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# Revitalizing Hudson Riverfronts

*Illustrated Conservation & Development Strategies for Creating Healthy, Prosperous Communities*

This document was prepared with technical and financial assistance from the New York State Department of State


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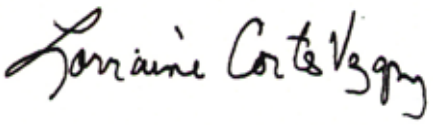
# Message from the Secretary of State

I am pleased to present ***Revitalizing Hudson Riverfronts***, developed through a partnership of Scenic Hudson, the City of Kingston, and the Department of State. This illustrated guide is designed to inspire and inform all who wish to create vibrant waterfront communities.

Whether you are an elected local official, a municipal planner, a developer, or a community advocate, you will find principles and implementation strategies for waterfront revitalization that are adaptable to your community's character and circumstances. I encourage you to use this guide as you develop and implement your waterfront vision.

Through New York's Local Waterfront Revitalization Program, the Department of State has long recognized that a community's waterfront is one of its greatest assets. With the support of the department's professional expertise and financial assistance, over 300 communities across the state are turning their visions of a revitalized waterfront into reality.

They are doing this by taking the steps necessary to restore the economic activity in their downtowns, increasing public access and recreational opportunities, and protecting natural resources. I hope ***Revitalizing Hudson Riverfronts*** will assist you as you work to protect, restore, and revitalize your community.



Lorraine A. Cortés-Vázquez
Secretary of State

# Foreword

The Hudson Valley's spectacular beauty, rich history, and ecological and agricultural resources are national treasures that have earned the region Congressional designation as a National Heritage Area. As we begin the fifth century since Henry Hudson's historic sail up the river that bears his name, we felt it was important to offer a set of principles that would ensure these resources and qualities endure for the next hundred years and beyond. These principles are illustrated and explained in this guide.

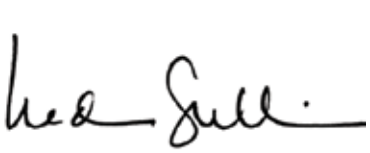
The region's stunning landscapes are the foundation of a multibillion-dollar tourism industry; they sustain working farms that generate half a billion dollars each year for the economy and protect our water supplies. Surveys also have shown that the valley's beauty and parkland are considered top assets by chief executive officers nationwide considering relocating their businesses here.

The principles in this guide were initially developed by Scenic Hudson and have been refined and illustrated with a grant from the New York State Department of State Office of Coastal, Local Government and Community Sustainability administered through the City of Kingston. An advisory committee (listed on the Acknowledgements page) provided valuable input in development of the document. We are grateful to all these parties for their help.

The principles reflect and support a regional vision that directs new growth to municipal centers near transit stations with existing infrastructure, so that our open spaces can be preserved for working farms, water and wildlife habitat protection, and recreation. Also noteworthy are recommendations regarding adaptation to the anticipated effects of global climate change.

We hope this document will guide developers in drawing up their initial and ultimate plans for waterfront projects and will be a resource for public officials in reviewing, guiding, and ultimately approving or denying projects. Similarly, we hope this will be used as a tool and guide by active citizens and organizations seeking to play a role in shaping waterfronts in their communities.

We hope all parties can find common ground in the goals and principles in this document. By working together toward this common vision, our Hudson River waterfronts can be vibrant and active places, sources of pride that will be remembered and celebrated as true and lasting legacies of the Hudson Quadricentennial.



Ned Sullivan
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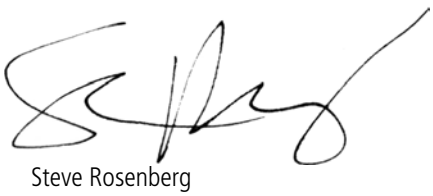

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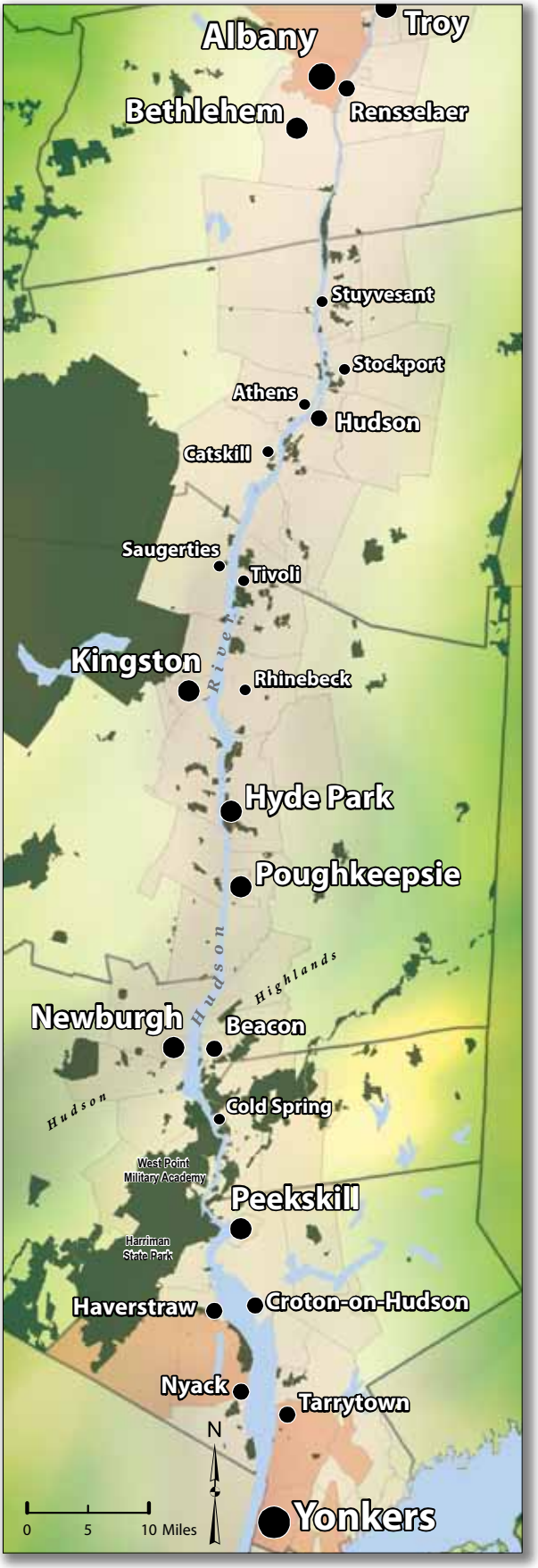
# Table of Contents




Hudson River Estuary

# Introduction

## Background

The Hudson River waterfront is at an important stage in its history. A thriving center of commerce and maritime activity through the early 1900s, the Hudson's shorelines became a nexus of manufacturing and transportation for much of the 20th century. As river-based industry declined and auto-centered development shifted economic growth away from downtowns in the 1950s, many waterfronts fell into disrepair or complete abandonment. Polluted water and contaminated land—legacies of factories along the Hudson—further drove people away from the shoreline.

In the last couple of decades, however, the Hudson riverfront has once again emerged as an iconic feature of the Hudson Valley. Environmental regulations are helping to make the river cleaner for swimming, fishing, and boating. Citizens, public officials, and developers are recognizing the quality-of-life benefits of working and living along the Hudson's shores. But this renewed interest in the riverfront also is inducing more development, jeopardizing environmental and scenic values.

To enhance and preserve the unique qualities of the Hudson River waterfront, this guide provides tools to promote the development of lively, pedestrian-friendly, mixed-use riverfronts in and adjacent to municipal centers while conserving forests, farms, wetlands, and fields, and providing for a continuous public greenway corridor along the river. This land-use pattern will allow riverfront communities to accommodate and benefit from new development in ways that increase economic viability, enhancing main streets and community life while protecting the Hudson River's ecology and internationally celebrated beauty. We recognize that any discussion of riverfront development also must address development in the adjacent downtown or municipal center; the guidelines in this document emphasize this important relationship. Likewise, we understand that towns, villages, and cities have different needs. These guidelines are applicable to municipalities of varying scales.

It is critically important that local leaders and developers engage citizens early in the planning phase of development proposals. Transparent, participatory design ensures that new development reflects a community's needs and desires. It also can expedite review and approval while fostering shared ownership over local land-use decisions. Public input should be sought from both immediate and neighboring communities.

This publication focuses on development directly adjacent to the Hudson River, specifically the 140 miles between the Troy Dam and George Washington Bridge. The guidelines are intended to provide appointed and elected officials, developers, local citizens, and community groups with guidance for where and how development should occur. In turn, these guidelines—supported by specific strategies, tools, and techniques—should help municipalities implement local visions of future land use.

## Who Should Use This Guide?

This guide is meant to help local officials, planners, developers, citizen activists, and other stakeholders find common ground in a future vision for waterfront development. By working together to achieve a shared vision, stakeholders can avoid conflict and controversy, resulting in a less contentious approval process that leads to waterfront development benefiting all concerned.

## Development Trends In the Hudson Valley

Over the last several decades, the Hudson River Valley's renaissance has turned it into one of the state's fastest-growing regions. Population in the 10 Hudson riverfront counties increased by nearly 15 percent between 1980 and 2006—roughly 50 percent faster than the state as a whole. Looking ahead, the region is projected to add more than 115,000 people over the next decade. Continued population growth in the valley, coupled with projected increases in economic activity and commuter miles traveled, will mean greater demands on the region's water, infrastructure, and natural and scenic resources.

These trends already are exerting tremendous pressures on the Hudson River's waterfronts. In 2007, over 15,000 new houses, apartments, townhouses, and condominiums were planned in Hudson riverfront communities.

This development includes several examples of poor riverfront development practices: inadequate building setback, repetitious building architecture, white exteriors, unvegetated shoreline, lack of open space, and uninviting public access.

Along the lower Hudson, huge high-rise residential projects have been completed and many more are proposed, with over 7,000 units envisioned on the Yonkers shoreline alone. On the former site of General Motors' 95-acre assembly plant in Sleepy Hollow (Westchester County), an environmental review has resulted in the approval of a large, mixed-use development with residences, a hotel, and commercial and retail space. In the Village of Haverstraw (Rockland County), over 850 residential units, along with restaurants and shops, have been approved on former industrial shorelands. (At this writing, the proposed Sleepy Hollow project has not progressed, while in Haverstraw some units are constructed and occupied, some are under construction, and others remain unbuilt.)

Likewise, in the middle reaches of the river, the reclamation of former industrial lands is spurring tremendous development plans. In Poughkeepsie (Dutchess County), a large restaurant and catering facility was built on a bluff overlooking the Hudson River; the second phase of that development calls for offices, shops, and restaurants on former industrial land to its south. Also in Poughkeepsie, a former riverside lumber yard is planned for redevelopment with approximately 600 residential units. In Kingston (Ulster County), approximately 2,000 units have been proposed in two contiguous projects, revitalizing land once home to quarries, brickyards, and a cement plant. The cities of Peekskill (Westchester County) and Newburgh (Orange County) are in earlier stages of planning for the reuse of their former industrial waterfronts.

Throughout the river valley, but in its middle and upper reaches, many single-family homes are under construction on the riverfront and the bluffs above it. This diffuse, often-overlooked component of riverfront development slowly but significantly reduces scenic and natural values along the river.

Are these projects good or bad? The answer is not always obvious and depends on one's perspective. While cleaning up and redeveloping polluted industrial land along the river has some clear public benefits, lack of proper planning can result in excessive traffic, stormwater run-off, degraded habitats, ruined views, and a "privatized" waterfront that excludes the general public. The principles and tools in this guide demonstrate how to capitialize on the prospect of waterfront development without compromising environmental resources and community character. At the same time, they suggest ways to provide thrilling new places for people to enjoy the river.

This large home, built close to the bluff line, is unscreened by vegetation and highly visible.

Clear-cut trees and white exteriors combine to mar the viewshed on a scenic hillside in the Hudson Highlands.

Homes built on the river's edge result in piecemeal development that systematically erodes riverfront quality.

## Developing and Implementing a Vision for Your Community

An overarching vision that promotes publicly accessible, pedestrian-friendly, mixed-use riverfronts in municipal centers while protecting natural areas and creating a public greenway corridor along the river is essential for guiding future development. Without it, projects that are easiest to finance and sell at the highest profit will prevail. This often results in poorly sited, isolated residential projects and single-use, high-rise residential buildings that are out of character with the local setting, reduce habitat, inhibit people from accessing the river, and mar scenic beauty—the qualities that made riverfront development attractive in the first place.

To avoid this scenario, it is critical that communities get ahead of the development curve by establishing a vision and preparing plans for their waterfronts. The next crucial step is establishing regulatory tools that provide a legal mechanism, established through municipal home rule, for implementing those plans, employing the strategies and tools provided in this publication.

Tackling these challenges is essential because when riverfront development occurs, it's in everyone's best interest to think holistically about the end result. A range of stakeholders—developers, municipal officials, state agencies, environmental advocates, and local residents—each bringing their own interests and perspectives to the process, need to work together to ensure that the waterfront plan and subsequent development maximizes benefits to the entire community.

## Planning and Zoning

Cities, towns, and villages can regulate local land use by adopting zoning laws based on Comprehensive Plans and Local Waterfront Revitalization Programs (LWRPs). These planning tools, which reflect goals agreed upon by community consensus, can effectively balance the rights of property owners with the need to protect residents' health, safety, and well-being.

LWRPs are especially useful tools for guiding waterfront development, functioning both as a plan and a program for implementing the plan. As a planning document for land and water use, an LWRP provides a locally prepared strategy for revitalizing a community's waterfront, offering a means through which critical issues can be addressed. In partnership with the NYS Department of State (NYSDOS), a municipality develops community consensus regarding the future of its waterfront and refines the State Coastal Management Program to reflect local conditions and circumstances. Once approved by the NYS Secretary of State, and receiving federal concurrence, the LWRP coordinates state and federal actions needed to assist the community in achieving its vision. As a program, an LWRP provides the organizational structure, local laws, projects, and ongoing partnerships needed to implement the planning document. Funding for both the development and implementation of an LWRP is available from the NYSDOS through the Environmental Protection Fund.

Nearly all municipalities along the Hudson estuary have zoning laws. Some Comprehensive Plans, LWRPs, and associated land-use laws include techniques such as overlay districts protecting riverfront bluffs (Town of Lloyd, Ulster County), design guidelines (City of Kingston's Rondout District), and provisions for planned unit developments (Town of Esopus, Ulster County) and open-space conservation. Unfortunately, regulatory tools in many riverfront communities date back to the 1970s and, therefore, are woefully out of date. Further, many municipalities have yet to adopt Comprehensive Plans and LWRPs. Without articulating a common vision for their waterfronts, local officials may be unprepared to address the tidal wave of development threatening their riverfronts.

## State Environmental Quality Review Act (SEQRA)

The State Environmental Quality Review Act (SEQRA) provides a framework and rules for state and local agencies such as planning boards, town boards, city councils, and other public agencies to incorporate the consideration of environmental factors into the existing decision-making process at the earliest possible time. SEQRA provides the process through which proposed development projects can be modified to reflect mitigation measures that avoid or minimize adverse environmental impacts. The results of SEQRA may lead to increased public access, protection of critical natural and visual resources, and the use of smart growth strategies.

For more information on the SEQRA process, visit www.dec.ny.gov/public/357.html.

# Vision for the Valley

To protect and enhance the unique qualities of the Hudson riverfront, promote the development of lively, pedestrian-friendly, mixed-use waterfronts and adjacent municipal centers while conserving natural areas and establishing a continuous public greenway corridor.

# The Hudson Riverfront Greenway Corridor


One of the most positive, forward-looking steps waterfront communities can take is to establish a riverfront greenway corridor along their entire shoreline. The greenway corridor serves as continuous, open space along the riverfront that provides public access, recreation, and habitat protection. Wherever conditions allow, this mostly vegetated corridor should extend inland to the 100-year floodplain boundary OR 100 feet from the mean high-water line, whichever is GREATER.

Riverfront greenway corridor uses can be thought of as falling into four basic forms:

**Built Riverfronts**: The most urban form of the riverfront greenway corridor that functions as a direct extension of the adjacent downtown area or municipal center. It provides public access to the riverfront and should include lively, mixed-use, pedestrian-friendly public destinations drawing upon local cultural, economic, and environmental assets.

**Linear Riverfront Parks**: Long, narrow public areas within the riverfront greenway corridor that offer uses such as walking, fishing, bicycling, picnicking, playgrounds, and observation of nature.

**Community Parks**: Public areas within the riverfront greenway corridor that include recreational facilities and amenities such as boathouses, swimming areas, fitness courses, athletic fields and courts, and larger performance and gathering venues. Community parks are larger and extend further from the riverfront than linear riverfront parks, linking downtowns and adjacent areas to the riverfront.

**Natural Areas**: Areas of the riverfront greenway corridor where sensitive natural communities, species, or habitats are preserved and restored, and where human use is limited to low-impact uses like walking and wildlife viewing.

(NOTE: The riverfront greenway corridor is not to be confused with the Hudson River Valley Greenway.)

# Greenway Corridor Detail

## Selected Terms Used in this Guide

**Adaptive reuse**: The process of renovating buildings for new uses while retaining their historic features. An old factory may be converted into an apartment building, restaurant, offices, or a mix of uses. An abandoned power plant may be converted into an entertainment complex. An unused church may become a restaurant or home. Adaptive reuse is beneficial because it extends a building's life, preserves historic structures, encourages infill development, minimizes the need to produce new building materials, and conserves energy.

**Environmentally sensitive area**: A place that is vulnerable to adverse environmental impacts. These areas may include floodplains, wetlands, steep slopes, and fish and wildlife habitats.

**Floodplain**: The land area adjacent to a waterbody that is susceptible to inundation from any source. A floodplain is built of sediments deposited by the river flowing through it and is covered by water when the river overflows its banks. During most floods, just a portion of the floodplain is covered with water; only during infrequent, very large floods is the whole floodplain covered. Floodplains tend to develop on watersheds' lower, less steep sections and pose greater risks to life, property, infrastructure, and natural resources. They are delineated based on the likely frequency of inundation. For example, the 100-year floodplain is subject to a one percent or greater chance of flooding in any given year and is commonly referred to as the base floodplain.

**Infill development**: New development on vacant parcels (or redevelopment of existing parcels) on sites between other buildings. Infill development is a concept that provides for population growth and services in built areas of cities, towns, and villages. It is the antithesis of "greenfield development," which occurs on vacant land (sometimes farmland or forested land) in outlying or rural areas.

**Mixed-use development**: The practice of allowing more than one type of use in a building or set of buildings. In planning zone terms, this can mean some combination of residential, commercial, industrial, office, institutional, or other uses.

**Traditional neighborhood development** (**TND**): Also called Neo-traditional Development or New Urbanism, this refers to a pattern of land use planning and development that emulates communities built in the early to mid-20th century, with an emphasis on compact, mixed-use development arranged on a grid of streets. TND is the antithesis of late-1960s suburbs (suburban sprawl) characterized by a separation of uses and great emphasis on the automobile.

**Transit oriented development** (**TOD**): The creation of vibrant, compact, walkable communities centered around transit systems, making it possible to live a higher quality life without complete dependence on a car for mobility. A TOD also can refer to a mixed-use residential or commercial area designed to maximize access to public transport; it often incorporates features to encourage transit ridership. A TOD neighborhood typically has a center with a train station, metro station, tram stop, or bus stop surrounded by relatively high-density development with progressively lower-density development spreading outward from its center. TODs generally are located within a radius of ¼ to ½ mile from a transit stop, as this is considered an appropriate scale for pedestrians.

## Acronyms used in this Guide

**DEIS**: Draft Environmental Impact Statement

**LEED™**: Leadership in Energy and Environmental Design

**LWRP**: Local Waterfront Revitalization Program

**NYSDEC**: New York State Department of Environmental Conservation

**NYSDOS**: New York State Department of State

**NYSERDA**: New York State Energy Research and Development Authority

**SEQRA**: State Environmental Quality Review Act

**TND**: traditional neighborhood development (see above)

**TOD**: transit oriented development (see above)

# CLIMATE CHANGE AND RIVERFRONT DEVELOPMENT

Climate change is one of the greatest challenges facing riverfront communities today. Any discussion of riverfront development must address how communities will respond to this issue. According to the Northeast Climate Impact Assessment, a 2007 report by the Union of Concerned Scientists (www.northeastclimateimpacts.org), average temperatures across New York State are projected to rise at least 5°F to 12°F above historic levels in winter and 3°F to 14°F in summer by the end of the century. As a result, days with temperatures above 90°F are likely to triple and days above 100°F will increase fivefold. We also can expect an increase of severe storms: Days with rainfall in excess of two inches (considered a threshold that can cause local flooding) are projected to increase by 40 to 80 percent during this century.

April 2005 flooding in the City of Kingston.

One of the most distressing impacts of climate change, especially for communities adjacent to the Hudson River—a tidal system directly connected to the Atlantic Ocean—is a projected rise in sea levels. According to the best climate data and projections at the time of this writing, including the New York City Panel on Climate Change's 2009 report (www.nyc.gov/html/om/pdf/2009/NPCC_CRI.pdf), **we can expect water levels on the Hudson River below Troy and in its tide-controlled tributaries to rise by as much as two to three feet by the end of this century, and perhaps that much again during the following century. Under more extreme but possible scenarios, these sea-level rise projections could roughly double.** This does not factor in the possibility of more frequent and severe shoreline flooding resulting from higher tides and the prevalence of extreme storm surges caused by increasingly volatile weather patterns.

It has been estimated that by the end of this century, the current 100-year flood will occur as often as every 10 years, and the 500-year flood may occur as often as every 100 years (for details, see the 2009 NYC Panel on Climate Change report noted above). Furthermore, with projected increases in storm frequency and volatility, 100-year flood elevation designations are likely to rise faster than sea levels. All of this will add considerable new risks to riverfront properties, commerce, and infrastructure. Also, as tidal flows of ocean water reach further upriver, salinity may increase, jeopardizing drinking-water supplies, altering the habitat and distribution of aquatic species, and affecting the river's ecological functions.

A sea-level rise of a few inches may not seem problematic. But in combination with impacts from more extreme storm and temperature patterns that can lead to river floods or droughts, climate change could cause significant disruption of critical infrastructure as well as loss of property and life. Municipalities, developers, and citizens must do their part to mitigate global climate change by reducing fossil-fuel emissions. However, due to the long lag time between greenhouse gas emissions and their effects on climate, some harmful impacts—including sea-level rise—are extremely likely to occur. Therefore, to protect the long-term viability of Hudson riverfront uses and the Hudson River ecosystem, municipalities must begin planning immediately to make their communities resilient to the impacts of climate change.

Many adaptation and mitigation strategies are available for riverfront communities. They are covered in detail below as well as throughout this publication.

## Adaptation Strategies

Adaptation strategies involve changing existing policies and practices or adopting new ones to minimize the impacts of climate change on communities and ecosystems.

1. Along all shorelines outside the built riverfront, and where site conditions allow, preserve and restore floodplains and riparian areas by maintaining a mostly vegetated riverfront greenway corridor. This corridor should extend inland to the 100-year floodplain boundary OR 100 feet from the mean high-water line, whichever is GREATER. If the width of the riverfront greenway corridor is constrained within the built riverfront by existing conditions, seek to maintain a minimum 75-foot corridor, wherever feasible. Throughout the riverfront greenway corridor, leave an intact vegetated buffer along the riverbank. (A variety of public uses can occur within the greenway, as discussed in Ch. III.)

2. Site critical infrastructure—such as sewer plants and outflows, as well as transportation routes and facilities—out of and sufficiently above the 500-year floodplain.

3. New structures within the riverfront greenway corridor should be elevated or built on grades above the 500-year floodplain. (A variety of public uses can occur within the built riverfront zone as discussed in Ch. III.)

4. Federal flood insurance rate maps (also known as FIRMs) do not take into account climate change adaptation. Local governments should consider exceeding the current state building code requirements for constructing in the 100-year floodplain (i.e., adding additional elevation to the lowest floors) by amending their local flood mitigation laws to take into account anticipated sea-level rise and potential increased extreme rainfall episodes due to climate change. Consult with appropriate federal, state, and county agencies.

5. Work with federal, state, county, and professional organizations to upgrade, locally adopt, and implement building-code provisions for all new construction and major renovations that recognize the best available information on future climate conditions of extreme wind speeds, precipitation, flooding, humidity, and peak temperatures.

6. Evaluate, upgrade, and monitor water supply, as well as sewer and drainage capacity, to cope with expected changing climate conditions such as extreme precipitation, run-off, drought, and temperature, as well as storm surge, sea-level rise, and saltwater intrusion in communities along estuary shorelines. (See Ch. I/B)

7. Promote low-impact development strategies that reduce paved surfaces and use permeable materials that allow rainfall to be absorbed into the ground, recharging drinking-water supplies and reducing flooding. (See Ch. IV)

8. Plant trees and create urban parks to cool down city centers and reduce atmospheric carbon dioxide.

9. To cope with extreme heat conditions, establish public cooling centers with backup generators and sufficient insulation to maintain interior cooling.

10. Establish municipal warning systems for floods, power outages, and brownouts.

In addition to the strategies provided above, the following resources can supply further guidance.

*International Council of Local Environmental Initiatives* (ICLEI): The U.S. branch of this organization runs two programs to help communities mitigate and adapt to climate change. (www.iclei.org)

- The Cities for Climate Protection program provides experienced staff, software tools, and a wide variety of programs and technical assistance to help local governments reduce greenhouse-gas emissions in an effective, efficient manner.

- The Climate Resilient Communities program helps local governments develop tools to assess their vulnerabilities and prepare for the impacts and costs of global climate change.

*The NaCO County Climate Protection Program*, developed by the National Association of Counties, supports counties' efforts to reduce fossil-fuel emissions, improve environmental and public health, and save taxpayer dollars. Tools include model climate-protection resolutions, peer training workshops, and information-sharing. (www.naco.org)

New York State has several programs to assist communities in addressing climate change:

The Office of Climate Change coordinates the state's efforts to respond to climate change by providing reliable scientific analysis to support climate-related policy decisions and developing programs to empower agencies, organizations, and individuals to reduce emissions of greenhouse gases and begin to adapt to the effects of unavoidable warming. (www.dec.ny.gov/60.html)

The NYSDOS, through Title 11 of the ***Environmental Protection Fund-Local Waterfront Revitalization Program***, has funding available for municipalities to develop plans and implement projects enabling them to prepare for and adapt to climate change and sea-level rise. (www.nyswaterfronts.com)

The NYSDEC ***Hudson River Estuary Program*** offers technical assistance to communities interested in stormwater management, land-use planning, and shoreline habitat restoration, as well as funding for associated projects through its Estuary Grants Program. (www.dec.ny.gov/lands/4920.html)

NYSERDA provides technical assistance for implementing energy-efficiency and renewable-energy projects. (www.nyserda.org/About/default.asp)

## Mitigation Strategies

Mitigation strategies aim to reduce the extent of global warming by taking actions to reduce greenhouse-gas emissions and atmospheric levels.

1. **Become a NYS Climate Smart Community**. A voluntary program managed by the NYSDEC, Climate Smart Communities helps local governments reduce greenhouse-gas emissions and adapt to climate change. Its draft pledge enumerates ways to implement a successful local climate program; communities can complement these with their own strategies. (www.dec.ny.gov/energy/50845.html)

2. **Promote development in areas with existing infrastructure**. Promote mixed-use, pedestrian-friendly development near transit hubs in municipal centers to reduce greenhouse-gas emissions associated with automobile dependence, while protecting natural areas that absorb atmospheric carbon dioxide and reduce flooding. (See Ch. I, IV, and VI)

3. **Decrease energy use in municipal operations**. Take measures to reduce electricity use by 15 percent by 2015. This is consistent with New York State's Energy Efficiency Portfolio Standard and "45 by 15 Initiative," which, together with increasing the use of renewable energy sources by 30%, intends to reduce the state's electricity consumption by 15 percent below projected levels by 2015.

- *Existing public facilities*: Inventory current municipal-building energy use and identify opportunities for conservation and efficiency retrofits. Obtain energy audits from NYSERDA or other professional assistance. Consider actions such as purchasing only Energy Star® equipment and appliances; improving lighting, heating, and cooling efficiency; setting thermostats for maximum energy conservation; increasing pump efficiency in water and wastewater systems; and recovering wastewater-treatment and landfill methane for energy production.

- *Sustainable building*: Promote sustainable building techniques in new development and achieve Leadership in Energy and Environmental Design (LEED™) certification for all new public buildings. LEED™, a program of the US Green Building Council, certifies new construction projects that incorporate a series of design and construction strategies that aim to improve buildings' performance in saving energy and water, reducing $CO_2$ emissions, improving indoor environmental quality, and reducing impacts on natural resources. Seek to achieve at least LEED™ Silver certification on all new government buildings. (See Ch. VI)

- *Infrastructure*: Incorporate energy-efficient technologies, operations, and maintenance practices into municipal street lighting, traffic signals, and water and wastewater treatment facilities.

- *Vehicle fleet and commuting*: Improve the average fuel efficiency of the municipal vehicle fleet. Consider reducing the number of vehicles, banning vehicle idling, using electric vehicles where possible, and encouraging bicycling, carpooling, and public transit for employees.

4. **Transition to renewable energy supply**. Draw as much of the municipality's power needs as possible from solar, wind, and small hydroelectric sources through direct generation or purchase. Set a goal of 30 percent of public-energy use from renewable sources by 2015, which is consistent with New York State's "45 by 15" Initiative. In the competitive New York electricity market, individuals and municipalities can select from a number of suppliers of renewably generated power.

5. **Increase urban greenery and tree cover**. Green space and tree cover in urban areas help reduce energy needs by keeping cities cooler and actively remove carbon from the atmosphere. They also provide other substantial environmental benefits like reducing air pollution and water pollution, and are a more effective and less expensive way to manage stormwater run-off than building carbon-intensive systems of concrete sewers, drainage, and water treatment facilities. (See Chapter IV for more low-impact development strategies.)

# I. Promote Riverfront Development in Areas with Existing Infrastructure

A key principle in protecting and enhancing Hudson River waterfronts is to stimulate development in municipal centers. Fortunately, much of the infrastructure that makes this possible and attractive is already in place. We have scenic, historic communities along the length of the river that offer opportunities to reuse buildings and sites in creative new ways. We have Metro-North and Amtrak stations that offer regional transportation links and excellent opportunities for adjacent residential and commercial development with connections to ferries, buses, bikeways, and walkable neighborhoods. And we have communities with strong maritime heritage and cultural amenities that can increase tourism and attract business. In addition to substantial economic opportunities, promoting development in our municipal centers also protects the scenic, environmental, and quality-of-life values that give the Hudson riverfront its unique character and makes it such a desirable place to live and work.

The NYSDOS Coastal Management Program and Local Waterfront Revitalization Programs explicitly identify revitalization of once-dynamic waterfront areas as one of the most effective means of encouraging economic growth without consuming valuable open space. These programs also encourage locating development in areas where public services and facilities essential to such development already exists.

To promote riverfront development in areas with existing infrastructure, communities should strive to:

**A. Promote Infill Development**

**B. Redevelop in Areas with Existing Drinking Water & Wastewater Infrastructure**

**C. Locate New Development Near Transportation Hubs**

# A. Promote Infill Development

Riverfront municipalities should take advantage of all opportunities to rehabilitate abandoned buildings and industrial and contaminated sites (known as infill). Creatively upgrading, expanding, and reusing these sites and structures is an excellent way to infuse municipal centers with new capital investment and vitality.

## STRATEGIES

**1. Identify and redevelop brownfields and greyfields.** A brownfield is property that is unused, underutilized, or difficult to sell due to known or suspected environmental contamination. Many riverfront areas contain former industrial sites falling under this description. Abandoned or underutilized shopping centers, strip malls, and other areas with extensive paved surfaces are known as greyfields. Unlike brownfields, they typically do not require remediation, so they are prime candidates for redevelopment. New visions for such sites have resulted in complete makeovers as tree-lined neighborhoods and mixed-use developments.

Utilizing innovative cleanup techniques, brownfields can be reclaimed and put to productive use. Examples along the Hudson River waterfront include Cold Spring Landing (Putnam County), proposed Long Dock Beacon (Dutchess), and Lighthouse Landing in Sleepy Hollow (Westchester).

BEFORE

AFTER

A lumberyard and bus depot contaminated land on Irvington's riverfront. Now remediated, the site is a park and senior center.

**2. Identify sites and buildings that can be adaptively reused.** When a building outlives its original function, riverfront communities have an opportunity to redevelop the structure while retaining its architectural details. Called adaptive reuse, this strategy provides excellent development opportunities for the many older historic and industrial buildings along the Hudson River, preserving local heritage and bolstering tax revenues. Prominent examples include Dia:Beacon (Dutchess County), the Lord & Burnham Building in Irvington (Westchester), and Dooley Square in Poughkeepsie (Dutchess).

This former department store in Poughkeepsie is now a commercial and residential development.

### *Tools & Techniques*

*Opportunities Waiting to Happen*, a guidebook published by the NYSDOS Division of Coastal Resources, helps communities redevelop abandoned buildings as part of their overall vision. It offers a step-by-step process, from determining a use for the building to engaging partners. It can be downloaded at nyswaterfronts.com/communities_abandonedbuildings.asp.

**3. Upgrade infrastructure and amenities.** Upgrading infrastructure and amenities such as lighting, sidewalks, street furniture, bike lanes, shade trees, and utilities in riverfront business districts should be part of a concerted program to attract infill development. Government policies and resources can steer redevelopment to infill sites and blighted areas.

### *Tools & Techniques*

**Code review**: Local governments should examine codes to remove barriers to suitable infill development.

- Strongly encourage infill development in comprehensive plans and zoning codes.
- Require fewer parking spaces or permit shared parking if a parcel is within ¼ mile of a transit stop.
- Establish design review procedures with clearly articulated standards for infill parcels to ensure quality, innovation, and context-sensitivity.

The Maryland Department of Planning's ***Models and Guidelines for Infill Development*** can help municipal officials overcome regulatory, economic, physical, and social barriers to infill development. (www.mdp.state.md.us/planningact/download/infill.pdf) In addition, Pace University's Land Use Law Center offers technical assistance to determine whether and to what extent local codes should be amended to accomplish infill objectives. (www.pace.edu/lawschool/landuse)

**Fiscal Tools**: Municipalities and/or developers should take advantage of low-interest loans, grants, tax credits, and other incentives from state and federal programs, including:

- *Community Development Block Grants*: This federally funded program, administered in New York by the NYS Office of Community Renewal, provides loans for projects in "viable urban communities" that create housing and economic opportunities for low- and moderate-income residents. (www.nysocr.org/ProgramInformation/overview.asp)
- *Tax Credit Incentives for Rehabilitation of Historic Properties*: State and federal tax incentives for historic preservation are available for the rehabilitation of income-producing (commercial, industrial, or residential rental) buildings or for owner-occupied historic homes. Eligible structures must be individually listed on the National Register of Historic Places or listed as contributing structures in National Register Districts. A federal credit for income-producing properties is available statewide and covers 20 percent of the qualified rehabilitation costs of the structure. An additional 20-percent state rehabilitation credit is available for income-producing structures receiving the federal credit and located in distressed census tracts; together, these programs cover 40 percent of the qualified rehabilitation costs. The state tax credit for owner-occupied historic residential structures will cover 20 percent of qualified rehabilitation costs, up to a credit value of $50,000 per structure, for homes located in distressed census tracts. New York's Historic Preservation Office (nysparks.state.ny.us/shpo) or the Preservation League of New York State (preservenys.org) can provide program details on both the state and federal programs, and help you determine if your project is census-tract qualified for the state rehabilitation tax credit programs.
- *Empire State Development (ESD)*: Formerly the Empire State Development Corporation, this state agency provides a one-stop shop for economic development resources. ESD's two Hudson Valley offices, in New Windsor (esd.ny.gov/MidHudson.html) and Troy (esd.ny.gov/Capital.html), offer a wide range of support services and information to guide and assist businesses seeking to grow and expand.
- *Tax Increment Financing (TIF)*: This is a type of "value capture financing" that provides local government with an economic development tool to fund public improvements and infrastructure needed to enable private investment and development. By New York's enabling statute, TIF must be used in designated blighted areas to fund needed infrastructure, such as new sidewalks, lighting, drainage, or transit service. Common in some states (Florida, Illinois, Oregon, and California), TIF has not been used extensively in New York. Nevertheless, since it can fund critical infrastructure and stimulate development in blighted areas—and do so without raising taxes—TIF may be a useful fiscal tool in some cases. For more information see *Tax Increment Financing In New York State*, Jennie C. Nolon, Pace University Land Use Law Clinic May 1, 2007, or www.nysedc.org/memcenter/TIF%20Paper.pdf

# B. Redevelop in Areas with Existing Drinking Water & Wastewater Infrastructure

Sustainable management of ground- and surface-water resources should be a priority in municipal riverfront planning and development. Wastewater overflows due to inadequate collection, conveyance, and treatment systems are a significant source of water pollution that can cause public-health risks and impact aquatic wildlife. To avoid this, it is important for communities to focus development in areas where existing facilities can handle increased use, or to create plans for upgrading these systems to handle new development. New water infrastructure near shorelines and flood-prone areas should be designed carefully, particularly in light of predicted sea-level rise and storm surges due to global climate change. Municipalities also should implement water-efficiency programs.

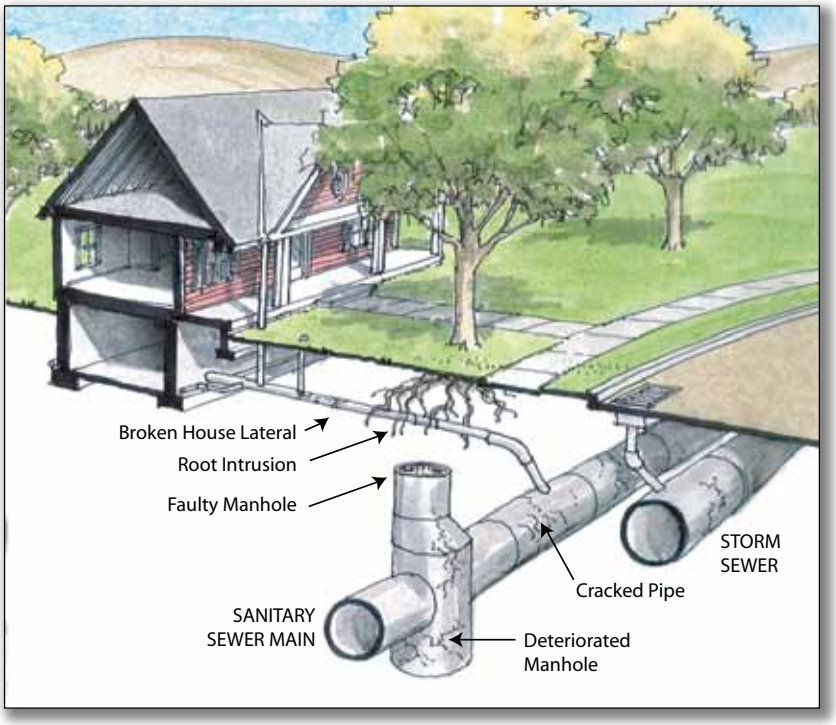
## STRATEGIES

**1. Ensure that the capacity of wastewater and water-supply infrastructure is adequate for existing and new development.**

### *Tools & Techniques*

**Implement comprehensive infrastructure evaluations to address long-term needs**:

- Conduct an overall assessment of existing wastewater and water-supply infrastructure.
- Identify and map areas served by combined storm and sanitary sewers, and by faulty infrastructure needing repairs, such as aging sewers and leaking water lines.
- Assess compliance with State Pollutant Discharge Elimination System (SPDES) permits.




Aging or deteriorating sewer lines, lateral connections to buildings, and other underground elements may threaten sub-surface water supply infrastructure.

- Plan repairs, upgrades, or new systems as needed.
- Develop a long-term capital plan to ensure the viability of water and wastewater infrastructure over time, including adequate funding for future upgrades and repairs.
- Monitor water quality in the receiving water body to ensure wastewater systems are operating effectively. Work with local watershed groups and other stakeholders to develop a pollution-prevention and monitoring program.

## Wastewater Overflows: Problems and Solutions

In many older Hudson riverfront communities, wastewater and stormwater are collected and conveyed in the same sewer system. These combined systems create "combined sewer overflows" (CSOs) when the volume of rain or melting snow exceeds the capacity of the wastewater treatment plant, resulting in raw sewage discharging directly into streams and rivers.

In communities served by older, separate storm and sanitary sewers, significant leaks are common where rainwater and groundwater can enter the system. This additional flow is known as "infiltration and inflow" (I&I).

In both situations, wastewater treatment plants were not designed to handle and properly treat these excess flows, resulting in discharges of inadequately treated wastewater to local surface-water bodies. ***Wastewater overflows are a significant source of pollution in the Hudson River and some of its tributaries,*** and are a primary cause of microbial contamination (bacteria, viruses, etc.), which poses health risks to swimmers, boaters, and anyone recreating on the river. Comprehensive solutions to these problems can be challenging and costly, yet low-impact development (LID) techniques, and where appropriate the use of on-site wastewater treatment and recycling systems, can be implemented in new building projects to help mitigate overflows over time.

**2. Recognize new development and redevelopment in municipal centers and adjacent riverfronts as key opportunities to achieve upgrades and expansions to water and wastewater infrastructure.** The process of planning, reviewing, and financing developments are important chances to review infrastructure needs, repair and replace aging wastewater infrastructure, separate combined sewers and storm drains, and eliminate groundwater contamination by repairing leaking pipes and replacing antiquated systems.

Aged infrastructure that is beyond capacity.

### *Tools & Techniques*

Ensure that wastewater infrastructure and water supply issues are fully considered in the SEQRA review.

Explore mechanisms for working with state and federal governments, developers, and other stakeholders to leverage funding and maximize infrastructure-upgrade opportunities.

Identify and seek funding from, among others, the NYS Environmental Facilities Corporation (www.nysefc.org/home/index.asp) and NYSERDA (www.nyserda.org).

Evaluate all available technologies for wastewater capacity upgrades and replacement systems to determine the most cost-effective and sustainable scale for new wastewater infrastructure, including onsite, centralized, or decentralized community systems. Where appropriate, treat and recycle wastewater onsite or by using smaller, decentralized community systems.

**3. Implement water-efficiency measures and incentives for existing and new development to reduce demand for potable water, and eliminate inappropriate discharges to the wastewater system.**

*Tools & Techniques*

Use efficient appliances and innovative technologies in buildings, including variable flush toilets, waterless urinals, high-efficiency clothes washers, and low-flow faucets and showerheads.

Disconnect inappropriate discharges from sewer lines.

Capture rainwater from roofs and other impervious surfaces for landscape irrigation and other nonpotable water uses.

Develop a water budget for the supply system and implement pricing strategies for potable water and wastewater services that provide incentives for using water efficiently. For example, establish a higher per-gallon price when users exceed a certain monthly usage threshold.

Implement a sub-metering requirement in new multi-family and commercial buildings to enable billing based on use by individual units, thereby encouraging conservation.

Rain barrels or cisterns capture roof run-off that can be used to water lawns and gardens.

**4. Consider climate change in water and wastewater infrastructure planning and management decisions.**

*Tools & Techniques*

**Assess the vulnerability of wastewater collection systems, treatment plants, and outfall locations to flooding and storm surges under existing conditions and with predicted sea-level rise**. Where existing low-lying infrastructure is vulnerable, begin planning for upgrades, relocation, or new systems.

**Implement energy audits and upgrades to increase energy efficiency.** Pumping, aeration, and other mechanical systems used in wastewater and water infrastructure use significant energy. Consider alternatives utilizing less energy, such as passive wastewater treatment systems that minimize the need for pumping and aeration. Funding may be available from NYSERDA or local utility companies.

**5. Use low-impact stormwater and wastewater practices to recharge groundwater and protect the sustainability of local streams, wetlands, and the Hudson River.** Low-impact development techniques minimize impervious surfaces and manage stormwater on-site, instead of conveying it to drains, ditches, and culverts flowing directly to overburdened wastewater treatment plants or local surface waters. (See Ch. IV)

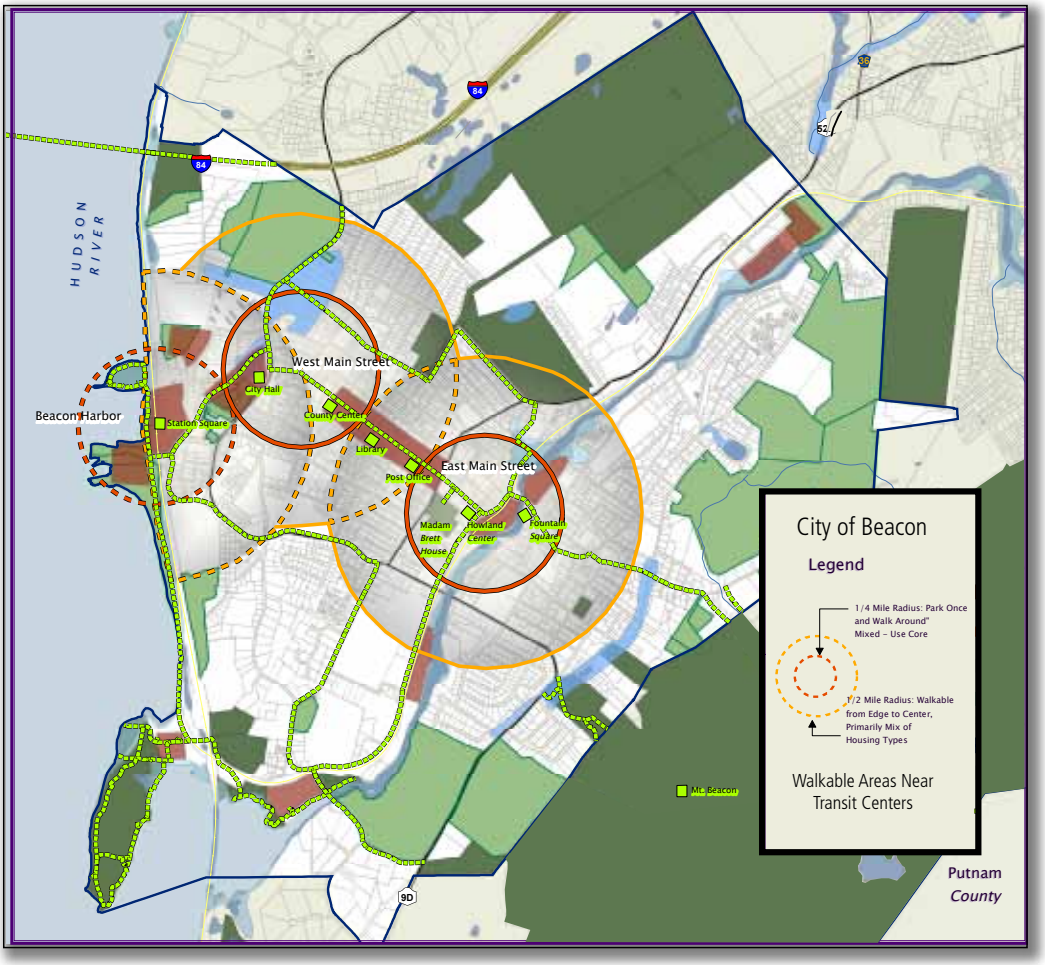
# C. Locate New Development Near Transportation Hubs

To invigorate riverfront municipal centers and mitigate climate change through reduced automobile use and fossil-fuel emissions, every effort should be made to promote mixed-use, pedestrian-friendly development in close proximity to public transit, and to provide connections to ferries, buses, and bicycles. Such transit oriented development (TOD) also facilitates travel between Hudson riverfront destinations, which can stimulate tourism and regional economic development.

## STRATEGIES

**1. Promote mixed-use development within ½ mile of public-transit facilities and hubs.** Research indicates people are willing to walk up to ½ mile to bus and train stations, shops, civic uses, and other amenities. Promoting a mix of uses—residential, recreational, civic, commercial, and office—near transit stations facilitates use of buses and trains, and promotes the foot traffic upon which nearby retail establishments depend.

Appropriate TOD densities in each community will vary according to circumstances. Recent commuter rail TOD in Hudson riverfront communities has ranged from 89 dwelling units per acre (DU/acre) in Yonkers (Hudson Park at Yonkers) to 16 DU/acre in Cold Spring (Cold Spring Landing). At this writing, Beacon's proposed TOD Overlay District would permit 28 DU/acre.




This map demonstrates several strategies presented in this guide. Mixed-use cores are identified with ¼- and ½-mile pedestrian radii at each end of Main Street and as an emerging center on the waterfront around Beacon Station. Development in areas near transit should be compact, offer a mix of uses (commercial, retail, office, entertainment, residential, and recreational, as appropriate). Zoning should encourage the greatest density and mix of uses within the first ¼ mile. Trails and sidewalks connect the waterfront's emerging core with cores on Main Street's central business district, parks (both on the waterfront and within the city), and residential areas. Areas of prime development opportunity are identified within these cores. However, areas of abandoned industrial development outside of these cores also are indicated as favorable for development.

Map source: Dutchess County Department of Planning and Development; included as a supplement in the City of Beacon Centers and Greenspaces Plan (Draft April 2007).

### *Tools & Techniques*

Include in your zoning code a Transit Oriented Development Overlay District that will encourage compact, mixed-use, walkable development in areas around transit stations.

Appropriate levels of development will vary from place to place. The appropriate density should be based on many factors, including the size of the community, type of transit, and availability of water and sewer infrastructure. Of course, it should be determined in a public planning process.

Permit proportionally greater commercial, retail, and entertainment uses in the first ¼-mile radius and slightly less development in the ½-mile radius (e.g., Town of Chapel Hill, NC, TOD District; townhall.townofchapelhill.org/abc/northern_area/background/tod_lumo_extract.pdf).

The overlay district should establish minimum density requirements and prohibit low-density uses that do not support transit and generate unacceptable levels of vehicular traffic (e.g., Town of Chapel Hill, NC, TOD District).

Conduct design charettes and involve the public to achieve "buy-in" and respond to concerns that density and mixed use may result in excess traffic, overcrowded schools, and crime.

Building scale, design, and overall density should reflect community vision and reinforce existing scale and character. (See Chapter VI)

**2. Design train stations to serve commuter and non-commuter needs.** Often a community's most valuable property surrounds a transit stop, yet this land is frequently used for surface parking. More than two-thirds of all automobile trips are for non-commuting purposes like shopping, recreation, and running errands. When designing a train station, parking area, and adjacent buildings, it is important to address both commuter and non-commuter needs.

### *Tools & Techniques*

**Transform surface parking adjacent to stations into multiple-use facilities**: Wrap a mix of commercial, office, and residential uses around large parking lots, providing places to live within walking distance of transit facilities, active foot traffic for retailers, and sufficient parking for all.

**Increase services in and near station centers**: Incorporate retail services and vendors such as delis, dry cleaners, and banks within the station or adjacent areas to meet commuter and non-commuter needs.

**Create a gateway**: Because of New York City's proximity, many Hudson River communities have created and cultivated a strong weekend visitor market. These communities can expand that effort by designing and marketing their train stations as regional gateways, offering tourist information and services such as bicycle and auto rentals, and creating links to downtown and riverfront areas via vans or trolleys.

This mixed-use transit oriented development at the Poughkeepsie train station provides services for commuters and jobs. The project was an adaptive reuse of an historic building using geo-thermal heating.

Poughkeepsie Metro-North train station.

**3. Ensure seamless connections between all transportation modes.** Provide safe, comfortable, and efficient transfer between rail, bus, and ferry facilities.

The Newburgh-Beacon ferry carries commuters across the river to Metro-North rail service.

*Tools & Techniques*

**Locate transportation connections in close proximity to one another**. Easy transfer between transit modes requires short walks that minimize time between arrivals and departures, as well as exposure to the elements.

**Ensure that shelter from inclement weather is provided**. If people are exposed to rain, snow, and cold wind, transit ridership will suffer. Likewise, shade should be provided from the hot sun.

**Require that plans provide pedestrian connections**. Safe sidewalks and paths connecting transit with neighborhoods, schools, community centers, stores, and parks reduce parking requirements at transit facilities—and our carbon footprint. (See Chapter VI)

**Provide information to help people find their way**. People expect certainty in making transit connections. Directional signs—and electronic signs indicating schedules and arrival/departure times—provide assurance that people will make timely connections.

**4. Promote bicycle use.** Bicycling can serve transportation as well as recreational needs. To facilitate biking, provide safe, functional, and attractive bike paths and infrastructure.

Secure parking for bicycles encourages their use.

*Tools & Techniques*

Install adequate bicycle-locking posts and lockers at train and bus stations, shopping districts, parks, and public facilities such as libraries and municipal buildings.

Equip buses with bike racks.

Publish rules and schedules for trains, buses, and ferries that accommodate bicycles.

Connect local bike paths to regional greenways. For example, in Beacon a path links the Metro-North station to a shoreline park and greenway trail.

Implement a community bike-share program.

Urban bicycle paths provide an amenity for commuters and recreational cyclists.

**5. Partner with and pursue assistance from New York State agencies and transportation providers**. Work cooperatively with the public and private sectors to make productive use of land around transit stations.

*Tools & Techniques*

NYSDOS, NYSERDA, NYS Department of Transportation, Hudson River Valley Greenway, the Metropolitan Transportation Authority, Amtrak, and your local transit agency are potential partners for collaboration with municipal officials, developers, and others in planning TOD.

# II. Encourage Water-Dependent & Water-Enhanced Uses in or Adjacent to Municipal Centers

Lively riverfronts are a mainstay of the Hudson Valley's economic and cultural life. In the 18th and 19th centuries, Hudson River communities were centers of shipping, fishing, and even whaling. Today, portions of their shorelines remain "working waterfronts," featuring shipbuilding and boat-repair facilities, marinas, and industries dependent on waterborne delivery of raw materials and finished products. At the same time, improvements in water quality have increased the Hudson's appeal for activities such as kayaking and canoeing, fishing, and nature study. For these beneficial, water-dependent uses to remain viable, they require riverfront land over which there is increasingly intense competition.

The NYSDOS Coastal Management Program, LWRPs, and Harbor Management Plans prioritize the siting of ***water-dependent*** uses adjacent to coastal waters. The same policies encourage ***water-enhanced*** uses, although not at the expense of water-dependent uses and only when they are compatible with surrounding development. Such uses—generally mixed-use commercial, residential, office, and land-based recreation—do not require a location on or adjacent to the Hudson but may add to public enjoyment and use of the riverfront.

Uses that are not water-dependent or water-enhanced (e.g., public works, certain industrial facilities, or bulk-storage units) should be discouraged from locating along the shore.

To protect the Hudson River's ecological integrity, new water-dependent and water-enhanced development should avoid shorelines with moderate or steep slopes as well as sensitive habitats. (See Ch. IV)

**Water-dependent uses**

Activities that can only be conducted on, in, over, or adjacent to a body of water. Examples: shipping facilities, dry docks, marinas, mooring areas, yacht clubs, boat yards, museums that interpret maritime activities, commercial fishing and recreational operations, facilities for shipping petroleum products and aggregates, ferry landings, support facilities for waterborne commerce and recreation, recreational fishing areas, swimming areas, and recreational boat launches.

**Water-enhanced uses**

Activities that do not require direct access to the water, but whose riverfront location adds to the public's use and enjoyment of the water's edge. Examples: restaurants, museums, hotels, spas, parks, community gardens, public plazas, esplanades, squares, playgrounds, and mixed-use (retail, office, residential).

**Non water-dependent uses**

Activities not requiring direct access to the water and whose riverfront location does not contribute to public use and enjoyment of the water's edge. Examples: car washes, auto sales and storage operations, auto repair facilities, self-storage units, and manufacturing not involving waterborne transportation.

## STRATEGIES

**1. Prepare a Local Waterfront Revitalization Program and, if warranted, a Harbor Management Plan to examine the pattern of land and water use trends along the riverfront. Based on this, develop an effective strategy for retaining and/or attracting water-dependent uses and balancing competing uses**.

### *Tools & Techniques*

Identify steps for prioritizing water-dependent uses. This should consider:

- If water-dependent uses are being replaced by uses that do not require a waterfront location, particularly residential.
- If demand for recreational boating facilities is increasing.
- If water-dependent operations are closing and the land is remaining vacant, determine why is this occurring.
- The nature of the demand for waterfront uses.

**2. Concentrate water-dependent uses.** To more efficiently provide and maintain infrastructure such as public docks, ferry landings, and links to land transportation, concentrate water-dependent facilities in close proximity to one another. Whenever possible, these uses should be located near municipal centers providing essential support services.

**3. Balance competing uses.** Because the riverfront is attractive for residential development, there is great competition for limited land. Waterfronts need to be protected and promoted as important elements of a community's maritime heritage and economy.

Avoid non water-dependent uses such as this junkyard in Marlborough, which does not require or benefit from a riverfront location.

Encourage water-dependent uses like this dry dock on Rondout Creek where tugboats and barges are repaired.

### *Tools & Techniques*

Consider a zoning code that provides incentives for water-dependent uses and limits other uses based on the following general approach:

- Encourage water-dependent uses where they already predominate. Often these areas are under intense pressure to be converted to residential use.
- Allow water-enhanced uses only by special permit and with the condition they be part of a mixed-use proposal that includes water-dependent uses and public riverfront access. This may provide needed economic support for desired water-dependent uses. These uses should not obstruct or impair important scenic views nor increase water pollution and stormwater run-off.
- Discourage development solely including non water-dependent uses—particularly residential projects—that compete with viable water-dependent uses.
- Site water-dependent uses to minimize impacts on fish and wildlife habitat; also avoid placing non water-dependent structures over surface waters. (See Chapter IV)

If warranted—and particularly where there is competition for waterfront space or conflicting land or water uses—develop a Harbor Management Plan that regulates the safe use of surface waters. Financial support is available from the NYSDOS.

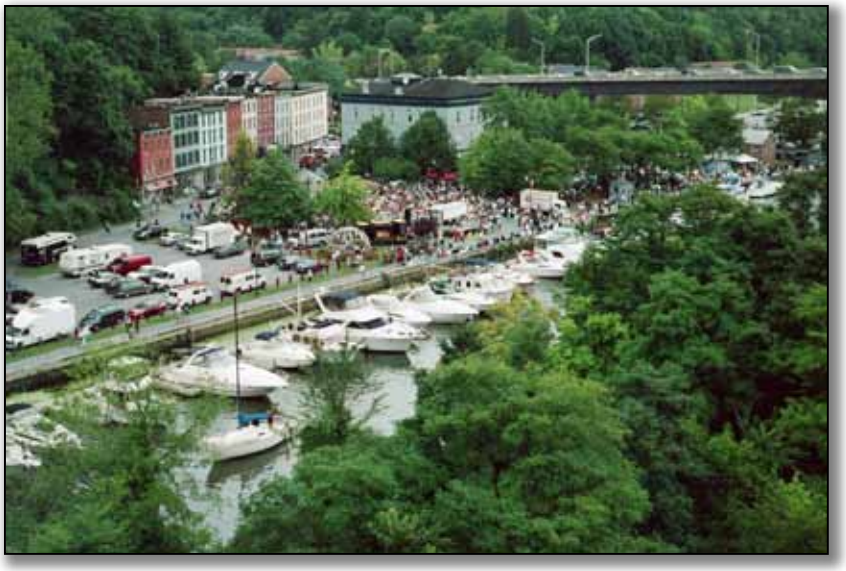
- Establish separate areas for competing uses when appropriate; e.g., marinas and commercial boating facilities should be located away from areas for swimming, water-skiing, and personal watercraft use.

Ensure that new or expanding marinas:

- Incorporate boating services meeting a range of needs.
- Do not displace or impair the operation of water transportation or commercial fishing.
- Do not encroach upon navigation channels or channel buffer areas.
- Provide public access to the shore, including boat ramps and transient boat mooring.
- Provide pump-out facilities unless the state's Clean Vessel Act plan indicates adequate facilities exist.

**4. Promote lively public uses and shoreline access on riverfronts.** Public spaces like plazas, boardwalks, esplanades, public parks and piers, and picnic areas are important for connecting people to the riverfront. For more detail, including Tools & Techniques, see Chapter III.

*NOTE*: Some water-dependent uses—particularly active shipyards, dry docks, and shipping operations—may not be compatible with riverfront esplanades and walkways. In these instances, it may be necessary to route pedestrian paths to their land side.



This inviting park along Rondout Creek in Kingston provides an ideal setting for festivals.

**5. Discourage parking immediately adjacent to the shoreline.** While it is important to accommodate people arriving by car, parking lots can degrade a waterfront's visual and environmental quality.

### *Tools & Techniques*

Provide parking within walking distance of the riverfront and make the walk safe and pleasant.

When financially feasible, consider structured parking upland from the shoreline as an alternative to surface parking. Parking structures can be "wrapped" with ground-level stores that create pedestrian activity and generate jobs and tax ratables.

Riverfront parking inhibits more desirable waterfront uses.

When parking is sited near the water, provide a buffer of berms and plantings to hide cars from river view. See Chapter VI for additional guidance on parking design to reduce adverse aesthetic and environmental impacts.

# III. Connect People to the River

The Hudson River is the natural asset that makes the waterfront such an attractive place to live, work, and play. Providing public access to, along, and into the river should be a priority of all shoreline development. In built riverfront areas, this can take the form of plazas for public festivals, concerts, and farmers' markets; esplanades and boardwalks for walking; and piers and marinas. Community parks, buffers, and natural areas also are essential for connecting people to the river. It is important to link riverfront areas to each other as well as to significant inland destinations like downtown shopping districts, parks, residential areas, and tourist attractions. These connections can be fostered through a system of sidewalks, trails, bike paths, roads, public transit, trolleys, ferries, or water taxis. They can be supported by attractive signage, landscape furniture, and sufficient lighting. By connecting people to the Hudson, riverfront development can stimulate investment in our riverfront municipalities while enhancing quality of life.

The NYSDOS Coastal Management Program and LWRPs call for protecting, maintaining, and increasing the level and types of access to the waterfront and water-related recreation resources. Accomplishing this requires balancing the following factors: the amount and types of waterfront access desired by the public, the capacity of infrastructure to provide access to the waterfront, and environmental constraints to providing access.

When located adjacent to the shore, development should provide for water-related recreation whenever such use is compatible with both reasonably anticipated demand for such activities and the development's primary purpose. Funding for projects that connect people to the river, such as parks, boat launches, and docks, may be provided by the NYSDOS; NYSDEC; NYS Office of Parks, Recreation and Historic Preservation; the Hudson River Valley Greenway; and the Hudson River Foundation.

## STRATEGIES

**1. Create a continuous, public riverfront greenway corridor that provides a range of uses for enjoyment of the waterfront.** One of the most positive, forward-looking steps waterfront communities can take is to establish a riverfront greenway corridor along their entire shoreline. The corridor serves as continuous, open space along the riverfront that provides public access, recreation, and habitat protection. A continuous corridor is critical to maintain public access along the river and enhance scenic quality while accounting for projected sea-level rise.

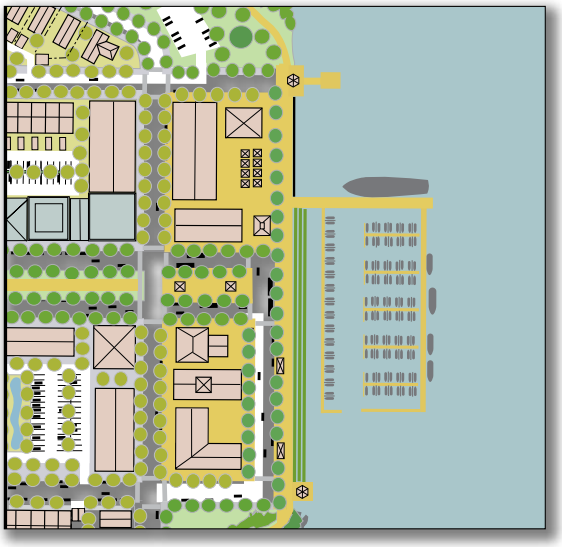
### *Tools & Techniques*

**Built riverfronts***:* Create built riverfronts that connect the river to downtown areas. These areas should function as direct extensions of one another and include lively, mixed-use, pedestrian-friendly public destinations that draw upon local cultural, economic, and environmental assets. Riverfront areas should prioritize water-dependent and water-enhanced uses that are accessible to the public. In this busy part of the greenway, esplanades, plazas, and paved walkways may be appropriate to withstand heavy foot traffic and accommodate public festivals or other events.

**Create community parks on the riverfront***:* These areas include recreational facilities and amenities such as boathouses, swimming areas, fitness courses, athletic fields and courts, and larger performance and gathering venues. Surface treatments include a combination of turf, gardens, and natural areas, as well as hard and soft walkways.

**Protect and/or restore natural areas**: Areas where natural vegetation and habitats are preserved and restored, and where uses are limited to protect sensitive resources. Carefully sited boardwalks or nature trails may be appropriate here.

**Create linear riverfront parks**: These areas primarily serve as linear, public parks for passive uses such as walking, fishing, picnicking, and river enjoyment and observation. Surface treatments include a combination of turf, gardens, and natural areas, as well as hard and soft walkways.



Example of a built riverfront.

Example of a community park and natural area.

Example of a community greenway.

**Boat launches**: Ramps for trailered boats as well as hand launches for car-topped kayaks and canoes provide easy river access. Ramps require more room for parked cars and trailers, and are more suitable in previously disturbed areas.

**Piers and docks**: Piers provide critical links between land and water. Since piers facilitate fishing in deeper water for people without boats, post advisories conveying information about the health hazards of eating Hudson River fish due to PCB contamination.

**Swimming areas**: As water quality improves, more people want to swim in the Hudson. Site swimming areas on unvegetated beaches and away from marinas and commercial boating facilities. Make sure they are well-marked with floating ropes. "River pools" like the one in Beacon, Dutchess County, allow people to swim in the river in an enclosed structure.


The Beacon River Pool allows people to swim in the river in a safe, enclosed setting.

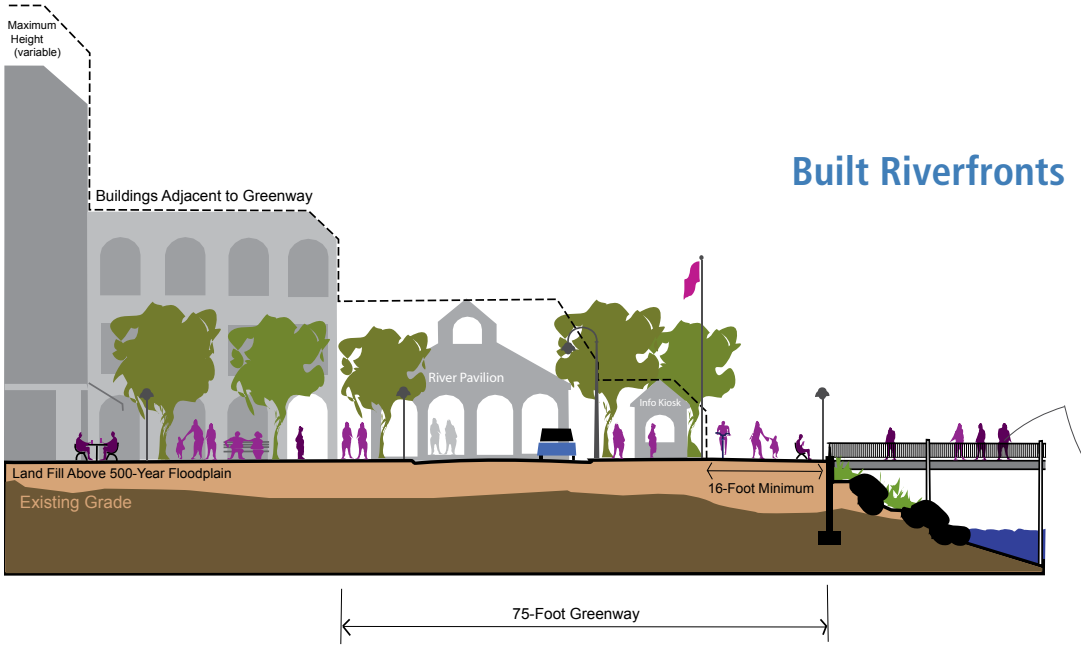
Kingston Point Beach offers swimming, windsurfing, and a boat launch.

Kayak launches such as this provide opportunities to paddle on the river.

**2. Establish municipal standards within the greenway that promote public use and access to the riverfront.**

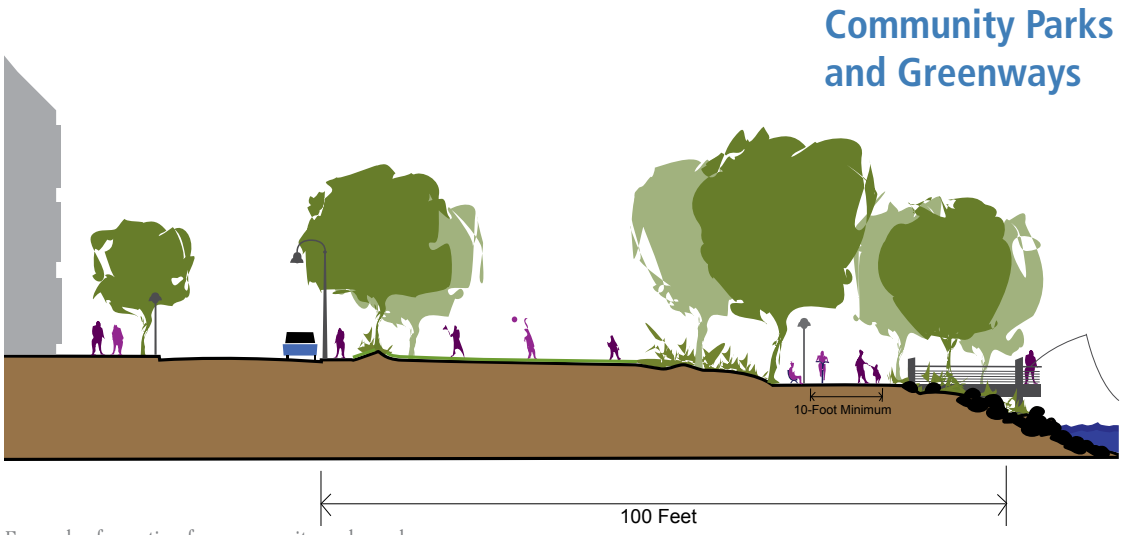
*Tools & Techniques*

In built riverfronts directly adjacent to downtown areas, maintain a minimum 75-foot setback from the top of the riverbank that is limited to publicly accessible water-dependent and water-enhanced uses, and includes a minimum 16-foot wide multi-use path.

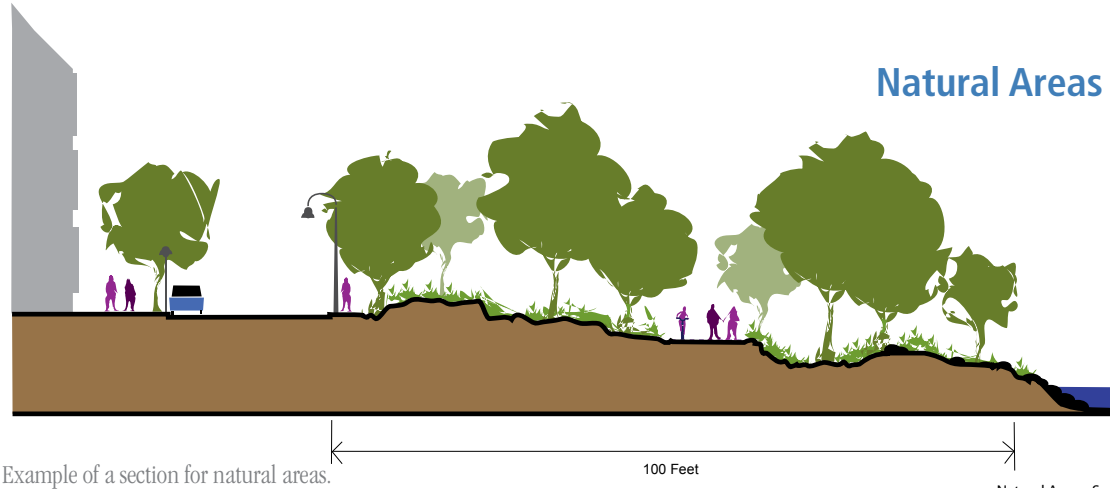



Example of a section for built riverfronts.

Outside the built riverfront and where site conditions allow, maintain a mostly vegetated corridor along the river that extends to the 100-year floodplain boundary OR 100 feet from the top of the riverbank, whichever is greater. Within this corridor, provide a minimum 10-foot wide multi-use path.




Example of a section for community parks and greenways.




Example of a section for natural areas.

Establish in the zoning code a requirement that public access must be provided along the shoreline as a condition for Special Uses. See Relevant Ordinances (Appendix), RF-R Rondout Creek and RF-H Hudson River front Districts (1992).

Incentive zoning: Provide developers with incentives in exchange for public access to the waterfront or other community benefits or amenities, such as parks, open space, and public recreational opportunities. These incentives are written into zoning codes and can include increases in residential density (or Floor Area Ratio) or decreases in setbacks and/or bulk standards.

When possible, obtain public access easements as part of large development projects. The value of this easement can often be used as a match for state grants (such as the Environmental Protection Fund) to improve public access.

*When developing or enhancing walkways*, clearly establish who will be responsible for management and maintenance of public parks, easements, and trails.

**3. Link riverfront destinations.** Water-based transit and a continuous pedestrian corridor are critical to maintaining public access along the river. Different shoreline settings require different corridor treatments.


Water taxis provide valuable connections to waterfront destinations.

### *Tools & Techniques*

**Walkways**: Riverfront trails and esplanades provide recreation as well as pathways between destinations. The appropriate width for trails and esplanades—at least 10 feet wide, but a minimum of 16 feet where heavy use is anticipated—will depend on several variables, including intended uses, predicted number of users, waterfront conditions, and availability of space.

**Water transit**: River-based transportation such as water taxis and ferries allow people to move easily between waterfront destinations. In addition, river travel highlights the Hudson River's unique character and dramatic beauty. Terminals may include docks, comfortable waiting areas, information kiosks, retail, restaurants and bars, and easy connections to land transportation and nearby destinations.

**Create "watertrails" or "blueways."** These small-boat and paddling routes combine recreation and environmental awareness and allow users to travel between designated stops along the way for rest, overnight stays, and enjoyment of land-based attractions in the vicinity. Watertrails can be promoted through a coordinated program of special events, signs, brochures, and Web sites. NYSDOS provides funding for development of such trails. The Hudson River Valley Greenway (www.hudsongreenway.state.ny.us/conserv/watertr.htm) and Hudson River Watertrail Association (www.hrwa.org) are working together to develop a watertrail on the Hudson.

**4. Link riverfronts to inland destinations.** Riverfronts can become important gateways to downtown shopping districts, residential areas, tourist attractions, and parks. The proximity of these destinations to a lively waterfront can increase visitation and support Main Street economies.

*Tools & Techniques*

**Transit hubs***:* Stations integrating various modes of transportation (bus, train, ferry, car) provide waterfront access for large numbers of people from many locations.

**Trolley***:* Many Hudson River communities (Beacon, Hudson, Kingston) use trolleys to connect waterfront districts and downtowns. Though primarily intended to serve tourists, trolleys can serve commuters as well.

**Pedestrian-friendly streets**: Steep hills separate business districts from riverfronts in many communities. To facilitate walking between the two, make sidewalks safe and enjoyable by providing well-designed streetscapes with trees, benches, lighting, and crosswalks. In areas with steep slopes, use slip-resistant surfaces, particularly on sidewalk and curb ramps. See Chapter VI for additional information.

**Signs**: A coordinated program of attractive, clear, and consistent signs can help establish a good first impression of the waterfront as a gateway, brand a waterfront and community, and ensure that people find businesses, parking, and points of interest.

Poughkeepsie's Main Street connects the central business district with the waterfront.

The Trolley Museum of New York in Kingston operates restored historic streetcars that connect the Rondout District with Kingston Point Park on the Hudson River.

**5. Avoid real and perceived barriers that restrict pedestrian movement and public access to the river.** Even public waterfronts with narrow riverside setbacks abutting private backyards and patios can create the perception of a private enclave and trespassing.

*Tools & Techniques*

Comprehensive Plans, zoning codes, and site plan design standards should prohibit gated communities.

Design waterfront projects to allow direct views of the riverfront from nearby roads.

Require all roads to be publicly owned.

Provide easy-to-read signs that indicate public accessibility, denote activities, interpret resources, and provide directions.

Provide adequate riverfront setbacks (75 feet for residential buildings in built riverfronts and 100 feet outside of built riverfronts), sidewalks, and paths for pedestrians and non-motorized uses.

**6. Comply with requirements of the Americans with Disabilities Act and seek opportunities to enhance recreational access for the disabled**.

This pier provides accessibility to people with disabilities.

*Tools & Techniques*

**Picnic tables and grills**: Design with extended ends, raised tops, or accessible sides so people in wheelchairs can use them.

**Trails and sidewalks**: Surfaces, widths, and grades should be designed to accommodate wheelchairs and walkers. Curb ramps, critical to providing access between the sidewalk and the street for people who use wheelchairs, are most commonly found at intersections, but they may also be used at other locations such as on-street parking, loading zones, bus stops, and midblock crossings.

**Kayak/canoe launches**: Sloped surfaces, handrails, and transfer assistance (grab bars, etc.) should be designed to accommodate the mobility-impaired.

**Fishing areas**: Lowered railings should be placed in a variety of locations to provide fishing opportunities for persons with disabilities.

**Signs**: Interpretive and directional signs should be installed at appropriate viewing heights and convey information to the visually impaired via Braille or audio messages.

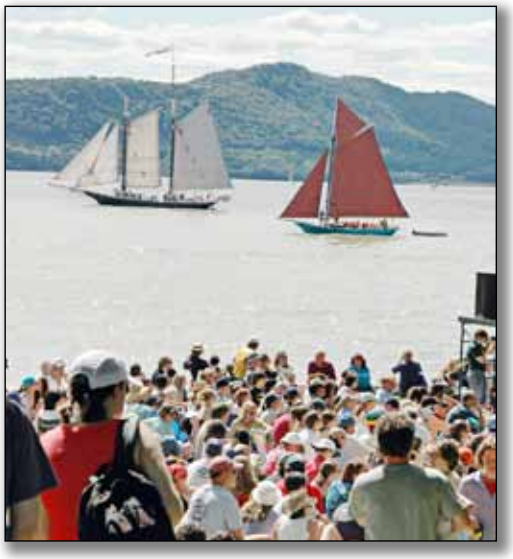
**Benches and resting areas**: Provide places to rest at periodic intervals in a variety of settings. Provide benches and enough space to position wheelchairs alongside them. (www.ncaonline.org/index.php?q=node/659)

**7. Where possible, promote public access on private and institutional lands abutting the riverfront.** Large institutional facilities (e.g., hospitals, schools, and office complexes) on the waterfront frequently hinder public river access. However, private property owners and institutions often benefit when their land is connected to extensive trail systems.

*Tools & Techniques*

Collaborate with upland owners to provide continuous trails along the river and strategic points for direct access to the water. In partnership with the City and Town of Poughkeepsie (and with public funding), Marist College improved its waterfront by creating and opening to the public the 12-acre Longview Park. It features a riverside trail, fishing pier, and gazebo.

**8. Create innovative programming to enliven the waterfront.** Events drawing people to the river can bolster the local economy and reinforce the waterfront as an essential component of civic life.



The Clearwater Festival in Croton-on-Hudson draws thousands of people to the riverfront each year.

*Tools & Techniques*

Establish or encourage a "Friends" group committed to promoting formal programs on the waterfront. Activities are limited only by your imagination, but have typically included festivals, farmers' markets, concert series, art installations, boat races, and fishing demonstrations.

Be sure your waterfront is designed to accommodate people throughout the four seasons and inclement weather by including shelter from the elements. This will ensure greater year-round attendance and economic benefit.

# CASE STUDY

## Catskill Point Park, Village of Catskill

Catskill Point Park, lower left.

Sitting on a scenic peninsula at the confluence of the Hudson River and Catskill Creek, Catskill Point for decades served as Greene County's Highway Department garage. Dump trucks and other equipment filled its historic warehouse and Freightmaster's Building. The grounds contained mounds of salt and sand, while the shoreline was a jumble of stones and logs from a rotting bulkhead. Thanks to a county-led initiative, this prominent riverfront site now functions as a 2.6-acre park that provides a walking trail, a museum, grassy areas for lounging, and a brick-paved place for public gathering.

Efforts to transform the space began in 1998, after county leaders, hopeful that a riverfront park would spur revitalization of downtown Catskill, relocated the garage and began cleanup of contamination. The following year a landscape architecture firm was hired to redesign the site, with explicit instructions from county officials to "make it green, open up access, and use the buildings." The park opened in 2000.

Located where 19th-century vacationers disembarked from steamboats to begin the overland journey to Catskill Mountain resorts, Catskill Point Park features an open plan that provides for multiple uses and maximizes views that include the Rip Van Winkle Bridge, Olana State Historic Site, and RamsHorn Marsh. Northerly vistas include a multi-tank oil storage facility adjacent to the park.

A paved riverfront promenade with numerous benches rings the park. Additional trees, shrubs, and other vegetation, particularly along the shoreline, would further improve the park.

One requirement for restored park buildings was a museum. "That was a key element," says Peter Markou, Greene County Economic Developer during the park's formation. "You have to have something for people to come and take a look at." Relics of Catskill's maritime history now fill the Freightmaster's Building, while the spacious warehouse serves as a venue for plays, concerts, festivals, and community events.

A seasonal dock on Catskill Point's creek side is suitable for small boats and can be used to launch canoes and kayaks. Ships like the *Clearwater* and excursion vessels can moor at a stationary dock on the Hudson River. Additional signage directing people from downtown Catskill would make the park easier to find.

County officials are delighted with how Catskill Point Park has connected village and county residents to the river. Says Gary Harvey, director of the county Highway Department (and a driving force behind the park's creation): "It's been a win-win for everybody."

Shoreline before restoration.

Restored historic buildings.

Riverfront promenade.

# IV. Protect Natural Resources

The Hudson River is an unusually long tidal estuary that connects its headwaters in the Adirondacks and all of its tributary streams to the Atlantic Ocean. This has resulted in a constellation of nationally important plant and animal communities reliant on an interconnected network of habitat types: upland areas that drain into the river through its tributaries, riverbanks, tidal wetlands, and submerged vegetation beds, and shallow and deepwater zones of the river itself. Waterfront construction can disrupt vital links between these habitats and alter the natural dynamics of the river through shoreline-stabilization techniques that restrict natural interactions between aquatic and terrestrial environments. Riverfront development also tends to increase impervious surfaces, which can overburden combined water treatment systems and pollute the river. With the additional risks associated with climate change, a long-term stewardship approach that preserves habitats and natural water flows is a critical component of responsible riverfront development.

An important component in safeguarding the quality-of-life values of the Hudson riverfront is protecting the shoreline itself, conserving the plants and animals that call the waterfront home, and sustaining the quality and natural processes of the river and its surrounding watershed. The condition of the lands within the Hudson River watershed, both bordering and away from the river, also determines their ability to provide services that sustain a healthy Hudson River ecosystem, such as the regulation of sediment and nutrients in the tributaries and main stem of the river, and the quality of water entering the Hudson.

To protect natural resources, we advocate the following:

**A. Protect, Restore, & Rehabilitate Wildlife Habitat**
**B. Protect, Restore, & Rehabilitate Natural Shorelines**
**C. Protect & Restore the Quality & Ecological Function of Water Resources**

# A. Protect, Restore, & Rehabilitate Fish & Wildlife Habitat

Riverfront planning and development should strive to protect, enhance, and restore an interconnected network of wildlife habitat. Many of the species that live in and along the Hudson's shores rely on multiple habitats—often both aquatic and terrestrial—requiring intact links between upland areas, the riverbanks, and the river channel itself. For example, many turtles feed in the Hudson's freshwater tributaries, lay eggs in a bare part of the shore, winter in small inland ponds, and travel to the river via forest paths. Several wading and migratory bird species use the shoreline in similar ways. The Hudson's oceangoing fish—like American shad, alewives, and American eels—migrate up the river and into its freshwater tributaries, requiring healthy shorelines and stream systems throughout their journey. Establishing strategies for conserving the connectivity and health of riverside habitats requires a comprehensive approach that is best addressed early in the design process of any waterfront development effort.

## STRATEGIES

**1. Conduct a natural resource inventory**. A community that knows its natural resources can better balance development with conservation. A complete natural resource inventory should seek to describe the biological community that utilizes the shoreline as habitat, as well as the physical setting and changes that may occur over time. Long- or short-term changes may include sediment erosion and deposition, declining native species, or colonization by invasive species. Natural resource inventories should identify ecologically significant areas, including the occurrence of rare and endangered species that may be affected by development, current and future wetlands, and opportunities for linkages to upland habitat areas. This work is an essential part of preparing any waterfront plan, such as a LWRP.

Fortunately, there is a wealth of ecological expertise to draw upon in the Hudson Valley, including:

- NYSDOS, which provides maps and descriptions of the state's designated Signficant Coastal Fish and Wildlife Habitats. (www.nyswaterfronts.com)
- NYSDEC's Hudson River Estuary Program, which provides technical support through its staff and partner organizations. (www.dec.ny.gov/lands/4920.html)
- NYSDEC's Natural Heritage Program, which tracks federal- and state-protected species as well as additional species that have been identified as at-risk or rare by biologists. (www.dec.ny.gov/animals/29338.html)

**2. Protect threatened, endangered, or regionally rare species, habitats, and ecological communities.** Conserving plant and animal species vulnerable to extinction (described as threatened or endangered) and regionally rare species should be a priority in any waterfront development. By making ecologically informed development decisions, waterfront municipalities can help stop the decline in biodiversity along and in the river. The NYSDEC Natural Heritage Program has identified the entire Hudson River estuary as a Tidal River Significant Natural Community. This designation applies to natural community types in the state that are rare or of high quality. These designated areas also may provide habitat for rare species of plants and animals. It is important to remember that many sites along the river may not host any rare or imperiled species, which makes conserving those sites that do even more important for the health of the Hudson Valley.

Least bittern (*Ixobrychus exilis*), seen here in a Hudson River marsh, is a NYS Threatened species.

Certain natural resources that are important contributors to the ecosystem's quality and biological diversity have been specifically identified by the state for protection. These include regulated tidal and freshwater wetlands; designated Significant Coastal Fish and Wildlife Habitats; and rare, threatened, and endangered species. In addition to these discrete, high-priority natural resources, the quality of an ecosystem depends on more common, broadly distributed resources such as unfragmented habitats and water quality.

Species in the Hudson River may be identified and legally protected as threatened or endangered under the federal Endangered Species Act (ESA) or the state Environmental Conservation Law (ECL). There are important differences between these two laws in the criteria they apply for determining threatened/endangered status and the degree of protection they provide for species. One product of these differences is that many species protected under the ECL are not protected under the ESA. Moreover, in addition to these two species-protection laws, the NYSDEC Natural Heritage Program tracks species that have been identified as at-risk or rare by biologists but have not been formally listed under the federal or state laws.

Globally rare freshwater tidal swamp and other rare habitats at RamsHorn Marsh in the Town of Catskill.

To best navigate these overlapping levels of protection, we strongly recommend contacting the Heritage Program for guidance in determining if a development site harbors rare or endangered species, as well as visiting the NYSDOS Web site for maps and narratives related to state-designated Significant Coastal Fish and Wildlife Habitats along the Hudson River. Both agencies also can provide information to assist in evaluating the impacts of proposed activities on species' persistence or habitat quality.

### *Tools & Techniques*

Protect ecologically significant areas in the greenway corridor by limiting activity in adjacent areas to compatible low-impact uses such as parks and nature trails. In particular, protect designated Significant Fish and Wildlife Habitats from uses that would diminish habitat values or significantly impair habitat viability.

Conserve natural ecological communities, avoiding significant adverse physical loss, degradation, or functional loss of ecological components such as species, habitats, and natural functions.

Avoid fragmentation of natural ecological communities and maintain corridors between ecological communities.

Conserve areas that support important nesting or feeding sites, perches, and other wildlife shelter. When possible, this includes the conservation of dead trees.

Retain and add indigenous plants.

Conserve snags, rocky shoals, and other in-water natural features.

Where appropriate, allow natural accumulation of wrack (natural debris).

**3. Protect and restore wetlands.** The Hudson River shoreline contains numerous tidal salt and freshwater wetlands supporting a diversity of vegetation and wildlife. By serving as filters and sediment removers, wetlands improve the Hudson's water quality. Wetlands are areas of high biodiversity and environmental function providing reproductive, forage, and refuge habitat for many species of birds, fish, reptiles, amphibians, and invertebrates. Protecting wetlands of all types and sizes, and maintaining their connections to the estuary and upland habitats, is critical to preserving their ability to make important contributions to the entire estuary ecosystem. This consideration may be especially important in conserving areas for the upland movement of tidal wetlands due to projected sea-level rise.

View of tidal marshes in Piermont from Tallman Mountain.

### *Tools & Techniques*

To protect wetland values, provide and maintain adequate buffers between wetlands and adjacent or nearby uses and activities.

- Prevent the loss of vegetated wetlands by avoiding fill or excavation. Subject to the U.S. Army Corps of Engineers, NYSDEC, or other regulatory jurisdiction, and where fill is unavoidable, minimize adverse impacts by using best construction practices and/or by providing for compensatory mitigation measures.
- Restore wetlands wherever practical to foster their continued existence as natural systems.

**Federal law**: Section 404 of the Clean Water Act regulates the placement of dredged or fill materials in waters of the United States, including wetlands. Activities such as fill for development, road construction, or excavation may be subject to federal permit requirements if they will impact wetlands that meet criteria for soils, vegetation, and hydrology. The U.S. Army Corps of Engineers conducts or verifies jurisdictional determinations and administers permit applications.

**NYS law**: A permit is required for any proposal to drain, dredge, excavate, fill, build a structure or obstruction within, or otherwise disturb a NYSDEC-designated freshwater wetland and the 100-foot buffer surrounding it. A DEC-designated wetland is 12.4 acres or larger, or has been specially designated because of a unique feature, such as the presence of endangered or threatened species.

**Local protections**: Municipal ordinances can extend wetlands protection below the state's 12.4-acre threshold and include seasonal and intermittent wetlands (such as vernal pools). This option is especially important given that many, if not most, wetlands are below the NYSDEC-designated minimum size mentioned above. At this writing, at least 16 Hudson Valley municipalities have enacted local wetland protection ordinances, including the Town of Hyde Park, Town of Cortlandt, Town of Fishkill, Village of Irvington, Town of Ossining, Town of Philipstown, and Town of Poughkeepsie. Some of these ordinances protect wetlands of any size, effectively including small but ecologically valuable wetlands in their planning processes.

**Constructed wetlands**: To recover the vast acreage of wetlands lost to development and agriculture, manmade wetlands can be designed for multiple uses, including stormwater management, recreation, and habitat. Created wetlands are inferior in many respects to natural wetlands. Therefore, preventing the loss of natural wetlands should be a priority. Only when such losses are truly unavoidable should created wetlands be considered.

**4. Maintain continuous shoreline habitats and their connections to inland habitats.** The continuity and connectivity of shoreline habitats is critical for preserving wildlife in the Hudson Valley. Many species rely upon both river and upland areas to survive and reproduce. Maintain corridors of continuous green space that connect vegetated riverbanks with upland parks and forests, meadows, lakes, and wetlands.

### *Tools & Techniques*

**Maintain shoreline connectivity**: Access points and greenway uses should be strategically sited to minimize disruptions to shoreline connectivity both along the river and to upland habitats.

Habitat corridor connecting the river's edge to tidal marsh, floodplain, forest, and upland forest on the hills and ridgeline above.

**Maintain shallow slope shorelines***:* Shorelines with shallow slopes dissipate wave energy, facilitate plant and animal migration between the river and land, and protect the capacity for shallow water and intertidal areas to migrate inland in response to rising sea levels.

**Wildlife underpasses***:* These can be constructed when major infrastructure creates an unavoidable barrier to wildlife movement. Consideration should be given to which species require passage, since this will influence underpass size, shape, and the amount of day-lighting required. Note that underpasses can create other management challenges, including elevated predation levels of animals moving through them. Avoiding the disruption of wildlife movement along established corridors is preferable to an engineered solution.

Shallow slope shoreline at Four-Mile Point Preserve, Coxsackie.

**Low-profile curbing***:* In areas of low traffic volume (20 or fewer vehicles per hour), it is preferable to allow wildlife to cross roadways. Vertical curbing can impede the movement of small animals. Eliminating curbing or creating gently sloped curbs at a 4:1 ratio will facilitate wildlife passage.

**5. Rehabilitate or restore riverfront habitat.** The process of identifying and preparing suitable sites for waterfront development presents an excellent opportunity to restore habitat. Rehabilitation/restoration opportunities along the riverfront might include removing contaminated soils on former industrial sites or along railroad rights-of-way, and using shoreline stabilization techniques (described in Section B of this chapter) to produce naturally vegetated shorelines. To identify opportunities for habitat restoration, include an ecologist or restoration professional in the design team at the project's outset.

### *Tools & Techniques*

Identify and mimic the physical and biological structure of naturally existing habitats to serve as models for restoration design. Reference historical data to understand how the site may have looked and functioned prior to construction of seawalls and other riverfront structures.

Where practicable, remove manmade barriers such as dams, ditches, and other structures to reestablish natural drainage and wildlife-movement patterns along the shoreline, up tributaries, or into adjacent habitats.

Refrain from adding structures in the water that would alter patterns of deposition and erosion, having adverse effects downstream.

Preserve a mix of shaded water and open water typical along the Hudson River.

Monitor and evaluate whether restoration efforts are achieving desired conditions; if not, modify the approach, especially where human activity will continue to change the site.

Plan and time construction to permit wildlife passage across or around new development.

**6. Minimize impacts from human use in wildlife restoration areas.** Protecting and restoring habitat while providing public access to the river is a challenging but necessary component of riverfront development. However, with foresight and careful management it can be accomplished.

*Tools & Techniques:*

Site walking trails and river access points in shoreline areas with rocky shorelines or unvegetated beaches that can withstand frequent pedestrian traffic. Shoreline areas with loose, unconsolidated soils and delicate plant species should be avoided as much as possible.

Provide public signs and outreach materials that educate the public about sensitive locations and their important environmental functions.

Involve community groups as "shoreline stewards" to help maintain and protect sensitive shoreline habitats.

**7. Avoid actions that harm submerged aquatic vegetation:** Plants that live underwater immediately along the shoreline are critical to the ecology of the Hudson River. No structures should be built over this submerged aquatic vegetation (SAV). Likewise, swimming and boating activities should be directed away from SAV beds to minimize impacts. Hardened, highly reflective shoreline treatments like sheet pile should not be built near SAV beds, as they direct wave energy downward and wash away nearby sediment.

Submerged aquatic vegetation at Tivoli Bay.

**8. Limit pollution and ecological impacts associated with landscape design and management.** The selection of plants, construction methods, and landscape-management practices can have significant impacts on wildlife, including the proliferation of invasive species, excess nutrients from fertilizers, and pollution from pesticides.

*Tools & Techniques*

Whenever feasible, choose native Hudson riverfront plant species in naturally occurring combinations that are adapted to local conditions and require little or no fertilization. In some cases, non-native plants that provide functions similar to native species might be considered, but this is not preferable.

Use "integrated pest management"—a technique relying upon biological and mechanical methods—to control insects with reduced pesticides. (www.epa.gov/pesticides/factsheets/ipm.htm)

Use compost instead of chemical fertilizers. This also limits excess nutrients from flowing into the river.

Include clover or native grass species (instead of horticultural varieties of grass) as a ground cover on embankments to stabilize soils and limit excessive nutrients from flowing into the river.

**9. Employ lighting that reduces impacts on wildlife.** Artificial lighting can disorient animals, disrupt the flowering cycle of plants, and diminish enjoyment of the riverfront, including the nighttime sky. (See Chapter VI)

**10. Promote public awareness and involvement.** Public participation in—and understanding of—habitat conservation and restoration projects increases the likelihood of successful wildlife protection. Well-informed citizens are better equipped to support project design that achieves both conservation and development goals. They also may be willing to serve as stewards of wildlife areas and restoration sites.

### *Tools & Techniques*

**Communications**:

- Organize information-sharing forums between local residents and the scientific, advocacy, development, and regulatory communities.
- Announce the restoration project well in advance of construction.
- Create and post well-designed interpretive signs explaining the construction timeline and the project's purpose.

**Direct engagement**:

- Encourage and provide for low-impact public recreation at restoration sites—fishing, kayaking, hiking/bicycle trails, wildlife-observation posts, school field trips, guided walks.
- Train local volunteers to lead walks, give talks, and teach about birding, animal tracks, seasonal migrations, etc.
- Organize community-based plantings and cleanup days.

Children enjoying the river while learning about nature.

## B. Protect, Restore, & Rehabilitate Natural Shorelines

The Hudson River is a productive and dynamic estuary whose shorelines provide important habitat and migration zones between river and land for many species. The Hudson also is a high-energy river. The constant flux of tides, ship wakes, wind-driven waves, storms, and ice scour inflict strong stresses that shape the main channel, shoals, and shorelines. Much of the natural shoreline is characterized by exposed bedrock or unconsolidated boulders and cobblestones. The majority of erosion-vulnerable sites on the river are areas where manmade filling has occurred, altering the river's natural pathway. Conventional riverfront development planning often focuses on human activity alone, restricting important hydrologic processes, decreasing habitat, and diminishing visual character. Working "with the river" to protect and enhance the biological and structural integrity of the shoreline is an essential component of responsible waterfront development, especially with the increasing flood risks associated with global climate change.

There are many policies in the NYSDOS Coastal Management Program and LWRPs that call for protecting natural resources, including:

- The protection, preservation, and (where practical) restoration of Significant Coastal Fish and Wildlife Habitats and tidal and freshwater wetlands.
- The restoration and stabilization of shorelines to reduce flooding, erosion, and damage to natural resources, perferrably using non-structural measures.
- The siting of buildings and other structures in the coastal area in ways that minimize damage to property and endangerment of human life caused by flooding and erosion.
- Employing best practices in controlling stormwater run-off, combined sewer overflows, and non-point pollution.

### STRATEGIES

**1. Identify shoreline conditions, suitability, and local priorities for shoreline uses.** Assessing shoreline conditions and identifying local priorities is an important step to determine the appropriate places for desirable uses along the riverfront. Each site will have a unique set of physical and biological characteristics that require consideration in deciding a riverfront's future. Table 1 (on the following page) describes three typical shoreline conditions based on slope and composition, factors that directly influence habitat value and suitable uses. A riverfront project area may encompass more than one of these conditions. As a guiding principle, strive to minimize human impairments to natural systems.

#### *Tools & Techniques*

Assess existing shoreline conditions, including riverbank form, sediment stability, plant and animal communities, and sediment size and composition.

Through community outreach, identify desirable shoreline uses. This may include water-dependent uses, water-enhanced uses, and habitat protection or restoration.

Identify shoreline types (natural and engineered) that are compatible with uses desired by the community as well as areas that are needed to maintain natural resources.

Steep riverbank slope.

Moderate riverbank slope.

Shallow riverbank slope.

## TABLE 1: TYPICAL HUDSON RIVER SHORELINE CONDITIONS

| | Steep Riverbank Slope | Moderate Riverbank Slope | Shallow Riverbank Slope |
|---|---|---|---|
| **Description** | Greater than a 45-degree slope (1:1 ratio) to a vertical wall, solid and rigid, usually adjacent to deep water. No aquatic vegetation. Able to withstand strong erosive forces such as high waves and wind. Does not usually incorporate use of vegetation on upland side of shoreline. | An 18- to 45-degree slope (3:1 to 1:1 ratio), usually adjacent to intertidal, shallow, or deep water. Intertidal zone near or on shore. Consists of coarse sediments; usually large, heavy rocks; or engineered materials to provide structural stability. Sometimes mixed with soils and woody vegetation. | Less than an 18-degree slope (3:1 ratio). Long, shallow slope allows maximum dissipation of wave energy. Consists of fine sediments from mud to sand or gravel. Terrestrial and aquatic plants are important for stabilizing sediments. Usually exists in lower wave energy locations, including sheltered areas protected from large fetch, ice flows, and boat and ship traffic. |
| **Habitat Value** | ***Poor.*** Tends to lack structural complexity with little or no refuge for small fish or invertebrates. Animals that migrate from the aquatic to the terrestrial environment have difficulty scaling a vertical wall. No intertidal zone. No opportunity for shallows or wetlands to migrate inland with rising sea level. | ***Fair to Good*** (site dependent). Slope allows wave energy to dissipate. Often has structural complexity that provides micro-habitats for fish, invertebrates, and plant species. Migration between aquatic and terrestrial environment possible for some species. Presence of vegetation can enhance habitat value. | ***Good.*** Depends on species and presence of vegetation or other structural elements. Shallow slope provides for largest shallow water and intertidal area that is used by a variety of plants, fish, and wading birds. Best for wetland migration into adjacent upland areas during sea-level rise. |
| **Natural Examples** | Bedrock. | Coarse-grain sediment, unconsolidated rock, sometimes mixed with woody vegetation. | Vegetated or unvegetated sandy or gravel beaches, intertidal mud flats, and rocky shore. |
| **Engineered Examples** | Sheet pile, concrete seawalls, timber bulkheads. | Rock riprap revetment or soft engineered mix of stabilizing structure and vegetation.<br>*NOTE: The bio-engineering techniques described in this chapter may be applicable in moderate slopes.* | Restored beaches with plantings using native aquatic and terrestrial plants, and geotextile fabric to stabilize soils. |
| **Suitable Shoreline Uses** | Many water-dependent and water-enhanced uses (see Ch. II)<br>• Marinas<br>• Ferry landings<br>• Waterfront esplanades<br>• Riverfront with upland activities<br>• Shoreline fishing<br>• Parks | Some water-dependent uses (see Ch. III) including:<br>• Potential habitat restoration<br>• Riverfront with upland activities<br>• Waterfront walkways with limited water access<br>• Fishing<br>• Parks | Some water-dependent uses (see Ch. III) including:<br>• Habitat restoration<br>• Passive recreation, including parks<br>• Active recreation, including parks<br>• Swimming areas<br>• Non-motorized boat launches<br>• Fishing |

NOTE: Installing engineered shoreline protection/stabilization measures such as bulkheads in shallow or intertidal areas is generally not recommended and in some cases may not be permitted. Vertical structures often reflect wave energy downward, causing scouring and eventual loss of intertidal and shallow habitats adjacent to the shoreline.

**2. In all areas of the greenway corridor, where site conditions allow, maintain a mostly vegetated greenway along the river that extends to the 100-year floodplain boundary OR 100-feet from the mean high-water line, whichever is greater. In these areas, leave an intact vegetated buffer of varying plant species and heights along the shoreline.** Natural shoreline buffers should include woody and herbaceous plants and decomposing leaves and logs in the understory of intact forest. In areas where there is less than 100 feet of greenway remaining, restoration and enhancement of the area is important to improve water quality and habitat protection.

Greenway with a vegetated shoreline and soft path treatment.

*NOTE*: To balance shoreline stabilization and wildlife needs with public access to the river, identify strategic opportunities—naturally occurring bedrock and beaches, boat launches, fishing piers, and docks near municipal centers—for direct contact with the Hudson.

**3. Protect floodplains.** Floodplains are critical to the Hudson River shoreline. In addition to supporting rich ecosystems, they absorb the periodic and natural flooding of rivers and streams, protecting communities and infrastructure. Such flooding is expected to increase with climate change.

To avoid conflicts between human uses and important flood-storage functions, development in or near floodplains—especially near confluences where tributaries meet the Hudson—should be minimized and designed to accommodate periodic flooding. Some examples of significant confluence zones include Albany/Troy (Mohawk River), Beacon (Fishkill Creek), Catskill (Catskill Creek), New Hamburg (Wappinger Creek), and Port Ewen and Kingston (Rondout Creek).

### *Tools & Techniques*

Site critical infrastructure—such as wastewater treatment plants and major transportation routes and facilities—out of and sufficiently above the 500-year floodplain.

Locate all non water-dependent uses above the 100-year floodplain as defined by the Federal Emergency Management Agency (FEMA).

In anticipation of floodplain elevations rising due to climate change and land development patterns, consider updating municipal Flood Damage Prevention laws by adopting local floodplain and flood way regulations even stricter than minimum FEMA requirements. For example, municipalities should consider establishing a Flood Damage Prevention overlay zone that limits development within a locally appropriate elevation above the existing 100-year floodplain designation.

Within the floodplain, ensure that structures are flood-resilient by constructing them of materials that can withstand periodic inundation or by elevating them above the the base flood elevation.

Turf playing fields in a greenway are resilient to occasional flooding.

**4. Whenever possible, rehabilitate or restore shorelines using permeable, vegetated stabilizing techniques.** Conventional river-shoreline stabilization, such as seawalls and vertical sheet pile, rely upon materials and techniques that harden the riverbank, reduce wildlife habitat, and degrade scenic character. New techniques—called "bio-engineering" or "soft riverbank stabilization"—combine manmade materials with vegetation, resulting in riverbank structures that control erosion, absorb floodwaters, and are aesthetically appealing. These techniques also tend to promote structural complexity, creating habitat for small aquatic and terrestrial organisms.

Installed vegetated shoreline stabilization treatment with native plant species, biodegradable soil bags, and a sloped shoreline.

### *Tools & Techniques*

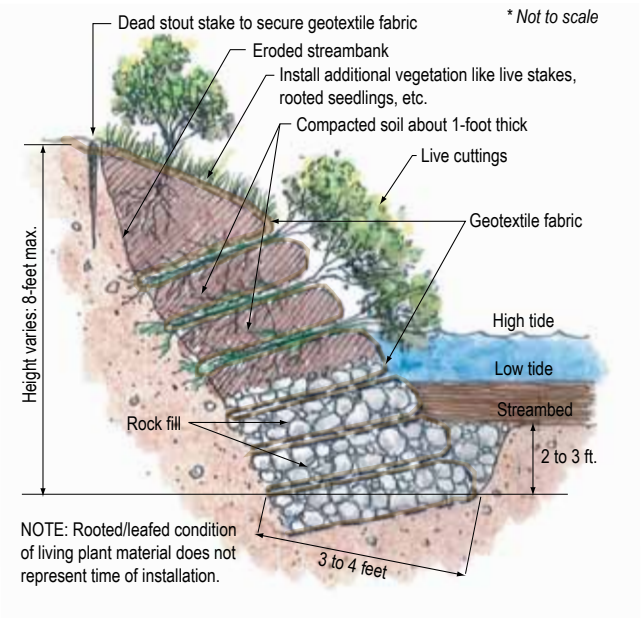
**Slope***:* Whenever possible, maintain a sloping shoreline to create an intertidal zone that dissipates wave energy, allowing for upland and aquatic vegetation and migration of animals between river and land.

**Reference site***:* Identify a nearby site with natural, stable shoreline conditions to use as a reference for shoreline restoration planning.

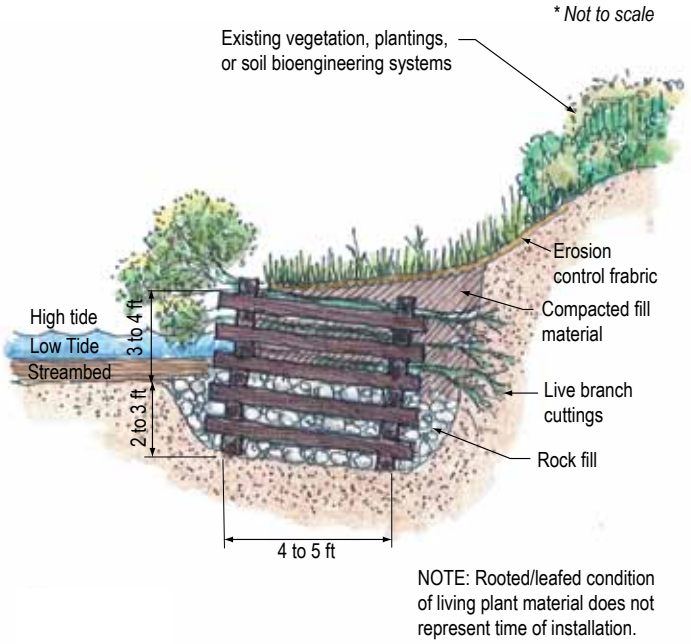
**CLIMATE CHANGE ADVISORY**: Sea-level rise and heightened storm surges need to be considered when stabilizing shorelines, including planning for periodic upgrades and maintenance.

**Bio-engineering***:* Several bio-engineered shoreline techniques have been used in riverine systems. Each has unique structural characteristics and needs to be evaluated by an engineer familiar with bio-engineering of shorelines and the Hudson River's estuarine environment to determine if it would provide adequate stability for a given site. Based on an analysis of Hudson River shoreline stabilization alternatives commissioned by the NYSDEC Hudson River Estuary Program, the following are some proposed bio-engineered shoreline construction techniques that may be suitable for Hudson riverfront communities.

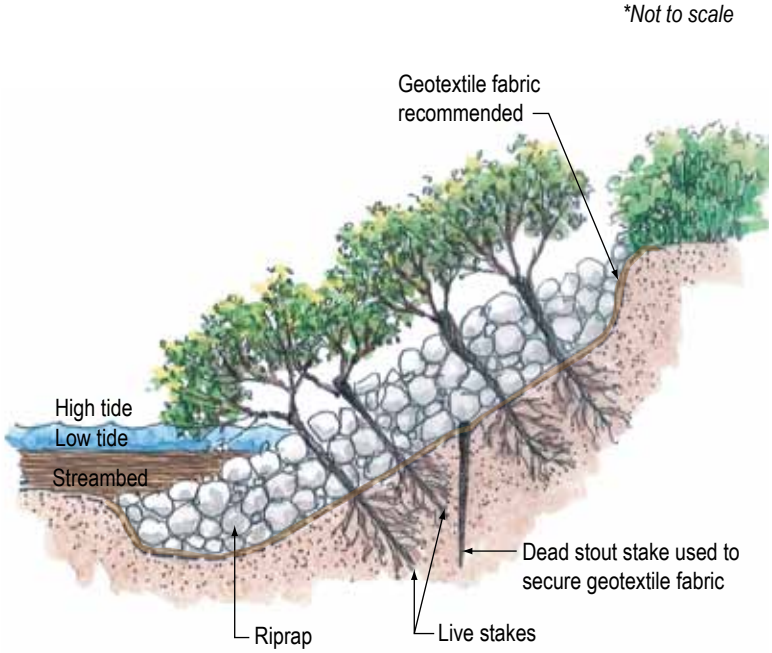
*Vegetated geogrids:* Brush layering with each soil layer wrapped in a geosynthetic material.



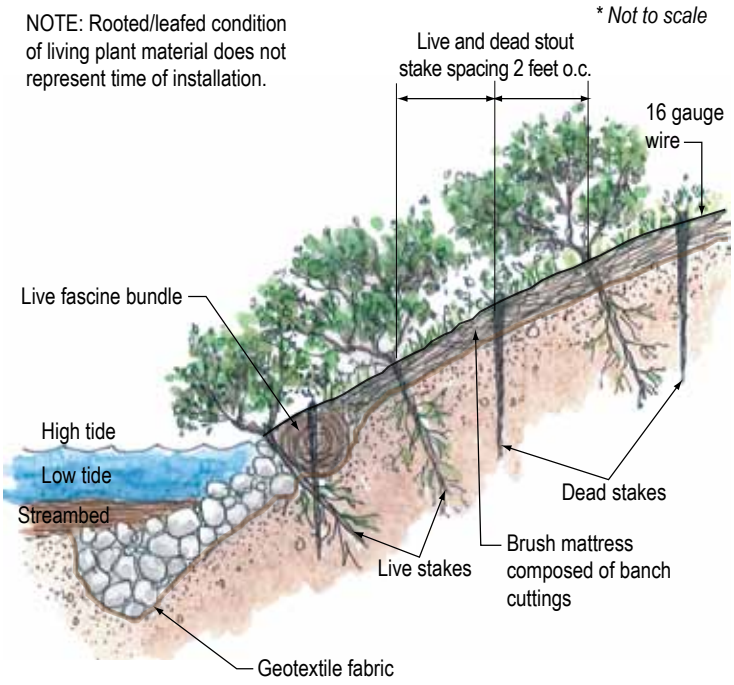
*Live crib wall:* A box-like arrangement of interlocking logs, timbers, precast concrete, or plastic structural members. The crib is filled with layers of backfill and live cuttings that root inside the crib and beyond into the slope.



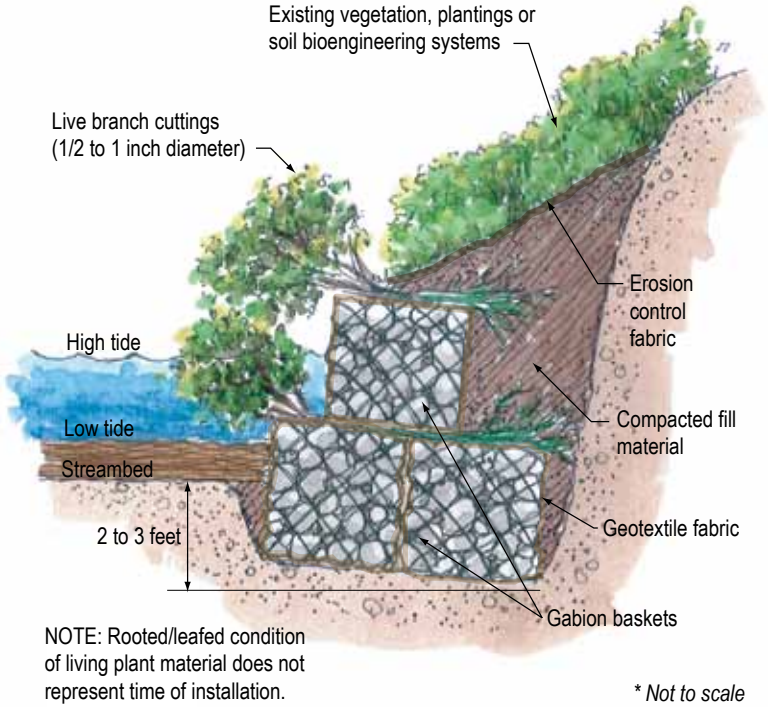

*Joint planting:* Riprap with live stakes tamped into the joints between the rocks.



*Brush mattresses:* Live cuttings with branches on the slope with butt ends keyed into toe protection. The branches are layered in a criss-cross overlapping pattern held in place by dead stout stakes and wire.




*Vegetated rock gabion wall:* Gabion baskets made of welded or twisted wire tied together and filled with rock. The baskets are stacked like bricks with a layer of soil and branch cuttings between each course of baskets.




(Similar to a rock gabion wall, a ***vegetative rock gabion mattress*** is stacked to match the existing slope of the bank. Live cuttings are tamped between gabion baskets.)

**5. When building structures along the shoreline, use techniques that protect and restore habitat and can withstand periodic flooding.** If it is determined that a water-dependent use requires a structure located on the shoreline, design and material choices can minimize its impacts to natural habitats.

### *Tools & Techniques*

Avoid hardened seawalls and, if feasible, use bio-engineered or vegetative shoreline stabilization methods.

Design piers and in-water structures with:

- Rough-textured surfaces to which shellfish and algae can attach.
- Materials with pockets and voids of various sizes in which fish, crabs, shrimp, and other aquatic animals can take shelter.
- Gaps and openings allowing light to penetrate the water.
- Wood that has not been pressure-treated with chemicals, such as sustainably harvested hardwoods that are naturally rot-resistant or new types of treated lumber that use non-toxic methods to increase rot resistance.

Reduce impermeable surfaces by using permeable paving materials and other low-impact development techniques described in Section C of this chapter.

Reduce fertilizer, herbicide, or pesticide use near the river by designing landscaping with native species that are adapted to riverfront habitats.

# C. Protect & Restore the Quality & Ecological Function of Water Resources

The types and patterns of land use along the river and within the entire Hudson River watershed determine the ecosystem's ability to provide services that sustain human and natural communities alike, including the recharge of groundwater, maintenance of wetland and stream hydrology, the delivery of sediment and nutrients to the tributaries and main stem of the river, and the purification of water entering the Hudson. To protect the water resources we all depend on, communities need to manage land uses and employ best management practices to minimize or eliminate any adverse impacts of development, particularly the contaminants carried by stormwater run-off. This includes controls on new impervious surfaces—like roads, parking lots, sidewalks, and roofs—that prevent water from percolating into the ground, having major impacts on water quality. The basic objective of low-impact development techniques (also known as better site design) is to minimize impervious surfaces and manage stormwater on-site, instead of conveying it to drains, ditches, and culverts flowing directly to local surface waters like the Hudson River, or to overburdened wastewater treatment plants. Low-impact development techniques can reduce wastewater overflows by infiltrating stormwater into the ground, while recharging aquifers and reducing local flooding.

## STRATEGIES

**1. Site projects in or adjacent to downtowns or municipal centers and away from natural areas.** Promoting appropriate riverfront development while preserving surrounding natural areas is a critical first step in protecting water resources. Land-use planning tools such as Comprehensive Plans, LWRPs, local laws, ordinances, and zoning can be used to promote this regional approach to siting new development.

### *Tools & Techniques*

**Identify and map critical water resources and adjacent ecologically sensitive areas**. Use the best available information and technology, including geographic information systems (GIS), to map areas that provide important water quality benefits. These include stream corridors and buffers, floodplains, wetlands, intact forests, important biodiversity areas, and steep slopes. Ensure that this information is used in planning decisions and that areas where natural hydrologic conditions, watercourses, and drainage systems exist are preserved.

**Conservation Overlay Districts**: A Conservation Overlay District can add standards to a zoning law for protecting important natural resources such as biodiversity areas, steep slopes, wetlands, floodplains, stream corridors, or intact forests.

**Watershed plans**: Develop or participate in a watershed management plan with neighboring municipalities. Both the NYSDOS and NYSDEC Hudson River Estuary Program can provide funding and technical assistance in creating inter-municipal strategies for conserving tributary watershed resources. The NYSDOS also has developed a guidebook on preparing and implementing watershed management plans, available at www.nyswaterfronts.com. See also www.dec.ny.gov/lands/5098.html.

**2. Incorporate low-impact techniques in new development and existing sites.** Where natural drainage systems are not capable of handling the anticipated run-off from a site, develop open, vegetated drainage systems that store, reduce, and filter run-off. These strategies can reduce the costs of construction and long-term maintenance while providing numerous environmental and aesthetic benefits. Many can be implemented as retrofits in existing sites and neighborhoods. Some may require code revisions (see below).

### *Tools & Techniques*

**Local vegetated riparian and littoral buffers**: Shorelines and tributaries should have intact, vegetated buffers that stabilize soil and enhance filtering capacity.

**Vegetated swales**: Instead of buried pipes, curbs, and gutter systems, use vegetated channels or swales to capture and filter run-off.

**Design parking islands as bioretention areas**: Lower the elevation of the islands; grade parking areas carefully (and use curb cuts if necessary) so run-off can drain into the islands and percolate into the ground.

**Create buffers and filter strips**: Preserve buffers and incorporate vegetation adjacent to impervious areas to intercept stormwater run-off and filter pollutants. This is especially important along streams, wetlands, and other water bodies.

**Rain gardens/bioretention areas**: Install rain gardens in street islands, intersections, and landscape areas. These well-drained, vegetated areas treat stormwater, replenish groundwater, beautify the landscape, and attract birds and butterflies.

A vegetated buffer strip along a street allows infiltration of stormwater.

**Green roofs***:* In addition to reducing stormwater run-off, these specially designed roofing systems increase building insulation and energy efficiency. They are often vegetated, which provides wildlife habitat and helps keep urban centers cooler.

**Rain barrels**: Placed above or below ground, rain barrels or cisterns can be used to capture roof run-off from new and existing buildings. The water can be reused for irrigation as well as toilets. (See Ch. I/B for more on rainwater reuse)

**StormChambers**: Typically much larger than rain barrels or cisterns, stormwater chambers are open-bottomed, below-ground collection containers that can be placed below parking lots or lawns near impervious surface. They allow water to slowly infiltrate the ground near the construction site, instead of quickly running off into waterways or municipal stormwater systems.

**Native plants**: Use trees, shrubs, grasses, flowers, and ground covers that are indigenous to the Hudson riverfront and adapted to climatic conditions. These can eliminate or reduce the need for irrigation, chemical fertilizers, and pesticides. Eliminate or minimize the use of herbicides to control weeds.

A rain garden as part of a vegetated swale effectively manages stormwater.

Vegetated green roofs save energy and reduce stormwater run-off.

**3. Modify existing regulations and plans to incorporate low-impact development practices.**

*Tools & Techniques*

**Pollution-prevention policies and plans**: Assess existing municipal programs and practices for their effectiveness in controlling nonpoint source pollution to waters and identify opportunities for modifying existing local laws and practices. Identify and address sources of additional contaminants that contribute to pollution and degrade water resources. (Agencies including the Planning Department, Health Department, Soil and Water Conservation District, and Cornell Cooperative Extension in your county may have useful information on these issues.)

**Local code review and revisions**: Identify codes that can be reviewed and revised by in-house staff or consultants, or draw upon available training and technical-assistance resources. In the towns of Clinton and Wappinger (both Dutchess County), local officials worked with the NYSDEC Hudson River Estuary Program to review and recommend specific code revisions designed to support low-impact development practices. In addition to the regulatory policies listed above in this chapter, the following are selected examples of key areas where local codes may require updates to support implementation of low-impact development techniques:

Permeable paving of parking swales.


Permeable asphalt treatment of parking stalls.

Constructed wetland wastewater treatment facility at Omega Institute in Rhinebeck.

- *Stormwater management*: Adopt a comprehensive local stormwater law that utilizes the techniques outlined in this chapter.
- *Wastewater treatment*: Encourage evaluation and implementation of alternative, innovative on-site wastewater treatment systems to remediate systems that do not adequately treat waste.
- *Groundwater*: The cumulative effects of development and impervious surfaces can impact groundwater recharge, and deplete existing potable water supplies and the base flow in streams needed by fish and wildlife. Ensure that zoning and design reviews protect groundwater recharge areas, base flows to streams and wetlands, and restrict water supply use or withdrawals to levels compatible with the recharge of aquifers.
- *Road widths*: Roads comprise the single largest component of new impervious area in many developments. Many municipalities may require minimum road widths of 26 feet or more. But for low-volume local roads, 18 to 22 feet is adequate. Use guidance from the American Association of State Highway and Transportation Officials (www.transportation.org) and other sources to minimize road width consistent with safety and other goals.
- *Parking area design*: Reduce parking lot size by requiring efficient layouts with reduced stall sizes and aisle widths, angled parking, and one-way aisles (see ***Model Zoning Regulations for Parking,*** Northwestern Connecticut Council of Governments, 2003; www.fhiplan.com/PDF/NW%20Parking%20Study/NW%20Connecticut%20Parking%20Study%20Phase%202.pdf). Allow shared-use agreements for parking areas. Require pervious materials for overflow parking areas and landscaping that incorporates stormwater treatment.

- *Permeable paving*: Permit or require use of permeable paving systems that allow stormwater to percolate directly into the ground. Make sure a winter de-icing maintenance agreement precludes the use of sand, which will clog up the pores of permeable paving material. Also ensure that salt applications will not affect groundwater wells.
- *Tree protection*: Require surveys of existing trees at proposed development sites to maximize protection during design and construction. Maximize undisturbed areas around existing trees (at least to the outside of the tree canopy) during construction to prevent soil compaction and root damage, which results in tree damage or death. Develop long-term tree care and maintenance programs.
- *Plant selection*: Prohibit planting of invasive species and require landscaping plans to utilize native vegetation appropriate for site conditions. (See ***Native Plant Guide for Stormwater Management Areas*** and other information from NYSDEC and NYS Department of Transportation.)

**4. Retrofit and maintain existing neighborhoods using low-impact development techniques**.

*Tools & Techniques*

**Community revitalization and infrastructure plans**: Adopt low-impact development design principles when revitalizing main streets and other areas. Incorporate principles in capital plans and designs for transportation and drainage infrastructure such as park-and-rides, drainage upgrades, and any projects involving roads and parking.

**Maintenance programs**: Establish long-term, sustainable maintenance, repair, and replacement plans.

**Training**: Provide training for maintenance staff, contractors, groundskeepers, and others involved with maintaining roads, parking, stormwater systems, landscaping, and other public infrastructure.

**Coordination**: Build relationships to ensure coordination between highway and public works officials, planning boards, planning consultants, utilities (e.g., energy, telecommunications, and water companies), commercial and multi-family property owners, and other stakeholders involved in infrastructure planning and maintenance.

**5. Minimize soil and slope erosion.** NYSDEC requires most construction sites to have an erosion-control plan during the construction period. Larger projects also must incorporate permanent stormwater-treatment practices.

*Tools & Techniques*

**Employ best practices**: Follow NYSDEC guidance, including the ***Stormwater Management Design Manual***, for design, installation, and maintenance of erosion-control practices. Divert water around disturbed areas on construction sites to prevent soil erosion from occurring. Site gently graded paths and roads parallel to contours instead of constructing steps and steep paths running straight down slopes. Use terracing to allow infiltration and prevent water from carving new drainage channels. Use properly installed erosion-control techniques during construction (silt fence, silt traps, check dams) along with diversion, seeding, and mulching.

**Revegetate**: Maintain vegetation and seed and/or mulch bare soil as soon as possible after grading is complete. Select plants with fine networks of surface roots.

**Adopt local laws**: Adopt a local erosion and sedimentation control law that establishes requirements for assessing and minimizing erosion.

**6. Use professionals experienced with low-impact development.** Many landscape architects have the training to incorporate low-impact development techniques in project designs and can contribute greatly to improving riverfront developments.

**7. Avoid stormwater practices that create risks to amphibians and reptiles.** Many species migrate across landscapes to access their required habitats. For example, amphibians and reptiles require access to vernal (spring) pools for their survival. Sometimes in order to reach their destinations, species must be able to cross streets. Raised curbs inhibit this movement, while other stormwater practices can interfere with water flow and ecological conditions needed for the animals' survival and breeding.

### *Tools & Techniques*

**Vernal pools and other wetlands***:* To maintain seasonal flows into vernal pools, locate stormwater-retention ponds at least 750 feet from pools. Do not site manmade stormwater-management ponds (which can act as "decoy" wetlands for species breeding in natural vernal pools) between vernal pools or along important migration routes used by amphibians. Design stormwater plans to maintain the predevelopment water-flow pattern into vernal pools and other wetlands. Do not use vernal pools or other natural wetlands for stormwater detention or biofiltration.

**Alternative curbs***:* Use curbs that allow small reptiles and amphibians to move safely across paved surfaces. Instead of conventional curbs, use "Cape Cod curbing" or "salamander ramps," or avoid curbs altogether and use grassy swales.

**Hydrodynamic separators***:* These stormwater devices are intended to trap sediment, but they can easily trap and kill amphibians. Avoid or only use them in conjunction with Cape Cod curbing or swales.

**Slope***:* Don't exceed a 1:4 slope for swales or curbs.

**De-icing material***:* Limit use of road salt and other de-icing materials that persist in the environment and change the salinity of groundwater or surface waterbodies.

# CASE STUDY

## Rondout District, City of Kingston

Boaters on Rondout Creek.

The City of Kingston, which completed a Local Waterfront Revitalization Program (LWRP) in 1992, is working to maintain the maritime character of its Rondout District through the preservation of historic architecture as well as by enhancing connections to Rondout Creek and the Hudson River and developing design standards for future growth.

Located on the shore of Rondout Creek, the district contains many buildings reflective of its 19th-century past as a bustling village located at the terminus of the Delaware & Hudson Canal (a street-side sign explains this history). On the west side of Broadway, a main street leading to the creek, historic storefronts of varied heights and colors today contain a lively mix of businesses. Similar structures on the street's east side were demolished in the 1970s and replaced with historically inspired row houses.

A variety of water-dependent and water-enhanced activities attract people to the district. Several Hudson River cruise boats moor at docks on Rondout Creek. The East Strand, running parallel to the creek, is home to the Hudson River Maritime Museum and the Trolley Museum of New York. Both offer rides: the former via boat to the 1915 Rondout Lighthouse in the Hudson River, the latter by streetcar to Kingston Point Park, also on the river. Myriad festivals and events are held at T.R. Gallo Park, alongside the creek. Kayaks can be launched from a city-owned dock on the creek or at Kingston Point Beach, a sandy beach on the Hudson River. Well-maintained sidewalks are provided on all streets, and parking is rarely a problem; a

lot at the foot of Broadway (located away from the creek) provides numerous spaces. Another lot adjacent to the Rondout could be improved with better buffering from the creek.

A decade after completing the LWRP, Kingston officials recognized a need to ensure that future plans for the Rondout District do not erase the past. So the city hired a consultant to help craft a Waterfront Development Implementation Plan with an Environmental Protection Fund (EPF) LWRP grant from NYSDOS for the redevelopment of 60 creek-side acres. After 18 months of workshops and community meetings, the strategy was finalized and adopted by the city's Common Council in 2002. Goals include creating a cluster of small museums, new mixed-use development and relocating remaining non-conforming industries along the creek.

A crucial part of the strategy was to create design standards requiring property owners to: 1) preserve existing trees and vegetation; 2) preserve existing façades of historic structures; 3) cluster buildings in groups to preserve open space; and 4) provide a continuous riverfront pedestrian esplanade the width of the property. The strategy also requires new construction to be in scale and character with existing buildings, and it aims to bring more residents to the district by requiring new structures to contain habitable spaces on second floors. It should be noted that the city planning board has the power to waive any of these standards.

At this time, the creek-side esplanade extends about ¾ of a mile. Strolls along it are no longer marred by the odor from a nearby wastewater treatment plant. Thanks to the city's significant investment in new processing equipment and technology, this problem has nearly been eliminated, marking another step forward in making the Rondout District an exciting destination for visitors and a vibrant place to live.

These photos illustrate historic resources and activities, such as boating, fishing, and festivals, that attract thousands of people to the Rondout District each year.

# V. Protect Scenic Resources

The Hudson River is one of the nation's scenic treasures. Along some stretches, majestic mountains and bluffs rise above the water. In others, forested slopes, estate lawns, marshlands, and farm fields line its banks. Much of these lands have been formally recognized by New York State as Scenic Areas of Statewide Significance (SASS). The Hudson also has been federally designated an American Heritage River and the entire Hudson Valley a National Heritage Area. Municipalities have broad powers to protect scenic integrity, and courts have upheld that safeguarding vistas and aesthetic quality fall under the domain of "protecting the public health, safety, and welfare." Because visual character is intimately linked to the identity of the Hudson riverfront, preserving and enhancing views to, from, and along shorelines is of utmost importance. Development along ridgelines should be avoided and as much vegetation as possible preserved. Where construction is suitable and desirable, buildings should reflect or enhance existing community scale and character. To enhance the river's visual presence from a distance, viewsheds and sightlines to the Hudson should be carefully considered.

Since visual quality contributes greatly to waterfront character, the NYSDOS Coastal Management Program and LWRPs contain policies intended to prevent the visual impairment of scenic areas and natural or manmade resources that contribute to the overall scenic quality of the coastal area.

Protecting visual quality also makes good economic sense. It provides the foundation for the heritage- and recreation-based tourism businesses that contribute billions of dollars to the Hudson Valley's economy.

## STRATEGIES

**1. Protect aesthetic and scenic values associated with the waterfront and any areas designated as Scenic Areas of Statewide Significance.** SASS designation is specifically intended to protect the landscapes' cultural, historic, and aesthetic values. Municipalities with an approved LWRP must ensure their actions (e.g., subdivision approval, rezoning) are consistent with the LWRP, including policies to protect the visual qualities in a SASS. Municipalities without an approved LWRP also can protect their scenic resources through the adoption of local land use laws. To determine if your municipality is in a SASS, see map at right or refer to the NYSDOS Web site www.nyswaterfronts.com.

Recognizing that each development situation is unique, adopt the following siting and facility-related guidelines (found in NYS Coastal Policy 24) and apply them to protect Scenic Areas of Statewide Significance and scenic qualities of other waterfront areas.

- Establish design guidelines to enhance existing scenic characteristics by minimizing introduction of discordant features.
- Site structures and other development back from shorelines or in other inconspicuous locations to maintain the attractive quality of the shoreline and retain views to and from the shore.
- Cluster or orient structures to retain views, save open space, and provide visual organization to a development.
- Incorporate sound, existing structures (especially historic buildings) into the overall development scheme.
- Remove deteriorated and/or degraded elements.
- Maintain or restore the original land form, except when changes screen unattractive elements and/or add appropriate interest.
- Use appropriate materials and vegetation to screen unattractive elements.
- Use appropriate scales, forms, and materials to ensure that buildings and other structures are compatible with and add interest to the landscape.

NOTE: Lloyd's Waterfront Bluff Overlay District and Kingston's LWRP draw upon these siting and facility-related guidelines to protect visual qualities (see case study on p. 74).

*Tools & Techniques*

**Height**: Promote building heights that reflect and enhance community scale and character. (See Ch. VI for specific guidance)

**Orientation**: Orient buildings so their long sides are perpendicular to the riverfront, park, or key viewpoint, avoiding a monolithic "wall effect."

**Staggering**: Arrange buildings with variable heights and setbacks, also using a variety of materials and colors to create visual interest.

**Building material, textures, colors**: Natural building materials such as stone or wood stained in earth tones with non-reflective surfaces blend more easily into the landscape than light-colored, reflective materials. Darker, light-absorbing colors help reduce a building's visibility.

**Landscape integration**: Site buildings near the toe of a slope, or in or near the edge of a wooded area and below (rather than on) a ridge. Except for farm buildings, avoid development in the middle of large open areas if alternatives exist.

**Vegetative screening**: Careful selection and arrangement of plant material can help screen development from sensitive viewpoints and provide visual buffers for parking lots, utilities, and other scenic eyesores.

**Selective trimming**: To conserve trees' ecological, shading, soil-stabilizing, and screening ability, be selective about trimming branches when creating views from decks and windows.

**Keyhole views**: Cut trees along a narrow corridor—called a "keyhole view"—to provide visual contact with the river while minimizing the overall scenic impact of deforestation.

**View corridors**: Keep view corridors such as streets and open areas free from large structures that may inhibit visual access to the river and surrounding landscapes.

Well-sited home provides views and also protects visual quality by retaining trees along the bluffs.

This home on the Hudson River with little setback and no vegetative screening mars visual quality.

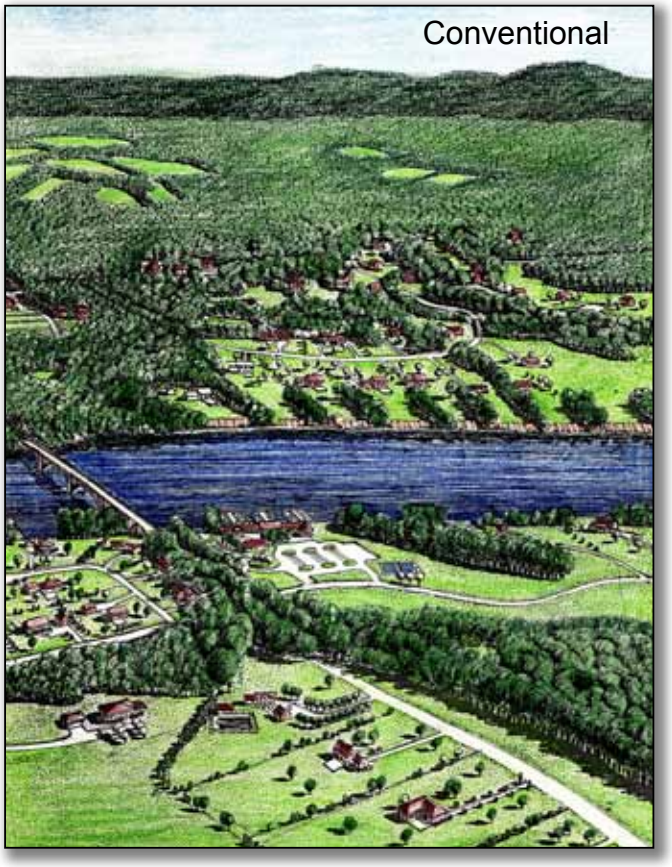
High-rise structures in New Jersey break the ridgeline in an unsightly manner.

**2. Develop local regulatory tools to protect visual character and scenic views in the Comprehensive Plan, LWRP, and/or local land use laws.** One of the most effective ways for municipalities to protect their riverfront's scenic character is to be proactive, establishing local regulations through zoning and other laws and ordinances. These regulations can address everything from establishing a review process for development proposals to prohibiting development along prominent ridgelines.

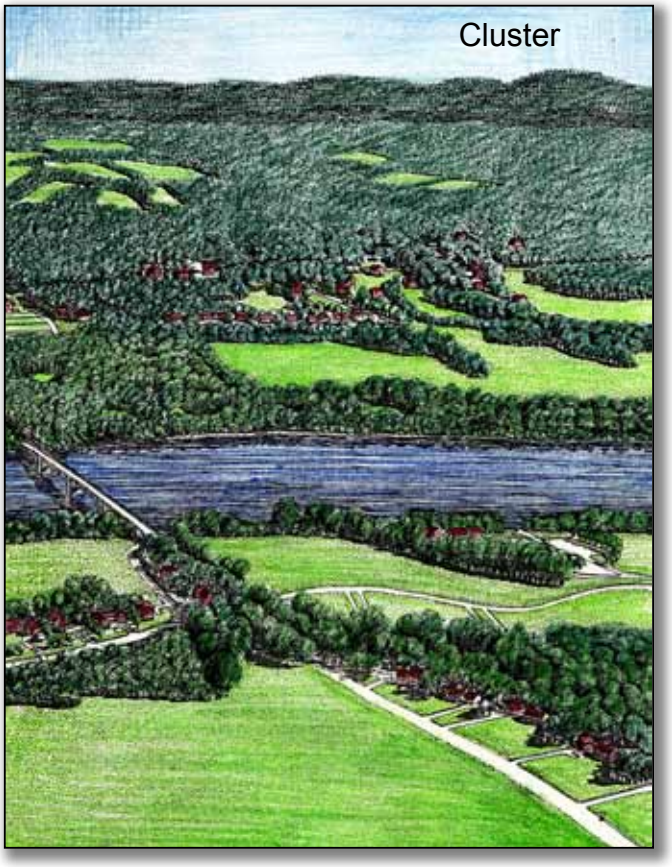
### *Tools & Techniques*

Establish site and design guidelines to minimize visual impacts along the riverfront through zoning, subdivision, and site plan review regulations. This could include a waterfront overlay zoning district for scenic protection (as in the Lloyd Waterfront Bluff Overlay, p. 74) with regulations on vegetation-clearing and recommendations on building materials, colors, and textures. Guidelines could include:

- *Clustering to protect views:* Large-lot zoning encourages sprawl and imposes widespread visual impacts. Where residential development will be visible from the river, zoning codes should require—or at least provide strong incentives to encourage—clustering homes on less visually sensitive lands. Done properly, this protects natural resources as well as views to and from the Hudson.




Conventional subdivision consumes land in a wasteful manner .




Cluster subdivision protects natural areas and scenic character .

- *Establishing setback requirements*: Zoning codes that require riverfront setbacks of 75-100 feet help prevent structures from appearing to loom over the shoreline (see Chapter VI/A, Strategy 2). These codes have the added benefit of preserving room for riverside vegetation, public space, natural light, and public walkways and amenities.

- *Limiting building heights and massing*: Tall buildings protruding above the tree line or ridgeline can have profound visual impacts. The height of new development should be compatible with existing building heights and community character of surrounding neighborhoods and blend in with the natural landscape. For example, along Kingston's Rondout Creek, buildings within 100 feet of the creek may not exceed 35 feet or 2.5 stories in height. (See Chapter VI/A, Strategy 2)

- *Creating architectural design standards that include a palette of architectural styles, building materials, and exterior color.* For example, the Design/Architectural Standards and Regulating Plan for Hudson Landing in Kingston provides a style book of choices reflecting local architecture that helps mitigate visual impacts.

- *Maintaining original landforms:* Structures should be sited and designed to fit the natural topography. Adopt laws prohibiting extensive cut and fill that provides flat areas on which to build.

- *Ridge top ordinances*: Adopt laws that prohibit clearing trees and siting buildings on ridgelines. Instead, site buildings at the midpoint and toe of slopes to maintain vegetation along bluffs and protect visual resources.

Natural building materials, earthtone colors, and intact vegetative screening make this home appear to blend into the hillside.

- *Steep-slope ordinances*: Adopt laws that prohibit building on slopes in excess of a 25-percent gradient and require enhanced erosion-control for slopes in excess of 15-percent gradient

**3. Evaluate the visual impact of significant developments, commensurate with potential impacts.** When large scale development is proposed—or sometimes smaller scale development in visually sensitive areas—a visual assessment can help understand how development might impact the visual character of the area. The cost of an assessment should be borne by the applicant. The NYSDEC's ***Assessing and Mitigating Visual Impacts*** offers a procedure for conducting the assessment. Additional strategies are discussed on the NYSDEC Web site, www.dec.ny.gov.

The following tools and techniques are offered with the understanding that larger, more visually prominent projects in visually sensitive areas (such as within or visible from a SASS) would require a greater degree of analysis than smaller projects in more urban areas, which might not require such analysis.

Balloon indicates the height of proposed development.

### *Tools & Techniques*

The simplest way to determine visibility is to prepare a "line-of-sight analysis" to determine if development will be visible from prominent viewpoints. This "low-tech" method involves a cross-sectional diagram of the topography along a line between a particular vantage point and the proposed development site with the project drawn in at the appropriate scale.

Weather balloons can be flown at appropriate locations and heights and photographed to determine the places from which the project would be visible.

Geographic Information Systems (GIS) analyses can be used to help determine the places from which development would be visible.

In cases involving large-scale development, produce a visual simulation—a computer-generated rendering—from pre-determined viewpoints to depict the appearance of the finished project.

Where appropriate, conduct a nighttime assessment of lighting impacts.

**4. Preserve the character of historic maritime communities.** Protecting the region's maritime heritage—e.g., the Julius Petersen Boatyard in Upper Nyack (Rockland County) and the Feeney dry docks on Rondout Creek in Kingston (Ulster)—is essential to maintaining the riverfront's scenic value

Riverfront communities benefit from heritage tourism supported by tour boats.

### *Tools & Techniques*

Provide interpretive panels, signs, brochures, and other materials to augment people's understanding and appreciation of the community's maritime heritage.

Protect water-dependent and water-enhanced uses (see Chapter II) and discourage uses that do not need to be sited directly along the riverfront.

Promote appropriate building scales, intensity of use, and architectural styles (see Chapter VI) on and near historic riverfronts.

# CASE STUDY

## Waterfront Bluff Overlay District, Town of Lloyd

As part of it's LWRP, the Town of Lloyd enacted a Waterfront Bluff Overlay District (WBOD) in 1993 for the area 100 feet west of the bluff line down to the Hudson River shoreline. The purpose of the district is to protect the significant aesthetic and natural resources of this area, which is part of a Scenic Area of Statewide Significance. As an overlay district, its requirements are not intended to replace the uses allowed in the underlying zoning districts; rather, its provisions are added to those of the underlying district in order to strengthen scenic protection.

Development proposals within the overlay area must comply with guidelines concerning vegetative cover; building location, height, colors, and materials; setbacks; site clearance; rooflines; and drainage, erosion/siltation control structures. New development must be set back from the bluff line along the town's Hudson River waterfront or sited in other inconspicuous locations to maintain the scenic qualities that characterize the bluffs and to protect views to and from the shore. Structures must be clustered or oriented to retain views, protect open space, and provide visual organization to a development.

While the intent of this local law is good, in practice the results have been mixed. Several recently constructed bluff-top homes are highly visible. Roads have been constructed along steep slopes and building sites have been cleared to allow construction of homes perched at the edge of the bluff with few trees remaining to buffer the view. The overlay district's restrictions on tree-cutting only apply to those trees with a diameter greater than 18 inches at breast height. As a result, behind some homes vast swaths of large trees not meeting this threshold have been cut down along the steep slope, leaving huge scars and denuded vegetation.

House with trees and view of river—before tree cutting.


Two years later, extensive tree cutting results in adverse visual impact.

Bluff overlay districts can be highly effective tools to guide new development while conserving important scenic resources. The key is to ensure that local laws are well-known to project applicants and consistently implemented and enforced by local boards. It also is important that these laws be coupled with other regulations regarding development activities on steep slopes and restrictions on tree-cutting to allow muted views but not complete clearing of building sites.

Town zoning code available at: www.ecode360.com/?custId=LL0645

Town Web site is www.townoflloyd.com

Even with provisions of Waterfront Bluffs Overlay District, this home still lies unshielded from river.

Natural building materials, dark color, and selective trimming of vegetation provides river views without creating adverse visual impact.

# VI. Promote Good Urban Planning & Sustainable Design

In many ways, the principles expressed in this chapter have been touched on previously and reflect the holistic approach that's critical in achieving a vibrant, successful, and sustainable riverfront. A synergistic, mutually supportive mix of uses, capitalizing on their location by the water, accessed by a well-connected and diverse transportation system, and providing compelling public open space and contextually appropriate scale and design are the hallmarks of riverfronts to which we all aspire.

A key component in protecting and enhancing the riverfront is promoting development, commerce, and livable neighborhoods in and immediately around "traditional waterfront communities." These communities—such as Kingston's Rondout District, Cold Spring, Nyack, and Peekskill—contain concentrations of water-dependent businesses, possess a distinctive character, and serve as regional focal points for commercial, recreational, and cultural activities. Good urban planning and sustainable design is essential to achieving this goal. For example, combining residential, commercial, and civic uses in a building or set of buildings fosters an active and diversified street life and riverfront. This can be enhanced by providing wide sidewalks, attractive street furniture, and sufficient lighting while employing traffic-calming techniques like narrow driving lanes, street trees, and on-street parking, all of which foster pedestrian safety and comfort. Likewise, it is important to respect community scale and character, and to offer a diversity of housing options. To gain long-term economic savings through energy efficiency and reduce the environmental impact of development—including climate-change mitigation—riverfront construction should strive to meet or surpass standards established by the LEED™ program.

The NYSDOS Coastal Management Program and LWRPs call for concentrating development in or adjacent to traditional communities. Development should be compatible with the general historic character of the area, with consideration given to scale, architectural style, density, and intensity of uses.

# A. Promote Good Urban Planning & Design

Mixed-use, pedestrian-friendly development that creates strong links to the river and respects the scale and character of existing communities is essential to cultivating a prosperous, livable, and attractive riverfront. Design that complements local architecture, active and attractive public spaces, low-impact outdoor lighting, and innovative parking solutions reduce the impact of development.


Example of a riverfront plan.

## STRATEGIES

**1. Locate new riverfront development in areas served by public transportation and where infrastructure already exists.** Specific guidelines and strategies for achieving this are covered in Chapter 1, and include:

- Infill development on former industrial or contaminated sites and vacant lots, and adaptive reuse of abandoned buildings.
- Development in areas with existing drinking water and wastewater infrastructure.
- Development in places near transportation hubs.

**2. Promote urban design that reflects and enhances community scale and character.** It is critical that building height and density of new development relate to the context of the existing community. The scale and character of future development should be guided by a public planning process based on existing conditions, and strengths, weaknesses, opportunities, and threats that characterize the waterfront. Generally speaking, taller buildings and greater densities are most appropriate in and should be directed to locations near commuter rail transit serving more populous places. Likewise, availability of public water and sewer can better support larger scale development than places without such infrastructure. Smaller hamlets and villages would probably be better served by a more modest scale of development, but still should be more dense than in the surrounding countryside. Varying building heights, as well as treatment of façades, roofs, and parapets, can help new, larger scale development appear as a more organically evolving part of the community.

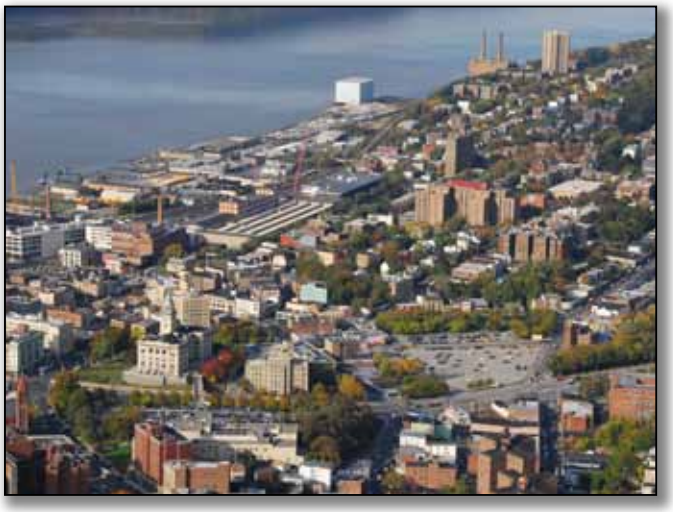
If a project is in, adjacent to, or visible from a SASS or another area designated as possessing high-quality scenic or historic values, smaller scale development, carefully sited and designed, would likely avoid adverse visual impacts and be more appropriate. As a general rule, building massing (size) significantly larger than existing structures should be avoided in order to protect important viewsheds.

### *Tools & Techniques*

Adopt form-based codes or design guidelines to provide developers with a clear understanding of the community's vision for height, massing, and design of buildings, as well as their relation to the street and public spaces. Form-based codes foster predictable built environments and a high-quality public realm by using physical form (rather than separation of uses) as the organizing principles of the code.

Village of Cold Spring.

City of Poughkeepsie.



City of Yonkers.

**3. Promote a mix of uses.** A combination of retail, lodging, office space, residential, and public and recreational uses is essential to create vibrant municipal centers. The benefits of such development include increased business activity, convenience to shopping and services, and lively adjacent riverfronts.

Buildings in downtown Rhinebeck provide a mix of uses with retail on the ground floor and offices and residences above.

### *Tools & Techniques*

Establish mixed-use zoning that connects existing commercial corridors to the waterfront.

Promote restaurants, retail, and other commercial uses along selected neighborhood or connector streets and, as appropriate, upland along the waterfront.

Provide a "vertical mix"—retail at the ground level and commercial, institutional, or residential uses on upper stories.

Locate civic uses—e.g., parks, community centers, and libraries—in prominent locations such as town squares, main streets, and major intersections.

Incorporate arts and entertainment venues such as theaters, galleries, and museums in central business districts.

**4. Provide an interconnected grid pattern of streets.** A street grid offers a number of direct routes for local transportation while encouraging pedestrian activity and reducing congestion on main streets. Suburban street systems without a grid of secondary streets concentrate traffic on a few main roads.

### *Tools & Techniques*

Provide an interconnected network of street types, including neighborhood (or connector) streets, one- and two-lane local streets, pedestrian streets, and rear service alleys.

Avoid dead-end streets and cul-de-sacs. These reduce access and "privatize" sections of the community.

To maintain pedestrian comfort and scale, locate buildings close to sidewalks. Municipal blocks should be no larger than 220 feet by 480 feet.

Reduce traffic speed by limiting the width of vehicle lanes to 10-11 feet and parking lanes to 7-8 feet, combined with other traffic-calming techniques.

In central business districts, maintain a maximum ratio of building height (H) to street width (W) of 1 to 3. A ratio of 1H to 2W is typical of traditional neighborhoods and widely preferred by pedestrians.

Develop Form-based codes specifying such things as building heights, massing, dimensions, colors, materials, relationships to streets and other public spaces, and street and sidewalk widths.

Diagram shows ratio of 1 building height to 3 road width.

Diagram shows ratio of 1 building height to 2 road width.

**5. Include prominent public spaces that support community life.** In addition to public areas on the riverfront, provide neighborhood parks, village greens, and squares to give municipal centers and riverfront neighborhoods a unique identity and spaces for residents to come together.

Village greens and squares support public life and community interaction.

### *Tools & Techniques*

Disperse small (¼-acre to 1-acre) parks throughout neighborhoods.

Site public spaces in prominent locations adjacent to streets and riverfronts.

Provide regular programming—concerts, festivals, farmers' markets—in these spaces.

Locate buildings—especially restaurants, retail, and civic services—close to public spaces, further enhancing them as community focal points.

Adorn spaces with high-quality landscaping and furnishings.

**6. Create strong links to the river.** Reconnecting upland neighborhoods and commercial centers to the Hudson River is essential. While highways, railroads, and steep grades can make this a challenge, communities can reestablish the riverfront as a prominent community feature through foresight and advance planning.

Neighborhood streets, such as Cold Spring's Main Street, create strong links to the river.

### *Tools & Techniques*

Provide the maximum number of street links from existing neighborhoods and commercial centers to the riverfront.

Orient principal streets to afford riverfront views.

Site local public streets along riverfront greenways and parks. This creates a clear delineation between public and private spaces, and offers year-round access to amenities along the river.

Provide pedestrian bridges and underpasses where railroads and highways hinder riverfront access.

Provide walking and bike paths from upland parks and trails to and along the riverfront. (See Ch. III)

Encourage new development in vacant lots along sloped streets to reestablish active links between the riverfront and upland areas.

Upgrade amenities such as benches, lighting, signage, and trees along streets leading to the river, providing strong pedestrian links to the waterfront.

Incorporate public art, furnishing, support structures (shade pavilions, etc.) and high-quality landscape treatment in waterfront open space to enhance the public's enjoyment of the river.

Comply with regulatory requirements of the Americans with Disabilities Act.

Provide piers and docking facilities.

**7. Create pedestrian-friendly streets and spaces.** On-street parking, wide and continuous sidewalks, street trees, good lighting, and street furniture foster appealing and safe environments that promote pedestrian activity.

This street scene illustrates well-used sidewalks, shade trees, effective signage, and active storefronts.

### *Tools & Techniques*

**Street trees***:* Trees are vital to creating a successful streetscape. Plant hardy trees with sufficient trunk and root protection at roughly 18- to 30-foot intervals (depending on the species) along all streets. Trees should be indigenous to the Hudson Valley and of sufficient size to provide canopy shade for the sidewalk and street.

**On-street parking**: Parked cars along the street slow traffic, provide a natural buffer between pedestrians and moving vehicles, and supply enough space-efficient parking to decrease the need for large, off-street lots.

**Safe intersections**: Avoid wide intersections, which are difficult for pedestrians to cross. Provide well-marked crosswalks at every intersection and in some mid-blocks where pedestrian activity is heavy. At key intersections, widen sidewalks and reduce road width (a technique sometimes called "neck-down").

**Street furniture**: Benches, light fixtures, signs, planters, and trash receptacles should complement each other and reflect local architectural styles.

**Lighting**: Illuminate sidewalks and crosswalks to enhance safety and nighttime character. See Strategy 10 below for specific Tools & Techniques.

**Signage**: Consistent with local zoning and comprehensive plans, require small-scale signage geared to pedestrian and not vehicular traffic. Prohibit out-of-scale signage on buildings and in display windows. Do not affix highway signs to buildings.

**8. Preserve historic resources in the waterfront area and promote designs complementing local architecture and heritage.** Hudson River communities possess a diversity of architectural styles—including Colonial, Italianate, Gothic Revival, Greek Revival, Victorian, and modern—constructed in a range of materials and colors. Many of these structures, as well as entire neighborhoods, are National Historic Landmarks or listed on the State and National Registers of Historic Places. While it is not necessary to copy architectural traditions in new development, it is important to respect the scale and character of neighboring buildings. It also is crucial to promote the conservation and restoration of historic buildings.

New buildings, such as these along Poughkeepsie's Main Street, reflect local scale and character.

### *Tools & Techniques*

Adopt an historic preservation ordinance that:

- Integrates historic buildings into new development plans while limiting and minimizing alterations to the resource.
- Minimizes the loss of historic resources or character when it is not possible to completely preserve the resource.
- Allows demolition only where alternatives for retention are not feasible.
- Avoids potential adverse impacts of development on nearby historic resources.

Seek local or state landmark status to protect important historic buildings and districts.

Seek funding for the restoration or rehabilitation of historic buildings.

Establish architectural and/or historic district review boards, and develop design guidelines based on existing buildings that contribute to community character.

**9. Incorporate innovative parking solutions.** Space for parking consumes large areas of land in municipalities. It also impacts waterfront character, transportation options, pedestrian movement and safety, and the Hudson River's water quality.

This parking lot has been designed to enhance scenic and environmental quality.

### *Tools & Techniques*

Site parking away from the water's edge but within a 5-minute (or ¼-mile) walk of major riverfront destinations.

Reduce required parking for uses located within a 10-minute (or ½-mile) walk from transit stations.

Incorporate on-street parking to provide buffers for sidewalks, reduce traffic speed, and offer convenient access to commercial uses.

Promote shared parking in mixed-use areas.

Locate parking lots behind or under buildings, not in front of them.

Promote a 1:1 ratio of cars to residential units in cities and a 1.5:1 ratio in towns and villages.

Minimize surface parking lots by providing economic incentives to build parking structures. Wrap them with "active" ground-floor uses—retail, restaurant, office.

Screen parking areas with hedges, trees, and aesthetically pleasing fences or walls.

Plant trees in parking lots to enhance visual character, provide shading, and absorb stormwater.

Treat stormwater on-site by employing low-impact development techniques—including pervious paving, alternative pavers in overflow parking areas, and bioretention areas.

**10. Incorporate low-impact outdoor lighting.** While lighting is important for safety and security, it also should be designed to maximize energy efficiency, minimize impacts on wildlife, enhance scenic character, and protect night skies against light pollution. For information about ways to avoid light pollution, visit www.darksky.org or www.darkskyinitiative.org.

### *Tools & Techniques*

Identify areas that require exterior lighting and those that can remain unlit.

Do not over-light. The use of .1-1 foot-candles is typically sufficient for most uses, including pedestrian paths and parking lots; 2-5 foot-candles are needed only for high-security areas. Lighting above 5 foot-candles is a waste of energy and will create glare conditions for pedestrians and drivers.

Encourage lighting that accents distinctive architectural features and is focused downward. Avoid "up-lighting" or illuminated banding that creates glare and light spillage.

Provide more natural and inviting color quality in pedestrian areas by avoiding the use of high-pressure sodium lighting.

Make main street and pedestrian-area lighting human-scale (10-15 feet high); parking lot lights should not exceed 15-20 feet high. Shield light fixtures to eliminate glare. Lighting outside of intersections should be at street level. Avoid cobra lights except at intersections.

Light outdoor signs from above.

**11. Include a diversity of housing options.** To meet a broad range of housing needs, residential projects should offer a variety of housing types and designs. Whether single-family, townhouse, condominium, or rental, no single type of housing should predominate.

### *Tools & Techniques*

Provide a range of housing sizes, types, and prices for both sale and rental.

Provide affordable or moderately priced housing—a minimum 10–20 percent of the total number of units.

Integrate affordable/moderately priced housing types throughout the development.

Add to the diversity of housing types by allowing accessory apartments in units or above garages.

Home ownership options should be provided through fee simple and condominium approaches.

## B. Promote Sustainable Design

To promote public health, environmental sustainability, and long-term economic savings through energy efficiency, new development should strive to meet or surpass standards developed by the Leadership in Energy and Environmental Design (LEED™) Green Building Rating System. This is all the more critical because buildings are responsible for nearly 40 percent of America's $CO_2$ emissions—a significant source of climate change.

LEED™ is a program of the non-profit U.S. Green Building Council. It provides municipal leaders, developers, architects, and building owners with consistent, credible standards for sustainable building practices. It was developed and is continuously refined via an open, consensus-based process that has made LEED™ the green-building standard for private developers as well as federal, state, and local governments.

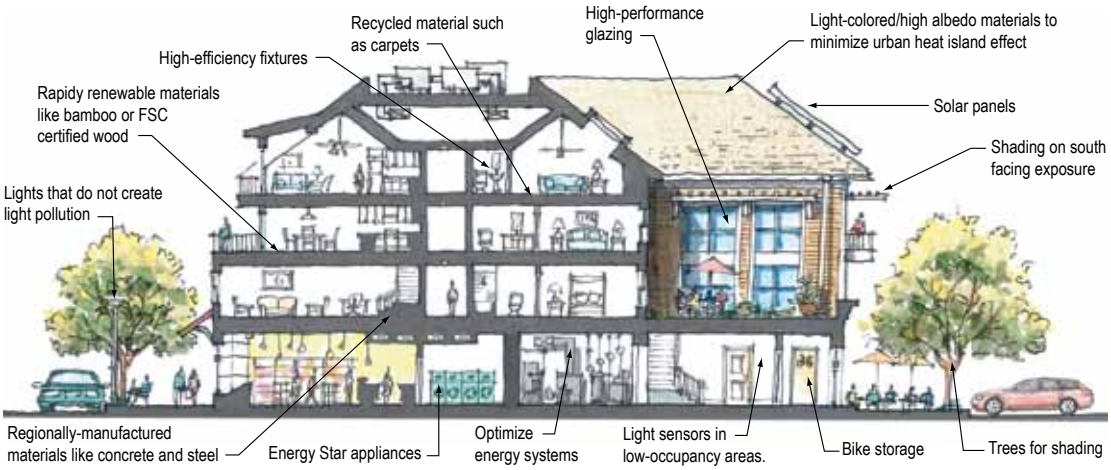
The program has established standards in five key areas of human and environmental health: sustainable site development, building energy efficiency, indoor environmental quality, water efficiency and quality, and materials and product selection. LEED™ certification provides independent, third-party verification that a building project meets the highest green-building and performance measures.

### Sustainable Sites Initiative

In addition to LEED™, the Sustainable Sites Initiative (SSI) is another green-construction rating system in development that is specifically for landscapes, with or without buildings. By establishing benchmarks based on the goods and services that sustain humans and other organisms—known as ***ecosystem services***—the SSI seeks to protect and enhance the capacity of landscapes to actually regenerate natural resources. This rating system is due for release in 2011. However, the preliminary report and draft benchmarks provide a comprehensive distillation and organization of sustainable site-design guidelines and can be used now. (www.sustainablesites.org)

Traditionally, LEED™ standards have applied primarily to individual structures. However, LEED™ is developing a new standard for Neighborhood Development (LEED-ND) that focuses on location and community pattern—in other words, where people live and how they get around. It addresses these concerns by establishing benchmarks for things like proximity to transit hubs, mixed-used configurations, and pedestrian-friendly streets.

To learn more about LEED™, visit www.usgbc.org or contact the New York chapter of LEED™ at www.usgbcny.org.




Section drawing illustrating sustainable building techniques.

# CASE STUDY

## Yonkers Riverfront, City of Yonkers

Aerial view of downtown Yonkers.

Recent development on the Yonkers waterfront demonstrates the balancing act necessary to provide appropriately scaled, transit oriented development on an urban waterfront.

In the mid-1980s, developers began to realize the potential of the city's Hudson River shoreline, which had long been derelict or devoted to industrial use. Initial development proposals called for six 38-story apartment towers located near the city's historic pier. Legal action to stop this project resulted in a settlement that provided an easement on the riverfront allowing space for an esplanade and protecting view corridors through the site. The settlement also set the stage for adoption of the city's 1998 Downtown Waterfront Master Plan, created with considerable citizen input and calling for pedestrian-friendly development with buildings no taller than nine stories. The master plan, in turn, provided the framework for the first new waterfront construction in decades.

The 266-unit Hudson Park South (Phase 1) was built on parcels at the foot of Main Street on the riverfront adjacent to Yonkers' train station and the City Recreation Pier. The two brick and masonry nine-story residential buildings include restaurants on the ground floor with parking facilities integrated into the building's design. A narrow, traffic-calmed road separates the buildings from the esplanade, providing a clear delineation between the public riverfront and private development.

In Phase II, called Hudson Park North, two additional apartment buildings—12 and 14 stories, respectively— with 294 units have since been constructed north of the original development. In order to mitigate building heights exceeding limits in the master plan, the developer widened the extension of the greenway adjacent to the new buildings and permitted public access to the buildings' spacious courtyard.

For commuters residing in these and other riverfront apartments, Yonkers' historic, beautifully renovated Metro-North station is a short walk away. Travel time to Grand Central Station is just 30 minutes.

The attractively landscaped esplanade sits directly above the shoreline, offering views from the George Washington Bridge to the Tappan Zee Bridge. A pavilion, built over the water, is used for a summertime concert series. Amenities on the esplanade connect visitors with the Hudson River's history. A public work of art in the half-acre sculpture park at the esplanade's southern end interprets the region's Dutch and English colonization. To the esplanade's north, next to the Hudson's confluence with the Saw Mill River, a display explains how Yonkers was settled along this tributary.

Hudson Park at Yonkers has not only demonstrated that it's possible to balance urban-style development and a public waterfront, but it appears to have breathed new life into the city's once-forgotten shoreline, which has become a destination for enjoying festivals, concerts, a farmers' market, sidewalk cafés, and restaurants. The main public library has been relocated to a renovated building, originally an Otis Elevator factory, a block from the river. Its large windows offer expansive views of the Palisades. And nearby, an old trolley barn, built in 1900, has been adaptively reused, enjoying new life as residential lofts and a fitness studio.

Yonkers' riverfront esplanade connects this sculpture garden and waterfront park with transit-oriented development and the city's historic pier.

# APPENDIX
# Relevant Municipal Ordinances

These municipal ordinances relate to principles, strategies, and tools & techniques in chapters 1-6.

## CHAPTER I: PROMOTE RIVERFRONT DEVELOPMENT IN AREAS WITH EXISTING INFRASTRUCTURE

### A. Promote Infill Development

**City of Kingston (Ulster County)**
**RT Rondout District (1992); Mixed Use Overlay District (2005)**
To implement the goals of its Local Waterfront Revitalization Program, supported by recent amendments to its zoning ordinance, the City of Kingston has promoted infill development in both its Rondout District ordinance and Mixed Use Overlay District.

The objectives of Kingston's RT Rondout District are to "encourage the use, rehabilitation, and adaptation of existing structures in this unique area in accordance with their original character," and to ensure that any new development is compatible with existing buildings. The district is divided into two sub-areas: the Broadway/West Strand area, in which enumerated commercial and residential uses are allowed as of right, and the remainder of the district, in which residential uses are allowed as of right, with certain commercial uses allowed by special permit. In issuing a special permit, the planning board must consider a new building's location, scale, and design, as well as any exterior modifications of an existing building, along with traffic generated by the proposed use. Any building-permit application for new construction or the demolition or exterior modification of an existing building must be referred to the city's Landmark Preservation Commission for advisory review.

The city's Mixed Use Overlay District encourages the adaptive reuse of commercial and industrial buildings for multifamily rental housing and to create mixed-income, pedestrian-based neighborhoods. Affordable-housing guidelines apply where five or more residential units are created; the planning board may deny a development permit if at least 20 percent of the residential units are not established as affordable. Development standards within the district limit commercial uses to street level and require that primary entrances of buildings face onto the street or a small park. They also require shade trees and human-scale lighting, and emphasize pedestrian connections in site plans.

City code available at www.generalcode.com
Chapter 405: Zoning; § 405-19; § 405-27.1.
City Web site: www.ci.kingston.ny.us

**City of Albany (Albany County)**
**C-1 District Design Standards (1993)**
Albany's C-1 Neighborhood Commercial District designation is intended to support "small-scale commercial uses in or near residential neighborhoods." The city's Traditional Neighborhood Design (TND) ordinance was adopted to protect the character and scale of neighborhoods that have "a high degree of original design integrity," but that might not qualify for historic-district designation. C-1 districts are included in the TND overlay because they "are frequently immediately adjacent to residences, and their size, scale and overall compatibility should enhance the neighborhood, not overwhelm it."

C-1 District Design Standards are intended to encourage pedestrian-oriented development that is compatible with its surroundings and "human in scale." New construction, exterior rehabilitation or modification, and demolition projects must comply with the standards. Setback requirements and parking standards encourage pedestrian uses. Parking lots must be screened from adjacent sidewalks. Shared parking is encouraged when peak demand occurs at different times for two or more uses. Lighting standards aim to reduce light pollution.

Detailed standards and diagrams address building orientation and height, roofs, and facades for new and renovated structures. The ordinance emphasizes preserving original elements of storefronts or buildings where possible and complementing the architectural proportions and design of existing structures. The use of building materials, lighting, awnings, security devices, air conditioners, and signs, as well as property-maintenance standards, are detailed in this ordinance.

City code available at www.generalcode.com
Chapter 375: Zoning, Article VII Traditional Neighborhood Development Overlay; § 375-46 C-1 District Design Standards
City Web site: www.albanyny.org

### B. Develop in Areas with Existing Drinking Water & Wastewater Infrastructure

**Town of Cazenovia (Madison County)**
**Cazenovia Lake Watershed Zone: Uniform Wastewater Management (2004)**
To preserve surface and groundwater within the town, all wastewater-treatment systems within the Cazenovia Lake Watershed Zone not continuously supervised by the NYSDEC or NYS Department of Health are subject to local regulation. The Cazenovia Lake Watershed is divided into two parts: a Critical Watershed Protection Zone lying within 500 feet of Cazenovia Lake, and the rest of the watershed. This ordinance includes design standards for new and replacement wastewater systems (which must conform to NYS regulations); authorizes wastewater-system inspections and surveys; requires regular septic tank inspections; requires permits for the construction and operation of wastewater systems; and sets out fees and penalties.

The town code requires separate storm sewers and sanitary sewers in areas served by public sewers. Furthermore, no new construction may install combined sewers.

Town code available at www.generalcode.com
Chapter 130: Sewers and Sewage Disposal, Part 5: Cazenovia Lake Watershed Zone, Article XXIV Uniform Wastewater Management
Town Web site: www.townofcazenovia.org

**Town of Red Hook (Dutchess County)**
**Zoning Districts (1993)**
To guide "both the development and conservation of the Town's land resources," Red Hook has adopted 11 zoning districts of varying densities, allowing greater intensity of development in areas with appropriate infrastructure and encouraging land and resource conservation in other areas. Five overlay districts provide additional protections for floodplains, groundwater and other environmental resources, scenic corridors, and historic landmarks.

The Waterfront Conservation District encompasses the town's most sensitive environmental areas and aims to preserve them in their natural state. A Limited Development District and a Rural Development 5 District include estate and open-space areas within the town's coastal management zone, and emphasize the use of low-density residential development, cluster development, and conservation easements. Among the other residential districts, the Residential 1.5 District, near the village center, encourages a range of housing types and allows increased densities for residential uses served by a town-approved central water-supply system. Two business districts and a floating Light-Industrial Use District concentrate services near the town's established center, where pedestrian access is encouraged, and allow auto-related and some light-industrial uses in surrounding areas and along highway corridors, where adequate access and infrastructure are available.

Town code available at www.generalcode.com
Chapter 143: Zoning, Article II Zoning Districts
Town Web site: www.redhook.org

**Town of Hyde Park (Dutchess County)**
**Infrastructure Standards (2007)**
An express purpose of Hyde Park's zoning ordinance is to "encourage a pattern of land use in the Town in which development of higher density, scale, and intensity of use, mixed land use, and mixed building use occurs in community centers with appropriate infrastructure and municipal services." Mandatory Site Development Standards apply to all development requiring site-plan approval.

For new large-scale developments, Infrastructure Standards require that any subdivision of 50 or more lots have central or municipal water and sewer systems meeting applicable standards of Dutchess County and the NYS Departments of Health and Environmental Conservation. Storm sewers must be separate from sanitary sewers. Water systems and sanitary-sewer systems should be extensions of existing systems whenever possible. Newly constructed systems designed to accommodate expansion must be connected to a municipal system. When the proposed development is located within 500 feet of a lot, it must be served by the system.

In specified districts, new development and renovations of existing development must install electric, telephone, and cable lines underground.

Town code available at www.generalcode.com
Chapter 108: Zoning, § 108-4.5 Site Development Standards, § 108-4.5(I)
Town Web site: www.hydeparkny.us

### C. Locate New Development Near Transportation Hubs

**Town of Malta (Saratoga County)**
**Downtown Overlay District (2005)**
The Town of Malta's Downtown Overlay District is intended to concentrate new development within easy reach of existing and future transportation, and incorporate traditional neighborhood design principles to create a pedestrian-friendly, mixed-use town center. The ordinance's goals are to develop "compact, defined urban neighborhoods, comprising a compatible mix of uses and housing types, connected to appropriately scaled sidewalks (with trees)" and to "facilitate convenient and safe movement throughout the community for all modes of transportation."

The ordinance encourages new residential development within a five-minute, or ¼-mile, walk of the town center. It establishes design standards for new development that govern building design and placement; sidewalk layout; street design, including streetscapes and traffic-calming features; street edges, including human-scale lighting and public rest areas; and parking. "To promote pedestrian activity and multimodal transportation," the ordinance's mass-transit provisions encourage the siting of new residential and commercial developments "within 1,320 feet of an existing or future transit stop as approved by the Planning Board." A clear path or sidewalk to the transit stop also may be approved or required by the board, and designated pull-off areas for buses and bus shelters are required.

Town code available at www.generalcode.com
Chapter 167: Zoning, Article XIV, Downtown Overlay District
Town Web site: www.malta-town.org.

**Town of Orangetown (Rockland County)**
**Route 303 Overlay Zoning District (2002)**
Orangetown's Route 303 Overlay Zone implements findings of the Route 303 Sustainable Development Study, a two-year joint project undertaken by the town and Rockland County together with the NYS Department of Transportation and the New York Metropolitan Transportation Council. Route 303 is a major regional artery. The study aims "to create a balanced and sustainable

approach to transportation and development" within the highway corridor through land-use controls that protect irreplaceable environmental assets—particularly the viewsheds and slopes of the Palisades—and support the environmental goals of the Hudson River Valley Greenway Compact and the federal Hudson River Valley National Heritage Area.

This overlay is intended to promote "orderly development through harmonious groupings of compatible and complementary land uses" and appropriate development standards. The regulations apply to approvals for any building or structure erected or altered within the district and to any rezoning, special-permit, site-plan, or subdivision approvals. The overlay promotes pedestrian and vehicular safety, and discourages retail strip development. New development is to be concentrated in accessible, mixed-use centers. A traffic-impact study and access-management plan are required if a proposed use will generate more than a 10-percent increase in peak-hour traffic or in total daily traffic on Route 303 or intersecting town or county highways.

Town code available at www.generalcode.com
Chapter 43: Zoning, Article XIII, Route 303 Overlay Zoning District
Town Web site: www.orangetown.com

## CHAPTER II: ENCOURAGE WATER-DEPENDENT & WATER-ENHANCED USES IN OR ADJACENT TO MUNICIPAL CENTERS

**City of Kingston (Ulster County)**
**RF-R Rondout Creek and RF-H Hudson Riverfront Districts (1992)**
Kingston's Rondout Creek and Hudson Riverfront Districts ordinance implements the goals of the city's Local Waterfront Revitalization Program by giving priority to water-related uses, the creation of distinct riverfront districts, controlling waterfront development, and providing permanent public views and access to the riverfront.

Uses permitted by right include the manufacture and repair of marine products; fishing and marine supply stores; wholesale and retail fish stores; parks and beaches; and scientific, artistic, and educational activities requiring access to coastal waters. Restaurants, hotels, retail stores, offices, and residences are allowed by special permit when the owner dedicates "meaningful, permanent public access" to the "dry, non-tidal or non-submerged shore areas" through a permanent easement or by granting fee title to the city.

The planning board may approve by special permit uses including not-for-profit clubs and recreational facilities, structures facilitating public access, and historic or alternative modes of transport. Marinas and related uses also may be approved. Marina applicants must demonstrate to the board that 1) the marina basin design meets enumerated criteria to promote tidal flushing and protect water quality; 2) minimal dredging will be required during construction and maintenance; 3) there is an adequate water supply for the project; and 4) parking areas are constructed of porous materials to reduce contaminated run-off. Best management practices must be incorporated into the project's design to maximize vegetative cover and permeable land surfaces, and to reduce stormwater run-off. Regulations in both districts regarding building height and setback from the water protect water quality and views.

City code available at www.generalcode.com
Chapter 405: Zoning; § 405-25
City Web site: www.ci.kingston.ny.us

**Town of Irondequoit (Monroe County)**
**River Harbor District (2002)**
Located on the east bank of the Genesee River near the Port of Rochester, the town has adopted a River Harbor (RH) District ordinance to promote water-related uses while protecting the riverfront's natural resources. The ordinance is intended to support the policies of the town's Local Waterfront Revitalization Program as well as regulations and policies of Rochester's adjacent areas; provide public access to the river; offer opportunities for appropriate mixed-use development; direct development to areas

with suitable topography and infrastructure; preserve environmentally sensitive features and existing vegetation; and facilitate recreational development.

Permitted principal uses in the RH District include single-family and multifamily dwellings; hotels and restaurants; parks; service shops and professional offices; and yacht clubs, marinas, and boat-building facilities. Accessory uses, which must be located on the same lot as principal uses, include piers, docks and wharves, pumping facilities, and services for the sale of boat fuel and fishing supplies. The ordinance mandates that construction of these facilities will not impair water quality or the riverfront's natural features. It also establishes requirements regarding materials; grading; and the shape, size, and number of piers and wharves.

Lot and bulk requirements are set out for residential and non-residential uses, including lot coverage and impervious-area ratios. Off-street parking and loading facilities are required for all uses; parking spaces must be a minimum of 25 feet from the water's edge. The planning board is authorized to require public access to the riverfront—via walkways, pedestrian trails, or bikeways—as part of site-plan or special-permit approval. The ordinance also establishes site-plan approval standards, design guidelines, and sign requirements.

Town code available at www.generalcode.com
Chapter 235: Zoning; Article XXIV River Harbor (RH) District
Town Web site: www.irondequoit.org

## CHAPTER III: CONNECT PEOPLE TO THE RIVER

**Town of Riverhead (Suffolk County)**
**Downtown Center 2: Waterfront (DC-2) Zoning Use District (2004)**
Riverhead's Waterfront (DC-2) District is intended to create continuous public pathways and access to the town's waterfront and protect open space and watershed resources. Within the district, only marinas and retail stores are allowed as of right. Hotels and indoor recreation areas may be allowed by special permit. Offices, gas stations, car washes, and drive-through windows for restaurants and banks are prohibited. The ordinance requires that each property within the district preserve "a contiguous open space area equal to at least 30% of the lot area." Native plant species are to be used in these areas to support the ecological habitat of the Peconic River. The use of lawns requiring fertilizers and herbicides is strongly discouraged.

Design standards require each property to provide a pedestrian easement for a walking trail connected to existing or future trails on adjacent lots. The trail must be at least four feet wide and made of permeable material. All elements of the site plan must be sited "to preserve and enhance" views of the Peconic River and pedestrian pathways to it. Buildings within the district must have entrances to the street and the trail. The standards also address building facades, signage, buffering, and hours for deliveries and loading. Parking standards encourage shared parking and driveways where possible. They also require landscaping of parking lots (in addition to the open-space requirement) and use of porous surfacing or landscaped infiltration systems for paved lots where underlying soils will support infiltration of stormwater run-off.

Town code available at www.generalcode.com
Chapter 108: Zoning; Article LVII
Town Web site: www.riverheadli.com

**City of Rochester (Monroe County)**
**Riverfront District (2002)**
Rochester's Riverfront District, located within the Center City District, is "continuous and uninterrupted along the river corridor" and was designed to include "all areas that had a physical and/or visual connection (literal or implied)" to the Genesee River. Design criteria aim to promote compatible development, provide "uninterrupted public access to the river's edge," and

"strengthen linkages across the river" between the city center's east and west sides.

The district maintains a 30-foot buffer along the river where no structures are permitted. Design Principles for the district emphasize the "strengthening of connections both to the riverfront and across the river," and encourage creating "a continuous public space along the riverfront…in conjunction with human-scaled development along the river." Building heights range from three to six stories, with lower heights nearest the river. Setbacks for buildings adjacent to the river range from 30 to 60 feet. Standards for building mass, orientation, and materials aim to complement the existing character of the district and create visual linkage throughout the riverfront. The ordinance emphasizes that "views and sight lines to the river, from throughout the district, should be enhanced."

The river promenade adjacent to the river has a minimum width of 12 feet. Entrances to plazas off the promenade must be at least 10 feet wide. Standards address benches, lighting, noise level, and plants and trees. Parking lots are not allowed on the riverfront. Plaza plantings must provide 50 percent shade at tree maturity and preserve sight lines to the river.

City code available at www.generalcode.com
Chapter 120: Zoning; Article IX, § 120-67
City Web site: www.ci.rochester.ny.us

## CHAPTER IV: PROTECT NATURAL RESOURCES

### A. Protect, Restore, & Rehabilitate Wildlife Habitat

**Village of Skaneateles (Onondaga County)**
**Skaneateles Lakeshore Development Regulations; Skaneateles Lake Watershed Overzone (2004)**
The village's Lakeshore Development Regulations were adopted to preserve the historic and aesthetic quality of the shoreline area within the village. Any proposed activity within 50 feet of Skaneateles Lake requiring a building permit or any grading involving an area of 500 feet or more within 50 feet of the lake line must obtain site-plan approval from the planning board. Within the 50-foot lakeshore setback zone, no structure may be built or expanded, with limited exceptions such as pump houses, gazebos, docks, and flagpoles. A minimum open-space ratio of 90 percent applies within the setback zone, including the enumerated exceptions. Restrictions regarding height, docks, and offshore structures, and design of boathouses and accessory buildings also apply.

The Lake Watershed Overzone is designed to protect water quality by controlling land uses that may create contaminated run-off. The ordinance applies to any activity requiring a building permit or any disturbance of 500 square feet or more within 300 feet of a watercourse or the lake line. Code Enforcement is responsible for the administration and oversight of these provisions. Land-disturbing activities within the overzone affecting 3,000 square feet or more must obtain site-plan approval from the planning board.

The Watershed Overzone ordinance requires compliance with the City of Syracuse's Watershed Rules and with applicable federal, state, and county regulations. Performance standards to prevent non-point source pollution call for grading of impermeable surfaces to direct run-off to the village's storm sewer system. Sufficient "travel time" must be allowed for pollutants to be neutralized before reaching the lake or any other watercourse. The removal of trees and vegetation is to be minimized, and drainage and erosion-control measures are required during and after construction. The reviewing board or officer is authorized to designate acceptable areas for site disturbance. Any part of the site outside these areas is designated "no-disturbance," allowing only minimal construction of driveways, trails, and utilities.

Village code available at www.generalcode.com

Chapter 225: Zoning; Article VI Overzone Regulations; § 225-19.1, § 225-20
Village Web site: villageofskaneateles.com

**Town of Ballston (Saratoga County)**
**Ballston Lake Waterfront District Regulations (2006)**
The regulations establish standards to protect Ballston Lake's visual environment and water quality. They require site-plan approval by the planning board for "all new construction, shoreline alteration, shared shoreline access and/or site clearing."

Design standards require that the visual impact of structures onshore be minimized through vegetative screening; that parking areas, driveways, and patios be made of permeable materials where practicable; that best management practices be used to control erosion and stormwater impacts; and that lighting not disturb surrounding properties or water views. Site-plan approval is required for shoreline alterations. General standards specify that the shoreline's natural contour must not be disturbed; vegetation must be preserved or replaced with indigenous plants; and aesthetic features along the shore must not be disturbed. Filling, dredging, and retaining walls and bulkheads are regulated. The planning board may permit "removal or rearrangement of materials in the water" only where the activity "is found to be beneficial to existing shoreline conditions, uses, and water quality and clarity." Treated lumber used in bulkheads or retaining walls must be non-leaching.

Tree-cutting and clearing on shorefront lots must be approved by the planning board. Applicants must comply with enumerated standards or submit an alternative cutting plan. Exceptions to this requirement are made to allow for lake access—a contiguous clear-cut opening in the buffer strip, angled to reduce run-off and not exceeding 75 feet or 20 percent of the lot's lake frontage. The ordinance includes provisions and standards for deeded or other contractual shoreline access where three or more lots do not have separate ownership of shore frontage.

Town code available at www.generalcode.com
Chapter 138: Zoning; Article VIIA
Town Web site: www.townofballstonny.nycap.rr.com

### B. Protect, Restore, & Rehabilitate Natural Shorelines

**Town of Milan (Dutchess County)**
**Habitat Assessment Guidelines (2005)**
Habitat Assessment Guidelines endorsed by the planning board provide "site-specific baseline information" that can be integrated early in the planning process to "establish environmental constraints" and guide plans for development "before the applicant invests significant time and money in design and engineering." A habitat assessment must be completed before a sketch plan is endorsed or SEQRA review is begun, and before erosion and stormwater plans are prepared for the site.

Because habitats exist on a landscape scale, the assessment must describe habitats found on the entire site, not just on the area of disturbance, and also must include "observable habitats on adjacent and nearby properties." Probable species associated with habitat types must be identified. If appropriate habitat is identified, species of conservation concern—endangered or threatened species protected by federal and state laws, and vulnerable species listed in the *Biodiversity Assessment Manual for the Hudson River Estuary Corridor*—must be assumed to be present or will be present in the future.

The habitat evaluation must describe the full range of habitat—including breeding, foraging, and population dispersal—for both protected and non-protected species. Criteria for evaluating species and habitat include rarity, diversity, and size of critical-habitat areas; fragility; local importance; connectivity; and fragmentation. A discussion of ecological and other impacts of the proposed project, biodiversity, and mitigation measures is required. The assessment and proposed mitigation measures are to be evaluated through a site visit by members of the planning board, the Conservation Advisory Council, and the town planner. Mitigation measures may be imposed as conditions on a development proposal.

Town of Milan Habitat Assessment Guidelines available at www.milan-ny.gov/townplanning.html)
For procedural questions regarding the guidelines, contact the planning board chair at www.milan-ny.gov/directory.html

**Town of Gardiner (Ulster County)**
**Shawangunk Ridgeline Protection District (2006)**
Taking a landscape-scale approach to natural-resource conservation, the ordinance documents the ecological value of the Shawangunk ridgeline as "one of the most important sites for biodiversity conservation in the Northeastern United States." Recognizing that the integrity of the entire ecosystem can be significantly affected by "any development within the Town at the higher elevations or on the steeper slopes of the Ridge," the ordinance aims to direct development to appropriate areas at lower elevations and to preserve more sensitive areas of steep slopes and unfragmented forests.

Three tiered sub-districts within the district have separate dimensional requirements, including minimum lot area, maximum building height and floor area, and maximum impervious-surface coverage. Resource-protection design requirements apply to all special permit applications within the district; the planning board may condition approvals to ensure that development "creates no more than a minimal impact on the scenic and ecological resources of the district and the surrounding area." A conservation analysis is required. Building envelopes and land disturbance are limited. Disturbed slopes must be re-vegetated with non-invasive species; visual protection and landscaping standards also require the use of non-invasive native species. Standards for roads, driveways, and utilities protect slopes and natural contours of the ridgeline. Water-resource protection standards include no unpermitted construction within 100 feet of a watercourse, no net increase in run-off, and the routing of run-off from impervious surfaces to detention ponds or infiltration structures.

Specific habitat protections include the requirement that land-altering activities minimize "the fragmentation of contiguous forest habitats and other ecologically significant areas." Major subdivision applications must identify habitats in consultation with a qualified professional. The planning board must refer applications for major subdivisions in the higher sub-districts to the NYS Natural Heritage Program for review. Forest management standards limit timber harvests and clear-cutting.

Town code available at www.generalcode.com
Chapter 220: Zoning; § 220-13.1
Town Web site: www.townofgardiner.org

### C. Promote & Restore the Quality & Ecological Function of Water Resources

**Village of Irvington (Westchester County)**
**Stormwater Control (2006)**
To aid local governments in complying with federal and state stormwater-management regulations, the NYSDEC has developed a Sample Local Law for Stormwater Management and Erosion & Sediment Control, which can be adapted to meet a community's individual needs. The sample law includes suggested language for zoning, subdivision, and site-plan regulations, and for an erosion and sedimentation ordinance. It also includes lists of recommended management practices and guidelines for executing a stormwater facility maintenance agreement.

Irvington has incorporated the NYSDEC's best-practices recommendations and maintenance agreement as a Stormwater Control Ordinance within its zoning code. A Stormwater Pollution Prevention Plan is required for all land-development applications. The plan must describe temporary and permanent measures to contain pollutants, sediment, and run-off, as well as permanent structural and vegetative methods of preventing pollution. Acceptable management practices to preserve water quality specified in the NYSDEC sample law and in the Irvington ordinance include five types of ponds to filter, detain, or hold stormwater; four types of wetlands, which can treat or detain storm flows; infiltration trenches, basins, and dry wells; sand filters, organic filters, and bioretention basins; and dry and wet swales.

Village code available at www.generalcode.com
Chapter 224: Zoning, Article XXVII: Stormwater Control
Village Web site: www.irvingtonny.gov
New York State Sample Local Law (2006) is available at www.dec.ny.gov/docs/water_pdf/localaw06.pdf

**Town of Clinton (Dutchess County)**
**Model Development Principles for Protection of Natural Resources in the Hudson River Estuary Watershed: Consensus of the Local Site Planning Roundtable (2006)**
In a process of code review and community consensus-building that extended from September 2004 to January 2006, the Town of Clinton was the focus for the development of model principles incorporating low-impact development (LID) methods for environmentally sensitive site design. The principles state that "LID integrates site ecological and environmental goals and requirements into all phases of planning and design." The 22 Better Site Design Principles set out in this report can be adapted to a community's unique conditions, and were considered by Clinton in partnership with the Wappinger Creek Watershed Intermunicipal Council, Dutchess County, NYSDEC, and the Center for Watershed Protection.

The Model Development Principles first address residential streets, parking, and lot development, and then go on to address conservation of natural areas. Street width and length, right-of-way width, and cul-de-sacs should be minimized. Vegetated open channels in the street right-of-way are recommended for stormwater management. Regulations for parking ratios, parking codes, parking lots, and parking structures should encourage shared parking and reduce impervious-surface coverage. Parking lot run-off should be managed through bioretention areas, filter strips, swales, and landscaping. Open-space design and management and flexible design standards for setbacks and frontages, sidewalks, and driveways are recommended. Residential rooftop run-off should be directed to vegetated areas or open channels, bioretention areas, rain gardens, and rain barrels.

To conserve natural areas, the creation of a system of naturally vegetated riparian buffers, managed from plan review through post-development stages, is recommended. Clearing and grading should be minimized. Trees and native vegetation should be preserved. Conservation incentives should be included in subdivision regulations. Stormwater outfall should be managed through conservation design, riparian buffers, and on-lot treatment.

*Town of Clinton Recommended Model Development Principles for Protection of Natural Resources in the Hudson River Estuary Watershed: Consensus of Local Site Planning Roundtable* is available at
www.townofclinton.com/pdf/ClintonBSDrev8.pdf
Town Web site: www.townofclinton.com

## CHAPTER V: PROTECT SCENIC RESOURCES

**City of Kingston (Ulster County)**
**Siting and Facility Related Guidelines, RF-R Rondout Creek District and RF-H Hudson Riverfront District (1992); RF-R Development Standards (2005)**
Kingston's Siting and Facility Related Guidelines aim to protect the scenic quality and views of the city's riverfront. The guidelines are to be specifically incorporated by the planning board into its review of development proposals in the Rondout Creek and Hudson Riverfront Districts. Development standards for the Rondout Creek District offer additional scenic protections.

In both districts, roadways, all utility power lines, and incompatible signs are prohibited from the shoreline. Development must protect views both to and from the river, allowing sight lines through the property and clustering or orienting buildings to maintain views from public streets. Architectural guidelines address scale, form, and materials to create development compatible with the landscape. Lighting must be designed to prevent diffusion.

Within the Hudson Riverfront District, a scenic landscape protection buffer is required for all development to maintain the river's vegetative corridor. As part of site-plan review, the applicant must submit a Visual Landscape Buffer Plan, including a detailed narrative describing the scenic impacts of the project and identifying existing topography and vegetation, proposed plantings, drainage, erosion prevention, and other landscaping. Parking areas should be buffered and building color should blend with the landscape.

Development Standards for the Rondout Creek District were created to protect historical waterfront development and to encourage new development "which enhances the visual appearance of the city" while streamlining the design review process. The standards require a clustered approach to new development, specify building heights and materials for riverfront facades, and prohibit large, monolithic walls. Roofs, facade composition and fenestration, and building materials and colors that enhance scenic quality are described in detail, along with standards for signs and lighting.

City code available at www.generalcode.com
Chapter 405: Zoning; § 405-31(E); § 405-31.1.
City Web site: www.ci.kingston.ny.us

**Town of Blooming Grove (Orange County)**
**Scenic Overlays (2005)**
Five overlay districts protect Blooming Grove's scenic resources: Scenic Gateways, Scenic Viewshed, Ridgeline, Scenic Roads, and Surface Water. Where more than one district applies to a parcel, the planning board is authorized to reconcile conflicting requirements.

The Scenic Gateways Overlay requires site-plan approval for the construction or significant alteration of a building or structure within the district. The planning board must evaluate the integration of the project with its built and natural surroundings, as well as with pedestrian, bicycle, and vehicular traffic patterns. The board also must evaluate site landscaping, signage, and building design.

In the Scenic Viewshed District, as well as in the Scenic Roads and Ridgeline districts, development approvals require a visual-assessment review, based on aerial photographs, perspective drawings, and descriptive materials derived from on-site surveys. The Viewshed Overlay defines standards for the use of unobtrusive building materials, colors, and textures, and for windows of low reflectivity. Within the Ridgeline Overlay, obstruction of public views must be avoided. Lighting may not be directed off-site nor exceed specified intensities. Signs may not be visible above the tree canopy, and existing vegetation and scenic features such as trees, hedgerows, and stone walls should be preserved.

Standards for the Scenic Roads Overlay include the maintenance of a continuous 100-foot vegetated buffer or open field along scenic roads, re-vegetation with indigenous plant material, underground utilities where possible, and the prohibition of fencing that blocks views from the road. For any use within the Surface Water Overlay district, a 100-foot buffer must be maintained along the edge of streams, lakes, wetlands, and other water bodies. The planning board may prohibit mowing and the application of chemicals within the buffer, and must ensure that any development within the overlay does not degrade the district's scenic character.

Town code available at www.generalcode.com
Chapter 235: Zoning, § 235-5; § 235-14.4
Town Web site: www.townofbloominggroveny.com/index.html

## CHAPTER VI: PROMOTE GOOD URBAN PLANNING & SUSTAINABLE DESIGN

### A. Promote Good Urban Planning & Design

**City of Saratoga Springs (Saratoga County)**
**Gateway Overlay District 1—Route 50 and Route 9; Gateway Overlay District 2—Marion Avenue (2003)**

The Gateway Overlay Districts of the City of Saratoga Springs are intended to maintain rural character in primarily commercial areas of the city near Saratoga Spa State Park. The ordinances establish mandatory standards and optional guidelines for new development and redevelopment, in conformance with the Comprehensive Plan. All of the standards emphasize design and materials that complement natural landforms.

District 1 is divided into Zone A, a commercial node of clustered uses with higher impervious surface limits; and Zone B, a lower-density, more rural commercial area.

The ordinance sets out design standards concerning Landform, Circulation and Parking, Structures, and Vegetation to be used in subdivision, site-plan, building permit, and architectural review. The standards require that "building location, type, and mass shall reflect and reinforce the site's natural landform." Changes in grade should minimize disturbance to the natural landform. In commercial nodes, straight-edge cuts and retaining walls may be permitted to facilitate clustering. Curvilinear circulation systems are encouraged outside commercial nodes. A maximum of 20 percent of parking may be located at the front of a building. Pedestrian systems in commercial nodes should be concrete or paved walks linking buildings, parking areas, and public spaces. In Zone B, pedestrian systems should be trails made of asphalt, stone dust, or mulch. Shared driveways are encouraged in both zones. Standards for the height, mass, roof form, and materials of structures emphasize rural scale and the preservation of views and open space. Structured patterns of vegetation are found in Zone A; clustered, more natural plantings are found in Zone B. In both zones, the preservation of existing vegetation and the use of indigenous species are encouraged.

District 2 design standards include site-development standards and guidelines for commercially zoned property; building-design standards for commercially zoned property; building-design standards and guidelines for residentially zoned property; and special traffic-calming actions. In commercial areas, only 20 percent of parking may be at the front of a building. One bicycle parking space is required for every 15 off-street vehicular spaces. Vehicular access to parking should be from an alley or secondary street. Traffic-calming actions include narrowing road shoulders, installing curbs, and installing "bump outs or pedestrian refuge areas" at pedestrian crossing points.

The regulations for both districts include Conceptual Development Plans illustrating "possible relationships between existing and infill buildings and the street in a long-range build-out scenario."

City Zoning Ordinance available at www.saratoga-springs.org/docs/bpwebsite.asp
Article XII; § 240-12.24; § 240-12.25
City Web site: www.saratoga-springs.org

**Town of Warwick (Orange County)**
**Traditional Neighborhood Overlay (TN-O) District (2002)**

Warwick's Traditional Neighborhood Overlay (TN-O) District is designed to provide "compact, pedestrian-oriented residential development in close proximity to shops, services, offices, civic buildings, and open space." These comprehensive regulations aim to reduce traffic congestion, encourage civic and community life, preserve the town's rural character and the traditional scale and mix of uses of its hamlets and villages, and present "a desired alternative to conventional, modern use-segregated developments such as large lot suburban subdivisions and strip commercial developments."

A TN-O District is made up of two areas: a neighborhood residential area and a main street area. The neighborhood area provides a variety of housing; the main street area provides service, retail, and civic and community uses. Minimum and maximum percentages of the gross area of the district are reserved for open space, civic uses, workplaces, retail uses, and small-lot and large-lot residential uses. The ordinance calls for a generally rectilinear block layout in residential areas, and for a diversity of lot sizes. Blocks are required to have a uniform build-to line defining the break between public and private space. Dimensional and design standards address building size, placement, character, and materials.

The TN-O allows for pedestrian circulation throughout the district. All streets must have sidewalks. Bicycle circulation is accommodated on streets or bicycle paths. Convenient access to available or planned public transit is required. Motor vehicle circulation must "minimize conflicts with pedestrians and bicycles." Traffic-calming features are called for, and a hierarchy of streets is established, with the aim of creating an interconnected rectilinear grid. The ordinance also establishes streetscape and streetlighting standards, and calls for the reduction of impervious surfaces through the use of interlocking pavers for low-impact parking needs.

Town code available at www.generalcode.com
Chapter 164: Zoning, §164-47
Town Web site: www.townofwarwick.org

### B. Promote Sustainable Design

**Town of Babylon (Suffolk County)**
**Green Building Certification (2006); Energy Star Requirements (2006)**

The Town of Babylon has formally adopted the LEED™ rating system for new construction of commercial buildings, offices, industrial buildings, and multiple residences, specifically including senior-citizen multiple residences. The Green Building Certification Ordinance applies to projects of 4,000 square feet or greater and is mandatory for all applications received one year after its effective date. As part of its Green Building Initiative, in a separate ordinance the town also has adopted requirements of the Long Island Power Authority New York ENERGY STAR Labeled Homes Program for all new single-family dwellings.

The LEED™ ordinance is intended to promote conservation of energy and water and to improve air quality. Applicants for building permits are required to submit a completed LEED-NC checklist to the Commissioner of Planning and Development and pay a fee of $.03 per square foot, which is refunded when LEED™ certification is achieved. The town building inspector is responsible for compliance and enforcement, and is authorized to inspect the project at each stage of construction.

Under the phased provisions of its ENERGY STAR ordinance, Babylon requires builders of single-family dwellings to comply with the Power Authority's Builder Option Package or achieve a rating of at least 84 on New York State's Home Energy Rating System. Additional requirements include designated electricity savings per dwelling unit; an automatically controlled mechanical ventilation system; and compliance with combustion safety testing standards. As of April 1, 2008, compliance with all aspects of the ENERGY STAR program, including field verification and testing, was required before a certificate of occupancy would be issued.

Town code available at www.generalcode.com
Chapter 89: Article VIII Green Building Certification [12-20-2006]; Article VI ENERGY STAR Requirements [8-15-2006]
Town Web site: www.townofbabylon.com

**New York City**
**Green Building Law (2005)**

The New York City Council estimates that its Green Building Law, which took effect on January 1, 2007, "will affect approximately $12 billion in construction over the City's ten-year capital plan." The law is intended to substantially reduce air pollution and energy and water consumption; reduce dependence on foreign oil; and achieve savings in energy and water costs that will offset any associated debt-service costs on increases in capital expenditures.

The Green Building Law applies to capital projects of city agencies and other capital projects that receive more than half of their estimated cost from the city or that receive $10 million or more from the city. A capital project costing $2 million or more and involving the construction of a new building or an addition to or substantial renovation of an existing building must achieve a LEED™ silver rating or higher. Schools and some other occupancies are required only to achieve LEED™ certification.

Capital projects costing $12 million or more must achieve specified percentages of energy savings, calculated under LEED™ or New York State standards, in addition to LEED™ ratings. Energy savings also are required for projects involving the installation of a boiler or HVAC system costing $2 million or more, a lighting system costing $1 million or more, or a plumbing system costing $500,000 or more. If necessary in the public interest, the mayor may exempt from the provisions of the law as much as 20 percent of capital expenditures in a given fiscal year.

NOTE: While the scale of New York City dwarfs Hudson riverfront municipalities, the underlying principles of this law are applicable to communities of any size.

New York City Green Building Law [Local Law 86 (2005)]
www.nyc.gov/html/dob/downloads/pdf/ll_86of2005.pdf.
Title 43, Chapter 10, of the Rules of the City of New York: Green Building Standards:
http://www.nyc.gov/html/oec/downloads/pdf/LL86/2Green_Buildings%20Rules-Final_Text-_Legal_1680311_.pdf.
Executive Order No. 97 of 2006:
http://www.nyc.gov/html/oec/downloads/pdf/LL86/1Executive%20Order_97_OEC.pdf.
Mayor's Office of Operations Office of Environmental Coordination: Green Building:
http://www.nyc.gov/html/oec/html/sustain/green_build.shtml

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"This illustrated guide is designed to inspire and inform all who wish to create vibrant waterfront communities. Whether you are an elected local official, a municipal planner, a developer, or a community advocate, you will find principles and implementation strategies for waterfront revitalization that are adaptable to your community's character and circumstances. I encourage you to use this guide as you develop and implement your waterfront vision."

—From the foreword by NYS Secretary of State Lorraine A. Cortés-Vázquez

This guide provides tools to promote the development of lively, pedestrian-friendly, mixed-use riverfronts in and adjacent to municipal centers while conserving forests, farms, wetlands, and fields, and providing for a continuous public greenway along the river. This land-use pattern will allow riverfront communities to accommodate and benefit from new development in ways that increase economic viability, enhancing main streets and community life while protecting the Hudson River's ecology and internationally celebrated beauty.

*Revitalizing Hudson Riverfronts* is based on six Riverfront Development Principles:

1. Promote Riverfront Development in Areas with Existing Infrastructure
2. Encourage Water-Dependent & Water-Enhanced Uses in or Adjacent to Municipal Centers
3. Connect People to the River
4. Protect Natural Resources
5. Protect Scenic Resources
6. Promote Good Urban Planning & Sustainable Design

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