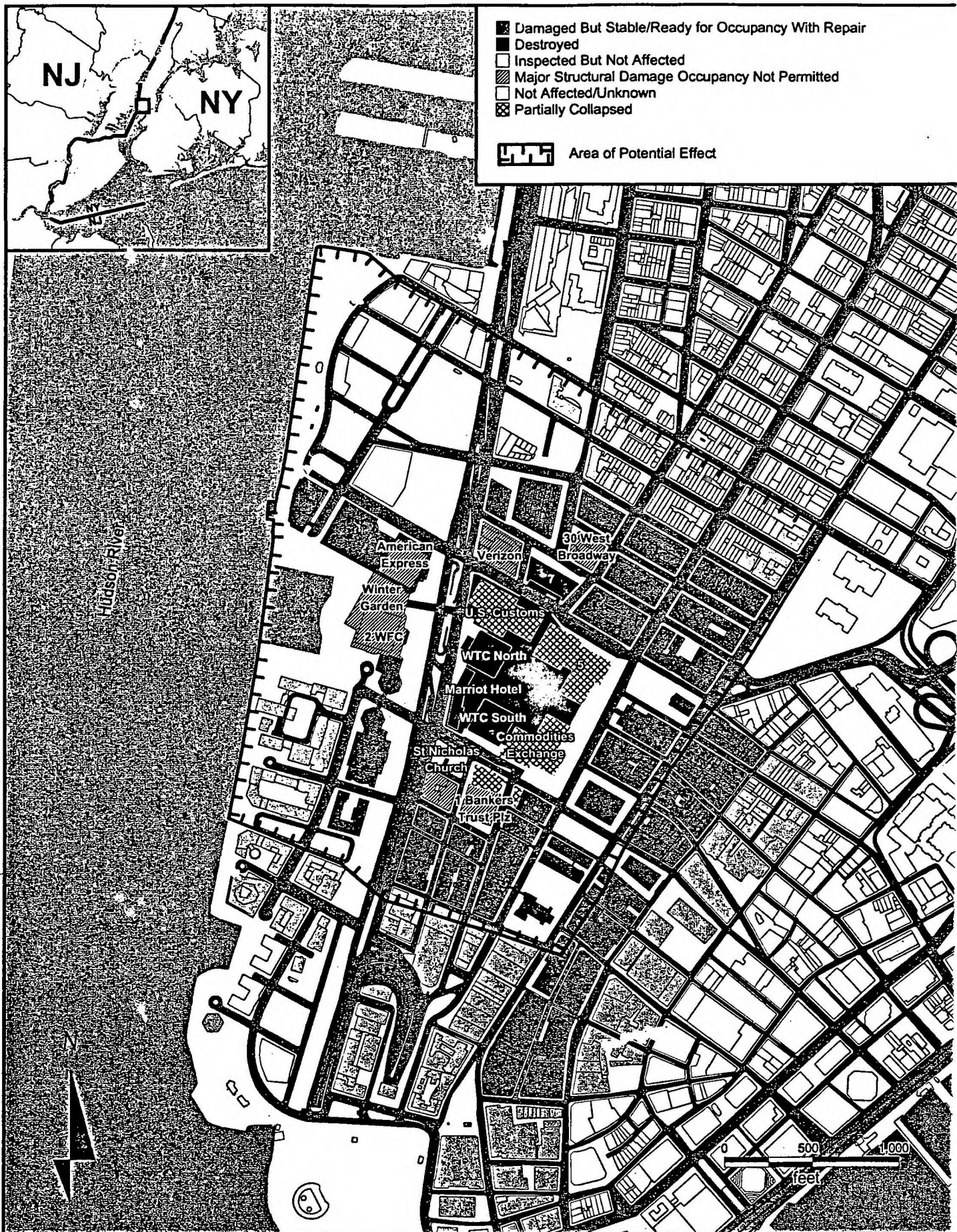
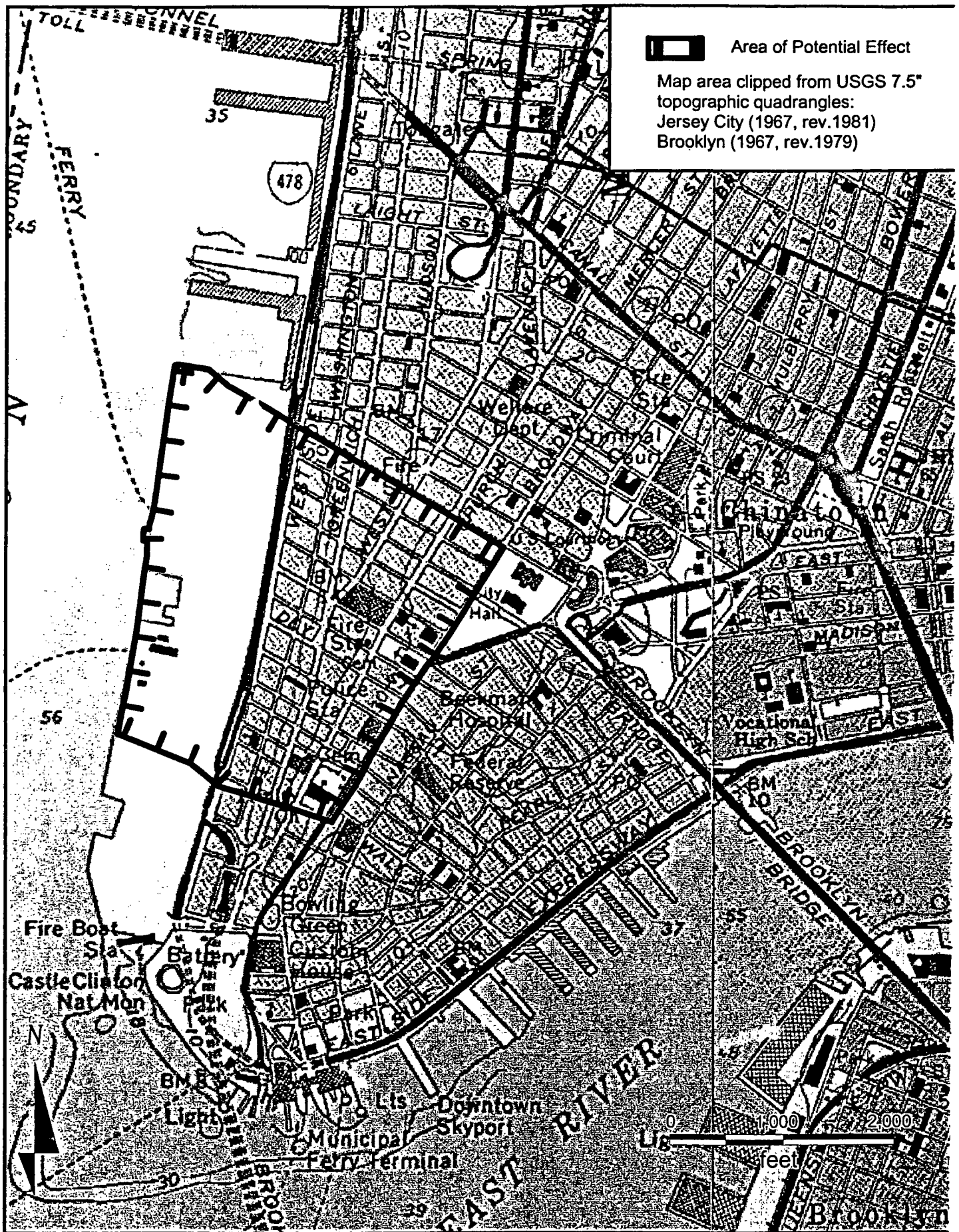




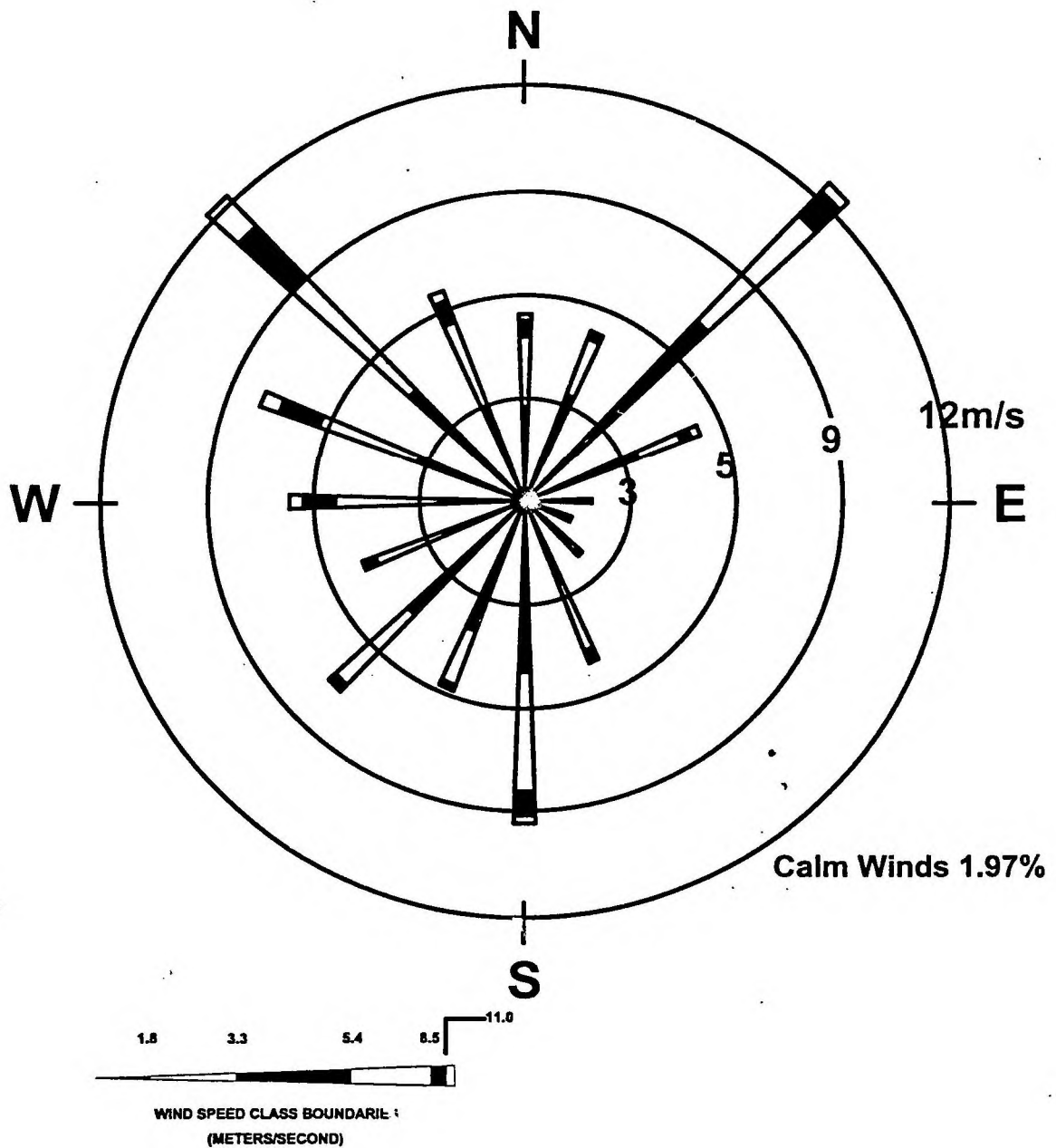
Building Status as of September 21, 2001

Figure 3-1



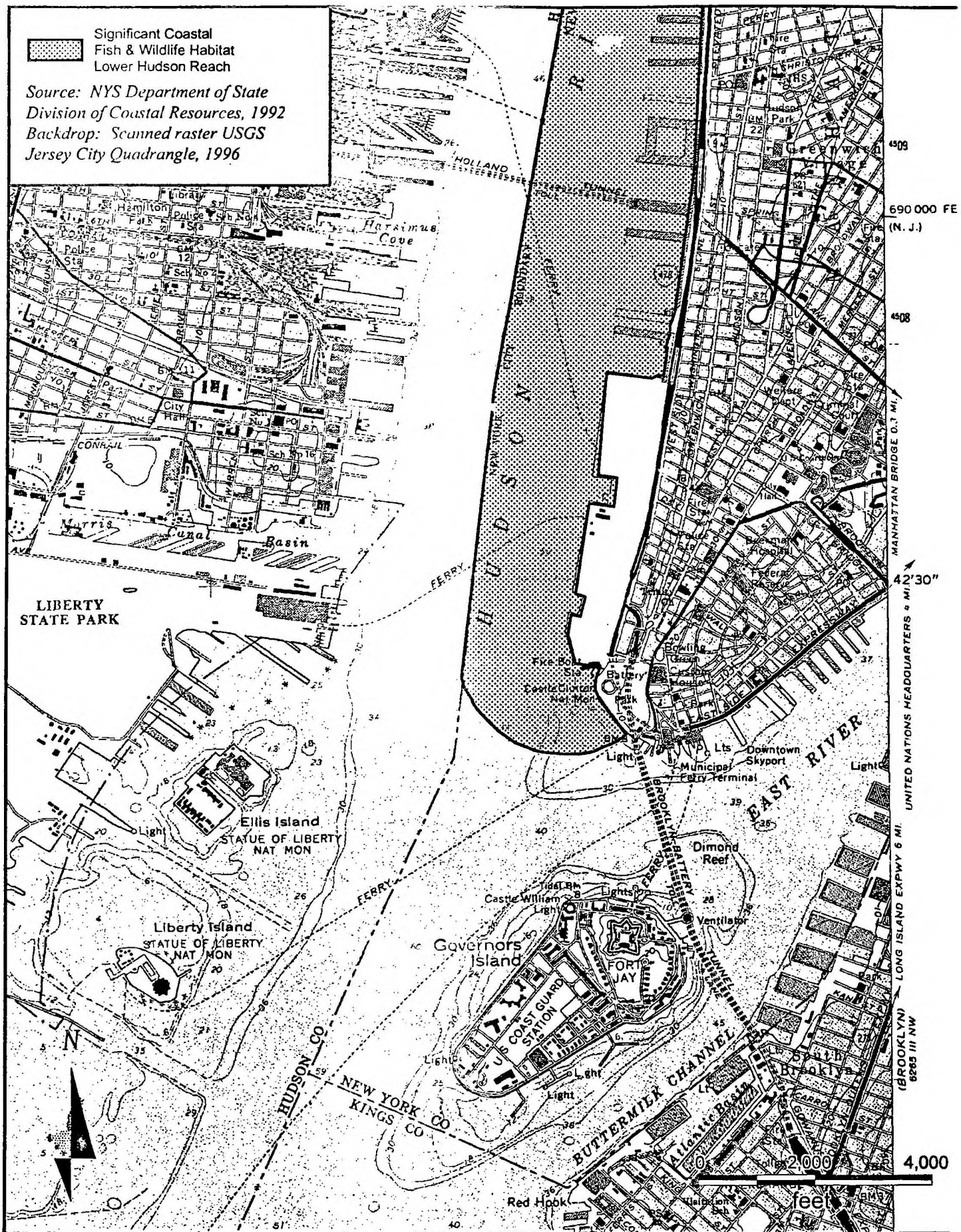
Lower Manhattan Topography

Figure 3-2



Windrose Station, LaGuardia Airport
Period of Record: 1991-95

Figure 3-3



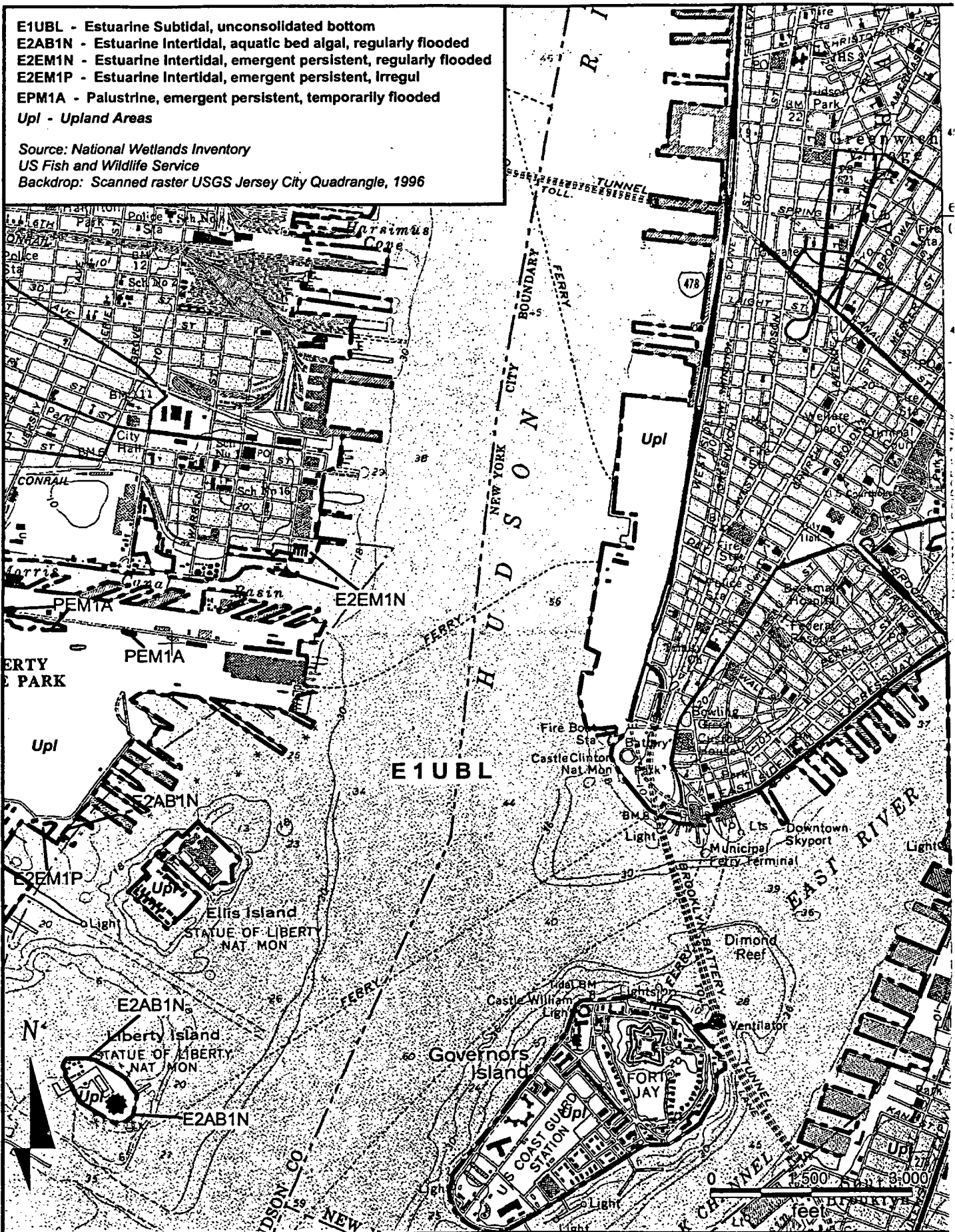
Significant Coastal Habitats

Figure 3-4



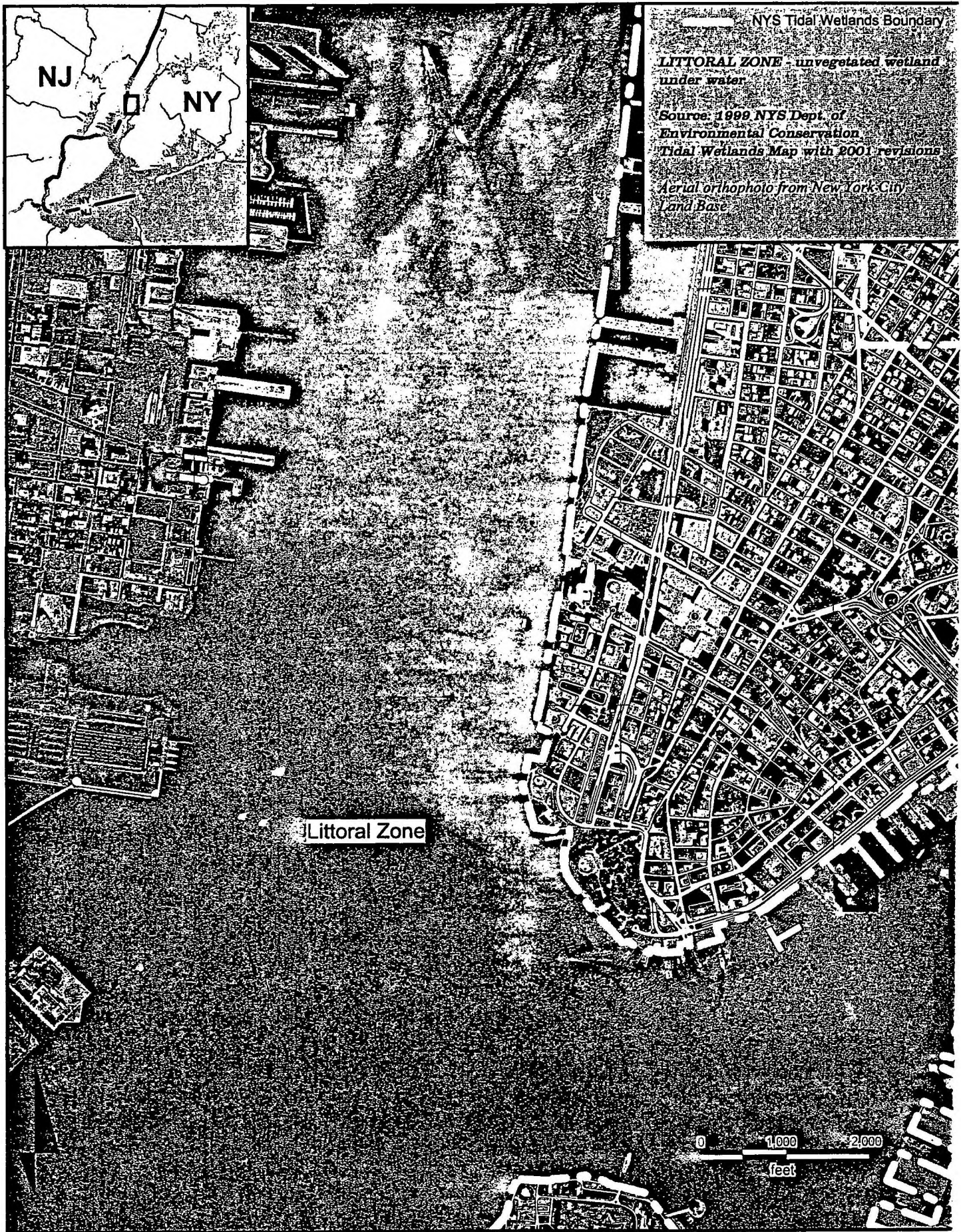
100-Year and 500-Year Floodplains

Figure 3-5



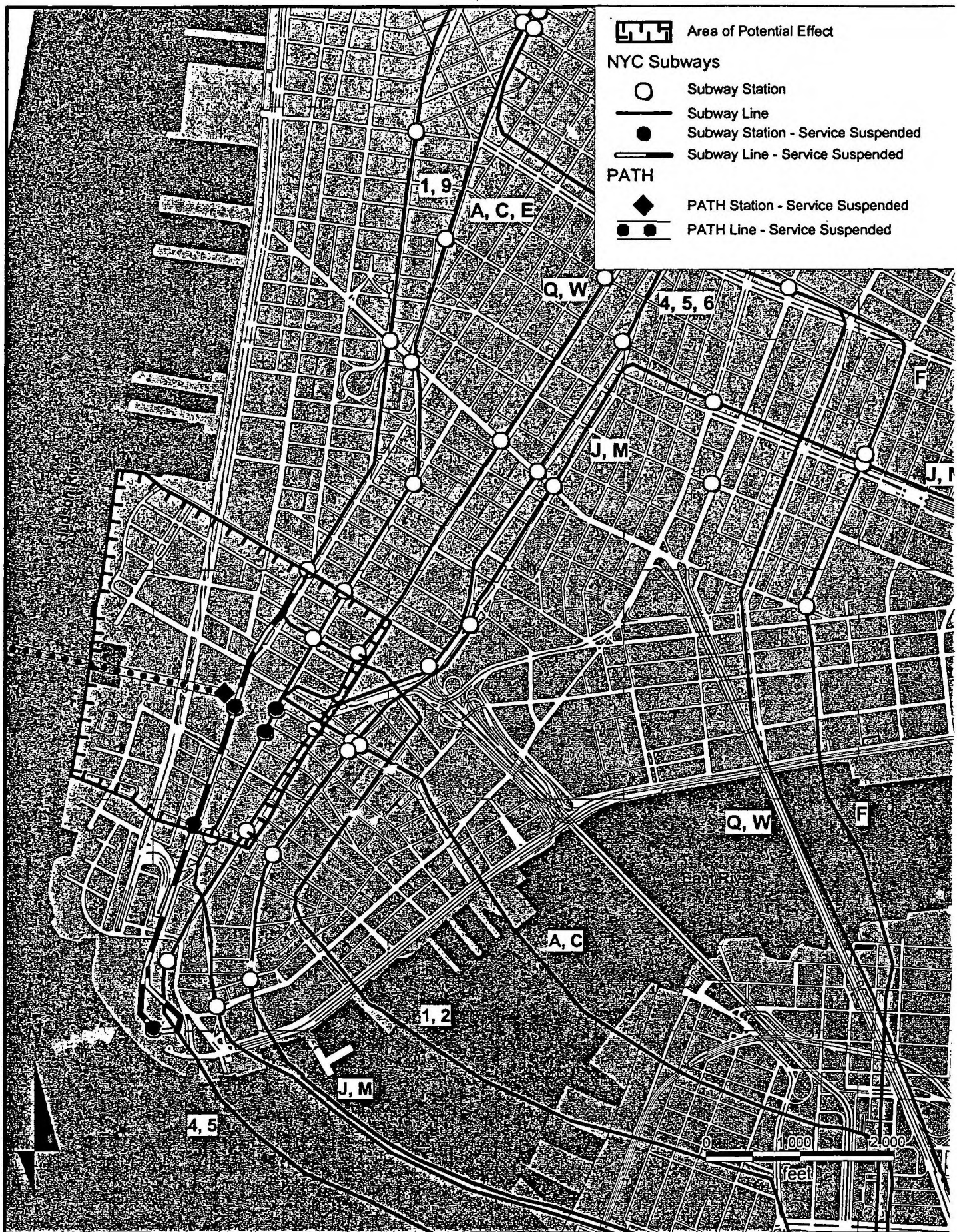
**National Wetlands Inventory Map
 Lower Hudson Reach**

Figure 3-6



New York State Tidal Wetlands Map

Figure 3-7



Mass Transportation

Figure 3-8

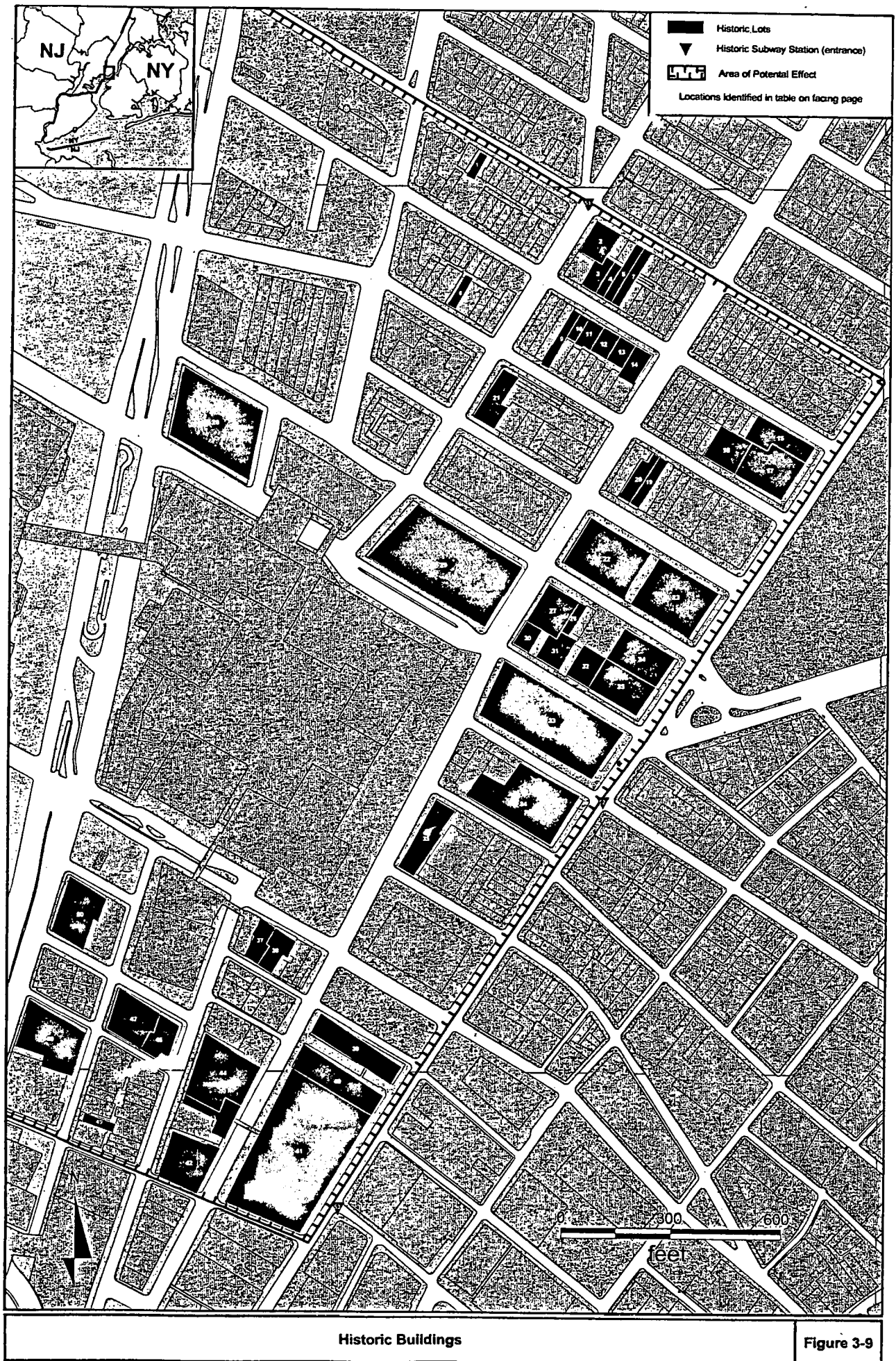


Figure 3-9 LEGEND***Historic Buildings in Impacted Area***

- | | | | |
|-----|--|-----|--|
| 1. | 160 Chambers Street (former Engine Co. 29 Firehouse) | 30. | 30 Vesey Street |
| 2. | 128 Chambers Street | 31. | 20 Vesey Street (old NY Evening Post Building) |
| 3. | 56 Warren Street | 32. | 14 Vesey Street (New York County Lawyers' Association) |
| 4. | 54 Warren Street | 33. | 209 Broadway (St. Paul's Chapel) |
| 5. | 52 Warren Street | 34. | 195 Broadway (former American Telephone & Telegraph Building) |
| 7. | 50 Warren Street | 35. | 26 Cortlandt Street (former East River Savings Bank) |
| 8. | 75 Murray Street (former Hopkins Store) | 37. | 125 Cedar Street (Beard Building) |
| 9. | 55 Warren Street | 38. | 114 Liberty Street |
| 10. | 53 Warren Street | 39. | 115 Broadway (United States Realty Building) |
| 11. | 49 & 51 Warren Street | 40. | 111 Broadway (Trinity Building) |
| 12. | 45-47 Warren Street | 41. | 75 Broadway (Trinity Church & Graveyard) |
| 13. | 41 Warren Street | 42. | 2 Rector Street (former Electric Bond & Share Company Building) |
| 14. | 136 Church Street | 43. | 74 Trinity Place |
| 15. | 11 Warren Street | 44. | 86 Trinity Place (American Stock Exchange) |
| 17. | 256 Broadway (Home Life Insurance Company Building) | 45. | 120 Greenwich Street |
| 18. | 9-15 Murray Street | 47. | 123 Washington Street (Deutsche Bank) |
| 19. | 23 Park Place | 48. | 110 Washington Street (New York Evening Post Building) |
| 20. | 25 Park Place | 49. | 103 Washington Street (former St. George's Syrian Roman Catholic Church) |
| 21. | 53 Park Place (former Dodge Building) | 50. | 90 West Street (West Street Building) |
| 22. | 99 Church Street | 51. | Chambers Street Subway Station |
| 23. | 233 Broadway (Woolworth Building) | 52. | Fulton Street Subway Station |
| 24. | 225 Broadway (Transportation Building) | 53. | Wall Street Subway Station |
| 25. | 217 Broadway (Astor Building) | | |
| 26. | 16 Barclay Street (former St. Peter's School) | | |
| 27. | 22 Barclay Street (St. Peter's Roman Catholic Church) | | |
| 28. | 140 West Street (Barclay-Vesey Building) | | |
| 29. | 90 Church Street (U.S. Post Office & Federal Office Building / Church St. Station) | | |



Lower Manhattan Land Use

Figure 3-11

bluefish, and other species. Commercial fishery for striped bass has been closed altogether for striped bass due to PCB contamination. Shellfish for direct consumption is prohibited in the Harbor. Water quality in the Lower Hudson River has improved since the construction of the North River Water Pollution Control Plant.

Environmental Impacts

No surface water bodies are located at the proposed project sites. Under the Clean Water Act, the U.S. EPA has delegated to NYSDEC regulation of discharges into surface water bodies. Prior to a discharge of wastewater (industrial waste, sanitary wastewater, or stormwater), a State Pollutant Discharge Elimination System (SPDES) permit must be obtained from the NYSDEC. Development will not increase the amount of impervious surfaces; however, a stormwater pollution prevention plan must be prepared to obtain the SPDES permit. The pollution prevention plan describes the stormwater collection system, the volume of stormwater, the rate of discharge, and the measures that are implemented to prevent pollutants from contaminating stormwater. In New York City, sanitary wastewater is mainly discharged into the municipal sewer system, which is operated by the New York City Department of Environmental Protection (NYCDEP). The NYCDEP has SPDES permits for its discharges and limits the materials that can be disposed of in the New York City sewer system. When stormwater is discharged into the combined sewers, NYCDEP permit conditions help regulate the volume and rate of stormwater discharge, the type, and the concentrations of pollutants.

Separate SPDES permits are also required for projects that disturb more than 5 acres of land at one time during construction. These construction-related SPDES permits address the issues associated with construction such as those related to dredging and filling, dewatering, and discharge, as well as stormwater and erosion control planning.

During the construction period and after the proposed structures, utilities, subways, roadways, bridges and walkways have been repaired, replaced, or restored, stormwater runoff from impervious surfaces such as buildings, parking lots, and sidewalks could occur. However, it is not anticipated that post-disaster stormwater runoff would be significantly different from pre-disaster conditions. Since stormwater would be managed in accordance with all federal, state, and NPDES regulations using specially designed stormwater drainage systems and detention basins, no significant impacts are anticipated. During construction and operation of the proposed facilities, no untreated wastewater would be discharged directly to surface water or groundwater. All sanitary wastewater would be discharged under appropriate permits. Dredging of sediment around piers may be necessary to facilitate equipment and materials transport although this dredging would be performed under permit conditions. For this reason, no significant impacts are expected.

3.1.3.1 FLOODPLAINS AND FLOODPLAIN MANAGEMENT EO 11988

The President's Executive Order 11988 on Floodplain Management typically requires that all Federal actions in or affecting the base floodplain be reviewed for opportunities to

relocate out of the floodplain or to minimize future damage from flooding. Because WTC impact area is low-lying in the vicinity of the Hudson River, flooding risks are associated with rainfall and storm surge from northeasters and hurricanes. The location map of the 100-year and 500-year floodplains is provided as *Figure 3-5*.

Regulated floodplain areas have been defined by FEMA and include areas that flood during storms that have a one percent chance of occurring in any given year, which is equivalent to a likelihood of occurring once every 100 years (100-year storm event). FEMA also maps the 500-year floodplains, but these are not regulated. Federal regulations require an analysis of impacts and options to avoid 100-year floodplain encroachment. FEMA has the responsibility for mapping and regulating floodplain areas. Federal regulations stipulate that in the case of a "significant encroachment" on the floodplain by a proposed project, a finding of an "only practicable alternative" is required. While a project is permitted to encroach on the 100-year floodplain, this encroachment may not be significant. In addition to federal requirements, NYSDEC Environmental Conservation Law regulations (6 NYCRR Part 502) require state agencies contemplating projects in the floodplain to consider the effect of these actions individually as well as cumulatively with other projects in the vicinity. In all cases, habitable structures must be flood-proofed or raised above the 100-year floodplain.

The WTC site is mapped on the Flood Insurance Rate Map (FIRM) panel number, 54 of 131, Community Panel Number 360497 0054B, effective date November 16, 1983. According to the FIRM, the western-most edge of the complex along West Street is located in the 100-year floodplain, specifically special flood hazard area, Zone A5, having a base flood elevation of 10 feet (*Figure 3-5*).

The FEMA is currently evaluating potential projects in order to comply with Executive Order 11988 *Floodplain Management* under the requirements of 44 CFR Part 9. The Executive Order and presence of a floodplain will not prevent restoration or redevelopment of the site. As with other types of facilities where FEMA has determined that there are no alternatives to reconstruction within the floodplain, FEMA intends to provide assistance for the construction, reconstruction, restoration and improvements in and around the World Trade Center disaster site, but may require upgrades to prevent the potential of flooding. Increased costs of restoration and repair projects associated with upgrades required by code are generally eligible for reimbursement.

Projects and facilities that fall within the mapped 100-year floodplain may include:

- Restoration of damaged and destroyed transportation infrastructure, including streets and subway systems
- Restoration of damaged and destroyed water control facilities, pipes and distribution systems
- Restoration of damaged and destroyed public buildings and related equipment

- Restoration of damaged and destroyed utilities, including sanitary and storm sewers, electrical power and natural gas distribution systems, and telephone lines

The existence of a delineated floodplain at the WTC site does not impact emergency measures or debris removal operations and will not prevent reimbursement of funds expended under these operations. Future development and construction within the delineated flood hazard area will require compliance with Federal, State and local regulations, which includes Executive Order 11988, *Floodplain Management*, Executive Order 11990, *Protection of Wetlands*, as well as other related environmental issues.

Environmental Impacts

New buildings and facilities would be constructed in compliance with the *Building Code of the City of New York*, Local Law No. 76, dated December 6, 1968 (amended June 1 1993). Portions of the *Code* address flood damage protection. The restoration and redevelopment of the WTC area would not be a significant new encroachment and would not result in increases of flood levels in the surrounding areas. The design of all proposed facilities would meet the applicable floodplain management criteria for state projects in flood hazard areas in accordance with 6 NYCRR Part 502. Since this is the case, no significant direct impacts to floodplains are anticipated.

3.1.3.2 WETLANDS AND WETLAND PROTECTION EO 11990

In general terms, wetlands are lands that are at least periodically saturated with or covered by water. They are transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. There are two fundamental wetland types: tidal and freshwater. Freshwater wetlands have no saline inputs, whereas tidal wetlands are regularly submerged by a salt-water body.

Wetlands in New York State are regulated both by the U.S. Army Corps of Engineers (USACE) and the New York State Department of Environmental Conservation (DEC). The USACE regulates wetlands pursuant to Section 404 of the Clean Water Act of 1977 (33 CFR Part 230) and Section 10 of the Rivers and Harbors Act of 1899 (*Figure 3-6*). The New York State DEC regulates freshwater wetlands that are 12.4 acres or larger, or, if freshwater wetlands have unusual local importance, under their permit authority described by the Freshwater Wetlands Act of 1975 (6 New York Codes, Rules, and Regulations [NYCRR] Part 663). NYSDEC also regulates a protective buffer zone around the freshwater wetland, called the adjacent area. The regulated adjacent area is 100 feet from the wetland boundary. State freshwater wetlands are depicted on U.S. Geological Survey (USGS) quadrangle base maps. Tidal wetlands are regulated in New York under the state's Tidal Wetlands Act of 1977 (6 NYCRR Part 661). In addition to tidal wetland resources, within the NYC limits, NYSDEC regulates a protective adjacent area, which extends 150 feet from the regulated wetland boundary. As defined by 6 NYCRR Part 661.4(b)(1)(ii), if there is functional and substantial fabricated structure that

lies generally parallel to the landward-most tidal wetland boundary and that is a minimum of 100 feet in length, the seaward edge of this structure may represent the limit of the regulated wetlands and adjacent area. State jurisdictional tidal wetlands are published on aerial photographs (*Figure 3-7*).

Activities within the wetlands and buffer zones cannot be undertaken without a permit from the USACE or the NYSDEC, as appropriate. In general, permission to disturb, fill or otherwise remove a wetland itself can only be granted if there is no feasible alternative to avoid such action and if appropriate mitigation, such as replacement wetlands in another location, can be established. Activities in the wetland buffer areas are limited to those types of development that would not change natural drainage systems or require the removal of vegetative cover.

Landward of the Hudson River along the lower Manhattan shoreline there is no state or federal jurisdictional wetlands. Virtually no substrate required for the rooting of shoreline aquatic vegetation exists. The Hudson River is labeled as littoral zone on the NYS Tidal Wetland Maps and as estuarine subtidal open water on the National Wetland Inventory (NWI) maps (*Figure 3-7*). This designation generally applies to deep-water areas in coastal estuaries. Upland zones are mapped further inland on both maps. Historic and recent construction activity, including extensive dredged material disposal to extend developable land area for commercial, residential and public use, has dramatically altered the location of the Lower Manhattan Hudson River shoreline, its contours and elevations. The shore is entirely lined with bulkhead, rip-rap and pier structures. A review of aerial photographs (April 8, 1994), maps including the National Wetland Inventory (NWI), NYS Tidal Wetland Maps, and USGS topographic quadrangle (Jersey City NJ, NY), and NOAA navigational charts confirm these shoreline characteristics.

Environmental Impacts

No significant, direct impacts to wetland resources are expected as result of the proposed projects or alternatives.

3.1.3.3 GROUNDWATER

The drinking water source for New York City is upstate surface water from the Catskill, Delaware, and Croton watershed systems. Groundwater is not used as a source of drinking water supply in the vicinity of the WTC or lower Manhattan area since tests have shown that it is not suitable for use as drinking water. Since surface water is not the drinking water source in the area, water wells are not present in the project area. Shallow groundwater at the WTC site is encountered between 5 to 15 feet below land surface based on available boring logs (NYCDDC 2001). The shallow groundwater of Manhattan has not been given a water quality classification. In New York State, all groundwater not otherwise classified is considered to be Class GA (drinking water). Since groundwater has not been classified in Manhattan, it is default classified as Class GA (drinking water), even though it is not potable. Groundwater is not a potable water source in lower Manhattan.

There is an underground retaining wall beneath the WTC site that was constructed in the 1960s to prevent the flooding from the Hudson River and shallow groundwater. As many as 1,100 of the anchors to bedrock, known as tiebacks, will eventually be connected to the retaining wall as support structures. The retaining wall was built to lend stability to the soil around the WTC site and keep groundwater from flooding the area (*The New York Times* 2001a).

Environmental Impacts

Groundwater is not a potable water source and would not be used for drinking water at any proposed facility. Construction of aboveground facilities would not affect or be affected by shallow groundwater. Building support structures, utilities, and subway repair/re-construction involving tunneling activities would require de-watering. Shallow groundwater is impacted by releases that have occurred in the vicinity of the WTC. Extensive subsurface construction and tunneling would be relatively deep and groundwater removal (dewatering) during excavation and construction would be necessary. Dewatering activities may result in generation of groundwater with minor amounts of contamination. The groundwater generated during dewatering would need to be sampled and tested prior to disposal to the stormwater system or to an approved facility that can accept the waste as characterized. Handling of shallow groundwater during dewatering would need to conform to standards established for health, safety, and environmental protection. The presence of possibly contaminated shallow groundwater would result in the need for remediation or the development of dewatering specifications and permitting to address this concern. Construction methods and techniques would be implemented by the responsible party, as appropriate, to avoid shallow groundwater impact. Tunneling and other excavation may require the use of a watertight slurry wall to surround the excavation area or the use of pressurized tunnel boring machines to pass beneath city streets. If long-term groundwater removal in this area occurs, a change in the groundwater flow direction may occur; however, this is deemed an insignificant effect. After construction, no significant impact to groundwater resources would occur.

3.2 BIOLOGICAL RESOURCES

3.2.1 FLORA

Because the lower Manhattan area has been developed for intensive urban land use no natural vegetative cover remains. Existing vegetative cover consists of ornamental species used for landscaping in and around the buildings, and along park esplanades on the Hudson River edge. A mix of herbaceous, shrub and tree vegetation was used for landscaping as planned by the Battery Park City Authority.

3.2.2 FAUNA

The re-development and repair of existing facilities and infrastructure within the urban landscape of lower Manhattan makes resource use by wildlife difficult. Those species

that have persisted in contact with the dense human environment would temporarily avoid the area of proposed construction.

Terrestrial wildlife species in lower Manhattan are limited mainly to squirrels, domestic and feral mammals, and many residential, transient and migratory bird species. Domestic species include dogs, cats and other pets such as occasional parrots, parakeets, and ferrets. Vermin that are targets for pest control include the house mouse, Norway rat and black rat. The Hudson River supports many fish species, including over-wintering striped bass, and micro- and macro invertebrates. With improvements in water quality, several marine borers have become pest species including crustaceans (e.g. *Limnoria tripunctata*) and mullusks (e.g. shipworm *Teredo navalis*). These species consume unprotected timber pilings in New York Harbor.

Residential and migratory bird species were regularly observed in and around the World Trade Center site including Battery Park and Governors Island. Aerial and ground surveys of the Lower Reach of the Hudson River have included observations of wintering waterfowl including Canvasback ducks (*Aythya americana*), Lesser Scaup (*Aythya affinis*), Red-breasted Mergansers (*Mergus serrator*), Hooded Mergansers (*Lophodytes cucullatus*), Mallards (*Anas platyrhynchos*), and Canada Geese (*Brantus canadensis*) (Governors Island FEIS). Brant were observed foraging on the lawns northwest of the World Trade Center complex last spring with Gadwalls (*Anas strepera*) and Ring-necked Ducks (*Aythya collaris*) seen offshore in the Hudson River (R. Creshkoff, personal communication).

Manhattan is located along the Atlantic flyway and migratory birds arrive every spring and fall to rest or feed as they make their way to northern breeding grounds or to southern over wintering grounds. Bird species of the Atlantic flyway, including various types of wrens, warblers, thrushes and vireos, come through New York City during the spring and fall migratory seasons. Almost 100 bird species have been sited in parks near the WTC site. When flying at night, the lighted and reflective skyscrapers of Manhattan can disorient migrating birds. Since 1997 New York City Audubon Society volunteers have been monitoring the number of migratory birds that strike windows of downtown skyscrapers. Approximately 85 species are known to have collided with the buildings of the World Trade Center complex. To alleviate the situation, the Port Authority of New York and New Jersey had netting placed over several windows at the World Trade Center. Success in reducing collisions led to increased netting coverage starting in May 2001. Managers of the World Financial Center reduced morning lighting in key locations, as well.

The Lower Hudson Reach of the Hudson River provides habitat for a diverse community of regionally significant fish populations and benthic invertebrates. The World Trade Center site is near the mouth of the Hudson River where anadromous fish species transition from saline to brackish waters as they migrate from the sea to fresh water for spawning. The entire lower portion of the Hudson River estuary forms important habitat during parts of the life cycle of striped bass providing a sheltered environment with abundant food sources. Large numbers of young-of-year, yearling, and older striped bass

(*Morone saxatilis*) winter in the Hudson River from mid-November to mid-April. Other common fish species occurring in the River's lower reach include yearling winter flounder (*Pseudopleuronectes americanus*) (December to April), summer flounder (*Paralichthys dentatus*), white perch (*Morone americanus*), Atlantic tomcod (*Microgadus tomcod*), Atlantic silverside (*Menidia menidia*), Bluefish (*Pomatomus saltatrix*), hogchokers (*Trinectes maculatus*), and American eel (*Anguilla rostrata*) (Hart and Milliken, 1992). Benthic invertebrate communities of New York Harbor include polychaetes, oligochaetes, nematodes, amphipods, mussels and barnacles. According to surveys by EEA (1991), species diversity is highest in the spring season. Higher water temperatures accompanied by hypoxic conditions (low dissolved oxygen levels) are probably responsible for lower diversity found by late summer. Generally under pier areas had greater species abundance and diversity than nearby substrates. Zones within the pier consist of soft mud and provide limited habitat.

Environmental Impacts

The proposed action would potentially require removal of areas of vegetation and landscaping associated with buildings and facilities that would be repaired or reconstructed. The proposed alternatives would result in the replacement, re-development, or repair/retrofit of existing buildings, subways, and area infrastructure. Existing buildings would be designed consistent with current land use and would incorporate new vegetation as part of the landscaping plan. No significant impact to flora would be anticipated.

As in the past, in cooperation with the Port Authority of New York and New Jersey, replacement buildings in the vicinity of the WTC would likely incorporate design elements to prevent or control impact to protected species and migratory birds related to collisions with windows or building projections. Any wildlife present in the vicinity of the WTC would be temporarily disrupted by construction activity and, depending on the size or duration of the proposed project, surface water resources may be indirectly impacted by runoff. Measures will likely be taken to minimize impact to on wildlife and surface water bodies, to maintain the water quality of the Lower Hudson Reach. Because of the urban nature of the WTC and the likelihood that land use will not change relative to pre-disaster conditions, no significant impacts to wildlife would be anticipated for any of the project alternatives.

3.2.3 THREATENED AND ENDANGERED SPECIES

Federal and state-listed threatened and the following statutes regulate endangered species and aquatic organisms:

- Endangered Species Act
- Fish and Wildlife Coordination Act
- New York State Environmental Conservation Law, Article 24, Freshwater Wetlands

- Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Designation for New York Harbor

Listed threatened and endangered species that can be found in the vicinity include the Shortnose sturgeon (*Acipenser brevirostrum*). The Peregrine falcon (*Falco peregrinus*) is a species of concern but is no longer a listed threatened and endangered species (USFWS personal communication).

Environmental Impacts

It is unlikely that repair, renovation, or replacement of existing facilities, subway lines and stations, roadways, underground utilities, bridges, pedestrian walkways, or green space would adversely affect proposed or listed threatened and endangered species in the lower Manhattan area. As in the past, replacement buildings would likely incorporate design elements to prevent or control impact to protected species. No significant direct impacts to any federally listed threatened or endangered species would be anticipated during the construction of the project alternatives. If federally listed or proposed threatened and endangered species have the potential to be impacted, FEMA would initiate consultation with the USFWS. Potential impacts to federally listed or proposed threatened and endangered species would be evaluated and documented in an SEA.

3.2.4 CRITICAL HABITAT

The Hudson River has been designated as significant habitat by state and federal agencies, for example:

- NYSDEC: Significant Fish and Wildlife Habitat
- NYSDOS: Significant Coastal Fish and Wildlife Habitat, Lower Hudson Reach
- EPA, NYC Dept of Parks and Recreation: Estuary of National Significance, Habitat Estuary Program

As stated in the July 1992 description of the Significant Coastal Fish and Wildlife Habitats Program, New York State Department of State has designated the Lower Hudson Reach extending from Battery Park northward to Yonkers, as significant fish and wildlife habitat. The eastern habitat boundary is the developed shoreline along Manhattan, Bronx, and Yonkers. The Lower Hudson Reach includes the waters along the boroughs including deepwater, shallows, piers, and interpier basins. The western habitat boundary is determined to be located in the middle of the River along the NY-NJ state line.

As a highly productive estuary, and one of the few major tidal rivers on the North Atlantic coast of the United States, the Hudson River was designated an *Estuary of National Significance* in 1988 by the U.S. EPA. With the New York-New Jersey Harbor Estuary approved as part of the National Estuary Program, the two states have been working on implementing an estuary plan (www.harborestuary.org).

Environmental Impacts

Measures would be taken to minimize impact to on wildlife and surface water bodies, to maintain the water quality of the Lower Hudson Reach. As a result, no significant direct impacts to critical habitat would be anticipated during the construction or operation of the project alternatives.

3.3 TRANSPORTATION AND TRAFFIC

Lower Manhattan has an extensive transit network, including 15 subway lines and 21 subway stations (*Figure 3-8*). Twelve routes serve the segment between Lower Manhattan and Midtown. Nine of these routes serve the segment between Lower Manhattan and Brooklyn. Four routes (1, 6, 9 and E) terminate in Lower Manhattan. Lower Manhattan is only indirectly served by commuter rail service. Commuter rail passengers arriving at Penn Station or Grand Central Terminal in midtown Manhattan, Jamaica Station in Queens, or Flatbush Avenue Terminal in downtown Brooklyn, must transfer to the subway in order to reach final destinations.

Lower Manhattan is served by 11 local and express bus routes, private express buses from the outer boroughs, and privately funded jitney service. The New York DOT operates a high-volume passenger and vehicle ferry service from Staten Island to a terminal at South Ferry. The Port Authority of New York and New Jersey maintains a ferry terminal at the World Financial Center and the New York DOT maintains a ferry terminal at Pier 11 on the East River. Both of these terminals are maintained for the provision of ferry services to Lower Manhattan from Brooklyn and New Jersey by private operations. The World Trade Center was provided service by the following transportation resources:

Table 3-3

Summary of Transportation Methods, Routes, Locations in the Vicinity of the WTC Disaster Area			
Subways/Trains	Bus Stops	Shuttles	Ferries
PATH to New Jersey	M9	Free Downtown Alliance Shuttle to South Seaport and Historic Battery Park	South Ferry
A	South end at Albany Street	Belvedere and North End Avenue	Staten Island Ferry
C	West End at One Financial Center	West and Murray Street	World Financial Center Terminal
E line station at WTC closed		Marriott World Trade Center	Brooklyn Army Terminal to the Whitehall Ferry Terminal

Table 3-3 (continued)

Summary of Transportation Methods, Routes, Locations in the Vicinity of the WTC Disaster Area			
Subways/Trains	Bus Stops	Shuttles	Ferries
N / R line between Canal and Whitehall Streets	M10	Marriott World Financial Center	
1 / 9 lines (Chambers and South Ferry) closed	West Street at Three World Financial Center	Liberty State Park	
2 / 3	South End Avenue and Albany Street	South Street Seaport	
	West Street at One Financial Center		
Rector Street	South End at West Thames Street		
1 / 9 at Greenwich Street (closed)			
N / R at Trinity Place (closed)	M22		
	Vesey Street and Three World Financial Center		
Battery Place	North End Avenue and Massey Street		
4 / 5 (closed)			

The fires and explosions at the WTC complex resulted in the loss or realignment of transportation services and facilities that fall under the jurisdiction of multiple local, state and federal agencies. Extraordinary modifications have been made to the operation of metropolitan New York transportation system for safety and security reasons. Many facilities remain closed. Some have restricted access, such as the restriction on single occupancy vehicle in Midtown and lower Manhattan on weekday mornings. Truck access to many areas is severely restricted. Access to Manhattan south of Canal Street by all vehicles is also severely limited. Emergency ferry service between Brooklyn and Manhattan and between New Jersey and Manhattan has been added, using vessels previously deployed in other regions. Most of these emergency transportation actions affect the amount of air pollution emissions, which may be classified as "non-exempt" projects and normally could not be implemented with a new conformity determination. In the near future, additional security measures are likely to be imposed that will continue to affect the operation of the transportation system throughout the New York metropolitan area. Many of the security measures may affect air quality and would normally be subject to conformity reviews prior to implementation.

Figure 3-8 illustrates subway service and closures as of October 5, 2001. Identified stakeholder agencies include, but are not limited to, the following:

- New York City DOT
- New York State DOT
- New York State MTA
- Port Authority of New York and New Jersey
- New Jersey Transit
- New Jersey DOT
- Battery Park City Authority
- Federal Highway Administration

Short-term activities related to emergency response and recovery efforts have severely affected transportation resources in Lower Manhattan. The fires and explosions at the WTC have generated 1.6 million tons of debris, requiring the closure of streets and debris removal operations. The WTC impact area is defined by Chambers Street on the north, Broadway on the east, Rector Street on the south and the Hudson River on the west (*Figure 1-3*).

Although not the subject of this PEA, debris removal experts have determined that the removal of approximately 1.6 million cubic yards of debris from the site will take approximately 10 months. During this time period, it is expected that much of the area will remain cordoned off for both safety and security reasons, requiring traffic to be re-routed to adjacent streets. The immediate perimeter area around the WTC has been reduced, as possible, to facilitate better traffic flow.

Interim recovery plans will need to assess the effects of the WTC disaster on regional and local transportation systems, services, facilities and demand. Initial estimates of the impact of the WTC disaster were developed by the NYCDOT and are based on annual average daily traffic (AADT) counts at major intersections. Traffic recorders were set up at 54 different intersections and pre- and post-disaster AADT data were compiled. In general, traffic patterns have changed significantly as a result of the WTC disaster. Appendix B provides the AADT data for pre- and post-disaster at 54 intersections throughout New York City (NYCDOT 2001).

Environmental Impacts

Long-range plans to restore facilities and services will require coordination with the City of New York, the State of New York and the State of New Jersey and will result in regional planning for the overall reconstruction process and potential changes in demographics and demand on roads, bridges and tunnels (for private, commercial and bus traffic); subway systems; ferry service, commuter railroads, and pedestrian conditions. The FEMA "white paper" titled *Transportation Facilities, Services and Travel Patterns of Lower Manhattan Pre/Post September 11, 2001* is incorporated by reference and describes transportation-related impacts associated with recovery actions.

Implementation of any of the action alternatives is not expected to increase the pre-disaster number of vehicles or traffic demand along area streets, roadways, and highways in Lower Manhattan. The implementation of any of the proposed action alternatives is not expected to result in significant impacts to area roadways. Temporary detours would occur with the construction of underground utilities, repair or renovation of existing buildings, construction of replacement buildings, repair and/or replacement of subway systems, and repair, replacement or construction of pedestrian walkways, parks, open public spaces or restoration of landscaping. It is likely that the traffic management plans implemented during the disaster recovery period will form the basis of future traffic management planning. Some measure of vehicular access would be provided by standard traffic control practices that will likely be implemented in stages or phases depending on the planned construction activities. Construction and water quality BMPs would be implemented as appropriate to mitigate impacts. Alternative routes would likely be available during the rebuilding period, although there may be delays and an impact to emergency response services.

Potential impacts to local traffic may occur during construction, although the majority of traffic constraints are related to the on-going debris removal actions at the WTC since September 11, 2001. Potential mitigation for construction-related traffic and transportation issues are as follows:

- Adequate on-site parking or transport areas for construction employees
- Use of rail and waterways for delivery of heavy and oversize equipment
- Avoidance of peak commuting hours for deliveries of heavy and oversize materials by roadways and streets.
- Avoidance of residential and school areas for delivery routes
- Phasing of the construction over an extended period.

3.4 NOISE

Noise, defined as unwanted or unwelcome sound, is Federally regulated by the Noise Control Act of 1972 (NCA). Sound is a fluctuation in air pressure. Sound pressure levels are measured in units called decibels (dB). The Federal Interagency Committee on Urban Noise developed land use compatibility guidelines for noise in terms of day-night average sound level (DNL) measured in decibels (dB). The A-weighted sound level or "dBA" is used to simulate people's perception of loudness and annoyance and accounts for those frequencies most audible to the human ear. These values of noise are logarithmic; meaning an increase in 10 dBA describes a doubling of sound pressure. The background noise of an office, at 50 dBA, is perceived as being twice as noisy as a library, at 40 dBA. Noise varies with distance from the source. The outdoor drop off rate for moving noise sources, such as trucks or cars, is a decrease of 4.5 dBA for every doubling of distance. For stationary noise sources, such as compressors or jackhammers, the outdoor drop off rate is 6.0 dBA for every doubling of distance between the noise source and receiver. Since the dBA sound pressure level describes instantaneous noise levels and few noises are constant, other ways of describing noise that occurs over extended periods have been developed. Fluctuating sound can be described by assuming that this fluctuating noise

heard over a specific period by assuming it had been a steady, unchanging sound. For this descriptor, called the equivalent sound level, L_{eq} , can be computed. The L_{eq} is the constant sound level that, in a given situation and period, conveys the same sound energy as the actual time-varying sound.

In order to describe the fluctuating noise over a specific period, statistical sound level descriptors are used. The most commonly used statistical noise levels are the L_{10} , L_{90} , and L_{eq} . The L_{10} is defined as the maximum one-hour sound level exceeded 10 percent of the time and is appropriate to describe traffic noise assessments. The L_{90} is defined as the sound level that is exceeded 90 percent of the time and is taken as the background noise level. The L_{eq} is the equivalent steady-state sound level that contains the same acoustic energy as the time-varying sound level during a stated time period. As required by New York City criteria, L_{10} is used to assess the impact caused by project-generated traffic. The equivalent noise level, L_{eq} , is used for stationary source evaluation.

The U.S. EPA's guidelines (and those of many Federal agencies) state that outdoor sound levels in excess of 65dB DNL are "normally unacceptable" for noise-sensitive land uses such as residences, schools, and hospitals. At unacceptable levels, noise can disrupt activities, particularly those associated with noise sensitive receptors, which can include parks, hospitals, residences, schools, museums, and houses of worship, among others. Although sound levels are subjective, Federal and local governments have established noise guidelines and regulations to protect people from adverse effects associated with noise. In general, residential units and other noise-sensitive land uses are "clearly unacceptable" in areas where the noise exposure exceeds 75dB DNL, "normally unacceptable" in areas where noise falls between 65dB to 75dB DNL, and "normally acceptable" in areas where the DNL is 65dB or below.

The City of New York has developed a local ordinance for noise control, a.k.a., the *New York City Noise Code* (DEP Code Title 24), dated March 1998. General provisions include prohibition against unreasonable noise. Construction activities are limited to weekdays between the hours of 7 a.m. and 6 p.m. unless urgent necessity in the interest of public safety exists. Rapid transit railroad, railroads, air compressors, paving breaker are restricted to allowable sound levels. Ambient noise quality zones, criteria and standards for various zoning and land uses have been developed based on the L_{eq} . Subchapter 7 of the *Noise Code, Certificates and Tunneling Permits*, describes requirements for tunneling permits and stipulated standards or requirements for tunneling operations. Noise levels in the study area are consistent with other urban areas. Traffic is a significant source of noise and is particularly heavy during the morning and evening rush hours.

The noise statutes, regulations, and guidance potentially applicable to the WTC redevelopment project include:

- New York City Noise Code—Title 24
- New York State Department of Public Service Noise Guidelines

Environmental Impacts

Implementation of any of the proposed action alternatives at WTC site would result in the construction of buildings, installation of utilities, demolition and repair of existing structures, removal of debris from the collapsed subway system, repair of roadways, and construction of pedestrian walkways and bridges. Collapsed buildings would be demolished and replaced. Short-term impacts on community noise levels during construction/demolition activities would include noise from construction equipment and noise from construction vehicles/delivery vehicles traveling to and from the proposed construction site. Construction-related equipment noise levels generally range from 76 dB for hoist operations and 85 dB for backhoe operations to a maximum of 100 dB for pneumatic hammers. Noise levels related to the proposed construction activities at a given receptor would vary widely, depending on the phase of construction. Some anticipated construction activities would include demolition, street and concrete removal, site clearing, tunneling and excavation, foundation installation, etc. Some increased noise levels would be anticipated to be perceptible to the nearby residential neighborhoods and schools located adjacent to WTC area during the construction period.

To minimize the potential impacts of construction noise to surrounding areas, tunneling, pavement breaking, excavation, demolition, and similar activities would be limited to daylight hours as described by the *New York City Noise Code*, when occasional loud noises are more tolerable. There would be an avoidance of construction and operating noise levels above those required by the *Noise Code* (65 dBA L_{eq} daytime and 55 dBA L_{eq} nighttime). In addition, there would be an avoidance of operating noise levels constituting a significant impact under CEQR (noise level increases greater than 3 dBA). Extended disruption of normal activities is not considered likely because projects would be performed on a staggered schedule since project planning and design for individual projects would not be performed concurrently. Since this is the case, there would be relatively short-term noise exposure periods anticipated to impact any one receiver during the various construction periods. No significant impacts related to construction noise would be anticipated as a result of the implementation of the proposed alternatives. After the construction period, operating noise levels would be consistent with pre-project conditions and would not exceed CEQR significance criteria.

3.5 CULTURAL RESOURCES

Historic Structures. The area impacted by the WTC disaster contains numerous historic and architecturally significant buildings (*Figure 3-9*). The WTC is located in Manhattan's Financial District. The 1970-77 construction of the WTC post-dates the majority of the buildings in lower Manhattan. These range from early religious structures just east of the WTC including Richard Upjohn's Trinity Church and St. Paul's Chapel (the oldest house of worship in Manhattan), to skyscrapers chronicling the development of the building type; historically significant early 20th century commercial office buildings; American financial icons such as the American Stock Exchange and the New York Stock Exchange; and Federal Hall National Memorial where George Washington was inaugurated into office as the first President of the United States.

To the west of the World Trade Center is Battery Park City and the World Financial Center constructed on landfill from the excavation for the WTC. Battery Park City is a collaboratively planned waterfront residential community interspersed with commercial buildings and open spaces along a mile-long esplanade and marina. Portions of the development may eventually be designated historic landmarks, but Battery Park City presently does not meet the minimum age threshold.

Section 101(b)(4) of NEPA established a federal policy of conserving the historic and cultural, as well as the natural, aspects of our national heritage. Regulations implementing NEPA stipulate that federal agencies consider the consequences of their actions on historic and cultural resources (40 CFR Part 1502.16[g]). Numerous other laws, regulations, and executive orders define other requirements for protecting cultural resources, but the primary requirements are those of Section 106 of the National Historic Preservation Act (NHPA). NHPA mandates that as federal projects, or federally funded or approved projects, are planned and implemented, the responsible federal agencies give due consideration to historic properties, which are defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places. Regulations for *Protection of Historic Properties* (36 CFR Part 800) implement NHPA by defining a process for demonstrating such consideration through consultation with State Historic Preservation Officer (SHPO), the federal Advisory Council on Historic Preservation (Council), and other interested organizations and individuals such as American Indian communities.

To be eligible for inclusion in the National Register, properties ordinarily must be at least 50 years old (unless they are exceptionally significant), and must be important in American history, architecture, archaeology, engineering, or culture, at the national, state, or local level. They also must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of the four following criteria:

- Criterion A: be associated with events that have made a significant contribution to the broad patterns of our history
- Criterion B: be associated with the lives of persons significant in our past
- Criterion C: embody the distinctive characteristics of a type, period, or method of construction, that represent the work of a master or possess high artistic values, or that represent a significant distinguishable entity whose components may lack individual distinction
- Criterion D: have yielded, or may be likely to yield, information important in prehistory or history (*National Register of Historic Places*, 36 CFR Part 60.4)

The types of cultural resources within the project area that may be eligible for the National Register include archaeological resources, historical buildings and structures, and potentially, traditional cultural places. The Section 106 process is defined by the regulations for *Protection of Historic Properties* includes the following steps:

- defining, in consultation with the SHPO, the area of potential effect, designing appropriate procedures to inventory and evaluate resources, and identifying potential interested and consulting parties
- inventory and evaluating the National Register eligibility of cultural resources that may be affected by the proposed action
- assessing the potential effect of the proposed action on National Register-eligible properties
- if appropriate, consulting with the SHPO, Council, and other interested parties to determine ways to avoid or reduce the impacts of the proposed action on National Register-eligible properties
- if necessary, proceeding with the proposed action under the terms of a Memorandum of Agreement or Programmatic Agreement

The impact of the WTC disaster on the seven historic buildings directly across the street from the WTC on the north, east and south is summarized below based upon preliminary information provided by New York Department of Buildings (NYDOB) and the New York Department of Design (NYDDC) and in material dated October 21, 2001.

Table 3-4

Summary of Historic Building Status and Condition in the Vicinity of the WTC Disaster Area				
Property Name	Location	Designation(s)*	Description	Condition
Barclay-Vesey Building	140-147 West Street	NRE, ICL	Art Deco skyscraper; one of first to exploit requirements of 1916 zoning code.	Structural damage to east facade. On south facade, steel sashes missing; damage to exterior cladding; some floor spandrel beam buckled or missing. Restoration of privately owned building is in process. Permit applications have been made to LPC.
West Street Building	90 West Street	NRE, ICL	23-story skyscraper designed by Cass Gilbert. Distinguished early example of Gothic detailing applied to skyscraper	Interior fires. Much damage on north facade: some spandrel beams exposed, dented and severed; sashes shattered in floors 1-15; extensive damage to terra cotta/granite exterior, and to marble detailing.

Table 3-4 (continued)

Summary of Historic Building Status and Condition in the Vicinity of the WTC Disaster Area				
Property Name	Location	Designation(s)*	Description	Condition
Former East River Savings Bank	26 Cortland St (aka 25 Dey St., aka 19 Church St.)	NRE	Neo-classical Art Deco commercial building	Damaged but stable (windows boarded, building netted)
US Post Office & Federal Office Building	90 Church Street	NR	15-story Classical Revival/Art Deco limestone government building.	Broken windows. No visible damage.
	114 Liberty Street (aka 119 Cedar St.)	NRE	10-story Renaissance Revival Building	Damaged but stable.
Beard Building	125 Cedar St. (aka 120 Liberty St)	NRE	12-story Sullivan-esque-inspired building w/ornate terra cotta.	"High potential for structural damage"

NR: Listed on the National Register of Historic Places
 NRE: Eligible for the National Register of Historic Places
 ICL: Individual City Landmark

The working assumption of the NYDDC, Bureau of Architecture and Planning, is that the seriously damaged buildings can be repaired (rather than demolished). With the exception of the Post Office, these are privately owned buildings, as are most of the buildings in the WTC impact area. The two buildings that sustained the most damage, 90 West Street and 140 West Street, are City landmarks and are subject to control by the LPC. The St. Nicholas Greek Orthodox Church, at 15 Cedar Street, was destroyed by the collapse of the WTC buildings. St. Nicholas Greek Orthodox Church was not designated a local landmark but was potentially eligible for the National Register since it was constructed in 1832.

Some of the historic buildings surrounding the WTC were damaged by falling debris and may have broken windows or sustained cornice or roof damage. The number of affected buildings is not known but it is expected that these buildings can be restored to pre-disaster conditions.

Three general concerns have been expressed regarding potential damage to historic buildings:

- Many of the buildings around the WTC are covered with a layer of dust generated by the fires. This dust may have compounds that chemically react with cleaning applications and building substrate. As a result, building conservators are recommending cleaning buildings of loose particulates prior to washing them.
- There may be a potential for the blast or vibrations of the to have loosened (or further loosened) decorative details on historic buildings in the area.
- In the event of catastrophic variations in the water table elevation and sea level changes due to storms or hurricanes, historic buildings may be at risk because they are not anchored in bedrock.

Environmental Impacts

Section 106 review applies only if the damaged historic structures are eligible for federal funds for repair, renovation or replacement. Structures eligible for FEMA's Public Assistance funding include state and locally owned buildings and buildings owned by some non-profit entities. There are very few structures in the area where the greatest damage occurred that fit this profile. As a result, it is unlikely that any seriously damaged structure will be the subject of a Section 106 review. As a result, these buildings can most likely be restored, so the potential impacts to historic properties are minimal.

3.5.1 Archeological Resources

There would be some disturbance at and below the ground surface as actions associated with repair, renovation, or replacement of damaged facilities, utilities, roadways, bridges, pedestrian walkways, parks, and subways are implemented.

Environmental Impacts

Impacts to archeological resources could potentially occur as a result of subsurface reconstruction in the vicinity of the WTC. The primary measure of potential impact is the extent of disturbance beyond already disturbed areas. Excavation, grading, and general soil disturbance, for example, would be necessary to bury water, sewer, natural gas, electrical, and telephone cable lines. However, the potential for archeological resources to exist under and immediately around the WTC is remote because the area was excavated into bedrock in order to construct the WTC. Archeological resources outside the perimeter of the WTC were probably not affected by the event or the emergency response actions that include emergency street cuts to repair or replace telecommunication, electric, gas, water, sewer or other utilities. As the emergency phase ends and planning for reconstruction begins, the Programmatic Agreement guiding Section 106 review for archeological sites requires FEMA to consult with SHPO when excavation is required when work occurs outside previously disturbed areas. The consultation will determine the level of effort necessary to identify and evaluate potential archeological resources.

FEMA has consulted with LPC, the Commission that regulates subsurface work within certain designated areas. The LPC will require that a permit application be submitted for approval prior to any excavation in the area. The LPC has identified locations immediately outside the WTC and within the impact area that have a potential to contain archaeological deposits (see *Figure 3-10*). None of these are sites regulated by LPC. The closest protected site is the triangular-shaped parcel to the northwest of the WTC that includes the African Burial Ground and the Commons Historic District.

This information and additional material gathered and analyzed by FEMA, including rock data soil borings logs, will help FEMA determine if potential archeological sites may be present in areas where excavation is planned. The level of effort necessary to identify and evaluate potential sites will depend on the potential for archeological effects associated with the proposed action. The range of effort includes an archeological survey or on-going monitoring by an archeologist during excavation. The Programmatic Agreement will provide guidelines for addressing the excavation and documentation of archaeological sites discovered during proposed project implementation.

3.6 SOCIOECONOMIC RESOURCES

Impacts related to socioeconomic resources include changes to demographics, employment, the local economy, and public safety hazards and are discussed in the following paragraphs. Incorporated by reference is the *1999 Annual Report on Social Indicators* report issued by the NYC Department of City Planning. This document is a compendium of statistical data that describe the economic, social, physical and environmental health of the City of New York. The issues described by this document, incorporated by reference, include demographics, economy and employment, public safety, health, education and culture, housing and infrastructure, and environment (air quality, harbor wastes, and solid waste disposal).

The area of direct impact for this PEA is located along the tip of Lower Manhattan, bounded by Chambers Street on the north, the Hudson River on the west, Rector Street on the south and Broadway on the east. In addition to the 17 buildings were destroyed or severely damaged, the terrorist attack has changed the economic geography of the New York City region. It is estimated that up to 50 million square feet of office space has been destroyed and tens of thousands of workers are being moved to different parts of the region (NYC Department of Building 2001). A complete list of affected facilities compiled on September 21, 2001 is provided in *Appendix B*. Essential community facilities are described in more detail in the *Section 3.6.3*.

3.6.1 Land Use/Zoning

The World Trade Center, a complex of commercial buildings bounded by West, Church, Vesey and Liberty streets, was built around the twin towers that each had more than 4.5 million square feet of space (*Figure 3-11*). Below the complex was a concourse featuring retail stores and connections to the subway and Port Authority Trans Hudson (PATH) trains. On the waterfront in this area is Battery Park City, a 92-acre mixed-use

development started in the 1970s on land created from fill material excavated during the construction of the WTC North and South buildings. Battery Park City is west of West Street and extends from Battery Place to north of Chambers Street. Forming the commercial core of Battery Park City is the World Financial Center, a complex of office towers with retail uses centered by a ground-floor atrium. Flanking the World Trade Center to the north and south are residential communities with shopping and restaurants, public open spaces, a waterfront esplanade and marina, the Jewish Heritage Museum, Stuyvesant High School on the north and Pier A on the south.

The New York State Legislature created the Battery Park City Authority (BPCA), a public benefit corporation, in 1968. In 1979, title to the land of Battery Park City was transferred from the City of New York to the BPCA. Since that time, parcels of land have been leased to private developers who build in accordance with the BPCA guidelines. The 1979 Master Plan for Battery Park City Authority allocated 30 percent of the area to open space—mainly public parks, plazas and the Hudson River Esplanade. The remainder is earmarked for residential units, commercial space and streets.

Accessible via the World Trade Center and the Winter Garden, is the Battery Park Esplanade along the Hudson River. Waterfront recreation was among the many uses of the outside open space. Pedestrians, bicyclists, joggers, and others who strolled and rested there shared the waterfront vistas. A small marina for community boating (for sailing, kayaking and other boating, and associated upstream or downstream angling) was located at the waters edge of the World Trade Center site. Many commercial boat excursions pass by the World Trade Center site including the Circle Line, the South Street Cruise Lines, the Spirit of New York and others.

The character of the lower Manhattan is well established as a densely developed Central Business District (CBD), surrounded by substantial and varied residential neighborhoods (*Figure 3-11*). Recent trends toward changing neighborhood character through the turnover of manufacturing and loft buildings to office, retail, or residential space, will likely continue. Below Canal Street and the Manhattan Bridge, dominant, pre-disaster land uses are defined by the Wall Street financial district, the World Trade Center, Battery Park City, governmental uses of the civic center, the Tribeca mixed-use neighborhood, and portions of Chinatown and the Lower East Site. The Wall Street area, home to the New York Stock Exchange, is the heart of the downtown business district. Dense office development characterizes the area with numerous historic skyscrapers and more modern towers. In response to public policies aimed at increasing the residential character of the financial district, there have been a number of conversions of commercial buildings to residential use. The completion of Battery Park City and the conversion of older office and loft buildings to a residential use have strongly influenced the area neighborhood character, as one of a dense mix of uses in a 24-hour working and living community. Notable institutions in the vicinity of the WTC site include New York Downtown Hospital, New York Law School, Smithsonian National Museum of the American Indian, Museum of Jewish Heritage, South Street Seaport Museum, Seamen's Church Institute, New York City Police Museum, Museum of American Financial

History, Guggenheim Museum Soho, Frances Tavern Museum, and the Skyscraper Museum.

The Department of City Planning is responsible for the City's physical and socioeconomic planning, including land use and environmental review. New York City is divided into three basic zoning districts: residential (R), commercial (C) and manufacturing (M). These three basic categories are subdivided by the intensity of use, for retail or manufacturing categories, parking, building bulk or residential density. Zoning regulations do not apply to public parks. The last comprehensive New York City Zoning Resolution was enacted in 1961. In the past 35 or so years, new development of land has been shaped by 1961 zoning maps and a number of map amendments. In 1998, the Lower Manhattan Special District was adopted as a major component of the Mayor's Revitalization Plan for Lower Manhattan (City Planning Commission Report 1998). New height and setback controls allow design flexibility and encourage new development. New regulations for the waterfront (i.e., Waterfront Revitalization Program) have promoted integrated development and new open space opportunities. The Manhattan area is zoned for predominantly commercial uses. The maximum size of a building on a lot is determined by the floor area ratio (FAR) assigned by the Zoning Resolution to each zoning district (Department of City Planning undated). A building can contain floor area equal to the lot area multiplied by the floor area ratio of the district in which the lot is located. The lowest FAR in any district is 0.5 and the highest FAR is 15, in the highest density office districts. Population density is controlled by the requirement that a specified number of square feet per lot area are provided by dwelling unit or room.

The Department of Buildings, the Board of Standards and Appeals, and the City Planning Commission are responsible for administering the *Zoning Resolution*. In addition, the Department of Environmental Protection, the Department of Health, and the Department of Ports and Trades are responsible for enforcement and administrative functions that relate to their operations within their jurisdiction. The Department of Buildings reviews applications for building permits, issues certificates of occupancy and makes all inspections relating to compliance with the Zoning Resolution. Zoning changes enacted in 1995 and 1996 eliminated the density penalty that had applied to the conversion of commercial buildings to residential use in high density (R 10 or equivalent) zoning districts in lower Manhattan.

Certain developments request modification of zoning regulations to ensure a better building or site plan. Review of these projects is required. Some development is allowed only by special permit granted by the City Planning Commission with City Council review or by Board of Standards and Appeals. Special permits are also subject to Uniform Land Use Review Procedure (ULURP) review process. Projects that have greater land use impacts or involve significant planning issues are under the jurisdiction of the City Planning Commission. At its discretion, the City Planning Commission may modify certain zoning requirements provided that specific findings of the Zoning Resolution are met. For some as-of-right development, the City Planning Commission or the Chairperson of the City Planning Commission is required to administratively certify

to the Department of Buildings that specified conditions are met. Lastly, variances may be granted when it would result in hardship to comply with the Zoning Resolution (Department of City Planning undated).

The City Charter requires the ULURP process be implemented when special permits are requested that are within the jurisdiction of the City Planning Commission (Section 197-c).

The Manhattan Office of the Department of City Planning has provided zoning information for those buildings damaged or destroyed during the WTC attack. The WTC was zoning C6-4/C5-3 (commercial) and WTC 7 building was zoned C6-4 (Manhattan Office, Department of City Planning 2001). Article 8 of the New York State Environmental Quality Review Act (SEQRA), as implemented by City Environmental Quality Review (CEQR), requires that every proposed text or map change be assessed for its impact on the environment.

Environmental Impacts

Conflicts with land use or zoning are not expected during the construction of actions proposed by the applicant. Implementation of the proposed projects would not require a change in the Zoning Resolution; as such, no project-related impacts associated with the proposed alternatives are expected. No significant impact to area zoning or land use would be anticipated since the proposed projects would result in a recovery to pre-disaster conditions.

3.6.2 Employment/Economic Base

The WTC disaster has caused severe social and economic impacts through changes to the physical environment, transportation resources, business closing and relocation, employment layoffs, school closings, student relocations, utility disruption, etc. The social and economic character of the immediate area has been significantly affected. There has been interruption in service to communities, lack of access to community facilities, and disruption to existing patterns of circulation, and potential impacts to neighborhood health and safety. These changes will linger and will produce changes in land development patterns and development densities that may not be in character with or on the same scale with the pre-existing neighborhood and community. In a large measure, community cohesion has been severely impacted by physical and psychological changes related to the WTC disaster and after-effects. Reports have been developed to establish the extent of economic and transportation impacts and are referenced below.

The lower Manhattan study area consists of a mixture of older and modern office towers; approximately 120 million square feet of office space and the ground floors of the office buildings occupied by retail uses and lobbies. With over 120 million square feet of office space, Lower Manhattan is the third largest business district in the U.S. In the 1990s, a severe economic recession eliminated as many as 100,000 jobs, and some high-profile firms have merged, moved or gone out of business. In recent years, the economic climate

has improved and profits and employment of surviving firms in the financial sector have increased.

More than half a million private sector jobs (7.3 percent of State private sector employment) were affected by the attack on the WTC. The area below 14th Street in Manhattan was the source of \$47.0 billion in wages in 2000. This represents 14.9 percent of wages in New York State in 2000. While just one-third of these jobs were in the Finance, Insurance, and Real Estate (FIRE) sector, two-thirds of wages were in the FIRE sector. Large business establishments in the FIRE sector account for a high share of the activity in this section of Manhattan.

A large share of New York State's economic activity occurs in New York City. In 2000, 44.3 percent of New York State's 6.9 million private sector jobs were in New York City (see *Table 3-5*). While the City contained less than half of the State's jobs, 58.7 percent of wages (\$184.9 billion of the \$314.9 billion) were earned in New York City. On average, jobs in the City pay more than in the rest of the State.

Just as New York City has a large share of New York State's employment and wages, Manhattan has a large share of New York City's employment and wages. In 2000, 62.9 percent of the City's 3.1 million private sector jobs were in Manhattan (see *Table 3-6*). Wages in Manhattan were \$152.0 billion out of New York City's \$184.9 total, or 82.2 percent. On average, Manhattan's jobs pay more than jobs in the rest of New York City.

In the week following the attack on the World Trade Center, most economic activity below 14th Street in Manhattan came to a halt. All businesses were closed and no traffic was allowed below 14th Street. Continued disruptions to some portions of the area below 14th Street are expected for several more weeks. In the vicinity of the World Trade Center, pre-attack levels of economic activity will not resume in the near future.

Table 3-7 shows employment and wages in Manhattan, below 14th street and in the vicinity of the World Trade Center. Twenty-six percent of Manhattan's 1.9 million jobs are in this area (501,000 jobs). Wages below 14th Street were \$47.0 billion in 2000 and accounted for 30.9 percent of all Manhattan wages. In the vicinity of the World Trade Center there were 99,200 jobs. Although these jobs totaled only 5.2 percent of Manhattan's total, they earned 9.1 percent (\$13.8 billion) of all Manhattan's wages.

Table 3-8 shows the industry breakdown of employment and wages below 14th Street and in the World Trade Center vicinity. While the FIRE sector accounts for only about one-third of jobs below 14th Street, it accounts for two-thirds of wages. The securities industry, a sub-sector of the finance industry, accounts for 20 percent of employment and nearly 50 percent of wages. Although the service sector accounts for 38.3 percent of employment, it accounts for only 22.3 percent of wages below 14th Street.

The concentration of FIRE sector employment was even greater in the vicinity of the World Trade Center. More than half of the employment around the WTC was assigned to this sector in 2000. The FIRE sector accounted for 82.4 percent of wages. The

securities industry alone accounted for 60.4 percent of wages, yet it employed only 34.1 percent of workers. Service sector employment accounted for 12.0 percent of wages and 26.0 percent of employment around the WTC. Other socioeconomic analyses have identified that establishments with over 500 workers account for 55.9 percent of wages and employ 36.6 percent of the workforce in this area.

The city government will incur a massive tax collection impact as a result of the disaster. The WTC alone was to have paid \$74 million in municipal taxes. Much of the revenue from the FIRE, which results in annual tax payments of \$1.5 to \$2 billion, is in jeopardy (*The Washington Post* Company 2001).

Table 3-5

Private Sector Employment and Wages in New York State and New York City Fiscal Year 2000 (NYS Department of Labor)			
	New York State	New York City	City's Share of State
<i>Employment</i>	6.9 Million	3.1 Million	44.3 Percent
<i>Wages</i>	\$314.9 Billion	\$184.9 Billion	58.7 Percent

Table 3-6

Private Sector Employment and Wages in New York City and Manhattan Fiscal Year 2000			
	New York City	Manhattan	Manhattan's Share of City
<i>Employment</i>	3.1 Million	1.9 Million	62.9 Percent
<i>Wages</i>	\$184.9 Billion	\$152.0 Billion	82.2 Percent
Source: NYS Department of Labor			

Table 3-7

Private Sector Employment and Wages in Manhattan, Below 14th Street, and the World Trade Center Vicinity Fiscal Year 2000			
	Manhattan	Below 14th Street	WTC Vicinity
<i>Employment</i>	1.9 Million	501,000	99,200
<i>Wages</i>	\$152.0 Billion	\$47.0 Billion	\$13.8 Billion
Source: NYS Department of Labor			

Table 3-8

Private Sector Employment and Wages by Industry Below 14 th Street and the in the Vicinity of the World Trade Center Fiscal Year 2000				
Below 14 th Street			WTC Vicinity	
Industry	Employment Share	Wage Share	Employment Share	Wage Share
FIRE	33.8%	65.5%	57.8%	82.4%
<i>Financial</i>	26.6%	59.6%	49.4%	77.7%
<i>Securities</i>	19.9%	49.3%	34.1%	60.4%
<i>Insurance/Real Estate</i>	7.2%	5.9%	8.4%	4.7%
Services	38.3%	22.3%	26.0%	12.0%
Other Industries	27.9%	12.2%	16.2%	5.6%
TOTAL PRIVATE	100.0%	100.0%	100.0%	100.0%

The New York real estate and office market was affected by the WTC disaster as itemized by the report developed by the New York City Partnership and the Chamber of Commerce titled, *Economic Impact Analysis of the September 11th Attack on New York*, which is incorporated by reference. The total immediate loss is approximately 15 million square feet (sf) of property in lower Manhattan with approximately 12.7 million sf destroyed and 2.3 million sf damaged or declared structurally unsound as a result of fire, falling debris and building collapse (Tycoon Village 2001). More than 10.7 million sf of property sustained damage and of that total, 5 million sf will be taken out of the real estate market for at least one year for extensive repairs and reconstruction and 5.7 million sf should be ready for occupancy in less than 12 months (Tycoon Village 2001).

Jones Lang LaSalle (JLL), a real estate services and investment firm, estimated the impact of the WTC disaster on New York City's real estate market. Preliminary findings were that the direct loss attributable to real estate alone could range up to \$10 billion, which includes total damage to the WTC and surrounding buildings. In Manhattan, the immediate reduction of commercial office space is approximately 25 million sf, with the net loss over the next year estimated to be over 20 million sf (JLL 2001), representing approximately 18 percent of the downtown office market. Prior to the disaster, Manhattan had approximately 26 million sf, or 7.5 percent, of vacant space for lease or sublease. After the WTC disaster, the total Manhattan real estate market is 328 million sf, the second largest office market in the world, following Tokyo (JLL 2001).

A recent, post-disaster real estate agreement resulted in Goldman Sachs leasing space at 1 Liberty Plaza for a period of 15 years with the asking lease rate being \$45 per square foot (Tycoon Village 2001).

Potential Environmental Impacts

The cost of the WTC disaster is estimated to be over \$6 billion. Additional employment opportunities and personal income related to construction would be generated during the construction period (short-term). The construction associated with the proposed action would have direct, indirect, and induced effects on local, regional, and state employment, output, and income. Direct effects include those arising from the purchases made by the construction sector and may include wages and salaries paid to workers directly engaged in the project's construction, as well as capital costs for equipment, materials, and supplies during construction. Induced effects of the project are generated by the consumption of goods and services made possible by the payrolls associated with the construction project. Indirect effects are the sum of all the rounds of purchases by all the interrelated sectors of the state economy (including direct, induced, and all additional effects), beginning with those that supply the suppliers of the construction sector. Indirect effects are produced throughout the local economy at each round of purchases. No significant impact to long-term area employment and income would be anticipated as a result of the implementation of any of the proposed action alternatives since no permanent relocation of people would be expected and restoration to pre-disaster conditions is the goal of the proposed projects. The New York City Partnership and Chamber of Commerce has developed a report titled, *Economic Impact Analysis of the September 11th Attack on New York*. This report is incorporated by reference by this PEA.

3.6.3 Utilities, Facility and Services

A number of subsurface utility lines and subsurface structures, both public and private, are located beneath the streets throughout lower Manhattan. These include sewer and water mains, telephone cables, electric lines, gas mains, and steam lines. On the average, the majority of facilities are located close to the street or within the street right-of-way. These utilities provide essential services to the properties surrounding the project area. Community facilities consist of public or publicly funded schools, hospitals, fire and police protection, and emergency care facilities.

Public services examined include emergency fire, rescue, police operations and utilities, even though many utilities are regulated on a state or federal level. In this context, utilities such as electricity, natural gas, water supply, steam, and sewer lines are considered public services. Publicly-owned utilities include water and sewer. Privately-owned utilities include natural gas, steam, and telephone. Underground utilities in the vicinity of the WTC were extensively damaged during the terrorist attack. During project implementation, the greatest potential for project-related impacts on utilities would be during construction.

Environmental Impacts

Excavation to repair, replace or retrofit underground utilities would be required in specific areas to be defined by the responsible party. Due to the number of utilities typically located beneath New York City streets, construction of the proposed alternatives, including utility upgrade, repairs and replacements, would affect all underground utilities. Engineering studies would be performed to identify where utilities are located so that utility protection measures would be developed and to ensure that service would be maintained. To ensure that no significant adverse impacts occur to existing utility infrastructure, a utility relocation report would be developed by project designers. A detailed field survey would be conducted and finalized during the project design stage with collaboration from a variety of agencies, property owners, and private utility companies.

3.6.3.1 Health Care Services

The NY Downtown Hospital (affiliated with the NYU Medical Center) is the only hospital within Manhattan Community District 1, located at 170 William Street near its termination at Beekman Street. This hospital is an approximately 300-bed facility with approximately 1,100 employees, including full- and part-time staff. NY Downtown Hospital is a community hospital, specially designed and staffed to accommodate nearby Chinese and Hispanic communities. There are no specialized health care units at this hospital. Emergency facilities at the NY Downtown Hospital include an emergency room and two ambulance units, one operating 24 hours per day, seven days per week, and another operating 8 hours per day, five days per week, to serve the large daytime population of the office workers in lower Manhattan.

Table 3-9 identifies health-care facilities capable of servicing the lower Manhattan area.

Table 3-9

Summary of Health-Care Facilities Capable of Servicing Downtown Manhattan			
Property Name	Patient Information	Description/Number of Beds	Additional Information
Bellevue Hospital Center	26,500 admitted 489,000 ambulatory 89,000 emergency 500 trauma Level I		This hospital is a 911 receiving hospital
NYU Downtown Hospital 170 William Street	10,000 inpatient 75,000 outpatient 30,000 emergency 600,000 treated	Voluntary, not-for-profit community teaching hospital; full-service, acute care facility; 300 beds	Specializes in ambulatory care; active emergency department

Beth Israel Medical Center	14,262 inpatients 23,724 ambulatory 25,061 emergency admissions 371,512 emergency visits 59,317 discharges	Full-service tertiary teaching hospital; 1,368 beds	Average occupancy rate: 77.1%
NYU Hospitals Center	8,596 outpatient day surgeries 22,723 outpatient emergency service 28,327 total discharges	616 beds (Tisch); 152 beds (Rusk)	82.7% occupancy rate (Tisch); 88.7% occupancy rate (Rusk)

Environmental Impacts

Workers responsible for demolition and construction activities would be expected to live within the NYC area and to already be using health care facilities and services in the area.

Although the proposed construction would likely result in a relatively short-term increase of calls to "911" and for emergency medical services, no significant impact to community or health care services in the vicinity of the WTC would be anticipated as a result of the implementation of any of the proposed action alternatives.

3.6.3.2 Water Supply

New York City possesses a water supply system that has exceptional source water quality and is most entirely supplied by gravity. Water from four primary upstate watersheds is impounded in the Croton, Catskill, and Delaware Systems that includes 18 reservoirs and three controlled lakes, with a total available storage capacity of about 558 billion gallons. The Croton, Catskill, and Delaware Systems were designed and built with various interconnections to increase flexibility by permitting exchange of water from one system to another. This feature helps mitigate localized droughts and takes advantage of excess water in any of the three systems. An emergency pumping station at on the Hudson River at Chelsea has the ability to augment the water supply by 100 million gallons per day (MGD) during severe drought conditions. Over the past 35 years, the average daily water demand in New York City has ranged from a low of 1,045 MGD in the drought year of 1966 to a high of 1513 MGD in 1979. In 1995, the average daily water demand for New York City was 1,326.2 MGD.

Environmental Impacts

Based on per capita usage, water demands for the proposed re-development would generally be consistent with the pre-disaster conditions at the WTC disaster area. Implementation of any of the proposed action alternatives is not expected to increase overall water demand at the WTC. New water lines would be designed to provide water in adequate quantities to provide service to existing populations. No significant impacts to area water supplies are anticipated. The energy required to operate the proposed water supply projects would be provided by the repaired ConEdison network and would not result in a significant demand in the study area.

3.6.3.3 Sanitary Sewer

The New York City's Department of Environmental Protection (NYCDEP) operates 14 wastewater treatment plants (WWTPs) also known as water pollution control plants in New York City. Throughout most of the City, the sewers are combined, which means that while sanitary sewage normally flows to WWTPs through the combined pipes, during rain events, when stormwater enters the system, the volume is too great to be handled by the plants. The combined sanitary sewage and runoff are discharged to nearby surface waters. However, the DEP limits the volume and the rate of runoff that can be discharged into the combined city sewers and the NYCDEP's regular maintenance and upgrades to the sewer system combined with decreased stormwater overflow have helped to bring New York's waters into compliance with the state and federal standards. The CSO system is a potential source of surface water pollution. Sewage from Manhattan is processed at the North River and Newtown Creek Water Pollution Control Plants.

Environmental Impacts

The New York City Administrative Code 15 RCNY 19, Use of Public Sewers, Sections 19-01 through 19-04, establish industrial discharge limits for several toxic substances. These limits are based on federal regulations governing the Industrial Pretreatment Program (IPP), which is locally administered by the NYCDEP. As necessary, during construction and operation, pre-treatment systems would be designed and specified to meet industrial discharge limits as administered by the NYCDEP. Meeting IPP limits would ensure that discharges to the sewer system would not result in an adverse impact on water quality.

Based on NYCDEP limits, the discharge of stormwater from the project is not expected to have an adverse impact on Newtown Creek. In addition, sanitary sewer demands for the proposed re-development would generally be consistent with the pre-disaster conditions at the WTC disaster area. Implementation of any of the proposed action alternatives is not expected to increase sanitary sewer demand in the vicinity of the WTC. New sanitary sewer lines would be designed to provide sanitary wastewater services in the area of damage and line replacement. No significant impacts to area sewage systems are anticipated after construction. The energy required to operate the proposed

wastewater supply projects would be provided by the repaired ConEdison network and would not result in a significant demand consumed in the study area.

3.6.3.4 Energy

Although it is likely that the proposed new facilities constructed as part of the long-term redevelopment effort at the WTC would be more energy-efficient than the facilities they replace, a significant benefit to electrical resources is not anticipated. It may be that the electrical system will be upgraded during proposed projects although the existing supply system would be able to handle the additional loading. The existing electrical services are provided by ConEd and would be sufficient to handle the increased usage associated with the planned proposed action alternatives.

Environmental Impacts

No significant impacts to area electrical supplies are anticipated from implementation of any of the proposed action alternatives.

3.6.3.5 Steam

Consolidated Edison (ConEd) provides steam for heating, hot water and air conditioning in lower Manhattan from the Battery to 96th Street to 2,000 customers consisting of more than 100,000 commercial and residential establishments. The system has 105 miles of mains and services and 1,200 steam manholes. Five steam-generating plants located in Manhattan provide the steam. The peak winter send out is nearly 10 million pounds per hour. Steam would be used to heat the new facilities planned during the long-term redevelopment effort. The central steam production plant is located _____ and has a rated capacity of _____.

Environmental Impacts

Based on the rated capacity of the steam plant, adequate capacity exists to provide the anticipated steam requirements. Thus, implementation of the proposed projects would not result in significant impacts to the NYC steam production capacity.

3.6.3.6 Natural Gas

ConEd provides natural gas to 350,000 customers in Manhattan. Of a total of 4,210 miles of gas mains, there are 1,470 miles of unprotected steel mains, 1,486 miles of cast iron mains, 876 miles of plastic mains, and 378 protected steel mains. Some natural gas lines were damaged during the WTC attack and will be repaired.

Environmental Impacts

Natural gas usage in the lower Manhattan area is not expected to change relative to pre-disaster conditions. No impacts are expected.

3.6.3.7 Solid Waste

In New York City, municipal solid waste is collected by the NYC Department of Sanitation. New York produces 3.6 pounds of solid waste per person per day or 26,400,000 pounds of solid waste (Gotham Gazette 2001). Construction debris, asbestos, and hazardous wastes are under the regulatory responsibility of the NYSDEC and the NYCDEP. Solid waste disposal requirements for the proposed re-development operations would be consistent with the previous disposal activities at the WTC.

Environmental Impacts

No significant change to solid waste collection and disposal at the WTC is anticipated as a result of the implementation of the proposed action alternatives. Capacity at existing landfills used by lower Manhattan is considered adequate.

3.6.3.8 Telephone

A network of conduits exists in lower Manhattan to accommodate underground telephone and communication lines. The local telephone company, Verizon, has sufficient resources to provide service to the area.

Environmental Impacts

No significant impacts to area telephone service are anticipated.

3.6.3.9 Police and Fire Protection

Police service in the study area is provided by the New York Police Department (NYPD) 1st Precinct and Mounted Troop A, stationed at 16 Ericsson Place, near the Holland Tunnel portal. This precinct services all of lower Manhattan from up to West Houston Street on the west side of Broadway, and to Chambers Street on the east side of Broadway. The total uniformed personnel in this precinct total 170. The 1st Precinct operates three patrols (shifts) per day, seven days per week. Seven radio patrol cars service the area and two officers are assigned to each patrol.

The New York City Fire Department (NYFD) provides fire suppression and emergency response throughout the five boroughs. The Department responded to over 450,000 calls in 1999. The Fire Department responds with 410 firefighting-supervising units from 226 locations in New York City. Facilities located in the vicinity of the WTC include Engine No. 4 and Ladder No. 15 at 42 South Street, Engine No. 10 and Ladder No. 10 at 124 Liberty Street, and Marine Company No. 1 located at Pier 12 on the Hudson River. A "box" system, corresponding to actual or conceptual locations of fireboxes, determines the sequence in which firefighting companies respond to an alarm. Other factors, such as proximity to other facilities, time of day, and availability of firefighting units, further determine the emergency response protocol. The marine units (fire boats) respond to both supply water and to land units as well as to serve directly as pumps in fire suppression.

Environmental Impacts

No significant impacts to area police and fire department services are anticipated during the implementation of any of the project alternatives.

3.6.3.10 School

The study area is located in the Manhattan Community District (CD) 1, located in New York City Board of Education School District 2. According to the latest Community District Needs 1998, there are 8 elementary schools, 6 High Schools, and 3 colleges located in the vicinity of the WTC. *Table 3-10* is a list of schools located within 1 mile of the WTC site.

Table 3-10

Schools Within 1 Mile of the World Trade Center Site				
School Name	Location	Zip Code	Student Population	Distance
High School of Economics and Finance	100 Trinity Place	10006	750	0.1
High School for Leadership	90 Trinity Place	10006	550	0.1
P.S. 89	201 Warren Street	10282	350	0.1
Intermediate School 89	201 Warren Street	10282	300	0.1
Church Street School for Music	74 Warren Street		300	0.3
P.S. 234	292 Greenwich Street	10282	636	0.3
Stuyvesant High School	345 Chambers Street	10282	3,000*	0.4
Early Childhood Center	334 Greenwich Street			0.4
Murry Bergtraum High School	411 Pearl Street	10038	3,900	0.6
NY Academy of Art Inc.	111 Franklin Street			0.6
St. James School	37 St. James Place			0.7
Transfiguration Catholic Church	29 Mott Street			0.7
P.S. 1	8 Henry Street	10038	700	0.8
P.S. 126	80 Catherine Street	10038	540	0.8
St. Joseph's School	1 Monroe Street	10002	230	0.8
Empire State Learning Academy	119 Canal Street			0.9
P.S. 130	143 Baxter	10013	1,030	0.9
Yung Wing Elementary School	40 Division Street	10002	1,030	0.9
Chelsea Vocational High School	131 6 th Avenue	10013	900	1.0
Seward Park HS Annex	350 Grand Street	10002	1,300	1.0

Environmental Impacts

The information provided by *Table 3-10* refers to pre-disaster locations and school capacities. Schools within approximately 0.5 miles of the WTC were closed or relocated immediately after September 11th. Students at Public School (PS) 89 reported initially to PS 3 and then to 111 Columbia Street to avoid disruption in classroom instruction. Students at Intermediate School (IS) 89 reported to IS 70 in Manhattan. Students at PS 150 reported to PS 3; those at PS 234 reported to PS 41 and then to St. Bernard's School at 327 West 13th Street. The students at the High School for Leadership and Public Service reported to the Fashion Industry High School and students at Stuyvesant High School reported temporarily to Brooklyn Tech High School for a few weeks before resuming classes at the Stuyvesant campus. The students at the High School for Economics and Finance reported to Norman Thomas High School located at 111 East 33rd Street.

In some cases, school enrollment declined for those schools named above that were directly impacted by the disaster. Most schools have reopened after extensive cleaning and site restoration. Environmental monitoring has confirmed that no hazardous conditions are present at the schools and students would not be impacted by attendance. Most schools will be re-opened in early 2002. No significant long-term adverse impacts to area schools are anticipated as a result of the implementation of any of proposed action alternatives.

3.6.3.11 Parks and Recreation

Open space for parks and recreation in lower Manhattan consists of large waterfront parks, a number of smaller parks interspersed among residential and commercial space, and plazas associated with buildings. These park spaces are administered by a number of public, private, and quasi-governmental agencies (i.e., City of New York, Port Authority, Battery Park City Authority). In the vicinity of the WTC, notable park spaces are the Battery Park Esplanade, Battery Park, and the Winter Park Garden. The largest parks in lower Manhattan include the following:

- Battery Park, including the Castle Clinton National Monument
- Battery Park City Esplanade, including the North Cove Yacht Harbor
- Hudson River Park

Battery Park is a recreational area that includes open-air concert facilities and piers for ferry recreational traffic to the Statue of Liberty and Ellis Island. The Battery Park City Esplanade and the North Cove Yacht Harbor are used for recreational boating, bicycling, jogging, and roller-skating. Landscaped areas with benches and sculptures are used for passive recreation (walking, reading, and picnicking). Children use the playgrounds and other open areas for recreation. A portion of this park, near the Winter Garden, is closed due to damage sustained during this disaster. The Hudson River Park is located on the west side of lower Manhattan and extends from Chambers Street north to 59th Street. This park includes piers and the waterfront area and includes bicycle pathway and

planted trees. Waterfront recreation includes commercial boat excursions operated by Circle Line, the South Street Cruise Lines, the Spirit of New York, and others. Open space areas include indoor as well as outdoor public areas. The Master Plan for Battery Park City, allocated 30 percent of the area to open space uses—mainly public parks, plazas, and the Hudson River Esplanade.

Table 3-11 summarizes privately-owned public spaces, including plazas associated with buildings (New York City Department of City Planning 2000). Battery Park, City Hall Park, and Trinity Church cemetery have landmark status of historical significance.

Table 3-12 summarizes larger public spaces that are parks located in Manhattan Community District 1 and part of Community District 3 (NYC DCP 2000).

Table 3-11

Privately Owned Public Spaces Manhattan Community District 1			
Building Address	Building Name	Public Space	Classification
1 Battery Park Plaza		Plaza	Marginal
1 Liberty Plaza	One Liberty Plaza	Plaza Special Permit Plaza	Circulation Neighborhood
1 New York Plaza		Arcade Plaza	Marginal Marginal
1 State Street	1 State Street Plaza	Arcade Plaza	Marginal Marginal
1 Wall Street	Bank of New York	Plaza	Circulation
100 Wall Street		Arcade Plaza	Circulation Circulation
100 William Street		Covered Pedestrian Space	Circulation
101 Barclay Street		Pedestrian Easement Public Lobby	Marginal Marginal
105 Duane Street	Tribeca Tower	Residential Plaza	Neighborhood
110 Wall Street		Arcade	Circulation
111 Wall Street		Arcade Plaza	Marginal Hiatus
115 Broad Street	4 New York Plaza	Arcade Plaza	Marginal Marginal
125 Broad Street	2 New York Plaza	Arcade Plaza	Marginal Hiatus
130 Liberty Street	One Bankers Trust Plaza	Arcade Elevated Plaza Elevated Shopping Pedestrian Bridge Pedestrian Walk Plaza Shopping Arcade	Circulation Hiatus Marginal Circulation Marginal Marginal Marginal

Table 3-11 (continued)

Privately Owned Public Spaces Manhattan Community District 1			
Building Address	Building Name	Public Space	Classification
140 Broadway	HSBC	Plaza	Circulation
160 Water Street		Arcade Plaza	Marginal Marginal
17 Battery Place		Arcade Plaza	Marginal Hiatus
17 State Street		Arcade Public Exhibit Sidewalk Widening Urban Plaza	Circulation Destination Circulation Hiatus
175 Water Street		Open Pedestrian Area Special Permit Arcade	Circulation Circulation
180 Maiden Lane		Enclosed Public Space Outdoor Public Space	Destination Neighborhood
17 State Street		Arcade Public Exhibit Sidewalk Widening Urban Plaza	Circulation Destination Circulation Hiatus
175 Water Street		Open Pedestrian Area Special Permit Arcade	Circulation Circulation
180 Maiden Lane		Enclosed Public Space Outdoor Public Space	Destination Neighborhood
180 Water Street		Arcade Plaza	Marginal Marginal
200 Water Street		Arcade Plaza	Marginal Hiatus
32 Old Slip	Financial Square	Arcade Sidewalk Widening Urban Plaza	Circulation Circulation Hiatus
33 Maiden Lane	Two Federal Reserve Plaza	Covered Pedestrian Space Public Pedestrian Circulation Area	Hiatus Circulation
388 Greenwich Street	Salomon Smith Barney	Plaza Public Plaza	Marginal Neighborhood
40 Broad Street		Arcade Urban Plaza	Marginal Hiatus
40 Rector Street		Plaza	Marginal

Table 3-11 (continued)

Privately Owned Public Spaces Manhattan Community District 1			
Building Address	Building Name	Public Space	Classification
45 Broadway	45 Broadway Atrium	Arcade Shopping Arcade	Marginal Marginal
52 Broadway		Arcade, Through Block	Circulation
45 Broadway	45 Broadway Atrium	Arcade Shopping Arcade	Marginal Marginal
52 Broadway		Arcade, Through Block	Circulation
55 Broad Street		Arcade	Marginal
55 Broadway	1 Exchange Plaza	Arcade Loggia Shopping Arcade Urban Plaza	Circulation Marginal Marginal Circulation
55 Church Street	Millennium Hilton Hotel	Sidewalk Widening Urban Plaza	Marginal Hiatus
55 Water Street		Arcade Elevated Plaza Plaza	Marginal Hiatus Marginal
59 Maiden Lane		Arcade Plaza	Marginal Neighborhood
60 Wall Street	J. P. Morgan	Arcade Covered	Circulation Destination
7 Hanover Square		Arcade Through Block Arcade	Circulation Circulation
72 William Street	William Street Hotel & Tower	Urban Plaza	Under construction
75 Wall Street	Barclays Bank	Arcade Open Space Urban Plaza	Circulation Neighborhood Neighborhood
77 Water Street		Arcade Plaza	Neighborhood Neighborhood
85 Broad Street	Goldman Sachs	Arcade Publicly Accessible Lobby Sidewalk Widening Urban Plaza	Circulation Marginal Circulation Neighborhood
86 Water Street	10 Hanover Square	Plaza	Marginal
88 Pine Street	Wall Street Plaza	Special Permit Plaza	Neighborhood
90 Washington Street		Plaza	Marginal

Table 3-12

Public Spaces and Parks Manhattan Community Districts 1 and 3			
Park Name	Designation	Area	Classification
Esplanade	Waterfront Park	South Cove to Chambers Street	Circulation
Rector Park	Park	Rector Place	Circulation
Esplanade	Waterfront Park	Battery Park to South Cove	Circulation
Battery Park	Waterfront Park	Southern Manhattan	Circulation
North Cove	Yacht Harbor	Waterfront Winter Garden	Harbor
Esplanade	Waterfront Park	North Park	Circulation
Washington Market	Market Place	Chamber and Greenwich Streets	Circulation
Barclay Street	Open Space	Murray Street and West Side Highway	Circulation
Bowling Green	Open Space	Whitehall and Beaver Streets	Open Space
1 Battery Park Plaza	Open Space	Whitehall and Pearl Streets	Plaza
1 New York Plaza Arcade Plaza Arcade/Plaza Vietnam Veterans' Plaza	Plazas	Between South and Water Streets	Plaza Arcade, Plaza Arcade, Plaza Plaza
South Street Seaport	Museum	Waterfront at Fulton Street	Museum
Brooklyn Bridge Pedestrian Walkway	Walkway	Brooklyn Bridge	Circulation
1 Police Plaza	Plaza	Park Row and Avenue of the Finest	Circulation
Southbridge Towers Plaza	Plaza	Fulton and Gold Streets	Open Space
St. Paul's Cemetery	Cemetery	Church and Vesey Sts.	Cemetery
Trinity Church Cemetery	Cemetery	Broadway and Rector Streets	Cemetery
City Hall Park	Plaza	Park Place	Neighborhood
African Burial Grounds	Landmark	290 Broadway	Landmark
Columbus Park	Playgrounds	Bayard and Morgan Streets	Circulation, Arcade
Governor Smith Memorial Park	Plaza	Catherine and Madison Streets	Circulation
Coleman Smith	Memorial Park	Market and Cherry Streets	Circulation

Table 3-12 (continued)

Public Spaces and Parks Manhattan Community Districts 1 and 3			
Park Name	Designation	Area	Classification
M.F. Tanehey	Playground	Market and Cherry Streets	Open Space
Source: Rand McNally & Company 1990			

Environmental Impacts

No significant long-term adverse impacts to park resources are anticipated as a result of the implementation of any of proposed action alternatives.

3.6.4 Aesthetics and Visual Resources

The WTC was a complex of 7 buildings on a 16-acre site in lower Manhattan's financial district. The North and South Towers were 110 stories or 1,368 and 1,362 feet tall, respectively.

3.6.5 Population

Census data were obtained in 1990 and 2000. The Census Bureau analyzes the data collected and provides in-depth socioeconomic statistics and analyses. For the 2000 Census, economic analyses have not been completed, although race data have been compiled. In order to analyze for environmental justice concerns (below), both economic and race data are required. Census block boundaries were redrawn for the 2000 Census. In order to compare equivalent data for environmental justice analyses, 1990 Census data should be used until the socioeconomic data analyses are completed. For this reason, 1990 population statistics are provided below for data consistency purposes.

Lower Manhattan has a population that has substantially increased from 1970 when 833 residents lived south of Chambers Street to 15,450 people in 1990. Residential population is concentrated in two areas: Battery Park City with 5,654 residents and the South Street Seaport area with 5,886 residents. The 1990 population of lower Manhattan is provided according to neighborhood in *Table 3-13*:

Table 3-13

Neighborhood	Population	Percent of Lower Manhattan
Battery Park City	5,654	36.6
World Trade Center	2,233	14.4
South Street Seaport	5,886	38.1

Neighborhood	Population	Percent of Lower Manhattan
Civic Center	1,677	10.9
TOTAL	15,450	100.0

Since 1990, the construction of new residential units in Battery Park City has added approximately 1,950 residents, and the conversion of office space into residences elsewhere in lower Manhattan has further increased the population by another 3,900 residents for a total of 5,850 new residents. The 1998 residential population of lower Manhattan is estimated to be approximately 21,300 persons. The future population growth is expected to occur primarily in Battery Park City where the Battery Park City Master Plan allows future population to increase to a maximum of 20,000 residents from the 1998 population of 7,600 residents. An estimated 6,600 to 8,560 additional residents could be added to the lower Manhattan population through the development of residential units from converted obsolete office space.

Predictions for increases in population in the Lower Manhattan study area show a relatively stable situation overall, although an increase of 19.9 percent population reflects the completion of Battery Park City and the trend to residential conversion. Population in 1995 for Lower Manhattan was 47,487. In 2010, the population in this area is expected to be 56,925 and in 2020, the population is expected to increase to 59,148, a 24.6 percent increase. The labor force is projected to increase by more than 8 percent between 1995 and 2010. This predicted labor force increase is more than double the predicted population increase and reflects an increase in multiple-worker households and families. Construction workers will, for the most part, work in Manhattan.

Environmental Impacts

The New York City Partnership and Chamber of Commerce will identify the socioeconomic impacts of the construction of the proposed project alternatives.

3.6.6 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, mandates that federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of programs on minority and low-income populations (59 *Federal Register* 7629-7633, February 16, 1994). A minority population is defined as a group of people and/or a community experiencing common conditions of exposure or impact that consists of persons classified by the U.S. Census Bureau as Black or African-American; Asian; American Indian or Alaska Native; Native Hawaiian or other Pacific Islander; Hispanic or Latino; or other non-white persons, including those persons of two or more races. A low-income population is defined as a group of people and/or a community that, as a whole, lives below the national poverty level based on the 1990 Census data (U.S. EPA 2001). The average poverty level threshold for a family of four people in 1989 was

a total annual household income of \$12,674 (U.S. Department of Commerce, Bureau of the Census 2001).

According to the U.S. EPA's *Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* and the U.S. EPA's Region 2 document *Interim Environmental Justice Policy* (U.S. EPA 1998; U.S. EPA 2001), disproportionately high and adverse effects on minority or low-income populations generally means an adverse effect that is predominantly borne by a minority population and/or low-income population; or would be suffered by the minority population and/or low-income population, and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority population and/or non-low-income population. For the purpose of analysis within this PEA, disproportionate adverse impact to minority or low-income populations occurs when the population within the given community of concern (COC) is adversely and disproportionately impacted, and the percentage of the population that is minority and/or low-income within the COC is more than double the percentage of the population that is minority and/or low-income within the appropriate statistical reference area (Council on Environmental Quality [CEQ] 1997; U.S. EPA 2001).

The U.S. Department of Commerce, Bureau of the Census, provides much of the relevant data on demographics and housing. Although only conducted every 10 years, the U.S. census provides the most accurate and detailed information for the years that data were acquired. In addition, the census provides the basis for most projections and estimates prepared by national, state, local, and private organizations. State, county, and city provide census data for political subdivisions of the country, for example. In addition, census data are provided by statistical subdivision that includes (in order of decreasing size) tracts, block-numbering areas, block groups, and blocks. These statistical subdivisions of counties were delineated to be homogeneous with respect to demographics, economic status, and living conditions.

Environmental Impacts

The proposed alternatives would not require additional right-of-way (ROW) along existing streets and there would be no residential or business displacements as a result of the implementation of the proposed alternatives. The project would not restrict long-term access to any existing public or community services, businesses, commercial areas, or employment centers. There may be short-term, localized effects to air quality (e.g., increase in dust) and noise levels (e.g., generated by construction equipment and activities) in the immediate area of the WTC during building, roadway, and bridge construction or repair and utility installation, repair and replacement; however, these effects would be temporary and would not be selectively limited to minority and low-income communities, but would potentially affect all residential and business communities located in the immediate area of the proposed projects.

While individual minority and low-income persons may be affected by the project and/or minority and/or low-income population reside within some of the Census Block Groups surrounding the WTC, it cannot be shown that the implementation of the project would

cause disproportionate adverse impacts to minority or low-income populations. In the long-term, the entire community, including minority and low-income populations, would benefit from redevelopment, repair and restoration of the WTC. To assist with post-disaster recovery, FEMA has implemented a Community Awareness Program that is performing outreach efforts throughout the five boroughs designed eligible for disaster assistance.

FEMA has not directly or indirectly used criteria, methods, or practices that discriminate on the basis of race, color, or national origin during the preparation of this document. All reference material used to describe the existing environment and to evaluate potential environmental impacts are commonly available reference sources and do not discriminate on the basis of race, color, or national origin.

3.6.7 Executive Order 13045 Protection of Children

A growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because children's neurological, immunological, digestive, and other systems are still developing; children eat more food, drink more fluids, and breathe more air in proportion to their body weight than adults; children's size and weight may diminish their protection from standard safety features; and children's behavior patterns may make them more susceptible to accidents because they are less able to protect themselves. Therefore, to the extent permitted by law and appropriate, and consistent with the agency's mission, each Federal agency:

- Shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and
- Shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

In the aftermath of the WTC disaster and in recognition of concerns for children's physical and mental health, many contingencies went into effect. Affected students also included college and day care center. Schools in the immediate vicinity of the World Trade Center site were closed altogether for several days longer than New York City public schools located elsewhere in the city. For schools that could not be reopened due to safety concerns or due to their use for rescue and recovery activities, schools reopened in alternate locations. To accommodate the sudden enlargement of the number of students, teachers and administrative staffs in a single building, replacement schools often shifted their schedules. The NYC Board of Education in coordination with agencies and stakeholders, including NYC Department of Health, school administrators and parents, made decisions on the school re-openings. A list of schools within 1 mile of the WTC site is provided by *Table 3-10* and discussed in *Section 3.6.3.10*. Hospitals that provide service to the lower Manhattan area are discussed in *Section 3.6.3.1*.

Environmental Impacts

As the main occupation of children over the age of five is attending school, and by virtue of school locations near the World Trade Center site, children attending school in the area will benefit from controls of air-borne particulate matter, noise, and traffic related to the reconstruction efforts. The U.S. Department of Health and Human Services has developed a program to address the special vulnerability of children and the impacts associated with the traumatic events. Crisis counseling and recovery assistance is incorporated into this program to respond to the disaster-relief needs of children. FEMA has provided funding to Center for Mental Health Services (CMHS) and has developed publications that will provide the continuing effort to disseminate knowledge gained from past crisis counseling programs. Two such publications are: *Psychological Issues for Children and Families in Disasters* and *Psychological Issues for Children and Adolescents in Disasters* (U.S. Department of Health and Human Services 1995 and 2000, respectively). Playgrounds and sand boxes affected by the WTC disaster have been cleaned—all sand was removed from each sand box and replaced as a preventative measure to ensure safety to children.

3.7 SAFETY

3.7.1 Executive Order 12699 Seismic Safety

Seismic hazards pose a serious threat throughout much of the United States. An earthquake in New York City would be considered a low-probability, yet high consequence event. The National Earthquake Hazards Reduction Program (NEHRP) was developed to address this threat and require Federal preparedness and mitigation efforts. On January 5, 1990, the President signed Executive Order 12699, *Seismic Safety of Federal and Federally-Assisted or Regulated New Building Construction*. Executive Order 12699 specifically states that the order pertains to assistance actions involving new construction or total building replacement. The Interagency Committee on Seismic Safety (ICSSC), through consensus procedures, is responsible to FEMA for recommending seismic design and construction standards and practices. The ICSSC recommended that compliance with NEHRP provisions be achieved through compliance with the International Conference of Building Officials (ICBO), 1997, *Uniform Building Code*, and the American Society of Civil Engineers (ASCE), 1996, *Minimum Design Loads for Buildings and Other Structures* (ASCE 7-95).

Environmental Impacts

All construction of new buildings that is eligible under the FEMA public assistance program must use appropriate seismic design and construction standards and practices. All post construction activities will conform to seismic safety regulations and standards in accordance with City building codes and FEMA 368—*NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures*, 2000 Edition. Appropriate geotechnical studies and engineering designs will be used to design earthquake resistant facilities to mitigate liquefaction and other seismic hazards to

acceptable levels. As such, no environmental impact is expected due to seismic safety issues or concerns related to the proposed action alternatives.

3.7.2 Public Safety and Welfare

The New York City Police Department and the Office of Emergency Management cordoned off residential areas in the vicinity of the WTC immediately after the disaster. The NYC Department of Health, the NYS Department of Environmental Conservation and the U.S. EPA are monitoring potential health risks associated with the aftermath of the disaster. New tunnels, utilities, buildings, roadways, and subways constructed during the redevelopment efforts would incorporate the safety and reliability policies of the NYCDDC and the fire/life safety codes and standards of the State of New York and the National Fire Protection Association (NFPA) 130, 72, 101, and 241. The safety measures provided in subways likely would include fire detection, emergency ventilation, emergency lighting, emergency exits, water to fight fires and emergency communication systems. Fire/life safety, security and ventilation systems would be monitored and controlled from an Operations and Control Center as defined in NFPA 130.

Police and fire protection services are designed to provide for the public safety and welfare. The New York City Police and Fire Departments would provide emergency response activities. Emergency response services may be slightly affected and there may be a slight increase in response time during the construction period as traffic detours and lane restrictions may result in traffic congestion.

Environmental Impacts

Construction of replacement facilities would adhere to City Safety Codes responsible for fire protection, energy conservation, and seismic safety. Construction workers would be expected to work in compliance with appropriate OSHA Health & Safety requirements. The Contractor Health & Safety Plan(s) would likely include procedures and measures to control dust and vehicular and equipment air emissions; manage exposure to friable and non-friable asbestos; minimize noise; manage, store, use and dispose of hazardous materials and hazardous waste; segregation and disposal of solid waste; develop and perform necessary spill prevention and response procedures; and manage stormwater and implement sediment control procedures.

3.7.3 Environmental Health

Working closely with City, State and Federal agencies since September 11, the New York City Department of Health has been conducting several public health activities in response to the World Trade Center disaster. Foremost among these are monitoring air quality in the general vicinity of the World Trade Center, working with other agencies to ensure that worker safety measures for search and rescue workers are in place, conducting surveillance for illnesses and injuries at New York City Hospitals, and mobilizing environmental investigation teams to ensure the safety of the food and water supplies.

NYC Department of Health, the U.S. EPA, the DEP, and other agencies or entities with jurisdiction monitor health risks in the aftermath of the WTC disaster. It has been recognized that children are generally more vulnerable to most health hazards than the general population. In order to have school-age children avoid unnecessary exposure to health hazards, schools in and around the World Trade Center site were closed off to the public until they could be tested for presence of asbestos and other toxicants. Residential areas were also cordoned off, including most of Battery Park City.

While excavation continues at the site, the Health Department has been monitoring the air quality and the U.S. EPA and the New York City Department of Environmental Protection (DEP) are also conducting tests. The Health Department has produced a Public Health Advisory for residents and people returning to work in the nearby area. Residents and workers are advised to guard against dust and soot that can cause respiratory symptoms and eye and throat irritation. Residents in the immediate area are advised to keep windows closed and to avoid strenuous outdoor activity in the area affected.

Environmental Impacts

Construction contractors rebuilding the WTC site will conform to OSHA health and safety requirements such as described by the *OSHA Guidance Manual for Hazardous Waste Site Activities* (NIOSH 1985) and *Standard Operating Safety Guides* (U.S. EPA 1992b). Health and safety plans will be developed and will include environmental and exposure monitoring. Contractors will maintain compliance with all environmental regulations and permits that apply to the work being performed. Periodic environmental health and safety monitoring may need to be performed to verify that employees are protected and exposure limits are not exceeded. Each contractor working at the site will maintain an OSHA 200 log. Pollution source reduction techniques and prevention strategies, as appropriate, recommended by the U.S. EPA's Office of Pollution Prevention will be incorporated into the design of the proposed projects. If unexpected conditions are encountered during excavation, for example, work will stop and the appropriate actions will be taken.

To mitigate for any potential impacts associated with future construction, and to protect human health and the environment, the following general actions will be performed:

- All materials (hazardous and non-hazardous) and wastes generated from construction activities will be handled, stored and disposed of in accordance with applicable Federal, state and local regulations
- Strict contract specifications will be established for construction contractors requiring proper management and disposal of materials and waste
- Waste generation will be minimized to the extent possible
- Excavated soils and materials will be used as fill material, as appropriate

- Development of procedures and programs to prevent significant risk to workers and public health which could result from exposure to hazardous materials and waste
- Proper storage and containment structures will be provided for all hazardous materials
- Health and safety plans will be developed by all construction contractors under the guidance of a recognized safety and health professional
- Access to the construction sites will be controlled with security and fencing

3.8 HAZARDOUS MATERIALS AND WASTE

Although this PEA does not address debris removal operations, the WTC disaster generated approximately 1.6 million tons of debris. This debris was generated by the collapse of all WTC buildings (1 to 7), the Plaza and the Plaza basement, as well as ancillary debris from surrounding buildings. As of January 2002, approximately 1 million cubic yards of debris have been removed and disposed of at the Staten Island landfill or have been recycled. The debris removal rate is approximately 100,000 tons per week. A debris management plan has been developed and is being implemented by the responsible contractor with oversight provided by the U.S. EPA.

Hazardous materials that may be encountered at the WTC site include the following (*Daily News* 2001 and U.S. EPA Debris Monitoring Plan):

- Asbestos: Fire retardant insulation sprayed onto ceilings, along elevator shafts, and in WTC Building 1 from the 1st to the 42nd floors.
- Freon: Approximately 65,000 gallons of Freon type R-12, R-32, and R-134 in HVAC systems and 7,000 gallons of Freon contained in storage cylinders.
- PCBs: Fluorescent light ballasts and 130,000 gallons from transformers and capacitors (containing less than the regulatory limit of PCBs)
- Lead: 3,600 to 36,000 lead acid batteries and circuit boards.
- Mercury: Light switches, fixtures and fluorescent light tubes
- Fuel oil: Approximately 100,000 gallons
- Water/wastewater treatment chemicals: 1,800 gallons
- Dielectric fluids: 35,000 gallons in Edison facility substation.
- Photo processing chemicals: 100 gallons in photographic laboratory
- Copier products: 400 gallons

The U.S. EPA has lead efforts to assess and recover hazardous substances and oil releases. As a result, approximately 72,000 gallons of oil or oil-containing water, 189 containers, 14 truck batteries, and 836 compressed gas cylinders has been recovered

The NYCDEC has requested that the U.S. EPA's decontamination plan incorporate provisions related to site remediation. The U.S. EPA is monitoring site conditions and issues a bi-weekly report called the Incident Command System (ICS) Report 201 (U.S. EPA 2001-2002).

Since September 11, the U.S. EPA and other federal agencies have been taking samples of the air, dust, water, river sediments and drinking water from the World Trade Center site and surrounding areas in Manhattan, Brooklyn, Staten Island and New Jersey. The U.S. EPA and other agencies have analyzed these samples for the presence of pollutants that might pose a health risk to response workers and the public. The samples are evaluated against a variety of benchmarks, standards and guidelines established to protect public health under various conditions. The U.S. EPA considers the amount of time a person is exposed to a particular pollutant and where – a school, workplace or home – in creating these criteria. The criteria, standards and guidelines used to evaluate the contaminants potentially present in the vicinity of the WTC site include the following (U.S. EPA 2001 December 14 meeting):

- AHERA school re-entry standard for airborne asbestos (70 S/mm^2)
- OSHA/EPA definition of ACM for bulk material ($> 1\%$ asbestos)
- NAAQS for ambient air sampling (lead, carbon monoxide, $\text{PM}_{2.5}$)
- OSWER residential guidelines for dioxin, PCBs, and lead in dust/bulk material
- OSHA PELs (TWA) for air samples taken on the debris pile (worker exposure)
- Federal Ambient Marine Water Quality Criteria and historical Hudson River data
- Federal Maximum Contaminant Level (MCLs) for drinking water samples
- NPDES permit limits

The monitoring program implemented by the U.S. EPA has indicated that concentrations of potential contaminants at the WTC site are within levels considered “safe” for area residents. On-site workers are mandated to follow contractor health and safety plan requirements to limit potential exposure to contaminants that may be elevated in the vicinity of excavation operations.

Environmental Impacts

For the proposed action alternatives, the construction of new facilities, installation of utilities and the demolition of the existing facilities may result in the generation of hazardous waste. The storage, handling and disposal of hazardous materials and wastes are regulated to eliminate or minimize public exposure and environmental impacts. Potential statutes and regulations applicable include the following:

- Resource Conservation and Recovery Act (hazardous waste management and disposal)
- Superfund Amendments and Reauthorization Act (Title III-Toxic Release Inventory Notification)
- New York City Fire Code

Wastes typically generated during construction include lumber, concrete, metal, glass, plastics, solvents, and empty containers. During construction, the responsible party

would be required to adhere to Resource Conservation and Recovery Act (RCRA) requirements for waste classification and disposal. Based on the classification of waste, the disposal of construction debris would comply with RCRA provisions, as necessary. Hazardous waste sent off-site for disposal would require disposal documentation; hazardous waste manifesting procedures would be followed with appropriate "cradle-to-grave" record-keeping and tracking performed. Based on RCRA requirements, the generator of hazardous waste during construction would be the responsible party and would be so designated on the waste disposal manifests. The responsible party would continue to compile and submit annual reports on waste generation volumes and rates.

Environmental Impacts

Excavation work may encounter buried construction debris and other hazards. In lieu of subsurface testing, specific management practices may be required of the responsible party to avoid or minimize delays in the construction schedule and to protect human health and the environment. In all cases, if such debris were encountered, work would stop. Management and proper disposal of buried debris encountered during demolition and construction activities would be in accordance with all local, state, and federal regulations.

The responsible party would manage hazardous materials and dispose of all wastes generated during construction, according to applicable federal, state, and local regulations. There will be designated, separate storage areas, secondary containment when appropriate, and buffer zones established near sensitive receptors. All stationary fuel tanks will have secondary containment and will be managed so that spills are prevented. All hazardous material containers will have proper labeling as required under OSHA's Hazard Communication Standard. Spill Prevention and Response Plans will be developed and implemented. Material safety data sheets (MSDSs) will be available for review. Each construction contractor will be responsible for the proper identification, containerization, labeling, storage, manifesting, reporting, transport and disposal of all hazardous materials and regulated wastes generated during construction. Impacts related to hazardous waste generation, storage, treatment, and disposal would not be significant. Handling and storage of hazardous materials would be performed in accordance with manufacturer's specifications. Grounds and building maintenance would require the use of pesticides and herbicides to control plant and animal pests. The site and any landscaping would be designed to reduce the use of fertilizers and pesticides. The responsible party would be responsible for handling and administering these materials in compliance with the appropriate federal and state regulations, and impacts would not be expected to be significant.

The implementation of the proposed alternative may possibly generate hazardous wastes during construction. Asbestos-containing materials and lead-based paint debris may possibly be generated during demolition. Since the responsible party would be responsible for following all applicable laws and regulations during construction, demolition, and operation of facilities, impacts related to use hazardous materials are not

expected. To mitigate for possible impacts associated with materials management during construction, the following mitigation activities may be performed, as discussed in *Section 3.7.3*.

3.8.1 Demolition of Asbestos-Containing Material

The implementation of the proposed alternative may possibly generate hazardous wastes during construction. Asbestos-containing materials may possibly be generated during demolition or building renovation. Since the responsible party would be responsible for following all applicable laws and regulations during construction, demolition, and operation of facilities, impacts related to use hazardous materials are not expected.

Environmental Impacts

Proper disposal of any asbestos wastes encountered during demolition would be conducted as directed by the CAA National Emission Standards for Hazardous Air Pollutants (40 CFR 61.40 through 157). The responsible party would be responsible for following all applicable laws and regulations and for obtaining any necessary permits related to hazardous waste generation, removal, storage, and disposal during construction and demolition of facilities (U.S. EPA 1992a).

3.8.2 Demolition of Lead-Containing Materials

Removal and disposal of any materials known to contain lead-based paint would be conducted in accordance with applicable regulations (Toxic Substances Control Act [TSCA], Titles I and IV). The responsible party would be responsible for following all applicable laws and regulations and for obtaining any necessary permits related to hazardous waste generation, removal, storage, and disposal during construction and demolition of facilities.

Environmental Impacts

No significant long-term adverse impacts are anticipated as a result of the implementation of any of proposed action alternatives since lead-based paint handling will be performed in accordance with applicable laws and pertinent regulations.

3.8.3 Closure of Underground Storage Tank Sites

Under Subtitle I of the Resource Conservation and Recovery Act, Congress directed the U.S. Environmental Protection Agency (EPA) to establish regulatory programs that would prevent, detect, and clean up releases from underground storage tank (UST) systems containing petroleum or hazardous substances. The UST regulations that EPA published in the Federal Register on September 23, 1988 established a number of requirements for UST owners and operators, which include release response and corrective action for UST systems. The activities specifically described under "corrective

action", or clean up, include investigation, reporting, abatement, and clean up of releases of regulated substances into the environment.

The U.S. EPA developed the UST regulations to be flexible and to be implemented by state and local agencies. To give states the latitude to tailor their corrective action programs to meet their needs and circumstances, U.S. EPA's regulations do not specify cleanup levels or administrative procedures that states must follow. Instead, the regulations provide only that state or local cleanup programs must be protective of human health and the environment, allowing states to make choices about how they will design and conduct their corrective action programs.

Environmental Impacts

New York City has promulgated *Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and Its Sources*, Chapter 18, effective May 1, 1997. The NYC Department of Environmental Protection enforces these rules and regulations. Since this is the case, no adverse environmental impacts associated with the operation of underground or aboveground storage tanks are anticipated associated with any proposed action alternative.

3.9 CUMULATIVE IMPACTS

Cumulative impacts are those, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency, or person undertakes such actions. The assessment of cumulative impacts will be implemented in accordance with guidance titled *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997) and will include an overview of the New York City Metropolitan Region in order to place, in context the more detailed descriptions of the area of potential effect. The discussion will include such topics as regional geography, broad demographic data, major land use patterns, centers of economic activity, and the regional transportation network. Reasonably foreseeable actions will be defined through coordination with Federal agencies having oversight or regulatory authority in the New York City Metropolitan Region.

Environmental Assessments and Environmental Impact Statements submitted for review and comment will be obtained or summarized to identify potential future projects and associated potential cumulative impacts. The following projects have been initially identified as being deserving of potential cumulative impact analyses. Future work will refine this list of potential regional projects that may be included in the cumulative impact assessment.

- Hudson-Bergen Light Rail Transit
- Newark Elizabeth Rail Link Study Corridor
- Long Island Rail Road East Side Access
- Whitehall Ferry Terminal
- Rome Intermodal Center
- Utica Union Station

- MTA/LIRR East Side Access
- New York Power Authority – Combined Cycle Project
- Arthur Kill Channel—Howland Hook Marine Terminal, New York and New Jersey
- Cross-Harbor Freight Improvements in New York and New Jersey
- New York and New Jersey Harbor Navigation Study
- Programmatic Port of New York and New Jersey Disposal Facilities
- Staten Island Bridges Program
- Hudson River Waterfront Transportation Corridor Improvements
- NY-9A Reconstruction Project, Battery Place to 59th Street, New York
- East Side Access Project, Improved Access to Manhattan
- Brooklyn Naval Station Disposal and Reuse
- Manhattan East Side Transit Alternatives Study
- Atlantic Coast of New York City from Rockaway Inlet
- Governors Island Disposition of Surplus Property
- New York Dredged Material Disposal Site Designation
- Queens Subway Improvement Options Study, 63rd Street
- Marina Development Project Area
- Kill Van Kull and Newark Bay Channels Improvements
- Manhattan Sites General Management Plans, Implementation

3.10 COASTAL ZONE MANAGEMENT

The Federal *Coastal Zone Management Act* (CZMA) of 1972, established to support and protect the distinctive character of the waterfront, set forth standard policies for reviewing proposed developed projects along coastlines. New York State Department of State (NYSDOS) administers the program at the state level and the New York City Department of Planning (NYCDCP) administers it in New York City. The program includes 44 statewide policies for waterfront protection and improvement and 12 policies specifically for New York City.

The purpose of the CZMA is to encourage and assist the states in preparing and implementing management programs to “preserve, protect, develop, and where possible, to restore or enhance the resources of the coastal zone. The New York City WRP is authorized under the state’s Coastal Zone Management Program that stems from this Act. The WRP is the city’s principal coastal zone management tool. It establishes the City’s policies for development and use of the waterfront and provides the framework for evaluating the consistency of all discretionary actions in the coastal zone. The New York State DEC is responsible for management and protection of natural resources and environmental quality. The DEC regulates activities that may have a negative impact on wetlands and water quality. Activities such as draining, filling, or building structures within a wetland or its adjacent buffer area may be undertaken only if DEC has issued a permit. The USACE is responsible for the protection and management of the waterways and wetlands. The USACE issues and reviews permit applications for activities occurring in navigable waters and in tidal or freshwater wetlands that meet the national

designation criteria. When reviewing projects, the USACE consults with the USFWS, the Coast Guard, and the U.S. EPA. Most of the development near or in New York's waterways requires permits from the DEC and the USACE. To receive permits, a project must be consistent with the state Coastal Zone Management Program and the local Waterfront Revitalization Program. Other local and state agencies also have a role in the redevelopment of New York City's waterfront and the WRP consistency review can ensure the policies and plans of New York City are considered by all permitting agencies.

The coastal zone boundary defines the geographic scope of the WRP. The coastal zone boundary extends from the Westchester and Nassau counties and New Jersey boundaries, and to the three-mile territorial limit in the Atlantic Ocean (*Figure 1-5*). Landward, the coastal zone boundary includes important coastal features such as Significant Maritime and Industrial Areas, Significant Coastal Fish and Wildlife Habitats (*Figure 3-4*), Special Natural Waterfront Areas, Tidal and Freshwater Wetlands, Parks and Beaches, Erosion Hazard Areas, and other areas, districts, or visual resources. The coastal zone boundary roughly extends parallel to the coast, along the tip of southern Manhattan, including the WTC site, for a variable distance of not less than 1,000 feet inland from the shore (*Figure 1-5*).

Section 10 of the Rivers and Harbors Act of 1899 gives the USACE jurisdiction over any structure in navigable waters. Section 10 requires a permit for construction of structures (such as piers and bulkheads) on or affecting navigable waters of the United States. For the permit to be issued, the project must not obstruct or alter navigable waters, present a significant adverse effect on the aquatic environment, or result in violations of water quality criteria. In addition, the project must result in public good. To the extent that the proposed projects would result in installation or rehabilitation of bulkhead in a navigable water (e.g., the Hudson River), it would be subject to USACE review.

Environmental Impacts

Consistency with the Coastal Zone Management policies is provided with compliance with the New York City's Local Waterfront Revitalization Program requirements. The NYSDOS has developed procedures to administer the New York State CMP for all projects that will affect the State's Coastal Area. The Federal Consistency Assessment Form would be prepared for all activities that would require a permit, license, waiver or certification or similar type of federal approval. Concurrence by the NYSDOS with the federal findings documented by the Consistency Assessment Form would be used to demonstrate consistency with the Coastal Zone Management Plan. A copy of this form is provided in *Appendix A*.