APPENDIX B

ANALYSIS OF ENVIRONMENTAL IMPACT CATEGORIES

A. Land Use, Neighborhood Character, Zoning and Public Policy

Land Use and Neighborhood Character

Butler Street Site

The Gowanus Facilities property at the Butler Street site consists of an L-shaped, level, 0.69-acre parcel situated at the head (north end) of the Gowanus Canal between Douglass Street to the south and Butler Street to the north. The Gowanus Canal borders the Gowanus Facilities property to the east and is lined with piers (see Appendix C for Figure 1: Land Use in the Vicinity of the Gowanus Facilities). The neighborhoods in the vicinity of the Gowanus Facilities at the Butler Street site include Carroll Gardens, Cobble Hill, and Gowanus. The Gowanus Facilities, where the proposed upgraded, above-ground and below-ground facilities would be constructed, is located in the midst of an urbanized area with a mixture of commercial, industrial and residential (multi-family) buildings. Land uses within the 400-foot radius study area include mixed-use; transportation and parking; single, double and multi-family residential; industrial; commercial; and vacant properties. Privately owned multi-family residential, industrial, transportation and parking properties border the Gowanus Facilities at the Butler Street site.

The proposed action involves upgrading the existing Gowanus wastewater pumping station facilities and does not involve construction of new buildings or major above ground structures that could affect neighborhood character. As stated above, the proposed action would not involve sitting of new facilities and would not significantly adversely impact the existing socioeconomic conditions, community facilities, open space, urban design and visual resources as discussed below. The proposed action would also preserve the historical character of the structures on-site that are eligible for the National Register and/or New York City Landmark Designation. In addition, the proposed action is not expected to result in potential adverse impacts on air quality, noise and traffic after the proposed action is constructed nor during construction (see Sections O, Q, R and S for discussions of these environmental impact categories).

The proposed action involves an upgrade of the existing Gowanus Facilities and the continuation of existing land use and operation of facilities at the Butler Street site. Therefore, the proposed action is not expected to result in potential significant adverse impacts to land use and neighborhood character at the Butler Street site. Refer to Section S – Construction Impacts for a discussion of potential impacts to land use and neighborhood character during the proposed action construction period.

Degraw and Columbia Streets Site

The area surrounding the proposed underground construction at the Tompkins Place and Degraw Street site is mostly multi-family residential. Land use in the 400-foot radius study area of the Degraw and Columbia Streets site is single-family, two-family and multi-family residential, industrial, commercial, vacant lots, and transportation and parking (see Appendix C for Figure 4: Land Use in the Vicinity of the Degraw and Columbia Streets Site). The proposed action involves an upgrade of the existing underground structures, extension of the existing underground force main, and the continuation of existing land use and operation of facilities at

the Degraw and Columbia Streets site. Therefore, the proposed action is not expected to result in potential significant adverse impacts to land use and neighborhood character at the Degraw and Columbia Streets site.

Tompkins Place and Degraw Street Site

The area surrounding the proposed underground construction at the Degraw and Columbia Streets site is mostly industrial, with some transportation, parking, mixed uses and vacant lots. Land use in the 400-foot radius study area surrounding the Tompkins Place and Degraw Street site manhole access includes single-family, two-family and multi-family residential, institutional, commercial, transportation and parking, and vacant properties (see Appendix C for Figure 7: Land Use in the Vicinity of the Tompkins Place and Degraw Street Site). The proposed action involves an upgrade of the existing underground structures and the continuation of existing land use and operation of facilities at the Tompkins Place and Degraw Street site. Therefore, the proposed action is not expected to result in potential significant adverse impacts to land use and neighborhood character at the Tompkins Place and Degraw Street site.

Zoning

Butler Street Site

As shown on the map provided in Figure 3: Zoning Map in the Vicinity of the Gowanus Facilities in Appendix C, the predominant zoning on all sides of the Gowanus Canal, including the Gowanus Facilities property at the Butler Street site, is M2-1. M2 districts are characterized by medium industrial areas and have lower required performance standards than M1 zoning, which are often located closer to residential areas. M2-1 zoning districts are mainly in older manufacturing areas with a floor area ratio of 2.0 and required parking.

An R6 residential zoning district falls within the 400-foot radius study area and extends north of Baltic Street and west of Bond Street. R6 districts are appropriate for medium density housing. Typical development is characterized by built-up areas with buildings between three and twelve stories.

In addition, M1-2 manufacturing district begins on the north side of Butler Street and extends to the southeast of the Gowanus Facilities property. M1 districts are often buffers between the heavier manufacturing districts and adjacent residential or commercial zoning. M1 zoning have the most stringent performance standards in the manufacturing category. Typical development is characterized by multistory lofts and many one- or two-story warehouses.

A large-scale development and rezoning is currently proposed approximately four blocks south of the Gowanus Facilities property at 363-365 Bond Street with an anticipated build year of 2011. The rezoning, if approved, would change the zoning from an M2-1 to an MX (M1-4/R7-2) zoning district and facilitate a mixed-use development for an approximately 2-acre area along the Canal and between Second and Carroll Streets. The New York City Department of City Planning (NYCDCP) has also initiated a land use framework study for the Gowanus Canal area, which may follow with a formal rezoning. However, according to NYCDCP, the zoning at the Butler

Street site itself would be maintained for continued industrial and/or commercial activity. The currently proposed rezoning at 363-365 Bond Street, which is outside of the 400-foot study area for the proposed action, as well as the larger rezoning currently under study may add more residential and community land uses to the area surrounding the proposed action.

The proposed action involves an upgrade of the existing Gowanus Facilities and the continuation of existing zoning at the Butler Street site. Therefore, the proposed action is not expected to result in potential significant adverse impacts to zoning at or surrounding the Butler Street site.

Degraw and Columbia Streets Site

As shown on the map provided in Figure 6: Zoning Map in the Vicinity of the Degraw and Columbia Streets Site in Appendix C, the predominant zoning in the 400-foot radius study area of the Degraw and Columbia Streets site is M1-1 Light Manufacturing with an R6 residential zoning district to the southeast, which are described above.

The proposed action involves an upgrade of existing underground structures, extension of the existing underground force main, and the continuation of existing zoning at the Degraw and Columbia Streets site. Therefore, the proposed action is not expected to result in potential significant adverse impacts to zoning at the Degraw and Columbia Streets site.

Tompkins Place and Degraw Street Site

As shown on the map provided in Figure 9: Zoning Map in the Vicinity of the Tompkins Place and Degraw Street Site in Appendix C, the predominant zoning in the 400-foot radius study area of the Tompkins Place and Degraw Street site is R6 residential zoning (described above) with a special purpose zoning district to the north. The Special Downtown Brooklyn District has height and setback restrictions in addition to urban design rules to continue the growth of the area.

The proposed action involves an upgrade of existing underground structures and the continuation of existing zoning at the Tompkins Place and Degraw Street site. Therefore, the proposed action is not expected to result in potential significant adverse impacts to zoning at the Tompkins Place and Degraw Street site.

<u>Public Policy</u>

Butler Street Site

There are no current community 197-A plans for the 400-foot radius study area around the Gowanus Facilities at the Butler Street site. As mentioned above, NYCDCP has initiated a rezoning study of the Gowanus Canal Corridor. The proposed action is consistent with the *New York City Waterfront Revitalization Policy* (WRP) (see Section K, Waterfront Revitalization Program below). Furthermore, the improved water quality resulting from the proposed action would be consistent with current and future public policy.

The proposed action involves an upgrade of the existing Gowanus Facilities and the continuation of existing operations at the Butler Street site. Improvements to water quality in the Gowanus Canal would further support future proposed policies and land uses in the area. Therefore, the proposed action is not expected to result in potential significant adverse impacts to public policy at the Butler Street site.

Degraw and Columbia Streets Site and Tompkins Place and Degraw Street Site

There are no current community 197-A plans or other land use/rezoning studies within the 400 feet radius of these sites. The proposed action is consistent with the New York City WRP (See Section K, Waterfront Revitalization Program, below). Therefore, the proposed action is not expected to result in potential significant adverse impacts to public policy at the Degraw and Columbia Streets site or the Tompkins Place and Degraw Street site.

B. Socioeconomic Conditions

No displacement of businesses or residences would occur as a result of the proposed action. The Gowanus Facilities would not be permanently staffed after construction. The proposed action would not directly or indirectly change population, housing stock, or any other demographic conditions. Therefore, the proposed action is not expected to result in potential significant adverse impacts to socioeconomic conditions.

C. Community Facilities

There are no schools, libraries, fire stations, police stations, houses of worship or health care facilities within the 400-foot study area of each of the three proposed work sites. As stated previously, the study areas are highly urbanized with a mixture of industrial, commercial and multi-family residential uses.

The proposed action would not displace any public or publicly funded community facilities, nor introduce residents or workers to the proposed action area. The upgraded Gowanus facilities would not be permanently staffed. The proposed action would not affect schools, libraries, hospitals, day care centers, or require additional police or fire protection facilities in the area. No increase in demand for community facilities and services would occur as a result of the proposed action because no change would occur to existing operations. Therefore, the proposed action is not expected to result in potential significant adverse impacts to community facilities and services.

D. Open Space

According to the New York City Open Accessible Space Information System (OASIS), there are no open spaces adjacent to the Gowanus Facilities property at the Butler Street site, the Degraw and Columbia Streets site, and the Tompkins Place and Degraw Street site. The nearest open space is a playground on Nevins Street, approximately 300 feet southeast of the Gowanus Facilities site. This playground is shielded from the site by buildings and facilities adjacent to the Gowanus Canal and on Nevins Street. The proposed action would result in improved

operations of the Gowanus Facilities and a continuance of existing land use. The proposed action would not change, diminish or eliminate open space. The effect on any open spaces in the lower reaches of the Gowanus Canal would likely be positive in that the proposed action would result in improved water quality conditions in the Canal. Therefore, the proposed action is not expected to result in potential significant adverse impacts to open space.

E. Shadows

Butler Street Site

The largest and tallest existing structure at the Gowanus Facilities site is, and would continue to be, the Gowanus Canal flushing tunnel system building, which has a footprint of 67 feet by 54 feet and is approximately 42 feet high at the apex of its roof. See Figure 16: Existing Gowanus Facilities and Proposed Post-Upgrade Rendering in Appendix C. Since this building would not undergo any external changes, shadows cast by this building would not change after the proposed action.

The overall increase in the total square footage of floor space of all buildings on the Gowanus Facilities property at the Butler Street site is 3% (lateral extension of the wastewater pumping station building). The new, proposed Gowanus Facilities service building, north of the Gowanus Canal flushing tunnel system building, would be approximately 23 feet high at the perimeter parapet wall, which would be approximately 5 feet taller than the current building. These differences in height and bulk would not significantly increase shadows in any direction. At the latitude of the Gowanus Facilities, shadows cast by buildings are longest during winter, when the sun traverses the sky at a lower angle than during spring, summer or fall. Shadows are cast westward in the mornings, northward in the afternoon, and eastward before dusk. The backyard of the tallest adjacent residential building west of the Gowanus Facilities may be in the shadow of the Gowanus Facilities service building for a slightly longer period of time than at present, approximately a half-hour in the morning during winter and summer months. Shadows in the afternoon would not reach across Butler Street, and at sundown, shadows cast eastward would not impact any residential or other land uses. The Gowanus Canal is south of the Gowanus Facilities service building and consequently, cannot be impacted by shadows from it. Therefore, the proposed action is not expected to result in significant adverse impacts due to shadows at the Butler Street site.

Degraw and Columbia Streets Site and Tompkins Place and Degraw Street Site

All structures affected by the proposed action at the intersection of Degraw and Columbia Streets and at the intersection of Tompkins Place and Degraw Street are and would continue to be subsurface structures. Thus, the proposed actions at these sites would not cast shadows on surrounding land uses. Therefore, the proposed action is not expected to result in potential significant adverse impacts due to shadows at the Degraw and Columbia Streets Site and Tompkins Place and Degraw Street Site.

F. Historic Resource

A *Phase IA Cultural, Historical, and Archaeological Investigation* conducted in September 2002, concluded that the Gowanus Facilities at the Butler Street site are not considered to be sensitive for the presence of Native American period or Historic period archaeological sites. The report concluded that additional archaeological investigations to test for such resources were not warranted. The Landmarks Preservation Commission (LPC) concurred with the Phase 1A findings and determined that there are no further archaeological concerns for the project area. Furthermore, LPC subsequently determined that the construction sites adjacent to the Butler Street site for the interim wastewater pumping station, at the intersection of Tompkins Place and Degraw Street for the Gowanus Canal flushing tunnel system access, and at the intersection of Columbia and Degraw Streets for the construction of the wastewater force main were included in the above review and determination. Therefore, the proposed action is not expected to result in potential significant adverse archaeological impacts.

Currently, the Gowanus Facilities at the Butler Street site are not officially listed on the National or State Registers of Historic Places nor are any structures on the site listed as City Landmarks by LPC.

In late summer of 2004, a draft report prepared for the U.S. Army Corps of Engineers (USACE), entitled National Register of Historic Places Eligibility Evaluation and Cultural Resource Assessment, indicated that the Gowanus Canal and vicinity meet the eligibility requirements for listing in the National Register of Historic Places as a historic district. Copies of the report were sent to both the State Historic Preservation Office (SHPO) and LPC for their review. By letter dated September 31, 2004, SHPO concurred, based on their review of the draft report, that the Gowanus Canal and vicinity formed a National Register-eligible historic district.

On August 1, 2006, SHPO reviewed additional information provided in subsequent discussions about the proposed action with the design consultants. Based on those discussions and SHPO review of the USACE's draft report, SHPO communicated the following:

- The Gowanus wastewater pumping station and service building have been substantially altered and are considered "non-contributing resources" within the National Register-eligible Gowanus Canal Historic District. Due to their non-contributing status SHPO does not need to review any proposed changes to these structures.

- The Gowanus Canal flushing tunnel system building, built 1905-1911, is a "contributing resource." As such, plans for proposed construction that could impact the interior or exterior of this building would have to be reviewed by SHPO.

- The 6,280-foot-long, 12' diameter Gowanus Canal flushing tunnel, built 1905-1911, is a "contributing resource." As such, plans for proposed construction that could impact the Gowanus Canal flushing tunnel would have to be reviewed by SHPO.

- The Gowanus Facilities gate house, built 1905-1911, is also a "contributing" resource. As such, plans for proposed construction that could impact the interior or exterior of this structure would have to be reviewed by SHPO.

With the exception of installing a ventilation louver behind a grate in one or two of the Gowanus Canal flushing tunnel system building's windows or vents, the exterior of the building would not be affected. Virtually all of the construction associated with the proposed action involves renovation, rehabilitation, and/or upgrade of equipment in below-ground level pit, chambers or vaults inside the Gowanus Canal flushing tunnel system building. Changes to the exterior of the Gowanus Canal flushing tunnel system building would be avoided, thereby maintaining the historical character of the exterior of the building.

Proposed construction activity inside the Gowanus Canal flushing tunnel itself is mostly related to the "in position" replacement of the existing force main. As necessary, broken or missing tiles along the Gowanus Canal flushing tunnel interior wall would be restored or replaced.

Construction activities planned for the Gowanus Facilities gate house are considered to be minor and consist of removing the Gowanus Canal flushing tunnel system isolation gate, replacing a floor access cover, and improving interior lighting. There are no construction activities planned for the Gowanus Facilities gate house exterior.

The overall structure, appearance, and dimensions of the Gowanus Canal flushing tunnel system building, the flushing tunnel, and the gate house would not be significantly impacted by the proposed action. As requested, copies of final design drawings related to work inside or outside these structures will be provided to SHPO for review and approved.

LPC determined that the Gowanus Canal flushing tunnel system building "appears to be eligible for National Register and/or New York City Landmark Designation." Shortly thereafter, additional proposed action information was provided to LPC that indicated there were no plans for work on the exterior of the Gowanus Canal flushing tunnel system building, other than the installation of ventilation louvers in some windows. LPC concluded they had no further architectural concerns for the proposed action.

Complete plans and specifications for all proposed interior and exterior work associated with the Gowanus Canal flushing tunnel, flushing tunnel system building and gate house, including any new construction or additions, will be submitted to SHPO for final review and approval. Any changes to the plans and/or specifications requested by SHPO based on their review will be implemented as part of the proposed action. Therefore, the proposed action is not expected to result in potential significant adverse impacts to historic resources at the Butler Street site.

G. Urban Design/Visual Resources

<u>Butler Street Site</u>

The Gowanus Facilities buildings at the Butler Street site currently include the brick Gowanus Canal flushing tunnel system building, service building, wastewater pumping station building,

and gate house. These are relatively well-screened from the main local street (i.e., Butler Street) by a brick façade along the north perimeter of the Butler Street site, consistent with the architecture of the on-site buildings. The Historic Register-eligible Gowanus Canal flushing tunnel system building (the dominant building at the Butler Street site) and the gate house incorporate a Renaissance style brick structure with limestone trim and decorative details. The brick Gowanus wastewater pumping station building and the service building are of more recent brick construction. Remaining industrial, commercial and residential structures within 400 feet of the proposed action site largely consist of low-lying, masonry structures of relatively recent construction.

The proposed action would not result in significant changes in height, bulk, form, setbacks, scale, use or basic arrangement of the existing Gowanus Facilities buildings and structures at the Butler Street site. The proposed action would preserve the historical character of the flushing tunnel system building, flushing tunnel and gate house which are eligible for the National Register and/or New York City Landmark Designation.

The proposed Gowanus Facilities service building would be designed to provide a "21st century" look to provide a contrast with the existing historical structures. The look of Butler Street would be preserved by retaining as much of the brick wall as possible along the Butler Street property line. The materials used on the Butler Street façade of the Gowanus Facilities service building would be granite, limestone, brick and stainless steel. All of these materials are traditional to the site, except for the stainless steel panels, which are intended to minimize the added structural weight of the Gowanus Facilities service building due to the additional height and to impart a modern look to the building.

The roof parapet design was intended to bring a lighter feel to the Gowanus Facilities service building and to allow a smoother transition between the building and the wastewater pumping station, which are different heights. In addition, the parapet design would screen rooftop equipment.

Increasing illumination within the Gowanus Facilities boundaries and along the exterior façade on Butler Street is required to enhance security. Currently the only sources of lighting on the site are the existing high pressure sodium street lighting cobrahead poles and wall mounted high pressure sodium fixtures flanking the door entryways.

Lighting for the Gowanus wastewater pumping station building would all be low voltage, shielded, and aimed inward from the property lines to minimize light trespass off-site. The lighting scheme on the façade adjacent to Butler Street would be comprised of low-wattage (26 watt), warm tone and semi-recessed luminaries within the arches in the façade. The proposed lighting design would provide functional lighting for visiting field personnel as well as lighting on prominent facades and enhance security. Aiming the Gowanus Facilities lights inward, automatically turning off most lights from dusk to dawn, and using low-wattage, shielded fixtures, are included as part of the proposed action to minimize adverse impacts to sensitive receptors from lighting. Other approaches to illuminating the remainder of the site include the following:

- The Gowanus Facilities buildings would be lit by shielded, low wattage floodlights mounted on the perimeter fence, on other buildings and on an existing cobrahead light pole, all aiming within the property lines to prevent light trespass
- The roof of the Gowanus Canal flushing tunnel system building (on the south side) would be washed with fluorescent uplighting located behind the cornice
- The existing bollards and light poles within the site (if it is determined that they are in serviceable condition) would be retrofitted with energy-efficient long-life lamp sources
- The flagpoles would be lit by direct burial metal halide in-ground uplights

The landscaping for the Gowanus Facilities at the Butler Street site would include the protection of existing street trees on the sidewalk and the replanting of native or adaptable plant species that can tolerate drought and occasional soil wetness on the site. Along Butler Street and Douglass Street, wooden tree guards would be installed to protect existing street trees before and during construction. Inside the Gowanus Facilities at the Butler Street site, the plant bed along the adjacent sanitation property would be planted with drought tolerant plant species. The area by the existing monument would be planted with a rain garden palette of plants. The narrow strip plant bed that wraps along the existing granite retaining wall would be planted with drought tolerant species. Between the gate house and the existing property on Douglass Street is another area that would be planted with a rain garden mix of plant species.

The Gowanus Facilities final design has been presented to both the NYC Art Commission and Brooklyn Community Board #6. Final submission to the NYC Art Commission was made on February 13, 2008 and was reviewed on March 10, 2008 at a public hearing and found to be acceptable (formal final approval is pending). The Brooklyn Community Board #6 approved the proposed action design on June 8, 2008. Therefore, the proposed action is not expected to result in potential significant adverse impacts to urban design/visual resources at the Butler Street site.

Degraw and Columbia Streets Site and Tompkins Place and Degraw Street Site

All structures affected by the proposed action at the intersection of Degraw and Columbia Streets and at the intersection of Tompkins Place and Degraw Street, are and would continue to be subsurface structures. Therefore, the proposed action is not expected to result in potential significant adverse impacts to urban design/visual resources at the Degraw and Columbia Streets site and the Tompkins Place and Degraw Street site.

H. Neighborhood Character

See Section A. Land Use, Neighborhood Character, Zoning and Public Policy for an assessment of the proposed action's impacts on neighborhood character.

I. Natural Resources

There are no significant "terrestrial" resources in the vicinity of the Gowanus Facilities at the Butler Street site, the Degraw and Columbia Streets site, or the Tompkins Place and Degraw Street site. There are no designated, significant habitats or reported occurrences of endangered, rare, or threatened species in the area. The Gowanus Canal is considered a tidal wetland according to the official NYSDEC Tidal Wetlands Map for the area. However, its classification is "Littoral Zone (LZ)," which refers to all lands under tidal water less than 6 feet at mean low

water. There are no vegetated intertidal marshes (IM) or coastal shoals/mudflats (SM) in the area surrounding the Gowanus Canal. The water quality and aquatic resources associated with the proposed action are discussed below.

It should be noted that the main purpose of the proposed action is to improve the capacity, function, efficiency, and reliability of the Gowanus Canal flushing tunnel system and wastewater pumping station with the aim of improving the water quality in the Gowanus Canal over the long term.

Water Quality

According to the 2000 Atlantic Ocean Long Island Sound Basin Waterbody Inventory and Priority Waterbodies List (Volume 1: New York City Metropolitan Waters), the surface water classification for the Gowanus Canal is "SD." The SD classification is given to waters that are suitable for fish survival but do not meet the requirements for primary and secondary contact recreation and fish propagation because of natural or man-made conditions. The NYSDEC standard for dissolved oxygen (DO) for Class SD Waters is 3.0 mg/l. The average DO level in the Gowanus Canal during the Gowanus Canal flushing tunnel system operation is on average between 6.0 and 7.0 mg/l.

Historically, aquatic life, recreational uses, and aesthetics have been severely restricted by poor water quality caused by unregulated discharges of industrial and municipal wastewater, combined sewer overflow (CSO) discharges of raw sewage, stormwater discharges, and oxygen demanding sediments in the Gowanus Canal. Poor circulation of water in the Gowanus Canal during the 30-year period that the Gowanus Canal flushing tunnel system was deactivated exacerbated these conditions. The Gowanus Canal is also affected by the New York Harbor area fish consumption advisories.

As stated in Appendix A, Project Description, the original bidirectional flushing system in 1911 incorporated a propeller pump design to convey water between the Gowanus Canal and Buttermilk Channel at 325 mgd through a 12-foot diameter brick tunnel. The Gowanus Canal flushing tunnel system eventually failed in the late 1960s and was abandoned. In the late 1990s, the Gowanus Canal flushing tunnel system was rehabilitated. Reactivation of the Gowanus Canal flushing tunnel system in 1999, after several decades of inactivity, resulted in improved water quality in the Gowanus Canal. Water quality in Buttermilk Channel was not impacted by reactivation of the tunnel as DO levels remained unchanged. In October 2000, the NYCDEP concluded monitoring in the Gowanus Canal and reported that DO levels for the Gowanus Canal's SD classification are generally met when the Gowanus Canal flushing tunnel system is operating. However, DO levels below the 3.0 mg/l standard have been reported during the summer with anoxic conditions producing hydrogen sulfide and causing odor problems. These conditions have been attributed to the lack of reliability and redundancy in the Gowanus Canal flushing tunnel system and CSO discharges into the Gowanus Canal.

The proposed action and the expected recommendations of the NYCDEP Long Term Control Plan (LTCP) are expected to continue to improve the water quality in the Gowanus Canal, consistent with State designated uses and water quality goals. The positive impacts of the

proposed action, once complete, include: increased efficiency and reliability of the Gowanus Canal flushing tunnel system; improved system redundancy as a result of installing multiple pumps in parallel; reduced frequency and intensity of CSOs to the Gowanus Canal by 34%; preserved DO levels in the Gowanus Canal; and reduction in nuisance odors, floatables, CSO sediments, oils/grease, discoloration, bacteria levels and sedimentation rate.

The Gowanus Canal flushing tunnel system and the wastewater pumping station are vital in the effort to improve the water quality in the Canal over the long term. Therefore, the proposed action is not expected to result in potential significant adverse impacts to water quality.

Aquatic Resources

Before the reactivation of the Gowanus Canal flushing tunnel system in the late 1990's, there were virtually no organisms living in the head of the Gowanus Canal due to low DO levels. During the sampling prior to the reactivation of the Gowanus Canal flushing tunnel system, only one genus, *Enchytraeus*, an oligochaete worm, and five species of zooplankton were observed at the head of the Gowanus Canal. Since reactivation of the flushing tunnel system, a number of resident and migratory fish and invertebrate species inhabit the Gowanus Canal (biological survey of the Gowanus Canal in 2003-2004 presented in the report, *Gowanus Bay and Canal Ecosystem Restoration Studies: Fish and Epibenthic Invertebrate Sampling Program)*. This improvement is directly attributable to the reactivation of the Gowanus Canal flushing tunnel system.

Throughout the Gowanus Canal, twelve species of fish were identified, with eggs as the most abundant life stage collected, followed by post yolk-sac larvae, then yolk-sac larvae. At the head of the Gowanus Canal, where the interim canal centralized OTS intake manifold would be installed, five species of ichthyoplankton were collected as eggs at a maximum density of 0.004 individuals/gallon, including bay anchovy (*Anchoa mitchilli*), Atlantic menhaden (*Brevoortia tyrannus*), Labridae spp., windowpane flounder (*Scophthalmus aquosus*) and Gadidae spp. While yolk-sac larvae were collected at low densities in the Gowanus Canal and Bay, none were found at the head of the Gowanus Canal. Post yolk-sac larvae at the head of the Gowanus Canal were observed at a maximum density of 0.011 individuals/gallon. Bay anchovy and winter flounder post yolk-sac larvae were observed in the greatest densities at the head of the Gowanus Canal and in the Gowanus Bay. Few adult fish were observed in the Gowanus Canal, including striped bass (*Morone saxatilis*), white perch (*Monrone americana*) and Atlantic silversides (*Menidia menidia*) that were observed at the head of the Gowanus Canal in the fall.

The community of fish species observed in the Gowanus Canal was dominated by migratory species common to the New York/New Jersey Harbor and Mid Atlantic regions. There were no resident species collected in the head of the Gowanus Canal, indicating the Canal may not provide the necessary habitat to support a resident fish community. In addition, the occurrence of migratory species in the Gowanus Canal corresponds with the temporal abundance of these species found in the New York/New Jersey Harbor.

There was no significant evidence that fish spawning occurs in any part of the Gowanus Canal, but some spawning likely occurs within the Gowanus Bay. The few eggs that were observed at

the head of the Gowanus Canal were mostly pelagic species. In addition, winter flounder were observed at the head of the Gowanus Canal and in the Gowanus Bay. If winter flounder spawning occurs in the Gowanus Canal, winter flounder larvae would be expected to be present in every sampling reach because their larvae have limited swimming ability. The observed distribution of eggs of pelagic species and winter flounder larvae suggests that spawning does not occur in the Gowanus Canal and that ichthyoplankton are transported into the Gowanus Canal from Buttermilk Channel through the Gowanus Canal flushing tunnel system or from the Gowanus Bay through tidal movements.

Throughout the Gowanus Canal considerable variability in the invertebrates was observed during the 2002-2004 sampling. The majority of organisms are characteristic of sediments associated with high organic matter, petroleum, sewage and low oxygen levels. Tube dwelling amphipods and polychaetes were the most dominant organisms. Species of mussels, barnacles, bryozoans, fouling amphipods and isopods were observed in lower densities. Crab species were only found in the head of the Gowanus Canal and in the Gowanus Bay. The head of the Gowanus Canal had the highest species richness of crab species, with the Pacific shore crab (*Hemigrapsus sanguineus*) being the most abundant. The Pacific shore crab is an opportunistic omnivore, which has the potential to out-compete many of the resident crab species in the Gowanus Bay and the New York/New Jersey Harbor.

The epibenthic species observed in the Gowanus Canal are common throughout the New York/New Jersey Harbor and Mid Atlantic regions. Species abundances were relatively low in the Gowanus Canal compared to a typical invertebrate community found in the New York/New Jersey Harbor. The species observed in the Gowanus Canal were primarily opportunistic organisms that colonize hard substrates in disturbed habitats and are considered pollution tolerant. Overall, the epibenthic community living in the Gowanus Canal is an impoverished community when compared to the established epibenthic communities inhabiting hard surfaces in the East River. As observed with the ichthyoplankton community, hydrodynamic processes greatly influence the epibenthic community composition of the Gowanus Canal with the New York/New Jersey Harbor and Buttermilk Channel as a source of their populations.

As would be expected, the planktonic organisms found at the head of the Gowanus Canal are, in most cases, the same organisms found in the Buttermilk Channel due to the hydrodynamic processes established by the Gowanus Canal flushing tunnel system. The most abundant plankton species in these waters is *Acartia*, which is an abundant zooplankton arthropod species found in the New York/New Jersey Harbor. In addition, species of hydrozoans, chaetognaths, annelids, and decapods were observed at the head of the Gowanus Canal after reactivation of the Gowanus Canal flushing tunnel system. Zooplanktons are weak swimmers and would be expected to be entrained by movement of water through the Gowanus Canal flushing tunnel system and tidal exchanges.

Protection against fish impingement and entrainment is addressed by maintaining low velocity (i.e., <1.0 fps) at the Buttermilk Channel intake structure. According to "Design of Water Intake Structures – for Fish Protection" by the American Society of Civil Engineers' Task Committee of Fish-Handling Capability of Intake Structures, studies show that fish tend to avoid water

moving with an average horizontal velocity of 1 fps. This has led to the use of velocity caps of less than 1 fps to reduce fish entrainment.

NYCDEP is required to submit a fish entrainment study for the Buttermilk Channel to NYSDEC Division of Fish, Wildlife & Marine Resources after the Gowanus Canal flushing tunnel system improvements are completed (NYSDEC correspondence October 31, 2002). Monitoring at the intake screen would be conducted to assess entrainment following the Gowanus Canal flushing tunnel reactivation and included in the above-mentioned study to be submitted to the NYSDEC. The purpose of the study would be to assess entrainment after the reactivation of the Gowanus Canal flushing tunnel system and the scope of work, including any monitoring or sampling required, would be coordinated with NYSDEC.

The long-term enhanced performance and reliability of the Gowanus Canal flushing tunnel system, the increased capacity of the wastewater pumping station, the new force main, and the resulting reduction of CSO, floatables, sediment, and other debris at the Gowanus Facilities property at the Butler Street site are expected to improve ecological conditions for benthic and other organisms in the Gowanus Canal through water quality improvements. Therefore, the proposed action is not expected to result in potential significant adverse impacts to natural resources. Refer to Section S – Construction Impacts for a discussion of potential impacts to natural resources during the proposed action construction period and operation of the interim canal centralized OTS.

J. Hazardous Materials

In order to determine whether the proposed action could increase exposure of people or the environment to hazardous materials, a Phase I hazardous materials environmental site assessment (ESA) was conducted. Consistent with NYSDEC's standards, criteria and guidance values, as well as applicable guidelines in the CEQR Technical Manual, the ESA included a historical land use review, a site reconnaissance and an environmental records search.

Phase I Environmental Site Assessment

The land use review focused on historical uses over the past 50 years. Land uses at the proposed action site and vicinity have been a relatively consistent mix of public utility, light industry, residential, and commercial uses. Land uses in the overall proposed action vicinity include light manufacturing, commercial, residential, vacant, educational, places of worship and recreational properties. Existing land use and zoning maps for the Gowanus Facilities site are provided in Figure 1: Land Use in the Vicinity of the Gowanus Facilities and in Figure 3: Zoning Map in the Vicinity of the Gowanus Facilities in Appendix C, respectively. The site reconnaissance did not identify any major environmental concerns of the existing Gowanus Facilities buildings. The Phase I hazardous materials database search included the Gowanus Facilities site, as well as the off-site locations (insertion pit sites at the intersection of Columbia and Degraw Street, and the intersection of Tompkins Place and Degraw Street) environmental records, particularly spills databases (LTanks and NY Spills). A summary of the analysis of the January 2006 spill records and SQG search and the SQGs for which violations once existed achieved compliance many years ago are provided in Table B-1.

Table B-1
OPEN LTANK, NY SPILLS, RCRA SQG SITES

LTANKS		
Map I.D. Number	**Name**	**Comments**
64	Gowanus housing NYCHA	Spill date: 05/06/2002; tank test failure; known release; DEC response; willing responsible party; corrective action taken; NYCHA owned site.
64	Gowanus housing NYCHA	Spill date: 05/01/2002; tank test failure; NYCHA-owned site; known release; DEC response; willing responsible party; corrective action taken; NYCHA-owned site.
NY SPILLS		
Map I.D. Number	**Name**	**Comments**
39	NYCDEP	Spill date: 01/06/98; source – gasoline station; spill class – known release; DEC response; willing responsible party; corrective action taken; no penalty recommended.
39	NYCDEP	Spill date: 03/31/93; source – gasoline station; spill class – known release; DEC response; willing responsible party; corrective action taken; no penalty recommended.
88	Bayside Fuel Depot	Spill date: 11/05/2002; known release; DEC response; willing responsible party; corrective action taken.
RCRA SQG		
Map I.D. Number	**Name**	**Comments**
42	Noble Cleaners	Small quantity generator; failure to meet SQG requirements; informal enforcement action; achieved compliance 08/27/1999.
81	O-Z Gedney	Small quantity generator; written information enforcement action; achieved compliance 11/01/1985.

Past on-site and surrounding area land uses may have impacted the soil and groundwater at this site. Therefore, a Phase II ESA was conducted to adequately identify and characterize subsurface soils of the site prior to on-site soil disturbance. A Phase II Work Plan summarizing the proposed drilling and soil/groundwater sampling activities was prepared and approved.

Phase II Environmental Site Assessment

The following is a summary of the major findings and conclusions of the Phase II ESA conducted for the proposed action. The Phase II ESA was conducted in order to evaluate the presence and extent of subsurface soil contamination in the areas where excavation would be

conducted as part of the proposed action. A separate, stand-alone Phase II ESA report was prepared.

The field work associated with the ESA, undertaken between April 21 and May 12, 2008, consisted of the advancement of a total of 12 soil borings and 6 groundwater probes at the Gowanus wastewater pumping station site at the head of Gowanus Canal, the Butler Street flushing tunnel access chamber, the interim wastewater pumping station system adjacent to Butler Street, the manhole access on Degraw Street near the intersection with Tompkins Place, the flushing tunnel exit chamber and insertion pit in Degraw Street near the intersection with Columbia Street where microtunneling will take place, and the proposed open-cut segment of the new wastewater force main near Columbia Street. The sample locations are shown in Figures 18, 19 and 20 in Appendix C.

Soil samples were submitted to a certified and NYSDOH-ELAP-approved laboratory (Mitkem Laboratories, located in Warwick, RI) for analysis of Target Compound List (TCL) Volatile Organic Compounds (VOCs) including MTBE, using the United States Environmental Protection Agency (USEPA) Method 8260, TCL Semivolatile Organic Compounds (SVOCs), using USEPA Method 8270, TCL pesticides, using Method 8081A, TCL Polychlorinated Biphenyls (PCBs), using Method 8082, herbicides (Method 8151A), Total Analyte List (TAL) metals, and gasoline and diesel range Total Petroleum Hydrocarbons (TPHs), using Method 8015. A total of 25 soil samples were collected. Soil sample results were compared to the NYSDEC Recommended Soil Cleanup Objectives (SCO) in the Technical Assistance and Guidance Memorandum (TAGM) 4046.

Groundwater samples were collected and analyzed for NYCDEP Limitations for Effluent Disposal to Combined or Sanitary Sewers, VOCs, SVOCs, pesticides, PCBs and TAL metals. A total of 6 groundwater samples were collected. Groundwater sample results were compared to the NYSDEC Class GA Groundwater Standards and Guidance Values.

Phase II ESA Findings

Based on the completed soil borings, the soil encountered throughout the proposed action areas was predominantly unconsolidated, non-native fill material consisting of a brown fine to medium sand with fine to medium gravel of up to approximately 10 to 15 feet below grade. The fill contains varying amounts of brick, concrete and metal fragments. Groundwater was encountered between approximately 11 and 14 feet below ground surface in the vicinity of the Gowanus wastewater pumping station and approximately 12 and 14 feet below ground surface in the vicinity of the intersection of Columbia Street and Degraw Street. Groundwater at the intersection of Tompkins Place and Degraw Street was not encountered; however, it is estimated to be approximately 45 to 50 feet below ground surface.

<u>Soil</u>

Based on the observed TAGM soil clean-up objectives (SCO) exceedances, there is low level contamination present in soil associated with the areas to be disturbed as part of the proposed action activities in and around the Gowanus Facilities at the Butler Street site.

Exceedances of the SCOs for several SVOCs and metals, and TPH concentrations were detected in soil collected from the on-site locations, including the underground storage tank area and the CSO chamber area, and off-site locations, including the Butler Street area and the Degraw and Columbia Streets area.

Given the presence of historic fill, low level soil contamination is consistent with current and former land uses. The presence of Polycyclic Aromatic Hydrocarbons (PAHs), a subset of SVOCs, and metals above their respective SCOs, as well as elevated TPHs in site soil, are not unexpected given the urbanized and industrialized nature of the areas investigated. PAHs are common soil contaminants in urbanized and industrialized areas because they are present in a wide range of materials, including coal ash, incinerator ash, and other combustion products, as well as in asphalt and were commonly incorporated into fill material. Therefore, it is not unusual to detect elevated levels of PAHs in historic fill material. All areas investigated are underlain by nonnative fill material that contains a wide array of anthropogenic material. Based on the documented soil contaminants, appropriate measures can be taken during the planned excavation activities to limit worker exposure to any soil exhibiting elevated concentrations of the above-referenced contaminants.

Groundwater

Based on the observed SCO exceedances, there is low level contamination present in groundwater in the areas where dewatering may occur as part of the proposed action activities in and around the Gowanus Facilities. Exceedances of the Class GA Groundwater Standards and Guidance Values were detected primarily in groundwater collected from the on-site CSO chamber area. However, MTBE and several metals were also detected above Class GA Groundwater Standards and Guidance Values in the on-site underground storage tank area and the off-site Butler Street area.

Based on the presence of historic fill, and the industrialized nature of this area, groundwater contamination is consistent with current and former land uses. The VOCs detected are commonly associated with gasoline products, and the selenium and thallium detected in the groundwater is likely attributable to the long industrial history of this area. Note that elevated concentrations of iron, magnesium, manganese and sodium are common in groundwater collected on Long Island and are not considered contaminants of concern. Based on the documented groundwater contaminants, appropriate measures would be taken during the proposed excavation activities to limit worker exposure to any groundwater exhibiting elevated concentrations of the above-referenced contaminants.

In addition, based on the NYCDEP Daily Effluent Standards exceedances of one or more of several metals and total dissolved solids detected in groundwater in all areas sampled, pre-treatment of groundwater (i.e., from any required dewatering activities) before discharge to the Gowanus Canal or any combined or sanitary sewer, may be required.

Phase II ESA Conclusions/Recommendations

Based on the above:

- Given the presence of VOCs, SVOCs metals and gasoline and diesel range TPHs detected in several soil samples collected in areas to be excavated as part of the proposed action, a project-specific Soil Management Plan (SMP) and a Construction Health and Safety Plan (CHASP) would be developed and implemented throughout all phases of the proposed construction excavation. The SMP and CHASP would be submitted to NYCDEP for review and approval prior to construction. The SMP and CHASP would address the following:

  - Protection of on-site workers from potential exposure to site-related contaminants;

  - Protection of adjacent properties, off-site personnel, and the environment from site contaminants through air monitoring and the control of dust and vapor migration; and

  - Provision for additional soil analysis in order to determine appropriate disposal methods.

  - If dewatering into the New York City sewer drain would occur during construction, a NYCDEP Sewer Discharge Permit would be obtained prior to the start of dewatering.

- Site groundwater contains low-level VOCs, SVOCs and metals. Treatment of the effluent water prior to discharge would be undertaken as necessary for any dewatering activities.

- The handling, storage, and disposal of any contaminated or hazardous materials encountered at the proposed action locations would be conducted in accordance with all applicable regulatory protocols.

With the implementation of all measures described above, significant adverse impacts related to hazardous materials would not be expected to occur as a result of the excavation and construction activities for the proposed action. Therefore, the proposed action is not expected to result in potential significant adverse impacts from hazardous materials.

K. Waterfront Revitalization Program

The Gowanus Facilities site is located within the coastal zone as shown on "Section 16" of the official Coastal Zone Boundary of New York Map (Figure 21: Coastal Zone Boundary of Proposed Action Area in Appendix C). Therefore, the proposed action has been evaluated for consistency with the policies of the New York City Waterfront Revitalization Program (WRP). The New York City Waterfront Revitalization Program Consistency Assessment Form and analysis is provided in Appendix E.

Through the upgrade of the Gowanus Facilities, including the upgrade of the flushing tunnel system elements and wastewater pumping elements, the proposed action is consistent with each of the WRP policies and would support and encourage specific policies as described below. Therefore, the proposed action is not expected to result in potential significant adverse impacts within the City's waterfront areas.

POLICY 3: Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation centers

The proposed action would not impede commercial or recreational boating or water-dependent transportation. In addition, the proposed action may support the observed increase in recreational activity in the Gowanus Canal through overall water quality improvements.

POLICY 4: Protect and restore the quality and function of ecological systems within the New York City coastal area.

The proposed action would reduce CSOs and stormwater discharges to the Gowanus Canal and enhance flushing of the Canal. The anticipated benefits of the proposed action would therefore be increased protection and water quality improvements in the area resulting in ecological improvements to the Gowanus Canal. Therefore, the proposed action is expected to have a positive impact on ecological systems in the area.

POLICY 5: Protect and improve water quality in the New York City coastal area.

The proposed action would protect and improve water quality in the coastal area. Greater control and reduction of CSOs, floatables and sedimentation to the head of the Gowanus Canal would protect and improve water quality. In addition, DO levels in the Gowanus Canal would be maintained as a result of the proposed Gowanus Canal flushing tunnel system upgrades. The proposed action is also part of New York City's LTCP for the protection of water quality City-wide through the reduction of CSO events in the Gowanus Canal.

L. Infrastructure

As described in the Project Description in Appendix A, the proposed action would involve the upgrade of the existing Gowanus wastewater system infrastructure (i.e., pumping station and force main) and flushing tunnel system infrastructure by replacing the old, malfunctioning or deteriorating elements of both systems. The increase in the design capacity of the pumping station from 22 mgd to 30 mgd is required to pump sewage and combined flow to the Red Hook WPCP interceptor at the Columbia and Degraw Streets intersection, and to eliminate existing wastewater flows to the Bond-Lorraine sewer. These wastewater system improvements would result in a reduction of CSOs to the Canal. The proposed action would increase the function, reliability and efficiency of both the Gowanus wastewater pumping and flushing tunnel systems, and result in water quality improvements over the long-term. The proposed action involves an upgrade of the existing Gowanus Facilities and the continuation of existing land uses and

facilities at the Butler Street site. The effects of the proposed action on the City's municipal systems are discussed below.

Stormwater

Stormwater runoff from the Gowanus Facilities at the Butler Street site is discharged directly to the Gowanus Canal via an on-site storm drain system and CSO tide gate chamber.

Stormwater runoff from the Gowanus Facilities at the Butler Street site after the Upgrade is complete would be attenuated by several stormwater best management practices (BMPs) including a green roof and bioretention areas, to reduce the amount of impervious area and runoff from the site, and to treat runoff before discharged to the Gowanus Canal. The proposed green roof on the Gowanus Facilities service building (see Figure 16: Existing Gowanus Facilities and Proposed Post-Upgrade Rendering in Appendix C) would have a footprint of approximately 500 square feet and handle approximately 2% of the runoff from the Gowanus Facilities at the Butler Street site. The size of the green roof system was limited based on the location of mechanical, electrical and other equipment on the roof and slope of available roof space on the service building. Runoff from paved areas and roof drains onsite, totaling approximately 5,671 square feet, would be directed towards the approximately 2,350 square feet bioretention areas, entering through curb cuts or directly from roof leaders. The locations where runoff enters the bioretention area would be protected and treated by vegetated swales or other inlet protection measures. The bioretention areas would receive approximately 30% of the runoff from the Gowanus Facilities at the Butler Street site and would be effective at removing phosphorus, nitrogen, metals and sediment from stormwater runoff.

The percent of stormwater runoff diverted to the green stormwater management practices and other stormwater management methods is given below:

- 35% treated by bioretention, green roof and other landscaped areas;
- 15% enters directly into the CSO tide gate chamber on-site; and
- 50% directed into the existing on-site storm drain system.

Water Supply and Wastewater

On-site connections to the potable water supply and sanitary sewer system currently exist. Increases in usage would not be anticipated because the Gowanus Facilities at the Butler Street site would no longer incorporate crew quarters.

As described above, the upgrade of the existing Gowanus wastewater system infrastructure (i.e., pumping station and force main) would increase the design flow of the system from 22 mgd to 30 mgd and convey sewage and CSOs to the existing 78-inch diameter interceptor located adjacent to the Columbia and Degraw Streets intersection. The proposed action would decrease CSOs in the Gowanus Canal, increase the overall function, reliability and efficiency of the wastewater system, and improve water quality over the long-term. Therefore, the proposed

action is not expected to result in potential significant adverse impacts to infrastructure including stormwater, water supply and wastewater.

M. Solid Waste and Sanitation Services

As described in the Project Description in Appendix A, the proposed action for the Gowanus Facilities at the Butler Street site would involve the installation of a system of influent grinders within the Gowanus wastewater pumping station, a CSO screening system, and a manually cleaned bar screen on the flushing tunnel system, both of which would require periodic collection and disposal off-site.

Flushing Tunnel System Elements

Solids would be prevented from entering the Gowanus Canal flushing tunnel system via the existing intake chamber at the Buttermilk Channel, adjacent to the Port Authority's Pier 9B. The intake chamber is equipped with a stainless steel static bar rack that is designed for the exclusion of debris. The bar rack is 33 feet tall and 24 feet wide, in three removable 8-foot wide sections consisting of two offset rows of 2-inch diameter cylindrical stainless steel bars. A floating boom has been installed around the inlet to prevent flooding debris from clogging the bar rack or being entrained in the Gowanus Canal flushing tunnel system.

The contract documents would require contractor inspection of the exiting Gowanus Canal flushing tunnel intake static bar rack. Currently NYCDEP/BWT provides for one inspection per month and one maintenance bar rack cleaning per year. The existing stop log chamber is cleaned on an as-needed basis (e.g., removal of debris for diver inspection of the Gowanus Canal flushing tunnel system).

The proposed stop log chamber bar screen is designed to simplify debris removal and should not result in greater capture of debris. The total solid waste captured under the new design would be approximately equal to what is currently removed by NYCDEP from the aforementioned structures.

Wastewater Pumping Station Elements

A CSO screening system consisting of horizontal, automatically raked bar screens would control the discharge of solids and floatables to the Gowanus Canal during CSO events. This system would retain floatables within the influent flow to the Gowanus wastewater pumping station and, accordingly, would not require on-site storage of screened materials.

Within the Gowanus wastewater pumping station, the installation of influent grinders would allow for solids contained in the combined sewage flow to be pumped to the Red Hook WPCP, thereby eliminating the need for the existing 6-cubic yard container, which is used to temporarily store screened solids prior to disposal off-site.

Therefore, the proposed action is not expected to result in potential significant adverse impacts to solid waste and sanitation services. Refer to Section S – Construction Impacts for a discussion of

potential impacts to solid waste and sanitation services during the proposed action construction period.

N. Energy

Power is provided to the Gowanus Facilities at the Butler Street site by Con-Edison. Based on available data from previous years, the existing energy use at the Gowanus Facilities at the Butler Street site is approximately 3,500,000 kWh/yr, with a total connected load of approximately 681kW. The proposed action would require a substantial increase in the total equipment connected load with a peak load of approximately 2,350 kW. In order to achieve the desired improvement in water quality in the Canal, the additional power is needed for the proposed increased capacities of both the Flushing Tunnel Pumping System and the Wastewater Pumping Station. A comparison of existing energy use and total future estimated energy use is provided below.

Estimated Existing Energy Use	
Existing Flushing Tunnel Pumping System	1,190,000 kW hr/yr
Existing Wastewater Pumping Station	424,500 kW hr/yr
Existing Equipment: HVAC, Lighting, Misc.	1,885,500 kW hr/yr
Total of Existing Energy Usage	*3,500,000 kW hr/yr*

Estimated Proposed Future Energy Use	
Proposed Flushing Tunnel Pumping System	5,278,000 kW hr/yr
Proposed Wastewater Pumping Station	508,000 kW hr/yr
Proposed Equipment: HVAC, Lighting, misc.	3,423,771 kW hr/yr
Total of Future Energy Usage	*9,209,771 kW hr/yr*

Currently, the existing, single Flushing Tunnel pump system pumps average of 154 mgd through the Flushing Tunnel but at low tide, ceases pumping due to hydraulic conditions. The proposed design provides for three (3) pumps with an average flow of 215 mgd. Unlike the existing pumping system, the proposed system provides back-up pumping capacity and, as a result, will run continuously, will not shut down during required maintenance or low tide, and will provide for improved Canal water quality due to the increased pumping capacity and the uninterrupted flow.

Currently the existing Wastewater Pumping Station discharges approximately 330 feet to the Bond-Lorraine Street sewer. The proposed design, and corresponding increase in energy usage, reduces potential for CSOs and provides for improved Canal water quality due to increased pumping capacity (28 mgd vs. 30 mgd) and relocation of the discharge point to the Columbia Street Interceptor located approximately one mile from the Gowanus Facility, thereby removing the Wastewater Pumping Station flow from the Bond St. sewer.

The existing pumping units in the existing wastewater pumping station were designed to pump to the Bond Street sewer to match the conditions of service for pumping to the Bond Street sewer

after the force main failure in the Tunnel. The existing pumping units were not designed to pump to the Columbia and Degraw Interceptor. Therefore, the conditions of service are different and an increase in energy is required for the proposed equipment to pump the flow the additional 4,590 feet to the Columbia and Degraw Interceptor. Condition of service of pumps is defined as flow rate in gallons per minute (gpm) at total dynamic head (TDH) at the rated point. The rated point is the where the system curve crosses the pump performance curve. For each exiting pump, the conditions of service are 4,875 gpm @ 37' TDH. For each of the proposed pumps, the condition of service is 6,950 gpm @ 53' TDH.

In order to accommodate all equipment proposed as a result of the proposed increased capacity of the Gowanus Facilities, the electrical distribution scheme would involve the installation of Con Edison transformers/network protectors within the service building and the change of the entire electrical system from 208VAC, 3pH, 4W to 480VAC, 3pH, 3W. The utilization of 480VAC for power distribution would allow for substantial installation cost savings based on reduced size of all motor controllers, HVAC equipment, electrical conduits and wires, etc. for the equipment utilized.

In addition, the proposed action includes the installation of an on-site diesel engine driven emergency generator to ensure operation during utility power interruptions. The generator would be exercised regularly (i.e., weekly) by NYCDEP personnel to ensure proper operation. The utilization of selective emergency load distribution (e.g., usage of two speed fans and multistage HVAC units) would minimize total connected load to the emergency generator and future diesel fuel consumption and exhaust emissions.

In order to minimize energy consumption for the proposed action, the use of energy efficient electrical motors on all pumps and related energy dependent equipment, latest available microprocessor controlled heating and cooling equipment, as well as site and perimeter lighting design in compliance with the New York State Energy Conservation Code would be utilized.

While the pumps for the Gowanus Canal flushing tunnel system and the wastewater pumping station would be larger and use more energy, the pumps would have an increased overall pump efficiency of 75% or more. The determination of overall pump efficiency was based on a review of efficient operating conditions for various available pumps and potential hydraulic and mechanical limitations under various single and multiple pump operating conditions. The motors specified will be of special design to achieve the required conditions of service and with an approximate motor efficiency of 90% or more to ensure the most efficient available technology during pump operating conditions. Variable speed drives are specified, in part, to improve (wire to water) efficiency of the pumping units and reduce operating costs compared to constant speed drives. The final selection of the pumping units will be based on manufacturers' ability to meet the specific conditions of service and efficiency requirements described above.

The proposed action would not disrupt or significantly modify existing power distribution or spare capacity, and would incorporate energy efficient electrical motors and pumps. Therefore, the proposed action is not expected to result in potential significant adverse impacts to energy. Refer to Section S – Construction Impacts for a discussion of potential impacts to energy during the proposed action construction period.

O. Traffic and Parking

There are no public parking lots within the 400-foot study area around the Butler Street site. Parking in this area is generally allowed along a number of streets, in some cases, one-way streets on one side of the road. At the Butler Street site, there are paved areas that can accommodate up to 25 authorized vehicles (cars or small trucks).

Post-construction operations at the upgraded Gowanus Facilities are not expected to adversely impact traffic and parking at the Butler Street site or in the vicinity. The existing permanent crew, which occupied the Gowanus wastewater pumping station offices, would be relocated to offices off-site. The upgraded Gowanus Facilities would generally be remotely operated and monitored and would not be permanently staffed on-site, as it is today. Traffic and parking activities associated with the upgraded Gowanus Facilities would be less than existing levels for staff.

In addition, the proposed CSO screening system would be designed to maintain screened solids and floatables within the influent flow to the Gowanus wastewater pumping station for subsequent pumping to the Red Hook WPCP interceptor. As a result, trucks for regular removal and disposal of solids and floatables from the Gowanus Canal CSO structures would not be required. According to the CEQR Technical Manual a detailed traffic and parking analysis is warranted if the proposed action would generate 50 or more peak hour trip ends (a round trip is two trip ends). Since the proposed action would not generate additional new trips, a detailed traffic analysis is not warranted and the proposed action would not create significant adverse traffic or parking impacts. Refer to Section S – Construction Impacts for a discussion of potential impacts to traffic and parking during the proposed action construction period.

P. Transit and Pedestrians

There are no subway stations or bus stops within the 400-foot radius study area of the Gowanus Facilities at the Butler Street site. A bus stop at the intersection of Court Street and Sackett Street is within the 400-foot radius of the Tompkins Place and Degraw Street site. There are two bus stops within the 400-foot radius of Degraw and Columbia Streets site, one at the intersection of Columbia and Sackett Street and the other at the intersection of Degraw Street and Hicks Street. The primary pedestrian activity in the three proposed action study areas is walking along the sidewalks adjacent to the commercial, industrial and residential buildings and facilities along the streets.

The proposed action does not generate pedestrian or transit trips, given that the Gowanus Facilities would not be permanently staffed. Furthermore, the proposed action would not generate operational vehicle or truck traffic that would conflict with pedestrian traffic in the area. Therefore, the proposed action is not expected to result in potential significant adverse impacts to transit or pedestrian traffic, walkways or bike paths, either permanently or during construction.

Q. Air Quality

Odors

Odors typically associated with sewage are both distinctive and complex. Although there could be many odorous compounds associated with the sewage and the decay of organic materials in sediments, hydrogen sulfide (H_2S) is expected to be the most prevalent malodorous gas. Generally H_2S is used as a trace indicator for odors in an odor impact analysis because it has a very unique, unpleasant, and discernable odor character, i.e., rotten egg, and it has one of the lowest detection thresholds of all compounds typically associated with sewage. H_2S is readily and reliably measurable to concentrations as low as 1 ppb. Additionally, it can be monitored by hand-held and/or stationary instruments. Therefore, H_2S was used as the surrogate compound for odor assessment of this study. Accordingly, as part of the environmental assessment for the proposed action, an odor impact analysis of the Gowanus wastewater pumping station was performed. The protocol for the analysis was based, in part, on previous odor impact studies at other existing or proposed NYCDEP wastewater pumping stations and is consistent with the guidance provided in the City Environmental Quality Review (CEQR) Technical Manual.

To perform the analysis, H_2S concentrations were sampled within and around the existing Gowanus wastewater pumping station, including the tide gate chamber, bar screen chamber, and wet well of the pumping station, two upstream manholes on Butler Street, and at the upper portion of the Gowanus Canal. A Jerome H_2S analyzer (Model 631-X), which is capable of measuring H_2S concentrations as low as 1 ppb, was used to perform the sampling.

On the basis of the H_2S sampling results, the maximum emission rates for these sources were developed which would be considered to be representative of the Gowanus wastewater pumping station worst-case odor emissions, and were used to evaluate odor impacts. In addition, the emission rates from each of the three zones of the head of the Gowanus Canal were developed on the basis of the maximum concentrations sampled via isolation flux chambers on the surface of the Canal.

The emission rates calculated from the sampling data were input to a computer model to estimate the potential off-site impacts. AERMOD, which is the air dispersion model developed by USEPA and considered to be the current state-of-the-art, was used to estimate the potential off-site impacts of the identified sources on-site and within the head of the Gowanus Canal. The projected off-site concentrations were compared with the New York State Ambient Air Quality Standard (NYSAAQS) of 10 ppb at the Gowanus Facilities property line, and the CEQR Technical Manual guidance threshold of an incremental 1 ppb at the nearest sensitive receptor.

Receptor data incorporated into the air dispersion model included a radial grid of ground level receptors located out to 2 km from the Gowanus wastewater pumping station, with equally spaced 100-meters rings of receptors. A second grid composed of a radial grid of receptors extended from the Gowanus wastewater pumping station in 10-meter increments out to 90-meters was included, and discrete receptors were located at regular intervals (10 m) along the Gowanus Facilities property line. Additionally, discrete receptors were located within the model

zone to represent sensitive receptors. Both ground level and elevated sensitive receptors were included in the model analysis.

Consistent with USEPA guidance, meteorological data comprising the latest available consecutive 5 years of representative data from John F. Kennedy Airport (2002-2006), which is the closest National Weather Service site, was incorporated into the model analysis.

The maximum H_2S impact predicted at the property boundary from the emissions of the Gowanus wastewater pumping station was 0.23 ppb. However, review of the model results indicated that higher impacts exist beyond the property boundary, with the maximum impact of 0.32 ppb at a distance of approximately 60 meters from the Gowanus wastewater pumping station exhaust. The maximum H_2S concentration predicted at a sensitive receptor (a three-story apartment building northeast of the Gowanus Facilities site across Butler Street) from the Gowanus wastewater pumping station was 0.29 ppb, well below the CEQR Technical Manual 1 ppb H_2S guidance value.

Improvements at and adjacent to the tide gate chamber would include the replacement of the tide gates and the installation of a CSO screening system. Accordingly, impacts from the tide gate chamber were considered as part of the odor impact assessment. The maximum H_2S impact predicted at the property boundary from the emissions from the tide gate chamber was 4.62 ppb. The maximum off-site H_2S impact predicted is 4.44 ppb, just off the southwest corner of the Gowanus Facilities property. The maximum H_2S impact predicated at a sensitive receptor resulting from the tide gate chamber is 0.24 ppb, well below the CEQR Technical Manual 1 ppb H_2S guidance value.

When the maximum impacts from the on-site odor sources (i.e., wastewater pumping station and tide gate chamber) are summed together, the air dispersion model predicts compliance with the 10 ppb standard at or beyond the property boundary and the 1 ppb threshold at sensitive receptors. Summing the maximum impact from each source together yields a conservative, worst-case, estimate of the combined impacts. Based upon the modeling, the maximum predicted concentration at the property line due to the combined impact from the Gowanus wastewater pumping station and tide gate chamber is less than 4.85 ppb and the maximum predicted concentration at a sensitive receptor is less than 0.53 ppb. The results show that the maximum 1-hour average H_2S levels from the proposed action would be lower than the NYSAAQS of 10 ppb and the levels at the closest sensitive receptors would be lower than the incremental CEQR threshold of 1 ppb.

The Gowanus Canal emits considerably higher concentrations. The maximum predicted impact from the Gowanus Canal is 33.25 ppb at a location 50 meters from the wastewater pumping station. The maximum predicted concentration at a sensitive receptor due to the Gowanus Canal is 1.55 ppb, which is at the same sensitive receptor location identified for the wastewater pumping station. The proposed action, however, involves the upgrade and modernization of the Gowanus Canal flushing tunnel system and the installation of a CSO screening system, both of which would result in an improvement of the water quality in the Gowanus Canal and, accordingly, a reduction in the odor generation potential of the Canal. Based upon the above, the proposed action is not expected to result in potential significant adverse impacts to odors.

Air Quality

As discussed above in the Energy section, an on-site emergency generator would be installed for use during utility power interruptions. Future diesel fuel consumption, exhaust emissions and greenhouse gas emissions would be minimized through the utilization of selective emergency load distribution. The proposed upgraded Gowanus wastewater pumping station and flushing tunnel system pumps, although larger and use more energy, would have increased overall efficiency. The motors specified would be the most efficient available to meet the conditions of service to avoid hydraulic and mechanical limitations at various pump operating conditions.

An analysis was undertaken to address the generation of fine particulate matter ($PM_{2.5}$) during the construction of the proposed action, as well as after construction is complete. Other emissions associated with diesel combustion (i.e., carbon monoxide, oxides of nitrogen, etc.) were considered negligible since the generators will only be operated on an intermittent basis during routine maintenance and testing. The following potential particulate matter emission sources were evaluated:

- Permanent emergency generator, which would be utilized to provide backup emergency power to the Gowanus Facilities after construction is complete.
- Interim emergency generator, which would be utilized to provide backup emergency power to the Gowanus Facilities during construction.
- Diesel powered vehicles utilized during construction.
- Fugitive particulate emissions (i.e., dust) generated during general construction and demolition operations.

Fine particulate matter impacts from the permanent emergency generator are discussed in this section. Predicted impacts from sources during construction are addressed in Section S – Construction Impacts.

The only significant $PM_{2.5}$ source at the permanent Gowanus Facilities would include the previously mentioned permanent emergency generator. In order to determine the potential off-site $PM_{2.5}$ impact from the permanent emergency generator, computer modeling was undertaken. The model, methodology and selected inputs to the model were selected in conformance with the NYCDEP's Interim Guidance for $PM_{2.5}$ Analyses. The modeling was aimed at determining the potential for $PM_{2.5}$ emissions to exceed the following threshold criteria:

- NYCDEP 24-hr Criterion of 2 ug/m^3
- NYCDEP Annual Criterion of 0.3 ug/m^3
- NYCDEP Annual Neighborhood-Scale Incremental Threshold of 0.1 ug/m^3

The emission rate for the permanent emergency generator was estimated based upon Chapter 3.4 (Large Stationary Diesel and All Stationary Dual Fuel Engines) of the USEPA's AP-42

document for estimating emission factors. The contract specifications for the engine generator would require that the permanent emergency generator must be factory-certified to comply with the USEPA standards in effect at the time of field installation.

The permanent emergency generator would be used strictly for backup emergency power after construction is complete, and would not be used for peak demand shaving. As a result, operation of the generator under normal conditions would consist of a 20–30 minute test, once per week and an annual test during scheduled maintenance. Since the date of the annual test cannot be determined at this time, it was conservatively assumed that the weekly test would consist of a 1–hour test instead of a 20–30 minute test. This adds approximately 26 additional hours to the annual run-time, which is sufficient to account for any testing during annual maintenance. This operating scenario was utilized for all model runs.

Dispersion modeling was performed using the USEPA AERMOD Version 07026 computer model. Key inputs into the model included the location of the emergency generator, buildings, property line information and sensitive receptors. In addition, 5-years of meteorological data from John F. Kennedy Airport (2002-2006) and terrain data (i.e., ground elevation) were entered into the model. The receptor grid was based upon NYCDEP's Interim Guidance for $PM_{2.5}$ Analyses, and consisted of a 1 km by 1 km Cartesian receptor grid with receptors spaced every 25 meters.

Based upon the results of the modeling, the maximum predicted $PM_{2.5}$ impacts from the permanent emergency generator are predicted to be below the applicable NYCDEP criteria. The maximum predicted off-site 24-hr impact is 0.68 ug/m^3, which is below the NYCDEP 24-hr Criterion of 2 ug/m^3. The maximum off-site annual impact is 0.015 ug/m^3, which is below the NYCDEP Annual Criterion of 0.3 ug/m^3. In addition, since the maximum annual impact is predicted to be less than the 0.1 ug/m^3 NYCDEP Annual Neighborhood-Scale Incremental Threshold, the neighborhood scale analysis was not required.

As a result of the above, the permanent emergency generator is not expected to result in potential significant adverse $PM_{2.5}$ impacts, as defined by the NYCDEP interim guidance. Refer to Section S – Construction Impacts for a discussion of potential impacts to air quality during the proposed action construction period.

R. Noise

In order to assess potential noise impacts from the operations of the upgraded Gowanus Facilities and during the construction period of the proposed action, a detailed Noise Impact Assessment was undertaken. The major findings and conclusions of the operational noise impact assessment are summarized below. Refer to Section S – Construction Impacts for the major findings and conclusions of the construction noise impact assessment.

Much of the operation of the Gowanus Facilities (Location N3 in Figure 22: Aerial Location Map of Noise Monitoring Locations in Appendix C) resulting from the proposed action would take place deep underground in plenums and chambers and isolated in buildings behind heavy doors or shaft covers, and therefore would have no effect on community noise levels. However,

the potential for noise impact due to HVAC operation was assessed due to the roof-mounted HVAC units at the Gowanus Facilities service building.

A 24-hour continuous ambient noise monitoring program was conducted on the south side of Butler Street, between Bond and Nevins Streets, immediately west of the Gowanus Facilities at the Butler Street site from Wednesday, May 24 to Thursday, May 25, 2006. Traffic on Butler Street was the dominant noise source.

Table B-2 below presents the measured noise levels in terms of Day-Night Sound Levels (L_{dn}), Daytime Sound Levels (L_d or L_{eq} from 7 – 10), and the Nighttime Sound Levels (L_n) measured along with the Percentile Levels, L_{eq}, and L_{max}.

Table B-2
EXISTING 24-HOUR NOISE LEVELS (dBA)

Butler Street Site (N3)							
Time Period	**L_{dn}**	**L_{eq}**	**L_1**	**L_{10}**	**L_{50}**	**L_{90}**	**L_{max}**
7 AM – 10 PM	68	67 (L_d)	74	69	60	53	101
10 PM – 7 AM		60 (L_n)	70	62	56	49	95

Under Local Law 113, noise levels from the aggregated circulation devices (i.e., air handling devises) are not to exceed 45 dBA as measured 3 feet within the open window or terrace door of the receiving dwelling unit. For purposes of the analysis, an outdoor-to-indoor open-window noise attenuation of 10 dBA was assumed (NYSDOT EPM).

The project includes noise reducing enclosures of 10 dBA for unit EF-7305 and and 12 dBA for unit EF-7306. Tables B-3 and B-4 below show the noise levels at the nearest receptors to the north and the west with attenuation and appropriate noise enclosures (see Figure 25: Noise Monitoring Location N3 – Gowanus Facilities and Butler Street Work Site in Appendix C for the location of the two nearest sensitive noise receptors).

Table B-3
NOISE LEVEL AT NORTH RECEPTOR WITH ATTENUATION

Equipment	Distance to Receptor (ft)	Reference Noise Level (dBA at 50-ft)	Noise Level at Receptor (dBA)
HV-7301	105	56	50
HV-7302	140	56	47
EF-7303	85	47	43
EF-7305*	90	47	32
EF-7306**	110	49	30
EF-7308	140	50	41
Receptor Noise Level Outside (dBA)			53
Noise Level at Receptor with Attenuation (NYSDOT EPM)			43

*Equipment with noise enclosures resulting in 10 dBA reduction.
** Equipment with noise enclosures resulting in 12 dBA reduction.

Table B-4
NOISE LEVEL AT WEST RECEPTOR WITH ATTENUATION

Equipment	Distance to Receptor (ft)	Reference Noise Level (dBA at 50-ft)	Noise Level at Receptor (dBA)
HV-7301	90	56	51
HV-7302	120	56	48
EF-7303	90	47	42
EF-7305*	15	47	48
EF-7306**	15	49	48
EF-7308	120	50	43
Receptor Noise Level Outside (dBA)			55
Noise Level at Receptor with Attenuation (NYSDOT EPM)			45

*Equipment with noise enclosures resulting in 10 dBA reduction.
** Equipment with noise enclosures resulting in 12 dBA reduction.

With an outdoor-to-indoor open-window noise attenuation of 10 dBA and noise enclosures, estimated interior noise levels at the closest North and West Receptors are corresponding 43 dBA and 45 dBA, below the 45 dBA limit of Local Law 113.

Table B-5 below presents the expected outdoor noise levels at the north and west receptors from the roof-mounted HVAC units with 10 dBA noise reducing enclosures as compared to CEQR impact thresholds.

Table B-5
ROOF-MOUNTED HVAC LEVELS WITH ATTENUATION AT MONITORING LOCATIONS

Receptor	HVAC Noise Level (dBA)	Nighttime Ambient Noise Level (L_n) (dBA)	Post Installation Noise Level (dBA)	Increase in Noise Level (dBA)	Exceeding CEQR Impact Significance Threshold
North	43	60	60	0	NO
West	45	60	60	0	NO

Thus, with the attenuating enclosures that are included as part of the proposed action, the HVAC equipment located on the roof of the Gowanus Facilities service building can be expected to increase nighttime ambient noise levels by 1 dBA or less at the nearest noise-sensitive receptors, well below the significance threshold of 3 dBA increase specified in CEQR Technical Manual and will have no impact on the community. Enclosures available from either the equipment manufacturers or enclosure manufacturers will be installed for EF-7305 and EF-7306 as part of the proposed action. Therefore, the proposed action is not expected to result in potential significant adverse impacts to noise. Refer to Section S – Construction Impacts for a discussion of potential impacts to noise during the proposed action construction period.

S. Construction Impacts

The overall construction of the proposed action would take approximately 4 years. The entire duration of construction for the proposed action is expected to start approximately in July 2009 and end in March 2013. The actual proposed construction activity would be fairly regular at the Butler Street site and intermittent at the other two construction sites. The construction schedule, a detailed project schedule and construction phases for the proposed action are provided in Appendix D.

Butler Street Site

The construction of the proposed action at the Butler Street site would take approximately 4 years a and will include the elements described below.

Flushing Tunnel System Elements

Construction of the Gowanus Canal flushing tunnel system elements on-site would include improvements to the flushing system located within the existing flushing tunnel building and portion of the flushing tunnel, which would last approximately 2 years and 2 months. The estimated dimensions of the proposed excavations affecting the Gowanus Canal flushing tunnel system building and courtyard would be 97' x 20' x 32'. The proposed 26 month construction of the Gowanus Canal flushing system shall proceed after the interim canal centralized oxygen transfer system (OTS) is installed, tested, and operational (approximately 9 months).

Construction of the Gowanus Canal flushing tunnel system related elements would include:

- Isolation and dewatering of the Gowanus Canal flushing tunnel, including removal of debris, cleaning and repair of the interior, as required.

Construction in the Gowanus Canal flushing tunnel system building would include:

- Interim electrical systems;
- Demolition within the Gowanus Canal flushing tunnel system building;
- Installation of foundation support system, jet grouting, dewatering, and excavation;
- Construction of a 12-foot wide reinforced tunnel section extending from the court yard through the Gowanus Canal flushing tunnel building comprising of intake and discharge chambers for the upgraded flushing tunnel pumping system;
- Installation of three submersible vertical, variable speed propeller pumps, upgrade of the hoist system, corrosion protection system and related mechanical equipment;
- Construction of electrical, HVAC and plumbing system; and

- Restoration of the interior and exterior of the Gowanus Canal flushing tunnel system building, including construction of the control room, toilet areas, and coating systems.

Wastewater Pumping Station Elements

Construction of the permanent Gowanus wastewater pumping station would take approximately 1 year and 8 months and include the following:

- Jet grouting, piles, dewatering, and excavation;
- Demolition of the existing Gowanus wastewater pumping station building and partial demolition of the foundation;
- Construction of the Gowanus wastewater pumping station building foundation and foundation support;
- Reinforced concrete construction of the Gowanus wastewater pumping station building sub-structure;
- Construction of brick and block Gowanus wastewater pumping station building;
- Replacement of the fuel tanks with associated 20' x 20' x 10' deep excavation;
- Installation of four major variable speed wastewater pumping units, grinders, new valves and piping, portion of force main piping, sluice gates, cranes and hoists, and related mechanical equipment; and
- Installation of electrical, HVAC and plumbing system.

Interim Wastewater Pumping System and Force Main

The 9-month construction of the interim Gowanus wastewater pumping system and force main would be required prior to initiating construction work for the permanent Gowanus wastewater pumping station (approximately 1 year and 8 months). Modifications to the existing active wastewater force main in Butler Street would be required to accommodate the interim Gowanus wastewater pumping system. The existing force main piping is deteriorated and must be replaced, The portion of the force main to be replaced is the portion of the force main that was not replaced after the 2007 force main break. Additional piping is also required for both the interim and permanent pumping station. The estimated dimensions of the proposed excavation associated with the installation of approximately 200 linear feet of the wastewater force main piping on Butler Street would be 8’ wide and 7’ deep.

Interim Canal Centralized Oxygen Transfer System (OTS)

The 5.5-month construction of the interim canal centralized OTS previously described in Appendix A would be required before the Gowanus Canal flushing tunnel system shutdown is

initiated. Demolition for the interim canal centralized OTS would consist of the small area, approximately 45 by 15 feet, located in the Douglass Street right-of-way along the Gowanus Canal. This includes the removal of bench, planters, shrubs and other related existing elements required to stage the pumps and oxygenation cone portions of the interim canal centralized OTS unit. The OTS will be in place and operational for approximately 26 months during the upgrade of the flushing tunnel system. The City of New York Department of Parks and Recreation (NYCDPR) has agreed to a design plan for the restoration of this area after the upgrade of the flushing tunnel system is completed and the OTS unit is removed. Construction of the interim canal centralized OTS would include:

- Two self-priming pumps;
- Intake systems consisting of an intake manifold and inlet piping incorporating duplex strainers;
- A 20-foot tall stainless steel oxygenation cone with a base diameter of 10 feet;
- Oxygen generating system, including an air compressor, air dryer, feed air receiver tank, pressure swing absorption oxygen generator and oxygen receiver tank; and
- Discharge piping consisting of approximately 2,500 linear feet of 24-inch diameter high density polyethylene (HDPE) distribution piping, including associated pendant anchors, anchor cables and marker buoys, as well as a series of discharge nozzles spaced approximately 50 feet on-center.

Reconstruction of the Gowanus Facilities Service Building

Reconstruction and commissioning of the Gowanus Facilities service building would take approximately 1 year and 8 months and include the following:

- Demolition of the existing superstructure and portions of the existing foundation;
- Construction of new reinforced concrete superstructure with brick, stone, and stainless steel façade and architectural elements;
- Installation of permanent Con Edison service and equipment including transformers and network protectors;
- Start-up, testing and commissioning of new Con Edison equipment;
- Green roof to be constructed on the roof of the Gowanus Facilities service building; and
- Installation of HVAC and plumbing system.

CSO Screening System and Tide Gate Chamber

The 13-month construction of the CSO screening systems would include the upgrade of the existing tide gate chamber including the installation of a CSO screening system, bending weirs, tide gates and reinforced concrete flow diversion chamber equipped with a flushing system. The estimated dimensions of the proposed excavation associated with the CSO flow diversion chamber would be 55' x 20' x 20' deep.

Ancillary Butler Street Site Improvements

Overall site improvements at the Butler Street site would be constructed during an 8-month period and include the following:

- Construction of reinforced concrete brick and wrought iron site wall and gate along Butler Street;
- New wrought iron gate along Douglass Street and restoration of fencing;
- Restoration of granite tiled perimeter wall;
- Removal and replacement of pavers;
- Restoration of and new site drainage;
- Landscaping with stormwater bioretention cells;
- Restoration and replacement of existing concrete curbs, sidewalks, and pavement; and
- Installation of improved Butler Street wall and site lighting.

<u>Degraw and Columbia Streets Site</u>

The construction of the proposed action at the Degraw and Columbia Streets site would take approximately 2 years and 4 months.

Construction of the Gowanus Canal flushing tunnel system exit chamber would include:

- Implement approved maintenance and protection of pedestrian and traffic plans for Degraw Street, east of the intersection of Degraw and Columbia;
- Excavation of a 30' x 25' x 35' deep pit;
- Construct sheeted excavation/dewater; and
- Construct Gowanus Canal flushing tunnel system exit chamber.

Construction at the northwest corner of Degraw and Columbia Streets site would include:

- Excavation of a 350' x 8' x 12' deep pit;
- Construct sheeted excavation and dewater;
- Microtunnel for the 33" diameter force main pipe to the tunnel exit chamber excavation; and
- Install force main pipe.

Construction of the Gowanus wastewater pumping system cleanout chamber would include:

- Excavation of a 50' x 20' x 35' deep pit;
- Remove microtunnelling equipment from the sheeted cleanout chamber excavation; and
- Construct cleanout chamber.

Construction of the Gowanus Canal flushing tunnel system related elements would include:

- Rehabilitate existing stop log chamber after realigning the existing regulator discharge sewer;
- Install new intake screen within the existing stop log chamber; and
- Inspect and repair, as required, the existing Buttermilk Channel intake screen.

Tompkins Place and Degraw Street Site

The construction of the proposed action at the Tompkins Place and Degraw Street site would take approximately 2 years and 2 months. Construction at the Tompkins Place and Degraw Street site would include:

- Implement approved maintenance and protection of pedestrian and traffic plans for the intersection of Tompkins Place and Degraw Street;
- Excavate 10' x 10' x 5' deep around the top of the existing manhole and maintain excavation while constructing the force main work and repairing the Gowanus Canal flushing tunnel; and
- Restore manhole and intersection after completing the Gowanus Canal flushing tunnel system work.

Construction of the dissipation chamber/existing interceptor manhole would include:

- Construct 33” diameter force main (open cut);
- Construct sheeted excavation and dewater;
- Construct dissipation chamber;
- Install 42” diameter RCP sewer pipe; and
- Construct alteration for the existing interceptor manhole.

Land Use, Neighborhood Character, Zoning and Public Policy

The construction of the proposed action at the Butler Street site would be completed utilizing measures and practices that are compatible with surrounding land uses and zoning districts and current public policy and are not expected to result in potential significant adverse impacts related to air, odors, noise, traffic or hazardous materials. Therefore, the construction work associated with the proposed action is not expected to result in potential significant adverse impacts to land use, neighborhood character, zoning and public policy.

Natural Resources

During the construction period of the proposed action, the Gowanus Canal flushing tunnel system at the Butler Street site would be temporarily deactivated. Due to historical degradation of water quality within the Gowanus Canal during the 30-year deactivation of the Gowanus Canal flushing tunnel system from the late 1960’s to the late 1990’s, the natural resources of concern are the potential disturbance to the water quality and aquatic ecology of the Gowanus Canal during the proposed flushing tunnel system shutdown. However, the interim canal centralized OTS would be installed and operational in order to maintain DO within the Gowanus Canal at levels high enough to both sustain aquatic life and minimize the generation and release of odors during the upgrade of the Gowanus Canal flushing tunnel system.

The interim canal centralized OTS would be constructed prior to the shutdown of the Gowanus Canal flushing tunnel system and operational during the proposed flushing tunnel system shutdown to maintain water quality and minimize odor potential from the Gowanus Canal. Without the OTS, the temporary impacts during tunnel shutdown could include reduced DO levels and increased sulfide, affecting the aquatic ecology of the Canal and possibly producing nuisance odors and aesthetics during hot and humid weather conditions.

While operating, the proposed interim canal centralized OTS is designed to intake water from the Gowanus Canal at a rate of approximately 6,750 gpm and an intake velocity of less than 1 foot per second (fps). The water drawn from the Gowanus Canal would be mixed with pure oxygen, which would be generated within the interim canal centralized OTS. The highly oxygenated discharge flow from the interim canal centralized OTS, having a DO concentration of 30 to 60 mg/l, would be transported down the Gowanus Canal for approximately 2,500-linear feet and discharged to mix with the Canal water at 50-foot intervals.

The proposed interim canal centralized OTS would be designed to provide oxygen to the Gowanus Canal at a rate based on the measured oxygen depletion rate, which was observed in the Canal during May of 2002 following the shutdown of the flushing tunnel system, after adjusting for summer temperatures and including a 50% safety factor, resulting in an estimated oxygen supply requirement of 3,250 lbs/day. This loading was based on meeting the New York State Class SD Criterion of 3 mg/l in the Gowanus Canal. However, 3 mg/l may not be maintained at all times and locations. Wet weather events resulting in CSO discharges to the Gowanus Canal would impact the minimum DO levels in the Gowanus Canal.

Water Quality

In order to estimate the immediate potential water quality conditions in the Canal during deactivation of the Gowanus Canal flushing tunnel system, a special field-sampling program was undertaken. The opportunity to conduct the sampling while the Gowanus Canal flushing tunnel system was deactivated occurred in May 2002 during repair and maintenance of the flushing tunnel system pump. The Gowanus Canal flushing tunnel system was deactivated on May 7, 2002 to conduct the repairs, and it remained shut down for 16 days until May 23, 2002. The sampling program was undertaken immediately before, during, and immediately after this interval. Water quality parameters that were tested included: pH, conductivity, turbidity, DO, temperature, salinity, total dissolved solids, sulfides, and fecal coliform. In addition, ambient air quality was monitored with a hydrogen sulfide meter.

With the exception of water temperature, all water quality parameters appeared to be impacted to one degree or another by the deactivation of the Gowanus Canal flushing tunnel system. Fluctuations in pH, temperature, conductivity, total dissolved solids and salinity were not significant or as precipitous as fluctuations in DO, sulfides, turbidity (water) and hydrogen sulfide H_2S (air). Turbidity actually dropped from a 20.5 NTU on the day before deactivation of the Gowanus Canal flushing tunnel system to 6.8 NTU after deactivation. This was expected under shutdown conditions as there is no discharge to stir up the sediment in the bottom of the Gowanus Canal, to bring in sediment from Buttermilk Channel, or from the flushing tunnel itself.

DO levels dropped sharply and quickly after the Gowanus Canal flushing tunnel system deactivation. The day before deactivation, DO at all four sampling locations measured between 6.0 and 7.0 (the NYSDEC standard for DO for Class SD Waters is 3.0 mg/l). By May 9th and 10th, DO levels fell to zero or slightly above at most sampling locations. DO rose to pre-deactivation levels at the head of the Gowanus Canal and the Union Street Bridge on May 13th, possibly due to heavy rain. However, levels again dropped to near zero on the 17th, 20th, and 22nd. Once the Gowanus Canal flushing tunnel system was reactivated on May 23, DO levels rose sharply to the highest levels (8.1 to 9.4 mg/l) seen during the entire sampling program.

The laboratory results showed that sulfides were “undetected” in the water at all sample locations the day before, and the three days after the Gowanus Canal flushing tunnel system deactivation, with the exception of 5.2 mg/l concentration detected at the head of the Canal on May 10, 2002, two days after the flushing tunnel system deactivation. As sampling continued after the

Gowanus Canal flushing tunnel system was deactivated, sulfides were detected at most of the sampling locations. Sulfides were not detected in any of the samples taken after the Gowanus Canal flushing tunnel system was reactivated.

Overall, the sampling results showed that peak H_2S concentration generally corresponded to peak sulfide levels in the water samples. For example, the highest average H_2S concentration in the air occurred on the same day (May 22nd) and at the same location (head of the Gowanus Canal) as the highest concentration of sulfides in the water. It should be noted that May 22nd was the last full day the Gowanus Canal flushing tunnel system remained shut down. Results of the water quality measurements were included in the report, Water/Air Quality Sampling at Gowanus Canal During May 2002 Temporary Deactivation of Flushing Tunnel, (June 2002).

The water quality data developed as part of the former Use and Standards Attainment (USA) study (1999), conducted before consideration of an interim pumping system or OTS, indicated that: 1) water quality in the Gowanus Canal during the construction period or flushing tunnel system deactivation would not be expected to deteriorate beyond levels observed during the 30-year period the Gowanus Canal flushing tunnel system was inoperative; and 2) water quality in the Gowanus Canal would be expected to improve significantly after the proposed action because of increased flushing and reduced CSOs.

Aquatic Resources

Potential Impacts of Reduced Dissolved Oxygen Levels

The principal water quality parameter affecting fish ecology is DO. Significant changes in other water quality parameters (i.e., temperature, conductivity, salinity, total dissolved solids and pH) are not expected to be adversely impacted by the proposed action. During the shutdown of the Gowanus Canal flushing tunnel system that would be required during the construction period, DO levels would be expected to decrease and affect the aquatic ecology of the Gowanus Canal without an interim system in place. Most fish species show signs of stress at DO levels between 2-4 mg/l and mortality occurs if levels are less than 2 mg/l for more than a few hours. The size of fish kills during oxygen depletion is influenced by the duration and magnitude of the event and by the behavioral response of the fish. In addition, sensitivity to low levels of DO has been shown to be species specific. Generally larger fish are more sensitive to low DO levels than smaller fish are.

Reduced DO levels may cause physiological and behavioral adjustments of fish species. The consequences of low DO levels depend on a species' ability to sense and avoid areas with low DO levels. Avoidance and escape mechanisms may be adequate for short-term exposure to low DO levels for mobile aerobic species. However, as the duration and magnitude of a low DO level event increases, fish exert more energy to absorb oxygen and can become more vulnerable to predation. DO levels have also been shown to directly influence other water quality parameters such as sulfides and other aspects of fish ecology such as mate choice and growth rates.

Potential Impacts of Elevated Dissolved Oxygen Levels

Elevated levels of DO in the Gowanus Canal from the operation of the interim canal centralized OTS could result in the potential for gas bubble trauma (GBT) to the aquatic animals within the affected portions of the Canal. GBT is a condition that occurs when gas bubbles form within the bloodstream or tissues an aquatic animal as a result of gas supersaturation within the water. Gas supersaturation in the water occurs when the total dissolved gas pressure is greater than the combined counteractive pressures, such as atmospheric and hydrostatic. Bubbles form within the bloodstream and tissues of organisms and impede blood flow, cause swelling and possibly death.

Lindroth (1957) stated that GBT can occur in dam spillways as a result of gas supersaturation caused by the water entraining surrounding air. Carlson (2005) adds that this is a major concern in the Columbia River System, where GBT is prevalent, and has been since the 1960s. Bouck et al. (1975) concedes that gas pressure above 115% cumulative gas saturation is deadly to many types of salmon. As part of a study on the Columbia River and its tributaries, it has been suggested that long term exposure to levels of 115% gas supersaturation has an effect on migrating fish (Maule et al., 1995). It is important to emphasize that these levels were established regarding supersaturation via the introduction of air, and not through the introduction of oxygen alone. Nitrogen could be the most important factor in the development of GBT, similar to the "bends" that can occur in divers.

Carlson (2005) notes that total gas pressure is not the sole contributor to GBT and measuring oxygen levels alone will not anticipate GBT. It has been observed that two waters containing the same total gas pressure do not yield similar cases of GBT. In fact, the water with more oxygen had less of an effect on fish (Carlson, 2005). This is due to metabolic factors; oxygen is being consumed through cellular respiration whereas nitrogen is not. The United States Environmental Protection Agency (EPA, 1986) maintains that oxygen is not as crucial in the formation of GBT. EPA recommends that the total gas pressure should be no more than 110% of the combined atmospheric and hydrostatic pressures. Again, this research is based on air, and not pure oxygen, being introduced into the water.

Colt et al. (1991) established safe oxygen concentration levels for hatchery reared fish, elaborating that surpassing 110% saturation would not likely harm aquatic life. This is due to the introduction of pure oxygen into the water in lieu of air. For cold water (i.e., 12°C) and warm water (i.e., 25°C) environments, the safe upper limit is 21 mg/l and 16 mg/l, respectively. These levels were for striped bass in cold water and channel catfish in warm water, and relate to chronic exposure. Because of the high density of fish in a hatchery, these levels are probably conservative.

It should be noted, also, that high levels of dissolved oxygen occur in nature. During warm weather, spikes in algal blooms will increase the dissolved oxygen in the water. Coupled with the warming of the water, supersaturation of oxygen occurs (EPA, 1986). Fish can adjust to these increases by avoiding areas of supersaturation by traveling

horizontally out of the affected area or diving deeper thus compensating for the increase of gas pressures. Also, in the case of oxygenation, spikes in the concentration of oxygen will occur at the point of administration and level off. So, fish would only be temporarily, if at all, subjected to these increased gas pressures.

The literature seems to be inconclusive regarding the contribution of oxygen supersaturation to GBT. In order to monitor the water quality in the Gowanus Canal during the operation of the interim canal centralized OTS, a field sampling and analysis plan has been prepared. At full capacity (discharge DO concentration of 40 mg/l), the interim canal centralized OTS would rapidly mix DO into the ambient water and is predicted to yield a laterally averaged peak oxygen level around 24 mg/l, and a 750-ft long region of the Gowanus Canal (from 1,300 to 2,000 ft from the head) where peak oxygen concentrations are slightly higher than the aforementioned 21 mg/l upper limit. As discussed previously, the interim canal centralized OTS can be run below full capacity, with discharged DO concentrations as low as 16 mg/l before mixing with the Gowanus Canal water. While operating the proposed interim canal centralized OTS, DO level is expected to be maintained between 1 mg/l and 3 mg/l in the Gowanus Canal. This effluent DO concentration is well within the safe upper oxygen limit, as established by Colt et al. (1991), while still providing adequate DO levels in other areas of the Gowanus Canal.

Potential Impacts of Entrainment and Impingement

According to the biological survey of the Gowanus Canal in 2003-2004 discussed above in Section I – Natural Resources, the Canal is used by multiple trophic levels of organisms that are common in the New York/New Jersey Harbor, which would be susceptible to entrainment/impingement from the proposed interim canal centralized OTS.

The intake structure will be designed with juvenile and adult fish protection systems to reduce the risk of impingement. The most common fish protection technique is velocity control such that the maximum horizontal velocity at the intake structure is less than the escape velocity of weaker fish species, typically 1 fps. According to "Design of Water Intake Structures – for Fish Protection" by the American Society of Civil Engineers' Task Committee of Fish-Handling Capability of Intake Structures, studies show that fish tend to avoid water moving with an average horizontal velocity of 1 fps. This has led to the use of velocity caps at this level or below to reduce fish entrainment.

Therefore, the intake manifold of the proposed interim canal centralized OTS has been designed to limit the intake velocities to less that 1 fps to prevent juvenile and adult fish impingement. In addition, the OTS intake pipe will be located behind (upstream) of the proposed 1" mesh, fish net that will extend across the width of the flushing tunnel discharge opening at the Gowanus Canal.

Entrainment of planktonic organisms, including the early life stages of fish species, and small invertebrates would occur because these organisms would not be able to escape the

intake velocity of the interim canal centralized OTS. Most of these organisms cannot sustain a directed swimming motion and are usually entrained by the movement of water. According to the biological survey of the Gowanus Canal in 1999 after the reactivation of the flushing tunnel system discussed above in Section I – Natural Resources, the maximum density of nekton/plankton observed at the head of the Gowanus Canal was 0.067 individuals/gallon. Given the 6,750 gpm intake rate of the interim canal centralized OTS, a conservative estimate of the number of nekton/plankton that would be entrained in the system is approximately 650,000 individuals per day.

However, the number of nekton/plankton available for entrainment is likely to be much lower. This is because most of these organisms are brought into the head of the Gowanus Canal via the flushing tunnel, which would not be active during the Gowanus Facilities Upgrade project construction period. Since there is little evidence of spawning in the Gowanus Canal itself, any nekton/plankton that are present would be transported to the head end via tidal processes from Gowanus Bay and New York Harbor. As a result, any mortality that would occur due to entrainment within the interim canal centralized OTS would not affect the overall aquatic communities of the Gowanus Bay, New York/New Jersey Harbor and Mid Atlantic regions because the individuals in the Gowanus Canal do not likely contribute to these populations.

The intake of the interim canal centralized OTS would have a localized impact on a small portion of the biota in the Gowanus Canal. However, as a result of the interim canal centralized OTS, DO levels would be maintained allowing the population of aquatic life to survive within the entire Gowanus Canal. Thus, the overall impact to the rest of the Gowanus Canal and associated biota would be beneficial due to the maintenance of DO levels when the interim canal centralized OTS is operational throughout the proposed upgrade period when the Gowanus Canal flushing tunnel system is shut down.

The NYCDEP has presented the design of the proposed OTS system to the New York State Department of Environmental Conservation (NYSDEC). The NYSDEC has concurred that the OTS system would be an acceptable approach to maintaining DO levels in the Gowanus Canal during the construction period for the upgrade. Construction of the OTS system would have to be done in accordance with required permits from the NYSDEC and the U.S. Army Corps of Engineers. A Joint Application for Permit has been submitted to these agencies for review and approval.

Furthermore, based on the above mentioned NYCDEP monitoring of the Gowanus Canal after the 1999 reactivation of the Gowanus Canal flushing tunnel system and the water quality study during the May 2002 temporary deactivation of the system, the water quality and ecological conditions in the Canal can be expected to improve quickly and significantly after activation of the upgraded flushing tunnel system. Post-reactivation monitoring by DEP indicated that the number of benthic macroinvertebrates increased after reactivation.

The long-term enhanced performance and reliability of the proposed action elements are expected to improve water quality and other ecological conditions for benthic and other organisms in the Gowanus Canal. Monitoring of the oxygen rate and DO concentration in the

Gowanus Canal and of the intake rate and velocity to minimize entrainment and impingement impacts on the juvenile and adult fish populations will be conducted as part of the proposed action. Therefore, the operation of the proposed interim canal centralized OTS during the construction period is not expected to result in potential significant adverse impacts to natural resources within the Gowanus Canal. In addition, there are no natural resources of concern at the Degraw and Columbia Streets site and the Tompkins Place and Degraw Street site. Therefore, the proposed action is not expected to result in potential significant adverse impacts on natural resources during construction at all three sites.

Solid Waste and Sanitation Services

During construction, there could be solid waste generated from construction-related debris, excavation and workers. Each construction site would be equipped with appropriate collection receptacles (dumpsters, etc.) and removed/emptied daily, or other appropriate schedule. The overall construction and excavation of soils for the proposed action would take place at the Gowanus Facilities at the Butler Street site and off-site excavation work at the Degraw and Columbia Streets site and the Tompkins Place and Degraw Street site. The volume of soil excavated would not necessarily be equal to the overall volume of the excavation because soil would not necessarily be encountered throughout the excavation. Some of the volume, in some cases most of the volume, would consist of concrete, asphalt or even empty spaces (i.e., voids in chambers, vaults, conduits, etc.). Solid waste would not be stored for extended periods at the site and would be disposed of according to all applicable federal, state and local regulations.

Trash removal would be performed on a weekly basis or more frequently if required and/or as directed by the Engineer. Demolition debris would be disposed at reasonable intervals or as directed by the Engineer. Excavated soil would not be stockpiled except for soil excavated below or beyond the specification payment limits or has not been previously tested. Such soil would be stockpiled on the work sites to allow for in-situ testing and classification prior to loading, weighing, and disposal.

Butler Street Site

Approximately 5,700 cubic yards of debris from excavation and demolition would be removed from the site, requiring approximately 400 (13 cy) trucks during the 32 months of excavation and demolition. The maintenance cleaning of the bar rack and the as-needed cleaning of the existing stop log chamber discussed in Section M – Solid Waste and Sanitation Services would not be necessary during the Gowanus Canal flushing tunnel system shutdown during the construction period.

Degraw and Columbia Streets Site

Approximately 3,500 cubic yards of debris from excavation and demolition would be removed from the site, requiring approximately 260 (13 cy) trucks during the 26 months of excavation and demolition.

Tompkins Place and Degraw Street Site

Approximately 1,200 cubic yards of debris from excavation and demolition would be removed from the site, requiring approximately 10 (13 cy) trucks during the 26 months of excavation and demolition.

Therefore, the proposed action is not expected to result in potential significant adverse impacts to solid waste and sanitation services at all three construction sites.

Energy

The energy consumption during the construction period for all sites, including the interim Gowanus wastewater pumping system and associated HVAC, site lighting and miscellaneous loads would be on par with the existing Gowanus Facilities power demand. Therefore, the proposed action is not expected to result in potential significant adverse impacts to energy during the construction period.

Traffic and Parking

Construction of the proposed action would not exceed any of the minimum development density thresholds in Table 3Q-1 of the CEQR Technical Manual. Furthermore, based on the Passenger Car Equivalent (PCE) factors in the CEQR Technical Manual (in the traffic and parking impact category section) the construction of the proposed action would generate fewer than 50 additional peak hour vehicle trip ends. Furthermore, the contractor would be required to provide parking for construction workers' personal vehicles at one or more off-site and off-street locations. Due to the above conditions and the low levels of existing traffic on streets adjacent to the construction sites, a comprehensive, quantitative traffic and parking analysis is, therefore, not warranted.

The construction necessary at the Gowanus Facilities at the Butler Street site for upgrading the Gowanus Wastewater pumping station and the flushing tunnel system would involve the movement of trucks and machinery to and from the sites, particularly at the beginning and end of the normal workday. Nevertheless, during construction, the proposed action would have short-term, intermittent, adverse effects on local traffic due to lane or partial street closures; temporary suspension of parking on directly affected local streets; and/or possible detours at intersections as described below (as to be determined by NYCDOT).

Butler Street Site

The lack of available space at the Butler Street Facility would require the Contractor to provide off-site parking areas for workers (maximum of approximately 20 workers) who will reach the facility via bus/car pooling. The daily peak for trucks is expected to be approximately 15 with an hourly peak of 2 trucks.

Based on current design, closure of one parking lane on Butler Street would be required for approximately 44.5 months during the upgrade/reconstruction of the interim Gowanus

Wastewater force main, Gowanus Canal flushing tunnel system, wastewater pumping station, and CSO diversion chamber. The New York City Department of Transportation (NYCDOT) reviewed and approved a preliminary lane closure plan submitted as part of the Gowanus Facilities Upgrade - Maintenance and Protection of Pedestrian and Traffic Plans (MPPT) and has provided appropriate traffic stipulations to reduce the impact. However, the preliminary MPPT plan reflected a previous estimate of the duration of lane closure of 22 months. Final plans, reflecting the final estimated duration of the lane closure will be submitted to the NYCDOT for approval and determination of traffic stipulations.

Tompkins Place and Degraw Street Site

The limited parking available at the intersection of Tompkins Place and Degraw Street would require the Contractor to provide off-site parking areas for all workers (maximum of approximately 5 workers) who will reach the facility via bus/car pooling. The daily peak for trucks is expected to be approximately 4 with an hourly peak of 1 truck.

Based on current design, closure of one parking lane on Degraw Street would be required for approximately 26 months while the existing Gowanus Canal flushing tunnel access manhole at the intersection of Tompkins Place and Degraw Street would be used for access to the Gowanus Canal flushing tunnel. The NYCDOT reviewed and approved a preliminary lane closure plan submitted as part of the Gowanus Facilities Upgrade - MPPT Plan and has provided appropriate traffic stipulations to reduce the impact. However, the preliminary MPPT plan reflected a previous estimate of the duration of lane closure of 10 months. Final plans, reflecting the final estimated duration of the parking lane closure will be submitted to the NYCDOT for approval and determination of traffic stipulations.

Degraw and Columbia Streets Site

Parking for workers and construction vehicles at the Columbia Street and Degraw Street work site is tentatively planned to be on the Port Authority Easement of City-owned property adjacent to the intersection. The maximum number of workers at this site is expected to be approximately 18. The daily peak for trucks is expected to be approximately 16 with an hourly peak of 2 trucks.

Closure of the west end of Degraw Street, near the intersection with Columbia Street, would be required for approximately 12 months in order to complete construction of the exit chamber that would be needed for the construction of the portion of the new wastewater force main that would extend outside of the Gowanus Canal flushing tunnel at this location. Additionally, closure of one lane of Degraw Street at this location would be required for an additional 14 months while the exit chamber is used for access to the Gowanus Canal flushing tunnel. The NYCDOT has reviewed and approved the street closure plan including the proposed detour around the west end of Degraw Street submitted as part of the Gowanus Facilities Upgrade - MPT Plans and has provided appropriate traffic stipulations to reduce the impact. Final plans reflecting the additional lane closure on Degraw Street will be submitted to NYCDOT for final review and determination of traffic stipulations.

As indicated above, traffic control permits for any street, lane or sidewalk closure would be obtained from the NYCDOT and traffic control during construction would be coordinated with the NYCDOT Office of Construction Mitigation and Coordination (OCMC) to ensure that traffic impacts are reduced to the maximum extent possible. If the NYSDOT requires scheduling of work outside of the 7:00 a.m. to 6:00 p.m. time frame, NYCDEP/BEPA would be notified to ensure that all other analyses and findings completed for the environmental review remain applicable.

As the design of the proposed action and the construction schedule are finalized, the exact location and duration of lane closures, parking suspensions, and/or detours can be refined and coordination with the NYCDOT as necessary. Construction vehicles and machinery would be staged on-site. The contractor would be required to provide parking for construction workers' personal vehicles at one or more off-site and off-street locations. All other measures required by NYCDOT to mitigate traffic will be implemented and, if any required measures trigger potential environmental impacts, the proposed action will undergo additional environmental review. Therefore, the proposed action is not expected to result in potential significant adverse impacts to traffic and parking at all three construction sites.

Refer to the Expected Construction Activities, Equipments and Schedule in Appendix D. Traffic control stipulations, permits and coordination for any such street closings would be obtained as discussed above.

Air Quality

Construction activities have the potential to impact air quality as a consequence of emissions from on-site construction engines as well as emissions from on-road construction-related vehicles. The most likely effects on air quality during construction activities from the proposed action would result from:

- Engine emissions generated by on-site construction equipment and backup emergency generator;
- Fugitive dust emissions generated by soil excavation and other construction activities; and
- Mobil source emissions generated by project-related construction trucks and worker vehicles traveling to and from the site on local roads.

During the peak construction period, it was estimated that there would be one backhoe, one front end loader, one crane, one vibratory hammer, one high pressure pump, one drilling rig, one excavator, and one backup emergency generator operating intermittently. The interim generator will be installed in a self contained transportable module and located at the southeast corner of the CSO Facility. According to NYCDEP/BWT requirements, maintenance testing will consist of a 1-hour test once per week.

The equipment has to comply with the New York City Local Law 77, which requires the use of Ultra Low Sulfur Diesel (ULSD) and installation of the Best Available Technology (BAT) including air quality filters on non-road equipment used in City construction. These requirements would reduce the emissions of fine particulate matter from the construction equipment by at least 85%. Therefore, it is unlikely for the construction equipment to be significant sources of particulate matter.

To minimize fugitive dust from construction activities, the contract specifications would require the contractor to employ environmental controls throughout the duration of construction. The contract specifications require the contractor to be responsible for controlling visible dust in accordance with the latest NYCDEP and OSHA standards, as well as all other applicable federal, state and local regulations. Dust control would be implemented whenever soil is exposed at the site, before, during and after the completion of construction activities. The dust control would also include measures to protect the temporary soil stabilization practices. When necessary, dust control would be implemented during non-construction hours (i.e., nighttime and weekends). The contractor would be required to apply water to roadways and active work areas or implement other methods. The use of chemicals for dust control would not be permitted. All excavation, loading and transportation of materials would be conducted to minimize fugitive dust. Air monitoring for dust would be conducted to ensure the effectiveness of all dust minimization techniques. Dust monitoring and minimization techniques would be outlined by the details of the Health and Safety Plan to be prepared by the contractor completing the work and approved by NYCDEP.

It should be noted that the number of construction truck trips during the peak construction period is estimated at less than 5 trips per hour at all three sites. This value is well below the NYCDEP $PM_{2.5}$ screening thresholds for mobile sources (i.e., 12 truck trips per hour). As a result, no further mobile sources analysis for $PM_{2.5}$ impacts is necessary for the construction of the proposed action.

Therefore, the construction of the proposed action is not expected to result in potential significant adverse impacts to air quality.

Noise

A quantitative noise analysis of construction was preformed following the Federal Transit Authority (FTA) and the Federal Highway Administration (FHWA) construction noise methodology using detailed construction activity schedules and equipment usages at all three construction sites (see Figure 22: Aerial Location Map of Noise Monitoring Locations in Appendix C). Maximum noise levels at the nearest noise-sensitive receptors resulting from construction site activity were estimated along with contributions from construction-induced traffic following the Passenger Car Equivalents (PCEs) methodology as detailed in CEQR Technical Manual. Potential construction noise impacts on existing noise condition were assessed against the significance threshold specified in CEQR Technical Manual.

The nearest noise-sensitive receptors to each of the three work sites were identified and listed in Table B-6. Figure 23: Noise Monitoring Location N1 – Degraw and Columbia Streets Work

Site, Figure 24: Noise Monitoring Location N2 – Tompkins Place and Degraw Street Work Site, and Figure 25: Noise Monitoring Location N3 – Gowanus Facilities and Butler Street Work Site in Appendix C identify the nearest sensitive receptors and the noise monitoring locations.

Table B-6
MONITORING LOCATIONS

Monitor	Location	Usage
N1	North of the Degraw and Columbia Streets Intersection	Residential/Commercial
N2	Junction of Tompkins Place and Degraw Street	Residential
N3	Butler Street between Bonds Street and Nevins Street	Residential/Industrial

A 24-hour continuous ambient noise measurement program was conducted at these locations on Wednesday, May 24 to Thursday, May 25, 2006. Measured noise levels are shown below in Table B-7 in terms of Daytime Sound Levels (L_d or L_{eq} from 7 – 10) measured along with Percentile Levels, L_{eq} and L_{max}:

Table B-7
EXISTING 24-HOUR NOISE LEVELS (dBA)

Degraw and Columbia Streets (N1)

Time Period	L_{eq}	L_1	L_{10}	L_{50}	L_{90}	L_{max}
7 AM – 10 PM	70 (L_d)	83	70	63	54	104

Tompkins Place and Degraw Street (N2)

Time Period	L_{eq}	L_1	L_{10}	L_{50}	L_{90}	L_{max}
7 AM – 10 PM	63 (L_d)	77	65	56	51	97

Butler Street (N3)

Time Period	L_{eq}	L_1	L_{10}	L_{50}	L_{90}	L_{max}
7 AM – 10 PM	67 (L_d)	74	69	60	53	101

Planned construction activities vary greatly from work site to work site, as do the durations of construction at each of the three work sites. Asphalt removal or pavement breaking and structural construction are activities common to all sites. Actual noise-generating construction durations vary from 15 months at the Tompkins Place and Degraw Street site, 20 months at the Degraw and Columbia Streets site, and 35 months at the Butler Street site, and interspersed with periods of little to no activity. Refer to Appendix D for a description and schedule of construction activities and equipment list and usage schedules at each of the three work sites.

Construction site noise levels were computed using equipment noise emission levels from the FTA and the NYCDEP City Tunnel No. 3, Stage 2 Manhattan Leg – Shaft 33B EIS, the number of construction equipment, and the amount of time each piece of equipment is in use (aka. usage factor)[1] for each activity accounting for a 7-dB insertion loss provided by the safety barriers.

[1] Boston Central Artery and Tunnel Project Construction Noise Control Spec 721.56

Safety barriers are construction site perimeter barriers or construction fences that have noise attenuating properties. Simultaneous and high noise level activities combined to yield the maximum noise levels. The construction noise levels at the nearest noise-sensitive receptors to each of the three monitoring locations are summarized in Table B-8 below.

Table B-8
CONSTRUCTION NOISE LEVELS AND DURATION AT MONITORING LOCATIONS

Location	Construction Site	Duration of Construction	Maximum Construction Noise Duration	Maximum Construction Noise Periods	Maximum Construction Noise Level (dBA)
N1	Degraw & Columbia	20 Months	1 Week	Month 4: Week 3	81
N2	Tompkin & Degraw	15 Months	1 Week	Month 1: Week 1	78
N3	Butler Street	35 Months	1 Week	Month 14: Week 2	75

At the Degraw and Columbia Streets site, the construction noise levels at the nearest noise-sensitive receptor (Location N1) would be expected to vary from 69 dBA to 81 dBA. The maximum construction noise level of 81 dBA would be expected to occur only during the third week of the fourth month of construction.

At the Tompkins Place and Degraw Street site, construction noise levels at Location N2 would be expected to range from 71 dBA to 78 dBA. The maximum construction noise level of 78 dBA would be expected to occur during the first week of the first month of construction.

At the Butler Street site, construction noise levels at Location N3 would be expected to range from 62 dBA to 75 dBA. The maximum construction noise level of 75 dBA would be expected to occur only during the second week of the fourteenth month of construction.

Potential contributions from construction-induced traffic outside of the construction sites were determined using the Passenger Car Equivalents (PCEs) method as detailed in CEQR Technical Manual. The results are shown to be negligible in Table B-9 below. The measured existing noise levels presented below were taken from 3:00 to 4:00 PM when traffic volume is greatest.

Table B-9
AMBIENT NOISE LEVELS WITH CONSTRUCTION TRAFFIC (dBA)

Location	Measured Existing	Estimated Increase	Total
Degraw Street near Columbia Street	75	Less than 1	75
Degraw Street near Tompkins Place	61	Less than 1	61
Butler Street btw Bond and Nevins Streets	65	Less than 1	66

The contributions from stationary sources (or construction site generated noise) and the mobile sources (construction related traffic noise) at the nearest noise-sensitive receptors are logarithmically combined to arrive at the resultant noise levels. Table B-10 presents the combined noise levels for the maximum construction noise period.

Table B-10
MAXIMUM NOISE LEVELS AT RECEPTORS WITH CONSTRUCTION
L_{eq} (1-HOUR)

Location	Maximum Construction Noise Duration	Maximum Construction Noise Periods	Maximum Noise Level L_{eq} (dBA)	Daytime Noise Level w/o Construction L_{eq} (dBA)	Resultant Daytime Noise Level with Construction L_{eq} (dBA)
N1	1 Week	Month 4: Week 3	81	70	81
N2	1 Week	Month 1: Week 1	78	63	78
N3	1 Week	Month 14: Week 2	75	67	76

At the Degraw and Columbia Streets site (N1), there would be nine months without any construction activity during the twenty months of the proposed action construction. For another six months, the highest construction noise levels at the nearest noise sensitive receptor Location N1 would be expected to be at or within 3 dBA of the ambient noise level; such increases are barely perceptible. Increases above ambient of more than 3 dBA may occur during the remaining five months, which would be readily noticeable. Increases of 10 dBA or more may occur during three weeks within this five month period. The maximum noise level (L_{eq} 1-hr) of 81 dBA may occur during the third week of the fourth month of construction. These impacts are short in duration and temporary in nature.

At the Tompkins Place and Degraw Street site (N2), there would be five months without any construction activity during the fifteen month of the proposed action construction. For the rest of the ten months, the highest construction noise levels that may occur at the nearest noise sensitive receptor Location N2 would be expected to be 71 to 73 dBA compared to an ambient noise level of 63 dBA, except that the maximum noise level (L_{eq} 1-hr) of 78 dBA may occur during the fourth week of the first month of construction. These impacts are short in duration and temporary in nature.

At the Butler Street site (N3), there would be two months without any construction activity during the 35 months of the proposed project construction. For the rest of the 33 months during that time, the highest construction noise levels at the nearest noise sensitive receptor Location N3 would be expected to be within 3 dBA of the ambient noise level, which are considered barely perceptible increases, except for one week when the maximum noise level (L_{eq} 1-hr) of 76 dBA may occur during the second week of the fourteenth month of construction, which would be an increase of 8 dBA above ambient. These impacts are short in duration and temporary in nature.

The maximum and highest construction noise level of 81 dBA projected at Location N1, 78 dBA at Location N2, and 76 dBA at Location N3 would be below the 85 dBA limit for construction noise under Local Law 113. Construction noise levels were derived under the assumption that all of the construction equipment onsite would be operating at the same time. Given that most construction equipment operates intermittently and at varying loading conditions, the analysis is conservative and the occurrences of these noise levels would not be expected to routinely occur.

New York City requires all construction activities to comply with the requirements and restrictions of the NYCDEP Noise Code as amended by the Local Law 113, which restricts construction activities to weekdays, between the hours of 7 AM and 6 PM. Contractors engaged by the proposed action and their equipment shall be required to strictly adhere to the applicable provisions of the NYCDEP Noise Control Code regulating construction activities (§24-219), permitted hours of construction work (§24-222), construction equipment (§24-228), air compressors (§24-226), on paving breakers (§24-230), limits on combustion engine exhausts (§24-228.1), and tunneling permits (§1403.3-7). However, pursuant to section 24-222, there are a number of circumstances under which after hours work (i.e., outside of the 7 AM to 6 PM weekdays limit) can be authorized by the NYCDEP. Such circumstances include: the event of undue hardship from unforeseen conditions; unique site characteristics; construction scheduling commitments; and/or financial considerations; or for City projects where the project is necessary for the provision of facilities, equipment and infrastructure for sewerage services. If after hours work is scheduled, NYCDEP/BEPA would be notified to ensure all other analyses and findings completed for the environmental review remain applicable. Therefore, the NYCDEP may authorize such after hours work provided that a Noise Mitigation Plan is prepared by the Contractor and submitted to the NYCDEP for review and approval.

Finally, NYCDEP and its contractors shall exercise good engineering practices (e.g., proper maintenance and operation with muffling devices, shutting off idling machineries not in use, etc.) at all construction sites at all times. While there would be some periods when the construction noise associated with the proposed action would be readily noticeable and even intrusive, these levels would be intermittent, temporary and short in duration. However, the construction of the proposed action would comply with the City Construction Noise Rules, which require a noise mitigation plan and the implementation of appropriate noise control approaches such as barriers to further reduce the temporary noise impacts discussed above at the construction sites. Therefore, the construction of the proposed action is not expected to have potential significant adverse noise impacts.

T. Public Health

According to the CEQR Technical Manual, a proposed action could impact public health due to impacts resulting from air quality, noise, traffic and hazardous material in soil or groundwater used for drinking water, odors, or other actions that exceed the City, State or Federal Standards. As described in other sections, the proposed action would not cause any such potential significant adverse impacts. Therefore, the proposed action would not be expected to result in potential significant adverse public health impacts to the surrounding area and no further examination is necessary.

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