

Planning For Jamaica Bay's Future: Preliminary Recommendations on the Jamaica Bay Watershed Protection Plan



Submitted by the
Jamaica Bay Watershed Protection Plan
Advisory Committee

June 29, 2006

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New York City Department of Environmental Protection. 2006, February 9. The Jamaica Bay watershed protection plan. Presentation at York College, Queens.

PLANNING FOR JAMAICA BAY’S FUTURE:
PRELIMINARY RECOMMENDATIONS ON THE JAMAICA BAY WATERSHED PROTECTION PLAN

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PART I

INTRODUCTORY NOTE FROM THE COMMITTEE

These preliminary recommendations are submitted to the Speaker of the New York City Council and the Commissioner of the New York City Department of Environmental Protection (DEP) pursuant to Local Law 71 (See Appendix A). As enacted in 2005, Local Law 71 requires DEP to develop a Jamaica Bay Watershed Protection Plan to restore the water quality and ecological integrity of Jamaica Bay. Local Law 71 created the Jamaica Bay Watershed Protection Plan Advisory Committee to assist DEP in developing the plan; the law specifically charged the committee with developing its own recommendations concerning the plan by no later than July 1, 2006. On June 13, the original sponsor of Local Law 71 introduced legislation to extend DEP's deadline for submission of the final plan by one year, from September 1, 2006 to September 1, 2007, as well as to provide for several interim milestones (See Appendix B). The legislation also calls for the committee to provide only "preliminary" recommendations by July 1, 2006, and to provide its final recommendations eleven months later, on June 1, 2007. The committee fully supports the proposed amendments to Local Law 71 and welcomes the opportunity to collect additional public and agency feedback on its work through the amended process. Accordingly, the recommendations contained herein are provided as both preliminary recommendations consistent with the pending legislation, and as recommendations consistent with the current law. The committee hopes for and anticipates the legislation's passage so that it, and DEP, can continue their work in developing both a vision and workable solutions for Jamaica Bay's future.

INTRODUCTION

Jamaica Bay's resources are in jeopardy. Thousands of acres of the bay's marshlands are mysteriously disappearing. Scientists predict that, at the current rate, the marsh islands will completely vanish in less than twenty years.¹ Poor, and in some places deteriorating, water quality remains a continuing problem for the bay, and may even be spurring the marsh loss.²

In response to this crisis, in 2005 the City of New York enacted Local Law 71. The new law calls for the

development of a watershed protection plan for the "watershed/sewershed" of Jamaica Bay. (See Appendix C.) The plan's overall goal is "to restore and maintain the water quality and ecological integrity of Jamaica bay."³

Local Law 71 also established a seven-member Jamaica Bay Watershed Protection Plan Advisory Committee (three members appointed by the city council and four members appointed by the mayor) to advise the New York City Department of Environmental Protection (DEP) in plan creation and to provide specific plan goals and recommendations to DEP and the New York City Council by July 1, 2006. (See Appendix D.) This report provides the committee's recommendations, as required by the law, and explains the process the committee has gone through to formulate these recommendations.

Following enactment of Local Law 71, the committee met on a regular basis from November 2005 through June 2006. The committee spent the first few months after its appointment developing draft goals and recommendations focusing on specific measures as prescribed by Local Law 71. As set out in the law, these measures include:

- Best management practices to minimize/control soil erosion, reduce point and nonpoint source pollution (e.g. development practices that control and minimize stormwater)
- Measures to address threats to aquatic habitat (e.g. restoring natural features and water flows)
- Land acquisition, planning/development practices that encourage or discourage certain land uses
- Protocol for agency coordination
- A public education program
- Enhanced enforcement against polluters
- Additional items developed by the committee.

Local Law 71 also called for the committee to assess the legal, technical, environmental and economic feasibility of possible plan measures and to develop a schedule, with interim and final milestones, to implement the plan's measures and achieve the specific goals and methods for monitoring progress.

Since the beginning, the committee has viewed its role in the development of the watershed protection plan as independent of, but cooperative with, DEP. The committee has held monthly joint sessions with DEP, and regularly exchanged technical information and progress reports.

The committee has also considered the most current scientific information available on the problems confronting the bay. Expert panels were convened on the topics of stormwater and green building best management practices, wetland loss and water quality in order to gain greater knowledge of the issues facing

Jamaica Bay and to explore new ways of reducing stresses on the bay. (See Appendix E.)

Finally, the committee has sought to involve the public as much as possible in the development of recommendations. The committee and DEP held public meetings at the start of the process in Brooklyn and Queens in January and February 2006. At the meetings, the committee and DEP provided an introduction to the law and the process that the committee would be following in developing its recommendations, and invited both oral and written comments. The committee received a large number of comments which are reflected in this report.

AN OASIS AMID AMERICA'S LARGEST CITY

Jamaica Bay's value to the city, the region, and the nation is immeasurable. Accessible to America's most populated city by subway and bus, Jamaica Bay is a haven for wildlife and the millions of people who visit the area each year. Even with its panoramic backdrop of Manhattan's skyscrapers and the rumble of planes taking off from adjacent John F. Kennedy International Airport, it is easy to get lost in the bay's restful open space and waters and lush green marsh islands. Hundreds of species of birds soar across along one of nature's expressways – the Eastern Flyway migration route – on the way to breeding grounds further north. Endangered and threatened species like peregrine falcons, piping plovers, and the Atlantic Ridley sea turtle call this area home, and the wetland fringes serve as important nurseries for more than 80 fish species.⁴

The bay comprises one of the largest and most productive coastal ecosystems in the northeastern United States, and includes the largest tidal wetland complex in the New York metropolitan area.⁵ Connecting to the Atlantic Ocean via the Rockaway Inlet, the bay is also an important component of the larger Hudson-Raritan Estuary, which contains the New York-New Jersey Harbor complex, one of the world's most utilized systems of waterways. Jamaica Bay's wetlands serve as flood protection and shoreline erosion control for the homes and businesses of the encircling neighborhoods. The Jamaica Bay watershed, which feeds the freshwater portion of the estuary, extends deep into Brooklyn, Queens, and Nassau County.

Made of glacial till left behind during the last ice age and shaped by erosion and wave action,⁶ the open water and wetlands portion of Jamaica Bay is approximately eight miles long, four miles wide and covers 26,645 acres,⁷ more than half of which is part of Gateway National Recreation Area's (Gateway)

Jamaica Bay Unit.⁸ The National Park Service (NPS) administers Gateway, which was established by Congress in 1972 in an effort to preserve outstanding natural areas closer to major urban centers. Gateway offers a multitude of benefits for local residents and encompasses the largest collection of natural systems, wildlife habitats, historic and cultural resources, and recreational opportunities in the New York City/New Jersey metropolitan area. Three-fourths of Gateway's Jamaica Bay Unit is water, marsh, and meadowland; the remaining upland areas include beaches, dunes, and forests.⁹

At the heart of the Jamaica Bay Unit is the Jamaica Bay Wildlife Refuge (Refuge), which covers 9,100 acres and is the only wildlife refuge accessible by subway.¹⁰ The Refuge, a state- and nationally-recognized important bird area, provides a variety of habitats for more than 325 kinds of waterfowl and shorebirds.¹¹ Visited by nearly 20 percent of the continent's species of birds every year, Jamaica Bay is considered one of the best bird-watching locations in the western hemisphere.¹²

The neighborhoods surrounding Jamaica Bay are home to more than five hundred thousand New Yorkers.¹³ The bay is bounded by Brooklyn and Queens on its northwestern and northeastern shores, Rockaway Peninsula (also part of Queens County) on its southern shore, and Hempstead, Nassau County, along a small section of the bay's southeastern shore. Major neighborhoods within and bordering the bay include the Rockaways, Canarsie, Spring Creek, Starrett City, Howard Beach, and Broad Channel. Residents of these communities consider the waters, parks, and open space surrounding the bay "a sanctuary or haven from the stress of the city."¹⁴

The Changing Bay

Human actions over time have significantly changed the bay's physical dynamics. Throughout the bay's history, it has served such competing functions as providing food and recreation for local residents, and as a place for sewage effluent and solid waste disposal. High bacterial levels from waste disposal ultimately forced the closure of the once-vibrant shellfishing industry in 1921.¹⁵ Sections of the bay's bottom were dredged in the early part of the 20th century as the city considered turning Jamaica Bay into a major commercial and industrial port.¹⁶ Although the port was never built, the dredged channels and pits continue to impact the bay's water quality and ecology. Many marshes surrounding Jamaica Bay have been filled and tributaries drastically altered to accommodate residential, commercial and

transportation needs. Construction of John F. Kennedy International Airport (JFK) alone decreased the surface area of marshland by 18 square kilometers.¹⁷

Stakeholder efforts have been active in the bay since the late 1970s, and in 2001 Gateway convened a blue ribbon panel of national experts to examine the bay's alarming and perplexing marsh loss. The panel focused on the bay's reduced sediment supply and suspension problems and recommended a number of additional studies and restoration projects, such as the Big Egg Marsh thin layer sediment spraying, to restore healthy marsh elevations. Following on the panel's work, the Jamaica Bay Ecosystem Research and Restoration Team (JBBERT) investigated potential restoration sites in the bay, primarily around the periphery. Restoration activities are moving forward at a few of these sites, but most remain still on the drawing board. To date, efforts by government and academic institutions, as well as community and environmental groups, have resulted in an improved understanding of the bay and its problems, but only very limited – even if promising in some cases (such as recent salt marsh thin layer sediment spraying) – restoration activity. Over a century of urbanization with resulting pollution, dredging, and filling has caused the bay's decline and it will take the combined engagement of all stakeholders to restore the bay.

PART II

In the following sections of the report, the committee has identified certain preliminary recommendations as priority items. These priority recommendations are found at the beginning of each section. Identification of priority recommendations was based upon several factors, including the importance of the recommendation in addressing the bay's problems and whether significant decisions were pending that might foreclose addressing the recommendation at a later date.

CHALLENGE: DEGRADED WATER QUALITY

From the 1970s to the 1990s, major investments to the city's sewage treatment plants dramatically improved the water quality of Jamaica Bay, but significant problems remain. While dissolved oxygen levels throughout much of Jamaica Bay's open waters have risen, these levels in Grassy Bay and certain other borrow pits, as well as in some tributaries, are often too low to sustain year-round marine life and healthy

biodiversity. At least seven highly toxic sediment sites exist in the bay.¹⁸ And since 1986, algae levels have been on the rise and water clarity in Jamaica Bay has declined more than 20 percent.¹⁹

The primary known culprits are combined sewer overflows (CSOs) and discharges of treated wastewater from the four city sewage treatment plants that encircle the bay (26th Ward, Coney Island, Jamaica, and Rockaway plants).²⁰ A combined sewer system that carries sewage and stormwater runoff to the plants for treatment serves most of the communities surrounding the bay. Rainfall intensity as low as 0.15 centimeters per hour for 6.7 hours will exceed the limited sewer and plant storage capacity, causing overflow of untreated sewage combined with stormwater through numerous outfalls ringing the bay's waters.²¹ Additionally, every day, the plants release approximately 300 million gallons of treated wastewater into the bay.²² The wastewater effluent contains thirty to forty thousand pounds of nitrogen each day, far too much nitrogen for the bay to assimilate.²³ One estimate puts the removal capacity of existing marshes somewhere between a tenth and a fifth of the total nitrogen inputs.²⁴ In certain places and times in the bay, the excess nitrogen creates a eutrophic environment, where an overabundance of organic matter in the water spurs the growth of algae blooms that decrease oxygen levels in the water as the algal organisms die off and decompose. Oxygen levels can dip so low that any aquatic life not able to swim away will die.²⁵ Indeed, by default, Jamaica Bay itself has become part of the city's wastewater treatment process – providing sinks for nitrogen, fine particulates, and biological oxygen demand – a practice which has taken its toll on the ecology of the bay.

The nitrogen-rich waters may also hinder the health of salt marsh cordgrass (*Spartina alterniflora*), which is essential to breeding fish and bird populations, and holds the bay's sediments together.²⁶ While the emergent part of cordgrass may be unaffected, the root systems are often disproportionately undersized and not capable of sustaining the cordgrass under conditions of physical stress, such as erosive forces during storms.²⁷

The New York State Department of Environmental Conservation (DEC) has included Jamaica Bay on its Section 303(d) impaired water list since 1998 because of violations of water quality standards relating to pathogens, nitrogen, and oxygen demand.²⁸ DEC's list cites CSOs and wastewater as the primary causes of the impairment. Specifically, CSOs have been documented as causing localized exceedances of bacterial standards in Jamaica Bay tributaries during and after storm events. CSOs are also believed to be significant sources of both organic pollutants and metals – such as

dioxins, various pesticides, PCBs, lead and mercury – into the bay.^{29*}

Some areas of Jamaica Bay have separated storm and sanitary sewers whereby wastewater is directed to the plants and stormwater is sent directly out to the bay. While this system eliminates CSOs, the stormwater still contains pollutants. For instance, the Belt Parkway's runoff contains pollutants from automobiles, including motor oil, engine coolant, brake dust and gasoline. JFK, which occupies more than 5,000 acres along the bay's north shore and is ranked fifteenth in worldwide airport passenger traffic,³⁰ discharges into the bay runoff contaminated with anti-icing and deicing compounds and other toxic chemicals drained from the large paved surfaces that form JFK's network of runways and taxiways.

Together with CSOs and stormwater, past releases from industrial facilities and three closed landfills – Edgemere Landfill off Rockaway Peninsula and the Fountain and Pennsylvania Avenue Landfills in Brooklyn – have significantly contributed to contaminant loading in the sediments of Jamaica Bay.³¹ Delays in the bay's flushing time caused by human alterations to the water flow (from dredging, filling, development) have increased the potential for pollutants to settle out to the bottom.³² Flushing time (or residence time) is simply the amount of time it would take for a particle of water (or contaminant) to circulate through the bay, i.e. from start to finish. Many of the toxic contaminants are persistent in the environment with the potential to accumulate through the food chain in the tissues of plants, invertebrates, fish and birds.³³ CSOs and stormwater outfalls also add to the bay's "floatables" – water-borne litter and debris like plastic bags, cigarettes, drink containers, and food wrappers.³⁴

Finally, current treatment plant technologies do not screen out hormone disrupting chemicals from wastewater. Recent studies have revealed that trace substances with hormone-like properties from prescription and over-the-counter drugs, and chemicals from soaps and other products exist in treatment plant effluent, and could be accumulating in the sediments of receiving waterbodies.³⁵ For example, estrogen from pharmaceuticals and industrial detergents that break down into products that mimic the hormone estrogen

can contribute to higher levels of estrogen-like materials in treatment plant effluent. These chemicals can build up in the sediments and affect development of marine life, such as winter flounder, by depressing the male to female ratio, causing delayed development and reduced hatch and survival rates.³⁶

To secure a healthy environment for Jamaica Bay's wildlife and increased recreational opportunities for visitors, Jamaica Bay's water quality must be further and significantly improved.

WATER QUALITY GOALS & NEXT STEPS

Summary of Water Quality Recommendations

Increasing the nitrogen removal capability of Jamaica Bay's sewage treatment plants will reduce algal blooms and thereby diminish the frequency and duration of anoxic events. The 26th Ward and Jamaica sewage treatment plants should be upgraded to tertiary treatment to screen out more nitrogen. It should also be investigated whether such tertiary treatment can remove possible endocrine disrupters and other byproducts of the modern post-industrial age. Additionally, centrate process effluent should be treated for reuse or discharged in a city area with better tidal flushing. Specifically, dewatering is the final step in the treatment plant process that wrings out the residual thickened organic matter or sludge; the wastewater from this process is nitrogen-rich and called centrate.³⁷ Centrate is run back through the plants' systems to help reduce its nitrogen level, but it still contributes to higher overall nitrogen releases from the plant.³⁸ The Jamaica plant usually dewateres its own sludge; the 26th Ward plant dewateres sludge from Coney Island, Rockaway, and sometimes the Jamaica and Owls Head plants.³⁹

Reduction and eventual elimination of CSOs will require a multi-pronged approach. Increasing the system's wet weather holding capacities and system maintenance will decrease CSO occurrences and contribute to cleaner waters with less organic content. Cleaning out sewer lines to remove accumulated sediment will enhance storage capacity immediately.

It remains important that DEP continue to site, design, and construct adequate CSO storage capacity, particularly for areas in the watershed/sewershed in which this is the only or principal CSO abatement option available. But constructing additional retention tanks on a diminishing land base and increasing sewer storage will not be enough to eliminate the CSO problem. It is becoming increasingly clear that simply building huge storage tanks to capture for eventual

* DEC removed Jamaica Bay, as well as certain other New York City waterbodies, from the Draft New York State 2006 303(d) List of Impaired Waters Requiring a TMDL based largely on actions to be undertaken pursuant to several DEC-DEP consent agreements. The committee strongly opposes this proposal as, among other things, these agreements do not call for achieving water quality standards.

treatment all of the ever-expanding wastewater and the stormwater will need to be augmented with other strategies – on a citywide basis, by DEP’s own calculations, the currently planned suite of CSO storage tanks will barely keep pace with the city’s currently projected development patterns.⁴⁰ In other words, DEP’s planned projects will not improve overall water quality, but will simply prevent it from getting worse.

It is vital to move solutions to the CSO problem up into the watershed/sewershed and closer to the problem’s source. Stormwater best management practices (BMPs) can diminish water flow to the plants (e.g. through increased conservation methods and incentives) and delay and/or reduce stormwater flow into the sewer system (e.g. through increased plantings that encourage infiltration and minimize runoff from pavement and other impervious surfaces directly to sewers), reducing the deluge of water that overwhelms the sewage system’s holding capacity. Preliminary modeling conducted by DEP indicates that implementation of BMPs in the watershed/sewershed could result in a significant reduction in the number and severity of CSO events in Jamaica Bay.

DEP has suggested that a long-term solution to the CSO problem include a weakening of water quality standards for certain waterbodies.⁴¹ The committee strongly discourages this “move the goalposts” approach. The goal of “fishable and swimmable” water for Jamaica Bay and its tributaries should not be changed. The bay deserves and requires this standard of performance, as do the communities that rely on and enjoy these waterbodies.

In addition, at various times in the past, the relocation of a portion or all of the bay’s sewer and stormwater outfalls out into the Atlantic Ocean has been proposed. While this plan would reduce contaminated waters entering Jamaica Bay, given circulation patterns and tidal flows, some fraction of the nitrogen-rich effluent discharged from the pipe would eventually end up back in the bay and in New York Harbor.⁴² The relocation scheme would also remove the largest source of freshwater into the bay.⁴³ Currently, only 10 percent of the bay’s freshwater input is through groundwater.⁴⁴ It is the Advisory Committee’s opinion that this option should continue to be studied, but that tertiary treatment for the 26th Ward and Jamaica sewage treatment plants and stormwater BMPs must first be implemented and the results monitored. The committee believes that the technical and legal difficulties associated with outfall relocation are likely to be insurmountable, and recommends converting the Jamaica Bay watershed into a showcase for state-of-the-art sewage treatment

and green technologies. The committee also recommends examining additional connections for flow of ocean water to the back bay through an open cut in the form of a stabilized inlet or through a series of underground chambers or culverts. In addition to the enhanced flushing of the back bay’s waters, such a connection to the Atlantic Ocean may provide a source of additional sediment; a lack of sediment is considered to play a role in the salt marsh loss problem. This connection may also provide renewable energy opportunities.

Policies should be put in place to prevent and reduce contaminated sediment in Jamaica Bay. In addition to eliminating CSOs and stormwater inputs with high pollutant loads, removal of major CSO sediment and past industrial deposits should be examined in order to improve the bay’s water quality and wildlife health. Monitoring of other contaminated areas is needed to assess impacts and, as needed, treat or isolate these risks.

Restoring vibrant shellfish populations to the bay could also improve overall water quality, as well as potentially provide recreational benefits through harvesting (depending on contaminant levels) and improved fishing. Oysters filter out contaminants and their colonies form natural reefs that provide fish habitat. In the latter part of the 19th century, Jamaica Bay was celebrated for its shellfish, including the eastern oyster, known then as the Rockaway oyster. Nearly 450,000 tons of oysters and clams were harvested from Jamaica Bay in 1906, but pollution, decreasing habitat, and overharvesting caused the industry to crash less than twenty years later.⁴⁵ NY/NJ Baykeeper has created a volunteer-driven oyster gardening program to restore oysters throughout the Hudson-Raritan Estuary, and similar efforts should be launched in Jamaica Bay.⁴⁶

Improved trash removal would make a difference in the bay’s appearance and water quality. Dedicating a skimmer boat to Jamaica Bay and increased trash receptacles and pick up capacity would reduce marine debris, and bayfront property owners should be required to keep their shorelines clean.

Specific Water Quality Goals & Recommendations

Goal: Secure fishable/swimmable waters in Jamaica Bay.

- ✓ Meet or exceed current federal, state, and local water quality standards for Jamaica Bay’s open water and tributaries. Attaining these standards would at least ensure water suitable for secondary recreation (e.g. kayaking, fishing) in most of Jamaica Bay’s waters, and

primary recreation (e.g. swimming, shellfishing) in the bay's open waters.

- ✓ Significantly reduce the frequency and severity of harmful algal blooms in Jamaica Bay's open waters resulting from anthropogenic influences.
- ✓ Reduce inputs of nitrogen and organic substances into Jamaica Bay to levels necessary to achieve numeric water quality criteria for dissolved oxygen (5.0 milligrams/Liter) throughout Jamaica Bay's open waters.
- ✓ Significantly reduce combined sewer overflows (CSOs) with the goal of eliminating all CSOs into Jamaica Bay (including tributaries) by 2020.

(See Appendix F for a list of all watershed protection plan goals.)

Recommendations to meet the goal of securing fishable/swimmable waters:

Upgrade and maintain sewage treatment plants and the sewer system

- Priority recommendation: Upgrade the 26th Ward and Jamaica wastewater treatment plants to tertiary treatment to reduce nitrogen inputs into the bay. Right now, sewage is screened for floatables (preliminary treatment), biologically treated to reduce the wastewater's organic content (primary and secondary treatment), and disinfected with chlorine. Adding tertiary treatment would further remove nitrogen from the continuous effluent stream released into Jamaica Bay, and may assist in screening out endocrine disrupters. Both plants have nearby vacant property which could accommodate these new facilities. DEP pilot projects utilizing the nitrogen capture technologies of SHARON (single reactor system for high activity ammonium removal over nitrite), which uses biological methods to convert ammonia to nitrogen gas, and ARP (ammonia recovery process), which uses physical methods to convert ammonia to commercial fertilizer, should be carefully reviewed for possible adoption in the bay and fast-tracked.⁴⁷
- Priority recommendation: Stop centrate processing at Jamaica Bay's sewage treatment plants or further treat centrate for nitrogen removal. DEP analyses show that removing 26th Ward centrate processing alone would result in a decrease of 2,170 pounds of nitrogen per day – approximately a six percent reduction in *total* daily nitrogen

loading to the bay.⁴⁸ The Advisory Committee believes that centrate treatment at the 26th Ward and Jamaica plants could be better handled through reuse or by treating at other city plants that discharge into waters with more efficient discharge rates, rather than into Jamaica Bay.⁴⁹

- Explore alternative treatment plant disinfection methods. Conventional chlorine treatment results in the formation of chlorinated organic compounds in plant effluent; such chlorinated compounds are increasingly considered to be environmentally harmful. Ultraviolet (UV) and ozone are two alternate methods of disinfection that should be considered.
- Revise JFK's State Pollutant Discharge Elimination System (SPDES) permit. This permit has not been significantly modified since it was first issued in 1987 and it no longer meets Environmental Protection Agency and state regulatory requirements. A draft permit was recently released for public comment. The final permit should incorporate requirements for monitoring and stormwater pollution prevention planning, and include effluent limits that ensure that the permit fully protects Jamaica Bay's water quality from harmful contaminants in the airport's runoff.
- Develop and implement strategies to trap initial stormwater runoff, known as the "first flush," in communities that are separately sewered. Initial runoff is usually more polluted than runoff originating later on in a storm event and such strategies can prevent high pollutant loads from reaching the bay. A first flush collection system can capture the most polluted stormwater during a rain event for treatment and allow for less polluted stormwater discharges.⁵⁰
- Use natural resource damage (NRD) assessment procedures to impose fines for illegal discharges to the bay that could have been avoided by proper maintenance, and create a dedicated fund for restoration programs arising from these claims. During New York City's 2003 power failure, backup generators at two sewage treatment plants failed, causing thirty million gallons of untreated sewage to spill into the East River⁵¹ and more than two hundred and thirty million gallons to spill into the Hudson River.⁵² DEP's inadequate backup generator maintenance and the resulting sewage discharges violated federal and state laws.⁵³

Harsher sanctions would help reinforce the importance of proper maintenance and timely repairs.

- Identify chemicals in treatment plant effluent which may have harmful ecological effects, such as components from pharmaceuticals. Characterize the levels and amounts of such chemicals entering Jamaica Bay and implement treatment and/or pre-treatment measures as necessary.
- Clean out accumulated sediments in sewer lines and catch basins to enhance their water storage capacity, and schedule regular cleanings to remove debris. Sewer lines and catch basins are the bay's first defense against oil, grease, trash and organic matter in stormwater – the cleaner these routes to the plants are, the more room they have to hold their full capacity of water and prevent CSOs. Where possible, these structures should be visually marked to increase public awareness of their purpose.
- Restore tributaries leading into Jamaica Bay. Improving these water corridors could help increase the natural flow of water and sediments to the bay, and reduce the impact of CSO events.
- Review DEP's portfolio of industrial pre-treatment permittees within the Jamaica Bay watershed with the goal of instituting BMPs with respect to their industrial processes in order to reduce loading of harmful chemicals in the influent to the treatment plants and ultimately in what is discharged to the bay.

Adopt stormwater BMPs

- Priority recommendation: Revise codes, guidelines and requirements that govern construction, reconstruction and landscaping of the city's public infrastructure, including sidewalk, street, median and public spaces, to incorporate minimum standards of performance for stormwater retention and infiltration. Over the last decade, advances in technologies and a first wave of applications around the country have made certain BMPs for stormwater appropriate for widespread use in the public infrastructure. For the Jamaica Bay watershed/sewershed, measures to increase infiltration hold particular promise, as many (although not all) parts of the bay's watershed/sewershed have a low groundwater table. For example, both urban and suburban areas in Pennsylvania and Michigan have used porous

asphalt pavement successfully to increase infiltration and decrease stormwater runoff. Porous asphalt makes use of stone aggregates that are fine enough to allow water infiltration into an underlying stone bed, allowing the removal of suspended solids, metals, oils and grease at very high rates.⁵⁴

- Priority recommendation: Implement a city pilot program that aggressively tests a variety of stormwater BMPs (e.g. green strips/medians, enhanced curb designs, use of porous sidewalk pavement) including through one or more area-specific pilot projects within the watershed area in both Brooklyn and Queens that would maximize use of such BMPs. Monitor and adapt the projects to generate a better base of information on the efficacy of different BMPs. For example, Seattle's Street Edge Alternative (SEA) project, which replaced impervious surfaces with porous materials, added vegetation along streets to enhance natural drainage and narrowed streets to reduce runoff, showed that stormwater BMPs are feasible in a large, metropolitan city. The SEA project's success led to its expansion throughout the city, and so far has reduced stormwater discharge in project areas by a factor of ten.⁵⁵ Actual implementation and monitoring of these types of projects, rather than lengthy modeling exercises, is also important, as experiences across the country have frequently shown that benefits are greater upon implementation than had been initially calculated.⁵⁶ Such pilot projects also have educational and public awareness value.
- Create a list of city-approved stormwater runoff/pollution BMPs for buildings and associated landscaping, and encourage their adoption by eliminating barriers in city building codes against their use, providing incentives to private developers who adopt BMPs (e.g. perhaps offering a reduced water rate) and requiring a certain percentage of city-funded new and redevelopment projects to incorporate BMPs. A review of city building codes to eliminate any barriers to stormwater BMPs should be conducted as soon as possible. The city has already begun promotion of green building technologies with Local Law 86, which requires new city construction to qualify for the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) silver certification.⁵⁷ (See Appendix G.) This requirement should be incorporated into all

agreements dealing with real estate property which the city leases to others for development as well. Further, the city should consider adopting the following standards/incentives to reduce inputs into the sewer system: require publicly financed buildings to devote a portion of their roofs for vegetated cover, increase the availability of green tax credits that private developers can use for green building technologies, and compel new tenancies on city-owned property requiring new buildings or substantial renovation of existing buildings to comply with Executive Order 111. (See Appendix H.) With approximately 300,000 square feet of green roof space constructed in 2005, Chicago is generally recognized as the current leader among American cities in green roofs.⁵⁸ New York City should aspire to take over this ranking over the next five years; the large number of industrial and/or commercial establishments with significant roof areas in the bay's watershed/sewershed should make it a prime area for such a focused effort by the city.

Conserve water

- **Priority recommendation:** With the goals of reducing water waste and lessening the impact on sewer systems, require that the city implement an aggressive public education program and a system of requirements and incentives to decrease residential and industrial water use in the Jamaica Bay sewershed by 15 percent within 10 years.⁵⁹ Reducing the amount of water entering treatment plants will both increase plant capacity during storm events and allow for an increase in the residence time of wastewater in the plant, aiding in the implementation of nitrogen removal technologies. New York City's sewage has been described as weak; therefore, water conservation efforts should not increase the concentration of sewage solids to the point of causing treatment difficulties.⁶⁰ Previous city water conservation efforts aggressively focused on leak detection and repair, replacement of old toilets with water efficient ones, installation of water meters and education about efficient water use. Largely thanks to these programs, New Yorkers decreased their water consumption by 25 percent from 1988 to 2001, but more can be done.⁶¹ Approximately 14 percent of household water is still wasted due to faucet leaks and drips, running water, and toilet seepage, among other causes.⁶² It has been almost a decade since the last major public campaign to increase water conservation, and, given this

amount of time and recent technological advances, it is time for a renewed push.

Goal: Significantly reduce harmful impacts from soil and sediment contamination in Jamaica Bay.

- ✓ No localized or net increase in contaminant concentrations in sediments and soils within Jamaica Bay watershed as a result of inputs via groundwater, combined sewer overflows, and water pollution control plant effluents.
- ✓ Significantly reduce or reverse acute and chronic detrimental biological and ecological impacts from sediment and soil contamination within the Jamaica Bay watershed, focusing on known bioaccumulative agents, such as heavy metals and certain organic compounds.
- ✓ Identify and monitor location and nature of sediment contamination in Jamaica Bay watershed. Prioritize remediation of sites containing sediments and/or soils identified as posing a human and/or ecological risk.

Recommendations to meet the goal of significantly reducing harmful impacts from soil and sediment contamination:

- Designate Jamaica Bay as a "no discharge zone." Establishing Jamaica Bay's waters as a no discharge zone would prohibit any vessels from dumping treated or untreated waste into the waters. As an adequate number of waste disposal "pump out" stations would be required before this change could legally be approved; an analysis of the current number of recreational vessels against the number of pump out stations should be conducted.⁶³
- Pass legislation prohibiting the use of treated or untreated contaminated sediment materials from outside of Jamaica Bay for restoration activities within the Jamaica Bay watershed. Existing Jamaica Bay sediments can be moved throughout the bay or clean sediments similar in grain size and sediment type to existing sediments can be used for filling activities within the bay, but any materials treated or untreated that would be characterized by their nature as in need of disposal should not be placed in Jamaica Bay.[†]

[†] One committee member dissents from this view believing that there is insufficient funds and clean material to restore all the pits in the bay and that the careful use of contaminated material as the sub-fill, above which a thick layer of clean material would isolate the contaminants, is not only technically feasible and safe, but

- Establish for Jamaica Bay the right of first refusal for any navigational or construction-related dredged bay floor sediment. In instances where sediments are dredged from the bay, for example in Rockaway Inlet, the potential beneficial use for these sediments within Jamaica Bay should be considered before their uses elsewhere.
- Comprehensively identify the toxic organic compounds, including pesticides, and metals in CSOs and stormwater entering the bay and develop strategies for reducing and eliminating harmful inputs. In the limited research conducted to date, DEC's Contaminant Assessment and Reduction Program has identified possible significant levels of toxic compounds in certain CSOs entering the bay.⁶⁴ This research should be expanded and solutions to any problem sources identified.
- Develop standards for identifying toxic sediment areas within the bay and assess and prioritize the need for their removal, isolation and/or treatment based on whether or not these areas will erode over time or impact the water column. Toxic sediments should be classified as those that may pose a human health hazard and those that may impair the ecological and biological functioning of the ecosystem. Identify pilot projects to safely reduce the risks caused by these hot spots.
- Examine the sources and impacts of airborne contamination to Jamaica Bay. The New York Academy of Sciences Harbor Consortium found that airborne pollution plays a major role in the level of mercury found in New York-New Jersey Harbor waterways; other airborne contaminants may also be impacting Jamaica Bay.⁶⁵

Goal: Restore populations of oysters and other shellfish to Jamaica Bay.

Recommendations to meet the goal of restoring oyster and shellfish populations:

- Develop and implement a Jamaica Bay shellfish remediation and management plan to secure the long-term revitalization of oysters and other local shellfish for improved water quality, biodiversity

and public consumption while safeguarding human health.

- Examine the possibility of creating one or more reefs to serve as fish and shellfish habitat, and potentially as a diving ground for recreational users, in appropriate locations within the bay.

Goal: Eliminate floatables, debris, slicks and settleable solids in Jamaica Bay to create a healthy, trash-free recreation area.

- ✓ Eliminate discharge of CSO settleable solids into Jamaica Bay.
- ✓ Remove CSO sediment deposits to help restore healthy marine ecosystems.
- ✓ Identify and remove existing debris causing ecological or aesthetic impairment.

Recommendations to meet the goal of eliminating floatables, debris, slicks and settleable solids:

- Dedicate a skimmer boat to Jamaica Bay clean up. A shallow draft pontoon-type skimmer vessel powered by two four-cycle outboard motors with a detachable height pickup net is needed to remove the floatable debris from Jamaica Bay's waters. The boat should be designed to move quickly through the bay to collect and drop off trash, but also be able to navigate the shallow waters.
- Remove, treat or isolate CSO sediment deposits where appropriate, for example from Paerdegat Basin. As a result of continued CSO discharges, Paerdegat Basin has a mound of settled solids extending approximately 1,000 feet south from the basin's head, 12 to 13 feet deep in areas. At the current accumulation rate, parts of the mound could be exposed during low tide within ten years. Such sediments and accompanying field conditions have an unpleasant odor and create hypoxic or anoxic conditions, and should be addressed immediately.⁶⁶
- Increase trash receptacles and collection in the Refuge's off-season. After Labor Day, most of the trash receptacles are removed throughout the Refuge, as NPS' funding for trash collection is reduced. Exploring the use of animal-proof containers and solar-powered trash compactors, such as the "Big Belly," which can hold trash for longer periods of time, or possibly negotiating additional disposal options with the New York City Department of Sanitation might allow for increased receptacles or more frequent trash pick up during the off-season.⁶⁷

also provides a very cost-effective means of restoring pits in a low-funding environment and should not be ruled out without further study.

- Develop an “Adopt a Waterfront” effort that allows private and public interests to be responsible for keeping areas of the bay clean. Similar efforts have been made in the city parks with the Partnerships for Parks program, which can serve as a model for Jamaica Bay.⁶⁸
- Develop city codes requiring Jamaica Bay waterfront property owners – public and private – to keep their shorelines clean of floatable debris. Similar to how adjacent property owners currently must keep sidewalks clean, bayfront owners could be responsible for removing the refuse that collects on their land.
- Develop a permanent and ongoing program for collection and removal of large-scale debris visible above the high tide mark that has been demonstrated to affect aesthetic or ecological uses within the bay.
- Support the passage of an expanded New York State bottle bill, “The Bigger, Better, Bottle Bill.” An extension of current returnable container deposit laws to cover non-carbonated beverages, such as bottled water, fruit juice, and teas, would reduce the number of bottles entering the waste stream and found as litter across the city’s streets and waterways. The current bill would also require bottle distributors to transfer unclaimed deposits to the state’s Environmental Protection Fund.⁶⁹ Since 1982, when the city passed its current returnable container deposit law, more than 80 million bottles and cans have been recycled.⁷⁰

CHALLENGE: COMPROMISED ECOLOGY

One of Jamaica Bay’s most pressing threats is the rapid disappearance of its wetlands. Between 1924 and 1999, more than 50 percent of its marshes disappeared.⁷¹ And since the 1970s, marsh loss has accelerated, first to an average of 26 acres per year between 1974 and 1994, and more recently to an average of 44 acres per year between 1994 and 1999.⁷² Scientists currently predict that the bay’s marsh islands will cease to exist by 2024.⁷³

Increasingly, marsh loss is occurring within the interior of marsh islands. When tidal pools expand, marsh areas become fragmented as the vegetation, largely cordgrass, *S. alterniflora*, becomes waterlogged and drowns, loosening the root structures that hold the land in place and turning into unvegetated mudflats.⁷⁴

On some islands, more than 75 percent of the vegetation has disappeared in the past three decades.⁷⁵

The exact cause or causes of Jamaica Bay’s wetlands degradation are still unknown. Even without further increases in mean sea level, at the current rate of loss, much of the wetlands are expected to erode.⁷⁶ Ongoing investigations have focused on changes in sediment deposition and excessive sulfides in sediments caused by water pollution.

A hardening of the bay’s perimeter has made it more difficult for sediment to enter the bay by washing over land and has lowered the bay’s sediment budget (the amount of water-borne sediment available for deposition onto land).⁷⁷ Without new sediment washing up on the marsh islands, these lands erode and vanish. Changes in the bay’s physical contours by westward progression of the Rockaway Peninsula, the dredging of navigational channels, the stabilization of Rockaway Inlet, the bulkheading of tributaries, landfills, and the construction of JFK and its runway into the bay – all have reduced sediment transport or affected water circulation. Hardened shorelines have also removed the natural graded edge between habitats, which is often the most productive strip.

Borrow pits and other areas from which sandy sediment was dredged to construct JFK and other areas around the bay and establish navigation channels may be acting as sediment sinks, and the increased wave energy and sediment flushing time caused by a deeper average depth may affect sediment accretion.⁷⁸ The flushing rate/residence time for water to circulate throughout the entire bay is around 35 days;⁷⁹ however, the specific residence time of water varies in different sections of Jamaica Bay – Grassy Bay with its deep borrow pits, for example, has a residence time of roughly one week.⁸⁰ Changes in hydrology also affect the bay’s salinity and, if significant enough, can make the bay unsuitable for many of its current species of flora and fauna.

Recent research comparing accretion rates to marsh loss have suggested that a lower sediment budget may not be the primary cause – instead, water pollution may play the key role. High amounts of organic content from wastewater and CSOs in the bay may be contributing to high concentrations of sulfide; longer periods of flooding also lead to a gradual build up of hydrogen sulfide in sediments. *S. alterniflora* has limited ability to oxygenate its roots and detoxify sulfide. At high sulfide concentrations, it cannot recover; its roots degrade, marsh grass loss occurs and the marsh begins to lose its physical integrity and fragments.⁸¹

Other factors are exacerbating marsh loss. The bay’s remaining natural uplands serve as important

buffers in maintaining the bay's wetlands, reducing stormwater flow, and providing habitat corridors, but too many are neglected and being lost to development.⁸² Additionally, snow geese graze and trample on *S. alterniflora*. When marshes were more plentiful this did not pose a serious problem, but as the wetlands disappear, the geese's impacts increase.⁸³ Mussel banks block the natural drainage channels of the marshes, allowing ponds to form on marshlands and immersing *S. alterniflora* for longer periods each year.⁸⁴ Tides bring wrack (sea lettuce, straw, dried seaweed, and floatable debris) into the bay to rest over the marshes and smother the remaining *S. alterniflora*.⁸⁵ There is also the possibility that nitrogen-enriched water is causing an excessive growth of *Ulva sp.* (sea lettuce), which is carpeting the bay's bottom and preventing sediments from being resuspended into the water for redistribution onto the marsh surfaces.⁸⁶

Historically, the bay's sediment accretion rate has kept pace with sea level rise and local subsidence.⁸⁷ However, global climate models predict an increase in average sea level rise, which would exceed the historical accretion rate of the bay, leading to more frequent inundation of the marshes, wave action and marsh erosion, thereby potentially transforming them to mudflats.⁸⁸ In research conducted for the U.S. Global Climate Change Research Program, a number of sea level rise projections were compared with plausible rates of marsh growth; analysis suggests that if enough sediment were available to marshes, the wetlands could survive all but the most extreme cases of future sea level rise.⁸⁹

In addition to habitat loss, Jamaica Bay's natural ecology is threatened by non-native and/or invasive species that out-compete indigenous species, as they often do not have naturally existing predators to check their proliferation. *S. alterniflora* provides food and shelter for birds, diamond-backed terrapins, and other animals and its detritus supports the salt marsh food chain.⁹⁰ Large stands of common reed or *Phragmites* are overtaking disturbed wetlands and uplands, and driving out *S. alterniflora* without providing the same set of ecological functions.⁹¹ Other very aggressive invasive plant species, including Japanese knotweed, Japanese honeysuckle, Oriental bittersweet, Russian olive and mugwort, are decimating entire plant communities around Jamaica Bay and drastically reducing biodiversity.

Two hundred fourteen species within the bay have been designed as being of "special interest" by the U.S. Fish and Wildlife Service. These include several federally-designated threatened or endangered bird species, such as the piping plover, peregrine falcon,

and roseate tern. Plant species of note include seabeach amaranth, seabeach knotweed, and willow oak. The endangered Atlantic Ridley and loggerhead sea turtles travel through here, as do more than 80 species of fish, including winter flounder and Atlantic silversides.⁹² These native species need additional protection to thrive.

Jamaica Bay has not been afforded the level of protection warranted by its unique ecological resources. It is also important that efforts to restore lost habitats not wait for definitive answers to all the questions about the marsh loss problem; rather, in order to ensure Jamaica Bay's continued viability, areas must be restored and protected simultaneous with ongoing investigations. Action is needed to protect and restore the bay's wetlands and uplands, and its native species, before it is too late.

ECOLOGICAL GOALS & NEXT STEPS

Summary of Ecological Recommendations

The Jamaica Bay watershed extends far beyond the bay's shoreline, and greater awareness of this fact and care of the resources therein is critical to revitalize the open water and wetlands portion.⁹³ Protecting upland green areas and reclaiming vacant land for use as parks and other ecological buffers allows increased capture of stormwater through pervious surfaces, provides additional habitat for indigenous species and serves as additional buffer when located adjacent to wetlands or other natural areas. These small "green islands" within a concrete landscape also provide restful space for New Yorkers.

Assuming continued positive results from current projects, Jamaica Bay's inner salt marshes should continue to be stabilized by sediment placement to simulate the compromised natural sediment transport process. Building up the marshes' sediment edge and preventing further deterioration will help maintain the bay's wetlands in the face of sea level rise and ensure a home for the area's wildlife.

Developing a plan to address the growing challenge of invasive species in Jamaica Bay is essential to maintaining and improving the area's native plant and wildlife diversity. Improving natural habitat through restoration activities will also benefit the diversity and numbers of native species.

Specific Ecological Goals & Recommendations

Goal: Prevent additional loss, in quality and extent, of existing Jamaica Bay wetland and

maritime native habitat complexes, including those serving as upland buffers, and increase the spatial extent of these habitats.

Recommendations to meet the goal of preventing additional loss of wetland and maritime native habitat complexes, and increasing their size:

- Priority recommendation: Expediently transfer city-owned wetlands and adjacent areas within the Jamaica Bay watershed/sewershed to a responsible public agency, per the recommendations of the Wetlands Task Force created by Local Law 83 (a seven-member group to “inventory city-owned wetlands in the City of New York”).⁹⁴ (See Appendix I.) The Advisory Committee recommends that the wetlands and adjacent areas identified by the Task Force within the Jamaica Bay watershed be protected from development immediately.
- Priority recommendation: Expand the buffer zone on tidal wetlands in Jamaica Bay from 150 to 300 feet. The DEC requires a permit for most activity in the area adjacent to tidal wetlands extending 300 feet;⁹⁵ however, in New York City, the adjacent area is defined to include only up to 150 feet. This definition should be changed to ensure protection of the city’s ever-shrinking number of wetlands. Shoreline buffer zones are very effective in filtering pollutants and excess nutrients and providing erosion and flood control, sediment trapping, and wildlife habitat.⁹⁶ Furthermore, as apparent sea level rise continues due to local subsidence and global warming, landward migration of wetlands is inevitable and needs to be accommodated through expanded buffer zones.
- Priority recommendation: Implement a Transfer of Development Rights (TDR) program in the Jamaica Bay watershed to encourage the preservation of existing open space. TDR programs protect open space by allowing landowners in conservation zones to be compensated by selling their development rights for a particular parcel of land to the municipality or developers in another district. TDRs have proven successful in the Pine Barrens on Long Island and the Pinelands in New Jersey by limiting development of ecologically important areas while providing for growth in compatible areas.⁹⁷ New York City has already instituted TDR programs as part of the Landmakers Preservation Ordinance and Broadway theater district.⁹⁸

- Evaluate the utility of a state or other formal designation that capitalizes on the history and natural resources of Jamaica Bay. Signage throughout the watershed would increase public understanding of the role that upland areas, as well as wetlands, have on the bay. Enhanced use of BMPs could also be encouraged within the area.
- Review additional vacant city-owned waterfront properties which may not have been identified by the Wetlands Task Force to evaluate returning these areas to a more natural state, including through transferring them to the appropriate city agency for such purpose. For example, transferring and restoring natural areas on the east side of Thurston Basin would provide additional bay access for the Queens community. Indeed, the headwaters of Thurston Basin in Idlewild Park and environs are Jamaica Bay’s most pristine. The intact salt marsh and tidal creeks in the Idlewild Park area should be targeted for restoration activities, and there should be an effort to expand the spatial extent of this unique portion of Jamaica Bay’s watershed.
- Revise New York City’s Waterfront Revitalization Plan, as authorized by the New York State Department of State Coastal Zone Management Plan, to be consistent with the Advisory Committee’s recommendations.⁹⁹ Zoning changes should be formulated and adopted as necessary to provide compatible uses within the bay environment while creating upland buffer areas and increased tidal wetlands adjacent to the bay through more stringent setback and building density requirements.

Goal: Protect Jamaica Bay’s inner salt marsh complexes from additional loss of spatial extent and function, and increase the spatial extent of these marsh complexes.

Recommendations to meet the goal of preventing additional loss of the inner salt marsh complexes, and increasing their size:

- Priority recommendation: Fill degraded low-lying areas of marshes with sediment to help restore their historic footprint, and monitor results. In 2003, NPS used a small hydraulic dredge mounted on an open boat to spray a slurry of sediment and bay water taken from a trench in an adjacent tidal creek on to the surface of Big Egg Marsh. The restoration has been “technically successful...as

the [sprayed] sand is transforming into a silty and organic saltmarsh soil.”¹⁰⁰ Assuming results continue to be positive, this technique of “spot filling” through jet or slurry spray should be used to fill in additional low-lying areas of Big Egg Marsh, and sections of Little Egg, Yellow Bar, Goose Pond, Black Bank, Silver Hole, and JoCo Marshes. Spot filling activities should be monitored using an adaptive management strategy, including for purposes of informing future restoration efforts in the bay and elsewhere.

- Priority recommendation: Remove artificial barriers and obstructions to tidal flushing within Jamaica Bay. For example, repairing the drainage culverts located under the Federal Aviation Administration roads to the east of the Rockaway Turnpike and reinstalling the culvert under New York Metropolitan Transportation Authority’s “A” line at 5th Road in Broad Channel would improve the area’s tidal flushing.¹⁰¹
- Examine various technologies for non-hardened structure stabilization to protect the windward side of marsh islands from natural wind and water erosion. Erosion armor of sand-filled biodegradable tubes or other geo-textiles made of natural or biodegradable fiber could reduce wave erosion and perhaps reduce marsh loss.¹⁰²
- Ensure that the U.S. Army Corps of Engineers’ (Corps’) larger-scale marsh restoration projects, such as those on Elders Point and Yellow Bar, are on schedule and properly funded. The Corps is currently undertaking a restoration project in a portion of Elders Point, with construction and planting scheduled for spring and summer 2006. The plan calls for the Corps to place 315,000 cubic yards of sand on the marsh islands and to construct 61 acres of low-lying marsh. Presently, there are nine acres of marshland on Elders Point.¹⁰³ The Corps has scheduled Yellow Bar construction and planting for winter 2006 through spring 2007. The Corps will place 80,000 cubic yards of sand on Yellow Bar and will construct 31 acres of low-lying marsh to supplement the existing 77.5 acres of marshland.¹⁰⁴
- Using lessons learned from the Elders Point and Yellow Bar restorations, fund and conduct feasibility studies for restoration of Black Wall, Rulers Bar, Duck Point, and Stony Point Marshes. These sites have been severely impacted by marsh loss, and would benefit from additional sediment.

Moreover, sediment could easily be moved on to these locations and monitored by community groups. Feasibility studies are needed before restoration efforts can be begun however, and should be undertaken for these sites as soon as possible.¹⁰⁵

- Require significantly higher mitigation ratios (amount of land mitigated in exchange for losing land to development) for tidal wetlands impacts in Jamaica Bay than those required thus far. Throughout the Hudson-Raritan Estuary, the Corps and DEC have typically required mitigation ratios of 2:1 to 3:1 for projects with unavoidable impacts to tidal wetlands and adjacent areas.¹⁰⁶ Given the bay’s historic wetland loss, mitigation for unavoidable tidal wetlands impacts in Jamaica Bay should use a 5:1 ratio as a minimum, with higher ratios required as appropriate.
- Examine the list of brownfields within the Jamaica Bay watershed/sewershed and evaluate on a case-by-case basis how to improve their ecological functioning. Remediation and reuse of sites where toxics continue to leach into groundwater could improve conditions in the bay; however, some sites in which natural resources have reemerged may be better left undeveloped. Incentives to help enhance these areas, such as called for in the “Brownfields to Greenfields” program proposed by NY/NJ Baykeeper, should be instituted.¹⁰⁷
- Pursue alternate sources of marshland restoration funding, including from private foundations, such as the National Fish and Wildlife Foundation, and from alternative government sources, such as the Environmental Benefits Fund to be created by DEP under the January 2006 Consent Decree with DEC.
- Develop a graduated real estate property transfer tax for new development within the Jamaica Bay watershed to fund marsh restoration. This impact fee could be modeled on an existing program that the East End of Long Island operates by which a portion of the real estate tax helps mitigate the ecological damage of open space loss. Alternatively, a portion of the city’s sales tax could be dedicated to marsh restoration in Jamaica Bay.
- Secure funding for New York/New Jersey Harbor Estuary Program (HEP) priority habitat acquisition and restoration sites located in Jamaica Bay. HEP is part of U.S. Environmental Protection Agency’s

National Estuary Program and is a stakeholder partnership that works to “develop and implement a plan to protect, conserve, and restore the estuary.”¹⁰⁸ One of HEP’s priorities is to acquire, restore, and protect habitat throughout the harbor estuary. HEP’s habitat workgroup is charged with identifying priority acquisition and restoration sites; as of February 2006, HEP has designated 26 sites in Jamaica Bay as priority acquisition and restoration sites.¹⁰⁹ It is also important that the involved agencies ensure that designated sites are not developed prior to the opportunity for acquisition.

- If filling of borrow pits in Norton Basin and Little Bay moves forward, use subsequent monitoring data to examine the potential benefits and drawbacks that such recontouring actions might have for the bay’s remaining borrow pits.[‡]
- Initiate long-term planning related to the Belt Parkway’s renovation and reconstruction that assesses use of design and construction elements that will decrease the highway’s footprint around the rim of Jamaica Bay, increase wetlands and hydrologic connectivity and decrease pollution inputs into the bay.

Goal: Prevent the introduction or spread of ecologically harmful invasive plant and animal species in and around Jamaica Bay, and reduce their current distribution and population levels as appropriate to improve natural diversity and ecological functions of the Bay.

Goal: Ensure a diverse and healthy population of native flora and fauna in Jamaica Bay.

Recommendations to meet the goals of preventing and reducing invasive species, and ensuring diverse and healthy populations of native flora and fauna:

- Priority recommendation: Develop a plan to monitor the spread of invasive species, assess impact on Jamaica Bay’s health, and develop

[‡] One committee member dissents from this view, stating that, at this time, he is against the filling of *any* borrow pits in Jamaica Bay unless it can be scientifically proven that there will be no harmful/detrimental effects to the surrounding area or the bay as a whole. He states that any potential benefits from the filling of Little Bay or Norton Bay should not necessarily be used to initiate action for other areas of the bay due to these areas’ unique differences.

programs for control. For example, Asian shore crabs were recently discovered in areas throughout the bay and more information on the potential impacts these crabs have on green and black-fingered mud crabs is needed, as well as how to eliminate or control their presence in the bay as necessary.¹¹⁰ NPS staff is currently developing a draft invasive plant management plan (to be released in 2007) that identifies target species and areas, and recommends management approaches.

- Widely publicize lists of invasive plant and animal species in Jamaica Bay and set up a hotline or Web site for local residents to notify officials about new invasive species.
- Incorporate invasive species control into restoration projects that target marshes along the bay’s periphery. By returning areas to natural elevations, invasive species, such as *Phragmites*, will be reduced and the recovered area will be more likely to repopulate with native species.
- Restore eelgrass beds in appropriate locations within the bay, possibly the south side of Little Egg Marsh. Eelgrass beds, which are found in estuarine waters less than eight feet deep, serve as important nurseries and habitats for fishes and shellfishes, help absorb wave action, and improve nutrient uptake and cycling.¹¹¹ Once found throughout the bay, these beds died off from disease and have been prevented from returning due to degraded water quality and dredging and deepening of former habitat.¹¹² Little Egg Marsh may be an appropriate area for a pilot project because the area is clear of boat traffic and it receives ocean water through the Rockaway Inlet, which are beneficial conditions for eelgrass establishment.
- Design and implement community planting programs using native species. Develop educational materials and a protocol to standardize Jamaica Bay restoration efforts to make them more efficient. The New York City Parks Department serves as a good example as it has implemented similar projects, most notably the Forever Wild Program.¹¹³

CHALLENGE: INADEQUATE PLANNING & OUTREACH

The challenges facing Jamaica Bay and its future

cannot continue to be responded to on an ad hoc basis. More than twenty-five governmental agencies have jurisdictional responsibilities in Jamaica Bay and while they often confer on specific projects, their overall programs lack coordination.¹¹⁴ Differing missions and mandates continue to frustrate the development of an overall plan or vision for Jamaica Bay.¹¹⁵

Jamaica Bay also lacks an overarching research plan to help guide water quality and habitat restoration studies. Several useful scientific forums have been held, but without a funded, dedicated coordinating structure, scientists have largely approached Jamaica Bay in an individualistic fashion, as targeted grants and specific research interests dictate.

Construction and development within the Jamaica Bay watershed has been conducted without consideration of potential adverse impacts on the bay and sometimes without notice to all interested and affected parties. Enforcement against polluters and clean-ups have not consistently been as strong as needed to preserve the bay's visual appearance and its ecological integrity.

Finally, and most significantly, Jamaica Bay suffers from a lack of identity outside of a committed core of advocates and users. Jamaica Bay's beauty and opportunities are largely unknown to the New York City's residents as a whole. Limited and poor quality access to the bay has prevented even local residents from enjoying this resource and from advocating for its protection and restoration. A much greater political constituency for Jamaica Bay must be created. Otherwise, it will be difficult, if not impossible, to attract necessary public funding and to ensure that government decisionmakers consistently consider the bay's protection to be a priority.

PLANNING AND OUTREACH GOALS & NEXT STEPS

Summary of Planning and Outreach Recommendations

Both increased awareness and use of Jamaica Bay will foster stewardship of the resource. Integrating a unit about the bay into the school curriculum would add to the number of teachers and students already taking advantage of Jamaica Bay's natural classroom. Developing additional access points and maps with information on the bay's offerings would help raise public understanding and foster stewardship of the bay.

The Mayor's Office of Environmental Coordination should ensure all agencies are notified of upcoming construction and restoration activities, and a

Jamaica Bay-specific environmental assessment form should be created. Restrictions on development and sanctions against illegal activities should be strengthened.

Establishing close ties within the scientific community would avoid duplicative research, allow more effective coordination in a climate of scarce resources and help continually improve understanding and success so critical to moving forward. A conference on restoration and research activities pertinent to Jamaica Bay should be held with the scientific community every two years. A Web site for data sharing among scientists, as well as the larger Jamaica Bay community, should be a priority. Further monitoring stations and studies are needed in order to improve community understanding of the resources.

Specific Planning and Outreach Goals & Recommendations

Goal: Institute an ongoing Jamaica Bay monitoring/science research program that identifies additional scientific needs, and coordinates interagency research and monitoring.

Recommendations to meet the goal of instituting an ongoing Jamaica Bay monitoring/science research program:

- **Priority recommendation:** Increase the number of remote real time monitoring stations in Jamaica Bay and the infrastructure necessary to support these. Current technology allows for marine water quality stations (buoys) to transmit real time data to DEP offices. Routine water quality parameters that should be monitored include salinity, dissolved oxygen, pH, temperature, and nitrogen levels. The selection of station locations should allow for a broad assessment of the bay's water quality at any point in time. Increased monitoring data will reduce the city's reliance on analytical modeling and provide a more accurate picture of the ecological system.
- New York City, acting through its various agencies and academic institutions, should facilitate a scientific symposium at least every two years to coordinate and guide scientific investigations on issues pertinent to the ecology of Jamaica Bay and to inform the greater public on the status of the bay's ecology. Scientific symposiums, such as the Jamaica Bay Institute's March 2004 "Jamaica Bay's Disappearing Marshes," help to not only

coordinate and guide scientific work, but also to inform the larger public and encourage increased policy action and funding. The city should provide a Web site for the Jamaica Bay community that is regularly updated, coordinated with other relevant Web sites, and made as user-friendly as possible to encourage community groups to interact and network. The Jamaica Bay Research and Management Information Network Web site could fill this need.

Goal: Improve public awareness of and access to Jamaica Bay.

- ✓ Develop education and outreach programs to increase knowledge of Jamaica Bay, including the benefits it provides the public, in adjacent communities and in the city as a whole.
- ✓ Increase the number of public access points to Jamaica Bay.
- ✓ Increase awareness of Jamaica Bay and its public benefits among elected officials.

Recommendations to meet the goal of improving awareness of and access to Jamaica Bay:

- Priority recommendation: Direct the Mayor's Office of Environmental Coordination to ensure that all relevant state, municipal and federal agencies are notified of construction and restoration activities and their impacts within the Jamaica Bay watershed/sewershed. Create a new Jamaica Bay watershed/sewershed environmental assessment form that ensures additional scrutiny of projects within the Jamaica Bay watershed, with an emphasis on environmental issues pertinent to the bay. The assessment should incorporate an analysis of cumulative impacts, including from related projects; after all, it has been the cumulative effects of countless projects, large and small, over the past 100 years that have so degraded Jamaica Bay. The committee also specifically notes that as the redevelopment of Rockaway Beach and other bay areas continues, standards and requirements must be developed to ensure that such development is fully compatible with the goal of protecting and restoring the bay.
- Priority recommendation: Add access points in Southwestern and Southeastern Queens. There is currently no access of any kind to Jamaica Bay from Southeastern Queens. Crumbling bulkheads, abandoned street ends, and vacant lands cut off communities that lie along the northern shore of the Rockaways and near JFK from the bay. The New York Waterfront Blueprint identified public

access opportunities in this area that would provide a natural link for Brooklyn and Queens residents to each other and to the bay; these should be considered.¹¹⁶

- Priority recommendation: Incorporate a unit on the Jamaica Bay watershed into city science and social studies curricula. Create a program about water and debris entering street catch basins and/or designate one week per year as "Jamaica Bay Conservation Week," during which students would write essays about the bay.
- Develop and distribute a detailed map displaying access points, boat ramps, parking areas, and walking/biking paths. This map should also include guidelines for how to both enjoy and take care of the resource.
- Develop a local nomination process that will allow the public, according to certain criteria, to nominate additional sites for access and consideration for protection and acquisition.
- Require the New York City Department of Health and Mental Hygiene to conduct a public health survey of people who regularly eat fish from Jamaica Bay and, based on this report, review existing fishing policies. Based on anecdotal information, a significant number of subsistence anglers and their families eat fish from the bay despite New York State Department of Health advisories; the possibility for additional outreach specific to Jamaica Bay should be explored.¹¹⁷
- Strengthen enforcement activities and sanctions against illegal dumping into Jamaica Bay. Businesses with records of polluting behaviors should face additional requirements, such as performance bonds or letters of credit in favor of city permit issuing agencies (DEP, New York City Department of Buildings) when undertaking work within the Jamaica Bay watershed.
- Produce an economic analysis of the benefits that Jamaica Bay's wetlands provide to the area as a way of encouraging community and business support for investment in the resource.

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Appendix A

**LOCAL LAWS
OF
THE CITY OF NEW YORK
FOR THE YEAR 2005**

No. 71

Introduced by Council Members Gennaro, Avella, Barron, Brewer, Clarke, Comrie, Fidler, Gonzalez, Jennings, Koppell, Liu, Nelson, Palma, Quinn, Recchia, Sanders, Vallone Jr. and Weprin.

A LOCAL LAW

To amend the administrative code of the city of New York, in relation to developing a watershed protection plan for the watershed/sewershed of Jamaica Bay.

Be it enacted by the Council as follows:

Section 1. Legislative findings and intent. In October of 1972, the United States Congress established the Gateway National Recreation Area (“Gateway”) as part of an effort to bring the National Park System and its ethic of preserving and protecting outstanding resources closer to major urban areas.

Gateway encompasses the largest collection of natural systems, wildlife habitats, historic resources, and recreational opportunities in the New York City/New Jersey metropolitan area. It also encompasses numerous sites of critical natural and cultural importance to the health of local ecosystems, to the life of migratory and native species and to the military, navigational and aviation history of the region and the nation, especially in the context of attendant defenses of New York Harbor.

According to the National Park Service (NPS), Gateway is the only extensive public natural area in the New York City region. The Jamaica Bay Unit is one of several units, consisting of lands, waters, marshes and submerged lands, comprising Gateway. The Jamaica Bay Wildlife Refuge (“Refuge”), established by the City of New York in 1948, is located within the Jamaica Bay Unit. The Refuge, a State and nationally recognized important bird area, encompasses 2,500 acres within the boroughs of Brooklyn and Queens. The only wildlife refuge in the National Park System, it provides a shelter for rare and endangered birds and a variety of habitats for more than 325 kinds of waterfront and shorebirds. It is also a critical stop-over area along the Eastern Flyway migration route and is one of the best and world renowned bird-watching locations in the western hemisphere.

Jamaica Bay is one of the largest and most productive coastal ecosystems in the State of New York, as well as within the Northeastern United States, and is an important recreational destination for local, national and international visitors. It contains approximately 13,000 acres of surface waters, including the largest tidal wetland

complex in New York State. These wetlands provide benefits such as natural water quality improvement, flood protection and shoreline erosion control for the commercial and residential areas in and around the Bay in Brooklyn and Queens. Unfortunately, construction and development within the Jamaica Bay watershed has often been conducted without consideration of potential adverse impacts on the Bay and sometimes without notice to all interested governmental agencies, civic groups and other interested parties. One such governmental agency is the NPS, which is the primary steward of the Bay, itself, and with whom, among many other agencies, it is critical for the City to collaborate in order to protect the Bay.

Jamaica Bay's future as an oasis of great ecological importance is in severe jeopardy due to the fact that thousands of acres of the Bay's marshy islands, which serve as nesting and feeding areas for an abundance of birds and other wildlife, are rapidly and mysteriously vanishing. Scientists predict that the Jamaica Bay marshlands will completely vanish in less than twenty years if the cause of their deterioration and a solution to their preservation are not found.

This legislation would require the New York City Department of Environmental Protection to create a watershed protection plan for the watershed/sewershed of Jamaica Bay, and would create a Jamaica Bay watershed protection plan advisory committee. The Council finds that such watershed planning is vital to the future of Jamaica Bay. This legislation establishes the initial pathway towards restoring and maintaining the water quality and ecological integrity of the Bay by comprehensively assessing threats to the Bay and coordinating environmental remediation and protection efforts in a focused and cost-effective manner. Watershed protection planning for Jamaica Bay is an efficient and effective means of promoting the sustainability of the Bay's environment, the economy associated with the Bay, and the linkages between the two.

§2. Chapter five of title 24 of the administrative code of the city of New York is hereby amended by adding thereto a new section 24-527 to read as follows:

§24-527 Watershed protection plan for the watershed/sewershed of Jamaica bay. a. No later than September 1, 2006, the commissioner shall complete a watershed protection plan for the watershed/sewershed of Jamaica bay, which shall, among other things, include measures the city can implement to help protect Jamaica bay. The overall goal of such plan shall be to restore and maintain the water quality and ecological integrity of Jamaica bay.

b. The commissioner shall assess the technical, legal, environmental and economical feasibility of including the following measures, at minimum, in the plan prepared pursuant to subdivision a of this section:

(1) best management practices for the minimization and control of soil erosion and stormwater runoff and reduction of both point and non-point source pollution, including, but not limited to, the promotion of development practices such as the on-site detention and infiltration of stormwater runoff, the minimization of impervious surfaces and the creation of natural systems to control and minimize stormwater runoff;

(2) measures to address threats to aquatic habitat, including, but not limited to, stabilizing and restoring salt marshes, wetlands, soils and other natural areas, strengthening ecological buffers, restoring natural features to the Jamaica bay watershed/sewershed shoreline, and reestablishing water flows;

(3) land acquisition and land use planning practices and opportunities, including, but not limited to, incentives, such as expedited permitting and property tax relief, for infill, brownfield redevelopment and other environmentally beneficial development, and

disincentives, such as stricter development guidelines, for development that may adversely impact Jamaica bay;

(4) a protocol for coordination with appropriate federal, state and city governmental entities that have jurisdiction over the Jamaica bay area, with respect to, but not limited to, efforts to restore and maintain the water quality and ecological integrity of Jamaica bay and notification regarding proposed development projects within the Jamaica bay watershed/sewershed that may adversely impact Jamaica bay;

(5) a protocol for coordination with the office of environmental coordination that ensures that environmental assessments and reviews of projects within the Jamaica bay watershed/sewershed address potential impacts to Jamaica bay and are conducted pursuant to all applicable federal, state and city environmental quality review laws and regulations;

(6) a public education program, including, but not limited to, programs for schools, developers, commercial facilities, civic groups and other local organizations and entities to increase awareness about the ecological significance and degradation of Jamaica bay; potential threats to Jamaica bay; restoration and watershed stewardship activities undertaken by the department and others involving Jamaica bay; and methods and practices to reduce pollution in Jamaica bay; and

(7) a program to target enforcement efforts that will help reduce polluting behaviors and operations that may adversely impact Jamaica bay.

c. The watershed protection plan prepared pursuant to subdivision a of this section, as it may be revised pursuant to subdivision f of this section, shall contain the following:

(1) specific goals related to restoring and maintaining the water quality and ecological integrity of Jamaica bay;

(2) the geographic boundaries of the watershed/sewershed of Jamaica bay for the purpose of achieving the goals of such plan and an explanation for the selection of such boundaries;

(3) the assessments the commissioner completed for each measure considered for inclusion in such plan;

(4) for any final recommendation of the Jamaica bay watershed protection plan advisory committee established pursuant to subdivision h of this section that was not assessed for inclusion or incorporated in such plan, an explanation for such omission; and

(5) a schedule, including interim and final milestones, for implementing the measures and achieving the specific goals included in such plan and methods of monitoring progress towards achieving such milestones and goals.

d. The commissioner shall implement the plan prepared pursuant to subdivision a of this section, as it may from time to time be revised pursuant to subdivision f of this section, in accordance with its provisions.

e. The commissioner shall submit to the mayor and the speaker of the council the watershed protection plan prepared pursuant to subdivision a of this section, or any revised plan prepared pursuant to subdivision f of this section, no later than five business days after its completion.

f. The watershed protection plan prepared pursuant to subdivision a of this section shall be reviewed and revised as necessary to achieve its goals, but in no event shall such review occur less often than once every two years.

g. No later than October 1, 2007, and no later than October 1 every two years thereafter, the commissioner shall submit a report to the mayor and the speaker of the council, which shall include, but not be limited to:

(1) the implementation status of the measures included in the watershed protection plan prepared pursuant to subdivision a of this section, as it may have been revised pursuant to subdivision f of this section; and

(2) where the plan has been reviewed in accordance with subdivision f of this section and the commissioner determines that no revisions are required, such determination and the reasons for it.

h. (1) A Jamaica bay watershed protection plan advisory committee shall be established, which shall provide advice to the commissioner for the duration of its term and provide final recommendations to the commissioner and the speaker of the council on the watershed protection plan prepared pursuant to subdivision a of this section regarding:

i. the specific goals of such plan related to restoring and maintaining the water quality and ecological integrity of Jamaica bay;

ii. the geographic boundaries of the watershed/sewershed of Jamaica bay to be included in such plan;

iii. any measures that should be assessed by the commissioner for inclusion in such plan, in addition to those listed in subdivision b of this section;

iv. the assessment of the technical, legal, environmental and economical feasibility of including in such plan the measures listed in subdivision b of this section and any additional measures; and

v. a schedule, including interim and final milestones, for implementing the measures and achieving the specific goals to be included in such plan and methods of monitoring progress towards achieving such milestones and goals.

(2) Such advisory committee shall be comprised of seven members, three of whom shall be appointed by the speaker of the council and four by the mayor. The members shall be appointed within forty-five days after the effective date of this section and shall serve without compensation. The chairperson shall be elected from amongst the members. Any vacancy shall be filled in the same manner as the original appointment for the remainder of the unexpired term. The commissioner may provide staff to assist the advisory committee.

(3) Such members of the advisory committee shall serve until three months after the date upon which the commissioner completes the watershed protection plan prepared pursuant to subdivision a of this section, after which time the committee shall cease to exist.

(4) No later than July 1, 2006, the chairperson of such committee shall submit a report containing its final recommendations to the commissioner and the speaker of the council.

§3. This local law shall take effect immediately.

THE CITY OF NEW YORK, OFFICE OF THE CITY CLERK, s.s.:

I hereby certify that the foregoing is a true copy of a local law of the City of New York, passed by the Council on June 30, 2005, and approved by the Mayor on July 20, 2005.

VICTOR L. ROBLES, City Clerk of the Council

CERTIFICATION PURSUANT TO MUNICIPAL HOME RULE LAW §27

Pursuant to the provisions of Municipal Home Rule Law §27, I hereby certify that the enclosed Local Law (Local Law 71 of 2005, Council Int. No. 565-A) contains the correct text and:

Received the following vote at the meeting of the New York City Council on June 30, 2005: 50 for, 0 against, 0 not voting.

Was signed by the Mayor on July 20, 2005.

Was returned to the City Clerk on July 21, 2005.

JEFFREY D. FRIEDLANDER, Acting Corporation Counsel

Appendix B

By Council Members Gennaro, Addabbo Jr., Brewer, Clarke, Fidler, Gerson, James, Koppell, Liu, Mark-Viverito, Monserrate, Nelson, Sanders Jr., Sears and Weprin

A Local Law to amend the administrative code of the city of New York, in relation to the watershed protection plan for the watershed/sewershed of Jamaica Bay.

Be it enacted by the Council as follows:

Section 1. Section 24-527 of the administrative code of the city of New York is amended to read as follows:

§24-527 Watershed protection plan for the watershed/sewershed of Jamaica bay. a. No later than September 1, [2006]2007, the commissioner shall complete a watershed protection plan for the watershed/sewershed of Jamaica bay, which shall, among other things, include measures the city can implement to help protect Jamaica bay. The overall goal of such plan shall be to restore and maintain the water quality and ecological integrity of Jamaica bay.

b. The commissioner shall assess the technical, legal, environmental and economical feasibility of including the following measures, at minimum, in the plan prepared pursuant to subdivision a of this section:

(1) (1) best management practices for the minimization and control of soil erosion and stormwater runoff and reduction of both point and non-point source pollution, including, but not limited to, the promotion of development practices such as the on-site detention and infiltration of stormwater runoff, the minimization of impervious surfaces and the creation of natural systems to control and minimize stormwater runoff;

(2) (2) measures to address threats to aquatic habitat, including, but not limited to, stabilizing

and restoring salt marshes, wetlands, soils and other natural areas, strengthening ecological buffers, restoring natural features to the Jamaica bay watershed/sewershed shoreline, and reestablishing water flows;

(3) land acquisition and land use planning practices and opportunities, including, but not limited to, incentives, such as expedited permitting and property tax relief, for infill, brownfield redevelopment and other environmentally beneficial development, and disincentives, such as stricter development guidelines, for development that may adversely impact Jamaica bay;

(4) (4) a protocol for coordination with appropriate federal, state and city governmental entities that have jurisdiction over the Jamaica bay area, with respect to, but not limited to, efforts to restore and maintain the water quality and ecological integrity of Jamaica bay and notification regarding proposed development projects within the Jamaica bay watershed/sewershed that may adversely impact Jamaica bay;

(5) (5) a protocol for coordination with the office of environmental coordination that ensures that environmental assessments and reviews of projects within the Jamaica bay watershed/sewershed address potential impacts to Jamaica bay and are conducted pursuant to all applicable federal, state and city environmental quality review laws and regulations;

(6) a public education program, including, but not limited to, programs for schools, developers, commercial facilities, civic groups and other local organizations and entities to increase awareness about the ecological significance and degradation of Jamaica bay; potential threats to Jamaica bay; restoration and watershed stewardship activities undertaken by the

department and others involving Jamaica bay; and methods and practices to reduce pollution in Jamaica bay; and

(7) a program to target enforcement efforts that will help reduce polluting behaviors and operations that may adversely impact Jamaica bay.

c. The watershed protection plan prepared pursuant to subdivision a of this section, as it may be revised pursuant to subdivision [f]h of this section, shall contain the following:

(1) (1) specific goals related to restoring and maintaining the water quality and ecological integrity of Jamaica bay;

(2) (2) the geographic boundaries of the watershed/sewershed of Jamaica bay for the purpose of achieving the goals of such plan and an explanation for the selection of such boundaries;

(3) (3) the assessments the commissioner completed for each measure considered for inclusion in such plan;

(4) for any final recommendation of the Jamaica bay watershed protection plan advisory committee established pursuant to subdivision [h]j of this section that was not assessed for inclusion or incorporated in such plan, an explanation for such omission; and

(5) a schedule, including interim and final milestones, for implementing the measures and achieving the specific goals included in such plan and methods of monitoring progress towards achieving such milestones and goals.

d. No later than September 1, 2006, the commissioner shall complete an interim report on the preparation of the watershed protection plan required pursuant to subdivision a of this section, which shall include, at minimum, the following elements:

(1) a description of the current status of the plan preparation, including, but not limited to, the status of all feasibility assessments of measures conducted pursuant to subdivision b of this section; and

(2) for each preliminary recommendation of the Jamaica bay watershed protection plan advisory committee provided to the commissioner pursuant to paragraph four of subdivision j of this section, the commissioner shall state whether:

i. i. the recommendation will be incorporated into the plan required pursuant to
subdivision a of this section;

ii. ii. the recommendation will not be incorporated into such plan, in which
case the
commissioner shall provide a detailed explanation of the basis for any such omission; or

iii. iii. the recommendation will be further assessed for inclusion in such plan,
in which case
the commissioner shall provide a detailed explanation of the reason for such further assessment,
including a timeline for such assessment's completion.

e. No later than March 1, 2007, the commissioner shall complete a draft of the watershed protection plan for the watershed/sewershed of Jamaica bay required pursuant to subdivision a of this section.

f. The commissioner shall implement the plan prepared pursuant to subdivision a of this

section, as it may from time to time be revised pursuant to subdivision [f]h of this section, in accordance with its provisions.

[e]g. The commissioner shall submit to the mayor and the speaker of the council the watershed protection plan, draft of such plan and interim report prepared pursuant to subdivisions a, d and e of this section, or any revised plan prepared pursuant to subdivision [f]h of this section, no later than five business days after its completion.

[f]h. The watershed protection plan prepared pursuant to subdivision a of this section shall be reviewed and revised as necessary to achieve its goals, but in no event shall such review occur less often than once every two years.

[g]i. No later than October 1, [2007]2008, and no later than October 1 of every [two]second year[s] thereafter, the commissioner shall submit a report to the mayor and the speaker of the council, which shall include, but not be limited to:

(1) (1) the implementation status of the measures included in the watershed protection plan prepared pursuant to subdivision a of this section, as it may have been revised pursuant to subdivision [f]h of this section; and

(2) where the plan has been reviewed in accordance with subdivision [f]h of this section and the commissioner determines that no revisions are required, such determination and the reasons for it.

[h]j. (1) A Jamaica bay watershed protection plan advisory committee shall be established, which shall provide advice to the commissioner for the duration of its term and provide preliminary and final recommendations to the commissioner and the speaker of the

council on the watershed protection plan prepared pursuant to subdivision a of this section regarding:

i. the specific goals of such plan related to restoring and maintaining the water quality and ecological integrity of Jamaica bay;

ii. the geographic boundaries of the watershed/sewershed of Jamaica bay to be included in such plan;

iii. any measures that should be assessed by the commissioner for inclusion in such plan, in addition to those listed in subdivision b of this section;

iv. the assessment of the technical, legal, environmental and economical feasibility of including in such plan the measures listed in subdivision b of this section and any additional measures; and

v. a schedule, including interim and final milestones, for implementing the measures and achieving the specific goals to be included in such plan and methods of monitoring progress towards achieving such milestones and goals.

(2) Such advisory committee shall be comprised of seven members, three of whom shall be appointed by the speaker of the council and four by the mayor. The members shall be appointed within forty-five days after the effective date of this section and shall serve without compensation. The chairperson(s) shall be elected from amongst the members. Any vacancy shall be filled in the same manner as the original appointment for the remainder of the unexpired term. The commissioner may provide staff to assist the advisory committee.

(3) Such members of the advisory committee shall serve until three months after the date upon which the commissioner completes the watershed protection plan prepared pursuant to subdivision a of this section, after which time the committee shall cease to exist.

(4) No later than July 1, 2006, the chairperson(s) of such committee shall submit a report containing the committee's preliminary recommendations regarding the watershed protection plan prepared pursuant to subdivision a of this section to the commissioner and the speaker of the council.

(5) No later than [July 1, 2006]June 1, 2007, the chairperson(s) of such committee shall submit a report containing [its]the committee's final recommendations regarding the watershed protection plan prepared pursuant to subdivision a of this section to the commissioner and the speaker of the council.

§2. This local law shall take effect immediately.

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PCW 6/7/06
LS #1173

Appendix C

Jamaica Bay Watershed

20% of the Watershed exists in Nassau County

Queens

Brooklyn

Jamaica

26 Ward

Coney Island

Rockaway

Legend

- Watershed
- nassauwatershed
- Centerline



0 0.5 1 2 Miles

Jamaica Bay Watershed / Sewershed Congressional Districts

20% of the Watershed exists in Nassau County

Queens

Brooklyn

Flows to Owls Head

Jamaica

26 Ward

Coney Island

Rockaway

Legend

-  Water Treatment Plant
-  Watershed
-  Sewershed
-  Congressional District



0 0.5 1 2 Miles

Queens Congressional Districts

- 5. Gary Ackerman
- 6. Gregory Meeks
- 8. Jerrold Nadler
- 9. Anthony Weiner

Brooklyn Congressional Districts

- 10. Edolphus Towns
- 11. Major Owens
- 12. Nydia Velazquez
- 13. Vito Fossella

Appendix D

LIST OF COMMITTEE MEMBERS INCLUDING AFFILIATIONS AND BIOGRAPHIES

Doug Adamo

Since his appointment as Chief of the Division of Natural Resources at Gateway National Recreation Area in March, 2003, Doug Adamo has worked in coordination with National Park Service and Gateway natural resource staff on a variety of issues/efforts focusing on Jamaica Bay resources. The largest effort was the Big Egg Marsh Experimental Saltmarsh Restoration Project, for which Mr. Adamo provided administrative assistance and began shortly after he reported to Gateway. In a multi-agency effort over the past 13 months, Mr. Adamo worked on compliance, alternative, and monitoring issues for the proposed Elder's Point and Yellow Bar Saltmarsh Restoration Project sponsored by the U.S. Army Corps of Engineers, New York City Department of Environmental Protection, and the Port Authority of NY & NJ.

Mr. Adamo also serves on the Harbor Estuary Program's Management Committee and the Long-Term Control Planning Government Steering Committee, both of which involve considerable efforts toward improving water quality in Jamaica Bay. In addition, he has coordinated development of and sought funding for several National Park Service project proposals to restore ecosystem health to Jamaica Bay. In April 2005, he hosted the first symposium on oysters and eelgrass in Jamaica Bay.

Mr. Adamo has a B.S. in Wildlife Biology and M.S. in Soil Science from West Virginia University. He previously worked as a biologist for the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and the U.S. Forest Service.

Manny Caughman

A community and environmental activist, Manuel Caughman is an active member of the Queens community, whose contributions in helping to resolve the environmental issues facing the residents of Southeast Queens has been evident for over almost a decade. As Chairman of the Community Board #12 Environmental Committee, the 29th Assembly District Environmental Committee, and a member of the Brooklyn-Queens Aquifer Feasibility Study, he has been instrumental in bringing attention to and resolving the issues currently facing the residents of Southeast Queens.

Having received numerous awards for his dedication to environmental issues pertaining to water quality, soil contamination and protection of aquifers, Mr. Caughman is recognized in the community by residents and elected officials on every level of government as a respected authority on issues facing the environment. The remediation of the West Side Hazardous Waste Site was paramount in improving environmental issues by removing petrochemicals from the soil that could possibly contaminate the aquifers. Mr. Caughman is currently working along with city and elected officials to address the rising water table affecting Southeastern Queens.

Len Houston

Len Houston is Chief of the Environmental Analysis Branch for the U.S. Army Corps of Engineers, New York District. He holds a B.S. in Biology from Brooklyn College and a M.S. in Marine Biology from Long Island University.

Mr. Houston authored the Reconnaissance Report (1999) recommending that the Federal government undertake (with the New York City Department of Environmental Protection as partner) preparation of a Feasibility Study for Environmental Improvements to Jamaica Bay. He was the Team Leader who developed the Jamaica Bay Environmental Survey that identified 50-plus potential improvement options,

and developed a scope of work and funding transfers for extensive field studies to investigate and assess many of those sites as part of the Jamaica Bay Ecosystem Restoration Program field study undertaken by the Aquatic Research and Environmental Assessment Center (AREAC) at Brooklyn College (under oversight and guidance of the Gateway National Recreation Area). As Chief of the Special Studies Section, Mr. Houston worked with the New York City Parks and Recreation Department to initiate and complete studies for environmental restoration projects at Gerritsen Beach and Spring Creek, the former of which was completed and led to the signing of a Project Cooperation Agreement with the City Parks Department to construct the recommended marsh restoration project upon appropriation of Federal studies. As Branch Chief, he worked with Gateway, the New York State Department of Environmental Conservation, Port Authority of NY & NJ and the New York City Department of Environmental Protection to initiate a study for a pilot project at Elders Point and Yellow Bar to address marsh island losses in Jamaica Bay. The Elders Point project has been funded and a contract to restore the mostly eroded marsh using stockpiled sand from the maintenance of Rockaway Inlet was awarded and is scheduled for completion in summer 2006.

Mr. Houston is the author of several presentations on restoration needs/options in Jamaica Bay for conferences sponsored by Gateway and AREAC. He is the Corps representative to the Jamaica Bay Task Force.

Dan Mundy

Dan Mundy is a retired Fire Captain and a lifelong resident of Broad Channel, Queens. In 1995 he was the first to notice the disappearance of the marshes in Jamaica Bay and in 1996 founded the Jamaica Bay Eco Watchers, an environmental group advocating for the restoration and funding to protect this great resource. He is the environmental chairperson of Community Board #14 and also serves on citizens advisory committees for the Harbor Estuary Program and Pollution Control. Mr. Mundy has been active in the planning, construction, and monitoring of the Big Egg Marsh Restoration project as well as the next restoration project with the U.S. Army Corps of Engineers, New York State Department of Environmental Conservation and New York City Department of Environmental Protection.

Eco Watchers also conducts water quality monitoring and works closely with other scientists working in Jamaica Bay. For the past four years, Mr. Mundy has led Operation Clean Sweep, a cooperative effort with the National Park Service, New York Department of Environmental Conservation, New York Department of State, Port Authority of NY & NJ, the New York Police Department, and the Jamaica Bay Guardian in removing hundreds of derelict boats and debris from the water and marshes of Jamaica Bay.

Bradford H. Sewell

Bradford H. Sewell is a senior attorney with the Natural Resources Defense Council, Inc. (NRDC), a public interest organization specializing in environmental protection. He is Director of the NRDC NY/NJ Harbor-Bight Project, which focuses on NY/NJ marine environmental issues, including marine water quality and fisheries. Since 1998, Mr. Sewell has also served as Director of the NRDC Everglades Project.

NRDC has been working to reduce the impacts on Jamaica Bay of combined sewer overflows and nitrogen pollution from New York City's wastewater treatment facilities. NRDC also provided legal assistance in the creation of Gateway National Recreation Area. Other relevant areas of NRDC's ongoing work include the clean up of contaminated sediments in Newark Bay (including minimizing impacts of navigational dredging projects), clean up of Hudson River PCBs, preserving the Hackensack Meadowlands, coastal habitat preservation around New York City, and green building design in the City. NRDC annually publishes *Testing the Waters*, which details the problem of beach closings as a result of

water pollution; also, in 2002, NRDC published a report entitled *Cape May to Montauk: A Coastal Protection Report Card*.

Mr. Sewell has a bachelor's degree from Stanford University, a law degree from Columbia University, and a master's in public health from the Division of Environmental Sciences at Columbia's School of Public Health. He is an adjunct faculty member at Columbia University School of Public Health, Division of Environmental Sciences. From 1992-1998, Mr. Sewell was an attorney at the New York law firm of Paul, Weiss, Rifkind, Wharton and Garrison, where he litigated and counseled clients concerning environmental matters.

Dr. R. Lawrence Swanson

Dr. R. Lawrence Swanson received his Ph.D. in Physical Oceanography from Oregon State University in 1971. Since 1987, he has been the director of the Waste Reduction and Management Institute (WRMI), and since 2003 also the Associate Dean of the Marine Sciences Research Center, Stony Brook University (SBU). Prior to his appointment at SBU, he was with the National Oceanic and Atmospheric Administration and served in a variety of capacities including Project Manager of the Marine Ecosystems Analysis Program for the New York Bight; Director of the Office of Marine Pollution Assessment; and the Executive Director of the Office of Oceanic and Atmospheric Research.

Dr. Swanson plays an active role in New York City's marine policy, often testifying at public hearings and producing government reports and policy recommendations. He has conducted research on water quality, ocean dumping, marine debris and medical wastes, hypoxia, marine pollution issues, and waterfront uses in and around New York City. Dr. Swanson serves as the principal investigator on the New York State component of the National Coastal Assessment Program, where he coordinates sampling of water quality, sediment toxicity and biological health of New York waters, including specific sites in Jamaica Bay. He also served as co-editor of a National Oceanic and Atmospheric Administration book concerning hypoxia and mass mortalities in the New York Bight. Dr. Swanson's work contributed to passage of federal legislation and also led to the national emphasis on regulating combined sewer overflows.

More recently, he synthesized large data sets for the New York City Department of Environmental Protection in order to expand the utility of the City's annual water quality monitoring program. This past year, he, along with other members of his research team, published a monitoring plan for the Hudson River for the New York State Department of Environmental Conservation. Swanson and a colleague, R.E. Wilson, have also prepared a paper for publication synthesizing historical data sets as they pertain to hypoxia in Western Long Island Sound.

Christopher R. Zeppie

Christopher R. Zeppie is Director of the Office of Environmental Policy, Programs and Compliance at the Port Authority of New York and New Jersey. Since coming to the Port Authority in 1979, Mr. Zeppie has held positions of increasing responsibility as Environmental Compliance Specialist; Manager, Permits and Governmental Approvals; Attorney, Environmental Law Division; Assistant Director, Office of Environmental Management; and Chief Environmental Policy Officer.

Mr. Zeppie serves on the Transportation Research Board's Committee on Climate Change and U.S. Transportation as well as the Steering Committee of the Environmental Division of the New York Academy of Sciences, the Advisory Committee to New York State Sea Grant, and the New York State Implementation Plan Coordinating Council for the Federal Clean Air Act.

He holds a B.S. degree in biology and ecology from Manhattan College, a M.S. degree in marine environmental science from the Marine Sciences Research Center at Stony Brook, and a J.D. degree from St. John's University School of Law. His Master Thesis is entitled "Vertical Profiles and Sedimentation Rates of Cd, Cr, Cu, Ni and Pb in the Sediments of Jamaica Bay, New York," and entailed extensive research in and around Jamaica Bay.

Prior to coming to the Port Authority, Mr. Zeppie worked as an Oceanographer at the New York District Corps of Engineers, Water Quality Compliance Branch and he has also held the position of environmental engineer at the New York Power Authority. He has been an adjunct faculty member at Stony Brook and the New York Institute of Technology.

Mr. Zeppie lives on Long Island in Rockville Centre and has three children and one grandchild.

Appendix E

LIST OF EXPERT PANELS CONVENED BY THE ADVISORY COMMITTEE

To help advise their recommendations, the Advisory Committee requested that a number of agency representatives and scientists who have conducted research concerning the Bay or have expertise in certain key areas address the committee. Below please find a list of speakers and the general topics they were asked to address.

May 15 Panel

Discussion Topic: “What is the water quality like in Jamaica Bay and how can it be improved?”

Panelists:

- Robert Wilson, Ph.D., Stony Brook University
- Mark Ringenary, Water Quality Specialist, Division of Natural Resources, Gateway NRA
- Martin P. Schriebman, Ph.D., Founding Director of the Aquatic Research and Environmental Assessment Center, Brooklyn College
- Anne McElroy, Ph.D., Stony Brook University

April 26 Panel

Discussion Topic: “What measures can we take to reverse wetlands loss in Jamaica Bay and restore wetlands?”

Panelists:

- Dr. Alex Kolker, Ph.D., Stony Brook University
- Charles Roman, Research Coordinator for the National Park Service, North Atlantic Coast Cooperative Ecosystem Studies Unit
- Steve Zahn, Marine Resources Program Manager, New York State Department of Environmental Conservation, Region 2

March 22 Panel

Discussion Topic: “How could we adopt more green infrastructure and other stormwater best management practices into the Jamaica Bay watershed?”

Panelists:

- Paul Mankiewicz, Ph.D., Executive Director, The Gaia Institute
- Neil Weinstein, Executive Director, Low Impact Development Center

Appendix F

LIST OF WATERSHED PROTECTION PLAN GOALS

- **Secure fishable/swimmable waters in Jamaica Bay.**
 - ✓ Meet or exceed current federal, state, and local water quality standards for Jamaica Bay's open water and tributaries. Attaining these standards would at least ensure water suitable for secondary recreation (e.g. kayaking, fishing) in most of Jamaica Bay's waters, and primary recreation (e.g. swimming, shellfishing) in the bay's open waters.
 - ✓ Significantly reduce the frequency and severity of harmful algal blooms in Jamaica Bay's open waters resulting from anthropogenic influences.
 - ✓ Reduce inputs of nitrogen and organic substances into Jamaica Bay to levels necessary to achieve numeric water quality criteria for dissolved oxygen (5.0 milligrams/Liter) throughout Jamaica Bay's open waters.
 - ✓ Significantly reduce combined sewer overflows (CSOs) with the goal of eliminating all CSOs into Jamaica Bay (including tributaries) by 2020.
- **Significantly reduce harmful impacts from soil and sediment contamination in Jamaica Bay.**
 - ✓ No localized or net increase in contaminant concentrations in sediments and soils within Jamaica Bay watershed as a result of inputs via groundwater, combined sewer overflows, and water pollution control plant effluents.
 - ✓ Significantly reduce or reverse acute and chronic detrimental biological and ecological impacts from sediment and soil contamination within the Jamaica Bay watershed, focusing on known bioaccumulative agents, such as heavy metals and certain organic compounds.
 - ✓ Identify and monitor location and nature of sediment contamination in Jamaica Bay watershed. Prioritize remediation of sites containing sediments and/or soils identified as posing a human and/or ecological risk.
- **Restore populations of oysters and other shellfish to Jamaica Bay.**
- **Eliminate floatables, debris, slicks and settleable solids in Jamaica Bay to create a healthy, trash-free recreation area.**
 - ✓ Eliminate discharge of CSO settleable solids into Jamaica Bay.
 - ✓ Remove CSO sediment deposits to help restore healthy marine ecosystems.
 - ✓ Identify and remove existing debris causing ecological or aesthetic impairment.
- **Prevent additional loss, in quality and extent, of existing Jamaica Bay wetland and maritime native habitat complexes, including those serving as upland buffers, and increase the spatial extent of these habitats.**
- **Protect Jamaica Bay's inner salt marsh complexes from additional loss of spatial extent and function, and increase the spatial extent of these marsh complexes.**
- **Prevent the introduction or spread of ecologically harmful invasive plant and animal species in and around Jamaica Bay, and reduce their current distribution and population levels as appropriate to improve natural diversity and ecological functions of the Bay.**
- **Ensure a diverse and healthy population of native flora and fauna in Jamaica Bay.**
- **Institute an ongoing Jamaica Bay monitoring/science research program that identifies additional scientific needs, and coordinates interagency research and monitoring.**
- **Improve public awareness of and access to Jamaica Bay.**
 - ✓ Develop education and outreach programs to increase knowledge of Jamaica Bay, including the benefits it provides the public, in adjacent communities and in the city as a whole.
 - ✓ Increase the number of public access points to Jamaica Bay.
 - ✓ Increase awareness of Jamaica Bay and its public benefits among elected officials.

Appendix G

**LOCAL LAWS
OF
THE CITY OF NEW YORK
FOR THE YEAR 2005**

No. 86

Introduced by The Speaker (Council Member Miller) and Council Members Gennaro, Brewer, Clarke, Fidler, Gerson, Gioia, James, Koppell, Liu, Martinez, Nelson, Recchia, Sanders, Stewart, Weprin, Gonzalez, Yassky, Moskowitz, Reyna, Foster, Perkins, McMahon, Addabbo Jr., Monserrate, Gentile, DeBlasio, Baez, Palma, Katz, Avella, Reed, Jackson, Vallone, Jr., Quinn, Rivera, Barron, Lopez, Arroyo, Sears and The Public Advocate (Ms. Gotbaum).

A LOCAL LAW

To amend the New York city charter, in relation to green building standards for certain capital projects.

Be it enacted by the Council as follows:

Section 1. Statement of findings and purpose. Probably no urban activity has greater impact on human health and the environment than building construction and use. Enormous quantities of resources are used during building construction, renovation and operation, and the production of these resources has substantial environmental impacts. It is estimated that 40% of raw materials consumed globally are used for buildings. In addition, in the United States, commercial and residential buildings are responsible for approximately 65% of electricity consumption, 30% of greenhouse gas emissions, 12% of potable water use and 136 million tons of construction and demolition waste annually. Also, many indoor building materials release hazardous toxins, impairing indoor air quality and reducing occupant health and productivity.

Since most of New York City's electricity is produced within the City and many buildings use oil or natural gas for their heating and hot water, energy consumption in building operation translates into greater local pollution, including emissions of sulfur dioxide, nitrogen oxides, particulate matter, carbon dioxide, and mercury. These pollutants contribute to respiratory disease, heart disease, smog, acid rain, and climate change. Moreover, as energy demand rises, so does our reliance on dirty, inefficient power plants, as well as the nation's dependence on foreign oil and natural gas.

Modern architects and engineers can reduce the health and environmental impacts of buildings by designing "high-performance buildings" or "green buildings." The United States Green Building Council, the nation's foremost coalition of real estate and environmental organizations working to promote green buildings, has developed a green building rating system known as LEED (Leadership in Energy and Environmental Design). Buildings receive LEED certification if their designs score sufficient "points"

in five general design areas including siting, water efficiency, energy and atmosphere, materials and resources and indoor environmental quality. Thousands of residential and commercial buildings, ranging from single-family homes to large corporate headquarters, have been designed and constructed throughout the United States utilizing green building principles. Significant local examples include 4 Times Square and 20 River Terrace. A recent study conducted for the State of California concluded that, on average, green buildings show a ten times return on the investment in green building design. This comprehensive analysis of 33 green buildings revealed an average green cost premium of less than 2%, with only a 0.66% premium for buildings that achieved the most basic level of LEED certification.

Numerous municipalities, including Atlanta, Austin, Boston, Boulder, Chicago, Dallas, Los Angeles, Portland (Oregon), San Diego, San Francisco, San José, and Seattle, have adopted LEED or have otherwise required that city-owned buildings be built according to green building criteria. Some localities have created incentive programs for privately-owned green building construction, including the use of direct subsidies, density bonuses and expedited permitting. Indeed, Boston will soon require private sector buildings of over 50,000 square feet to be LEED-certifiable.

In New York City, numerous governmental bodies have also embraced green building concepts. The Battery Park City Authority has begun utilizing green building guidelines modeled on LEED for all commercial and residential building construction in Battery Park City. The Department of Design and Construction has also developed High Performance Building Guidelines and has begun applying the guidelines for libraries and other facilities. The New York City Transit Authority has adopted green building guidelines for all new transit facilities, including the Second Avenue Subway. Moreover, the Lower Manhattan Development Corporation and the Port Authority of New York and New Jersey have developed sustainable design guidelines and have designated “environmental planning” as one of five general requirements for the redevelopment of the World Trade Center site and surrounding area.

Likewise, many states, such as California, Connecticut, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, and Rhode Island, have begun utilizing LEED for state-owned buildings. The State of New York provides tax credits for buildings that meet defined green building criteria and, under Executive Order 111, state agencies are directed to reduce energy use and carbon dioxide emissions and to utilize green building principles.

The City owns approximately 1,300 buildings and leases over 12.8 million square feet of office space, and this legislation will affect approximately \$12 billion in construction over the City’s ten-year capital plan. Considering the size of the City’s real estate portfolio, the Council finds that the use of green building criteria for City capital projects will substantially reduce New York City’s electricity consumption, air pollution and water use, as well as improve occupant health and worker productivity and encourage market transformation. The Council further finds that reducing overall energy demand through green building techniques will reduce our dependence on foreign oil. Finally, the Council finds that green buildings are a sound investment of public dollars. The Council’s financial analysis indicates that, without taking any other savings or social benefits into account, savings in water and energy cost will offset debt service payments on any increase in capital expenditures resulting from this legislation. Accordingly, the Council declares that it is reasonable and necessary to employ green building standards in the construction and renovation of City-owned and City-funded buildings and that these standards be utilized in an orderly and timely fashion.

§2. The New York city charter is amended by adding a new section 224.1, to read as follows:

§224.1 *Green building standards.* a. *As used in this section the following terms shall have the following meanings:*

(1) *The term "capital project" shall mean a capital project as defined in section 210 of this chapter that is paid for in whole or in part from the city treasury.*

(2) *The term "city agency" shall mean a city, county, borough, or other office, position, administration, department, division, bureau, board or commission, or a corporation, institution or agency of government, the expenses of which are paid, in whole or in part, from the city treasury.*

(3) *The term "construction work" shall mean any work or operations necessary or incidental to the erection, demolition, assembling, alteration, installing, or equipping of any building.*

(4) *The term "green building standards" shall mean design guidelines, a rating system or rules for constructing buildings that ensure site planning, water efficiency, energy efficiency and renewable energy, conservation of materials and resources and indoor environmental quality.*

(5) *The term "inflation" shall mean the annual twelve (12) month average of the consumer price index published by the United States department of labor.*

(6) *The term "LEED energy and atmosphere credit 1" shall mean the credit point under LEED for New Construction version 2.1 intended to achieve increased energy performance.*

(7) *The term "LEED green building rating system" shall mean a version of the Leadership in Energy and Environmental Design (LEED) building rating system published by the United States Green Building Council, not less stringent than the selected green building rating system, including a standard developed by or for the city consisting of practices and technologies derived from the LEED rating system that are reasonable and appropriate for building in New York city.*

(8) *The term "LEED water efficiency credit 3.2" shall mean the credit point under the LEED for New Construction version 2.1 intended to achieve water use reduction.*

(9) *The term "not less stringent" shall mean providing no less net environmental and health benefits.*

(10) *The term "rehabilitation work" shall mean any restoration, replacement or repair of any materials, systems and/or components.*

(11) *The term "selected green building rating system" shall mean the current and most appropriate building rating system published by the United States Green Building Council; provided, however, at the mayor's discretion, the term "selected green building rating system" shall mean New Construction version 2.1, Existing Buildings version 2 or Commercial Interiors version 2, whichever is most appropriate for the project under United States Green Building Council guidelines.*

(12) *The term "substantial reconstruction" shall mean a capital project in which the scope of work includes rehabilitation work in at least two of the three major systems, electrical, HVAC (heating, ventilating and air conditioning) and plumbing, of a building and construction work affects at least fifty percent (50%) of the building's floor area.*

b. (1) *Each capital project with an estimated construction cost of two million dollars (\$2,000,000) or more involving (i) the construction of a new building, (ii) an addition to an existing building, or (iii) the substantial reconstruction of an existing building shall be designed and constructed to comply with green building standards not less stringent than the standards prescribed for buildings designed in accordance with*

the LEED green building rating system to achieve a LEED silver or higher rating, or, with respect to buildings classified in occupancy groups G or H-2, to achieve a LEED certified or higher rating. If the mayor elects to utilize green building standards other than the LEED green building rating system, the mayor shall publish findings demonstrating that such other green building standards are not less stringent than the LEED standards described above for achievement of a LEED silver or, if applicable, a LEED certified rating. The green building standards utilized by the city in accordance with this section shall be reviewed and updated, as necessary, by the mayor no less often than once every three years.

(2) In addition, if the estimated construction cost of a project required to comply with green building standards in accordance with paragraph one of this subdivision is 12 million dollars (\$12,000,000) or more such project shall be designed and constructed to reduce energy cost as follows:

(i) Capital projects, other than buildings classified in occupancy group G, with an estimated construction cost of 12 million dollars (\$12,000,000) or more but less than 30 million dollars (\$30,000,000) shall be designed and constructed to reduce energy cost by a minimum of twenty percent (20%), as determined by the methodology prescribed in LEED energy and atmosphere credit 1 or the New York state energy conservation code, whichever is more stringent. In addition to such twenty percent (20%) reduction in energy cost, the design agency shall make investments in energy efficiency that reduce energy cost by an additional five percent (5%) if it finds that the payback on such investment through savings in energy cost would not exceed seven years.

(ii) Capital projects, other than buildings classified in occupancy group G, with an estimated construction cost of 30 million dollars (\$30,000,000) or more shall be designed and constructed to reduce energy cost by a minimum of twenty-five percent (25%), as determined by the methodology prescribed in LEED energy and atmosphere credit 1 or the New York state energy conservation code, whichever is more stringent. In addition to such twenty-five percent (25%) reduction in energy cost, the design agency shall make investments in energy efficiency that reduce energy cost by an additional five percent (5%) if it finds that the payback on such investment through savings in energy cost would not exceed seven years.

(iii) Capital projects involving buildings classified in occupancy group G with an estimated construction cost of 12 million dollars (\$12,000,000) or more shall be designed and constructed to reduce energy cost by a minimum of twenty percent (20%), as determined by the methodology prescribed in LEED energy and atmosphere credit 1 or the New York state energy conservation code, whichever is more stringent. In addition to such twenty percent (20%) reduction in energy cost, the design agency shall make investments in energy efficiency that reduce energy cost by an additional five percent (5%) if it finds that the payback on such investment through savings in energy cost would not exceed seven years or, in the alternative, the design agency shall make investments in energy efficiency that reduce energy cost by an additional ten percent (10%) if it finds that the payback on such investment through savings in energy cost would not exceed seven years.

c. Capital projects, other than those required to comply with green building standards in accordance with subdivision b of this section, shall be subject to the following:

(1) Each capital project that includes the installation or replacement of a boiler at an estimated construction cost for such installation or replacement of two million dollars (\$2,000,000) or more, or that involves the installation or replacement of lighting systems

in a building at an estimated construction cost for such installation or replacement of one million dollars (\$1,000,000) or more, shall be designed and constructed to reduce energy cost by a minimum of ten percent (10%), as determined by the methodology prescribed in LEED energy and atmosphere credit 1 or the New York state energy conservation code, whichever is more stringent.

(2) Each capital project, other than a project required to comply with paragraph one of this subdivision, that involves the installation or replacement of HVAC comfort controls at an estimated construction cost for such installation or replacement of two million dollars (\$2,000,000) or more, shall be designed and constructed to reduce energy cost by a minimum of five percent (5%) as determined by the methodology prescribed in LEED energy and atmosphere credit 1 or the New York state energy conservation code, whichever is more stringent.

d. In addition to complying with any other applicable subdivision in this section, each capital project involving the installation or replacement of plumbing systems that includes the installation or replacement of plumbing fixtures at an estimated construction cost for such installation or replacement of plumbing systems of five hundred thousand dollars (\$500,000) or more shall be designed and constructed to reduce potable water consumption in the aggregate by a minimum of thirty percent (30%), as determined by a methodology not less stringent than that prescribed in LEED water efficiency credit 3.2; provided, however, that such percentage shall be reduced to a minimum of 20% if the department of buildings rejects an application for the use of waterless urinals for the project.

e. This section shall apply only to capital projects involving buildings classified in occupancy groups B-1, B-2, C, E, F-1a, F-1b, F-3, F-4, G, H-1 and H-2.

f. The mayor may exempt from each provision of this section capital projects accounting for up to 20% of the capital dollars in each fiscal year subject to such provision if in his or her sole judgment such exemption is necessary in the public interest. At the conclusion of each fiscal year the mayor shall report to the council the exemptions granted pursuant to this section.

g. This section shall not apply to capital projects of entities that are not city agencies unless fifty percent (50%) or more of the estimated cost of such project is to be paid for out of the city treasury. This exemption shall not apply to any capital project that receives ten million dollars (\$10,000,000) or more out of the city treasury.

h. This section shall not apply to capital projects that have received capital dollars from the city treasury before January 1, 2007.

i. The mayor shall promulgate rules to carry out the provisions of this section.

j. The costs listed in subdivisions b, c, d and g of this section shall be indexed to inflation.

k. Capital projects accounting for at least fifty percent (50%) of the capital dollars in each fiscal year allocated for each city agency that are subject to paragraph one of subdivision b of this section that utilize a version of the LEED green building rating system for which the United States Green Building Council will accept applications for certification, shall apply to the United States Green Building Council for certification that such projects have achieved a silver or higher rating under the LEED green building rating system or, with respect to projects involving buildings classified in occupancy groups G or H-2, a certified or higher rating under such rating system.

§3. An annual report shall be prepared no later than September 1 of each year in accordance with the procedure and format established by the department of design and construction. Such report shall include, but shall not be limited to, a list and brief

description, including square footage and total cost, of any capital project subject to section 224.1 of the charter, as added by section 2 of this local law, completed during the preceding calendar year; the estimated level of LEED certification such capital projects have achieved as determined by the design agency in accordance with the LEED rating system or, if applicable, the level achieved, as certified by the United States Green Building Council; additional costs attributable to complying with the LEED green building rating system or any other green building standard; an assessment of the health, environmental and energy-related benefits achieved in comparison with a base-case code compliant project (including projected energy savings and reductions in peak load, reductions in emissions, reductions in storm water runoff and potable water use); a summary of agency findings related to additional investment in energy efficiency pursuant to subparagraphs (i), (ii), and (iii) of paragraph two of subdivision b of section 224.1 of the charter, including any additional investment in energy efficiency considered and the estimated payback time for such investment through savings in energy cost; and the total value of capital allocations in each fiscal year, by city agency, of projects subject to, and exempted by the mayor for each of paragraph one and subparagraphs (i), (ii) and (iii) of paragraph two of subdivision b, paragraphs one and two of subdivision c and subdivision d of section 224.1 of the charter, as added by section 2 of this local law, as well as a list and brief description, by agency, of such exempted projects, including square footage and project cost. The first such report shall be completed on or prior to September 1, 2008.

§4. This local law shall take effect on January 1, 2007 and shall apply to capital projects for which the final design is approved pursuant to section 223 of the New York city charter after such effective date, except that prior to such effective date the mayor shall take all actions necessary for the timely implementation of this local law, including the promulgation of rules, and shall take all practicable steps to implement this local law. Section 3 of this local law shall expire and shall be of no further force and effect on and after January 1, 2019. Subdivision k of section 224.1 of the charter, as added by section 2 of this local law, shall expire and shall be of no further force and effect on and after January 1, 2017.

THE CITY OF NEW YORK, OFFICE OF THE CITY CLERK, s.s.:

I hereby certify that the foregoing is a true copy of a local law of the City of New York, passed by the Council on September 15, 2005, and approved by the Mayor on October 3, 2005.

VICTOR L. ROBLES, City Clerk of the Council

CERTIFICATION PURSUANT TO MUNICIPAL HOME RULE LAW §27

Pursuant to the provisions of Municipal Home Rule Law §27, I hereby certify that the enclosed Local Law (Local Law 86 of 2005, Council Int. No. 324-A) contains the correct text and:

Received the following vote at the meeting of the New York City Council on September 15, 2005: 46 for, 0 against, 0 not voting.

Was signed by the Mayor on October 3, 2005.

Was returned to the City Clerk on October 4, 2005.

JEFFREY D. FRIEDLANDER, Acting Corporation Counsel

Appendix H



State of New York

Executive Chamber

No. 111

EXECUTIVE ORDER

DIRECTING STATE AGENCIES TO BE MORE ENERGY EFFICIENT AND ENVIRONMENTALLY AWARE "GREEN AND CLEAN STATE BUILDINGS AND VEHICLES"

WHEREAS, New York is dedicated to the mutually compatible goals of environmental protection and economic growth;

WHEREAS, New York has adopted measures designed to allow energy markets to operate more competitively and has significantly reduced taxes in order to reduce energy costs and encourage continued economic growth;

WHEREAS, the generation and use of energy has a significant impact on the environment, contributing to emissions of sulfur dioxide, nitrogen oxides, greenhouse gases, and other pollutants;

WHEREAS, State government is a major consumer of energy, spending approximately \$300 million per year and purchasing approximately 1500 new vehicles annually with a concomitant impact on the environment; and

WHEREAS, it is appropriate that State government assume a leadership role in promoting the efficient use of energy and natural resources in the interest of the long-term protection and enhancement of our environment, our economy, and the health of our children and future generations of New Yorkers.

NOW, THEREFORE, I, GEORGE E. PATAKI, Governor of the State of New York, by virtue of the authority vested in me by the Constitution and Laws of the State of New York, do hereby order as follows:

I New Energy Efficiency Goals.

All agencies and departments over which the Governor has Executive authority, and all public benefit corporations and public authorities the heads of which are appointed by the Governor (hereinafter referred to as "State agencies and other affected entities"), shall seek to achieve a reduction in energy consumption by all buildings they own, lease or operate of 35 percent

by 2010 relative to 1990 levels. All State agencies and other affected entities shall establish agency-wide reduction targets and associated schedules to reach this goal and shall also be responsible for establishing peak electric demand reduction targets for each state facility by 2005 and 2010. No buildings will be exempt from these goals except pursuant to criteria to be developed by the New York State Energy Research and Development Authority ("NYSERDA"), in consultation with the Division of the Budget ("DOB"), the Office of General Services ("OGS") and the Advisory Council on State Energy Efficiency ("Advisory Council") as established herein.

II State Buildings Energy Efficiency Practices.

A. Existing Buildings.

Effective immediately, State agencies and other affected entities shall implement energy efficiency practices with respect to the operation and maintenance of all buildings that they own, lease or operate. Such practices may include, but shall not be limited to: (1) shutting off office equipment when it is not being used; (2) adjusting the setting of space temperatures; (3) turning off lighting in unoccupied areas; (4) inspecting and re-commissioning or re-tuning heating, air conditioning and ventilation equipment to ensure optimal performance; and (5) cycling and restarting equipment on a staggered basis to shed electricity loads and minimize peak electricity demand usage. State agencies and other affected entities shall strive to meet the ENERGY STAR® building criteria for energy performance and indoor environmental quality in their existing buildings to the maximum extent practicable. Within 180 days of the date of this Executive Order, NYSERDA shall develop guidelines to help agencies and other affected entities implement energy efficiency practices in their buildings.

B. New Buildings and Substantial Renovation of Existing Buildings.

In the design, construction, operation and maintenance of new buildings, State agencies and other affected entities shall, to the maximum extent practicable, follow guidelines for the construction of "Green Buildings," including guidelines set forth in Tax Law § 19, which created the Green Buildings Tax Credit, and the U.S. Green Buildings Council's LEED™ rating system. Effective immediately, State agencies and other affected entities engaged in the construction of new buildings shall achieve at least a 20 percent improvement in energy efficiency performance relative to levels required by the State's Energy Conservation Construction Code, as amended. For substantial renovation of existing buildings, State agencies and other affected entities shall achieve at least a ten percent improvement. State agencies and other affected entities shall incorporate energy-efficient criteria consistent with ENERGY STAR® and any other energy efficiency levels as may be designated by NYSERDA into all specifications developed for new construction and renovation.

III Procurement of Energy-Efficient Products.

Effective immediately, State agencies and other affected entities shall select ENERGY STAR® energy-efficient products when acquiring new energy-using products or replacing existing equipment. NYSERDA shall adopt guidelines designating target energy efficiency levels for those products for which ENERGY STAR® labels are not yet available.

IV Purchase of Power from Renewable Sources.

State agencies and other affected entities with responsibility for purchasing energy shall increase their purchase of energy generated from the following technologies: wind, solar thermal, photovoltaics, sustainably managed biomass, tidal, geothermal, methane waste and fuel cells. State agencies and other affected entities shall seek to purchase sufficient quantities of energy from these technologies so that 10 percent of the overall annual electric energy requirements of buildings owned, leased or operated by State agencies and other affected entities will be met through these technologies by 2005, increasing to 20 percent by 2010. No agency or affected entity will be exempt from these goals except pursuant to criteria to be developed by NYSERDA, in consultation with DOB, OGS and the Advisory Council.

V Procurement of Clean Fuel Vehicles.

State agencies and other affected entities shall procure increasing percentages of alternative-fuel vehicles, including hybrid-electric vehicles, as part of their annual vehicle acquisition plans. By 2005, at least 50 percent of new light-duty vehicles acquired by each agency and affected entity shall be alternative-fueled vehicles, and by 2010, 100 percent of all new light-duty vehicles shall be alternative-fueled vehicles, with the exception of specialty, police or emergency vehicles as designated by DOB. State agencies and other affected entities that operate medium- and heavy-duty vehicles shall implement strategies to reduce petroleum consumption and emissions by using alternative fuels and improving vehicle fleet fuel efficiency.

VI Role of NYSERDA and Creation of the Advisory Council on State Energy Efficiency.

NYSERDA shall coordinate implementation of this Executive Order and shall assist each agency and affected entity in the fulfillment of the responsibilities imposed herein in a cost-effective manner. To assist NYSERDA in fulfilling the requirements imposed by this Executive Order, there is hereby established an Advisory Council on State Energy Efficiency consisting of the following members, who shall serve ex officio: the President of NYSERDA; the Director of the Division of the Budget; the Commissioners of OGS, the Department of Environmental Conservation, the Department of Correctional Services, the Office of Mental Health and the Department of Transportation; the Chairman of the Public Service Commission; the Chancellor of the State University of New York; the Secretary of State; the Chairman of the New York Power Authority; the Chairman of the Metropolitan Transportation Authority; the Executive Director of the Dormitory Authority; and the President of the Long Island Power Authority. The President of NYSERDA shall serve as the chair of the Advisory Council. The members of the Advisory Council may designate one or more persons to act as their designee(s). The Advisory Council shall meet regularly, but no less than twice a year, for the purpose of advising NYSERDA as to how it can best assist State agencies and other affected entities in achieving the goals of this Executive Order with the greatest degree of cooperative effort and effectiveness. Members of the Advisory Council shall receive no compensation but shall be entitled to reimbursement for any necessary expenses incurred in connection with the performance of their responsibilities.

VII Assistance and Cooperation.

Every agency and department over which the Governor has executive authority, and all public benefit corporations and public authorities the heads of which are appointed by the Governor, shall provide all reasonable assistance and cooperation requested by NYSEDA and the Advisory Council for the purpose of carrying out this order. Such assistance may include the assignment of staff and the provision of support services.

VIII Participation of other governmental entities.

Local governments and school districts that are not subject to the requirements of this Executive Order are encouraged to review their energy efficiency practices and procedures, to institute appropriate operational and maintenance modifications, and to accelerate the implementation of energy efficiency projects. NYSEDA, OGS, the New York Power Authority and the Long Island Power Authority are hereby directed to offer any assistance as may be appropriate to assist local governments and school districts to achieve the goals of this Executive Order, including, but not limited to, assistance with procurement.

IX Repeal of Prior Executive Order.

Executive Order No. 132, promulgated on January 2, 1990, and continued unamended and unmodified, is hereby revoked and superseded by this Executive Order as of the date hereof.



G I V E N under my hand and the

Privy Seal of the State

in the City of Albany

this tenth day of June in

the year two thousand

one.

BY THE GOVERNOR

Barbara J. Hanft
Secretary to the Governor

M. E. Pataki

Appendix I

**LOCAL LAWS
OF
THE CITY OF NEW YORK
FOR THE YEAR 2005**

No. 83

Introduced by Council Members Gennaro, Addabbo Jr., Avella, Comrie, Fidler, Gerson, Gonzalez, Jennings, Koppell, Lopez, Martinez, McMahon, Palma, Quinn, Recchia, Sanders, Weprin, Reyna, Monserrate, Lanza, Vallone Jr., Brewer, Yassky, Gentile, Liu, Jackson, Gallagher, DeBlasio, Arroyo and the Public Advocate (Ms. Gotbaum).

A LOCAL LAW

To create a temporary task force to study the feasibility of transferring city-owned wetlands to the jurisdiction of the department of parks and recreation.

Be it enacted by the Council as follows:

Section 1. Legislative findings and intent. Wetlands are among the most productive ecosystems in the world. For example, wetlands such as intertidal or salt marshes are comparable in ecological productivity to rainforests. An immense variety of species of microbes, plants, insects, amphibians, reptiles, birds, fish and mammals can be part of a wetland ecosystem. Physical and chemical features such as climate, landscape shape, geology and the movement and abundance of water help to determine the plants and animals that inhabit a wetland. Wetlands provide values that no other ecosystem can, including natural water quality improvement, flood protection, shoreline erosion control and opportunities for recreation and aesthetic appreciation. In the City of New York, there are approximately fourteen square miles of wetlands still in existence, where more than 100 square miles once existed. Despite urbanization, 778 native plants and animals still exist in the City, accounting for sixty percent of the species that existed 100 years ago.

A number of inventories regarding wetland areas in New York City already exist, such as those included in recommendations of the Habitat Working Group of the Harbor Estuary Program; recommendations of "An Islanded Nature", the latest report on expanding the Harbor Herons Urban Nature Refuge concept; the recommendations of the Needs and Opportunities Report to the Army Corp of Engineers on environmental restoration of the harbor estuary; and, the recommendations of the Regional Plan Association. In addition, there may be other inventories in existence that are not included in the above-mentioned list.

An outstanding example of wetlands with ecological, water quality improvement, and recreational and aesthetic significance is those found in or near Jamaica Bay. This bill would create a task force to inventory City-owned wetlands in the City of New York

and ascertain the feasibility of transferring these properties to be under the protection of the Department of Parks and Recreation.

The City Council finds that City-owned wetlands, for which a transfer to the Department of Parks and Recreation is feasible, should be transferred in an expeditious manner in order to protect and maintain their environmental, economic and other benefits to New York City.

§2. a. There is hereby established a temporary task force to advise the mayor of the city of New York and the speaker of the council of the city of New York as to the technical, legal, environmental and economical feasibility of a transfer of city-owned wetland areas, including, but not limited to, those listed in existing inventories, to the department of parks and recreation.

b. Such task force shall be comprised of seven members, three of whom shall be appointed by the speaker of the council and four by the mayor. The members shall be appointed within sixty days of the enactment of this local law and shall serve without compensation. The chairperson shall be elected from amongst the members. Any vacancy shall be filled in the same manner as the original appointment for the remainder of the unexpired term. The commissioners of environmental protection and parks and recreation may provide staff to assist the task force.

c. Such members of the task force shall serve for a period of nine months, after which time such task force shall cease to exist.

d. No later than three months before the expiration of the task force, the chairperson shall submit a report containing its conclusions and recommendations to the mayor of the city of New York and the speaker of the council of the city of New York.

e. No later than six months after the submission of the report pursuant to subdivision d of this section, the mayor of the city of New York, or his or her designee, shall submit a report to the speaker of the council of the city of New York, which shall include, of those city-owned wetland areas that the task force deemed feasible for transfer to the department of parks and recreation:

1. the wetland areas that were transferred to such department, including the dates upon which such transfers occurred;

2. the wetland areas that are in the process of being transferred to such department or for which a determination to transfer has been made but for which the process to transfer has not yet begun, including the status of and anticipated dates for such transfers; and

3. the wetland areas that were not transferred and are not in the process of being transferred to such department, including an explanation as to why such action was not or will not be taken.

§3. This local law shall take effect immediately upon its enactment.

THE CITY OF NEW YORK, OFFICE OF THE CITY CLERK, s.s.:

I hereby certify that the foregoing is a true copy of a local law of the City of New York, passed by the Council on August 17, 2005, and approved by the Mayor on August 31, 2005.

VICTOR L. ROBLES, City Clerk of the Council

CERTIFICATION PURSUANT TO MUNICIPAL HOME RULE LAW §27

Pursuant to the provisions of Municipal Home Rule Law §27, I hereby certify that the enclosed Local Law (Local Law 83 of 2005, Council Int. No. 566-A) contains the correct text and:

Received the following vote at the meeting of the New York City Council on August 17, 2005: 47 for, 0 against, 0 not voting.

Was signed by the Mayor on August 31, 2005.

Was returned to the City Clerk on September 1, 2005.

JEFFREY D. FRIEDLANDER, Acting Corporation Counsel