAND AREA*

2.08 square miles

• POPULATION*

7,392

• POPULATION AGES 5-14*

909

• INTERMODAL LOCATIONS

Boonton Avenue and
Kiel Avenue.....Park and Ride

• MODE TO WORK*

Number of bicycle commuters 7
Number of pedestrian commuters 118
Number of total commuters..... 4,057

• PARKS AND OPEN SPACE

Municipal

Arch Street Park
Kakeout Brook
Stoney Brook Swim Club
Western Avenue Park

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Ace Road
Arch Street
Bartholdi Avenue
Bellevue Avenue
Boonton Avenue
Brown Avenue
Butler Place
Carey Avenue
Carl G. Whritenour Road
Cedar Street
Center Court
Decker Road
Edgemere Terrace
George Street
Gifford Street
Hasbrouck Avenue
High Street
Hiller Court

Holly Court
Kakeout Road
Kiel Avenue
Lafayette Avenue
Leonard Road
Lundy Terrace
Mabey Lane
Main Street
Manning Avenue
Morse Avenue
Myrtle Avenue
Notchwood Road
Oak Spring Street
Outlook Street
Pearl Place
Post Court
Reservoir Avenue
Ridge Road
Robert Street
Stoney Hill Road

EXISTING FACILITIES (continued)

• **Sidewalks (continued)**

Sunset Avenue
Third Street
Tintle Road
Valley Road
Wagda Avenue
Whittek Road
William Street

• **Shared Roadways**

Bartholdi Avenue
Boonton Avenue
Carey Avenue
High Street
Lafayette Avenue
Robert Street

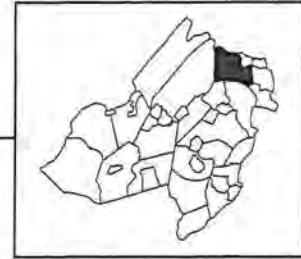
RECOMMENDATIONS

• **Sidewalks**

Brown Avenue
Cedar Street
Central Avenue
Decker Road
Elm Street
Gifford Street
Gromley Lane
Kakeout Road

Outlook Street
Plane Street
Roosevelt Avenue
Shore Street
Sunset Avenue
Terrace Avenue
Third Street
Valley Road

Kinnelon Borough



• MUNICIPAL SUMMARY

This municipality is low density residential with no distinct downtown. Commercial development is located along NJ 23. Kinnelon Road (CR 618), Fayson Lakes Road, and Boonton Avenue (CR 511) are shared roadways. There are small portions of sidewalks in some residential developments in the Borough. Silas Condict Park and Pyramid Mountain Natural Historic Area contain trails.

• LAND AREA*

18.37 square miles

• POPULATION*

8,470

• POPULATION AGES 5-14*

1,184

• INTERMODAL LOCATIONS

Meadtown Shopping Center... Park and Ride

• MODE TO WORK*

Number of bicycle commuters 0
Number of pedestrian commuters 42
Number of total commuters..... 4,520

• PARKS AND OPEN SPACE

State

Pyramid Mountain NHA

County

Pyramid Mountain

Silas Condict Park

Sunset Valley Golf Course

Municipal

Boonton Avenue Field

Borough Park

Buck Mountain

Fire Pond Lot

Geoffrey Drive Park

Hidden Acres Drive Park

Municipal Field

Pheasant Run Park

Rock Pear Mountain

Wood Chase Lane Park

*=1990 Census

EXISTING FACILITIES

• Shared Roadways

Boonton Avenue
Fayson Lakes Road

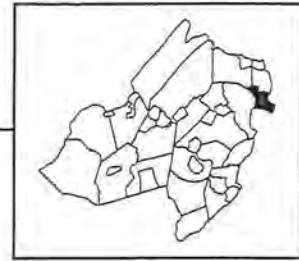
Kinnelon Road
Silas Condict Park

RECOMMENDATIONS

• Sidewalks

Tintle Road

Lincoln Park Borough



• MUNICIPAL SUMMARY

As an older established municipality, the downtown area has a well-defined sidewalk network and a railroad station. Beaver Brook Road and Jacksonville Road (CR 504) are shared roadways in the Borough. There is a proposed multi-use path along Park Avenue between Comly Road (ALT. 511) and Ryerson Road.

• LAND AREA*

6.73 square miles

• POPULATION*

10,978

• POPULATION AGES 5-14*

1,097

• INTERMODAL LOCATIONS

Lincoln Park Station..... Rail Station

• MODE TO WORK*

Number of bicycle commuters 0
Number of pedestrian commuters 44
Number of total commuters..... 6,113

• PARKS AND OPEN SPACE

State

Great Piece Meadows

Municipal

Aqueduct Park
Beaver Brook Park
Beavertown Park
Elm Street Park
Evergreen Park
Great Piece Meadows
Hilltop Park
John Street Park
Lynn Park
Municipal Complex
Public Park
Ryerson Road
Wildan Park
Willow Street Park

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Beaver Brook Road
Boonton Turnpike
Comly Road
Main Street
Ryerson Road

• Shared Roadways

Arthur Road
Beaver Brook Road
Bog and Vly Lane
Hillview Road
Jacksonville Road
John Street
Park Avenue
Ryerson Road

RECOMMENDATIONS

- **Bicycle Lanes**

Arthur Road

- **Sidewalks**

Arthur Road

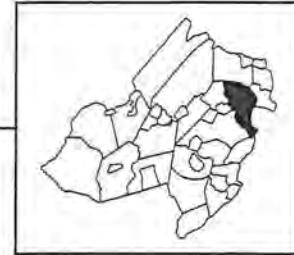
- **Multi-Use Paths**

Park Avenue

- **Walking Trail**

Morris Canal Trail

Montville Township



• **MUNICIPAL SUMMARY**

The Township is characterized by continued residential development and no distinct downtown area. Shared roadways are Jacksonville Road (CR 504), portions of Change Bridge Road, and Vreeland Avenue. A bicycle lane is proposed for a portion of Change Bridge Road. Portions of sidewalks exist along Boonton Avenue (CR 511) and US 202, with limited access to the Towaco railroad station. Gaps in the sidewalk system are proposed to be filled in and new sidewalks are proposed for River Road, Horseneck Road, and Pine Brook Road.

• **LAND AREA***

18.85 square miles

• **POPULATION***

15,600

• **POPULATION AGES 5-14***

2,203

• **INTERMODAL LOCATIONS**

NONE

• **MODE TO WORK***

Number of bicycle commuters 7
 Number of pedestrian commuters 102
 Number of total commuters..... 8,297

• **PARKS AND OPEN SPACE**

State

Great Piece Meadows

County

Pyramid Mountain

Municipal

- Bog and Vly Meadows
- Community Park
- Dorsey Pond/Morris Canal
- Douglas Estates
- Edmunds Tract
- Etta Konner
- Fletcher
- Great Piece Meadows
- High Ridge
- Hilldale Park
- Hook Mountain Open Space
- Howald Tract
- Indian Lane East
- John Street
- Lake Valhalla Lot
- Longview Park
- Manchester Park
- Mars Court
- Masar Park
- Millers Lane Area
- Municipal Fields
- Reilly
- Sharlatt Tract
- Sisco Tract
- Stoney Brook
- Tristam Place
- Veterans Memorial Park

*=1990 Census

EXISTING FACILITIES

- **Sidewalks**

Arthur Place
Avalon Road
Brittany Road
Change Bridge Road
Gathering Road
Horseneck Road
Jacksonville Road
Konner Avenue
Muccoloch Drive
Main Road
Main Street
Vreeland Avenue
Whitehall Road

- **Shared Roadways**

Bloomfield Avenue
Boonton Avenue
Change Bridge Road
Hook Mountain Road
Jacksonville Road
Rockaway Valley Road
Vreeland Avenue

- **Walking Trail**

Morris Canal Trail

RECOMMENDATIONS

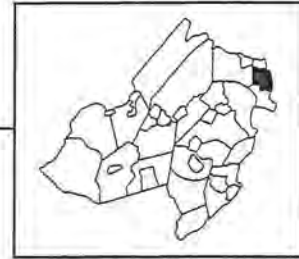
- **Sidewalks**

Canal Road
Change Bridge Road
Hook Mountain Road
Horseneck Road
Konner Avenue
Lancaster Avenue
Main Road
Main Street
Muccoloch Drive
Normandy Road
Pine Brook Road
River Road
Sheffield Street
Whitehall Road

- **Bicycle Lanes**

Change Bridge Road

Pequannock Township



• MUNICIPAL SUMMARY

The two distinct downtown areas in the Township are Pompton Plains and Pequannock, which have well-defined sidewalk networks. A bicycle lane and sidewalk are proposed along West Parkway, which has some sidewalk. A multi-use path is proposed along the New York, Susquehanna & Western Railroad from Riverdale, through the Township to the Mountain View railroad station in Wayne, Passaic County. Jacksonville Road (CR 504) and Newark-Pompton Turnpike (CR 660) are shared roadways.

• LAND AREA*

7.04 square miles

• POPULATION*

12,844

• POPULATION AGES 5-14*

1,630

• INTERMODAL LOCATIONS

Newark-Pompton Turnpike.....Park and Ride

• MODE TO WORK*

Number of bicycle commuters 15

Number of pedestrian commuters 127

Total number of commuters 6,895

• PARKS AND OPEN SPACE

County

Sunset Valley Golf Course

Municipal

Aquatic Park

Cherry Street Park

General Purpose Park

Golf Course

Greenview Park

Hidden Cove Park

Hillview Field

Lyman Avenue Park

Mountainside Park

Pequannock Valley Park

Riverside Park

Rockledge Park

Town Hall

Twin Brooks

Washington Park

Wellfield

Woodland Lake Park

* = Source: 1990 Census

EXISTING FACILITIES

• Sidewalks

Boulevard

Jackson Avenue

Jacksonville Road

Lincoln Park Road

Newark-Pompton Turnpike

West Parkway

• Shared Roadways

Hillview Road

Jacksonville Road

Newark-Pompton Turnpike

RECOMMENDATIONS

- **Sidewalks**

Boulevard
West Parkway

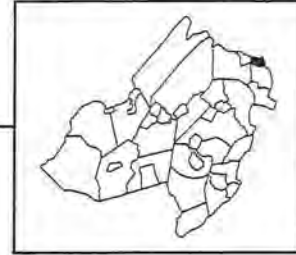
- **Multi-Use Paths**

NYS & W Path

- **Bicycle Lanes**

West Parkway

Riverdale Borough



• MUNICIPAL SUMMARY

This small municipality is bisected by the interchange of NJ 23 and I-287. Sidewalks are primarily located in the northeast section of the Borough. A bicycle lane and sidewalk are proposed along the Newark-Pompton Turnpike, where there is already a portion of existing sidewalk. A bicycle lane and sidewalk is also proposed along Post Lane. This is a logical connection to the multi-use path proposed along the New York, Susquehanna & Western Railroad, which travels from Riverdale, through Pequannock, and to the Mountain View railroad station in Wayne.

• **LAND AREA***
2.08 square miles

• **POPULATION***
2,370

• **POPULATION AGES 5-14***
296

• **INTERMODAL LOCATIONS**
NONE

• **MODE TO WORK***
Number of bicycle commuters 5
Number of pedestrian commuters 27
Total number of commuters 1,287

• **PARKS AND OPEN SPACE**
Municipal
Freedom Park
Independence Park

* = 1990 Census

EXISTING FACILITIES

• **Sidewalks**
Arlington Avenue
Haycock Avenue
Mead Avenue
Newark-Pompton Turnpike
Paterson-Hamburg Turnpike
Riverdale Road

• **Shared Roadways**
Paterson-Hamburg Turnpike

RECOMMENDATIONS

• **Sidewalks**
Newark-Pompton Turnpike
Post Lane
Riverdale Road

• **Multi-Use Paths**
NYS&W Path

• **Bicycle Lanes**
Newark-Pompton Turnpike
Post Lane

8.3 Region Three

Municipalities:

- Denville Township
- East Hanover Township
- Hanover Township
- Morris Plains Borough
- Mountain Lakes Borough
- Parsippany-Troy Hills Township

Description:

Region Three contains municipalities that are extensively developed and exhibit a wide range of land use patterns. Parsippany-Troy Hills is the most populated municipality in Morris County and has major employment centers. Pedestrian activity is popular around the lake communities in this region. Sidewalks exist in the downtown areas of Denville and Morris Plains and there is a multi-use path on the Boulevard in Mountain Lakes. Patriots' Path traverses this region with sections to be completed. Expansion of the sidewalk network is proposed as well as the development of bicycle lanes.

Map Four

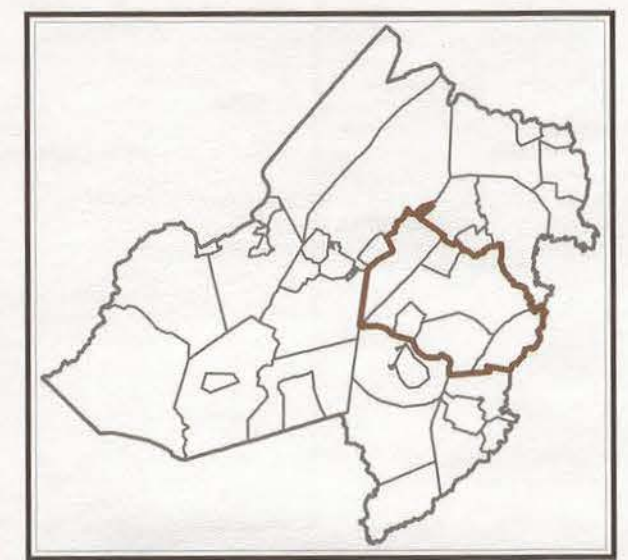


Figure 8.4 Map Region Three

Source: MCDOT

Region 3

Existing and Proposed Routes



Existing Facilities

- Bike Lane
- Multi-use Path
- Multi-use Trail
- Sidewalk
- Walking Trail
- Shared Roadway

Proposed Facilities

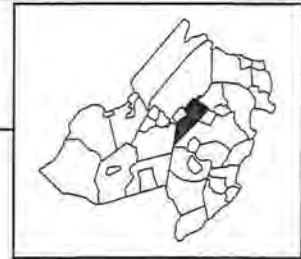
- Bike Lane
- Multi-use Path
- Multi-use Trail
- Sidewalk
- Walking Trail
- Bike Lane and Sidewalk

Parks and Open Space

- Bicycling Trails
- Hiking Trails
- Railroad Stations
- Railroads
- Water



Denville Township



- **MUNICIPAL SUMMARY**

This municipality has a distinct downtown area with sidewalks. Denville has two railroad stations within walking distance of residential areas. The township also contains several private lake communities where pedestrian activities are common. Sidewalks exist along NJ 53 and US 46, but there are missing sections. Completion of the sidewalk is proposed on Morris Avenue and Savage Road. Diamond Spring Road (CR 603) and Pocono Road are shared roadways with partial sidewalks. Bicycle lanes are proposed along sections of these roads.

- **LAND AREA***

12.1 square miles

- **POPULATION***

13,812

- **POPULATION AGES 5-14***

1,623

- **INTERMODAL LOCATIONS**

Denville Station Rail Station
Savage Road.....Park and Ride

- **MODE TO WORK***

Number of bicycle commuters 11
Number of pedestrian commuters 123
Number of total commuters..... 7,659

- **PARKS AND OPEN SPACE**

County

Tourne Park

Municipal

Beaver Brook Park
Birch Run
Cambridge Avenue Park
Cooks Pond
Denbrook Park
Denville Avenue Open Space
Gardner Field
Hogan Walk Gazebo
Knuth Farm
Kwiatkowski Park
Muriel Hepner Park
North Ridge Park
Riverside Drive Park
South Shore Park
Sunderland Road Park
Toft Hill Park
Zeek Road Park

*=1990 Census

EXISTING FACILITIES

- **Sidewalks**

Broadway Avenue
Bush Road
Church Street
Diamond Spring Road
East Main Street
First Avenue
Katherine Street
Morris Avenue
Orchard Street
Pocono Road
Savage Road
Second Avenue
St. Mary's Place
Stone Bridge Court
Tabor Road
Third Avenue
West Main Street

- **Walking Trails**

Morris Canal Trail (within Tourne Park)

- **Shared Roadways**

Baswood Drive
Bush Road
Casterline Road
Cedar Lake Road East
Cedar Lake Road North
Cedar Lake Road West
Cooper Road
Diamond Spring Road
East Main Street
Florence Avenue
Franklin Road
Lakewood Drive
Laurelwood Drive
Miller Road
Mosswood Trail
Old Boonton Road
Openaki Road
Palmer Road
Pocono Road
Ridgewood Parkway East
Ridgewood Parkway West
River Road
Riverside Drive
Tabor Road

RECOMMENDATIONS

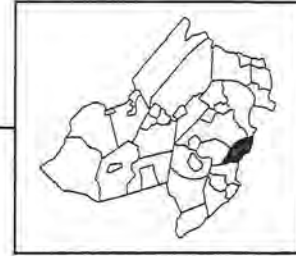
- **Sidewalks**

Franklin Road
Morris Avenue
Savage Road
US 46

- **Bicycle Lanes**

Diamond Spring Road
Pocono Road

East Hanover Township



• MUNICIPAL SUMMARY

Predominantly residential, this community has commercial strip development along NJ 10 and a downtown shopping area. Ridgedale Avenue (CR 632) is a shared roadway with some existing sidewalks and a proposed bicycle lane along part of its length. Klinger Road is a shared roadway with a proposed multi-use path that would connect to an existing multi-use path leading to the Passaic River. On the other end of the path, there would be connections to a network of proposed pedestrian trails in Parsippany-Troy Hills Township. Patriots' Path is proposed to extend through the Township to the county border.

• LAND AREA*

8.18 square miles

County

Pinch Brook Golf Course
Patriots' Path

• POPULATION*

9,926

Municipal

Afton Hills
Concord Park
Edgemount Estates
Fairview 1
Fairview 2
Gifford Heights
Golf Edge Estates
Heritage Estates
Lorie Homes
Lurker Park
Parkside Hill Estates
River Oaks Park
Royal Palms Park
Silver Springs Park
Sommer's Park
Troy Meadows

• POPULATION AGES 5-14*

1,281

• INTERMODAL LOCATIONS

NONE

• MODE TO WORK*

Number of bicycle commuters 27
Number of pedestrian commuters 53
Number of total commuters..... 5,559

*=1990 Census

• PARKS AND OPEN SPACE

State

Troy Meadows

EXISTING FACILITIES

• Sidewalks

Eagle Rock Avenue
Hanover Road
Mount Pleasant Avenue
Ridgedale Avenue

• Multi-Use Paths

Lurker Park Path

EXISTING FACILITIES (continued)

- **Shared Roadways**

Barnida Drive
Eagle Rock Avenue
East Harvest Avenue
Gail Drive
Klinger Road

Petry Drive
Ridgedale Avenue
Troy Road
Valley Road
Willow Place

RECOMMENDATIONS

- **Walking Trails**

Patriots' Path

- **Multi-Use Paths**

Patriots' Path

- **Bicycle Lanes**

Ridgedale Avenue

Hanover Township



• MUNICIPAL SUMMARY

A major employment center within the county, this municipality is bisected by I-287 and NJ 10. Sidewalks exist on major connector roads such as Whippany Road (CR 511), Troy-Hills Road, Ridgedale Avenue, and Malapardis Road. Parsippany Road (CR 511) is a shared roadway where sidewalks are proposed. An extension of Patriots' Path is proposed for the Township.

• LAND AREA*

10.66 square miles

County

Patriots' Path

• POPULATION*

11,538

Municipal

Bee Meadow Park

Black Brook Park

Central Park

East Shore Park

Forest Way Park

Hanover Green

Hansch Park

Heritage Park

Herms Property

Knollwood Estates

Malapardis Park

Monroe Park

Reynolds Avenue Park

Runnymede Park

Summit Avenue Park

Trailwood Park

• POPULATION AGES 5-14*

1,414

• INTERMODAL LOCATIONS

NONE

• MODE TO WORK*

Number of bicycle commuters 0

Number of pedestrian commuters 112

Number of total commuters..... 6,219

• PARKS AND OPEN SPACE

State

NJ Natural Lands Trust

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Columbia Turnpike

Hanover Avenue

Highview Avenue

Horse Hill Road

Malapardis Road

Park Avenue

Parsippany Road

Ridgedale Avenue

Troy Hills Road

Whippany Road

EXISTING FACILITIES (continued)

- **Multi-Use Paths**

Major Joseph Morris Trail (Patriots' Path Trail System)

- **Shared Roadways**

Park Avenue
Parsippany Road
Whippany Road

RECOMMENDATIONS

- **Sidewalks**

Hanover Avenue
Mount Pleasant Avenue
Park Avenue
Parsippany Road
Whippany Road

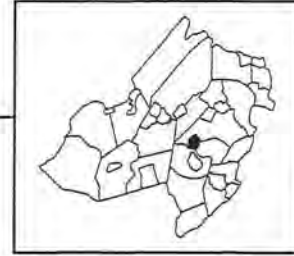
- **Multi-Use Paths**

Patriots' Path

- **Walking Trails**

Patriots' Path

Morris Plains Borough



• MUNICIPAL SUMMARY

The Borough has a downtown area, which includes the railroad station. The majority of the streets in this residential community have sidewalks. Bicycle lanes are proposed along portions of West Hanover Avenue and Littleton Road (US 202). A bicycle lane and sidewalk is proposed along Tabor Road (NJ 53). Mountain Way is a shared roadway.

• LAND AREA*

2.6 square miles

• POPULATION*

5,219

• POPULATION AGES 5-14*

593

• INTERMODAL LOCATIONS

Morris Plains Rail Station

• MODE TO WORK*

Number of bicycle commuters 0

Number of pedestrian commuters 97

Number of total commuters..... 2,903

• PARKS AND OPEN SPACE

Municipal

Briarcliff

Central Avenue Park

Community Park

Laurel Street Open Space

Memorial Park

Near Harrison Avenue

Roberts Garden

Simon's Park

Sun Valley Way Open Space

Watnong Park

*=1990 Census

EXISTING FACILITIES

• Sidewalks

East Hanover Avenue

Glenbrook Road

Grannis Avenue

Littleton Road

Malapardis Road

Speedwell Avenue

Stiles Avenue

West Hanover Avenue

• Shared Roadways

Central Avenue

Glenbrook Road

Grannis Avenue

Littleton Road

Mountain Way

Speedwell Avenue

Stiles Avenue

West Hanover Avenue

RECOMMENDATIONS

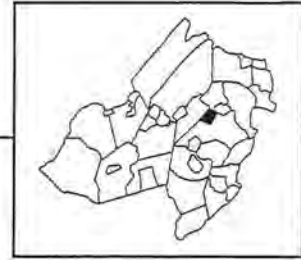
- **Sidewalks**

Glenbrook Road
Littleton Road
Tabor Road

- **Bicycle Lanes**

East Hanover Avenue
Littleton Road
Tabor Road
West Hanover Avenue

Mountain Lakes Borough



• MUNICIPAL SUMMARY

This lake community was planned in the 1920's around the railroad station and trolley line. The Boulevard (CR 618) has a multi-use path with a bicycle lane and sidewalk proposed for a short portion near US 46. Sidewalks exist on Morris Avenue, Midvale Road, Lake Drive, and Glen Road. Pocono Road is a shared roadway which has some stretches of sidewalk. A sidewalk is proposed along US 46 as well as along Fanny Road which is a shared roadway.

• LAND AREA*

2.67 square miles

• POPULATION*

3,847

• POPULATION AGES 5-14*

615

• INTERMODAL LOCATIONS

Mountain Lakes Station..... Rail Station
 Boulevard & Lake Drive.....Park and Ride

• MODE TO WORK*

Number of bicycle commuters 8
 Number of pedestrian commuters 22
 Total number of commuters 1,824

• PARKS AND OPEN SPACE

County

Tourne Park

Municipal

Alden A. Haswell Field
 Birchwood Lake
 Briarcliff Rd Park
 Cove Lake
 The Cove
 Crane Park
 Crestview Road Park
 Crystal Lake
 Frank B. Kaufman Park
 Halsey A. Frederick Memorial Park
 Island Beach
 Lookout Road Park
 Lyman Wilson Memorial Park
 Memorial Park
 Midvale Boat Dock
 Mountain Lake
 North Pocono/Sunset Park
 Reservoir/Grunden's Pond
 Richard M. Wilcox Park
 Shadow & Olive Lakes
 Sunset Lake, N.W.
 Thorleif Fliflet Bird Sanctuary
 Tower Hill Sled Run
 Wildwood Dam
 Wildwood Lake
 Wildwood Park
 William N. Taft Memorial Park

*=1990 Census

EXISTING FACILITIES

- **Sidewalks**

Boulevard
Briarcliff Road
Crane Road
Glen Road
Intervale Road
Lake Drive
Larchdell Way
Midvale Road
Morris Avenue
Pocono Road

- **Multi-Use Paths**

Boulevard

- **Shared Roadways**

Fanny Road
Intervale Road
Laurelwood Drive
Pocono Road

RECOMMENDATIONS

- **Sidewalks**

Boulevard
Fanny Road
US 46

- **Bicycle Lanes**

Boulevard

Parsippany-Troy Hills Township



• MUNICIPAL SUMMARY

This large municipality has diverse development patterns and land uses. A small downtown exists in the Lake Hiawatha section, while strip development is prevalent along NJ 10 and US 46. There are many highways that traverse the Township including: US 46, US 202, NJ 10, NJ 53, I-80, I-280, and I-287. The easy accessibility to these highways has attracted many large companies, making Parsippany one of the largest employment generators in the state. Shared roadways exist on Mountain Way, Casterline Road, North Beverwyck Road, Halsey Road, Lake Shore Drive (Lake Parsippany), Green Bank Road, and New Road. There are sidewalks on portions of Parsippany Road / Parsippany Boulevard, with proposals to fill in the gaps. Littleton Road (US 202) serves as a focal point for bicycle and pedestrian activity, being a shared roadway for the most of its distance, with intermittent sidewalks. Additional sidewalks and bicycle lanes are proposed. Tabor Road (NJ 53) is also a shared roadway with proposed sidewalks and a bicycle lane. There is a multi-use path around Lake Parsippany. An extension of Patriots' Path is proposed as well as a multi-use path from River Road to Green Bank Road.

• LAND AREA*

23.89 square miles

County

Old Troy Park
Patriots' Path

• POPULATION*

48,478

Municipal

Craftsman Farms
Crestview Park
Druid Hill Park
Forest Drive Park
Hills of Troy Park
Knoll Park
Lake Hiawatha Park
Lake Parsippany Park
Lake Parsippany Tot Lot
Manor Park
Mountain Way Tract
Park Road Park
Powder Mill Park
Rainbow Lakes Mini Park
Rockaway Neck Park
Smith Field Park North
Smith Field Park South
Volunteers Park

• POPULATION AGES 5-14*

5,070

• INTERMODAL LOCATIONS

US 46 & Baldwin Road.....Park and Ride
US 46 & Beverwyck Road.....Park and Ride
US 46 & Grange Road.....Park and Ride

• MODE TO WORK*

Number of bicycle commuters 82
Number of pedestrian commuters 347
Total number of commuters 28,869

• PARKS AND OPEN SPACE

State
Troy Meadows

*= 1990 Census

EXISTING FACILITIES

- **Sidewalks**

Greenbank Road
Intervale Road
Littleton Road
New Road
North Beverwyck Road
Parsippany Boulevard
Parsippany Road
Ridgedale Avenue
South Beverwyck Road

- **Multi-Use Paths**

Lake Parsippany Path

- **Shared Roadways**

Central Avenue
Collins Road
Fanny Road
Forest Drive
Greenbank Road
Halsey Road
Intervale Road
Lake Shore Drive
Littleton Road
Mountain Way
New Road
North Beverwyck Road
Old Bloomfield Avenue
Old Dover Road
Parsippany Boulevard
Parsippany Road
Ridgedale Avenue
Tabor Road
Union Hill Road

RECOMMENDATIONS

- **Sidewalks**

Fanny Road
Littleton Road
Parsippany Boulevard
Parsippany Road
Tabor Road

- **Multi-Use Paths**

Knoll Road

- **Multi-Use Trails**

Pigeon Hill Trail

- **Walking Trails**

Patriots' Path

- **Bicycle Lanes**

Littleton Road
Tabor Road

8.4 Region Four

Municipalities:

- Chatham Borough
- Chatham Township
- Florham Park Borough
- Harding Township
- Long Hill Township
- Madison Borough
- Morris Township
- Town of Morristown

Description:

Region Four is a mixture of development types ranging from well established downtown areas in Morristown, Madison, and Chatham Borough, to open spaces, such as the Great Swamp in Long Hill, Harding, and Chatham Township. Sidewalks exist in all of the downtown areas. The Giralda Farms multi-use path, the Traction Line Recreational Trail, and the Loantaka Reservation multi-use path are in this region. There are a variety of proposals for bicycle lanes and paved paths.

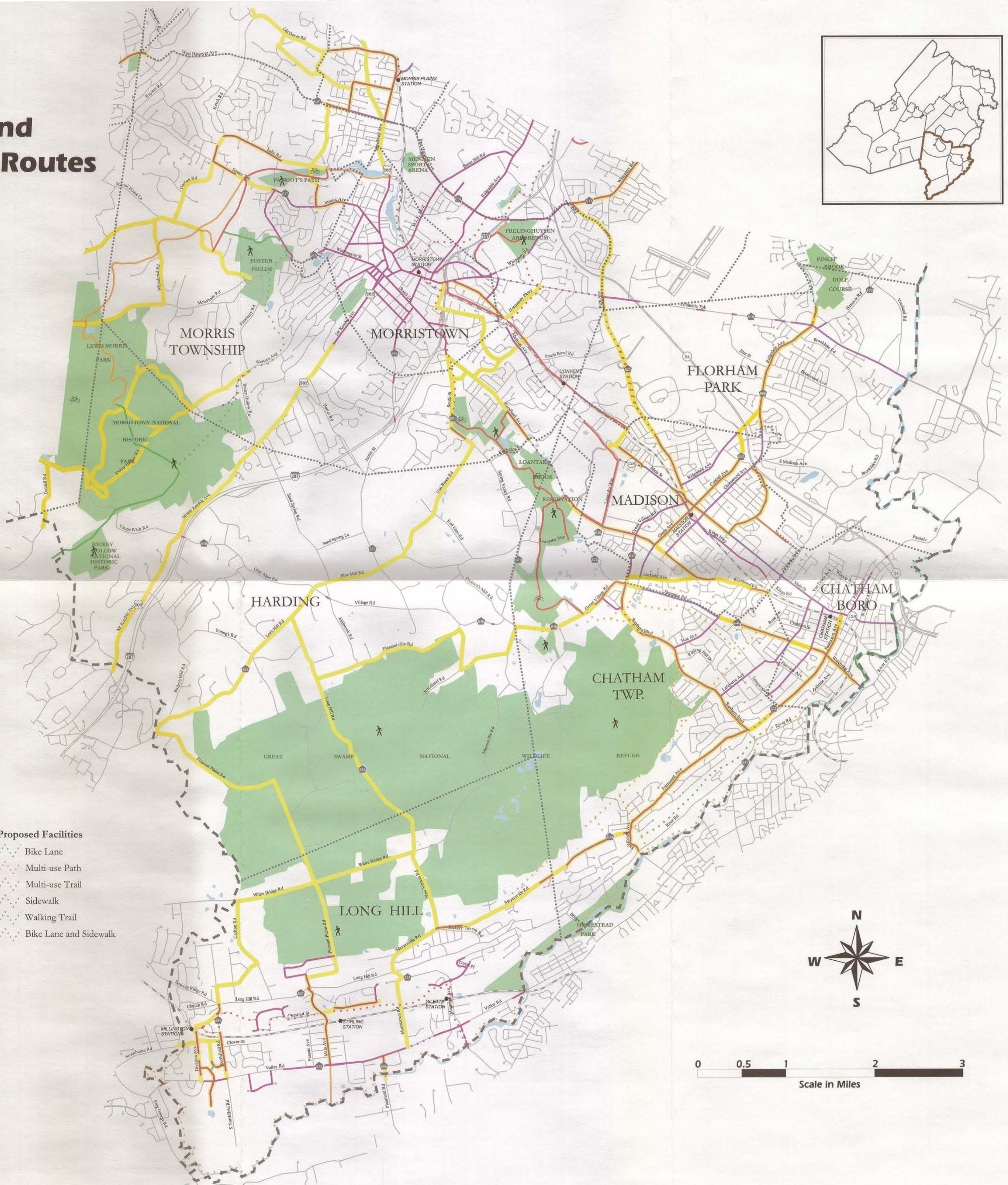
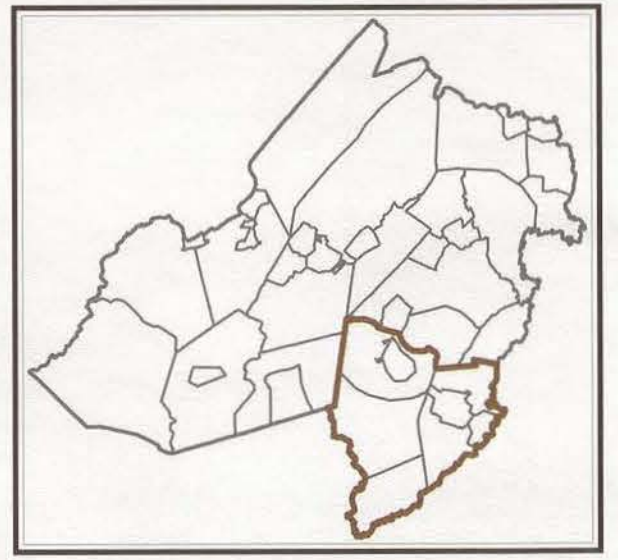
Map Five



Figure 8.5 Map Region Four

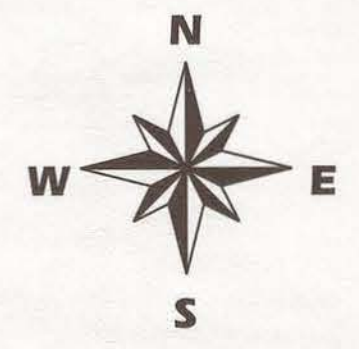
Source: MCDOT

Region 4: Existing and Proposed Routes

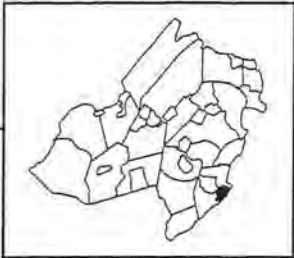


- | Existing Facilities | Proposed Facilities |
|---------------------|------------------------|
| Bike Lane | Bike Lane |
| Multi-use Path | Multi-use Path |
| Multi-use Trail | Multi-use Trail |
| Sidewalk | Sidewalk |
| Walking Trail | Walking Trail |
| Shared Roadway | Bike Lane and Sidewalk |

- Parks and Open Space**
- Bicycling Trails
 - Hiking Trails
 - Railroad Stations
 - Railroads
 - Water



Chatham Borough



• **MUNICIPAL SUMMARY**

The traditional grid pattern design of the Borough contains an extensive network of sidewalks, with access to a railroad station in the downtown area. Fairmount Avenue (CR 638) and Shunpike Road (CR 628) are shared roadways. A riverwalk is proposed along the Passaic River, connecting to Chatham Township.

• **LAND AREA***

2.41 square miles

• **POPULATION***

8,007

• **POPULATION AGES 5-14***

987

• **INTERMODAL LOCATIONS**

Chatham Borough Rail Station
 PSE&G Park and Ride

• **MODE TO WORK***

Number of bicycle commuters 11
 Number of pedestrian commuters 72
 Number of total commuters 3,984

• **PARKS AND OPEN SPACE**

Municipal

- Brookside/Municipal Building
- Conservation Area
- Garden Park
- Memorial Park
- Shepard-Kollack Park
- Stanley Park
- Wahula Woods

*=1990 Census

EXISTING FACILITIES

• **Sidewalks**

- Fairmount Avenue
- Lafayette Avenue
- Main Street
- Passaic Avenue
- Washington Avenue
- Watchung Avenue

• **Shared Roadways**

- Fairmount Avenue
- Watchung Avenue

• **Walking Trails**

- Riverwalk

RECOMMENDATIONS

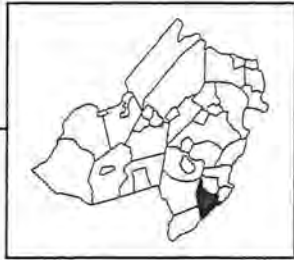
• **Sidewalks**

- Fairmount Avenue

• **Walking Trails**

- Riverwalk

Chatham Township



• **MUNICIPAL SUMMARY**

Characterized by residential neighborhoods and an extensive network of public open space, the Township contains a wide variety of recreational opportunities. Streets that comprise the backbone of the sidewalk network are Southern Boulevard (CR 647) and Fairmount Avenue / Meyersville Road (CR 638). Shared roadways include Green Village Road (CR 646) and Fairmount Avenue / Meyersville Road. Multi-Use paths are located in Loantaka Reservation and in the Giralda Farms complex. A bicycle lane is proposed on Woodland Avenue (CR 636).

• **LAND AREA***

9.34 square miles

• **POPULATION***

9,361

• **POPULATION AGES 5-14***

1,099

• **INTERMODAL LOCATIONS**

NONE

• **MODE TO WORK***

Number of bicycle commuters 0
 Number of pedestrian commuters 55
 Number of total commuters..... 4,738

• **PARKS AND OPEN SPACE**

Federal

Great Swamp National Wildlife Refuge

County

Great Swamp Outdoor Education Center
 Loantaka Brook Reservation
 Passaic River Park

Municipal

Colony Recreation Center
 Cougar Field
 Esternay Field
 Fairmount Park
 Gates Avenue Park
 Green Village Park
 Nash Field
 Shunpike Field
 Tanglewood Lane Properties

*=1990 Census

EXISTING FACILITIES

• **Sidewalks**

Fairmount Avenue
 Fairview Avenue
 Green Village Road
 Hickory Place
 Lafayette Avenue
 Meyersville Road

Noe Avenue
 Shunpike Road
 Southern Boulevard

• **Multi-Use Paths**

Giralda Farms Path
 Loantaka Path

EXISTING FACILITIES (continued)

- **Shared Roadways**

Fairmount Avenue
Green Village Road
Meyersville Road

Shunpike Road
Southern Boulevard
River Road
Woodland Avenue

RECOMMENDATIONS

- **Sidewalks**

Fairmount Avenue
Southern Boulevard
Woodland Avenue

- **Walking Trails**

Heritage Greenway

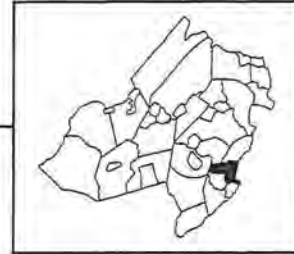
- **Multi-Use Trails**

Heritage Greenway
Passaic River Park Trail

- **Bicycle Lanes**

Shunpike Road
Woodland Avenue

Florham Park Borough



• MUNICIPAL SUMMARY

Commercial development is prevalent along Columbia Turnpike (CR 510) and Ridgedale Avenue (CR 608), with some campus-style office parks in the vicinity of Vreeland Avenue as well as Park Avenue (CR 623). Sidewalks exist along Ridgedale Avenue and Columbia Turnpike. Park Avenue and Ridgedale Avenue are shared roadways. A bicycle lane is proposed on Ridgedale Avenue that would continue into East Hanover Township.

• LAND AREA*

7.43 square miles

• POPULATION*

8,521

• POPULATION AGES 5-14*

947

• INTERMODAL LOCATIONS

NONE

• MODE TO WORK*

Number of bicycle commuters 7

Number of pedestrian commuters 77

Number of total commuters..... 4,684

• PARKS AND OPEN SPACE

State

NJ Natural Lands Trust

County

Pinch Brook Golf Course

Municipal

Baldwin Park

Beechcrest Recreation Area

Campfield Gardens

Emmett Park

Mini-Park

Patriot Park

Prudden Park

Public Plaza

Spring Garden Lake

Stobeaus Field

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Columbia Turnpike

Hanover Road

Ridgedale Avenue

• Shared Roadways

Greenwood Avenue

Park Avenue

Ridgedale Avenue

RECOMMENDATIONS

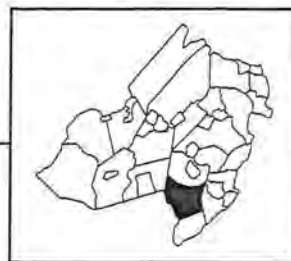
• Bicycle Lanes

Ridgedale Avenue

• Sidewalk

Park Avenue

Harding Township



• MUNICIPAL SUMMARY

The Great Swamp National Wildlife Refuge and Morristown National Historical Park are located within this Township. Both of these natural resource areas contain pedestrian trails. There are a number of shared roadways which are popular with recreational bicyclists: Mount Kemble Road (US 202), Lee's Hill Road (CR 663), Blue Mill Road (CR 663), Van Beuren Road, Pleasantville Road, Pleasant Plains Road, Long Hill Road (CR 604), Miller Road, and Green Village Road.

• LAND AREA*

20.42 square miles

• POPULATION*

3,640

• POPULATION AGES 5-14*

371

• INTERMODAL LOCATIONS

NONE

• MODE TO WORK*

Number of bicycle commuters 0

Number of pedestrian commuters 18

Number of total commuters..... 1,876

PARKS AND OPEN SPACE

Federal

Great Swamp National Wildlife Refuge
Morristown National Historical Park

State

NJ Natural Lands Trust

County

Lewis Morris Park
Loantaka Brook Reservation

Municipal

Bailey's Mill Road
Barrett Field
Bayne Park
Blue Mill Fields
Harding Equestrian Park
Kirby Hall Park
Memorial Park
Open Space at Mount Kemble Avenue
Pleasantville Road

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Glen Alpin Road
Village Road

• Multi-Use Paths

Loantaka Path

• Multi-Use Trails

Lewis Morris Park Trails

• Walking Trails

Jockey Hollow Trails

EXISTING FACILITIES (continued)

- **Shared Roadways**

Blue Mill Road
Jockey Hollow Road
Lee's Hill Road
Long Hill Road
Meyersville Road
Miller Road

Mount Kemble Avenue
National Park Road
Pleasant Plains Road
Pleasantville Road
Tempe Wick Road
Van Beuren Road
Woodland Road

RECOMMENDATIONS

- **Sidewalks**

Woodland Avenue

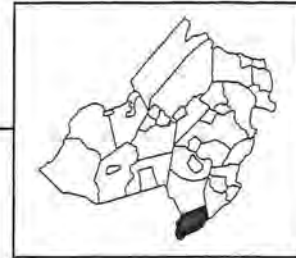
- **Bicycle Lanes**

Woodland Avenue

- **Walking Trail**

Patriots' Path

Long Hill Township



• MUNICIPAL SUMMARY

This municipality contains five distinct communities, three of which have their own railroad stations. The Township plans to build a multi-use path connecting the Stirling and Millington railroad stations. Sidewalks exist in many residential areas and along Valley Road (CR 512). Valley Road (CR 512) is also a shared roadway along with Morristown Road, Meyersville Road (CR 638), Pleasant Plains Road, New Vernon Road, and White Bridge Road. There are pedestrian trails within the Great Swamp National Wildlife Refuge. A river walk has been proposed along the Passaic River connecting to Chatham Township.

• LAND AREA*

12.07 square miles

• POPULATION*

7,826

• POPULATION AGES 5-14*

843

• INTERMODAL LOCATIONS

Gillette Station..... Rail Station
 Millington Station Rail Station
 Stirling Station..... Rail Station

• MODE TO WORK*

Number of bicycle commuters 0
 Number of pedestrian commuters 44
 Number of total commuters..... 4,379

• PARKS AND OPEN SPACE

Federal

Great Swamp National Wildlife Refuge

State

McEvoy Park

County

Passaic River Park

Municipal

1223 Valley Road
 520 Valley Road
 Cherbrooke at Gillette
 Chestnut Street
 Col Woods
 Elizabeth Street
 Essex Street
 Fenview Open Space
 Former Composting Center
 Hicks Park
 Jane Street
 Lester Street
 Little League Field
 Long Hill Road
 Magnolia Avenue
 McEvoy Park
 Mercer Street
 Meyersville Field
 Morristown Road
 Northfield Road
 Overlook Open Space
 Railroad Avenue
 Raymond Street
 River Road
 Roseville Avenue
 South Main Avenue
 Stirling Lake
 Union Street
 Warren Avenue
 York Drive
 Youth Center

*=1990 Census

EXISTING FACILITIES

- **Sidewalks**

Birchwood Drive
Central Avenue
Cottage Place
Cottage Place West
Deer Run
Delaware Avenue
Division Avenue
Forest Drive
Gates Avenue
Heritage Run
High Street
Indian Run
Long Hill Road
Main Avenue
Meyersville Road
Midvale Avenue
Mountain Avenue
Northfield Road
Plainfield Road
Pleasant Plains Road
Rainbow Drive
Sherwood Lane
Skyview Terrace
Valley Road
Winding Way

- **Walking Trails**

Midvale Avenue/Birchwood Drive connection

- **Multi-Use Trails**

South Main Avenue extension

- **Shared Roadways**

Birchwood Drive
Carlton Road
Chestnut Street
Division Avenue
Dogwood Terrace
Long Hill Road
Meadowview Road
Meyersville Road
Midvale Road
Morristown Road
New Vernon Road
Northfield Road
Old Forge Road
Plainfield Road
Pleasant Plains Road
Rainbow Drive
River Road
Stone House Road
Valley Road
White Bridge Road

RECOMMENDATIONS

- **Sidewalks**

Mountain Avenue
Valley Road

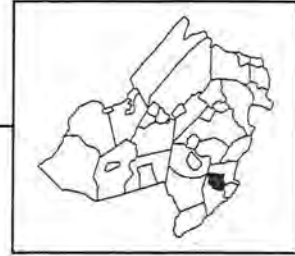
- **Multi-Use Paths**

Millington-Stirling Bicycle Path
Stirling-Gillette Path

- **Multi-Use Trails**

Riverwalk

Madison Borough



• **MUNICIPAL SUMMARY**

The Borough originally developed around the railroad station and has a well-defined sidewalk network along Main Street (NJ 124) and in most residential areas. Memorial Park Path, Giralda Farms Path, and the Traction Line Recreational Trail are heavily traveled multi-use paths. A bicycle lane is proposed along portions of both Main Street (NJ 124), Madison Avenue, Greenwood Avenue, Shunpike Road, and Green Avenue. Shared roadways exist along Park Avenue (CR 623), Central Avenue (CR 608), Woodland Road, Garfield Avenue, Green Village Road, and Shunpike Road. Fairleigh Dickinson and Drew Universities generate large amounts of bicycle and pedestrian activity.

• **LAND AREA***

4.19 square miles

• **POPULATION***

15,850

• **POPULATION AGES 5-14***

1,398

• **INTERMODAL LOCATIONS**

Madison Station..... Rail Station

• **MODE TO WORK***

Number of bicycle commuters 22

Number of pedestrian commuters 840

Number of total commuters..... 8,257

• **PARKS AND OPEN SPACE**

County

Loantaka Brook Reservation

Municipal

Central Green Park

Cole Park

Dodge Field

Edwards Field

Fen Court

Gibbons Place

James Park

Lucy D. Anthony

Madison Park

Memorial Park

Niles Park

Parkside Park

Ridgedale Park

Rosedale Field Park

Summer Hill Park

Sunset Park

Wetlands & Delbarton

*=1990 Census

EXISTING FACILITIES

- **Sidewalks**

Central Avenue
Green Avenue
Green Village Road
Greenwood Avenue
Kings Road
Madison Avenue
Main Street
Morris Place
Park Avenue
Prospect Street
Ridgedale Avenue
Rosedale Avenue
Shunpike Road
Woodland Road

- **Multi-Use Paths**

Giralda Farms Path
Memorial Park Path
Traction Line Recreational Trail

- **Shared Roadways**

Central Avenue
Danforth Road
Garfield Avenue
Green Avenue
Green Village Road
Kings Road
Main Street
Morris Place
Park Avenue
Rosedale Avenue
Shunpike Road
Woodland Road

RECOMMENDATIONS

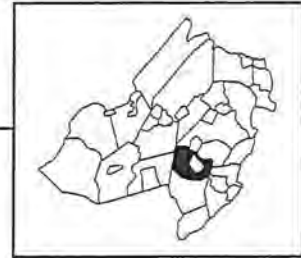
- **Sidewalks**

Madison Avenue
Park Avenue

- **Bicycle Lanes**

Green Avenue
Greenwood Avenue
Madison Avenue
Main Street
Shunpike Road

Morris Township



• MUNICIPAL SUMMARY

The Township, which surrounds Morristown, contains a variety of residential neighborhoods, office development, and the Convent Station railroad station. The Traction Line Recreational Trail, Loantaka Recreational Trail, and Patriots' Path traverse the Township. Additional sections of Patriots' Path are proposed. A number of shared roadways connect this municipality to its contiguous municipalities, mainly Mount Kemble Avenue (US 202), Woodland Avenue, and Mendham Road (CR 510).

• LAND AREA*

15.78 square miles

• POPULATION*

19,952

• POPULATION AGES 5-14*

2,094

• INTERMODAL LOCATIONS

Convent Station Rail Station

• MODE TO WORK*

Number of bicycle commuters 28

Number of pedestrian commuters 425

Number of total commuters..... 10,930

• PARKS AND OPEN SPACE

Federal

Morristown National Historical Park

County

Fosterfields

Frelinghuysen Arboretum

Lewis Morris Park

Loantaka Brook Reservation

Patriots' Path/West Morris Greenway

Traction Line Recreation Trail

William G. Mennen Sports Arena

Municipal

Applewood Road

Beatrice Tucker Park

Burnham Park

Butterworth Field Park

Childrens Park

Collinsville Park

Covenant Road

Donald Delpho Park

Edward Hayward Park

Elmer Saunders Park

Fanok Road West

Frelinghuysen Park

Ginty Field

Harlan Glen Park

Ironwood Road

Kiwanis

Lake Manor

Robert LaRue Field

Rolling Hill at Blackberry

Spring Valley Road

Streeter Park

Sussex Woods

Tall Timbers

Veterans Park

Western Avenue Reservoir

*=1990 Census

EXISTING FACILITIES

- **Sidewalks**

Hanover Avenue
James Street
Kahdena Road
Lake Road
Lake Valley Road
Madison Avenue
Martin Luther King Boulevard
Mendham Road
Mount Kemble Avenue
Park Avenue
Ridgedale Avenue
Spring Valley Road
Sussex Avenue
West Hanover Avenue
Whippany Road
Woodland Avenue

- **Walking Trails**

Patriots' Path

- **Multi-Use Trails**

Patriots' Path

- **Multi-Use Paths**

Loantaka Path
Patriots' Path
Traction Line Recreational Trail

- **Shared Roadways**

Dwyer Lane
Gaston Road
Jockey Hollow Road
Lake Road
Lake Valley Road
Mendham Road
Mount Kemble Avenue
Normandy Parkway
Old Glen Road
Park Avenue
South Street
Speedwell Avenue
Spring Valley Road
Sugarloaf Road
Sussex Avenue
Turtle Road
Van Beuren Road
Washington Valley Road
West Hanover Avenue
Western Avenue
Whitehead Road
Woodland Avenue

RECOMMENDATIONS

- **Sidewalks**

Columbia Turnpike
Hanover Avenue
Madison Avenue
Park Avenue
Whippany Road

- **Walking Trails**

Patriots' Path

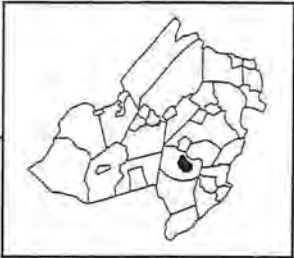
- **Multi-Use Paths**

Patriots' Path
Traction Line-Loantaka connection

- **Bicycle Lanes**

Madison Avenue
Sussex Avenue
West Hanover Avenue

Town of Morristown



• **MUNICIPAL SUMMARY**

As the county seat, this Town has attracted a mixture of high density residential and commercial development, with business activity centering around the Green and the South Street/ Madison Avenue (NJ 124) area. A railroad station is located within walking distance from the Green. Morristown recently revitalized some of their extensive sidewalk system. Portions of Patriots' Path exist, with additional sections proposed, and the Traction Line Recreational Trail begins in Morristown. There are five shared roadways within the Town.

• **LAND AREA***

2.94 square miles

• **POPULATION***

16,189

• **POPULATION AGES 5-14***

1,393

• **INTERMODAL LOCATIONS**

Morristown Station..... Rail Station

• **MODE TO WORK***

Number of bicycle commuters 17
 Number of pedestrian commuters 687
 Number of total commuters..... 9,161

• **PARKS AND OPEN SPACE**

Federal

Morristown National Historical Park

County

Patriots' Path/West Morris Greenway
 Traction Line Recreation Trail

Municipal

- Abbett Ave Park
- Budd Street Park
- Burnham Park
- Cauldwell Park
- Elliot Street Park
- Footes Pond Park
- Ford Avenue Park
- Harrison Street Park
- Jacob Ford Park
- Jersey Avenue Park
- King Street Playground
- Lidgerwood Park
- Speedwell Park

Other

Morristown Green

*=1990 Census

EXISTING FACILITIES

- **Sidewalks**

Ann Street
Bank Street
Catano Avenue
Early Street
East Park Place
Elm Street
James Street
Lafayette Avenue
Macculloch Avenue
Madison Avenue
Maple Avenue
Martin Luther King Boulevard
Mills Street
Morris Avenue
Morris Street
Mount Kemble Avenue
Olmstead Road
Schuyler Place
South Park Place
South Street
Speedwell Avenue
Spring Street
Sussex Avenue
Washington Avenue
Washington Street
Western Avenue

- **Multi-Use Paths**

Patriots' Path
Traction Line Recreational Trail

- **Multi-Use Trails**

Patriots' Path

- **Shared Roadways**

Ford Avenue
Franklin Street
South Street
Speedwell Avenue
Turtle Road
Washington Avenue
Woodland Avenue

RECOMMENDATIONS

- **Sidewalks**

Morris Street

- **Multi-Use Paths**

Patriots' Path
Traction Line-Rail Station connection
Traction Line-Loantaka connection

8.5 Region Five

Municipalities:

- Chester Borough
- Chester Township
- Mendham Borough
- Mendham Township
- Washington Township

Description:

Region Five contains Chester and Mendham Boroughs that have small downtowns with existing sidewalks. Gaps in the sidewalk network are proposed to be completed. The larger townships surrounding these boroughs are more rural in nature. A significant number of parks and open space characterize this region, providing ample recreational opportunities. Portions of Patriots' Path and Columbia Trail traverse this region and will link these facilities when completed.

Map Six

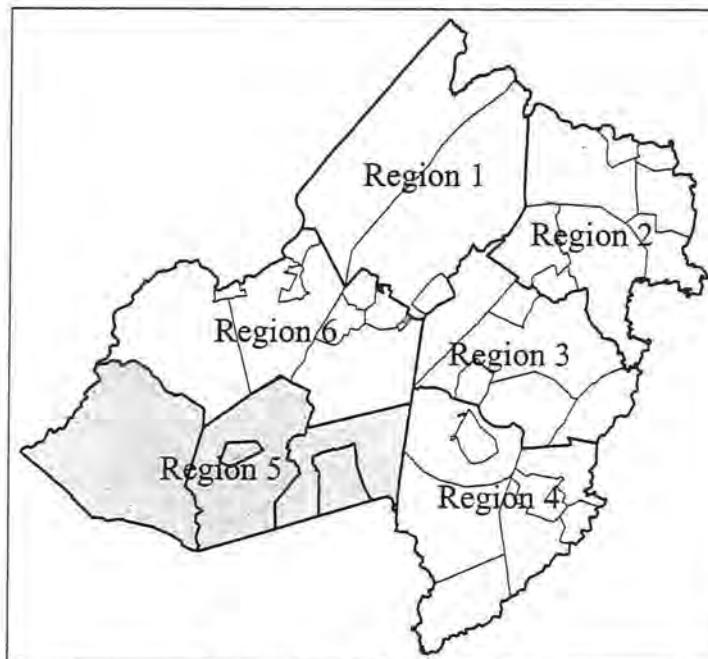
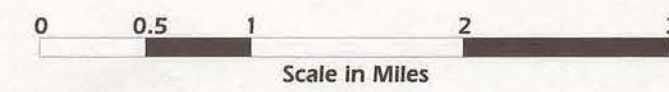
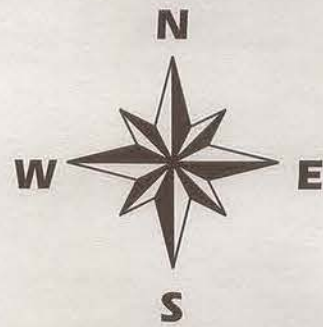
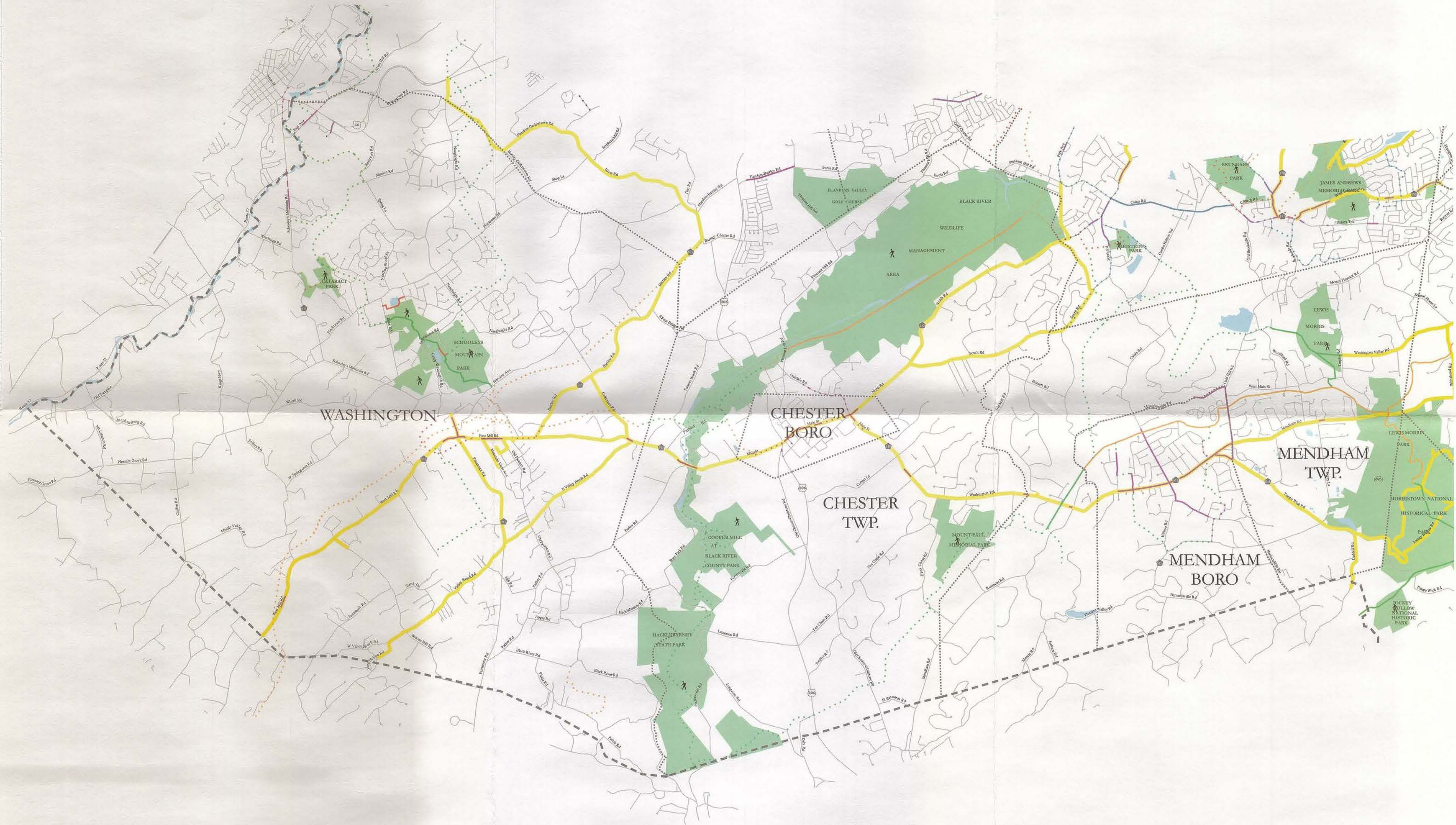
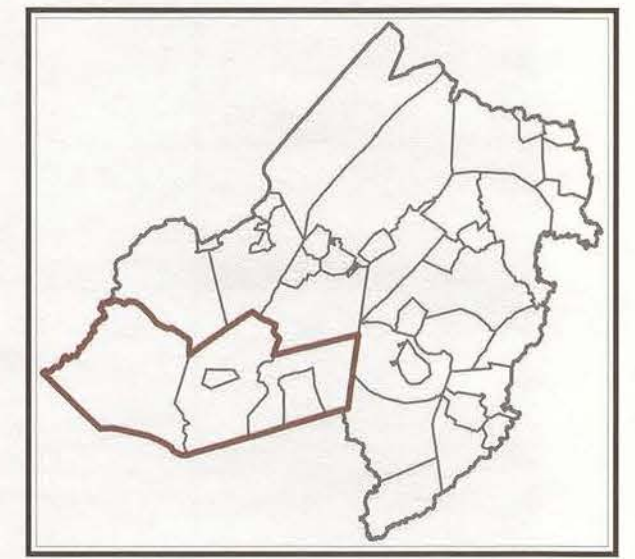
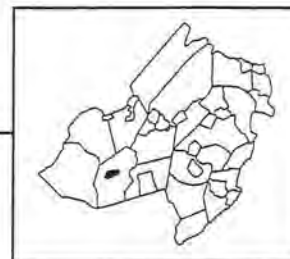


Figure 8.6 Map Region Five
Source: MCDOT

Region 5 Existing and Proposed Routes



Chester Borough



• MUNICIPAL SUMMARY

This municipality has a bustling, historic downtown shopping area that lends itself to high pedestrian use along Main Street (CR 513). The Borough intends to complete the sidewalk system along Main Street.

• LAND AREA*

1.54 square miles

• POPULATION*

1,214

• POPULATION AGES 5-14*

168

• INTERMODAL LOCATIONS

NONE

• MODE TO WORK*

Number of bicycle commuters 0

Number of pedestrian commuters 36

Number of total commuters..... 654

• PARKS AND OPEN SPACE

Municipal

Borough Park

Chubb Park

Grove Street Park

Municipal Field

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Main Street

North Road

Washington Turnpike

• Shared Roadways

Ironia Road

Main Street

North Road

Washington Turnpike

RECOMMENDATIONS

• Sidewalks

Main Street

Oakdale Road

Perry Street

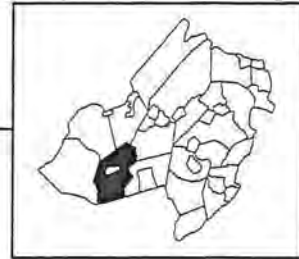
US 206

Washington Turnpike

• Multi-Use Trails

Patriots' Path

Chester Township



• MUNICIPAL SUMMARY

The majority of bicycle and pedestrian activity in the Township occurs on the West Morris Greenway Trail and Patriots' Path, which connect five large parks. Proposals to complete this regional trail network are planned. Shared roadways exist on Washington Turnpike (CR 510).

• LAND AREA*

29.3 square miles

• POPULATION*

5,958

• POPULATION AGES 5-14*

877

• INTERMODAL LOCATIONS

NONE

• MODE TO WORK*

Number of bicycle commuters 0
 Number of pedestrian commuters 36
 Number of total commuters..... 3,127

• PARKS AND OPEN SPACE

State

Black River Wildlife Management Area
 Hacklebarney State Park

County

Bamboo Brook Outdoor Education Center
 Black River Park (Cooper Mill)
 Mount Paul Memorial Park
 Patriots' Path/West Morris Greenway
 Willowwood Arboretum

Municipal

Black River Recreation Area
 Chubb Park
 Tiger Brook Park

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Washington Turnpike

• Multi-Use Trails

Patriots' Path

• Shared Roadways

North Road
 South Road
 Washington Turnpike

RECOMMENDATIONS

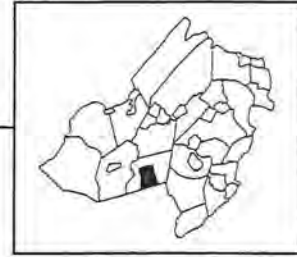
• Multi-Use Trails

Patriots' Path
 West Morris Greenway (Patriots' Path Trail System)

• Walking Trails

Patriots' Path

Mendham Borough



• MUNICIPAL SUMMARY

The Borough contains a village area and a shopping center along Main Street (CR 510). There are sidewalks on a number of the streets, as well as along most of Main Street. Additional sidewalks are proposed on some residential streets. Patriots' Path traverses the Borough and additional sections are proposed. A loop is also proposed to connect existing sidewalks to Patriots' Path.

• LAND AREA*

6.02 square miles

• POPULATION*

4,890

• POPULATION AGES 5-14*

609

• INTERMODAL LOCATIONS

NONE

• MODE TO WORK*

Number of bicycle commuters 8

Number of pedestrian commuters 74

Number of total commuters..... 2,508

• PARKS AND OPEN SPACE

Municipal

Borough Park

Dean Road Arboretum

Franklin Road/Coventry Road

Franklin Road Tract

Heather Way Tract

India Brook

Linden Lane Tract

Mountain Valley Park

Patriots' Path

West Field Park

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Cold Hill Road

East Main Street

Lake Drive

Mountain Avenue

Mountainside Road

North Linden Lane

Talmadge Road

Tempe Wick Road

West Main Street

• Multi-Use Trails

Patriots' Path

• Shared Roadways

East Main Street

Tempe Wick Road

West Main Street

RECOMMENDATIONS

- **Sidewalks**

Coventry Road
Dean Road
Prentice Lane
Talmadge Road

- **Walking Trails**

Mendham Borough Loop
Patriots' Path

Mendham Township



• MUNICIPAL SUMMARY

A low density residential municipality, the Township contains a significant amount of open space and recreational facilities, including existing and proposed segments of Patriots' Path. Multi-use trails are also located within Lewis Morris Park. Shared roadways include Tempe Wick Road (CR 646), Mendham Road (CR 510), and Washington Valley Road.

• LAND AREA*

17.86 square miles

• POPULATION*

4,537

• POPULATION AGES 5-14*

585

• INTERMODAL LOCATIONS

Ralston Fire House Park and Ride

• MODE TO WORK*

Number of bicycle commuters 0

Number of pedestrian commuters 46

Number of total commuters..... 2,261

• PARKS AND OPEN SPACE

Federal

Morristown National Historical Park

County

Lewis Morris Park

Mount Paul Memorial Park

Patriots' Path

Municipal

Buttermilk Falls Natural Area

Cold Hill Preserve

Dismal Harmony

Dos Pasos

India Brook

Meadowood Park

Mount Pleasant Recreation Area

Municipal Pond

Patriots' Path

Ralston Fields

Salisbury Preserve

Tempe Wick Preserve

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Cold Hill Road

Mendham Road

Mountainside Road

• Multi-Use Trails

Lewis Morris Park Trails

John Cunningham Trail (Patriots' Path Trail System)

• Walking Trails

Patriots' Path

Lewis Morris Park Trails

EXISTING FACILITIES (continued)

• **Shared Roadways**

Bartley Road
East Mill Road
East Valley Brook Road
Fairmount Road
Ledell Road
Mendham Road

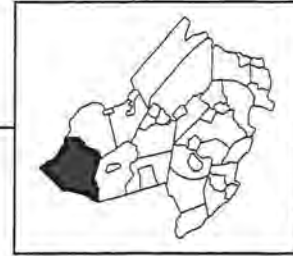
South Road
Tempe Wick Road
Washington Valley Road
Washington Turnpike
West Mill Road
West Valley Brook Road

RECOMMENDATIONS

• **Proposed Walking Trails**

Patriots' Path

Washington Township



• MUNICIPAL SUMMARY

Primarily rural with low density residential development, this municipality contains Schooleys Mountain Park, which has pedestrian trails and a lake. Extensive additions to the existing segment of Patriots' Path are proposed for the Township.

• LAND AREA*

44.82 square miles

County

Schooleys Mountain Park
Patriots' Path

• POPULATION*

15,600

Municipal

Bartley Field
Califon Field
Cataract Park
Cobblestone Field
Flocktown Road
Hemlock Drive
Koehler Pond
Peter Carol Field
Quail Run
Rock Spring Park
Scott Park
Spring Acres
Squire Hill Road
Wooded Valley East

• POPULATION AGES 5-14*

2,903

• INTERMODAL LOCATIONS

US 46 West of Reservoir RoadPark and Ride

• MODE TO WORK*

Number of bicycle commuters 0
Number of pedestrian commuters 88
Total number of commuters 7,899

• PARKS AND OPEN SPACE

State

Hacklebarney State Park

* = 1990 Census

EXISTING FACILITIES

• Sidewalks

East Avenue
East Mill Road
Hearthstone Boulevard
Schooleys Mountain Road
West Mill Road

• Multi-Use Paths

Schooleys Mountain Park
Lake Path

• Shared Roadways

Bartley-Drakestown Road
West Valley Brook Road

• Walking Trails

Schooleys Mountain Trail

RECOMMENDATIONS

- **Sidewalks**

Drakestown Road
East Avenue
Hearthstone Boulevard

- **Multi-Use Paths**

Cataract Park
Patriots' Path
Long Valley Bypass / Realignment of Schooleys
Mountain Road

- **Multi-Use Trails**

Columbia Trail
Patriots' Path
Hacklebarney Watershed Greenway

- **Bicycle Lanes**

Hearthstone Boulevard

- **Walking Trails**

Patriots' Path

8.6 Region Six

Municipalities:

- Town of Dover
- Mine Hill Township
- Mount Arlington Borough
- Mount Olive Township
- Netcong Borough
- Randolph Township
- Roxbury Township
- Victory Gardens Borough
- Wharton Borough

Description:

Region Six represents a diverse range of municipalities, ranging from older developed communities to larger rapidly developing townships. Sidewalks exist in the downtown areas of Dover, Netcong, and Wharton. Expansion of the sidewalk network is proposed. The only bicycle lane in Morris County is located in Randolph, where the creation of a bicycle network is proposed.

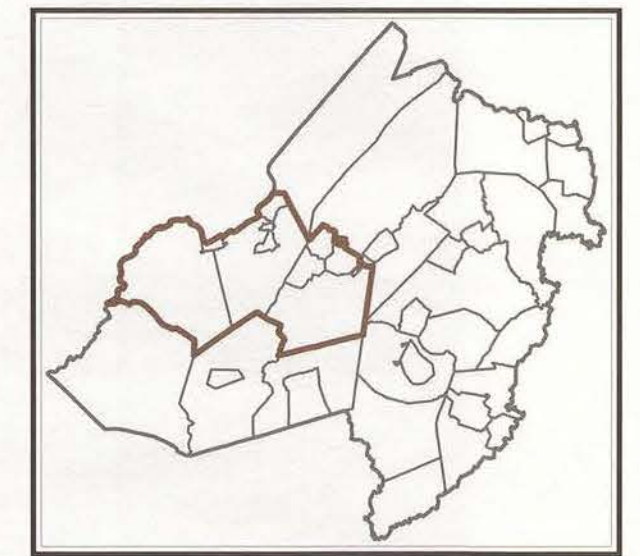
Map Seven



Figure 8.7 Map Region Six
Source: MCDOT

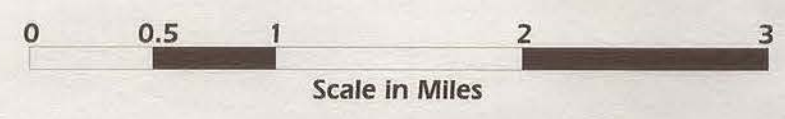
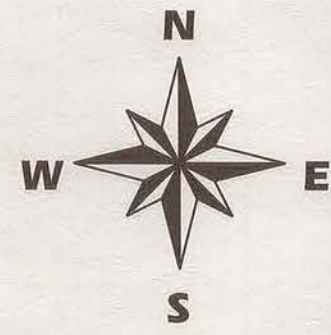
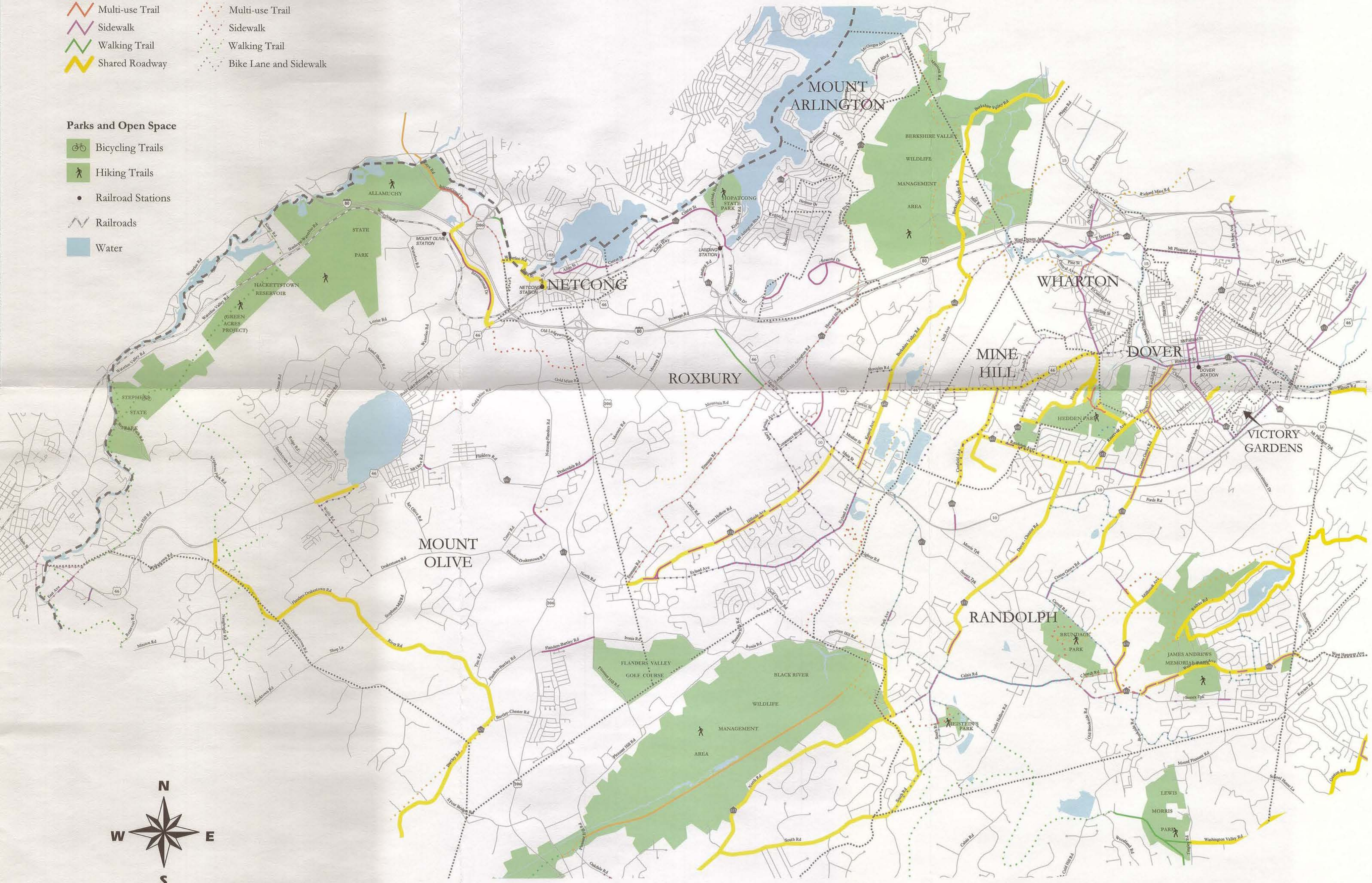
Region 6

Existing and Proposed Routes

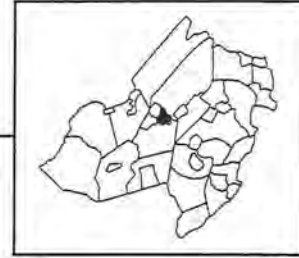


- | Existing Facilities | Proposed Facilities |
|---------------------|------------------------|
| Bike Lane | Bike Lane |
| Multi-use Path | Multi-use Path |
| Multi-use Trail | Multi-use Trail |
| Sidewalk | Sidewalk |
| Walking Trail | Walking Trail |
| Shared Roadway | Bike Lane and Sidewalk |

- Parks and Open Space**
- Bicycling Trails
 - Hiking Trails
 - Railroad Stations
 - Railroads
 - Water



Town of Dover



• MUNICIPAL SUMMARY

This municipality is one of the more urban communities in Morris County with a large downtown area that contains a well-developed sidewalk network and a railroad station. A trail along a portion of the Rockaway River east of the Dover railroad station is proposed. A bicycle lane has been proposed along portions of East and West Blackwell Streets (CR 513) and North and South Salem Streets. Hedden Park has pedestrian trails.

• LAND AREA*

2.68 square miles

• POPULATION*

15,115

• POPULATION AGES 5-14*

1,787

• INTERMODAL LOCATIONS

Dover Station Rail Station

• MODE TO WORK*

Number of bicycle commuters 21

Number of pedestrian commuters 355

Number of total commuters 8,119

• PARKS AND OPEN SPACE

County

Hedden Park

Municipal

Crescent Field

Hooey Park

Hurd Park

J.F.K. Commons Park

King Field Complex

Mountain Park

Mountain Park (Phase II)

Overlook Park

Salem Village Park

Second Street Playground

Water Works Park

West Blackwell Street Park

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Blackwell Street
East Blackwell Street
East Clinton Street
East McFarland Street
Mount Hope Avenue
Mount Pleasant Avenue
North Bergen Street
North Morris Street
Prospect Street
Salem Street
South Bergen Street

South Morris Street
South Salem Street
Van Nostrand Avenue
West Blackwell Street

• Shared Roadways

Livingston Avenue
Prospect Street
Reservoir Avenue
Van Nostrand Avenue

RECOMMENDATIONS

- **Sidewalks**

West Blackwell Street

- **Multi-Use Trails**

North Sussex Street extension

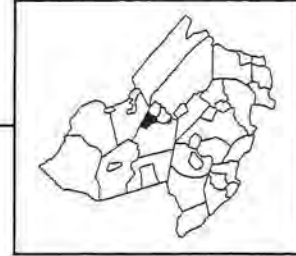
- **Walking Trail**

Moeller's Hill Trail

- **Bicycle Lanes**

Blackwell Street

Mine Hill Township



- **MUNICIPAL SUMMARY**

The Township's dominant features are its hilly terrain and abandoned iron mines. Hurd Street is the one shared roadway in this municipality. Bicycle lanes and sidewalks are proposed on US 46, Canfield Avenue (CR 669), and Randolph Avenue (CR 640 and CR 662), while only sidewalks are proposed for Randall Avenue. Hedden Park has pedestrian trails and a multi-use path.

- **LAND AREA***

2.99 square miles

- **POPULATION***

3,333

- **POPULATION AGES 5-14***

358

- **INTERMODAL LOCATIONS**

NONE

- **MODE TO WORK***

Number of bicycle commuters 10

Number of pedestrian commuters 18

Number of total commuters..... 1,794

- **PARKS AND OPEN SPACE**

County

Hedden Park

Municipal

Canfield Avenue Park

Fireman's Field

Municipal Beach

Recreation Center

Rutgers Tract

*=1990 Census

EXISTING FACILITIES

- **Sidewalks**

Canfield Avenue

Randolph Avenue

- **Multi-Use Paths**

Hedden Park

- **Shared Roadways**

Canfield Avenue

Ford Street

Hurd Street

Indian Falls Road

Oak Street

Randolph Avenue

Thomastown Road

US 46

RECOMMENDATIONS

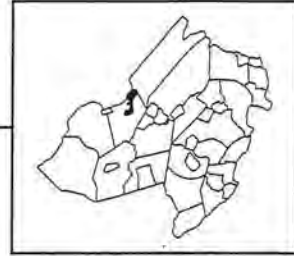
- **Sidewalks**

Canfield Avenue
Dickerson Mine Road
First Street
Frank Street
Green Road
Indian Falls Road
Randall Avenue
Randolph Avenue

- **Bicycle Lanes**

Canfield Avenue
Dickerson Mine Road
First Street
Frank Street
Green Road
Indian Falls Road
Randolph Avenue

Mount Arlington Borough



• MUNICIPAL SUMMARY

This hilly lakeside community is characterized by sidewalks in many of the residential developments. A multi-use path is proposed along Howard Boulevard (CR 615). A railroad station and park and ride facility are planned at the intersection of Howard Boulevard and I-80.

• LAND AREA*

2.12 square miles

• POPULATION*

3,630

• POPULATION AGES 5-14*

457

• INTERMODAL LOCATIONS

NONE

• MODE TO WORK*

Number of bicycle commuters 0

Number of pedestrian commuters 34

Total number of commuters 2,049

• PARKS AND OPEN SPACE

State

Berkshire Valley Wildlife Management Area

Hopatcong State Park

County

Lee's County Park

Municipal

Arlington Glen

Memorial Park

Municipal Beach

Summit Ave Field Park

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Howard Boulevard

Orben Drive

Seasons Drive

RECOMMENDATIONS

• Multi-Use Paths

Howard Boulevard

Mount Olive Township



• MUNICIPAL SUMMARY

This municipality has a large amount of commercial development along US 46, US 206, and in the International Trade Center. Within the Trade Center is a railroad station as well as a shared roadway, International Drive. Two multi-use paths are proposed in the vicinity of the Trade Center, one along Ledgewood Road and the other an extension of the Love Lane path. A bicycle lane is proposed on Wolfe Road. Patriots' Path is proposed to be extended through the Township.

• LAND AREA*

30.44 square miles

• POPULATION*

21,282

• POPULATION AGES 5-14*

2,917

• INTERMODAL LOCATIONS

Mount Olive Station Rail Station

• MODE TO WORK*

Number of bicycle commuters 35

Number of pedestrian commuters 201

Total number of commuters 12,387

• PARKS AND OPEN SPACE

State

Allamuchy State Park

Budd Lake

Stephens State Park

County

Flanders Valley Golf Course

Municipal

Budd Lake Bog

Camelot Park

Flanders Park

Lions Park

Lou Nelson Park

Municipal Beach

Powerline Park

Tulip Park

Turkey Brook Park

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Drakesdale Road

Flanders Road

Flanders-Bartley Road

International Drive

Netcong-Flanders Road

• Multi-Use Paths

Love Lane

• Multi-Use Trails

Allamuchy State Park

EXISTING FACILITIES (continued)

- **Shared Roadways**

Bartley Road
Bartley-Drakestown Road
Bartley-Long Valley Road
International Drive
Naughtright Road
River Road
US 46
Waterloo Road

- **Walking Trails**

Morris Canal Trail (Allamuchy)
Morris Canal Trail

RECOMMENDATIONS

- **Sidewalks**

Old Wolfe Road
Wolfe Road

- **Multi-Use Paths**

Chamberlain Road extension
Continental Drive
Corey Road extension
International Trade Center Expansion Path

- **Multi-Use Trail**

Columbia Trail

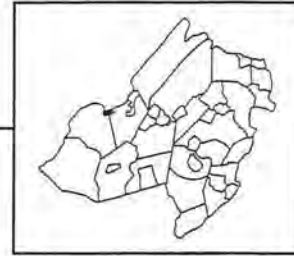
- **Walking Trails**

Patriots' Path

- **Bicycle Lanes**

Old Wolfe Road
Wolfe Road

Netcong Borough



• MUNICIPAL SUMMARY

This compact municipality has a downtown area centered around the railroad station. A sidewalk exists along the length of Allen Street (CR 631) continuing into Roxbury as Center Street. A bicycle lane is proposed to connect the Netcong railroad station to the International Trade Center in Mount Olive. Bank Street is a shared roadway.

• LAND AREA*

0.77 square miles

• POPULATION*

3,311

• POPULATION AGES 5-14*

356

• INTERMODAL LOCATIONS

Netcong Station Rail Station

• MODE TO WORK*

Number of bicycle commuters 4

Number of pedestrian commuters 69

Total number of commuters 1,791

• PARKS AND OPEN SPACE

State

Musconetcong State Park

Municipal

Arbolino Memorial Park

DiRenzo Park

*=1990 Census

EXISTING FACILITIES

• Sidewalks

Allen Street

Port Morris Street

• Shared Roadways

Bank Street

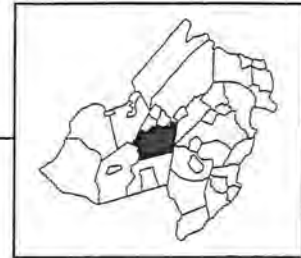
Flanders Road

RECOMMENDATIONS

• Multi-Use Paths

Netcong Rail Station Path

Randolph Township



• **MUNICIPAL SUMMARY**

This municipality is primarily residential in nature with some commercial development along NJ 10. The County College of Morris is located in this municipality, which is a major traffic generator. The Township has many parks, which provide extensive recreational opportunities. Randolph has been proactive in planning for future bicycle and pedestrian facilities for parks, residential areas, and other public facilities. An extension of Patriots' Path is proposed for this municipality. The only officially designated bicycle lane in the county exists on Calais Road. Shared roadways exist along Dover Chester Road / Reservoir Avenue (CR 513), Center Grove Road / Schoolhouse Road / Millbrook Avenue (CR 670), and West Hanover Avenue (CR 650).

• **LAND AREA***

20.96 square miles

• **POPULATION***

19,974

• **POPULATION AGES 5-14***

3,029

• **INTERMODAL LOCATIONS**

NONE

• **MODE TO WORK***

Number of bicycle commuters 0
Number of pedestrian commuters 106
Total number of commuters 10,643

• **PARKS AND OPEN SPACE**

County

Hedden Park
James Andrews Memorial Park
Patriots' Path

Municipal

Brundage Park
Combs Hollow
Edna Brundage Estate
Farmstead Court
The Glen at Shongum
Golden Corners
Heistein Park
Kiwanis
Old Brookside
Randolph Park
Rosenfarb
Senior Center
Stoneybrook Day Camp

*=1990 Census

EXISTING FACILITIES

- **Sidewalks**

Canfield Avenue
Carrell Road
Center Grove Road
Dover-Chester Road
Franklin Road
Millbrook Avenue
Park Avenue
Quaker Church Road
Randolph Avenue
School House Road
South Morris Street
South Road
South Salem Street
Sussex Turnpike
West Hanover Avenue

- **Bicycle Lanes**

Calais Road

- **Shared Roadways**

Center Grove Road
Dover-Chester Road
Ironia Road
Meadow Brook Road
Millbrook Avenue
Old Chimney Road
Openaki Road
Park Avenue
Quaker Church Road
Radtke Road
Randolph Avenue
Reservoir Avenue
Rickland Road
School House Road
Shongum Road
South Road
West Hanover Avenue

RECOMMENDATIONS

- **Bicycle Lanes**

Arrow Place
Brookside Road
Carrell Road
Center Grove Road
Clover Lane
County College of Morris
Deep Dale Drive
Deer Run Drive
Doby Road
Dover-Chester Road
Evergreen Lane
Franklin Road
Green Lane
Highview Terrace
Ivy Lane
Jason Lane
Knights Bridge Drive
Lake Shore Drive
Morey Lane
Mostyn Road
Musiker Avenue
Old Shunpike Road
Park Avenue

Pleasant Hill Road
Quaker Church Road
Randolph Avenue
Rock Ledge Road
South Road
South Salem Street
Sussex Turnpike
Tanager Lane
Washington Place
Willow Drive

- **Sidewalks**

Calais Road
Dover-Chester Road
Franklin Road
Quaker Church Road
Randolph Avenue
Sussex Turnpike

RECOMMENDATIONS (continued)

• **Multi-Use Paths**

Brundage Park Path
Church Road
Heistein Park
Patriots' Path
Randolph School Path
Sussex Turnpike
Sussex Turnpike Bypass Path

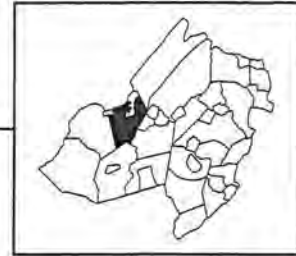
• **Multi-Use Trails**

James Andrews Memorial Park Trails
West Morris Greenway (Patriots' Path Trail System)

• **Walking Trails**

Patriots' Path

Roxbury Township



• MUNICIPAL SUMMARY

This rapidly developing community has concentrated commercial and residential development activities in the vicinity of the areas of Ledgewood and Succasunna. Bicycle lanes and sidewalks are proposed for US 46, Main Street, Commerce Boulevard, Righter Road, Eyland Avenue, and Hercules Road. A sidewalk, which will provide access to the Lake Hopatcong railroad station, is proposed for Landing Road / Lakeside Boulevard / Center Street (CR 631) continuing into Netcong. Multi-use paths are proposed along Emmans Road, Howard Boulevard (CR 615), and along the Black River.

• LAND AREA*

21.35 square miles

• POPULATION*

20,429

• POPULATION AGES 5-14*

3,258

• INTERMODAL LOCATIONS

Lake Hopatcong Station Rail Station

• MODE TO WORK*

Number of bicycle commuters 0
 Number of pedestrian commuters 99
 Total number of commuters 10,874

• PARKS AND OPEN SPACE

State

Berkshire Valley Wildlife Management Area
 Hopatcong State Park
 Musconetcong State Park

County

Alamatong Wellfield
 Flanders Valley Golf Course
 Minnisink Park

Municipal

Alexandria Park
 AT&T/Mooney Mountain Project
 Berkshire Valley Recreation Area
 Brookside Park
 Emmans Road Park
 Eyland Woods
 Freund Park
 King House
 Kiwanis Park
 Lamington Drive Park
 Midland Pond
 Morningside Drive Park
 Morris Canal Park
 Old Netcong High School Athletic Field
 Port Morris Park
 Roxbury Knoll Park
 Sandra Park
 Succasunna Field
 Vanover Drive Park
 Walden Park
 Whitegate Estate

* = 1990 Census

EXISTING FACILITIES

- **Sidewalks**

Berkshire Valley Road
Center Street
Eyland Avenue
Hillside Avenue
Howard Boulevard
Kenvil Avenue
Lakeside Boulevard
Landing Road
Mount Arlington Boulevard
Shippenport Road
West Dewey Avenue

- **Shared Roadways**

Berkshire Valley Road
Hillside Avenue
Kenvil Avenue

- **Walking Trail**

Morris Canal Park Trail

RECOMMENDATIONS

- **Sidewalks**

Center Street
Commerce Boulevard
Eyland Avenue
Hercules Road
Lakeside Boulevard
Landing Road
Main Street
Mary Louise Avenue
Riggs Road
Righter Road
US 46
West Dewey Avenue

- **Multi-Use Trails**

Abandoned Wharton and Northern
AT&T/Mooney Mountain Trails
Berkshire Valley Wildlife Management Area
West Morris Greenway (Patriots' Path Trail System)

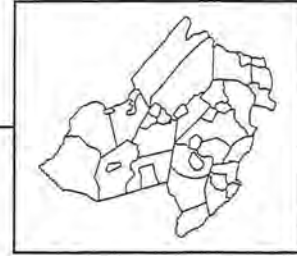
- **Multi-Use Paths**

Along High Bridge Branch of Railroad
Black River Connection Trail
Black River Trail
Emmans Road
Howard Boulevard
International Trade Center Expansion Path

- **Bicycle Lanes**

Commerce Boulevard
Eyland Avenue
Hercules Road
Main Street
Mary Louise Avenue
Riggs Road
Righter Road
US 46

Victory Gardens Borough



• MUNICIPAL SUMMARY

This is Morris County's smallest municipality and it is located adjacent to the commercial development along NJ 10. Bicycle lanes are proposed on Franklin Road and South Salem Street.

• LAND AREA*

0.15 square miles

• POPULATION*

1,314

• POPULATION AGES 5-14*

184

• INTERMODAL LOCATIONS

NONE

• MODE TO WORK*

Number of bicycle commuters 0

Number of pedestrian commuters 24

Total number of commuters 756

• PARKS AND OPEN SPACE

NONE

* = 1990 Census

EXISTING FACILITIES

• Sidewalks

Franklin Road

South Salem Street

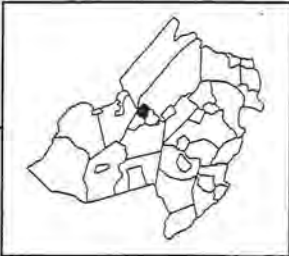
RECOMMENDATIONS

• Bicycle Lanes

Franklin Road

South Salem Street

Wharton Borough



MUNICIPAL SUMMARY

This municipality has a traditional downtown. Sidewalks exist along Main Street (CR 634) and portions of Dewey Avenue (CR 642). Sidewalks are proposed for the gaps on Dewey Avenue (CR 642) and along St. Mary's Street. The West Morris Greenway is proposed to travel through the Borough.

LAND AREA*
2.18 square miles

POPULATION*
5,405

POPULATION AGES 5-14*
619

INTERMODAL LOCATIONS
NONE

MODE TO WORK*
Number of bicycle commuters 76
Number of pedestrian commuters 72
Total number of commuters 3,077

PARKS AND OPEN SPACE

- Municipal*
Columbia Street Park
Duffy School
Huff Street Park
Hugh Force Park
Langdon Avenue Park
Robert Street Park
Soccer Fields
Washington Forge Pond

* = 1990 Census

EXISTING FACILITIES

- Sidewalks**
West Dewey Avenue
East Dewey Avenue
North Main Street
South Main Street

RECOMMENDATIONS

- Sidewalks**
East Dewey Avenue
West Dewey Avenue
St. Mary's Street

- Multi-Use Trails**
Hugh Force Park Trail
West Morris Greenway (Patriots' Path Trail System)

CHAPTER NINE

Liability and Costs

9.1 Liability

It is the responsibility of the state, counties, and municipalities to ensure that all basic safety concerns are met for bicycle and pedestrian facilities. Liability is a priority topic that is often considered when planning new facilities. However, liability tends to be a subjective matter and useful information is difficult to obtain due to divergent viewpoints.

It is important that municipalities, as well as the state and county, find a balance between encouraging bicycle and pedestrian travel and preventing

unnecessary liability exposure. Throughout the 1980's the subject of liability, for bicycle and pedestrian facilities became a major concern. Prior to the establishment of formal bicycle and pedestrian planning and engineering guidelines, some substandard facilities were constructed, which resulted in liability concerns. According to the technical paper, "Liability Aspects of Bicycle Environments: Bicycle Facilities and Roads" (Institute of Traffic Engineers 1990 Compendium of Technical Papers) the following are the basic factors that have heightened liability issues:

1) Exposure – More bicyclists on the road, especially those with limited experience, means there are more chances for serious accidents.

2) Misunderstanding of the bicycle's vehicular nature – A bicyclist is not simply a pedestrian with wheels, but is more similar to a vehicle with a rider. This resulted in trail designs that did not account for this fact and created dangerous sharp curves, inadequate facility widths, improper intersections where bicycle facilities met roadways, and infrequent maintenance.

Liability is no greater for bicycle or pedestrian facilities than for road projects. The same type of care should be applied to the planning and engineering for bicycle and pedestrian facilities. A key guideline for agencies planning or designing bicycle and pedestrian facilities is to carefully adhere to design guidelines, especially AASHTO's Guide for The Development of Bicycle Facilities (1991), and the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (Section 9). The Guide provides bikeway design standards for various travel environments and provides sensible guidelines for proper design planning, to meet the needs of bicyclists' and other road users. Other helpful guidance is contained in the New Jersey Department of Transportation's Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines and their Pedestrian Compatible Planning and Design Guidelines.

Government agencies are generally protected from negligent facility designs through a principle known as "design immunity." This immunity is usually granted if the design applications and standards have been followed. If a bicycle/pedestrian facility was designed to route bicyclists around a particular hazardous condition, certain liability factors would decrease since the responsible bicyclist would

have the choice of utilizing the designated path over the more dangerous one.

Another strategy to improve safety and decrease liability is to encourage bicycle and pedestrian education programs. All bicyclists, both advanced and basic, should be encouraged to participate in programs that will teach strategies for traveling and commuting in traffic, as well as other public education programs.

9.1.1 Negligence

Negligence is the failure to exercise the care that a person would usually undertake under reasonable, ordinary circumstances. Those planning, designing, and maintaining bicycle and pedestrian facilities must be aware of what is considered negligent practice.

9.1.2 Determining Liability

The Hunterdon County Road Bicycle Facility Assessment (1997) and the "Liability Aspects of Bicycle Environments: Bicycle Facilities and Roads" (ITE 1990 Compendium of Technical Papers) address liability issues in detail.

Both documents mention the principle issues that relate to liability:

- **Did a potentially dangerous defect exist?** A facility needs to be reasonably safe. If unusual obstructions or dangers are present on the facility, a bicyclist is not expected to anticipate them. Evidence of generally accepted practice and the published standards that were in effect at the time of facility implementation, such as the AASHTO guidelines, are the design guidelines to be met.
- **Was the defect the main cause of the damages?** It must be proven that the defect actually caused the damage. Many times there may be several causes for an accident, however if the "but for" test is

applied where the question is asked, "If it were not for the defect, would the accident have occurred?"

- **Was the plaintiff contributory to the negligent action?** Examples of contributory negligence include inattention, reckless conduct, speeding, drug and alcohol use, and failure to wear a bicycle helmet. There is also comparative negligence or a relative degree of negligence in which a court may decide to award an amount of money based on the percentage of responsibility for negligence by each party.
- **Did the agency have knowledge of the allegedly hazardous condition?** Actual knowledge means that someone registered a complaint or otherwise reported the problem. Constructive knowledge means that through the process of routine maintenance, the problem should have been discovered, especially if a significant amount of time has passed. For this reason, maintenance priorities must be established, such as clearing roads of snow first, then sidewalks and bicycle facilities. Also, if a new facility is built to an out dated standard then liability may lie with the agency responsible for construction, planning, or maintenance.
- **Was the agencies' action discretionary or ministerial in nature?** Discretionary actions are generally higher level decisions and are often immune to lawsuits, if a good faith effort has been undertaken. Examples include planning, allocation of resources, and design decisions made with no bias. Ministerial actions do not involve policy level decisions or choices and are more clearly defined. They include maintenance and other routine procedures, such as filling a pothole. Failure to

properly execute such tasks can result in greater liability exposure.

Based on knowledge gained from case studies in "Liability Aspects of Bicycle Environments: Bicycle Facilities and Roads," it is evident that the proper location, design, and maintenance of bicycle and pedestrian facilities is crucial for them to be safely utilized. There are three basic conclusions specifically of concern:

- 1) Serious injury can result from a bicycle fall or collision.
- 2) Bicyclists are not always given enough recognition as "vehicle" operators in the planning, design, and maintenance procedures.
- 3) Responsible agencies can be held liable for bicyclist injuries whether or not bikeways are provided.

9.1.3 Trouble Shooting

The Hunterdon County Planning Board's legal representative at the law offices of Miller, Porter & Muller, P.C. provided criteria to help decrease liability exposure. To further protect the agency, it is important that appropriate signs be placed to instruct users in proper use of the facilities and of any implicit hazards.

Common accident problems must be incorporated into the planning and design of new and existing facilities. Consideration of bicyclists and pedestrians should be included in traffic safety programs and data on accidents should be routinely collected and analyzed, to effectively develop countermeasure strategies.

Transportation professionals familiar with bicycle and pedestrian facilities should be involved in designing and planning facilities. They should provide for safe design features such as grades, curves, sight distances, traffic control devices, and surface materials. Use of current guidelines (AASHTO and MUTCD)

and good judgement are vital in constructing the safest possible facilities.

Records should be kept on complaints to identify safety problems. When citizen reports are combined with police reports, countermeasure procedures may be developed. Documenting follow-up actions is important because it shows the agency responds to safety concerns.

Routine inspection and maintenance programs must be developed and implemented. Maintenance plans should address reoccurring problems such as potholes, road debris, water accumulation.

Completed projects should be evaluated for effectiveness. Sometimes construction of a facility will lead to unexpected changes in the resultant combination of traffic. For example, a bicyclist traveling on an off-road bicycle path may feel overly confident and not be prepared if the facility crosses an intersection, where neither the bicyclist nor the motorist are prepared to encounter one another.

9.1.4 Maintenance in Liability

Since maintenance is an important liability issue, the following AASHTO Guidelines for the Development of Bicycle Facilities are provided:

- Create a smooth surface free of potholes and debris.
- Eliminate drop-offs from pavement edges.
- Inspect pavement conditions – do not allow broken pavement edges.
- Inspect signs – making certain that signs do not intrude into bicycle travel space.
- Control growth of trees, shrubs, and vegetation.
- Supply trash and recycling receptacles and be sure they are regularly emptied.
- Mow area in the vicinity of bicycle paths.
- Plow snow – do not use deicing agents.

- Enforce and prevent unauthorized motor vehicles from using the path.
- Maintain bicycle and shoulder lane striping and markings.
- Establish (or assign) an agency responsible for the control, maintenance, and policing of bicycle facilities.

If a path will be used during the winter as a recreational cross-country skiing path, then snow management would be different from a path used by commuters or school children.

9.2 Costs

9.2.1 Construction Costs

Construction costs for bicycle and pedestrian facilities vary because of factors such as, topography, drainage, site distance, site preparation, grade crossings, dimensions, surface type, and permits. The three main facility features are lane striping, pavement, and signs.

Lane striping is one of the most economical options in creating a bicycle or pedestrian facility. Sample estimates are:

Paint Striping:
\$0.10-\$0.15 per linear foot

Plastic Striping:
\$0.30 per linear foot

Therefore, the cost for one mile of paint striping ranges between \$528-\$792. For plastic striping the cost for one mile would be \$1,584.

Estimated surface material costs for a one mile long by eight feet wide path on relatively flat ground would be calculated as follows:

Aggregate base (Quarry process stone), 6 inches thick:

1,674 tons x \$55 per ton = \$92,070.00

Asphalt (Bituminous concrete), 2 inches thick:

569.23 tons x \$65 per ton = \$36,999.95

These cost estimates are from the Hunterdon County Planning Board's County Road Bicycle Facility Assessment and include excavation costs. A case study of a Morris County facility, the Traction Line Recreational Trail Extension, which details other costs can be found in Appendix F.

The third facility feature is signs. Most standard roadway signs that forewarn users of obstacles are yellow with a symbol in black silhouette. These signs come in a variety of sizes but the following are approximate costs for the most popular sizes:

24 inches x 18 inches = \$100.00

30 inches x 30 inches = \$125.00

Other important factors that influence the total cost of a bicycle and pedestrian facility include engineering fees, labor costs, fencing, and land acquisition costs.

9.2.2 Maintenance Costs

Routine sidewalk maintenance includes providing proper clearances from vegetation, maintaining handicap accessibility, correcting changes in sidewalk elevation from underlying tree roots, and repairing of cracks and other hazards. The Accessibility Guidelines for Buildings and Facilities detail the repair procedures for damaged sidewalks.

The winter season in New Jersey brings additional maintenance requirements, due to snow and ice accumulations. If a facility is

open during all seasons, an effort must be made to clear all hazards created by the precipitation, including snow removal, icy surfaces, and fallen tree limbs. Maintenance costs vary depending on facility type, accessibility factors, and available resources. Agencies should provide funds for scheduled snow removal for all sidewalks and pedestrian crosswalks, for which they are responsible. Most municipalities require property owners to remove snow from sidewalks within 24 hours following the end of snowfall. However, pathways and other trail linkages are generally not plowed, because of low usage in the winter months.

9.2.3 Amenities Costs

In the private sector there are costs for implementing and maintaining bicycle and pedestrian facilities. Companies that encourage bicycling or walking as a means to commute to work, should create a plan to add amenities such as bicycle racks, lockers, and showers. In this regard, the public sector should also consider adding bicycle racks and bicycle storage facilities to transit stations, to promote multi-modal travel.

Each bicycle and pedestrian proposal should be considered individually for the purposes of cost assessment. Even similar facilities located within two separate environments will have different requirements and features. If facilities cross through multiple municipalities, a need may exist for additional jurisdictional arrangements. Alternately, municipalities will need to agree on sharing construction and maintenance costs. It is important to weigh the costs and benefits of bicycle and pedestrian facility implementation and maintenance.

CHAPTER TEN

Funding Sources

This chapter identifies sources of funding, eligibility, and general administrative requirements for bicycle and pedestrian projects. The Federal Highway Administration (FHWA) is the source of funding for most of these projects.

10.1 TEA 21

The majority of transportation funds come from the federal Transportation Equity Act for the 21st Century (TEA 21), which is a six year federal authorization act. This legislation replaced the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). Signed into law in June of 1998, this \$214 billion, 800 page act authorizes funds to the FHWA and Federal Transit Administration (FTA). Each

year Congress appropriates funds authorized in TEA 21 for the FHWA and FTA to pass on to the states. Although these federal agencies distribute funds to the state departments of transportation, they do not participate in the selection of projects to be funded. However, federal regulations and guidelines must be followed when using federal money.

Current projections estimate that New Jersey will receive approximately \$64 million over the next six years for Transportation Enhancement projects such as bicycle paths, and historic preservation. An allocation of \$370 million is expected for Congestion Mitigation and Air Quality (CMAQ)

programs, which can be applied to bicycle and pedestrian facility projects.

10.2 Project Prioritization

States are required by TEA 21 to have a metropolitan planning organization (MPO) to prioritize and approve all projects receiving federal funding. The 13 counties of northern New Jersey, including Morris County, comprise the North Jersey Transportation Planning Authority (NJTPA) MPO region, which is headquartered in Newark. The remainder of the state is divided into two MPO's, the Delaware Valley Regional Planning Commission (DVRPC) and the South Jersey Transportation Planning Organization (SJTPO).

NJTPA has 20 voting members, one from each county, Jersey City, Newark, NJDOT, NJ Transit, the Governor's Office, the Port Authority of New York and New Jersey, and a citizens' representative. NJTPA uses the pipeline process to handle projects. Projects may be introduced by any voting member, at which time they go through a preliminary screening process and are then evaluated and given a numerical ranking. A preliminary study determines the level of environmental analysis required and identifies mitigation and other needs. The amount of available funding determines how many projects are funded. Funded projects are then put in the Transportation Improvement Program (TIP).

The TIP is a five year list of transportation projects developed in a continuing, comprehensive, and cooperative planning process. The TIP includes descriptions, cost estimates, funding sources, phases of work, and project schedules for federal and state funded transportation projects.

Federal regulations require the TIP contain realistic project implementation time frames and funding sources. The TIP must be consistent with the NJTPA's Transportation

Plan, the State Air Quality Implementation Plan (SIP), the Congestion Management System, and the state's Annual Construction Program, which becomes part of the State Budget. Projects on the TIP are prioritized according to a variety of criteria including whether they help bring the region into attainment with the National Ambient Air Quality Standards (NAAQS). Generally, bicycle and pedestrian projects fall within this area for prioritization.

10.3 Funding Sources

Summarized below are most of the government funding sources available for bicycle and pedestrian facilities. As funding sources continue to be updated, some details may change. The sources are listed alphabetically by the organization who administers the funds. For example, the most commonly used funding program, Transportation Enhancements, is listed under State agencies because the New Jersey Department of Transportation (NJDOT) administers the FHWA funds.

10.3.1 State Agencies

Most of the funding sources described in this section originate from a federal source, such as the FHWA, the US Department of Environmental Protection (US DEP), or the National Highway Traffic Safety Administration (NHTSA). These funds may be applied for through New Jersey agencies such as the NJDOT, NJ Department of Environmental Protection (NJDEP), or the NJ Department of Law and Public Safety.

Program: **Transportation Enhancement Program**

Authorization Act: TEA 21

Federal Agency: FHWA

*State Agency responsible:
(for program administration)* NJDOT

Eligible Recipients: Municipal and County governments; and
private non-profit agencies

Funding type: Full Federal and State funding, no local match,
reimbursement program

Description: This program is well known for its application to bicycle and pedestrian projects. There are ten types of transportation enhancement projects eligible, including rails-to-trails conversions and general bicycle and pedestrian projects. Since this program began, New Jersey has had 57 bicycle and pedestrian projects and 37 streetscape or beautification projects approved. In New Jersey the funding available ranges from \$8 million to \$12 million annually. Each year NJDOT solicits applications for this program and NJDOT selects the projects to be funded. Due to its strong association with bicycle and pedestrian improvements, transportation enhancement program funds are the easiest to obtain. They are often the first or only source of funding considered for these projects. Other eligible activities include the provision of safety and educational activities for bicyclists and pedestrians, as well as the provision of tourist and welcome centers.

Program: **Congestion Mitigation and Air Quality (CMAQ)**

Authorization Act: TEA 21

Federal Agency: FHWA

*State Agency responsible:
(for program administration)* NJDOT

Eligible Recipients: Municipal and County governments; and
private non-profit agencies

Funding type: Full Federal and State funding; reimbursement program

Description: This program is directed at funding projects that improve air quality in non-attainment areas (all of New Jersey) by improving transportation conditions. Bicycle and pedestrian projects are eligible for CMAQ funds.

Program: **National Recreational Trails Fund
(Simms Trails System Act)**

Authorization Act: TEA 21

Federal Agency: FHWA

*State Agency responsible:
(for program administration)* NJ Department of Environmental Protection
(Office of Lands Management, Division of Parks and Forestry)

Eligible Recipients: Municipal and County governments; and
private and public non-profit agencies

Funding type: 50% Federal / 50% Matching funds;
reimbursement program

Description: Annually, states receive money to develop trail-related projects in national parks. Available for about three years, in Fiscal Year 1997 New Jersey received approximately \$281,000 for about 30 projects, used primarily to improve multi-use trails. This funding has been awarded to state, county, and local governments for approximately 100 projects. The Morris County Park Commission utilized this funding for a portion of Patriots' Path.

Program: **Section 402 Safety Funds (NHTSA)**

Authorization Act: TEA 21

Federal Agency: National Highway Traffic Safety Administration (NHTSA)

*State Agency responsible:
(for program administration)* NJ Department of Law And Public Safety
(Division of Highway Traffic Safety)

Eligible Recipients: Municipal and County governments; schools, hospitals

Funding type: Full Federal Funding; reimbursement program

Description: This funding is for construction and non-construction projects that create safer traveling conditions. Bicycle and pedestrian facility improvements are eligible projects. The Director of the New Jersey Division of Highway Traffic Safety administers this program for the state. This program funded a public service campaign that used brochures, as well as physical improvements, to enhance safety in the city of Trenton. Communities with a high rate of accidents who show local support for projects that improve safety would be eligible for this funding.

Program: **Local Bicycle and Pedestrian Planning Assistance**
Authorization Act: TEA 21
Federal Agency: n/a

State Agency responsible: NJDOT
(for program administration)

Eligible Recipients: Municipal and County governments
Funding type: Consultant assistance; line item in NJDOT budget

Description: Through its' Bicycle and Pedestrian Advocate, NJDOT has made a consultant available. The consultant may provide counties and municipalities with technical planning assistance for bicycle and pedestrian circulation plans and other similar studies. This funding comes through NJDOT Program Funds as a line item in the NJDOT budget.

Program: **National Highway System (NHS)**
Authorization Act: TEA 21
Federal Agency: FHWA

State Agency responsible: NJDOT
(for program administration)

Eligible Recipients: State government
Funding type: Full Federal and State Funding; reimbursement program

Description: The NHS includes the 42,000 miles of interstates, highways, and 113,000 miles of other major roads. States have identified these roads as vital to the national and regional economy and for connectivity purposes. Limited NHS funding may be used for bicycle and pedestrian improvements.

When put in the context of a larger project, bicycle and pedestrian facilities may be included. Examples of eligible projects are those that create bicycle-friendly roadways such as bicycle-safe drainage grates, designate bicycle facilities, and add pedestrian-friendly features such as sidewalks. If independent bicycle or pedestrian projects will benefit bicyclists and pedestrians and are in or adjacent to the right-of-way of a NHS road, they may be eligible for funding. To date, New Jersey has not used this funding source for any independent bicycle or pedestrian improvements, because demands have exceeded funding.

Program: **Scenic Byways**

Authorization Act: TEA 21

Federal Agency: FHWA

*State Agency responsible:
(for program administration)* NJDOT

Eligible Recipients: State and County governments

Funding type: 80% Federal and 20% local ; reimbursement program

Description: This small, discretionary grant program may be used to fund pedestrian projects that fulfill a management plan for designated scenic byways. A scenic byways designation must be in accordance with a program developed and adopted by the state.

Program: **Surface Transportation Program (STP) Funds
(including Safety Projects)**

Authorization Act: TEA 21

Federal Agency: FHWA

*State Agency responsible:
(for program administration)* NJDOT

Eligible Recipients: Municipal and County governments

Funding type: Full Federal and State funding; no local match; reimbursement program

Description: Because this program is broadly defined, it offers flexibility. This funding is appropriate for incidental or independent bicycle and pedestrian projects. This program allows projects to be built and funded in phases. Ten percent of the STP program is used for safety related improvements. Potentially, projects that directly or indirectly improve safety for pedestrians may be funded. NJDOT's Bureau of Traffic Engineering administers this program for New Jersey and generally analyzes accident frequency and type for project selection. Pedestrian signals and skid resistant pavement surfacing have been accepted as eligible.

Program: **Hazard Elimination Program**

Authorization Act: TEA 21

Federal Agency: FHWA

*State Agency responsible:
(for program administration)* NJDOT

Eligible Recipients: State, County, and Municipal governments

Funding type: 80% Federal and 20% local ; reimbursement program

Description: The TEA 21 legislation added bicycling and walking hazards to the list of eligible projects. The definition of "public road" has been expanded to include publicly owned bicycle or pedestrian facilities, as well as traffic calming measures.

Program: **Transit Enhancement Activity**

Authorization Act: TEA 21

Federal Agency: Federal Transit Authority (FTA)

*State Agency responsible:
(for program administration)* NJ Transit

Eligible Recipients: Transit Agencies

Funding type: 95 % Federal and 5% local match;
reimbursement program

Description: The TEA 21 legislation added this new transit enhancement funding program with a set-aside from Urban Area formula transit grants. Projects that improve bicycle and pedestrian access to public transportation such as bicycle storage facilities and equipment to transport bicycles on buses and trains are eligible for this funding. Because this program originates from the FTA, it is administered through NJ Transit.

Program: **Transportation Trust Fund**
Authorization Act: NJ Transportation Trust Fund Authority Act of 1984
Federal Agency: n/a

State Agency responsible: NJDOT
(for program administration)

Eligible Recipients: State, Municipal, and County governments
Funding type: 100 % State funded; reimbursement program

Description: The State of New Jersey provides funds through the Transportation Trust Fund (TTF). Governor Whitman reauthorized this program on May 30, 1995 for another five years. Some bicycle and pedestrian projects are eligible for this funding.

10.3.2 North Jersey Transportation Planning Authority (NJTPA)

These funding sources are available to the NJTPA member counties and cities. Municipalities may partner with counties to apply for these funding sources.

<i>Program:</i>	<u>Local Scoping and Local Lead Projects</u>
<i>Authorization Act:</i>	TEA 21
<i>Federal Agency:</i>	FHWA
<i>State Agency responsible: (for program administration)</i>	NJTPA
<i>Eligible Recipients:</i>	County and Municipal (partnered w/counties) governments
<i>Funding type:</i>	100% Federal funding

Description: These federal STP funds are directly available to counties through NJTPA. This ultimately allows counties, as well as municipalities that partner with counties, to receive STP funds for final design and construction.

<i>Program:</i>	<u>Technical Studies Program</u>
<i>Authorization Act:</i>	TEA 21
<i>Federal Agency:</i>	FHWA and FTA
<i>State Agency responsible: (for program administration)</i>	NJTPA
<i>Eligible Recipients:</i>	County governments
<i>Funding type:</i>	80% Federal / 20% County; reimbursement program

Description: This program provides federal grant assistance for state or local governments to receive money for planning, engineering, design, and evaluation of proposed transportation projects. They may be used to fund bicycle and pedestrian planning, but not for construction or operational costs. Technical studies are generally used for feasibility studies or for creating a handbook or manual on a specific transportation need. Because this program is limited to counties, a municipality would have to approach a county to administer or take the lead on an applicable study.

10.3.3 Other Funding Sources

These sources are not strictly utilized to fund transportation programs, however they do encompass bicycle and pedestrian facilities.

<i>Program:</i>	<u>Local Aid for Centers</u>
<i>Authorization Act:</i>	NJ Transportation Trust Fund Authority Act of 1984
<i>Federal Agency:</i>	n/a
<i>State Agency responsible: (for program administration)</i>	NJDOT
<i>Eligible Recipients:</i>	Municipal governments
<i>Funding type:</i>	75% at award of contract/ 25% at project completion
<p><i>Description:</i> This NJDOT funding program was created to help municipalities that formally participated in the NJ State Development and Redevelopment Plan (SDRP), and became “designated centers of place.” Communities may apply for funding for non-traditional transportation improvements if the projects are part of a designated center. Some examples of projects that have been funded are bicycle and pedestrian facilities, rails-to-trails bicycle and pedestrian trails, and streetscape beautification projects. Eligible projects are basically similar to those eligible for Transportation Enhancements from the FHWA, except that there are only about 38 designated centers eligible to apply for funding.</p> <p>Preliminary engineering, design, and construction costs may be funded. Criteria for selection of proposals is competitive and projects must be transportation-related, as well as construction ready. Municipalities must have a commitment with funds and support from the community. The Bureau of Statewide Planning cooperates with the Bureau of Local Government Services to administer this program.</p>	

<i>Program:</i>	<u>Local County Aid Program</u>
<i>Authorization Act:</i>	NJ Transportation Trust Fund Authority Act of 1984
<i>Federal Agency:</i>	n/a
<i>State Agency responsible: (for program administration)</i>	NJDOT
<i>Eligible Recipients:</i>	County governments
<i>Funding type:</i>	100% State funding
<p><i>Description:</i> This program provides funding to all of the counties in the state based on the proportion of road mileage and population for each county. Every year, counties must draft a Capital Transportation Program listing projects to be undertaken and detailing their associated costs. Construction costs and physical improvements for bicycle and pedestrian facilities, such as installation of signs and bicycle-safe drainage grates, may be funded.</p>	

Program: **Local Municipal Aid Program**
Authorization Act: NJ Transportation Trust Fund Authority Act of 1984
Federal Agency: n/a

State Agency responsible: NJDOT
(for program administration)

Eligible Recipients: Municipal governments
Funding type: 75% at award of contract/ 25% at project completion

Description: This program provides municipalities with funds for transportation projects. Funding amounts vary annually, based on the amount by the State Legislature. If funding is granted, NJDOT will pay 75 percent of the total amount awarded for construction, with the balance to be paid upon completion of the project.

Program: **Local Aid, Discretionary Program**
Authorization Act: NJ Transportation Trust Fund Authority Act of 1984
Federal Agency: n/a

State Agency responsible: NJDOT
(for program administration)

Eligible Recipients: State, County, and Municipal governments
Funding type: 75% at award of contract/ 25% at project completion

Description: The State's emergency or special transportation needs are supplemented with this program. A municipality or county may apply any time for these funds. Requests are approved by the NJDOT Commissioner, who has allocated a minimum \$1.5 million of Discretionary Aid funding for the Fiscal Year 1998 for funding pedestrian projects. A similar allocation for pedestrian projects is anticipated for Fiscal Year 1999. The payment structure is the same as with the Municipal Aid Program.

<i>Program:</i>	<u>County or Municipal Capital Funding</u>
<i>Authorization Act:</i>	NJSA: 40:55D- (MLUL)
<i>Federal Agency:</i>	n/a
<i>State Agency responsible: (for program administration)</i>	n/a
<i>Eligible Recipients:</i>	Municipal and County governments
<i>Funding type:</i>	County or municipal budgets and capital programs
 <i>Description:</i> County and municipal governments may fund bicycle and pedestrian facilities through their own annual budget or through capital funding. These types of funding may be used for pedestrian improvements such as trails, sidewalks, crosswalks, signals, and traffic calming. The cost of new sidewalks may partially be assessed against the property owners whose property fronts on the improvement. Bicycle and pedestrian projects may be a part of larger improvement projects or independent. Municipal or county funding, even in small amounts, demonstrates a commitment and may lead to other possible funding sources.	

<i>Program:</i>	<u>Community Development Block Grant (CDBG) Program</u>
<i>Authorization Act:</i>	P.L. 102-550
<i>Federal Agency:</i>	US Department of Housing and Urban Development
<i>County Agency responsible: (for program administration)</i>	County of Morris, Division of Community Development
<i>Eligible Recipients:</i>	Municipal governments; private and public non-profit agencies
<i>Funding type:</i>	Various matching requirements
 <i>Description:</i> The County of Morris qualifies for this federal grant program administered by the US Department of Housing and Urban Development. Pedestrian improvements may be eligible for funding as long as they occur in low to moderate income areas or provide a benefit for groups with special needs. Most of federal dollars are allocated to municipalities with the exception of Dover and Parsippany. Projects that have been funded include improvements to the streetscape, installation of sidewalks, and modifications to curbs to meet the Americans with Disabilities Act (ADA) requirements.	

<i>Program:</i>	<u>Green Acres</u>
<i>Authorization Act:</i>	Previously approved bond issues
<i>Federal Agency:</i>	n/a
<i>State Agency responsible: (for program administration)</i>	NJ Department of Environmental Protection (Green Acres Office)
<i>Eligible Recipients:</i>	Municipal and County governments; private and public non-profit agencies
<i>Funding type:</i>	Usually 75% loan / 25% grant; Governor's new proposal for open space may change funding formula
<i>Description:</i> Traditionally, Green Acres program grants and loans have been utilized for projects such as multi-use trails as well as for amenities at the beginning and end of trails, such as trash receptacles and parking areas. State, county, and municipal governments may receive funds through state bond issues for the development of facilities and the acquisition of land. Non-profits are only eligible for acquisition funds, with requirement that a 50 percent match be made.	

10.4 Funding Allocation Case Study

A case study that details the approximate major costs associated with the construction of the Morris County Park Commission's Traction Line Recreational Trail Extension, built in 1997, may be found in Appendix F.

All funding for this multi-use path was obtained through a federal Transportation Enhancement Program grant. The design, engineering, and construction funds were made available through the NJDOT, the State agency administering the program.

10.5 Funding Agency Contacts

Funding resources and allocation methods vary, based on a number of factors, therefore the information provided below may change. NJDOT's Office of the Bicycle and Pedestrian Advocate will be monitoring funding sources, as they become available.

For NJDOT administered projects:

NJDOT
Office of the Bicycle and Pedestrian Advocate
CN 600, 1035 Parkway Avenue
Trenton, NJ 08625
(609) 530-8062

For NJTPA administered projects:

County of Morris
Division of Transportation Management
PO Box 900
Morristown, NJ 07963-0900
(973) 829-8101

For County or Municipal Capital Funding programs:

Contact the appropriate Municipal or County governing body.

For Local programs:

NJDOT
Bureau of Local Government Services
200 Stierli Court
Mt. Arlington, NJ 07856-1322
(973) 770-5070

For CDBG grants:

County of Morris
Department of Planning & Development
Division of Community Development
PO Box 900
Morristown, NJ 07963-0900
(973) 285-6060

For Green Acres programs:

State of New Jersey
Dept. of Environmental Protection
Green Acres Program
501 E. State Street, 1st Floor
CN 412
Trenton, NJ 08625-0412
(609) 984-0570

CHAPTER ELEVEN

Goals, Objectives, and Implementation Strategies

The development of this bicycle and pedestrian element enables Morris County and its municipalities to identify facilities and to consider improvements for non-motorized transportation. The goals, objectives, and implementation strategies were developed in a cooperative effort with municipalities through the Bicycle and Pedestrian Public Advisory Committee (BiPED PAC), the New Jersey Transportation Planning Authority (NJTPA), New Jersey Department of Transportation (NJDOT), NJ Transit, and various Morris

County agencies, including the Morris County Planning Board and the Board of Transportation of Morris County. The goals and objectives are consistent with state and county master plan elements.

The goals and objectives were developed at the beginning of the process of developing the Element. Implementation strategies evolved from the input of the above mentioned groups, as well as staff observations.

11.1 GOAL #1

Establish a coordinated bicycle and pedestrian network.

Objectives

- Encourage the completion of gaps in existing sidewalk networks, especially for connections to major trip attractions such as schools, parks, downtowns, or other shopping/service amenities.
- Design bicycle and pedestrian facilities, whenever possible, to the AASHTO standards, the Manual of Uniform Traffic Control Devices (Section Nine guidelines), and NJDOT Bicycle and Pedestrian Facilities Planning and Design Guidelines.
- Encourage bicycle and pedestrian travel to major destinations by establishing efficient links to minimize travel time.
- Integrate the bicycle and pedestrian network with the transit system.
- Encourage the expansion of the bicycle and pedestrian system to include additional scenic, recreational, and commuter routes.
- Identify the network through the use of uniform signs.
- Promote on-going maintenance for bicycle and pedestrian facilities.
- Recommend the inclusion of bicycle storage facilities, such as bicycle racks and lockers, at major trip destinations.
- Recommend safety devices at appropriate locations to minimize conflict between bicyclists, pedestrians, and motorists.

GOAL #1 (continued)

Establish a coordinated bicycle and pedestrian network.

Implementation Strategies

- Install “Share the Road” type signs and stripe motor vehicle travel lanes on shared roadways.
- Stripe travel lanes on roadways with pavement widths of 12 feet or more from center line to allow for bicycle and pedestrian uses, working in conjunction with municipal officials.
- Install bicycle storage facilities at railroad stations and park and ride lots.
- Create bicycle and pedestrian facilities in areas surrounding railroad stations and park and ride lots, where feasible and safe. Construct sidewalks within a one mile radius of railroad stations and park and ride lots. Include lighting in plans where feasible.
- Encourage inter-municipal coordination to plan, provide, and maintain common bicycle and pedestrian facilities.
- Encourage municipal and county cooperation to inform each other when new bicycle and pedestrian facilities are added to the network.
- Examine utility rights-of-way for possible bicycle and pedestrian facilities.
- Undertake “rails-to-trails” projects for the conversion of abandoned rail corridors into public paths, where feasible.
- Include bicycle and pedestrian facilities in the design of roadway and bridge construction and reconstruction projects, where feasible.

11.2 GOAL #2

Develop planning policies and procedures that encourage opportunities for bicycling and walking.

Objectives

- Encourage municipalities to examine land use practices to provide opportunities for bicycle and pedestrian travel.
- Encourage municipalities to include specific Master Plan recommendations for bicycle and pedestrian facilities.
- Identify appropriate security measures to deter crime.
- Address the requirements of the Americans with Disabilities Act (ADA) in the design, implementation, and maintenance of all facilities.
- Encourage municipalities to develop municipal ordinances that specify requirements for bicycle and pedestrian facilities.
- Coordinate the design and construction of routes between local jurisdictions to ensure continuity of bicycle and pedestrian facilities throughout the region.

Implementation Strategies

- Encourage municipalities to establish a checklist to assist municipal staff and developers to identify what types of bicycle and pedestrian facilities are to be included in development.
- Encourage municipalities to participate in the Bicycle and Pedestrian Public Advisory Committee (BiPED PAC) to learn about the activities of other committee plans.
- Review subdivisions and site plans to ensure that they are designed with consideration to bicycle and pedestrian access.
- Require right-of-way (ROW) dedication for bicycle and pedestrian facilities as part of the development review process, where appropriate.

11.3 GOAL #3

Develop a network of government and private interests that will foster bicycle and pedestrian facilities.

Objectives

- Coordinate state, county, and municipal capital improvement programs for the development of bicycle and pedestrian facilities.
- Coordinate and assist local efforts to obtain funding for new bicycle and pedestrian facilities.
- Encourage local governments to provide adequate funding for maintenance of bicycle and pedestrian facilities.
- Provide municipalities with information on liability issues for bicycle and pedestrian facilities.

Implementation Strategies

- Develop interlocal agreements for multi-jurisdictional facilities, which may include cost, maintenance, and construction.
- Encourage and educate employers to have workplace amenities such as showers, lockers, and changing facilities for employees that bicycle or walk to work.
- Encourage and educate employers to use financial and other incentives for employees to bicycle and walk to work.
- Encourage commercial property owners of employment centers to provide bicycle and pedestrian facilities such as paths and sidewalks.
- Recommend commercial property owners install bicycle storage facilities at employment sites in secure areas protected from inclement weather, such as in on-site garages.
- Encourage corporations, individuals, and groups to participate in “Adopt-a-Trail” programs.
- Encourage transit operators to establish or expand “bike-on-board” programs, where feasible.
- Update and maintain a depository of bicycle and pedestrian information.

11.4 GOAL #4

Promote public awareness and acceptance of bicycling and walking as alternative modes of transportation.

Objectives

- Encourage bicycle use and walking as alternatives to single occupancy automobile trips.
- Promote campaigns to heighten public awareness of safety issues.
- Encourage school districts, colleges, police departments, health clubs, bicycle shops, and other organizations to offer bicycle and pedestrian educational programs.
- Expand public education and safety programs in the school system for children and their parents.
- Promote public education programs on “rules of the road,” helmet use, and proper street crossing techniques.
- Increase public awareness of existing and future bicycle and pedestrian facilities, including those at transit stations and park and ride lots.

Implementation Strategies

- Educate automobile users on bicycle and pedestrian safety issues and on “sharing the road.”
- Retain the Bicycle and Pedestrian Public Advisory Committee (BiPED PAC).
- Develop a series of bicycle and pedestrian compatibility maps for public use as a companion effort to the Morris County Bicycle and Pedestrian Element.
- Publicize the Morris County Bicycle and Pedestrian Element to various interested groups through a public outreach effort.
- Install signs to inform bicyclists and pedestrians of the proper use of facilities.
- Enforce existing laws so that sidewalks are not used by bicyclists, with the exception of young children.

11.5 GOAL #5

Create safe bicycle and pedestrian facilities.

Objectives

- Identify and develop safe routes for children traveling to and from school.
- Eliminate hazards such as potholes, road debris, water accumulation, and low hanging tree branches.
- Support municipal efforts to enforce helmet laws.
- Recommend helmet laws be expanded to include all ages.
- Encourage municipalities to participate in a pedestrian safety sidewalk program with tripod signs.

Implementation Strategies

- Develop appropriate intersection improvements, signal timings, extensions of sidewalks, suitable signs, and crossing guards where children travel to and from school.
- Encourage the development and implementation of maintenance plans to eliminate hazards such as potholes, road debris, water accumulation, non-bicycle friendly stormwater grates, and low hanging tree branches.
- Encourage municipalities to keep detailed records of bicycle and pedestrian accidents to determine problem locations.
- Encourage citizens to report accidents to municipal, county, and state officials to assure the most accurate accident statistics.
- Encourage municipalities to consult appropriate design guidelines, such as AASHTO standards, the Manual of Uniform Traffic Control Devices (Section Nine guidelines), and NJDOT Bicycle and Pedestrian Facilities Planning and Design Guidelines to create the safest possible facilities.
- Encourage municipal snow removal practices that include clearance at pedestrian crosswalks.
- Encourage municipalities to enforce local ordinances for snow removal of sidewalks.

APPENDIX A

Glossary and List of Acronyms

Glossary

Advanced bicyclist: A bicyclist who is highly experienced, rides frequently, often has special training, and is confident in all traffic conditions.

Basic bicyclist: A bicyclist who is less comfortable in traffic and ride less frequently; however, they form the largest group of bicyclists.

Bicycle and pedestrian facilities: Any path, trail, sidewalk, shared roadway or storage facility used for the purpose of bicycle or pedestrian travel.

Bicycle lane: A lane used solely for bicycle travel, and are commonly marked with pavement striping and signage.

CAAA: Clean Air Act Amendments of 1990 - This act focuses on applying various alternative transportation measures to reduce carbon-dioxide and ozone, as they relate to mobile source emissions.

CBD: Central Business District - The largest, most intensively developed, mixed use area within a town or city, usually associated with the "downtown" area of a town or city.

Comparative negligence: A term used to describe the following situation: If an accident occurs when a bicyclist or pedestrian is only found partially responsible for an accident and he or she then may receive some compensation.

Contributory negligence: A term used to describe the following situation: If an accident occurs and a bicyclist or pedestrian is found to have been riding inattentively, then he or she may be found responsible.

Crosswalk: Any portion of a road distinctly indicated or marked for pedestrian crossing through the use of lines or of different surface materials.

Discretionary actions: An action which describes upper level government decisions.

Greenways: A linear open space established along a natural corridor or land, which may be situated along a railroad or utility right-of-way, which has been converted into a scenic, recreational route.

ISTEA: Intermodal Surface Transportation Efficiency Act of 1991 - This act provided approximately \$155 million for highways, highway safety, and mass transportation. It also included funding for bicycle and pedestrian facilities. The funding expired at the end of 1992.

"Kiss and ride": Access mode to transit where passengers are driven to a transit spot and left to board a transit unit and then met after their return trip.

MC RIDES, Inc.: Morris County Rides, Inc. – The transportation management association for Morris County and other northern New Jersey counties.

MCM: Morris County Metro - The local bus service for Morris County provided by PABCO Transit.

Ministerial actions: An action which is carried out by a specified legal order.

MPO: Metropolitan Planning Organization – An organization that develops plans and programs for metropolitan areas. Federal funds are distributed through this organization.

Multi-modal: Various types of modes of transportation used for travel such as automobiles, bicycles, in-line skates, and pedestrians, as well as others.

Multi-use path: A paved path which is utilized by different modes of travel which is and completely separated from vehicle traffic. They may be adjacent to a road or utility right-of-way.

Multi-use trail: A trail which is utilized by different modes of travel, which is out of the automobile right-of-way; also may be unpaved and made of earthen materials.

NJT: NJ Transit - The quasi-state government agency which manages a network of busses and trains in New Jersey.

NJTPA: New Jersey Transportation Planning Authority - The MPO for northern New Jersey.

Non-motorized modes of travel: Any travel mode which solely relies on human power.

Park-and-ride lots: A parking lot designed for drivers to leave their cars and use mass transit facilities beginning, terminating, or stopping at the park and ride facility. In some cases, they may be reached by bicyclists or pedestrians.

Path: A paved passage separate from vehicular traffic which travels through controlled property.

Pedestrian path: A path which is completely separated from the motor vehicle traveled way and maybe similar to a sidewalk. Many pedestrian paths are not adjacent to roads.

Pedestrian refuge islands: Small medians strategically placed along the highway. Many are located where intersection areas are large and crossing distances great.

Pedestrian trail: A trail which is solely utilized by pedestrians, both hikers and walkers.

Recreational bicyclists and pedestrians: People who participate in bicycling and walking as a leisure activity or as a form of exercise.

Right-of-way: The strip of land over which a public road is built; the land occupied by a rail line.

Shared roadway: A road without a designated bicycle lane, sidewalk, or path due to insufficient road width but which is utilized for bicycle or pedestrian activity. May also include signs and striping.

Sidewalk: The portion of a right-of-way designed for preferential or exclusive use by pedestrians.

Signage: Any device providing an informational or directional message to bicyclists and pedestrians.

SIP: State Improvement Program - New Jersey's program to meet the requirements of the CAAA of 1990 requirements.

TCM: Transportation Control Measures - Low cost techniques to be utilized to improve air quality.

TDM: Travel Demand Management - Strategies aimed at reducing the number of vehicle trips, shortening trip lengths, and removing vehicle trips from peak travel hours.

TEA 21: Transportation Efficiency Act of 21st Century - This transportation reauthorization bill continues the transportation goals, set by ISTEA, through the year 2003.

TIP: Transportation Improvement Program - Five year capital programming document.

Traffic calming: Includes a variety of physical alterations to reduce vehicle speed, to create a safer environment for bicyclists and pedestrians. Seeks to reduce the dominance and speed of motor vehicles.

Traffic control device: A signal, marking, or other device placed on or adjacent to a street or highway to regulate, warn, or guide traffic.

Traffic-actuated signal: Control signals that are electronically activated by the presence or absence of vehicles.

Trail: An unpaved passage made of earthen material, usually located in preserved area.

VMT: Vehicle Miles Traveled - A measurement of total miles traveled by vehicles in an area for a specific time period.

Young child bicyclist: Most child bicyclists lack adequate judgement and do not usually ride on streets unless supervised by an adult; however, they are frequent users of bicycles.

Acronyms

AADT: Annual Average Daily Traffic

AASHTO: American Association of State and Highway Transportation Officials

ADA: Americans with Disabilities Act of 1990

B.I.K.E: Biking Is Kind to the Environment

BHSI: Bicycle Helmet Safety Institute

BiPED PAC: Bicycle and Pedestrian Public Advisory Committee

CDBG: Community Development Block Grant

CMAQ: Congestion Mitigation and Air Quality

DCA: New Jersey Department of Community Affairs

DVRPC: Delaware Valley Regional Planning Commission

FHWA: Federal Highway Administration

FTA: Federal Transit Administration

IMBA: International Mountain Biking Association

ITE: Institute of Traffic Engineers

MAPS: Morris Area Paratransit System

MCDOTM: Morris County Division of Transportation Management

MUTCD: Manual of Uniform Traffic Control Devices

NAAQS: National Ambient Air Quality Standards

NBWS: National Bicycling and Walking Study

NHS: National Highway System

NHTSA: National Highway Traffic Safety Administration

NJDOT: New Jersey Department of Transportation

NYS&W: New York, Susquehanna, & Western Railroad

SDRP: State Development and Redevelopment Plan

SJTPO: South Jersey Transportation Planning Organization

SOV: Single Occupancy Vehicle

STP: Surface Transportation Program

TMA: Transportation Management Association

TTF: Transportation Trust Fund

UCC: Urban Coordinating Council

US EPA: United States Environmental protection Agency

USDEP: United States Department of Environmental Protection

APPENDIX B

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APPENDIX C

Facility Selection Criteria

When a facility improvement is desired, its primary purpose (e.g., non-recreational or recreational) and the following factors should be considered to determine its type, location, and priority:

1. **Barriers** - In some areas, there are physical barriers to bicycle travel, caused by topographical features, freeways, or other impediments. In such cases, providing a facility to overcome a barrier can create new opportunities for bicycling.
2. **Accidents** - The reduction or prevention of bicycle accidents (i.e., bicycle/motor vehicle, bicycle/bicycle, bicycle/pedestrian and single bicycle accidents) along routes is important. The potential for alleviating accident problems through the improvement of a facility should be assessed. Plans should be reviewed to eliminate the introduction of new accident problems.
3. **Directness** - For utilitarian bicycle trips, facilities should connect traffic generators and should be located along a direct line convenient for users.
4. **Access** - In locating a bicycle path, consideration should be given to the provision for frequent and convenient bicycle access, especially in residential

area. Adequate access for emergency, maintenance and service vehicles should also be considered.

5. **Attractiveness** - The scenic value is particularly important along a facility intended to serve a primarily recreational purpose.
6. **Security** - The potential for criminal acts against bicyclists, especially along remote bicycle paths, and the possibility of theft or vandalism at parking locations should be considered.
7. **Delays** - Bicyclists have a strong inherent desire to maintain momentum. If bicycles are required to make frequent stops, they may tend to avoid the route or disregard the traffic controls.
8. **Use conflicts** - Different types of facilities introduce different types of conflicts. Facilities on the roadway can result in conflicts between bicyclists and motorists. Bicycle paths can involve conflicts between bicyclists, moped operators, roller skaters and pedestrians on the facility and between bicyclists and motorists at highway and driveway intersections.
9. **Maintenance** - Maintenance-sensitive design is an important feature. An improperly maintained bikeway will often be shunned by bicyclists in favor of a parallel roadway.
10. **Pavement surface quality** - Bikeways must be free of bumps, holes and other surface irregularities if they are to attract and satisfy the needs of bicyclists. Utility covers and drainage grates should be at grade and, if possible, outside the expected area of travel. Approaches to railroad crossings should be improved as necessary to provide for safe bicycle crossings.
11. **Truck and bus traffic** - Because of their aerodynamic effect and width, high-speed trucks, buses, motor homes, and trailers can cause special problems for bicyclists. Where bus stops are located along a route, conflicts with bus loading and discharge and pavement deterioration may also be problems.
12. **On-street motor vehicle parking** - The turnover and density of on-street parking can effect bicyclist safety (e.g., opening car doors and cars leaving angle parking spaces).
13. **Traffic volumes and speed** - For facilities on roadways, traffic volumes and speeds must be considered along with the roadway width. Commuting bicyclists frequently use arterial streets because they minimize delay and offer continuity for trips of several miles. It can be more desirable to improve heavily traveled high-speed streets than adjacent streets, if adequate width for all vehicles is available on the more heavily traveled street. When this is not possible, a nearby parallel street may be improved for bicyclists, if stops are minimal and other route conditions are adequate. When such a parallel facility is improved, care must be taken that motor vehicle traffic is not diverted. In general, inexperienced bicyclists will not ride on heavily traveled high-speed arterials but will prefer quieter streets. Thus, cyclists' preferred routes may change over time as their skill levels change.
14. **Cost/funding** - Location selection will normally involve a cost analysis of alternatives. Funding availability can limit the alternatives; however, it is important that a lack of funds not result in a poorly designed or constructed facility. It is usually more desirable not to construct a bicycle facility than to construct a poorly planned or designed facility. The decision to implement a bikeway plan should be made with a conscious, long-term commitment to a proper level of maintenance. If only a

small amount of funds is available, emphasis should usually be given to low-cost improvements (e.g., bicycle parking, removal of barriers and obstructions to bicycle travel, roadway improvements, and non-construction projects such as mapping).

15. Local laws - Bicycle programs must reflect local laws and ordinances. Bicycle facilities must not encourage or require bicyclists to operate in a manner inconsistent with the adopted rules of the road.

16. Bridges - Bridges can serve an important function by providing bicycle access across barriers. However, some

features found in bridges can be unsuitable where bicyclists are to be accommodated. The most common of these are curb-to-curb widths that are narrower than the approach roadways (especially where combined with relatively steep grades), open grated metal decks found on many movable spans, low railings or parapets, and certain types of expansion joints that can cause bicyclists steering difficulties.

17. Intersection conditions - A high proportion of bicycle accidents occur at intersections. Facilities should be selected so as to minimize the number of crossings.

APPENDIX D

Cartway And Right-Of-Way Widths

Cartway and Right-of-Way Widths

Street Type and Intensity		Total Average Daily Traffic	Traveled Way (feet)	Number of Parking Lanes	Parking Lane Width (feet)	Cartway Width (feet)	Curb or Shoulder	Sidewalk (SW) or Graded Area (GA)	Right-of-Way Width (feet)
Residential Access	Low intensity	1500	20	1	8	28	none	1 SW 1 GA	50
	Medium	1500	20	1	8	28	curb	2 SW	50
	High with on-street parking	1500	20	1	8	28	curb	2 SW	50
	High with off-street parking	1500	20	0	0	20	none	2 SW	50
Neighborhood	All intensities	1500	14	2	16	30	curb	2 SW	50
Minor Collector	Low intensity with no parking	3500	20	0	0	20	none	1 SW 1 GA	50
	Low with one parking lane	3500	20	1	8	28	curb	1 SW 1 GA	50
	Medium	3500	20	1	8	28	curb	2 SW	50
	High with one parking lane	3500	20	1	8	28	curb	2 SW	50
	High with two parking lanes	3500	20	2	16	36	curb	2 SW	60
	High with off-street parking	3500	22	0	0	22	curb or shoulder	2 SW	50
Major Collector	Low intensity	7500	24	0	0	24	none	2 SW	50
	Medium and High	7500	24	0	0	24	curb or shoulder	2 SW	50 if curb, 54 if shoulder
Special Purpose Streets	Rural street	500	20	0	0	20	none	2 GA	40
	Rural lane	200	18	0	0	18	none	2 GA	40
	Alley (one way)					9			11
	Alley (two way)		18	0	0	18	none	2 GA	22
	Cul-de-sac	250							
	Marginal access street								
	Divided street								
	Parking loop (one-side parking)		24	1	18		curb		42
	Parking loop (two-side parking)		24	2	36		curb		60

Source: Residential Site Improvement Standards

APPENDIX E

Site Design Criteria

**Site Review Checklist
for Pedestrian Facilities**

Overall Pedestrian System:

- Are both utilitarian and recreational walking considered in the plan?
- Are utilitarian paths direct? Do they provide for connections to existing pedestrian magnets near by?
- Do recreational pathways take advantage of unique site features? Are they generally visible from homes or other buildings?
- Does the pedestrian system consider the type and probable location of futures development on adjacent or nearby parcels of land? Is there flexibility to provide direct connections to adjacent parcels, should that be desired later on?
- Are pedestrian entrances clearly evident through either design features, topography, signing or marking?
- Are walkways along the street separated and buffered from traffic as much as possible?

Safety and Security:

- Are crossings of wide expanses of parking lot held to a minimum?
- Are pathways generally visible from nearby buildings and free from dark, narrow passageways?
- Is adequate lighting provided for nighttime security?
- Are sight distances adequate for motorists to see pedestrians at intersections and other places where people are likely to enter the roadway?
- Do pathways lead to the safest crossing points?
- Are pedestrian/vehicle conflict kept to a minimum?
- Are pedestrians clearly visible to traffic wherever they cross the street?

Walking Surfaces and Amenities:

- Are the walking areas scaled to the pedestrian?
- Are the walking surfaces skid-resistant and sloped for drainage?
- Are the provisions made for curb ramps and are they properly designed?
- Are major changes in grade properly treated with stairways and handrails?

Source: Planning, Design and Maintenance of Pedestrian Facilities, FHWA, 1989

APPENDIX F

Funding Case Study

Listed below is a case study which details the approximate major costs associated with the construction of the Traction Line Extension, built in 1997. This estimate does not include design, study, or acquisition costs.

This facility was constructed on a former trolley line right-of-way between Convent Station and Madison, a distance of 0.89 miles or 4,718 feet. All funding for this multi-use path was obtained through a federal grant from the Transportation Enhancement Program.

Site clearing	\$14,500	Chain Link Fence.....	\$100,516.90.
Roadway Excavation	\$24,596	6 ft high, 7,946 linear ft. at	\$12.65 per linear ft.
2.24 cubic yds at \$11 per cubic yd.		Chain Link fence gates.....	\$230 each
Dense graded aggregate	\$10,340	6 ft. wide	
(stone) base, 4 in. thick		Signs:	
2,350 sq. yds. at \$4.40 per sq. yd.		21" x 15"	\$95 each
Base course	\$17,064	12" x 24"	\$85 each
bituminous stabilized Mix 1-2		18" x 24"	\$100 each
540 tons at 31.60 per ton		30" x 30"	\$125 each
Bituminous concrete	\$2,100.00	30" x 60"	\$190 each
leveling course, mix 1-5, 60 tons		9" x 12"	\$75 each
at \$35.00 per ton		6" x 24"	\$75 each
Drainage.....	\$7,950	Landscaping:	
Reinforced concrete culvert pipe ..	\$2,800	Topsoil	\$15,980.00
18 in., 100 linear ft. at \$28 per		4" thick , 9,400 sq. yd. at \$1.70	
linear ft.		per sq. yd.	
Concrete sidewalk.....	\$320	Seeding.....	\$4,230
4 in. thick, 8 sq. yds. at \$40 per		9,400 sq. yd. at \$0.45 per sq. yd.	
sq. yd.			

This is an example of a funded and completed project within Morris County. Agencies may apply for similar types of funding if they meet the application criteria.

APPENDIX G

International Mountain Bicycling Association (IMBA) Rules of the Trail

MOUNTAIN BIKERS

Help make outdoor recreation safe and enjoyable for everyone. Please follow IMBA's Rules of the Trail. Your cooperation will help preserve trails and reduce user conflict .

IMBA RULES OF THE TRAIL

- 1 Ride on open trails only.**
- 2 Leave no trace.**
- 3 Control your bicycle.**
- 4 Always yield trail.**
- 5 Never scare animals.**
- 6 Plan ahead.**



Riding on public trails is a privilege. Do your part:
RIDE RESPONSIBLY.



I·M·B·A
INTERNATIONAL MOUNTAIN BICYCLING ASSOCIATION
P.O. BOX 7578 • BOULDER CO 80306