

HUDSON WATERFRONT WALKWAY

Plan and
Design Guidelines



DEP

DEP
SR
482
.N45
H83
1984
C.2

DEP
SB
482
.N45
H83
1984

HUDSON WATERFRONT WALKWAY

c. 2

Plan and Design Guidelines

March, 1984

Prepared for:

**The State of New Jersey
Department of Environmental
Protection**

Prepared by:

**Wallace Roberts & Todd
Architects, Landscape Architects,
Urban and Environmental Planners**

**Louis Berger & Associates, Inc.
Engineers, Economists and Planners**

**Ralph B. Hirsch
Executive Director
Bicycle and Pedestrian
Transportation Research Center**

PROPERTY OF NEW JERSEY
O.E.P. INFORMATION
RESOURCE CENTER

NEW JERSEY STATE LIBRARY



3 3009 00592 9171

This report was prepared under contract with the New Jersey Department of Environmental Protection, Division of Coastal Resources, with financial assistance by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resource Management, under provisions of the Federal Coastal Zone Management Act, P.L. 92-583, as amended.

PROPERTY OF NEW JERSEY
O.E.P. INFORMATION
RESOURCE CENTER

Table of Contents

	PAGE NO.
PREFACE	1
THE WALKWAY PLAN	3
Introduction	5
Purpose of the Plan	5
Summary of Conclusions	7
I. The Location of the Walkway	9
II. Building the Walkway and Making It Work	23
The Role of the Federal Government	23
The Role of the State	24
The Role of the Counties	25
The Role of the Waterfront Municipalities	26
The Role of Citizens	29
The Role of Developers	29
III. Factors in Walkway Design	33
User Needs	33
Key Cultural Resources and Special Areas	37
Access to the Waterfront	48
Compatibility of the Proposed Walkway with State Bikeway and Trails Plans	53
Models and Prototypes of Outstanding Waterfront Walkway Design	56
Sources	57
DESIGN GUIDELINES	65
Introduction	67
Purpose of the Guidelines	67
Statement of Coastal Policy	67
Importance of the Walkway to the Development of the Hudson Waterfront	68
How the Design Guidelines Relate to the Hudson Waterfront Walkway Plan	69
How to Use the Guidelines	70
The Developer	70
Department of Environmental Protection	71
I. Minimum Requirements for Public Accessways	73
Waterfront Walkway	73
Location	73
Dimensions	73
Connecting Walkway	73
Location	73
Dimensions	73
Bicycle Access	74
Location	74
Dimensions	74
Parks and Plazas	74
Location	74
Minimum Size	74
Required Design Elements	74
Signage	74

1997 JUL 12 12:60 9569 HONOLULU # 105205

	PAGE NO.
II. Exceptions to Minimum Requirements for Public Accessways	75
III. Overall Requirements for Public Access	77
Continuity of Public Accessways	77
Preservation of Views of the Waterfront and Palisades	77
Safety and Security	78
Privacy	79
Durability and Maintenance	80
Design Compatibility and Quality and Amenities	80
Environmental Protection	82
IV. Prototype Design Solutions	83
Prototypical Cross-sections of the Public Accessway	83
Design Solutions to Prototypical Site Conditions and Use	89
Mixed-use Office-Commercial-Residential-Marina Development	89
Water-Dependent Industry Development	91
Non-water-Dependent Industry	92
Engineering Considerations for Walkway Development at the Water's Edge	93
Existing Conditions along the Waterfront	93
Tidal Flats	94
Revetted Shoreline	94
Palisades	95
Waterfront Structures	96
Engineering Considerations for Walkway Construction	98
V. Open Space Components	99
Walkways	99
Parks and Plazas	101
Bicycle Paths and Bicycle Parking	102
Trails	104
Scenic Overlooks	105
VI. Design Elements	107
Paving	107
Pedestrian Ramps	110
Stairways	111
Seating	113
Planting	115
Planters, Tree Grates, Tree Guards	123
Trash Receptacles	125
Buffers: Fencing, Walls, Bollards, Plant Materials	126
Lighting	128
VII. Performance and Maintenance of Public Accessways	131
Performance	131
Maintenance	131
General Maintenance Objectives	131
Maintenance Planning and Execution	131
Routine Maintenance	131
Walkway Maintenance Plan Requirement	132
Liability	132
Sources and Specific References	133
Credits	136

Preface

This report presents the results of a two year study, funded by the New Jersey Department of Environmental Protection, to plan a continuous Waterfront Walkway on the New Jersey side of the Hudson River between the George Washington Bridge and the Bayonne Bridge.

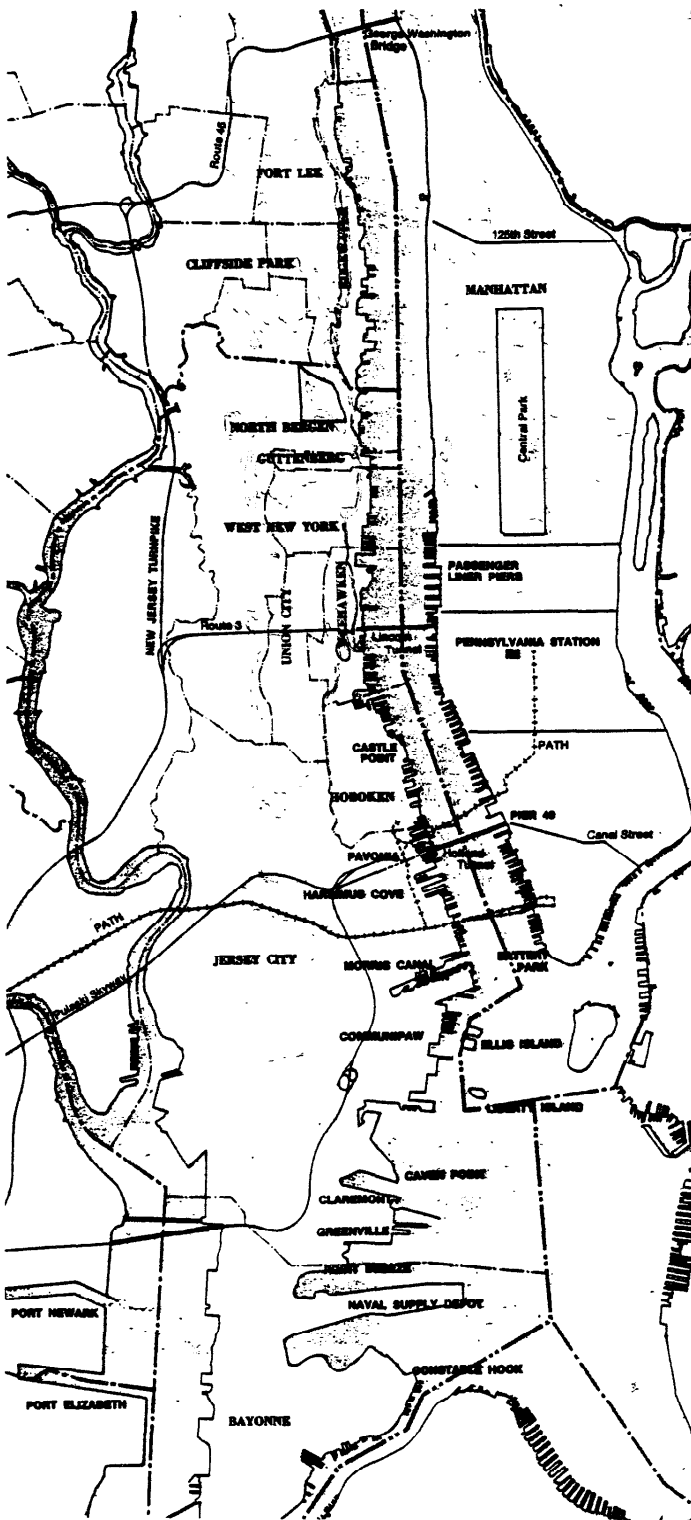
The report sets out the recommendations of the Hudson Walkway Plan and presents Design Guidelines for the Walkway.

Background studies for the Walkway Plan are set out in a report entitled The Hudson River Waterfront Walkway, Existing Conditions and Preliminary Walkway Designation, December 17, 1982.

The task of preparing the Plan and the Guidelines has been a challenging one. Even more challenging will be the task of carrying out the recommendations. The New Jersey Hudson Waterfront is a unique urban environment and an astonishing opportunity for public access to the water's edge. It will require the combined efforts of many to make the plan a reality.

The Plan is a vision for the future, to be implemented incrementally, as developers complete projects along the waterfront. The plan demonstrates the intent of State Coastal Policy that the walkway be included as an essential part of every development along the waterfront. The walkway will not displace other waterfront uses, but rather will complement the design scheme selected by the developer for each site.

The Design Guidelines present DEP's minimum locational and dimensional requirements for the walkway, and standards and suggestions for examples of means by which public access can be incorporated within a variety of different uses and types of development.



The Hudson Waterfront Walkway is proposed as a continuous waterfront public access system along the New Jersey shore of the Hudson River from the George Washington Bridge to Bayonne.



The Walkway Plan



Introduction

The Hudson Waterfront Walkway Plan is an outgrowth of and a sequel to the Final Report of the Hudson River Waterfront Study, Planning and Development Commission, published in September 1980.

The concept has been under consideration for several decades; it was presented in the Regional Plan Association's 1966 Study, The Lower Hudson, and is supported by the policies stated in the New Jersey Trails Plan, published in 1982 by the New Jersey Trails Council, and by the findings of the Draft 1983 New Jersey State Outdoor Recreation Program.

PURPOSE OF THE PLAN

Based upon the findings of the two year study of the Hudson Waterfront Commission, the New Jersey Department of Environmental Protection Division of Coastal Resources undertook the Walkway Study for the purpose of defining a continuous waterfront pathway from Fort Lee to Bayonne, with access paths from neighborhoods and roadways where appropriate.

The consultants were charged with identifying a pathway that will link nodes of interest and provide access to paths ascending the Palisades cliffs and linking to local residential neighborhoods in the "Little Apple" communities.

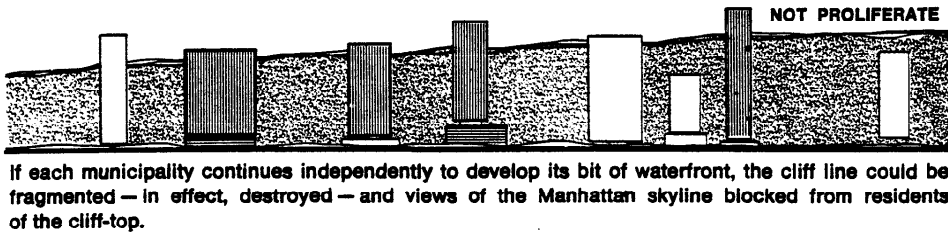
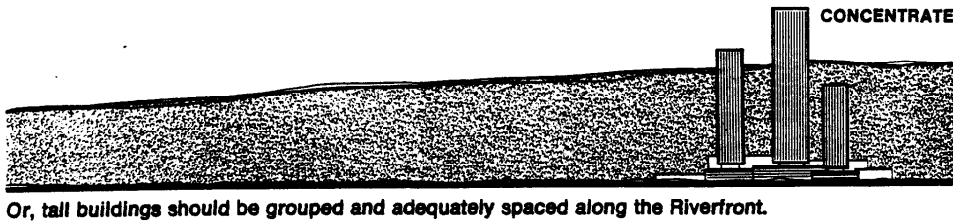
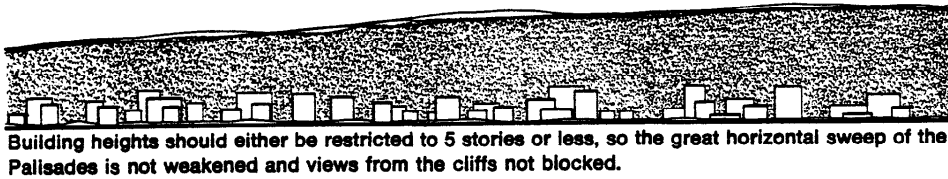
In conformance with Coastal Resource and Development Policies, the route is intended to parallel the waterfront and to link existing parks, while providing for direct contact with the water's edge to the maximum extent practicable.

Connections to paths above the Palisades cliffs are to be considered so that parallel systems of paths above and below the cliffs can eventually be developed to take advantage of unique open space opportunities. Areas are to be identified where the path could be widened into a plaza or small waterfront park.

The criteria for review of development permit applications under the State's authority to regulate development within the Coastal Zone includes a requirement for provision for public access to all coastal waters.



By 1966, the Regional Plan Association had identified the potential for a Waterfront Walkway along the New Jersey shore of the Hudson River in their "Lower Hudson Plan."



The Regional Planning Association's 1966 "Lower Hudson Plan" set out important principles for maintaining the visual quality of the New Jersey shore of the Hudson, principles which are supported by New Jersey's Coastal Policies.

The Plan and the Design Guidelines for the Walkway, which follow the Plan in this volume, are intended to be both specific and flexible, and to decrease uncertainty on the part of both developers and permit agencies with regard to suitable and acceptable ways that the waterfront access requirement can be met.

Responding creatively to the opportunity to establish a major urban waterfront open space system along the Hudson Waterfront will require cooperation, initiative and a vision of what can be achieved on the part of residents of the communities along the River, citizens groups, recreation and bicycling organizations, developers and municipal, county, state, regional and Federal Agencies that can take action to make the Hudson Waterfront Walkway a reality.

The excellent progress in achieving agreements to date between the Division of Coastal Resources and waterfront

developers is most encouraging. Tentative or final agreements have been achieved regarding the location design and configuration of the walkway on more than a third of the 3400 acres presently proposed for development on the Hudson Waterfront between the George Washington and Bayonne Bridges. Many steps remain, however, between tentative agreement and completion of construction, that must be followed through upon to assure the successful realization of the Walkway.

This Walkway Plan and The Guidelines that follow it in this volume are designed to assist in making the vision a reality.

The Plan describes the generalized ideal location of The Walkway and major issues, problems and opportunities for walkway design and construction. The generalized plan maps are followed by a discussion of how various individuals, groups and agencies can help to build the Walkway and to make it work.



In September, 1980, the jurisdiction of the New Jersey Department of Environmental Protection's Coastal Resource and Development Policies was expanded to include the Hudson.

SUMMARY OF CONCLUSIONS

Dramatic changes are occurring on the Hudson River Waterfront in New Jersey.

Consolidation and reorganization of rail service in the region in the 1970's resulted in abandonment of major portions of the 1900 acres along the New Jersey Hudson Waterfront between the George Washington and the Bayonne Bridge that were occupied by railroad yards until the 1960's.

Simultaneously, as a result of the major technological change in shipping to container operations with mechanized handling and storage, bulk cargo operations along the Hudson Waterfront have become obsolete.

As a result, after twenty years of stagnation, vast areas of the waterfront have become available for development, and developers have begun to respond. As of December 1982, including the 800 acre Liberty State Park, 3400 acres along the Hudson Waterfront are proposed for mixed use, residential, commercial, office and major recreational development. More than half of the length of the Hudson Waterfront between the George Washington Bridge and the Bayonne Bridge lies within these proposed development areas.

The Hudson Waterfront Walkway is proposed as a continuous open space system along the River's edge, linking these sites together and providing one of their major amenities, while assuring that the public will continue to be able to gain access to the River.

The New Jersey Department of Environmental Protection Division of Coastal Resources' power to require provision, construction and maintenance of public access to the waterfront through waterfront development wherever feasible means that the potential exists for a very substantial portion of the walkway to be built and maintained at little cost to the public.

Coordination of State, County and municipal waterfront open space plans with the Walkway Plan will ensure the success of this major urban waterfront landscape project.

Guidelines for design and construction of the Walkway call for establishment of small waterfront parks at intervals of no more than one-half mile along the water's edge. Public lands with possible potential for development as waterfront parks are identified as a part of the Plan.

Studies undertaken in the preparation of the Hudson Waterfront Walkway Plan are documented in the Existing Conditions Report.



The Location of the Walkway

Part One

The location of the proposed walkway has been delineated on the basis of inventories and mapping and identification of significant problems and opportunities associated with:

- Key cultural resources and special areas under the New Jersey Coastal Zone Management Program;
- Parks and recreation areas;
- Other existing land uses;
- The status of railroad properties;
- The status of current major development; and
- Access and road system conditions.

The following pages illustrate the proposed location of the walkway and a summary of factors of particular relevance to its development.

In the review of preliminary findings of the study with citizens' groups and Municipal, County, Regional and State Agency staff, it was determined that the Plan should show the long range proposed route for the walkway, rather than a staged system with interim temporary links.

Because many development plans for the waterfront are in the concept planning stage, it is not possible to anticipate the form of future development on other sites. It was therefore concluded that the delineation of The Walkway must be generalized with, as one of its major











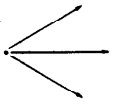












purposes, to demonstrate the State's intent that the walkway be located as close to the water's edge as possible, with loop excursion routes to scenic overlooks, and areas of particular historic interest.

Where tentative or final agreements have been achieved between the Division of Coastal Resources and developers as to the specific location of the walkway, the location of the walkway reflects these agreements. Examples include the Ford Plant, Roc Harbour, Hartz Mountain, Arcorp and Newport City developments.

The detailed design of the walkway will be governed by the general policies set out in this Plan and the Design Guidelines for the Walkway. These documents will serve as the basis for review by the Department of Environmental Protection Division of Coastal Resources of public access provisions within all proposed waterfront development as a condition of approval of waterfront development permits.

The plan is of necessity generalized, and the specific locations of the waterfront walkway, of walkway connections to the nearest inland public roadway, and of waterfront parks, plazas and scenic overlooks along the walkway, will have to be determined as integral features of the design of each development.

Legend

	Ideal Route		PATH Train		Development Parcels
	Loop Excursion Route		Existing Ferry		Historic Sites
	Ferry Services		Proposed Ferry		Historic Sites
	Existing Fishing		Outstanding Views		Municipal Ownership
	Proposed Fishing		Major Vehicular Access		Railroad Property
	Existing Marina		Minor Vehicular Access		Parks
	Proposed Marina		Pedestrian Access		Tidal Flats
	Hospital				Beach

THE HUDSON WATERFRONT WALKWAY PLAN

The following pages summarize key problems and opportunities associated with walkway delineation from the George Washington Bridge south to the Bayonne Bridge.

The Palisades Interstate Park occupies all of the study area in Fort Lee from the George Washington Bridge to the Edgewater municipal line and from the water's edge to the approximately 1000 feet west of the Palisades.

There are several marinas and boat launching ramps and recognized fishing spots within the Palisades Interstate Park. It represents an excellent starting point for the walkway, both because of its existing attraction to waterfront recreation users and because of its potential for providing a parking area for bicyclists who bring their bicycles to the area by automobile on bicycle racks. The walkway would serve as an extension to the recreational experience provided at the park.

With the closing of industry along the water's edge there came to be little reason for anyone to travel to Edgewater. The severe limitation of access from the west by the steep slopes of the Palisades further isolates the municipality. Recent residential development has begun to change the character of Edgewater's riverfront.

The Edgewater Municipal Park, located between Hudson Harbor House and Admirals Walk, was built without Green Acres funding. Access to the park is not therefore required to be permitted for non-residents of the Boro. Anyone outside the municipality wishing to use the playfields or basketball courts must get a permit from the Recreation Department.

The northern part of Edgewater is characterized primarily by residential uses. With the exception of three highrises: existing Hudson Harbor House and Admirals Walk and the proposed Commodore, these are mostly one and two family homes.

Non-resident users of the waterfront are primarily fishermen and crabbers and people who make use of the boating facilities at the Richmond and Von Dohn marinas.

Restaurants at the Richmond Marina and the Binghamton Ferry attract many local residents.

KEY ISSUES AND RECOMMENDATIONS

Of primary concern in this area is the prohibition against bicyclists and pedestrians on Henry Hudson Drive in Fort Lee Historical Park, part of the Palisades Interstate Park System.

Recommendation: Request the Palisades Interstate Park Commission to change their policy of prohibiting bicyclists and pedestrians on Henry Hudson Drive.

Henry Hudson Drive is a spectacular route which begins 100 feet above the river at the edge of the Palisades and proceeds down the face of the Palisades to the water's edge at Ross Dock north of the George Washington Bridge. From here a dirt path proceeds south along the water's edge, connecting with private roads south of Palisades Interstate Park.

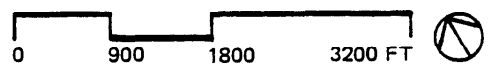
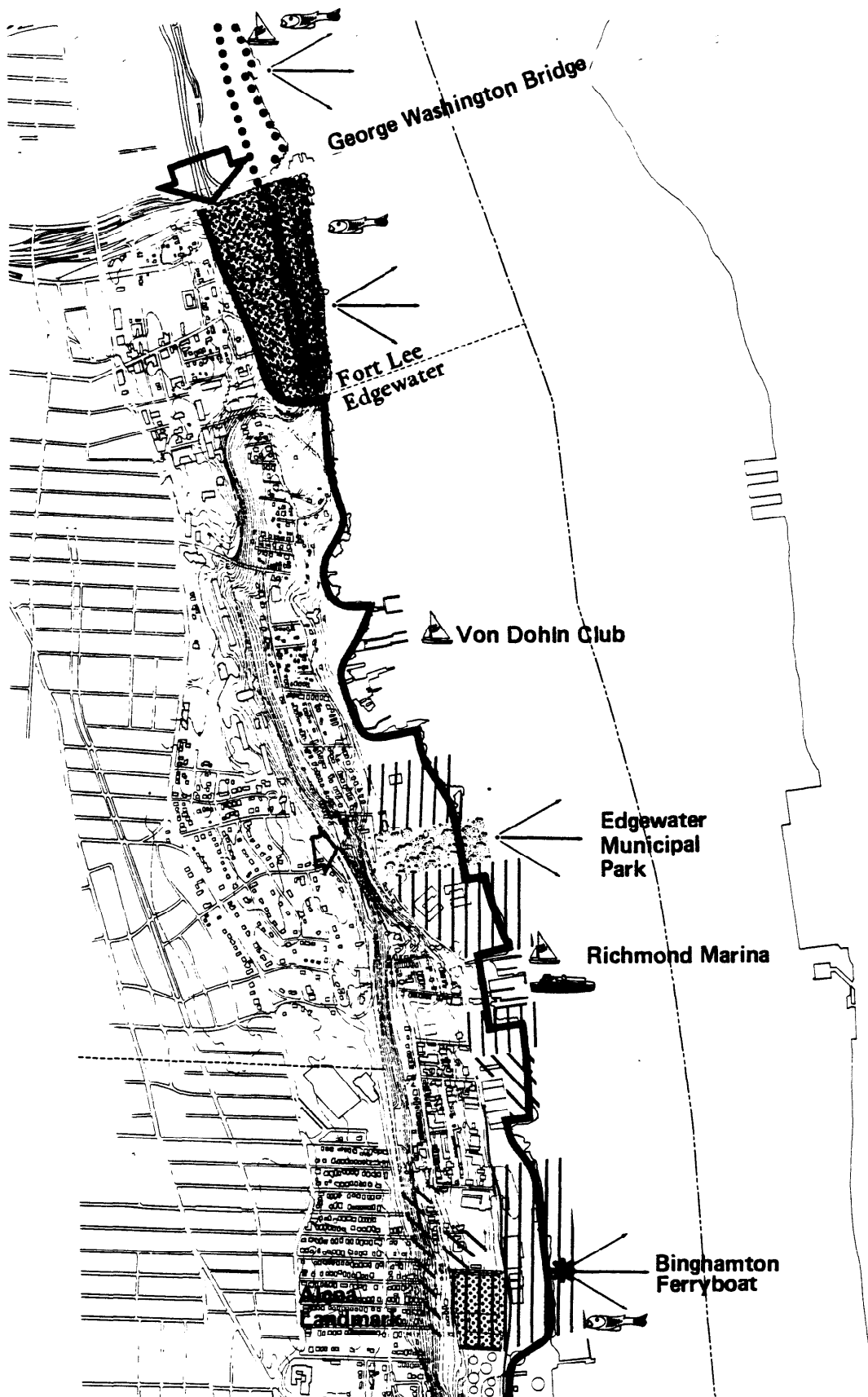
Recommendation: Future development of waterfront lands to the south of Fort Lee Historical Park should provide for public access on the waterfront linking to the existing waterfront path in the park.

A public route through the Edgewater Municipal Park will require an agreement from the municipality.

Recommendation: Establish a limited buffered access route through the park parallel to the water's edge. There is currently a wide area of bermed fill at the water's edge which could easily accommodate a walkway and benches.

The parking lot on the Binghamton site adjacent to the waterfront has unobstructed views of the water and the Manhattan skyline.

Recommendation: As development of the Binghamton Recreation Complex proceeds, the 30' to 40' unmaintained water's edge should be improved to provide a promenade for walkers and cyclists.



THE HUDSON WATERFRONT WALKWAY PLAN

The Ford Factory has tentatively agreed to provide direct access to the water at the north of the factory building, leading to a pedestrian plaza at the end of the pier. The possibility of access along the water to the north and south of the factory should be explored as review of the development plans for the site proceeds.

Among the amenities in the municipality of North Bergen are two thousand feet of almost vacant waterfront land, spectacular views from Boulevard East on top of the 150-foot-high Palisades Cliffs, and North Hudson Park. Several active citizens' groups including the North Bergen Action Group, Concerned Citizens to Save the Palisades and the Save the Palisades Association have expressed strong support for the walkway concept. While the primary goal of these groups is to prevent any construction which would desecrate the scenic and natural grandeur of the Palisades Cliffs, public access to the waterfront and the preservation of open space for park development are issues integrally related to this primary goal. The Roc Harbour Corporation and Palisades Hospital control a significant amount of the waterfront land in North Bergen. Vacant land and debris are being cleared to make way for future hospital expansion and 679 residential units. Open space and public access requirements will have to be met before coastal development permits will be issued for the hospital. Approval has been granted by the Division of Coastal Resources of Roc Harbour's proposed public access provisions.

The municipality of Guttenberg occupies only 600 linear feet of waterfront property through which the proposed walkway will pass. This 5.8 acres of waterfront property is owned by Prudential Insurance Company. There are no development plans for this land and the municipality of Guttenberg has no zoning ordinance.

The town of West New York's exemplary Controlled Waterfront Zoning District's requirement that 30% of the gross area of waterfront property shall be set aside for "public park and other recreational or open space use, in such dimensions and locations as to be utilized to the maximum extent for active and passive recreation facilities," require that such facilities are included in any waterfront development scheme in that municipality.

KEY ISSUES AND RECOMMENDATIONS

Uses along the Waterfront include major industries like Hills Brothers and Lever Brothers that are major employers and generators of tax revenues for waterfront communities.

Recommendation: Development of the waterfront walkway must recognize and respect the functional requirements of these industries.

River Road must accommodate all local traffic as well as provide the major connecting link between the George Washington Bridge and the Lincoln Tunnel. Traffic problems are severe during peak traffic periods and will become more acute with further development along the waterfront. Joggers use the River Road despite heavy traffic volumes. School children are not, however, allowed to walk along the River Road where sidewalks are either narrow or non-existent.

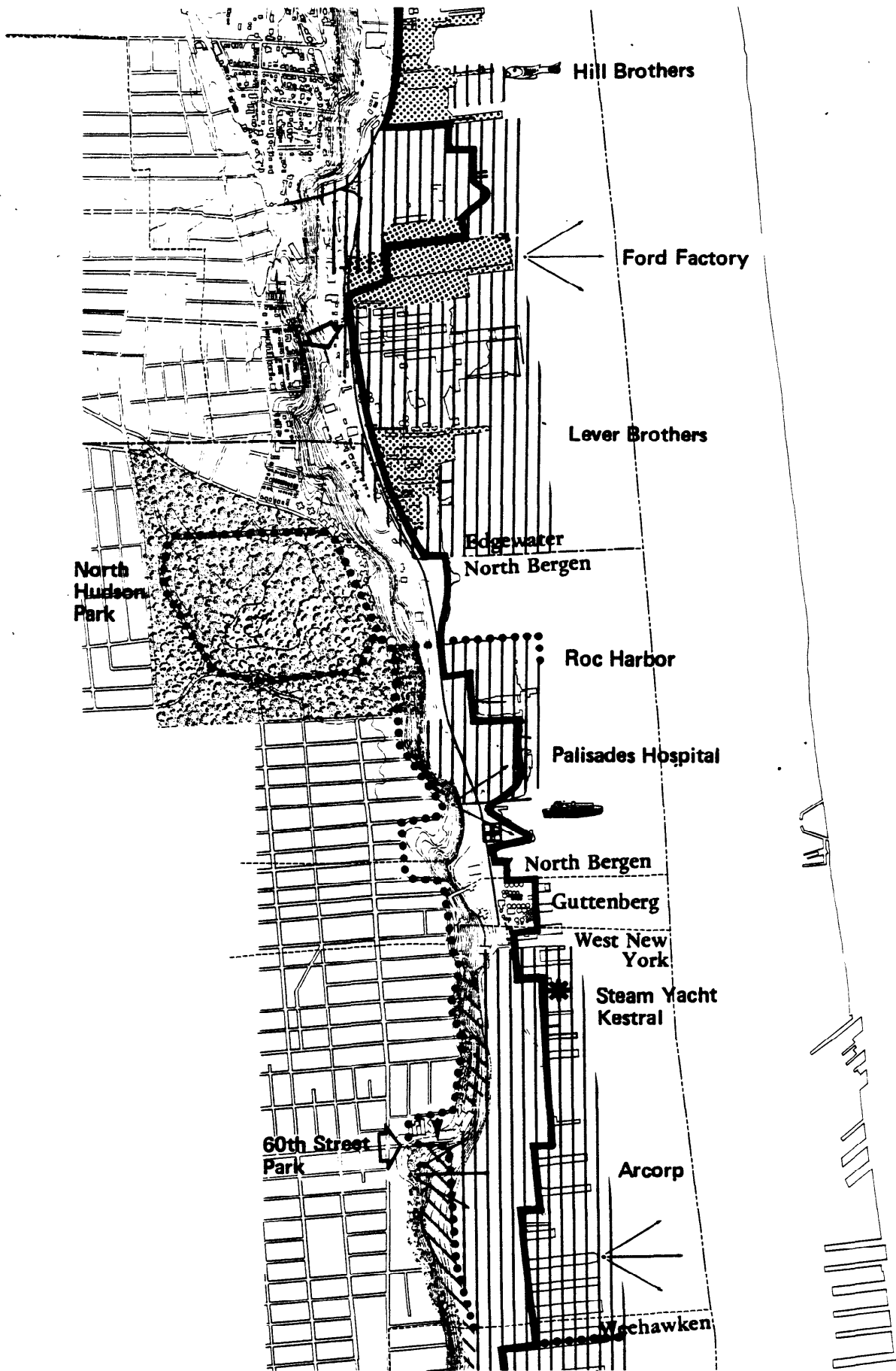
Recommendation: Encourage development of the waterfront walkway as a safe north-south pedestrian alternative to River Road, and reconstruction of River Road in accordance with the State's bicycle compatible design standards.

60th Street Park offers outstanding views from cliff top parks and the promenade along Boulevard East.

Recommendation: Careful improvements to landscaping could improve these scenic overlooks; prune trees that block views from the 60th Street Park.

The Arcorp Development is a 350-acre, proposed mixed-use development beginning just south of Guttenburg/West New York municipal line which will include public access along the water's edge. The Palisades Cliffs on the west side of the site are owned in part by the City of West New York and in part by the developer.

Recommendation: Improve the existing foot path along the face of the cliff as a scenic trail for public access from 60th Street to 51st Street.



0 900 1800 3200 FT



THE HUDSON WATERFRONT WALKWAY PLAN

Most of the waterfront in West New York and a substantial portion of the waterfront in Weehawken are owned by the Arcorp Development Corporation. Concept plans for the 350-acre Arcorp mixed-use development show parks, plazas and extensive open space, including water walks between the piers and an inner "Venice Walk."

The remainder of the waterfront in Weehawken is owned by Hartz Mountain, whose plans for mixed-use development provide the opportunity for walkway construction in the near future under coastal permit process requirements.

Views from cliff-top parks and walkways, including the Aaron Burr Duel site and a World War I monument, continue from West New York into Weehawken. Weehawken residents share with residents of West New York concerns of park preservation and maintenance, overcrowding, difficult waterfront access, protection of the Palisades and heavy traffic along Boulevard East. In addition, heavy traffic volumes near the Lincoln Tunnel at all hours are a significant consideration in the routing of the walkway. Access under the Lincoln Tunnel Helix will be of major concern in the future design of the walkway.

Hoboken began as a peaceful riverside resort for visitors from Manhattan who wandered along the six-mile riverwalk to the Elysian Fields. Following this peaceful beginning, Hoboken emerged as a center for shipbuilding, railroads, the Erie Lackawanna Ferry, and major European steamship lines. In the last ten years Hoboken has experienced substantial reinvestment. Splendid, solidly-built three and four story townhouses and five story apartment buildings have been rehabilitated.

The City of Hoboken proposes waterfront renewal extending from Eleventh Street in the north to Observer Highway in the south. Bethlehem Steel and Maxwell House Coffee will remain as working waterfront industries.

While the City and many residents see a need for tax ratables on the waterfront. Hoboken environmentalists are eager to preserve open space recreation sites for fishing and the annual Hoboken Festival.

KEY ISSUES AND RECOMMENDATIONS

Hamilton Park, overlooking the Burr-Hamilton duel site, is a lovely park with planting, seating and unrestricted views to the Hudson River and Manhattan skyline, an excellent example of a scenic overlook.

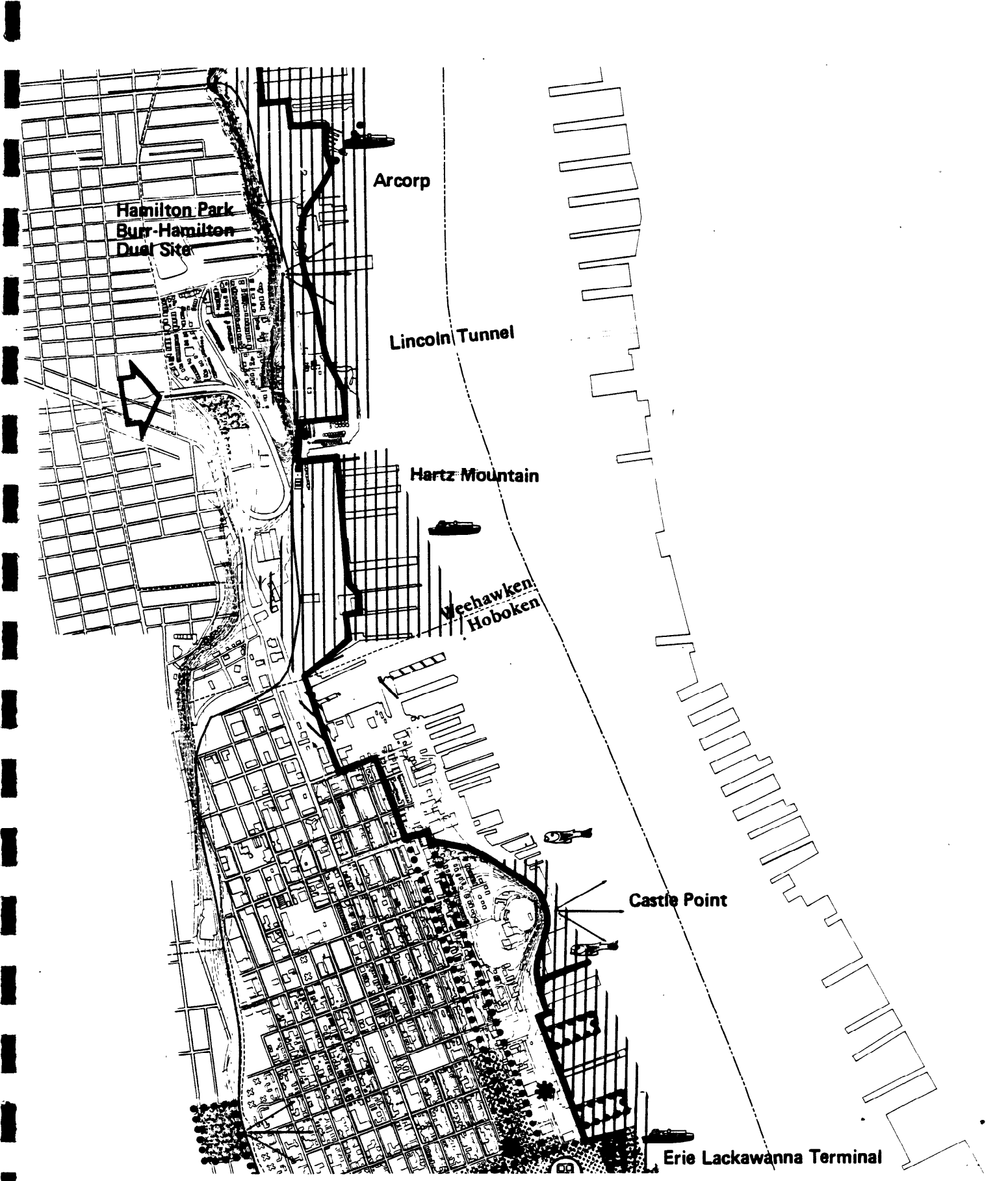
Recommendation: Both developers and waterfront municipalities should look for opportunities to establish similar scenic overlooks at intervals along the cliffs overlooking the waterfront.

As development proceeds, existing streets in the Corridor, particularly River Road, will require widening, and some new roads may be constructed.

Recommendation: Assure that all improvements to existing roads and all new roads conform to the State's bicycle-compatible bikeway standards. In general, seek and support extension of public transportation in the Corridor, in the form of light rail transit, bus service, ferry service and water taxi service, to minimize parking requirements along the waterfront.

Major proposed development projects in Hoboken include plans for the Hoboken-Port Authority piers, Castle Point, the Erie-Lackawanna Terminal Building, and the Observer Highway Railroad frontage.

Recommendation: The design of the waterfront walkway should provide an opportunity for overall landscape and urban design coordination of the many redevelopment proposals for Hoboken's waterfront. Attention must be given to respecting the functional requirements of the City's major waterfront industries in the design and construction of the walkway.



Arcorp

Hamilton Park
Burr-Hamilton
Dual Site

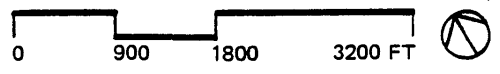
Lincoln Tunnel

Hartz Mountain

Weehawken
Hoboken

Castle Point

Erie Lackawanna Terminal



THE HUDSON WATERFRONT WALKWAY PLAN

Plans for the Hoboken Port Authority piers call for conversion into a large mixed-use development, including residential, office, commercial, marina and PATH-related facility uses. The Hoboken City Council must approve the use, mix and physical character of any proposed plan before development can proceed. Some residents recommend, in addition, provision for an arts and cultural center to include an auditorium, museum and an outdoor performance site, a commercial district which does not compete with the businesses along Washington Street and an architectural character which is compatible with the rowhouses on nearby streets. A walkway route can easily be integrated into any plans providing these desired amenities, although lot size and configuration constraints in Hoboken may call for consideration of exceptions to minimum dimensional and locational requirements in the design of the walkway. Current plans for the Erie Lackawanna Terminal Building, which is on the National Register of Historic Places, include rehabilitation of commuter railroad facilities. Pedestrian access through the Terminal site could provide an important waterfront link to Newport City and the Jersey City waterfront south to Exchange Place. Without this link, the pedestrian or bicyclist must travel ten blocks west, away from the waterfront, to get around the New Jersey Transit commuter rail tracks which block traffic south from Hoboken into Jersey City.

Newport City, the Harbourside Terminal, Exchange Place, Colgate Park and Liberty State Park all offer ample opportunity for provisions for waterfront access and park and recreation sites in Jersey City. Response to the concept of a waterfront walkway route has been very favorable as residents are eager to see this currently underutilized waterfront resource made accessible to the public.

Citizens' groups in Jersey City, the Harsimus Cove Neighborhood Association, the Hamilton Park Neighborhood Association, the Citizens Committee of Hudson County, Jersey City Environmental Protection Association, and the Coalition to Advance Public Access Opportunities along the Jersey City Waterfront, are particularly concerned about preserving public access to the waterfront and about traffic impacts on neighborhood streets.

The walkway may provide for side excursions through the Historic Neighborhoods of Jersey City, before crossing the Morris Canal into Liberty State Park.

KEY ISSUES AND RECOMMENDATIONS

The potential for continuous access to the waterfront in Hoboken and Jersey City is disrupted at present by the Canal just south of the Erie Lackawanna Terminal.

Recommendation: Redevelopment of the New Jersey Transit yards after the relocation of the rail yards should provide for pedestrian access across the canal at or near the water's edge.

The absence of a fishing pier in the northern section of the Jersey City waterfront is a great concern to the citizens who must travel four or five miles to Caven Point Fishing Pier, south of Liberty State Park.

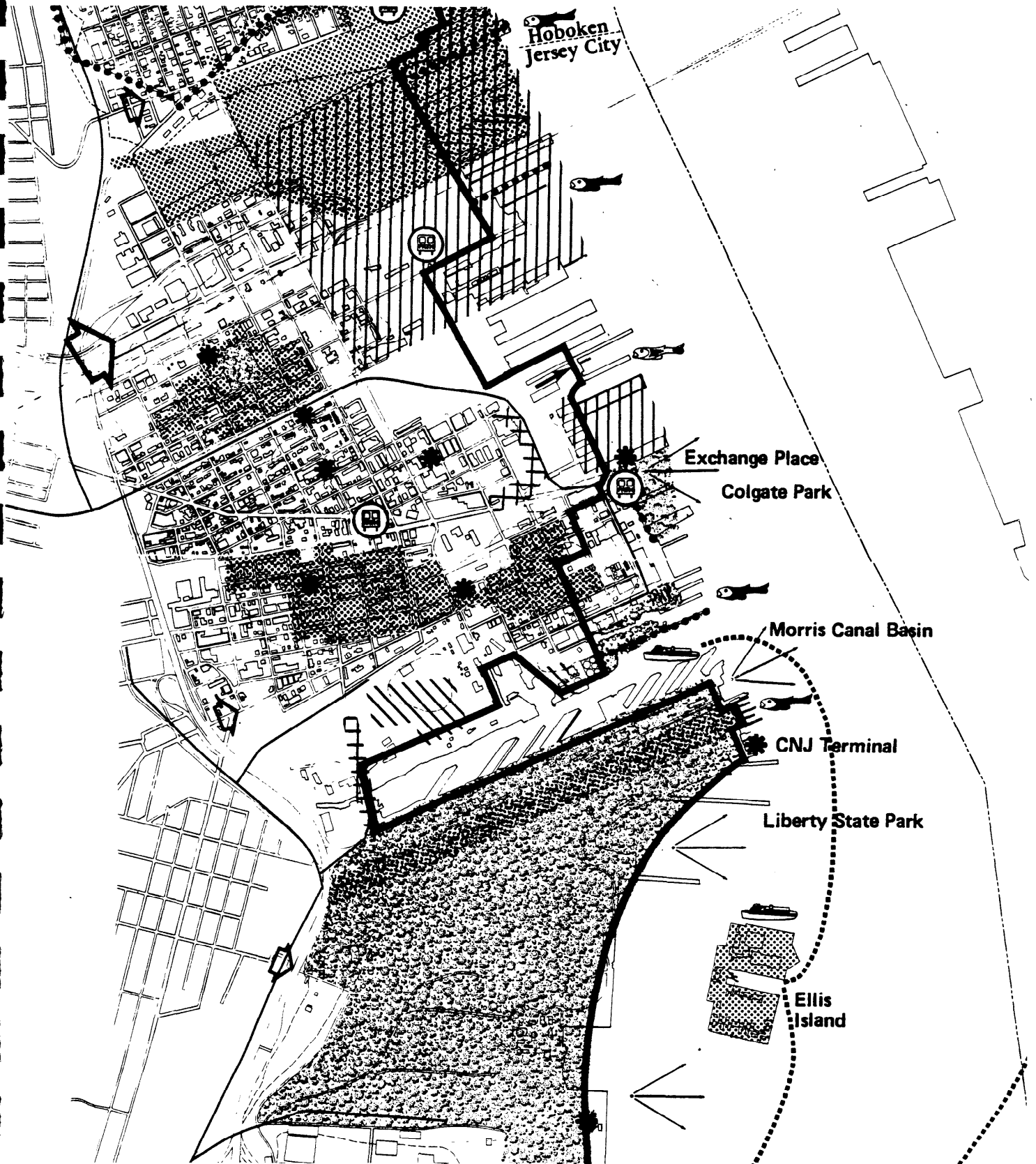
Recommendation: Integrate boardwalks, water's edge plazas, and public access to piers with provision for fishing in plans for the Newport City, Harbourside Terminal, Exchange Place Plaza developments.

The PATH stations in Jersey City provide excellent opportunities for pedestrian and bicycle access to the walkway.

Recommendation: Promote signage and informational materials at PATH stations providing maps and information about the walkway. The New Jersey Department of Environmental Protection will provide signage within major public rights-of-way; developers will provide signage within each development.

The Railroad trestle over the Morris Canal provides a critical potential access link between Jersey City and Liberty State Park.

Recommendation: Encourage acquisition by Jersey City or the State of the trestle as a pedestrian link to Liberty State Park. Also encourage establishment of the 3 Penny Ferry across the canal from Washington Street in Paulus Hook.



THE HUDSON WATERFRONT WALKWAY PLAN

The 800-acre Liberty State Park is a major regional, State and national recreation facility, providing access by Ferry to Ellis Island and the Statue of Liberty.

Another major stopping point on the walkway route will be the 4200-foot-long Caven Point Pier. In addition to providing east-west access along the pier, it is presently very popular for walking, picnicking and fishing. Access to the eastern edge of the Caven Point Recreation Area will provide areas for fishing, crabbing, ecological study and passive outdoor recreation. This north-south route is important in order to insure the continuation of the Liberty Park system and to provide continuous linkages within the park along the water's edge.

To the south it has been recommended that Greenville Yards and Port Jersey be considered as part of the walkway route. The future of the Greenville Yards and Port Jersey is currently being debated.

The Port Authority of New York and New Jersey, and Jersey City are undertaking a land use study for this area to plan its development for industrial usage. In addition, the Port Authority of New York and New Jersey is considering a coal export facility on its 105-acre undeveloped site on the eastern tip of the Port Jersey Peninsula. Definitive location of the walkway must, of necessity, be deferred until these studies are completed.

MAJOR ISSUES AND RECOMMENDATIONS

Major revisions to the plan for Liberty State are proposed, to incorporate private as well as public investment in the 800-acre park and to phase development of the park in such a manner that each phase functions well on its own while serving as a catalyst for subsequent phases.

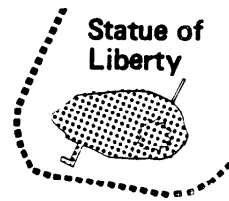
Recommendations: Assure that revised plans for Liberty State Park make provision for continuous pedestrian and bicycle access through the park with provision for linkage to the walkway on properties immediately to the north and south of the park.

The beach and tidal flats south of Liberty State Park are a unique natural environment along the Jersey waterfront.

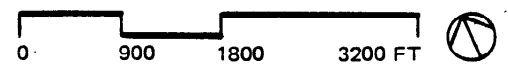
Recommendation: Provide for a trail or boardwalk, or combination of the two, to serve as a link in the continuous walkway system, while causing minimal disruption to the natural environment.

The Caven Point Pier is presently used for walking, picnicking and fishing.

Recommendation: Link the Pier with the walkway, as a special loop route.



Caven Point Pier



THE HUDSON WATERFRONT WALKWAY PLAN

Immediately south of the Port Jersey Peninsula in Bayonne is the Military Ocean Terminal, a secure military base. Public access to this site is prohibited. It is currently being considered as the site of a naval surface action group that will reestablish the facility as an active naval base. Currently the only safe route for pedestrians and bicyclists between the Port Jersey Peninsula and the Constable Hook area is Avenue "E", which is separated from the waterfront by the railroad tracks and Route 169. It is proposed that the walkway eventually be located east of the railroad tracks and Route 169 to bring the pedestrian or bicyclist closer to the waterfront.

The northern portion of the Constable Hook area is divided into three ownership parcels. The first parcel just east of Route 169 is an eight-acre parcel of undeveloped land fill owned by the Shiovone-Donovan Construction Company. There are no known development plans for this property. The center parcel of land is the City of Bayonne's sanitary landfill site consisting of approximately 37 acres of fast land. The site is currently used by residents for jogging, biking, fishing, archery and other passive recreation uses. Vehicular access is provided by North Hook and New Hook Roads. Pedestrian access is possible along the length of the waterfront to the Exxon property. To the east of the landfill site the Public Service Electric and Gas Company owns approximately 75 acres of fast land and an undetermined amount of riparian rights for which it currently has no plans.

Exxon, USA, owns a substantial portion at the eastern tip of the Constable Hook area, where they have a liquid bulk terminal. They are presently constructing a new loading pier on the site. The El Dorado Terminal, located immediately south of Exxon, is in the midst of a forty million dollar expansion of their liquid bulk terminal. In addition, the Bayonne Industries plan to build a new pier in the area.

The proposed route skirts the perimeter of this industrial area, proceeding south along Route 169. Broadway provides the first direct access road to the Bergen Point East Reach of the Kill Van Kull River. The Fifth Street connector is proposed as a short loop excursion to the Atlas Yacht Club. Broadway provides not only a link to the waterfront but access to the Kill Van Kull Park which extends west to the Bayonne Bridge.

KEY ISSUES AND RECOMMENDATIONS

The Bayonne Sanitary Landfill site is about to be closed by order of NJDEP. Bayonne residents have long been asking the City to consider a portion of the site for public open space.

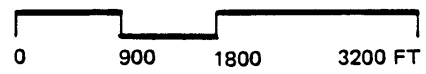
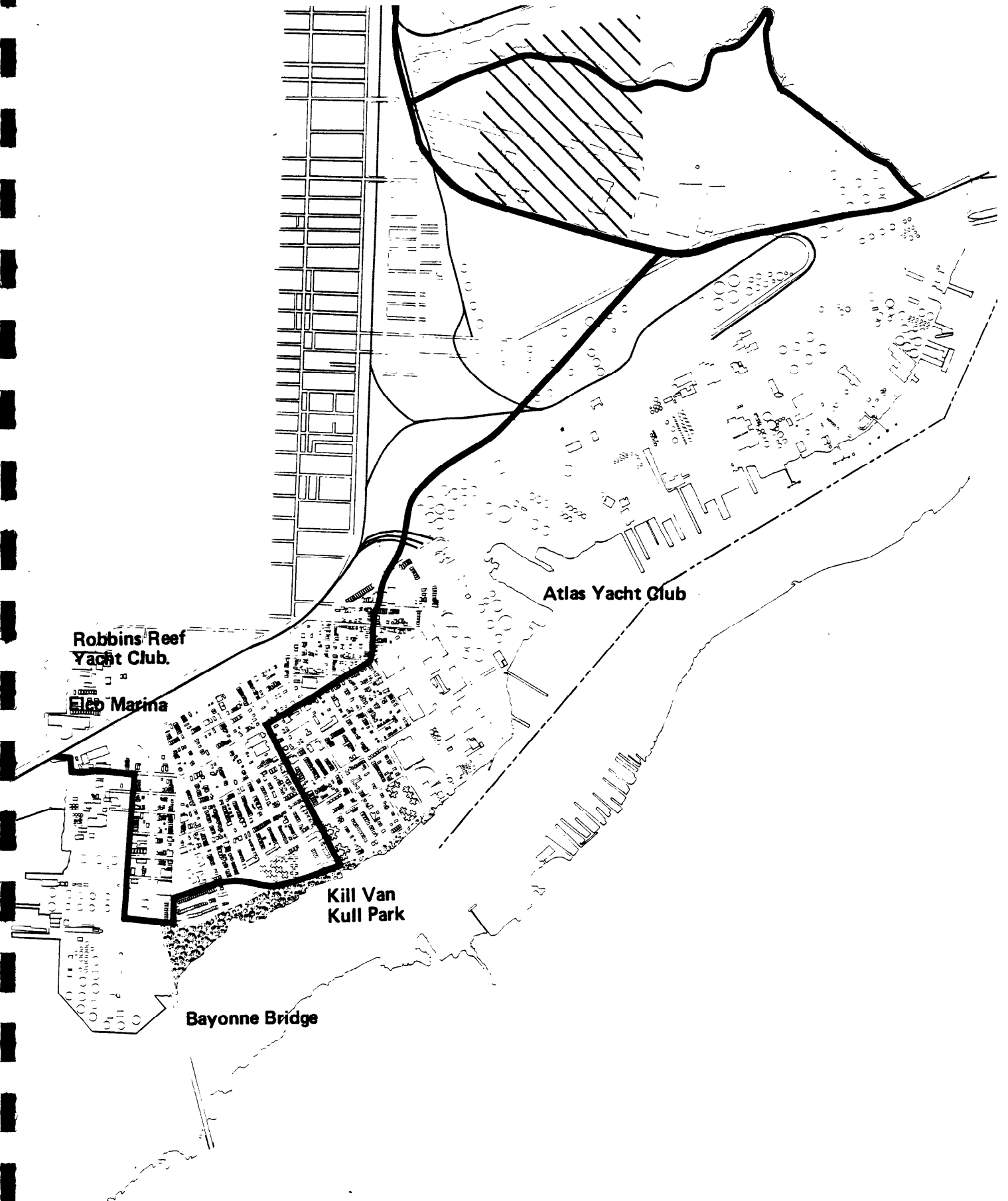
Recommendation: Encourage establishment of a waterfront park at this site as part of the walkway system.

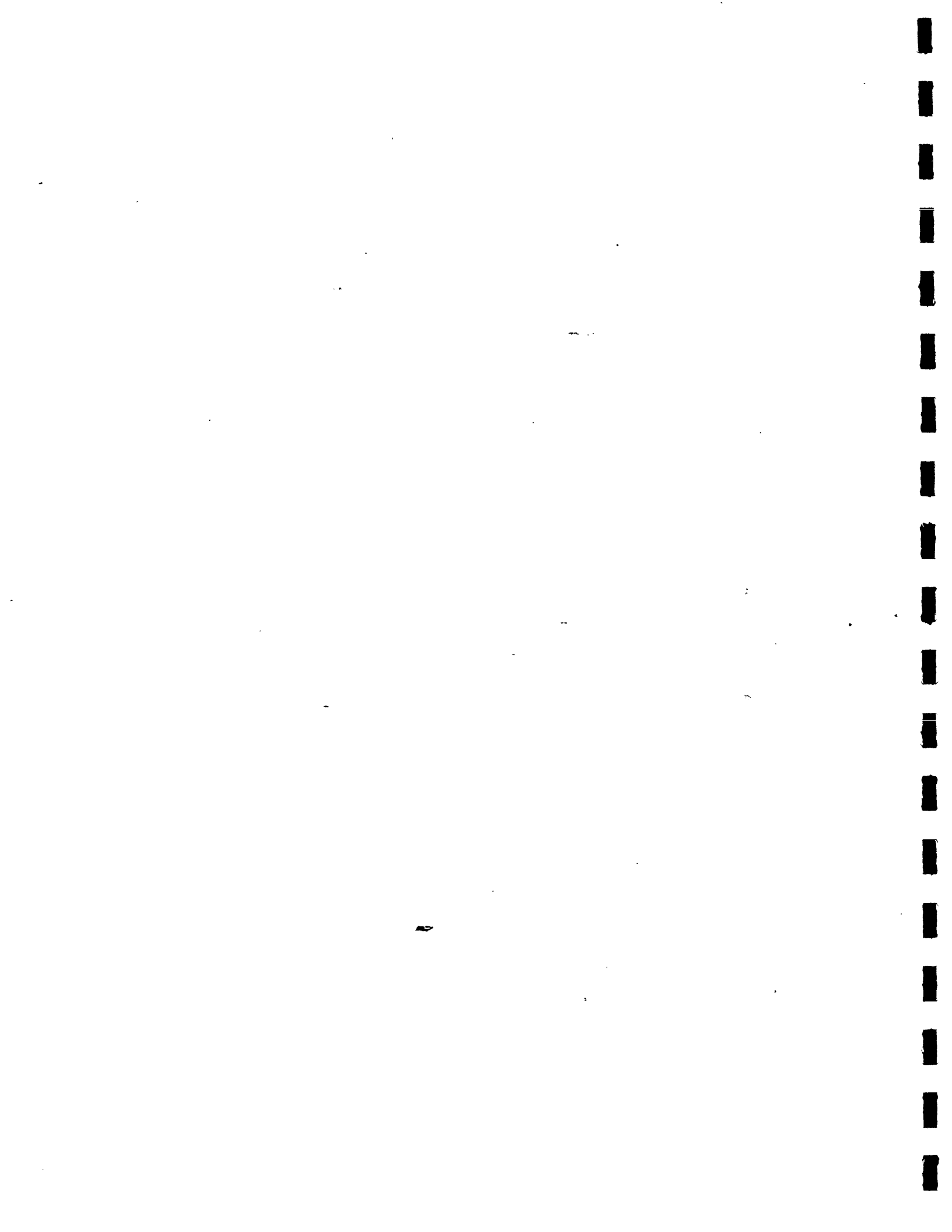
Much of Bayonne's waterfront is occupied by major industries and liquid bulk terminals which occupy the water's edge and most of the lands near the river.

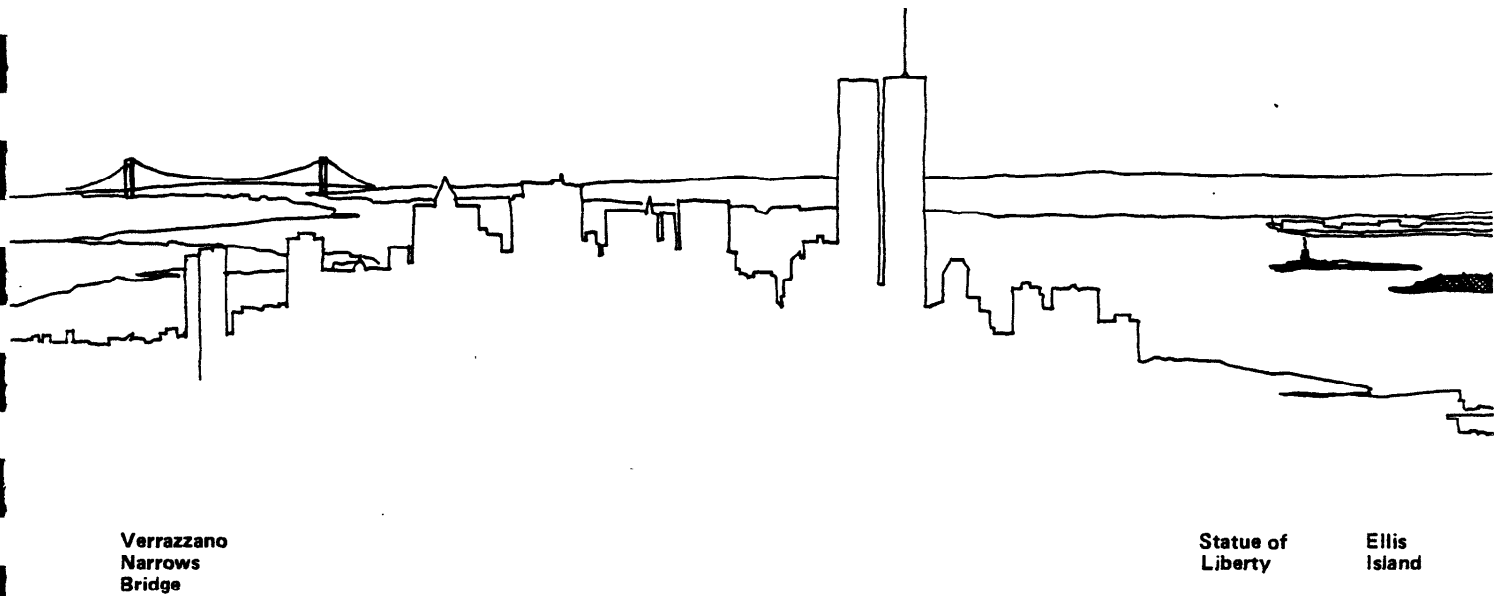
Recommendation: While public access is not feasible at this time in such areas, the potential for a future landscaped access easement along portions of the waterfront should not be discounted as entirely incompatible with the industrial land use. The San Francisco and Seattle waterfronts are both examples of cities where public access has been successfully integrated with industrial development.

While the Bayonne Bridge is the terminus of the Hudson walkway study area, residents and city officials would like to see a public walkway easement continue north on Avenue "A" to the Elco Marina, the Robbins Reef Marina, the City Park, Veterans Memorial Stadium and Park, and the Hudson County Park.

Recommendation: Consider continuation of the walkway system west and north on the Passaic River and south onto Staten Island.







Verrazano
Narrows
Bridge

Statue of
Liberty

Ellis
Island

Building the Walkway and Making it Work

Part Two

Building the walkway and making it work will require the combined efforts of many.

This section discusses briefly specific actions that might be taken by the Federal, State and County Governments, the waterfront municipalities, waterfront developers that will help to ensure that the walkway is developed in such a way as to be of the greatest benefit to all concerned.

THE ROLE OF THE FEDERAL GOVERNMENT

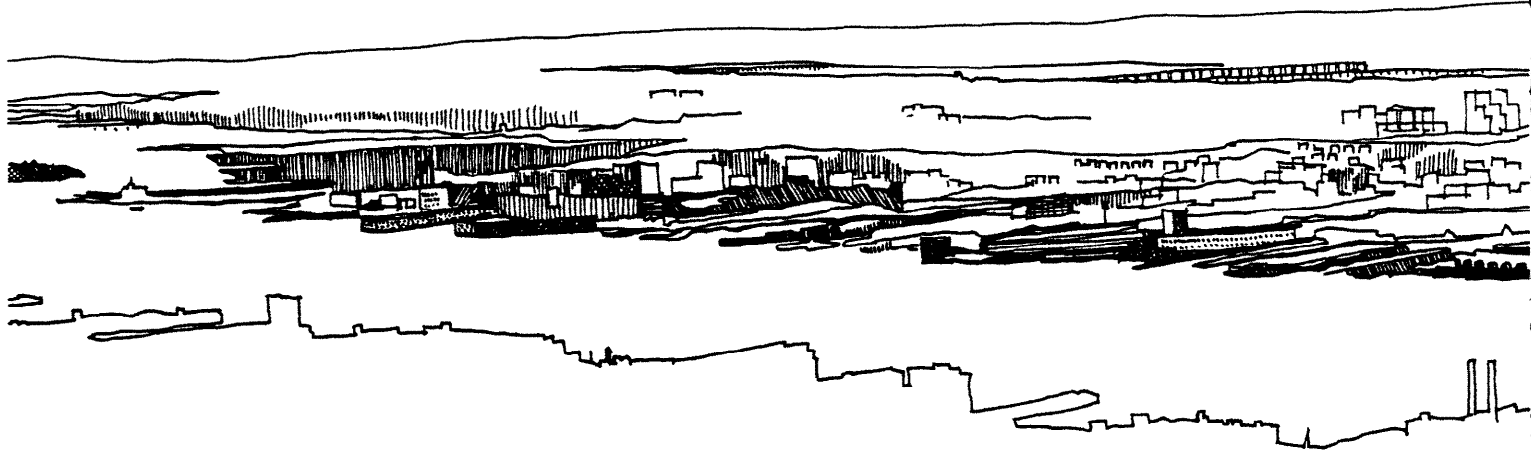
The following federal policies affecting the Hudson Waterfront can or could assist significantly in the successful realization of the walkway.

- Federal Government Agencies including the Department of the Interior and the Army Corps of Engineers must approve any significant changes to the river's edge.

Agreement on the part of these agencies as to the importance of encouraging construction of

the Hudson Walkway, and an understanding of the goals of the plan will be helpful to coordination of the State and Federal waterfront development review processes.

- Some federal funding is available that can assist in construction of the walkway. The Surface Transportation Assistance Act of 1982, for example includes among eligible Federal-aid highway projects, construction by the State of pedestrian walkways and bike-paths, and construction of bicycle lanes along existing roadways.
- In its administration of Ellis Island and the Statue of Liberty, the Department of the Interior could contribute to the recreation potential of the waterfront by requesting that the Circle Line Ferry permit bicycles to be carried aboard. This would permit bicyclists to travel via ferry to and from the Hudson Waterfront, Manhattan, and Staten Island.



Liberty
State
Park

Exchange
Place

Newport
City

Erie Lackawanna
Terminal

THE ROLE OF THE STATE

State Agencies with the greatest potential for helping to realize development of the walkway include the State Department of Environmental Protection (NJDEP) and the State Department of Transportation (NJDOT).

It is the power of the NJDEP to require provision of public access on all waterfront development sites that makes establishment of a continuous Walkway possible. An additional means by which NJDEP can support the Walkway is by giving priority to Green Acres applications that include provisions for construction of portions of the Waterfront Walkway.

NJDOT can be supportive of provision of public access by various means, as outlined briefly below.

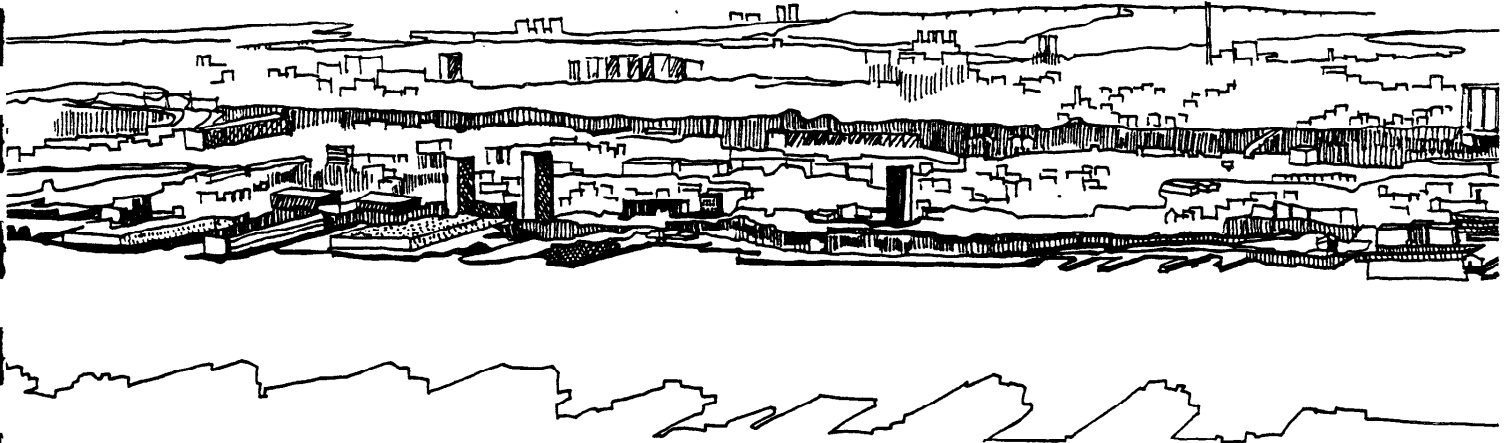
- In its Hudson Corridor Waterfront Access Study, which is just getting underway, DOT should place particular emphasis upon improving public transportation of every feasible mode, including bus, light rail, ferryboat, water taxi and helicopter in the

corridor to take the place, of auto access to the degree possible. Attention should also be given in the Study to the problem of severely restricted available parking in the Corridor and potential locations for structured public parking or for remote parking lots located adjacent outside the Corridor, but accessible to the Corridor residents or employees, with shuttle bus service to Waterfront sites.

- Consideration should be given to allocating some federal highway funds for construction of bicycle lanes on River Road and for construction of portions of the Walkway that cross public lands.

New Jersey Transit, and the PATH system (operated by the New York-New Jersey Port Authority) could increase the recreational potential of the Waterfront by a number of moves summarized below.

- No general design standards now exist for transit vehicles with regard to the carriage of bicycles on board.



NY-NJ Port
Authority
Terminal

Stevens
Institute

- Future specifications for commuter rail cars to be used on all New Jersey Transit lines into Hoboken should provide for bicycle access to the vehicle and for the safest feasible location of bicycles on board.
- In preparing designs for PATH and New Jersey Transit rail station modifications; bicycle movement should be considered. Areas which need particular attention include turnstiles for entrance and exit, stairs, escalators, and elevators.
- The PATH system's operating policies should continue to foster the carriage of accompanied bicycles on PATH trains with due consideration of the safety of all passengers. The present policies, which are based on the issuance of a permit to the bicyclist upon application, seem to be working well.
- On New Jersey Transit commuter trains into Hoboken, operating policies now permit folding bicycles but prohibit regular bicycles at all times. The carriage of regular bicycles at specified off-peak times and with certain limitations as to number of bicycles per rail car should be tried experimentally to see whether any problems arise.
- Access areas surrounding PATH and New Jersey Transit rail stations should be reviewed for any special hazards to bicycle use (e.g., dangerous grates). Any such hazards should be removed or reduced; where that is not feasible, warning signs should be placed.
- Information signs about the Hudson River Bikeway should be prominently displayed in all rail stations serving its access points.

THE ROLE OF THE COUNTIES

Bergen and Hudson Counties can contribute significantly to realizing public access goals along the Hudson Waterfront by requiring and assuring that all major street improvements and all new street construction in the Corridor conforms to the Bicycle-Compatible Roadway Guidelines of the State Department of Transportation.



Bethlehem
Steel

Hartz
Mountain

THE ROLE OF THE WATERFRONT MUNICIPALITIES

Opportunities for waterfront municipalities to assist in realizing the Hudson Walkway Plan take several forms including participation in preparing the plan and guidelines, adoption of ordinances and controls that will supplement New Jersey Coastal Policies in requiring preservation of public access in waterfront development, and construction of portions of the walkway across municipally owned lands.

Participation in Preparation of the Walkway Plan

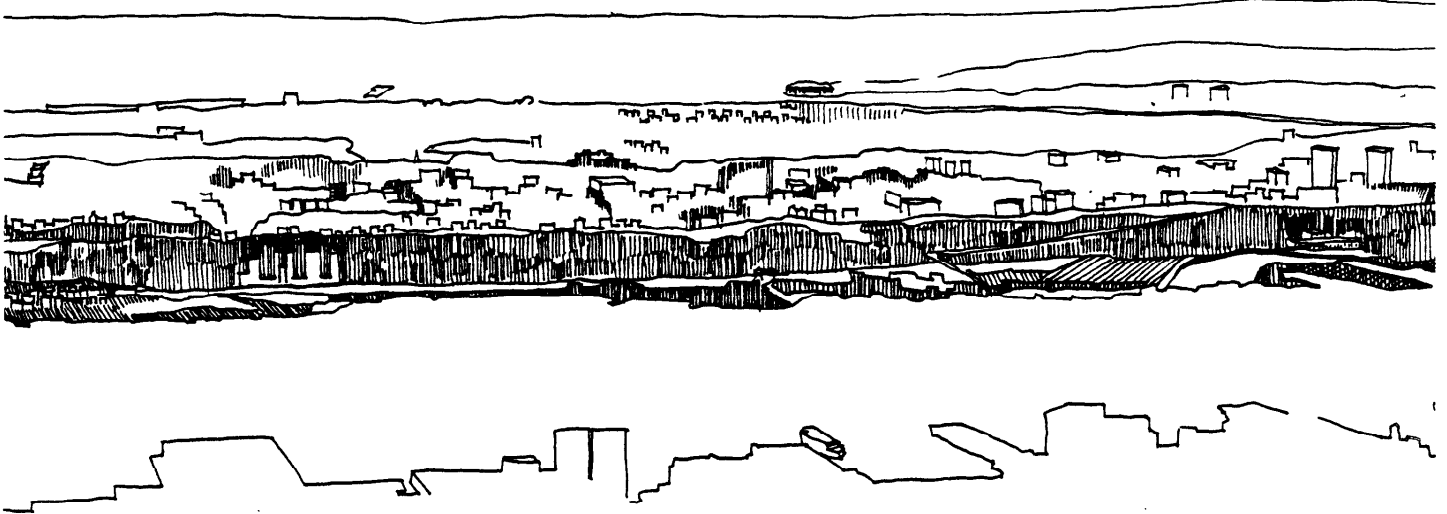
The New Jersey Waterfront municipalities participated in the efforts of the Hudson River Waterfront Study, Planning and Development Commission, summarized in the Commission's Final Report in September 1980, and each municipality is represented on the Steering Committee for the Hudson Waterfront Walkway Study.

Participation in preparation of these studies assures that each of the waterfront municipalities has been able to contribute to the development of the Plan, and has had the opportunity to identify and discuss issues of particular local concern with respect to the walkway.

Adoption of Ordinances and Controls Supplementing New Jersey Coastal Policies

A review of the zoning ordinances of all waterfront municipalities found that only West New York presently has zoning significantly supportive of public access policies. West New York's zoning ordinance prohibits high rise development on the Palisades, and requires that 30 percent of any development site in the Controlled Waterfront Development District must be usable land contiguous to the water allocated for public open space. These requirements provide a positive example for other waterfront municipalities, which should be encouraged to consider similar provisions. Weehawken and North Bergen are reviewing their ordinances at present and therefore have an opportunity right now to adopt provisions governing waterfront access and preservation of waterfront views.

Other findings of the inventory of local ordinances of particular concern in relation to development of the walkway include some districts with high percentages of lot coverage (e.g., 85% coverage, Fort Lee Commercial Districts; 65% coverage, North Bergen High Density Residential District) and somewhat low minimum parking requirements (e.g., one parking space per dwelling unit, Hoboken R-1 Residential Conservation District, and one and one quarter parking spaces per dwelling unit, Jersey City).



Hamilton-Burr
Duel Site

Arcorp

While such provisions do not necessarily prevent establishment of public access to the waterfront meeting all the criteria set out in the Walkway Plan and Guidelines, they raise several specific issues related to public access.

- Where a high lot coverage is permitted, particularly with multi-story buildings; particular care will be required to assure that views of the river and the Palisades will be preserved, as provided for by NJDEP Coastal Policies.
- Minimal parking provisions in zoning ordinances of waterfront municipalities exacerbate an already severe parking problem along the Hudson Waterfront, if insufficient parking is required to be provided in new waterfront development. The impacts of insufficient parking provision within new waterfront development are likely to be much greater than those of parking requirements associated with recreational use of the Hudson Walkway.

This problem is a complex one. If parking requirements in municipal zoning ordinances were significantly increased, inordinate portions of many

waterfront development sites would have to be used for parking.

- A far better approach might entail a combined strategy of:

seeking to improve public transportation within the Corridor

encouraging developers to provide off-site parking areas for occupants of waterfront development sites (such provisions might be incorporated in local ordinances); and

seeking agreements with major manufacturing companies and other non-residential uses in the Corridor, to permit use of their parking facilities by the general public on weekends. An inventory of available space in major public and private parking lots in waterfront municipalities was prepared during the Walkway Study and is set out in technical materials supplied to NJDEP by the consultants. A summary of these findings is set out in the accompanying table.



West New York

Guttenburg

North Bergen

Waterfront municipalities should also urge the New Jersey Department of Transportation to address the issue of severely limited parking in N.J. DOT's current study of access in the Hudson Waterfront Corridor.

Construction of Portions of the Walkway Across Municipally Owned Open Space at the Water's Edge

An important and very direct way in which waterfront municipalities can assist in realizing the Walkway Plan is by constructing the portions of the proposed walkway that cross municipally owned open space on the waterfront.

As a part of the Walkway Study, order-of-magnitude cost estimates have been prepared for construction of the walkway along the water's edge across specific municipally owned land parcels. These estimates are intended to be of assistance to waterfront municipalities in preparing plans for development of water's edge sites and grant applications for such open space development.

Walkway construction cost estimates across key publicly owned parcels on the waterfront are estimated in the

table following. Costs are for a 16 foot wide walkway. A range of costs are given assuming different pavement types. Where repairs are required to existing bulkheads, repair costs are included. Where natural shoreline exists, costs for a new bulkhead or revetment were not included in the estimate.

The costs listed in this section are based on 1982 prices for similar construction in northern New Jersey. The source of costs are recent bids received by New Jersey DOT and 1982 Dodge Guide for public work and heavy construction.

The cost given herein for various types of walkway or bikeway construction are "Order-of-Magnitude" costs. It must be recognized that many elements will vary in actual conditions and therefore so will the cost. Among conditions which will influence the cost are accessibility, total length of the project, amount of fill or grading required, etc. Larger projects will tend to have lesser per lineal foot cost than smaller ones because contractor's mobilization and overhead cost will be spread over and other amenities will all influence actual costs.



Edgewater

Palisades
Interstate Park

George
Washington
Bridge

THE ROLE OF CITIZENS

Citizens and citizens groups have played a very important role in developing policies and plans to preserve public access to and views of The Walkway and The Palisades ever since the character and use of the Hudson Waterfront began its major shift from waterfront industry and rail to residential and mixed use development.

This role will be of continuing importance as developers and municipalities complete proposals for, and undertake construction of their portions of the Walkway system.

The comments of concerned citizens and citizens groups to the State Department of Environmental Protection Division of Coastal Resources will help to assure that The Walkway Plan and Guidelines are realized.

THE ROLE OF DEVELOPERS

The role of Waterfront developers is essential to the success of the Walkway. Technical aspects of the developers' responsibilities in providing for public access are set out in some detail in the second part of this volume, describing design guidelines.

Those developers who go beyond the minimum requirements for public access, however, and who examine with staff of the Division of Coastal Resources early in concept planning how the Walkway can be provided on their site will assure that the Walkway provides the greatest possible benefits not only for public access but also for their own developments.

INVENTORY OF MAJOR PARKING LOTS ALONG THE HUDSON CORRIDOR FROM FORT LEE TO BAYONNE, NEW JERSEY

	Lot Location	Capacity (No. Cars)	Ownership	Use
Fort Lee	Lemoine Avenue and Main Street	456	Fort Lee	Public
	Ross Dock Area	233	Palisades Interstate Park Comm.	Public
	Fort Lee Historic Park	114	Palisades Interstate Park Comm.	Public
Edgewater	Ballfield (Playground)	30	Edgewater	Public
	American Legion	30	Edgewater	Club Members
	Town Hall	30	Edgewater	City Employees
	Binghampton Ferry	514	Binghampton	Patrons
	Hills Brothers Coffee	300	Hills Brothers	Employees
	Lever Brothers	*	Lever Brothers	Employees
	Post Office	70	Private Company	Employees
North Bergen	Palisades General Hospital	289	Private Company	Employees and Patients
	Office Building (7800 River Road)	200	Thomas Haggeny	Employees
Guttenberg	No Lots			
West New York	Park Avenue and 54th Street	55	W. New York Parking Authority	Public
	Park Avenue and 66th Street	67	W. New York Parking Authority	Public
Weehawken	No Lots			
Hoboken	Maxwell House Coffee	295	Maxwell House	Employees
	River Street (between 3rd & 4th)	454	Hoboken Parking Authority	Residents
	River Street (between 2nd & 3rd)	454	Hoboken Parking Authority	Public
	River Street and 2nd Street	830	Hoboken Parking Authority	Public
	Hudson Place	350	Hoboken Parking Authority	Public
Jersey City	Pavonia Path Station	*	—	Public
	Exchange Place Path Station	*	—	Public
	Journal Square Path Station	618	Parking Company of America	Public
	Liberty State Park		Liberty State Park	
	a. Park Office	187		Public
	b. Park Office	182		Public
	c. Boat Launch	60		Boaters
	d. Pool Area	500		Bathers
	e. Terminal Complex	75		Special Events
	f. Ferry Parking	250		Public
	g. Ferry Parking	250		Public
	h. Ferry Parking (overflow)	100		Public
	Caven Point	190	Jersey City	Public
Bayonne	E. 26th Street (east of Broadway)	40	Bayonne Parking Authority	Public
	E. 24th Street (east of Broadway)	40	Bayonne Parking Authority	Public
	E. 21st Street (east of Broadway)	40	Bayonne Parking Authority	Public
	E. 22nd Street (east of Broadway)	40	Bayonne Parking Authority	Public
	W. 21st Street (west of Broadway)	40	Bayonne Parking Authority	Public
	W. 22nd Street (west of Broadway)	40	Bayonne Parking Authority	Public
	W. 24th Street (west of Broadway)	40	Bayonne Parking Authority	Public
	Broadway (between 23rd and 24th)	80	Bayonne Parking Authority	Public

Source: Interviews, Louis Berger & Associates, Inc., August 1983.

*: Not available.

ESTIMATED ORDER-OF-MAGNITUDE COSTS FOR SIXTEEN-FOOT-WIDE WALKWAY ON KEY PUBLIC PARCELS

Municipality	Parcel*	Existing Shoreline Type	Estimated Lineal Feet	Shoreline Improvement Required	Pavement Type (costs/LF)	Estimated Total Cost
Edgewater	Post Office Site	Natural	800'	Grading \$80/LF	Gravel (\$10)	\$ 72,000
					Asphalt (\$40)	\$ 96,000
					Brick (\$80)	\$ 128,000
					Boardwalk (\$600)	\$ 480,000
West New York	Northern Border	Timber Bulkhead	300'	Moderate Repair \$100/LF plus \$10/LF Surface Preparation	Asphalt (\$40)	\$ 45,000
					Brick (\$80)	\$ 57,000
					Granite (\$120)	\$ 69,000
Hoboken	Weehawken Cove	Masonry Bulkhead	600'	Moderate Repair \$300/LF plus \$10/LF Surface Preparation	Asphalt (\$40)	\$ 210,000
					Brick (\$80)	\$ 234,000
					Granite (\$120)	\$ 238,000
Hoboken	Upland portion of 5th and 6th Street Piers	Masonry Bulkhead	900'	Moderate Repair \$300/LF plus \$10/LF Surface Preparation	Asphalt (\$40)	\$ 315,000
					Brick (\$80)	\$ 351,000
					Granite (\$120)	\$ 387,000
Hoboken	Foot of Hudson Place	Concrete Bulkhead	400'	Moderate Repair \$200/LF plus \$10/LF Surface Preparation	Asphalt (\$40)	\$ 100,000
					Brick (\$80)	\$ 116,000
					Granite (\$120)	\$ 132,000
Jersey City	Exchange Place (north of York Street)	Timber Bulkhead	500'	Heavy Repair \$800/LF plus \$20/LF Surface Preparation	Asphalt (\$40)	\$ 430,000
					Brick (\$80)	\$ 450,000
					Granite (\$120)	\$ 470,000
Jersey City	Exchange Place/Colgate Park (south of York Street)	Timber and Concrete Bulkhead	500'	No Repair \$10/LF Surface Preparation	Asphalt (\$40)	\$ 25,000
					Brick (\$80)	\$ 45,000
					Granite (\$120)	\$ 65,000
Jersey City	Caven Point	Natural Shoreline	4,500'	Grading \$80/LF	Gravel (\$10)	\$ 405,000
					Asphalt (\$40)	\$ 540,000
					Brick (\$80)	\$ 720,000
					Boardwalk (\$600)	\$2,700,000
Bayonne	Constable Hook	Natural Shoreline	7,000'	Grading \$80/LF	Gravel (\$10)	\$ 630,000
					Asphalt (\$40)	\$ 840,000
					Brick (\$80)	\$1,120,000
					Boardwalk (\$600)	\$4,200,000

*See Walkway Plan Maps for locations of parcels.

ORDER-OF-MAGNITUDE COST ESTIMATES FOR CONSTRUCTION OF THE WALKWAY ACROSS KEY MUNICIPALLY OWNED PARCELS

AT-GRADE WALKWAY ALONG NATURAL SHORELINE

Surface Preparation

Clearing, grading and preparation of walkway subsurface (no shore stabilization assumed necessary) \$50-80/linear foot

Paving

In addition to the above costs, the costs listed below will be incurred for the itemized surface types.

Unpaved with gravel surface \$10/linear foot

Unpaved with wood chips on sand base including edging \$15/linear foot

Bituminous paved walkway \$40/linear foot

Concrete \$50/linear foot

Brick \$80/linear foot

Concrete pavers \$60/linear foot

Cobblestone \$95/linear foot

Bluestone \$100/linear foot

Granite blocks \$120/linear foot

WALKWAY ON NEW BOARDWALK ALONG NATURAL SHORELINE

\$600/linear foot

WALKWAY ON EXISTING TIMBER PIERS

includes guard-railing, wood planking

\$110-130/linear foot

WALKWAY ALONG TIMBER, MASONRY OR CONCRETE BULKHEAD

Same as walkway along natural shoreline, except minimal or no grading required; surface preparation \$20-30/linear foot

Additional paving costs, as indicated in the Walkway Along Natural Shoreline section, apply.

BULKHEAD REPAIRS

Guidelines for Budgeting

Timber Bulkheads: Moderate Repairs

\$100/linear foot

Heavy Repairs

\$800/linear foot

Masonry Bulkheads: Moderate Repairs

\$300/linear foot

Heavy Repairs

\$1200/linear foot

Concrete Bulkheads: Moderate Repairs

\$200/linear foot

Heavy Repairs

\$1000/linear foot

BRIDGE OVER MORRIS CANAL BASIN

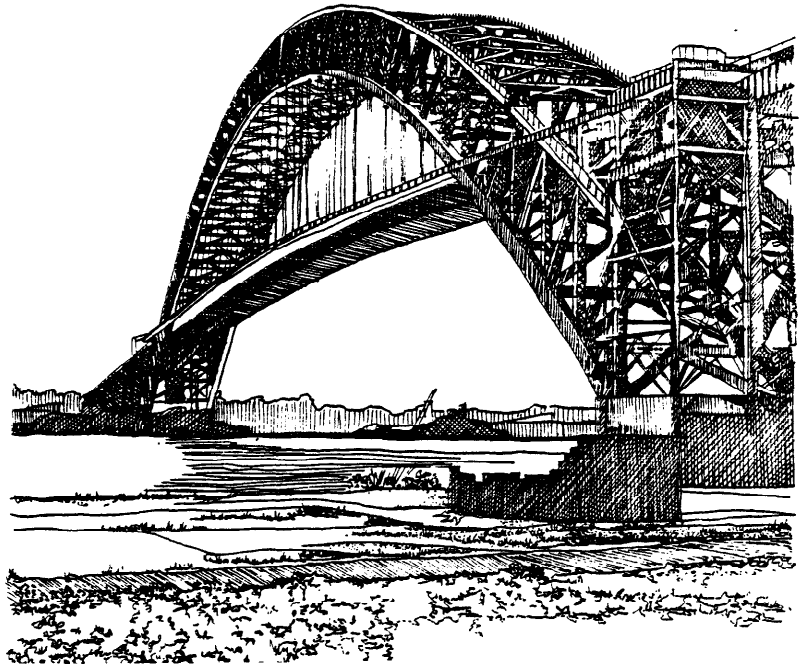
Reconstruction of timber railroad trestle with ten foot wide deck and guard railing

\$120/linear foot

Order-of-magnitude estimate for reconstruction of 100 foot trestle

\$12,000/linear foot

Source: Louis Berger & Associates



Marking the southern limit of the Hudson Walkway is the Bayonna Bridge, the world's longest man-made arch.

Factors in Walkway Design

Part Three

In designing the Hudson Walkway within each waterfront development, consideration should be given to:

- walkway user needs;
- potential linkages to special areas and points of interest along the corridor, including historic sites and districts and public parks and recreation areas;
- the capacity and condition of other elements of the corridor access and circulation system;
- open space policies of various agencies and groups with regard to the Hudson waterfront; and
- outstanding features of successful existing waterfront walkways.

For reference, a brief discussion of each of these factors is set out below.

USER NEEDS

In approaching the task of planning and designing a facility for human-powered movement, it is crucial to understand the classes and subclasses of its potential users, their characteristics

and special needs, the conflicts that may arise among them, and how these conflicts can be reduced by design or programmatic measures.

The principal classes of potential users are:

- . On foot (walkers and runners)
- . Wheelchair users
- . Bicyclists (recreational and utilitarian)
- . Skaters (rollerskaters and skateboarders)
- . Special users (e.g., pushcart vendors).

There are considerable differences among these classes, and within them, in typical speed and continuity of movement, typical trip length, degree of control, and vulnerability to collision with others.

On Foot

This is the basic class of user for whom a walkway usually is (and should be) designed. Of all the user classes it probably has the largest range of differences in the factors mentioned



The trolley rails and cobblestone on Essex Street in Jersey City are typical of the hazards to bicyclists on local streets in the Hudson Waterfront Corridor.

above. Speeds range from perhaps 1 mile per hour for an elderly person or an accompanied toddler, to 10 miles per hour for a speedy runner, with typical walking speeds around 3 MPH and jogging speeds around 5 to 7 MPH. Trip lengths will vary from a few hundred feet to several miles, and continuity will range from an unbroken run or walk to a frequent stop-and-go. Movement patterns range from the purposeful straight line of the brisk walker or runner-in-training to the essentially random dashing-about by the young child. There is a wide variation in vulnerability, from the tough young athlete to the frail elderly person. There may also be considerable range in alertness and ability to adjust to potential conflict with other uses. In sum, this is the most numerous class, the one whose members most need protection, and whose characteristics should therefore guide the basic design decision.

Principal needs are a moderately smooth surface, whether paved or unpaved, and -- for those who want to break their trip -- places to rest or view the scene, preferably out of the stream of passing traffic. A railing or balustrade to lean on (as along the Thames embankment in London) or a low wide balustrade to sit on (as to the Copenhagen waterfront) are welcome features.

Wheelchair Users

This class contains a wide range of physical vigor, from those who take part in marathon races to those who can move very little without assistance. As implied by this range, the trip length may vary greatly. Principal needs are a relatively smooth paved surface and ramps at changes in elevation; stairs are a major obstacle. Places outside the traffic stream are welcome; balustrades should not be so high as to obstruct the view of the waterfront.

Bicyclists

This class shows a wide variation in skill and endurance. The regular bicycle tourist may ride 50 to 100 miles in a day, whereas the occasional recreational bicyclist may be tired after only a few miles. Speeds will range from 5 miles per hour to 20. Bicyclists vary greatly in control over their vehicle and hence in their ability to avoid collisions; a study for the Federal Highway Administration's Pedestrian Planning Manual recommends that an average of 6 conflicts per minute (i.e., 6 pedestrians to be avoided each minute) as the upper limit of acceptable bicycle/pedestrian conflicts, although skilled bicyclists undoubtedly could handle a greater number.



Heavy truck traffic presents difficulties for bicyclists and pedestrians on Henderson Street.

Principal needs are a smooth unbroken paved surface (although it is possible to cycle at a fairly slow speed on smooth unpaved trails), an absence of built-in hazards (e.g., sewer gratings with parallel bars), and a minimum of pedestrian use of the facility. The currently accepted design approach to accommodate bicyclists is reflected in this excerpt from the Guide For Development of New Bicycle Facilities (AASHTO, 1981):

In general, multi-use paths are undesirable; bicycles and pedestrians do not mix well. Whenever possible, separate bicycle and pedestrian paths should be provided. If this is not feasible, additional width, signing and striping should be used to minimize conflicts.

The current general approach in the United States to designing for bicycle traffic is to integrate it into vehicular traffic on the roadway as much as possible, using such measures as wide curb lanes and smooth shoulders to give added lateral clearance.

Skaters

By and large rollerskaters and skateboarders are young -- in their teens and twenties -- and vigorous. Movement patterns vary, with skaters tending to a straight line and skateboarders often preferring a slalom or zigzag pattern. Principal needs are for an extremely smooth paved surface; slight downgrades are used for gaining added speed and a more thrilling ride.

Special Users

Pushcart vendors, as a non-motorized user class, and maintenance and law enforcement people -- either motorized or not -- may have special design requirements, depending on the type of cart or vehicle used. As a rule pushcarts can use the ramps provided for wheelchair access, but unless the path is wide enough they may block the passage of other users. Access for maintenance vehicles will require a certain minimum width and load capacity for the path.



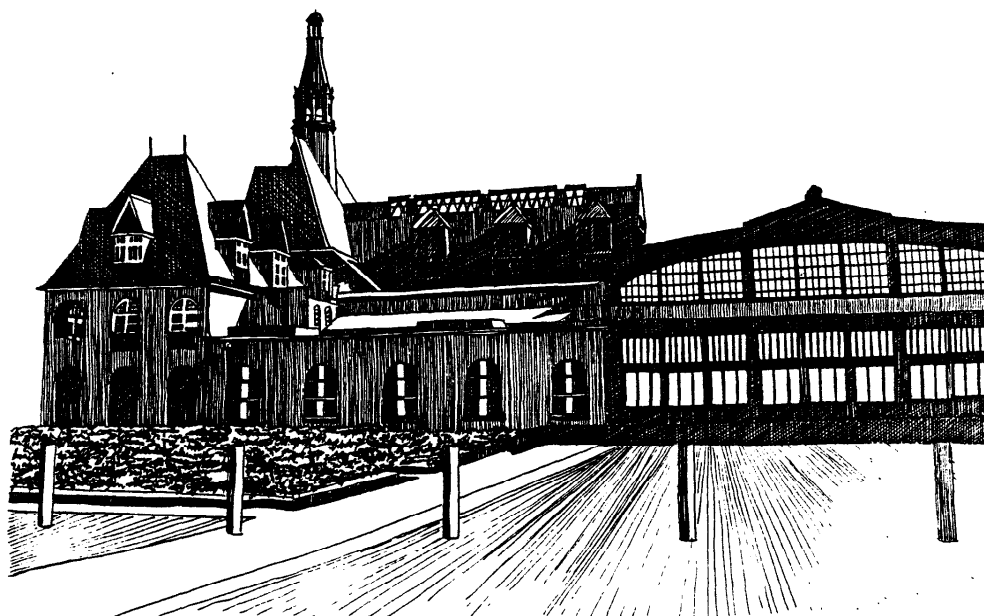
Various potential users of the walkway will have special needs that must be considered in its design.

Reducing Conflict Among Users

Several approaches exist to reduce or eliminate conflict among the various classes of potential users. One is to prohibit a certain type of use outright: e.g., to ban bicycling or rollerskating. However, unless there is an attractive alternative facility reasonably nearby and there are design features to discourage that use, the ban is likely to be ineffective or to require a high level of enforcement. One example of "discouraging design features" might be to make the path's surface too rough for pleasant skating or cycling on segments of anticipated heavy pedestrian use.

A second approach is to divide and assign space on the path. However, this requires more width than may be available. Moreover, as pedestrians, bicyclists and skaters tend to use any reasonably attractive facility that is available, regardless of posted space assignments, this approach is rarely workable.

A third possibility is to separate users in time, or to ban some user groups at specified times. This method is popular in seaside resorts such as Ocean City, Maryland and Cape May, New Jersey. The boardwalk is open to all users in the morning until a posted time, usually 10 a.m., and after that time bicyclists are banned.



The Hudson waterfront is rich in cultural resources, like the Central New Jersey railroad/ferry terminal, which was constructed in 1899 and is currently undergoing restoration in conjunction with development of Liberty State Park.

KEY CULTURAL RESOURCES AND SPECIAL AREAS

Special Areas as defined by NJDEP's Division of Coastal Resources, were identified and mapped for the Walkway corridor. These Special Areas are specific types of areas within the coastal zone that "merit focused attention and special management policies." Of the 44 types of Special Areas listed in Coastal Resource and Development Policies (April 1982), 17 were determined to exist in the Walkway corridor.

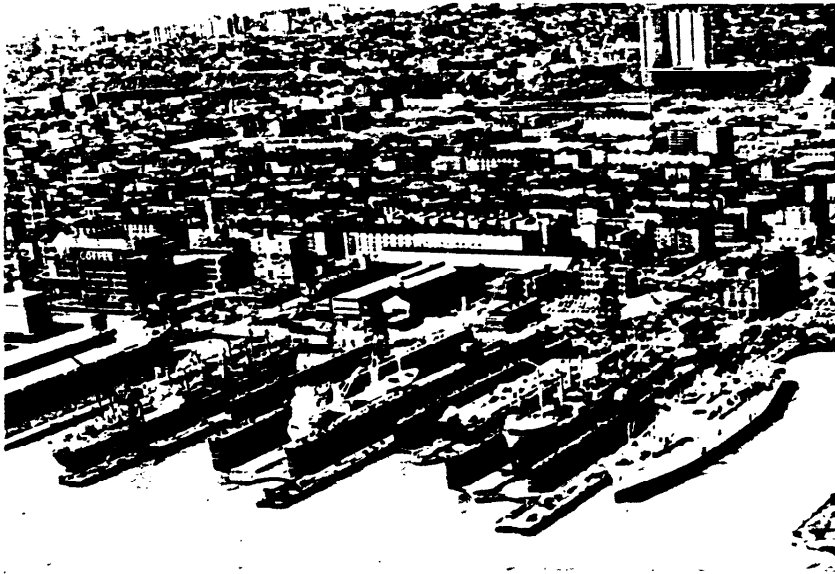
In identifying Special Areas along the Hudson Waterfront, information was obtained through conversations with members of NJDEP's Division of Coastal Resources and Bureau of Marine Fisheries, the U.S. Soil Conservation Service, the U.S. Army Corps of Engineers, and local planning offices; analysis of U.S.G.S. quadrangle maps, U.S. Army Corps of Engineers Port Series data, aerial photos and tax maps; site investigations were also performed.

Ports

The entire Hudson River waterfront from Jersey City to Edgewater is considered a Port since (based on the Coastal Resources and Development Policies definition given for Ports as a Special Area) pockets of active and inactive marine terminals exist along its length. The fact that the Walkway is proposed for construction in these port cities is significant in the respect that the route should be located and designed so as not to interfere with any specific port operations. However, these port operations do offer the potential for interesting views of port related activities to users of the Walkway facility.

Submerged Infrastructure Routes

The principal Submerged Infrastructure Routes within the project area are the Lincoln Tunnel, the Conrail tunnel, several sets of PATH rail tubes, the Holland Tunnel, and various utilities serving Ellis and Liberty Islands.



Pockets of active marine terminals exist along the Hudson Waterfront.

These routes were identified from U.S.G.S. quadrangle maps, hagstrom maps, and the Liberty State Park Phase A Schematic Document for Proposed Landfill and Pedestrian Walkway in Upper New York Bay prepared by the Port Authority of New York and New Jersey. Identification of these submerged routes is only important in the respect of ensuring that none of them will be affected during facility construction. However, due to the nature of the proposed facility, it is not anticipated that interference with these routes would be a major issue.

Intertidal Flats

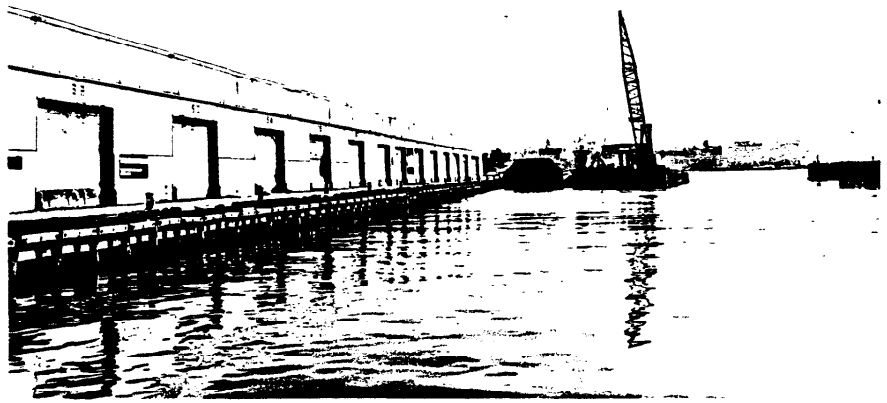
The only Intertidal Flats identified within the project area are located in the vicinity of Caven Point and the southern portion of Liberty State Park. These Intertidal Flats were located from an analysis of U.S.G.S. maps and aerial photos, supplemented by conversations with members of the Jersey City Division of Urban Research and Design and visual analysis. Because of the critical role that these areas play in supporting many benthic organisms, it is important to ensure that they not be disturbed by any Walkway construction. Due to the nature of the project, it is unlikely that any potential impacts will occur.

Filled Water's Edge

Although a soil designations map for Hudson County has never been prepared by the U.S. Department of Agriculture's Soil Conservation Service, it is expected that the majority of the land bordering the river is filled, according to a staff member of the Soil Conservation Service. The construction of a Walkway on the Filled Water's Edge areas would comply with the policies of NJDEP since it will not preempt use of the waterfront for potential water dependent uses nor will it prevent public access policy, the Walkway would tend to make the waterfront more accessible than it is at present.

Prime Fishing Areas

For the purposes of this study, the definition of Prime Fishing Areas was interpreted to include only those piers and points of access which are presently actively used by recreational fishermen. These areas were identified from a combination of sources, including conversations with and data supplied by members of NJDEP's Bureau of Marine Fisheries, a report prepared by NJDEP's Bureau of Recreation and Heritage Planning entitled Hudson River Waterfront Fishing Pier Study, and visual inspection. Seven locations



Piers and marine terminals that are still in use are an important part of the economic life of the Waterfront.

within the project area have been identified as Prime Fishing Areas: (1) the Seatrain pier in Edgewater; (2) the old Union Drydock piers in Hoboken; (3) the Castle Point pier in Hoboken; (4) the abandoned Penn Central Railroad pier north of Exchange Place in Jersey City; (5) the crabbing jetties along the southern bulkhead of Liberty State Park in Jersey City; (6) the tidal flat off of Caven Point in Jersey City; and (7) the Caven Point Pier in Jersey City. The accessibility to and recreation demand at several of these areas could be significantly increased by the development of a Walkway along the waterfront. Depending on the precise location and design of the Walkway other areas that are not now used for fishing could become Prime fishing Areas in the future.

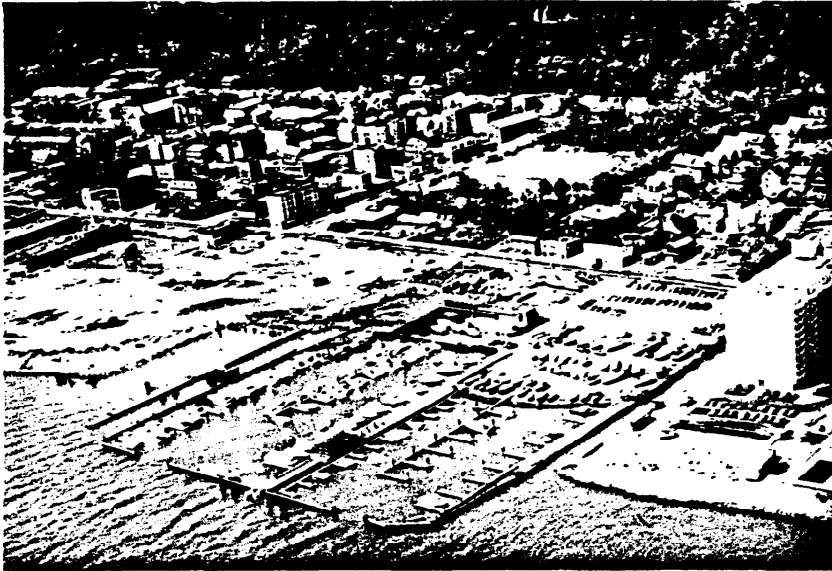
Finfish Migratory Pathways

It has been determined that the Hudson River is a Finfish Migratory Pathway for five species listed by NJDEP as being of particular concern: alewife, blueback herring, American shad, striped bass and American eel. In addition, other fish commonly known to migrate along the Hudson are bluefish, Atlantic tomcod and white perch. The Hudson's status as a Finfish Migratory Pathway was determined from conversations with members of NJDEP's

Bureau of Marine Fisheries and Division of Coastal Resources. It is not anticipated that migratory characteristics of the river would have any implications for location or design of the Walkway. However, this characteristic does offer an indirect opportunity to Walkway users who are also interested in fishing from the shore.

Navigation Channels

The U.S. Army Corps of Engineers Port Series No. 5 and conversations with the New York District of the Corps indicates the following Navigation Channels along the Hudson River: a channel 45 feet deep and 2,000 feet wide along the New York side from deep water in Upper New York Bay to West 40th Street in Manhattan; a channel 48 feet deep and 2,000 feet wide along the New York side from West 40th Street to 59th Street; a channel 40 feet deep along the New Jersey side and adjacent to the other channels from deep water in Upper New York Bay to 59th Street; a channel 30 feet deep and 750 feet wide along the Weehawken-Edgewater waterfront from 59th Street to about one mile south of the George Washington Bridge (no longer actively maintained); and a natural channel 45+ feet deep along the New York side from 59th Street past the George Washington Bridge. In addition, small channels connect the main channel



Pleasure boat marinas are presently limited to boats with drafts of less than five feet along this stretch of the Waterfront, but current development proposals include marinas that provide for deeper draft boats.

to Caven Point, Liberty Island and Liberty State Park. In general, these channels serve to benefit potential users of the Walkway in that large vessels moving up and down the river offer interesting views. Some of the approach channels (e.g., the Morris Canal Basin) are a constraint to Walkway location across the channel since vessel access must be maintained.

Marina Moorings

Three Marina Moorings have been identified within the project area, all of which are located in Edgewater; they are the North Hudson Yacht Club (private), the Von Dohln Marina (public) and the Richmond Marina (public). These were identified from a combination of aerial photos, U.S.G.S. maps and a conversation with the Borough clerk of Edgewater. The proposed Walkway could provide additional access to these marinas, depending on the particular location and design of the route. In any case, the existence of these marinas offers the opportunity of viewing incoming and outgoing recreational vessels to potential Walkway users.

Natural Water's Edge/Floodplains

Although parts of the waterfront are identified by the Hudson River Waterfront Study, Planning and Development Commission final report as being flood hazard areas, the policies for this particular Special Area do not apply because of the extensive amount of filled water's edge. Therefore, the existence of floodplains in the project area do not serve as a major constraint to Walkway construction except that the facility should be designed in such a manner that it will not be damaged during flooding.

Wetlands

Two areas of Wetlands have been identified in the project area. The first area is located in the southern section of Liberty State Park just north of the existing pavilion. The area contains *Spartina alterniflora* and small mudflats. This area was identified on the basis of aerial photos, U.S.G.S. maps, the Hudson River Waterfront Study, Planning and Development Commission final report, and conversations with members of the



The Palisades are world-famous vertical columns of diabase rock, which originated beneath the ground as volcanic magma 195 million years ago.

Jersey City Division of Urban Research and Design. The proposed Walkway along the waterfront in Liberty State Park will be located and designed so as to avoid any impact on the wetland areas, although the promenade portion of the facility will provide users the opportunity to view the vegetation and wildlife of the area from an excellent vantage point.

The second area is an approximate 21.5 acre wetland located in the northern section of Caven Point. It was identified and documented by the "Texas Instruments Liberty Park Ecological Study October 1976." The Caven Point Wetland contains *Spartina alterniflora*, mudflats and shallow tidal bays. The wetland is separated from the remainder of Caven Point by Caven Creek. The wetland takes the form of a peninsula.

Wetlands Buffer

At Liberty State Park, a Wetlands Buffer is located adjacent to the only identified wetland area in the project area. The Walkway will be located and designed so as to avoid any impact on the natural ecotone between the wetlands and the surrounding uplands as well as the wetland area itself.

Steep Slopes

The only significant Steep Slopes in the project area are those associated with the Palisades ridge which runs almost the entire length of the project from Fort Lee to Jersey City. The exact location and configuration of the Palisades were determined from aerial photos and U.S.G.S. maps. Since much of the southern portion of the ridge is actually located west of the project area boundary, only the northern part is important in terms of Walkway development. The steepness of the cliffs is absolutely prohibitive to any facility construction in some areas while other areas, although allowing construction, would be very difficult to get up and down for many users. Construction along the top of the cliffs could offer many panoramic views of the Hudson River and New York City even though it would be away from the waterfront area while construction at the base of the cliffs would promote greater use of the actual waterfront.



The Erie Lackawanna Terminal, adorned with ornate copper, looks much as it did when it was completed in 1907.

Historic and Archaeological Resources

A total of 29 sites were identified as on or eligible for inclusion on the State and National Registers of Historic Places. These sites were determined from an analysis of records maintained by the State Historic Preservation Officer. Many of these sites could be of particular interest to users of the proposed Walkway due to their historic and/or architectural value. In such cases, these sites could serve as major nodes of interest along the route. It is not anticipated that Walkway development will adversely affect any of the sites.

It should be noted that there are many other sites in the project area of local significance as determined by local historical societies and groups. These sites are too numerous to list here. Perhaps of most relevance to the Walkway project was the former existence of a "River Walk" along the Hoboken Waterfront from the New York ferry slips (present site of Erie Lackawanna Terminal) to the Elysian Fields. This walk served as a promenade along the Hudson river in the mid-19th Century. At that time Hoboken was a favorite recreation destination for New York City residents who took ferries across the Hudson for a "day in the country".

STATE AND NATIONAL REGISTER SITES IN THE HUDSON WALKWAY CORRIDOR

George Washington Bridge, Fort Lee

This magnificent span was designed by Port of New York Authority engineer Othmar Amman and noted architect Cass Gilbert and constructed between 1927 and 1931. The bridge represented numerous structural advances for its time and was nearly twice as long as the span that had previously been the longest in the world.

Palisades Interstate Park (Fort Lee Historic Park section), Fort Lee

The creation of this park was the result of a late 19th century movement to prevent destruction of the Palisades, which were being heavily quarried. The Palisades Interstate Park Commission was founded in 1900, and the first land purchase involving Fort Lee Bluff (the section south of the George Washington Bridge), was completed later that same year with financing provided by J.P. Morgan. In 1974, work began on the development of this section of the park as the Fort Lee Historic Park, commemorating the Revolutionary War activities which occurred in the area.

Ferryboat "Binghamton," Edgewater

The "Binghamton" was built in 1904-5 in Newport News, Virginia, for the Hoboken Ferry Company, a subsidiary of the Delaware, Lackawanna and Western Railroad Company. The ferryboat was in continuous service from 1905 to 1967, providing the final connection between the rail lines in Hoboken and New York City. It is one of the few early 20th century ferryboats surviving on the eastern seaboard and is now permanently docked in Edgewater off River Road and serves as a restaurant.

Alcoa Edgewater Works, Edgewater

The first section of this huge factory was built in 1916, with the majority of the building being constructed in 1919-20 (the building was completed to its present extent in 1939-40). It was designed to be the largest aluminum mill in the world at the time. The construction of the mill buildings involved structural innovations in its use of reinforced concrete. During the course of the mill's operation (it was closed in 1965) several important aluminum manufacturing processes were developed here.

Ford Motor Company Assembly Plant, Edgewater

This huge factory was built in 1929-30 according to the designs of the architectural firm of Albert Kahn, Associates. Kahn was noted for its designs in the area of industrial architecture and was actively involved in that field both in the United States and the Soviet Union. The building is presently undergoing redevelopment for residential use.

Steam Yacht "Kestral," West New York

The "Kestral" was built in Charleston, Massachusetts, in 1892, and since its construction has always served as a private yacht under various owners. It is probably the last functioning steam yacht on the eastern seaboard, and may be the last coal-burning vessel of this type in the United States. It is presently owned by the American Maritime Academy, a marine educational organization, and is berthed at the New York, Ontario and Western Railroad Coal Pier off River Road in West New York, 400 feet south of the Guttenberg border.

209 River Street, Hoboken

This is the location of a handsome brick office building associated with the maritime industry in Hoboken. It is located in front of the Port Authority Piers in southern Hoboken.

Southern Hoboken Historic District

This historic district encompasses the main commercial area and transportation hub of Hoboken. It includes portions of River, Hudson, Court, Washington, Bloomfield, Observer Highway, and First through Fourth Streets. Several sites within the district are listed on or eligible for the State and National Registers on their own merit.

Hoboken City Hall

The Hoboken City Hall occupies a square block in the heart of downtown Hoboken, fronting on Washington Street. The present building incorporates two phases of construction, the first completed in 1883, the second in 1911. City Hall is of significance in the areas of architecture, politics and military history, having been used as an Armory during both world wars.

Hoboken Land & Improvement Company Building

The Hoboken Land & Improvement Company Building at 1 Newark Street, is significant for its historic association with the commercial development of Hoboken, and enterprises involving the development and expansion of transportation facilities. Also the unique design of the building is significant for the excellence of its craftsmanship and detailing. The building dates back to 1889.

Hoboken Seamen's Mission

The Seamen's Mission building at 60-64 Hudson Street was built in 1907 and added to in 1910 and 1925. For seventy years, the Hoboken Seamen's Mission has served as a refuge for German Sailors. It was the site of raids by Federal agents during both world wars to seek out spies.

Erie Lackawanna Railroad & Ferry Terminal, Hoboken

This handsome complex looks much as it did when completed in 1907. It is significant in the areas of architecture, engineering (the entire main structure is built over water) and transportation.

Railroad and Ferry Yards, Jersey City

This area contains a number of railroad yards and piers including an early coal pier (ca. 1913), rail-to-barge transfer piers, and the former Pavonia Ferry Landing. It is significant in the area of transportation and occupies the waterfront area from the Holland Tunnel north to the Hoboken boundary.

273 Tenth Street, Jersey City

This structure is located adjacent to but not included in the Hamilton Park Historic District.

Hamilton Park Historic District, Jersey City

This attractive brownstone residential area includes portions of Sixth through Ninth Streets and Jersey Avenue in the vicinity of Hamilton Park which has been a focus for this area of the City since the 19th Century.

88-92 Erie Street, Jersey City

This individual structure is of significance for its architectural merit.

Grace Van Vorst Church, Jersey City

Located at 268 Second Street, this church was erected in 1850-53.

Great Atlantic and Pacific Tea Company Warehouse, Jersey City

Between 1900 and 1929, this complex was used as a manufacturing and distribution point by A & P to supply all stores in the New York metropolitan area. It is located on Provost Street between First and Bay Streets, is remarkably little changed, and is a National Historic Landmark.

Van Vorst Historic District, Jersey City

This historic district, like the Hamilton Park District, centers on a block square formal park, in this case, Van Vorst Park. The area has a concentration of brownstones and includes Jersey Avenue, Vanik, Barrow, Grove, Wayne, Mercer, Montgomery, York, Bright and Grand Streets.

Ionic House, Jersey City

Built in 1835-40 at 83 Wayne Street, this site is the former Dr. William Barrow Mansion. It is within the boundaries of the Van Vorst District but is listed on the State and National Registers based on its own significance.

Timer Cribbing and Stratified Fill, Jersey City

This resource is located beneath the Exchange Place area and is significant for engineering.

Engine Company No. 2, Jersey City

Located at 160 Grand Street, this fire station dates to 1850.

Paulus Hook Historic District, Jersey City

This district is a residential area of brownstones including portions of York, Grand, Sussex, Morris, Essex, Greene, Washington, Warren and Van Vorst Streets/Avenues.

Central Railroad of New Jersey Terminal, Jersey City

This magnificent 1889 railroad/ferry terminal at the foot of Johnson Avenue is currently undergoing restoration in conjunction with Liberty State Park development. It is of significance in the areas of architecture, transportation and history because of its association with Ellis Island.

Pier G, Jersey City (demolished)

Pier G was a large frame reinforced pier located in the big basin of the Morris Canal. It was used as a reloading and storage area for general cargo from the west and coal from the Lehigh Valley. The pier had several levels for storage and reorganization of cargo. Cargo was removed from railroad cars and loaded into barges for delivery throughout the inner harbor area. It was considered significant for both its architectural integrity and its potential contribution to early transportation history.

Car Float and Transfer Bridges, Jersey City (demolished)

The Transfer Bridge was a gangplank-like assembly which allowed rail cars to be pushed to the floats. Rail cars were then loaded directly onto the float for delivery of goods to points within the inner harbor. It was considered significant for its potential to contribute to early transportation history and the area's cultural history.

Vessel No. 99, Jersey City

This vessel was a wooden mine-sweeper called the S.S. Newton. These vessels were called watermelon boats because of their shape. They were constructed of wood because the mines were magnetic. This vessel was considered significant because these mine-sweepers were the last wooden boats commissioned by the Navy.

Pier 19, Jersey City

This pier was a repair facility built by the Jersey Central Railroad to repair their own vessels. They also worked on other companies' vessels. In 1977, when the facility was recorded, it was still being used by the McCallister Tug and Barge Repair Company. It was a complex of buildings consisting of four floating drydocks along the shore, a sawmill and woodworking shop, a paint shop, a forge and blacksmith shop, a machine shop, store houses and offices. It was considered significant because it was still being used for its original purpose and therefore maintained its integrity of setting and purpose.

Statue of Liberty National Monument, Jersey City

This National Monument includes both Liberty Island and Ellis Island in the waters of New York Harbor.

Source: Louis Berger & Associates



Blue crabs abound in the saline Caven Point wetland while Ospreys, Least Terns and Black Skimmers (Endangered Species) and Great Blue Herons, Pied-billed Grebes, Short-eared Owls and Savannah Sparrows (Threatened Species) have been sighted there.

Endangered or Threatened Wildlife or Vegetation Species Habitats

Specific information about Endangered or Threatened Wildlife or Vegetation Species for the overall project area is generally unavailable. However, the wetlands at Liberty State Park and the intertidal flats near Caven Point are representative of habitats for such species. The Texas Instruments Study of October 1976 for Liberty State Park inventoried the following species:

Declining in New Jersey

Red-necked Grebe (Winter)

Threatened Species

Great Blue Heron
Pied-billed Grebe
Short-eared Owl
Savannah Sparrow

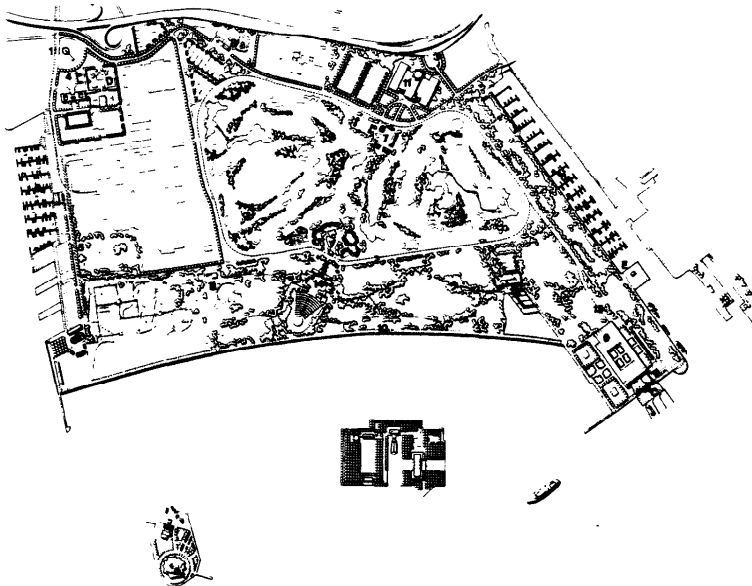
Endangered Species

Osprey
Least Tern
Black Skimmer

The Palisades cliffs are also considered to be a potential habitat area because of the historic nesting of peregrine falcons along the cliffs face. These habitat areas were determined from a conversation with a member of NJDEP's Division of Coastal Resources. These areas act as a constraint to Walkway development in that the facility should avoid passage through them. These areas offer users of the facility an opportunity to view the last vestiges of these habitat types in the project area.

Critical Wildlife Habitats

Like the Endangered or Threatened Wildlife or Vegetation Species Habitats, the wetlands areas at Liberty State Park and Caven Point, the intertidal flats off of Caven Point and the Palisades cliffs are considered to be Critical Wildlife Habitats. The source of these determinations, their constraints to Walkway development and their aesthetic opportunities are similar to those for the Endangered or Threatened Wildlife or Vegetation Species Habitats.



Recently adopted plans for Liberty State Park provide for staged development, beginning with construction of an 18-hole golf course, completion of the Intrapark roadway and marina development along the south and possibly the north embankments.

Public Open Space

The major areas of Public Open Space in the project area are: Palisades Interstate Park in Fort Lee; Veterans Park in Edgewater; North Hudson Park in North Bergen; a linear park along Kennedy Boulevard East in West New York and Weehawken; Weehawken Municipal Park adjacent to the municipal building; Elysian Park and Stevens Park in Hoboken; and Liberty State Park in Jersey City. These parks were identified on the basis of tax map data, field investigation and conversations with local planners. Other smaller areas of public space are also present in the project area. The proposed Walkway is compatible with all of these areas in terms of land use. Several of these parks have the potential to serve as termini and major nodes for Walkway routing and generate significant demand for such a facility within, as well as to and from, their borders.

The major parks and recreation areas in the Hudson River Waterfront area are described in the accompanying table.

Special Urban Areas

Five cities in the project area are considered to be Special Urban Areas: Jersey City, Hoboken, West New York, North Bergen and Bayonne. As stated in NJDEP's Coastal Resource and Development Policies report, the policy for Special Urban Areas is to promote "development that will help to restore the economic and social viability" of these areas. Although the proposed Walkway would not significantly improve the socioeconomic situation of these areas directly, it would have more of an indirect impact in this regard by helping to make the waterfront more attractive to the types of development that are most important in a financial sense. (e.g., residential, commercial, etc.).

PARKS AND RECREATION AREAS

Name	Location	Acreage	Jurisdiction	Facilities
Palisades Interstate Park	Fort Lee	2,500.0	Interstate Park Commission	Picnic areas, marinas, hiking trails, visitors' center
Monument Square Park	Fort Lee	0.73	Boro of Fort Lee	Benches, passive recreation
Veterans Park	Edgewater	11.91	Boro of Edgewater	Baseball fields, playground, picnic area, benches
Zalewski Park	Cliffside Park	0.83	Boro of Cliffside Park	Tot lot
North Hudson Park	North Bergen	167.32	Hudson County	Fishing pond, tennis courts, softball fields, hockey rink
Municipal Park	West New York	9.0	Town of West New York	Tennis courts
Donnelly Park	West New York	4.25	Town of West New York	Swimming pool
Hamilton Plaza	Weehawken	3.39	Township of Weehawken	Benches, overlook
Municipal Park	Weehawken	5.27	Township of Weehawken	Basketball and tennis courts, football stadium
Elysian Park	Hoboken	2.50	City of Hoboken	Basketball courts, benches, playground, shuffleboard
Stevens Park	Hoboken	3.00	City of Hoboken	Little league field, benches
Riverview Park	Jersey City	4.00	City of Jersey City	Tot lot, benches, overlook
Hamilton Park	Jersey City	3.67	City of Jersey City	Basketball and tennis courts, tot lot, benches, passive recreation
Van Vorst Park	Jersey City	1.84	City of Jersey City	Tot lot, benches, passive recreation
Paulus Hook Park	Jersey City	0.92	City of Jersey City	Benches, passive recreation
Liberty State Park	Jersey City	800.0	New Jersey DEP	Benches, passive recreation, open space, natural preserve



Piers along the Hudson provided for transfer of bulk cargo from ships to rail cars before the age of containerization.

ACCESS TO THE WATERFRONT

The accompanying table presents an inventory of road system characteristics and conditions on all public road rights-of-way, any segment of which may serve as a major means of access to the Walkway system.

Findings of particular relevance to walkway design are:

- the very limited access between the top of the Palisades and the waterfront below; and

- the heavy traffic volumes on River Road.

Rail Systems

The inventory of railroad holdings indicates that the freight railroad companies collectively have managed to divest themselves of most of their waterfront property, while retaining enough trackage to continue their service to a declining number of

industrial customers. While the freight railroad officials remain somewhat optimistic regarding their future (primarily on the basis of coal terminal development at the Greenville Yards or Port Jersey), clearly the years of greatest activity on the waterfront have long since passed. The extent of property and facility holding reflects the much reduced scope of operations.

In 1966, when the Regional Plan Association published the Lower Hudson Study, active railroad operations occupied 1900 acres and used piers covering one-fourth of the Lower Hudson Waterfront. Since 1966 rail holdings have been reduced by more than half and numerous properties still in railroad ownership are either for sale or being considered for sale. While nine railroads owned lands in the study area in 1966, major railroad landholdings in 1982 are limited to those of the New York, Susquehanna and Western Railroad, Conrail, New Jersey Transit and the Port Authority of New York and New Jersey.

ROADWAY CHARACTERISTICS BY MUNICIPALITY

Roadway	Length (miles)	Jurisdiction	No. of Lanes	Pavement Width (ft.)	Street Parking	Traffic Lights	Sidewalks	Surface Condition	Comments
FORT LEE:									
Henry Hudson Drive (Ross Dock to River Road)	1.50	Palisade Interstate Park Commission	2	21	none	none	none	good	1-2 foot rock drainage way on each side
Hudson Terrace (Plaza Street to Main Street)	0.10	Bergen County	2	33	SB	1		good	
Hudson Terrace (Main Street to River Road)	0.35	Bergen County	2	28	none	none		good	steep; widened inter- section at Henry Hud- son Drive could be dangerous
EDGEWATER:									
River Road (Hudson Terrace to Orchard St.)	0.55	Bergen County	2	23-31 (var.)	both (var.)	none		good	
River Road (Orchard St. to Rte. 5)	0.90	Bergen County	2	28-45 (var.)	both (var.)	none		good	widens to 4 lanes at the Commodore com- plex to allow turning movements
River Road (Rte. 5 to Archer St.)	0.95	Bergen County	2	28-42 (var.)	both (var.)	1		poor	generally narrow with- out parking; heavy truck use at Hess Oil tanks
River Road (Archer St. to North Bergen)	1.95	Bergen County	2	26-33 (var.)	SB (var.)	none	NB (var.)	fair-poor	some narrow and dan- gerous curves on steep area; dangerous inter- section at Gorge Road
Orchard Street (River Rd. to Undercliff Ave.)	0.05	Edgewater	2	33	SB	none		good	
Undercliff Avenue (Or- chard St. to Rte. 5)	0.90	Edgewater	2	21-26 (var.)	SB	none		fair	steep toward Rte. 5 in- tersection; Rte. 5 inter- section dangerous due to circular movements
Undercliff Avenue (Rte. 5 shared alignment)	0.30	State of New Jersey	2	30-33 (var.)	SB (var.)	none		good	steep on curves
Undercliff Avenue (Rte. 5 to Garden Place)	0.40	Edgewater	1	21-26 (var.)	both	none		good	one-way traffic (SB)
Undercliff Avenue (Garden Pl. to Archer St.)	0.40	Edgewater	2	26	both	none		good	
Archer Street (Under- cliff Ave. to River Rd.)	0.05	Edgewater	2	26	both	none		good	steep
NORTH BERGEN:									
River Road (Edgewater to Guttenberg)	1.00	Hudson County	2	33-35 (var.)	none	1		good	widens to 3 lanes at Lever Bros. to allow turning movements
Bulls Ferry Road (River Rd. to J.F.K. Blvd.)	0.20	Hudson County	2	33	none	none		fair	steep; dangerous curve near top of hill
J.F. Kennedy Boulevard East (Bulls Ferry Rd. to N. Hudson Park Rd.)	0.60	Hudson County	2	42	both	several		good	
North Hudson Park Road* (J.F.K. Blvd. to near Bulls Ferry Rd.)	0.80	Hudson County	2	28-42 (var.)	both (var.)	none		good	
J.F. Kennedy Boulevard East (Bulls Ferry Rd. to Guttenberg)	0.60	Hudson County	2	42	both	several	both	good	
GUTTENBERG:									
River Road (N. Bergen to W. New York)	0.10	Hudson County	2	33	none	1		good	
J.F. Kennedy Boulevard East (N. Bergen to W. New York)	0.25	Hudson County	2	42	both	several	both	good	

*North Hudson Park Road is officially named Riverview Drive and Main Drive.
(continued)

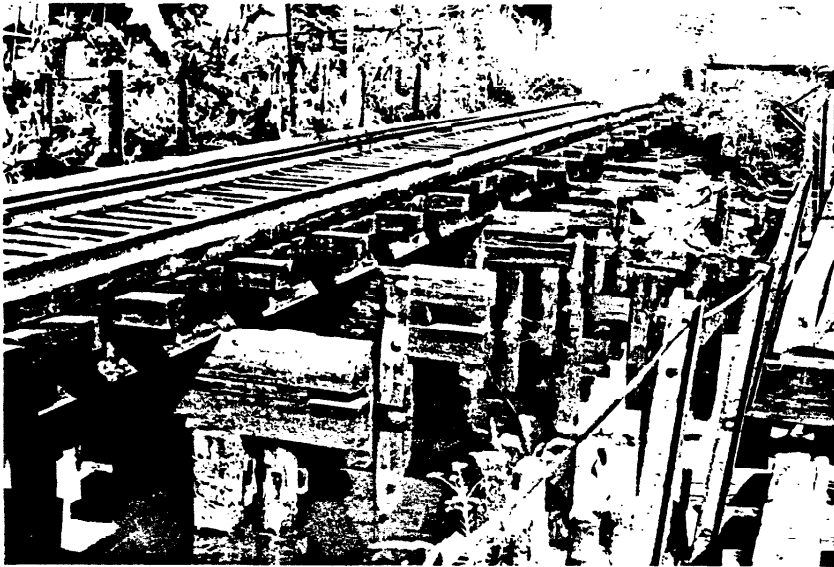
ROADWAY CHARACTERISTICS BY MUNICIPALITY (continued)

Roadway	Length (miles)	Jurisdiction	No. of Lanes	Pavement Width (ft.)	Street Parking	Traffic Lights	Sidewalks	Surface Condition	Comments
WEST NEW YORK:									
River Road (Guttenberg to J.F.K. Blvd.)	0.70	Hudson County	2	33	none	none		good	steep at southern end
J.F. Kennedy Boulevard East (Guttenberg to River Road)	0.60	Hudson County	2	42	both	several	both	good	
J.F. Kennedy Boulevard East (River Rd. to Weehawken)	0.45	Hudson County	2	42	both	several	both	good	
J.F. Kennedy Boulevard East (W. New York to Lincoln Tunnel Approach)	1.10	Hudson County	2	42	both	several	both	fair-good	steep area north of Lincoln Tunnel
J.F. Kennedy Boulevard East (Lincoln Tunnel Approach to Hoboken)	0.70	Hudson County	3-5 (var.)	42-50 (var.)	none	several	both (var.)	fair-good	entire stretch is very dangerous; bridge crossing into Hoboken
HOBOKEN:									
Park Avenue (Weehawken to Viaduct St.)	0.30	Hudson County	2	33-42 (var.)	none	1		poor	bridge crossing into Weehawken
Viaduct Street (Park Ave. to Washington St.)	0.15	Hudson County	2	35	both	several	both	fair	stop-and-go traffic
Washington Street (Viaduct St. to 8th St.)	0.50	Hoboken	2	52	both	several	both	fair	stop-and-go traffic; diagonal parking and illegal double parking
Washington Street (8th St. to Observer Hwy.)	0.70	Hoboken	2	42	both	several	both	fair	stop-and-go traffic
11th Street (Washington St. to Hudson St.)	0.05	Hoboken	2	42	both	none	both	fair	traffic lanes separated by median
Hudson Street (11th St. to Observer Hwy.)	0.95	Hoboken	1-2 (var.)	24-31	both (var.)	1	both	fair-poor	one-way traffic south-bound; illegal double parking
River Street (11th St. to Hudson Pl.)	1.20	Hoboken	2	38	both (var.)	none	both (var.)	fair-poor	old rail line still exists in roadway
Hudson Place (River St. to Hudson St.)	0.05	Hudson County	2	42	both	none		fair	
Observer Highway (Hudson St. to Paterson Ave.)	0.60	Hudson County	5-6	50	none	none	WB	fair	portion has wide shoulder on EB side for adjacent warehouse trucking
Paterson Avenue (Observer Hwy. to Paterson Plank Rd.)	0.25	Hudson County							no access available from Observer Hwy. due to guard rail
JERSEY CITY:									
Paterson Plank Road (Paterson Ave. to Bowers St.)		Hudson County							
Bowers Street (Paterson Plank Rd. to Palisade Ave.)		Jersey City							
Palisade Avenue (Bowers St. to Franklin St.)		Jersey City							
Franklin Street (Palisade Ave. to Mountain Rd.)		Jersey City							
Mountain Road (Palisade Ave. to Paterson Plank Rd.)		Jersey City							
Henderson Street (Observer Hwy. to 8th St.)	0.75	Jersey City	2	28-40 (var.)	both (var.)	several		poor	crosses Holland Tunnel approach lanes; passes under several trestles; poor drainage
8th Street (Henderson St. to Hamilton Pl.)	0.30	Jersey City	1	26	both	none	both	good	one-way traffic WB; sidewalks have bicycle ramps at corners
Hamilton Place (8th St. to 9th St.)	0.10	Jersey City	1	26	both	none	both	good	one-way traffic NB

(continued)

ROADWAY CHARACTERISTICS BY MUNICIPALITY (continued)

Roadway	Length (miles)	Jurisdiction	No. of Lanes	Pavement Width (ft.)	Street Parking	Traffic Lights	Sidewalks	Surface Condition	Comments
9th Street (Hamilton Pl. to Henderson St.)	0.30	Jersey City	1	26-31 (var.)	both (var.)	none	both	good	one-way traffic EB; cement median at Grove St. intersection blocks WB travel; abandoned warehouse trucking lane adjacent to road between Henderson and Grove
McWilliams Place (9th St. to 8th St.)	0.10	Jersey City	1	26	SB	none	both	good	vertical parking
Jersey Avenue (8th St. to Grand St.)	0.75	Jersey City	2	33	both	several	both	good	
Jersey Avenue (Grand St. to Morris Canal Basin)	0.40	Jersey City	2	24	none	none	none	poor	portion unpaved; mostly truck use
Montgomery Street (Jersey Avenue to Henderson St.)	0.30	Jersey City	2	26	EB	several	both	poor	
Montgomery Street (Henderson St. to Exchange Pl.)	0.50	Jersey City	4	50-60 (var.)	both (var.)	several	both	good	portions separated by median
Greene Street (Montgomery St. to Grand St.)	0.10	Jersey City	2	24	none	none		fair	some cobblestones in surface
Grand Street (Greene St. to Jersey Ave.)	0.70	Jersey City	2	35	both	several	both	good	
Henderson Street (Grand St. to Morris Canal Basin)	0.30	Jersey City							
Audrey Zapp Drive (Phillip St. to Central R.R. Terminal)	0.75	Jersey City	2	21	none	none	none	poor	surface entirely of brick cobblestones
Phillip Street (Audrey Zapp Dr. to Burma Rd.)	0.80	Jersey City	2	26	none	none	none	good	
Burma Road (Phillip St. to Morris Pesin Dr.)	0.40	Jersey City	2	26	none	none	none	poor	intersection at Morris Pesin Dr. is particularly poor condition
Morris Pesin Drive (Burma Rd. to Liberty Park Visitors' Center)	0.70	Jersey City	2	31	none	none	none	fair	shoulders delineated
Caven Point Road (Morris Pesin Dr. to Pier Rd.)	1.00	Jersey City	2	38	none	none	none	poor	primarily truck route; heavy road surface debris
Pier Road (Caven Point Rd. to Caven Point Pier)	0.85	U.S. Army/State of N.J./Jersey City	2	20	none	none	none	fair-poor	limited use



The Conrail trestle bridge across the Morris Canal basin is a potential future link in the walkway.

A Conrail trestle-bridge across the Morris Canal basin has been identified as being of particular potential importance as a link in the walkway system.

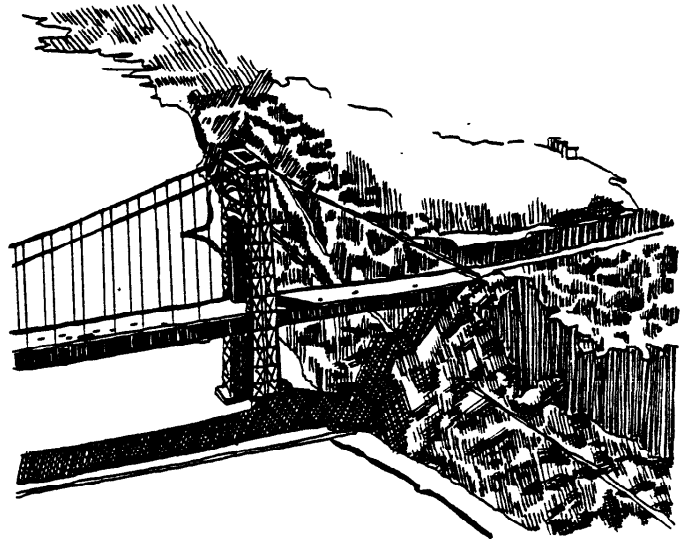
NJ Transit's primary holding along the Hudson River waterfront is its Hoboken rail passenger station and adjacent car storage and maintenance yard. This yard is the eastern terminus for all passenger trains on the Morristown line while the station provides a convenient point to interchange with the Port Authority's adjacent PATH station. Relocation of the rail car storage and maintenance yard to Secaucus is under consideration; however, any such move is at least 3-5 years away.

NJ Transit also owns the former Central NJ Railroad (CNJ) line in Jersey City running parallel to the NJ Turnpike into Bayonne.

The Port Authority of NY and NJ operates the Port Authority Trans-Hudson (PATH) light rail system between

Newark, NJ and New York City, NY. Along its route in New Jersey there are seven stations located at Penn Station in Newark; Harrison; Journal Square; Pavonia Street, Grove Street and Exchange Place in Jersey City; and the Hoboken Terminal in Hoboken. Much of the Port Authority's rail holdings are underground and are not expected to affect or be affected by Walkways along the waterfront.

Both New Jersey Transit and the PATH light rail system provide excellent access for pedestrians to the walkway system but these are severely limited opportunities for people who wish to bring bicycles to the study area by means of public transportation. Only folding bicycles are permitted during off-peak hours on New Jersey Transit trains. On the PATH system full size bicycles are allowed as well as folding bicycles, but in both cases access is limited to off-peak hours and a permit is required.



The New Jersey Trails Council identifies two trails within the Palisades Interstate Park; one at the base of the cliffs and one along its top edge.

COMPATIBILITY OF THE PROPOSED WALKWAY WITH STATE BIKEWAY AND TRAILS PLANS

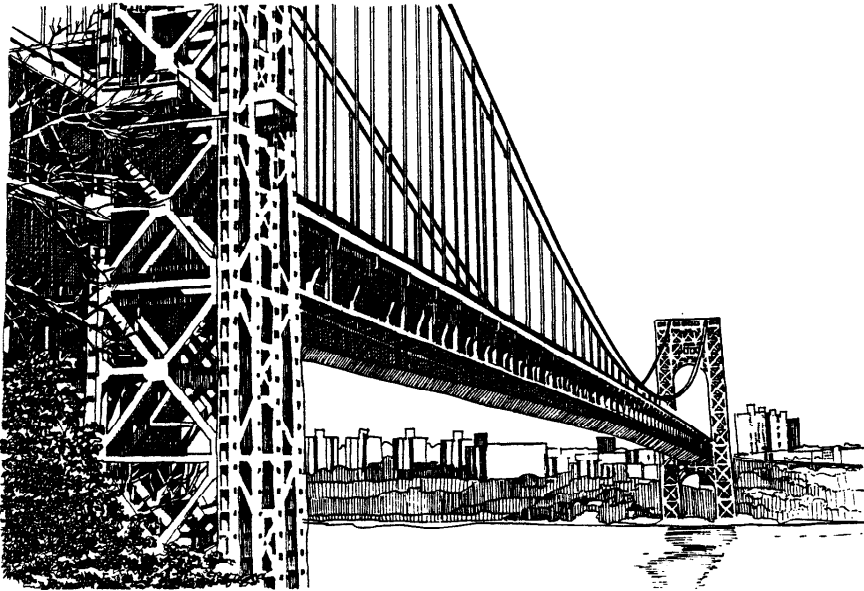
The proposed Hudson River Walkway was evaluated in terms of its compatibility with two State-prepared documents related to linear trails. These documents are: (1) Bikeways in New Jersey: Status of Planning and Development (1980) prepared by the New Jersey Department of Transportation, and (2) New Jersey Trails Plan (1982) prepared by the New Jersey Trails Council.

The New Jersey Department of Transportation document identifies all bikeways that were either existing, under construction or proposed as of August 1978. In the Hudson River Walkway corridor, no bikeways were in existence or under construction at that time although two short segments were proposed. One segment consists of about 1.0 mile of Class III bikeway to be built along River Street in Hoboken from Elysian Park to the old Erie Lackawanna Terminal. The other segment consists of about 1.2 miles of Class I bikeway to be built through North Hudson Park in North Bergen. Both of these routes generally coincide

with the location and design of the proposed Hudson River Walkway. The River Street route coincides with a portion of the proposed main route of the Walkway while the North Hudson Park route roughly coincides with one of the proposed loop excursion routes.

Two other routes are indicated by the Department of Transportation as being proposed in the general vicinity of the proposed project route although they are outside of the actual project area. One route consists of approximately 10.8 miles of Class I bikeway along the top of the Palisades cliffs from Fort Lee to the New York State line. The other route consists of about 1.0 mile of Class I bikeway through Lincoln Park in Jersey City. Although the Lincoln Park route would not provide any connection to the proposed project route, the Palisades route could serve as a continuation to the proposed project if a connector could be provided.

The New Jersey Trails Council document does not identify any existing or proposed components of the State Trails System, including walkways or bikeways, in the immediate vicinity of the proposed project from Jersey City to Fort Lee. However, it does identify two



Trails within the Palisades Interstate Park provide the potential for linkages within the Waterfront Walkway.

existing trails within the Palisades Interstate Park running from Fort Lee to the New York State line. One is located at the base of the cliffs while the other runs along the top edge. the former is identified as being in deteriorated condition. Both trails are primarily oriented toward hikers. Either of these trails could easily be connected to the proposed route along the Hudson River waterfront.

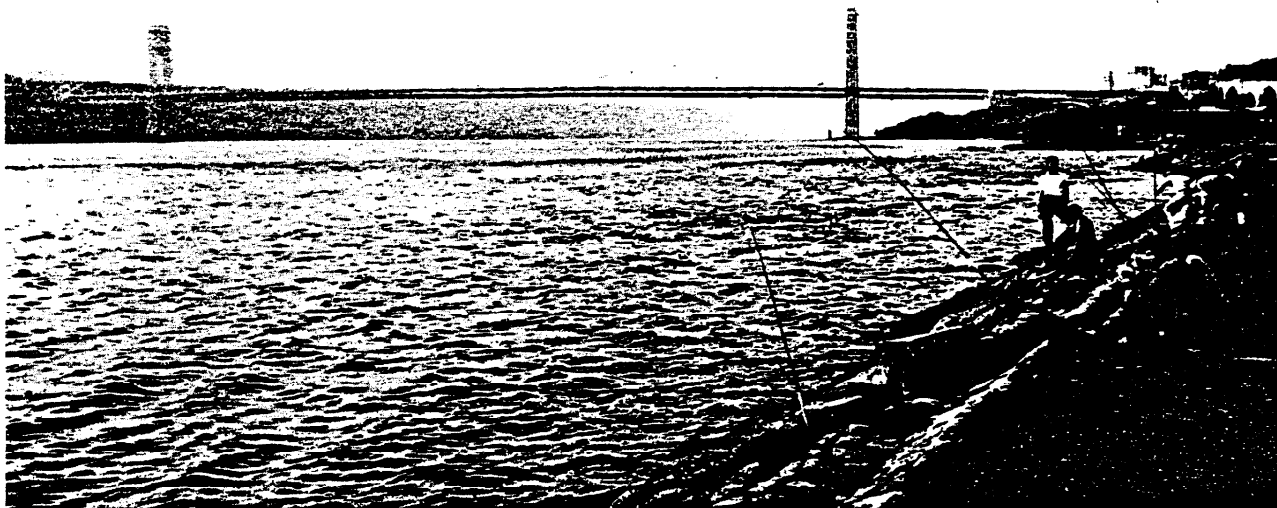
This document also identifies several major issues with which the Trails Council is concerned. These issues must be addressed in order to expand and improve New Jersey's trails resources. The proposed Walkway seems to promote the State's view in relation to several issues, specifically those issues related to public use of private land, multiple jurisdictions, multiple use and compatibility, recreation and transportation, and urban trails. These views are stated verbatim below:

MULTIPLE USE AND COMPATIBILITY -
As a way to get more from limited resources, multiple use has wide appeal. Trails can be constructed that serve more than one user group. They are less expensive than creating 2 or 3 separate

trails for the different activities. A single trail uses less material and takes less land area. It also requires less personnel to maintain and patrol than several separate trails. We need to resolve the basic problem of compatibility between high speed and low speed uses and between motorized and non-motorized trail activities and to design multiple use trails that offer high quality trail experiences for all users.

RECREATION AND TRANSPORTATION -
Some recreational trails can also be used for transportation. Pedestrian walkways and bicycle paths can serve local commuter transit stations, schools, and shopping areas. However, the State's roads are most important for both recreational and transportation bicycling. We need to consider the safety of cyclists and work to make the total road network more suitable for bicycling.

URBAN TRAILS - Few trails are currently located in urban areas but a strong demand for urban



Urban trails provide special opportunities for hiking and fishing within the heart of the metropolitan area.

trails is expected to increase in the future. Because of the urban character of much of New Jersey, we need to concentrate on developing existing rights-of-way such as city alleys, abandoned railroads, utility corridors, and rehabilitated waterfronts. We need to encourage communities to work together to establish regional trail systems.

PUBLIC USE OF PRIVATE LAND - We need to encourage more public use of private lands. We can zone to require that existing trails be maintained when development occurs and that trails, or interior pathways be included in the design of new developments. We can provide tax relief to those who allow access to their land for recreational uses. We can actively encourage a cooperative recreational use program geared to corporations with large land holdings. We can publicize the existence of the Landowner's Liability Act.

MULTIPLE JURISDICTIONS - We need to resolve the regulatory conflicts which cause problems in our attempts to establish regional trails. Land use regulations can vary greatly along a trail right-of-way that crosses jurisdictional boundaries. Cooperative agreements with municipal and county agencies; funds from state, county, municipal, and private sources; huge amounts of volunteer time and labor; boundless faith and enthusiasm; these are the basic ingredients of a successful regional trail. We can publicize examples of successful regional trails to show that they can work and help develop the broad based support necessary to create such trails.



The landscape of the Hudson Waterfront is about to undergo major changes. It is essential that new development provide for public enjoyment of the water's edge.

MODELS AND PROTOTYPES OF OUTSTANDING WATERFRONT WALKWAY DESIGN

The opportunity to design a waterfront walkway on the Lower Hudson is a unique one.

It demands a search through the great urban waterfronts for models and prototypes of design responses to its particular physical and social character.

"The corridor-like quality of the Hudson, between the wooded cliffs of the New Jersey Palisades and the forest of man-built towers on the Island of Manhattan, is apparent to anyone who has ever been on or alongside this river. The strong corridor image reinforces the visual effect of all landmarks. Structures poorly sited or set sprawling on the riverside could sharply diminish the value of the river view as well as preclude public access to and enjoyment of the river's edge."

It is critical, in this period of major transition from manufacturing and break-bulk port operation to mixed use urban development of the Hudson River

Waterfront, that a systematic approach to the design treatment of the water's edge be established and incorporated in municipal, county and state waterfront development review procedures.

Illustrations of the results of a search through successful design responses to similar conditions along other great urban waterfronts have been incorporated in relevant sections of the Design Guidelines, which follow the Plan in this volume. These examples address the variety of conditions and circumstances that are found in the current major development proposals for the Hudson River Waterfront and that can be anticipated in other future riverfront development, ranging from intimate residential streetscapes to grand formal plazas with park-like promenades and working industrial promenades.

Particular consideration has been given to identifying creative and sensitive design treatments for pedestrian promenades, bicycle paths, boating facilities, waterfront parks, gardens, and urban plazas.

*Roy Mann, Rivers in the City, New York: Praeger, 1973.

SOURCES

Historic Resources

Ahern, Tom, Hoboken Office of Community Development - Historic Preservation.

Brooks, Joseph, Jersey City Department of Economic Development, Division of Urban Research and Design.

Historic Sites Surveys, Boroughs of Cliffside Park, Edgewater and Fort Lee, Bergen County Office of Cultural and Historic Affairs, 1981.

Lofs, Charles, A Plan of the New City of Hoboken (map), Hoboken, New Jersey, March 1804.

National Register Nomination Forms, SHPO opinions and determinations of eligibility, files of Office of Cultural and Environmental Services, New Jersey Department of Environmental Protection, Trenton, New Jersey.

New Jersey and National Registers of Historic Places, June 1, 1980 and updates of November 1, 1980 and August 31, 1981.

Our Hoboken Heritage, (1976 Calendar), Redden, Caroline; Aaronson, Sally and Sullivan, Edward. Hoboken Urban Preservation Program, 1976.

Proctor, Mary and Matuszeski, Bill, Gitty Cities, Temple University Press, Philadelphia, 1978.

Spielman and Brush, Map of Hudson County, 1881, Hoboken, New Jersey.

Special Areas

Barbara Kaufman, NJDEP, Division of Coastal Resources.

Rich Kantor, NJDEP, Division of Coastal Resources.

Bruce Freeman, NJDEP, Bureau of Marine Fisheries.

Bill Andrews, NJDEP, Bureau of Marine Fisheries.

Bill Flasak, U.S. Army Corps of Engineers, New York District.

Jerry Killeen, Jersey City Division of Urban Research and Design.

Dan Schindler, U.S. Department of Agriculture, Soil Conservation Service.

Mr. Susskind, Borough Clerk, Edgewater.

Parks and Recreation Areas

Richard Olson, Assistant Superintendent, Palisades Park Commission.

Jim Woods, Fort Lee Building Department.

Mr. Susskind, Borough Clerk, Edgewater.

Mr. Quick, Cliffside Park Recreation Department.

Ray Schindler, Superintendent, North Hudson Park.

West New York Tax Assessment Office.

Weehawken Clerk's Office.

Hoboken Tax Assessment Office.

Jerry Killeen, Jersey City Division of Urban Research and Design.

Community Plans

Beyer, Blinder and Belle, Year 2001
Development Slides: Existing Land Use,
1982.

T.E. Moore, "Cliffside Park: Existing
Land Use Map," March 1978.

Mayo Lynch & Associates, Inc. "Existing
Land Use: North Bergen Port Authority;"
updated by Elizabeth Schonwald, Mayo
Lynch and Associates, Inc., November
1982.

Community Housing and Planning
Associates, Inc., "Existing Uses of
Land 1975: Town of West New York,
N.J."

The Planning Association of North
Jersey, "Proposed Zoning Map: Township
of Weehawken," April 1982.

Mayo Lynch & Associates, Inc. "City of
Hoboken: Land Use 1977."

Buckhurst, Fish, Hutton, Katz and Louis
Berger & Associates, Inc., "Jersey City
Master Plan Review," July 1982.

James M. Sweeney, City of Bayonne.

Citizens' Groups

Winifred Spallone, Chairman, Concerned
Citizens to Save the Palisades

James Drago, Save the Palisades

Walter Krammer, Councilman, Hoboken
Board of Education

Audrey Zapp, Advisory Committee to
Liberty State Park

Lorraine Garry, President, Para
(preservation/restoration)

David Kloepper, President, Van Voorst
Park Historic District

Joe Thompson, Hamilton Park Historic
District

Joseph Duffy, Joseph Sehasny, Paulus
Hook Neighborhood Association

Morris Pessin, Director, "City Spirit"
(Cultural Arts-Jersey City)

Helen Manogue, Environmental Commis-
sion-Historic Preservation

William Beren, Joanne Katzban, Water-
front Commission

Richard Brice, Save the Hudson Our
River Environment (S.H.O.R.E.)

Municipalities

Edgewater

Thomas Tansey, Mayor

Mr. Colantoni, Recreation Department-
Eleanor Van Gelder Elementary School

Charles Pessa, Councilman

Dean Remondos, Director, Mary Stewart,
Secretary, Planning Board

Patricia Corbett, Women's Club

Joseph Ferry, Lions' Club

Albert Von Dohln, Chamber of Commerce

Joe Burgess, Planning Study-Malcolm
Kasler Associates, Consultants

Cliffside Park

John Cennarazzo, Director, Planning
Board

Frank Biasco, George Quick, Recreation
Department

North Bergen

Anthony DiVincent, Mayor

Mrs. Harley, Planning and Community
Development

North Bergen Action Group

Guttenberg

Lawrence Manger, Manager, Galaxy

Robert Tholen, Jr., Recreation
Department

Patrick Forenza, School Supervisor

Prudential Insurance Company

West New York

Leona Sherman, Director, Planning and
Community Development

Weehawken

Richard Turner, Town Manager, Donna
Jandik, Secretary

Grace Harris, Planning Association of
North Jersey

Hoboken

Thomas Ahern, Department of Planning
and Community Development

Jim Farina, Director, Recreation-
Department of Health and Welfare

Mr. Van Wie, Director, Public Works

Fred Bado, Community Development Agency

Mr. W.F. Crisman, Stevens Institute

Steve Block, Sally Aronson, Civic
Leaders

Paul Ratundi, Director, Louis Fretz,
Craig Malia, Municipal Waterfront
Commission

Stephanie Hottendorf, Secretary,
Historic Preservation

Patricia Florio, Landmark Preservation
Commission of New York City

Jersey City

Mark Munley, Director, Department of
Housing and Economic Development

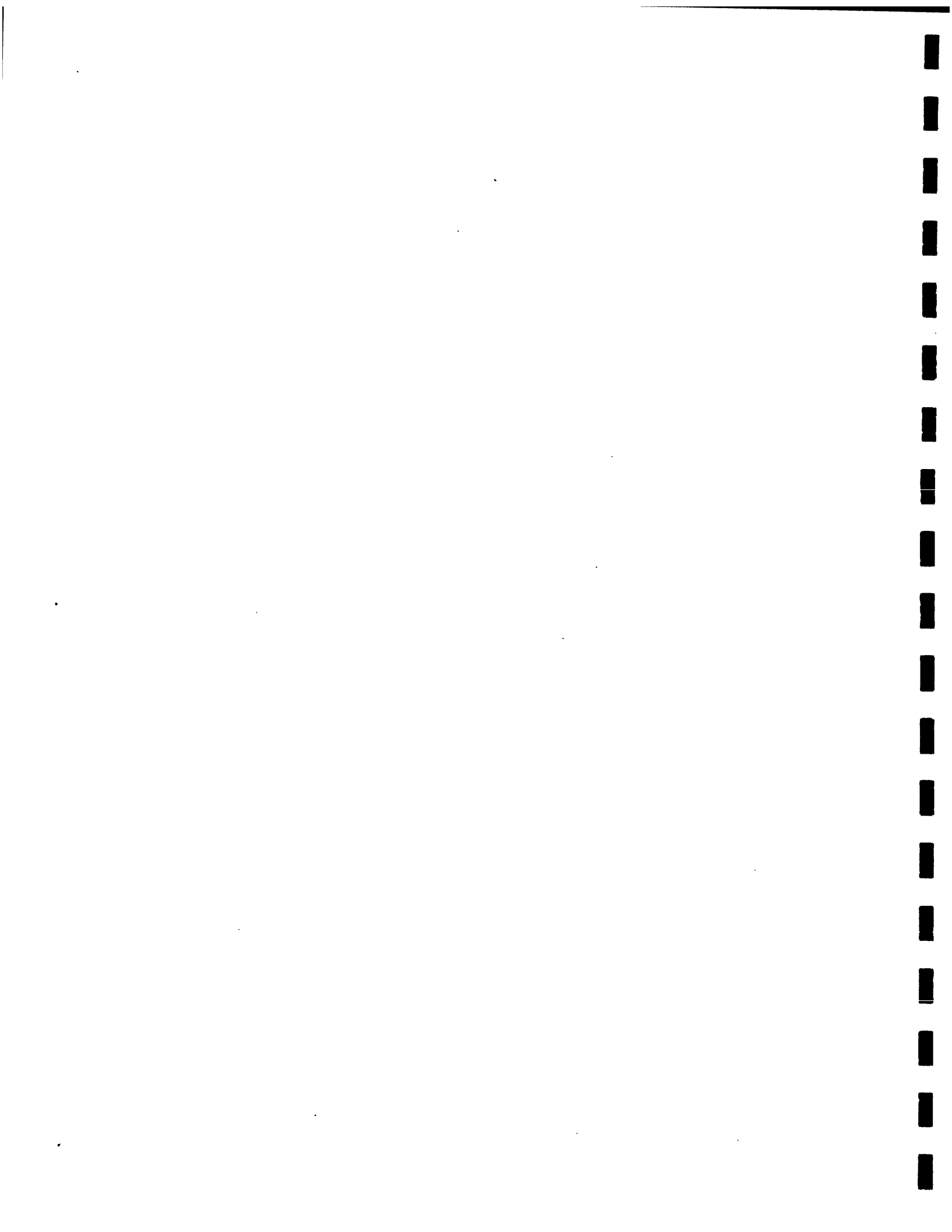
Ed Kolling, Director, Karen Waldren,
Assistant, Division of Urban Design and
Research

Joe Brooks, Historic Preservation

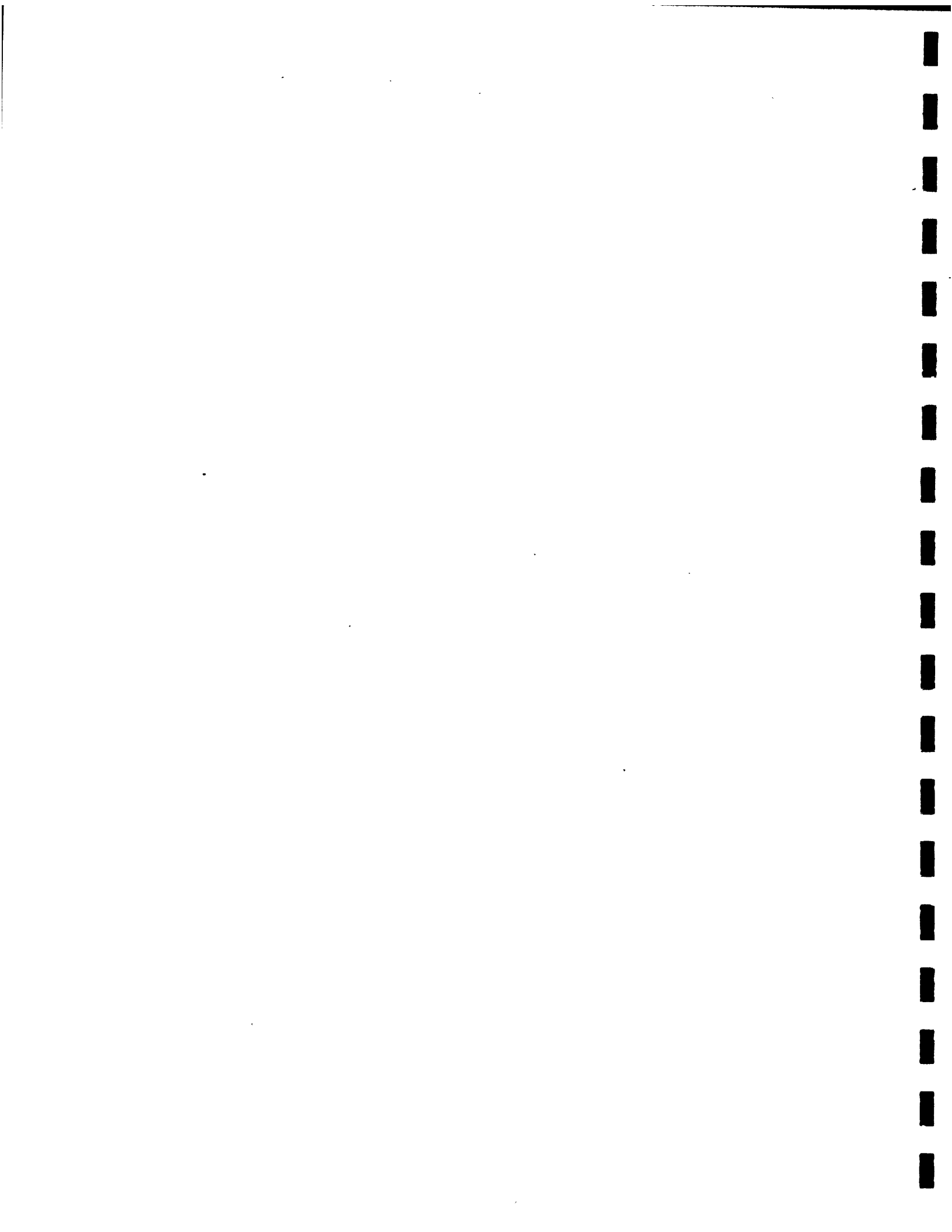
Bob England, Harsimus Cove

Bayonne

Rachel Budd, Nancy Richardson, B.A.T.



Design Guidelines





The New Jersey Hudson Waterfront, between the George Washington Bridge and the Bayonne Bridge, provides a unique opportunity for construction of an urban waterfront walkway linking major new development with existing communities, and preserving public access to the water's edge.

Introduction

PURPOSE OF THE GUIDELINES

The purpose of this manual of Design Guidelines is to assist the New Jersey Department of Environmental Protection's Division of Coastal Resources in reviewing permit applications under the Waterfront Development Permit Law, N.J.S.A. 12:5-3, to determine the adequacy of provisions for public access to the Hudson River Waterfront and to assist potential developers, local officials, and residents of waterfront municipalities in determining what appropriate public access is.

Statement of Coastal Policy

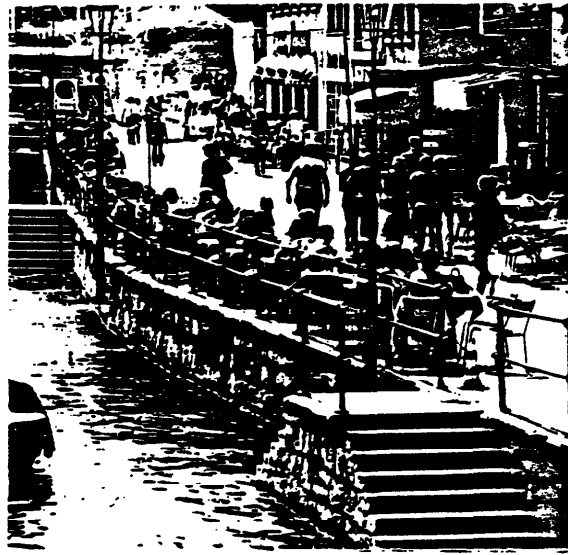
The Coastal Resource and Development Policies of the New Jersey Department of Environmental Protection (DEP) Division of Coastal Resources (N.J.A.C. 7:7E-1.1 et. seq.) include the requirements concerning public access to the waterfront, as described in these excerpts from the Coastal Policies: "Coastal development adjacent to all coastal waters, including both natural and built-up waterfront areas, shall provide perpendicular and linear access to the waterfront to the maximum extent practicable, including both visual and physical access. Shorefront development that limits public access and the diversity of shorefront experience is discouraged." (N.J.A.C.7:7E-8.13)

Under Housing Use Policies, (N.J.A.C.-7:7E-7.2) and Transportation Use Policies (N.J.A.C.7:7E-7.5) the following elements are encouraged within housing development: bicycle paths, bicycle storage facilities, lighted walkways with benches, sidewalks with curb ramps, shade trees and pedestrian controlled traffic lights.

The Design Guidelines are intended to clarify what these statements mean in practical terms for both the developer and DEP.



Office and retail commercial uses in Baltimore's Inner Harbor benefit from the continuous walkway at the Harbor's edge.



Residents of Luzerne, Switzerland, find their waterfront walkway a pleasing pedestrian route to work and to shopping areas.

Importance of the Walkway to the Development of the Hudson Waterfront

Dramatic changes are occurring on the Hudson River Waterfront in New Jersey, providing a unique opportunity to incorporate public access.

Consolidation and reorganization of rail service in the region resulted in abandonment of major portions of the 1900 acres along the New Jersey Hudson Waterfront between the George Washington and the Bayonne Bridge that were occupied by railroad yards until the early 1970's.

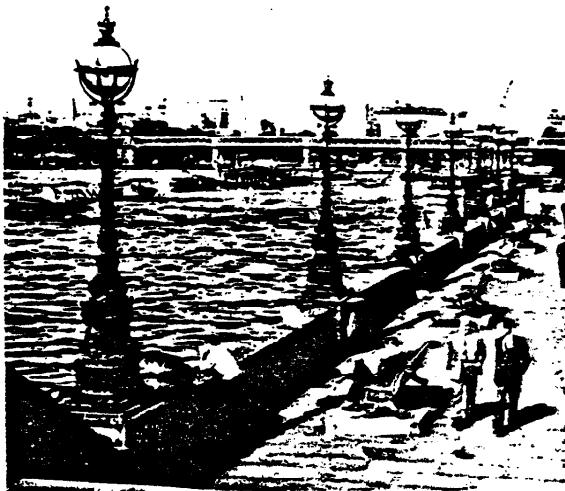
Simultaneously, because of the major technological changes in shipping to container operations with mechanized handling and storage, bulk cargo operations along the Hudson Waterfront have become obsolete.

As a result, after twenty years of stagnation, vast areas of the waterfront have become available for redevelopment, and developers have begun to respond. As of December, 1982, including the 800-acre Liberty State Park, 3400 acres along the Hudson Waterfront

were proposed for mixed use, residential, commercial, office, and major recreational development.

The New Jersey Department of Environmental Protection Division of Coastal Resources' authority to require construction and maintenance of public access to the waterfront wherever feasible through waterfront development provides an opportunity for the development of a major unifying design element throughout the corridor. The public accessway will provide for continuous pedestrian access along the waterfront between major new developments and existing historic sites, parks and urban centers, and will preserve important vistas of this major urban waterfront.

Office and retail commercial development will benefit particularly from the high visibility associated with location along a major urban waterfront walkway. Generous open pedestrian spaces create a grand urban design scale enhancing the image of adjacent uses, and can provide the stage for a variety of lively festival activities.



Victorian lights with a stone bulkhead define the edge of the waterfront promenade. (Thames, London)



Ground level stores and landscaping buffer residential mid-rises from the public walkway. (Stockholm, Sweden)

The walkway will provide for convenient pedestrian and bicycle access between residential development and nearby places of employment, commercial and community service centers, schools, libraries, health facilities and recreation areas along the waterfront. Because of constraints upon automobile travel within the corridor, the waterfront pedestrian and bicycle access system will be a significant amenity for residents of corridor neighborhoods.

The Jersey Hudson Waterfront is notably lacking in landscaped open space and characterized by severe access problems. The Hudson Walkway will provide not only a refreshing linear park system with fine views, but a major new continuous element in the corridor transportation system.

How the Design Guidelines Relate to the Hudson Waterfront Walkway Plan

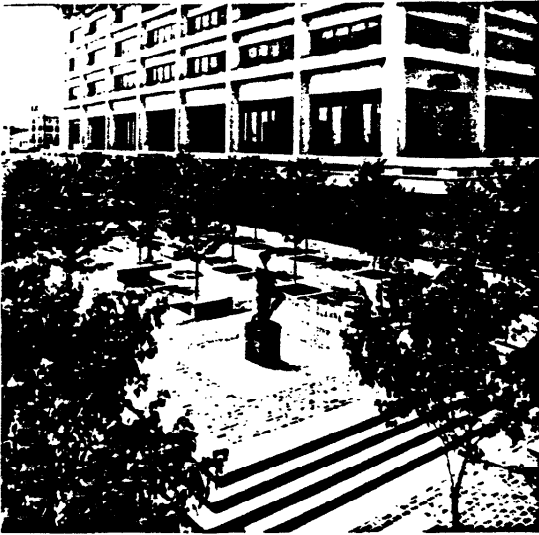
The Hudson Waterfront Walkway Plan is an outgrowth of and a sequel to the Final Report of the Hudson River Water-

front Study, Planning and Development Commission, published in September, 1980.

The Walkway Plan presents a delineation of the proposed waterfront walkway between the George Washington Bridge and the Bayonne Bridge.

Because many development plans for the waterfront are in the concept planning stages, the Walkway Plan is correspondingly shown in concept form. As development proposals are taken to detailed design stages, the Walkway Plan will be detailed according to specifications contained in these guidelines. The purpose of the Walkway Plan is to demonstrate clearly DEP's intent that the walkway be located as close to the water's edge as possible, with loop excursion routes to scenic overlooks on the Palisades and areas of particular historic and cultural interest.

The Plan, which precedes the Guidelines in this volume, provides important background information for design of the walkway for developers and for DEP.



Provision for public access at the concept planning stage permits the design of highly compatible building-open space relationships as at the Wilmington Government Plaza.

HOW TO USE THE GUIDELINES

These Design Guidelines are intended to clarify what is meant by public access and to decrease uncertainty with regard to suitable and acceptable ways in which the waterfront public access requirement can be met.

The Developer

Design of the waterfront walkway system is an integral part of the design of any waterfront development site.

At the earliest concept planning stages, the developer should obtain copies of the Hudson Waterfront Walkway Plan and Design Guidelines to provide guidance for incorporation of public access ways in design of a proposed development.

The developer should also obtain copies of DEP's Coastal Resources and Development Policies N.J.A.C.7:7E-1.1. et. seq. for a detailed description of Waterfront Development Policy and of the New Jersey Coastal Development Handbook (June 1982, as amended) for an outline of the entire Waterfront Development permitting process.

Plans presented by the developer to DEP in applications for Waterfront Development Permits should be presented at a large enough scale and in sufficient detail to demonstrate clearly:

- the way in which the location and design of proposed public accessways on the site meets the Minimum Dimensional and Locational Requirements for Public Accessways set out in Part I of the Guidelines, and the Overall Requirements for Public Access, set out in Part III; and
- any factors and conditions on the site and in the proposed development plan that may warrant permission of exceptions to the Minimum Dimensional and Locational Requirements, on the basis of considerations described in Part II of the Guidelines.

Where possible and particularly at later phases in the development process, applications should include plans and cross-sections illustrating detailed design of public accessways, and demonstrating their correspondence to set out in Part V Open Space Components and Part VI Design Elements of the Guidelines.



The World Trade Center with penthouse restaurant views provides a focal point at the harbor's edge in Baltimore.



Seating and tables at this waterfront plaza allow office workers to enjoy views of the bay on their lunch hour. (Seattle, Washington)

Prototype Design Solutions set out in Part IV of the Guidelines provide examples of plans and cross-sections illustrating the location and design of public accessways in response to typical site conditions found along the Hudson Waterfront.

Applications for permits at later phases in the development process should also set out a plan for continuing maintenance of public accessways over time, as discussed in Part VII of the Guidelines.

Department of Environmental Protection

These Guidelines will provide the basis for the New Jersey Department of Environmental Protection Division of Coastal Resources' review of all applications for Waterfront Development Permits.

DEP staff will review all applications for Waterfront Development Permits for both private and public development to assure that Minimum Dimensional and Locational Requirements and the Overall Requirements for Public Accessways are met in each development plan.

Where conditions warranting exceptions to Minimum Requirements are applicable, DEP Staff will review information provided in applications and in the Hudson Waterfront Walkway Plan against guidelines set out in Part II, below, to determine the appropriateness of granting such exceptions.

For applications at later phases of development, DEP staff may provide guidance and suggestions regarding the design of specific open space components and the selection of design elements, based on guidelines set out in Parts IV, V and VI, below.

DEP staff will review proposed methods for on-going maintenance of public accessways, taking into account factors discussed in Part VII, below, to assure that proposed accessways will be maintained in conformance with plans approved as a condition of issuance of Waterfront Development Permits.

DEP will also use these Guidelines as the basis for comments and recommendations to other planning and regulatory agencies, with regard to factors affecting the Hudson Waterfront.



Minimum Requirements for Public Accessways

Part One

Minimum requirements for the provision of public accessways on waterfront development sites include requirements for:

- Waterfront Walkways,
- Connecting Walkways,
- Bicycle Access,
- Parks and Plazas, and
- Signage

WATERFRONT WALKWAY

Location

Every waterfront development must include a waterfront walkway, as close to the water's edge as possible, parallel to the river.

Dimensions

The public access easement for waterfront walkway must have a minimum right-of-way width of thirty feet. The waterfront walkway must include a minimum unobstructed paved area of sixteen feet in width. The remainder of the right-of-way width may be paved or landscaped with street lighting, seating and other street furniture as appropriate, and may include a separate paved surface of a minimum width of ten feet designated as a bikeway.

Building setbacks and yards shall be calculated from the edge of the thirty foot public access easement.

CONNECTING WALKWAY

Location

Connecting walkways are intended to provide a connection between the first public road inland and the waterfront.

Connecting walkways should terminate at the water's edge. Ideally, this will be at the waterfront walkway, but in cases where the walkway is away from the water, connecting walks may terminate at a waterfront parks or plaza, a scenic overlook, a park, a trail or a pier.

At least one connecting walkway must be provided within any waterfront development site, but in no case shall the interval between connecting walkways be more than one half mile along the waterfront.

Dimensions

The public access easement for a connecting walkway must have a minimum width of twenty feet. A connecting walkway must include a minimum unobstructed paved area of ten feet in width. The remainder of the right-of-way width may be paved or landscaped with lighting, and other street furniture as appropriate.

Building setbacks and yards shall be calculated from the edge of the twenty foot public access easement.

BICYCLE ACCESS

Location

Provision of safe, convenient and adequate facilities for bicyclists within waterfront developments may be made by one or both of the following means:

- construction of a separate paved route specifically designated for bicyclists, parallel to the waterfront and connecting walkway system, within the same 30 foot public access easement;
- permission of use of the waterfront walkway and of connecting walkways by bicyclists during specific hours of the day, as indicated by appropriate signage;

In addition, all internal development roadways shall be designed to accommodate bicycle travel.

Bicyclists may be required to walk their bikes under all other conditions.

Dimensions

The minimum width for a two directional bike path shall be ten feet.

Minimum dimensions and standards for accommodations of bicycle travel on roadways are set out in the New Jersey Department of Transportation's Bicycle Compatible Roadways - Planning and Design Guidelines, December, 1982.

PARKS AND PLAZAS

Location

Where a proposed development extends more than one-half mile along the waterfront, stopping points shall be provided in the form of one or more parks or plazas contiguous to the Waterfront Walkway on or overlooking the waterfront. Such stopping points

shall be provided at intervals of no more than one-half mile along the Waterfront Walkway.

Minimum Size

The minimum size of a park or plaza shall be 1500 square feet.

Required Design Elements

For the first 1500 square feet of any required park or plaza, the following design elements shall be provided:

- a minimum of 1 linear foot of seating for each 80 square feet or fraction thereof of the area of the park or plaza;
- a minimum of 1 tree per 750 square feet or fraction thereof of the area of the park or plaza, planted with a minimum caliper of 3 1/2 inches;
- bicycle parking facilities for parking a minimum of 2 bicycles for every 1000 square feet or fraction thereof of the area to the park or plaza;
- a minimum of one litter receptacle or trash barrel with a minimum capacity of thirty gallons for every 750 square feet or fraction thereof of the area of the park or plaza.

These requirements shall not apply to any additional area of a park or plaza over and above the minimum required area.

SIGNAGE

Signage shall be provided at all access points to the public access system and shall be consistent with the Coastal Access Signage system of the New Jersey Department of Environmental Protection Division of Coastal Resources.

Illustrations of examples of design solutions to the requirements set out in this section, are presented in Part IV of the Guidelines.

Exceptions to Minimum Requirements for Public Accessways

Part Two

Exceptions to the Minimum Dimensional and Locational Requirements for public accessways set out in Part I will be considered where:

- existing piers and structures that are to be incorporated in proposed waterfront development can accommodate public access meeting all other objectives and purposes set out in the Hudson Waterfront Walkway Plan and in these Guidelines, but have physical constraints that prevent compliance with easement or paved surface width requirements;
- the operational requirements of existing or proposed industrial or port uses may prevent access to the water's edge for health or safety reasons or compliance with easement or paved surface width requirements;
- lot size and configuration would result in an inordinate amount of an existing property being governed by the public access easement, as determined by NJDEP in consultation with the developer.

In the above cases the public access easement and paved surface may be permitted to be narrower than the otherwise permitted minimum width, or alternatively, the walkway may continue along the perimeter of the property provided that it connects or provides for connection with public accessways on adjacent properties.

On narrow waterfront sites, where the Palisades are close to the waterfront, consideration may be given to modifying the minimum requirements as follows:

- The minimum right-of-way of a waterfront walkway will be 20', of which 16' will be paved and unobstructed, and the remaining 4' will be either paved or landscaped.
- Connecting walkways to the waterfront may be sidewalks along the perimeter of building blocks and may have a minimum paved right-of-way of 12'.

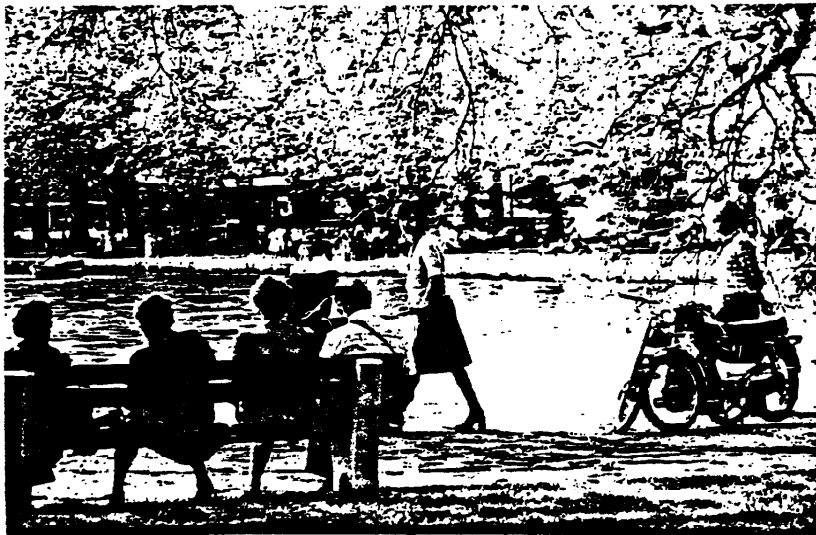
Exceptions to Minimum Requirements for dimensions of waterfront and connecting public accessways may also be permitted where DEP finds that the intent of these Guidelines is met in large part through provision of waterfront public parks or plazas of outstanding design quality.

In environmentally-sensitive areas, as specifically defined and identified by DEP or in areas recreated as natural areas, subject to approval by DEP, it is recommended that boardwalks or trails be established to meet the waterfront public access requirement.

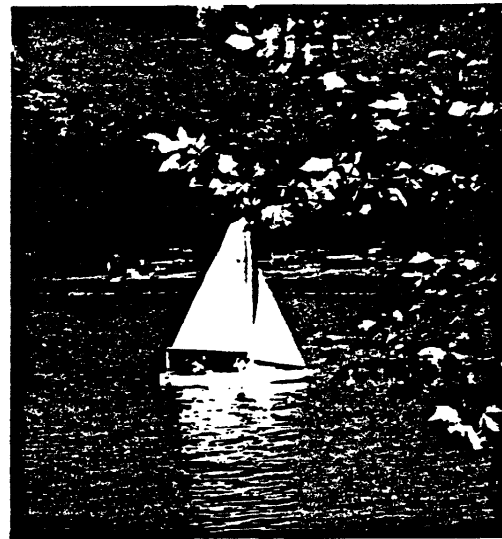
The minimum easement width for a trail shall be six feet. The minimum trail width shall be 30". The recommended width is 3-4'.

In no case shall the minimum width of the public access easement be less than six feet.





Trees provide a shady canopy for pedestrians and bicyclists along the waterfront in Annecy, France.



East and West River Drives in Philadelphia provide for 8.5 miles of continuous pedestrian and bicycle access along the Schuylkill River.

Overall Requirements for Public Access

Part Three

The design of all public accessways must reflect consideration of:

- Continuity of Public Accessways;
- Preservation of Views of the Waterfront and the Palisades;
- Safety, Security and Privacy;
- Durability and Maintenance;
- Design Compatibility and Quality, and Amenities;
- and Environmental Protection

CONTINUITY OF PUBLIC ACCESSWAYS

A basic purpose of the Hudson Waterfront Walkway Plan and of these Guidelines is to assure the establishment of continuous public accessways along the Hudson Waterfront from the George Washington Bridge to the Bayonne Bridge.

The public accessway on each waterfront development site must link with public access on adjacent properties to the north and south.

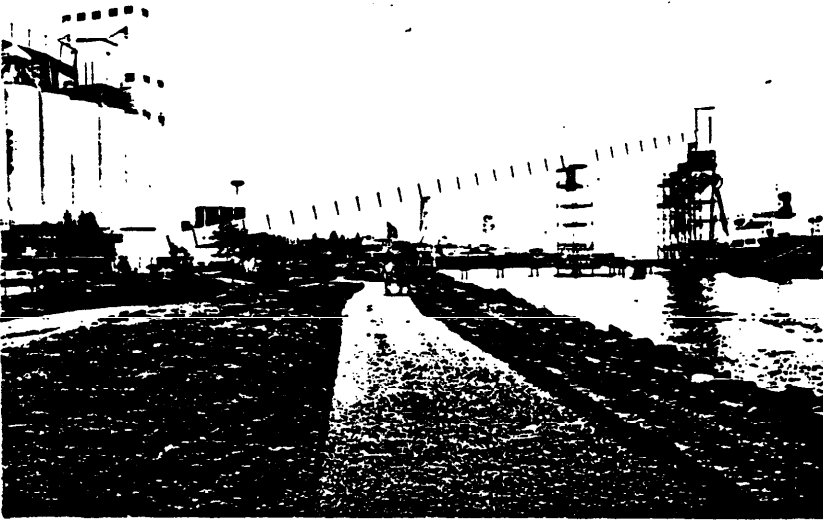
Changes in grade which are so great as to impede movement on the public access system should be avoided.

Every application for a Waterfront Development Permit must include plans illustrating the method by which this purpose will be met on the site in question, and must illustrate both interim and long range provisions for connections of public accessways on the site with existing and potential public accessways on adjacent properties and existing public rights-of-way.

PRESERVATION OF VIEWS OF THE WATERFRONT AND THE PALISADES

State Coastal Policy and the Hudson Waterfront Walkway Plan call for preservation, insofar as is possible of:

- Views of the Waterfront from the Palisades,
- Views of the Palisades from the Waterfront, and of
- View corridors to the Waterfront from the first public road inland from the waterfront.



A simple asphalt walk permits safe viewing of a working waterfront industry.
(Seattle, Washington)



A "scenic" overlook allows pedestrians to watch port activities.
(Southampton, England)

Every application for a Waterfront Development permit must include a detailed public access plan illustrating the method by which this purpose will be met on the site in question. Particular care should be given to illustrating the relationship of proposed building heights, widths and locations to future views and view corridors.

SAFETY AND SECURITY

The location and design of public accessways on all waterfront development sites must respect both functional and aesthetic considerations associated with existing adjacent development and with the proposed use of the site and must assure the safety of those using the public accessways and the security of existing and proposed uses.

Safety and security will be a particular concern in industrial development.

The location of waterfront and connecting walkways must be designed to avoid conflict with functioning industrial operations, and to protect the public from potentially hazardous operations and conditions.

Buffers or landscaping may be permitted between public accessways and industrial buildings and storage areas.
(See Buffers, Part VI.)

Public accessways through industrial sites and office and retail commercial development may be closed during those hours when such uses are not in operation.

Public access can increase safety by providing added visibility within waterfront development.

Public accessways should be barrier-free.

Applications for Waterfront Development Permits must describe and illustrate, as appropriate, means by which issues of safety and security will be addressed.



Residential, commercial and recreation facilities compatibly coexist in this compact, multi-level space. (Hilton Head, South Carolina)

PRIVACY

While privacy will be of particular concern in residential development, creative and imaginative design and appropriate landscaping and buffering can assure a secure and intimate residential environment, while providing for public access to the waterfront.

The design and location of the continuous public access system through residential development will vary according to housing type. Low rise dwelling units will require more of a separation and screening from the public access system than mid-rise and high-rise apartments, although privacy is also a concern for mid-rise and high-rise apartment development.

Public accessways must be adequately separated or screened from residential windows, balconies or patios and athletic facilities such as swimming pools and tennis courts to insure privacy for residents.

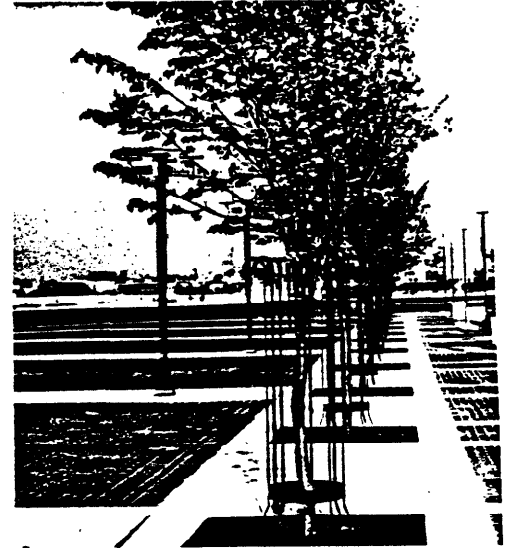
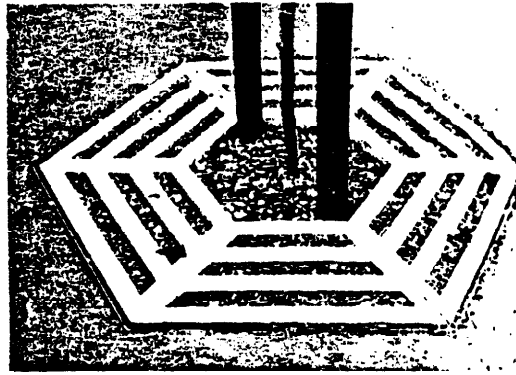
Public open space should be provided adjacent to the waterfront while "interior" parks, tot lots and open space may be preserved for the use of residents of the development.

Landscaping may be used to screen the walkway within the 30 foot easement, providing that a minimum width of 16 feet is paved and maintained for public access.

Connecting walkways, providing access between the first public thoroughfare and the waterfront should be located in development access or open space corridors. They may be located adjacent to major entrance routes to a development. Paved walkways to residential parking areas may serve as part of a connecting walkway.

In the interests of assuring safety, security and privacy, public accessways in any residential waterfront development may be closed between the hours of 11 p.m. and 5 a.m. Such provisions shall be evaluated and determined on a case-by-case basis.

Applications for Waterfront Development Permits must describe and illustrate, as appropriate, means by which issues of privacy will be addressed.



Durable steel, concrete and cast iron grates are carefully selected and integrated with the paving pattern to complement other site furnishings and adjacent buildings. (Munich, Germany, and Camden, New Jersey)

DURABILITY AND MAINTENANCE

It is the intent of the Hudson Waterfront Walkway Plan and of these Guidelines that public accessways be established and maintained as a permanent amenity that will retain their design quality and structural integrity.

It is important that construction methods and materials and amenities be selected with appropriate consideration of durability and maintenance requirements and that adequate provision be made for on-going maintenance of public accessways.

Amenities and design elements should be designed to be vandal-resistant.

Recommended means of ensuring durability, and vandal-resistance and minimizing maintenance requirements for specific materials are discussed in Part VII.

Applications for Waterfront Development Permits must describe, and illustrate as appropriate, means by which issues of durability and maintenance will be addressed.

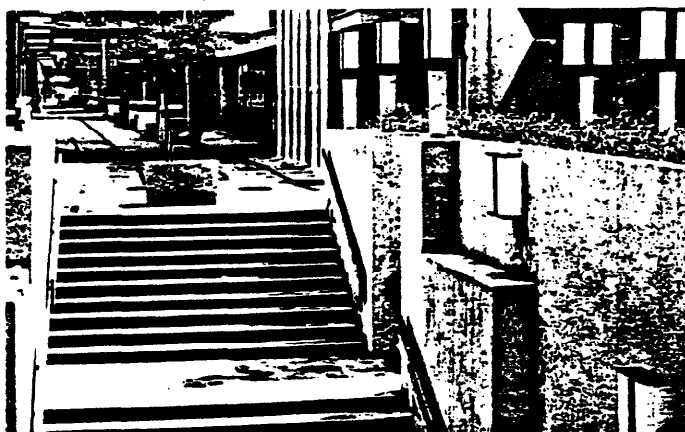
DESIGN COMPATIBILITY AND QUALITY AND AMENITIES

Materials and site furniture for public accessways should be selected to complement the design of the development and to respect and enhance the scale, color, texture and style of the architecture.

Paving materials for public accessways should be selected to blend effectively with the scale, color and style of building facades; brick and concrete edged walkways among low-rise buildings present a different scale and image than granite slab paving adjacent to glass high rises.

Generally more expensive materials should be reserved for important and frequently used places.

Residential developments will be enhanced by provision of high quality site furnishings compatible with the architectural character of the development. Developers are encouraged to provide seating, lighting, shade trees, trash receptacles, and drinking fountains within the 30 foot public access easement, on the condition that a minimum of 16 feet is paved and maintained for public access.



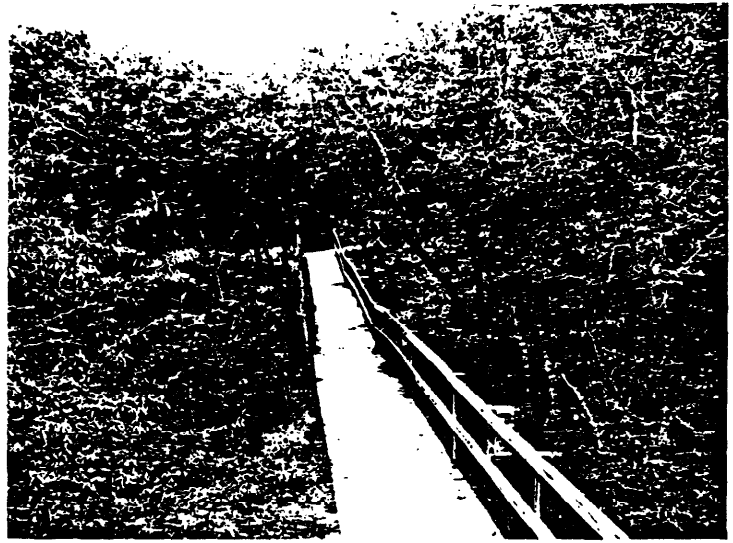
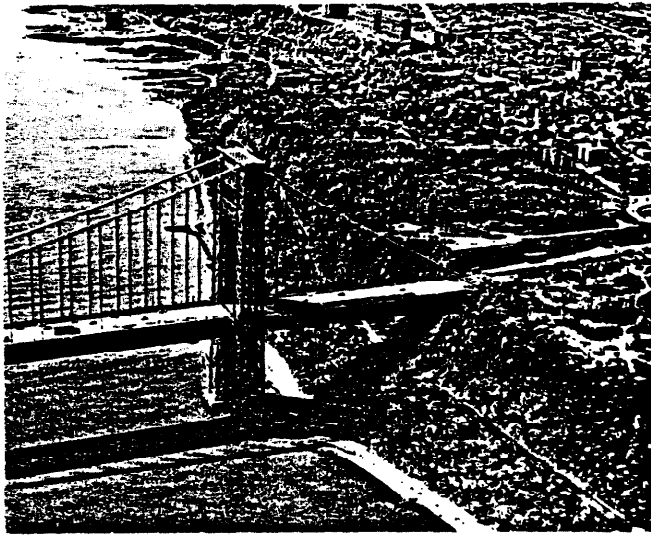
Walls define a stairway, enclose a seating nook, and edge a planter, complementing site furnishings. (Honolulu, Hawaii)

A variety of street furniture including benches, lighting, bicycle racks, drinking fountains, information kiosks, play equipment, trash receptacles and tree grates and tree guards may appropriate in office and commercial development. Adequate seating which is comfortable, durable and carefully located provides critical stopping and resting points along access paths or in open plazas. Signs, maps, art work and flags add color and vitality while focusing the pedestrian's attention towards commercial facilities and the riverfront. Where these will not in-

terfere with public access, they may be provided within the 30 foot minimum public access easement, providing that a minimum of 16 feet is paved and maintained for public access.

The public access system may suitably be constructed of simple, functional materials such as concrete or asphalt in industrial development.

Guidance may be provided by DEP staff in the selection of materials and design elements for public accessways.

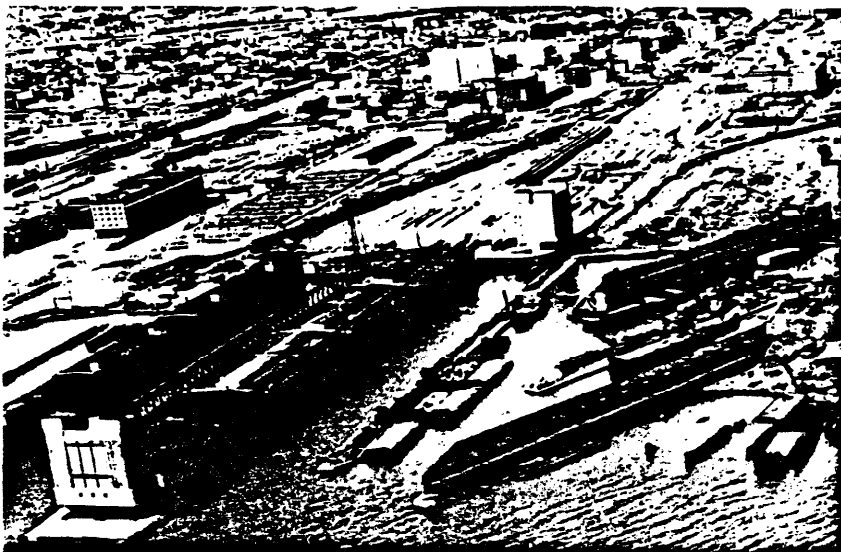


Narrow trails and boardwalks provide for pedestrian access with minimum disturbance in steeply sloped and wooded areas. (Palisades Interstate Park, Fort Lee, New Jersey, and Amelia Island, Florida)

ENVIRONMENTAL PROTECTION

Design of public accessways must take into account preservation of unique valuable and fragile environmental areas including but not limited to the steep slopes of the Palisades, Wetlands and Intertidal flats and Wildlife habitats.

All applications for Waterfront Development Permits should demonstrate the relationship between the location and design of proposed public accessways and any Special Areas requiring environmental protection as defined in Coastal Resources and Development Policies N.J.A.C. 7:7E-1.1 et seq as amended that occur on the site.



The variety of existing conditions along the Hudson Waterfront requires a variety of design responses for provision of public access to the water's edge. (Jersey City and Edgewater, New Jersey)

Prototype Design Solutions

Part Four

This section demonstrates how public access may be incorporated in developments with a variety of different land uses. Examples do not represent specific sites; they are intended to illustrate some of the more common conditions encountered along the Hudson River.

Cross-sections of three alternative designs of the waterfront walkway and two alternative designs of the connecting walkway are followed by plans showing possible methods by which public accessways might be incorporated in:

- a mixed-use office-commercial-residential marina development;
- a water-dependent industrial site; and
- a non-water-dependent industrial site.

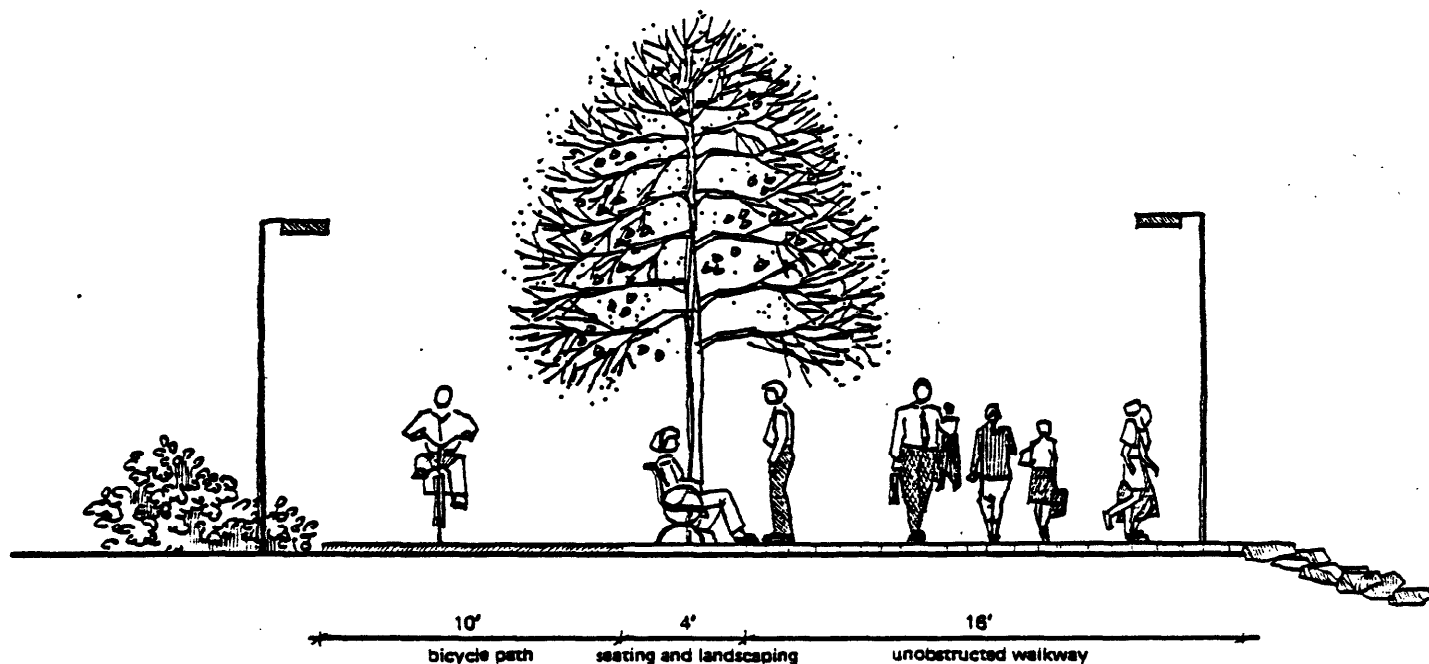
Finally, typical water's edge conditions and engineering considerations for walkway development in response to these conditions are illustrated and described.

Solutions presented in this section are examples of responses to conditions found along the waterfront and are not intended to represent all acceptable means by which the public access requirement might be met.

In addition to illustrating examples of walkway design and alignment, this section provides examples of the type of information and illustration of public access provision that the developer is required to provide as a part of any application for a DEP Waterfront Development Permit.

PROTOTYPICAL CROSS-SECTIONS OF THE PUBLIC ACCESSWAYS

Three cross-sections are presented here illustrating alternative locations of the sixteen foot paved walkway within the thirty foot public access easement for a waterfront walkway, with alternative treatments of landscaping and the water's edge. Two cross-sections illustrate similar features of alternative designs for a connecting walkway.



Typical Waterfront Walkway Cross Section 1

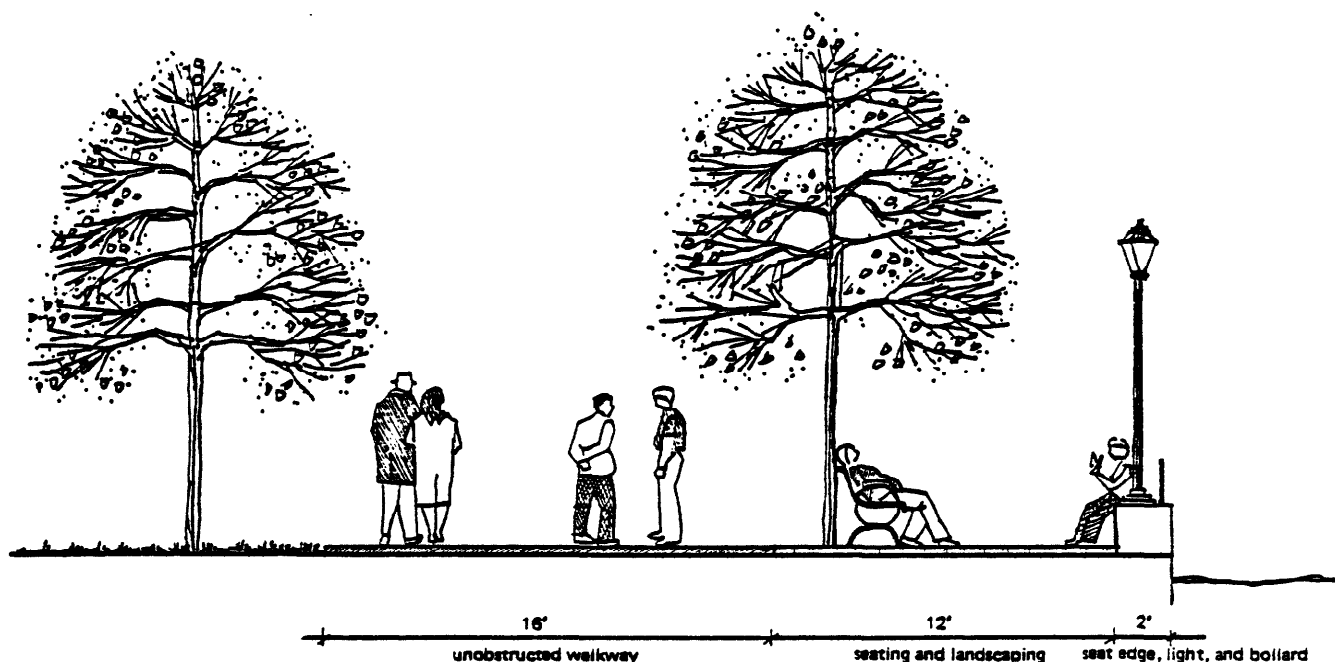
Typical cross-section #1 illustrates a design solution that incorporates a ten foot wide bicycle path, parallel to the sixteen foot walkway which is buffered from it by a four-foot-wide landscaped and seating area. Lighting is provided at both sides of the thirty foot right-of-way, with rip-rap treatment of the water's edge.

Typical recommended materials and design elements depicted in cross-section #1 and considerations in their selection are as follows:

The bikeway has a bituminous concrete paving surface, well-suited for a smooth bicycle ride. Steel bicycle racks and fountains are provided at parks and plazas rather than along the bike path to prevent any obstruction of bicycle traffic. Adequate light levels are provided using 10-14' lighting fixtures, set outside of the 10' wide bike path and coordinated with the walkway light fixtures.

While a more generous buffer would be preferred, a minimum 4' wide landscaped is provided to separate the bikeway and walkway. A subtle change of paving materials from bituminous concrete to brick or granite block pavers visually and physically delineates the various use areas. Canopy trees are selected to provide adequate shade. Branches are pruned to a height of 8' to allow bicyclists to pass under them; alternatively a variety is selected with an upright branching habit.

Six-foot-long redwood or purpleheart benches with backs provide comfortable views to passersby and the river. Trash receptacles are provided adjacent to seating areas to discourage littering. A 3' steel or cast iron railing or bollards provides protection at water's edge while allowing seat height views to the river and skyline.



Typical Waterfront Walkway Cross Section 2

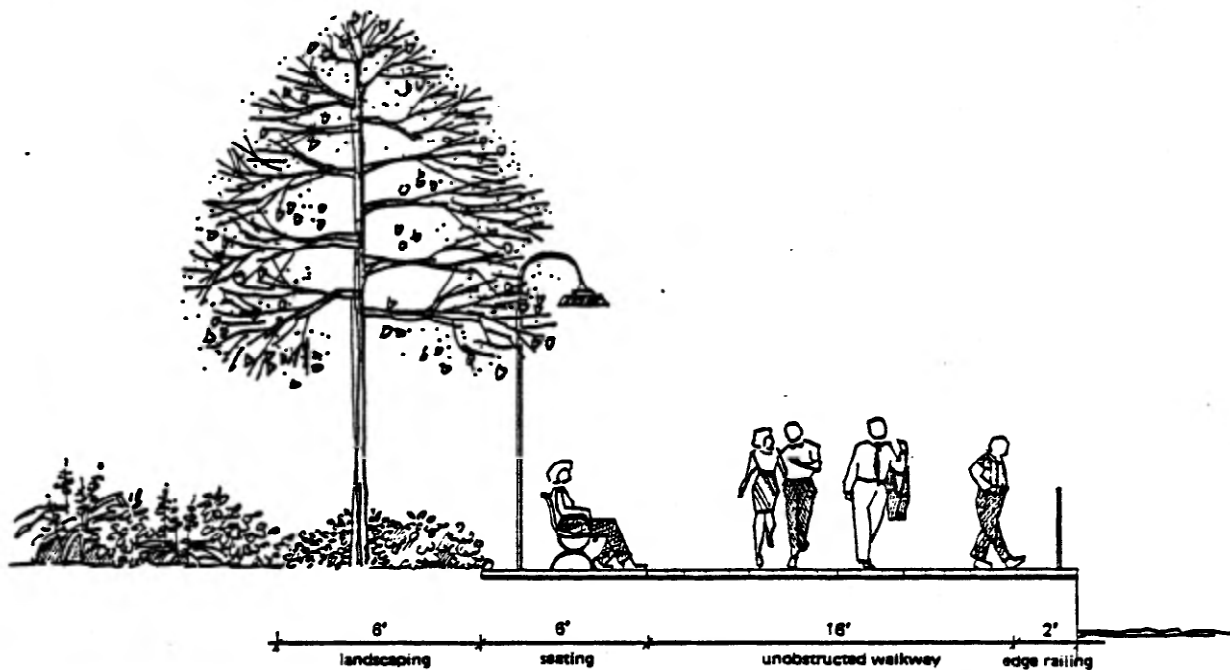
Typical cross-section #2 illustrates location of the sixteen foot walkway set back from the riverfront with a twelve foot wide landscaped area at the water's edge.

Typical recommended materials and design elements depicted in cross-section #2 and considerations in their selection are as follows:

Paving or grade changes can differentiate between the active and passive use areas.

Bituminous concrete, brick or concrete may be used for the walkway, and brick, concrete or stone used for the sitting area.

Canopy trees planted on either side of the walkway will create a strong symmetrical image, defining the waterfront while providing shade and a degree of buffer between adjacent uses. Benches set back from the water's edge will allow for a 6' wide space where people may gain access to seating and views of the river. A stone or concrete edge at the waterfront may support a light fixture while providing informal seating.

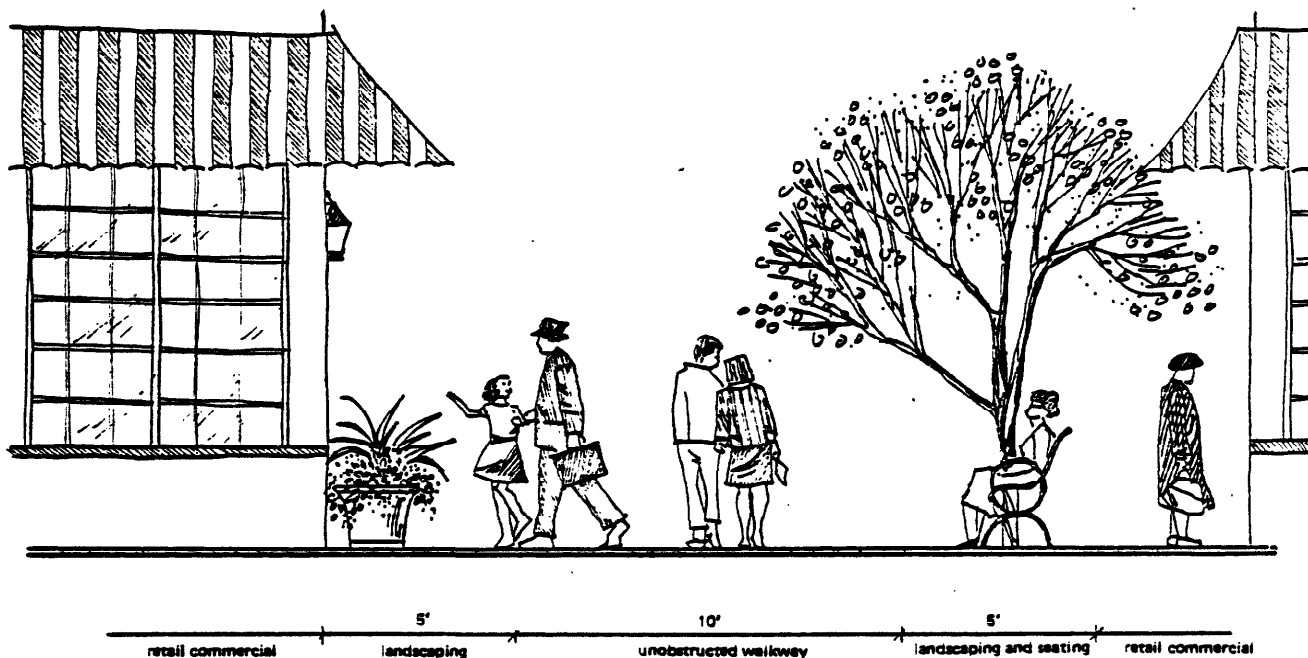


Typical Waterfront Walkway Cross Section 3

Typical cross-section #3 illustrates location of the sixteen foot walkway adjacent to the riverfront with landscaping and seating areas provided in the inland portion of the thirty foot wide right of way.

Typical recommended materials and design elements depicted in cross-section #3 and considerations in their selection are as follows:

Canopy trees are located close enough to the walkway edge to provide some shade to pedestrians and those seated. Lights at the 10-14' height are located so as not to interfere with tree locations. Subtle or dramatic paving changes may be used to define the sitting area, walkway or edge railing. Railings of steel, cast iron or wood should not have pointed pickets in order to allow pedestrians to lean over the water's edge to gaze at the view.

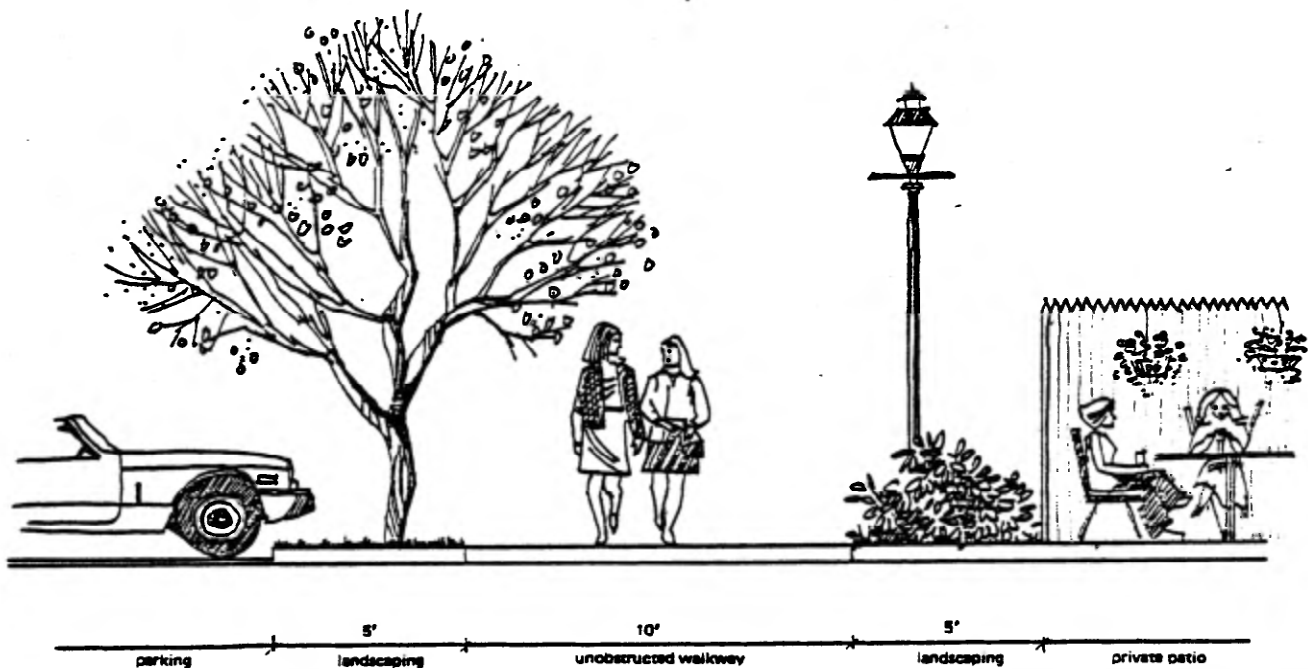


Typical Connecting Walkway Cross Section 4
Retail Commercial Development

Typical cross-section #4 illustrates a connecting walkway through a retail commercial site. An easement of 20' is required in order to prevent creation of narrow alley-like spaces. Planters and intermediate-level trees which are especially suitable for this limited space provide color and shade while softening the hard quality of the building-enclosed space. Abundant seating is provided in this commercial development where people stop to eat, rest, talk between visits to stores. Seating opportunities may be integrated with other design elements such as fountains, planter edges or low walls.

Trash receptacles will be heavily used and should be provided. (See Part II Parks and Plazas, required design elements.)

Additional lighting may not be necessary if lighting levels from adjacent buildings are adequate. (See Part VI, Lighting.) Elegant or more formal paving materials such as brick, stone, or concrete pavers may more appropriately complement adjacent buildings than the bituminous concrete paving which is recommended for walkways in industrial areas.

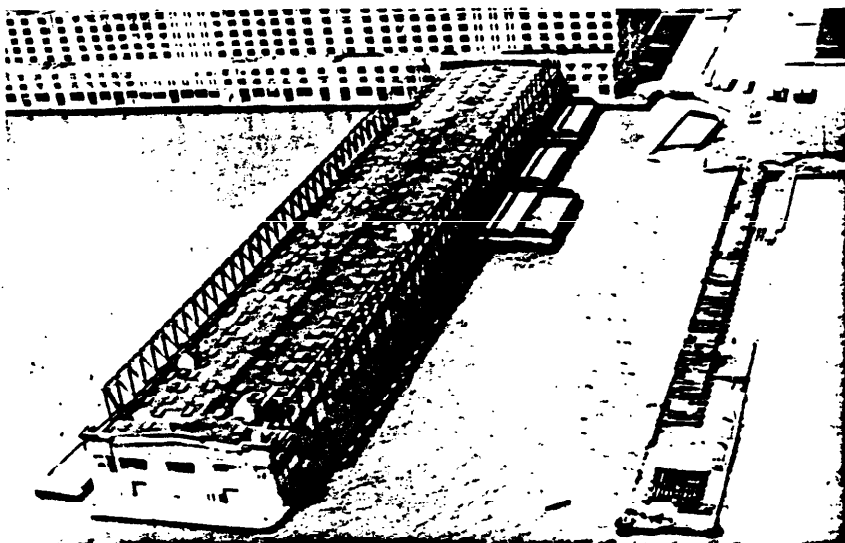


Typical Connecting Walkway Cross Section 5
Residential Development

Typical cross-section #5 illustrates a connecting walkway in a low-rise residential development. The 10' wide recommended walkway located adjacent to a residential parking area combines public access to the waterfront with "private" access to parking areas and residential entrances. A 5' wide buffer strip between parking and the walkway allows for tree or shrub planting which screens views to cars while reducing glare and providing shade to pedestrians. Berms or grade changes may also be used successfully to screen

views. Private residential entrances, patios or balconies may be completely separated from the public walkway with 6' high timber fences or walls. Shrub or vine landscaping will soften the face of the fence or wall while providing eye level color. Brick, concrete or neatly edged bituminous paving would be appropriate materials for residential walkways.

These cross-sections are illustrative of only a few of many possible design solutions.



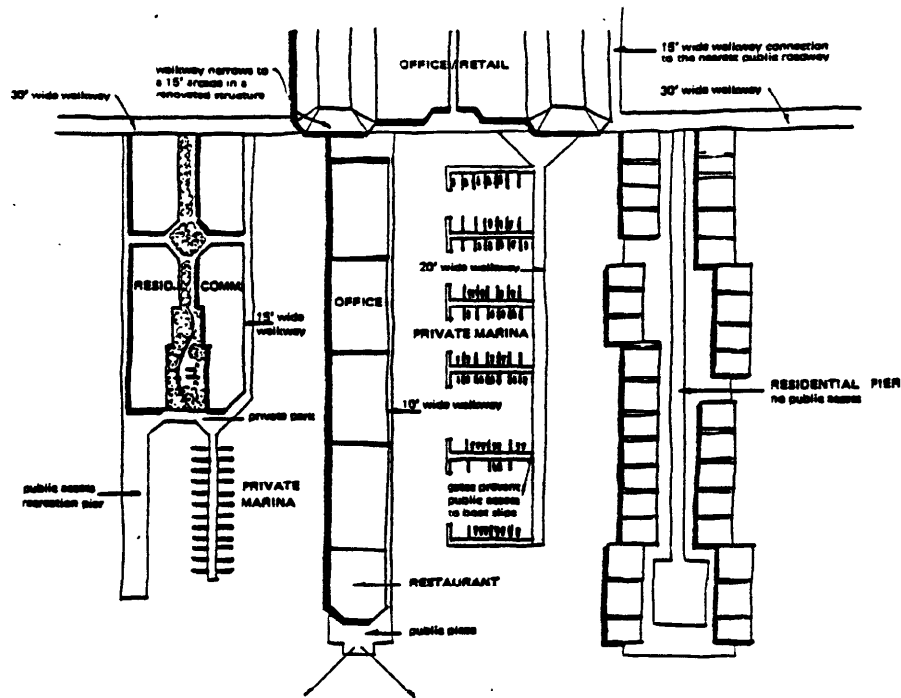
Conditions of existing piers along the Hudson vary widely. Many are scheduled for demolition under the Corps of Engineers—State Harbor Clean-Up Program. Others are proposed for inclusion in major mixed-use developments.

DESIGN SOLUTIONS TO PROTOTYPICAL SITE CONDITIONS AND USE

The sketch plans presented in this section illustrate examples of means by which public access might be provided on hypothetical sites incorporating features frequently encountered along the Hudson Waterfront. These sketches do not illustrate any specific site. Instead they incorporate features typical of the Hudson Waterfront.

Mixed Use, Office-Commercial-Residential- Marina Development

Many of the recent and current proposals for development of waterfront properties on the Hudson River are for mixed-use, including office, commercial, residential or marina development, and frequently several or all of these uses. Many incorporate existing or reconstructed piers in their plans.

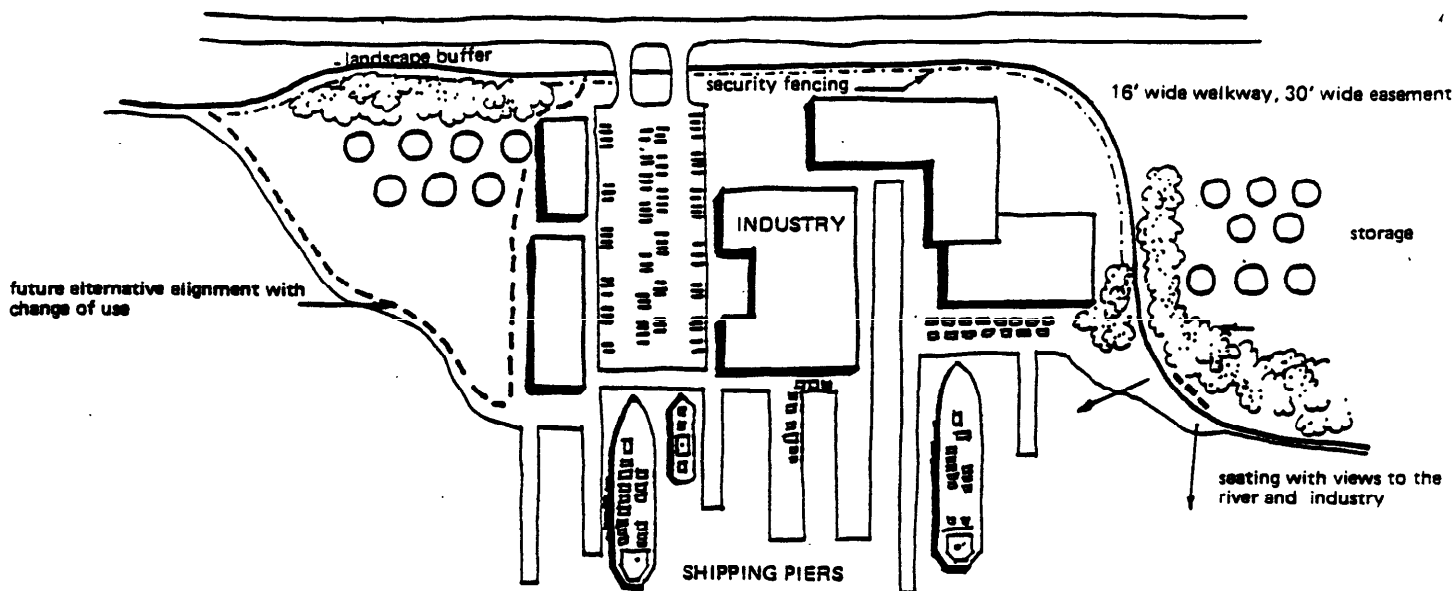


Typical Design Solution 1: Office, Residential Marina Development

Typical Design solution #1 illustrates constraints that are presented by existing site conditions including: narrow piers and existing structures located at the water's edge, and by the requirements of proposed uses including privacy and security for marina and residential uses.

Narrow piers and existing structures which are located at the water's edge present spatial constraints which may necessitate reduction of the required minimum 30' walkway easement width in order to achieve the maximum possible public access to the water's edge. In addition, a reduced walkway easement may address concerns of privacy and security which are particular to residential or marina uses. Access to

piers may be restricted entirely, may be limited to a one-way route terminating in a plaza, overlook or park, or may circulate around the perimeter of the pier. Each of these conditions is illustrated respectively in the residential pier, office pier and residential/commercial pier in Typical Design Solution #1. While access may be restricted on some private piers, it is essential that views from the walkway behind the piers to the waterfront be preserved. The design and location of paving materials, site furnishings and planting on piers will require special attention due to spatial limitations, weather exposure, structural requirements and safety precautions.



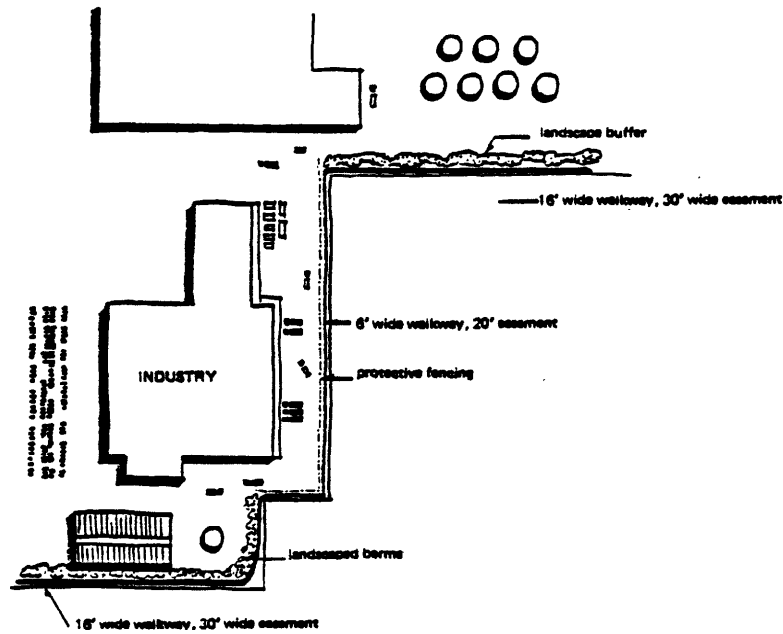
Typical Design Solution 2: Water-Dependent Industry

Water-Dependent Industry

Historically, the Hudson Waterfront has been dominated by water-dependent industry. While uses of the waterfront are changing, water-dependent industry continues to be a significant feature of the landscape as well as an employer and source of tax-revenues for waterfront communities.

Typical Design Solution #2 illustrates the manner in which public access might be provided on a water-dependent industrial site where the operational requirements of the industry requires that the walkway be located along the inland perimeter of the property.

Provision is made for connections with public accessways on adjacent properties. An adequate spatial buffer provides for safe but unobstructed views of port activities. Seating at key viewing points provides a rest stop for pedestrians or bicyclists. Dense shrubbery, evergreen trees or earth berms are used to screen unsightly storage areas. Fencing or walls utilized to insure the security of industrial operations are placed as far away from the walkway edges as possible. Shrubs or vines are used to soften the appearance of walls or fences. Lighting levels are increased in high security areas. Bituminous concrete paving provides a functional durable material appropriate for an industrial site.



Typical Design Solution 3: Non-Water-Dependent Industry

Non-Water-Dependent Industry

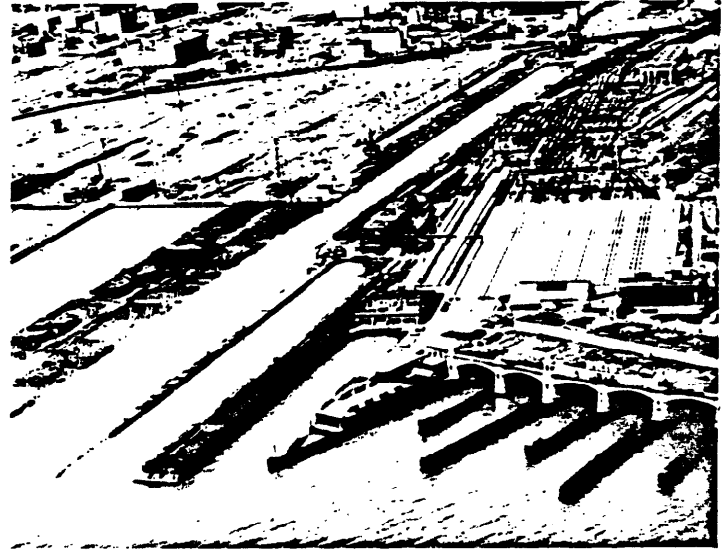
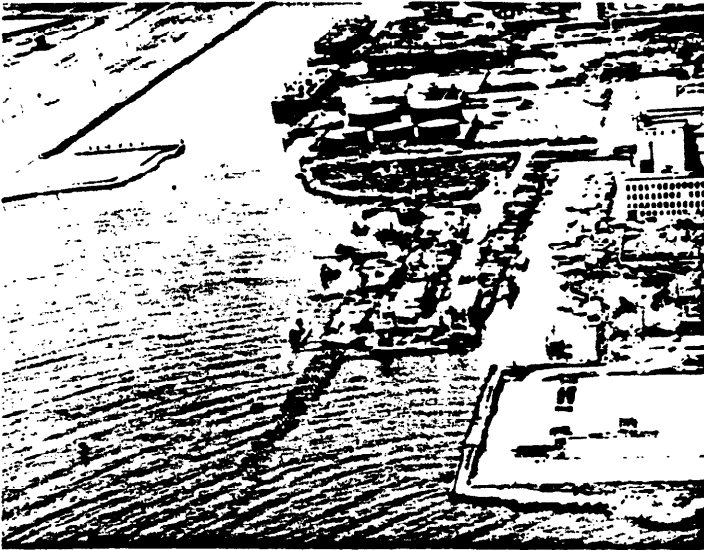
Non-water-dependent industry, while characterized by security requirements for its operations, provides an opportunity to permit public access at the water's edge.

Typical Design Solution #3 illustrates site conditions typical of such industries, including physical constraints upon the width of the walkway resulting from building locations and space requirements for storage and loading. As illustrated here, an exception to the minimum waterfront walkway width is permitted along the parking and loading

area, in order to achieve a water's edge public access connection between two links of the waterfront walkway meeting the minimum requirements.

Fencing insures the security of the industrial operations and separates public access from loading and storage areas. Seating areas should be carefully located where views of industrial operations are of particular interest. Materials of site furnishings and paving are simple and functional.

Walkway width is reduced in order to achieve public access to the water's edge.



Development of Liberty State Park in Jersey City and the New Jersey Transit Rail Yards in Hoboken present opportunities for construction of pedestrian bridges across the Morris Canal Basin and the NJT canal to provide for continuity of the Waterfront Walkway.

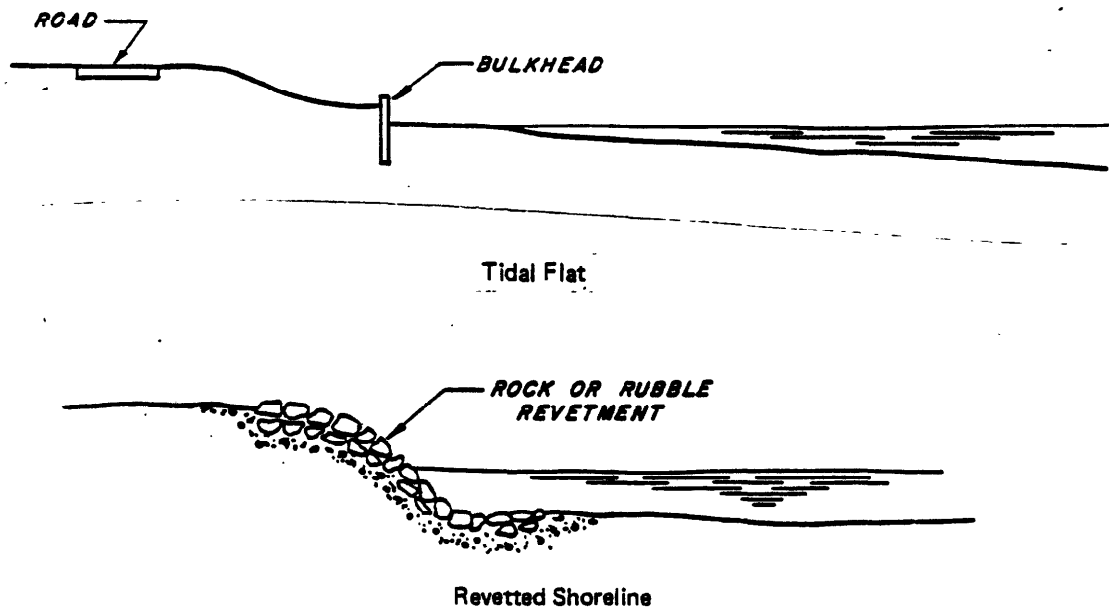
ENGINEERING CONSIDERATIONS FOR WALKWAY DEVELOPMENT AT THE WATER'S EDGE

Existing Conditions along the Waterfront

The waterfront along the New Jersey side of the Hudson River, from the George Washington bridge to the Bayonne area, includes two types of conditions: natural and filled water's edge. The natural water's edge is encountered at the Palisades Interstate Park, Edgewater Municipal Park, Caven Point and near the U.S. Naval Reservation in Bayonne. Everywhere else along the waterfront, the water's edge consists of bulkheads, piers, marinas and other types of man made structures. In most cases the waterfront structures have

been poorly maintained and have suffered damage from the weather, waves, and fire. The type of structures encountered varies from pile supported piers to timber, masonry or crib walls on timber relieving platforms supported on timber piles. In rare instances the shoreline is protected by rubble or rock revetment.

The development of a walkway along the water's edge presents various engineering problems. Their solution depends on the type of water's edge, the amount of work required to restore or rebuild the waterfront structure and on the adaptability of the water's edge to be developed as a riverfront walkway. The various problems, engineering constraints and their solution are discussed and identified below.



Tidal Flats

The tidal flats, mostly found near Caven Point and in Bayonne near the U.S. Naval Reservation, consist of very flat, sandy and silty slopes. The flats are frequently overgrown with reeds or other aquatic vegetation. Further inland, the higher terrain is wooded in some locations. Sometimes fill was placed behind a timber bulkhead, to provide a base for access roadways.

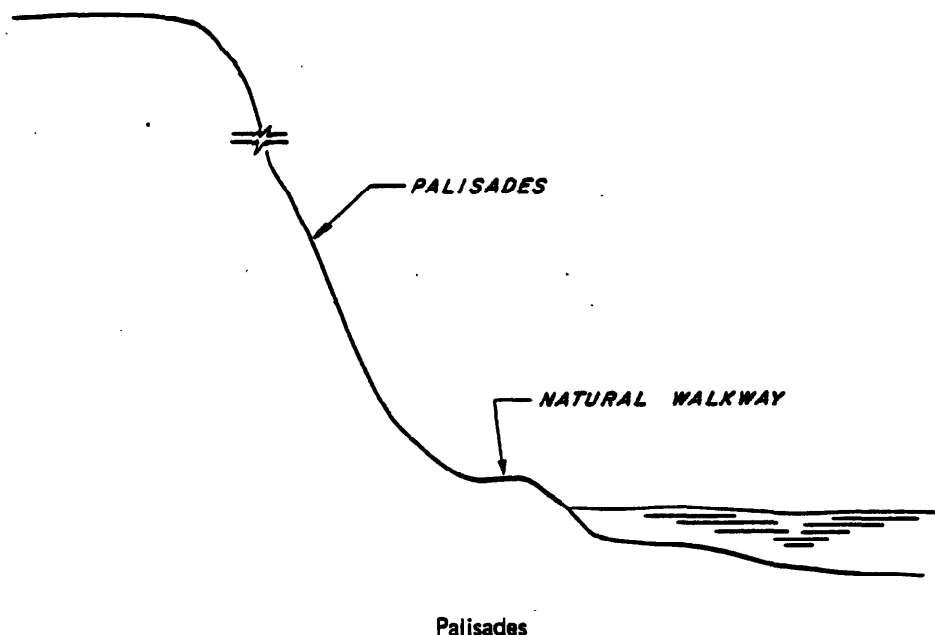
Where the walkway along tidal flats is to be paved, it should be located away from the water's edge, along the higher inland terrain. Only minimal grading will usually be required and the construction costs will be limited primarily to the walkway itself. Placement of the walkway closer to the water's edge will require significant increase in construction costs. The walkway, in this case, could take the form of a trail (see Trails Parts V and VI) or could be placed on a timber trestle in order not to disturb the

flow of the tides and preserve the natural habitat. A finger pier (jutting into the river) may be another alternative allowing close observation of the river and of the surrounding habitat. This alternative, however, is expensive to construct because it requires either a timber or concrete trestle or a fill protected with rock revetment.

Revetted Shoreline

Examples of a revetted shoreline are found near Edgewater Municipal Park, Roc Harbor, Weehawken and Bayonne. Revetted shoreline is found only in a few isolated locations where significant erosion had threatened the river banks.

This type of shoreline is generally found to be just a few feet above flood level and is very easy to develop for walkway use. It allows the walkway to be close to the water's edge and in most cases requires only minor grading.

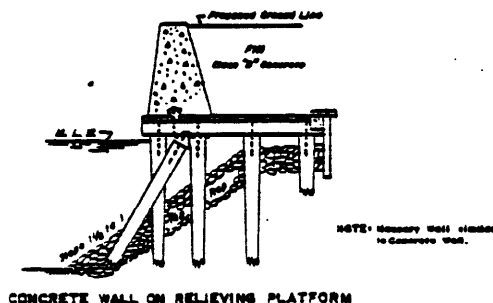
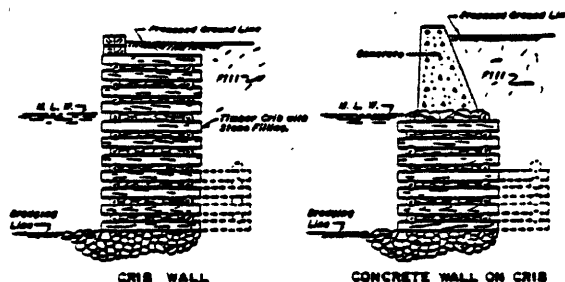
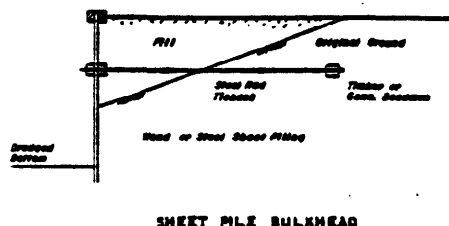


The costs involved are therefore primarily those connected with the construction of the walkway itself. The shoreline slopes if not already revetted or sparsely revetted should be fortified with adequate revetment in order to prevent future erosion. Shorelines subject to flooding should be raised above flood level. This could be costly. The most economical solution would include the construction of a dike whose crest could be occupied by the walkway. Another alternative is construction of an elevated boardwalk.

Palisades

The condition where the Palisades cliffs approach the water's edge is found only immediately south of the George Washington Bridge, where a narrow area remains between the steep escarpment and the water's edge.

The engineering constraints provided by the Palisades include difficult access to the water's edge and lack of sufficient room or width for walkway development near the water's edge. Several problems must be dealt with: erosion of steep palisade slope tending to spill on the walkway at its foot (talus pile), widening of narrow areas at the water's edge requiring filling beyond the natural edge and consequent revetment or stabilization of the slopes on the river side, and provision for access from the high ground to the walkway at the foot of the palisades. Access could be provided in the form of a serpentine foot trail. Alternatively, a boardwalk might be constructed, elevated on pilings.



Existing Waterfront Structures

Waterfront Structures

The man-made waterfront includes various types of finger piers and bulkheads. Finger piers and bulkheads usually are pile supported or may include crib walls or walls supported on timber relieving platforms which are supported on piles. In general, waterfront timber structures are subjected to various types of deterioration or hazards. Timber which is submerged and remains constantly under water, will not rot but is sometimes exposed to attack by barnacles and marine borers. That portion of timber structure which is in the tidal range is subject to alternate wet and dry cycles and therefore will decay over time unless impregnated with creosote. The timber above the tidal line is frequently subject to battering by boats and barges or occasionally to damage by fire. Creosote, which is helpful against teredos and rot, is readily flammable and therefore presents a real fire hazard.

In most cases, the geological configuration of the rock shelf below the river bottom has been the determinant of the type of waterfront structure constructed. The rock shelf along the Hudson River varies greatly in depth. When distance to the rock is less than 30 to 40 feet, the usual waterfront construction is either piles or cribbing filled with rock and sunk to rest on the rock shelf. When the depth to rock exceeds 40 feet piles where usually driven and a timber relieving platform was constructed on top of the piles at a level just below the mean low tide. On top of the relieving platform timber crib, masonry or concrete retaining walls were constructed. Fill was then placed on top of the platform and behind the walls.

In general, when the existing structure below water level is reasonably sound, it is relatively economical to repair the structure above the water level. However, when the supporting piles or



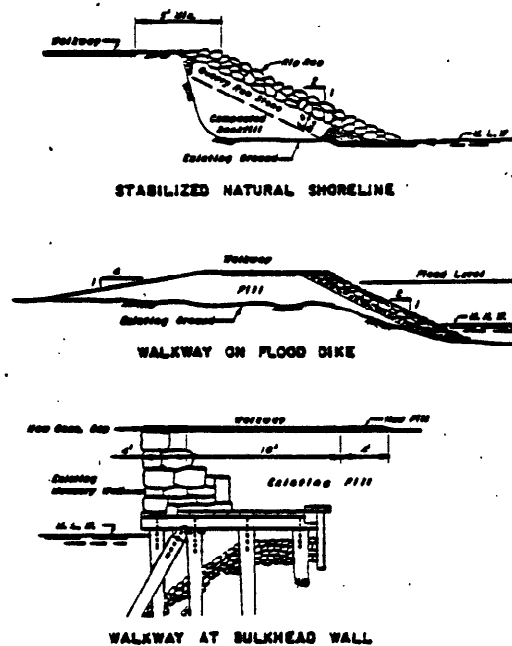
Narrow sites at the base of the Stevens Institute's outcrop and the Palisades in West New York present particular constraints for the continuous walkway system that can be overcome by such means as a second-level walkway.

relieving platform are deteriorated, rehabilitation can be very expensive, and replacement may be more cost-effective in the long-run.

The walkway on top of piers or bulkheads can be constructed with minimal cost. In cases where it is desired to cantilever the walkway over the pier or bulkhead edge the walkway costs will be significantly higher. This approach need not be used except in cases where available area on the pier or bulkhead is very restricted.

In cases where the bulkhead wall is damaged, it is imperative to repair it in order to be able to retain the fill behind it and thus prevent localized fill subsidence and consequent damage to the walkway itself.

Finger piers (or trestles), when deteriorated, are usually removed and the point where they tie to the longitudinal bulkhead must be repaired. In some cases, such as at the Liberty State Park, most of the finger piers have been removed and the shoreline was rehabilitated by either repairing the timber bulkheads or by cutting the cribbing at low tide level and constructing revetted slopes toed into the remaining cribbing. Costs have varied but on the average it was possible to rehabilitate the bulkhead walls and construct a 10 foot wide walkway including railing, lighting and landscaping for less than \$200 per lineal foot (in 1982).



Engineering Considerations for Walkway Construction

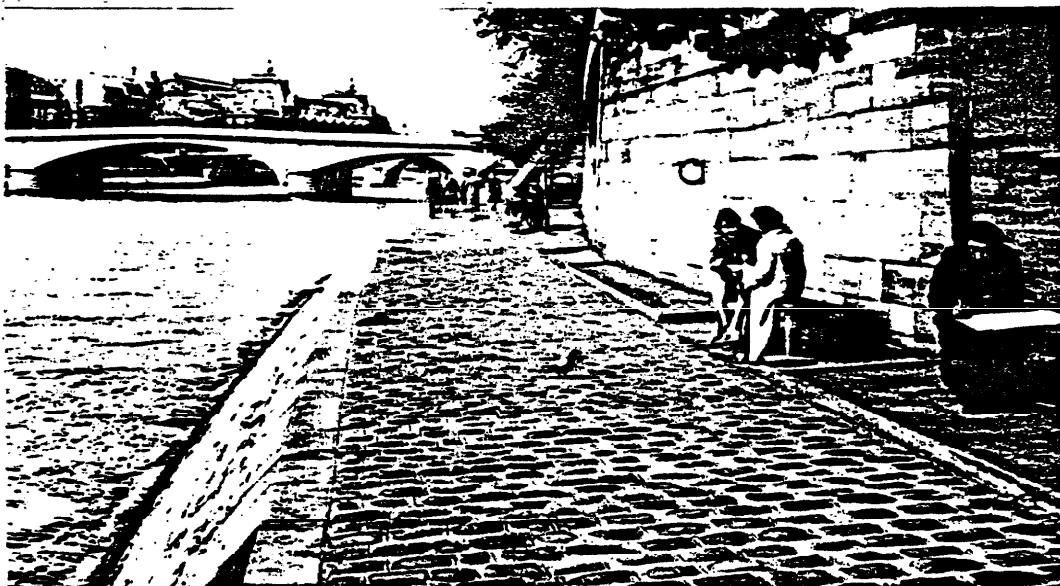
In general it is proposed to develop a 16 foot wide walkway with or without a 10 foot wide bikeway. The walkway when constructed together with the bikeway would be either adjacent to the bikeway or separated from it by a landscaped area.

In terms of engineering requirements, the pedestrian or bicycle traffic would not impose special structural requirements for the walkway construction. In general the loads imposed by service or maintenance vehicles or police patrol vehicles would be governing. We shall consider the following cases:

- Walkway on Fill or on Grade: The basic requirements would be adequate surface drainage and sufficient pavement composition. The walkway should consist of at least 4 inches of gravel covered with either 2 inches of wood chips or bituminous paving. More expensive pavements could also be employed, if budgets permit.
- Walkway on Wood Deck: Timber structures such as piers or wood decks may cantilevered from existing bulkhead walls. The decking should be 2 inch minimum thickness supported on rafters spaced on 12 inch centers.

- Walkway on Concrete Deck: In a few instances, such as near Stevens Institute, concrete deck was constructed on timber piling. For this type of construction, painted lines delineating the walkway may be sufficient, or the walkway may be delineated by curbing or other separators. The concrete surface, if necessary, should be repaired and refinished.
- Bikeways on Fill or Grade: Bicycles require a hard and smooth surface because of their narrow section, high pressure tires and lack of suspension. Bituminous paving is therefore preferred over gravel or earth surfaces.
- Bikeway on Wood Decks: When the bikeway is on wood decks the planking should be perpendicular to the direction of travel and spaced sufficiently tightly to prevent "grooving" of the tires.

These guidelines are a general response to the conditions and waterfront structures encountered along the Hudson riverfront. Each segment of the walkway will require a detailed engineering study to arrive at optimum solutions with respect to investment costs, aesthetics, maintenance and safety.



Where space is limited, a twelve-foot-wide walkway with seating is accommodated immediately adjacent to the water's edge. (Seine, Paris, France)

Open Space Components

Part Five

This section describes and illustrates suggestions for the design of:

- Walkways,
- Parks and Plazas,
- Bicycle Paths and Bicycle Parking,
- Trails, and
- Scenic Overlooks

that will provide public access to Hudson Waterfront.

Unlike the Requirements for Public Accessways set out in Parts I and III the suggestions set out in this section are not necessary conditions for issuance of a Waterfront Development Permit. Instead they are intended to provide guidance in design of public accessways.

Local codes should be consulted to assure conformance with all applicable requirements.

WALKWAYS

Purpose of the Waterfront Walkways

To provide an area of land for continuous public access parallel to the water's edge which will allow the public to benefit from the spectacular scenic value of the Hudson River.

Purpose of the Connecting Walkways

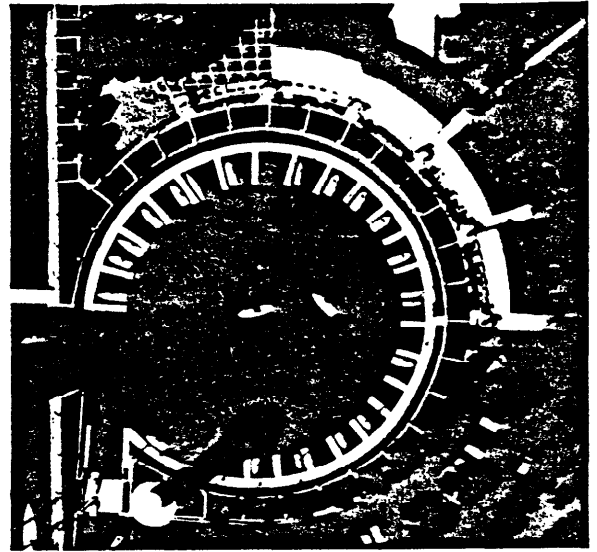
To provide for public access between the first public thoroughfare inland from the river's edge and the waterfront walkway, allowing residents of nearby neighborhoods and communities to enjoy the river's edge.

Suggestions

Hard surfaced walkways should have a slope no greater than 5% to allow access for the disabled. Grades exceeding 5% should comply with standards regarding ramps. Paved surfaces should



This tree-lined waterfront walkway provides a shaded place for strolling and watching the river traffic. (Annecy, France)



A brick walkway surrounds the circular marina at the Wiggins Waterfront Park. (Camden, New Jersey)

be cross pitched to provide for adequate drainage, generally, not less than 1% and not more than 4%. Sufficient clearance should be provided to allow for maintenance vehicles and maintenance vehicle turn-around points. Vertical clearance necessary to maintenance vehicles is generally considered to be a minimum of 10'. Local requirements for fire access may necessitate greater vertical clearance.

The aesthetic quality of both waterfront and connecting walkways and their design relationship to waterfront development will be enhanced by planting and seating provisions at appropriate intervals.

Safety can be enhanced by installation of bollards or low fencing at the waters edge, and provision of lighting and public telephones along the walkway.

In addition to required signage indicating access points to the walkway and to the nearest public road from the walkway, provision of signs is encouraged to indicate the location of bicycle parking facilities and public telephones.



Shade trees separate this wide waterfront promenade from a grassy plain where people can throw a frisbee, walk their dog, or play a game of football. (Portland, Oregon)



Stepped seats provide ample space for sunning, lunching, or watching the passing boats. (Zurich, Switzerland)

PARKS AND PLAZAS

Purpose

To provide for stopping points along the continuous public access system with places to park bicycles and to sit, at or overlooking the water's edge. While parks are generally landscaped open areas, plazas are paved areas within higher density development.

Suggestions

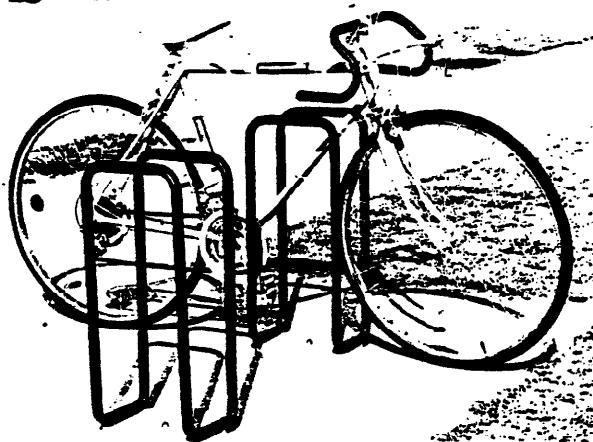
Parks and plazas to be provided along the public access system are intended for public use and should be contiguous to and easily entered from the public access system. The grade differential at the interface between the walkway and a contiguous park or plaza should therefore generally not be more than 3 feet.

All portions of a park or plaza that are not paved should be landscaped, with hardy plant materials. (See Planting.)

One of the most important factors in designing a successful park or plaza is provision of adequate seating facilities. Seating facilities may take many forms and should be carefully located. (See Seating.)

Other factors affecting successful park or plaza design include orientation to major circulation routes (streets or walkways), orientation to the sun, visual aesthetics, proportion and placement (shape), and amount of space (degree of crowding).

Walls of a building adjoining a plaza may provide an opportunity for decorative treatment, including for example, espaliered trees, trellised vines or murals.



Bicycle racks located at parks and plazas should be highly visible, adequately spaced and sized to fit a variety of bicycle types.

BICYCLE PATHS AND BICYCLE PARKING

Purpose

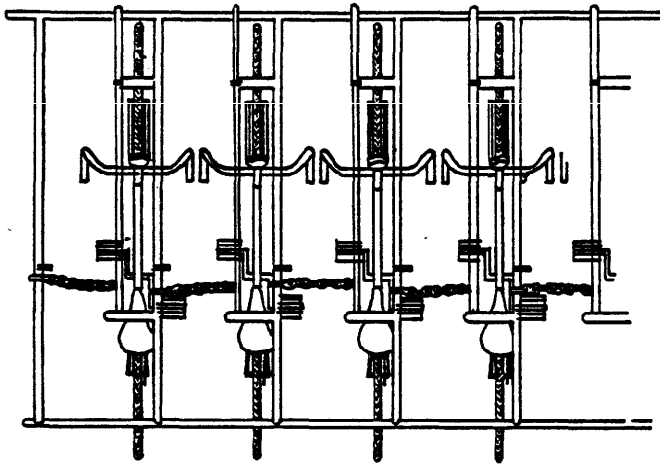
Bicycle paths are facilities on exclusive rights-of-way and with minimal cross flow by motor vehicles. Bicycle paths may serve the commuting or recreational bicyclist and are for the exclusive or preferential use of bicycles.

Suggestions

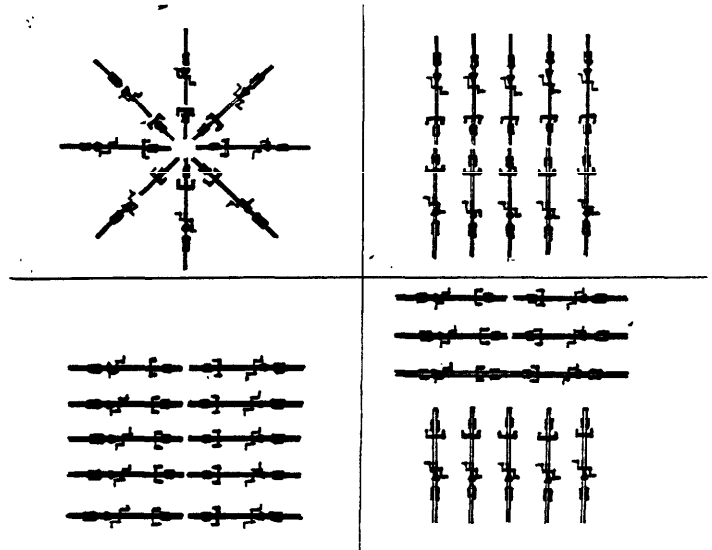
Reference should be made to the American Association of State Highway and Transportation Officials' Standards for

basic dimensional and locational standards for bicycle paths and recommendations regarding horizontal and vertical alignment, design speed and stopping sight distances.

Prevention of bicycle accidents (i.e., bicycle/motor vehicle, bicycle/bicycle, bicycle/pedestrian and single bicycle accidents) along routes is important. A high proportion of bicycle accidents occur at intersections. Facilities should be designed to minimize the number of crossings. Intersections should be clearly marked.



BICYCLE RACK ACCESS DIMENSIONS



Bicycle racks may be aligned in a variety of configurations.

Pavement surface must be free of bumps, holes and other surface irregularities if they are to attract bicyclists. Utility covers and drainage grates should be at grade and if possible, outside the expected area of travel. Expansion joints in bridge pavement should be made safe. Crowning the path is not advised.

The design of bicycle pathways should not encourage or require bicyclists to operate in a manner inconsistent with the adopted Rules of the Road.

Lighting is recommended to allow the bicyclist to see the bicycle path direction, surface conditions and obstacles.

Lighting is especially appropriate where riding at night is expected, at street intersections, underpasses, or tunnels and where nighttime security could be a problem.

Bicycle parking units should fit bicycles of various sizes and types, and locking devices of generally available kinds.

Bicycle parking facilities should be readily visible to bicyclists. Signs can be used to indicate the location.

If the units are installed in an auto parking area, a physical barrier may be needed to protect parked bicycles from damage by cars.



Wetland and beach areas may be made accessible by carefully constructed trails or boardwalks.



Proposed cliff edge trails on the Palisades may provide new access to existing vantage points for viewing the river and skyline.

TRAILS

Purpose

To provide for public access on the steeply sloped and heavily wooded Palisades and on the beach areas of Jersey City, where construction of a 16 foot wide paved surface would be detrimental to these particularly sensitive environments. Where approved by DEP, trails may also serve as public accessways on portions of the waterfront redeveloped as natural areas.

Suggestions

Trail entrances should be located at convenient access points from major public thoroughfares or walkways.

Maximum comfortable trail gradients are generally considered to be between 5% and 10%.

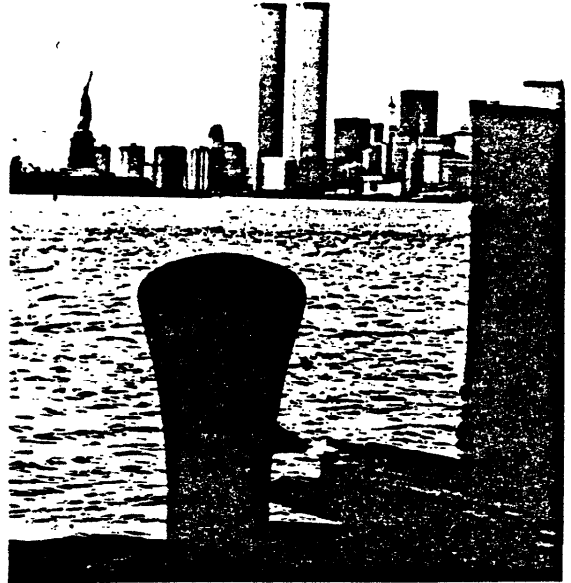
Cross slopes are generally considered to range from 2% to 5%, to provide for adequate drainage.

Cut-slope refers to the slope adjacent to a trail, following excavation. The degree of cut on any hillside depends on the soil stability, type, and hardness. Slopes exceeding a 1:1 ratio will require terracing or reinforcement with a wood or stone retaining wall.

Hand construction of trails is preferable to machine construction, which should only be used in disturbed areas or where the trail also provides a service vehicle route. Visible evidence of trail construction should be restricted to the area of the trail width.

In wet or damp areas, or areas of fragile habitat, the trail surface should be raised by construction of a boardwalk or a footbridge. A trail should be graded or built up only if this will not damage fragile areas.

For trail construction recommendations designed to help minimize erosion and maintenance see the U.S. Forest Service's contract specifications for trail construction.



Caven Point in Jersey City is a fine example of a scenic overlook.

SCENIC OVERLOOKS

Purpose

To provide for stopping points on the Palisades cliffs and other outcropping at points with unique or spectacular views of the Hudson River, the Manhattan skyline the New Jersey shoreline.

Suggestions

Overlooks should be established in areas with outstanding views of the waterfront accessible to a public road or a waterfront or connecting walkway.

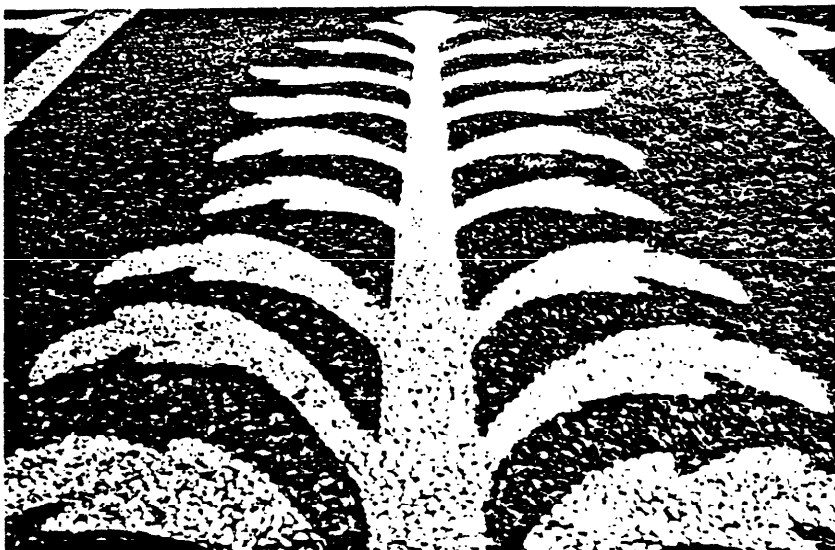
Locations along the waterfront well-suited for establishment of a scenic overlook are identified in the Hudson Walkway Plan.

Where a scenic overlook is designated as part of the proposed development, scenic easements on surrounding parcels should be established to ensure that permitted structures will not block or in any way diminish the views of the shoreline or river. Easement widths and heights will vary depending on the extent of the view.

Plans indicating means by which views will be preserved submitted as part of an application for a DEP Waterfront Development Permit, should indicate clearly the means by which views from a designated scenic overlook will be maintained.

Scenic overlooks should be paved, with seating areas and trash receptacles. Fencing is generally recommended but should be no higher than 3' and should not obstruct views.





Hand placed river washed stones create a pleasing leafy paving pattern. (Portofino, Italy)



Cut stone pavers provide a large-scale pattern in this urban plaza. (Venice, Italy)

Design Elements

Part Six

This section describes and illustrates suggestions for the design of:

- Paving
- Pedestrian Ramps
- Stairways
- Seating
- Planting
- Planters, Tree Grates and Tree Guards
- Trash Receptacles
- Buffers: Fencing, Walls, Bollards
Planting and
- Lighting

that will be provided on any public accessway.

Unlike the Requirements for Public Access Ways set out in Parts I and III, the suggestions set out in this section are not necessary conditions for issuance of a Waterfront Development Permit. Instead, they are intended to provide guidance in design of specific elements of public accessways.

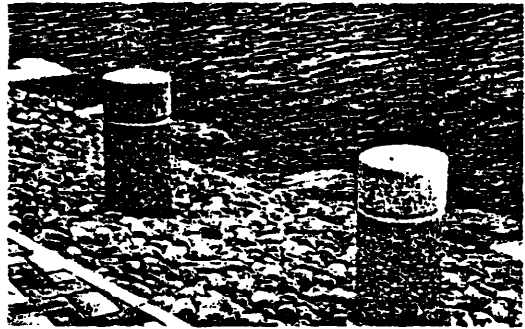
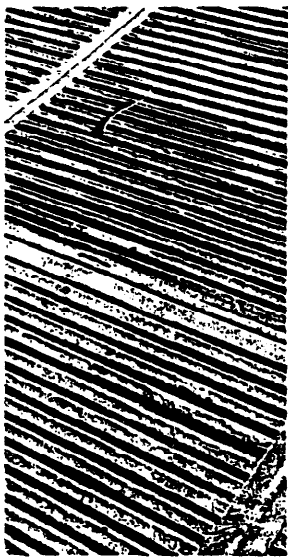
Local codes should be consulted to assure conformance with all applicable requirements.

PAVING

Purpose

To provide a smooth, durable, non-skid ground surface for the safe movement of pedestrians, bicyclists and maintenance vehicles.

As specified in Part I, hard surfacing shall be used in all cases for the minimum paved areas of waterfront and connecting walkways, except environmentally sensitive areas.



A wide variety of paving types and patterns are suitable for use in the waterfront walkway.

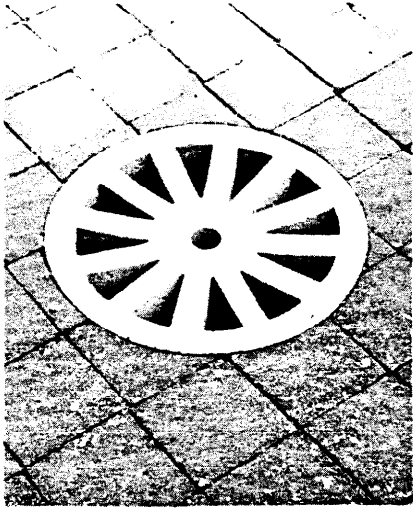
Suggestions

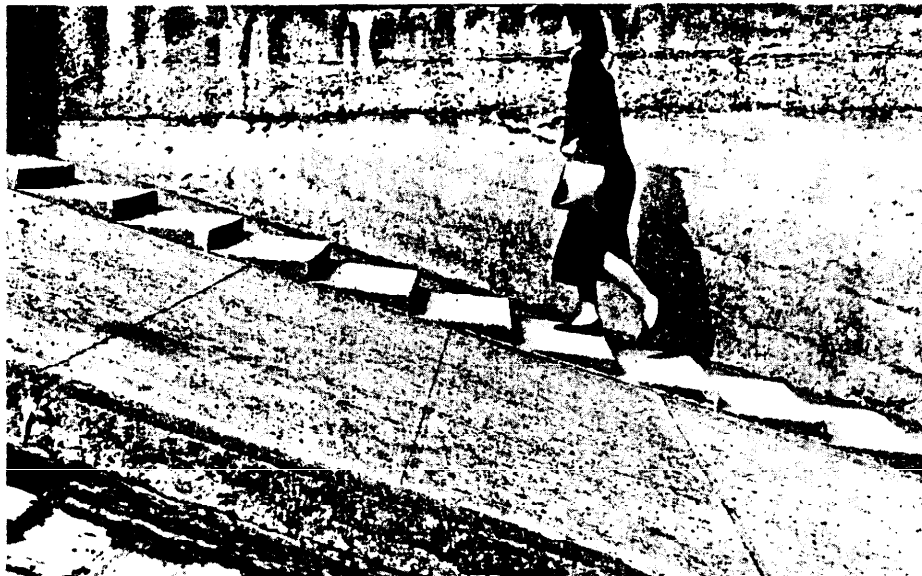
Modular surfaces which are composed of individual pieces placed one at a time are generally richer in texture, color and pattern than monolithic pours and tend to be more expensive due to both material and installation costs.

Monolithic surfaces which are installed in a continuous pour have greater strength and durability than modular surfaces.

A variety of paving materials may be used to define use areas, or to alert a pedestrian or bicyclist to a change in grade or an approaching intersection. Changes of paving materials should be carefully executed to insure a logical and visually smooth transition. Consideration should be given to transitions of pattern, scale, color, texture and jointing.

Design elements such as lights, trash receptacles, benches, tree grates and drainage inlets which are set in paving, should be located to relate to the paving pattern, scorelines and expansion joints.





Steps adjacent to a steep ramp provide choice of movement.

PEDESTRIAN RAMPS

Purpose

Pedestrian ramps are designed to provide access under three conditions; across a curb where there is an abrupt change in surface level, where slope gradients are excessive and stairs are undesirable, and where handicap access is to be accommodated.

Suggestions

Accessways which have slopes between 5% and 12%, other than stairs or unsurfaced trails, should be designed as pedestrian ramps. Where the slope of an accessway is between 12% and 30%, ramps, stairs, trails, or any combination thereof may be constructed.

The maximum gradient for handicap access should be 8.33%. The maximum comfortable gradient for pedestrians is typically 15%.

Landings should be provided at the top and bottom of ramps, approximately every 30' for handicap use, as rest

spots for long gradual climbs, and where ramps change direction. Landing width should be at least equal to width of the ramp leading to it.

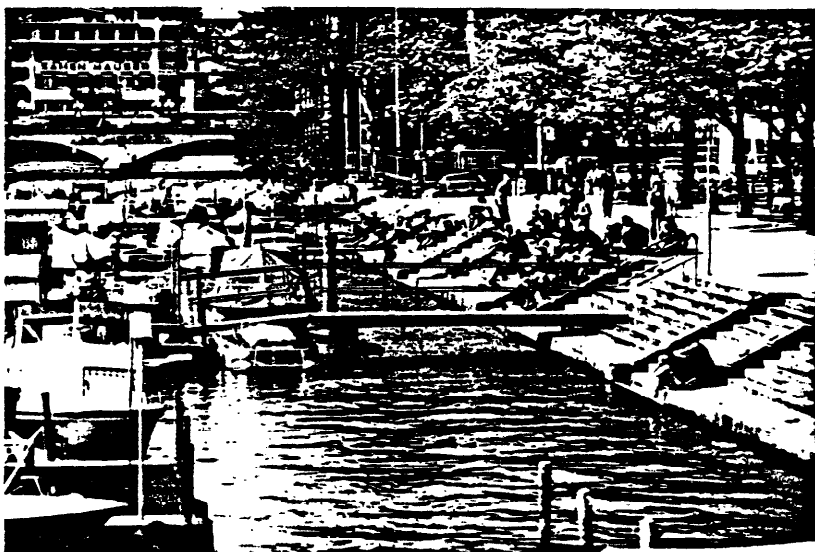
Soil erosion is reduced by construction of rock spillways which disperse and slow the rate of flow where water drains off the ramp.

Drainage grates should be carefully integrated with the paved surface so as not to present a barrier to handicapped use.

Curbs at the edge of ramps prevent soil and debris from washing onto the ramp surface. Curbs also provide a tactile edge for guidance of the visually impaired as well as an edge limitation and wheelstop for wheelchair occupants.

Ramps may be surfaced in as wide a range of paving materials. Surface texturing and grooves prevent the surface from becoming too slippery but should not be pronounced enough to hamper handicap access.

Typically ramps are paved in asphalt or concrete to provide smooth, stable, non-erodible surfaces.



Stairs provide informal seats for people to relax and enjoy the sun and view.
(Zurich, Switzerland)

STAIRWAYS

Purpose

A series of steps or flights of steps for providing access from one level to another.

Suggestions

Stairs should generally be provided under the following conditions: 1) where the accessways line of descent will exceed 31% but will not exceed 64%, 2) where erosion or soil stability problems prevent the development of other facilities (pathways), 3) where an accessway has a long vertical drop, 4) where there is a high visitor use of a steeply sloped area.

Where feasible, a barrier free alternative should also be provided.

Volume of traffic anticipated and width of approaching walk will determine stair width required.

For convenience and comfort of pedestrians, dimensions and ratio should be uniform for all treads and risers for any given flight of stairs.

Landings should be provided where stairways change direction and should be of at least the width of the stairway.

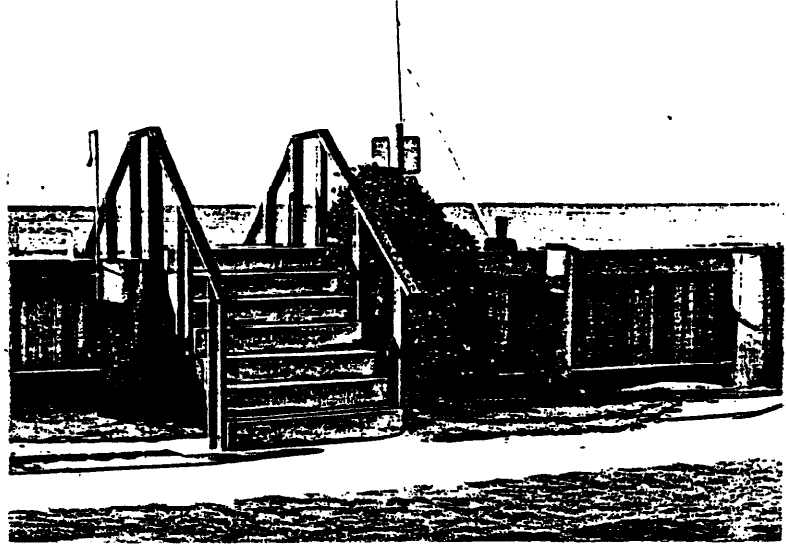
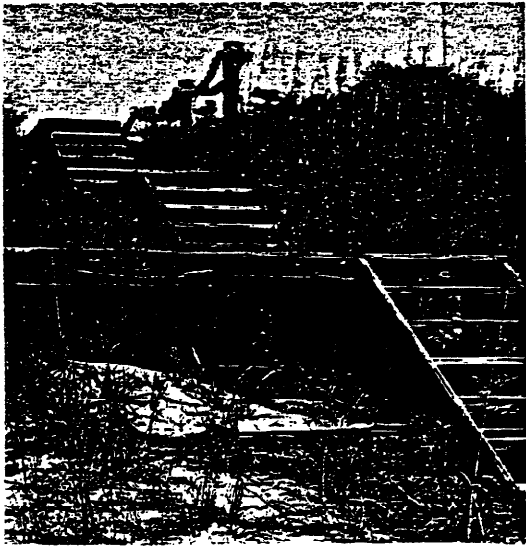
Handrails should be provided along both sides of staircases or steps where the rise exceeds 8" or the run exceeds 6'. Handrail height from the top of the riser to the top of the handrail, is typically 30"-34".

Stairways may be constructed as single-structure staircases, as steps anchored in a slope, or as a combination of both.

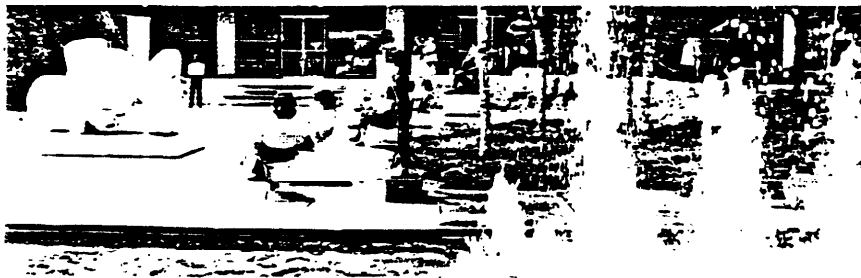
Individual steps anchored into the slope are appropriate.

- Where an accessway's line of descent is too steep for a continuous natural trail or hard-surfaced walkway.
- Where soils are stable and erosion is not a problem.
- Where terrain is steep for short distances or intermittently.
- Where a low cost solution is desired.

Footings should extend below frost level or lowest expected seasonal beach elevation. Footings on cliff faces should extend as deeply into the cliff (preferably bedrock) as is economically possible. Handrails should be secured in concrete footings or adequately bolted in place.



Stairs and steps can be important design elements in a development, in addition to providing access to the water's edge.



Seating arrangements should provide for comfortable resting places along the walkway.

SEATING.

Purpose

To provide a comfortable place for people to sit along the waterfront walkway and in parks, plazas and scenic overlooks.

Suggestions

Seating should be set back from walkways or located on walkways of a sufficient width to avoid conflict between pedestrians and those people seated. The setback on any seating from the unobstructed 16' wide walk edge to the centerline of the bench should be at least 30". For all types of seating, the preferred seat height is 16-17".

Where walls provide seating opportunities, they should be of a height and width to assure comfort. The maximum typically acceptable height 36".

The minimum width from front to back should be 16".

Typical dimensions for benches and chairs with backs call for:

- minimum seat width (front to back) of 14";

- minimum back height of 12";

- back angle of 8°-12°;

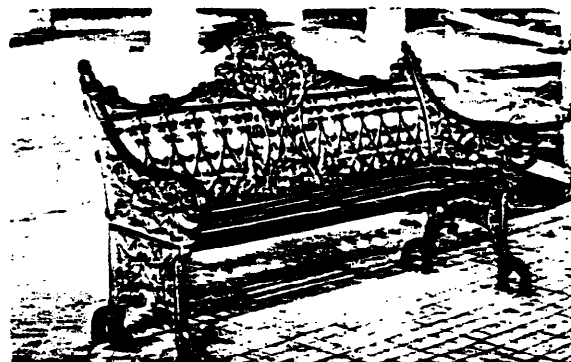
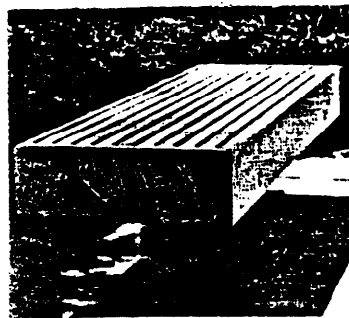
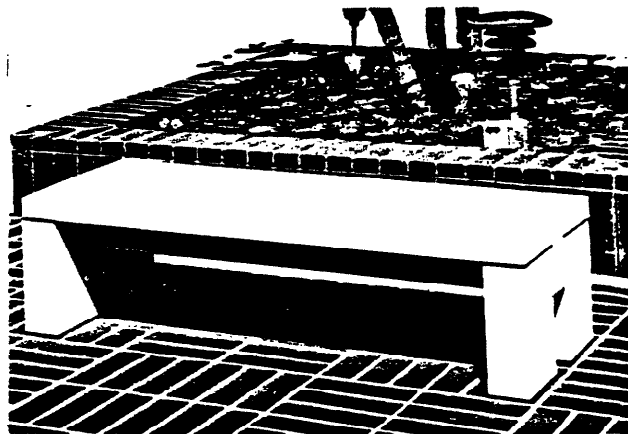
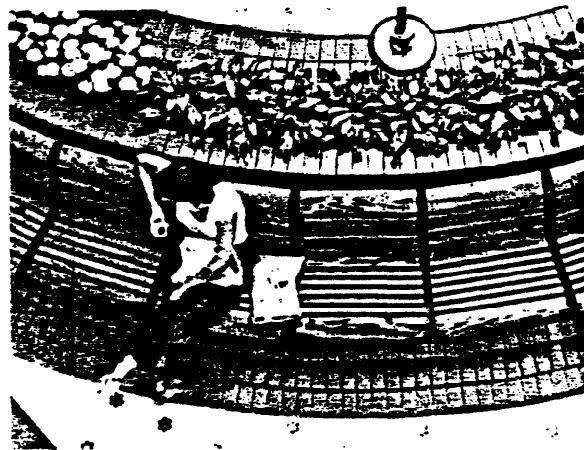
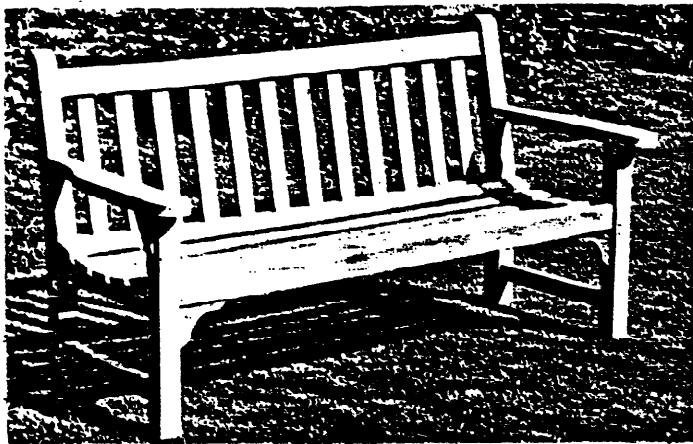
- preferred seat angle of 10° (flat is acceptable).

Handicap standards call for 10% of all available benches to have backs.

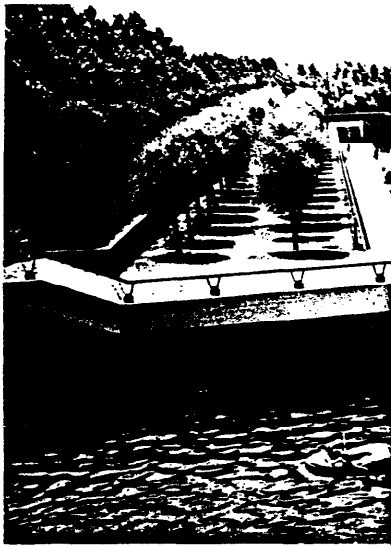
Exposure to the sun, the degree of enclosure, and the overall aesthetics and quality of design in a space, all contribute to the desirability of a sitting area.

People sit where they are socially comfortable; most often where there are other people, and where the flow of pedestrian traffic is most concentrated. Extremely isolated or heavily-screened seating arrangements are not advisable for security and personal safety reasons. Some seating may be separated from the main grouping to provide "quiet" space as long as visual communication is maintained.

People prefer to have a choice about where they are to sit. Contrived seating arrangements often remain unused. Wide, low walls and planter edges provide excellent, informal seating opportunities. Interior corner arrangements of benches and seat walls are desirable.



The style of benches and seating areas provided along the walkway should be selected to respond to the design character of each development.



Plantings along the walkway may be very formal or very naturalistic.

PLANTING

Purpose

To soften the built environment, provide shade, to direct views or traffic, to define a space, to provide wind screens, visual buffers, or physical barriers.

Suggestions

Canopy trees planted 6' or less from the edge of a paved pedestrian area should be limbed up a minimum of 7' to allow for pedestrian movement and eye level views.

Trees planted at grade must have a minimum soil depth of 3'-6". A minimum of 200 cubic feet of soil per tree is advisable to provide ample room for root growth.

Plant materials should be hardy in zone 6. Varying micro climates and environmental conditions will require diffe-

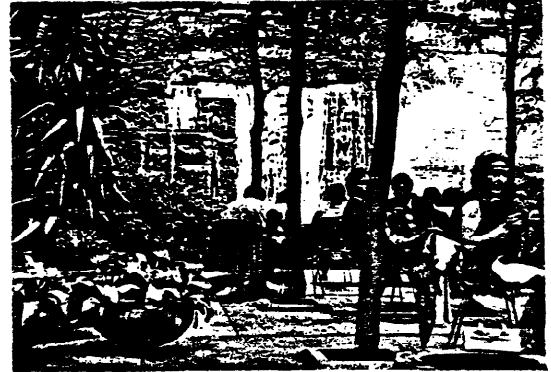
rent plant selections. Plants appropriate in a tidal flat or marsh area, which may require some salt tolerance, will be different from those along the wind swept water's edge or the steeply wooded palisades cliffs.

In addition to considering the hardiness aesthetics and use of the plant, material should be analyzed to determine its resistance to insects and diseases. Plants should be readily available from regional nurseries in the quantities and size desired. Growth rates may affect the selection, size and spacing of materials. Maintenance requirements should be considered.

Canopy Trees may reach a mature height of 30' to 120'. Canopy Trees providing shade while allowing breezes to pass through are especially appropriate at sitting areas. Canopy trees may create a "ceiling" for outdoor spaces providing a satisfying sense of protection and enclosure.



Ground covers and vines frame this view of lawn, shrubs, intermediate and canopy trees.



A bosque of honey locusts provide shade and enclosure to this urban park. (New York City)

Intermediate trees generally reach a mature height of 15'-30'.

Intermediate trees may be effective in small scale spaces and are good choices for planters where root area is restricted.

Many ornamental flowering trees are included in this category. Ornamental trees when carefully selected may provide seasonal display throughout the year. The characteristically low branching habit of most intermediate level trees may block views or make pedestrian movement difficult.

Shrub materials generally reach a height of 1'-15'.

Shrubs add color, texture and form at and below eye level.

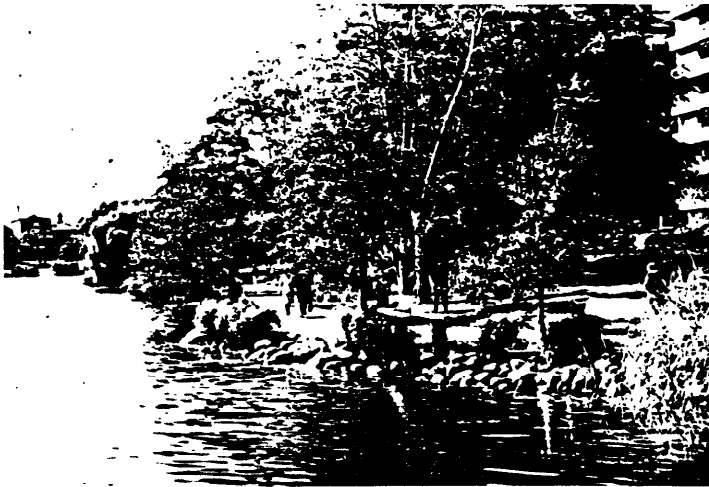
Shrubs provide a transition between intermediate level trees and groundcover. Small scale plants or dwarf varieties may be selected for use in planters or small scale spaces.

Vines may be used for climbing (walls, trellis, fences) or for rapid and extensive groundcover on steep erodible slopes.

Vines provide color, form and textural relief on the ground plane and against building walls. Vines on building walls will reflect solar radiation, reducing heat and glare from unprotected wall surfaces.

Groundcovers form low spreading mats which require little maintenance and may stabilize banks and slopes from wind or water erosion. Groundcovers do not produce shade directly but they do reduce ground temperatures and evaporation from the soil while moderating reflection and glare.

Because some heavily shaded ground planes beneath trees are difficult to plant, consideration should be given to paving such an area.



A "natural" water's edge may be created through special landscape treatment.

In general successful plant compositions use a predominance of material, color, or texture to give needed unity. Accent materials are then introduced to play against the dominant material creating contrast. Simple planting masses using a limited palette of materials are generally easier to accomplish successfully than an extremely complicated planting scheme.

All plants require some degree of maintenance if they are to be kept weed-free, disease or pest-free and in top physical condition.

The degree of maintenance may, however, vary greatly from minimal maintenance plantings to plantings which require constant attention. Plants should be carefully selected to ensure that they are suitable to withstand the environmental site conditions (sun, soil, shade, wind, moisture level) as well as the physical conditions (steep slopes, building walls and enclosures, limited growth space, traffic pollution and volume). Maintenance procedures which may be necessary include: pruning, weed removal, litter pick up (dead branches, flowers, fruit), spraying for pests, fertilizing, mowing and seasonal planting (annual flowers).

PLANTS FOR VARIOUS PURPOSES

Shade Trees for Edging the Walkway

- *Acer rubrum*
- *Ascer saccharum*
- *Ginko biloba*
- *Gleditsia triacanthos* 'inermis'
- *Liquidambar styraciflua*
- *Oxydendron arboreum*
- *Platanus acerifolia*
- *Pinus strobus*
- *Pyrus calleryana*
- *Quercus coccinea*
- *Quercus palustris*
- *Quercus phellos*
- *Quercus borealis*
- *Sophora japonica*
- *Tilia cordata* 'greenspire'
- *Zelkova serrata* 'village green'

Windbreaks

- *Acer ginnala*
- *Acer negundo*
- *Acer platanoides*
- *Acer pseudoplatanus*
- *Acer rubrum*
- *Carpinus betulus*
- *Cornus mas*
- *Crataegus mollis*
- *Crataegus phaenopyrum*
- *Fagus species*
- *Fraxinus americana*
- *Fraxinus pennsylvanica lanceolata*
- *Juniperus species*
- *Ligustrum lucidum*
- *Malus baccata*
- *Picea abies*
- *Picea glauca*
- *Picea omorika*
- *Pinus nigra*
- *Pinus resinosa*
- *Pinus strobus*
- *Pinus sylvestris*
- *Pinus thunbergii*
- *Populus alba*
- *Quercus many species*
- *Quercus imbricaria* (one of best)
- *Quercus palustris*
- *Quercus phellos* (one of best)
- *Rhamnus davurica*
- *Thuja species*
- *Tilia species*
- *Tsuga canadensis*
- *Tsuga caroliniana*
- *Ulmus americana*
- *Ulmus pumila*
- *Viburnum prunifolium*

Barrier Plants

- *Aralia species*
- *Berberis species*
- *Chaenomeles species*

- *Crataegus species*
- *Elaeagnus species*
- *Gleditsia triacanthos*
- *Pyracantha species*
- *Pyrus species*
- *Prunus cerasifera*

Screens

- *Acer ginnala*
- *Buxus sempervirens*
- *Cornus mas*
- *Elaeagnus angustifolius*
- *Hamamelis vernalis*
- *Ligustrum species*
- *L. tatarica*
- *Magnolia stellata*
- *Prunus laurocerasus*
- *Rhamnus frangula*
- *Spiraea veitchii*
- *S. vulgaris*
- *Thuja occidentalis*
- *T. orientalis*
- *Viburnum species*

Trees for Confined Areas

- *Acer campestre*
- *Acer ginnala*
- *Acer palmatum*
- *Acer palmatum atropurpureum*
- *Albizia julibrissin rosea*
- *Carpinus betulus*
- *Carpinus carolinianum*
- *Carpinus japonica*
- *Cercis canadensis*
- *Cornus florida*
- *Cornus kousa*
- *Crataegus crus-galli*
- *Crataegus oxycantha*
- *Crataegus phaenopyrum*
- *Elaeagnus angustifolia*
- *Fraxinus ornus*
- *Halesia carolina*
- *Ilex aquifolium*
- *Ilex opaca*
- *Koeleria paniculata*
- *Magnolia species*
- *Malus species*
- *Oxydendrum arboreum*
- *Pinus bungeana*
- *Pinus strobus*
- *Prunus species*
- *Styrax japonica*
- *Syringia amurensis japonica*
- *Tsuga canadensis*
- *Tsuga caroliniana*
- *Viburnum prunifolium*
- *Viburnum sieboldii*

Trees for Moist to Wet soils

- *Abies balsamea*
- *Acer rubrum*
- *Betula nigra*
- *Betula populifolia*
- *Carpinus caroliniana*
- *Carya ovata*
- *Chamaecyparis thyoides*
- *Fraxinus caroliniana*
- *Fraxinus pennsylvanica*
var. *lanceolata*
- *Larix laricina*
- *Liquidambar styraciflua*
- *Nyssa sylvatica*
- *Picea mariana*
- *Picea rubra*
- *Platanus occidentalis*
- *Quercus bicolor*
- *Quercus palustris*
- *Quercus phellos*
- *Salix babylonica*
- *Taxodium distichum*
- *Thuja occidentalis*
- *Tilia americana*
- *Tsuga canadensis*

Shrubs for Moist to Wet Soils

- *Amelanchier* species
- *Calluna vulgaris*
- *Clethra alnifolia*
- *Comptonia peregrina*
- *Cornus alba*
- *Cornus sanguinea*
- *Cornus sericea*
- *Hypericum densiflorum*
- *Ilex glabra*
- *Ilex verticillata*
- *Ilex vomitoria*
- *Kalmia angustifolia*
- *Kalmia latifolia*
- *Leucothoe fontanesiana*
- *Lindera benzoin*
- *Myrica* species
- *Rhododendrum calendulaceum*
- *Rhododendrum canadense*
- *Rhododendrum nudiflorum*
- *Rhododendrum vaseyi*
- *Rhododendrum viscosum*
- *Salix tomentosa*
- *Taxus canadensis*
- *Thuja occidentalis* varieties
- *Viburnum alnifolium*
- *Viburnum dentatum*
- *Viburnum opulus*
- *Viburnum trilobum*

Shrubs and Vines that Withstand City Conditions

- *Acer ginnala*
- *Aesculus parviflora*
- *Berberis thunbergii* and
varieties
- *Celastrus* species
- *Chaenomeles* species
- *Clematis paniculata*
- *Cornus alba*
- *Cornus mas*
- *Cornus sericea*
- *Crataegus phaenopyrum*
- *Elaeagnus angustifolius*
- *Euonymus* species
- *Forsythia* species
- *Hammelis* species
- *Hedera helix*
- *Hibiscus syriacus*
- *Hydrangea* species
- *Hypericum aureum*
- *Ilex crenata*
- *Ilex glabra*
- *Juniperus chinensis*
'Pfitzeriana'
- *Leucothoe fontanesiana*
- *Ligustrum* species
- *Lindera benzoin*
- *Lonicera* species
- *Magnolia stellata*
- *Mahonia aquifolium*
- *Malus* species and varieties
- *Myrica pensylvanica*
- *Pachysandra terminalis*
- *Parthenocissus quinquefolia*
- *Parthenocissus tricuspidata*
- *Pieris* species
- *Pittosporum tobira*
- *Potentilla fruticosa*
- *Prunus subhirtella*
- *Pyracantha coccinea* 'Lalandei'
- *Rhamnus* species
- *Rhododendrum obtusum* 'Amoenum'
- *Rhus* species
- *Rosa multiflora*
- *Rosa rugosa*
- *Rosa wichuraiana*
- *Spiraea bumalda*
- *Spiraea vanhouttei*
- *Symphoricarpos* species
- *Syringia amurensis japonica*
- *Taxus* species and varieties
- *Vaccinium corymbosum*
- *Viburnum carlcephalum*
- *Viburnum dentatum*
- *Viburnum lentago*
- *Vinca minor*
- *Wisteria sinensis*

Trees Withstanding City Conditions

- Abies concolor
- Acer campestre
- Acer negundo
- Acer platanoides
- Acer pseudoplatanus
- Aesculus species
- Albizia julibrissin rosea
- Crataegus phaenopyrum
- Crataegus oxyacantha
- Elaeagnus angustifolia
- Fraxinus americana
- Fraxinus pennsylvanica lanceolata
- Ginkgo biloba
- Gleditsia triacanthos
- Koelreuteria paniculata
- Magnolia grandiflora
- Magnolia soulangiana
- Magnolia stellata
- Malus species
- Phellodendron amurense
- Picea pungens
- Platanus species
- Populus alba
- Quercus borealis
- Rhamnus davurica
- Sophora japonica
- Taxus cuspidata
- Tilia species
- Tsuga caroliniana
- Ulmus americana

Trees for Seashore Planting (tolerant of sandy soil, constant wind exposure and some trees tolerant of salt spray)

- Acer platanoides
- Acer pseudoplatanus
- Aesculus hippocastanum
- Ailanthus altissima
- Amelanchier canadensis
- Crataegus crus-galli
- Cryptomeria japonica
- Elaeagnus angustifolia
- Fraxinus velutina
- Hex opaca
- Juniperus virginiana
- Magnolia grandiflora
- Morus alba
- Nyssa sylvatica
- Picea pungens glauca
- Pinus nigra
- Pinus pinaster
- Pinus rigida
- Pinus sylvestris
- Pinus thunbergii
- Populus alba
- Prunus serotina
- Quercus alba
- Robinia pseudoacacia

Shrubs and Vines for Seashore Planting (tolerant of sandy soil, constant wind exposure and some shrubs tolerant of salt spray)

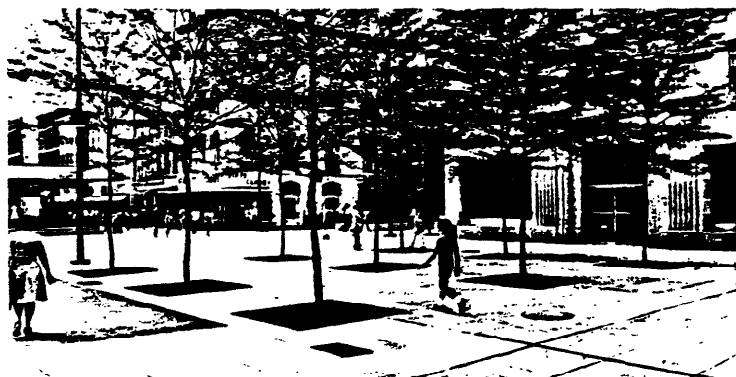
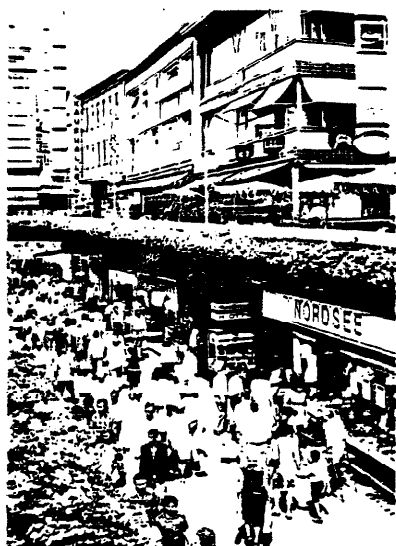
- Arctostaphylos uva-ursi
- Aronia arbutifolia
- Chamaecyparis pisifera
- Clematis paniculata
- Clethra acuminata
- Clethra alnifolia
- Comptonia peregrina
- Cornus sericea
- Cotoneaster species
- Cytisus species
- Elaeagnus species
- Euonymus japonicus
- Hibiscus syriacus
- Hydrangea macrophylla
- Hydrangea anomala petiolaris
- Ilex glabra
- Ilex opaca
- Juniperus communis
- Juniperus conferta
- Juniperus horizontalis and varieties
- Ligustrum amurense
- Ligustrum ovalifolium
- Lonicera japonica 'Halliana'
- Lonicera tatarica
- Myrica pensylvanica
- Pinus mugo and varieties
- Potentilla species
- Prunus maritima
- Rhamnus species
- Rhus species
- Rosa blanda
- Rosa multiflora
- Rosa nitida
- Rosa rugosa
- Rosa virginiana
- Rosa wichuraiana
- Salix repens
- Spiraea species
- Syringa vulgaris
- Tamarix species
- Taxus species and varieties
- Vaccinium corymbosum
- Viburnum cassinoides
- Viburnum dentatum
- Wisteria sinensis
- Yucca species

Shrubs and Vines Relatively Pest Free
and Requiring Low Maintenance

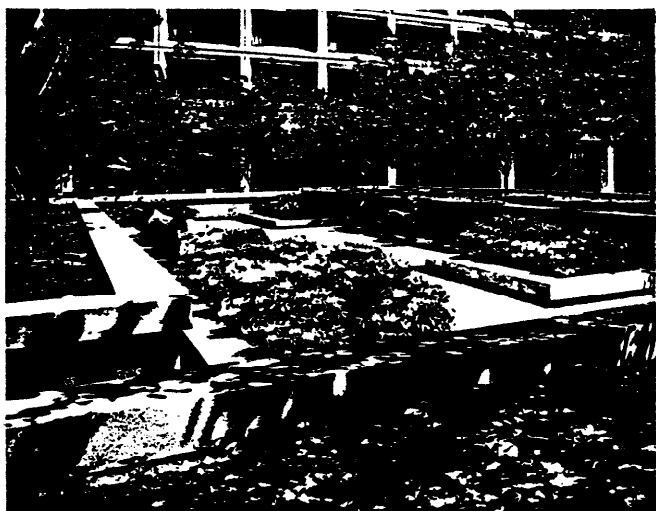
- *Acer ginnala*
- *Berberis julianae*
- *Berberis thunbergii*
- *Clethra alnifolia*
- *Cornus mas*
- *Elaeagnus umbellata*
- *Euonymus alata*
- *Forsythia ovata*
- *Forsythia suspensa* var.
 sieboldii
- *Hamamelis* (all)
- *Hydrangea paniculata*
 '*Grandiflora*'
- *Hex verticillata*
- *Leucothoe fontanesiana*
- *Lindera benzoin*
- *Lonicera maackii*
- *Myrica pensylvanica*
- *Pieris floribunda*
- *Potentilla fruticosa*
- *Prunus triloba*
- *Rhododendron maximum*
- *Rosa multiflora*
- *Rosa rugosa*
- *Spiraea x vanhouttei*
- *Symphoricarpos albus* var.
 laevigatus
- *Taxus cuspidata*
- *Vaccinium* species
- *Viburnum* species

Trees Relatively Pest Free

- *Carpinus* species
- *Cedrus* species
- *Cercidiphyllum japonicum*
- *Chamaecyparis* species
- *Cornus mas*
- *Cotinus americanus*
- *Elaeagnus angustifolia*
- *Ginkgo biloba*
- *Gleditsia triacanthos*
- *Juniperis* species
- *Koelreuteria paniculata*
- *Laburnum* species
- *Liquidambar styraciflua*
- *Magnolia acuminata*
- *Magnolia salicifolia*
- *Magnolia stellata*
- *Myrica* species
- *Phellodendron* species
- *Populus alba*
- *Rhamnus davurica*
- *Sciadopitys verticillata*
- *Sophora japonica*
- *Stewartia* species
- *Styrax* species
- *Taxus* species
- *Viburnum* species



Landscaping along the walkway should take into account preservation of views of the water and minimization of maintenance requirements.



Concrete planters enclose this plaza area while edging the walkway with seat height walls. (Hartford, Connecticut)



Cast iron tree grates and guards protect the trees while creating a strong visual pattern in the landscape. (Eugene, Oregon)

PLANTERS, TREE GRATES, TREE GUARDS

Purpose

Planters provide structural support and a container for soil and plant materials where materials are unable to be planted directly into the ground or where an urban or hard paved multilevel effect is desired. Tree guards protect the tree against vandalism or vehicular damage. Tree grates provide a clean finished surface which allows air and water to reach the plant and protects the tree against removal by vandals and root damage from foot traffic.

Suggestions

The existing ground plane must be able to support the weight of planters. Designs of concrete, brick or stone must be adequately stabilized with footings.

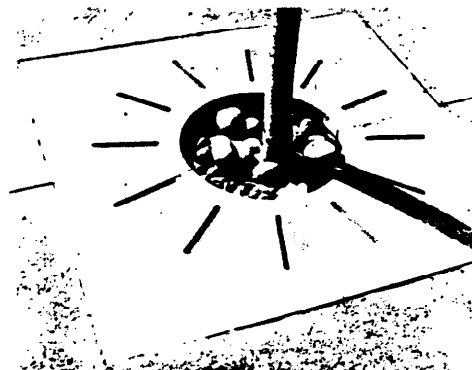
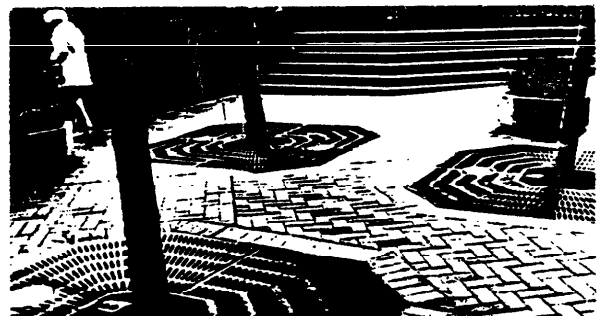
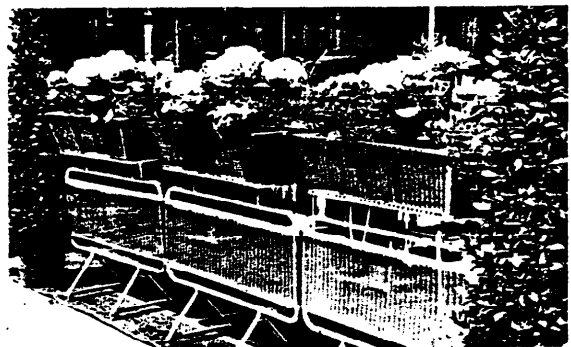
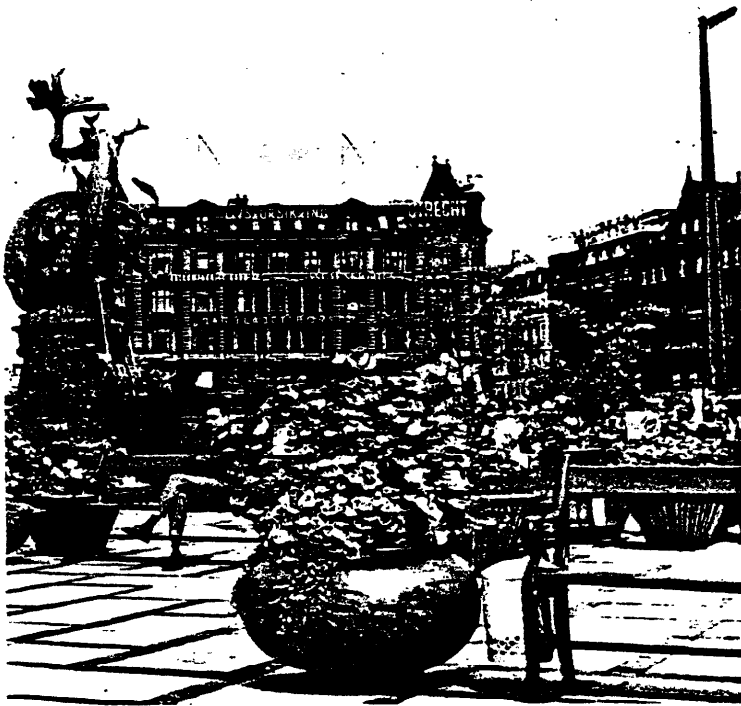
All planters must be adequately reinforced as required to withstand earth and water pressures and the weight of the plant material.

All planters must have adequate drainage systems.

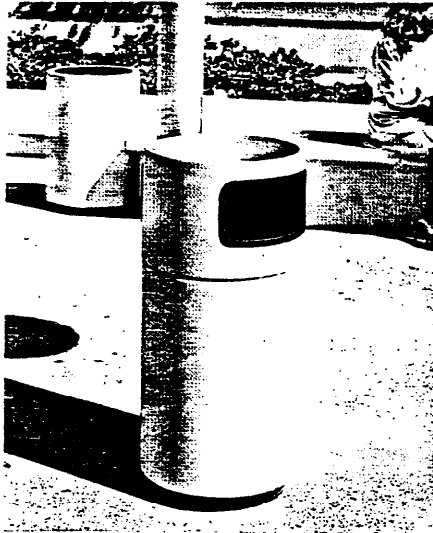
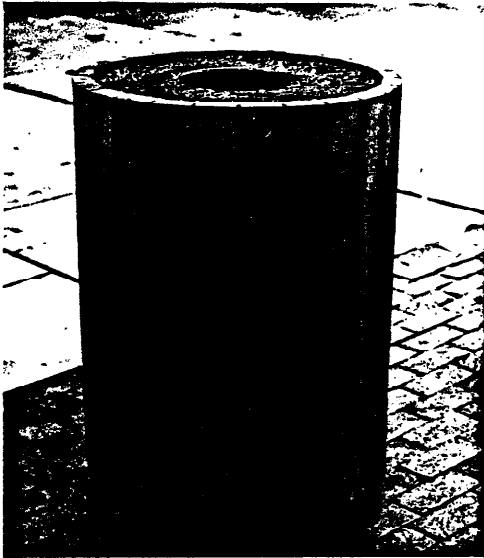
Planters, tree grates and tree guards must be adequate in size to accommodate the anticipated size of the plant materials.

Structural integrated planting containers which define spaces and provide a variety in the height of the planted ground plane are preferable to the use of modular containers.

Where modular containers are used it is recommended that a single style of planter be selected and repeated either in a symmetrical alignment or in a clustered effect within any park, plaza, scenic overlook, or portion of the walkway. Planters may be typically constructed of concrete, stone, terracotta, brick, lead or fiberglass. Consideration should be given to graffiti protection coating to help ward off vandalism.



Planters, tree grates and tree guards can enhance the quality of the Hudson Waterfront environment.



Trash receptacles at frequent intervals along the walkway will help reduce maintenance requirements.

TRASH RECEPTACLES

Purpose

To provide containers for disposing of litter and garbage, in order to ensure cleanliness and to facilitate maintenance of the public access system.

Suggestions

Provide one trash receptacle for every 4 picnic tables with benches.

Do not site trash receptacles immediately adjacent to benches or eating areas. Allow a minimum distance of 5' between seat and receptacle.

Litter is the number one maintenance problem in most public open spaces. Paper trash, garbage and broken bottles degrade the image of any public space,

further encouraging misuse and vandalism. Trash receptacles must be provided for people to dispose of refuse and must be emptied as needed to remain usable.

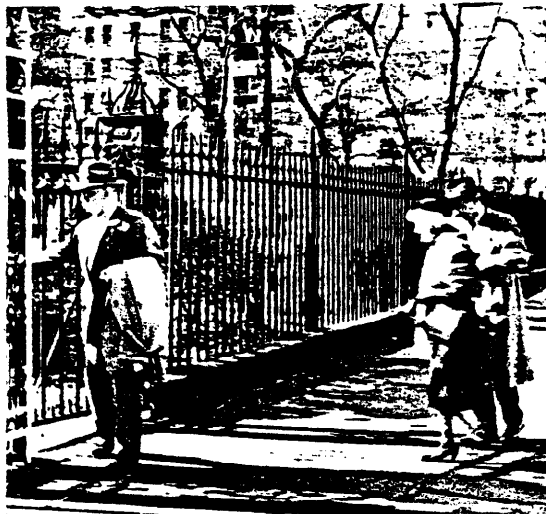
Receptacles may be constructed of a variety of materials including wood, concrete, steel, cast iron, and fiberglass.

All secured receptacles must have liners for trash removal. Least expensive and functional are plastic trash bags. Plastic or steel cans may be used. Steel wire post or wall mounted receptacles may be unlocked with a key for trash dumping.

Receptacles mounted in grassed areas should be set on a flush concrete pad or mulched area to allow sufficient room for lawn mowers to cut grass around the base of the receptacle.



A retaining wall buffers a seating area from adjacent uses and activities. (Chicago, Illinois)



A formal cast iron fence encloses this urban park while allowing for visibility. (Gramercy Park, New York)

BUFFERS: FENCING, WALLS, BOLLARDS, PLANT MATERIALS

Purpose

To provide a complete or partial physical or visual means by which adjacent conflicting use areas may be separated. Bollards, fences, walls, earth berms or plant materials may be used as buffers.

Suggestions

The type of buffer selected will depend on the use intended; the degree of screening, security and strength required. Buffers may be used to separate vehicular, bicycle or pedestrian circulation, to act as partial visual screens for privacy, to block views of unsightly areas: to contain recreational sites, to secure high risk or restricted areas, to delineate edges or gardens, parks, plazas and to provide a protective edge or allow for level or grade changes.

Fences

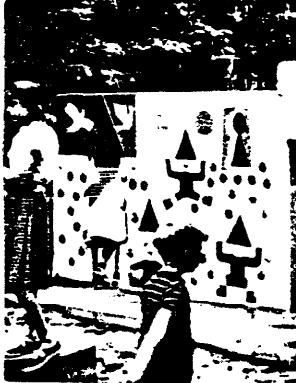
Fencing used to partially screen or separate areas of pedestrian use should generally not exceed 6'. Fencing over 6' in height should be reserved for use in areas where extreme security measures are required or on recreational sites (tennis, baseball, etc.) where play needs to be contained.

While all fences are essentially barriers, the degree of physical impediment suggested by the fence design may vary widely. Height, color, material thickness and density of members will all help to communicate the degree of separation intended.

Ornamental fencing designed to define the edge of a garden, park or plaza and to allow full visibility should not exceed 3' in height.



A retaining wall buffers a seating area from adjacent uses and activities. (Chicago, Illinois)



A brightly-painted wall adds color to this children's play area. (Copenhagen, Denmark)



Cast iron bollards with chains provide protection to this street edge sitting area. (York, Pennsylvania)

Walls

Walls may generally be divided into two distinct types; free standing or retaining walls. Retaining walls which are specifically designed to withstand the pressures of retained earth will provide a sharply defined edge between two different grade levels. Free standing walls may be used to define, shape, enclose, protect, and block spaces.

Height should vary depending on use; grade level to be retained, service area to be blocked, privacy to be provided, planter to be filled, seating to be provided, etc. Like ornamental fencing, freestanding walls should be no higher than 3', where a view or vista is to be preserved, and should generally not exceed 6' in height.

Bollards

Bollards are vertical site elements used as a barrier which physically or visually deters vehicular traffic. When chains are hung between bollards they function similarly to a low fence.

Physical deterrent bollards should be a minimum of 8" in diameter.

Visual deterrent bollards should be a minimum of 3 1/2" in diameter. The maximum for each should be 24".

Heights may vary from 16" (seat height) to 36".

Bollards should be spaced a maximum of 4' on center to deter vehicular traffic, unless chains between bollards are provided.

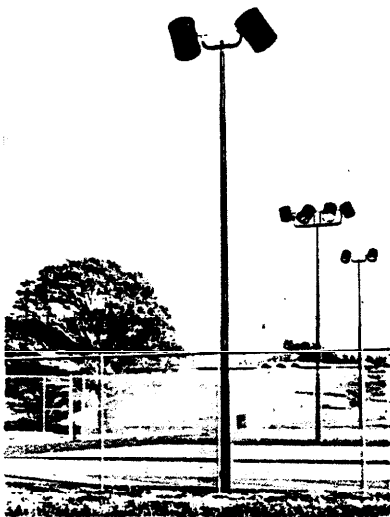
Locking bollards are used to exclude vehicular access except by key holders; private property owners, fire brigade and police. Bollards either hinge down or can be physically removed from their sockets.

Lighting bollards may be used as physical or visual deterrents while providing low level amenity lighting.

Lighting bollards should be spaced so that illumination levels are adequate for use. These bollards are appropriate for both vehicular separation and pedestrian path delineation.

Plant Materials

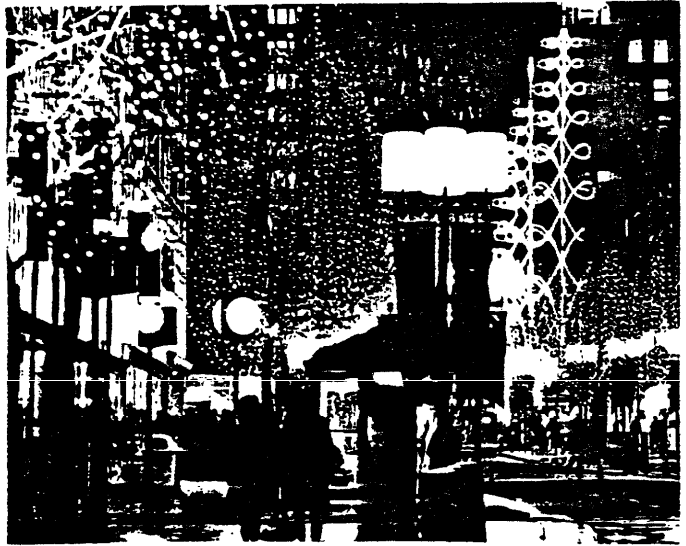
Plant buffers or screens may serve a number of purposes; to filter noise and dust particles, to shield against winds, to reduce views where privacy and security must be maintained, to block views where an unsightly area must be screened, and to act as a barrier to pedestrian traffic. (See Part VI, Planting.)



Lighting provides night use of recreation facilities.



Pedestrian scale lampposts light this waterfront marina.



Tiny lights woven through tree branches and spiralled patterns create a festive atmosphere in this urban mall. (Minneapolis, Minnesota)

LIGHTING

Purpose

To provide visibility along the Walkway during dark hours for recreation and security purposes and to provide ornamental enhancement of architectural, landscape, or artistic details.

Suggestions

The illumination level for a project is primarily a function of use. The following are typical recommended minimum standards.

	Average Footcandles	Security Areas: Footcandles	
		Low Mount 9-15 ft.	High Mount 15-30 ft.
Roadside Sidewalk			
Commercial	0.9	2.0	4.0
Intermediate	0.6	1.0	2.0
Residential	0.2	0.4	0.8
Walkways			
Park	0.5	0.6	1.0
Pedestrian Tunnels	4.0	5.0	-
Pedestrian Overpass	0.3	0.4	-

The height of pedestrian scale pole mounting heights along the waterfront or connecting walkway should be 12'-14'. The pole mounting height at parks, plazas or scenic overlooks should be 12'-32'.

An important criterion in selection for lighting of the Walkway is lamp resistance to corrosion.

Three types of lighting may be used along the Hudson Walkway:

1) Utility and Security Lighting

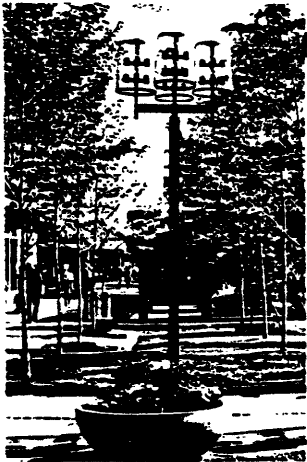
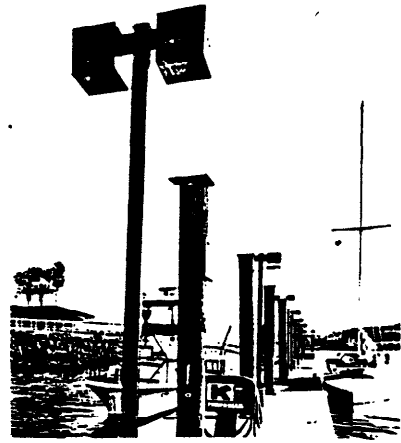
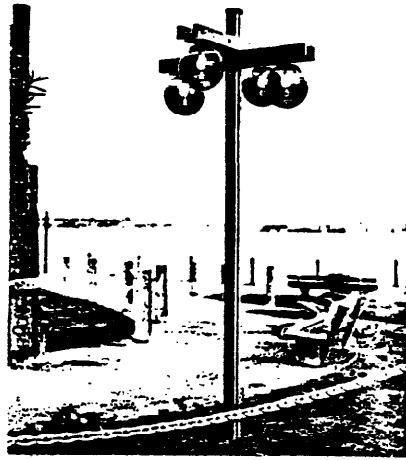
Increases the efficiency of the bicyclist or pedestrian in the night-time environment. Characteristically, the light levels are minimal and color and uniformity are minor considerations.

2) Area Lighting

Refers to lighting systems designed to permit the use of an area in near daylight conditions. These systems include large public spaces. They typically require special attention to the light distribution pattern.

3) Effect Lighting

Is the most demanding of the three functional lighting levels. Effect lighting has to satisfy the objectives of security and utility lighting with the added objective of creating an exciting visual environment.



Lighting can provide visibility along the walkway during dark hours for recreation and security.



Performance and Maintenance of Public Accessways

Part Seven

PERFORMANCE

For major mixed use developments, Waterfront Development Permits for such steps as site preparation may be issued early in the development process when development proposals are still in conceptual planning. For large scale projects in which development is to be carried out over a period of years, modifications to proposed land-use configurations are likely, particularly to portions of the site to be developed in later phases.

In order to assure that the public access system will be developed in the manner agreed to as a condition of Waterfront Development Permit issuance at the final stages of development, the developer should file with the New Jersey Department of Environmental Protection a performance guarantee or guarantee sufficient in amount to cover the cost of construction of the public access system as approved. Alternatively, the developer may include the public access system in Phase I of a multi-phase project. Cost estimates should be prepared by the developer and approved by the New Jersey Department of Environmental Protection. A performance guarantee may be in the form of a performance bond issued by a bonding or surety company approved by the Department of Environmental Protection, a certified check returnable to the developer after full compliance, or any other form of surety approved by the Department of Environmental Protection.

MAINTENANCE

General Maintenance Objectives

The purpose of maintenance is to safeguard the original investment by preserving the facility in good operating and serviceable condition. A good maintenance program is cost effective since it corrects minor problems as they occur and prevents occurrence of major deterioration which, besides being very costly to repair, causes interruptions and inconvenience to the users of the facility.

The proposed waterfront walkway will therefore need a well-planned, continuing maintenance program. The program should include routine and periodic maintenance of public accessways. The items to be included in the program will be the following:

- Walkway and bikeway pavements
- Pavement shoulders
- Drainage facilities
- Adjacent supporting structures
- Signage and lighting (at crossings and public facilities)
- Landscaping and shrubs

The type and the frequency of maintenance will depend on the materials used for accessway construction and on the volume of traffic using the facility.

Maintenance Planning and Execution

Proper maintenance planning includes once-a-year detailed inspection of the facility, followed by scheduled work operations. The maintenance work should be performed only by skilled personnel. In the case of the proposed walkway the responsibility for maintenance should be clearly defined.

Routine Maintenance

Routine maintenance is done once a year. Its purpose is to perform small repairs requiring small work crews and simple tools. It is best to time the routine maintenance work in early spring. The winter rains or snow and cold weather contribute to the occurrence of minor damage such as cracks, rust, breakdown of the pavement edges, erosion of shoulder material, etc. When routine maintenance and repair is not performed, the minor problems develop into major ones due to progressive deterioration.

The routine maintenance should include the following work:

- Bituminous Surfaces: resurfacing, usually just the wearing (1.5 inches) if the remaining pavement is sound or removal of existing paving and construction of new paving (2.5 to 4 inches).
- Unpaved Surfaces: regravelling and recompaction.
- Drainage System: regrade ditches and swales, paving of heavily-eroded ditches, replace damaged pipes.
- Timber Structures: replace planking, replace rotted-out members, replace damaged piling, etc.
- Concrete, Masonry and Brick Structures: repoint joints, repair spalled concrete, seal cracks, etc.
- Signage, Lighting, Landscaping: replace damaged poles, signs and luminaires. Replace dead shrubs and trees and renovate landscaping.

Good maintenance will pay for itself in the long run. A well maintained facility is a more attractive facility and tends to be used more. Frequently used walkways and bikeways also reduce opportunities for vandalism and crime. The ability to perform the necessary maintenance work implies planning, adequate equipment and skilled personnel and, last but not least, an adequate budget to meet the necessary costs.

Walkway Maintenance Plan Requirement

The requirement for provision for public access to the waterfront carries with it an obligation on the part of the owners of waterfront development to provide for continued maintenance of the public access system over time. As a condition of Waterfront Development Permit issuance, the developer shall file with the New Jersey Department of Environmental Protection a continuing Public Access System Maintenance agreement which shall guarantee to the satisfaction of the Department of Environmental Protection an obligation

upon all future owners of the development to provide for continuing maintenance of the portion of the public access system located within the development.

This agreement may provide for establishment of a home-owners or property-owners association responsible for maintenance of the public access system as a common open space element. Where the State, municipal or county government is willing to accept responsibility for maintenance of the walkway, the agreement may provide for annual contributions by property owners to pay for such municipal or county-maintenance of the public access system.

Alternative forms of agreement including agreements for joint property owner-municipal responsibility, for example, will be approved by the New Jersey Department of Environmental Protection, provided that they meet the intent of these guidelines.

LIABILITY

Landowners have a duty to exercise reasonable care to protect persons using their property from injury and should be adequately insured against liability due to such injuries.* Evidence of insurance is required as a condition of the Waterfront Development Permit prior to operation of the walkway, and should be demonstrated by a certificate of insurance covering all public areas (including the walkway) issued by an insurance company licensed to do business in New Jersey.

*The New Jersey Landowner's Liability Act (N.J.S.A. 2A:42A-2 et seq.) provides that a landowner who allows the use of his property for recreational uses is liable only for a "willful or malicious" failure to protect against a dangerous condition. However, the Act applies only to rural, unimproved lands.

SOURCES

The preparation of these guidelines drew upon an analysis of existing conditions on the Hudson Waterfront, documented in the Hudson Waterfront Walkway Plan, and a review of the relevant features of successful waterfront walkways in other parts of the country and the world, including pertinent standards and controls.

Reference was made in particular to:

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

California Coastal Commission and State Coastal Conservancy, Designing Accessways, The Department of Parks and Recreation, San Francisco and Oakland, 1982.

Cartwright, Richard, The Design of Urban Space, Halsted Press Division John Wiley & Sons, New York, New York, 1980.

Klatt and Landphair, Landscape Architecture Construction, New York, New York, 1979.

Mann, Roy and Associates, Shoreline Appearance and Design, April, 1975

New York City Zoning Ordinance, Appendix B: Digest of Open Space Zoning Provisions, New York City, 1977.

Washington State Rules and Regulations, An Illustrated Handbook for Barrier Free Design, Seattle, Washington, 1978

Whyte, William, The Social Life of Small Urban Spaces, The Conservation Foundation, Washington, D.C., 1980

Specific References

Seating in Parks and Plazas

William H. Whyte, The Social Life of Small Urban Spaces, Appendix B: Digest of Open Space Zoning Provisions New York City. (Washington: The Conservation Foundation, 1980)

Note: This is the least restrictive seating requirement of those indicated in the Open Space Zoning Provisions for New York City.

Bicycle Parking Facilities in Parks and Plazas

ibid., p. 117

Walkway Grades and Vertical Clearance

Designing Accessways: Coastal Access Standards Element of the California Recreation Plan, (San Francisco, California: The California Coastal Commission, The Department of Parks and Recreation, The State Coastal Conservancy, 1982), p. 39.

Grade Differential in Parks and Plazas

Whyte, op.cit., p. 117

Bicycle Paths

Guide for Development of New Bicycle Facilities 1981, (Washington, D.C.: American Association of State Highway and Transportation Officials, AASHTO, 1981), p.16, p.18, p.27.

Bicycle Parking Facilities, Santa Barbara, California.

AASHTO, op.cit., pp.6, 7 and 27.

Trails

California Coastal Commission op.cit.,
pp. 32-39 (Standards and Suggestions
for Trails)

Paving

City of Miami Florida Design
Guidelines, (Suggestions for Paving)

Ramps

California Coastal Commission, op.cit.,
pp 48-51 (Standards and Suggestions for
Ramps)

Stairways

lbid., pp 52-59 (Standards for
Stairways)

Seating

Whyte, op.cit., pp.24-30, 117
(Standards for Seating)

California Coastal Commission, op.cit.,
p.76

Planting

Whyte, op.cit., p.113

Trash Receptacles

California Coastal Commission, op.cit.,
p.76

Lighting

The American National Standards Insti-
tute (ANSI) sponsored by the Illumi-
nating Engineering Society

Fred Klatt and Harlow Landphair,
Landscape Architecture Construction,
(New York: Elsevier North Holland,
Inc.) p.263.

Credits

DIRECTION FOR THE STUDY

John R. Weingart, Acting Director, New Jersey Department of Environmental Protection,
Division of Coastal Resources
Barbara E. Kauffman, Urban Waterfront Planner, New Jersey Department of Environ-
mental Protection, Division of Coastal Resources

CONSULTANTS

Wallace Roberts & Todd

David A. Wallace, Partner-in-Charge
Antoinette F. Seymour, Senior Associate-in-Charge and Urban Planner
C. Alyn Pruett, Associate and Urban Designer
Constance S. Dee, Landscape Architectural Designer
Charlotte Daley, Graphics Designer
Dolores Strickland, Graphics Designer
L. Robert Cotton, Graphics/Production
Margaret Dewey, Composition
Leonard Goodman, Graphics
Owen Hart, Graphics
Kathleen Landis, Graphics
Stephanie Leaphart, Typing
Russell Morasch, Graphics
Andrew Searle, Graphics
Elizabeth Taylor, Typing

Louis Berger & Associates, Inc.

A. Brook Crossan, Director, Planning and Environmental Group
Joseph J. Layton, Project Planner
Kenneth J. Hess, Environmental Planner
Richard L. Porter, Senior Historian
Robert Nardi, Transportation Planner
Nancy Neuman, Senior Planner

Bicycle and Pedestrian Transportation Research Center

Ralph B. Hirsch, Executive Director

Data and recommendations presented in the plan have been mapped by the Consultant Team for the New Jersey Department of Environmental Protection, Division of Coastal Resources, by category on a series of aerial photographs and/or base maps of the study area at a scale of 1" = 400'.