Hempstead Lake State Park Project

Information Document

Project Background

Rebuild by Design

In June 2013, the United States Department of Housing and Urban Development (HUD) initiated Rebuild by Design (RBD), a competition to respond to Superstorm Sandy's devastation in the northeast region of the United States and promote a design-led approach to pro-active planning for long-term resilience and climate change adaption. The winning proposals would be implemented using Community Development Block Grant – Disaster Recovery (CDBG-DR) funding as well as other public and private-sector funding sources. In June 2014—following a year-long research and design process during which the design teams met and collaborated with regional experts, government entities, elected officials, issue-based organizations, local community groups and individuals—HUD announced the winning proposals. The Nassau County Living with the Bay Project (LWTB) was one of the selected projects. As a result, New York State has been allocated $125 million of CDBG-DR program funds to implement the project.

The goals of New York State's RBD implementation plan are to make communities more physically, economically, and socially resilient in the face of intense storm events. RBD is focused on promoting projects that strengthen resiliency throughout all aspects of the community, including ecological, economic, and social elements. The built environment helps maintain the natural ecosystem, which lessens vulnerability to disaster impacts and provides collateral benefits to the economy, public health, overall well-being and quality of life in the community. RBD resiliency projects strive to implement innovative, flexible, and scalable interventions that could be replicated in other parts of the State, nation, and globally. Diversity, redundancy, networked connectivity, modularity, and adaptability are important features of resiliency projects promoted by RBD.

Living with the Bay and the Resiliency Strategy

LWTB provides a comprehensive suite of potential interventions intended to provide long-term resilience and climate change adaption for Nassau County communities within the Mill River Watershed. The LWTB Project and Resiliency Strategy includes developing a program of specific projects and potential project locations, consistent with the RBD principles outlined above, that will address flooding caused by storm surge and rainfall (flood defense), improve coastal habitat and water quality (ecological restoration), ease public access to the waterfront (access and urban quality), and educate the public on stormwater and environmental management (social resiliency). The LWTB Project and Resiliency Strategy will identify, analyze, and prioritize potential resiliency interventions for a programmatic implementation of the interventions that will best serve the community.

The outcome of the Resiliency Strategy will be a program of thematically consistent and prioritized projects consistent with the goals set forth in the RBD LWTB Project.

Documented flooding problems within the LWTB Project Area are caused by inadequate drainage collection and conveyance capacity, high tailwater conditions (the level of water downstream of hydraulic structures, i.e., dams, culverts, outfalls, etc.) deeming the existing stormwater systems inadequate for critical storms, and overtopping storm surge events. Other documented problems within the LWTB Project Area include degradation and loss of habitat, shoreline degradation, and compromised water quality. The LWTB Project and Resiliency Strategy will consider and incorporate sea level rise projections throughout the development of resiliency interventions.

The LWTB Project and Resiliency Strategy will identify and prioritize projects and project types with program-specific timeframes and costs for planning, design, permitting, procurement, construction, and project closeout. The LWTB Project and Resiliency Strategy has preliminarily identified the following six general projects or project types:

- *Hempstead Lake State Park*: The New York State Office of Parks, Recreation and Historic Preservation (OPRHP) manages the 521-acre park located in the northern portion of the LWTB Project Area. This project would improve the Park's existing water management infrastructure, restore/construct approximately 8 acres of new emergent wetland, and provide new educational and recreational amenities.
- *Smith Pond*: South of Hempstead Lake State Park, Smith Pond is a 22-acre freshwater pond located in the center of the LWTB Project Area north of the Sunrise Highway in the Village of Rockville Centre. The proposed improvements at Smith Pond would consist of resiliency interventions, such as dredging, habitat restoration, stormwater storage, and improved public access.
- *East Rockaway High School and Blue-Green Park*: South of Smith Pond, East Rockaway High School is situated along the west bank of the Mill River between Centre Avenue and Pearl Street. Design options under consideration would reduce the school's vulnerability to flooding, stabilize an eroding shoreline, facilitate a continuous north-south route along the water for pedestrians and cyclists, and enhance the connection between the School and the river. Just north of East Rockaway High School, the Blue-Green Park provides municipally-owned open space that the LWTB Project and Resiliency Strategy may utilize to redirect and store storm surge, facilitate a continuous north-south pedestrian and cycle pathway, and protect municipal assets currently stored on the site.
- *Coastal Marsh Restoration*: At the southern end of the LWTB Project Area, where the Mill River drains into Hewlett Bay, tidal marshes present an opportunity attenuate wave energy and prevent erosion that threatens the communities to the north. Design options under consideration include installation of rock sills, floating marsh islands, and raised marshes (behind some rock sills) to reduce the erosion of the marsh fringes and provide long-term stability of multiple marsh environments.
- *Greenway*: The LWTB Project proposes the development of a continuous Greenway from Hempstead Lake State Park and Tanglewood Preserve south to Bay Park and

Hewlett Bay. The multi-use path would vary in width and, where practical, typically include 10-foot-wide permeable pavement with water storage and infiltration.

- *Stormwater Retrofit*: Throughout the LWTB Project Area, green infrastructure retrofit projects will be pursued as a means of improving stormwater collection and conveyance to mitigate flooding and improve water quality. Parcel-based green infrastructure projects, green streets, and green-gray infrastructure would be installed, as practicable, at identified problem areas.

The LWTB Project and Resiliency Strategy are configured such that projects can advance independently, subject to availability of funding. The Hempstead Lake State Park Project (Proposed Project), which is a component of the larger LWTB Project and Resiliency Strategy, would be functionally independent of the remaining potential projects discussed above and would have both independent utility and a distinct schedule for implementation.

Hempstead Lake State Park Project Description

Hempstead Lake State Park (Park) is a 521-acre multi-use facility in the Town of Hempstead (see **Figure 1** and **Figure 2**). The Park is located on the northern end of the Mill River watershed and includes the largest body of fresh water in Nassau County, namely Hempstead Lake, as well as several smaller ponds including: Northeast (NE) Pond; Northwest (NW) Pond; McDonald Pond; South Pond; and Schodack Pond. In addition to its water assets, the park also provides one of the largest continuous tracks of forested land present in southern Nassau County.

The Park includes 20 tennis courts, children's playgrounds, basketball courts, bridle trails for horseback riding, biking and hiking trails, picnic areas and a carousel. Access is available via Lakeside Drive and Peninsula Boulevard. Parking areas are available from both roadways. Trails run through the park connecting to the amenities and along the two roadways and Hempstead Lake shore. Social trails traverse the area between Northeast and Northwest ponds, as well as among South Pond, McDonald Pond, and Hempstead Lake.

The Proposed Project consists of four (4) components intended to improve stormwater management, enhance natural ecosystems, provide connectivity among diverse populations, enhance safety, and promote education programs at the Park. The Proposed Project components are as follows, a detailed description of each is provided below: "Dams, Gatehouse and Bridges;" "Northwest and Northeast Ponds;" "Environmental Education and Resiliency Center;" and "Greenways, Gateways and Waterfront Access."

Dams, Gatehouse and Bridges

There are three dams within the Park. The Proposed Project would remove vegetation, including approximately 1,200 trees, from the dam faces, and restore the operation of the dams and associated water flow control infrastructure within the Park to improve stormwater management. The design and restoration of the dams at the Park would be completed in close coordination with the New York State Department of Environmental Conservation (NYSDEC) as permitted through the New York State Dam Safety Regulations.

Northwest (NW) Pond Dam

The NW Pond Dam is located north of the Southern State Parkway and east of Eagle Avenue at the southern end of the NW Pond (see **Figure 2a**). The dam consists of a 230-foot-long earthen berm with an 11-inch thick concrete top slab that also acts as an emergency overflow. The concrete slab meets the existing grade at either end. The earthen berm was constructed around a core of timber sheet pilings filled with a mixture of sand and gravel. The original low-level maintenance outlet is no longer functional. The dam failed sometime before January 2012. Currently, the breach in the embankment is more than 35 feet wide and expanding.

The Proposed Project would replace the existing earthen embankment with a dam anticipated to be 5 feet tall and 230 feet long, consisting of a steel sheet pile upstream face with an earthen embankment behind it. An outlet weir would be provided with the lowest step set at elevation 21.0 feet, which is slightly below the normal water level in the NW Pond. The top of the dam would be set at elevation 25.0 feet, which is below the existing dam crest elevation of 27.0 feet to avoid creating any backwater effects on the upstream drainage collection systems.

The proposed dam would provide a normal impoundment of approximately 17 acre-feet of water over 7 acres of surface area, and a maximum impoundment of approximately 70 acre-feet of water over 25 acres of surface area.

The open channel from the NW Pond Dam to Hempstead Lake passes under the Southern State Parkway in a 10-foot-high and 20-foot-wide culvert. Water then flows through twin 5-foot-diameter pipes before emptying into Hempstead Lake. The Proposed Project would improve the channel by removing the twin pipes and replacing them with an open-bottom bridge. The bridge would improve flow and minimize the risk of the culverts failing during large storm events.

Hempstead Lake Dam, Outlet Gatehouse, and Pipe Arch

The Hempstead Lake Dam is located at the southern end of Hempstead Lake; a portion of Lakeside Drive located west of Peninsula Boulevard runs across the crest of the dam (see **Figure 2b**). The dam is a 1,500-foot-long and 17-foot-high earthen embankment with a clay core, and it was constructed in 1873 with five sluice gates and an adjacent outlet gatehouse containing outlet controls for the dam's sluice gates. The outlet gatehouse operates four (4) overflow weirs and the five (5) sluice gates that direct water flows through twin 36-inch diameter pipes inside an attached pipe arch running from the dam south along the west side of McDonald Pond to South Pond. Currently, the outlet controls within the gatehouse are not operable, and the five sluice gates are fixed shut, although two of the sluice gates have been permanently cut open and result in a typical 4- to 5-foot seasonal fluctuation in lake water levels.

The upstream face of Hempstead Lake Dam is protected by an approximately 18-inch thick layer of cut stones fit tightly together and held in place by gravity. In some areas, particularly near the gatehouse where the slope of the dam steepens from approximately 33 percent to 45 percent, the stones are grouted. The stones form an apron at the upstream toe of the dam and extend out into the lake. Much of the stone work is covered by sediment, leaf litter, and vegetation, primarily in the form of vines and trees. The downstream face of the dam is an earthen embankment heavily vegetated with trees, shrubs, and vines.

The Proposed Project would restore the Hempstead Lake Dam's sluice gates, outlet gatehouse, and pipe arch to renew the functionality of the dam's sluice gates. The dam restoration would include replacing all five sluice gates on the dam, installing an inspection cat walk and water-level monitoring equipment, internal and exterior repairs to the outlet gatehouse (including floor restoration, window replacement, and masonry repointing), and repairing the floor and walls of the pipe arch. The work would require the removal of trees and vegetation from the face of the dam, including tree root balls, which would be refilled with clean fill. Trees on the upstream side of the dam that cannot be removed without damaging the stone facing would be cut to a 4-inch stump and sealed with preservatives. Approximately 1,500 cubic yards of sediment from the stone-lined upstream side of the dam. Approximately 350 cubic yards of fill is anticipated to fill root ball areas on the downstream side of the dam. As the dam comprises historic structures, all design and construction work would strive to maintain historic accuracy and would be completed in accordance with state and federal requirements. Aesthetic design would be balanced with security concerns and functionality. Interpretive signage would also be installed that informs patrons on the history and function of the Hempstead Lake Dam.

Upon completion, the dam would provide a normal (seasonal) impoundment of approximately 198 to 658 acre-feet of water over 64 to 115 acres of surface area, and a maximum impoundment of approximately 2,510 acre-feet of water over 178 acres of surface area.

The proposed work at Hempstead Lake Dam is intended to be completed in concert with work at the NW Pond Dam (above) and the South Pond Dam and Outlet Weir (below), but is equally as important as a stand-alone project for overall protection of the watershed. Controlling the flow of water through the Hempstead Lake Dam is integral to flood protection as well as maintaining the water level of the Hempstead Lake to promote ecological improvements and provide recreational opportunities. The Proposed Project would also include the development of an operating plan for the dam to provide Park management operating procedures to actively manage water flow before, during and after storm events to prevent flooding in the communities surrounding the Park, both upstream and downstream of the Hempstead Lake Dam.

South Pond Inlet Gatehouse, Dam, and Outlet Weir

South Pond is located at the southern end of Hempstead Lake State Park. Water flows into the pond via the pipe arch from Hempstead Lake to the north, as well as from Schodack Brook to the west.

The South Pond Dam is an earthen embankment located at the southern end of South Pond. The dam is approximately 750 feet long and 10 feet high, and is north of Lakeview Avenue. The upstream and downstream faces of the dam are covered with trees and shrubs, and portions of the dam crest have settled (sunken) over time.

The South Pond Outlet Weir is located along the dam, approximately 200 feet west of Peninsula Boulevard (see **Figure 2b**). The stone Outlet Weir is 25 feet long and set at an elevation of approximately 12.0 feet; the surrounding earthen embankment is set at an elevation of approximately 17.0 feet. Water drops over the spillway before entering a culvert under Lakeview Avenue.

There are two gatehouses at South Pond: an inlet gatehouse and an outlet gatehouse.

The pipe arch from the Hempstead Lake Dam outlet gatehouse connects to the South Pond inlet gatehouse, which is located at the northeast edge of South Pond (see **Figure 2b**). The brick South Pond inlet gatehouse is similar in style to the building at Hempstead Lake but is smaller since it only extends slightly beyond the width of the pipe arch itself. The south end of the building is the pipe arch opening to South Pond. The door and windows have been closed over and there is nothing remaining of the original wooden floor that would have extended from wall to wall and rested upon the brick shelf built into each side wall. Slots built into the brickwork indicate that wooden flashboards may have been used to adjust the flow coming out of the pipe arch into South Pond. The existing metal roof is poor condition.

The remains of the original South Pond outlet gatehouse are located at the west end of the South Pond dam (see **Figure 2b**). This outlet gatehouse ties into the pipe arch system that runs along the western side of South Pond. It was once connected to the main pipe arch between Hempstead Lake and South Pond at a point approximately 35 feet north of the South Pond inlet gatehouse. The back of the dilapidated South Pond outlet gatehouse ties into the brick pipe arch system that continues southward and is part of the original Ridgewood Reservoir water system. The outlet gatehouse has no roof and partial walls on three sides. A concrete barrier was built in front of the outlet at some more recent time preventing it from acting as an overflow for South Pond under most conditions.

The inlet gatehouse at the north end of South Pond would be restored in a manner similar to the Hempstead Lake gatehouse with a new door, roof, wooden floor, and windows to replicate the original style. The brickwork at the south end of the building would also be repaired to ensure the structural integrity of the building. The small interior room created by providing flooring may be used for storage and/or educational purposes.

At the south end of the Pond, the project would include the removal of trees and vegetation that have grown through the dam. Additional fill with native grass plantings would be applied to the dam crest to create a uniform crest and width, and the stonework on historic outlet weir would be rehabilitated to address damage caused by vandalism. The existing 7-foot height and 750-foot length of the dam would be maintained. Upon completion, the South Pond Dam and Outlet Weir would maintain existing normal and maximum impoundment, which comprise approximately 109 acre-feet over 21 acres of surface area, and approximately 229 acre-feet over 27 acres of surface area, respectively.

The existing wall of the deteriorated outlet gatehouse would be removed to a structurally safe height and some of the bricks may be salvaged to repair the South Pond inlet gatehouse. The historic pipe arch that ties into the south wall of the building would be bulk-headed prior to placement of fill. The existing wall sections would be The remains of the South Pond outlet gatehouse would be photographed prior to any deconstruction.

Bridges

Three proposed pedestrian bridges would be installed at the following locations: over the Mill Creek near where it enters the NE Pond; over the open stream channel between the Southern

State Parkway and Hempstead Lake which would replace two 5-foot-diameter culverts; and over Schodack Brook near where it enters South Pond (see **Figure 2a** and **Figure 2b**). The bridges would be designed to fit into the Park aesthetic. The bridges would have a width of 11.5 feet, or 1.25 times the bank full width, and be designed to handle a load of 15,000 pounds to accommodate emergency and maintenance vehicles. The elevation of the bridges would be coordinated with the adjacent multi-use paths and would maintain stormwater flows for most rainfall events.

Northeast and Northwest Ponds

The Northeast Pond (NE Pond) and Northwest Pond (NW Pond) are located at the northern most end of the Park and are bordered to the north by Hempstead High School and Hempstead Golf and Country Club, to the west by the Lakeview residential neighborhood, and to the south and east by the Southern State Parkway and Peninsula Boulevard (see **Figure 2a**).

Runoff from an approximate 5.7-mile square area currently drains into the ponds through Mill Creek (see **Figure 2a**). Several outfalls along the Southern State Parkway discharge into the NE Pond, and one outfall discharges runoff from the parkway into the NW Pond. The Ponds are also fed by groundwater flows. There is significant erosion along the banks of the Mill Creek channel, which contributes to the sedimentation of the ponds. The erosion has also created unstable banks, apparent by the exposed soil and large trees that are falling across the channel.

The components of the Proposed Project within the NW Pond and NE Pond would involve the installation of floatables catchers and sediment basins at pond inlets and the creation of filtering wetlands and pond excavation/dredging to mitigate ongoing bank erosion, improve water quality, expand aquatic habitat, and increase impoundment capacity.

Northeast (NE) Pond

The surface water level of NE Pond is approximately 25.9 feet above sea level. The pond has a depth of 6 feet. The muck layer in NE Pond ranges from 1 to 1.5 feet, and the pond has steep side slopes around its perimeter that descend to a flat bottom muck layer. There are 3.69 acres of existing emergent wetlands and 2.83 acres of Shrub Maple wetland at NE Pond. In NE Pond the predominant visible issues are the amount of floatables, sediment and debris along the shoreline and the creek channel and within the wetland and area north of the pond.

The Proposed Project would involve installation of a floatables catcher at the Mill Creek entrance to the NE Pond at a concrete channel designed to handle the depth of flow for a 100-year storm event. The floatables capture system would have a stationary double-netting system designed for a flow of 875 cubic feet per second (CFS). It would filter and capture the floatables carried in the flow from a 1-year storm event, and it would be sized to capture bottles but allow smaller-sized materials, such as leaves and organic matter, to pass through. A new paved road of 0.41 acres is proposed and will be used as an access to and from the floatable catcher. The work in the NE Pond would also include bank stabilization and erosion control through installation of open grid pavers in the channel of Mill Creek north of the concrete channel and within the Park. From the floatables catcher, water would flow to a new sediment basin. The sediment basin would contain up to 10 percent of the 1.5-inch water quality volume in accordance with NYSDEC design parameters.

In total, approximately 69,000 cubic yards of material would be dredged or excavated from NE Pond (see **Figure 2c**). Approximately 16,000 CY of sediments would be dredged from the center of NE Pond. The preliminary samples of the sediments in the NE Pond had a range of elevated concentrations for multiple contaminants. In particular, metals were found to be beyond Class C contamination thresholds in one of the three samples taken in the NE Pond. Class C sediments, as described in NYSDEC's Technical & Operation Guidance Series (TOGS) Section 5.1.9, are expected to be acutely toxic to aquatic biota and would likely be subject to more stringent dredging, management and disposal requirements. Furthermore, it is the responsibility of the permit applicant to ensure the Class C sediment is not a regulated hazardous material as defined in 6 NYCRR Part 371. Additional sediment sampling would be conducted after the Sediment Sampling Plan submitted to NYSDEC for review has been approved and the design is finalized.

Based on these preliminary sediment sampling analyses, most of the 16,000 CY would be reused on-site within the NE Pond. A new bermed filtering wetland would be constructed along the northwestern edge and existing drainage channel of NE Pond. A second bermed filtering wetland would be constructed on the southeastern edge of the pond to filter flow from five outfalls coming from the Southern State Parkway; this second berm would also serve as a trail. The only materials removed from the site would be materials unsuitable for reuse within the pond, such as the waste materials screened from the dredge. Unsuitable materials would be hauled and disposed off-site in accordance with disposal requirements.

The remaining 53,000 CY of soil material would be excavated from the periphery of the pond and used to construct the sediment basin and channel. The dredged materials and upland excavation would be used to raise the pond bottom elevation to create wetlands areas, which would then be planted with emergent wetland vegetation, as well as develop a low-flow channel to slowly filter the runoff directed to the wetlands. The wetlands would have constructed berm edges to hold the runoff and an overflow spillway to allow the filtered runoff to outfall into the NE Pond.

The existing bypass channels to NE Pond would be restored by excavating the sediment build up that is currently blocking the flow, reshaping the channel, and revegetating with emergent vegetation to filter the volume of flow directed to NW Pond. The wetland channels would have a piped overflow spillway to direct filtered runoff through the first channel to a second filtering wetland that discharges into NW Pond (see below). Slopes in excess of 1 in 3 would be stabilized with coir mats or fiber logs.

At NE Pond, the project would remove a total of 3.41 acres of wetland area comprising emergent wetland and shrub red maple wetland. The project would remove 2.24 acres of shrub red maple wetland located in the eastern section of the pond, and the area would be used to create a sediment basin to settle out the high sediment load from the watershed. The project would remove 1.17 acres of degraded emergent wetland, which is heavily sediment laden and populated with invasive vegetation, located in the northern Mill Creek stream channels. A total of 7.65 acres of new emergent wetlands would be created, for an overall net gain of 5.13 acres of emergent wetland. Wetland habitat in NE Pond would change from a current acreage of 6.52 to 10.76 acres. See **Figure 2c**.

Northwest (NW) Pond

The water level in NW Pond is low due to the breach of the NW Pond dam and drought conditions, but, as stated above, also due in large part to sedimentation. The surface water level of NW Pond is approximately 23.0 feet above sea level. Water depth ranges from 0 to 1.5 feet. NW Pond increases in depth from the north to the south. The surface gradually slopes from wetland to pond open water areas, to the south, and the deepest pond section is adjacent to the dam. The muck layer in NW Pond is approximately 6 inches thick. There are 14.74 acres of emergent wetlands at NW Pond. In NW Pond, the predominant visible issues are the low water level and the breached dam.

Water predominantly enters NW Pond via a stream channel from NE Pond and from a 96-inch pipe outfall located on the west side of the NW Pond. Storm flow was also carried to NW Pond via a drainage bypass channel located north of NE Pond, but the large sediment deposits in the channels and at the north end of the site prevent storm runoff from reaching these bypass channels and flowing through them. As described above, the flow through these channels would be re-established by excavating the sediments, regrading and planting with emergent wetland vegetation to create additional filtering wetlands. Improvements would also include the installation of a floatables catcher and sediment basin at the 96-inch pipe outfall. This floatables catcher would be accessible via the same new paved road proposed for the NE Pond. The existing wetlands immediately north of the outfall would be re-graded to direct the initial flow to a channel through the wetlands that would provide additional filtering capacity of runoff.

Dredging would occur within the center of the surface water area of NW pond. The dredging is proposed to provide 6 feet of pond depth for additional pond volume and to improve aquatic habitat in this shallow pond. The project would remove approximately 12,000 CY of materials for the pond (see **Figure 2c**). Preliminary sampling of the sediments from the NW Pond exhibited no elevated contamination and may, with NYSDEC approval, be managed with unrestricted use. Additional sediment sampling would be conducted after the Sediment Sampling Plan submitted to NYSDEC for review has been approved and the design is finalized. The excavated sediments will be used to establish the sediment basin at the outfall and the wetland edge along the south shoreline. The only materials to be removed from the site are those waste materials screened from the dredge materials.

Based on preliminary sediment sampling, this material would be used in creation of wetland edges. Slopes in excess of 1 in 3 would be stabilized with coir mats or fiber logs.

In total for the NW Pond, the project would remove 0.77 acres of emergent wetland and add 0.53 acres, for a net loss of 0.24 acres of emergent wetland. Total wetlands in NW Pond would decrease from 14.74 to 14.50.

Combined, the proposed wetland enhancement activities at NW Pond and NE Pond would require removal of approximately 1,805 trees.

Greenways, Gateways, and Waterfront Access

The Proposed Project would expand and improve the existing path system within the Park. The proposed greenway and trail system upgrades would enhance connectivity and provide direct access for the public to the natural resources within the Park. Connection points to the surrounding neighborhoods, as well as access to the Northern Ponds would be provided through new gateways and access points. Waterfront access would be enhanced through installation of piers, kayak launches, and fishing docks along Hempstead Lake. The greenway and trails would include the bridges over the open stream channel between the Southern State Parkway and Hempstead Lake, and over Schodack Brook near where it enters South Pond, as discussed above. Grading and removal of trees would be required for these features. The greenway and trail improvements would be designed and implemented in a manner that would allow for connection to, and replication for, the pedestrian and cycling pathways under consideration in the larger LWTB Project and Resiliency Strategy.

Greenway and Trails

A12-foot-wide, crushed stone dust greenway would run through the west side of the Park, from Lakeview Avenue in the south to Peninsula Boulevard north of NE Pond (see **Figure 2a** and **Figure 2b**). This greenway would connect to a planned greenway running along the Mill River corridor from Hempstead High School in the north to Bay Park in the South. It would be open on a daily basis for public recreational use (such as walking, jogging, biking, horseback riding, and bird watching). The proposed greenway would consist of improvements to the existing system of trails within the Park and would require the removal of approximately 100 trees. The greenway would be capable of facilitating access for emergency vehicles. The greenway would also include educational signage to convey to the public the positive benefits of the LWTB Project and Resiliency Strategy. Trees would be planted along the greenway to enhance the natural character of the Park.

Trails

A renovated hiking, cycling, and bridle path would be installed around the perimeter of Hempstead Lake (see **Figure 2a** and **Figure 2b**). On the west side of the lake, this pervious crushed stone trail would be located between the greenway and the lake. The hiking, cycling, and bridge path would include a spur crossing the Southern State Parkway and the planned greenway at Eagle Avenue, connecting to the Eagle Avenue gateway, new parking lot, and a loop spur running along the northwest side of the northern ponds, west of the proposed greenway. In addition, new wetland trails and minor dirt trails would be constructed to provide hiking access to the rehabilitated northern ponds (see **Figure 2a**).

Gateways

The Proposed Project would improve the existing informal dirt parking lot north of the Southern State Parkway at Eagle Avenue (see **Figure 2a**). A 0.91-acre formalized parking lot with four stormwater retention basins, 48 car spaces, and three bus spaces would be constructed. The entrances to the parking lot would also have direct access to/from the Long Island Railroad local stations and access from other public transportation.

Two 64-square-foot gateways entries from surrounding neighborhoods would be created at Eagle Avenue and Graham Avenue. These gateways would include signage and direct access to the

greenway or trails. The gateways would provide direct pedestrian access from the adjoining neighborhoods, a significant portion of which are low to moderate income communities. These gateways would also open views and provide additional access points for emergency vehicles.

Observation Areas/Piers/Kayak Launches

The trails and greenway would also provide access to the ponds and lake. A new raised walkway would extend westward from Lakeside Drive, intersect the greenway, and run westward to a new 400-square-foot observation pavilion along Hempstead Lake (see **Figure 2a**). The pavilion would be located approximately 23 feet above the Hempstead Lake surface, but it would not extent out over the water. In addition, a 416-square-foot new kayak launch, and up to four 600-square-foot /fishing piers/docks would be built along the Hempstead Lake shore, providing additional access points to the water. Up to five 64-square-foot bird viewing platforms would be built around the Lake, opening up views to the public (see **Figure 2a**).

Environmental Education and Resiliency Center

The Proposed Project includes construction of a new, single-story Environmental Education and Resiliency Center West of Lakeside Drive (see **Figure 2b**). The approximately 8,000-square-foot (approximately 52 feet x 96 feet (irregular) in footprint) Environmental Education and Resiliency Center would comprise a main education room, overlook deck, restrooms, and storage facilities. Utilities would be connected to the building through underground boring and a 24-inch-wide trench that would be backfilled upon project completion.

The facility would provide a centralized destination and connection for the residents to the Hempstead Lake corridor that would directly support environmental education and recreational opportunities. Specific spaces within the proposed Environmental Education and Resiliency Center are proposed to be designed flexibly, with spaces that would permit a resilient occupancy of the building that can adapt quickly to the varied uses to serve as an information, storage, and a gathering space, during and immediately following emergencies and natural disasters affecting the surrounding community. The building would include a full building load emergency generator to provide resiliency during power outages.

The proposed Environmental Education and Resiliency Center would demonstrate environmental sustainability, responsibility, and resilient building practices. Where appropriate passive design strategies would be implemented in the configuration of the building whereby solar heat loss and gain would be controlled to minimize the active HVAC requirements. The building would be provided with an automatic emergency diesel generator, which would be located outside the building's southwestern façade. The generator would have the capacity to provide energy to the entire building in the event of a power outage. The building would include roof-mounted solar (photovoltaic) panels providing up to 30 kilowatts of electricity, intended to provide adequate power for 100 percent of basic building systems during non-peak loading scenarios.

Statement of Purpose and Need

The purpose of the LWTB Project is to improve community resilience and reduce risk from flooding and damage to life and property by mitigating local flood risk from coastal surge and stormwater, while improving drainage, enhancing natural resources and improving public access.

The purpose of the Proposed Hempstead Lake State Park Project, as a component of LWTB Project and Resiliency Strategy, is to improve stormwater management, enhance natural ecosystems, provide connectivity among diverse populations, enhance safety, and promote education programs at the Park.

The purpose of the Proposed Project is to improve the impoundment capacity of the system through replacement of the NW Pond Dam, allow for stormwater management through flow control at Hempstead Lake Dam, and improve dam safety through tree removal. The existing dams within the Park are physically impaired, resulting in limited or uncontrolled water impoundment. In 2011, the NW Pond Dam failed, creating a 35-foot breach of the embankment dam. This breach is expanding, and it is decreasing water levels in the NW Pond and NE Pond and impairing functionality of wetland systems. The embankment dam is in need of repair in order to restore the ecological value of the NW Pond and NE Pond wetland systems and increase stormwater runoff impoundment during rainfall events. The Hempstead Lake Dam's sluice gates are fixed shut, thus limiting water flow control through the Mill River system. Replacing the sluice gates and repairing the Hempstead Lake Dam Gatehouse is needed to restore the functionality of the sluice gates. Trees have grown on the side slopes of Hempstead Lake Dam and South Pond Dam, which can compromise structural integrity. These trees need to be removed in order to preserve the structural integrity of the dams and ensure the safety of the communities downstream of these flood control structures.

The purpose of the NW Pond and NE Pond component of the Proposed Project is to provide ecological restoration through improved the water quality of the Mill River System by treating stormwater runoff through pollutant capture and increased filtration, by creating and enhancing wetland areas and improving pond habitat in the northern pond/wetland complex. Over the years, the waters entering the Park have become more polluted due to the increase of impervious surfaces within the Hempstead Lake watershed. The NE and NW Ponds have low oxygen levels and can be anoxic, and the ponds system is unable to cleanse itself via oxidation to the same degree that a healthy freshwater system would. Levels of fecal coliform, which is an indicator species representative of the relative concentration of pathogens, exceed standard values, which increases disease risk for aquatic species and may increase biological oxygen demand and eutrophication. Elevated nutrients in the system include phosphorous and ammonia, and there is a potential for heavy metals to be present in toxic concentrations.

The drainage systems along Mill Creek and other outfalls do not prevent floatables from entering the piped system, and substantial levels of floatables are carried through the system and into the Park during each rain event. Heavy sediment loads, as well as pollutants, are also carried in the runoff and are deposited in the Mill Creek channel and also within the area north of NE Pond and the pond's shoreline areas at the outfalls (see **Figure 2a**). The sediment load has down-cut and modified the drainage patterns within the creek and the area north of NE Pond, and altered the flow between the ponds. The sedimentation, in addition to floatables and pollution also brought in by the stormwater, has negatively impacted the function of the ponds and wetland areas. With nothing in place upstream to capture sediment and floatables, the Northwest and Northeast ponds act as sediment and garbage retention basins. Ultimately, the plastics and garbage end up farther downstream as they breakdown or are dislodged, finally impacting the bay and ocean. Pollutants

also continue downstream, increasing the pollutant load for downstream communities and waters.

The water level in NE Pond is low due, in part, to the 2016 drought conditions. However, a larger contributing factor is the heavy siltation occurring in the pond due to sediment laden stormwater runoff from the watershed.

The purpose of the Environmental Education and Resiliency Center—as well as the Greenway, and Gateways, and Waterfront Access components—is to increase social resiliency and park access, increasing connectivity of the surrounding community to the waterfront. The community surrounding the Park has limited direct access to the natural resources within the Park. The Proposed Project would improve access throughout the Park, increase the availability of amenities for education opportunities, learning spaces, and community gathering, and stimulate the public stewardship over the Park.

Existing Conditions and Trends

Location

Hempstead Lake State Park is a 521-acre multi-use park located in West Hempstead – an unincorporated hamlet located along the western edge of the Town of Hempstead in Nassau County, New York. The population of the Town of Hempstead comprises the majority of the population of Nassau County. Based on the 2010 census, if the Town of Hempstead were to become a city, it would be the second largest city in the state. The communities that surround the park represent a mix of incomes. Roughly 6 percent of the population lives below the poverty line, with areas to the southwest and northeast of the Park identified as potential Environmental Justice Areas by NYSDEC.

The Proposed Project location is roughly bound by the Hempstead Golf and Country Club to the north, Lakeview Avenue to the south, Peninsula Boulevard to the east, and Woodfield Road to the west. Mill Creek enters the park in the northern end and flows into the two northern ponds before flowing into Hempstead Lake, and South Pond, leaving the park. Schodack Brook also flows into the park through Schodack Pond and into South Pond Downstream of the Park, at Smith Pond, several streams join with the Mill River, which continues southward south and into the bay and, ultimately, the ocean.

Land Use

The current land use of the Proposed Project site is recreational. Land uses adjacent to the site are predominantly residential, comprising a mix of single- and multi-family units. Other land uses surrounding the project area are interspersed and include commercial properties to the east, west, and south, and a combination of recreational, open space and industrial areas to the north. Hempstead High School and Hempstead Golf and Country Club are also located north of the site.

Floodplain Management

The Proposed Project site is located within an area of minimal flood hazard, designated by FEMA as Zone X, which is outside of both the 1% and 0.2% annual chance floodplain. It is therefore not located within a base floodplain. See **Figure 3**.

Within the project site boundary, in addition to the NE and NW Ponds, Hempstead Lake, McDonald Pond, and South Pond water bodies, small freshwater ponds are present within the northern and southern portion of the project area. Freshwater forested/shrub wetlands are present on the north and south portions of the project site as well, and freshwater emergent wetlands are located on the northern portion of Hempstead Lake and the eastern portion of Northwest Pond.

Hempstead Lake, part of the upper portion of the Mill River watershed, drains to Hewlett Bay, located on the South Shore of Long Island. Mill Creek, a tributary of Hempstead Lake, is located along the northern edge of the Proposed Project site. Neither Mill Creek nor Mill River are listed on the New York State Department of Environmental Conservation Wild, Scenic, and Recreational Rivers list (NYSDEC 2017) or on the Nationwide Rivers Inventory (NPS 2009).

Coastal Zone Management and Coastal Barrier Resource System
Hempstead Lake State Park is located outside of the coastal zone, as shown in **Figure 4**. The park is not protected by the Coastal Barrier Resource System, as shown in **Figure 5**.

Cultural Resources
Hempstead Lake was originally constructed as part of the Brooklyn Waterworks water supply system to provide water to Brooklyn, New York. The North ponds were developed when the Southern State Parkway was constructed, which separated the northern lake section from the remainder of Hempstead Lake. New York State Department of Transportation (NYSDOT) design plans for the Southern State Parkway referred to the NE Pond area as an Impoundment Area, and all drainage from the parkway was piped to this area (Cashin Associates, 2017).

After construction of the Southern State Parkway, few improvements were made to the North ponds area. This section of the park saw limited use - mainly for horseback riding and some other trails use. As the watershed continued to develop, runoff volumes and velocities increased and the drainage system allowed floatables and debris to be carried to the ponds where they've become trapped on the shoreline and within the ponds (Cashin Associates, 2017).

The Hempstead Lake Dam, Hempstead Lake Gatehouse, and pipe arch were constructed in 1873 (Cashin Associates, 2017a). The dam is a 1,500-foot-long and 17-foot-high earthen embankment with a clay core, and it was constructed with five sluice gates and an adjacent outlet gatehouse (Hempstead Lake Gatehouse) containing outlet controls for the dam's sluice gates. The outlet gatehouse and sluice gates direct water flows through twin 36-inch diameter pipes inside the attached pipe arch, running from the dam south along the west side of McDonald Pond to the inlet at the South Pond Gatehouse. The dam's outlet-controls are currently not functional. The five sluice gates have rusted shut, although two of the sluice gates have been permanently cut open and result in a typical 4- to 5-foot seasonal fluctuation in lake water levels.

Hempstead Lake State Park was determined eligible for listing in the National Register of Historic Places by the Office of Parks, Recreation and Historic Preservation on June 5, 2017 (Howe 2017). The park meets Criterion A in the areas of recreation, conservation, and park planning as one of a network of state parks established on Long Island in 1924 as part of New York's comprehensive state park and parkway plan. The park also meets Criterion C in the area

of design (Howe 2017). Resources in the park that could be affected by the project include the Hempstead Lake Dam and South Pond Inlet Gatehouses.

Ecological Resources

Wetlands

Wetland assessments were conducted at the two northern ponds. Assessments indicate that there are 14.74 acres of emergent wetlands at Northwest pond, 3.69 acres of emergent wetlands at NE Pond, and 2.83 acres of Shrub Maple wetland at NE Pond, for a total of 21.26 acres of wetlands. From south to north, the waterbodies are: South Pond, McDonald Pond, Hempstead Lake, Northwest Pond, and NE Pond. National Wetlands Inventory (NWI) wetlands are indicated by a string of letters and numbers and identified as open water (Lake & Freshwater Pond), Freshwater Emergent, and Freshwater Forested/Shrub Wetland. See **Figure 8**.

Water Quality

Between November 2016 and January 2017, a total of 14 surface water samples were collected and analyzed from seven sampling locations by Cashin Associates, P.C. (Cashin Associates), to characterize the baseline water quality of the NE and NW Ponds and to determine the impacts stormwater has on the water quality of the pond system. Samples for each parameter were collected during both dry conditions (sampling conducted following an extended drought in which the two ponds were not receiving or discharging any considerable amounts of surface water or stormwater), and wet weather conditions (sampling conducted during heavy rainfall in which over 1.5 inches of rain fell). The samples were analyzed for bacteria counts, nutrient concentrations, particle concentrations, volatile organic compounds, semi-volatile organic compounds, heavy metals and pesticides.

Sampling confirmed the presence of high bacteria levels; based on the results of the *Enterococci* testing, stormwater appears to be a major contributor to the high bacteria levels in the pond system. Samples collected from stormwater entering the NE Pond from Mill Creek indicated that this area is the major source of these bacteria. Average concentrations of phosphorus levels in both wet and dry conditions were found to be an order of magnitude higher than the NYDEC guidance value, indicating that the pond system is at risk of becoming, if not already, eutrophic. Dissolved oxygen levels also indicated anoxic and hypoxic conditions are present in the pond system. Total suspended solids (TSS) results were observed to increase significantly under wet conditions, and sample results indicated that the average pH across all sample locations and events was 7.0, which falls within the acceptable range of 6.5 to 8.5 for lakes (Cashin Associates, 2017).

Toluene was the only volatile organic compound detected during both wet and dry sampling events, and was detected at very low concentrations. No semi-volatile organic compounds were detected. Some stormwater samples demonstrated concentrations of multiple heavy metals, with the highest metal concentrations observed under wet conditions. Based on these results, there is a potential for heavy metals, particularly total chromium, to be present in aquatically toxic concentrations. However, additional sampling and analysis focusing on the dissolved form of these contaminants would be necessary to make this determination. No PCBs or pesticides were detected in the samples (Cashin Associates, 2017).

Overall, sampling results indicated that the ponds generally exhibit poor water quality characteristics and stormwater runoff appears to be a major contributor to contaminants entering the pond system.

Remediation Sites
There are no remediation sites located in the project site or immediate vicinity. See **Figure 6**.

Sole Source Aquifer
The project site is in an area served by a designated sole source aquifer. See **Figure 7**. A Sole Source Aquifer consultation with the U.S. Environmental Protection Agency will be undertaken by GOSR.

Biological Resources

Vegetation
A desktop review of available resource mapping, previous reports, and species inventories was conducted to identify vegetation resources within the Proposed Project site, including significant natural communities. Significant natural communities are rare or high-quality wetlands, forests, grasslands, ponds, streams, and other types of habitats considered significant from a statewide perspective by the New York State Department of Environmental Conservation (NYSDEC) Natural Heritage Program (NHP). According to the NYSDEC Environmental Resource Mapper (NYSDEC 2017), the Proposed Project site is within the vicinity of rare plants and a significant natural community (coastal plain pond shore) lies within a portion of the Proposed Project site.

Coastal plain pond shore habitats include the gently sloping shores of coastal plain ponds and have highly variable water levels based on seasonal and annual fluctuations in groundwater, precipitation, and evapotranspiration. Substrates are typically made up of sand, gravel, or muck and vegetation community varies with the water level. In years with low water levels when the substrate is exposed, the vegetative community is dominated by dense sedges, grasses, and herbs. In years with high water levels and submerged substrate the vegetative community is dominated by floating-leaved aquatic species and a few emergent species. Coastal plain pond shores are typically divided up into four zones: the upper wetland shrub thicket zone; the upper, low herbaceous fringe zone; the sandy exposed pond bottom zone; and the organic exposed pond bottom zone. The upper wetland shrub thicket zone is either pine barrens shrub swamp or the coastal variant of highbush blueberry bog thicket. The upper, low herbaceous fringe zone is a narrow band of vegetation dominated by peat moss (*Sphagnum* spp.), yellow-eyed grass (*Xyris difformis*), narrow-leaved goldenrod (*Euthamia caroliniana*), bluejoint grass (*Calamagrostis canadensis*), clubmosses (*Lycopodiella inundata, L. appressa*). The sandy exposed pond bottom zone is often very sandy and dominated by beakrushes (*Rhynchospora capitellata, R. nitens*) and nutrush (*Scleria reticularis*). The organic exposed pond bottom zone is more frequently flooded than the sandy zone and the dominant plants of this zone are bald-rush (*Rhynchospora scirpoides*), pipewort (*Eriocaulon aquaticum*), spikerushes (*Eleocharis obtusa, E. olivacea*), and gratiola (*Gratiola aurea*) (Edinger et al. 2014).

Between February 22 and 23, 2017, a tree density survey was conducted by Cashin Associates in the upland areas adjacent to the NE and NW ponds (Cashin Associates 2017b). A total of 26 random sample sites were selected within six sub-sample areas of the Proposed Project site. The six sub-sample areas included the following locations: Road edge of the NW Pond [dominated by cherry trees (*Prunus spp.*)]; Upland Oak Forest north of the NW Pond; Upland Oak forest between the NE and NW Ponds; Red Maple Swamp; disturbed upland forest area south of NE Pond Channel (dominated by locusts (*Robinia spp.)* and maples (*Acer spp.*)]; and Upland Forest Strip southwest of NE pond [dominated by oaks (*Quercus spp.*]. Invasive species observed during the survey included: Japanese honeysuckle (*Lonicera japonica*), English ivy (*Hedera helix*), common reed (*Phragmites australis*), Japanese knotweed (*Polygonum cuspidatum*), devil's walking stick (*Aralia spinosa*), and tree of heaven (*Ailanthus altissima*). The mean tree density of the site area averages between 289 and 316 trees per acre and the estimated number of trees identified at each area ranges from 89 to 3,963.

In December 2016, Cashin Associates prepared a design report (Cashin Associates, 2017a) which included a field and desktop plant and wildlife survey. Numerous exotic or invasive plant species were observed on the project site in both upland and wetland locations. Plants identified as New York State (NYS) invasive species which were found within the Proposed Project site include: Norway maple (*Acer platanoides*), garlic mustard (*Alliaria petiolata*), oriental bittersweet (*Celastrus orbiculatus*), autumn olive (*Elaeagnus umbellata*), Japanese knotweed, privet (*Ligustrum sinense*), Japanese honeysuckle, purple loosestrife (*Lythrum salicaria*), common reed, locust, multiflora rose (*Rosa multiflora*). As part of the design report, preliminary wetland delineation and assessment was completed at Proposed Project site on November 4 and 5, 2016. Dominant wetland vegetation observed included beggarticks (*Bidens* spp.), spikerushes, common three-square (*Schoenoplectus pungens*), common reed, and willows (*Salix* spp.). The assessment noted that the red maple swamp that was densely overrun by invasive species.

Wildlife and Fish

Terrestrial wildlife expected to utilize the Project Site includes squirrels, chipmunks, muskrats, mice, raccoons, deer, reptiles, and resident and migratory birds. Various habitats within the Proposed Project site are utilized by owls, osprey, bald eagles, herons, egrets, waterfowl, as well as migratory birds such as warblers, flycatchers, and vireos. Forested area provides breeding habitat for species such as great horned owls, woodpeckers, and migratory songbirds. Fish and amphibians utilize aquatic habitat, including Hempstead Lake and its adjacent water bodies which are connected to the Mill River and eventually flows to Hewlett Bay.

According to the National Audubon Society (Audobon 2017), Hempstead Lake is one of the most important sites on Long Island for wintering waterfowl, beginning in late August and peaking in the late fall and winter. At peak times, the numbers run into the many thousands with the following species present: gadwall, American wigeon, American black duck, mallard, northern shoveler, northern pintail, green-winged teal, canvasback, lesser scaup, common merganser, hooded merganser, and ruddy duck. Of these, the most numerous are the American black duck, mallard, and lesser scaup. Hempstead Lake also one of the most important sites for migrant landbirds on Long Island, and approximately seventeen species of shorebirds have been observed foraging at the north end of the lake when water levels go down. Large numbers of terns use the area as a feeding and bathing site in late summer.

Surveys conducted in support of the Proposed Project by Seatuck Environmental Association have documented a diversity and abundance of birds using the shallow open water, mudflats and freshwater meadows within the Proposed Project site. Species include freshwater shorebirds (least sandpiper, spotted sandpiper, solitary sandpiper, semipalmated plover, pectoral plover, greater yellowlegs, lesser yellowlegs), wading birds (great blue heron, great egret, snowy egret, green heron, black-crowned night heron, glossy ibis) and dabbling ducks (American black duck, blue-winged teal, northern shoveler, green-winged teal, American wigeon, gadwall, northern pintail).

According to NYSDEC Division of Fish, Wildlife & Marine Resources, Bureau of Fisheries (NYSDEC 2017c, NYSDEC 2014), NYSDEC stocked Hempstead Lake with the following species: chain pickerel, golden shiner, brown bullhead, banded killifish, pumpkinseed, bluegill, largemouth bass, and black crappie, and yellow perch. Subsequent surveys documented survival and reproduction of all species stocked except golden shiner. Two species that were not stocked but are known to occur within the lake are common carp, a non-native species that was illegally introduced into the lake by an unknown source, and American eel. Largemouth bass is the most numerous species documented within the lake. McDonald Pond, South Pond and Hempstead Lake are stocked with trout in the fall.

Threatened and Endangered Species
The New York State Department of Environmental Conservation (NYSDEC) Environmental Assessment Form (EAF) Mapper Report indicated that no endangered or threatened species or Rare Plants or Animals were identified within the project area.

A request was made to the U.S Fish and Wildlife (USFWS) for information regarding the potential presence of species under jurisdiction of the USFWS within the Proposed Project site via the ECOS-IPaC project planning tool. This list indicates that the following six listed species may occur in the Proposed Project Site and/or may be affected by the Proposed Project: sandplain gerardia (*Agalinis acuta* – endangered), seabeach amaranth (*Amaranthus pumilus* – threatened), piping plover (*Charadrius melodus* – threatened), red knot (*Calidris canutus rufa* – threatened), roseate tern (*Sterna dougallii* – endangered), and northern long-eared bat (*Myotis septentrionalis* – threatened). These species' habitat requirements include:

- Sandplain gerardia: pine-barrens grasslands; remnant grasslands.
- Seabeach amaranth: sparsely vegetated upper beach zone.
- Red knot: mudflats with abundant food such as horseshoe crab eggs.
- Piping plover: wide, flat, open, sandy beaches with limited vegetation and limited human disturbance.
- Roseate tern: open water for fishing and barrier-island nesting colony areas free of predators and human disturbance.
- Northern long-eared bat: abundant stands of trees with sufficient bark crevices and snags for roosting.

Based on these habitat requirements, sandplain gerardia, seabeach amaranth, red knot, piping plover, and roseate tern are not expected to occur within the Proposed Project site. Forested areas

within the Proposed Project site may provide potential summer habitat for northern long-eared bats (NLEB). Summer habitat for northern long-eared bats consists of a wide variety of forested habitats where they roost, forage, and travel. If present within the Project site, NLEB would likely utilize the large, intact woodlands along the south shore of Hempstead Lake. The Proposed Project site is not located within the vicinity of known or assumed northern long-eared bat hibernacula or maternity roosts according to NYSDEC Natural Heritage Program (NHP) data. Based on information from the USFWS Long Island Field Office, the nearest known maternity roost is located on Brookhaven National Lab property, located over 40 miles east of the Proposed Project site.

The USFWS Trust Resources Report also indicates that there are twenty-seven species of migratory birds that are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act that could potentially be affected by the Proposed Project, including bald eagle (*Haliaeetus leucocephalus*). Bald eagles have been observed within the Proposed Project site, but no breeding eagles have been documented in the area.

The New York State Department of Environmental Conservation (NYSDEC) Natural Heritage Program (NHP) was also contacted to request information on any known occurrences of federal or state endangered, threatened, proposed, or candidate species of flora and fauna or any critical habitats known to support those species within the vicinity of the Proposed Project site. Correspondence received from the NYSDEC NHP indicates that there are records of three plants listed as state threatened or endangered: fringed boneseat (*Eupatorium hyssopifolium* - threatened), globe-fruited ludwigia (*Ludwigia sphaerocarpa* - threatened), and weak rush (*Juncus debilis* - endangered).

Scenic Resources

The Southern State Parkway traverses the park between the Northern Ponds and Hempstead Lake. The parkway is designated as a New York State Scenic Byway. See **Figure 9**.

Environmental Justice

Environmental Justice (EJ) populations are present in the project site vicinity, as defined by the NYSDEC based on data from the 2000 U.S. Census. See **Figure 10**.

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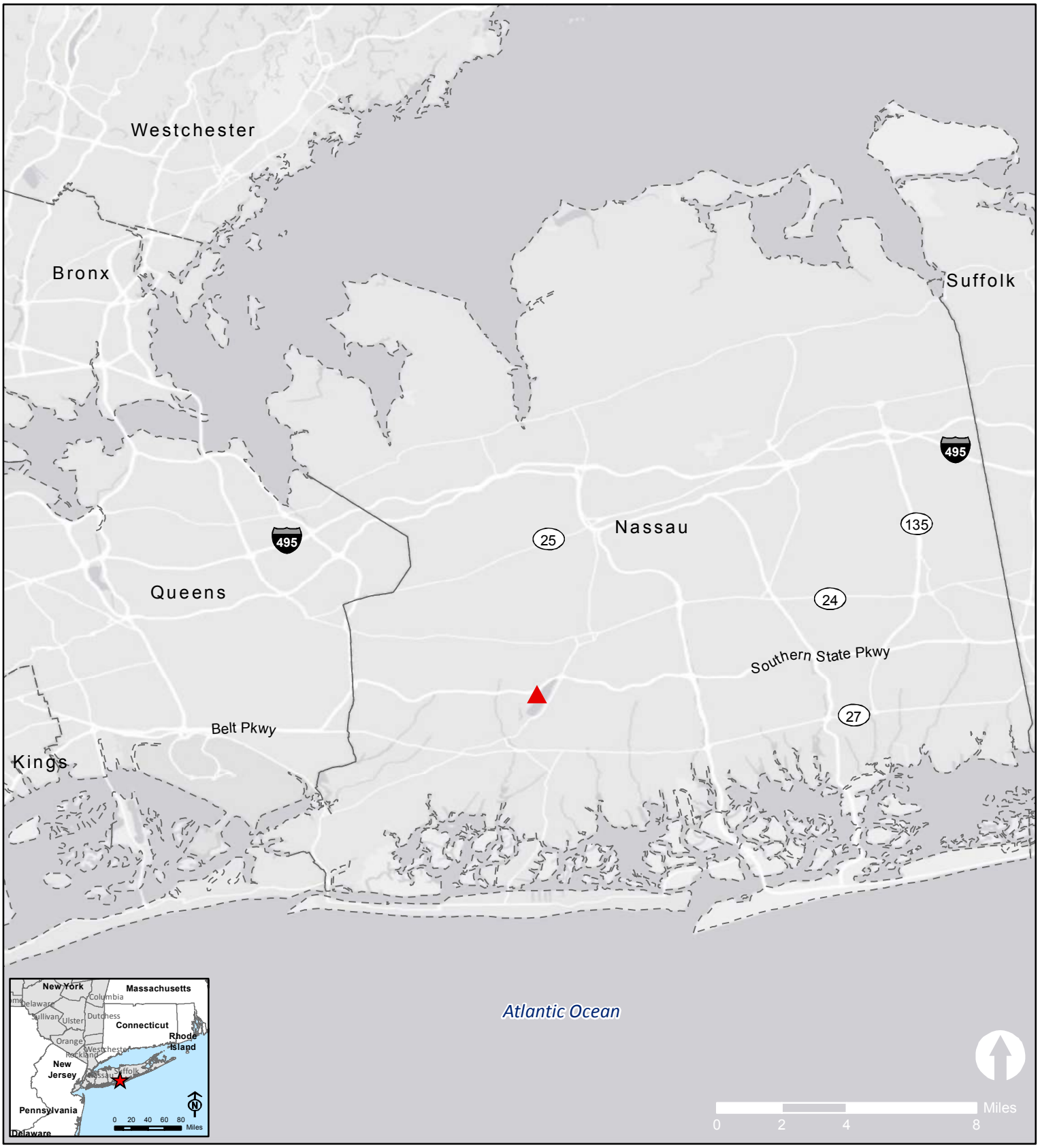
FIGURES



▲ Project Location

County Boundary

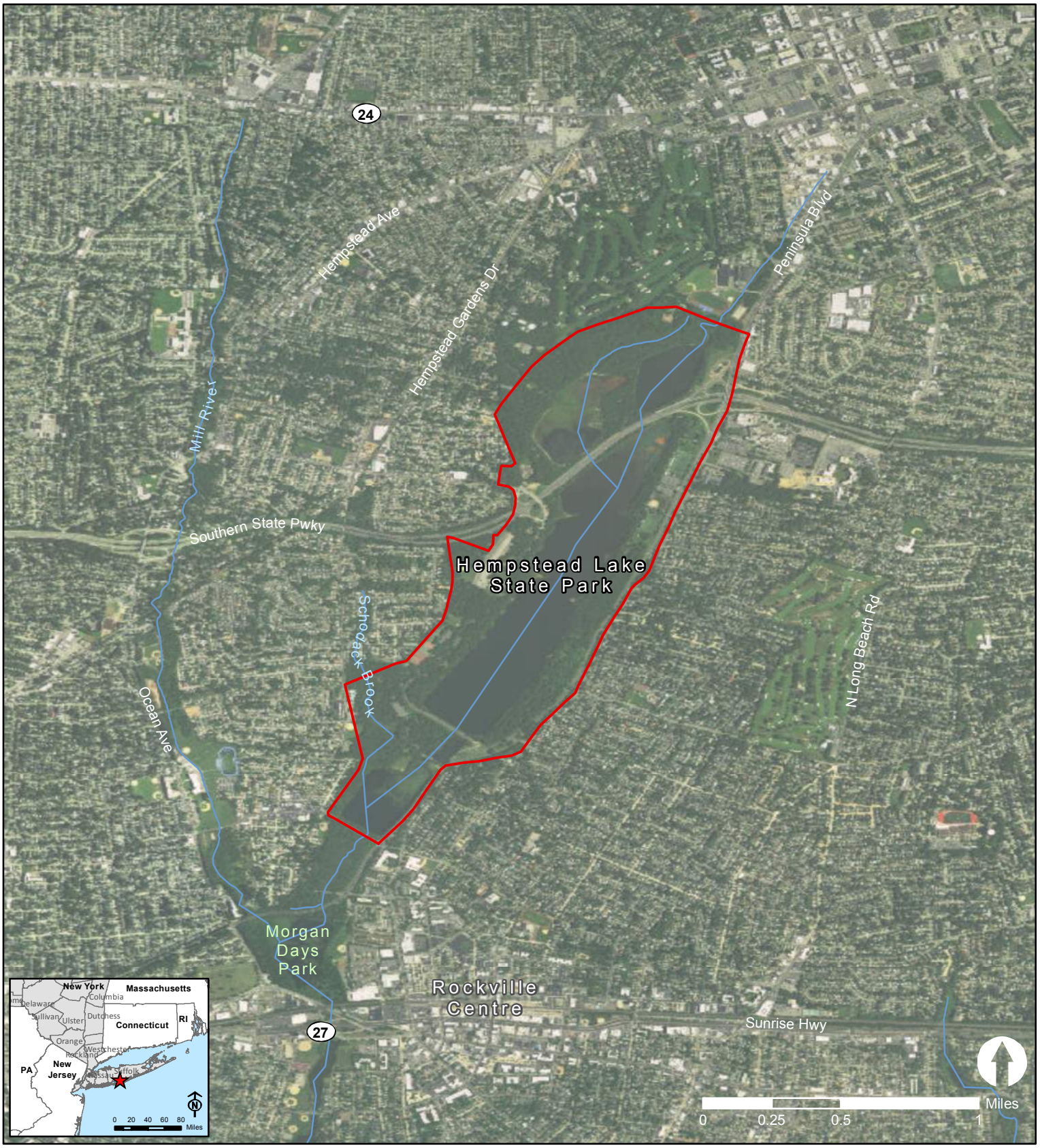
Figure 1

Regional Location

Hempstead Lake State Park

Source: U.S. Fish and Wildlife Service; Suffolk County GIS Data;
NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

Louis Berger



Project Boundary

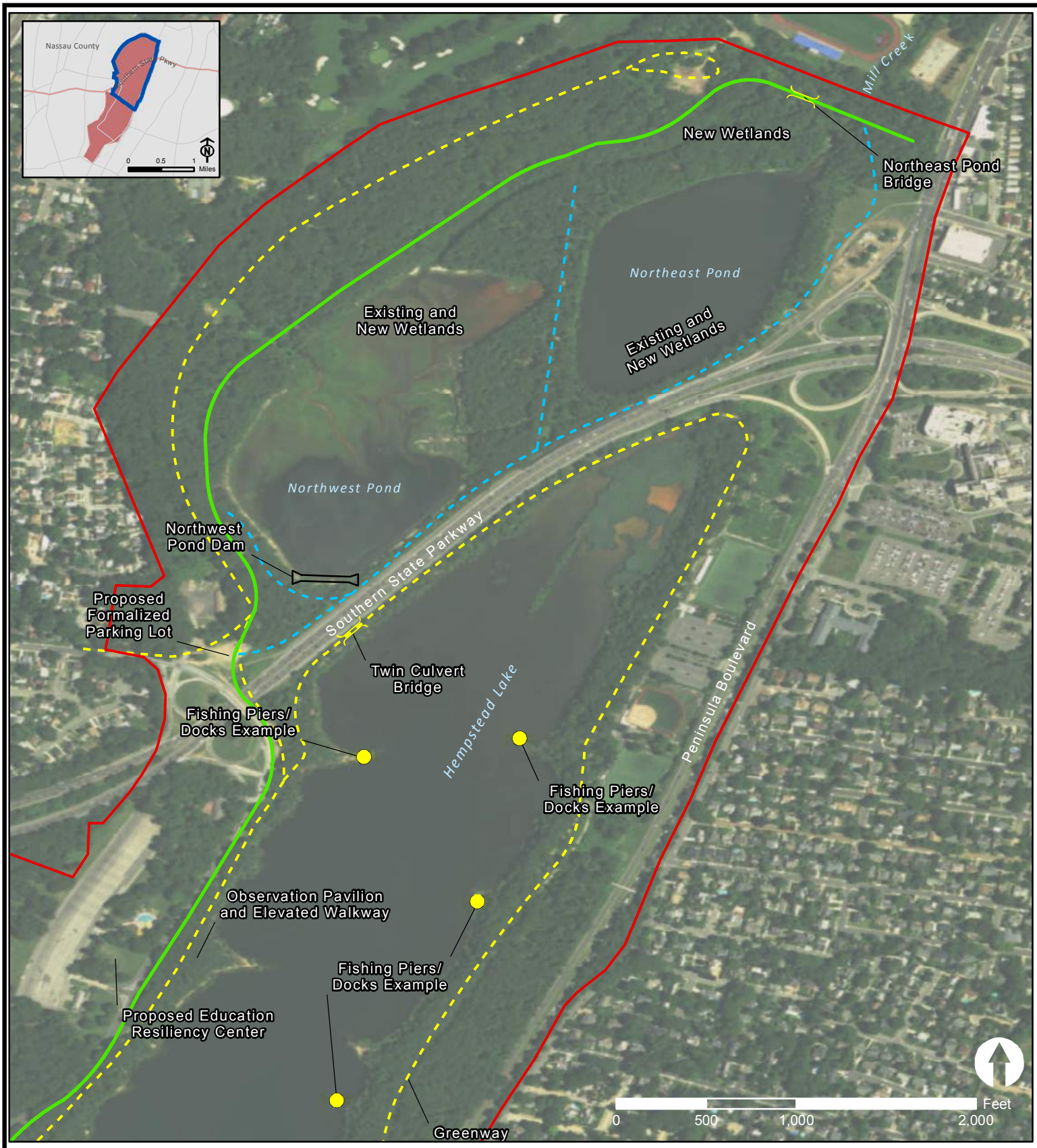
Figure 2

Project Area

Hempstead Lake State Park

Source: USGS; NYS GIS Clearinghouse; NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

Louis Berger



Bridge

Proposed Dock/Fishing Pier/Kayak Launch Walkway

Proposed Greenway

Proposed Wetland/Minor Trail

Proposed Hiking, Cycling, and Bridle Path

Project Boundary

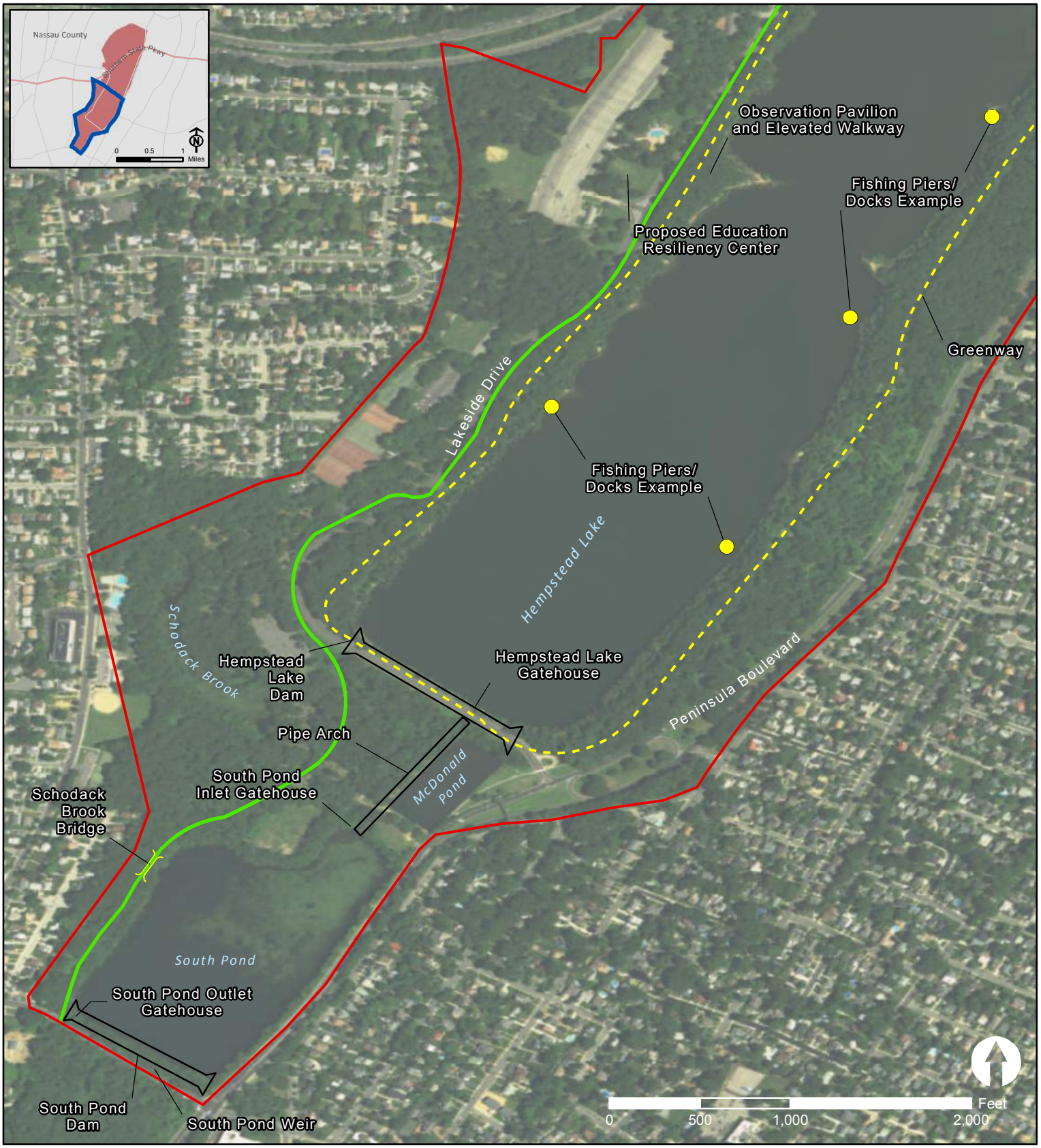
Source: USGS; NYS GIS Clearinghouse; NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

Figure 2a

Site Plan, North

Hempstead Lake State Park

Louis Berger



Bridge

Proposed Dock/Fishing Pier/Kayak Launch Walkway

Proposed Greenway

Proposed Wetland/Minor Trail

Proposed Hiking, Cycling, and Bridle Path

Project Boundary

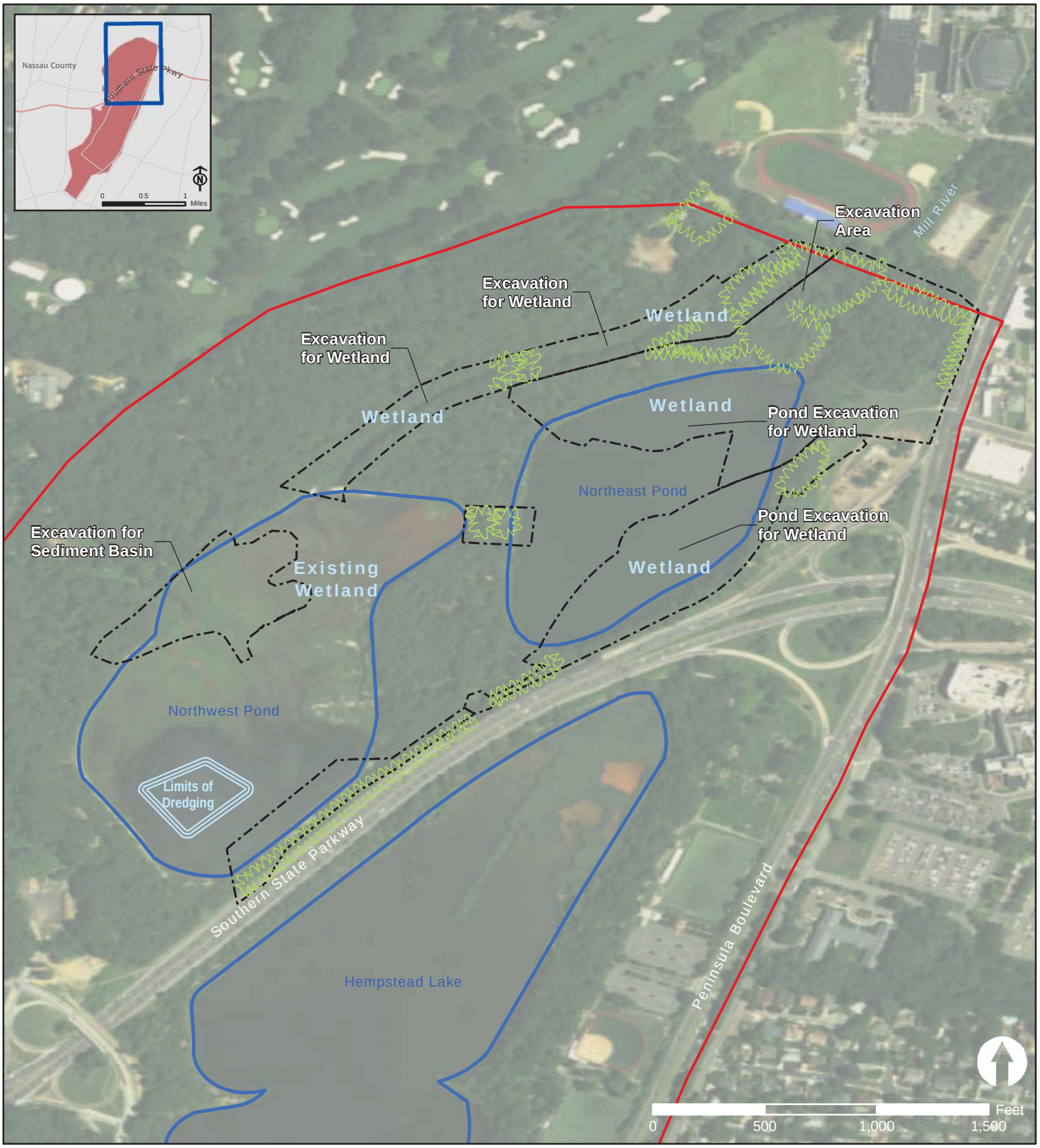
Source: USGS; NYS GIS Clearinghouse; NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

Figure 2b

Site Plan, South

Hempstead Lake State Park

Louis Berger



Project Boundary

Limits of Disturbance

Dredging

Tree Removal Area

Waterbody

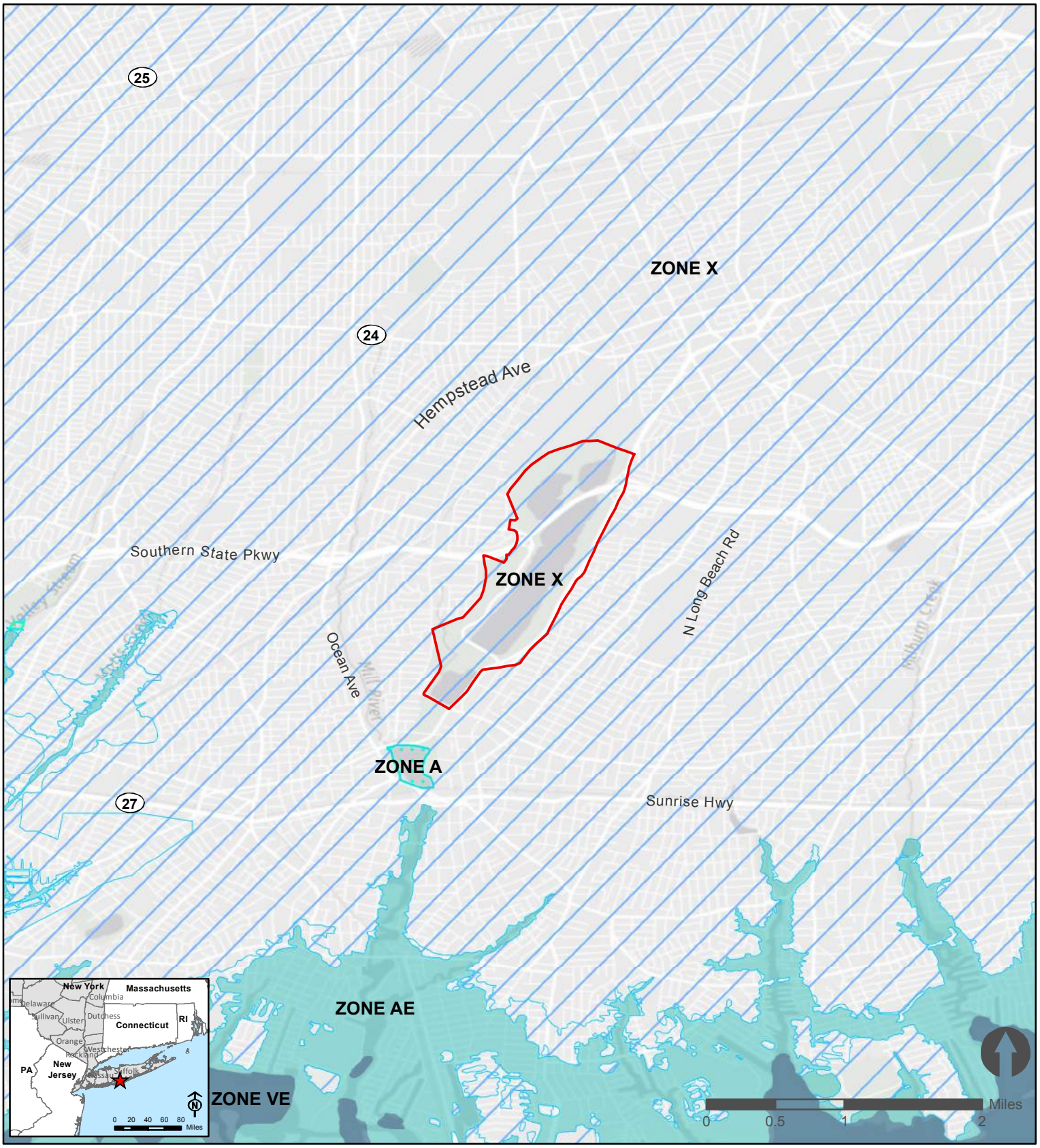
Source: USGS; U.S. Fish and Wildlife Service; National Wetland Index; NYS GIS Clearinghouse; NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

Figure 2c

Northern Ponds Project Components

Hempstead Lake State Park

Louis Berger



Flood Hazard Zone

- Project Boundary
- Zone X
- Zone A
- Zone AE
- Zone VE

Figure 3

Flood Hazard

Hempstead Lake State Park

Source: FEMA, NYS GIS Clearinghouse; NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

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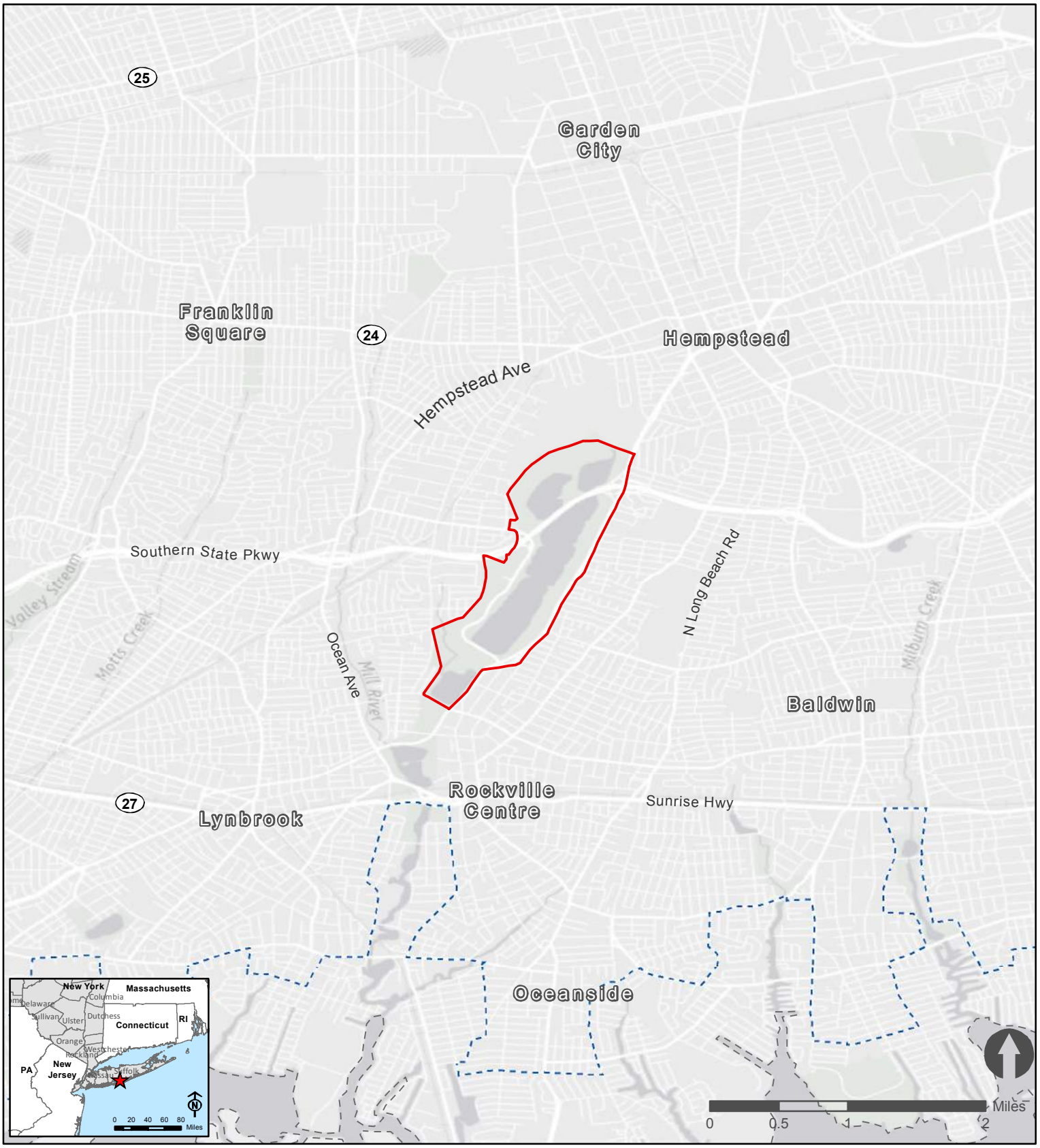

Project Boundary

Coastal Boundary

Figure 4

Coastal Boundary

Hempstead Lake State Park

Source: FEMA, NYS GIS Clearinghouse; NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

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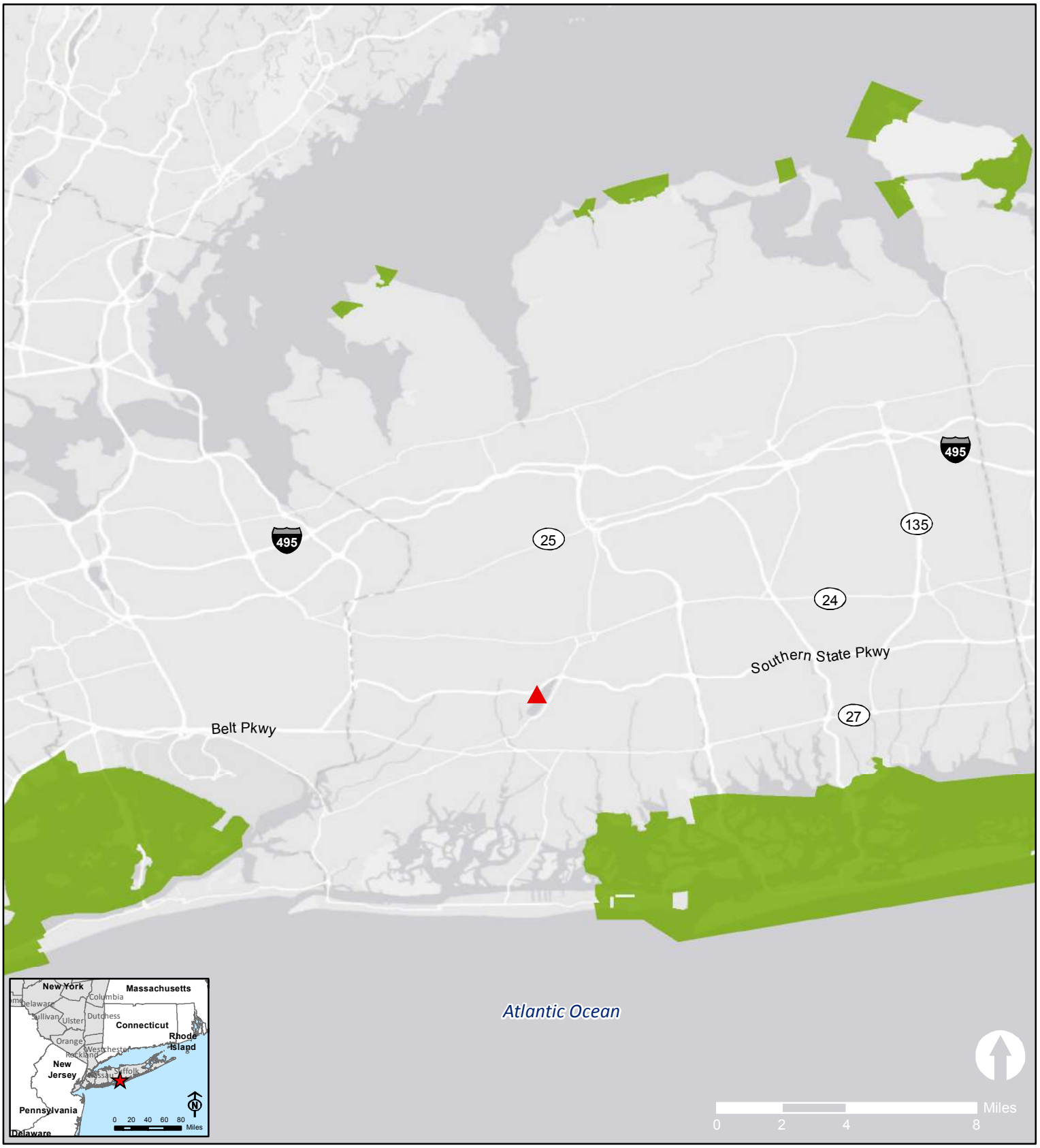


▲ Project Location

Coastal Barrier Resource System

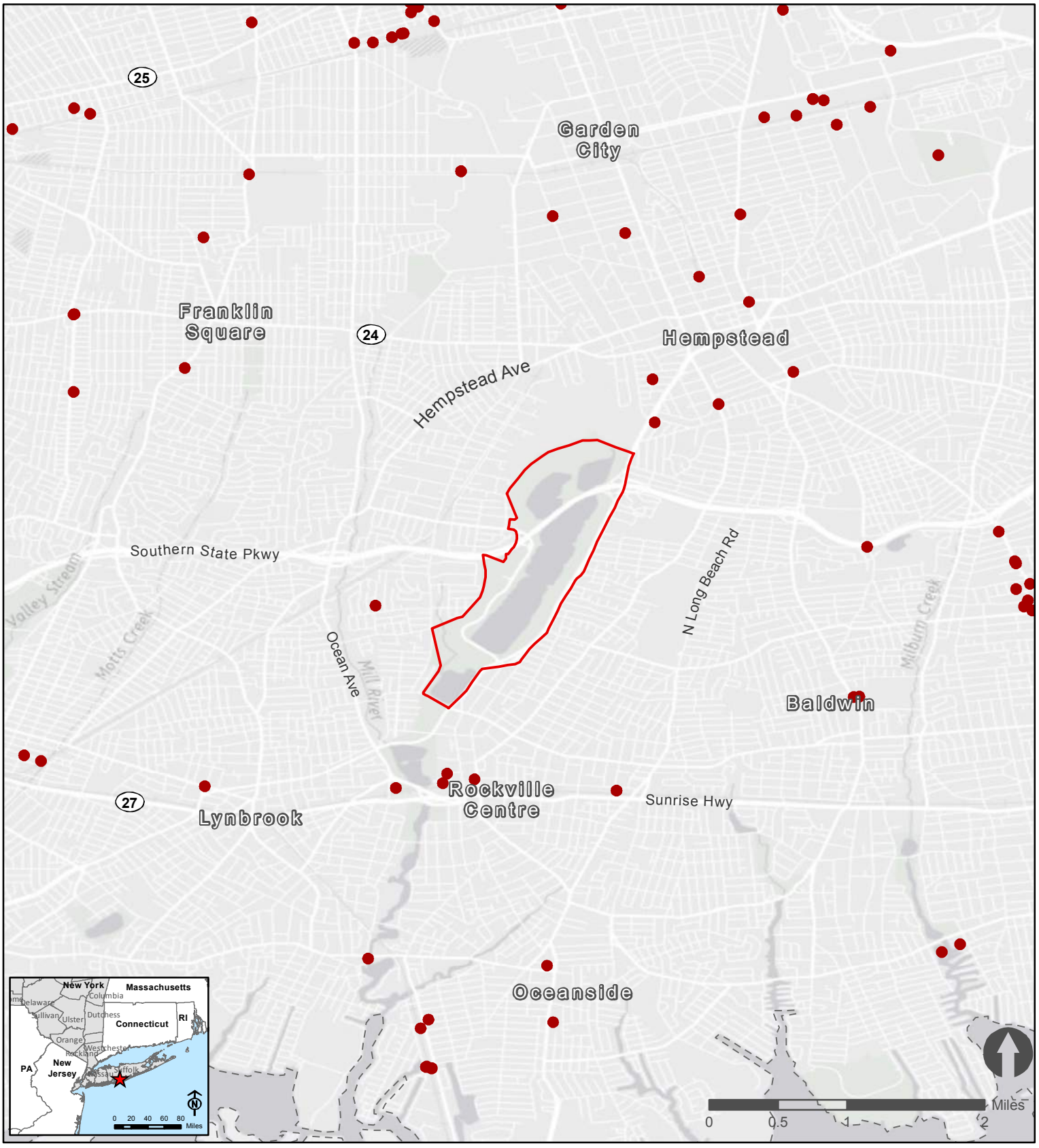
Figure 5

Coastal Barrier Resource System

Hempstead Lake State Park

Source: U.S. Fish and Wildlife Service; Suffolk County GIS Data;
NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

Louis Berger



Project Boundary

Remediation Site

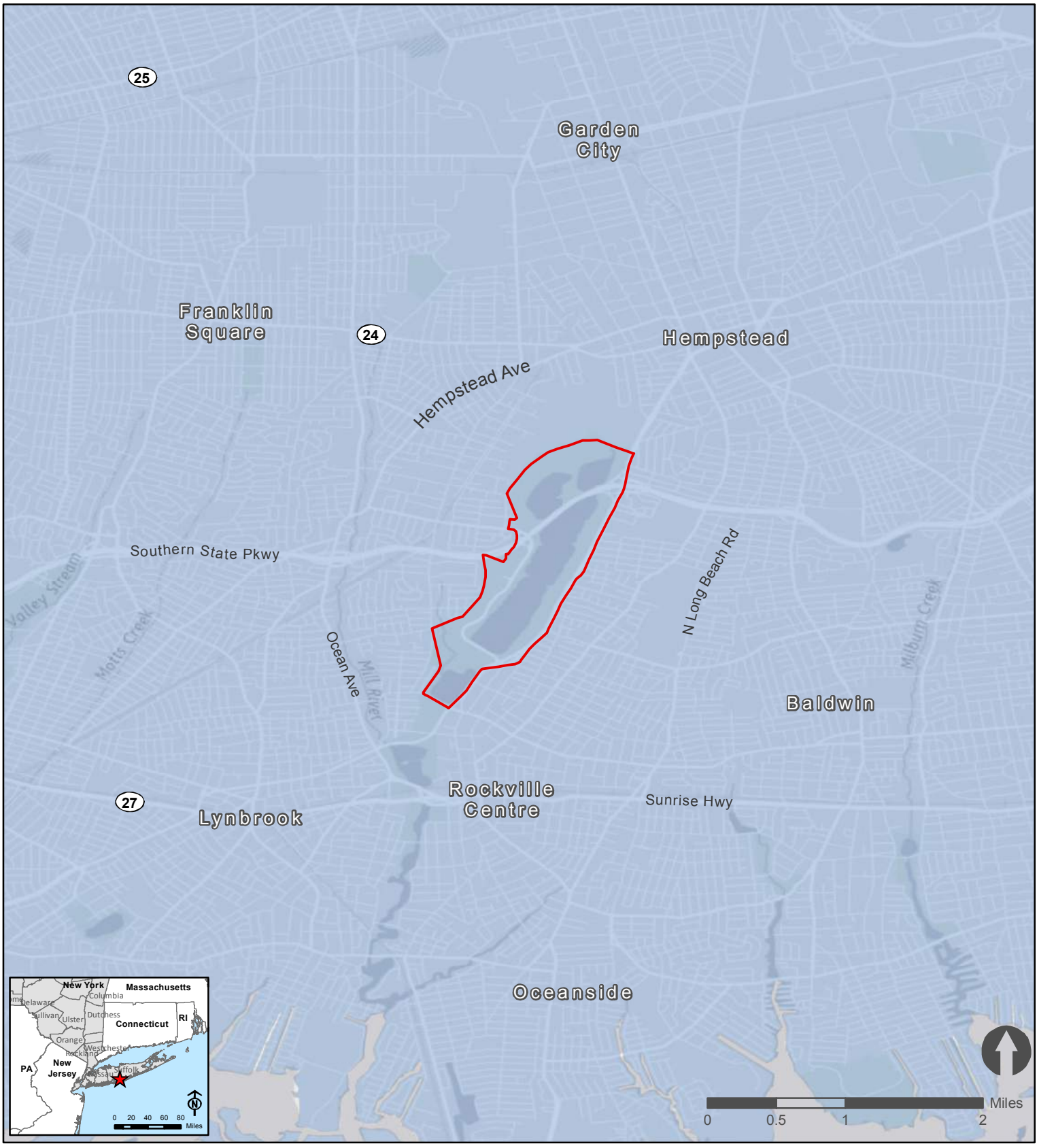
Figure 6

Remediation Sites

Hempstead Lake State Park

Source: FEMA, NYS GIS Clearinghouse; NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

Louis Berger



Project Boundary

Sole Source Aquifer

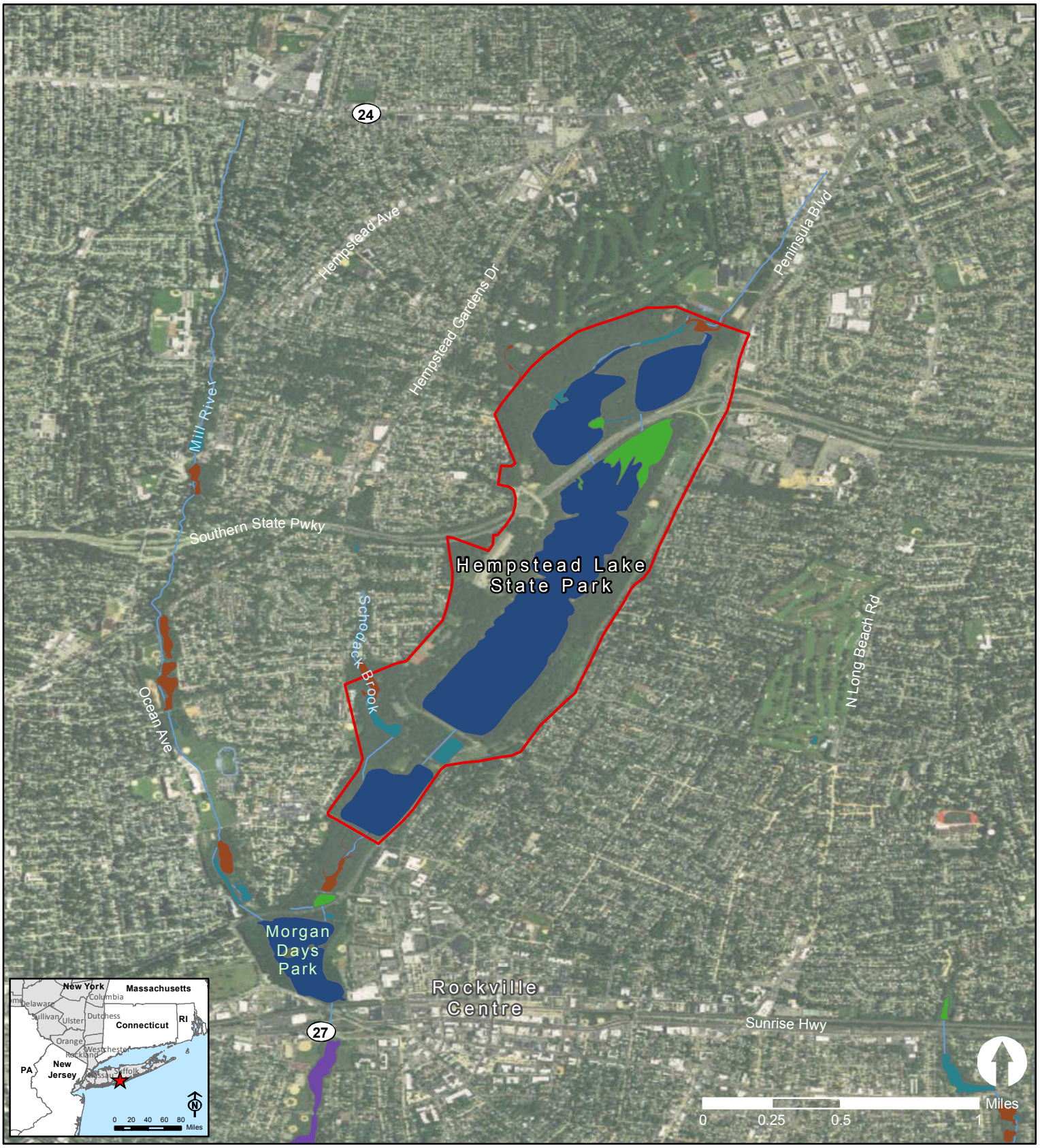
Figure 7

Sole Source Aquifers

Hempstead Lake State Park

Source: FEMA, NYS GIS Clearinghouse; NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

Louis Berger



Project Boundary

Wetland Type

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

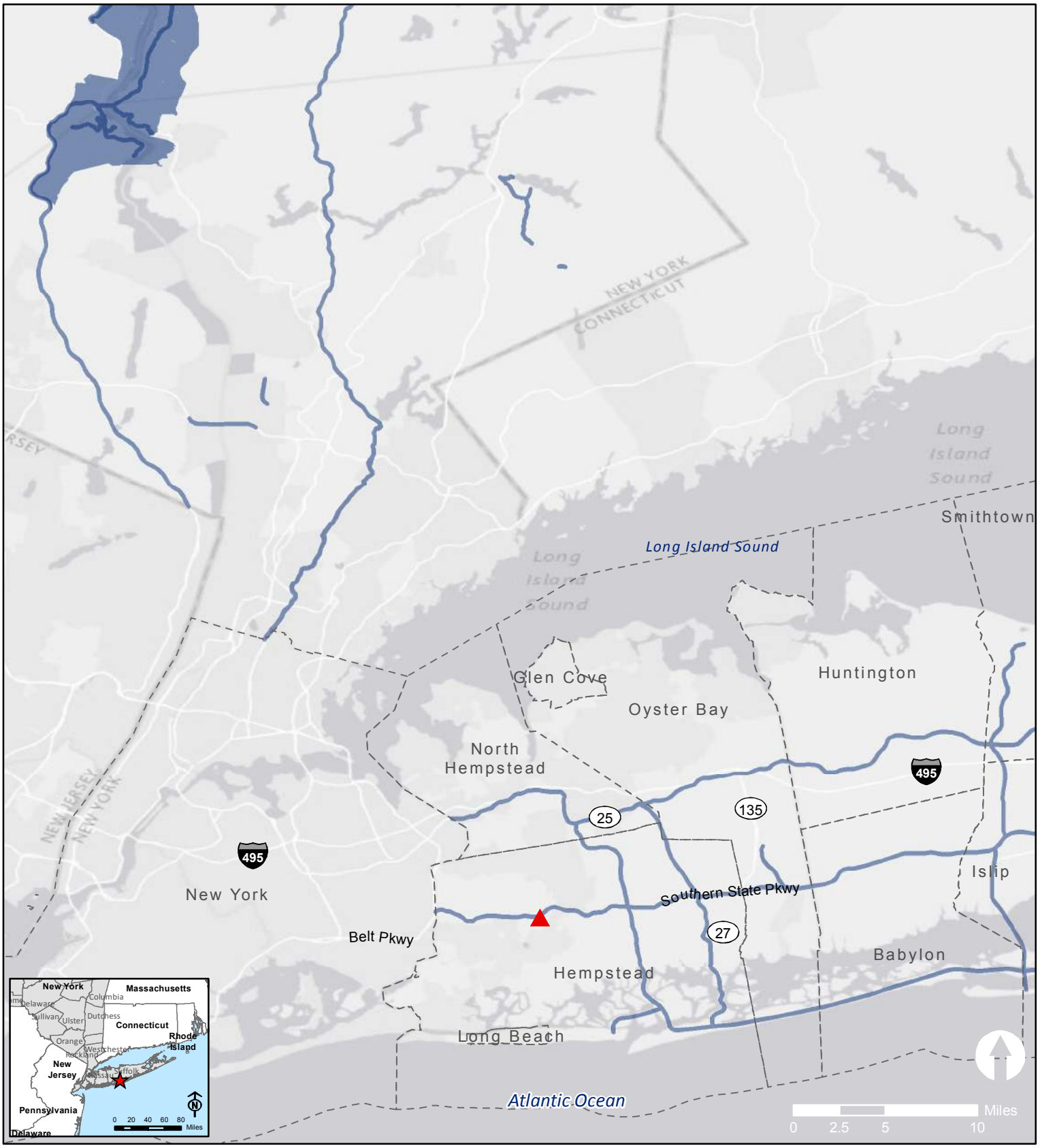
Source: USGS; U.S. Fish and Wildlife Service; National Wetland Index; NYS GIS Clearinghouse; NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

Figure 8

Wetlands

Hempstead Lake State Park

Louis Berger



Project Location

New York State Scenic Byway

Scenic Areas of Statewide Significance

City and Town Boundary

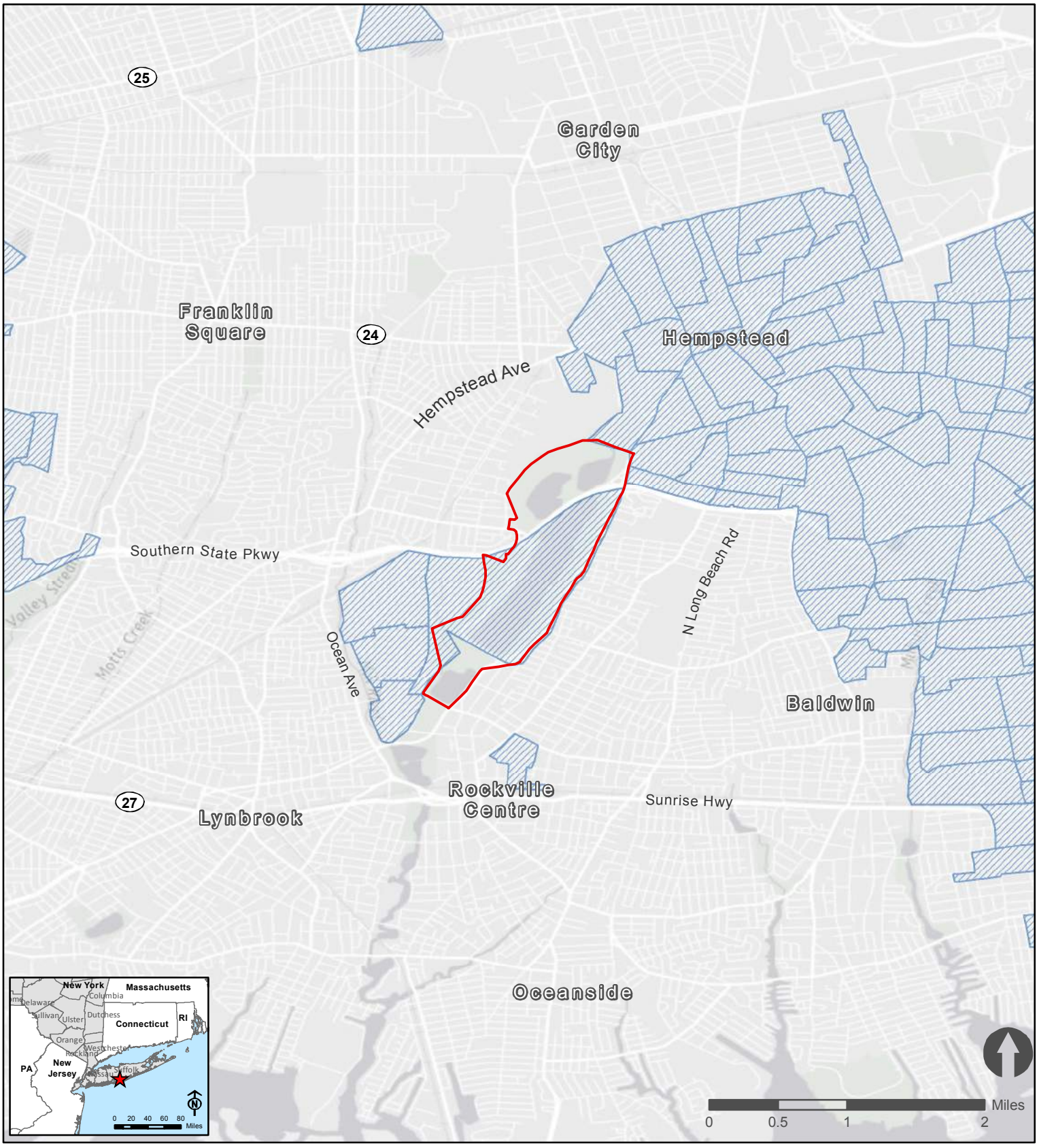
Figure 9

Scenic Areas

Hempstead Lake State Park

Source: U.S. Fish and Wildlife Service; Suffolk County GIS Data; NYS Department of Transportation; NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

Louis Berger



Project Boundary

Potential EJ Area

Figure 10

Potential EJ Areas

Hempstead Lake State Park

Source: NYS GIS Clearinghouse; NYS Department of Environmental Conservation; ESRI World Imagery; ESRI Street Map

Louis Berger