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16. Abstract. <p>This bicycle and pedestrian master plan was prepared in cooperation with Westchester, Rockland and Putnam Counties. The study area encompasses all three counties, and is known as the Mid-Hudson South Region of the New York Metropolitan Transportation Council (NYMTC).</p> <p>The plan defines a vision for bicycling and walking in the tri-county region and builds on previous regional and local studies to identify needs, define strategies and recommend projects that improve conditions for bicyclists and pedestrians. Findings and recommendations are the result of a public outreach process, field analysis and application of state-of-the practice planning and evaluation techniques. The focus of the plan was to target specific locations within the tri-county region, and propose solutions, treatments and practices to implement improvements. The products of this study include the Master Plan report and appendices, an Executive Summary, and GIS mapping.</p>			
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Overall guidance and direction was provided by a Project Advisory Committee. The Committee was formed at the start of the project and met regularly to review draft products, provide support and contribute ideas for the plan. A number of individuals, agencies and organizations also contributed through their participation at public workshops and meetings, response to surveys and questionnaires, and written review comments.

Thanks, appreciation and recognition are expressed to all those who contributed to the development of the plan.

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I. ABSTRACT

Purpose of the Plan

In 1999, Westchester, Rockland and Putnam Counties launched the Mid-Hudson South Bicycle and Pedestrian Master Plan. The plan was initiated in response to federal mandates which require that long range transportation plans include accommodations for bicycles and pedestrians, as an integral component of the overall transportation network. The following plan objectives are consistent with the Transportation Equity Act for the 21st Century (TEA-21):

- To develop an integrated system/network of bicycle and pedestrian facilities for both transportation and recreation purposes,
- To increase safety for bicyclists and pedestrians,
- To encourage bicycling and walking through community planning and encourage local facility investment,
- To promote bicycling and walking as alternatives to automobile travel,
- To educate the public on opportunities for bicycle and pedestrian travel in the region, and
- To promote bicycle and pedestrian access to employment centers.

In keeping with federal mandates, this plan identifies locations in the three county region where it would be feasible to develop bicycle and pedestrian facilities that could serve as viable alternative means of transportation. As this is a three county plan, it was not possible to examine every bicycle and pedestrian facility in the region. Therefore, the plan identifies regional projects for implementation, and shows examples of bicycle and pedestrian treatments that can be applied to other facilities not specifically listed in the plan. Through this approach, the plan can serve as a tool for municipalities to improve conditions for bicycle and pedestrians by developing local bicycle and pedestrian plans, and promoting local projects.

This plan identifies bicycle and pedestrian facilities by county and lists the resources available to people who bicycle and walk for transportation or recreation purposes. Recommendations and resources are provided for bicycle and pedestrian safety and education, and for communities planning new and proposed facilities, including bike lanes, sidewalks, trail extensions and multi-use trails.

The maps and project lists at the end of this abstract show existing regional bicycle and pedestrian facilities, and indicate bicycle and pedestrian facilities that were proposed through the development of the master plan. These facilities are also listed in Appendix C.

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Plan Elements

Vision

One of the first steps in the development of the *Mid-Hudson South Region Bicycle and Pedestrian Master Plan* was the formation of a local and regional vision and goals for the three counties with regard to bicycle and pedestrian activity. The importance and benefits of cycling and walking were emphasized, and put in perspective with regional planning initiatives and nationwide trends.

Area Characteristics and Needs

This section of the master plan discusses specific characteristics of the Mid-Hudson South Region that affect the potential for bicycling and walking. Demographic characteristics, journey to work and employment data are reviewed. This section also focuses on the different land uses in the region and the opportunities and constraints they present for bicycling and walking. Common issues impacting bicycle and pedestrian travel in the three counties are also discussed.

The area characteristics and needs assessment process included a review of existing and proposed on-road and off-road facilities, identification of origins and destinations, review of current ordinances, and mapping of key bicycle/pedestrian trip generators and transit facilities.

Implementation Strategies

The successful implementation of the recommendations provided in this *Master Plan* will include not only the construction of bicycle and pedestrian facilities, but also ongoing policy, education, encouragement, enforcement and maintenance activities. This section describes land use and transportation planning programs and policies that affect pedestrians and cyclists in the Mid-Hudson South region, and offers implementation strategies for addressing these issues in order to develop a safe, efficient and comprehensive regional bicycle and pedestrian network. The importance of the street system and the need to consider bicycle and pedestrian activity in every aspect of transportation system and land use planning and design, including public transit, is emphasized.

Identified Projects and Prototype Examples

Based on the vision and goals, assessment of existing conditions and needs, input received during meetings with the public and the Project Advisory Committee (PAC), and expert analysis, the plan sets forth recommendations for bicycle and pedestrian improvements (routes and facilities) within each county. Prototype project selection criteria were developed during this process, providing a qualitative approach to evaluating bicycle and pedestrian needs. Recommendations based on selection criteria consist of system-wide solutions for the entire Mid-Hudson South region, on-road

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bicycle and pedestrian improvements for the roadways that make up the study network, and independent project recommendations. Preliminary, route-specific improvement recommendations have been made to identify target facility types for selected routes and centers. Maps of existing and proposed facilities have been prepared for the regional route network and for all three counties. These are included on the following pages.

In addition, the Latent Demand Score (LDS) method was used to assess demand-based bicycle “need” for the Mid-Hudson South region. This method is only one criteria that can be used to evaluate a potential bicycle facility. It essentially estimates the relative potential bicycle trips generated within a given area, and assesses the draw of various attractors over a given distance. This analysis generated a scored network of bicycle routes within all three counties. Details on the overall methodology and specific latent demand calculations of particular routes are provided in Appendix D.

This section of the plan provides specific recommendations for 32 of the facilities identified in the master plan. These 32 facilities were selected to represent a cross section of projects whose design can be applied to other facilities.

Cost Estimates

A generalized cost estimate per project was developed based upon typical unit prices. They include a breakdown of cost by various project elements, including roadway intersection enhancements, installation of sidewalks and curb ramps, installation of gateway treatments, provision of pedestrian overpasses and off-road bike paths, signage and striping of bike lanes and crosswalks, various traffic calming treatments, establishment of trailheads, streetscape amenities, and widening and resurfacing of roadways to accommodate bicycle usage of shoulders.

Design Strategies and Guidelines

A general discussion of various bicycle and pedestrian facilities is included along with typical examples to illustrate the range of facility types. For example, on-road improvements for pedestrians include the installation of sidewalks, curb ramps and striped crosswalks. On-road improvements for bicyclists include bicycle lanes and bicycle routes. And, independent project recommendations include upgrading critical intersections, enhancing pedestrian crossings and providing bicycle parking facilities. Facility design guidance addresses transit access, parking, walkways, street-crossings, multi-use paths, intersections, signing/markings and traffic calming.

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Funding Sources

A combination of Federal, State and local government funding and dollars from the private sector provides the most effective means to ensure implementation of the *Mid-Hudson South Region Bicycle and Pedestrian Master Plan*. A listing of possible funding sources is provided in this report.

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EXISTING FACILITIES

Westchester County

Table 1 lists existing bicycle and pedestrian facilities in Westchester County, consisting of off-road paths, road shoulders and routes along selected roads. Most off-road trails are multi-use though some are restricted for pedestrian (hiking) use only. Routes along major road corridors are primarily intended for bicycle use. Not listed are trail systems within county and state parks or network on-road routes with wide shoulders or compatible on-road bicycle routes. Municipalities are abbreviated as follows:

ARD	Ardsley	LEW	Lewisboro	PLV	Pleasantville
BED	Bedford	MMT	Mamaroneck Town	POC	Port Chester
BRM	Briarcliff Manor	MMV	Mamaroneck Village	PDG	Pound Ridge
BRX	Bronxville	MTK	Mount Kisco	RYC	Rye City
BUC	Buchanan	NWC	New Castle	RYK	Rye Brook
CTD	Cortlandt	NRO	New Rochelle	SCD	Scarsdale
CRO	Croton-on-Hudson	NOC	North Castle	SLH	Sleepy Hollow
DBF	Dobbs Ferry	NSM	North Salem	SOM	Somers
ECH	Eastchester	OST	Ossining Town	TTN	Tarrytown
ELM	Elmsford	OSV	Ossining Village	TUC	Tuckahoe
GRB	Greenburgh	PEL	Pelham	WHP	White Plains
HAR	Harrison	PEM	Pelham Manor	YON	Yonkers
IRV	Irvington	PKS	Peekskill	YTN	Yorktown
LAR	Larchmont				

**TABLE 1
EXISTING FACILITIES IN WESTCHESTER COUNTY**

FACILITY NAME	FACILITY DESCRIPTION	FACILITY TYPE	TOTAL MILES	MUNICIPALITY	PROJECT STATUS/ COMMENTS
North County Trailway	Paved, multi-use trail on the right-of-way of the former Putnam Division Railroad between Eastview in the Town of Mt. Pleasant and Putnam County.	OFF-ROAD	22.1	MTP, BRM, OST, NWC, YTN, SOM	21.5 miles built; half-mile missing link sections will complete trailway in 2001.
South County Trailway	Paved, multi-use trail following the course of the former Putnam Railroad right-of-way from Eastview south to the Bronx	OFF-ROAD	14.1	GRB, ELM, IRV, DBF, ARD, HAS, YON	5.6 miles built between Elmsford and Yonkers. 1.75 miles section from Eastview (at North County Trailway) to Warehouse Lane in Greenburgh to be complete in 2001.
Old Croton Aqueduct Trailway	Historic, unpaved trail following the route of the original Croton Aqueduct between Croton Dam and New York City, connecting to the Bronx. Several areas of detour in which road alignments are used.	OFF-ROAD	24.0	CTD, OST, OSV, BRM, MTP, SLH, TTN, IRV, DBF, HAS, YON	Facility is complete.

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FACILITY NAME	FACILITY DESCRIPTION	FACILITY TYPE	TOTAL MILES	MUNICIPALITY	PROJECT STATUS/ COMMENTS
Briarcliff-Peekskill Trailway	Trail following the right-of-way lands of the Briarcliff-Peekskill Parkway linking county and local parks	OFF-ROAD	5.6	CTD, YTN, NWC, OST	Hiking only.
Tarrytown-Kensico Trailway	East-West trail linking the Bronx River, North County and Croton Aqueduct Trailways. Utilizes both on road (Rte. 100C, Virginia and local roads) and off-road alignments.	ON & OFF ROAD	4.9	MTP, GRB, TTN	1.1 miles built as path.
Bronx River Pathway	Path on the Bronx River Parkway Reservation between Kensico Dam Plaza and New York City	OFF-ROAD	12.8	NOC, MTP, WHP, SCD, EAS, BRX, MTV, TUC, YON	9.0 miles built in three sections. Design study underway for a 1.1 mile trail extension north of Harney Road.
Camp Smith Trail	Rugged state hiking trail crossing Camp Smith from the tollhouse on Route 6/202 to connect with the Appalachian Trail north of the county border.	OFF-ROAD	2.3	CTD	Hiking only.
Playland Pathway	Pathway situated on parkway lands between U.S. Route 1 and Playland Amusement Park. Pathway is parallel to Playland Parkway.	OFF-ROAD	1.0	RYC	Facility is complete.

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PROPOSED FACILITIES

Westchester County

As part of the development of this master plan, Westchester County worked to expand its existing 90 mile system of bicycle facilities developed in the 1980s, to a 366 mile proposed network of bicycle and pedestrian facilities to include on road routes as well as off road paths.

The following table shows proposed bicycle and pedestrian routes in Westchester County. The facilities include off-road multi-use paths, and road corridor routes. Hiking only trails are included which connect population centers, commercial and recreational facilities and provide links to other trails.

Routes along major road corridors are primarily intended for bicycle use. The purpose of showing them is to provide a framework for future road improvements for accommodating bicycle travel. Improvements could involve providing ample shoulder widths, bicycle travel lanes, off-road parallel paths, or posting routes with bike route signage. The type of facility to be developed would depend on the feasibility of implementation, such as available right-of-way.

Facilities shown with an asterisk (*) are identified in the master plan with specific improvements needed to implement them, as shown on the “cut sheets” in Section V., “Identified Projects and Prototype Examples.

**TABLE 2
PROPOSED FACILITIES IN WESTCHESTER COUNTY**

FACILITY NAME	FACILITY DESCRIPTION	FACILITY TYPE	TOTAL MILES	MUNICIPALITY	PROJECT STATUS/COMMENTS
Bear Mountain-Yorktown Heights Trail	East-west route between Annsville Circle and Yorktown Heights. Western portion proposed to be built on Bear Mountain Parkway (and Extension) right-of-way lands. At Taconic Parkway, it follows a route planned by the Town of Yorktown that utilizes parkway lands, a planned parkway overpass, Strang Blvd., and crosses through FDR State Park to join a town spur trail that connect with the North County Trailway.	OFF-ROAD	12.0	PKS, CTD, YTN	Proposed facility. Referenced on Bear Mountain Parkway / Route 35/202/6 cut sheet.
Catskill Aqueduct Trail	Alignment utilizes the level surface of the Catskill Aqueduct between the Bear Mountain Parkway and Mohansic County Park	OFF-ROAD	3.9	CTD, YTN	Development and use of this facility needs to be approved and coordinated with the NYCDEP.

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FACILITY NAME	FACILITY DESCRIPTION	FACILITY TYPE	TOTAL MILES	MUNICIPALITY	PROJECT STATUS/COMMENTS
*Cross Eastchester Trail	Trail alignment provides a connection between the Bronx River and Hutchinson River Pathways and has on and off-road elements.	ON-ROAD OFF-ROAD	2.5	ECH	Included in Town's master plan.
Hillside Woods Trail	Trail will link the Old Croton Aqueduct and South County Trailways. Alignment goes through Hillside Woods County Park, village parkland, public school lands and the former Carvel property.	OFF-ROAD	1.5	DBF, HAS	This facility is mapped in Hastings's Community Vision for Comprehensive Planning and Strategic Action Plan, 10/98. A design and feasibility study, funded by a Greenway Conservancy grant, will be undertaken in 2001.
Hutchinson River Pathway	Multi-use trail from the southeastern portion of Westchester County to NYC, linking 5 county parks.	OFF-ROAD	14.6	RYK, HAR, WHP, SCD, NRO, EAS, PLM, MTV	Presently developed as a narrow equestrian trail between Twin Lakes County park in Eastchester and the I-287 overpass in Harrison. Also identified by East Coast Greenway as part of Maine to Florida trail.
Mahopac Branch Trailway	Links the North County Trailway in Putnam County to the Golden Bridge train station in Lewisboro, following alignment of the abandoned Mahopac Branch Railroad, with a half-mile detour along a utility power line at the county border.	OFF-ROAD	5.6	SOM, LEW Also Carmel in Putnam County	Funded in the TIP (PIN#8756.83.121) for development as a paved multi-use trail.
Cortlandt Shoreline Trail	Trail alignment follows the Hudson River waterfront between Peekskill and Ossining, linking three county waterfronts parks and Peekskill's Riverfront Green.	OFF-ROAD	14.1	PKS, CTD, CRO, OST	Proposed facility.
Columbus Avenue	County road corridor situated between Kenisco Dam Plaza and Route 117.	ON-ROAD	5.0	MTP	Recommended by the town to be developed as a bike path.
*Cross Westchester-Rockland Link (Rte. 119-TZ Bridge)	Route follows Westchester Avenue through White Plains to Route 119 and a path on the Tappan Zee Bridge will connect into Rockland County	ON-ROAD	13.0	HAR, WHP, GRB, ELM, TTN	Any plans to replace the Tappan Zee bridge should accommodate bicycles and pedestrians.
Croton Aqueduct Extension	Route utilizes Croton Dam Road and links the North County Briarcliff-Peekskill and Old Croton Aqueduct Trailways. Also follows part of Route 134.	ON-ROAD	5.8	CTD, YTN	Proposed facility.
Lake Street	County road route linking downtown White Plains with Silver Lake County Park and the County Airport	ON-ROAD	3.1	WHP, HAR	Proposed facility.
Long Ridge Road	County road route linking Bedford Village (Route 22) with a Connecticut DOT designated bike route in Stamford	ON-ROAD	4.2	BED, PDG	Proposed facility.

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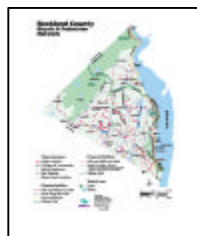
FACILITY NAME	FACILITY DESCRIPTION	FACILITY TYPE	TOTAL MILES	MUNICIPALITY	PROJECT STATUS/COMMENTS
Mamaroneck Avenue	Runs along Bloomingdale Road and Mamaroneck Avenue south to the Hutchinson River Pathway and Saxon Woods County Park.		3.5	WHP, HAR	Identified in White Plains Comprehensive Plan.
Mill Road	Route situated on the south side of Titicus Reservoir between Routes 22 and 121. Follows local roads to connect the North Salem hamlets of Purdy's and Salem Center.	ON-ROAD	4.3	NSM	Recommended by town.
Palmer Road	County road route providing a link between the Bronx River Pathway and South County Trailway	ON-ROAD	1.0	YON	Proposed facility.
*Pelham Shore Road	County road route spurring off Route 1 in New Rochelle, follows the shoreline, linking Glen Island County Park and connecting with Bronx Greenway in Pelham Bay Park.	ON-ROAD	2.5	NRO, PLM	Proposed facility.
Route 1	Alignment spans the entire Route 1 corridor from NYC to Connecticut linking all the Sound Shore communities	ON-ROAD	13.3	PLM, NRO, MMT, MMV, RYC, POC	Proposed facility.
*Route 6	Commercial corridor between the Bear Mountain Parkway and Putnam County that has been improved in sections with wide shoulders.	ON-ROAD	7.9	CTD, YTN, SOM	Route 6N (East Main Street) is a less traveled parallel road that is proposed to be signed as a bike route.
*Route 6/202	Route leads to the Bear Mountain Bridge connecting into Rockland/Orange Counties. A spur on Route 9 provides a connection into Putnam County.	ON-ROAD	3.6	CTD, PKS	The narrow, winding and hilly nature of the road will require special design treatment to safely accommodate bicyclists.
Route 9/9A	Route follows Route 9A from Buchanan to Croton, then south on US Route 9 to downtown Yonkers, continuing south on Riverdale Avenue connecting to the Bronx. Numerous intersections with the Old Croton Aqueduct Trailway.	ON-ROAD	27.4	BUC, CTD, CRO, OST, OSV, BRM, MTP, SLH, TTN	Proposed facility.
*Route 22	Central route from White Plains to Putnam County	ON-ROAD	26.8	WHP, NOC, BED, LEW, NSM	Section between Armonk and the Kensico Reservoir is improved with wide shoulders. Popular route for experienced cyclists.
*Route 22	Central route from Kensico Dam Plaza in White Plains to Route 1 in Mount Vernon	ON-ROAD	14	WHP, SCD, ECH, TUC	Popular route for experienced cyclists.
Route 35	East-west route in the northern county. An alternative Cross River bypass route through Ward Pound Ridge reservation along Boutonville Road and Route 124 could be considered. Need to consider parallel off-road paths where feasible to address safety concerns.	ON-ROAD	14.6	SOM, BED, LEW	Section between Whitehall Corners and Katonah Hamlets is improved with wide shoulders. Links with designated bike route in Connecticut.

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FACILITY NAME	FACILITY DESCRIPTION	FACILITY TYPE	TOTAL MILES	MUNICIPALITY	PROJECT STATUS/COMMENTS
*Route 100 Central Park Ave	Route follows the entire Central Park Avenue corridor from the County Center to the NYC line	ON-ROAD	10.7	WHP, GRB, YON	Proposed facility.
Route 100 Somerstown Turnpike	Route runs between the North County Trailway and Putnam County	ON-ROAD	11.0	YTN, SOM	Section between Routes 118 and 35 is improved with wide shoulders in both directions.
*Route 117 Corridor	Between US Route 9 and 35. It follows Route 117 from US 9 to Bedford Hills, utilizing Lexington Avenue in Mount Kisco, a .75 mile off-road path between Bedford Hills and Katonah, and Bedford Road through downtown Katonah.	ON-ROAD	15.8	MTP, PLV, NWC, MTK, BED	Section between Route 9 and the Taconic Parkway is a divided 4-lane roadway containing wide shoulders in both directions.
Route 120	Route situated between U.S Route 1 and 22 and connects the north county touring routes and the county airport.	ON-ROAD	9.5	RYC, HAR, NOC	Popular bike route.
Route 121	North county route which branches off from Route 22 in Bedford Village and continues north into Putnam County, linking Bedford Village, Cross River and Salem Center, as well as Mountain Lakes and Ward Pound Ridge County Park facilities.	ON-ROAD	13.9	BED, PDG, LEW, NSM	Proposed facility.
Route 127	Route runs from Hutchinson River Pathway through downtown Harrison, connecting with Route 1.	ON-ROAD	13.8	HAR	Recommended by the Town of Harrison.
Route 128	Route provides a link between Route 22 in Armonk and Route 117 in Mount Kisco and connects with Wampus Pond County Park.	ON-ROAD	5.4	NOC, NWC, MTK	Proposed facility.
Route 137	From Route 121 in Bedford to Connecticut. A two-mile spur along Westchester Avenue utilizes a one-mile off-road path into the hamlet of Scott's Corners.	ON-ROAD	5.5	BED, PDG	Links with state designated bike route in Connecticut.
River Walk	Conceived in 2000, the River Walk would follow the entire Hudson River shoreline from New York City to Putnam County, to maximize access to the Hudson River Waterfront.	OFF-ROAD	46	CTD, PKS, BUC, CRO, OST, OSV, BRM, MTP, SLH, TTN, IRV, DBF, HAS, YON	Route currently under development.
Horseman's Trail	Greenway designated trail connecting Old Croton Aqueduct trail to the Hudson River Waterfront	OFF-ROAD	1.2	SLH	Hiking only.
Leatherstocking Trail	Between the City of New Rochelle and Village of Mamaroneck. Links into Saxon Woods County Park	OFF-ROAD	2.0	NRO, MMT, MMV	Hiking only.

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EXISTING FACILITIES

Rockland County

Rockland County has both off-road trails and on-road facilities. Table 3 lists the existing facilities that comprise the County's bicycle and pedestrian network. Most off-road trails are multi-use and traverse along the ridgeline that follows the Hudson River north to Haverstraw. A few of the off-road facilities are pedestrian use (hiking) only due to topographic constraints. State Route 9 Bicycle Route is primarily located along major road corridors and is intended for bicycle use. Not included in the listing are trail systems located within State, County or local parks. Municipalities are abbreviated as follows:

A	Airmont	NS	New Square	SV	Spring Valley
CR	Chestnut Ridge	N	Nyack	SP	Stony Point
C	Clarkstown	O	Orangetown	SU	Suffern
GV	Grand View	PI	Piermont	UN	Upper Nyack
H	Haverstraw	PO	Pomona	VH	Village of Haverstraw
HI	Hillburn	R	Ramapo	WHI	Wesley Hills
K	Kaser	SL	Sloatsburg	WH	West Haverstraw
M	Montebello	SN	South Nyack		
NH	New Hempstead				

**TABLE 3
EXISTING FACILITIES IN ROCKLAND COUNTY**

FACILITY NAME	FACILITY DESCRIPTION	FACILITY TYPE	LOCATION	JURISDICTION
Esposito Memorial Trail	Multi-Use Path	OFF-ROAD	South Nyack to Grandview-on-Hudson	Village of South Nyack
Nyack Beach/Hook Mountain Greenway	Multi-Use Path (Part of Hudson River Greenway Trail)	OFF-ROAD	Upper Nyack to Haverstraw	PIPC
Jones Point Greenway Trail	Multi-Use Path (Part of Hudson River Greenway Trail)	OFF-ROAD	Bear Mt. State Park to Dunderburg Mt	PIPC
Hader Park Trail	Multi-Use Path (Part of Hudson River Greenway Trail)	OFF-ROAD	Grandview on-Hudson	Village of Grandview
Tallman Mt. State Park Trail	Multi-Use Path (Part of Hudson River Greenway Trail)	OFF-ROAD	Route 9W to Ferdon Ave.	PIPC
Stoney Point Battlefield Historic Site Trail	Multi-Use Path (Part of Hudson River Greenway Trail)	OFF-ROAD	Loop Trail within Stoney Point Battlefield Park	PIPC

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FACILITY NAME	FACILITY DESCRIPTION	FACILITY TYPE	LOCATION	JURISDICTION
Harriman/Bear Mountain State Park Trail	Multi-Use Path (Part of Hudson River Greenway Trail)	OFF-ROAD	Route 9W to Bear Mountain Bridge	PIPC
Long Path	Multi-Use Path	OFF-ROAD	New Jersey to Orange County	NY-NJ Trail Conf/NYS/Cnty
Rockland Lake State Park Loop Trail	Paved Multi-Use Path	OFF-ROAD	Loop Trail within Rockland Lake State Park	PIPC
Route 9 Bike Route	Bicycle Route along Route 9 Corridor	ON-ROAD	New Jersey to Bear Mt. Bridge And Putnam Cnty	NYSDOT
North Broadway Bike Route		ON-ROAD	Nyack to Hook Mt. Park	Village of Nyack/NYSDOT
Orangetown Rail Trail	Multi-Use Path	OFF-ROAD		Town of Orangetown
Bicycle Storage	Bowline Park (10 Bike Capacity)		Village of Haverstraw	Town of Haverstraw
	Memorial Park (10 Bike Capacity)		Village of Nyack	Village of Nyack
	Fountain Pond Road And Village Youth Center (2 Locations)		Village of Hillburn	Village of Hillburn
	Village Community Center		Village of Suffern	Village of Suffern
	Public Parks And Schools		Countywide	School District Multi-Jurisdiction

**MID-HUDSON SOUTH REGION
BICYCLE AND PEDESTRIAN MASTER PLAN**

PROPOSED FACILITIES

Rockland County

To supplement the existing facilities in Rockland County, needed pedestrian, bicycle, or multi-use facilities have been identified in Table 4. Many of the proposed pedestrian improvements will link gaps in sidewalk systems, repair poorly maintained sidewalks, or provide facilities in areas with high pedestrian volumes. The bicycle and multi-use facilities proposed would expand the County’s network and link commercial, recreational and transportation services to population centers.

**TABLE 4
PROPOSED FACILITIES IN ROCKLAND COUNTY**

FACILITY	FACILITY DESCRIPTION	FACILITY TYPE	LOCATION	JURISDICTION	STATUS
Route 59	Complete sidewalk and establish bike route	ON-ROAD	Suffern to Nyack	NYSDOT/Town of Clarkstown	Unfunded
Route 340	Sidewalk requires replacement and upgrade	ON-ROAD	Oak Tree Rd. to State Line	NYSDOT	Unfunded
Oak Tree Rd.	Sidewalk requires replacement and upgrade	ON-ROAD	Rt. 303 to Washington St.	Town of Orangetown	
Central Ave.	Sidewalk requires replacement and upgrade	ON-ROAD	John St. to Main St.	Town of Orangetown	Unfunded
Gilbert Ave.	Sidewalk requires replacement and upgrade	ON-ROAD		Town of Orangetown	
S. Main St.	Sidewalk requires replacement and upgrade	ON-ROAD		Town of Orangetown	
River Rd.	Sidewalk requires replacement and upgrade	ON-ROAD	Grandview-on-Hudson	County	Funded Tea-21 (STP)
Ramapo River Greenway	Establish Multi-Use Trail	OFF-ROAD	Sloatsburg to N.J. state line	County	Part. Fund. Tea-21 (TEP)
County Route 80	Complete sidewalk network, establish Bike Route and provide streetscape amenities in New City	ON-ROAD	P.I.P. to Route 304 and Brewery Rd. to Strawtown Rd.	County and Town of Clarkstown	2 - Projects Funded Tea-21 (STP)
Forshay Rd.	Sidewalk requires replacement and upgrade	ON-ROAD	Viola Rd. to Willow Tree Rd.	Cty. and Town Of Ramapo	Funded Tea-21 (STP)
Palisades Interstate Parkway Bikepath I	Construct bikepath within the R.O.W. of the P.I.P.	OFF-ROAD	State line to N. Middletown Rd.	NYSDOT	Funded Tea-21 (SDF)

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FACILITY	FACILITY DESCRIPTION	FACILITY TYPE	LOCATION	JURISDICTION	STATUS
Hudson River Esplanade	Establish a river walk along the Hudson River shoreline	OFF-ROAD	Town of Haverstraw	County	Unfunded
Hudson River Park Trail	Establish a river walk through the New Hudson Park - (would connect in future with other trails)	OFF-ROAD	Town of Haverstraw	County	Unfunded
County Roads	Improve road shoulders, replace drainage castings with bicycle safe gates	ON-ROAD	Countywide	County	Unfunded
Route 304	Rehabilitate the existing sidewalk from Virginia Street to Germonds Road	ON-ROAD	Town of Clarkstown	NYS DOT	Unfunded
Little Tor Road	Rehabilitate the existing sidewalk between Red Hill Road and New Hempstead Road	ON-ROAD	Town of Clarkstown	County	Unfunded
Route 303	Construct sidewalk from Lake Road, Congres to Gilchrest Road	ON-ROAD	Town of Clarkstown	NYS DOT	Unfunded
West Nyack Road	Construct sidewalk from east of Palisades Parkway to Parkway Drive	ON-ROAD	Town of Clarkstown	County	Unfunded
Old Middle Town Road	Construct sidewalk from Old Middletown Road to St. Agatha's Home	ON-ROAD	Town of Clarkstown	County	Unfunded
Old Middle Town Road	Replace sidewalk and curb b/w the railroad tracks and Fairview Avenue	ON-ROAD	Town of Clarkstown	County	Unfunded
Main Street, Nanuet	Replace sidewalk from Church Street to Nanuet Mall/Stop & Shop driveway	ON-ROAD	Town of Clarkstown	County	Unfunded
North Main Street, New City	Construct sidewalk from Phillips Hill Road to Blue Jay Circle	ON-ROAD	Town of Clarkstown	County	Unfunded

*MID-HUDSON SOUTH REGION
BICYCLE AND PEDESTRIAN MASTER PLAN*

To view
PUTNAM MAP
open the file named
"putnam county.pdf"



**MID-HUDSON SOUTH REGION
BICYCLE AND PEDESTRIAN MASTER PLAN**

**TABLE 5
EXISTING FACILITIES IN PUTNAM COUNTY**

FACILITY NAME	FACILITY DESCRIPTION	FACILITY TYPE	TOTAL MILES	MUNICIPALITY	PROJECT COMPLETED
Route 9D	Bike route along Route 9D	ON-ROAD	10.6	Philipstown	YES
Putnam County Bikeway I	Putnam County from Westchester County Line to Mahopac Hamlet	OFF-ROAD	1.83	Carmel	NO – Under construction
Putnam County Bikeway II	Bikeway from Mahopac Hamlet to Seminary Hill Road at the junction of Routes 6 and 52	OFF-ROAD	5.68	Carmel	NO – Funded, designed, construction in 2001
Putnam County Bikeway III	Bikeway from Seminary Hill Road to Brewster Village	OFF-ROAD	3.90	Carmel – Southeast	NO – Funded, design 2001, construction in 2003
PART Bus System Bicycle Racks	Putnam Area Rapid Transit has four buses with bike racks	--	--	--	YES
Maybrook Bikeway I	Bikeway from the Dutchess County line through the town of Paterson in Putnam County to Route 164	OFF-ROAD	3.7	Patterson	NO – Funded, design 2001, construction in 2001
Maybrook Bikeway II	Bikeway from Pumphouse Road in Brewster Village to the Danbury Line	OFF-ROAD	5.4	Southeast	NO – Not funded
Maybrook Bikeway III	Bikeway from Route 164 in Patterson to Pumphouse Road in Brewster Village	OFF-ROAD	4.5	Patterson Southeast	NO – Not funded
Intermodal Bikeway Fence-Maybrook Bikeway I	Chain link fence between rail track and the bikeway	OFF-ROAD	3.7	Patterson	NO – Funded, construction in 2001
Mahopac Branch Bikeway	Bikeway for commuters between Mahopac and Goldens Bridge	OFF-ROAD	5.7	Carmel	NO – Funded design 2002, construction 2004

**MID-HUDSON SOUTH REGION
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**TABLE 6
PROPOSED FACILITIES IN PUTNAM COUNTY**

FACILITY NAME	FACILITY DESCRIPTION	FACILITY TYPE	TOTAL MILES	MUNICIPALITY	PROJECT COMPLETED
Mahopac Branch Bikeway	Bikeway for commuters between Mahopac and Goldens Bridge on former railroad ROW	OFF-ROAD	5.7 (.75 miles in Putnam)	Somers, Lewisboro, Carmel	NO – Funded design 2002, construction 2004
State Route 22	Designated bike route which will link Putnam County to Westchester and Dutchess counties	ON-ROAD	14.88	Southeast Patterson	NO
Route 6N	Designated bicycle route from Westchester County line to Route 6	ON-ROAD	4.4	Carmel	NO
Bicycle Racks	Two bike racks will be installed at the Brewster Village Railroad Station along the Metro-North Railroad line	OFF-ROAD	--	Brewster	NO
Commuter Foot Bridge	Bridge will be constructed over Croton River from Route 100 to Route 22 at Croton Falls	OFF-ROAD		Somers, North Salem	NO
Countywide Sidewalk Contract	Sidewalks will be constructed along state highways, crosswalks, school crossings and other pedestrian facilities will be funded	ON-ROAD	--	--	NO
Bicycle/Pedestrian Signals	Pavement markings and signage contract to improve traffic operation and safety features	ON-ROAD	--	--	NO
Bicycle/Pedestrian Safety Education and Promotional Program	Will provide grants to municipalities, schools, media for safety education and public service information	--	--	--	NO
Drainage structures	Replacement of all drainage structures along county and state roads to make them bicycle friendly	ON-ROAD	--	--	NO
Route 52	From Route 6 to Dutchess County Line	ON-ROAD	6.85	Carmel, Kent	NO
Route 311	From Route 52 Kent to Route 22 in Patterson	ON-ROAD	6.14	Kent, Patterson	NO

**MID-HUDSON SOUTH REGION
BICYCLE AND PEDESTRIAN MASTER PLAN**

To view
WESTCHESTER/PUTNAM/ROCKLAND COUNTY MAP
open the file named
"all counties.pdf"



MID-HUDSON SOUTH REGION BICYCLE AND PEDESTRIAN MASTER PLAN

II. VISION

National Perspective

Bicycling and walking are becoming more important parts of the transportation and recreation systems in communities across America, and the benefits are far reaching. First, increased bicycling and walking help foster a better quality of life due to a healthier lifestyle and a healthier environment (reduced congestion, reduced air and noise pollution, reduced petroleum consumption, etc.). Second, providing bikeways and walkways helps meet the needs of a large segment of population who do not have access to an automobile (young, elderly, poor, people with disabilities, etc.). Third, walking and bicycling may also promote increased economic activity. People who walk and cycle for recreation spend money on food, lodging, bicycle products, rentals, repairs, etc.

People of all ages and abilities are currently bicycling and walking – for all types of trips. However, in many communities, significant barriers prevent these activities from becoming safer and more convenient options. Current facilities and infrastructure often do not meet the diverse needs of a wide range of bicyclists and pedestrians. Commuters, children, seniors and others that do not drive are under-served by the existing transportation system.

Changes in Federal, State, and local policies and programs are encouraging the increased use of these modes and access to public transit via these modes through comprehensive planning, accommodating facility design and supportive programs. As recognized in the June 2000 Clinton-Gore *Building Livable Communities* report, "...expanding community transportation choices to reduce traffic congestion, pollution and oil consumption..." is one of the key initiatives to creating a better quality of life for communities across America. The passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 defined a new approach to providing transportation facilities and services at the State and local levels. ISTEA promotes the regular inclusion of considerations of bicyclists and pedestrians in transportation planning and provides a range of flexible funding options. Virtually all of the funding sources which were available for bicycle or pedestrian projects or planning under ISTEA have been continued under the new transportation funding legislation: TEA-21. This *Bicycle and Pedestrian Master Plan* was funded under TEA-21.

The *National Bicycling and Walking Study* conducted by the U.S. Department of Transportation (USDOT) in 1994 set two important national goals:

- To double the percentage of trips (from 7.9 percent to 15.8 percent) taken by bicycling and walking; and
- To simultaneously reduce by 10 percent the number of bicyclists and pedestrians killed or injured in traffic-related crashes.

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Furthermore, the New York Metropolitan Transportation Council (NYMTC) has published a regional transportation plan -- *Regional Transportation Plan Update 1995-2015, Pedestrian/Bicycle Element* -- which states a vision for bicycling and walking:

It is the vision of the Pedestrian/Bicycle Element of the Regional Transportation Plan to promote and encourage walking and bicycling as modes of travel by increasing safety for pedestrians and cyclists and by improving access to all transportation facilities and services region-wide. This vision reflects the goals of the Regional Transportation Plan which are to increase mobility, decrease congestion, and overall, improve the quality of life throughout the metropolitan region.

This report incorporates state-of-the-practice bicycle and pedestrian planning and design techniques with the vision and input of the people of the Mid-Hudson South region.

Regional Vision

Consistency with Regional Planning Documents

In addition to being consistent with long range transportation planning goals established at the federal level, this plan also advances strategies addressed in planning documents produced by Westchester, Rockland and Putnam Counties. These include *Patterns for Westchester* (1996), *Transportation into the 21st Century* (Westchester County, 1995), *Historic River Towns of Westchester* (1997), *Connections* (Westchester County, 1998), Rockland County's Comprehensive Plan, *Rockland County: River to Ridge* (2001), the *Long Path Report* (Rockland County, 1990), and *Putnam County Bicycle/Pedestrian Plan* (1997).

These plans emphasize transit and pedestrian friendly design, reducing single occupant vehicle travel, improving access to transit, and enhancing intermodal connections.

In addition, many communities in the three county region have long supported improving accommodations for bicycles and pedestrians. For example, many municipal comprehensive plans include recommendations for bicycle and pedestrian facilities.

The current master plan also builds on past work accomplished by the counties and some municipalities to implement bicycle facilities. For example, the existing facilities shown on the network maps, and project lists included in the abstract and in Appendix C, were the result of previous planning efforts. These lists augment previous planning studies and serve as the basis of the bicycle and pedestrian route network.

Public Involvement

The preparation of this Master Plan included an extensive public involvement component that solicited input through surveys and public meetings. The individual

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counties conducted some of the initial public outreach. For example, in Westchester and Rockland Counties, surveys were sent to municipalities and bicycle organizations, and follow-up meetings were held to gather input on the locations of existing and proposed facilities. (See Appendix E – Public Input)

This information was augmented through public meetings held in June 1999 and June 2000 to solicit input from the public on the specific facilities to be included in the plan. The proposed bicycle and pedestrian facilities shown on the study maps and project lists are the result of this process. A technical training seminar was also held in June 1999 on specific design issues related to bicycle and pedestrian planning.

Participants in public meetings were asked to consider what qualities constituted their “vision” for the future of bicycling and walking in the Mid-Hudson South region. The results ranged from very specific changes in physical conditions to broad statements of preference. Several themes emerged from the public’s vision statements. Most of these refer to the kind of environment the communities believe would be conducive to bicycling and walking. The results of the public outreach efforts, including the surveys, public meetings and individual discussions, are summarized below.

- Provide inter- and intra-jurisdictional linkage and networks: This can be done by creating an interconnected system that provides safe and convenient links between residential, commercial, business, recreational and waterway areas. This system should take the following into consideration:
 1. Cross-county planning and coordination
 2. Bicycle/pedestrian connections across Hudson River
 3. Key destination access for bicyclists and pedestrians
 4. Facilities along highways such as the Palisades Interstate Parkway and Route 9W, and general lane reduction and wider shoulders
- Provide transit access for cyclists and pedestrians.
- Develop more paths and trails including rail-trails, and reinforce existing trails.
- Utilize easements wherever possible.
- Reduce automobile dependency.
- Create safer crossings on state highways for bicyclists and pedestrians of all abilities.
- Enforce bicycle and pedestrian facility requirements on new developments.
- Create walkable communities.
- Improve continuity of facilities.
- Focus on the use of bicycles for transportation, not just recreation.
- Promote bicycle and pedestrian facilities that improve access to employment and assist individuals in moving from welfare into the workforce.

Source – Public Meetings, June 1999 and June 2000

Taking the national goals for bicyclists and pedestrians, NYMTC’s goals, and the local community vision statements for the *Mid-Hudson South Region Bicycle and Pedestrian Master Plan*, we arrive at the following vision statement:

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“The Mid-Hudson South Region Bicycle and Pedestrian Master Plan envisions a transportation system that will accommodate and encourage bicycling and walking that is safe and convenient for users of all abilities. Over the next 15 years, jurisdictions in this study area will strive to create an interconnected system/network that provides safe and convenient links to and between transit, residential, commercial, business, recreation and waterway areas, and will take cross-county/regional planning and coordination into consideration.”



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III. AREA CHARACTERISTICS AND NEEDS

Regional Overview

The Mid-Hudson South region encompasses 858 square miles¹ within the counties of Westchester, Rockland and Putnam, and hosts a population of approximately 1.22 million people². This region is characterized by two water bodies of significance – the Hudson River and the Long Island Sound – which effectively create 136 miles of waterfront property³. It is also characterized by both hilly and flat terrain.



Located in close proximity to New York City, this region is served by a variety of transportation choices: interstate and arterial roadways; two bridges – Tappan Zee and Bear Mountain; ferry service – including a ferry operating between Haverstraw and Ossining; two passenger rail operators -Amtrak and Metro-North; and three major bus lines – Bee Line Bus System in Westchester County, Putnam Area Rapid Transit (PART) in Putnam County, and Transport of Rockland (TOR) in Rockland County. Furthermore, there are existing bicycle and pedestrian facilities – off-road paths, road shoulders and routes along selected roads - in each of the three counties, as well as in neighboring jurisdictions that currently provide opportunities for cycling and walking. Additional routes have also been planned for each county, which create viable links between population centers, commercial and recreational facilities and existing bicycle and pedestrian routes in the region.

Demographic Characteristics

- The Mid-Hudson South region has 332 schools (elementary, middle and secondary), which translates to a student population of approximately 173,000.⁴ The elderly population (65 and over) comprises over 160,000.⁵ These two populations combined

¹ Westchester County- 450 square miles; Rockland County- 176 square miles; Putnam County- 232 square miles. Source: County Planning Departments.

² Westchester County – 874,866; Rockland County – 265,475; Putnam County – 83,941. Source: 1990 Census.

³ Westchester County – 41 miles of riverfront and 36 miles along LI Sound; Rockland County – 40 miles of Riverfront; Putnam County – 19 miles of riverfront. Source: County Planning Departments.

⁴ Westchester, Rockland and Putnam Counties – Countywide Data

⁵ 1990 US Census – Demographic Data

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make for a very large group of people typically reliant on walking, cycling and public transit as a primary means of transportation.

- While 87 percent of all households in this region own a car (greater than 54 percent own more than two cars), 13 percent of all households in this region show a zero car ownership.⁶ This, coupled with an increasing elderly population, indicates considerable potential demand for pedestrian and bicycle facilities. A growing elderly population makes both cycling and walking necessary and viable transportation modes. The elderly also have a greater dependency on mass transit than the general population.
- Overall, a majority of the Mid-Hudson South region’s working population travels to work within their county of residence. Of those that travel outside the county in which they reside, 25 percent travel to New York City; 4 percent travel to Northern, Central and Eastern New Jersey; 3 percent travel to Southwestern Connecticut; and 1 percent travel to Dutchess and Orange counties.⁷
- Journey-to-work travel mode data for the Mid-Hudson South region indicate that 76 percent travel by motor vehicle, 15 percent travel by mass transit, and 4 percent travel by other means. 1990 Census Journey-To-Work (JTW) data indicates that biking and walking constitute approximately 5 percent of the JTW trips in the Mid-Hudson South region, broken out as shown in the following table.⁸

**JOURNEY-TO-WORK BY
TRAVEL MODES
MID-HUDSON SOUTH REGION 1990**

	Travel Modes (% of all Workers)			
	Motor Vehicle	Mass Transit	Bicycling	Walking
Putnam County	89.24%	6.10%	0.04%	1.49%
Rockland County	87.34%	6.78%	0.11%	2.60%
Westchester County	71.32%	18.90%	0.14%	5.37%

⁶ 1990 US Census – Demographic Data

⁷ 1990 US Census – Journey-To-Work Data

⁸ 1990 US Census

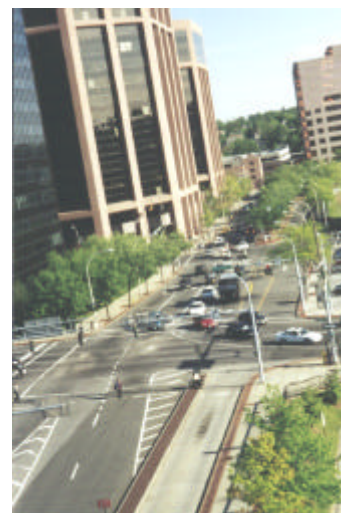
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Area Types

The land use complexion representative of this region comprises “area types” categorized as Urban Centers, Village Centers, Waterfront Communities, Suburban Areas, and Rural Areas. Key characteristics and land use and transportation planning issues that affect cyclists and pedestrians are outlined below.

Urban Centers

- *Characteristics:* Typical land use is high-density, mixed-use with extensive infrastructure, a well-defined downtown business district and served by major roads and major bus/rail interchanges. Examples of Urban Centers include White Plains, Yonkers, Mount Vernon and New Rochelle.
- *Key Opportunities and Challenges:*
 1. Street Layout – grid street systems create numerous intersections, where opportunities are greater for conflict between pedestrians, cyclists and motor vehicles. At the same time, grid systems can benefit pedestrians and cyclists by dispersing traffic more evenly throughout the urban center.
 2. Bicycle Lanes – differential settlement between the bicycle lane and travel lane can discourage use of bicycle lanes.
 3. Sidewalks – high volume and high speed motor vehicle traffic creates threatening and uncomfortable conditions for pedestrians.
 4. Maintenance – poor maintenance interferes with safe and continued use of bicycle and pedestrian facilities.
 5. Linkages to Mass Transit – bicycle and pedestrian access to transit or a transportation system that offers a range of choices for the traveling public in Urban Centers provides a tremendous opportunity for reducing motor vehicle trips.



Village Centers

- *Characteristics:* Typical land use is primarily small-scale, mixed-use development with surrounding residential and office/service sectors and well-developed infrastructure. Village Centers are served by major roads and a slightly lower service transit center than Urban Areas. Examples of Village Centers include Hastings, Irvington, Tarrytown, Mamaroneck, Brewster, Spring Valley and Suffern.



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- *Key Opportunities and Challenges:*
 1. Community Support – creating a community that supports bicycling and walking, with active local citizen participation is critical to the successful development and implementation of bicycle and pedestrian facilities.
 2. Historic Districts/Regional Identity – bicycle and pedestrian activity have often been compromised by historic districts with widened streets, narrowed sidewalks and no provision for bicycle lanes. Nevertheless, historic areas provide important tourist attractions for bicyclists and pedestrians.
 3. Street Design – higher density of small towns and villages promotes opportunities for bicycling and walking.

Waterfront Communities

- *Characteristics:* Typical land use is mixed residential/commercial with emphasis on recreation, and is served by a commercial base within walking distance of the waterfront. Most waterfront areas in the Mid-Hudson South region are designated as historic districts on the National Register of Historic Places. Examples of waterfront communities are Ossining, Nyack, Mamaroneck, Port Chester, Cold Spring, Tarrytown, Piermont and Rye.



- *Key Opportunities and Challenges:*
 1. Historic Identity/Significance – waterfront communities along the Hudson River and Long Island Sound share a rich history and offer extensive opportunities for recreation and tourism. For example, Westchester County will be looking to identify opportunities for the development of a continuous trailway adjacent to the Hudson River Waterfront.
 2. Access to Waterways – in Westchester and Putnam counties, public access to the Hudson River waterfront is impaired by an active rail line and industrial uses along the east side of the Hudson River.
 3. Bridge Access – poor safety and access issues discourage pedestrians and cyclists from crossing bridges.

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Suburban Areas

- *Characteristics:* Typical land use is primarily residential with low-intensity retail/office development and some vacant developable land available. Located adjacent to hamlet centers and villages, Suburban Areas are served by major and minor arterials with limited alternative modes of transportation. Examples of Suburban Areas include Yorktown, Cortlandt, Greenburgh, (unincorporated) North Castle and Orangetown.



- *Key Opportunities and Challenges:*
 1. Land Use Patterns – sprawling low-density character of suburbs in this region creates trip distances that make biking and walking extremely difficult for most residents.
 2. Commercial and Retail Area Design – design is primarily aimed at patrons that arrive by motor vehicle.
 3. Neighborhood Design – poor local street connectivity, epitomized by the cul-de-sac, forces greater amounts of traffic onto arterial roads, creating a dangerous environment for pedestrians and cyclists.
 4. Connections to Transit – promoting bicycle and pedestrian access to suburban transit facilities remains an untapped opportunity for reducing motor vehicle trips.

Rural Areas

- *Characteristics:* Typical land use is sparsely-developed, primarily rural landscape with scattered small communities and free-standing residential and commercial developments, with some agricultural operations. There is little developed infrastructure with on-site well water and wastewater systems. Rural Areas are generally served by a rural two-lane road network. Examples of Rural Areas include Patterson, Kent, Southeast, Sloatsburg and North Salem.



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- *Key Opportunities and Challenges:*
 1. Bicycle and Pedestrian Accommodations in Rural Community Downtowns – speeding traffic and narrow roads often present difficult conditions.
 2. Recreational Touring Routes – bicycle touring has become a very popular vacation and short trip recreation activity in rural areas.
 3. Rural Roadway Maintenance – poor maintenance affects safe and continued use of roadways for both recreation and utilitarian cycling.

Common Issues

Public Transit Access: Pedestrian and bicycle facilities in transit corridors make transit systems more effective. It is critical to design and install facilities such as bike lanes and sidewalks and curb ramps that are compliant with the Americans with Disabilities Act (ADA) that link bicyclists and pedestrians to transit facilities. Additionally, amenities such as transit shelters, secure bicycle parking and improved lighting aid in safely encouraging, accommodating and linking pedestrian and bicycle activity to public transit. Providing a means to carry bicycles on trains, buses and ferries is also critical. For example, MTA Metro-North Railroad currently provides bicycle-accessible cars.

Together, the high percentage of households in the Mid-Hudson South region without a car (13 percent)⁹, and the increase in the elderly population compound the need for and importance of public transit, and bicycle and pedestrian access to public transit. Furthermore, since most JTW trips, particularly those by public transportation, begin and end with walking, the case to expand and improve pedestrian linkages is even stronger. Another excellent example of promoting and supporting bicycle access to transit is the provision of bicycle racks on Putnam Area Rapid Transit (PART) buses.

In keeping with this, NYMTC's *Ten Steps to Improve Links Between Bicycling, Walking and Public Transportation* should be implemented wherever possible. These steps are enumerated in Appendix B.

Bicycle and Pedestrian Safety: Safe traveling conditions are a priority for bicyclists and pedestrians in the Mid-Hudson South region. The following table, taken from the *Pedestrian and Bicycle Element* of NYMTC's *Regional Transportation Plan Update 1995-2000*, indicates the number of pedestrian and bicycle accidents that occurred in the Mid-Hudson South region between 1992 and 1994 using accident data from the New York State Department of Motor Vehicles.

⁹ 1990 US Census

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**BICYCLE AND PEDESTRIAN ACCIDENTS IN
MID-HUDSON SOUTH REGION BY COUNTY (1992-1994)**

	Total Motor Vehicle Accidents	Pedestrian/Motor Vehicle Accidents (% of Total Accidents)	Bicycle/Motor Vehicle Accidents (% of Total Accidents)
Putnam County	4,971	81 (1.6%)	35 (0.7%)
Rockland County	14,095	433 (3.1%)	199 (1.4%)
Westchester County	41,320	2,170 (5.3%)	705 (1.7%)

The New York State Department of Transportation (NYSDOT) is currently developing a comprehensive public report on pedestrian and bicycle safety. This document will provide a comprehensive statistical/GIS-based report on pedestrian and bicycle traffic collision data, identifying cause of crash, conditions, trends and frequencies. This will serve as an important guide for identifying safety issues and needs in the Mid-Hudson South region.

Access Management: Most conflicts between vehicles and pedestrians or vehicles and bicyclists occur at intersections, driveways and alleys – places where users are traveling in different directions. Uncontrolled and/or unlimited access or egress creates many conflicts between cars entering and exiting a roadway and bicyclists and pedestrians riding or walking along the roadway. Limiting and consolidating driveways reduces the number of conflict points, and makes existing roads more attractive to bicyclists and pedestrians.

Bridge Access: It is important that pedestrian and bicycle access to bridges be maintained and improved to the maximum extent possible. A good example of this is the Bear Mountain Bridge which currently has a shared dedicated bikeway/walkway facility. The Tappan Zee Bridge, however, does not accommodate bicycles or pedestrians. Pedestrian and bicycle accommodations should be a priority during any proposed redesign of the bridge. Solutions to consider include a dedicated bicycle/walkway, bus bike racks, and bikes on board buses and ferries. NYMTC's *Twelve Steps to Improved Bridge Access* should be implemented wherever possible. These steps are enumerated in Appendix B.

Maintenance and Safety of Facilities: The spot improvement program in Seattle, Washington has served as a model for many communities throughout the United States, and is recommended for communities in the Mid-Hudson South region. This program provides a vehicle for local citizens to report low-cost bicycle and pedestrian facility maintenance and safety deficiencies such as bike lane/shoulder sweeping, hazardous drainage grate replacements, sidewalk and trail maintenance, directional signs,

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crosswalk striping, pot holes and small sidewalk gap connections. This program is an excellent way to get the community involved and interested in a local bicycle/pedestrian plan. A "report card" is made available at public locations such as libraries, post offices, bike shops, etc., for citizens to complete at their convenience. It is recommended that this program be coordinated through local planning and public works departments. Funding for this program could be established through the Transportation Improvement Program (TIP).

Coordination with Ongoing Street and Highway Improvements: It is important to consider the needs of cyclists and pedestrians in the planning and design of all highway and street projects. For example, a roadway resurfacing project provides the opportunity to improve shoulder conditions, and install bicycle-safe drainage grates. Bicycle facilities, pedestrian safety improvements and other activities that enhance the transportation system for all users should be routinely integrated into the highway and street design process.

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IV. IMPLEMENTATION STRATEGIES

Good places to walk and bicycle are a common ingredient in communities with high quality of life. A bicycle- and pedestrian-friendly environment does not happen by accident, but must be considered in every aspect of transportation system and land use planning and design. Municipal regulations should provide elements that promote a safe and accessible intermodal transportation system that accommodates bicyclist and pedestrian activity. The system must accommodate each mode and the linkages between them, and should not only be directed at trips made entirely by bicycle or on foot, but also at improving travel for those who may walk or cycle to the bus, rail or ferry stop and complete their trip on transit.

This section describes land use and transportation planning programs and policies that affect pedestrians and cyclists, and offers recommendations for addressing these issues in order to develop a safe, efficient and comprehensive regional bicycle and pedestrian network. Issues and recommendations apply to all geographic “area types” that are representative of different municipalities in Westchester, Rockland and Putnam counties.

Policies and Programs

Recommended programs and policies are basic in nature, and geared toward improving the perception of the walking and bicycling environment, as well as stimulating increased levels of interest among key stakeholders in the Mid-Hudson South region. These measures will help ensure the successful implementation of a regional *Master Plan* and smooth transition to local planning efforts.

- *Engineering* – The goal of engineering policies and programs is to overcome the physical barriers that discourage people from walking and cycling. For example, create paths that provide intra-county connections, install bicycle amenities at bus stops, commuter rail stations, park-n-rides and major employment centers, implement land ordinances with facility design guidelines, and establish transportation policies that protect and promote bicycle and pedestrian activity.

In each of the counties of the Mid-Hudson South region, it is important to identify key roadways that serve cyclists and pedestrians and look to implement design/facility improvements that integrate bicycle/pedestrian elements. For example, all bridge rehabilitation or reconstruction projects should incorporate safe bicycle/pedestrian access. The potential reconstruction of the Tappan Zee Bridge offers this opportunity.

Engineering oriented programs may also involve the implementation of traffic calming practices. Key roadways that would better serve cyclists and pedestrians with the aid of traffic calming treatments should be identified. Traffic calming is a

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way to simultaneously address transportation needs and quality-of-life in our communities. It is a change from traditional transportation planning, and is a movement toward balancing the needs of all users of the roadway. It involves rethinking the physical design of streets, and recognizing the street as public space shared by pedestrians, cyclists and motorists alike. Other benefits of traffic calming include increased transportation choices, improved transit access, improved neighborhood identity and improved air quality.

- *Enforcement* – Enforcement is important in promoting safe travel for bicyclists, pedestrians and motorists. Many bicycle and pedestrian crashes are the result of motor vehicle driver inattention to operating laws and rules of the road. Increasingly, speed is becoming a threat to safety and security of pedestrians and cyclists. This was a noted concern of citizens that participated in the public meetings held for this plan.
 1. Positive Reinforcement – Positive reinforcement programs for good behavior can create positive peer pressure among bicyclists and pedestrians and create good PR and media coverage for the local police departments. Delivery of these enforcement programs is best done by officers on bicycles or on foot, so that they are viewed as peers as well as enforcers. Stickers and sports cards, ice cream and discounts for meals can be rewards for good behavior for children. Coupons for free bicycle inspections can reinforce positive behavior and educate children and parents on reflector and light requirements and regular maintenance routines.
 2. Police Enforcement – *Verbal warnings* are appropriate where there is not the immediate threat of crash or injury. Verbal interaction gives the officer an opportunity to educate people on conditions and behaviors that precipitate crashes and injury. *Verbal warnings* can be issued quickly and make a positive contact between officers and the public. *Written warnings* should be the minimum enforcement measure where the threat of injury is apparent. Pedestrians are the most vulnerable of roadway users. Juvenile warnings should include a written warning to parents, and may require follow-up action. Citations should be issued in any case where threat of severe injury is imminent, and where a crash has occurred (regardless of whether there was injury). Fines for infractions should be doubled in school areas and defined “safety zones” where crashes have occurred previously.
- *Education* – Individual perception of the walking and bicycling environment impacts the level of use. Perceptions are a collection of education, information (and misinformation) and direct experience. Education is not only about teaching children the safety “rules of the road,” it also includes teaching adults that bicycling and walking are legitimate ways to travel and reinforcing the rights and responsibilities of bicyclists, pedestrians and motorists. Educational recommendations are therefore aimed at several audiences in the region: children, parents, adults and motorists. Public outreach may take the form of conducting educational programs that train cyclists, pedestrians and motorists in safe cycling

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and walking in motor vehicle traffic, as well as promoting bicycling and walking as part of health and wellness educational programs.

- *Encouragement* – Marketing and promotional programs that increase public awareness are critical to overcoming the non-physical barriers to bicycle and pedestrian travel. These include events or promotional opportunities for individuals to travel by bike or on foot. Special events, such as Walk Your Child to School Days and walking and bicycling tours are popular ways of encouraging people to walk and cycle more. An excellent example of a bicycle and pedestrian encouragement program that is already underway in Westchester County is the “Bike and Skate Sundays” whereby the Bronx River Parkway is closed to vehicular traffic every Sunday during May, June, September and October (except holiday weekends). Other examples include Putnam County’s Fall Classic Half Marathon and Annual Bicycle Tour de Putnam. Each offers participants the opportunity to experience the picturesque and historic qualities of the county. These special events need to be supported by additional information and programs (e.g., a Walking Tour Map) to encourage people to engage in bicycling and walking increasingly as part of their everyday lives.
 1. Student Involvement – Enlisting students in various projects related to this *Master Plan* would provide students with the opportunity to get involved in their community, thereby building a sense of community pride. Once students have a vested interest in a project, their involvement is often critical to its success. Projects/programs such as tour leadership, “Clean-up Day”, landscaping, signage design development, etc., could become integrated into the school curriculum.
 2. Walking and Bicycle Tours/Map – Walking and bicycling tours are a good way to introduce newcomers and visitors to a community. Tours are also one way to introduce walking and bicycling as a beneficial physical activity to residents, particularly seniors. Whether guided in person, by signing or by maps, walking and bicycle tours orient people within their greater community. Each of the counties is rich in history and architecture. Walking and bicycle tours would be an excellent vehicle to highlight historical events or places, architecture and even wildlife, plants and trees along some of the waterbodies and parks/open spaces in the Mid-Hudson South region.
 3. Main Street Promotions – Experts in the economic vitality of “Main Streets” highly value promotion of downtown businesses as part of a strategic business plan.¹⁰ There is a strong commitment to this in Westchester already via the Historic River Towns of Westchester (HRTW) *Tourism and Economic Development Plan* which focuses on the 14 communities along the Hudson River waterfront in Westchester County. Special events and promotions reinforce the sense of place and identity that distinguishes downtowns/villages from less dense “mega” retail development. Increased foot traffic is one indicator of retail success;

¹⁰ *Revitalizing Downtown*, National Main Street Center, National Trust for Historic Preservation, 1996.

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providing special opportunities and incentives for people to walk and shop in downtown areas encourage their repeat business.

- *Partnerships* – The success of bicycle and pedestrian projects is typically improved when a public/private partnership exists among key stakeholders; project recommendations are prioritized and implemented so that each new project builds on the previous one; and an effective marketing and promotional program is in place. The East Coast Greenway, a multi-use trail that is considered the urban alternative to the Appalachian Trail, was recently designated by the White House as a National Millennium Trail. By connecting existing and planned trails from Canada to the Caribbean, this trail will provide a continuous, safe, green route for users of all ages and abilities. Parts of the East Coast Greenway pass through Westchester County. This is an ideal opportunity to partner with the sponsoring organization, the East Coast Greenway Alliance.

Another opportunity to improve public awareness and use of bicycle and pedestrian facilities in the Mid-Hudson South region is to advertise in established publications like the “Smart Guide.” This Transportation Guide is funded by the NYSDOT and the Federal Highway Administration (FHWA), in cooperation with Metro-North Railroad, the New York State Thruway Authority and the counties of Westchester, Rockland and Putnam. The Smart Guide is part of a broad campaign undertaken by public and private sectors to reduce congestion and improve air quality by encouraging alternate modes of transportation (versus single-occupant vehicles). It promotes bus, ferry and rail transit options. Here is an opportunity to expand its coverage to bicycle and pedestrian transportation options.

Finally, Westchester’s SMART COMMUTE program and the Westchester Transportation Management Organization are other vehicles to help promote bicycle and pedestrian activity in the region.

Roles and Responsibilities

Strategies have also been identified based upon the roles that different bodies play in the implementation of bicycle and pedestrian improvements. The following section outlines the roles of federal, state and local Executive and Legislative branches of government, Planning Departments/Commissions, Transportation and Highway Departments, Engineering or Public Works Departments/Commissions, Police Departments, Fire Departments, Transit Departments/Authorities, Employers and Corporations, Recreation Departments, Bicycle Touring Groups and Recreational Organizations. It should be noted that roles and responsibilities may vary for different jurisdictions.

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a. Executive and Legislative Branches of Government

- Adopt regulations that require the provision of sidewalks and bicycle facilities for all new development.
- Assign and train bicycle/pedestrian program staff, and establish a bicycle/pedestrian advisory committee.
- Establish a capital funding program that can be used to fund bicycle and pedestrian related projects or leverage state and federal grants.
- Institute a public awareness campaign demonstrating the benefits of bicycling and walking.
- Provide leadership through the initiation and adoption of a comprehensive bicycle and pedestrian plan.
- Facilitate citizen participation that allows public input into decision making regarding bicycling and walking.
- Take direct actions to meet Clean Air Act Amendment goals by providing bicycle and pedestrian lanes as an integral part of road improvement projects and promote the use of trailway systems.
- Promote land use policies and transportation investments that nurture establishment of multi-modal linkages such as transit centers.
- Promote coordinated activities such as Main Street beautification programs/contests that result in enhanced pedestrian and bicycle environments – as HRTW communities currently do each summer.
- Increase the number of areas zoned as mixed-use development.
- Institute a bicycle/pedestrian advisory committee or assign responsibilities to an existing recreation committee.
- Identify sources of funding for bicycle and pedestrian projects.
- Implement land ordinances that protect the rural environment by managing development along scenic routes, bicycle and pedestrian paths, etc.
- Improve conditions along routes that bisect rural communities and act as an obstacle to bicycle and pedestrian movement.
- Implement a “Rustic Roads Program” similar to Wisconsin’s which deters an increase in traffic volumes and speed limits on certain roads.

b. Planning Department or Commission

- Promote land use policies and transportation investments that nurture establishment of multi-modal linkages such as transit centers.
- Develop a comprehensive bicycle and pedestrian plan as a separate plan or as an element in the transportation plan.
- Update site plan regulations to require pedestrian facilities, including sheltered walks and direct access from commercial buildings to streets for stations offering public transportation facilities.
- Produce a bicycle-pedestrian map, showing greenways, bicycle and pedestrian paths, low-traffic streets, and points of interest.

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- Develop and implement a procedure for evaluation of bicyclists' and pedestrians' needs in the early planning stages of all capital programs.
- Implement a bicycle usage monitoring program.
- Prepare land use plans and ordinances that encourage mixed use development.
- Administer a public participation program.
- Develop a trail plan to promote integration of existing bicycle trails, lanes, and routes.
- Improve bicycle and pedestrian accessibility around schools and transit stations.
- Prepare plans for linkages between shopping centers, other commercial areas, parks, residential areas, and future land use.
- Design open space linkages using abandoned rail corridors, stream valleys, utility corridors, and other rights-of-way.
- Create a regional plan for bicycle and pedestrian linkages utilizing abandoned rail corridors, stream corridors, and other rights-of-way.
- Work closely with county engineers in identifying highway improvement projects such as shoulder paving.
- Develop an inventory of maps showing touring routes and compatible roadways.

c. Transportation and/or Highway Departments

- Inaugurate phased pedestrian-cyclist traffic lights to give non-motorized travelers a safe head start before motorists.
- Plan to discourage, not accommodate, motor vehicle traffic via traffic calming projects.
- Create pedestrian and bicycle-friendly roads to bus/train stations and major activity centers via better roadway design, signage, and maintenance.
- Develop shoulder paving and maintenance programs that will accommodate bicyclists and pedestrians.
- Assist in identifying roadways that are used by bicyclists.

d. Engineering or Public Works Department or Commission

- Provide bicycle and pedestrian facilities in conjunction with capital projects.
- Provide bicycle and pedestrian facilities as independent capital projects.
- Develop a spot improvements and maintenance program.
- Create bicycle-friendly roads to bus/train stations and major activity centers via better roadway design, signage, and maintenance.

e. Police Department

- Enforce the integrity of bike lanes and cyclist right-of-way with ticketing and towing patrols.
- Implement a bicycle and pedestrian accident monitoring and surveillance system.
- Develop a police-on-bicycle program.

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- Develop and conduct educational programs that train cyclists, pedestrians and motorists in safe cycling and walking in motor vehicle traffic.
- Provide training for law enforcement officials in bicycle and pedestrian education and regulations.
- Assist in identifying roadways that are utilized by bicyclists.
- Identify potential hazard areas along roadways and bike routes.
- Increase patrolling along roadways used extensively by bicyclists or pedestrians.

f. Fire Department

- Maintain existing emergency telephones on bridges and install phones on bridge paths that lack phones.

g. Transit Department or Authority

- Install or upgrade bicycle parking facilities and passenger amenities such as seating and shelter at commuter rail/bus stations.
- Coordinate efforts with municipality to improve bicycling and walking routes between transit services and major destination points.
- Improve signage and information for cyclists and pedestrians at stations.
- Provide bicycle storage at transportation hubs by installing racks and/or lockers.
- Provide means to carry bicycles on mass transit.
- Encourage bicycle rental and repair establishments within close proximity to transportation hubs.

h. Employers and Corporations

- Invite businesses to install conveniently and safely situated indoor and outdoor bicycle racks.
- Encourage bicycling and walking to work as part of an Employee Commute Options Program.
- Promote bicycling and walking as part of health and wellness programs.
- Encourage businesses to provide showers and changing accommodations as part of Employee Commute Options Programs and health and wellness programs.

i. Recreation Department

- Promote bicycling and walking to parks by providing accessible facilities.
- Develop greenways to link open spaces.
- Conduct bicycle and pedestrian safety programs.
- Include programs to promote walking and bicycling.

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j. Bicycle Touring Groups and Recreational Organizations

- Promote local bicycling opportunities through development of brochures, suitability maps, and recreational resources.
- Assist in identifying scenic routes.
- Organize the provision of ancillary facilities such as lodging, campsites, and food sources, and transport-and-ride bicycling facilities.

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V. IDENTIFIED PROJECTS AND PROTOTYPE EXAMPLES

This section recommends specific improvements needed to implement 32 of the projects identified for inclusion in the master plan. Based upon fieldwork, existing technical resources and public outreach efforts, these locations were selected for further analysis. These projects are either defined as corridors or centers, and range in size from corridors of over 20 miles to centers that focus upon a central business district. These projects also serve as prototypes for the rest of the facilities included in the master plan and for the rest of the region.

Each project analysis includes short and long term facility recommendations, potential opportunities and constraints, latent demand score (LDS) results, roadway improvement evaluations and conceptual cost estimates. "Cut sheet" schematic recommendations are also illustrated.

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Project Selection Criteria

The factors listed below were used to determine the bicycle and pedestrian facilities to be included in the master plan. While they represent projects proposed and developed through public outreach initiatives, an effort was made during the development of the master plan to include a variety of project types, and a geographic sampling of projects located throughout the three county region. Through this approach, the plan can enable implementation of identified projects, as well as promote similar bicycle and pedestrian initiatives where the recommended treatments can be applied.

Area Types/Geographic Diversity

Projects representative of the “Area Types” in the three counties as previously described in Section III of this plan were evaluated and selected. “Area Types” include the following, and their defining characteristics are more specifically referenced in other sections of this plan:

- Urban Centers
- Village Centers
- Waterfront Communities
- Suburban Areas
- Rural Areas

Opportunities and Constraints

Selected projects exhibited opportunities and constraints related to the following:

- Transit Access
- Waterfront Access
- Activity Center Linkage
- Bicycle/Pedestrian Safety
- Bicycle/Pedestrian Access
- Trail Crossings
- Off-road Facilities
- On-road Facilities
- Tourism
- Land Use Patterns
- Street Design

Regional Linkages/Significance

Individual projects were also examined in a broader regional context. Projects with existing and potential linkages outside the immediate environs to other municipalities and even other states were identified. These included projects that could serve as linkages across the Hudson, or provide connectivity to Connecticut, New Jersey, other New York counties, and other regional trails. Potential for connectivity to mass transportation was also examined.

Feasibility/Ease of Implementation

The feasibility of a project is often determined by its physical attributes and constraints (e.g., existing street design, right-of-way availability or other geometric constraints). Projects were selected along routes with adequate roadway widths or rights-of-way, or in centers where installation of enhanced crosswalks and/or traffic calming measures could be implemented.

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Public and/or Political Support

Project selection was also based on demonstrated public or political support. This included identifying whether any grant requests had been put forth and/or funded; whether projects had been identified in local master plans; and/or whether any infrastructure already existed or was planned for the area. For example, a scheduled roadway resurfacing or maintenance project may at the same time create an opportunity to improve shoulder conditions for bicyclists. Almost all roadway improvement projects provide an opportunity to integrate bicycle and pedestrian treatments.

Latent Demand Analysis

As part of the assessment of area characteristics and needs, this study included a latent demand score analysis as one criteria to evaluate bicycle usage/potential demand.

Unlike travel demand for the auto, which usually can be quantified by actual vehicle counts, travel demand for the bicycle mode is complex due to various impediments. Bicycle counts are not representative of actual “demand”, often because of poor accommodation, safety and quality of transportation facilities or overall environment. In response to this, the Latent Demand Score (LDS) method was developed to identify roads and trails with the greatest potential for bicycle usage.

The LDS approach is one method to estimate bicycle trip activity potential. It is based on Newton’s Law of Gravitation, and utilizes a standard gravity model reflecting typical human activity patterns. In essence, it estimates the magnitude of bicycle trip generation within a given study area, and assesses how “big and powerful” the draw of various attractors may be. It also factors the proximity of these places to various segments of the overall road and trail network into the calculation, with the premise that the farther you get from the attractor, the fewer bicyclists you will see. Distance is used as the primary travel impedance, as the distance between trip origins and destinations affects the decision to ride a bicycle more dramatically than it does the decision to hop into a car.

The condition of the bicycling environment further affects whether a trip by bicycle is made, and how far or by what route a person is willing to travel. A route that is perceived unsafe due to traffic and road conditions will effectively discourage increased bicycle travel, regardless of latent demand. Topography and perceived “quality” of the bicycling experience are other conditional elements that may affect the manifest demand for travel by bicycle.

Impedances are also different for different trip purposes. For example, national survey data indicates that people are typically willing to bicycle a greater distance to work than they are to simply pick up a convenience item at a neighborhood store.

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What the LDS then provides is a relative ranking of different routes in comparison to each other (countywide and regionally, in the case of the Mid-Hudson South region). From this point, various network segments and projects can be prioritized based upon the travel activity expected on each segment, and then compared to various physical and environmental factors. For example, plans set forth at the close of a latent demand analysis may establish priorities to provide safety enhancements along a route that is currently perceived to be unsafe, but scores high relative to latent demand. On the other hand, projects with a lower relative latent demand score would not necessarily be ruled out from implementation, based on their potential to meet other regional goals. These include addressing a specific market of users, or completing a missing link in a bicycle network. For example, the Bear Mountain Bridge route receives a very low latent demand score of only 3, but would not necessarily be ruled out from implementation because the facility currently provides the only bicycle link between Rockland and Westchester counties.

And so, the LDS method is an effective analysis tool for assessing relative bicycle travel demand in a region. Overall, it:

- Includes all relevant trip generators and attractors;
- Quantifies the potential trip interchange between generators and attractors;
- Recognizes that different trip types account for differing shares of the total trips;
- Estimates the tripmaking probability of each trip type as a function of distance; and
- Can be employed to assess the latent demand for any roadway network.

The first step in the LDS method is to identify trip generators and attractors. In other words, pinpoint the “sources” and “draws” for bicycle trips. These serve as the “trip ends” for four general trip purposes:

- Home-based work trips
- Public schools
- Parks
- Home-based shopping trips

Generators are the origin end of the trip, and are represented by every residence in the study area. Attractors are the destination end and are represented by every business, school, park, trail and social and service establishment within the study area. Trip generators and attractors form the foundation of the bicycle travel demand calculations that are at the heart of the LDS method.

For the purposes of the *Mid-Hudson South Region Bicycle and Pedestrian Master Plan*, the locations for many of the generators and attractors were identified individually (and specifically geocoded on the associated maps), particularly for the school and social/recreational trip purposes.

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Aggregated data was used for modeling the other trip purposes. For example, while the LDS method quantifies the trip generation of every residence for work trips, it does not pinpoint the physical location of every residence within the study area. Rather, it uses the aggregated population and employment data, as compiled by Traffic Analysis Zone (TAZ) from the Mid-Hudson South regional transportation planning model for the year 2020.

Once the data is collected and aggregated accordingly, the potential trip interchange between origins and destinations is calculated. Spatial queries are performed to capture the data along particular network corridor segments. The methodology then addresses how many, what magnitude and what type of trip generators fall along and near these segments. Various travel distance ranges, established from data reported in the 1995 *Nationwide Personal Transportation Survey*, are then used to determine how far people are willing to travel for a particular trip purpose.

The LDS method essentially calculates a probability, based on frequency, magnitude, and proximity of bicycle trip generators and attractors. In other words, it estimates the “probable” number of trips that would be made if conditions were ideal for bicycling. It assumes no inhibitions to travel such as incompatibility of roadway design, amount and speed of traffic on roadway, topography and other prohibitive factors. As such, when reviewing the scoring, it is important to keep in mind that one of the significant impedances to bicycle travel, the effect of motor vehicle traffic, is assumed not to exist for the purpose of calculating these latent trips. This assumption is based on the premise that if motor vehicle traffic were not present, the “latent” bicycle trips would become “revealed” trips.

A complete account of data collection and calculation procedures, as well as a complete tabular and mapped display of latent demand score for the regional network are provided in Appendix D. LDS rankings are also noted on individual project summary sheets for corridor facilities only, as the method estimates relative demand between generators and attractors along specific routes, and, therefore, does not apply to a point location.

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Prototype Examples

The 32 project locations that were selected are illustrated on the map and matrix on the following pages, and are listed below. They are not in priority order within each county.

Westchester County

1. Route 100 (Central Avenue/Central Park Avenue) from Tuckahoe Road to Route 119
2. Croton-on-Hudson
3. Pelham Shore Road from County Line to North Terminus
4. Route 22 (southern) from Route 1 to Kensico Dam Plaza
5. Route 22 (northern) from Kensico Dam Plaza to Croton Falls
6. Cross Eastchester Trail from Bronx River Bikeway to Hutchinson Parkway
7. Tarrytown
8. Port Chester
9. Route 119 from Route 9 to White Plains
10. Route 117 from Route 9 to Cross River Road
11. White Plains
12. Bear Mountain Parkway/Route 6/Route 35 from Hudson River to Taconic Parkway

Rockland County

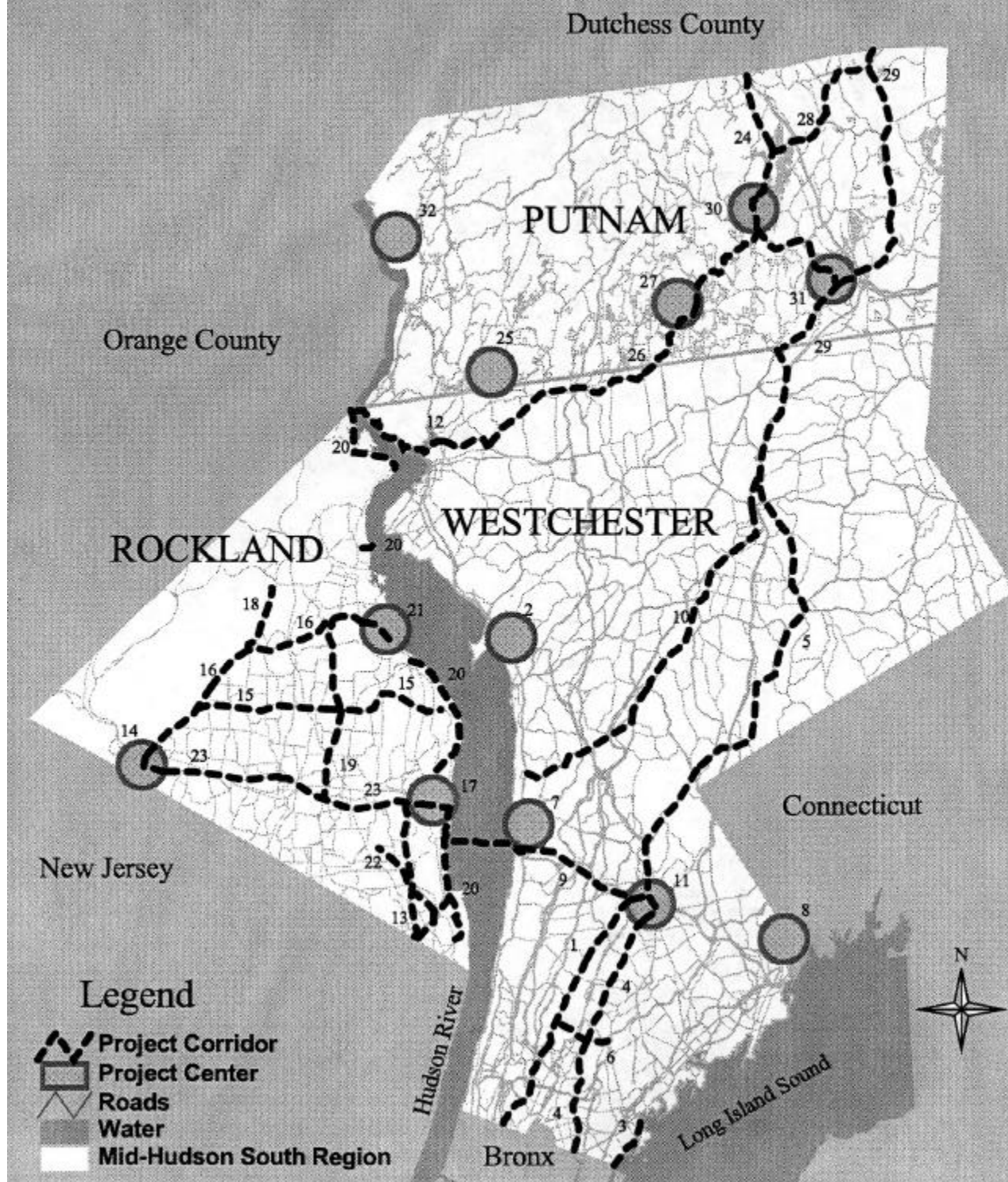
13. Route 303 from New Jersey Border to New York State Thruway
14. Suffern
15. County Route 80 (Grandview/New Hempstead/Congers Lake) from Route 202 to Route 9W
16. Route 202 from Suffern to Haverstraw
17. Nyack
18. Calls Hollow Road from Route 202 to Route 98
19. Little Tor/Middletown Road from Route 59 to Route 202
20. Hudson River Trail
21. Haverstraw
22. Joseph B. Clark Rail Trail from Oak Tree Road to Piermont
23. Route 59 from Suffern to Nyack

Putnam County

24. Route 52 from County Line to Carmel
25. Lake Peekskill
26. Route 6 from County Line to Brewster
27. Mahopac
28. Route 311 from Route 52 to Route 22
29. Route 22 from County Line to Patterson
30. Carmel
31. Brewster
32. Cold Spring

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Project Key Map



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To view
PROJECT LOCATION MATRIX
open the file named
"matrix.pdf"

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For each of the selected projects, the consultant team conducted a field inventory of existing conditions. Findings indicate that there are numerous places where bicycling and walking are currently accommodated and enjoyed, while there are also a myriad of opportunities and constraints for additional bicycle and pedestrian activity. Recurring themes include sidewalk continuity, shoulder widths, transit access, access management, bicycle and pedestrian amenities (racks, shelters, benches, etc.) and high traffic volumes and speeds. An overriding theme is connectivity to other bicycle and pedestrian facilities, places of employment, commercial centers and recreational facilities. These projects are also representative of numerous other facilities in the study region.

The following section includes a schematic and cut sheet for each of the 32 selected projects. The information included on the schematics and cut sheets effectively summarizes the field observations. Over the course of the field work analysis, each corridor was driven and each center was assessed on foot for data collection purposes. The windshield and on-site surveys were conducted to collect relevant data for each corridor. All observations of bicycle and pedestrian accommodations, safety issues and compliance with standards and guidelines were noted. In addition, extensive photo documentation was created to reinforce the observations. The photos are effective in illustrating existing conditions, deficiencies and needs, and highlighting areas that present opportunities for bicycle and pedestrian improvements

The schematics included in the following section graphically illustrate the information gathered during the field work analysis. Each corridor was broken down into component segments that share similar existing conditions and deficiencies. For example, a corridor segment that was characterized by moderate traffic with little or no residential development would be designated a “rural highway,” while another segment in the same corridor would carry a “strip mall” designation if it were flanked with automobile-oriented retail destinations. Projects were proposed for each segment, with respect to overall corridor goals. As in the case of the previous example, the recommendations for a rural highway segment may not include sidewalk installation, but a strip mall segment along the same corridor may warrant sidewalk installation and repair.

Village and town center observations are presented on maps provided by each jurisdiction, or on available existing maps when local maps were not available. Each center was broken down into a series of “destinations” and “links.” Destinations were defined as places that are or could become accessible by non-motorized travel methods. Links were defined as the roadways and paths that connected these destinations. Projects were then proposed to improve bicycle and pedestrian access at destinations and along links.

Questionnaires were distributed to all jurisdictions in which projects were identified. The questionnaire sought local knowledge, and attempted to identify key players, key

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destinations, previous studies, existing and future development projects, known and perceived problems, transit service characteristics and needs for expansion. It also sought to establish a regional transportation purpose, and to provide a brief physical inventory of regional bicycle and pedestrian facilities. The questionnaire also requested that any relevant plans or studies be provided to the consultant. Although there was a limited response to the questionnaire, the information received was very informative and was incorporated into the final cut sheets.

The cut sheets summarize all of the information gathered, observations made and feedback received from all sources, including client and citizen review. A cut sheet was developed for each project location and includes details regarding existing conditions, deficiencies, opportunities and constraints of its respective project location. The cut sheets also include a list of proposed projects, project lengths, cost estimates, latent demand score and each project's regional transportation role.

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To view
WESTCHESTER/ROCKLAND/PUTNAM COUNTY CUT SHEETS
open the file named
"cut sheets.pdf"

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VI. COST ESTIMATES

A generalized cost estimate per project was developed based upon per-unit costs and project-specific prices. These estimates are presented primarily for comparison purposes and represent project recommendations for on- and off-road bicycle and pedestrian facilities throughout the three-county region. They include a breakdown of cost by various project elements, including roadway intersection enhancements, installation of sidewalks and curb ramps, installation of gateway treatments, provision of pedestrian overpasses and off-road bike paths, signage and striping of bike lanes and crosswalks, various traffic calming treatments, establishment of trailheads, streetscape amenities, and widening and resurfacing of roadways to accommodate bicycle usage of shoulders. A range for each project is given. This range is based on a .75 and a 1.25 multiplier of the average project cost for materials and installation. The range allows for a more realistic cost estimate by accounting for fluctuations due to economic conditions including variances in construction costs, labor costs, materials costs, etc.

Estimates do not include costs associated with ROW acquisition, planning and design services, mobilization, utility relocation and other factors that may vary in accordance with more detailed project scoping and feasibility studies. Unit prices are based on both regional and national project examples.

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To view
WESTCHESTER/ROCKLAND/PUTNAM COST ESTIMATES
open the file named
"cost estimates.pdf"

*MID-HUDSON SOUTH REGION
BICYCLE AND PEDESTRIAN MASTER PLAN*

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VII. DESIGN STRATEGIES AND GUIDELINES

Strategies

The following section recommends strategies that address particular issues associated with the bicycle and pedestrian environment in the Mid-Hudson South region. These overriding issues include street layout, bicycle and pedestrian facilities and amenities, linkages to mass transit, streetscaping, maintenance, regional and historic identity, bridge and waterfront access and community support.

ISSUES

STRATEGIES

Street Layout



- Install clear bike lane striping at intersections
- Minimize crossing distances
- Design parking lots to provide direct bike/ped access to destinations
- Implement parallel parking to buffer pedestrians
- Design or retrofit streets to create balance between all modes of transportation
- Promote traditional grid-street system, which better supports alternative transportation
- Minimize roadway widths to encourage slower speeds
- Connect side streets to provide direct access to principal facilities

Bicycle/Pedestrian Facilities



- Install bicycle lanes and sidewalks between major origins and destinations
- Provide sidewalks and on-road bicycle facilities along corridors for touring and local cyclists
- Construct bicycle lanes with same surface quality as pavement
- Set sidewalk back from road with a physical separation
- Design sidewalk to accommodate two-way traffic and anticipated volumes
- Implement traffic calming measures that accommodate bicycle activity
- Install bicycle-sensitive loop detector systems at key traffic signal locations
- Encourage pedestrian access from nearby streets in new development
- Install curb ramps where needed, in order to comply with ADA standards
- Develop bicycle route networks to guide cyclists to scenic areas and urban/village/town centers
- Install bicycle safe drainage grates.

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ISSUES

STRATEGIES

Bicycle/Pedestrian Amenities



- Require bicycle parking for new development and major remodeling projects
- Provide bicycle parking at transit stops, garages, commercial/retail operations, and other key activity centers/destinations
- Install shelters and benches at major transit stops
- Install high-visibility crosswalks
- Require well-lit parking locations that are convenient to key activity centers/transit opportunities

Linkages to Mass Transit



- Provide signage, route information, benches/shelters, crosswalks and sidewalks at transit stops
- Provide bicycle lockers and sheltered racks of solid construction
- Provide front-mounted bicycle racks for buses, and ceiling hooks on other transit vehicles
- Work with transit to promote bike/ped ridership via marketing campaigns (such as maps, etc.)
- Encourage high-density mixed-use development

Streetscaping



- Provide wide sidewalks and adequate lighting
- Provide dedicated space for bicycle travel
- Provide pedestrian- and cyclist-scale lighting and signage
- Implement interpretive and directional signage program
- Install street trees to provide shade

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ISSUES

STRATEGIES

Maintenance



Implement a maintenance program including sweeping, snow removal, filling cracks and potholes, replacing below-grade grates, and repainting markings

Regional/Historic Identity



Preserve pedestrian environment typical of early neighborhoods and enhance bicycle access accordingly
 Develop historic bicycle and walking tour
 Develop and enhance an off-road multi-use trail along a historic corridor
 Promote joint heritage trails

Bridge Access



Incorporate pedestrian and bicycle access into the reconstruction of bridges
 Provide pedestrian and bicycle access on both sides of roads approaching bridges to enhance safety
 Maintain pedestrian and bicycle access throughout construction on bridges that already provide access
 Provide transit options and enhancements for bicyclists, where current bridge facilities do not exist or do not support bicycle usage
 Address ADA requirements in design of pedestrian and bicycle bridge access

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ISSUES

STRATEGIES

Waterfront Access



Improve connections between downtowns and waterfronts via bicycle and pedestrian paths and crossings
Pursue initiatives for waterfront promenades and multi-use paths along the Hudson River

Community Support



Develop a local bicycle and pedestrian master plan
Include bicycle and pedestrian facilities as part of the traditional transportation planning program
Engage local community (citizens/organizations) to guide development of master plan and bike/ped programs and facilities
Encourage mixed land uses and development patterns that support bicycle and pedestrian activity through updated/revised zoning laws and subdivision regulations

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Guidelines

Well-designed bicycle and pedestrian facilities are safe, attractive and convenient. It is not only important to encourage those already bicycling and walking to continue, but it is equally -- if not more -- important to encourage others to use non-motorized transportation. Good design, coupled with education and enforcement, help accomplish this. Examples of bicycle and pedestrian facilities and general guidelines critical to a successful network are discussed below. More detailed design guidelines and requirements may be found in the 1999 Edition of the *Guide for the Development of Bicycle Facilities*, and *Policy on Geometric Design of Highways and Streets*, both produced by the American Association of State Highway and Transportation Officials (AASHTO); *Manual on Uniform Traffic Control Devices (MUTCD)* as adopted by NYSDOT; Chapter 25 on Traffic Calming in NYSDOT's *Highway Design Manual*; *Americans with Disabilities Act (ADA) Guidelines* and FHWA's *Flexibility in Highway Design*.

- **Pedestrian Facilities -**

- ❖ *Sidewalks* – Sidewalks are the backbone of the walkway system. Yet, in many areas they seem to be an afterthought or left out of the transportation planning process altogether. The Mid-Hudson South region is no exception. Sidewalks serve to safely and conveniently provide access for pedestrians between key destinations – residential neighborhoods, commercial/office areas, transit stops, libraries, schools, downtowns, etc. It is important that sidewalk widths are adequate (at least 5 feet or wider in areas with heavy pedestrian traffic) and free and clear of obstacles (meters, telephone poles, trash receptacles, etc.). Field inventory of the prototypical projects in the Mid-Hudson South region indicates that although in some areas sidewalks are wide and well-maintained, there are still many deficiencies related to sidewalks. New sidewalks and upgrades to existing sidewalks are needed in most of the project locations.



Sidewalk treatments may vary in different types of locations. Wide decorative sidewalk areas are commonly found in town centers and in places with high volumes of pedestrian traffic. Four- to five-foot walkways are typical of residential neighborhoods. Walkways should be wide enough for two people to pass and should have a clear-width that is free from all obstructions, such as signs, trees, utility poles, parking meters, etc.

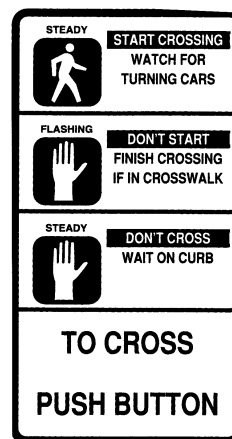
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- ❖ *Street Crossings* – Crossing streets exposes pedestrians to a certain amount of risk, even when the pedestrians are crossing at designated locations at the correct time. Drivers need to be made aware that they should look for and yield to pedestrians. Marking crosswalk pavement with stripes or a different material (such as brick pavers) helps channel the walker directly across an intersection and lets drivers know they are passing through the pedestrian right-of-way. Decorative crosswalks provide a sense of continuity for pedestrians and designate pedestrians as “equal” users of the roadway. The crossing between the school and the park on Route 202 near Grandview Avenue in Rockland County is one example of a location that requires attention.



Crosswalk treatments may include diagonal or longitudinal lines for added visibility, especially at high-volume pedestrian crossings and at mid-block.

- ❖ *Crossing Signals* – In addition to pavement markings, crossing signals help regulate the intersection between motorists and pedestrians. “Walk” and “Don’t Walk” signals send clear messages to pedestrians. Where signals are installed, they should be clearly visible to all, and should allow sufficient time for people of all abilities to cross the roadway safely. Pedestrian signal design at urban intersections and multi-lane arterials may include pedestrian signal head and pedestrian push-buttons. Signal push-buttons should be located where everyone can activate them, including people in wheelchairs.



- ❖ *Linkages* – Pedestrian linkages or connections provide shortcuts that enable pedestrians to travel by the most direct route between destinations. Linkages to destinations such as the rail station in Tarrytown, and improved pedestrian circulation elements in parking areas including the Palisades Center Mall are examples of two issues that need to be addressed.



Pedestrian linkages may connect adjacent office, residential or commercial uses.

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- **Bicycle Facilities –**

- ❖ *Bicycle Lane* – Bicycle lanes are striped and signed corridors with pavement markings that carry one-way bicycle traffic in the same direction as motor vehicle traffic. It is preferable to have a striped lane dedicated to cyclists, but often in rural areas, the lack of shoulders on rural roads forces cyclists to use

the travel lane. On urban roads, install lanes with a minimum width of 4 or 5 feet when next to curbs; on rural roads, install a minimum 4-foot shoulder. For all types of roadways, stripe lanes with appropriate markings to indicate intended use for bicycles; install clear markings where bike lanes cross intersections; and install a separate turning lane where there is a considerable volume of bicycles turning left.

- ❖ *Bicycle Route* – Bike routes are roads that are signed to provide continuity to other bicycle facilities. Pavement width, drainage grates, railroad crossings, pavement condition and

signal responsiveness to bicycles should be evaluated and improved as needed on roads designated as bicycle routes. For example, a bike route is recommended for Route 6 in Putnam County.

- ❖ *Drainage Grates* – Drainage grates can prove unsafe for cyclists. It is important that bicycle-safe grates (those with closely spaced bars perpendicular to the flow of traffic) are installed and that they are flush with the road surface.

- **Multi-Use Paths** – These facilities are separated from the roadway and are most appropriate where there is a continuous right of way that is generally uninterrupted by intersections. The design of a path is generally 12 feet wide (with a minimum of 10 feet).



Bike lanes are appropriate facilities on arterials and major collectors, with the following advantages: They help to define road space, provide an obstacle-free path, reduce stress and give cyclists a right to the road.



Bicycle-safe drainage grates prevent narrow bicycle wheels from being trapped between grate openings.



A pathway or facility on a separate right-of-way may be designed for a variety of different users, such as bicyclists, walkers, skiers, skaters and equestrians.

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- **Transit Stops** - Transit stops (bus, train and park and rides) should provide a comfortable environment for waiting passengers. Amenities such as shelters, bicycle parking, landscaping, adequate lighting and buffers from vehicular traffic are important to creating a comfortable environment that encourages the use of public transit. Transit stops should be accessible to pedestrians and cyclists by providing adequate sidewalk and bike route linkages. Route 59 near the 287/87 intersection is an example where pedestrian linkages are needed from the residential neighborhoods to the park and ride lot.



Pedestrian- and bicycle-friendly transit stops will encourage users to walk or bike to the local transit stop. Amenities may include bicycle racks and lockers, benches, shelters, route maps and schedule information.

Accommodating bicycles on mass transit is also essential to creating a transit-friendly environment. Putnam County has equipped all of its PART buses with bike racks.

- **Traffic Calming** – An increasing number of communities are incorporating innovative strategies to control residential street traffic, in order to improve safety for all users. Traffic calming is a term that is applied to a range of facility-related treatments aimed at reducing the dominance and speed of motor vehicles. Examples of traffic calming treatments include neckdowns, diverters, chicanes, roundabouts, signage and speed humps. High speeds and significant pedestrian conflict observed in villages like Brewster and Cold Spring candidates for traffic calming.



Traffic circles and other devices such as textured surfaces, raised intersections and neckdowns are techniques that reduce vehicle speeds and help manage traffic in downtowns and on local neighborhood streets.

- ❖ *Neckdowns/Curb Extensions/Bulb-Outs* – These devices visually “choke” the road or reduce the effective width of the road, provide a larger pedestrian refuge area, minimize the pedestrian crossing distance, and provide better sight distance for both pedestrians and motorists. Curb extensions should not encroach upon or limit the roadway width required to accommodate bicycle traffic. Additionally, bulb-outs/extensions may be landscaped to provide an aesthetically pleasing appearance and enhance community identity.



Curb extensions reduce crossing distances for pedestrians.

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- **Bicycle Parking** – It is important to recognize the need for long-term and short-term parking for bicycles. Bicycle racks are best suited for short-term parking, typically at shopping areas, public areas (schools, libraries) and recreation facilities. Bicycle racks are recommended near the library, school and waterfront park in Haverstraw, for example. Long-term parking facilities or bicycle lockers are more appropriate at locations where one would leave their bicycle for the entire day or longer, including bus and train stations.



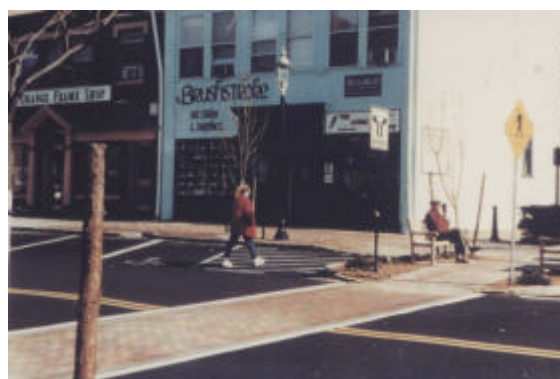
Bicycle racks and lockers may be installed at such destinations as transit stops, libraries, parks, downtown commercial areas, park and rides and employment centers, to encourage bicycle use. Racks generally meet short-term parking requirements for brief stops such as shopping. Bicycle lockers provide secure, long-term parking facilities for commuters at transit stations and employment centers.



- **Signing and Markings** –It is important to install clear markings to indicate the presence of a bicycle lane, while bicycle routes require signs indicating “share the road,” “bike route” and information about destination distances and route direction changes. One location where such signing and marking is needed is along Route 22 in the northern part of Westchester County to point out key destinations between Croton Falls and Kensico Dam Plaza, for example. Another location is Calls Hollow Road in Rockland County which would benefit from "Share the Road" signs. All signs and pavement markings should comply with guidelines set forth in MUTCD.

- **Additional Facilities**

- ❖ *Lighting* – Adequate lighting is sometimes overlooked as a pedestrian concern. Lighting is an important factor relative to the convenience and security of walking in early morning and evening hours. Street lighting that focuses on the roadway may not adequately illuminate the walkway. Additionally, in downtown areas, lighting is an important component of the streetscape.



Textured crosswalks in conjunction with curb extensions, landscaping, lighting, and street furniture enhance the pedestrian character of downtown areas.

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- ❖ **Streetscaping** – The walking and cycling environment consists of more than just sidewalks and bicycle routes. Streetscaping, for example, is one way of transforming a space into a place that encourages people to bike and walk, by adding elements like trees and other landscaping, benches and bicycle racks. It can also remove or camouflage potential eyesores such as guide rails, fences and parking lots, or in targeted areas serve as a gateway. Specific areas that would benefit from streetscaping treatments include the parking areas at the strip malls and commercial areas along Route 22 in Putnam County.



Gateways are visual and physical features that convey that the driver is entering a different and special area. Lighted landscaping treatments with signs are typically used to create this feature.

- **ADA Requirements** – All treatments must comply with Americans with Disabilities Act (ADA) criteria.
- **Access Management** – Where there is no distinction between the roadway and driveways, or poor definition of the roadbed, access management should be applied. Access management provides safer and more efficient flow of traffic along a roadway while preserving reasonable access to abutting properties. Access management focuses on the control and regulation of the spacing and design of driveways and streets, medians and median openings, traffic signals and freeway interchanges. Routes 202 and 52 in Rockland and Putnam counties, respectively, are candidates for access management. This will more effectively define the road, and ultimately better organize traffic turning movements.



Median islands in the center of the street visually narrow oversized street widths and reduce travel speeds, while also providing a refuge for pedestrians and cyclists in the middle of busy roads.

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VIII. FUNDING

The most common method for funding bicycle and pedestrian projects is to combine local, public-sector and private-sector funds with funds from State, Federal and additional private-sector sources. Since the early 1990s, State and Federal funding has become increasingly available for construction, connection or renovation of bikeways, sidewalks, bicycle parking and other related projects. Many communities involved with pedestrian and bikeway implementation projects are taking advantage of this opportunity, and choosing to leverage local money as a match for these outside funding sources, in essence multiplying their resources.

The funding sources cited below represent opportunities that have been pursued by other communities.

Federal Government Funding Sources

Some Federal programs offer funding for projects that aim to improve community infrastructure, transportation, housing and recreation. Some of the Federal programs that could be used to support the development of bicycle and pedestrian facilities in the Mid-Hudson South region include:

Transportation Equity Act for the 21st Century (TEA-21) This is the successor to the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). TEA-21 authorizes Federal highway, highway safety, transit and other surface transportation programs. It continues and extends ISTEA's accommodation of bicycle and pedestrian oriented projects. Furthermore, TEA-21 maintains ISTEA's emphasis on local involvement in transportation planning. The Federal funds within TEA-21 allocated to New York State for transportation improvements are primarily from two sources:

1. Federal Aid Highway Funding – administered through Federal Highway Administration (FHWA).
2. Federal Transit Assistance – administered through Federal Transit Administration (FTA).

There are many programs within TEA-21 that support the development of bicycle and pedestrian transportation facilities and infrastructure. These programs are as follows:

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- *National Highway System (NHS)*
New York State may spend NHS funds to construct bicycle and pedestrian transportation facilities on land adjacent to any highway on the National Highway System except the Interstate System. Bicycle and pedestrian facilities can be constructed as an incidental part of a larger NHS project. These facilities are constructed at the same time as the larger project. Also eligible are facilities that are constructed adjacent to an NHS route, but are built as an independent project.

In addition, NHS funds can be transferred to the Surface Transportation Program (STP) by New York State. The City of Seattle, for example, had \$2 million of NHS funds transferred to their Surface Transportation Program to construct a 50-foot median along a five-mile stretch of roadway, which included walkways, crosswalks and other pedestrian amenities.

- *Surface Transportation Program (STP)*
STP funds may be used to fund the construction of small bicycle and pedestrian travel improvements within larger roadway projects, as well as independent projects such as the conversion of abandoned rail corridors for bicycle and pedestrian use, shoulder paving, bicycle-safe drainage grates, sidewalks, traffic calming, pedestrian traffic signals and crosswalks. This program may also be used by states in a flexible manner to fund non-construction projects such as brochures, public service announcements and route maps related to bicycle and pedestrian safety. These funds are programmed by the Metropolitan Planning Organization (MPO) in the Transportation Improvement Program (TIP). The TIP is adopted every two years by NYMTC and becomes part of a comprehensive list of all highway projects (state or local) and all transit projects (capital or operating) in urban and rural areas that propose to use Federal funds.
- *Congestion Mitigation and Air Quality Improvement Program (CMAQ)*
This program provides a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. The CMAQ program was created to ease congestion on local streets and improve air quality in communities that do not meet or strive to stay in compliance with federal air quality standards. Westchester and Rockland counties are in severe non-attainment areas. Putnam County is in a moderate non-attainment area.

Eligible CMAQ projects include improved transit facilities and bicycle and pedestrian programs, among others.

A recipient must demonstrate that its project will improve air quality throughout the community. Funding requires a 20 percent local match.

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- *Transportation Enhancements Program (TEP)*
This program is designed to fund projects outside the norm of traditional transportation programs. For example, TEP enables the funding of projects targeted towards strengthening cultural, aesthetic, historic and environmental aspects of intermodal transportation networks. Eligible projects fall into one or more of a dozen categories. Some of these categories include the following:
 1. Provision of facilities for bicycles and pedestrians, including safety and educational activities for bicyclists and pedestrians;
 2. Acquisition of scenic easements and scenic or historic sites;
 3. Scenic or historic highway programs and provision of tourist and welcome center facilities;
 4. Landscaping and other scenic beautification;
 5. Historic preservation; and
 6. Preservation of abandoned railway corridors, including conversion and use for pedestrian and bicycle trails.
 As with many other federal programs, the applicant is required to share 20 percent of the total project cost. Applications must be submitted by sponsors from a municipality, another State agency, or an Authority (includes other public and quasi-governmental agencies that have the authority to enter into a binding contract with New York State).

- *Ferry Boat Program*
A total of \$220 million is authorized over the six year TEA-21 cycle for construction of ferry boats and ferry terminal facilities.

- *Bus Program*
TEA-21 offers funding for bus and bus-related facilities. This funding is apportioned directly to transit systems. This may include amenities and facilities for bicyclists such as parking, bike-on-bus racks and pedestrian shelters. In FFY 2000, New York State transit systems will receive approximately \$26.7 million under this program (5 percent of the national total).

- *Access to Jobs Program*
A total of \$750 million is authorized for the period from 1999 through 2003. This funding is for job access and reverse commute activities under TEA-21.

- *Recreational Trails Program/Symms Act*
Under this program, funding is available for development and maintenance of recreational trails, many of which can benefit bicyclists and pedestrians. States must establish a State recreational trails advisory committee that represents both motorized and non-motorized trail users. The allocation of funds in each state is as follows: 30 percent for motorized use, 30 percent for non-motorized use and 40 percent for diverse trail uses. The National Recreation Trails Fund Act (NRTFA) is a funding source that uses funds paid into the Highway Trust Fund from fees on non-

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highway recreation fuel used by off-road vehicles and camping equipment. States can grant funds to private and public sector organizations. Recipients must provide a 20 percent match. Funded projects must be consistent with the Statewide Comprehensive Outdoor Recreation Plan (SCORP).

- *National Scenic Byways Program*
This component of TEA-21 is designed to protect and enhance America's designated scenic roads. TEA-21 authorizes funding for technical assistance and grants to States for the purpose of developing scenic byway programs and undertaking related projects including bicycle and pedestrian facilities along roads designated as National Scenic Byways, All-American Roads or State Scenic Byways. Eligible projects include planning, safety and facility improvements, cultural and historic resource protection and tourism information signage.
- *Planning and Research*
This component of TEA-21 is designed to invest in research and its application to maximize the performance of the transportation system. Funds are allocated through the Metropolitan Planning Organization - in this case, NYMTC.
- *Hazard Elimination Program (HEP)*
This program provides funding for safety-oriented improvements to existing infrastructure. HEP includes in its list of eligible activities mitigation of bicycle and pedestrian hazards and traffic calming measures. In addition, the definition of a "public road" has been expanded to include publicly-owned bicycle and pedestrian pathways and trails. Project areas with high rates of bicycle and/or pedestrian accidents have a greater chance of receiving funding.
- *Federal Transit Administration Funds*
TEA-21 requires transit agencies to use 1 percent of funds received under this program on transit enhancement projects. Bicycle and pedestrian access to transit (train stations, bus depots, park and rides, ferry terminals), bicycle parking facilities and equipment to allow bicycles on trains, buses and ferries are improvements that would be eligible for FTA Funds. This program requires a 20 percent local match.
- *Community Development Block Grant (CDBG) Program*
The U.S. Department of Housing and Urban Development (HUD) offers financial grants to communities for neighborhood revitalization, economic development and improvements to community facilities and services, especially in low- and moderate-income areas.

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- *Small Business Tree Planting Program*
The Small Business Administration provides small grants of up to \$10,000 to purchase trees for planting along streets and within parks or greenways. Grants are used to develop contracts with local businesses for the plantings.
- *Design Arts Program*
The National Endowment for the Arts provides grants to states and local agencies, individuals and nonprofit organizations for projects that incorporate urban design, historic preservation, planning, architecture, landscape architecture and other community improvement activities, including greenway development. Grants to organizations and agencies must be matched by a 50 percent local contribution. Agencies may receive up to \$50,000.

State Funding Sources

- *Clean Air Clean Water Bond Act*
The Bond Act is a statewide referendum for environmental projects including parks, historic preservation and heritage area projects that develop, expand or enhance public linkages to water bodies, promote water based recreation or enhance the natural, cultural or historic aspects of water bodies. Funds may be used for development of the Hudson Valley Greenway Trail System including walkways, bikeways and intermodal storage areas for bicycles. This program provides \$50 million for these projects. Funds may pay up to 50 percent of the eligible project to a cap of \$500,000. Applicants may be municipalities or not-for-profit organizations. The program is administered by the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) and Hudson River Valley Greenway agencies.
- *NYS DOT Consolidated Street and Highway Improvement Program (CHIPS)*
These funds are administered through a formula applied by NYS DOT to municipalities that apply for the funding for local infrastructure needs within the highway right-of-way. CHIPS funds were used for street improvements in the Route 1 Corridor Study in Port Chester.
- *Department of State Coastal Zone Management Program*
Funding for water-related improvement projects made available to communities that have a completed and approved Local Waterfront Revitalization Program.
- *New York State Greenway Small Grants Program*
This program provides funds for community trail planning, design, construction, mapping, intermodal trailhead amenities and signage. Applicants may be a municipality or a not-for-profit organization. The project must fulfill the Greenway principles.

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- *NYSOPRHP Funding Program*
Funding under this program is available for projects related to municipal parks, historic preservation and the acquisition and development of parklands. This may include trails.

Local Funding Sources

- *Local Private-Sector Funding*
Private sector businesses often realize additional sales from increased pedestrian and bicycle traffic. As such, local businesses should be contacted and encouraged to fund improvements that enhance pedestrian and bicycle activity. An example of such an undertaking could be a local bicycle shop purchasing bike racks for a town through which a bike route passes, and strategically placing the bike racks within close proximity to the shop itself. Local food establishments, such as ice cream shops and delis, would also benefit from bike racks at their places of business.
- *Volunteer Work*
Volunteers can be recruited for a variety of tasks, including maintenance, events organization and promotion. Volunteers can help to offset costs as well as raise awareness of a project.
- *Business Improvement Districts (BIDs)*
Business improvement districts (BID) are self help ventures organized by property owners and local governments to identify and develop defined areas of cities or downtowns where a more successful and profitable business climate is needed. They are capitalized by the pool of property owners within the identified district, who self-impose an additional real estate tax. Additional funding is derived from annual city contributions and from private sponsorships and grants. The funds raised can be targeted for bicycle and pedestrian enhancements.
- *Public/Private Partnerships*
Retail and commercial developers should be encouraged/mandated to provide appropriate bicycle and pedestrian facilities within the context of their development. Coordination between various projects should be facilitated to ensure that there are consistent and continuous pedestrian and bicycle networks.