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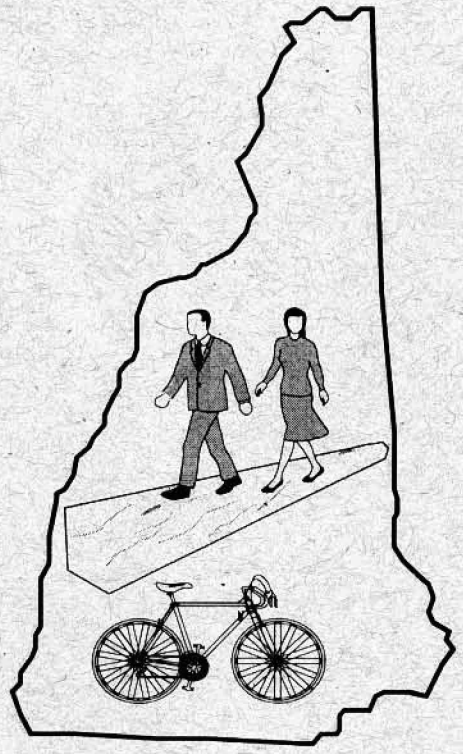
NEW HAMPSHIRE STATEWIDE BICYCLE AND PEDESTRIAN PLAN



PREPARED BY
N.H. DEPARTMENT OF TRANSPORTATION
BUREAU OF TRANSPORTATION PLANNING

IN COOPERATION WITH
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

JANUARY, 1995

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

CHARLES P. O'LEARY, JR.
COMMISSIONER

December 9, 1994

As Commissioner of the New Hampshire Department of Transportation, I am pleased to adopt the New Hampshire Statewide Bicycle and Pedestrian Plan, as an element of the State's Long Range Statewide Transportation Plan.

Through its policies and practices, the Department recognizes and supports bicycling and walking as modes of transportation, and will work towards providing and maintaining suitable facilities.

I wish to thank the Bicycle and Pedestrian Transportation Advisory Board for its efforts in advising the Department during the preparation of the Plan. Due to budgetary limitations and legal restrictions, it was not possible to accept all of the recommendations made by the Board. The Department, however looks forward to continuing its cooperative efforts with the Advisory Board in order to provide the best feasible transportation system.

Sincerely,

Charles P. O'Leary, Jr.
Commissioner

CPO/deb

JOHN O. MORTON BUILDING - 1 HAZEN DRIVE - P.O. BOX 483 - CONCORD, N.H. 03302-0483
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New Hampshire Statewide Bicycle and Pedestrian Plan

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This document was prepared in cooperation with the Federal Highway Administration, with the assistance of the State's regional planning commissions, metropolitan planning organizations, and the Bicycle and Pedestrian Transportation Advisory Board.

The contents of this document reflect the views of the New Hampshire Department of Transportation. The contents does not necessarily reflect the views of the Federal Highway Administration, regional planning commissions, metropolitan planning organizations, or the Bicycle and Pedestrian Transportation Advisory Board.

EXECUTIVE SUMMARY

In accordance with Section 1033 of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, the New Hampshire Department of Transportation (NHDOT) has developed a bicycle and pedestrian plan for the state. The bicycle element of this plan is an update of a plan produced by the Department in 1977 entitled *Shared Roadway Bike Lane Study*.

Advisory Brd

Another provision of ISTEA was the assignment of a bicycle/ pedestrian transportation coordinator within the NHDOT to develop and manage the plan and all related programs. To assist in the development process, a Bicycle and Pedestrian Transportation Advisory Board was established as a means of advising NHDOT on pertinent issues and items considered in the plan, develop a statewide bike route system, and provide overall guidance to the program in general. The Board is made up of representatives from various bureaus within the NHDOT, other state agencies, the Federal Highway Administration, and other organizations involved in bicycle and pedestrian related issues.

In developing the plan, specific goals and objectives were outlined. Essentially, the plan would serve to recognize, support, and encourage bicycling and walking as an alternative to motorized forms of transportation and as a legitimate element of the State's broader intermodal transportation system.

Regional Plans developed

As part of the plan, each of the State's regional planning commissions and metropolitan planning organizations were asked to develop their own regional bicycle/pedestrian plans. The regional plans were the basis for selecting routes for the statewide bike route system, which would be made up of shared roadway bike lanes, as well as separate bike path facilities. In developing the statewide bike route system, the connection of population and activity centers, the reduction of the number of single occupant motor vehicle trips, and the conservation of energy were taken into consideration.

Design Standards

Planning and design criteria for bicycle facilities were established. Critical factors in planning such facilities include purpose and need, project support, operation and maintenance responsibilities, cost of facility, and adherence to current design criteria. In areas with shared roadway bike lanes, design criteria suggests a minimum 4 foot paved shoulder be provided. Separate bike paths are recommended to be at least 8 feet in width.

Funding for bicycle/pedestrian projects may be available from a variety of sources, with each set of funds having its own unique eligibility requirements. ISTEA funding categories include National Highway System (NHS), Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) Improvement Program, and Bridge Program funds.

A project selection process is established to take proposed projects from their inception through to programming and implementation. The selection process, which would take place in 2 year cycles, revolves around the actions of the regional planning commissions and metropolitan planning organizations, the NHDOT, the Governor, the Governor's Advisory Commission on Intermodal Transportation (GACIT), the State Legislature, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the Environmental Protection Agency (EPA). During the selection process, public input will be solicited at several key steps. The program is set up such that proposed projects are processed through or generated by the regional planning commissions or metropolitan planning organizations. The process described applies to bicycle and pedestrian projects, as well as transit and highway projects.

Implementation of projects would involve coordination within the NHDOT, as well as cooperative efforts with other agencies and organizations. Prioritization of bicycle, pedestrian, and other projects will take place in the Statewide Transportation Improvement Program (STIP). Throughout the implementation of the plan, the Bicycle and Pedestrian Transportation Advisory Board will continue to work with the NHDOT and provide guidance.

Procedures for maintenance of facilities are established. This includes proper delineation, roadway resurfacing procedures, and periodical inspection of facilities. Upon completion of viable segments of the system as determined by NHDOT, the segments will be designated as bicycle routes, and properly identified.

Safety and enforcement, involving programs and education campaigns not related to the construction of actual facilities, would play an important role in the Plan. Emphasis is placed on the wearing of bicycle helmets as a means of lessening or preventing injuries due to bicycle crashes and falls.

Although pedestrian trips are recognized as generally being more

local and urban in nature in comparison to bicycle trips, pedestrians would continue to be allowed, with a few exceptions, on any public roadways or facilities, along with motor-vehicles and bicycles. Further details on pedestrian facilities and programs in local areas are contained in the regional bicycle and pedestrian plans.

CHAPTER 1

INTRODUCTION AND PURPOSE

New Hampshire's 1977 Statewide Bicycle Plan has been updated to conform with the federal Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. It also has been expanded to include pedestrian travel. The policy of the ISTEA is "...to develop a National Intermodal Transportation System that is economically efficient and environmentally sound, provides the foundation for the Nation to compete in the global economy, and will move people and goods in an energy efficient manner." The ISTEA emphasizes innovative planning and flexibility in project funding based on intermodal transportation plans that address all modes of transportation, including bicycle and pedestrian facilities. Funding sources and suggested techniques for implementing bikeways are examined. The distribution of funds is the responsibility of the states.

The ISTEA legislation is very broad ranging. The purpose of ISTEA is enunciated in its statement of policy. The new ISTEA program emphasizes intermodal efficiency of systems rather than the previous emphasis on new construction of highways. According to ISTEA's Policy Statement:

> "The National Intermodal Transportation System shall consist of all forms of transportation in a unified, interconnected manner, including the transportation systems of the future, to reduce energy consumption and air pollution while promoting economic development and supporting the Nation's pre-eminent position in intermodal commerce... Social benefits must be considered with particular attention to the external benefits of reduced air pollution, reduced traffic congestion and other aspects of the quality of life in the United States... Financial assistance will be provided to State and local governments and their instrumentalities to help implement National goals relating to mobility for elderly persons, persons with disabilities, and economically disadvantaged persons."

The NHDOT, in cooperation with metropolitan planning organizations (MPOs), and regional planning commissions (RPCs) is to develop transportation plans and programs. These plans and programs must provide for the development of intermodal transportation networks which will function as the transportation system for the state, the metropolitan areas, and the nation as a whole. In addition, the planning agencies must develop long range

plans for bicycle and pedestrian transportation which are incorporated into the long range intermodal transportation plan for their regions. Once the long range plan for bicycle and pedestrian transportation is incorporated into the long range transportation plans for each region, they are then consolidated and coordinated to produce a long range intermodal transportation improvement plan for the entire state.

An increase in bicycle usage in recent years has created a demand for suitable facilities. This increase is due in part to a heightened awareness of health and fitness and the advantage of the mobility and efficiency of the bicycle. This document responds to that growing interest in bikeways throughout the state. One advantage of the bicycle as an alternative mode of transportation is related to environmental quality. It is necessary to maintain and improve our living environment by reducing air pollution and general congestion throughout the transportation network.

This plan is intended to fulfill the ISTEA requirements by presenting a system of bikeway routes for communities throughout the state. The plan will be coordinated statewide with each regional planning commission's bicycle/pedestrian plan. A series of criteria is presented for the location and design of bicycle transportation routes.

CHAPTER 2

GOAL AND OBJECTIVES

GOAL: The overall goal of the NHDOT Statewide Bicycle and Pedestrian Plan is **to recognize, support, and encourage bicycling and walking as alternatives to motorized forms of transportation and as an element of the state's intermodal transportation system.**

OBJECTIVES:

To achieve its goal:

1. The NHDOT will strive to adopt and maintain an interconnected network of safe facilities to integrate bicycles with other modes of transportation.

The network will be comprised of interconnected existing state and

town maintained roads and bicycle paths that are considered to be safe and efficient for bicycle travel. The network will be adopted based on full consideration of the recommendations of the regional planning commissions and on public comments.

Mix of facilities (bike only)

The backbone of the network will consist of **shared roadways**. **Bicycle lanes** will be used where dictated by safety and usage considerations. In some instances, **bicycle paths** will be used where needed for safety or to accommodate unusually high bicycle traffic. Where appropriate, "Bike Route" signs will be installed, both to guide bicyclists and to alert motorists to the increased possibility of the presence of bicyclists on the road.

It is emphasized that the establishment of this network does not mean that roads not on the network are not suitable for bicycling or that bicyclists would not be permitted on such roads. Bicycles will continue to be permitted on all roads where they are currently permitted.

Once adopted, the NHDOT, in cooperation with other State agencies, as appropriate, will develop a map depicting the network (including route descriptions), and will make it available to the general public.

2. The NHDOT will promote bicycling and walking as viable modes of transportation.

The NHDOT recognizes that bicycling and walking, when used in lieu of motor vehicles, can have measurable impacts on efforts to improve air quality, reduce energy usage, and reduce congestion.

The NHDOT will work cooperatively with the state's safety, environmental, and vacation travel agencies in conjunction with regional planning commissions to develop materials to be used in promotional campaigns to encourage bicycling and walking for commuting, recreation, and tourism.

3. The NHDOT will identify specific bicycle facility needs on the state transportation system and implement corrective actions within budgetary limitations.

Many people do not ride bicycles or ride infrequently due to the fear of riding safely with accompanying traffic on the roadway. At the state, regional, and local levels, there are three basic methods to provide for the safety of cyclists and address the growing interest in bicycling: education, hazard free roads, and the use of bikeways. By providing these opportunities, potential bicyclists will be

encouraged to ride bicycles more frequently.

The first method is better educational programs that teach motorists and cyclists to safely co-exist on the road. Such programs would insure that cyclists have the necessary knowledge to ride safely. Bicyclists share roadways with automobiles and trucks, creating an array of serious hazards to inexperienced cyclists resulting from the close proximity to faster moving vehicles and motor vehicle doors being opened into the travel lane. This problem is intensified by motorists who are also inexperienced with sharing the road with cyclists, particularly in rural areas.

The second method is to provide hazard free roadways. This requires that debris be removed regularly from the sides of the roads and shoulders. Potholes and other hazards will be repaired. Storm grates with elongated slot openings that could trap bicycle wheels will be replaced with safer designs or will be recessed behind the curb line.

The designation of bike lanes, the third method, is often a good solution to the dangers of bicycle/vehicle conflicts. Well designed bike lanes can give novice cyclists a chance to develop skills for safe confident riding in traffic. They offer both motorists and bicyclists improved predictability and awareness. If necessary, construction of an independent bike path may also be considered to minimize bicycle/vehicle conflicts.

The NHDOT will identify funding opportunities for bicycle facilities and improvements. If practical, the NHDOT will assist local agencies, groups, and individuals in funding bicycle transportation projects.

AASHTO

4. The NHDOT will develop and adopt roadway design treatments to accommodate bicyclists safely onto the highway network, and incorporate these standards into projects where appropriate, including bridge projects, on the state and regional bicycle route system.

The NHDOT has adopted bikeway design standards developed by the American Association of State Highway and Transportation Officials (AASHTO), and will continue to develop and adopt, as necessary, design treatments to safely accommodate bicyclists. Standards may be modified for certain elements as knowledge and experience is gained. The standards will be applied to both special purpose bicycle facility projects and to general purpose highway projects where bicycles are permitted.

5. The NHDOT will act cooperatively among state agencies in developing programs to enhance and improve bicyclist and pedestrian safety and provide a statewide resource through its appointed bicycle and pedestrian transportation coordinator.

Providing safe facilities for bicyclists and pedestrians, combined with ongoing training and education for people of all ages, will serve to enhance bicycling and walking for all purposes.

The NHDOT will work cooperatively to develop a program of bicycle and pedestrian safety education to improve the understanding and effectiveness of bicycling and walking as modes of transportation. The NHDOT will coordinate and provide assistance to other state agencies and bicycling organizations in developing, producing, and distributing bicycling materials and information to:

A. Promote helmet use for all bicyclists

B. Maintain a resource library of bicycle and pedestrian safety and bicycle use information for riders of all ages

C. Encourage participation by local police departments, school systems, civic organizations, and other groups in a program of bicycle and pedestrian safety education for people of all ages.

The NHDOT has assigned the position of Bicycle and Pedestrian Transportation Coordinator. The Coordinator will serve as a single point of contact and information resource within the state in order to improve the understanding of bicycle and pedestrian matters. The Coordinator will also develop procedures to handle public comments, questions, and complaints.

The NHDOT will collect and analyze accident and injury data involving bicyclists and pedestrians, and will use that data to supplement pending facility design, construction, and maintenance decisions.

6. The NHDOT will provide or fund bicycle support facilities through its Transportation Enhancement and Congestion Mitigation and Air Quality Programs, where appropriate, and will encourage the provision of such facilities by others.

The NHDOT will provide bicycle support facilities, such as safe and effective bicycle storage lockers, at park and ride lots, other intermodal stations, and trip destinations in locations and situations under its jurisdiction. The NHDOT will seek appropriate public-

private partnerships with private employers, other transportation providers, and public agencies, to provide bicycle support facilities at other locations.

CHAPTER 3

BACKGROUND

In January, 1977, the NHDOT prepared the "Shared Roadway Bike Lane Study" as a proposed plan for rural bicycle routes in New Hampshire. The report outlined a program that was divided into two phases. The first phase defined immediate actions, while the second phase involved an in-depth analysis of bicycle accident statistics, analysis of proposed projects upon their completion, and public involvement.

Phase I

A. Develop an overall plan for "shared roadway" bicycle routes throughout the state.

B. Develop standards for design and maintenance of routes.

C. Establish primary objectives.

Phase II

A. Monitor bikeway projects upon completion.

B. Solicit input from public and private agencies to aid in the continuous planning and development process consistent with the overall plan.

C. Investigate methods of controlling and policing the designated routes.

D. Assist in the establishment of complementary facilities in cooperation with other public and private agencies.

E. Investigate the establishment of public education programs relating to bicycle safety through the cooperation of other public and private agencies.

F. Investigate methods of full public awareness of bicycle facilities and encourage the use of them.

With the cooperation of representatives from the NH Department of Resources and Economic Development (DRED) and bicycling organizations, (such as the Granite State Wheelmen), as well as the regional planning agencies, a network of bike routes was established, taking into account factors of population, recreational areas, services, and availability of existing paved shoulders. Regional bike route systems were first established through the regional planning agencies, then linked by a series of connectors, forming a statewide bike route system. Design criteria recommends a minimum shoulder width of four feet for shared roadway bike lanes and eight feet for two-way bike paths. Sections within the established system that did not meet the minimum four foot shoulder width were then identified. Follow-up maintenance, signing, and striping of routes upon completion was also addressed.

Under this plan, only a handful of projects were built, as there was limited funding available at the time and funds ran out quicker than anticipated. These projects include shared roadway bike lanes on U.S. Route 3 from Hooksett to Pembroke, a combined shared roadway and bike path along N.H. Route 1-A in Rye leading into and through Odiorne Point State Park, a bike path along N.H. Route 49 in the center of Waterville Valley, and bike lanes on a short section of U.S. Route 4 in Lebanon. Other existing facilities on the statewide system include bike paths along I-89 in Concord and Enfield, I-93 through Franconia Notch, and the Spaulding Turnpike at Dover Point. Though the Hooksett to Pembroke job was the longest, signing and striping was never done because it was not a completed route from Manchester to Concord. The 1977 plan, however, remained in effect, and the original report was considered the official document of the NHDOT regarding bicycle facilities.

With the enactment of the ISTEA, each state was required to develop a bicycle and pedestrian plan or revise and update any existing plans. Each state was also to establish or assign the position of bicycle/pedestrian coordinator. The NHDOT assigned the bicycle/pedestrian coordinator and developed a process to revise its existing bike plan.

To assist in the process, a Bicycle and Pedestrian Transportation Advisory Board was established as a means of determining pertinent issues and items to be addressed in the plan and developing a statewide bike route system, as well as providing overall guidance to the program in general. In addition to the coordinator, the Board consists of representation from the following agencies and organizations:

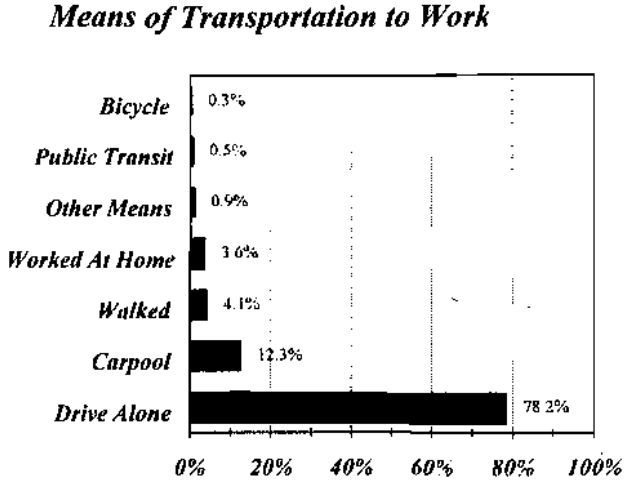
Bureau of Transportation Planning (NHDOT)
Bureau of Highway Design (NHDOT)
Bureau of Highway Maintenance (NHDOT)
Bureau of Traffic (NHDOT)
NH Office of State Planning
NH Department of Resources and Economic Development
NH Department of Safety
Federal Highway Administration
Metropolitan Planning Organizations
Regional Planning Commissions
Dartmouth-Hitchcock Injury Prevention Center
American Automobile Association
Audubon Society of New Hampshire
Granite State Wheelmen
Seacoast Area Bicycle Routes

A series of meetings were held over a period of several months. With the completion of this document, it is the intention of the NHDOT to retain the Advisory Board in order to keep the NHDOT advised and in touch with bicycle and pedestrian related issues over the long term.

CHAPTER 4

BICYCLE FACTS AND TRENDS

Bicycle ridership has increased in recent years for various reasons, both personal and practical. The Bicycle Institute of America (also known as the Bicycle/Pedestrian Federation of America), a partnership of bicycle organizations, industry representatives, and private citizens, based in Washington, D.C., estimated that there were 99 million persons in the United States in 1992 who, at least occasionally, rode a bicycle. Adults represent approximately 55 million of that total, children, the remaining 44 million. Commuting statistics from



the 1990 U.S. Census reveal that approximately 0.3 percent of all commuters in New Hampshire use a bicycle as their primary means of transportation. The graph on the previous page shows a comparison of the various means of commuting.

Growth trends in bicycle ridership reflect significant increases in all categories of the bicycling population. The number of adult bicyclists classified as riding regularly totalled 31 million in 1992, a thirteen percent increase over the previous year. Estimates suggest that the total adult bicycling population increased by another ten percent in 1993 to nearly 35 million. Since 1986, commuter bicycling has increased an average of ten percent per year to a total of 4.3 million in 1992. The League of American Bicyclists reports that a survey conducted by the Gallup Organization suggests that by the year 2010, total bicycling ridership will approach 60 million. Of the various categories of bicyclists, the greatest growth (about 60 percent) over the past several years has been among persons who ride mountain bicycles. These increases are attributed to transportation planners' efforts to improve inner-city bicycle travel and greater public awareness of the environmental and health benefits of bicycling.

Bicycle Institute of America statistics reveal that retail sales of bicycles increased significantly in the last twenty years. The total number of bicycles sold in the United States peaked in the mid-1970s. Bicycle use increased due to the drastic rise in the price of Middle East exported oil. A resurgence in bicycle sales occurred in the mid-1980s, and has continued to the present, largely due to the public's strong interest in mountain bicycles, which, as previously mentioned, has become the basic bicycle type most preferred by adults in the United States. According to estimates from the Bicycle Manufacturers Association, approximately 11.6 million bicycles were sold in the United States in 1993, with 7 million of those being domestic shipments and 4.6 million in imports. A large variety of bicycle models are available today reflecting the various changing needs of bicycle users.

CHAPTER 5

PLANNING AND DESIGN CONSIDERATIONS

Bicycle facilities can be constructed as incidental features of larger highway projects or as independent projects. Both types have been successfully implemented in the past. Initial planning considerations include the following:

1. Determine if there is project support at the local, state, and federal levels, and whether the project relates to other priorities in the local master plan, regional bicycle plans, the Statewide Bicycle and Pedestrian Plan, or the Statewide Transportation Improvement Plan.

2. Determine the operation and maintenance responsibilities both now and in the future.

3. Determine the cost of the bicycle facility, including cost of construction and any necessary right-of-way acquisition. (A sample program estimate is shown in Exhibit 1 to assist communities in determining cost estimates for proposed bicycle facilities.)

4. Design of the project should follow current design criteria.

A detailed set of guidelines for bicycle facility planning is contained in Appendix B.

During the preliminary design phase of a bicycle facility, investigating and gathering data on existing conditions is necessary. Local bicycling practices need to be observed. Origin-destination surveys may prove to be the only accurate method of determining local trip patterns. In some cases, it may need to be determined whether the directness or the quality of the trip is more important. Planning will be required to forecast future bicycle trip demand. Finally, continued public participation is essential during this preliminary phase so that all pertinent information is made available for comment and input.

The design of bicycle facilities should follow the most current information available. The NHDOT has used and will continue to use the design guidelines set forth in the "Guide for the Development of Bicycle Facilities" prepared by the AASHTO, dated August, 1991. This reference document discusses the planning, design, and maintenance of these facilities. The Guide discusses both shared roadway bike lanes and separate bike path facilities.

The Federal Highway Administration recently published a report entitled "Selecting Roadway Design Treatments to Accommodate Bicycles", which gives the designer a correlation between shared lane width and annual average daily traffic (AADT), vehicle operating speeds, and type of bicyclist. This can be used to determine how safe an existing facility is and what, if any,

corrective measures are needed in the future.

The primary element of design for the shared roadway portion of the statewide bike route system involves the construction of paved shoulders, although independent bike paths may be appropriate in some cases. It has to be assumed that automobiles will be crossing the bike lanes, and at times automobiles and maintenance vehicles will encroach upon them. For this reason, shoulders should be constructed to adequately support the heavier loads.

Soil conditions will be carefully investigated where bicycle lanes are to be added to existing sections of highway. Differential settlement could occur between the new shoulder and old travelled way during periods of freezing and thawing. In most instances, it would be desirable to match the shoulder sub-base depth to that of the existing roadway. This would include a minimum of 6 inches of crushed gravel under the additional pavement. In cases where a stable sub-base exists under the roadway, a minimum of 8 inches of gravel and 6 inches of crushed gravel will be used. Additional sand and/or gravel may be needed to match the subsurface depth of existing roadway. In all cases, 3 inches of hot bituminous pavement will be provided for a minimum of 4 feet in width (Exhibit 2). Two way bicycle travel adjacent to the travelled way on one side of the highway is not permitted under New Hampshire Motor Vehicle Laws, therefore a minimum 4 foot shoulder would be required on both sides of the highway. Where there is curbing, 5 foot shoulders should be used.

Where applicable, bicycle paths constructed as separate facilities would carry two way bicycle traffic and, other than maintenance vehicles and snowmobiles where allowed by local ordinance, would be limited to non-motorized transportation. It is recommended that this type of facility have a width of at least 8 feet, with a minimum of 6 inches of crushed gravel, 8 inches of gravel, and a pavement thickness of at least 2 inches (Exhibit 3).

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION
PROGRAM / PRELIMINARY ESTIMATE

Fed. Proj. No.
State No.

Town of:
County of:
Name of Road:
Type: SPECIAL BIKEWAY PROJECT

Date:
Length: Miles
Pavement: Ft. Wide
Shoulders: Ft. Wide

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	PRICE	AMOUNT
	Major "Bikeway/Bikepath" Construction Items:				
	******List of Typical Items*******				
	Clearing and Grubbing				
	Common Excavation and/or Borrow				
	Rock Excavation				
	Crushed Gravel				
	Gravel				
	Sand				
	Hot Bituminous Pavement				
	Curbing				
	Guardrail				
	Uniformed Officers or Flaggers				
	Permanent Signs ($1000/mi.)				
	Fine Grading ; 12' wide ($8000/mi.)				
	Maintenance of Traffic				
	Construction Signs and Warning Devices ($1000/mi.)				
	SUB-TOTAL #1				
	Misc. Items (15-20%)				
	SUB-TOTAL #2				
	Drainage (15-25%) rural/urban				
	SUB-TOTAL #3				
	Water Pollution Control (5-10%)				
	Mobilization (5-10%)				
	SUB-TOTAL #4				
	CONTRACT TOTAL				
	Additional Project Costs:				
	Preliminary Engineering (P.E.) 10%-20%				
	Right-of-Way (R.O.W.)				
	Construction Engineering (C.E.) 15%				
	SUB-TOTAL #5				
	PROJECT TOTAL				
	Additional Special items				
	Lighting, Signal Control				
	Bridges				
	Field Office				
	GRAND TOTAL				
	Round Total to nearest $5,000				

Name Date

Computed by: _____
Checked by: _____
Estimate Apprv. _____

EXHIBIT 1

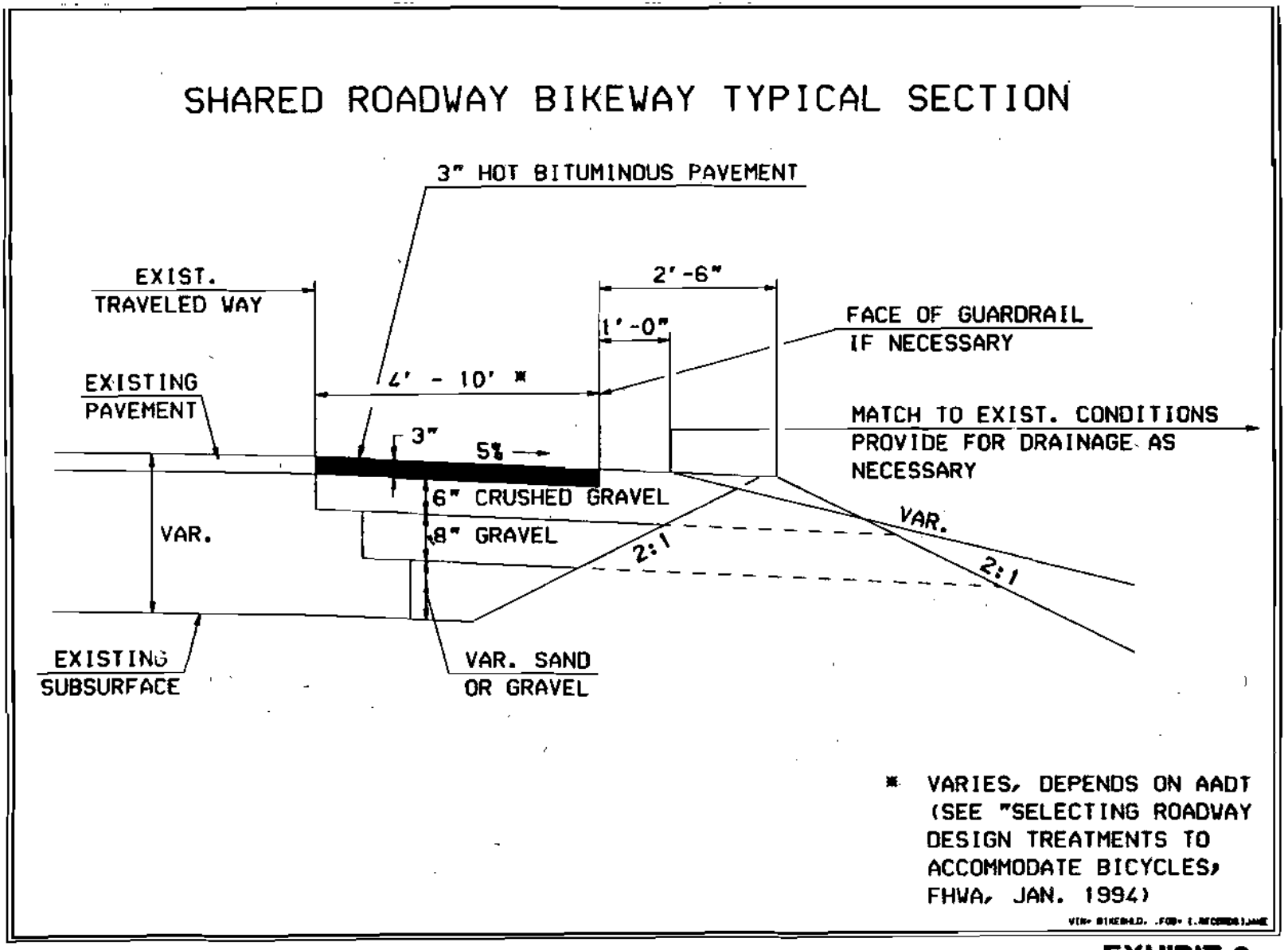

SHARED ROADWAY BIKEWAY TYPICAL SECTION
3" HOT BITUMINOUS PAVEMENT
EXIST.
TRAVELED WAY
2'-6"
1'-0"
FACE OF GUARDRAIL
IF NECESSARY
EXISTING
PAVEMENT
4' - 10' *
3"
5%
MATCH TO EXIST. CONDITIONS
PROVIDE FOR DRAINAGE AS
NECESSARY
6" CRUSHED GRAVEL
8" GRAVEL
VAR.
2:1
VAR.
2:1
EXISTING
SUBSURFACE
VAR. SAND
OR GRAVEL
* VARIES, DEPENDS ON AADT
(SEE "SELECTING ROADWAY
DESIGN TREATMENTS TO
ACCOMMODATE BICYCLES,
FHWA, JAN. 1994)

EXHIBIT 2

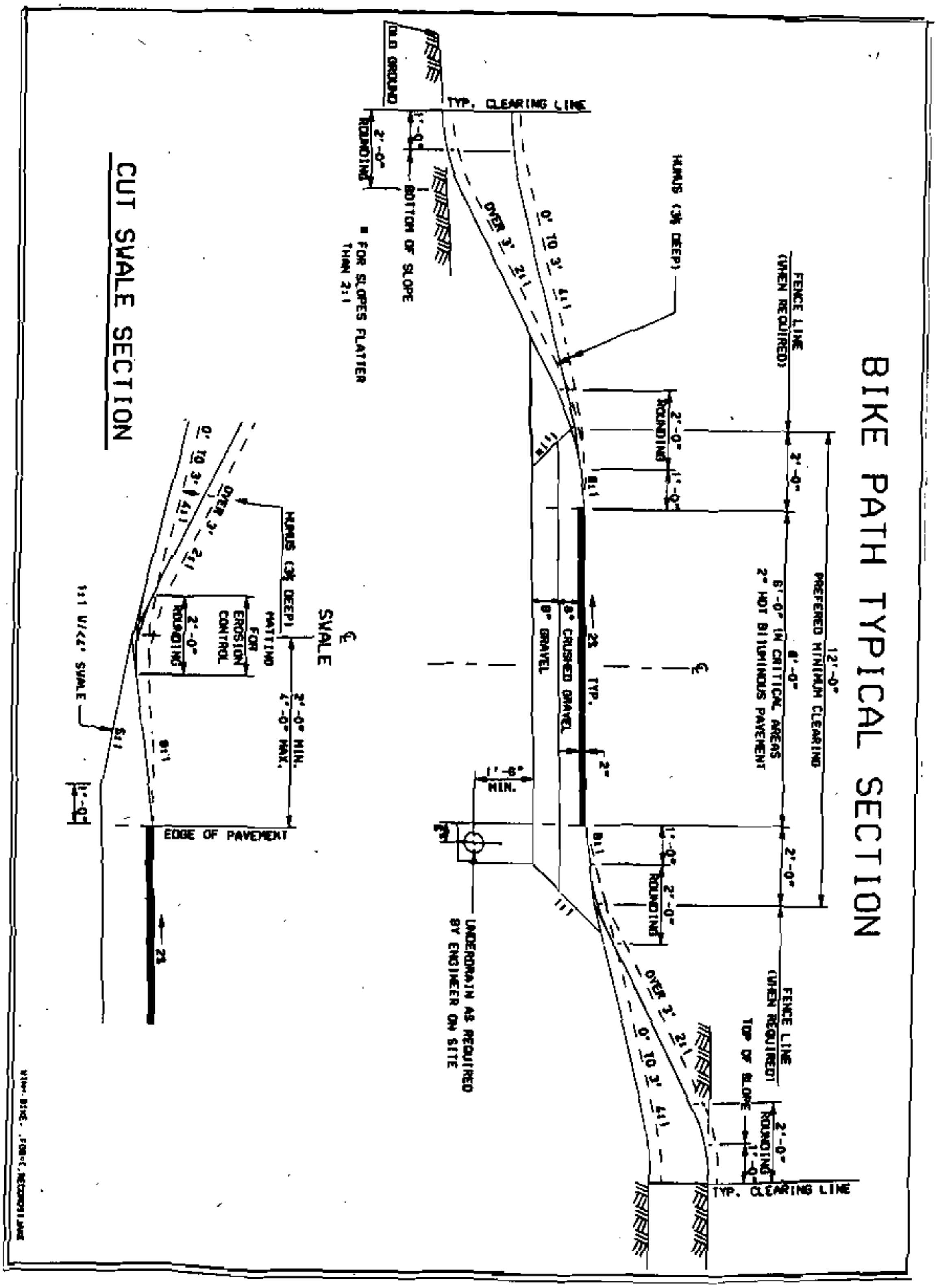

BIKE PATH TYPICAL SECTION
CUT SWALE SECTION
TYP. CLEARING LINE
OLD GROUND
BOTTOM OF SLOPE
* FOR SLOPES FLATTER THAN 2:1
HUMUS (3" DEEP)
FENCE LINE (WHEN REQUIRED)
ROUNDING
12'-0" PREFERED MINIMUM CLEARING
8'-0"
6'-0" IN CRITICAL AREAS
2" HOT BITUMINOUS PAVEMENT
8" CRUSHED GRAVEL
8" GRAVEL
2% TYP.
UNDERDRAIN AS REQUIRED BY ENGINEER ON SITE
TOP OF SLOPE
0' TO 3' 4:1
OVER 3' 2:1
SWALE
MATTING FOR EROSION CONTROL
2'-0" MIN. 4'-0" MAX.
EDGE OF PAVEMENT
1:1 W/<2' SWALE

EXHIBIT 3

CHAPTER 6

DEVELOPMENT PROCESS

To develop a comprehensive statewide bicycle/pedestrian plan, the NHDOT asked each RPC to develop a regional bicycle/pedestrian plan. The regional plans were the basis for selecting those routes which would become a part of the statewide bike route system (Map A). The system, which totals approximately 2,200 miles, would primarily consist of roadway shoulders. The regional plans contain more routes than the statewide plan, since in many cases, local roads were incorporated in the regional plans.

In developing the statewide bike route system, the NHDOT took the following into consideration:

1. Connection of population centers - It is important that population centers throughout the state be connected by routes that are safe and suitable for bicycle travel. These population centers offer employment opportunities. If connected with adequate bicycling facilities, they will afford the public an alternative to the motor vehicle for commuting to work.

2. Reduction of motor vehicle trips - Reduction of motor vehicle trips from the roadway by providing a safe alternative for the travelling public will help to reduce air pollution and mitigate congestion within the state. In developing the plan, it was recognized that bicycle projects must be "principally for transportation, rather than recreation purposes", as stipulated in Section 1033 of ISTEA.

3. Conservation of energy - The reduction in vehicle miles of travel by motorized vehicles will reduce the amount of fuel consumed, resulting in energy savings.

The map on the following page also shows the current status of roadway shoulders on the statewide bike route system. Of the portion of the system utilizing roadway shoulders, approximately 40 percent already has 4 foot or wider paved shoulders in place, and is suitable for bicycle travel. Approximately 10 percent has paved shoulders of less than 4 feet in width, with the remaining 50 percent currently having no paved shoulders.

STATE OF NEW HAMPSHIRE

PREPARED BY THE
NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION
BUREAU OF TRANSPORTATION PLANNING
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

4 0 4 8 12 MILES
SCALE

STATEWIDE BIKE ROUTE SYSTEM

COMPACT AREAS

	# MILES
NO PAVED SHOULDERS	1150
LESS THAN 4 FOOT WIDE PAVED SHOULDERS	150
4 FOOT OR WIDER PAVED SHOULDERS	920
PAVED BIKE PATH	20
FUTURE PAVED BIKE PATH	10

SOURCE: 1990 NHDOT ROAD INVENTORY FILE.
AS ADJUSTED BY HIGHWAY MAINTENANCE DISTRICT ENGINEERS (OCTOBER, 1994).

ROUTES DEVELOPED WITH INPUT FROM REGIONAL PLANNING COMMISSIONS, METROPOLITAN PLANNING ORGANIZATIONS, ADVISORY BOARD, AND NHDOT.

BIKE ROUTES THROUGH COMPACT AREAS ARE SHOWN FOR CONTINUITY PURPOSES ONLY. REFER TO REGIONAL BICYCLE/PEDESTRIAN PLANS FOR DETAILS ON REGIONAL AND LOCAL BIKE ROUTES.

REGIONAL PLANNING COMMISSIONS

1. NORTH COUNTRY COUNCIL
2. LAKES REGION
3. UPPER VALLEY-LAKE SUNAPEE
4. SOUTHWEST REGION
5A. CENTRAL NEW HAMPSHIRE
5B. SOUTHERN NEW HAMPSHIRE
5C. NASHUA REGIONAL
6. ROCKINGHAM
7. STRAFFORD

FOR PLANNING PURPOSES ONLY
JANUARY 1995

CHAPTER 7

FUNDING CATEGORIES, LEVELS, AND AVAILABILITY

The ISTEA provides each state with flexibility in the use of Federal-aid highway funds. It was the intent of Congress to allow the states to develop transportation programs which provided opportunities to develop alternatives to the use of automobiles while maintaining a transportation system to meet the needs of the travelling public.

The ISTEA allows the use of NHS, STP, CMAQ, and Bridge Replacement and Rehabilitation Program funds for the planning, design, and construction of bicycle and pedestrian facilities. However, it should be stressed that while these funds are eligible for this use, these types of facilities will be in competition with all of the other permitted uses for these funds.

The NHS consists of approximately 155,000 miles nationally and is made up of the Interstate system and other selected principal arterials. The final system will be designated by Congress in 1995. In New Hampshire, the proposed NHS is 793 miles in length. Annually, the NHDOT receives approximately $20 million in NHS funds. These funds may be used for construction, reconstruction, resurfacing, restoration, and rehabilitation of segments of the system. In addition, these funds are eligible for use for certain transit activities, transportation planning, highway research, fringe and corridor parking facilities, start up costs for traffic management and control activities, development of management systems, highway safety improvements, carpool and vanpool projects, bicycle transportation, and pedestrian walkways.

Surface Transportation Program funds can be used for basically the same types of projects as the NHS monies. STP funds can be used on any roadway, except those classified as local (urban or rural) or rural minor collectors. The NHDOT receives approximately $28.8 million in federal funds annually for the STP. Within the program, 10 percent of the funds are required to be used for Transportation Enhancements ($2.9 million each year). There are nine eligible types of projects that this portion of the STP funds can be used for:

- Bicycle and pedestrian facilities
- Scenic or historical highway programs
- Landscaping and other scenic beautification
- Historic preservation
- Rehabilitation and operation of historic transportation facilities
- Preservation of abandoned railway corridors

- Control and removal of outdoor advertising
- Archaeological planning and research
- Mitigation of water pollution due to highway runoff

The NHDOT has established an application procedure for the use of the Transportation Enhancement monies, utilizing the regional planning commissions as the clearinghouse for the applications. Applicants should keep in mind that these are not grants, and the applicant must supply the matching funds (20 percent). Projects under the Transportation Enhancement program are not limited to construction of bicycle or pedestrian facilities. These funds can also be used to provide shelters, lockers, and other amenities to accommodate bicyclists or pedestrians. In addition, these funds can be used for bicycle/pedestrian planning activities.

Another 10 percent of STP funds must be spent on certain types of safety related projects. Bicycle and pedestrian projects could be among them. The remaining 80 percent may be spent on many types of highway and other intermodal transportation projects, including bicycle and pedestrian facilities.

Congestion Mitigation and Air Quality funds are limited in use to those areas that are classified as non-attainment for ozone or carbon monoxide under the Clean Air Act. Currently in New Hampshire, the non-attainment areas include all of Hillsborough, Merrimack, Rockingham, and Strafford counties. Applicants must demonstrate that their projects are likely to contribute to the attainment of a national ambient air quality standard. Projects such as shared ride programs, transit activities, traffic management, intersection projects, signalization, demand management programs, inspection/maintenance programs, and bicycle/pedestrian programs are eligible for funding under this category. The NHDOT receives approximately $4.8 million annually under this program. The CMAQ program is administered by application, in the same manner as described for the Transportation Enhancement program.

Bridge Replacement/Rehabilitation funds may be used for bicycle/ pedestrian projects in conjunction with certain highway bridge projects to provide safe accommodation for bicycles and pedestrians. The NHDOT receives approximately $9.2 million each year for these project types.

The question of availability of funds is often raised. Currently, programs such as CMAQ and Transportation Enhancements under the STP programs are selected under an application process. These projects are applied for every two years by eligible applicants. In general the RPCs in the development of their regional plans and

programs, will include bicycle and pedestrian projects and request that they be included within the STIP. Parties interested in having projects involving bicycles and pedestrians included in the regional plans and programs and eventually in the STIP need to participate in the public involvement process within the individual planning commission regions to bring their proposed projects forward. A pamphlet entitled "Bicycle and Pedestrian Provisions under the Intermodal Surface Transportation Efficiency Act of 1991" is available. It briefly explains the program and funding sources.

It should be kept in mind that transportation needs identified within the State of New Hampshire far exceed the availability of funds to meet those needs. The competition between highway, transit, bicycle, pedestrian, and other projects is intense.

CHAPTER 8

IMPLEMENTATION

The primary purpose of New Hampshire's bicycle and pedestrian plan is to provide for a safe and efficient means of bicycle travel throughout the state. In addition, bicycling is a viable option for alternative transportation and by providing resource information, is promoted and encouraged. This is outlined previously in the Plan's goals and objectives. The bicycle and pedestrian provisions of ISTEA require the State to address these issues and work towards developing a plan which would be suitable for implementation. The prioritization of bicycle, pedestrian, and other projects will take place in the STIP. Bicycle lanes or paths will be considered with any future highway projects that fall within the statewide bike route network. Consideration will be given to providing shoulders in projects on other roads that are not on the bike route system as well.

Implementation of the proposed program will involve the continued coordination between the Transportation Planning, Highway Design, Construction, Traffic, and Highway Maintenance Bureaus within NHDOT, as well as RPC's, MPO's, municipalities, and other cooperating agencies and organizations. Such cooperative efforts will include working with the Department of Resources and Economic Development in updating its State Bicycle Map. Also, the NHDOT will continue to rely on its Bicycle and Pedestrian Transportation Advisory Board throughout the implementation process. Possible refinements to the program will be considered in the future as necessary.

The selection of individual projects must comply with federal, state, and metropolitan planning regulations, as well as the requirements of the 1990 Clean Air Act Amendments, and Chapter 283 of the 1994 Laws of New Hampshire. This has resulted in a project selection process as described in Appendix C. Projects, with the exception of Transportation Enhancement (TE) and Congestion Mitigation and Air Quality (CMAQ), will go through this selection process. In the case of TE and CMAQ projects, applications are submitted to the regional planning commissions in even numbered years (1994, 1996,...) The regional planning commissions review the applications to make recommendations to the TE and CMAQ Advirosy committees respectively. The advisory committees submits a recommended list of projects to the NHDOT Commissioner. In turn, the Commissioner submits the recommendations to the GACIT by July list of odd numbered years (1995, 1997,....) From that point on, the process is the same as outlined in Appendix C.

It is extremely important that communities, special interest groups, or individuals wishing to have bicycle or pedestrian projects included in the process work closely with their respective regional planning commissions. In addition, they should take advantage of the numerous opportunities to supply input into the process. Opportunities exist at the local, regional, and statewide level to have public input into the development of the regional TIP and the STIP. For further details on the public input opportunities, refer to the *Public Involvement Process for Transportation Improvement Projects* guide available through the RPCs, MPOs, or the NHDOT.

CHAPTER 9

SAFETY AND ENFORCEMENT

While bicycles have always been a popular form of transportation and recreation with children, there continues to be a growing popularity in bicycle use among adults. The increase in ridership brings about increasing exposure to the risks associated with riding both on and off the roadway. According to statistics compiled by the Johns Hopkins Injury Prevention Center, there are over 900 bicycle fatalities nationally each year, with 20,000 bicyclists being admitted to hospitals and 580,000 receiving emergency room treatment. Since 1932, the National Center for Statistics and Analysis has recorded more than 40,000 bicyclist fatalities. Other facts about bicycle accidents are as follows:

- Motor vehicles are involved in about 90 percent of bicycle fatalities and 12 percent of injuries.

- One-third of bicycle fatalities occur on roads with speed limits of 55 m.p.h. or higher.

- Bicyclists hospitalized with head injuries are 20 times as likely to result in death as those without head injuries.

- Bicycle head injuries cause 3/4 of all bicycle related deaths to school-aged children.

- Bike helmets have been shown to reduce the risk of head injury by 85 percent and brain injury by almost 90 percent.

If a room full of bicyclists were asked whether they had ever fallen off their bicycle, almost all hands in the room would go up. Bicycle accidents and falls do occur. Bicycle helmets are necessary and are recommended to neutralize the trauma of impact.

A bicycle helmet is classified by the material used to cover its exterior. There are three basic types that are available:

SOFT SHELL - The lightest bicycle helmet (weighing approximately one-half pound), which consists of an expanded polystyrene (EPS) core with a Lycra fabric exterior cover. It has no outer shell.

HARD SHELL - The heaviest bicycle helmet (weighing one pound or more), which consists of a durable, hard plastic, or fiberglass outer shell over the EPS core.

MICRO SHELL - A mid-weight bicycle helmet (weighing between one-half and one pound) with a light, semi-rigid plastic cover, which combines the durability of hard shell with the light weight of soft shell.

An organization that serves as the resource center for injury prevention in New Hampshire is the Injury Prevention Center at Dartmouth Medical School. Some of the services provided there include:

Providing an audiovisual loaning library
Offering brochures and informational handouts
Building coalitions throughout the state on specific issues
Collecting and analyzing injury-related data
Supporting community projects

The Injury Prevention Center, with funding from the New

Hampshire Department of Education, has developed a bicycle safety and bicycle helmet use program geared towards third grade students. The NH B.I.K.E.S. (Biking Includes Keeping Educated and Safe) program has been distributed to every elementary school in New Hampshire. Materials include handouts for students and parents, an observational survey form, a bicycle safety quiz, coupons for discounted helmets, and a curriculum for teachers.

In addition to the Injury Prevention Center, the New Hampshire Head Injury Foundation is another organization that addresses bicycle safety concerns and head injury prevention, and serves as a resource for educational materials.

With respect to safety considerations related to the interaction between bicycles and motor vehicles, the New Hampshire Department of Safety is very concerned with the safety of bicyclists using our highways. The fact that both motorists and bicyclists have to share our public ways means that each must recognize and respect the concerns of the other party. Much of this could be accomplished through safety education in Driver Education classes and bicycle clubs.

The Department of Safety has expressed a willingness to promote bicycle and pedestrian safety by incorporating material in future editions of the state driver's manual, as well as providing distribution areas in Motor Vehicle substations for any bicycle safety publications. Also under consideration is the addition of bicycle and pedestrian safety questions to driver written exams.

Since, under state law, bicycles basically follow the same rules of the road as motor vehicles, they are also subject to the same type of enforcement. Unfortunately, enforcement efforts over the years have focused primarily on motor vehicles. However, in many cases, accidents with bicycles involve bicyclists who either do not know or who willfully disregard traffic regulations. Appendix D contains state laws regulating bicycles and pedestrians.

One means of increasing awareness and compliance among riders is through police bicycle patrols. In areas where they have been implemented, bike patrols have been found to be highly successful. Through their presence, bicycle use is promoted and safety and regulatory awareness is heightened, not to mention the fact that they have proven to be a very effective public relations and crime fighting tool. There are several communities in the state that currently operate police bike patrols, with several more considering them.

CHAPTER 10

MAINTENANCE

Maintenance of bicycle facilities once they are in place is an essential element of the overall plan. Maintenance improvements will be necessary on bikeways that are already in place, as well. Proper maintenance is important. If facilities are not maintained, bicyclists will tend to avoid those facilities which were specifically designated for them, in favor of encroaching on the motor vehicle travelled way. On sections of highway that already have paved shoulders, improvements would include such items as drainage adjustments, repairing ragged edges, shimming, and resurfacing. Many of these situations are normally taken care of under the NHDOT's highway resurfacing program. It is recommended that within budgetary limitations, highway sections with eight to ten foot paved shoulders, be resurfaced the full roadway width. In the past, resurfacing on some of these sections only included the travel lanes themselves or one or two feet into the shoulders, mostly due to budgetary constraints. Problems identified from past resurfacing procedures have been addressed and discussed by NHDOT. NHDOT will strive to correct these problems on future resurfacing projects. It is standard practice for the NHDOT not to resurface beyond the existing edge of the paved surface. Any widening of the roadway or the addition of paved shoulders is accomplished through reconstruction.

It is important that bikeways be clear of debris. Sand, stones, and other types of debris also create hazardous bicycling conditions, and make the facility undesirable to the bicyclist. Although, on shared roadways, the wind action created by moving motor vehicles keeps the portion of the shoulder immediately adjacent to the travelled way relatively clean, this natural sweeping action has less effect further onto the shoulder. Therefore, bicycle lanes should be periodically inspected throughout the bicycling season.

Bikeways should be clearly delineated by signing or both signing and striping, as appropriate for the type of facility. Upon the completion of several concurrent sections which make up a viable segment of the system, that segment should be designated as a bicycle route, and should be signed, marked, or otherwise identified accordingly.

CHAPTER 11

PEDESTRIAN CONSIDERATIONS

Prior to the age of automobiles and other mechanized means of transportation, walking was the primary means of transportation. Over time it has also become a leisure activity. Travel by foot serves a fundamental link between various other modes of transportation, i.e., walking to the car, the bus stop and other destinations. Thought of in these terms, walking serves as a true intermodal means of travel.

Commuting bicyclists are willing to regularly travel five or ten miles to reach their destination. Pedestrian travel, on the other hand, is generally short in length, local in nature, and predominant in urban-type settings. Walking as a form of transportation is based primarily on convenience. Certain segments of the population, such as the elderly, however, depend on walking as the only opportunity for mobility in their everyday life. The average pedestrian trip length is less than one mile, before other transportation options are chosen. In areas where several stops can be accomplished easily, it is the main form of transportation.

Commitment to pedestrian travel is also influenced by several elements. Weather, sidewalk or crosswalk locations, traffic, crime, air quality and accident occurrence are several pedestrian environmental considerations. A pedestrian friendly environment as well as pedestrian rights and concerns have become overshadowed. Most motor vehicle laws protect the pedestrian right-of-way. However, this is not recognized by many drivers. At many intersections, traffic signal timing is inadequate for pedestrians, leaving the pedestrian vulnerable to vehicular conflicts. Pedestrian crosswalks are often encroached upon by drivers. Drivers often become impatient and irritated when a pedestrian takes longer than expected to cross the road. Of all pedestrian accidents, 90 percent occur in urban areas. Safety is a primary concern for pedestrians of all ages. Education of safe pedestrian practices must begin at an early age.

Pedestrians are allowed on public facilities throughout the state that motor vehicles and bicycles travel on with the exception of certain limited access highways. Pedestrian education and road condition awareness are concerns that the pedestrian must consider when travelling along these facilities in a proper manner when pedestrian facilities are not available.

Pedestrian trips are identified into four basic categories: work, school, personal business (shopping, doctors appointments, etc.), and recreational. Nationally, approximately one-third of pedestrian travel is for school purposes for those age 14 or more according to the report *Planning and Implementing Pedestrian Facilities in Suburban and Developing Rural Areas*, June, 1987, prepared by the Transportation Research Board. That is why pedestrian education at an early age is essential to provide basic safety principles to those who will continue utilizing pedestrian and other intermodal transportation facilities in the future. As referenced in Chapter 10, education efforts through the appropriate agency are under consideration.

Pedestrian facilities in New Hampshire include adequate sidewalks, crosswalks, and specific walking areas that provide access to services from parking facilities. Sidewalks provide a safety zone for pedestrians from vehicles. Sidewalks should be of a width to accommodate the amount of expected pedestrian traffic. As the health benefits of walking are emphasized, the enjoyment of walking is spreading as a leisure activity. Indoor and outdoor shopping areas are seeing an increase of pedestrians enjoying exercise, fresh air, and visual benefits. Walking areas are often provided for access to available services and ease of exercise. This increased awareness of the value of walking will only serve to add to the importance of pedestrian travel as an intermodal form of transportation.

Pedestrians are not yet as formally organized or represented as the bicycling interests are. There are a growing number of people who are choosing walking as a means of commuting, recreation, and fitness. Travel by foot is the most basic form of transportation, and links people to all other modes. It is, therefore, important that adequate pedestrian facilities be provided for and maintained. On-going programs, such as the construction of sidewalk ramps and curb cuts at intersections in conjunction with the Americans with Disabilities Act, have been successful in enhancing physically impaired individuals' mobility.

Communities in New Hampshire need to examine their zoning ordinances and subdivision regulations closely and make conscious decisions as to how the pedestrian will be accommodated. Local land use regulations should be modified to accommodate pedestrian travel including: sidewalks in subdivisions, commercial zones, to bus stops, and paths to community facilities such as schools and

libraries. Communication between the NHDOT and local and regional planning agencies is essential in the provision of safe, effective pedestrian facilities. Communities can emphasize their pedestrian needs through regional planning efforts and establish a foundation for linking pedestrian travel to other modes of transportation.

One example of pedestrian facilities planning is the New Hampshire Heritage Trail that follows the Merrimack River through Bedford, Manchester, and Hooksett. Although initially recreational in nature, the Heritage trail can be linked to schools, residences, and other associated pedestrian facilities. Efforts have been made through alternative financing measures such as Transportation Enhancement and CMAQ programs through ISTEA to extend or further link the Heritage Trail to other community areas and provide greater intermodal use of this facility in the future. Additional planning of pedestrian facilities is essential to the development of this network in conjunction with alternative bicycle opportunities.

Agencies involved in transportation, including the NHDOT, must consider the safety of pedestrians in transportation project design. Providing pedestrian transportation options becomes increasingly important as air quality and congestion issues continue to require attention. Like other alternate modes of travel, funding is restricted and limited.

For further details on pedestrian facilities and programs in local areas, refer to the regional bicycle and pedestrian plans.

APPENDICES

APPENDIX A

RESOURCES AND CONTACTS

The NHDOT wishes to acknowledge and thank the Bicycle and Pedestrian Transportation Advisory Board for its efforts in guiding the development of the Statewide Bicycle and Pedestrian Plan. The assistance of the Board, in combination with input from other various organizations, city, town, and regional planning officials, as well as individual citizens, was critical to the development of a realistic plan that addresses the current needs of bicyclists and pedestrians and promotes bicycling and walking as viable and important alternative modes of transportation. The following is a directory of resource and contact agencies, organizations, and individuals involved in various aspects of bicycle and pedestrian related activities.

BICYCLE AND PEDESTRIAN TRANSPORTATION ADVISORY BOARD

Stephen J. Pawlowski, P.E.
Bicycle/Pedestrian Transportation Coordinator
N.H. Department of Transportation

Richard G. Marshall, P.E.
Chief of Systems Planning
N.H. Department of Transportation

Theodore Kitsis, P.E.
Final Design Supervisor
N.H. Department of Transportation

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Assistant Administrator, Bureau of Highway Maintenance
N.H. Department of Transportation

James S. Colburn, P.E.
Administrator, Bureau of Traffic
N.H. Department of Transportation

Diane L. Flint Hardy, AICP
Principal Planner
N.H. Office of State Planning

Robert Spoerl
Trails Specialist
N.H. Department of Resources and Economic Development

Robert K. Turner
Director, Division of Motor Vehicles
N.H. Department of Safety

Richard Lemieux, P.E.
Transportation Planner
Federal Highway Administration

Maura S. Carriel
Transportation Planner
Rockingham Planning Commission

Edward Connell
Senior Regional Transportation Planner
Upper Valley-Lake Sunapee Regional Planning Commission

David A. Juvet
Director of Public/Government Relations
American Automobile Association

Lynn Wampler MacDonald
Program Director
Dartmouth-Hitchcock Injury Prevention Center

Kirk Stone
Environmental Affairs Director
Audubon Society of N.H.

David H. Berliner, DVM
President
Granite State Wheelmen

Peter Rice
Secretary
Seacoast Area Bicycle Routes

BICYCLE/PEDESTRIAN PROGRAM

N.H. Department of Transportation
Bureau of Transportation Planning
John O. Morton Building
P.O. Box 483
Concord, N.H. 03302-0483
(603) 271-3344

Federal Highway Administration
Bicycle/Pedestrian Program Office, HEP-50
400 7th St., SW
Washington, D.C. 20590
(202) 366-5007

Federal Highway Administration
Region 1 Office
Leo W. O'Brien Federal Building
Room 719
Albany, N.Y. 12207
(518) 472-4230

Federal Highway Administration
N.H. Division Office
279 Pleasant Street
Room 204
Concord, N.H. 03301
(603) 225-1605

BICYCLE AND PEDESTRIAN SAFETY

N.H. Department of Safety
Division of Motor Vehicles
James H. Hayes Building
10 Hazen Dr.
Concord, N.H. 03305
(603) 271-2251

National Highway Traffic Safety Administration
400 7th St., SW
Washington, D.C. 20590
(202) 366-2121

National Highway Traffic Safety Administration
Region 1 Office
Transportation Systems Center
Kendall Square, Code 903
Cambridge, MA 02142
(617) 494-3427

American Automobile Association
166 S. River Rd.
Bedford, N.H. 03110-6910
(603) 669-0101

Dartmouth-Hitchcock Injury Prevention Center
Dartmouth Medical School
Hanover, N.H. 03755
(603) 650-1780

BICYCLING ORGANIZATIONS

Bicycle/Pedestrian Federation of America
1506 21st St., NW, Suite 200
Washington, D.C. 20036
(202) 463-6622

League of American Bicyclists
190 W. Ostend St., Suite 120
Baltimore, MD. 21230
(410) 539-3399

Granite State Wheelmen
2 Townsend Ave.
Salem, N.H. 03079
(603) 898-9926

Seacoast Area Bicycle Routes
P.O. Box 412
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Dover, N.H. 03820-6015
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APPENDIX B

BICYCLE FACILITY PLANNING CRITERIA

The factors to consider in bicycle planning depend upon the situation and the primary purpose of the facility. The most important considerations are described below. The following criteria can be used in determining the type, location, and priority of facilities.

1. **Usage** - Bikeways should be located in areas where use can be maximized. Generally, they should be located within the same corridors as arterials and collectors since bicyclists have the same origins and destinations as motorists. The following factors should be considered:

~ Location of employment centers - large employers or concentrations of employment.

~ Location of commercial facilities - shopping centers, malls, and large retailers.

~ Location of mode transfer - major points of mode transfer such as transit hubs, railroad stations, park and ride lots, and connecting bike routes.

~ Location of community and regional facilities - schools, libraries, community centers, governmental offices, stadiums, conservation areas, fairgrounds, beaches, historic and cultural resources, tourist attractions, and recreation areas.

~ Demographics - population, density, age, household size and type (single family, multi-family), and economic data.

~ Trip lengths - between likely origins and designations.

2. **Access** - In locating a bikeway, consideration should be given to the provision of frequent and convenient bicycle access.

3. **Directness** - For utilitarian bicycle trips, facilities should connect traffic generators, and should be located along a direct line convenient for users. Cyclists, like motorists, prefer a direct route. This is less important for recreational bicycle trips, where often there is no specific destination.

4. **Barriers** - In some areas, there are physical barriers to bicycle travel caused by topographic features (steep slopes or gullies), rivers, large water bodies, wetlands, freeways, bridges, railroads, or other impediments. In some cases, designing the facility to overcome such barriers can create new opportunities for bicycling.

5. **Continuity** - A planned bicycle route system should be free of missing links or gaps.

6. **Delays** - Bicyclists have a strong desire to maintain momentum. If bicyclists are required to make frequent stops, they may tend to avoid the route or disregard traffic controls.

7. **Traffic Safety** - The reduction and prevention of bicycle related accidents along proposed routes are important considerations.

8. **Use Conflicts** - Different types of facilities introduce different types of conflicts. For example, shared roadway facilities can result in conflicts between bicyclists and motorists. Bicycle paths can involve conflicts between bicyclists, roller skaters, and pedestrians, and between bicyclists and motorists at highway and driveway intersections.

9. **Truck and Bus Traffic** - Because of their aerodynamic effects and width, high-speed trucks, buses, motorhomes, 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.

10. **On-Street Motor Vehicle Parking** - The turnover and density of on-street parking can affect bicyclist safety.

11. **Intersection Conditions** - A high proportion of bicycle accidents occur at intersections. Facilities should be selected so as to minimize the number of crossings.

12. **Traffic Volumes and Speed** - For facilities on roadways, traffic volumes and speeds must be considered along with the roadway width.

13. **Environmental Impacts** - In defining a corridor, the environmental impacts associated with air quality, noise, wetlands, water resources, soils erosion, endangered species, wildlife habitat, and historic and cultural resources should be taken into account.

14. **Social and Economic Impacts** - In defining a corridor, the social impacts associated with development of the bikeway project,

such as neighborhood opposition, residential security, privacy, and ethnic discord, should be considered. The economic benefits of bicycle paths in terms of stimulating economic development and bringing revenue to a community or region should not be overlooked.

15. **Aesthetics** - While not a primary consideration, the scenic qualities and attractiveness of a bicycle route should be a consideration, especially in selecting bicycle routes for recreational purposes or through tourism regions.

16. **Security** - The potential for criminal acts against bicyclists in remote areas or high crime neighborhoods should be a consideration. Also, the possibility of theft or vandalism at parking lots should be taken into account.

17. **Maintenance** - Thorough routine maintenance is an important design feature. An improperly maintained bikeway will often be shunned by bicyclists in favor of a properly maintained roadway.

18. **Pavement Surface Quality** - Bikeways must be free of bumps, holes, and other surface irregularities. Utility covers and drainage grates should be at grade, and, if possible, located outside the expected area of bicycle travel. A smooth surface is required for efficiency and comfort.

19. **Cost/Funding** - Location selection typically involves a cost analysis of alternatives. The lack of funding or budget constraints may limit the choice of alternatives.

20. **Ease of Implementation** - Based on existing traffic operation/ conditions, presence of parking, neighborhood politics, the amount of space, right-of-way availability, and laws and regulations, the overall feasibility of constructing the bikeway should be considered.

APPENDIX C

PROJECT SELECTION PROCESS

By October 1 of even numbered years, the NHDOT will submit the Ten Year Transportation Program to the RPCs/MPOs (as approved by Legislature on June 1). The NHDOT will omit the first two years of projects since they will be under design or construction during the development of the next STIP. The NHDOT will recommend projects for years nine and ten. Those projects will act as a guideline for the monies available for use in developing both the regional long range transportation plan and the regional TIP. The RPC or MPO public involvement processes during the development of the RPC or MPO TIPs are followed at this time.

By April 1 of odd numbered years, each RPC and MPO develops and submits their recommended Ten Year Transportation Improvement Program (Ten Year TIP) to the NHDOT. The NHDOT will combine the TIP's into the STIP. The STIP must continually go through financial constraint analysis and the CAAA conformity process for improvement projects in nonattainment areas. In addition, the STIP shall meet LRSTP goals and objectives.

By July 1 of odd numbered years, the NHDOT will submit a financially constrained Ten Year STIP to the GACIT. The GACIT will conduct a series of public hearings to afford the public an opportunity to comment on the proposed Ten Year STIP. A legal notice of these meetings will be published in a newspaper of general circulation to inform the public of the opportunity for public input. A record of the comments received and the responses to those comments will be kept on file at NHDOT headquarters in Concord and will be available for public review.

By December 1 of odd numbered years, the GACIT will submit its recommendations for the Ten Year STIP to the Governor for review and comment.

By January 15 of even numbered years, the Governor will submit the recommendations to the Legislature. The Legislature will conduct the normal committee hearings which afford the public an opportunity for input.

By June 1 of even numbered years, the Legislature will take the necessary action to approve a financially constrained Ten Year STIP.

By June 15 of even numbered years, the NHDOT will submit the legislatively approved Ten Year STIP to the RPC/MPOs to review the GACIT/Governor/Legislative changes in each of their region's projects.

By July 30 of even numbered years the RPC/MPOs will approve the final Three Year TIPs. (the first three years of the Ten Year STIP). The public involvement process established by the RPC/MPO is followed at this time. When the Three Year TIP is in CAAA conformance, the MPO will formally approve the Three Year TIP and submit it to the NHDOT.

By August 1 of even numbered years, the NHDOT will submit the MPO Three Year TIPs, along with the conformity analysis, to the FHWA and the FTA for their review. The FHWA and FTA must make a determination of conformity after receiving comments from the Environmental Protection Agency (EPA). During this review period, the NHDOT will submit the record of MPO approved TIPs, to the Governor or designee for approval.

By September 1 of even number years, the NHDOT will submit the Three Year STIP to the FHWA and FTA for review and approval by October 1.

October 1 of even numbered years, the TIP/STIP development process begins again.

APPENDIX D

STATE LAWS REGULATING BICYCLES AND PEDESTRIANS

RULES OF THE ROAD

265:34 Pedestrians Subject to Traffic Signs and Regulations.

A pedestrian shall obey the instructions of any traffic sign or regulation specifically applicable to him, unless otherwise directed by a police officer. Pedestrians shall be subject to traffic and pedestrian control signals as provided in RSA 265:9 unless required by local ordinance to comply strictly with such signals. At all other places, pedestrians shall be accorded the privileges and shall be subject to the restrictions stated in this chapter.

265:35 Pedestrian's Right of Way in Crosswalks.

I. When traffic control signals are not in place or not in operation the driver of a vehicle shall yield the right of way, slowing down or stopping if need be to so yield, to a pedestrian crossing the roadway within a crosswalk when the pedestrian is upon the half of the roadway upon which the vehicle is traveling, or when the pedestrian is approaching so closely from the opposite half of the roadway as to be in danger.
II. No pedestrian shall suddenly leave a curb or other place of safety and walk or run into the path of a vehicle which is so close as to constitute an immediate hazard.
III. Paragraph I shall not apply under the conditions stated in RSA 265:36.
IV. Whenever any vehicle is stopped at a marked crosswalk or at any unmarked crosswalk at an intersection to permit a pedestrian to cross the roadway, the driver of any other vehicle approaching from the rear shall not overtake and pass such stopped vehicle.

265:36 Crossing at Other Than Crosswalks.

I. Every pedestrian crossing a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield the right of way to all vehicles upon the roadway.
II. Any pedestrian crossing a roadway at a point where a pedestrian tunnel or overhead pedestrian crossing has been provided shall yield the right of way to all vehicles upon the roadway.
III. Between adjacent intersections at which traffic control signals

are in operation pedestrians shall not cross at any place except in a marked crosswalk.
IV. No pedestrian shall cross a roadway intersection diagonally unless authorized by traffic control devices; and, when authorized to cross diagonally, pedestrians shall cross only in accordance with the official traffic control devices pertaining to such crossing movements.

265:78 Competitive Bicycle or Moped Races.

No person shall conduct or participate in any competitive bicycle or moped race on any class I, class III, or class III-a highway or on the state-maintained part of any class II highway, unless such race is sponsored or such race has obtained, prior to such race, the written approval of the commissioner and of the police department of each city, town or place in which such race is to be held. In the case of a competitive bicycle or moped race on a class III-a highway, the sponsor of the race shall also obtain the approval of the executive director of the fish and game department. The commissioner and the executive director of the fish and game department may require insurance, police coverage or other regulations to insure the safety and protection of the public, and the permit may exempt competitors from such requirements of this chapter relative to rules of the road as are not inconsistent with public safety.

265:143 Application of Motor Vehicle Laws to Bicycles

Every person propelling a vehicle by human power or riding a bicycle shall have all of the rights and be subject to all of the duties applicable to the driver of any other vehicle under the rules of the road, except as to those provisions which by their nature can have no application.

265:144 Riding on Bicycles.

I. A person propelling a bicycle shall not ride other than upon or astride a permanent and regular seat attached to the bicycle.
II. No bicycle shall be used to carry more persons at one time than the number for which it is designed and equipped.
III. No person riding upon any bicycle, coaster, roller skates, skateboard, sled or toy vehicle shall attach the same or himself to any vehicle upon a roadway.
IV. No person operating a bicycle shall carry any package, bundle or article which prevents the driver from keeping at least one hand upon the handlebars.
V. Persons riding bicycles 2 or more abreast shall not impede the normal and reasonable movement of traffic and, on a laned roadway, shall ride within a single lane.

VI. Bicyclists intending to turn right or left shall not be required to give a continuous hand or arm signal if the hand is needed in the control or operation of the bicycle.
VII. A person propelling a bicycle may pass a slower-moving vehicle in the same lane provided such movement can be made with reasonable safety.
VIII. Any bicyclist shall stop upon demand of a peace officer and permit his bicycle to be inspected.
IX. No bicycle shall be operated unless the steering, brakes, tires, and other required equipment are in safe condition.

265:145 Clinging to vehicles prohibited

No person riding a motorcycle, bicycle, moped, coaster, sled, skateboard, or toy vehicle, or wearing roller skates, shall hold fast to, or hitch onto any streetcar, or any other vehicle moving upon a way.

265:146 Permits.

The mayor of a city, or selectmen of a town, may, in their discretion, upon any special occasion, grant permits to any persons to ride bicycles or mopeds, at any rate of speed, for a time not exceeding one day upon specified portions of the public ways of such city or town, and may annex such other reasonable conditions to such permits as they may deem proper.

265:152 Bicycle Parking.

I. A person may park a bicycle on a sidewalk unless prohibited or restricted by an official traffic control device.
II. A bicycle parked on a sidewalk shall not impede the normal and reasonable movement of pedestrian or other traffic.
III. A person shall not park a bicycle on a roadway in such a manner as to obstruct the movement of a legally parked motor vehicle.
IV. In all other respects, bicycles parked on a way shall conform with provisions of law regulating the parking of vehicles.

266:86 Headlamp Required at Night.

Every bicycle operated upon any way during darkness shall be equipped with a lamp emitting a white light visible from a distance of 300 feet in front of the bicycle and with a red reflector on the rear of a type approved by the director, which shall be visible from a distance of 300 feet to the rear when directly in from of the lawful upper beams of headlamps on a motor vehicle. A lamp emitting a

red light visible from 300 feet to the rear may be used in addition to the red reflector. Every moped driven upon any way during darkness shall be equipped with one headlamp which meets the specifications for headlamps which meets the specifications for headlamps established in RSA 266:31. Taillamps and stop lamps are required on mopeds.

266:87 Pedal Reflectors Required

On or after August 23, 1983, no person shall sell a new bicycle or moped or pedal for use on a bicycle or moped either separately or as part of a new bicycle or moped, unless that pedal is equipped with a reflector of a type approved by the director, which conforms to 49 CFR 571.108 Table 2 and which is visible from the front and rear of the bicycle or moped from a distance of 200 feet during darkness.

266:89 Sirens Prohibited

No bicycle or moped shall be equipped with a siren, nor shall any person on a bicycle or moped use a siren.

APPENDIX E

DEFINITION OF TERMS[1]

BICYCLE - A vehicle having two tandem wheels, propelled solely by human power, upon which any person or persons may ride.

BICYCLE LANE - A portion of a roadway which has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists.

BICYCLE PATH - A bikeway physically separated from motorized vehicular traffic by an open space or barrier, and either within the highway right-of-way or within an independent right-of-way.

BICYCLE ROUTE - A segment of a system of bikeways designated by the jurisdiction having authority, with appropriate directional and informational markers, with or without a specific bicycle route number.

BIKEWAY - Any road, path, or way, which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

HIGHWAY - A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

RIGHT-OF-WAY - A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes.

ROADWAY - The portion of the highway, including shoulders, for vehicle use.

SHARED ROADWAY - Any roadway upon which a bicycle lane is not designated and which may be legally used by bicycles, regardless of whether such facility is specifically designated as a bikeway.

[1]AASHTO "Guide for the Development of Bicycle Facilities", August, 1991

APPENDIX F

GLOSSARY OF ACRONYMS

AADT - Annual Average Daily Traffic
AASHTO - American Association of State Highway and Transportation Officials
B.I.K.E.S. - Biking Includes Keeping Educated and Safe
CAAA - Clean Air Act Amendments
CMAQ - Congestion Mitigation Air Quality
DRED - Department of Resources and Economic Development
EPA - Environmental Protection Agency
FHWA - Federal Highway Administration
FTA - Federal Transit Administration
GACIT - Governors Advisory Commission on Intermodal Transportation
ISTEA - Intermodal Surface Transportation Efficiency Act
LRSTP - Long Range Statewide Transportation Plan
MPO - Metropolitan Planning Organization
NHDOT - New Hampshire Department of Transportation
NHS - National Highway System
RPC - Regional Planning Commission
STIP - Statewide Transportation Improvement Program
STP - Surface Transportation Program