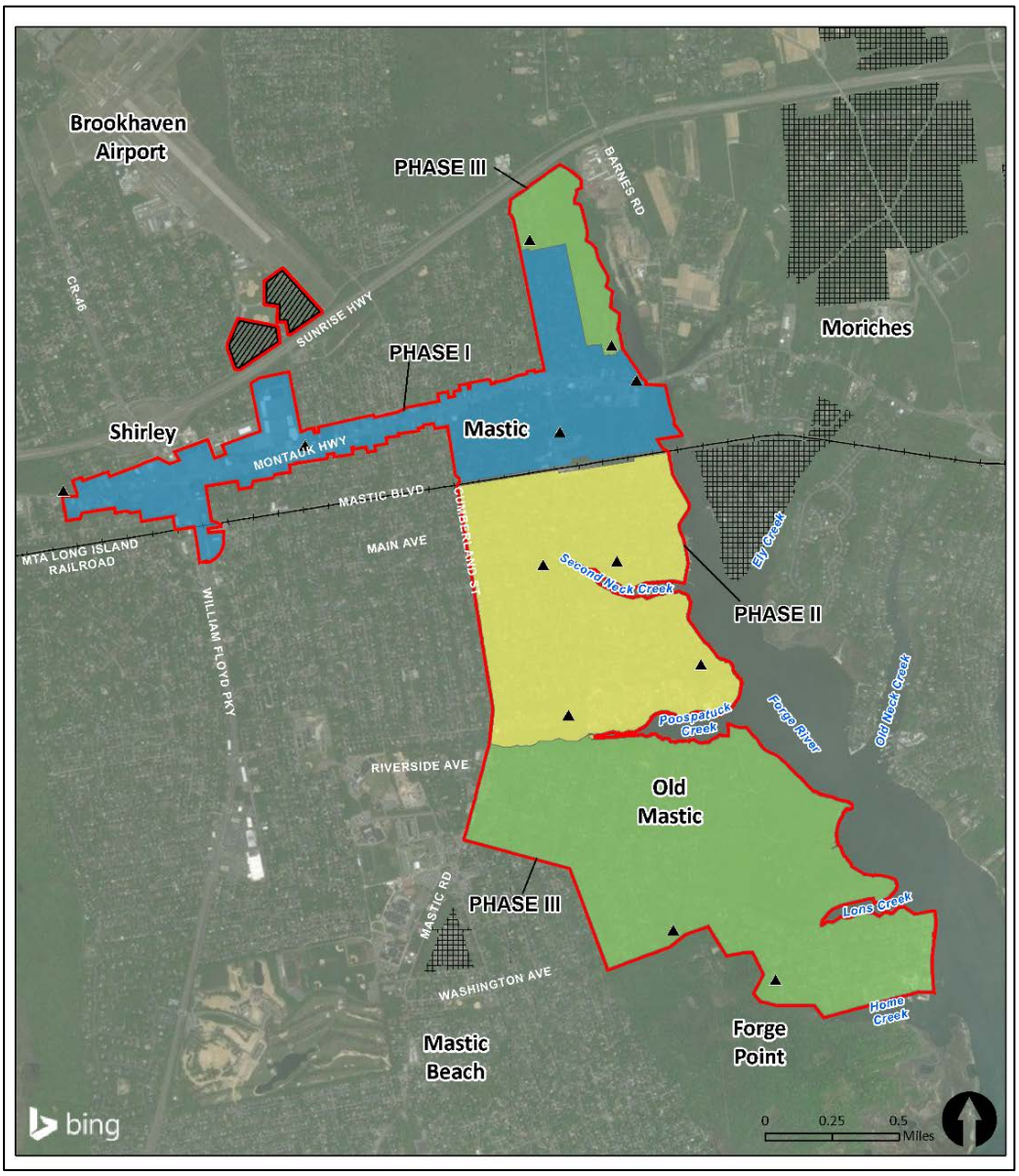

Forge River Watershed Sewer Project
Draft Environmental Impact Statement
Town of Brookhaven, Suffolk County, New York

May 2018

Prepared pursuant to the New York State Environmental Quality Review Act

SEQRA Lead Agency:
NY Governor's Office of Storm Recovery
25 Beaver Street, 5th Floor
New York, NY 10004

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Forge River Watershed Sewer Project

TOWN OF BROOKHAVEN

SUFFOLK COUNTY, NEW YORK

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Prepared by

Governor's Office of Storm Recovery (GOSR), an office of the
New York State Housing Trust Fund Corporation

Cooperating Agencies

Federal Emergency Management Agency (FEMA)
Suffolk County Department of Public Works
Suffolk County Executive's Office

Federal, State and Local Involved and Interested Agencies

U.S. Fish and Wildlife Service (USFWS)
New York State Department of Environmental Conservation (NYSDEC)
New York State Department of State (NYSDOS)
New York State Department of Parks, Recreation, and Historic Preservation: State Historic Preservation Office (OPRHP / NYSHPO)
New York State Division of Homeland Security & Emergency Services (NYSDHSES)
Suffolk County Department of Health Services
Town of Brookhaven
United States Environmental Protection Agency (USEPA)

The State of New York Governor's Office of Storm Recovery (GOSR), operating under the auspices of the New York State Homes and Community Renewal's Housing Trust Fund Corporation (HTFC), a public benefit corporation and subsidiary of the New York State Housing Finance Agency, 99 Washington Avenue, Suite 1224, Albany, New York 12260, is the Grantee of Community Development Disaster Recovery (CDBG-DR) funds appropriated by the Disaster Relief Appropriations Act, 2013 (Pub. L. 113-2, approved January 29, 2013) related to disaster relief, long-term recover, restoration of infrastructure and housing, and economic revitalization in the most impacts and distressed areas resulting from a major disaster declared pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974 (Stafford Act) in calendar years 2011, 2012, and 2013. GOSR implements the State's obligations, as they pertain to CDBG-DR funding, under the State Environmental Quality Review Act (SEQRA) through duly authorized Certifying Officers, and is the lead agency responsible for the preparation of this Draft Environmental Impact Statement (DEIS). On December 23, 2015, GOSR issued a Notice of Intent to Prepare an EIS (NOI EIS) pursuant to the State Environmental Quality Review Act (SEQRA) and Article 8 of the Environmental Conservation Law (New York State Environmental Conservation Law Sections 3-0301(1)(b), 3-0301(2)(m) and 8-0113).

This DEIS analyzes the potential impacts of Proposed Action, which would establish a Mastic-Shirley Sewer District, and construct and operate a collection system connected to approximately 3,400 parcels. The system would include a combination of gravity sewers and low-pressure sewers, a conveyance system consisting of multiple pump stations and force mains, and an Advanced Wastewater Treatment Facility (AWTF) on the Brookhaven Calabro Airport site. Or, based on detailed design, an all low-pressure system could be implemented. The AWTF would use either a Membrane Bioreactor (MBR) or Sequencing Batch Reactor treatment process. The Proposed Action would result in combined average daily flows of approximately 1.4 million gallons per day, which, after treatment, would flow to subsurface leaching fields. Once the parcels are connected to the sewer district and the system is operating, existing OWTS would be removed or abandoned in accordance with Section 740-14 of the Suffolk County Code. The DEIS presents the alternatives that are being considered for implementing the Proposed Action and to examine and compare the social and environmental impacts of those alternatives.

Public viewing of the DEIS is available online at: http://www.stormrecovery.ny.gov/environmental-docs. The DEIS is also available for public viewing in person at the following locations:

- New York State Governor's Office of Storm Recovery; 25 Beaver Street, 5th Floor; New York, NY 10004; Monday–Friday, 9:00 a.m.–4:00 p.m.
- Brookhaven Free Library; 273 Beaver Dam Road; Brookhaven, NY 11719 Monday–Thursday, 9:30 a.m.–8:00 p.m.; Friday, 9:30 a.m.–5:00 p.m.; and Saturday, 9:30 a.m.–5:00 p.m.
- Mastic Moriches Shirley Community Library; 407 William Floyd Parkway; Shirley, NY 11967; Monday - Thursday: 9:00 a.m. - 9:00 p.m.; Friday: 9:00 a.m. - 6:00 p.m.; Saturday: 9:00 a.m. - 5:00 p.m.; Sunday: 12:00p.m. - 4:00p.m.
- Town of Brookhaven; Town Clerk; 1 Independence Hill; Farmingville, NY 11738; Monday–Friday, 9:00 a.m.–4:00 p.m.
- Suffolk County; Division of Planning & Environment; H. Lee Dennison Building, 4th Floor; 100 Veterans Memorial Hwy; Hauppauge, NY 11788; Monday–Friday, 9:00 a.m.–4:00 p.m.
- Suffolk County District 3; Legislator Rudy A. Sunderman; 1120 Montauk Highway, Suite G; Mastic, NY 11950; Monday–Friday, 9:00 a.m.–4:00 p.m.
- Town of Brookhaven; Councilman Daniel J. Panico; 1 Independence Hill; Farmingville, NY 11738; Monday–Friday, 9:00 a.m.–4:00 p.m.
- Town of Brookhaven; Councilwoman Valerie M. Cartright; 1 Independence Hill; Farmingville, NY 11738; Monday–Friday, 9:00 a.m.–4:00 p.m.

Further information may be requested by writing to the Governor's Office of Storm Recovery at the address above or by emailing NYSCDBG_DR_ER@nyshcr.org or by calling (212) 480-6265.

Comments on this DEIS will be accepted through June 1, 2018, and should be submitted via email at NYSCDBG_DR_ER@nyshcr.org or by mail, at Governor's Office of Storm Recovery: 25 Beaver Street, 5th Floor, New York, NY 10004. Written comments may also be submitted at the following address, or by mail, in the proper format, to be received on or before June 1, 2017: Governor's Office of Storm Recovery: 25 Beaver Street, 5th Floor, New York, NY 10004. All comments must be received on or before 5pm on June 1, 2018, or they will not be considered.

GOSR will hold a public hearing from 7:00 pm to 9:00 pm on May 22, 2018. The hearing location is the Mastic Fire District, 1080 Mastic Road, Mastic, NY 11950.

For further information concerning this document, contact:
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New York, NY 10004
(212)480-6265

May 2, 2018

Date of Acceptance	Matt Accardi, Assistant Counsel and Certifying Officer Governor's Office of Storm Recovery

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[1] Appendix A in the environmental assessment document includes the figures that are embedded in this document. The naming conventions of appendices between the environmental assessment and environmental impact statement were preserved to eliminate confusion.

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ABBREVIATIONS AND ACRONYMS

APE	Area of Potential Effect
AWTF	Advanced Wastewater Treatment Facility
bgs	below ground surface
BMP	best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO_2e	carbon dioxide equivalent
CR	County Road
dB	decibel
dBA	A-weighted decibels
ECL	(New York) Environmental Conservation Law
EFH	Essential Fish Habitat
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESD	Empire State Development
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FTA	Federal Transit Administration
GOSR	Governor’s Office of Storm Recovery
gpd	gallons per day
GWh	gigawatt hours
HCS	Highway Capacity Software
HMGP	(FEMA) Hazard Mitigation Grant Program
I/A OWTS	innovative/alternative on-site wastewater treatment plant and disposal system(s)
kWh	kilowatt hours
kW	kilowatt
Ldn	day night noise level
Leq	equivalent noise level
Leq(h)	average sound energy over one hour
Lmax	maximum noise level
Lmin	minimum noise level

LOS	level of service
MBR	membrane bioreactor
mgd	million gallons per day
mg/L	milligrams per liter
ML	monitoring location
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NYCRR	New York Codes, Rules, and Regulations
NYMTC	New York Metropolitan Transportation Council
NYNHP	New York Natural Heritage Program
NYSDEC	New York State Department of Environmental Conservation
NYSDOS	New York State Department of State
NYSHPO	New York State Historic Preservation Office
OWTS	on-site wastewater treatment and disposal system(s)
PCE	passenger car equivalents
$PM_{2.5}$	particulate matter less than 2.5 micrometers in diameter
PM_{10}	particulate matter less than 10 micrometers in diameter
PPCP	pharmaceuticals and personal care product
PSEG	Public Service Enterprise Group Incorporated
SBR	sequencing batch reactor
SCDHS	Suffolk County Department of Health Services
SCDPW	Suffolk County Department of Public Works
SEQRA	State Environmental Quality Review Act
SEQR	State Environmental Quality Review
SHPA	(New York) State Historic Preservation Act
SPDES	State Pollutant Discharge Elimination System
SSD	Suffolk Sewer District
SWPPP	Stormwater Pollution Prevention Plan

Task Force	Suffolk County Sewer District/Wastewater Treatment Task Force
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WWTP	wastewater treatment plant

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GLOSSARY

Cesspool. Cesspools are a simple form of on-site wastewater treatment. The cesspool, a concrete, or cement block pit with an open bottom and perforated sides, receives raw wastewater directly from the building. The sanitary wastewater from the building enters the cesspool and percolates out the bottom or sides of the structure with no treatment.

Grinder pump. Grinder pumps convey sewage from homes or light commercial uses into a holding tank, then macerate the sewage into a fine slurry and transfer it from the holding tank to the treatment system, which can be either an on-site system or a centralized treatment system.

Leaching pool. A leaching pool is a type of leaching structure and is similar to a cesspool in configuration, except it does not receive wastewater directly, but rather from the septic tank, where primary treatment has occurred.

Leaching structure. A leaching structure is part of the septic system, an on-site wastewater treatment and disposal system, and receives wastewater that has received primary treatment from the septic tank. Its purpose is to allow the effluent to leach into the surrounding soil, where it receives final treatment. There are several types of leaching structures, although a leaching pool is the most common. A leaching structure can also be part of a wastewater treatment plant, where it receives treated effluent to percolate into the groundwater basin.

Membrane bioreactor. A membrane bioreactor (MBR) is a widely used technology for advanced municipal and industrial wastewater treatment to remove solids in wastewater effluent. The MBR entails the combination of a membrane process like microfiltration or ultrafiltration with the activated sludge process, a biological wastewater treatment process. Untreated wastewater is pretreated with screens to remove solids, then flows into a denitrification (anoxic) zone followed by a nitrification (aeration) zone prior to the membrane. Recirculation is used to enhance denitrification as required for nitrogen nutrient removal. The MBR process produces a high quality effluent with almost complete solids and bacteria removal.

On-site wastewater system. On-site wastewater treatment and disposal systems (OWTS) are methods of treating wastewater locally on a property. Conventional on-site systems consist of cesspools, septic systems, and other similar forms of treatment. There are also innovative/alternative on-site wastewater systems (I/A OWTS) that remove nitrogen and other compounds, in addition to primary treatment.

Septic system. A septic system is a conventional form of on-site wastewater treatment, which provides more treatment than a cesspool. A septic system consists of a septic tank for primary treatment; effluent from the septic tank is discharged into a leaching structure, which is typically a leaching pool. The septic tank must be periodically pumped to remove accumulated sludge. The soil below the leaching pool provides final treatment and removal of bacteria.

Sequencing batch reactor. The sequencing batch reactor (SBR) uses an activated sludge process for the treatment of wastewater. Activated sludge uses aeration and biological flocculation to oxidize ammonium, nitrogen, and phosphorus in biological matter in the sludge, thereby removing nutrients from wastewater. SBR is a fill and draw type reactor system involving one or two complete-mix reactors where all phases of an activated sludge process occur. The five stages of a conventional SBR system are fill with wastewater, aeration/mix, sedimentation/clarification, draw or decant treated effluent, and idle. During aeration, oxygen is bubbled through flow-through tanks

containing a mixture of primary treated wastewater and activated sludge to reduce organic matter. In the settling stage of the reactor, sludge formed by the bacteria settles out to the bottom of the tank, where anaerobic bacteria start to use oxidized nitrogen, rather than oxygen, and the nitrogen is converted to a gaseous state. The sludge is removed for further treatment, and the effluent from the reactor can be stored for further treatment. Because the mixed liquor remains within the reactor during all phases of the conventional SBR-activated sludge treatment process, separate secondary sedimentation facilities are not required.

Watershed: A watershed for surface water is an area of land that drains all the streams and surface runoff from rainfall and melting snow to a common outlet such as the mouth of a bay, tidal estuary (such as Forge River), or any point along a stream channel. The watershed for surface waters includes lakes, streams, reservoirs, wetlands, and the underlying groundwater. A watershed for a groundwater body is conceptually similar to a watershed for surface water because groundwater flows from high points (divides) to low points (outlets, discharge areas) in the subsurface. The boundaries of surface water and groundwater watersheds do not always coincide. Surficial aquifers (the water table) generally mimic surface-water watersheds, while deeper (confined) aquifers are less likely to conform to surface features and exhibit watersheds (or basins) determined by geologic factors.

The watershed for Forge River, as discussed in this document, is equivalent to its groundwater contributing area (based on Cameron Engineering (2012) and the groundwater model developed by Camp Dresser & McKee (2009). The Forge River groundwater contributing area is the extent of the upland area from which groundwater contributes to the base flow of the streams and creeks that are tributaries to the Forge River. The Forge River watershed is subdivided into subwatersheds that are delineated based on stormwater collection system areas for the lower reaches of the watershed and the groundwater contributing areas for the upper or outermost reaches of the watershed.

EXECUTIVE SUMMARY

Forge River Watershed Sewer Project Environmental Review Process

This draft Environmental Impact Statement (EIS) has been prepared pursuant to the New York State Environmental Quality Review Act (SEQRA), for the Forge River Watershed Sewer Project (the Proposed Action). The Governor's Office of Storm Recovery (GOSR) is the SEQRA lead agency for the environmental review of the Proposed Action.

The Federal Emergency Management Agency (FEMA) is the lead agency under the National Environmental Policy Act (NEPA) and related laws for the environmental review of the Proposed Action. A separate NEPA environmental assessment is underway for the federal environmental review of the Proposed Action.

Project Description

Forge River is located within the hamlets of Mastic and Shirley in the Town of Brookhaven. The project area encompasses approximately 1,600 acres in the densely developed residential and commercial area bounded by Sunrise Highway to the north, Home Creek to the south, William Floyd Parkway to the west, and Forge River and its tributaries to the east. The project area also includes a 13.7-acre undeveloped parcel and a 17-acre undeveloped parcel, both of which are located on the Brookhaven Calabro Airport, which is situated north of Sunrise Highway (New York State Route 27).

The project area is subject to heavy rainfall events that lead to regular surface and groundwater flooding and a combination of both ground and surface water flooding, with varying intensity and frequency. The project area has experienced intense flooding during events such as Hurricane Sandy in 2012, Hurricane Irene in 2011, and other unnamed seasonal storms, nor'easters, and hurricanes.

Sub-performing and non-performing on-site wastewater treatment and disposal systems (OWTS) provide sanitary wastewater disposal in the project area. While the exact number of system failures cannot be quantified, many of the OWTS in the project area failed during Hurricane Sandy and will continue to be subject to failures during future storm events. The failure of OWTS causes public health risks associated with uncontrolled sewage discharges.

The primary purpose of the Proposed Action is to mitigate short-term, repetitive, adverse impacts on human life and property associated with OWTS failures in the Forge River watershed in Suffolk County, New York, caused by natural hazards. The secondary purpose is to mitigate long-term, adverse impacts associated with such failures on surface waters and coastal wetlands that reduce the ability of these waters and wetlands to provide natural protection against storm surge.

The Proposed Action would establish a Mastic-Shirley Sewer District and construct and operate a collection system connected to approximately 3,400 parcels. The system would include a combination of gravity sewers and low-pressure sewers, a conveyance system consisting of multiple pump stations and force mains, and an Advanced Wastewater Treatment Facility (AWTF) on the Brookhaven Calabro Airport site. As detailed designs progress, an exclusively low-pressure conveyance system may also be considered. The AWTF would use either a Membrane Bioreactor (MBR) or Sequencing Batch Reactor (SBR) treatment process. The Proposed Action would result in combined average daily flows of approximately 1.4 million gallons per day (mgd), which, after treatment, would flow to subsurface leaching fields. Once the parcels are connected to the sewer

district and the system is operating, existing OWTS would be removed or abandoned in accordance with Section 740-14 of the Suffolk County Code, *Discontinued use of cesspools and septic systems*.

Impacts and Mitigation Measures

This EIS evaluates the impacts of the Proposed Action in the resource categories listed below. Impacts are assessed for both construction and operation of the Proposed Action, as well as potential effects from long-term growth inducement. A summary of impacts and mitigation measures is presented in **Table ES-1**. The EIS also presents a cumulative impact analysis of the Proposed Action in combination with past, present, and reasonably foreseeable future projects.

- Topography and Soils
- Air Quality
- Water Quality
- Wetlands and Coastal Resources
- Floodplains
- Vegetation
- Wildlife and Fish
- Threatened and Endangered Species and Critical Habitats
- Cultural Resources
- Aesthetic Resources
- Land Use and Planning
- Socioeconomics
- Environmental Justice
- Noise
- Transportation
- Community Facilities and Services
- Public Health and Safety
- Climate Change
- Public Services and Utilities

Alternatives

This EIS also evaluates reasonable and practicable alternatives to the Proposed Action. Alternatives provide decision makers and the public with possible options to the Proposed Action, in addition to providing the context that is necessary to enable comparisons of potential impacts and effectiveness in meeting project objectives. Alternatives to the Proposed Action include a No Action Alternative, as required by SEQRA, as well as an Innovative/Alternative (I/A) OWTS Alternative.

Table ES-1. Proposed Action: Summary of Impacts and Mitigation

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
Topography and Soils	Negligible impacts on topography from alteration of the elevation of land surface outside the footprint of the AWTF. Negligible impacts from construction of the proposed sewer district. Minor, adverse impacts on soils from erosion and compaction and an increase in impermeable surfaces.	Replacing permeable land with impermeable surfaces (e.g., buildings and parking lots associated with pump stations and the AWTF) would have a minor, adverse impact on soils.	Minor, adverse impacts on soils from erosion and compaction and an increase in impermeable surfaces.	Adverse impacts would be minimized by construction best management practices (BMPs) for soil erosion and stormwater protection, compliance measures, and engineering controls.
Air Quality	Short-term, minor adverse impacts from emissions associated with construction equipment and vehicles.	Negligible impact on air quality from volatile organic compound emissions associated with treatment operations, and long-term, minor, adverse impacts on air quality from backup power generator use. Adverse impacts would be minimized by following U.S. Environmental Protection Agency (EPA) equipment	Provision of sewer infrastructure would have minimal, long-term effects on the trip generation or traffic patterns. Long-term, indirect air quality impacts would be negligible.	Adverse impacts would be minimized by following EPA equipment compliance measures and performance standards, minimizing idling times, and implementing a fugitive dust control plan.

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
		compliance measures and performance standards, minimizing idling times, and implementing a fugitive dust control plan.		
Water Quality	Short-term, minor, adverse impacts on water quality from soil erosion. Short-term, negligible impacts related to hazardous materials associated with the removal of the existing OWTS. Short-term, negligible impacts from fuel handling, excavated soils, and potential to uncover hazardous materials. Adverse impacts would be minimized through implementation of BMPs and compliance measures.	Potential long-term, adverse impact on groundwater quality from the discharge of small quantities of pharmaceuticals and personal care products with long-term, significant, beneficial effects on groundwater quality and surface waters from nitrogen removal and increased pollution treatment levels achieved by the AWTF. Short-term, adverse impacts on groundwater quality as a result of repair activities. Long-term, negligible to minor, adverse impacts from required handling and storage of hazardous materials, increased	Long-term, indirect impacts on water quality would be minor but consistent with direct effects. Negligible, adverse, long-term, indirect impacts on sludge disposal would result.	Adverse impacts from construction activities would be minimized through implementation of BMPs for soil erosion, stormwater protection, hazardous materials handling, and OWTS removal as well as meeting compliance measures and adhering to standard operating procedures. Operational adverse impacts would be addressed through standard post-construction stormwater BMPs, installation of low-flow fixtures at AWTF, and review of rainwater storage and reuse possibility at the AWTF.

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
		generation of sludge, increased use of potable water, and the addition of impervious surfaces. Long-term, beneficial effects on water quality from the improved sewer system and substantial reduction of the risk of sanitary wastewater releases.		
Wetlands and Coastal Resources	Potential indirect, short-term, negligible, minor impacts on downstream wetlands and surface water from soil erosion and sedimentation. Short-term, negligible, adverse impacts on coastal resources. Adverse impacts would be minimized by BMPs and compliance measures.	Long-term, beneficial effects on freshwater and tidal wetlands and open waters from a reduction in storm-related sanitary wastewater discharges and high nitrogen concentrations in groundwater and surface water.	Any future development would be subject to existing regulatory requirements (such as setbacks) pertaining to development in proximity to a wetland. Adherence to these regulations would ensure that indirect, long-term impacts on wetlands and coastal resources would be negligible.	Adverse impacts would be minimized by implementation of BMPs for soil erosion and stormwater protection and compliance measures.

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
Floodplains	Potential short-term, minor, adverse impacts from disturbance of floodplain function, reduction of natural floodplain values, and increases in stormwater runoff from construction if floodplains cannot be avoided.	Long-term, indirect impacts on floodplains from increased runoff because of an increase in impervious surfaces. Long-term, indirect, beneficial effects from reduced degradation by pollutants and decreased risks of flood loss and flood impacts on human life and property. Potential short-term, adverse impacts on the operation of the sewer system from flooding.	Any future development on floodplain parcels would be required to complete a separate floodplain impact analysis and follow all applicable state and federal regulations for construction in a floodplain. Indirect, long-term impacts on floodplains would be negligible.	Adverse impacts would be minimized by avoidance and minimization where possible, compliance measures, and implementation of BMPs for soil erosion and stormwater protection and implementation of flood proofing and design elements.
Vegetation	Long-term, moderate, localized, adverse impacts on vegetation from permanent loss of up to 30.7 acres of pine-oak forest vegetation from AWTF and leaching structure construction, and permanent loss of vegetation from pump station construction. Potential impacts from soil erosion and ground disturbance could	Long-term, beneficial effects from the improved health of upland and wetland vegetation from the prevention of sanitary wastewater overflow during future flood events and reduction in groundwater nitrogen concentrations.	Any future development would be subject to existing regulatory requirements, such as setbacks from wetlands and tree removal permits. Adherence to these regulations would ensure that long-term, indirect impacts on vegetation would be negligible.	Adverse impacts would be minimized through construction BMPs for soil erosion and stormwater protection; compliance measures; limits on tree removal according to Town Code Chapters 70 and 490; and measures requiring clean equipment to reduce the spread of invasive species.

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
	damage vegetation and allow for non-native invasive plant species to spread or become established.			
Wildlife and Fish	Short-term, minor, adverse impacts on wildlife from noise and construction activities. Minor, adverse impacts on migratory bird species from removal of 30.7 acres of trees associated with the AWTF and leaching fields. Potential impacts on fish and aquatic resources from short-term increases in turbidity and sedimentation in local surface waters.	No impacts on terrestrial wildlife. Long-term, beneficial effects on fish and aquatic resources from improved water and sediment quality. Long-term, beneficial effect on the airport area from tree removal that would reduce the risk of wildlife hazards to aircraft.	Any future development would be subject to existing regulatory requirements, such as setbacks from wetlands and tree removal permits. Adherence to these regulations would ensure that long-term, indirect impacts on wildlife and fish would be negligible.	Adverse impacts would be minimized through implementation of BMPs for soil erosion and stormwater protection; compliance measures; and operational maintenance of leaching field landscaping.

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
Threatened and Endangered Species and Critical Habitats	Potential short-term, minor, adverse impacts on northern long-eared bats from noise and tree removal associated with construction activities. Potential impacts on silvery aster from increased sedimentation.	Long-term, beneficial effects from reducing storm-related sanitary wastewater discharges and high nitrogen concentrations in wetlands and surface water, which would result in improved water quality.	Any future development would be subject to existing regulatory requirements, such as setbacks from wetlands and tree removal permits. Adherence to these regulations would ensure that long-term, indirect impacts on threatened and endangered species would be negligible.	Adverse impacts would be minimized by conducting tree removal activities outside active northern long-eared bat roosting seasons (i.e., limit tree removal activities to November 1 through March 31) and by conducting a biological survey prior to construction activities to observe presence or absence of silvery aster.
Cultural Resources	No effects on archaeological resources, depending on location of excavation. Potential negligible impacts on historic architectural resources from minor landscape disturbance.	No effects on archaeological resources or historic architectural resources.	No effect or short-term, minor, adverse impacts on archaeological resources, depending on the findings of archaeological surveys conducted in areas of high sensitivity that coincide with proposed ground-disturbing activities. Impacts on historic architectural resources would be evaluated based on any site-specific development proposal.	None

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
Aesthetic Resources	Short-term, minor, adverse impacts on aesthetic resources and viewsheds from tree removal and the presence of construction equipment.	Long-term, minor impacts on aesthetic resources and viewsheds from new infrastructure that presents minor, new visual features to the surrounding area.	Effects on viewsheds and aesthetic resources would be beneficial because they would conform to existing zoning, as approved by the Town of Brookhaven and Village of Mastic Beach.	None
Land Use and Planning	Potential short-term, local, negligible impacts if land acquisition is required.	Long-term, direct, negligible to minor impacts on the function and land use of 14 parcels from the change in use. Impacts on zoning from proposed government and utility uses in zones A-Residence-I and J-Business-2, which are not currently permitted uses.	Indirect, long-term effects from induced growth would be beneficial because they would conform to existing zoning, which was approved by the Town of Brookhaven and the Village of Mastic Beach.	Impacts could be mitigated or minimized in the event of a Town-approved amendment to the zoning code to allow for utility/infrastructure within any of the zones in which the new infrastructure is proposed.

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
Socioeconomics	Short-term, beneficial effect on employment from new construction jobs and associated spending at local businesses in Suffolk County.	No effects on businesses and households incurring user, maintenance, and operation fees. Long-term, beneficial effect from access to sewer infrastructure by residential and commercial properties, and long-term, beneficial effect for the community from avoided property loss associated with enhanced ecosystems and improved flood attenuation.	Induced growth would likely be limited relative to the overall population and employment level in the census tract study area in 2030. Therefore, growth is not expected to generate any indirect population or business displacement. In addition, because of limited increases in households and the fact that new residential units would likely be apartments, which typically house fewer school-age children than houses, growth is not expected to lead to a net negative fiscal flow. Indirect long-term impacts on socioeconomics would be negligible.	None
Environmental Justice	Minor, adverse impacts in terms of air quality, water quality, transportation, community services and facilities, public health and safety, aesthetic resources and moderate, adverse impact in terms of noise. The impact on environmental justice populations would not be considerably more severe or greater in	The adverse fiscal impact on owners of connected properties in environmental justice communities would not be greater than the impact on the general population. However, for lower income households, the cost would account for a larger portion of their income. The owners of properties in	Growth inducement would not result in effects on other resources that would be considerably more severe or greater in magnitude on the environmental justice population than on the general population.	Provide grants to property owners for whom the annual cost of the sewer infrastructure would exceed 2% of their income, for the portion of the cost exceeding the 2%. Similarly, grants could be provided to tenants who experience significant rent increases directly because of the sewer cost.

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
	magnitude than the impact on the general population.	the environmental justice communities would experience the same benefits from the Proposed Action as the general population.		
Noise	Short-term, moderate, adverse impacts from stationary sources while constructing components of the AWTF, collection system, and pump stations and associated mobile sources (construction traffic).	Long-term, intermittent, negligible impacts. Adverse impacts would be mitigated by BMPs, compliance measures, and engineering controls.	Long-term, indirect noise impacts would be negligible. Increased densities described would not result in a substantial increase in mobile source noise.	Adverse impacts would be mitigated by implementation of BMPs and conformance with construction work hours and local noise ordinances. Impacts could also be mitigated through specific design requirements (i.e., generally housing equipment within structures and applying architectural and mechanical features to the degree required to meet the design criteria to reduce noise).

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
Transportation	Short-term, minor, adverse impacts associated with construction of sewers. Delays would be anticipated at the northbound and southbound approaches at the intersection of Mastic Beach Road (EB/WB) and Mastic Road (NB/SB); and at the eastbound approach at the intersection of Montauk Highway (EB/WB) and Washington Ave (NB) / Hemiker Street (SB). Adverse impacts would be mitigated by limiting construction times to between 9:00 a.m. and 5:00 p.m. if turning lanes need to be closed at an affected intersection to avoid background peak hours.	No effect	Induced growth would have minor, long-term impacts on the trip generation or traffic patterns. Increased intensity would not result in adverse impacts on traffic and transportation because it would be occur in combination with recommended roadway improvements.	Adverse impacts would be mitigated by limiting construction times to between 9:00 a.m. and 5:00 p.m. if turning lanes need to be closed at an affected intersection to avoid peak hours.

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
Community Services and Facilities	Short-term, minor adverse impacts from temporary property disturbance required to connect to collection and conveyance system. No effect on emergency services during construction.	No effect	New developments would be subject to local taxes and development fees to fund such services. As such, indirect, long-term impacts on community facilities would be negligible.	None
Public Health and Safety	Short-term, minor, adverse impacts from associated air quality and noise impacts including dust, emissions, and noise. No impact on emergency services during construction.	Long-term, beneficial effects from the reduction in storm-related sanitary wastewater discharges and high nitrogen and pathogen concentrations in groundwater and surface water. Less assistance would be required from public health and safety providers during storm events from the combination of reduced discharges and the enhanced storm-surge attenuation abilities of the ecosystem.	New developments would be connected to the sewer district and would not result in public health and safety risks associated with flooded OWTS. New developments would be subject to local taxes and development fees to fund such services. As such, indirect, long-term impacts on public services would be negligible.	Adverse impacts would be mitigated by implementation of BMPs and adherence to local Town codes.

Area of Evaluation	Construction	Operation	Indirect from Growth Inducement	Mitigation (specify construction or operation)
Climate Change	Short-term, minor, adverse impacts from peak-year construction greenhouse gas emissions of 5,271 metric tons of carbon dioxide equivalent (CO_2e).	Long-term, minor, adverse impacts from a net greenhouse gas increase in 7,123.5 metric tons CO_2e per year, with beneficial effects from reduced methane emissions. Long-term, indirect beneficial effect of proposed project of less direct discharge and nitrogen and pathogen loading due to increased coastal resiliency.	Negligible, long-term effects on trip generation or traffic patterns and associated greenhouse gas emissions. Induced growth would be concentrated along Montauk Highway, away from sea level rise impacts. Long-term, negligible impacts related to climate change.	None
Public Services and Utilities (Energy Only)	Short-term, negligible impact on energy use from expenditure of gasoline, diesel, and electricity. Negligible contribution to overall energy consumption in New York State from petroleum consumption.	No effects from sludge disposal. Long-term, negligible impacts on energy; system operations would contribute 0.07% to annual Long Island GWh consumption.	Long-term impacts on energy use would be negligible because of the limited increase in development compared to the size of the service areas for each energy generation and distribution system.	None

1.0 INTRODUCTION

On October 29, 2012, Hurricane Sandy caused storm damage to several areas across the state of New York. On October 30, 2012, President Barack Obama declared Hurricane Sandy a major disaster. The declaration authorized the Department of Homeland Security-Federal Emergency Management Agency (FEMA) to provide assistance to the State per federal disaster declaration DR-4085-NY. Suffolk County (subrecipient) has applied to the FEMA Hazard Mitigation Grant Program (HMGP) for funding of the Suffolk County Coastal Resiliency Initiative in accordance with Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974 (42 United States Code [USC] 5170c), as amended; the Sandy Recovery Improvement Act of 2013; and the accompanying Disaster Relief Appropriations Act of 2013. The New York State (NYS) Division of Homeland Security and Emergency Services is the recipient partner. The NYS Governor's Office of Storm Recovery (GOSR), an office of New York State Homes and Community Renewal's Housing Trust Fund Corporation, is responsible for the direct administration of the U.S. Department of Housing and Urban Development Community Development Block Grant – Disaster Recovery Program in New York State. GOSR is a project partner, funding other elements of the Suffolk County Coastal Resiliency Initiative, and serving as the overall strategic coordinator for the environmental review of the complete portfolio of projects mentioned below.

1.1 Suffolk County Coastal Resiliency Initiative

The Suffolk County Coastal Resiliency Initiative seeks to mitigate impacts on human life and property, surface waters, and coastal wetlands associated with on-site wastewater treatment and disposal system (OWTS) failures caused by natural hazards. A conventional OWTS employs either a either a cesspool or septic system that consists of a septic tank and leaching structure. Natural hazards include rain events, storm surge, and coastal flooding, particularly as they contribute to rising groundwater elevations and septic or cesspool failures. Approximately 74 percent of homes in Suffolk County rely on OWTS (Suffolk County 2015a).

Suffolk County collaborated with local community representatives on the Suffolk County Sewer District/Wastewater Treatment Task Force (Task Force) to delineate areas where investment in sanitary sewer and wastewater infrastructure could provide environmental, economic, and/or social benefits and identify critical need areas where the implementation of sewer infrastructure may be warranted and should be assessed. The Task Force and the 2015 *Suffolk County Comprehensive Water Resources Management Plan* identified the connection of parcels in Southwest Sewer District (SSD) #3 and the Carlls, Connetquot, Forge, and Patchogue River watersheds as key measures to address several water and environmental quality issues (Suffolk County 2015a). This process resulted in the identification of several potential projects.

- **SSD #3**: SSD #3 is south and west of the Southern State Parkway from the Nassau County line to the hamlet of East Islip, in the townships of Babylon and Islip. This project would install service laterals connecting 2,699 residential parcels in SSD #3 to existing collection and conveyance systems terminating at Suffolk County's Bergen Point Wastewater Treatment Plant (WWTP). This action would collect an additional 670,000 gallons of wastewater per day.
- **Carlls River Watershed**: The Carlls River is located in Babylon and flows into Great South Bay on the mainland side of Long Island just north of Fire Island Inlet. This project

comprises three sub-areas, which include portions of North Babylon, West Babylon, Wyandanch, and Deer Park, and would construct a new collection system to connect 2,797 parcels to existing conveyance systems by extending interceptors within parts of North Babylon, West Babylon, Wyandanch, and Deer Park. The proposed sewer system is expected to capture approximately 854,000 gallons of wastewater per day and convey it to the Bergen Point WWTP in SSD #3.

- **Connetquot River Watershed**: The Connetquot River is located on the south shore of Long Island in Great River and flows into Great South Bay. This project would construct a new collection system to connect 465 parcels to existing conveyance systems via interceptors within the Town of Islip. The proposed sewer system is expected to capture approximately 150,000 gallons of wastewater per day and convey it to the Bergen Point WWTP in SSD #3.
- **Patchogue River Watershed**: The Patchogue River is located off Patchogue Bay on Long Island's south shore, about 17 miles east of the Fire Island Inlet and 14 miles west of Moriches Bay Inlet. This project would construct a new collection system to connect 648 parcels to existing conveyance and treatment systems, increasing flows to the Patchogue Advanced Wastewater Treatment Facility (AWTF) by 300,000 gallons per day (gpd).
- **Forge River Watershed**: Forge River is located within the hamlets of Mastic and Shirley in the Town of Brookhaven. This project would construct new collection and conveyance systems, connecting portions of the hamlets to a new AWTF proposed at Calabro Airport in the Town of Brookhaven. Phases I/II and III of the project include 3,398 parcels, with flows of 1.4 million gallons per day (mgd).

The Suffolk County Coastal Resiliency Initiative was configured in such a way that the five projects could each advance independently, subject to availability of funding.

1.2 Forge River Watershed Sewer Project Environmental Review Process

This document addresses the Forge River Watershed Sewer Project (the Proposed Action) in the Forge River watershed, as referenced above and described in greater detail below. The project is functionally, geographically, hydrologically, and hydraulically separate from the other four projects discussed above as part of the Suffolk County Coastal Resiliency Initiative and has both independent utility and a distinct schedule for implementation. Therefore, a permissibly separate environmental review process for the project is being completed, including an assessment of cumulative impacts to ensure that the review is no less protective of the environment.

GOSR is the lead agency pursuant to the State Environmental Quality Review Act (SEQRA) and related laws for the environmental review of the Proposed Action. This draft environmental impact statement (EIS) is issued pursuant to SEQRA, codified at Article 8 of the New York Environmental Conservation Law (ECL), and its implementing regulations, promulgated at Part 617 of Title 6 of the New York Codes, Rules and Regulations (NYCRR), which collectively contain the requirements for the State Environmental Quality Review (SEQR) process. Accepted methodologies and procedures that are consistent with SEQR have been used as a general guide for evaluating the potential environmental impacts of the Proposed Action. Specific methodologies and impact significance criteria used in the technical analyses are discussed accordingly in each EIS section.

FEMA is the lead agency under the National Environmental Policy Act (NEPA) and related laws for the federal environmental review of the Proposed Action. A separate NEPA environmental assessment has been prepared for federal environmental review of the Proposed Action.

2.0 PURPOSE AND NEED

Section 404 of the Robert T. Stafford Relief and Emergency Assistance Act of 1974 (42 USC 5170c), as amended, authorizes FEMA to provide funding to eligible grant applicants for activities that have the purpose of reducing or eliminating risks to life and property from hazards and their effects. The primary purpose of the Proposed Action is to mitigate short-term, repetitive, adverse impacts on human life and property associated with OWTS failures in the Forge River watershed in Suffolk County, New York, caused by natural hazards. The secondary purpose is to mitigate long-term, adverse impacts associated with such failures on surface waters and coastal wetlands that reduce the ability of these waters and wetlands to provide natural protection against storm surge.

The Proposed Action is needed because OWTS in the project area are susceptible to both capacity and treatment or disposal failures during flood and heavy rain events. Many systems in the project area failed during Hurricane Sandy, causing loss of wastewater use, septic backflow into homes, and nitrogen and pathogen pollution on private property.

3.0 PROJECT LOCATION AND BACKGROUND

Forge River is located within the hamlets of Mastic and Shirley in the Town of Brookhaven. The project area comprises three "phases."

The project area was initially identified as "Phase I/II," which comprises properties on the north and south sides of County Road (CR) 80 (Montauk Highway) between William Floyd Parkway and Forge River (**Figure 3-1**). The proposed HMGP grant would be applied to Phase I/II of the project, and design of these phases is under way. Phase I/II include 2,394 parcels. However, 404 parcels are vacant, and connection to these parcels would not be funded by the HMGP grant, although future connection would not be prohibited. As such, 1,990 parcels would be connected in Phase I/II.

The environmental analysis in this document addresses Phase I/II, assuming connection of 2,094 parcels, which provides a conservative analysis and is consistent with the HMGP grant application (Suffolk County 2015b). The environmental analysis in this document also addresses Phase III, which includes an additional 1,304 parcels and consists primarily of residential areas along Forge River to the south of the Phase II area and some parcels north of the Phase I area. Funding for Phase III has not yet been identified, and no design work has been completed. (The number of total parcels in Phase III has been revised since the Scoping Document was finalized to remove vacant parcels, consistent with Phase I/II.) Unless a particular phase is specified, the term "project area" applies to the combined Phase I/II and III areas.

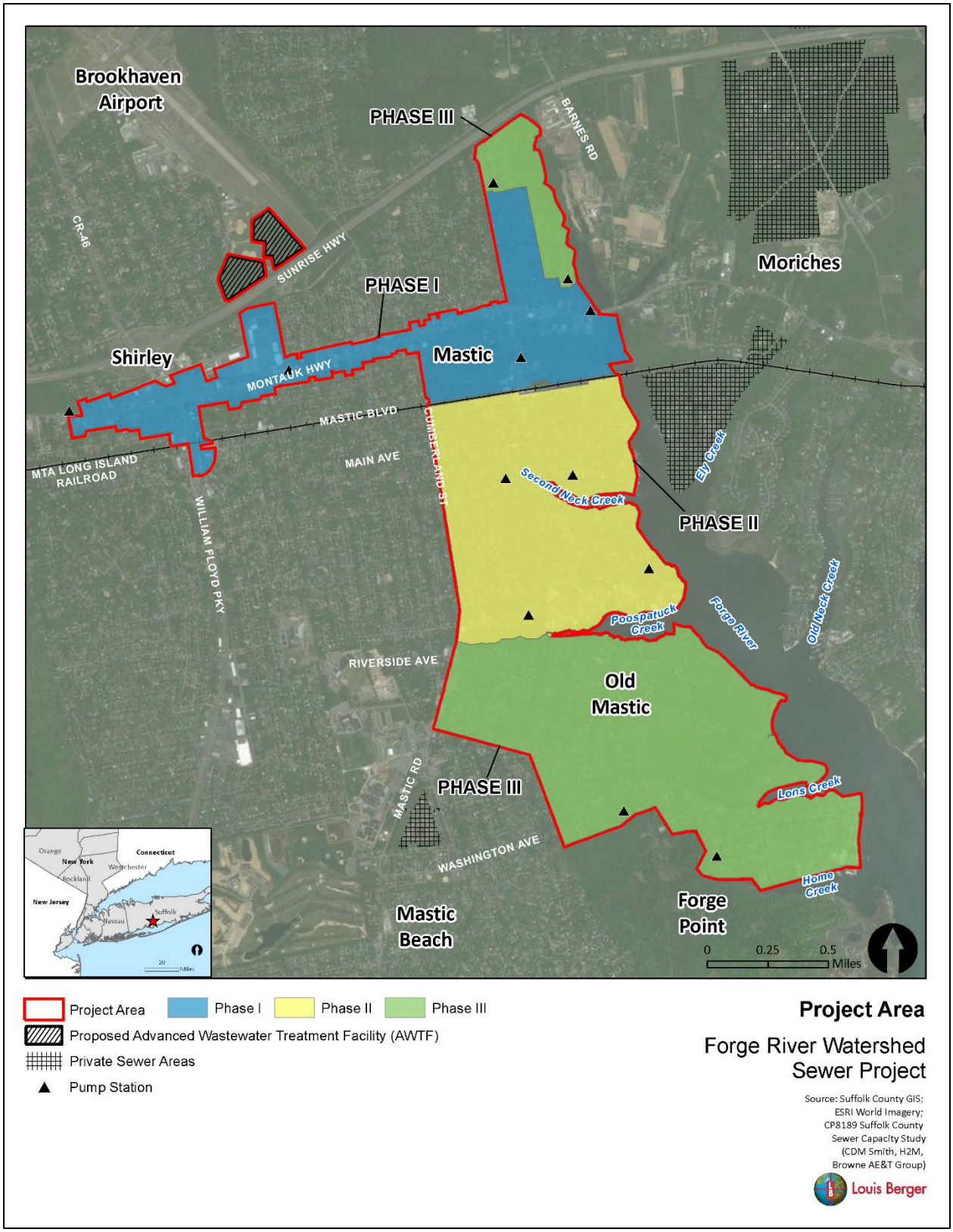

Figure 3-1. Forge River Watershed Sewer Project Area

The project area encompasses approximately 1,600 acres in the densely developed residential and commercial area bounded by Sunrise Highway to the north, Home Creek to the south, William Floyd Parkway to the west, and Forge River and its tributaries to the east. The project area also includes a 13.7-acre undeveloped parcel and a 17-acre undeveloped parcel, both of which are located on the Brookhaven Calabro Airport, which is situated north of Sunrise Highway (New York State Route 27). Existing land uses include commercial and retail storefronts, offices, and restaurants along the Montauk Highway Corridor and residential properties throughout the rest of the project area (**Figure 3-2**).

The project area is subject to heavy rainfall events that lead to regular surface and groundwater flooding and a combination of both ground and surface water flooding, with varying intensity and frequency. The project area has experienced intense flooding during events such as Hurricane Sandy in 2012, Hurricane Irene in 2011, and other unnamed seasonal storms, nor'easters, and hurricanes.

The project area is affected by heavy storms that can lead to flooding and inundation from surging ocean water. About 90 percent of the Phase I/II area is located within the Forge River watershed, and the remaining 10 percent of the Phase I/II area is located within the Carmans River watershed (based on watershed boundaries defined in Cameron Engineering 2012; see also the definition in the Glossary). The entire Phase III area is located within the Forge River watershed. Sanitary wastewater disposal in the project area is provided by OWTS, which comprise either septic systems or cesspools.

- A septic system is considered a conventional OWTS in this document. A septic system consists of a septic tank for primary treatment. The effluent from the septic tank is discharged into a leaching structure, which is typically a leaching pool. The septic tank must be periodically pumped to remove accumulated sludge. The soil below the leaching pool provides final treatment and removal of bacteria.
- A cesspool receives raw wastewater directly from a building. Cesspools are usually constructed of concrete or block with an open bottom and perforated sides. The sanitary wastewater from the building enters the cesspool and percolates out the bottom or sides of the structure with no treatment.

OWTS are designed to address public health risks and efficient waste management/water disposal; OWTS in the project area may perform as designed. However, OWTS are not designed to treat nitrogen, which results in inadequate performance for the protection of the environment. While the exact number of system failures cannot be quantified, many of the OWTS in the project area failed during Hurricane Sandy and will continue to be subject to failures during future storm events. During Hurricane Sandy, hundreds of residential systems and more than ten commercial systems in the project area experienced surface water inundation. OWTS failures result when systems are flooded by heavy rainfall or submerged in shallow groundwater that rises during storm events, reducing system capacity and/or inhibiting or eliminating system treatment or disposal capability.

The failure of OWTS causes public health risks associated with uncontrolled sewage discharges during and after storm events that create pathways for human exposure to harmful pathogens and increase risk to human life and property. Functional OWTS provide only basic wastewater treatment, and therefore do not remove nutrients. As a result, they can degrade ecosystems that protect Long Island's south shore against storm surge, and this effect can worsen if OWTS fail.

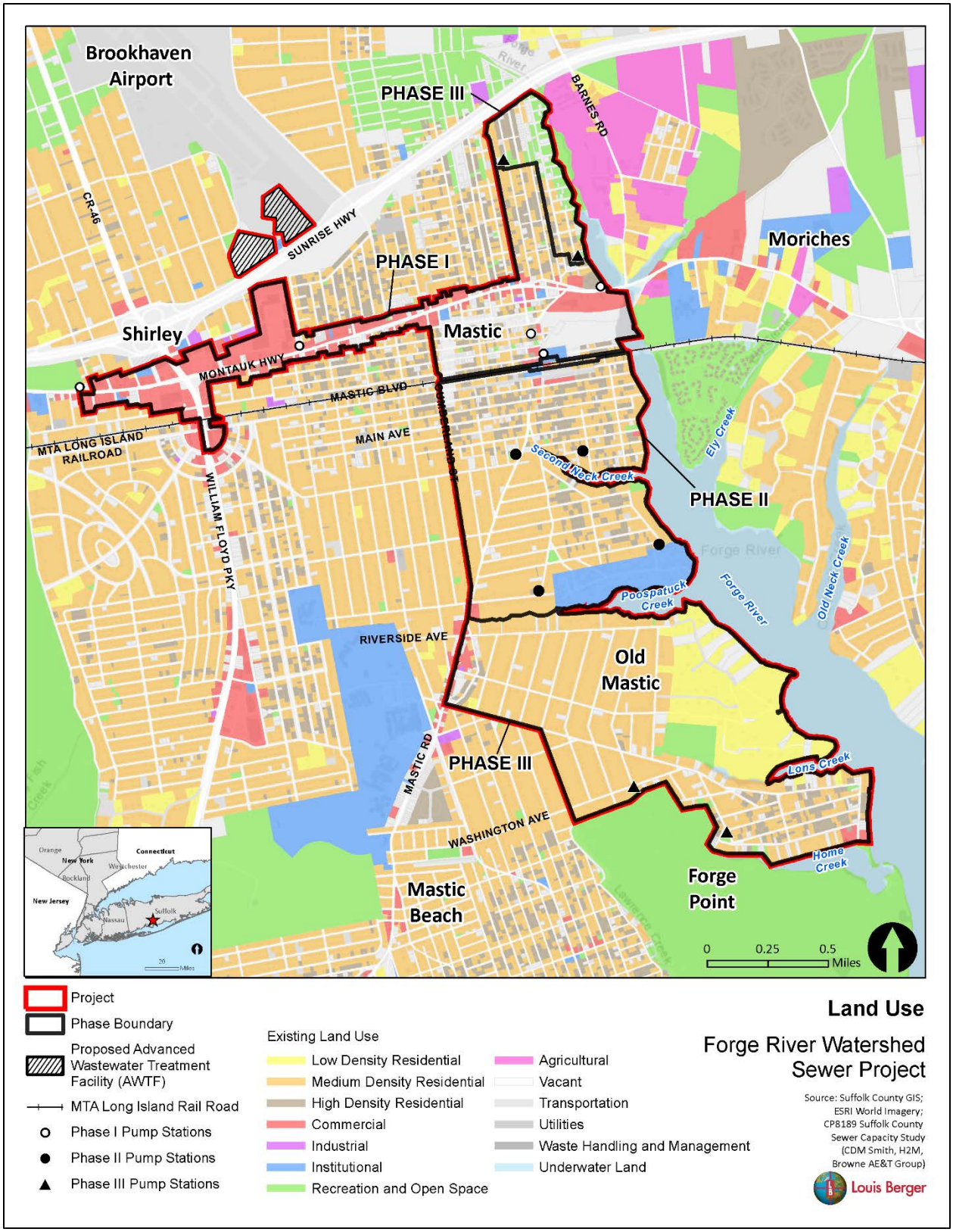

Figure 3-2. Land Use

Risks to human life and property include raw (untreated) sewage backups into buildings or yards and overflows onto the land or into surface waters; health/safety hazards and costs associated with the cleanup of raw sewage backups; loss of wastewater treatment; and beach closures because of non-point source pollution.

According to data provided by the U.S. Army Corps of Engineers (USACE), high levels of nitrogen in surface waters and groundwater from OWTS—as well as from point and non-point source discharges from remaining duck farms, residential fertilizer use, and storm water runoff—lead to elevated levels in the waters of Forge River and the Great South Bay (USACE 2016, 2017). Elevated nitrogen levels reduce the health of tidal marshes (including loss of eelgrass and shellfish), which impairs the ability of the ecosystem to provide protection against storm surge during storm events.

Suffolk County worked with local community representatives on the Task Force to delineate areas where investment in sanitary sewer and wastewater infrastructure could provide environmental, economic, and/or social benefits and identified critical need areas where the implementation of sewer infrastructure may be warranted and should be assessed. The Task Force and 2015 *Suffolk County Comprehensive Water Resources Management Plan* identified the connection of parcels in SSD #3 and the Carlls, Connetquot, Forge, and Patchogue River watersheds as key measures to address several water quality and environmental quality issues. In 2013 and 2014, feasibility studies were prepared for the Forge River watershed to document the sewage collection and treatment/effluent discharge requirements to replace OWTS, associated capital and operation costs, and environmental and economic benefits (CDM Smith 2013, 2014). The feasibility studies were followed by the Forge River Nitrogen Reduction Report in 2014 (amended 2015), which evaluates engineering alternatives for sewering the Mastic-Shirley Sewer District (CDM Smith 2015).

4.0 PROJECT DESCRIPTION

The Proposed Action would establish a Mastic-Shirley Sewer District and construct and operate a collection system with a combination of gravity sewers and low-pressure sewers, a conveyance system consisting of multiple pump stations and force mains, and an AWTF. As detailed designs progress, an exclusively low-pressure conveyance system may also be considered. The AWTF would use either a Membrane Bioreactor (MBR) or Sequencing Batch Reactor (SBR) treatment process. Treated effluent would be discharged into a series of leaching vaults and allowed to infiltrate into the ground.

Detailed descriptions of the individual project components are presented below. **Figure 4-1** through **Figure 4-6** present maps of the drainage zones within the project area and associated gravity sewer mains and low-pressure sewer mains. Phases I through III would result in combined average daily flows of approximately 1.4 mgd, which include the effects of future development and the expansion of businesses that the new sanitary infrastructure could facilitate. Design specifications and details would be refined through the detailed design process.

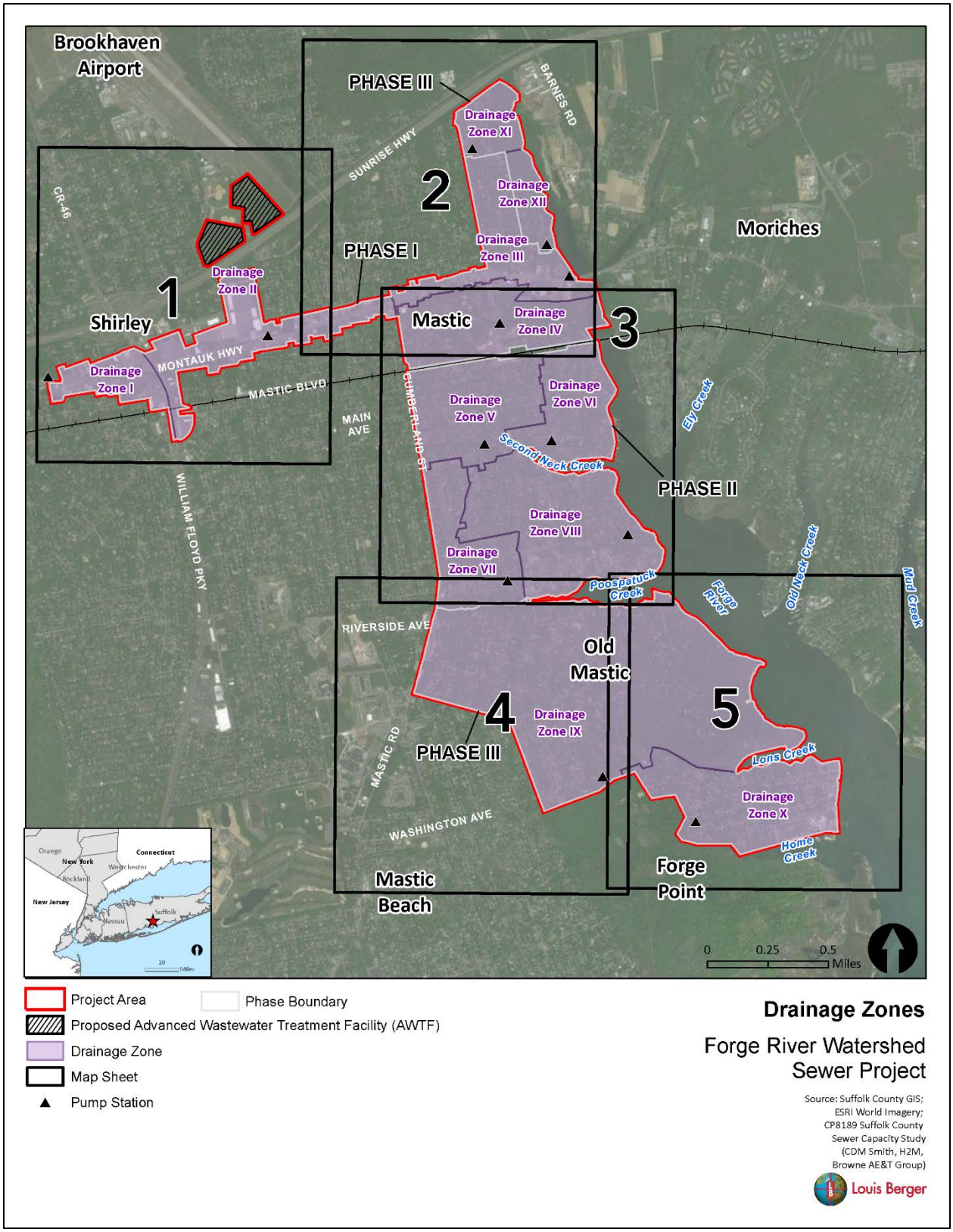

Figure 4-1. Sewer District Drainage Zones Key Map

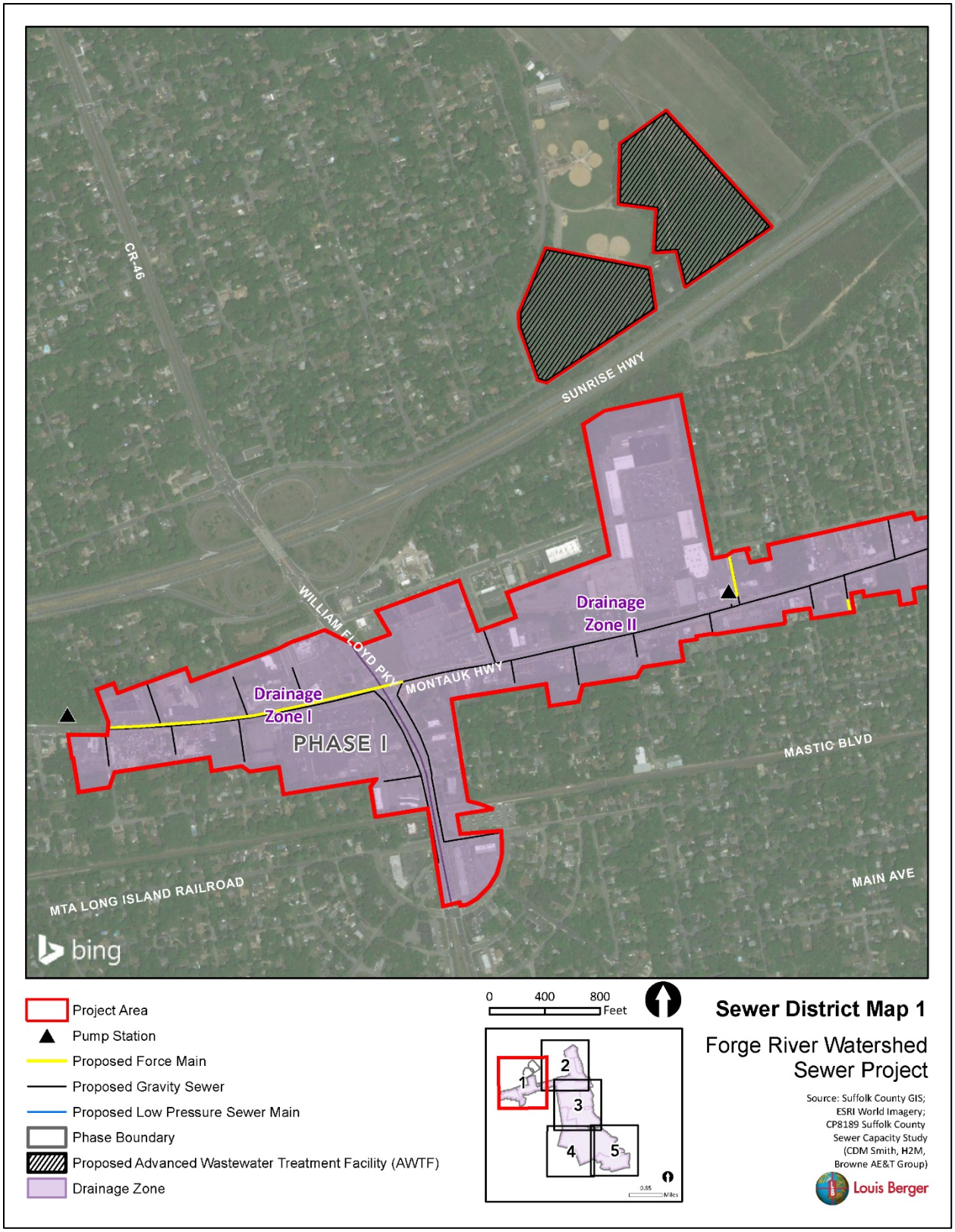

Figure 4-2. Sewer District Map 1

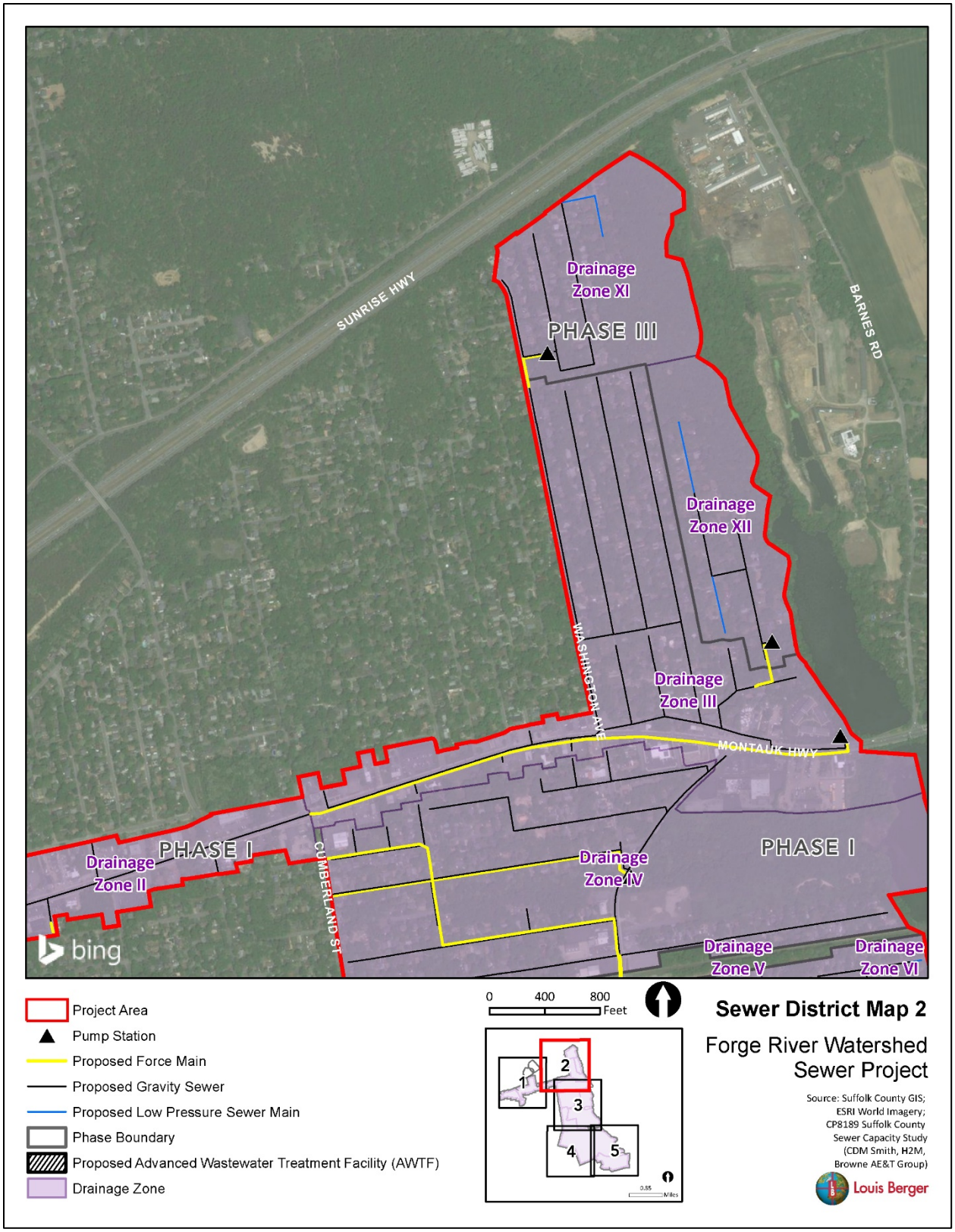

Figure 4-3. Sewer District Map 2

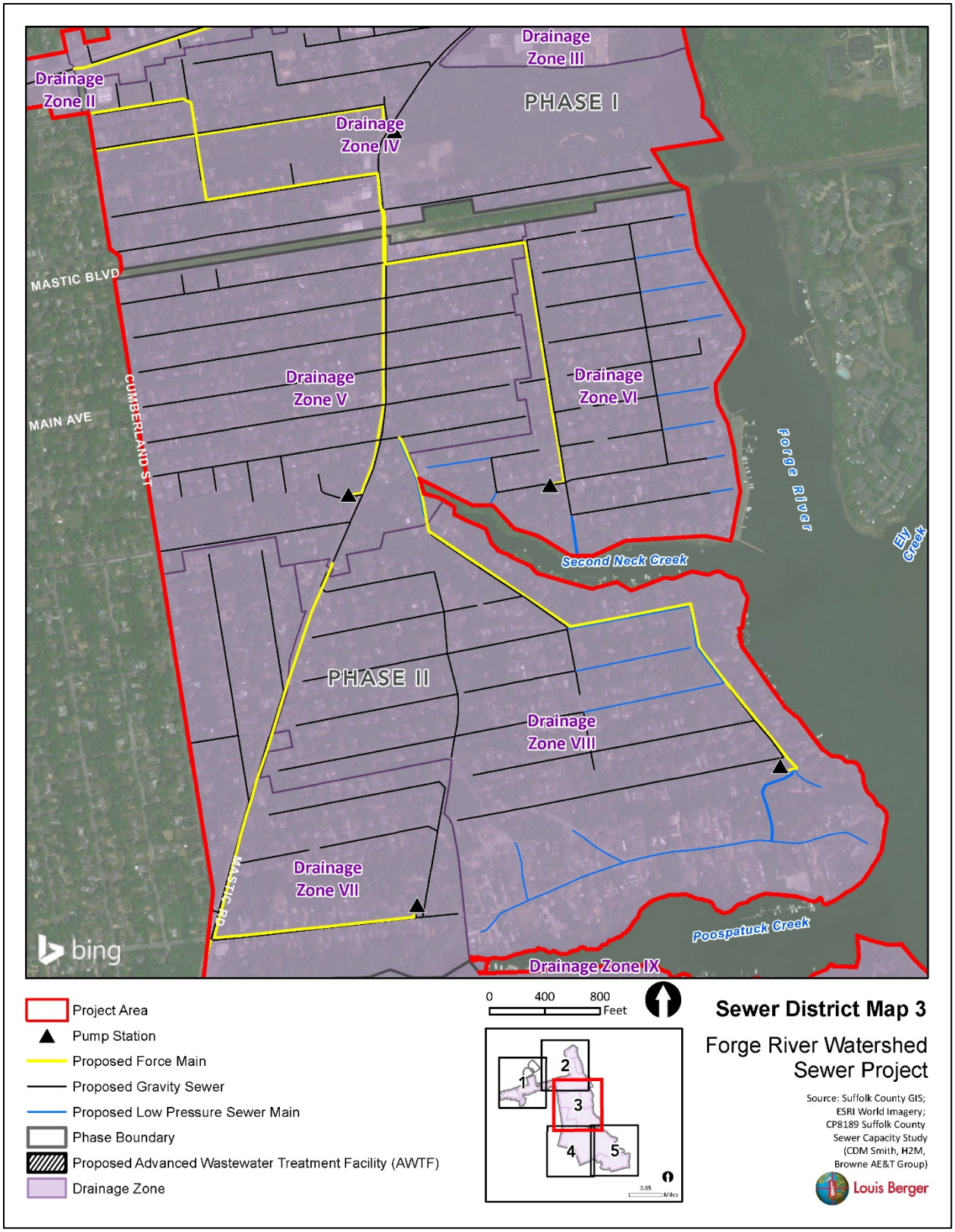

Figure 4-4. Sewer District Map 3

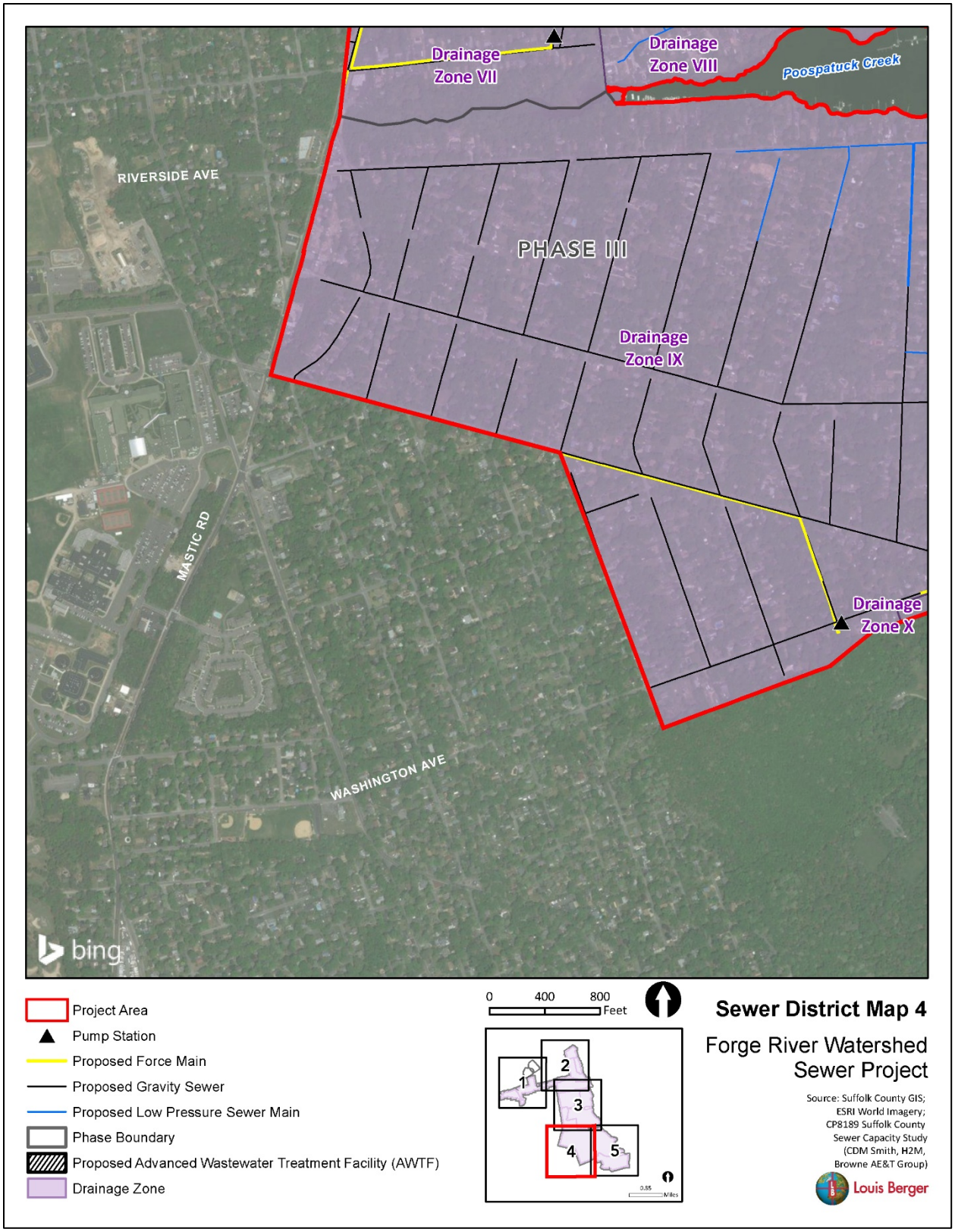

Figure 4-5. Sewer District Map 4

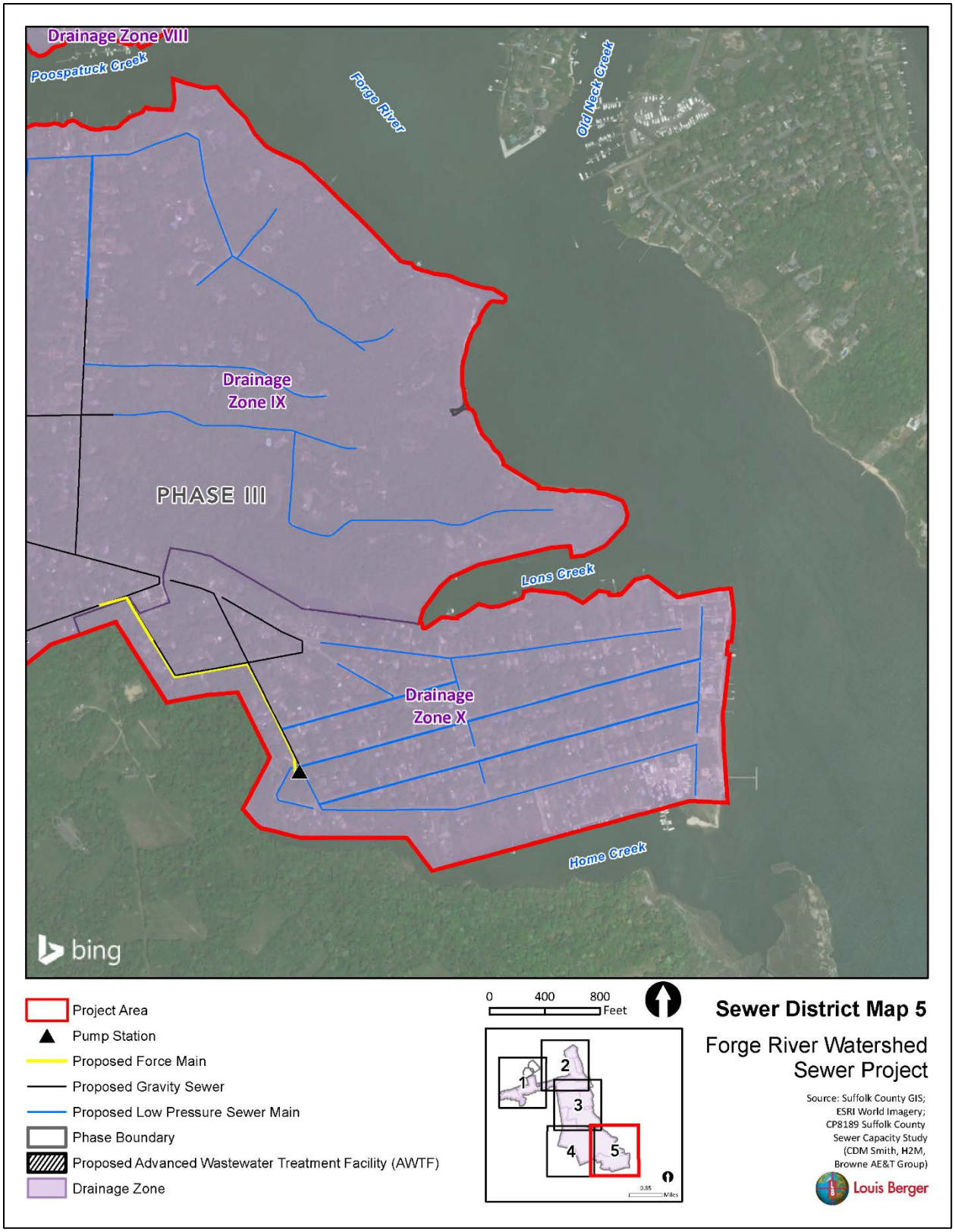

Figure 4-6. Sewer District Map 5

4.1 Combination of Gravity and Low-Pressure Sewers Collection System

4.1.1 Collection

If the collection system includes both gravity and low-pressure sewers, the Montauk Highway Corridor and residential areas, where the depth to groundwater is generally greater than 10 feet, would be served by gravity sewers. In these areas, pipe installation would follow the inclines of the terrain to allow for natural flow to a pump station. Sewers would run within street rights-of-way with lateral (side) connections to adjacent properties. **Figure 4-1** through **Figure 4-6** present maps of the drainage zones within the project area and associated gravity sewer mains and low-pressure sewer mains.

The gravity sewer collection system would consist of approximately 161,500 linear feet of polyvinyl chloride piping ranging in diameter from 8 to 20 inches, and laterals with diameters of 6 or 8 inches. Gravity sewer mains would be installed at depths no less than 6 feet below ground surface (bgs) to provide the required clearances between existing utilities and to maintain sufficient slope to facilitate a self-scouring (gravity-based) velocity of wastewater flow within the pipe.

Approximately 560 manholes would be located and sized in accordance with the minimum intervals recommended in the *Recommended Standards for Wastewater Treatment Facilities* (Health Research, Inc. 2014). Low-pressure sewers would be used in relatively flat areas where the groundwater table is shallow, generally at a depth of 10 feet or less, along Forge River and its tributaries, as well as along Moriches Bay.

The low-pressure sewers would consist of approximately 46,000 linear feet of between 2- and 4-inch diameter high-density polyethylene mains. Parallel mains would be installed in areas where high flows are expected and along streets that have connecting properties located on both sides to provide additional capacity. Areas where parallel force mains are installed would require cross-over manifolds to provide a built-in by-pass capability to maintain operation during maintenance activities and repair work. Singular mains would be run in areas where low flows are expected and/or where properties connecting to the sewer service abut only one side of the street.

The mains would be installed at an appropriate depth to provide the required clearances between existing utilities. Sewer cleanouts would be located along each stretch of low-pressure sewer main installed. Air release manholes and drain manholes would be located at all relative high and low points throughout the network.

Each property would be connected to the low-pressure sewer mains by either a 1.25-inch or 2-inch diameter high-density polyethylene pipe. Each building connection would include a lateral assembly consisting of a buried check valve and curb stop located at the property line. These lateral assemblies would be needed to eliminate potential backflow from the mains to the on-site grinder pump stations and provide a way to shut individual property services off from the rest of the collection system.

Each connected property would operate and maintain an on-site storage tank with level-sensing equipment and a grinder pump. Grinder pumps would be installed outside buildings to the extent practicable. The grinder pumps would be turned on when a pre-set fill level is sensed in the storage tank and turned off after the storage tank is drained to a low-level condition. The pump cycles would be controlled by the capacity of the on-site wet well, the real-time pressure within the common sewer main, and the daily wastewater generation rate of the property. The approximately 300 grinder pumps would be configured to operate based on the average daily and peak hourly

flows expected from each property. All electrical and vent pipes associated with each grinder pump station would be installed at a height higher than the base flood elevation (100-year storm elevation plus 5 feet, Hurricane Sandy inundation plus 4 feet, or 500-year storm elevation, whichever is the most protective). Each grinder pump would be sealed in a watertight pit so it could be submerged. On-line standby spare pump(s) would be included in each grinder pump station to satisfy Suffolk County Department of Health Services (SCDHS) redundancy requirements.

The pumps would be either positive displacement or centrifugal grinder-type. They would operate on a single-speed controller with a 70-gallon storage capacity. Experience indicates that properties with grinder pump stations would have a two- to three-day storage capability if limited water were used. During power outages, grinder pump stations would be capable of running off portable emergency power backup generators operated and maintained by the sewer district. Each grinder pump station would be located either inside the basement of the building it serves or buried outside in the vicinity of the existing OWTS (at a depth of approximately 10 feet bgs), depending on each building's existing plumbing configuration and to minimize disturbance to individual property owners.

4.1.2 Conveyance

4.1.2.1 Pump Stations

Wastewater from the gravity and low-pressure sewers would flow to 12 separate pump stations located throughout the project area. Eleven stations would require single-chamber wet wells and singular force mains to convey flow directly to the tributary sewers to the twelfth pump station via force main.

The twelfth pump station would serve as an influent pump station to the AWTF. This station would be provided with dual-force mains and a chambered wet well to provide operational flexibility during initial low-flow periods.

Each pump station would occupy a site of approximately 2,500 square feet. Each station would be approximately 80 square feet, with a depth up to 25 feet bgs, plus approximately 200 square feet for parking. Additional space may be required at some locations to facilitate site access and storage of materials and equipment during construction activities. The storage capacity of each station would be based on the average daily design flow, and the pump sizes would be selected to handle the peak hourly flows within each drainage zone. Each pump station site would include a wet well, valve and flow meter pits, control building, and emergency backup generator, all of which would be formed from pre-cast concrete.

Each wet well would include variable-speed submersible pumps capable of passing 3-inch diameter solids, as well as redundant standby pumps in accordance with the requirements of Suffolk County Department of Public Works (SCDPW) and SCDHS. The control panels for each pump station would be located inside of a control building designed with exterior architectural accents to blend in with the surrounding areas. Pump station sites would be surrounded by fences and landscaping to inhibit vandalism and provide visual screening. Stations would also include odor-control systems to minimize the potential for nuisance odors to migrate off-site.

Natural gas-powered generators would be installed to the maximum extent possible where gas utility service is available. In those parts of the project area where natural gas is unavailable, diesel-powered generators may be required. Backup generators would be constructed with

sound-attenuating enclosures to minimize disturbances to the surrounding areas. Diesel fuel would be stored on-site in appropriate containers.

At the time this analysis was prepared, the approximate location of each pump station had been determined, but refinement of some locations and selection of individual tax lots (parcels) is subject to further design considerations. As such, the document analyzes the impacts of developing 12 stations on up to 17 potential sites. Suffolk County would acquire pump station sites.

4.1.2.2 Force Mains

The force mains would consist of approximately 42,500 linear feet of DR-18 polyvinyl chloride piping, ranging in diameter from 6 to 16 inches. All force mains would be installed at a minimum depth of 4 feet bgs.

Cleanouts would be located at regular intervals and at locations where bends in the force main exceed 45 degrees along the entire route. Where fittings and cleanouts would be installed, the pipe material would be required to transition from polyvinyl chloride to ductile iron. Air release manholes and drain manholes would be installed at relative high and low points, respectively, along the force main routes to minimize the potential for pressure surges and water hammer (i.e., the concussion and accompanying noise that result when a volume of water moving in a pipe suddenly stops or loses momentum).

4.2 Exclusively Low-Pressure Sewers Collection System

If a component of the Proposed Action were to employ a collection system composed exclusively of low-pressure sewers, the collection system would entail:

- installation of approximately 207,500 feet 2- to 4-inch diameter low-pressure force mains within the streets;
- provision of 1.25-inch service connection line for each property, extending from the curb to the building; and
- installation of a simplex grinder pump on each of the 3,398 properties.

No pump stations would be required for an exclusively low-pressure sewer. Conveyance would occur within mains similar to those discussed in Section 4.1.2.

4.3 Advanced Wastewater Treatment Facility

4.3.1 Treatment Method

The conveyance system would direct wastewater flows to an AWTF located on two non-contiguous parcels totaling 30.7 acres on the southwestern portion of Brookhaven Calabro Airport property (the western parcel is 13.7 acres and the eastern parcel is 17 acres). The AWTF structures would be located in the northeast portion of the 13.7-acre parcel, while the on-site subsurface leaching structures would be located on the second parcel. The AWTF would have a hydraulic daily design flow capacity of 1.4 mgd, which is equivalent to the projected average daily design flow of the collection and conveyance system. The proposed AWTF would use either an MBR or an SBR.

4.3.1.1 Membrane Bioreactor Process

Figure 4-7 presents a general MBR treatment process. Wastewater would be directed to the AWTF and discharged to influent screening equipment that would be sized to handle peak-hour flows and remove solids and debris. These solids and debris would be washed and compacted on-site and conveyed into a container for off-site disposal. The wastewater passing through the influent screens would flow by gravity into an aerated equalization tank, which would be sized to provide capacity for 20 percent of the average daily flow, and would be used to regulate constant flow through the facility to maintain the process and result in more consistent treatment efficiency. Flow from the equalization tank would discharge into parallel pre-anoxic basins, which would provide mechanical mixing to facilitate denitrification of the wastewater. The wastewater would then flow via gravity into downstream aeration basins where nitrification of the wastewater would occur.

Following nitrification, wastewater would be conveyed to downstream post-anoxic basins for denitrification. Effluent from the post-anoxic basins would enter parallel downstream MBRs to remove solids remaining in the process stream and to filter the wastewater prior to discharging to the on-site subsurface leaching structures. Each membrane tank would be sized to handle a proportioned amount of the process flow to provide redundancy in the event that one tank is taken offline for maintenance. Additionally, one of the membrane tanks would be used as a membrane bioreactor thickening/standby MBR in the event that one of the online MBR basins is taken offline for maintenance. The solids removed in the clarification portion of the process would be either returned to the biological process or pumped to a sludge holding tank for further conditioning. Sludge thickening would be provided at the AWTF to increase the solids concentration to 3 percent prior to liquid sludge disposal to the Bergen Point WWTF (CDM Smith 2014). All process tanks would be indoors.

As further explained in the Alternatives Screening Report (Appendix B.3), the MBR process would produce a total nitrogen concentration in the effluent of between 3 and 5 milligrams per liter (mg/L), commonly described as the “limit of technology” for nitrogen removal.

4.3.1.2 Sequencing Batch Reactor Process

Figure 4-7 presents the SBR treatment process. If an SBR is selected as the treatment option, wastewater would be directed to the AWTF and discharged to influent screening equipment that would be sized to handle peak-hour flows and remove solids and debris. These solids and debris would be washed and compacted on-site and conveyed into a container for off-site disposal. The wastewater passing through the influent screens would flow by gravity into an aerated equalization tank to regulate constant flow through the facility to maintain the process and result in more consistent treatment efficiency. Flow from the equalization tank would discharge into parallel process bioreactor tanks where anoxic, aeration, and clarification would be combined in one common tank to achieve nitrification/denitrification, eliminating the need for additional tanks and recycle flows between tanks. Then the wastewater would flow via gravity into the post-equalization tank.

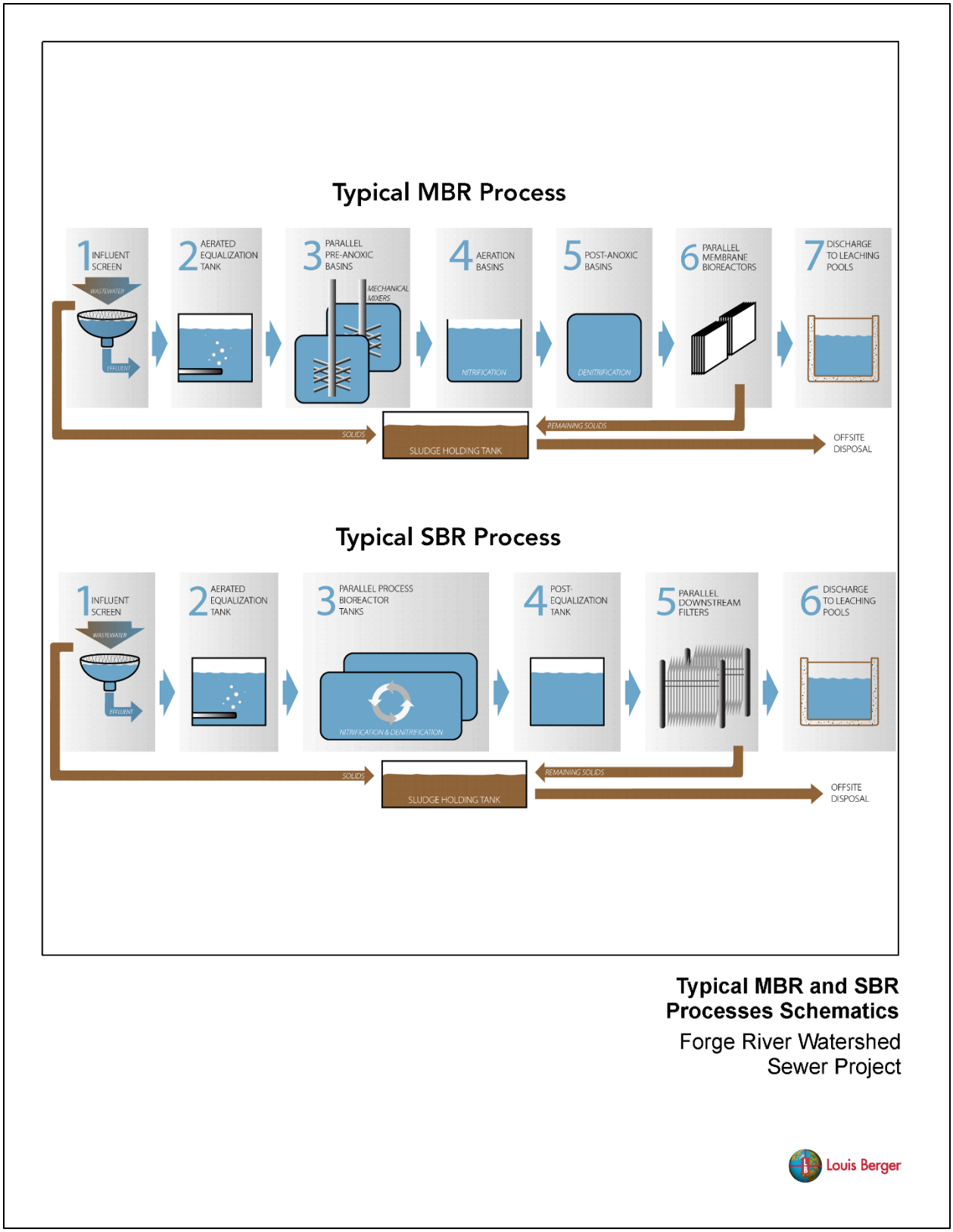

Figure 4-7. Typical Membrane Bioreactor and Sequencing Batch Reactor Processes Schematics

Treated effluent from the post-equalization tank would enter parallel downstream filters to remove solids remaining in the process stream and to filter the wastewater prior to discharging to the on-site subsurface leaching structures. Each bioreactor tank and filter would be sized to handle a proportioned amount of the process flow to provide redundancy in the event that one tank is taken offline for maintenance. The solids removed in the clarification portion of the process would be either returned to the biological process or pumped to a sludge holding tank for further conditioning. Sludge thickening would be provided at the AWTF to increase the solids concentration to 3 percent prior to liquid sludge disposal to the Bergen Point WWTF (CDM Smith 2014). All process tanks would be indoors.

As explained in the Alternatives Screening Report (Appendix B.3), the SBR process has been documented to achieve the limit of technology for nitrogen removal (a total nitrogen concentration in the effluent of between 3 and 5 mg/L).

4.3.2 Facility Sizing

Based on SCDPW and SCDHS requirements, up to 5 acres would be required for the AWTF buildings and parking, which would be accommodated on the 13.7-acre parcel at the AWTF site. Design flows from the project area would require approximately 5 additional acres for the subsurface leaching area. This area is based on an effluent loading rate of 10 gpd/square foot with 8-foot diameter leaching structures with an effective depth of 16 feet per structures and a separation distance between structures of 8 feet. The leaching area would require the installation of 350, 8-foot diameter leaching with approximately 90, 5-foot diameter distribution structures. The leaching structures would be located on the 17-acre parcel.

All process tanks would be located inside a building designed with architectural features that blend into the surrounding area. The building would be equipped with an odor control system to minimize potential odors from migrating off-site during normal operations. An emergency standby power generator would be provided to maintain system operation during periods of power loss. The generator would be fueled by natural gas and located inside an on-site weatherproof enclosure. The process controls, laboratory, motor control center, pumps, storage, and a small locker room would also be integral to this building.

4.4 Implementation and Construction

4.4.1 Sewer District

The sewer program would be initiated by creation of a Mastic-Shirley Sewer District through public referendum. If approved by the voters, the system could be designed, constructed, and implemented within approximately six years. An NYS licensed professional engineer would prepare all plans, specifications, and reports for the design of the AWTF and collection system (Suffolk County Sanitary Code, Article 7).

Construction of the proposed collection, conveyance, and treatment systems would be undertaken in concurrent phases and would be completed in four years.

Gravity sewers would be installed through open cut excavation the length of each roadway where the new line would occur. Depending on the depth to groundwater, dewatering could be required in some locations. Upon pipeline installation, the cuts would be backfilled and the roadway surface restored.

It is possible that directional drilling or other low-impact installation techniques would be used to install the low-pressure sewers. Directional drilling would be advantageous because it would minimize roadway excavation, restoration, and dewatering.

Excavation for the AWTF and leaching structures would occur over approximately one year, followed by three years of construction. AWTF construction would include clearing and grading for the access road, parking lot, building footprint, and leaching structure area. Excavation would be required for building footings, process tanks, subsurface leaching structures, and influent and effluent piping. Excavation depths for the process tanks would be approximately 25 feet bgs. Excavation for the leaching structures would likely need to extend to approximately 20 feet bgs to accommodate the concrete leaching structures, adequate cover over the structures, and a base layer of sand.

To provide a conservative analysis, this EIS assumes that approximately 2 million cubic yards of material would be removed during construction of the sewer district systems, under either a combined gravity and low-pressure system or an entirely low-pressure system. Of that total, approximately 658,000 cubic yards associated with excavation of the AWTF infrastructure and the pump stations would be hauled off-site for beneficial re-use or disposal, based on an evaluation of the material. Although this material may be re-used within the project area to backfill traditional OWTS on individual parcels, the assumption of off-site hauling provides for a more conservative impact analysis. The remaining 1.3 million cubic yards associated with excavation for laterals, low-pressure sewers, grinder pumps, and gravity sewers (if used) would remain on-site for use as backfill.

Suffolk County does not intend to connect vacant parcels to the sewer district. However, the County would not prohibit the connection of such parcels to the district at a later date.

4.4.2 Removal of Existing OWTS

Removal or abandonment of the existing OWTS would be performed in accordance with Section 740-14 of the Suffolk County Code, *Discontinued use of cesspools and septic systems*. A licensed septage hauler would be used to remove the solids from the individual systems and clean the septic tank, leaching structures, and cesspools. The sludge and wastewater would be removed via vacuum truck and hauled to an approved wastewater treatment facility. The preference would be to abandon systems in place to reduce generation of solid waste and associated hauling and disposal. When infrastructure components must be removed because of contamination or other potential hazards, as determined by SCDHS, any recyclable components (i.e., steel tanks) would be recycled, if possible. The remaining non-recyclable materials would be handled as construction and demolition solid waste and disposed in accordance with the Town of Brookhaven Local Solid Waste Management Plan (Town of Brookhaven 2017). OWTS abandonments and removals would require the addition of clean materials to replace the voids left by system components. Excess earth from AWTF leaching pool excavation would be considered as fill material for OWTS to mitigate the need for virgin fill materials. The soil re-used at residential properties should meet the New York State Department of Environmental Conservation (NYSDEC) residential soil cleanup objectives. The ground surface following construction activities would be landscaped or otherwise returned to its original condition to prevent soil erosion.

5.0 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

This section discusses the potential impacts of the Proposed Action on each environmental resource topic.

5.1 Environmental Analysis Framework

The analyses of potential impacts evaluate conditions with and without the Proposed Action during the foreseeable design life of the alternative. Future year conditions with and without the Proposed Action are compared as a basis for presenting incremental change and identifying impacts. The study area for the environmental analysis varies for each resource topic and is described in the methodology discussions.

The affected environment describes the existing social and environmental resources that may be affected by the Proposed Action. The descriptions focus on those resources that are most likely to be affected by the Proposed Action, either adversely or beneficially.

In accordance with NYSDEC's SEQRA regulations found at 6 NYCRR Part 617, direct, indirect, and cumulative impacts are assessed for the Proposed Action and its alternatives.

- **Direct Impacts** are those that are caused by the action and occurring at the same time and place.
- **Indirect Impacts** are those reasonably foreseeable impacts caused by the action but occurring later in time or farther removed in distance. They include effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems.
- **Cumulative Impacts** are those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

The impact analysis follows the same approach for all resource categories. Impacts are characterized by criteria that describe their context, type, duration (i.e., long- and short-term impacts), and intensity.

- **Context** refers to the spatial and social scale over which impacts could occur. The Council on Environmental Quality (CEQ) regulations require that the significance of an action be analyzed in several contexts, from the macro level (regional) through the micro level (local).
- **Type** describes the beneficial or adverse nature of the impact. Impacts that improve the state of a resource are considered beneficial, while impacts that degrade a resource are considered adverse.
- **Duration** describes the temporal considerations of how long the impacts are expected to last. Short-term impacts are defined as either those associated with the construction period or those that are not permanent, while long-term impacts are defined as those occurring throughout the design life of the Proposed Action.
- **Intensity** refers to the severity of impact, defined as minor, moderate, or major.

When possible, quantitative information is provided to establish potential impacts, and the potential impacts are evaluated qualitatively based on the criteria listed in **Table 5.1-1**. These

criteria are expanded upon in the methodology section for each resource topic. Significant impacts are defined as "major and adverse."

Table 5.1-1. Evaluation Criteria for Potential Impacts

Impact Scale	Criteria
No Effect	The resource area would not be affected, and there would be no effects.
Negligible Impact	Changes would be non-detectable or, if detected, the impacts would be slight and local. Impacts would be well below regulatory standards, as applicable.
Minor, Adverse Impact	Changes to the resource would be measurable, but the changes would be small and localized. Impacts would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse impacts.
Moderate, Adverse Impact	Changes to the resource would be measurable and have both localized and regional impacts. Impacts would be within or below regulatory standards, but historical conditions would be altered temporarily. Mitigation measures would be necessary, and the measures would reduce any potential adverse impacts.
Major, Adverse Impact	Changes to the resource would be readily measurable and would have substantial consequences on local and regional levels. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse impacts would be required to reduce impacts, but long-term changes to the resource would be expected.
Beneficial Effect	There would a positive effect on the resource.

5.1.1 Resource Topics Carried forward for Detailed Analysis

GOSR developed a list of resources to be studied in detail that potentially could be affected, either beneficially or adversely, by the Proposed Action. GOSR identified these resource topics based on agency and public scoping efforts, as well as federal and state laws, regulations, executive orders, and related documentation.

This EIS focuses on the resource topics that are of greatest interest to the public or have potential for environmental impacts, as determined during the scoping process. The public scoping process is summarized in Appendix B.4, Public Scoping Document. The following resource topics are analyzed in detail in this EIS:

- Topography and Soils
- Air Quality
- Water Quality
- Wetlands and Coastal Resources
- Floodplains
- Vegetation
- Wildlife and Fish
- Threatened and Endangered Species and Critical Habitats
- Cultural Resources
- Aesthetic Resources

- Land Use and Planning
- Socioeconomics
- Environmental Justice
- Noise
- Transportation
- Community Services and Facilities
- Public Health and Safety
- Climate Change
- Public Services and Utilities

5.1.2 Resource Topics Dismissed from Detailed Analysis

In accordance with SEQRA regulations, an EIS should focus on potentially significant adverse impacts and eliminate consideration of those impacts that are irrelevant or non-significant (6 NYCRR 617.8). Five resource topics were considered in the preparation of this EIS but were dismissed from detailed study because the Proposed Action would not result in environmental effects. A brief discussion of each topic and the reason for dismissal follows.

5.1.2.1 Geology

Bedrock in the project area is more than 2,000 feet from the surface and would not be affected by excavation activities. Therefore, no effects related to geology are expected, and the topic is not included in this EIS.

5.1.2.2 Coastal Barrier Resources Act, Coastal Erosion Hazard Areas, and Otherwise Protected Areas

In the 1970s and 1980s, Congress recognized that certain actions and programs of the federal government have historically subsidized and encouraged development on coastal barriers, resulting in the loss of natural resources; threats to human life, health, and property; and the expenditure of millions of tax dollars each year. To remove the federal incentive to develop these areas, the Coastal Barrier Resources Act of 1982 designated relatively undeveloped coastal barriers along the Atlantic and Gulf coasts as part of the John H. Chafee Coastal Barrier Resources System and made these areas ineligible for most new federal expenditures and financial assistance (USFWS 2016). The Coastal Erosion Hazard Law (ECL Article 34) empowers NYSDEC to identify and map coastal erosion hazard areas and to adopt regulations (6 NYCRR Part 505). The Coastal Erosion Hazard Area Permit Program manages regulated activities or land disturbance on properties within the coastal erosion hazard areas. The Proposed Action does not include land within the Coastal Barrier Resource Act system or a mapped coastal erosion hazard area. Therefore, coastal barriers, otherwise protected areas, and coastal erosion hazard areas are not evaluated in this EIS.

5.1.2.3 Wild, Scenic, and Recreational Rivers

The project area does not contain any rivers classified as wild, scenic, or recreational under the Wild & Scenic Rivers Act (Public Law 90-542; 16 USC 1271 et seq.). In addition, Forge River is not a Wild, Scenic, or Recreational River under NYSDEC regulations found at 6 NYCRR 666.

Therefore, an analysis of impacts on wild, scenic, and recreational rivers is not included in this EIS.

5.1.2.4 Open Space and Recreation

The Proposed Action would not involve construction within any designated public open spaces or parks. Therefore, an analysis of impacts on open space and recreation is not included in this EIS.

5.1.2.5 Farmland

Based on the soil classifications presented in the Natural Resources Conservation Service (NRCS) report obtained for the proposed project area in January 2017, approximately three-quarters of the land in the project area is classified as important farmland. However, because all of the land within the project area is committed to urban development, it is not subject to the Farmland Protection Policy Act. In addition, the project is not located within an agricultural district or existing operational farmland. Therefore, an analysis of impacts on farmland is not included in this EIS.

5.2 Topography and Soils

5.2.1 Methodology

5.2.1.1 Study Area

The study area for topography and soils includes areas within the boundaries of the Forge River project area that would be used as construction staging areas for equipment and supplies. Construction activities are not expected to occur outside these areas.

5.2.1.2 Approach

Impacts were assessed based on the extent of changes to surficial topography and disturbance to soils, including natural, undisturbed soils; the potential for increased soil erosion resulting from disturbance; and limitations associated with the soil types that could affect the ability to support existing and future structures.

5.2.2 Existing Conditions

Long Island is underlain by Coastal Plain Deposits, a mass of wedge-shaped, unconsolidated geological deposits of sand, gravel, silt, and clay over southward-sloping, consolidated bedrock. The thickness of these unconsolidated, glacial, and deltaic deposits ranges from more than 2,000 feet along the south shore barrier beaches of Suffolk County to a few hundred feet in the northwestern sections of Nassau County. This sequence of unconsolidated deposits consists of several distinct geological units ranging from late Cretaceous through Pleistocene, with some recent deposits near shores and streams. Specific formations include the Monmouth Group, the Matawan Group, and the Magothy Formation.

The topography of the study area is generally sloped, with the highest elevation of approximately 50 feet above sea level located in the northwest portion at the proposed AWTF parcel. The elevation declines across the study area in the southeast direction to approximately 5 feet above sea level at the watercourses (**Figure 5.2-1**). Based on topographic analysis of the proposed AWTF site, the land surface is mostly flat with some gentle slopes.

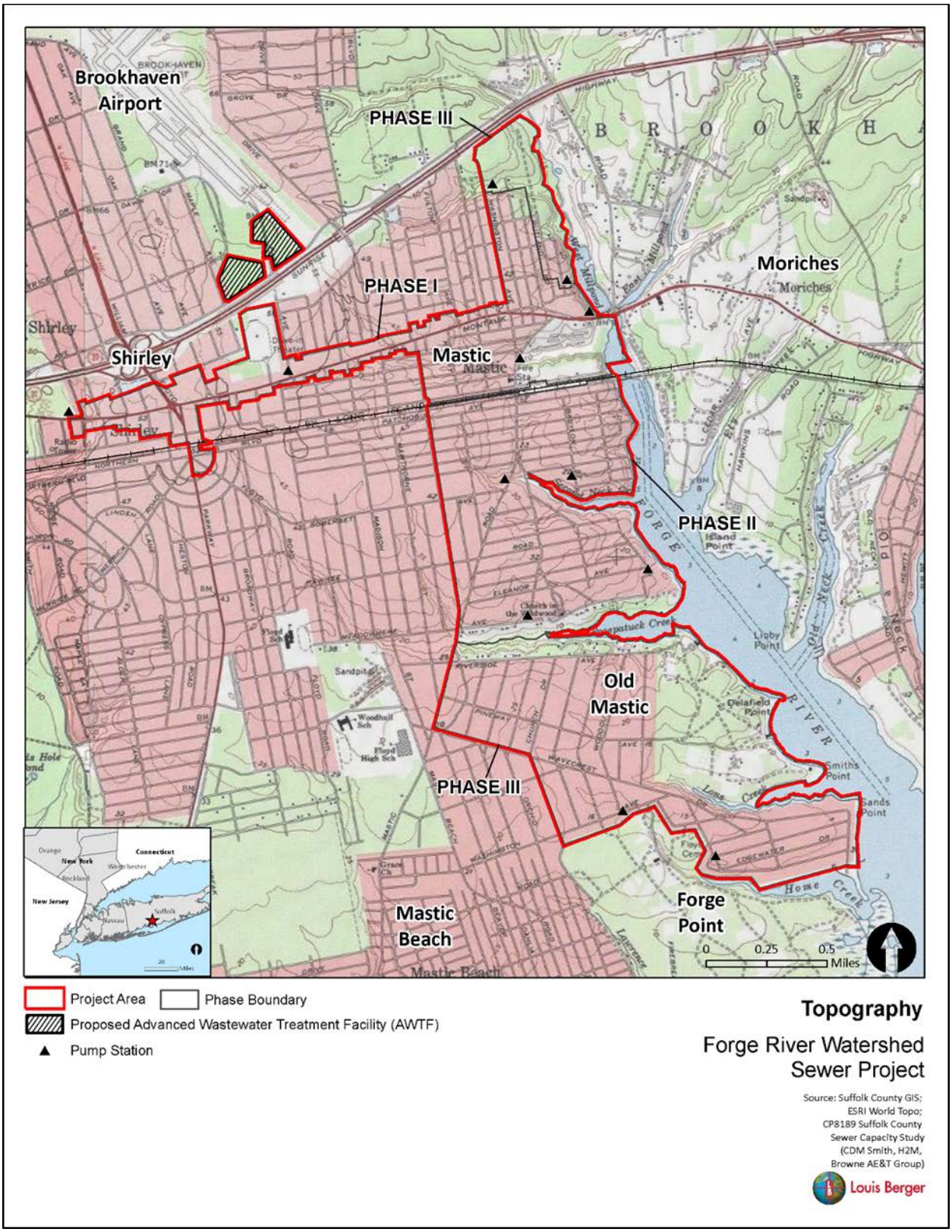

Figure 5.2-1. Topography

NRCS mapped the soils in the study area (**Figure 5.2-2**). The study area includes several prevalent soil types, including the loamy sands of the Riverhead series and Plymouth series, as well as the sands of the Carver and Plymouth series. Wareham loamy sand, Deerfield Sand, and Swansea muck complete the soil units present (**Table 5.2-1**). Characteristics of the soils found in the study area are presented in Appendix B.11, Soil Characteristics.

Three-quarters of the study area consists of farmland soil (i.e., approximately 1,200 acres out of the total 1,662 acres), and two classifications of farmland soils are present: "farmland of statewide importance" soils (approximately 375 acres) and "all areas are prime farmland" soils (approximately 818 acres). Deerfield sand, Plymouth loamy sand for 0 to 3 and 3 to 8 percent slopes, and Wareham loamy sand make up the "farmland of statewide importance" soils classification, while Riverhead sandy loam from 0 to 3 percent and 3 to 8 percent slopes and Sudbury sandy loam make up the "all areas are prime farmland" soils classification (**Table 5.2-1**; **Figure 5.2-3**).

Hydric soils also are present in the study area; approximately 20 acres (2 percent) of the soils in the study area have a hydric rating. These units include Deerfield sand, Swansea muck, and Wareham loamy sand (**Table 5.2-1**; **Figure 5.2-3**). The presence of hydric soil indicates that the material was formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Construction in areas of hydric soil during the saturation period would require dewatering during construction operations. Further, any materials used in the construction of subsurface components located in hydric soils would need to be evaluated for resistance to degradation under saturated conditions. Impacts on hydric soils in wetlands are analyzed in Section 5.5.

The known saturated hydraulic conductivity of soils in the study area ranges from less than approximately 18 micrometers per second to approximately 137 micrometers per second, which represents a qualitative range of moderately rapid to rapid. Hydraulic conductivity is an indication of how quickly wastewater would infiltrate into the soil. The hydraulic conductivity of some soil types, including urban-source materials (e.g., cut and fill land and fill land) and certain natural formations (e.g., tidal marshes and recharge basins) are not available.

Soils with a saturated hydraulic conductivity characterized as rapid account for approximately 45 percent of those in the study area that have values, while those categorized as moderately rapid comprise the remaining 55 percent.

Based on the observed saturated hydraulic conductivities, it is unlikely that that study area soils would cause effluent backups during the leaching process. See Section 5.4, Water Quality, for an analysis of the hydraulic conductivity of the soils and associated impacts of the leachate on existing groundwater wells.

5.2.2.1 Contaminated Soils

Searches of state and federal contaminated site databases yielded no findings for active or archived sites within 1 mile of the study area. Searched sites include:

- NYSDEC Environmental Site Data Search
- U.S. Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation, and Liability System Public Access Database
- EPA Resource Conservation and Recovery Act Envirofacts Search

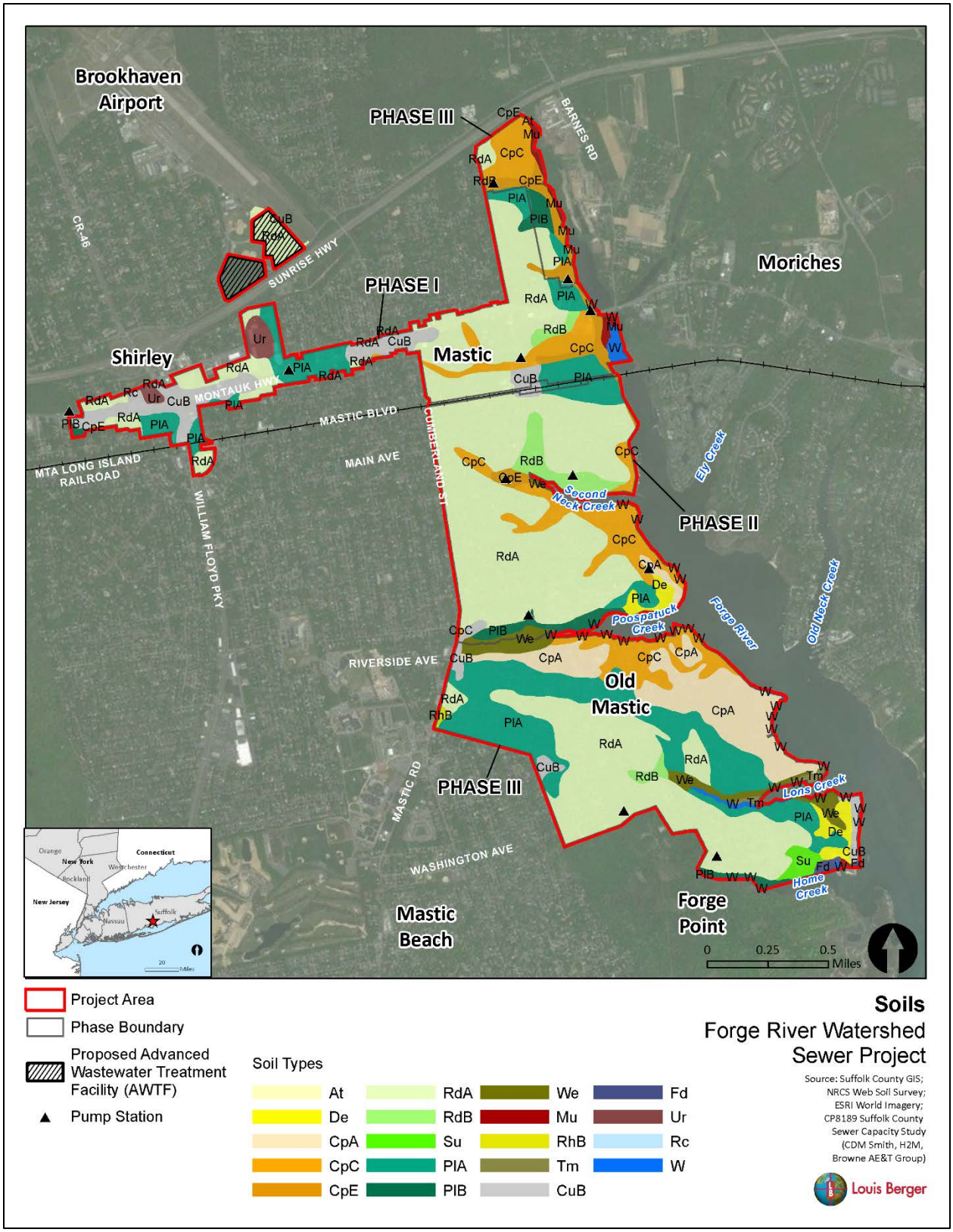

Figure 5.2-2. Soils

Table 5.2-1. Soil Types within the Study Area

Map Unit Symbol	Map Unit Name	Acres in Area of Interest	Percent of Area of Interest	Erosion hazard (K factor)	Hydric Rating
At	Atsion sand	0	0.0%	Not rated or not available	65
CpA	Carver and Plymouth sands, 0 to 3 percent slopes	129.4	7.90%	Not rated or not available	0
CpC	Carver and Plymouth sands, 3 to 15 percent slopes	157.9	9.60%	Not rated or not available	0
CpE	Carver and Plymouth sands, 15 to 35 percent slopes	38.1	2.30%	Not rated or not available	0
CuB	Cut and fill land, gently sloping	81.5	5.00%	Not rated or not available	0
De	Deerfield sand	22.7	1.40%	Not rated or not available	5
Fd	Fill land, dredged material	2.8	0.2%	Not rated or not available	0
Mu	Swansea muck, 0 to 1 percent slopes, coastal lowland	7.4	0.50%	Not rated or not available	100
PlA	Plymouth loamy sand, 0 to 3 percent slopes	284.9	17.40%	0.10	0
PlB	Plymouth loamy sand, 3 to 8 percent slopes	29.9	1.80%	0.10	0
Rc	Recharge basin	0.1	0.0%	Not rated or not available	0
RdA	Riverhead sandy loam, 0 to 3 percent slopes	769.2	46.90%	0.15	0
RdB	Riverhead sandy loam, 3 to 8 percent slopes	39.2	2.40%	0.15	0
RhB	Riverhead and Haven soils, graded, 0 to 8 percent slopes	1.5	0.1%	0.17	0
Su	Sudbury sandy loam	9.6	0.6%	Not rated or not available	0
Tm	Tidal marsh	4	0.2%	Not rated or not available	95
Ur	Urban land	13.9	0.80%	Not rated or not available	0
W	Water	11.4	0.70%	Not rated or not available	0
We	Wareham loamy sand	37.2	2.30%	Not rated or not available	60

Source: NRCS (2017a,b)

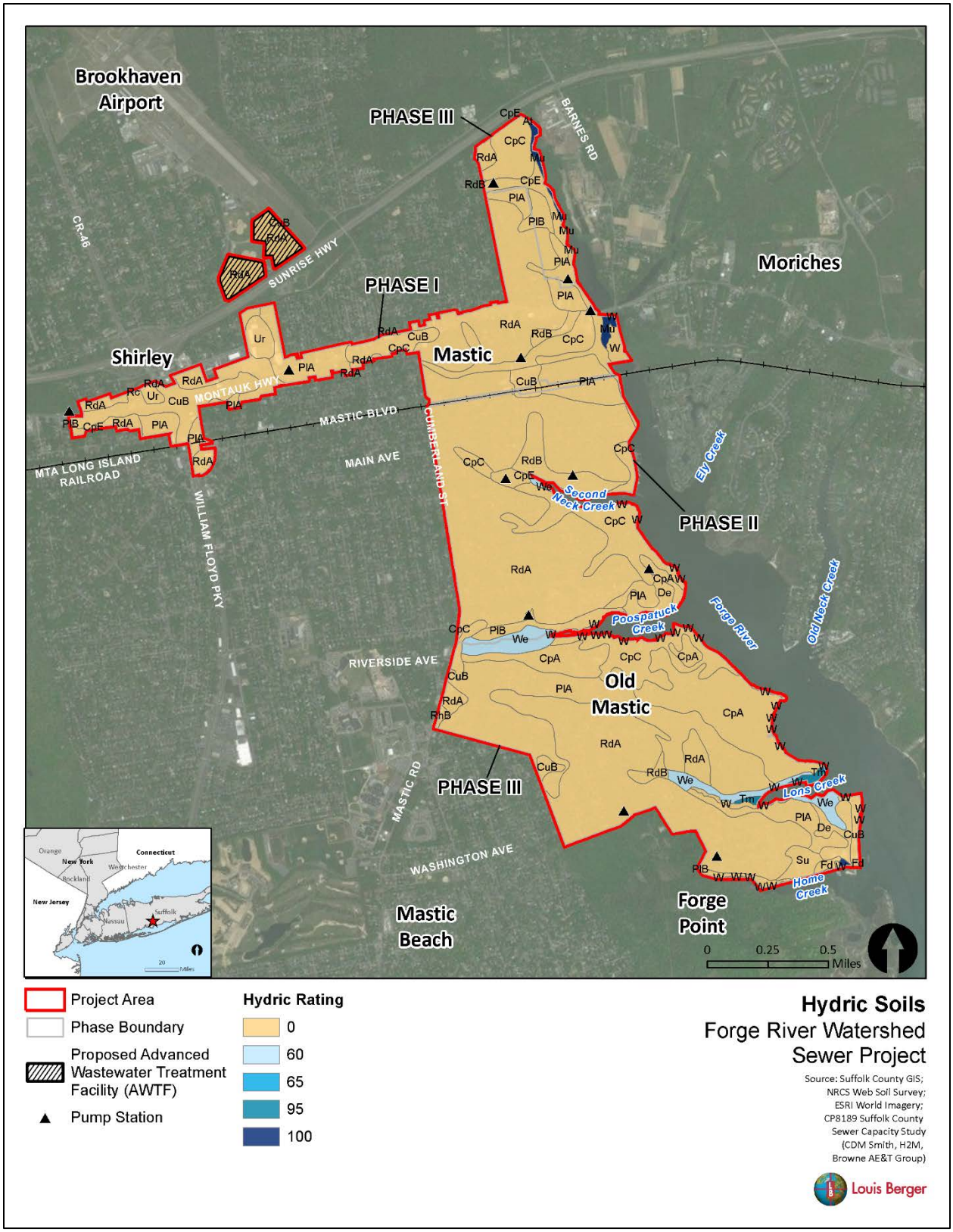

Figure 5.2-3. Hydric Soils

5.2.3 Potential Impacts and Proposed Mitigation

5.2.3.1 Construction

Topographic Impacts

Construction of the collection system would require clearing and grading for pump stations (if a combined collection system is pursued) and associated parking spaces. Excavation would be required for pump stations (approximately 25 feet bgs), force mains (at least 4 feet bgs), gravity sewers (at least 6 feet bgs), low-pressure sewers (approximately 6 feet bgs), grinder pump stations (approximately 10 feet bgs), and service laterals and grinder pumps (approximately 5 feet bgs). Once construction is complete, the excavated areas for all laterals, pipes, grinder pumps, and mains would be backfilled to the pre-construction grade. At pump station locations, excavated areas would be occupied by the foundations of pump station buildings, and no other changes to the topography of these sites would occur. As a result, construction of the new collection and conveyance system would have no effect on the topography of the study area.

Construction of the AWTF would alter the existing topography within the proposed footprint of the facility and would result in negligible impacts on the elevation of the land surface outside the footprint of the facility.

Construction of the AWTF would also require clearing portions of the site and grading for the access road, buildings, and parking lot. Excavation would be required for building footings (approximately 6 to 10 feet bgs), treatment tankage inside building (approximately 25 feet bgs), influent and effluent piping (approximately 4 to 6 feet bgs), and leaching structures (20 feet bgs). Extensive excavation that would greatly alter the existing elevation (other than for built structures) would not be necessary. The exact amount of grading required would be determined during detailed design.

Construction of the proposed sewer district would have negligible, short-term impacts on the topography of the study area. This determination applies regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

Soil Impacts

Compaction resulting from erosion would reduce the infiltration rate of water, thereby reducing moisture replenishment to the soils. Further, compaction would reduce the water-holding capacity of a soil, resulting in poorer plant growth and increased susceptibility to drought (NRCS 2000).

Erosion would result in minor, adverse impacts on soils in the study area. While construction would not affect a large acreage of land in relation to the entire watershed, the risk of erosion is significantly higher for disturbed land than it is for planted land. Construction activities would result in a minor, adverse impact on soils by degrading soil quality (e.g., loss of nutrients and organic matter, loss of nutrient holding capacity, density increase, and compaction from heavy equipment) (NRCS 2000).

Overall, short-term, localized soil impacts from construction would be minor and adverse. This determination applies regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued. See Section 5.4, Water Quality, for a discussion of impacts on groundwater and impacts related to hazardous materials.

5.2.3.2 Operation

Replacing permeable land with impermeable surfaces (e.g., buildings and parking lots) would have a minor, adverse impact on soils.

5.2.3.3 Indirect Impacts from Growth Inducement

Topography along Montauk Highway is generally flat and would not be substantially affected by redevelopment. If vacant parcels were connected in the future, development would be restricted to buildable areas and would need to avoid wetlands and floodplains and be consistent with existing zoning. Development of these parcels would not affect topography. However, construction could increase erosion, resulting in short-term, localized impacts on soils.

5.2.3.4 Mitigation

To mitigate construction impacts, best management practices (BMPs), including soil and erosion control measures, would be employed during construction to minimize potential, temporary soil erosion effects. These measures are described in detail in Section 5.4.3.4, the mitigation section for the Proposed Action.

To mitigate operational impacts, engineering solutions, such as permeable pavement or bioswales, would be included in the design of the AWTF to reduce soil erosion.

5.3 Air Quality

5.3.1 Methodology

5.3.1.1 Regulations

The Clean Air Act of 1970 (42 USC 7401–7661 [2009]) is a comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. The act authorized EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. The NAAQS include six criteria air pollutants: lead, nitrogen dioxide, ozone, carbon monoxide, sulfur dioxide, and particulate matter (including both particulate matter less than 10 micrometers in diameter [PM_{10}] and particulate matter less than 2.5 micrometers in diameter [$PM_{2.5}$]). Areas where the monitored concentration of a criteria pollutant exceeds the applicable NAAQS are designated as being in nonattainment of the standards, while areas where the monitored concentration of a criteria pollutant is below the standard are classified as in attainment. Former nonattainment areas are called maintenance areas.

Federally funded actions in nonattainment and maintenance areas are subject to EPA conformity regulations (40 Code of Federal Regulations [CFR] Parts 51 and 93) that ensure that emissions of air pollutants from planned federally funded activities do not affect the state's ability to meet the NAAQS. When subject to this regulation, the federal agency is responsible for demonstrating conformity of its proposed action with the State Implementation Plan for attainment with the NAAQS.

General conformity regulations (40 CFR 93 Subpart B) apply if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutants caused by the federal action equal or exceed certain *de minimis* rates. If the action will cause emissions above the *de minimis* rates and the action is not otherwise exempt, "presumed to conform," or included in the existing

emissions budget of the State Implementation Plan, the agency must conduct a conformity determination before it takes action.

5.3.1.2 Study Area

The study area for air quality is the general boundary of the Forge River project area because this is the area where any potential short- or long-term emissions could occur from construction of new wastewater treatment infrastructure. It is also the area where any impacts on air quality-sensitive receptors would have the highest potential to occur.

5.3.1.3 Approach

Impacts were assessed based on a comparison of the emissions of criteria pollutants under the Proposed Action with the general conformity *de minimis* thresholds. Impacts were considered major and adverse when annual criteria pollutant emissions would exceed general conformity *de minimis* criteria or localized air quality impacts would exceed NAAQS.

The proposed AWTF and pump stations (if a combined collection system is implemented) would include diesel emergency backup power generators, which would be regulated under the minor New Source Review (air permitting) program. Pursuant to 40 CFR 93 Subpart B, generator emissions are not subject to conformity determination. However, to account for all project activities that would contribute to total direct or indirect emissions, generator emissions were included in *de minimis* criteria analysis.

General conformity applies to emissions of pollutants and precursor pollutants for which Suffolk County is designated as nonattainment or maintenance. **Table 5.3-1** shows the applicable *de minimis* thresholds for each pollutant (the term "precursor" in the table refers to the pollutants). A general conformity determination would not be required if an applicability analysis shows the emissions during construction and operation would not exceed the *de minimis* thresholds.

Table 5.3-1. Applicable General Conformity *de minimis* Thresholds (for Pollutants for which Suffolk County Is Designated as Nonattainment or Maintenance)

Pollutant	Type	*De minimis* Threshold (tons/year)	Suffolk County Attainment Status
Volatile organic compounds	Ozone precursor	50	Non-attainment for 2008 8-hour ozone standard
Nitrogen oxide	Ozone precursor and $PM_{2.5}$ precursor	100	
$PM_{2.5}$	Direct emissions of $PM_{2.5}$	100	Maintenance area for 1997 annual average $PM_{2.5}$ and 2006 24-hour average $PM_{2.5}$ standards
Sulfur dioxide	$PM_{2.5}$ precursor	100	

Source: 40 CFR 93.153

5.3.2 Existing Conditions

NAAQS and New York State ambient air quality standards that would be applicable to the study area are presented in Appendix B.8, Ambient Air Quality Standards.

Suffolk County is a moderate nonattainment area for the 2008 8-hour ozone standard and a maintenance area for the 1997 annual average fine particulate matter ($PM_{2.5}$) and 2006 24-hour average $PM_{2.5}$ standards (EPA 2016a). Suffolk County is an attainment area for the remaining criteria pollutants, as shown in **Table 5.3-1**; therefore, general conformity requirements do not apply to other criteria pollutants in the study area and a *de minimis* evaluation is not necessary.

5.3.3 Potential Impacts and Proposed Mitigation

5.3.3.1 Construction

Construction activities would result in short-term emissions of criteria pollutants from off-road, heavy-duty construction equipment (e.g., backhoes, excavators, and graders), haul trucks, construction worker commutes, and fugitive dust. Based on the attainment status of Suffolk County, a general conformity emissions analysis was prepared for nitrogen oxide, volatile organic compounds (VOC), and $PM_{2.5}$. Diesel equipment and vehicles emit substantially less sulfur dioxide when compared to direct $PM_{2.5}$ emissions, and, consequently, the $PM_{2.5}$ precursor sulfur dioxide was not analyzed. (EPA's National Emissions Inventory data for New York State shows that sulfur dioxide emissions from highway vehicles are 20 percent of $PM_{2.5}$ emissions from highway vehicles. Therefore, if the general conformity *de minimis* threshold is not exceeded for $PM_{2.5}$ direct emissions, it cannot be exceeded for sulfur dioxide). Construction of the Proposed Action would take approximately four years, with the highest emissions occurring in the early phases when more excavation and haul truck and heavy equipment activity. Because the general conformity *de minimis* criteria are expressed on an annual basis, 2018 was analyzed as the peak construction year.

Construction emissions were quantified using the Motor Vehicle Emission Simulator (current version: MOVES2014a) model for haul truck and worker commute emissions, the NONROAD model for off-road equipment, and EPA AP-42 procedures for quantifying fugitive dust emissions (EPA 1995). Assumptions regarding equipment requirements, workers, truck trips, and the quantity of soil to be moved were developed for the analysis. These assumptions conservatively encompass the quantity of soils to be hauled under a combined gravity and low-pressure system or an entirely low-pressure system. Detailed documentation of the emission calculations is provided in Appendix B.9, Air Quality Technical Analysis.

Table 5.3-2 summarizes the construction emission analysis results for the Proposed Action assuming a combined collection system is constructed. The general conformity *de minimis* thresholds would not be exceeded. Emissions would be lower if an exclusively low-pressure collection system is implemented. Short-term air quality impacts would be minor and adverse. This determination applies regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued. Mitigation measures identified in Section 5.3.3.4 would further reduce impacts.

Table 5.3-2. 2018 Peak Construction Year Emissions Summary (Tons)

	Nitrogen Oxide	VOC	$PM_{2.5}$
Off-road heavy equipment	4.5	0.7	0.3
On-road haul trucks and worker commutes	19.8	1.0	0.9
Fugitive dust	NA	NA	5.6

	Nitrogen Oxide	VOC	$PM_{2.5}$
Total	**24.3**	**1.7**	**6.8**
General conformity *de minimis* threshold	100.0	50.0	100.0
De minimis threshold exceeded?	No	No	No

5.3.3.2 Operation

This section discusses potential air quality impacts related to the emission of criteria air pollutants and odors. A greenhouse gas emissions analysis is provided in Section 5.19, Climate Change.

Mobile Sources

A mobile-source air quality impact analysis for the direct impacts of the Proposed Action is not necessary because the provision of sewer infrastructure would have long-term, negligible effects on trip generation or traffic patterns. The AWTF would result in a few commuter trips per day and fewer weekly truck trips for sludge removal. These increased trips would be partially offset by the reduction of OWTS maintenance-related truck trips with construction of new sewer infrastructure.

Stationary Sources

The AWTF, pump stations (if a combined collection system is implemented), and grinder pumps would be run by electricity; therefore, no stationary source emissions related to fuel combustion would occur under normal conditions (see the section on backup generators below for information on emergency backup power).

The primary criteria pollutant emission associated with wastewater treatment processes is the ozone precursor VOC (EPA 1995). The interaction of a complex number of factors influences VOC emissions from wastewater, including airflow over the water surface, wastewater surface area, temperature, and turbulence; wastewater retention time; the depth of the wastewater; and the concentration of organic compounds in the wastewater and their physical properties, among other factors (Eastern Research Group 1997). Detailed design information on the AWTF is not available; therefore, it is not possible to develop a detailed project-specific emission estimate. An order-of-magnitude VOC emission estimate was developed based on the methods used by EPA's 2014 National Emissions Inventory for Publicly Owned Treatment Works. Publicly owned treatment works were estimated to emit 0.85 pounds of VOC per million gallons of wastewater treated (EPA 2016b). The AWTF would treat 511 million gallons per year (1.4 mgd, 365 days a year). Based on the generic national emission factor, this would result in 434 pounds per year of VOC emissions (0.217 ton), which is well below the general conformity 50 tons per year *de minimis* threshold. Therefore, the Proposed Action would have a negligible effect on emissions of VOC.

Hydrogen Sulfide /Odors

The nearest residences would be approximately 200 feet or more from the AWTF. As an entirely enclosed airtight facility, the control of odors from the AWTF to eliminate off-site impacts would be addressed through the design process. The ability to control odors and VOC by enclosing the treatment process is one of the advantages of MBR technology (Hai et.al. 2014). MBR technology allows for incorporation of filters to scrub malodorous compounds such as hydrogen sulfide (Shareefdeen and Singh 2005). If SBR technology is pursued, the treatment process would be fully enclosed, and odors would be controlled. With incorporation of advanced odor control technology

during the design process, hydrogen sulfide concentrations at the nearest sensitive receptors would be well below the New York State ambient air quality standard, and no impacts are expected.

Backup Power Generators

The proposed AWTF and pump stations (if a combined collection system is implemented) would include diesel or natural gas emergency backup power generators. Emissions from backup power sources would only occur in emergencies/power outages and for periodic testing. For purposes of this analysis, one 900 kilowatt (kW) (1,207 horsepower) diesel backup generator is assumed for the AWTF. Each of the 12 pump stations is expected to use a 300-kW (402-horsepower) diesel backup generator. The annual emissions of backup power generators, based on up to 500 hours of operation for each generator (up to approximately 20 days of power outages plus 2 hours of testing each month), were estimated based on their approximate horsepower, fuel type, and EPA's AP-42 (EPA 2015a). Since the AP-42 emission factors assume older/uncontrolled equipment, representative nitrogen oxide emission factors from current model generators were obtained from manufacturer specifications (CAT C9 Acert-300 kW and CAT C32-900 kW). **Table 5.3-3** summarizes the results of the emergency generator analysis and demonstrates emissions would be below the general conformity *de minimis* criteria if a combined collection system is implemented. Emissions would be lower under an exclusively low-pressure collection system. Technical backup information for the generator calculations is provided in Appendix B.9, Air Quality Technical Analysis.

Overall, operations under a combined collection system would result in emissions of 13.89 tons of nitrogen oxide, 4.07 tons of VOC, 3.79 tons of sulfur oxides, and 3.32 tons of PM per year, all of which would be well below *de minimis* thresholds. Operational emissions would be lower under an exclusively low-pressure system. Therefore, long-term air quality impacts would be minor and adverse.

Table 5.3-3. Criteria Pollutant Emissions (in Tons/year) from Backup Power Generators

Pollutant	AWTF Generator (900 kW)	Pump Stations (12 300 kW generators)	Total	General Conformity *de minimis* threshold
Nitrogen oxide	3.26	10.64	13.89	100
VOC	0.76	3.03	3.79	50
Sulfur oxides	0.75	3.03	3.79	100
PM	0.66	2.65	3.32	100

Notes: Generators were estimated to run for 500 hours per year.
All sulfur oxides are assumed to be sulfur dioxide and all PM (PM_{10}) assumed to be $PM_{2.5}$.

5.3.3.3 Indirect Impacts from Growth Inducement

Development intensity could increase along the Montauk Highway Corridor, which could increase emissions. In addition, any future development on vacant parcels would result in net new emissions. A mobile-source air quality impact analysis for the indirect impacts of the Proposed Action is not necessary because the provision of sewer infrastructure would have minimal

long-term effects on traffic patterns, and the increased densities described in Appendix B.13 would not be so substantial as to result in emissions above the thresholds shown in **Table 5.3-3**. Long-term, indirect air quality impacts would be negligible.

5.3.3.4 Mitigation

Although construction emissions would be below *de minimis* thresholds, temporary construction-related air quality impacts on sensitive receptors would be further minimized through the incorporation of the following measures into the contract specifications:

- **Dust Control Measures**: To minimize fugitive dust emissions from construction activities, a fugitive dust control plan would be required. For example, stabilized truck exit areas would be established for washing the wheels of all trucks that exit the construction sites; truck routes within the AWTF site would be watered as needed or, in cases where a route would remain in the same place for an extended duration, the routes would be stabilized, covered with gravel, or temporarily paved to avoid the resuspension of dust; all trucks hauling loose material would be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the development site; water sprays would be used for all demolition, excavation, and transfer of soils to ensure that materials would be dampened as necessary to avoid the suspension of dust into the air. Loose materials would be watered or covered.
- **Utilization of Newer Equipment**: EPA's Tier 1 through 4 standards for non-road engines regulate the emission of criteria pollutants from new engines, including PM, carbon monoxide, nitrogen oxide, and hydrocarbons. (For a summary of the phase-in of Tiers 1 through 4 exhaust emission standards for nonroad compression ignition [diesel] engines, see: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OA05.pdf). To minimize $PM_{2.5}$ emissions, non-road construction equipment with a power rating of 50 horsepower or greater would meet at least the Tier 3 emissions standard or incorporate the best available tailpipe retrofit technology for reducing diesel particulate matter emissions, such as diesel particulate filters verified by EPA.
- **Idling Limits**: Idling times would be minimized by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes consistent with NYSDEC regulations (NYSDEC n.d.).

To minimize emissions from backup power generators, new equipment with a power rating of 50 horsepower and above would be required to comply with the New Source Performance Standards, and generators would have Maximum Achievable Control Technology Reciprocating Internal Combustion Engines compatible engines.

5.4 Water Quality

5.4.1 Methodology

5.4.1.1 Regulations

The Clean Water Act of 1977 regulates discharge of pollutants into water. Section 402 of the Clean Water Act requires that all construction disturbing more than 1 acre of ground, as well as municipal, industrial, and commercial facilities discharging wastewater or stormwater directly

from a point source into a surface water of the United States, must obtain a National Pollutant Discharge Elimination System permit.

Under the National Pollutant Discharge Elimination System, EPA regulates both point and non-point pollutant sources, including stormwater and stormwater runoff. EPA has authorized NYSDEC to administer the National Pollutant Discharge Elimination System program, referred to as the State Pollutant Discharge Elimination System (SPDES). The SPDES program also regulates discharges to groundwater. Activities that disturb 1 acre of ground or more require an SPDES stormwater permit, while groundwater discharges of treated municipal wastewater require an SPDES municipal permit.

Section 1424(e) of the Safe Drinking Water Act of 1974 (Public Law 93–523) authorizes EPA to designate an aquifer for special protection under the sole source aquifer program if the aquifer is the sole or principal drinking water resource for an area (i.e., it supplies 50 percent or more of the drinking water in a particular area) and if its contamination would create a significant hazard to public health. No commitment for federal financial assistance may be provided for any project that EPA determines may contaminate a sole source aquifer such that a significant hazard to public health is created.

SCDHS also enacted policies under the Suffolk County Sanitary Code to protect water quality and groundwater to ensure the availability of an adequate and safe source of water supply (Suffolk County Sanitary Code, Chapter 760). For example, the code regulates the protection of water supply by requiring cross-connection controls to prevent the backflow or entry of undesirable contaminants and/or toxic substances into the water distribution system. The code also establishes standards for the construction, operation, and discharge of treatment and disposal systems. Suffolk County is separated into eight groundwater management zones based on differences in hydrogeology and groundwater quality; the County establishes flow limitations for parcels in each zone. In 1981, these zones were added under Article 6 to the Suffolk County Sanitary Code. The Town of Brookhaven is located within Groundwater Management Zone VI, in which the sanitary flow limitation is 300 gpd/acre. The goal for Groundwater Management Zone VI is to limit the nitrogen concentration in groundwater to 4 mg/L (Suffolk County 2015a).

The Proposed Action involves water resources in Suffolk County. SEQRA (6 NYCRR 617.9(h)), requires an analysis of such actions' consistency with the *Suffolk County Comprehensive Water Resources Management Plan* for the special groundwater protection area program.

Chapter 86 of the Town Code for Brookhaven details stormwater management and erosion control standards and complies with federal and NYS stormwater control guidelines.

5.4.1.2 Study Area

The primary study area for water quality consists of Forge River, its watershed, and downstream areas. The sum of all discharges from the watershed, both from groundwater and surface water, affect water quality in Forge River. The secondary study area consists of Moriches Bay because the water in Forge River flows to and therefore affects the water quality in the bay. In addition, some consideration was given to Carmans River because a small portion of the project area is located within its watershed. Carmans River discharges to Great South Bay.

5.4.1.3 Approach

Impacts were assessed by comparing the existing water quality in the study area with the anticipated water quality conditions under the Proposed Action, including any improvements in

groundwater quality and the resulting water quality improvements in the surface waters. The analysis was based on available reports and data, which contain varying levels of quantification. A sole source aquifer screening checklist and supporting documentation were completed for the Proposed Action and are provided in Appendix C.2, Sole Source Aquifer Screening.

5.4.2 Existing Conditions

The study area is subject to heavy rainfall and storm events that lead to regular surface and groundwater flooding with varying intensity and frequency. Intense flooding occurred, for example, during Hurricane Sandy in 2012 and Hurricane Irene in 2011 as a result of surging ocean water and rising groundwater elevations. During Hurricane Sandy, hundreds of residential OWTS and more than ten commercial OWTS in the study area experienced surface water inundation. OWTS failures result when systems are flooded or submerged during storm events, reducing system capacity and/or eliminating system treatment or disposal capability.

Waterbodies within and adjacent to the study area consist of the Forge River and its tributaries, Carmans River, Moriches Bay, and groundwater in the study area (Cameron Engineering, 2012). More than 95 percent of the Phases I through III area is located within the Forge River watershed (CDM Smith 2013). Only the westernmost part of the Phase I/II area is located within the Carmans River watershed. The entire Phase III area is located within the Forge River watershed.

5.4.2.1 Estuarine Waterbodies

Estuarine waters in the study area consist of the following:

- **Forge River**: Forge River extends northwest from Moriches Bay (**Figure 5.4-1**). The estuary has several tributaries. In the study area (i.e., on the western side of Forge River, these tributaries are named [from north to south] Second Neck Creek, Poospatuck Creek, Lons Creek, and Home Creek; Second Neck Creek has also been referred to as Wills Creek, e.g., in Cameron Engineering 2012). West Mill Pond, located at the northern tip of Forge River, is a freshwater body that is separated from Forge River by a dam (see further discussion below).
- **Moriches Bay**: Forge River drains into Moriches Bay. This bay, created by the long barrier beach along the Atlantic Ocean, is connected to Great South Bay via Narrow Bay.
- **Carmans River**: Carmans River, located along the western side of the Mastic/Shirley peninsula, drains into Bellport Bay, which is located in the northeastern corner of Great South Bay (beyond boundary of **Figure 5.4-1**).

NYSDEC classifies each waterbody based on its designated uses (6 NYCRR 701). The Lower Forge River (south of its confluence with Second Neck Creek) and Moriches Bay are classified as SA surface waters (6 NYCRR 922.4). The best usages of Class SA waters are shellfishing for market purposes, primary and secondary contact recreation, and fishing, and the water quality is suitable for fish, shellfish, and wildlife propagation and survival. The Upper Forge River and its estuarine tributaries, as well as Carmans River, are classified as SC waters. The best usage of Class SC waters is fishing. Class SC waters are suitable for fish, shellfish, and wildlife propagation and survival, and the water quality is suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.

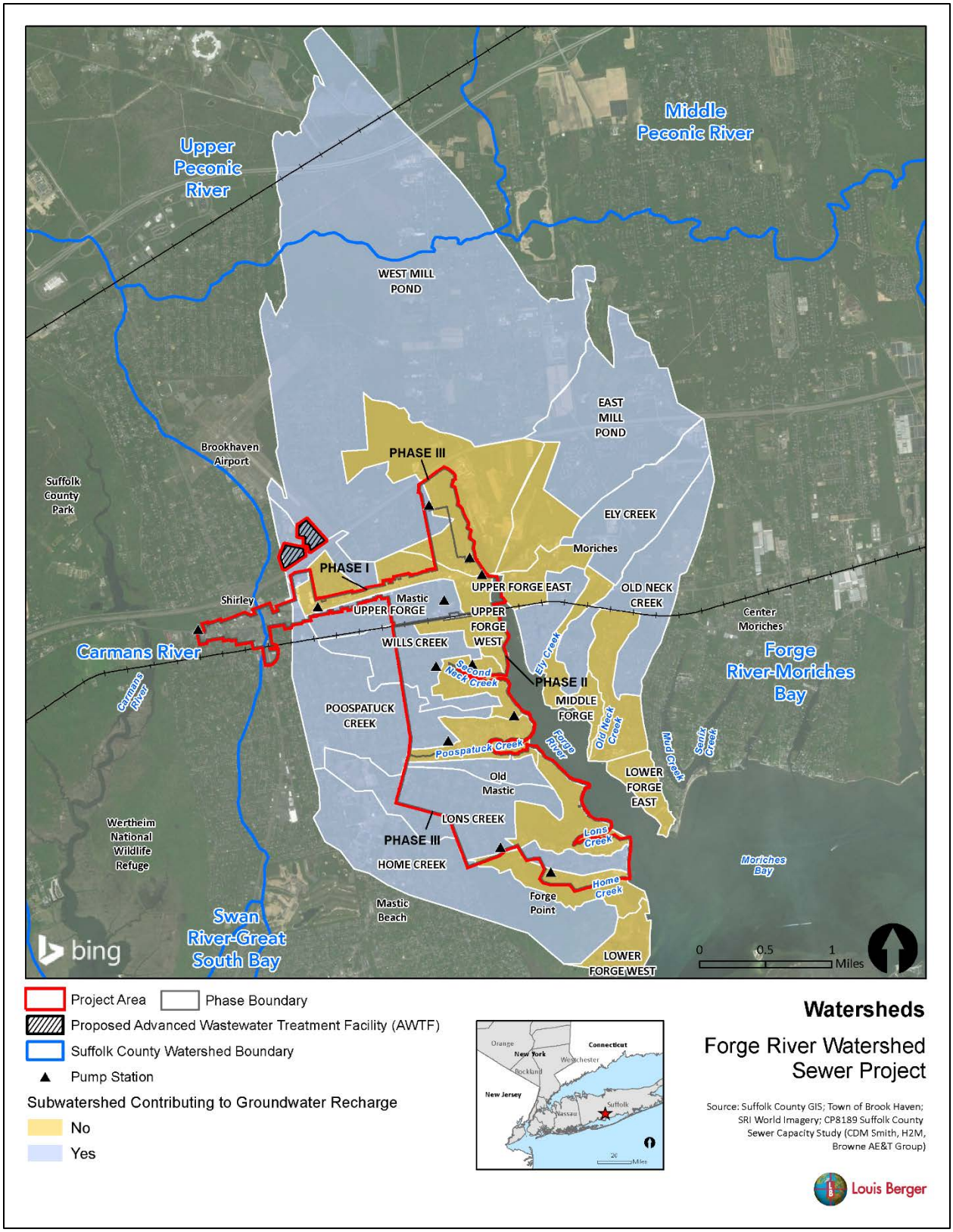

Figure 5.4-1. Watersheds

The Forge River has a history of water quality impairments and has experienced chronic hypoxia (i.e., very low oxygen concentrations in the water column) and fish kills. It is listed on the New York State 303(d) list of impaired waterbodies. Specifically, the Upper Forge River is included on the 303(d) list as part of the tidal tributaries to West Moriches Bay estuary system (Waterbody ID 1701-0312) and is listed as impaired from high nutrient loading, low dissolved oxygen concentrations, and pathogen contamination (EPA 2014a). The Lower Forge River and Cove (Waterbody ID 1701-0316) is listed as impaired because of pathogens that result in restrictions on shellfishing and consumption purposes.

Extended periods of hypoxia occur primarily in the main channel of the Upper Forge River and in several of its tributaries during the summer (Swanson et al. 2009a). The hypoxia is caused by seasonal plankton blooms, combined with oxygen consumption by organic material on the bottom. Algae blooms are caused primarily by nitrogen loading because nitrogen is the limiting nutrient (rather than phosphorus). Researchers from SUNY Stony Brook calculated a total nitrogen load of 2,362 pounds/day to the Forge River (after subtracting the load from the Jurgielewicz duck farm, which closed in 2011) for the time of the study (Swanson et al. 2009b; **Table 5.4-1**). The majority of the load was contributed by OWTS (18 percent) and benthic flux (74 percent). Considering only "new" sources of total nitrogen to Forge River (i.e., not considering benthic flux), more than two-thirds (70 percent) of the total nitrogen entering Forge River is supplied by OWTS. Although the OWTS load contribution pertains to the entire Forge River watershed, most of the OWTS are located in the western part of the watershed (i.e., in the study area) (Cameron Engineering 2012).

Table 5.4-1. Total Nitrogen Loading to Forge River

Nitrogen Source	Total Nitrogen Load (pounds/day)	Percent of Total Nitrogen Input	
		All Sources	All Sources, except Benthic Flux
Fertilizer	76	3%	12%
Atmospheric deposition	88	4%	14%
OWTS	430	18%	70%
Sewage treatment plants	25	1%	4%
Benthic flux	1,743	74%	--
Total Nitrogen Input	**2,362**	**100%**	**100%**

Source: Swanson et al. (2009b), as cited in Cameron Engineering (2012)
Note: Data were adjusted to reflect the closing of the Jurgielewicz duck farm in the West Mill Pond watershed in 2011.

Other sources of nitrogen contribution include benthic flux, which is a result of decomposition of organic matter at the bottom of the estuary and recycling of nitrogen back into the water column for renewed uptake by algae. Benthic flux is a temporal load and its relative contribution at any one time varies based on the physical, chemical, and biological processes transferring settled/bottom nitrogen into suspended/dissolved nitrogen in the water column.

Pathogens are biological agents (such as bacteria and viruses) that cause disease or illness to their host. Water samples from multiple stations in the Forge River frequently exceeded total coliform

standards (Cameron Engineering 2012); coliform is a common bacterial indicator for wildlife and waterfowl contamination, discharge from WWTPs, stormwater, or contributions from failing OWTS via groundwater. Elevated coliform concentrations were widespread throughout the watershed.

Carmans River receives most of its flow from groundwater (Town of Brookhaven 2013). McGregor O'Malley (2008) determined that both the Upper Glacial Aquifer and the Magothy Aquifer contribute to the Carmans River, but the groundwater discharge is dominated by the Upper Glacial Aquifer. Carmans River also receives elevated concentrations of nutrients (e.g., Zaikowski et al. 2008; NYSDEC 2010), although not to the same extent as the Forge River.

In Moriches Bay, nitrogen loading from its watershed (particularly from Forge River) has affected the water quality for many decades because of increasing development and use of fertilizers (South Shore Estuary Reserve Council 2001; Swanson et al. 2009a). Nitrogen loading has resulted in algae blooms, followed by hypoxia and loss of shellfish beds during the decay of the algae. Because of the mostly enclosed nature of Moriches Bay with only limited flushing, contaminants such as excessive nitrogen accumulate in the bay.

5.4.2.2 Freshwater Bodies

West Mill Pond is located north of Forge River. Together with East Mill Pond, it is the primary source of freshwater to Forge River; together, the two ponds contribute 80 percent of surface water runoff to Forge River (Brownawell et al. 2009, as referenced in Cameron Engineering 2012). West Mill Pond is classified as Class C waters. The best usage of Class C waters is fishing. Class C waters are suitable for fish, shellfish and wildlife propagation and survival. The water quality is also suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.

The East and West Mill Ponds are highly eutrophic. Nitrogen from sediment, groundwater, and surface water inputs (and in the past from duck farms) leads to regular and dense algae blooms (Cameron Engineering 2012). Upon die-off of these algae, decomposition uses oxygen, causing anoxic conditions in the water column.

5.4.2.3 Groundwater Aquifers

Groundwater in Suffolk County comprises a designated sole source aquifer under the Safe Drinking Water Act. This sole source aquifer is the only source of potable water for the roughly 1.5 million residents of Suffolk County. The sole source aquifer consists of three individual overlying aquifers—the Lloyd, Magothy, and Upper Glacial Aquifers (from deepest and oldest to the shallowest and most recent). The Upper Glacial Aquifer establishes the water table in the study area. Physical characteristics for the water-bearing units in south-central Suffolk County are provided in **Table 5.4-2**.

Table 5.4-2. Physical Characteristics for the Upper Glacial, Magothy, and Lloyd Aquifers

Aquifer	Area (square miles)	Average Thickness (feet)	Average Hydraulic Conductivity (gpd per square foot)	Average Transmissivity (gpd per foot)	Main Body Flow Model Present Day Water Balance (mgd)
Upper Glacial	141	120	1,900	230,000	1,133
Magothy	141	900	360	320,000	33
Lloyd	141	300	270	80,000	23

Source: McClymonds and Franke (1972); Suffolk County (2015a)
Notes: Values based on mainland Long Island only; the North and South Fork were not included in these calculations.

Based on potentiometric surface maps and depths to groundwater measured in this area, the Forge River study area is located in a regional groundwater discharge zone. Groundwater moves out of the Upper Glacial Aquifer and into local surface waterbodies, including Forge River, Carmans River, and Moriches Bay. Ground surface elevations in the study area range from about 50 feet to 0 feet above mean sea level (MSL). Depth to groundwater in the study area ranges from 40 feet to less than 5 feet (**Figure 5.4-2**; U.S. Geological Survey 2016). The travel time of most groundwater in the study area before reaching Forge River is less than five years (**Figure 5.4-3**).

5.4.2.4 Wastewater Treatment

Wastewater treatment in the study area is provided by OWTS. Prior to the mid-1970s, when much of the development in the Forge River watershed occurred, cesspools were installed for OWTS. Cesspools are simple leaching basins into which untreated wastewater flows. Beginning in the mid-1970s, OWTS design was improved with the installation of septic systems. Septic systems have a holding tank for solids (septic tank) and an associated leaching system, and they primarily remove solids and bacteria. Effluent from OWTS infiltrates into the ground and ultimately reaches groundwater.

This analysis addresses connection of 2,094 parcels in the Phase I/II area and an additional 1,304 parcels in the Phase III area (3,398 parcels total) that use OWTS. Approximately 200 of the parcels in the Phase I/II area and 25 of the parcels in the Phase III area are commercial properties and the rest are residential. The density of OWTS in the study area is high compared to many other parts of the Forge River watershed (Cameron Engineering 2012). The OWTS in the study area are partially outdated and failing. Failing OWTS cause untreated effluent to be released into the surrounding soil. OWTS failures occur when systems are flooded by heavy rainfall or are submerged in shallow groundwater that rises during storm events and reduces system capacity and/or inhibits or eliminates system treatment or disposal capability, as described below.

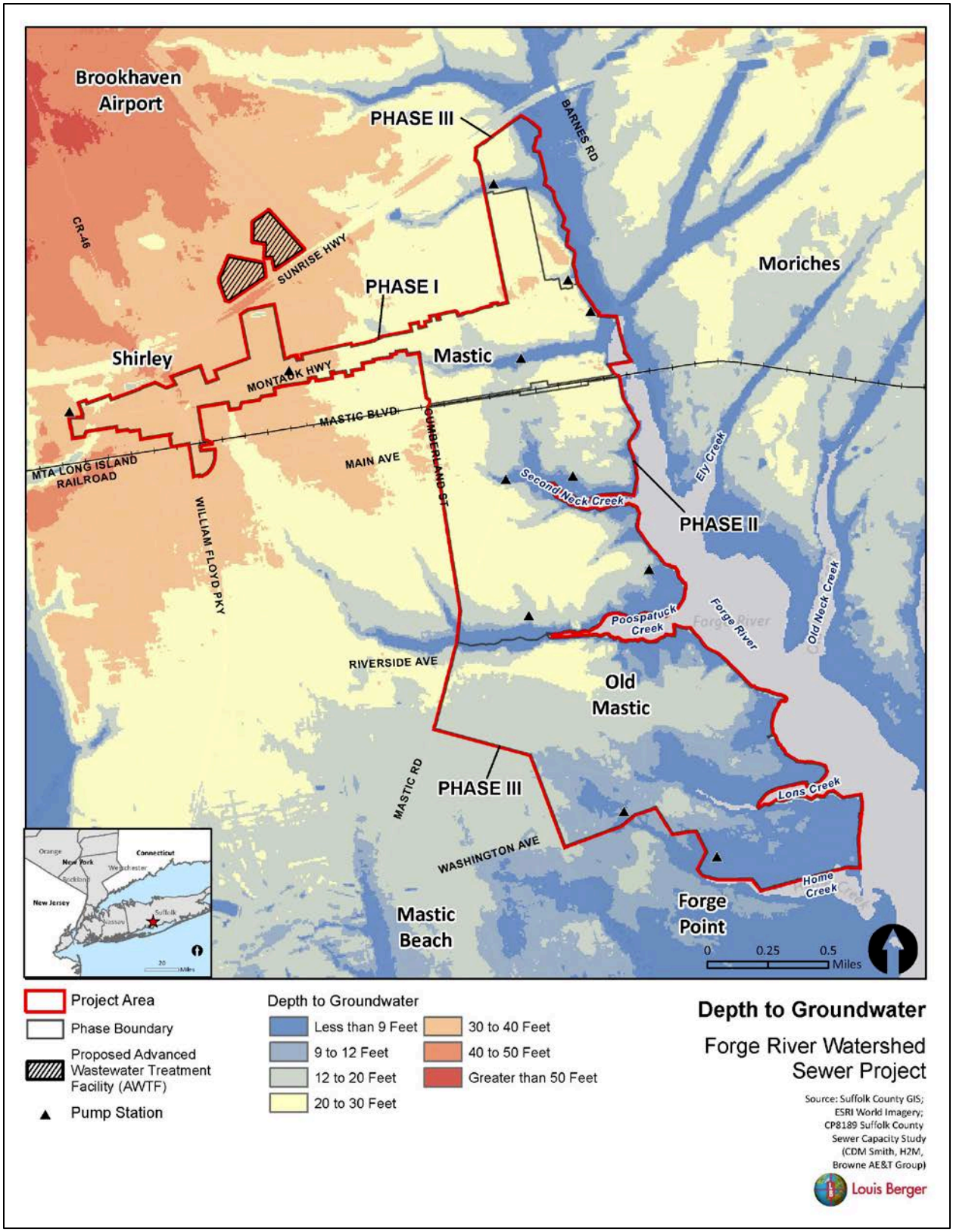

Figure 5.4-2. Depth to Groundwater

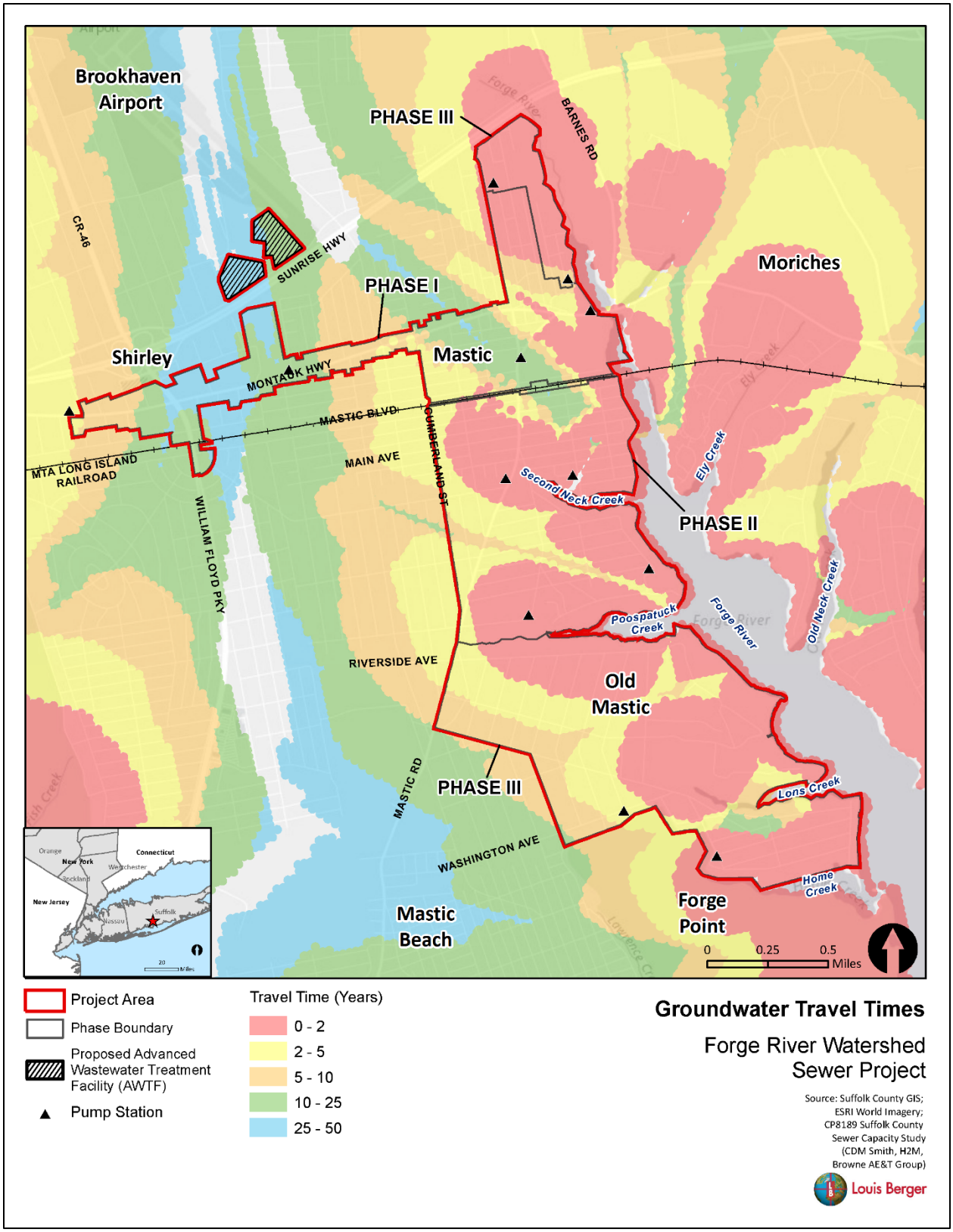

Figure 5.4-3. Groundwater Travel Times to Forge River

- **Capacity failure** occurs when tidal inundation of the land surface saturates soils above and around the systems causing water to enter the systems or when groundwater rises into cesspools or leaching pools, reducing system hydraulic capacity. Capacity failure manifests itself by slow draining domestic plumbing or backup of wastewater into the homes or basements of buildings served by the systems.
- **Treatment and disposal failure** occurs when groundwater or floodwaters inundate the systems or soils immediately beneath the systems, disrupting the biological treatment activity in the systems. A 2-foot vertical separation between the bottom of the cesspool or leaching pool and the water table is necessary for decomposition of organic compounds, biodegradation of detergents, and die-off of bacteria and viruses. For an extended period of months to years following system failures caused by inundation, nutrients (e.g., nitrogen) and pathogens are discharged untreated to groundwater and potentially to nearby surface waterbodies. Rising groundwater tables and floodwaters can also result in flotation of tanks unless they are properly anchored in the ground.

The solids generated by OWTS eventually build up in the septic tank and must be pumped out by a septage hauler. Typically pump-out would be required every three to five years for conventional OWTS depending on type and size of household served. This waste is typically transported to a WWTP for processing and disposal.

New testing and studies reveal other contaminants that may be discharged from OWTS. These emerging contaminants of concern, such as pharmaceuticals and personal care products (PPCPs), have been detected in wastewater (Suffolk County 2015a) and contain a diverse collection of thousands of chemical substances, including prescription and over-the-counter drugs, fragrances, cosmetics, diagnostic agents, vitamins, sunscreen and insect repellants. PPCPs from bodily excretion, bathing, and disposal of unwanted medications to OWTS, sewers, or trash have the potential to enter groundwater (Suffolk County Water Authority 2016a). Minimal degradation of these contaminants occurs under anaerobic conditions, which are the conditions common in conventional OWTS (Suffolk County 2015a).

5.4.2.5 Water Supply

The study area is supplied with potable water by the Suffolk County Water Authority, which delivers water to homes, schools, fire hydrants, and wherever else potable water is needed (Suffolk County Water Authority 2016b). The Suffolk County Water Authority is an independent public-benefit corporation, founded in 1951, serving approximately 1.2 million Suffolk County residents. The Authority operates without taxing power on a not-for-profit basis and is the largest groundwater supplier in the country (Suffolk County Water Authority 2016b).

There are three types of water supply wells within or near the study area:

- **Public Water Supply Wells**: Suffolk County Water Authority owns and operates the two public water supply well fields in the direct vicinity of the study area: the Lambert Avenue well field and the Main Street well field (Suffolk County Water Authority 2017a). These wells draw water from the Magothy Aquifer (Suffolk County Water Authority 2017b).
    - Lambert Avenue well field: Well S-71881 in this well field draws water from a depth zone of -104 to -268 feet MSL (i.e., approximately 154 to 318 feet bgs). Well S-71882 draws water from a depth zone of -209 to -269 MSL (i.e., approximately 258 to 318 bgs). The zones of contribution for the well field extend to the

north-northeast, approximately 1,000 feet to the east of the eastern boundary of the AWTF 17-acre parcel.

- Main Street well field: Well S-96232 in this well field draws water from a depth zone of -443 to -503 feet MSL (i.e., approximately 485 to 545 feet bgs). Well S-112780 draws water from a depth zone of -372 to -474 MSL (i.e., approximately 414 to 516 bgs). The zones of contribution for the well field also extend to the north northeast. This zone transects the site of the AWTF area.

The average nitrate concentrations in these wells range between non-detectable and 1 mg/L, and the susceptibility rating for nitrate ranges between high (Main Street well field) and very high (Lambert Avenue well field) (Suffolk County, 2015a). The high susceptibility ratings do not imply that the wells will eventually become contaminated by nitrogen; however, it is an indication that these wells are vulnerable to nitrate contamination, and additional groundwater protection measures are warranted.

Suffolk County Water Authority has 35 active wells in distribution zone 20 (of 27 interconnected distribution zones), where the majority of the study area is located. Community supplies must meet rigorous federal and state quality standards and are routinely tested for purity (Suffolk County 2015a). EPA currently has no health standards or guidelines for PPCPs in drinking water and does not require testing for this diverse collection of substances (Suffolk County Water Authority 2016b).

- **Non-community Wells**: SCDHS regulates the two non-community wells in the study area, which are located within the Phase I area, approximately half a mile southwest of the site for the proposed AWTF. These two wells possibly serve restaurants and likely draw their water from the Upper Glacial Aquifer (SCDHS 2017a). The County only has depth data confirming draw from the Upper Glacial Aquifer for one of the wells (Suffolk County 2017). Compared to public water supply wells, non-community wells are tested for fewer parameters at reduced frequencies (Suffolk County 2015a).
- **Private Wells**: SCDHS does not regulate private wells. Therefore, SCDHS does not keep records on the existence or location of private wells. Public water supply is available in the area, but connection is not mandatory. As a result, it is possible that a few private wells serve parcels in the study area (SCDHS 2017b). Private wells typically draw water from the Upper Glacial Aquifer and thus are more prone to contamination. Private wells are only required to be tested once—for approval of new construction (Suffolk County 2015a).

5.4.2.6 Groundwater Quality

Groundwater is the major source of flow into Forge River, ranging between 1.6 and 3.6 times the contribution of stream flow (Cameron Engineering 2012, and references therein). CDM Smith (2014) modeled the total predicted nitrogen concentration in groundwater in the study area. The model was based on existing zoning and land use conditions in the Mastic/Shirley area and typical sanitary wastewater loading rates. This information was incorporated into a spreadsheet loading model to estimate the nitrogen load associated with each property in the study area. The model results indicate that the total nitrogen concentrations in groundwater are expected to be higher than 10 mg/L in a large portion of the study area (**Figure 5.4-4**), exceeding Suffolk County's target for Groundwater Management Zone VI of 4 mg/L. The existing load of total nitrogen entering Forge River from various wastewater sources in the study area was modeled as 244 pounds/day (CDM

Smith 2014). Residential sources contribute about 92 percent of the current total nitrogen load from wastewater discharged to groundwater, with the remainder contributed by commercial and institutional sources. The total nitrogen load of 244 pounds/day from wastewater in the study area represents 57 percent of the load estimated from OWTS for the entire Forge River watershed (430 pounds/day; **Table 5.4-1**). An additional 7 pounds/day of total nitrogen from OWTS in the study area was modeled to enter Carmans River (CDM Smith 2014).

5.4.2.7 Stormwater

The study area contains approximately 1,660 acres. Approximately 90 percent of the stormwater runoff generated within this area drains to the Forge River, with the remaining 10 percent draining to the Carmans River. The study area is densely populated, and existing impervious areas include roads, sidewalks, driveways, houses, buildings, and parking lots.

Suffolk County has a Phase II Stormwater Permit (GP-0-08-002) (SPDES Permit Number: NYR20A411). The County has developed a Stormwater Management Program to reduce stormwater pollution from County-owned roads and properties. The Town of Brookhaven also has a Stormwater Management Program in place (SPDES Permit Number: NYR20A411) and has identified 330 stormwater outfalls within its jurisdiction, many of which serve the study area. Both entities have stormwater education and participation programs in place, along with policies and procedures to control runoff from construction sites, identify and remove illicit discharges, and reduce pollution from municipal operations.

5.4.2.8 Hazardous Waste Sites

The NYSDEC Division of Environmental Remediation maintains a database with records of sites addressed under one of its remedial programs (state superfund, brownfield cleanup, environmental restoration, and voluntary cleanup). This database also includes the Registry of Inactive Hazardous Waste Disposal Sites and information on Institutional and Engineering Controls in New York State. Based on a search of this database on January 3, 2018, no hazardous waste sites are listed in the study area (NYSDEC 2018).

5.4.3 Potential Impacts and Proposed Mitigation

The determinations below apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.4.3.1 Construction

Stormwater Impacts during Construction

Construction of the Proposed Action would require activities such as clearing, grading, excavating, dewatering, and stockpiling soil and other earthen materials, which could have the potential to adversely affect water quality. Some construction activities would require dewatering when groundwater or precipitation accumulates in an excavated area and must be removed so that work may be accomplished. Construction at the AWTF site should not require extensive dewatering because groundwater is much deeper than the proposed excavations. Dewatering would be necessary during construction of the collection and conveyance system, particularly in those areas with shallow depths to groundwater.

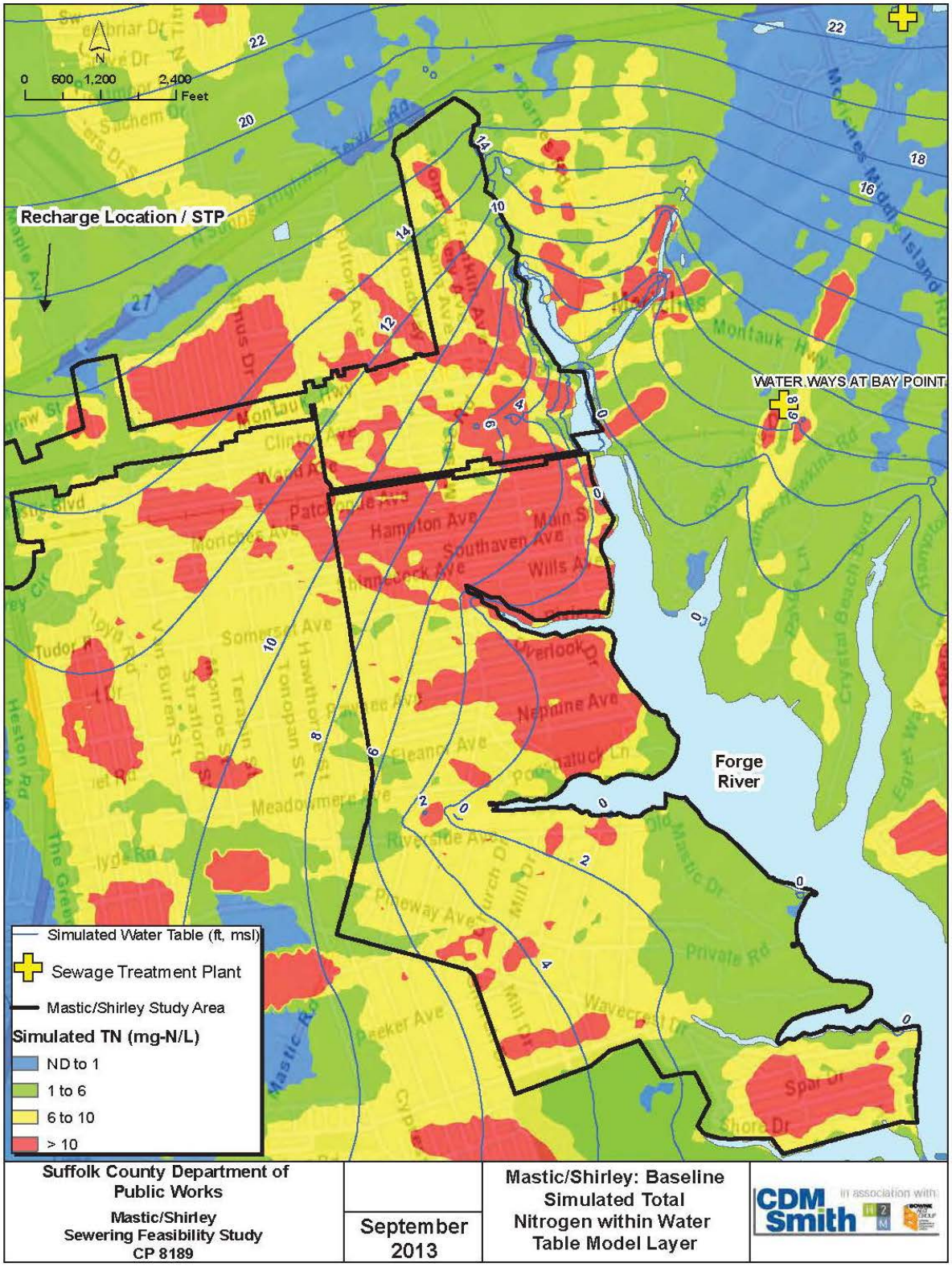

Figure 5.4-4. Modeled Total Nitrogen Concentrations in Shallow Groundwater under Existing Conditions for the Phase I/II and III Areas

No construction would occur within the vicinity of the surface waterbodies in the study area nor would any work directly modify them. Construction activities could result in short-term, minor, adverse impacts on water quality due to soil erosion. Impacts would be minimized through BMPs as described below under Mitigation.

Removal of Existing OWTS

Existing OWTS (cesspools and septic systems) serving the buildings within the study area would need to be removed or properly abandoned in place once the parcel is connected to the collection system. Individual OWTS would be emptied and cleaned. For OWTS that are abandoned in place, the cleaned tank or cesspool would be backfilled with earth, sand, or other acceptable material. For OWTS that are removed, the cleaned components of the OWTS (i.e., tank, concrete, and pipes) would be removed from the ground and disposed of as construction and demolition debris. Suffolk County would oversee abandonment of commercial OWTS, and any contamination in the OWTS would be remediated. All disturbed areas would be returned to their original condition. Short-term, negligible, hazardous material-related impacts are expected to result from the removal of existing OWTS when conducted in accordance to the BMPs described below under Mitigation.

Hazardous Materials Handling during Construction

Construction of the Proposed Action would require fuel, oil, solvents, and lubricants for the operation of the construction equipment. Construction would also involve the potential risk of uncovering hazardous materials during excavation.

Short-term, negligible impacts are expected to result from the handling of fuel, excavated soils, and other potentially hazardous materials during construction. The potential risk for uncovering hazardous materials during excavation for the Proposed Action is low, based on a search of the NYSDEC Division of Environmental Remediation database (NYSDEC 2018). Spill prevention, prompt spill notification and response, and soil handling techniques would be used to reduce the potential for polluting receiving waters with contaminants as described below under Mitigation.

5.4.3.2 Operation

AWTF Operation

The proposed 1.4 mgd AWTF would use either MBR or SBR treatment technologies. The MBR technology is a suspended growth-type activated sludge process used for nitrogen removal. The MBR treatment option is capable of reliably producing an effluent nitrogen concentration of 3 to 5 mg/L, commonly described as the “limit of technology” for nitrogen removal (CDM Smith 2015).

The SBR is also a growth-type activated sludge process used for nitrogen removal. It also achieves pre-anoxic denitrification using biological oxygen demand in the influent wastewater. The SBR process is generally expected to achieve effluent nitrogen concentrations of 4 to 6 mg/L (CDM Smith 2014). However, monitoring data collected in 2016 from four SBR wastewater treatment facilities in Suffolk County demonstrate that the SBR process can achieve an effluent nitrogen concentration of 3 to 5 mg/L as well, similar to the MBR process (SCDPW 2016b). These measurements are consistent with the findings by Jimenez et al. (2007), who assessed the performance of multiple SBR facilities in Florida. Therefore, for the purposes of this EIS, this analysis considers the nitrogen removal performance of MBR and SBR processes comparable.

The AWTF would operate in compliance with a SPDES permit and Suffolk County Article 6 and Article 7 requirements. The SPDES permit would establish the maximum allowable concentration for each potential contaminant of concern that may be contained in the treated wastewater. For AWTFs discharging to groundwater, SPDES permit discharge limits are typically established at 10 mg/L for nitrogen. Based on the environmentally sensitive area to which this AWTF would discharge, effluent nitrogen levels would be reduced to the limits of technology (3 to 5 mg/L; CDM Smith 2015). Monitoring wells would be required to monitor the impacts of the treated effluent on groundwater quality; samples would be collected and analyzed on a quarterly basis from these wells. NYSDEC would inspect the AWTF on a quarterly basis (CDM Smith 2013). The MBR or SBR processes would achieve considerable pathogen removal, although no effluent discharge limit is expected to be set for this contaminant. Effects on groundwater quality would be significant, long-term, and beneficial because of the high level of nitrogen removal achieved by the AWTF.

The *Suffolk County Comprehensive Water Resources Management Plan* identifies the following additional pollutants of concern potentially present in municipal wastewater: VOC, PPCPs, microplastics, and 1,4-dioxane. Because the primary water quality objective of the Proposed Action is nitrogen removal, these pollutants of concern would not be subject to targeted removal. However, the biological treatment processes (MBR or SBR) would remove these pollutants to some extent (Louis Berger 2017). The activated sludge process proposed is expected to achieve better removal of these pollutants than the existing OWTS (Suffolk County 2015a). The effect on groundwater quality would be significant, long term, and beneficial because of the higher level of treatment achieved by the AWTF. Very small quantities of these pollutants of concern would still be discharged, but the levels would be substantially below existing conditions. The public health implications of low concentrations of PPCPs in water are only now being studied and are not yet well understood (Suffolk County 2015a).

Collection System Operation

Maintenance of the gravity sewers, force mains, and low-pressure sewer lines would include periodic cleaning and inspection. Pump stations (if a combined collection system is pursued) would require daily to every-other-day visitation for spot inspections. Routine maintenance would include weekly emergency generator exercises, monthly wet-well cleaning, and annual pump maintenance. Pump station status would be reported via a master control system with secure Internet access.

Grinder pump operation requires that a property owner follow a few rules about what not to put into the system. Some chemicals and substances could adversely affect a grinder pump and may cause safety hazards and or reduce the lifespan of the pump. As long as property owners avoid putting prohibited substances in the system, routine maintenance of grinder pumps should not be required.

During operation of the collection and conveyance system, groundwater could potentially be affected temporarily during a sewage pipe leak or break. Temporary dewatering may be necessary to reach the pipe for repair. Operation of the collection system could result in short-term, adverse impacts on groundwater quality from repair activities, but performance of these activities would adhere to BMPs as described below under Mitigation. Overall, operation of the collection and conveyance system, as part of centralized wastewater treatment, would also provide long-term, beneficial effects on water quality in the study area.

Hazardous Materials Handling during Operation

Operation of the AWTF and collection and conveyance system would require the handling of fuel, hazardous materials, and infectious waste. Approximately 3,000 gallons of diesel fuel for the emergency generators, 1,000 gallons of methanol for sewage processing, and 1,000 gallons of caustic for sewage processing and odor control would be stored at the AWTF. If a combined collection system is pursued, additional quantities of diesel fuel ranging from 250 to 1,000 gallons would be stored at each of the pump stations not served by natural gas. The diesel or natural gas would be used for the on-site emergency generators in the event of a power outage. The exact number of pump stations requiring diesel storage would be determined during design.

Long term, negligible hazardous-material-related impacts are expected to result from the operation of the AWTF and associated collection and conveyance system. Proper hazardous-material training and spill prevention techniques, as described under Mitigation, below, would be used to reduce the potential for polluting receiving waters with contaminants from operations.

Post-Construction Stormwater Impacts

The Proposed Action would add a total of approximately 210,000 square feet (i.e., approximately 4.8 acres) of impervious surfaces to the study area. Specifically, these impervious surfaces would consist of the AWTF building(s), access road, and parking (approximately 205,000 square feet). The concrete leaching structures (used to discharge treated wastewater to groundwater) would be located below the ground surface, and the area above the leaching structures would be grassed (except for access manholes); therefore, the leaching structures have not been included in the impervious surface calculations. The AWTF facility would be located on an airport property; as a result, open tanks would not be an acceptable alternative because they could attract birds, which are a known hazard to airplane traffic (CDM Smith 2013). The treatment processes would be contained entirely within buildings or covered structures. If the combined collection system is pursued, these surfaces would also include the 12 pump station buildings and associated paved parking (approximately 5,000 square feet). The specific measures that would be used to attenuate stormwater from the new impervious areas would be determined during design and would include BMPs described under Mitigation, below. With the identified mitigation measures, the additional impervious surfaces would result in long-term, minor, adverse impacts on water quality.

Water Quality Impacts during Flood Events

The AWTF would be located 50 feet above MSL, which would be outside the flood zone for the Mastic-Shirley area. However, part of the proposed wastewater collection and conveyance infrastructure would be located within the floodplain (see Section 5.6 for a discussion of impacts on floodplains). If the combined collection system is pursued, pump stations in the floodplain are expected to be constructed of flood-resistant building materials and equipped with submersible pumps to minimize damage and disruption of service during flood events. Flooding could have a temporary impact on the sanitary collection system; gravity sewers within flooded areas would likely surcharge, and grinder pumps within low-pressure collection areas would be affected by power outages. Operational disruptions could have short term, minor, adverse impacts on water quality unless a storm event caused structural damage to roadways, which could increase the extent of impacts. Long term, however, operation of the Proposed Action would have beneficial effects on water quality because it would substantially reduce the risk of releases of sanitary wastewater into the community and into nearby waterways during flood events.

Groundwater Quality

The Proposed Action would result in discharges to the groundwater at the AWTF site, instead of discharges from OWTS throughout the study area under existing conditions. Both the MBR and SBR processes would reduce the total nitrogen load discharged to groundwater from the study area from 244 pounds/day currently to 58 pounds/day (based on an effluent total nitrogen concentration of 5 mg/L) (CDM Smith 2014). The discharged total nitrogen load would mix with groundwater that slowly migrates from high elevations on Long Island toward the coast. Groundwater is largely recharged by precipitation (rain and melting snow), which contains very low nitrogen concentrations. Model results show that the total nitrogen concentrations in groundwater throughout the study area would decrease from mostly greater than 6 mg/L under existing conditions, particularly in the Phase I/II area, to mostly below 6 mg/L (**Figure 5.4-5**). Only a few parts of the Phase I area would have groundwater nitrogen concentrations that would continue to exceed 6 mg/L because of the higher nitrogen loading from OWTS located just to the north of the study area. The future total nitrogen concentration in groundwater would be lowest in the southern portion of the study area, which would be less affected by the discharges from the AWTF. Model results that show the extent to which the study area would achieve the nitrogen target of 4 mg/L for Groundwater Management Zone VI are not available.

The Proposed Action would have a long-term, beneficial effect on groundwater quality throughout the study area. This generally also includes the area around and downgradient of the AWTF.

Loading to Surface Waters

Removal of total nitrogen by the Proposed Action would almost entirely benefit the Forge River. The Proposed Action would reduce the total nitrogen load entering Forge River by 186 pounds/day (modeled using an effluent quality of 5 mg/L; CDM Smith 2014), which would substantially reduce the load of all OWTS currently contributing total nitrogen to the Forge River. Assuming that the load estimated by Swanson et al. (2009b) (i.e., 430 pounds/day; **Table 5.4-1**) is reasonably representative despite the slightly different watershed area considered in their assessment, the Proposed Action would cut the total nitrogen load entering Forge River approximately in half. This reduction would result in a long-term, beneficial effect on the water quality of Forge River.

The existing total nitrogen load from the study area to Carmans River of 7 pounds/day would be eliminated (CDM Smith 2014) because the treated effluent would be discharged via the AWTF to the Forge River watershed. This load reduction would also have a long-term, beneficial effect on the water quality of Carmans River, although the benefit would be substantially smaller than that for Forge River because of the substantially smaller removed load.

For a number of years after the implementation of the Proposed Action, the load reduction to Forge River would be even higher because of the travel time of groundwater. **Figure 5.4-5** shows that the travel time of groundwater in much of the study area ranges from 0 to 5 years. The travel time from the proposed AWTF site to Forge River, however, is between 10 and 25 years. Therefore, after total nitrogen loading from OWTS is eliminated through implementation of the Proposed Action, the effluent from the new AWTF would require more than 10 years to arrive at Forge River, although hydraulic pressure from 1.4 mgd of the effluent may accelerate the flow.

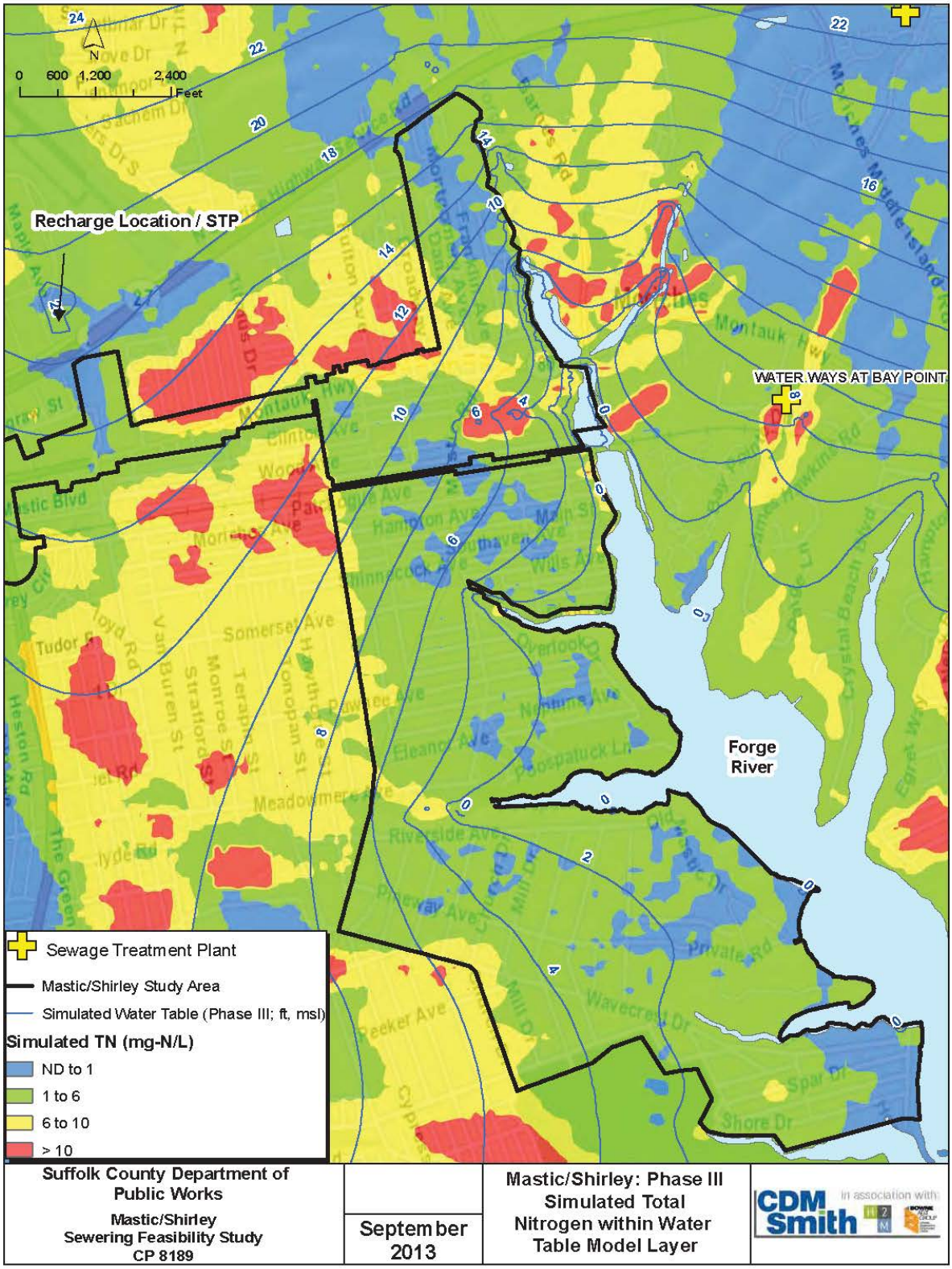

Figure 5.4-5. Modeled Total Nitrogen Concentrations in Shallow Groundwater after Implementing the Proposed Action for the Phase I/II and III Areas

Any short- or long-term reduction in nitrogen loading to Forge River would be beneficial to the water quality in Moriches Bay. The nitrogen loading reduction of the Proposed Action would be one of multiple steps needed to collectively improve water quality (nutrients, bacteria), limit and eventually eliminate shellfish bed closures, and limit and eventually prevent fish kills and brown tide outbreaks in the bay.

Groundwater Elevations

The centralized treatment system under the Proposed Action may temporarily lower the water table in most of the study area. The extent of the lowered water table is expected to be minor, but cannot be quantified because model data are not available. In the long term, the water table would adjust to generally current conditions because the effluent released into groundwater at the AWTF site would migrate toward Forge River.

Based on the experience of SCDPW, an assessment by the AWTF designer, and a review of similar wastewater treatment facility groundwater recharge areas on Long Island, the long-term increase in the groundwater table elevation at the perimeter of the AWTF site would be less than approximately 2 inches (Gannett Fleming 2017).

Drinking Water Supply Impacts

The two public water supply well fields in the study area are located downgradient of the AWTF. These wells draw water from the Magothy Aquifer. The average pumping rates over the last 20 years (1997 to 2016) have been fairly steady, without a net increase (Suffolk County Water Authority 2017c). For the next 25 years, the Suffolk County Water Authority projects an increase in the pumping rate of these four wells by 5 to 10 percent. To meet this demand, a third well may be drilled at the Lambert Avenue well field in the next 15 to 20 years. In addition, the four wells will be replaced by new wells drilled at the same well fields within the next 20 years; these wells will be drilled to the same depth.

The potential impact of the effluent from the proposed AWTF on the four community drinking water wells was simulated using the calibrated Suffolk County Groundwater Model; the report is provided in Appendix B.5. In essence, the simulation determined that under recent average annual conditions of recharge and water supply pumping, the treated effluent of 1.4 mgd from the AWTF would migrate through the Upper Glacial Aquifer toward the Forge River, with no effects on the four community wells. At substantially higher pumping rates (the simulation used 78 percent for the Lambert Avenue wells and 43 percent for the Main Street wells, which reflect the summer pumping rates projected for the entire year), the effluent would contribute to the pumped well water. This could include entrainment of PPCPs into the pumped well water if PPCPs are present in the effluent.

The two non-community wells within the Phase I study area are located more than 0.5 mile southwest of the AWTF site. These wells would not be affected because they are located upgradient of the groundwater flow direction for AWTF effluent discharge.

Private wells, if located within the flow of the effluent discharge at the AWTF and Forge River, may be adversely affected if they are used as a drinking water source. The recommended mitigation would be to connect the parcels(s) served by the potentially affected well(s) to the public water supply. Efforts should be made to locate any such drinking water well(s) located directly downgradient of the AWTF. Private wells used solely for landscaping purposes would not be affected.

A connection to the public water supply would be required for operation of the AWTF to supply water to the on-site bathroom, laboratory, and for cleaning purposes. The AWTF is not expected to use a large quantity of water for operation; therefore, water use for the Proposed Action is expected to have a long-term, negligible impact on groundwater supplies.

Special Groundwater Protection Area

Because the Proposed Action would involve water resources in Suffolk County, SEQRA (6 NYCRR 617.9(b)(5)(h)) requires an analysis of its consistency with the *Suffolk County Comprehensive Water Resources Management Plan* for the Special Groundwater Protection Area program. Sole Source Aquifer Protection (ECL Article 55) designates nine areas within Nassau and Suffolk Counties that are Special Groundwater Protection Areas. These nine areas are designated as watershed recharge areas that are important for the maintenance of large volumes of high-quality groundwater. The existing water supply policy is to ensure the future quantity and quality of groundwater recharge by controlling development and pumping rates in these Special Groundwater Protection Areas. All Special Groundwater Protection Areas are designated Critical Environmental Areas, which are areas of exceptional or unique natural settings that have an inherent ecological, geological, or hydrological sensitivity. Based on a review of the *Special Groundwater Protection Area (Central Suffolk) Critical Environmental Area Map #2*, the study area is not located in a Special Groundwater Protection Area (NYSDEC 1993), and the Proposed Action would not impede Suffolk County's efforts to control development in these areas. Therefore, the Proposed Action would be consistent with the *Suffolk County Comprehensive Water Resources Management Plan* for the Special Groundwater Protection Area program.

5.4.3.3 Indirect Impacts from Growth Inducement

The proposed AWTF would be designed with a treatment capacity to accommodate potential redevelopment of existing parcels and any other induced growth. Therefore, long-term, indirect effects on water quality would be consistent with direct effects and would be beneficial.

5.4.3.4 Mitigation

Stormwater (During Construction)

- BMPs would be implemented during construction to minimize potential temporary soil erosion. Sample BMPs include installing and maintaining temporary barriers (i.e., berms, dikes, silt fences, straw bales, or sandbag barriers) around disturbed areas and soil stockpile perimeters to retain the soil on-site rather than allowing it be washed off into surface waterbodies.
- BMPs would be specified as part of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity permit application, which would also include an erosion and sediment control plan and stormwater pollution prevention plan (SWPPP).
- Additional BMPs include covering inactive soil stockpiles or otherwise protecting them from stormwater via soil stabilization and revegetating or permanently stabilizing disturbed areas when construction activities are sufficiently complete.
- Water removed from excavations via dewatering would be handled according to the protocols established in the SWPPP. These protocols would include removing sediment from the water prior to discharge likely using portable sediment settling tanks and/or silt control bags.

Hazardous Materials Handling (During Construction)

- BMPs would be implemented including: training employees on safe storage and material handling practices; placing drip pans or absorbent materials at potential drip and spill locations during filling and unloading of containers; incorporating spill response procedures into regular construction safety meetings; preparing for spills by storing and clearly labeling appropriate spill cleanup materials in a location known to all.
- The contractor would be required to respond to all spills immediately upon discovery. The appropriate spill response would be determined by the quantity and/or composition of spilled substance and would be detailed in the SWPPP. For minor spills, the protocol would be: (1) contain the spill, (2) recover the spilled material, (3) clean the spill area using absorbent materials (i.e., do not hose down the area), and (4) dispose of clean-up materials appropriately.
- Any spills of hazardous materials that enter the subsurface would be reported to NYSDEC (New York State Spill Hotline 1-800-457-7362) within two hours of discovery (NYSDEC 2016a). The NYSDEC spill response staff would then investigate such spills and take action based on the substance spilled, the potential environmental damage, and safety risks to the public. Both immediate response and continued cleanup would vary depending on the type of spill and the damage caused.
- If soils (or other material) encountered during excavation or any construction activity indicate signs of potential contamination, the contractor would be required to characterize the material and handle it accordingly.
- Any hazardous materials would be managed by NYSDEC-permitted haulers and disposal sites. The contract documents would state that the contractor would comply with all applicable federal, state, and local laws, codes, and regulations, including, but not limited to, 6 NYCRR Part 375, Environmental Remediation Programs.
- If fill material is required, clean fill would be used.

OWTS Removal

- Removal or abandonment of the existing OWTS would be performed in accordance with Section 740-14 of the Suffolk County Code, *Discontinued use of cesspools and septic systems*, and all requirements of the Town of Brookhaven Local Solid Waste Management Plan (Town of Brookhaven 2017).
- A licensed septage hauler would be used to remove the sludge from the OWTS and transport it to an approved wastewater treatment facility for disposal.
- Systems would be properly abandoned in place where possible to reduce generation of solid waste.
- When infrastructure components must be removed, any recyclable components (i.e., steel tanks) would be recycled, if possible. Non-recyclable materials would be handled as construction and demolition solid waste.
- OWTS abandonments and removals would require the addition of clean materials to replace the voids left by system components. Excess earth from AWTF leaching structure

excavation would be considered as fill material for OWTS to mitigate the need for virgin fill materials.

- Following construction activities, the ground surface would be landscaped or otherwise returned to its original condition to prevent soil erosion.

Operation of Collection System

- Proper grinder pump operation would be ensured by providing property owners with a complete list of manufacturer-specific operator instructions at the time of installation.
- Property owners would be specifically instructed to avoid putting any of the following materials into sinks, toilets, or drains because they can clog the system and create unsafe conditions in the lines and tank: cooking fat, oil or grease, degreasing solvents, cigarette butts, dental floss, feminine hygiene products, diapers, baby wipes, strong chemicals, eggshells, coffee beans, or disposable gloves.

Hazardous Materials Handling (During Operation)

- The AWTF would be run by a licensed WWTP operator specially trained in the handling of hazardous materials and infectious waste.
- A spill prevention control and countermeasures plan would be developed, and adequate secondary storage would be provided for fuel and chemicals, as required.
- The AWTF operating protocol would call for the safe and careful handling, labeling, storing, and use of all potentially hazardous or infectious materials as required by the Suffolk County Sanitary Code and other state and federal regulations.

Post-Construction Stormwater

- Stormwater design would include BMPs to attenuate stormwater from the new impervious areas.
- BMPs would ensure compliance with all applicable local, state, and federal regulations and would likely include on-site infiltration.
- Stormwater collection and reuse would be explored during design. The large roof area and need for clean water in the facility operations may present the designers with a unique opportunity for stormwater collection, storage and on-site reuse.

Drinking Water

- Use of water for AWTF operations would be minimized by installing low-flow fixtures and using water judiciously during cleaning operations.
- Collection and storage of rainwater would be investigated during design to see if the potential exists to use stored rainwater for cleaning purposes.
- The discharged effluent from the proposed AWTF would not enter the water pumped from the four community supply wells in the Lambert Avenue and Main Street well fields. However, should the pumping rates from these wells be increased substantially in the future, and prior to installing additional drinking water wells at the two well fields, the associated impact of the effluent from the AWTF on the pumped water should be analyzed.

5.5 Wetlands and Coastal Resources

5.5.1 Methodology

5.5.1.1 Regulations

Wetlands are areas that are inundated or saturated by surface water or groundwater with a frequency and duration sufficient to support a prevalence of vegetation or aquatic life typically adapted for those soil conditions. Actions that could affect wetlands require review under Section 404 of the Clean Water Act (33 USC 1344), which establishes the USACE permit requirements for discharging dredged or fill materials into waters of the United States and traditional navigable waterways. USACE regulation of activities within navigable waters is also authorized under the 1899 Rivers and Harbors Act.

Executive Order 11990, Wetlands Management, requires federal agencies to avoid funding activities that directly or indirectly support occupancy, modification, or development of wetlands, whenever practicable alternatives are available. GOSR uses the 8-Step review process to evaluate potential effects on and mitigate impacts to wetlands in compliance with Executive Order 11990. NYSDEC administers and regulates state-mapped wetlands and upland adjacent areas (buffers) in New York State under the Freshwater Wetlands Act (ECL Article 24) and the Tidal Wetlands Act (ECL Article 25).

The Coastal Zone Management Act, administered by states with shorelines in coastal zones, requires those states to have a Coastal Zone Management Plan to manage coastal development. Projects falling within designated coastal zones must be evaluated to ensure they are consistent with the Coastal Zone Management Plan. Projects receiving federal assistance must follow the procedures outlined in 15 CFR 930.90–930.101 for federal coastal zone consistency determinations. Projects receiving federal assistance must follow the procedures outlined in 15 CFR 930.90–930.101 for federal coastal zone consistency determinations.

Chapter 81 of the Town Code for Brookhaven details the Wetlands and Waterways Law, which applies to wetlands and surface waters. The law regulates development, construction, and other activities—such as vegetation removal, dredging, and pollutant discharges—in wetlands and waterways to protect these resources and associated functions and values. Permits are required based on the type and extent of development or alteration and impacts on resource functions, public welfare, storm hazards, and water quality.

5.5.1.2 Study Area

The primary study area for wetlands and coastal resources is contained within the boundaries of the Forge River project area, including areas that would be used as construction staging areas for equipment and supplies. Construction activities are not expected to occur outside these areas. The secondary study area includes Forge River and Moriches Bay because the Proposed Action could affect the health of wetlands and coastal resources in the bay.

5.5.1.3 Approach

Impacts on freshwater and tidal wetlands and coastal resources were assessed based on the presence of wetlands and coastal resources within the area of direct disturbance. Potential indirect effects on tidal wetland health or degradation were assessed. The U.S. Fish and Wildlife Service (USFWS) maps the approximate wetland limits as part of the National Wetlands Inventory (NWI). NYSDEC also maps state regulated freshwater and tidal wetlands. An on-site inspection was

conducted in November 2016 and again in November 2017 to confirm presence and approximate extent of wetlands and state-regulated adjacent areas. A field delineation of wetlands in accordance with the USACE 1987 Wetland Delineation Method, the 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*, and the *New York State Freshwater Wetlands 1995 Delineation Manual* would be conducted during engineering design and permitting to more precisely establish wetland regulatory limits within the study area.

Potential impacts on coastal resources from the Proposed Action were assessed in terms of nitrogen and pathogen pollution and the resulting effects on aquatic vegetation and tidal wetlands in the Moriches Bay. Consistency with the policies of the New York State Coastal Zone Management Program were qualitatively assessed for the Proposed Action. A federal consistency assessment form and supporting documentation was prepared in accordance with the Coastal Zone Management Act and is provided in Appendix C.1, Coastal Zone Management.

5.5.2 Existing Conditions

Wetlands within the study area and adjacent areas are shown in **Figure 5.5-1**. Within the project area, USFWS NWI-mapped wetlands are associated with portions of the western shoreline of Forge River and the tidal tributaries of Wills Creek, Poospatuck Creek, Lons Creek and Home Creek. USFWS NWI-mapped freshwater forested wetlands in the project area are associated with a tributary to East Mill Pond in the north, and at the western (upstream) end of Poospatuck Creek, Lons Creek, and Home Creek. NYSDEC-mapped wetlands overlap the NWI-mapped wetlands and include additional pockets of tidal wetlands along Forge River and its tributaries. NYSDEC classifies the tidal wetlands as fresh marsh, high marsh, intertidal marsh, mudflats, and littoral zone (shallow open water). The USFWS NWI and NYSDEC mapping of wetlands in the project area was confirmed during on-site inspections conducted in November 2017.

Additional freshwater and/or tidal wetlands associated with the East and West Mill Pond, the eastern shoreline of Forge River, and Ely Creek and Old Neck Creek tributaries are present in the study area. The *Forge River Watershed Management Plan* (Cameron Engineering 2012) provides a brief description and mapping of tidal wetlands within the Forge River estuary, which includes the project area and portions of the study area. The report does not adequately describe each of the wetland types, and not all the wetland types listed in the summary table were shown on the mapping included in the report. However, the summary table is included here for reference as **Table 5.5-1** because it provides an indication of the types and extent of tidally influenced wetlands that are associated with the Forge River and its tributaries.

The wetlands within and adjacent to the study area are productive parts of the landscape and are important to watershed and biotic health. Wetlands absorb floodwaters, supply base flow, protect shorelines, trap sediments, recharge groundwater, improve water quality, and provide essential habitat for a variety of fish and wildlife. Some of the tidal and freshwater wetlands have degraded habitat because of the dominance of *Phragmites* (common reed), which has replaced most native plant species in the affected wetlands. While the habitat function has been degraded, *Phragmites*-dominated wetlands still perform important functions such as water quality improvement, flood storage, and wave attenuation.

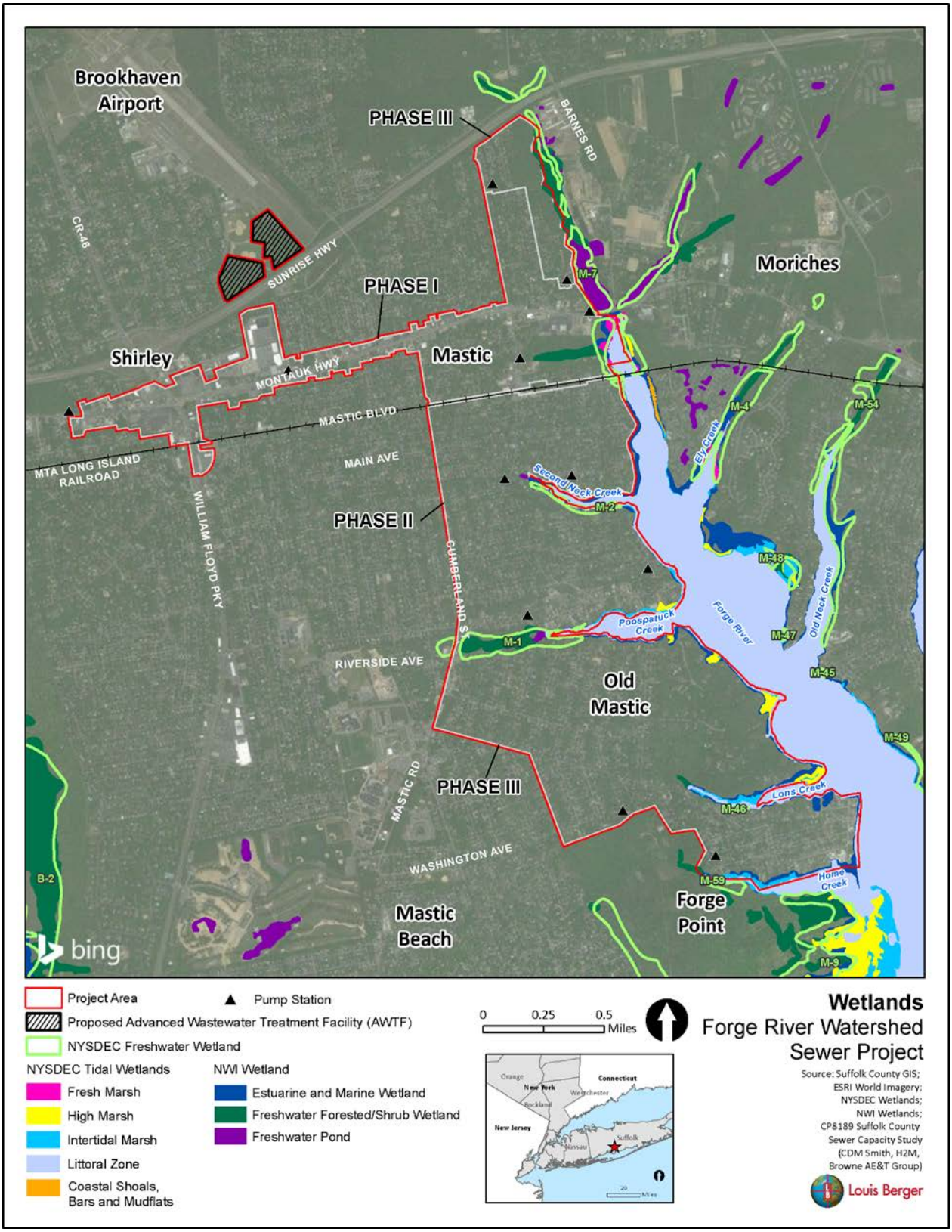

Figure 5.5-1. Wetlands

Table 5.5-1. Wetlands within the Forge River Estuary

Subwatershed	Mudflat	Pannes, Pools	*Phragmites*[b]	*Spartina*[c]	Upper Marsh
East Mill Pond[a]	0.1573				
Ely Creek	4.5766	0.0822	5.8831	1.8996	3.0470
Home Creek	0.1476	0.5137	4.7657	17.7378	0.4734
Lons Creek	0.1985		2.4011	4.1216	0.3566
Lower Forge East	0.6441		0.6092	0.3435	
Lower Forge West		0.6950	23.0000	63.4956	3.1710
Mid Forge East	0.2536		6.2277	8.0683	1.0284
Mid Forge West	0.3012		0.1479	4.0104	0.3548
Old Neck Creek	0.3571		4.5867	1.3160	0.1341
Poospatuck Creek	0.3834		1.3431	0.7817	0.0139
Upper Forge East	2.7374	0.0024	3.4176		0.0439
Upper Forge West	0.2327		1.0316		
West Mill Pond[a]	0.8343	0.0141	0.2712		
Wills Creek	1.7053	0.2025	0.6072	0.5457	0.0289
TOTALS	12.3718	1.5099	54.2921	102.3202	8.6520

Source: Cameron Engineering (2012)
Notes: [a]freshwater wetlands only
[b]degraded brackish or freshwater marsh dominated by the invasive, non-native, *Phragmites australis* (common reed) plant species
[c]includes native *Spartina*-dominated low marsh and high marsh plant communities

The study area is located partially within the "Coastal Zone Area South," a Critical Environmental Area designated by the Town of Brookhaven. Forge River is within the landward coastal boundary and empties into Moriches Bay, which is designated as significant habitat for coastal fish and wildlife.

5.5.3 Potential Impacts and Proposed Mitigation

The determinations below apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.5.3.1 Construction

A November 2016 field inspection by Louis Berger confirmed that the proposed AWTF would not be located in a wetland or within a 100-foot regulated upland adjacent area. Therefore, the construction of the AWTF, including access roads, would not affect wetlands or upland adjacent areas. Conveyance and collection system construction would temporarily disturb roads and

residential yards during installation of the collection system and laterals to individual homes and removal and closure of individual OWTS. Direct permanent impacts on freshwater and tidal wetlands are unlikely; however, adjacent areas may be temporarily disturbed during installation of conveyance infrastructure at the western extent of Second Neck Creek (also known as Wills Creek).

If the combined collection system is pursued, the required pump stations would be located outside wetlands and adjacent areas to avoid impacts on wetlands and regulated adjacent areas. During the design period, field surveys would be conducted at each pump location and easement parcel and, as needed, wetland boundaries would be delineated to confirm construction limits to avoid disturbing these resources.

The construction of the AWTF and collection system has the potential to result in indirect, temporary impacts on downstream wetlands and surface water from soil erosion and sedimentation. However, the Proposed Action would use BMPs to control runoff and stabilize soils to minimize the potential for sediment, nutrient, and turbid water discharges to wetlands and surface waters during the construction period. These measures would be specified as part of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity permit application, which would also include an Erosion and Sediment Control Plan and SWPPP. With implementation of the mitigation measures, construction of the Proposed Action would have direct and indirect, short-term, minor impacts on wetlands and/or adjacent areas.

5.5.3.2 Operation

The operation of the Proposed Action would have a beneficial effect on freshwater and tidal wetlands and open waters within the Forge River watershed by reducing storm-related sewage discharges and high nitrogen concentrations in groundwater and surface waters that contribute to algal blooms, low dissolved oxygen, and habitat degradation. The effect of reduced nitrogen within groundwater would take several years to be realized while the nitrogen-laden groundwater is slowly replaced through infiltration of precipitation. The Proposed Action would remove a substantial source of nitrogen inputs into the Forge River watershed and have a long-term beneficial effect on wetlands.

Consultation with New York State Department of State (NYSDOS) was initiated on December 29, 2016, to assess compliance with the State Coastal Management Program policies under the Coastal Zone Management Act. On January 27, 2017, NYSDOS determined that the project meets its general consistency concurrence criteria (Appendix C.1). The Proposed Action would have a short-term, adverse impact on coastal resources during construction, but the impact would be negligible because BMPs, discussed under Mitigation, below, would be followed. During operation, the Proposed Action would have long-term, beneficial effects on coastal resources because nitrogen and pathogen loading would be reduced, and the health of coastal wetlands would be improved.

5.5.3.3 Indirect Impacts from Growth Inducement

Any future development on vacant parcels would be subject to existing regulatory requirements (such as setbacks) pertaining to development within regulated freshwater or tidal wetlands and their regulated adjacent areas. Approximately 37 undeveloped parcels within the project area are associated with regulated wetlands and/or adjacent areas; therefore, development of one or more of the vacant parcels has the potential to cause an indirect impact on these resources. Adherence

to these regulations would ensure that indirect, long-term impacts on wetlands and coastal resources would be negligible.

5.5.3.4 Mitigation

BMPs would be used during construction to control runoff and stabilize soils to minimize the potential for sediment, nutrient, and turbid water discharges to wetlands and surface waters during the construction period. These measures are described in detail in Section 5.4.3.4, the mitigation section for the Proposed Action.

5.6 Floodplains

5.6.1 Methodology

5.6.1.1 Regulations

Executive Order 11988, Floodplain Management, requires that a federal agency avoid direct or indirect support of development within the floodplain whenever there is a practicable alternative. GOSR and FEMA use Flood Insurance Rate Maps to identify the floodplains for the National Flood Insurance Program. Federal actions within the 100-year floodplain require the federal agency to conduct an 8-Step floodplain review process (Appendix B.10). This process, like NEPA, requires the evaluation of alternatives prior to funding the action. FEMA's regulations on conducting the 8-Step process are contained in 44 CFR Part 9.

Additionally, all FEMA HGMP-funded projects carried out in the floodplain or affecting the floodplain must be coordinated with the local floodplain administrator for a floodplain development permit, and the action must be undertaken in compliance with all relevant, applicable, and required local codes and standards to reduce the risk of future flood loss; minimize the impacts of floods on safety, health, and welfare; and preserve and possibly restore beneficial floodplain values as required by Executive Order 11988.

The Town of Brookhaven Town Code Chapter 33, Flood Damage Prevention, regulates construction and other development within special flood hazard areas of the Town of Brookhaven to protect human health and safety; minimize damage and loss of public and private property, infrastructure, and businesses; and reduce the necessity for flood-related rescue and relief efforts. The Town ordinance is based on FEMA standards and uses FEMA flood hazard elevations. Development includes "any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, paving, excavation or drilling operations or storage of equipment or materials." Development requires a permit for any new or substantially improved structure to be located in the 100-year floodplain. Sanitary sewage systems must be designed to minimize or eliminate infiltration of floodwaters and should not increase base flood elevations by more than 1 foot.

Chapter 86 of the Town Code for Brookhaven describes required stormwater management and erosion control and complies with federal and New York State stormwater control guidelines. The ordinance regulates the rate and volume of stormwater runoff resulting from development activities, runoff leaving a development site must maintain the same rate and volume as predevelopment stormwater runoff, to the maximum extent technically feasible.

5.6.1.2 Study Area

The primary study area includes the floodplains within the boundaries of the Forge River project area, while the secondary study area comprises floodplain resources beyond the project area, including coastal wetlands downstream within Moriches Bay and the larger south shore bays, which provide tidal flood mitigation benefits to the project area.

5.6.1.3 Approach

Impacts were assessed based on the extent of disturbance to floodplains and base flood elevations, an evaluation of changes to stormwater runoff and drainage conditions (including quantity and volumes), and the ability of coastal wetlands to provide flood attenuation functions. This analysis evaluated changes to the existing area of floodplains, floodplain functions and values, and flood risk.

The estimated increase in impervious surfaces resulting from the AWTF and pump stations was quantified based on available information. The proposed stormwater management facilities, drainage facilities, green infrastructure measures, and detention areas also were generally evaluated. Detailed information will be determined during engineering design. An 8-Step floodplain review process (i.e., Floodplain Management Plan) was prepared in accordance with Executive Order 11988 and is provided in Appendix B.10.

5.6.2 Existing Conditions

The majority of the study area does not contain any floodplains, and the study area is not within a designated floodway. The 8-Step floodplain review process for the Proposed Action is provided in Appendix B.10.

FEMA Flood Insurance Rate Map panels 36103C0717H, 36103C0736H, 36103C0737H, 36103C0738H, 36103C0739H, and 36103C0730H (**Figure 5.6-1**) effective September 25, 2009, indicate that the site contains both 100-year (i.e., Zones A, AE, and VE) and 500-year (i.e., Zone X [shaded]) floodplains adjacent to the Forge River and associated tributaries (FEMA 2009a,b,c,d,e,f).

The limit of moderate wave action extends upstream past the mouths of the tributaries on the western side of Forge River (i.e., Home Creek, Lons Creek, Poospatuck Creek, Second Neck Creek, and an unnamed tributary) and includes some portions of the land along Forge River.

Floodplains and wetlands provide natural functions including the reduction of peak flood flows and storm surges, temporary storage of floodwaters, and recharge of groundwater. These services help to reduce impacts on infrastructure and property and enhance public safety during extreme flood events. Floodplains can also sustain ecosystem integrity and health and improve water quality. Healthy wetland vegetation in a floodplain can attenuate waves, thereby reducing the potential for flooding and related hazards and losses accompanying extreme weather events and sea level rise. Vegetation stem density and submergence depth interact to dissipate wave energy associated with storm surges and tidal flooding (Anderson et al. 2013). Nitrogen and pathogens from OWTS have played a part in the degradation of tidal wetlands in Suffolk County, resulting in reduced coastal protection from storm surges and flooding (NYSDEC 2014).

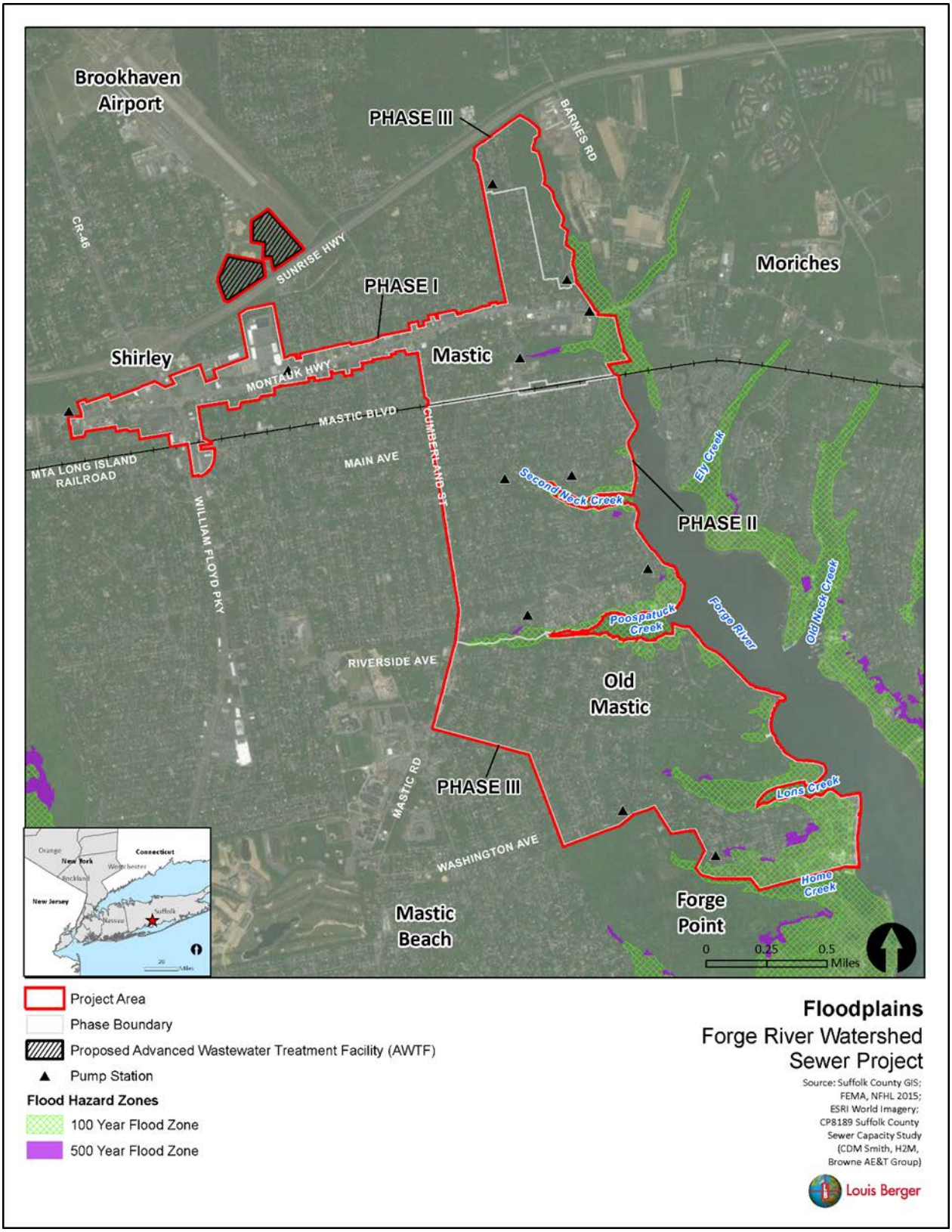

Figure 5.6-1. Floodplains

Flooding in the study area stems from storm surges and heavy precipitation events. During heavy rainfall, impervious surfaces prevent infiltration, which leads to increased stormwater runoff moving quickly over the surface and potentially overwhelming stormwater management infrastructure and resulting in flooding. Flooding also results from shallow groundwater that rises during storms. Heavy rainfall events in the area produce flooding of varying intensity and frequency from surface and groundwater or a combination of both.

5.6.3 Potential Impacts and Proposed Mitigation

Appendix B.10 includes the 8-Step floodplain review process conducted for the Proposed Action. The review indicates that constructions of the Proposed Action would have direct temporary, adverse impacts on floodplains, and operation would have long-term, beneficial impacts. The 8-Step floodplain review in Appendix B.10 includes a detailed analysis of the impacts on floodplains and flood risk from the Proposed Action. A summary is provided below.

Construction of all elements of the sewer collection and conveyance system and the AWTF would result in ground disturbance; however, most of this disturbance would be located outside the floodplain. Segments of the proposed force and low-pressure sewer mains would be constructed in 100-year floodplain and in the 500-year floodplain. These segments of the sewer collection and conveyance system must be constructed in the floodplain because the properties that need to be connected to the sewer system are located in the floodplain. Specifically, the mains and laterals would be buried underground or located within existing areas of impervious surface such as roadways. Construction and the use and storage of heavy equipment within floodplains would result in temporary, adverse impacts from soil compaction, vegetation and soil disturbance, and degradation of floodplain functions.

Compliance with permitting and regulatory requirements, the use of BMPs, stormwater management techniques, and sediment and erosion control plans would minimize the temporary adverse impacts on floodplains and associated flood risks. In accordance with permit requirements, temporarily disturbed floodplain areas would be returned to pre-construction conditions to avoid long-term impacts. Therefore, construction activities have the potential to temporarily disturb floodplain functions, reduce natural floodplain values, and increase stormwater runoff, resulting in direct, short-term, minor, adverse impacts. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.6.3.1 Operation

During operation of the Proposed Action, the presence of new permanent structures could affect stormwater and indirectly affect the floodplain. Potential indirect, long-term, impacts on floodplains from increased impervious surface associated with the AWTF and pump stations constructed outside the floodplain would be minimized through compliance with NYS stormwater control guidelines and stormwater management measures to ensure that the post-development conditions do not adversely affect downstream areas. Because of the guidelines and mitigation measures, no direct, long-term effects on floodplains or changes in the potential flood risk from stormwater flooding are expected.

Flooding within the project area would not affect the operation of the pump stations because they would be constructed with flood-resistant building materials and equipped with submersible pumps to minimize damage and disruption of service during flood events. However, flood events could have a temporary impact on the collection system. During flooding, there is the potential for

gravity sewers to surcharge and power outages to affect the grinder pumps associated with the low-pressure sewers. Therefore, the adverse impacts of flooding on the operation of the sewer system would be short term, unless a storm event caused structural damage to roadways and underlying sewer components

The removal of failing OWTS would decrease the discharge of pollutants that degrade the floodplains and tidal wetlands in the region, thereby benefiting floodplains and decreasing flood risks and hazards to the local communities. Reducing regional floodplain and wetland degradation would allow these resources to better dissipate wave energy and mitigate flooding associated with tidal surge, which in turn would reduce hazards to human health caused by flooding and storm-related failure of OWTS. Overall, indirect, long-term effects on floodplains would be beneficial from the reduced degradation caused by pollutants and the decrease in the risk of flood loss and impacts of floods on human life and property. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.6.3.2 Indirect Impacts from Growth Inducement

Eighty-seven vacant lots (approximately 2 percent of the total lots) are located within 100-year and 500-year floodplains in the project area. Any future development on vacant parcels would be required to complete a separate floodplain impact analysis and follow all applicable state and federal regulations for construction in a floodplain. Indirect, long-term impacts on floodplains would be negligible.

5.6.3.3 Mitigation

Mitigation measures and practices for protecting floodplains would reduce or offset any potential adverse impacts from construction or operation of the Proposed Action. Detailed mitigation measures are described in Section 5.4.3.4, the mitigation section for the Proposed Action.

The Proposed Action would result in a net increase in impervious surfaces. Stormwater runoff from the proposed AWTF would be contained through on-site stormwater management facilities; the specific management practices to minimize the effect of the new impervious surfaces would be determined in the detailed site design process. Detailed mitigation measures applicable to protect floodplain functions are described in Section 5.4.3.4, the mitigation section for the Proposed Action.

5.7 Vegetation

5.7.1 Methodology

5.7.1.1 Regulations

Executive Order 13112, Invasive Species, as amended, requires federal agencies, to the extent practicable, to prevent the introduction of invasive species; provide for their control; and to minimize the economic, ecological, and human health impacts that invasive species cause. Invasive species prefer disturbed habitats and generally possess high dispersal abilities, enabling them to out-compete native species.

5.7.1.2 Study Area

The study area for vegetation includes the Forge River project area, including the proposed AWTF parcels, pump station locations, and areas that would be used as construction staging for equipment

and supplies. The study area also includes vegetation in adjacent wetlands associated with Forge River and its tributaries, and tidal wetlands within Moriches Bay that would be affected by the Proposed Action.

5.7.1.3 Approach

Impacts were assessed based on potential changes to existing vegetation, a decrease in size of a population of local plant species, or a change in the type or amount of suitable habitat available to plant species that currently occur in the study area. Direct, adverse impacts on vegetation may occur when vegetated areas are cleared for the construction of buildings and infrastructure. Adverse impacts on vegetation may consist of a reduction in on-site species diversity and habitat suitable for use by plant species, and beneficial effects may consist of an increase in such diversity and habitat. Additionally, opportunistic, non-native, invasive species can spread or become established following ground disturbance associated with construction. Invasive plant species prefer disturbed habitats and generally possess high dispersal abilities, enabling them to out-compete native species. The analysis determined whether potential beneficial effects on vegetation may occur as a result of the reduction of untreated sewage overflows onto vegetated land or into surface waters, as well as improvements in water quality within Forge River and its tributaries.

A desktop review of available resource mapping, previous reports, and species inventories was conducted to identify vegetation resources within the study area, including significant natural communities. Significant natural communities are rare or high-quality wetlands, forests, grasslands, ponds, streams, and other types of habitats considered significant from a statewide perspective by the NYSDEC Natural Heritage Program (NYNHP). Data on plant species and ecological communities within the study area were reviewed and compared with the descriptions and associations defined in *Ecological Communities of New York State* (Edinger et al. 2014). The NYSDEC Environmental Resource Mapper (NYSDEC 2016b) was searched for the presence of significant natural communities within the vicinity of the study area. An on-site inspection was conducted in November 2016 to characterize the plant communities within the study area and confirm presence and approximate extent of plant species and ecological communities.

5.7.2 Existing Conditions

The majority of the study area is dominated by impervious surfaces in a community that is nearly completely developed with residential and commercial properties. There are street trees, predominantly oak species (*Quercus* spp.), and residential properties are landscaped with mowed grass, shrubs, and trees. A list of plant species, including native and invasive species, within Suffolk County is included in Appendix C.4, NYSDEC Correspondence. NYSDEC does not identify any significant natural communities in the study area. Nearby significant communities include red maple-black gum swamp and brackish tidal marsh within the Wertheim National Wildlife Refuge. Plant species found within the undeveloped portions of the study area are described below. No state or federal threatened or endangered plant species were observed during the November 2016 field inspection. Suitable habitat for special-status plant species is discussed in Section 5.9, Threatened and Endangered Species and Critical Habitats.

The 13.7-acre parcel proposed for the AWTF location is at the Brookhaven Calabro Airport and currently consists of pine-oak forest with an area of maintained turf associated with the airport's safety areas located in the northeast portion of the site. The 17-acre parcel proposed for future

AWTF leaching structures, located to the east of the AWTF site, consists entirely of pine-oak forest. Pitch pine-oak forests, as described in *Ecological Communities of New York State* (Edinger et al. 2014), are mixed forests that typically occur on well-drained, sandy soils of glacial outwash plains or moraines. The dominant trees are pitch pine (*Pinus rigida*) mixed with scarlet oak (*Quercus coccinea*), white oak (*Q. alba*), and red oak (*Q. rubra*). The shrub layer is well-developed with scattered clumps of scrub oak (*Quercus ilicifolia*) and a nearly continuous cover of low heath shrubs, such as lowbush blueberries (*Vaccinium angustifolium*) and black huckleberry (*Gaylussacia baccata*). The herbaceous layer is relatively sparse; characteristic species include wintergreen (*Gaultheria procumbens*), and Pennsylvania sedge (*Carex pensylvanica*). Site investigations confirmed that these characteristic plant species were present within the AWTF parcels. In addition to the species listed above, American holly (*Ilex opaca*), sassafras (*Sassagras albidum*), bigtooth aspen (*Populus grandidentata*), and striped prince's pine (*Chimaphila maculata*) were observed in the 13.7 acre AWTF parcel. The canopy of the 17-acre parcel is somewhat less dense than that of the 13.7-acre AWTF site, and the understory has a denser cover of blueberries and oak saplings. Sugar maple (*Acer saccharum*), sassafras, bigtooth aspen, black cherry (*Prunus serotina*), northern bayberry (*Morella pensylvanica*), eastern red cedar (*Juniperus virginiana*), switchgrass (*Panicum virgatum*), and sweet fern (*Comptonia peregrina*) were observed in the 17-acre parcel. The perimeter of the 17-acre area is mowed for security patrol access. Invasive plants species observed within both parcels include oriental bittersweet (*C. orbiculata*), roundleaf greenbrier (*Smilax rotundifolia*), bristlegrass (*Setaria verticillata*), and Japanese honeysuckle (*Lonicera japonica*).

The southeastern portion of the study area in Old Mastic is predominately undeveloped pine-oak forest with some residential development. Additional undeveloped pine-oak forest is present in the northeast corner of the study area, south of Sunrise Highway.

Forested wetlands are present adjacent to tributaries to West Mill Pond, and are characterized as red maple-swamp white oak swamps. As described in *Ecological Communities of New York State* (Edinger et al. 2014), this hardwood community is typically found in small, isolated basins on sandy soils that are underlain by a clay layer and is co-dominated by red maple (*Acer rubrum*) and oaks, such as swamp white oak (*Quercus bicolor*) and/or pin oak (*Q. palustris*). Site investigations confirmed that dominant vegetation within the wetland consists of oak species (*Quercus* spp.) and red maple (*A. rubrum*). Other vegetation observed included black cherry, eastern red cedar, and sweet pepperbush (*Clethra alnifolia*), while mugwort (*Artemisia vulgaris*), oriental bittersweet, and garlic mustard (*Alliaria petiolata*) were present along the upland boundary.

Emergent fringe wetlands occur adjacent in the eastern portion of the study area along the shoreline of West Mill Pond, Forge River, and their tributaries. Vegetation within wetlands along the Upper Forge River and along Second Neck Creek, Poospatuck Creek, Lons Creek, and Home Creek is predominately common reed. Smooth cordgrass (*Spartina alterniflora*) is present within fringe wetlands where these creeks converge with Forge River, along the shoreline of the Lower Forge River, and in the tidal wetlands of Moriches Bay. USFWS NWI has mapped considerable portions of the Forge River downstream of Willis Creek as subtidal algal beds; however, the *Forge River Watershed Management Plan* (Cameron Engineering 2012) indicates that algal beds in Forge River consist of sea lettuce (*Ulva latuca*), an algae that is tolerant of nutrient loading and blooms under eutrophic conditions.

A narrow strip of sandy beach is present at southeast corner of the study area near the mouth of Forge River. Vegetation present along the upper limits of the beach includes American beachgrass

(*Ammophila breviligulata*), rough cocklebur (*Xanthium strumarium*), common reed, seaside goldenrod (*Solidago sempervirens*), winged sumac (*Rhus copallinum*), and rugosa rose (*Rosa rugosa*).

5.7.3 Potential Impacts and Proposed Mitigation

5.7.3.1 Construction

Construction of the Proposed Action would result in the permanent loss of up to 30.7 acres of pine-oak forest vegetation within the footprints of the AWTF 13.7-acre and 17-acre parcels. These areas would be converted to developed land to house the treatment facility and buildings, leaching field, roads, and parking lots. The facilities would be landscaped to be consistent with wildlife hazard management measures as described in the mitigation section included in Section 5.8, Wildlife and Fish. These specifications would be detailed in the engineering design. The approximately 5-acre leaching field would be designed as a subsurface leaching system that would be covered with soil, seeded with the recommended grass species, and maintained at the Federal Aviation Administration (FAA)-recommended intermediate grass height of 6 to 12 inches. To reduce attractiveness to wildlife, no additional landscaping would be added to the leaching area, including trees or shrubs.

If the combined collection system is pursued, vegetation would be permanently lost because of the construction of pump stations, several of which would be located on partially or entirely undeveloped, vegetated sites. Across the 12 pump station sites, up to 5,000 square feet of vegetation would be cleared to allow for the construction of wet wells, valves and flow meter pits, control buildings, emergency backup generators, and parking. Some revegetation with landscaping species would be included in construction because the pump station sites would be surrounded by fences and landscaped to inhibit vandalism and provide visual screening.

Only minimal impacts on vegetation from construction activities are expected to occur outside the footprints of the AWTF, leaching structures, or pump station facilities because the conveyance and collection system would be built within street rights-of-way with lateral connections to adjacent properties. Grinder pumps for the low-pressure sewers would be located either inside the basement of the building they serve or buried outside near the existing OWTS, potentially disturbing residential landscape vegetation. If any street trees needed to be removed from the Village of Mastic Beach during construction of the collection system, a permit would be required from the Village, and the Village may require that the tree be replaced with an approved species within 12 months after its removal (Town Code Chapter 490: Trees and Shrubs). If any street trees needed to be removed from the hamlet of Shirley during construction of the collection system, the Town of Brookhaven would require a permit from the Planning Board (Town Code Chapter 70: Tree Preservation).

As noted above, opportunistic non-native invasive plant species are present within the study area. These species could spread or become established following ground disturbances associated with construction.

Adverse impacts on vegetation would be localized to the footprints of the AWTF, AWTF leaching structures, pump station facilities (if the combined collection system is pursued), residential properties where laterals or grinder pumps are installed, and any street trees they may need to be removed during construction of the conveyance and collection system. Vegetation within the remainder of the study area would not be affected during construction. Construction would result

in the loss of up to 31 acres of vegetation associated within existing forested habitat in the location of the proposed facilities; tree removal methods and disposal would be chosen by the project contractor, in conformance with existing regulations. Stands of similar vegetation occur within the study area, as well as within extensive forested areas found throughout the region.

Overall, construction of the Proposed Action would have a long-term, moderate, adverse impact on vegetation. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued. The moderate impacts would be reduced by the mitigation measures identified below.

5.7.3.2 Operation

The reduction of sanitary wastewater overflow would reduce potential adverse impacts on vegetation within the study area during future flood events. Vegetation within the study area, including tidal wetlands associated with Forge River and its tributaries and tidal wetlands within Moriches Bay would benefit from water quality improvements. The reduction of nitrogen loading in wetlands in the study area would help prevent the deterioration of currently healthy wetland vegetation and allow the existing impaired vegetation to improve. Water quality improvements may also lead to an increase in the distribution of aquatic vegetation beds and native salt marsh vegetation along the Forge River. Therefore, operation of the Proposed Action would have a long-term, beneficial effect on the health of upland and wetland vegetation in the study area by preventing sanitary wastewater overflow during future flood events and by reducing groundwater nitrogen concentrations, which migrate to the Forge River. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.7.3.3 Indirect Impacts from Growth Inducement

As discussed in Section 5.13, Socioeconomics, the Proposed Action could facilitate increased development and development intensity within the study area. Specifically, development intensity could increase along the Montauk Highway Corridor. Suffolk County does not intend to connect vacant parcels to the sewer district; however, any future development on vacant parcels would be subject to existing regulatory requirements, such as setbacks from wetlands and tree removal permits. Adherence to these regulations would ensure that long-term, indirect impacts on vegetation would be negligible.

5.7.3.4 Mitigation

Tree clearing at the AWTF, AWTF leaching structures, and pump station sites would be kept to the minimum area required for the facilities, and construction fencing or flagging would be used to demarcate the limit of disturbance to avoid unnecessary clearing. Landscaping to inhibit vandalism and provide visual screening at the pump station sites would incorporate native species resistant to infestation by invasive insects.

If vegetation were disturbed during installation of laterals or grinder pumps on residential properties, these areas would be re-landscaped using native species similar to pre-construction conditions. If street trees needed to be removed during construction of the conveyance and collection system, where feasible, any removed trees or shrubs would be replaced with native species resistant to infestation by invasive insects.

To limit the spread or introduction of invasive plant species, construction equipment would be thoroughly cleaned prior to leaving a work location where vegetation has been disturbed.

Treatment to remove any invasive species that may become established after construction should also be conducted.

5.8 Wildlife and Fish

5.8.1 Methodology

5.8.1.1 Regulations

The Migratory Bird Treaty Act of 1918 provides a program for the conservation of migratory birds that fly through lands of the United States. The act requires federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any migratory birds or result in the destruction or adverse impact on designated critical habitat of such species. The law makes it illegal for anyone to "take," possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or their parts, feathers, nests, or eggs. "Take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities."

The Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801) promotes the protection, conservation, and enhancement of Essential Fish Habitat (EFH) for those species actively managed under federal fishery management plans. EFH includes those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The Magnuson-Stevens Fishery Conservation and Management Act requires all federal agencies to consult with the National Oceanic and Atmospheric Administration Fisheries on all actions or proposed actions that are permitted, funded, or undertaken by the federal agency that may adversely impact designated EFH. Adverse impacts may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components.

As discussed in Section 5.7, Vegetation, Executive Order 13112, Invasive Species, requires federal agencies, to the extent practicable, to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. Invasive species prefer disturbed habitats and generally possess high dispersal abilities, enabling them to out-compete native species. If introduced, invasive insect species may pose a threat to ash trees and other hardwood species in the area.

Because the Brookhaven Calabro Airport is the location under consideration for the proposed AWTF, conformity with stipulations established by the FAA Advisory Circular for *Hazardous Wildlife Attractants on or Near Airports* (FAA Advisory Circular No. 150/5200-33B dated August 28, 2007) is required. Airport sponsors and managers have a legal responsibility under federal regulations through 14 CFR 139 to ensure the airport maintains a safe operating environment.

5.8.1.2 Study Area

The study area for wildlife is contained within the boundaries of the Forge River project area, including the location of the proposed AWTF and leaching structures and areas that would be used as construction staging areas for equipment and supplies. Construction activities are not expected occur outside these areas. The study area for fish incudes Forge River and its tributary West Mill Pond and the pond's tributary along the Phase I/II and Phase III area in Mastic, and the downstream waters of Moriches Bay.

5.8.1.3 Approach

Impacts were assessed based on the extent of disturbance to wildlife and fish habitat. A review of the existing habitat community types within the study area and sources such as the North American Breeding Bird Survey and NYSDEC were used to evaluate species potentially present in the study area. The National Audubon Society website was accessed to determine if any Important Bird Areas are located within the study area. Information on fish species and their distribution in the Forge River area was obtained from the *Forge River Watershed Management Plan* (Cameron Engineering 2012), fish and shellfish reports of the South Shore Estuary Reserve Council (South Shore Estuary Reserve Council 1998, 1999), and the National Oceanic and Atmospheric Administration's EFH website. An on-site inspection of the proposed AWTF 13.7-acre and 17-acre parcels and overall study area was conducted in November 2016 to better characterize vegetative species and existing habitat.

Land uses that may attract wildlife and therefore pose a concern for aviation safety include wastewater treatment facilities. This section assesses the potential for the Proposed Action to attract wildlife hazards and provides recommendations for reducing wildlife hazards to human health and safety. For this analysis, impacts were assessed for both the 13.7-acre parcel proposed for the AWTF and the 17-acre parcel proposed for the leaching structures at Brookhaven Calabro Airport.

5.8.2 Existing Conditions

5.8.2.1 Terrestrial Wildlife

Although the majority of the study area is developed commercial and residential areas, patches of land support a diversity of habitat types from pitch pine oak forest to tidal wetlands. Therefore, a diversity of wildlife species is expected to occur within the study area. During the field investigation conducted in November 2016, the following wildlife species were observed in the study area: white-tailed deer (*Odocoileus virginianus*), blue jay (*Cyanocitta cristata*), black-capped chickadee (*Poecile atricapillus*), white-breasted nuthatch (*Sitta carolinensis*), American crow (*Corvus brachyrhynchos*), mute swan (*Cygnus olor*), and herring gull (*Larus argentatus*).

Wildlife species expected to be found in commercial and residential areas of the study area include those adapted for suburban habitats and human disturbance, including striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), white-tailed deer, and gray squirrel (*Sciurus carolinensis*). Common birds in suburban areas include species such as northern cardinal (*Cardinalis cardinalis*), blue jay, American crow, and downy woodpecker (*Picoides pubescens*) (Sullivan et al. 2009). Non-native species adapted to human disturbance include rock pigeon (*Columbia livia*), house sparrow (*Passer domesticus*), and European starling (*Sturnus vulgaris*).

Portions of the Forge River and adjacent floodplain wetlands have the potential to provide habitat for migrating, breeding, and wintering waterfowl, such as American black duck (*Anas rubripes*), greater scaup (*Aythya marila*), American wigeon (*Anas americana*), bufflehead (*Bucephala albeola*), common goldeneye (*Bucephala clangula*), common merganser (*Mergus merganser*), and pied-billed grebe (*Podilymbus podiceps*) (Sullivan et al. 2009).

Forested areas, including the proposed AWTF facility parcel, provide food, cover, and breeding habitat for various wildlife species. Interior-forest bird species may use the areas as stopover

habitat during migration or as nesting habitat during the breeding months. Based on local data from the North American Breeding Bird Survey, these species can include scarlet tanager (*Piranga olivacea*), wood thrush (*Hylocichla mustelina*), veery (*Catharus fuscescens*), ovenbird (*Seiurus aurocapilla*), northern parula (*Setophaga americana*), and American redstart (*Setophaga ruticilla*) (Pardieck et al. 2015). Airport operations staff indicated that turkey also inhabit these forested areas. These forest areas also have the potential to provide roosting habitat for various bat species, including the federally threatened northern long-eared bat (*Myotis septentrionalis*), discussed further in Section 5.9, Threatened and Endangered Species and Critical Habitats.

Invasive insect species, such as emerald ash borer (*Agrilus planipennis*) and Asian longhorn beetle (*Anoplophora glabripennis*), may pose a threat to ash trees and other hardwood species in the study area if a local or nearby infestation is already established. Currently there are no known infestations of emerald ash borer on Long Island; however, Asian longhorn beetle is present in some areas.

Because of their proximity to the study area, natural areas located nearby provide extensive and diverse habitats for various wildlife species, which in turn, may attract those species to habitats within the study area. These areas include Wertheim National Wildlife Refuge and Fire Island National Seashore. The wildlife refuge is located just west of the study area and consists of woodland, grassland, and fresh, brackish, and salt marsh wetland habitats. The William Floyd Estate, part of Fire Island National Seashore, is located south of the study area, and consists of forest and wetlands, including salt marsh (National Park Service 2016).

Although potential wildlife habitat exists in the proposed AWTF parcels, wildlife use on or near Brookhaven Calabro Airport is highly discouraged because of FAA safety requirements. Six white-tailed deer were observed in the forested areas of the proposed AWTF location at the time of the November 2016 field investigation.

5.8.2.2 Fish and Aquatic Resources

Forge River is a mesohaline (salinity ranging from 5 to 18 parts per thousand) tidal river, which receives freshwater discharges primarily from East Mill Pond and West Mill Pond, although a number of other creeks also discharge to the river. There is a 7-foot deep dredged navigational channel allowing navigation as far north as the Long Island Railroad trestle, but the majority of the river is shallow, and significant portions of the river and its tributaries are intertidal. Mudflats are exposed at low tide along much of the river and creeks. The river and creeks contain approximately 100 acres of salt marsh (Cameron Engineering 2012). The sediments of Forge River and its creeks consist primarily of deep, unconsolidated anoxic muds that support a low-diversity benthic macroinvertebrate community dominated by taxa tolerant of poor water quality conditions. Frequent algal blooms continually add decaying organic matter to river and creek sediments. Poor water quality in Forge River causes fish and shellfish kills in the summer months (Swanson et al. 2009c).

Diverse fish species occur within the South Shore Estuary, which includes Moriches Bay, Narrow Bay, and their tributaries, such as Forge River. A report prepared for the South Shore Estuary Reserve Council (1998) found that common and resident finfish species using the estuary included mummichog (*Fundulus heteroclitus*), Atlantic silverside (*Menidia menidia*), striped killifish (*Fundulus majalis*), northern pipefish (*Syngnathus fuscus*), sheepshead minnow (*Cyprinodon variegatus*), threespine stickleback (*Gasterosteus aculeatus*), fourspine sticklebacks (*Apeltes quadracus*), and bay anchovy (*Anchoa mitchili*). These species may be present in Forge River during those times of year when dissolved oxygen levels are supportive but likely migrate out to

the bay when dissolved oxygen levels are low. These low dissolved oxygen conditions are caused by seasonal plankton blooms occurring in warm water conditions, combined with oxygen consumption by decaying organic material on the bottom. Killifish and mummichogs are the most tolerant of low oxygen conditions, which occur in spring and summer. The report also found that the estuary provided nursery habitat for commercially, recreationally, and ecologically important species including summer flounder (*Paralichthys dentatus*), blackfish (*Tautoga onitis*), black sea bass (*Centropristis striata*), bluefish (*Pomatomus saltatrix*), striped bass (*Morone saxatilis*), Atlantic menhaden (*Brevoortia tyrannus*), butterfish (*Peprilus triacanthus*), and scup (*Stenotomus chrysops*).

Other resident fish that use the estuary for spawning and as nursery habitat include naked goby (*Gobiosoma bosci*), grubby sculpin (*Myoxcephalus aenaeus*), longhorn sculpin (*Myoxocephalus octodecemspinosus*), shorthorn sculpin (*Myoxcephalus scorpius*), winter flounder (*Pseudopleuronectes americanus*), white perch (*Morone americana*), tomcod *(Microgadus tomcod*), weakfish (*Cynoscion regalis*), cunner (*Tautogolabrus adspersus*), northern puffer (*Sphoeroides maculatus*), hogchoker (*Trinectes maculatus*), and oyster toadfish (*Opsanus tau*). Some species (i.e., Atlantic silversides) may spawn in the *Spartina* beds along Forge River and its tributaries. Many of these species may be present in Forge River when temperatures and dissolved oxygen levels are suitable, but these species are expected to vacate the area during severe oxygen depletions that are most common during spring and summer.

The brackish salinity zone of Moriches Bay (which include Forge River) is designated as EFH for various life stages of federally managed finfish species, including bluefish, summer flounder, winter flounder, and windowpane flounder *(Scopthalmus aquosus)*. This designation includes EFH for juvenile and adult summer flounder. USFWS NWI mapping shows considerable portions of Forge River downstream of Second Neck Creek and adjacent areas of Moriches Bay as subtidal algal beds. Algal beds within juvenile and adult summer flounder EFH are Habitat Areas of Particular Concern. However, the 1998 South Shore Estuary Reserve Council report indicates that algal beds in Forge River consist of sea lettuce (*Ulva latuca*), which experiences blooms that suggest impaired water quality. Based on water quality conditions in the Forge River, it is unlikely that summer flounder are regularly present.

While EFH has not been designated for many forage species, impacts on these species can affect habitat for EFH-designated species that rely on them as a food source. Forage species likely to occur in Forge River include mummichog, striped killifish, sheepshead minnow, Atlantic silversides, and grass shrimp (*Palaemonetes* spp.).

The *Forge River Watershed Management Plan* (Cameron Engineering 2012) found that the Forge River was not especially hospitable fish habitat for many of the other fish species occurring in Moriches Bay because of a preponderance of silt and detritus, little sandy bottom, lack of eelgrass beds and poor bottom structure. Fish use is limited because of existing water quality impairment (see Section 5.4), especially during periods of extended hypoxia.

The muddy substrate and low dissolved oxygen conditions of Forge River are also unfavorable for crustacean and molluscan shellfish. Much of the Forge River substrate is anaerobic mud, inhabited by few species of worms and gastropods that are very tolerant of poor water quality conditions. The predominately soft river substrate does not support hard clams, oysters, or blue mussels or favor the settlement of their larvae. Crabs and shrimp are more mobile and may frequent areas of

higher water quality within the Forge River, avoiding areas of increased detritus decomposition and oxygen depletion.

West Mill Pond and its tributary are upstream, nontidal reaches of Forge River. Fish passage between West Mill Pond and Forge River is not currently possible because of the dams associated with the structure of the Montauk Highway. This pond, as discussed in Section 5.4, Water Quality, is highly eutrophic. No data on the fish communities of this eutrophic pond are available, but it can be assumed that only a few fish species tolerant of poor water quality and habitat conditions are likely to inhabit the pond, such as largemouth bass (*Micropterus salmoides*), sunfish (*Lepomis* spp.), and catfish (*Ictalurus* spp.).

5.8.3 Potential Impacts and Proposed Mitigation

5.8.3.1 Construction

During construction, minimal tree removal along street corridors may be required, but impacts on migratory bird species would be negligible because street trees do not provide high quality nesting habitat because of their proximity to human disturbance. If the combined collection system is pursued, tree removal would be required for some of the proposed pump station locations, but their removal would be unlikely to significantly affect migratory bird species because these locations are also situated near residential areas or along road corridors and do not provide high quality nesting habitat. The proposed pump station areas and the areas of the AWTF that are currently forested have the potential to provide roosting habitat for the federally threatened northern long-eared bat, discussed in Section 5.9, Threatened and Endangered Species and Critical Habitats.

The construction of the Proposed Action would result in the removal of up to 31 acres of forest habitat. Trees would be removed outside the breeding season to minimize potential impacts on migratory bird species. The AWTF construction would result in adverse impacts on migratory bird species from the permanent loss of forested habitat. These impacts, however, would be considered minor because of the presence of larger, unfragmented forested areas near the AWTF location that are farther from human and aircraft disturbance.

At the proposed 13.7-acre and 17-acre AWTF parcel locations, the Proposed Action could cause short-term, minor, adverse impacts on wildlife from noise associated with tree removal activities, depending upon the sequencing of tree removal and the amount of forested area that remains once trees are removed. Wildlife using the forested areas are not accustomed to the constant noise and disturbance that would accompany tree removal machinery and direct human presence within their habitat. Once all trees have been removed, no further impacts on wildlife are anticipated from the construction activities.

Construction would have no effect on the spread of invasive insect species as long as BMPs required by the U.S. Department of Agriculture and New York State Department of Agriculture and Markets are in place, as described in the mitigation section below.

Short-term increases in turbidity and sedimentation in local surface waters may result from erosion and transport of excavated soils to local waterways during construction of the collection, conveyance, and treatment facilities, especially from excavation work within roads. Decommissioning OWTS may also result in increased turbidity and sedimentation in local waterways. Erosion and sedimentation BMPs discussed in Section 5.4, Water Quality, would minimize impacts on local waters.

Overall, the Proposed Action would have local, short-term, minor, adverse impacts on wildlife and fish within the study area during construction. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.8.3.2 Operation

Once operational, the Proposed Action would have no effects on terrestrial wildlife in the study area because all operations would occur indoors or underground, except for limited vehicular trips associated with plant operation and maintenance.

Wildlife use of Brookhaven Calabro Airport and adjacent areas is discouraged, because of the hazards to aircraft posed by many wildlife species. A wildlife hazard plan is not required for the Proposed Action because all proposed uses at the AWTF would be contained in enclosed buildings or buried underground to minimize odors and accessibility to any open water, nearly eliminating the potential for attracting wildlife. Removing trees in this area would eliminate cover for certain hazardous wildlife species, such as white-tailed deer, which pose a substantial strike risk to arriving and departing aircraft. Mitigation measures, including garbage storage, would be implemented at the AWTF to minimize wildlife attractants. If maintained as described in the mitigation section below, the proposed AWTF would have a long-term, beneficial effect on the airport area, reducing the risk of wildlife hazards to aircraft.

Once the AWTF is operational, the frequency and magnitude of OWTS sewage releases would be greatly reduced compared to current conditions, and total nitrogen concentrations in groundwater and surface waters would be reduced. Hypoxic conditions and algal blooms, which can cause fish kills and abandonment of areas of poor water quality, would occur less often. Increases in dissolved oxygen in surface waters would help to increase oxygenation of sediments, which would reduce the prevalence of anoxic muds and improve benthic productivity. Fish, benthic invertebrates, and waterfowl that use Forge River and its tributaries and the downstream waters of Moriches Bay and Narrow Bay would benefit from improved water and sediment quality that may result from implementation of the Proposed Action. Improved water quality would increase ecosystem health by enhancing the ecological functions of tidal wetlands, mudflats, and subtidal shallows within the South Shore Estuary. Over the long term, fish and benthic communities and habitats would experience beneficial effects. Operationally, the Proposed Action would have minor impacts on terrestrial wildlife and would result in long-term, beneficial effects on fish. Additionally, the risk of wildlife hazards to aircraft would be reduced. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.8.3.3 Indirect Impacts from Growth Inducement

Any future development on vacant parcels would be subject to existing regulatory requirements such as setbacks from wetlands and tree removal permits. Adherence to these regulations would ensure that long-term, indirect impacts on wildlife and fish would be negligible.

5.8.3.4 Mitigation

To ensure that the proposed AWTF facility itself does not create a wildlife attractant, the following measures would be implemented to minimize wildlife hazards:

- All mowed lawn areas of the facility, including leaching structure fields, would be maintained at the FAA-recommended intermediate grass height of 6 to 12 inches to minimize attraction of wildlife to either short-grass or long-grass habitat. Short-grass habitat provides foraging opportunities for flocking species such as Canada geese and

blackbird/starling species. Long-grass habitat limits overall visibility across the airfield and provides habitat for small mammal species that attract raptors and larger mammalian predators.

- Leaching structure fields and any mowed lawn areas would be seeded with grass species less favorable to bird species, including zoysiagrass (*Zoysia japonica*) and tall fescue (*Schedonorus arundinaceus*). Tall fescue is often infested with a fungal endophyte, making it unpalatable to species such as Canada geese.
- To minimize the facility's attractiveness to wildlife, additional landscape plants, including trees and shrubs, would not be installed at the AWTF.

Trees in the AWTF location and leaching structure area would not be removed during the migratory bird breeding season, which occurs between April 1 and August 31.

To reduce potential impacts from invasive species, including emerald ash borer and Asian longhorn beetle, individuals working on-site would be aware of the possibility that these insects may be present and would be encouraged to report anything suspicious promptly to NYSDEC or the New York State Department of Agriculture and Markets. Any trees that may need to be replaced because of the Proposed Action would be tree species that are resistant to these invasive insects.

Erosion and sedimentation BMPs would be implemented during construction to minimize impacts on local waters. Detailed measures are described in Section 5.4.3.4, the mitigation section for the Proposed Action.

5.9 Threatened and Endangered Species and Critical Habitats

5.9.1 Methodology

5.9.1.1 Regulations

The Endangered Species Act of 1973 provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The act requires federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse impact on designated critical habitat of such species. The act also prohibits any action that causes a "take" of any listed species of endangered fish or wildlife. The term "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

Critical habitat, as defined in the Endangered Species Act, is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

Bald eagles (*Haliaeetus leucocephalus*) were removed from the federal list of threatened and endangered species on August 9, 2007, and are no longer protected under the Endangered Species Act. However, bald eagles are still federally protected under the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the Lacey Act. In addition, bald eagles are listed as threatened by the State of New York and are protected under NYSDEC Endangered and Threatened Species Regulations.

In addition to the federal Endangered Species Act, the New York State Endangered Species Act (ECL 11-0535) prohibits the take, importation, transportation, possession or sale of state endangered, threatened and special concern species, except under license or permit from the department.

5.9.1.2 Study Area

The study area for threatened and endangered species includes the boundaries of the Forge River project area, including the location of the proposed AWTF and leaching structures, and areas that would be used as construction staging areas for equipment and supplies. Construction activities are not expected to occur outside these areas. The study area also includes Forge River and its tributaries and the downstream waters and tidal wetlands of Moriches Bay.

5.9.1.3 Approach

Impacts were assessed based on the extent of disturbance to potential habitat for any federal or state-endangered, threatened, or special concern species. In addition, any potential for direct impacts on listed wildlife or fish individuals were evaluated. Potential adverse impacts may include disturbance of endangered, threatened, or rare plant species or the diminishment of their habitat.

The NYSDEC Environmental Resource Mapper was accessed to make a preliminary determination as to whether any state threatened or endangered plant or animal species or critical habitat is found within the study area. NYNHP was contacted to request information regarding specific records of any federal and/or state special-status species or habitats of special concern documented within the vicinity of the study area. The USFWS-Long Island Ecological Services Office was contacted through the Information, Planning, and Conservation System regarding the potential presence of wildlife species under the jurisdiction of USFWS within the vicinity of the study area, and an official species list was obtained. Agency responses were reviewed, and the potential that each species may occur within the study area was assessed based on a review of species' life history and habitat preferences. An initial field survey was conducted to characterize potential threatened or endangered plant or animal species habitat in November 2016.

5.9.2 Existing Conditions

5.9.2.1 Threatened and Endangered Plant Species

The official list of federally listed endangered and threatened species and candidate species known or likely to occur in the study area is provided as Appendix C.5, USFWS Consultation. This list indicates that sandplain gerardia (*Agalinis acuta* – endangered) and seabeach amaranth (*Amaranthus pumilus* – threatened) have the potential to occur in the study area.

According to the NYSDEC Environmental Resource Mapper, rare plants were identified in the southern portion of the study area. In addition, the NYSDEC Environmental Resource Mapper identified an "old or potential record" of state-endangered silvery aster (*Symphyotrichum concolor* var. *concolor*) in the study area. NYNHP was also contacted to request information on any known occurrences of federal or state endangered, threatened or proposed, or candidate species of flora or any critical habitats known to support those species within the vicinity of the study area. On December 21, 2016, NYNHP indicated that swamp sunflower (*Helianthus angustifolius* – state threatened), marsh straw sedge (*Carex hormathodes* – state threatened), and water pygmyweed (*Crassula aquatica* – state endangered) have been documented in the study area or in its vicinity.

NYNHP also noted that silvery aster has a historical record in the vicinity of the study area. NYSDEC NHP correspondence is provided in Appendix C.4, NYSDEC Correspondence. **Table 5.9-1** summarizes the federal and state endangered, threatened, or proposed candidate plant species.

Table 5.9-1. Endangered and Threatened Plant Species Documented in the Study Area

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat Present in Study Area
Sandplain gerardia	*Agalinis acuta*	E	E	Pine barrens grasslands; remnant grasslands	None
Seabeach amaranth	*Amaranthus pumilus*	T	E	Sparsely vegetated upper beach zone	None
Silvery aster	*Symphyotrichum concolor var. concolor*		E	Open pinelands, savannas, pink-oak woodlands	AWTF parcels
Swamp sunflower	*Helianthus angustifolius*		T	Wetlands near ocean	Along Forge River and tidal tributaries
Marsh straw sedge	*Carex hormathodes*		T	Salt or brackish marsh; fens, wetland margins, coastal wet forests	Along Forge River and tidal tributaries
Water pygmyweed	*Crassula aquatica*		E	Intertidal riverbanks; fresh to tidal shores near coast	Along Forge River and tidal tributaries

Notes: E – Endangered, T – Threatened

Sandplain gerardia grows in remnant grasslands in pine barrens with broad, grassy swaths; in other remnant grasslands including those around golf courses; and along roadsides and railroads. It requires disturbed areas that provide bare soil areas within these grasslands. Suitable habitat for sandplain gerardia does not occur in the study area (NYNHP 2015a).

Seabeach amaranth grows in the upper beach zone above the high tide line and is intolerant of even occasional flooding during its growing season. The habitat of seabeach amaranth is sparsely vegetated with annual herbs and, less commonly, perennial herbs (mostly grasses) and scattered shrubs. This species is intolerant of competition and does not occur on well-vegetated sites. Sites include lower foredunes and upper strands of non-eroding beaches. Upper beach habitat for seabeach amaranth is not present in the study area (USFWS 2014).

Silvery aster occurs primarily in open pinelands, savannas, and grassy openings in pine-oak woodlands with dry, sandy soils. The wooded areas proposed for the AWTF and leaching structures may contain potential habitat for silvery aster. The last NYNHP record for this species indicates that it previously occurred in dry, sandy woods in 1934; however, absence from the area

is assumed (Polloni 2001). Silvery aster was not observed in the AWTF 13.7-acre or 17-acre parcels during the November 2016 site visit.

Swamp sunflower inhabits open wetlands near the ocean. These wetlands usually contain some influence from saltwater but are often more freshwater-influenced. Potential habitat for swamp sunflower does occur in the study area but is limited to the study area boundaries along Forge River, Poospatuck Creek, Lons Creek, and Home Creek. The NYNHP record for this species indicates that it previously occurred in Forge Point marsh, which is located outside the study area (NYNHP 2015b).

Marsh straw sedge occurs in and adjacent to salt or brackish coastal marshes or rarely slightly inland, tidal marshes where it can occur in dune swales and on dry or wet sands. It also grows in fens, on margins of wetlands, and in wet forests adjacent to the coast. Additional habitat includes maritime rock ledges and moist coastal sands at sea level. Potential habitat for marsh straw sedge occurs adjacent to the study area. The NYNHP record for this species indicates that it previously occurred in Forge Point marsh, which is located outside the study area (NYNHP 2015c).

In New York, water pygmyweed occurs in tidal mud flats, marshes, and rocky shores along the lower Hudson River, and along the banks of intertidal rivers on Long Island. It is also found along the margins of pools and on fresh to tidal shores near the coast. Potential habitat for water pygmyweed occurs in the study area, limited to the project area boundaries along Forge River, Poospatuck Creek, Lons Creek, and Home Creek. The NYNHP record for this species indicates that it previously occurred in Carmans River wetlands in the Wertheim National Wildlife Refuge, which is located outside the study area (NYNHP 2015d).

5.9.2.2 Threatened and Endangered Wildlife and Fish

According to the USFWS Environmental Conservation Online System – Information, Planning, and Conservation System website, NYSDEC Environmental Resource Mapper, and NYNHP, the following species have been documented in or near the study area: piping plover (*Charadrius melodus* – federally threatened); roseate tern (*Sterna dougallii* – federally endangered); red knot (*Calidrus canatus rufa* – federally threatened), bald eagle (*Haliaeetus leucocephalus*) (nesting) (state threatened), and northern long-eared bat (*Myotis septentrionalis*) (state threatened, federally threatened). NYNHP also noted that seaside sparrow (*Ammodramus maritimus* – state special concern) has been documented near the study area. NYNHP correspondence is provided in Appendix C.4, NYSDEC Correspondence. The official list of federally listed endangered and threatened species and candidate species known or likely to occur in the study area is provided as Appendix C.5, USFWS Consultation. **Table 5.9-2** summarizes the federal or state endangered, threatened, proposed, or special concern species documented near the study area.

Species habitat requirements include:

- Northern long-eared bat: Summer habitat includes abundant stands of trees with sufficient bark crevices and snags for roosting. Based on information from the USFWS Long Island Field Office, the nearest known maternity roost is located approximately 3 miles north of the study area. Potential maternity colony, roost, and foraging habitat is located in the 13.7-acre and 17-acre AWTF parcels and wooded areas located along Forge River and Lons Creek (USFWS 2015a).

Table 5.9-2 Endangered and Threatened Wildlife Species Documented in the Study Area

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat Present in Study Area
Northern long-eared bat	*Myotis septentrionalis*	T	T	Wooded areas, fencerows, riparian corridors; trees ≥3 inches diameter at breast height with cracks, crevices, cavities, or exfoliating bark	Summer habitat is present throughout the forested areas
Piping plover	*Charadrius melodus*	T	E	Sandy beaches above high tide line, foredunes, and sandspits	None
Red knot	*Calidrus canatus rufa*	T		Sandy beaches with gentle slopes and minimal wave action, sand spits, and marsh islands	None
Roseate tern	*Sterna dougallii*	E	E	Barrier islands and salt marshes; foraging habitat shallow coastal waters	No breeding habitat; foraging habitat present in Forge River channel
Bald eagle	*Haliaeetus leucocephalus*		T	Large bodies of water; nests in tall trees near water	Foraging habitat located along Forge River and tributaries
Seaside sparrow	*Ammodramus maritimus*		SC	Coastal high and low marsh	Marshes along Lons and Home Creeks

Notes: E – Endangered, T – Threatened, SC – Species of Concern

- Piping plover: Habitat includes wide, flat, open, sandy beaches and barrier islands, with limited vegetation and limited human disturbance (USFWS 2015b). Piping plover habitat is not present in the study area.
- Red knot: Habitat includes sandy beaches with gentle slopes and minimal wave action and mud flats with abundant horseshoe crab egg food source (Niles 2003). Red knot habitat is not present in the study area.
- Roseate tern: Habitat includes open water for foraging and barrier island nesting colony areas free of predators and human disturbance. Potential foraging habitat for roseate tern exists in the Forge River channel, but breeding habitat is not present in the study area.
- Bald eagle: A known bald eagle nest is located on Forge Point, outside and to the south of the study area. The nest was identified during the field investigation in November 2016.

To minimize disturbance, the USFWS National Bald Eagle Management Guidelines recommend that activities take place outside a 660-foot buffer from a bald eagle nest. The Forge Point nest is located more than 660 feet from the project area boundary. Bald eagle foraging habitat is located within the study area, but is limited to tidal creek and riverine areas.

- Seaside sparrow: coastal high and low marsh, generally elevated from flooding with muddy open areas for feeding (NYNHP 2015e). Potential habitat for seaside sparrow is located in the study area but is limited in size and is located only along Lons Creek and Home Creek.

Threatened or endangered species, such as piping plover, red knot, roseate tern, and bald eagle—while not likely found within the limits of the project area—may use Forge River and the coastal waters, wetlands, and beaches of Moriches Bay and Narrow Bay for foraging or breeding.

5.9.2.3 Critical Habitats

According the USFWS official species list, no designated critical habitats occur within the study area.

5.9.3 Potential Impacts and Proposed Mitigation

5.9.3.1 Construction

Tree removal associated with the Proposed Action could affect the northern long-eared bat maternity colony, summer roosting, foraging, and travel habitat. The permanent loss of potential summer habitat would result in a minor, adverse impact on northern long-eared bats. Short-term noise and construction activity impacts would be negligible with the implementation of the mitigation measures identified below, which would require that all tree removal occur outside the bat roosting season. Outside the roosting season, northern long-eared bats hibernate in caves and mines located outside the study area and would likely not be directly affected by tree removal activities, thereby avoiding incidental take.

FEMA submitted the northern long-eared bat 4(d) rule streamlined consultation form to USFWS on February 9, 2017 (Appendix C.5) under the USFWS's January 5, 2016, Intra-Service Programmatic Biological Opinion on the final 4(d) rule for the northern long-eared bat. By signing this form, FEMA determined that the Proposed Action may affect the northern long-eared bat, but that any resulting incidental take of the northern long-eared bat is not prohibited by the final 4(d) rule. USFWS did not respond to the letter. As such, FEMA and GOSR presume that the effect determination is informed by the best available information and that its project responsibilities under 7(a)(2) with respect to the northern long-eared bat are fulfilled through the USFWS January 5, 2016, Programmatic Biological Opinion.

Potential habitat for piping plover, red knot, seabeach amaranth, and sandplain gerardia does not occur in the study area; therefore, construction activities would not affect these species.

Potential habitat for seaside sparrow and foraging habitat for roseate tern occur in the study area. Impacts on these wildlife species from construction activities would be negligible because construction would be too distant from suitable habitat to result in measurable effects.

The Proposed Action would not affect the known bald eagle nest on Forge Point; therefore, there would be no effect on bald eagle nesting.

Potential habitat for state-listed swamp sunflower, marsh straw sedge, and water pygmyweed is located in wetland areas along the edges of the study area, where construction activities would not occur. Impacts from construction activities, such as from increased sedimentation, would be negligible for these plant species and would be minimized through the implementation of water quality BMPs.

State-listed silvery aster is presumed to be absent from the study area; however, based on the historical record of this species within the study area and the suitable habitat present in the AWTF site, a qualified biologist would survey both AWTF parcels prior to construction to note the presence or absence of silvery aster. If found in an area that is proposed for clearing, the plant(s) would be relocated to nearby, similar habitat outside the area of disturbance. Therefore, construction of the Proposed Action would not adversely affect this species.

Overall, construction of the Proposed Action would have short-term, negligible impacts on threatened and endangered species. The Endangered Species Act effect determination for the Proposed Action is that the project may affect, but is not likely to adversely affect, the northern long-eared bat. The Proposed Action would have no effect on the other federally listed species that potentially occur within the vicinity of the study area. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.9.3.2 Operation

Once the Proposed Action is operational, nearby wetland and aquatic threatened and endangered species habitats would experience beneficial effects over the long term because the frequency and magnitude of OWTS sewage releases would be greatly reduced compared to current conditions. The deterioration of wetland habitat would be reduced, allowing impaired vegetation and water quality to improve. Species that use Forge River and its tributaries and downstream waters would benefit from improved water, sediment, and habitat quality that would result from the Proposed Action. The long-term effect on threatened and endangered species would be beneficial for species using wetland and aquatic habitats.

Once operational, northern long-eared bats may continue to use the AWTF location as a travel corridor between forest habitats that provide potential roost and foraging habitat outside the project area. No effects on silvery aster would occur from the operation and maintenance of the AWTF. Once the Proposed Action is operational, no effect is anticipated on threatened and endangered species using terrestrial habitats. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.9.3.3 Indirect Impacts from Growth Inducement

Any future development on vacant parcels would be subject to existing regulatory requirements such as setbacks from wetlands and tree removal permits. Adherence to these regulations, as well as restriction of tree removal pursuant to mitigation identified below, would ensure that long-term, indirect impacts on threatened and endangered species would be negligible.

5.9.3.4 Mitigation

To avoid impacts on northern long-eared bat, all tree removal activities would take place from November 1 to March 31, outside the active season. Northern long-eared bats hibernate in caves and mines located outside the study area between November 1 and March 31 and would likely not be affected by tree removal activities, which would avoid incidental take.

To avoid potential impacts on state-listed silvery aster, a qualified biologist would survey both AWTF parcels prior to construction to note the presence or absence of this plant. If found in an area that is proposed for clearing, the plant(s) would be relocated to nearby, similar habitat outside the area of disturbance.

5.10 Cultural Resources

5.10.1 Methodology

5.10.1.1 Regulations

Federal actions require lead agencies to consider the impacts of their actions on cultural resources. This obligation is defined in Section 106 of the National Historic Preservation Act (NHPA), as amended and implemented by 36 CFR Part 800. The NHPA defines a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register." Eligibility criteria for listing a property on the National Register of Historic Places (NRHP) are found at 36 CFR Part 60. In addition, the New York State Historic Preservation Act (SHPA), as implemented by Article 14 of the Parks, Recreation and Historic Preservation Law, requires State agencies to consult with the commissioner if it appears that any project that is being planned may or will cause any change, beneficial or adverse, in the quality of any historic, architectural, archeological, or cultural property that is listed in the NRHP or property listed on the NYS Register of Historic Places or that is determined by the commissioner to be eligible for listing in the NYS Register of Historic Places. Information regarding previously surveyed cultural resources is available online via the New York State Historic Preservation Office's (NYSHPO) Cultural Resource Information System. Requirements for review include the identification of significant cultural resources that may be affected by the undertaking. Cultural resources are the record of human experience. Collectively they include prehistoric and historic sites, structures, districts, buildings, objects, artifacts, cultural landscapes, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons.

Only those cultural resources determined to be potentially significant under the NHPA or SHPA are subject to protection from adverse impacts resulting from an undertaking. To be considered significant under the NHPA, a cultural resource must meet one or more of the criteria established by the National Park Service that would make that resource eligible for inclusion in the NRHP. The term "eligible for inclusion in the NRHP" includes all properties that meet the NRHP listing criteria, which are specified in the Department of Interior regulations Title 36, Part 60.4 and NRHP Bulletin 15. Sites that have not been evaluated at the time of the undertaking may be considered potentially eligible for inclusion in the NRHP and, as such, are afforded the same regulatory consideration as nominated properties. To be significant under the SHPA, properties must be eligible properties as defined in State Historic Preservation Law, Section 3.09(8), Article 14.09, subsection 426.2.

New York State Commissioner Policy, Contact, Cooperation, and Consultation with Indian Nations, provides guidance to NYSDEC concerning cooperation and consultation with Indian Nations on issues relating to protection of environmental and cultural resources within New York State.

5.10.1.2 Study Area (Area of Potential Effects)

Pursuant to 36 CFR 800.4(a)(1), the area of potential effect (APE) is defined as the geographic area(s) within which the undertaking may directly or indirectly affect cultural resources. Within the APE, impacts on cultural resources are evaluated for both historic structures (aboveground cultural resources) and archaeology (below ground cultural resources). The APE coincides with the project area (**Figure 3-1**).

5.10.1.3 Approach

Potential impacts were assessed based on changes to the pattern(s), feature(s), or integrity of a historic district or structure, and disturbance of archaeological resources. Cultural resources for environmental review purposes are primarily those resources that are listed or eligible for listing in the NRHP or NYS Register of Historic Places, as well as those addressed by certain other laws protecting archeological sites and Native American properties.

Phase IA archaeological sensitivity and architectural resource assessments were conducted for the sites associated with the Proposed Action in May and June 2016, respectively, in accordance with guidelines and recommendations established by with the NHPA; Procedures for the Protection of Historic and Cultural Properties (36 CFR 800); the Procedures for Determining Site Eligibility for the NRHP (36 CFR 60 and 63); SEQRA; and *Secretary of the Interior's Standards for Archaeology and Historic Preservation* (USDOI 1983). These Phase IA Cultural Resource Surveys are provided in Appendix B.2. On May 30, 2017, the NYSHPO concurred with the architectural resource assessment finding that no historic properties would be affected. For the archaeological review, the NYSHPO requested additional Phase IB archaeological testing at several pump station sites and the AWTF. The Phase IB survey was submitted to the NYSHPO for review and comment; concurrence of the findings was received on February 9, 2018.

An impact is considered "adverse" when an undertaking alters any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association.

5.10.2 Existing Conditions

5.10.2.1 Archaeology

The majority of the APE is characterized by mid- and late-20th century and early 21st century residential development and is considered to have low sensitivity for historical archaeological resources. For a similar project in Patchogue, GOSR consulted with the NYSHPO in November 2015 regarding appropriate testing protocol for historic archaeological sensitivity. The NYSHPO determined that additional subsurface testing would only be necessary where proposed ground-disturbing activities outside the right-of-way would occur through a known archaeological site or areas of known early European occupation (18th century or earlier) (Louis Berger 2015). GOSR applied this same methodology to the Forge River Watershed Sewer Project. The earliest known map of the area is the Damerum map, which dates to 1815. This map shows occupation along what is now the Montauk Highway and at Blue Point located west of the APE. Areas of archaeological sensitivity for potential historic archaeological deposits were based on structures depicted on the 1873 F. W. Beers Atlas of Long Island. However, these potential late 19th century deposits are later than the period of concern expressed by the NYSHPO. The Damerum map shows

early 19th century occupation in areas well north and west of the APE. Therefore, it is unlikely that the APE was the site of early European occupation.

Background research conducted in the Cultural Resource Information System indicates that no previously recorded archaeological sites occur within the APE. Within a 1.6-kilometer (1-mile) radius of the APE, 12 previously recorded archaeological sites, 7 historic and 5 prehistoric, were identified. The majority of historic sites within a mile of the APE are along Sunrise Highway, just north of the Montauk Highway. The historic sites include two mills and a tavern site with no remaining visible evidence. Also included with the historic sites are an 18th century residence, a tavern, a church and associated cemetery, a farm site, and a possible homestead or domestic residence. The historic sites near the APE date from the 18th century to mid-20th century (Mazeau 2010). The five prehistoric sites are lithic reduction locations. Three of these are of unknown periods. The Wertheim site spans many periods, including Middle and Late Archaic, the Middle Woodland, and Late Woodland to Contact. The Red Fox site is eligible for listing in the NRHP (Doucette 2011). The other three prehistoric sites have stratigraphic integrity, but it could not be determined if these were intact prehistoric sites or random artifact scatters (Mazeau 2010).

The Phase IA archaeological sensitivity and architectural resource assessments included background research and a pedestrian reconnaissance survey of the APE. The goal of the reconnaissance survey was to assess the potential for cultural resources in the APE and included a review of archaeological site files and cultural resource management projects within 1.6 kilometers (1 mile) of the APE. The pedestrian reconnaissance survey found that much of the APE has been subjected to degrees of disturbance related to 20th century residential and commercial development. However, some portions of the APE were still considered to have archaeological sensitivity based on the probability of intact soils and sensitivity for the presence of cultural resources. The Phase IB survey of these sites found that the majority of contexts in these areas were disturbed. No potentially eligible sites were found, and no further testing was recommended (see Appendix C.3).

5.10.2.2 Historic Properties

The APE is characterized by a mixture of commercial and residential properties. Commercial properties are concentrated along Montauk Highway, William Floyd Parkway, and Mastic Road. In 1947, the APE was a heavily wooded, sparsely populated area with approximately one to two buildings per block. Most of the residential areas appear to date to after World War II with widely scattered older buildings between Mastic Boulevard and Riviera Drive.

Examination of the APE in New York State's Cultural Resource Information System indicates that 21 properties have been previously surveyed (**Table 5.10-1**). No NRHP-listed properties are found within the APE. Seven of the 21 previously recorded properties have been recommended as not eligible, including the Brookhaven Calabro Airport. The remaining 14 previously recorded properties have not been evaluated with respect to NRHP criteria.

A historic resource that is not included in the Cultural Resource Information System inventory is the Old Mastic Historic District, which encompasses much of what was historically part of the Floyd estate and later the Dana estate (Figure 5.10-1). The district, which encompasses an area of private drives (Old Mastic Drive, Dana Court, Estate Drive, and an unnamed private road at the end of Pineway Avenue), was given historic designation by the Town of Brookhaven in 1980. The historic district is currently under the jurisdiction of Mastic Beach, which was incorporated as a

village in 2011. The district does not appear to have undergone local review and is not listed in the NYS Register of Historic Places/NRHP.

Table 5.10-1. Known Architectural Resources in the Area of Potential Effects

Site No.	Property Address	Date	Existing Designation Status
10302.002681	172 Somerset Avenue	ca. 1960	Not Eligible
10302.003093	25 Abby Lane	1955	Undetermined
10302.003173	104 Mastic Boulevard	1970s	Not Eligible
10302.003241	190 Mastic Boulevard	ca. 1930	Not Eligible
10302.003254	181A Poospatuck Lane	ca. 1970	Undetermined
10302.002270	384 Whitter Drive		Not Eligible
10383.000029	386 Whittier Drive		Not Eligible
10302.003074	20 Oceanview Drive	1961	Undetermined
10302.003077	46 Shore Drive	1958	Not Eligible
10302.003097	31 Oceanview Drive.	1959	Undetermined
10302.003104	67 Edgewater Drive.	1987	Undetermined
10302.003108	53 Oceanview Drive	1960	Undetermined
10302.003157	42 Shore Drive	1955	Undetermined
10302.003169	16 Shore Drive	1937	Undetermined
10302.003192	7 Shore Drive	1954	Undetermined
10302.003202	22 Wavecrest Drive	ca. 1920	Undetermined
10302.003206	11 Spar Drive	1950	Undetermined
10302.003207	21 Shore Drive	1955	Undetermined
10302.003229	33 Ocean View Drive	1947	Undetermined
10302.003258	9 Spar Drive	ca. 1930	Undetermined
10302.003249	Town of Brookhaven Calabro Airport 135 Dawn Drive		Not Eligible

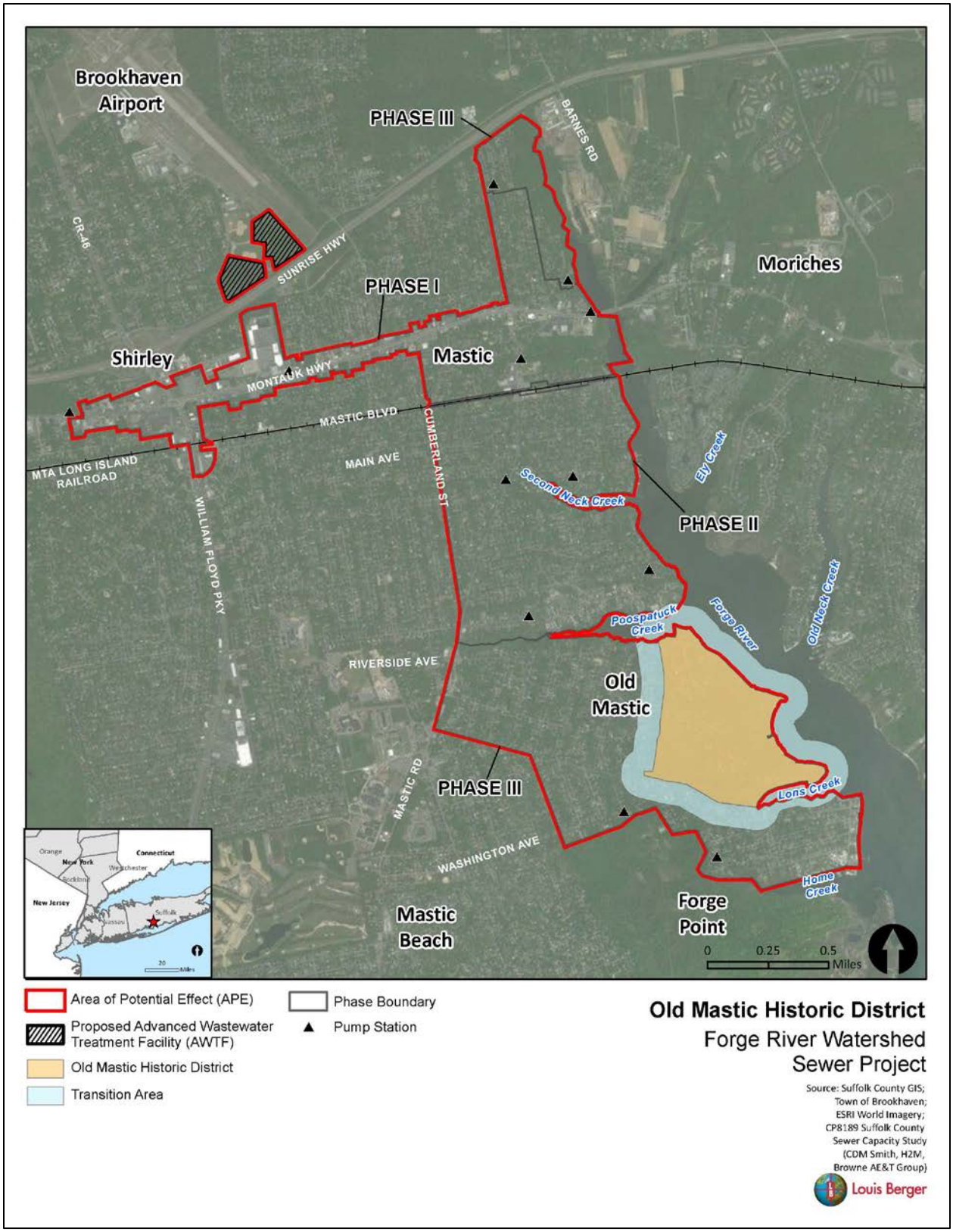

Figure 5.10-1. Old Mastic Historic District

The reconnaissance survey identified the Caretaker's Cottage, built in the early 1880s, as the only NRHP-eligible dwelling at the east end of Riverside Avenue associated with the Dana estate. Additional potentially eligible resources are likely to be found along the private drives in the area. Examination of the remaining APE, including the areas around the proposed pump stations, found no other historic resources present. The area in general is a mix of one-story gable front cottages, one-story ranches, and larger early 20th century homes. Many of the residences have synthetic siding and replacement windows.

5.10.3 Potential Impacts and Proposed Mitigation

The determinations below apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.10.3.1 Construction

The Proposed Action would have no effect on archaeological resources as archaeological surveys conducted in areas of high sensitivity found no intact archaeological deposits. The Proposed Action would have no effect on historic architectural resources because only the landscape would be disturbed. Any significant landscaping features that contribute to the setting of an individual historic property or a historic district would be replanted upon completion of construction. Only minor alterations would be necessary at the basement level to connect each property to the sewer collection system, which would result in short-term, negligible impacts on historic resources.

5.10.3.2 Operation

The operation of the sewer collection system as proposed in Proposed Action would have no effect on archaeological resources or historic architectural resources. The operation of the system would not change the significant features of historic architectural resources or diminish the potential to yield important information for archaeological resources.

5.10.3.3 Indirect Impacts from Growth Inducement

The Proposed Action could facilitate increased development and development intensity within the APE. Specifically, development intensity could increase along the Montauk Highway Corridor. This induced development, which would likely be by private developers, would have no effect on archaeological resources because no intact archaeological deposits were found in areas of high sensitivity.

Development would have no effect because no historic resources were identified on the Montauk Highway Corridor. As noted above, privately funded developments would not be subject to Section 106 review.

5.11 Aesthetic Resources

Aesthetic resources or viewsheds are areas of land, water, or other environmental element that is visible to the human eye from a fixed vantage point. Viewsheds are areas of particular scenic or historic value that have been deemed worthy of preservation against development or other change and include spaces that are readily visible from public areas and thoroughfares, such as from public roadways, public parks, or high-rise buildings. If the viewshed is integral to the setting of a landmark building or part of the NHPA Evaluation Criterion for a building's eligibility, it must be considered in any new development or renovation proposal.

5.11.1 Methodology

5.11.1.1 Regulations

No federal regulations regarding aesthetic resources are applicable to the project area, but the following guidelines are used to evaluate the significance of potential impacts on viewsheds.

NYSDOS, Office of Planning and Development, developed a scenic assessment program that identifies the scenic qualities of coastal landscapes, evaluates them against criteria for determining aesthetic significance, and recommends areas for designation as Scenic Areas of Statewide Significance. NYSDOS protects designated scenic landscapes through review of projects that require state or federal actions. Guidance for assessing the overall visual characteristics of a waterfront is included in the *Making the Most of Your Waterfront* guidebook (NYSDOS 2009).

New York State Scenic Byways are transportation corridors of particular statewide interest that represent a region's scenic, recreational, cultural, natural, historic, or archaeological significance. They include Scenic Roads that were designated by NYSDEC prior to the creation of the Scenic Byways Program; parkways that exhibit statewide scenic, recreational, cultural, natural, historic or archaeological significance; the North Country Touring Routes; and other roadways that offer views, historical sites, or wildlife habitat.

The *Town of Brookhaven Comprehensive Plan* (Town of Brookhaven 1996) and the *Long Island South Shore Estuary Reserve Comprehensive Management Plan* (South Shore Estuary Reserve Council 2001) contain recommendations to protect and address the aesthetic character of the Town and south shore estuary, respectively.

5.11.1.2 Study Area

The study area encompasses the boundaries of the entire project area, with an emphasis on parcels where new aboveground features are proposed, such as the sites of the AWTF and pump stations and views from surrounding areas. Landscaping in the location of proposed sewer lines and laterals is also included in the study area.

5.11.1.3 Approach

Impacts were assessed based on potential changes to the visual character and views within the study area. Views of new aboveground structures or other changes to the visual landscape were considered. No designated scenic or aesthetic resources are present in the study area; therefore, impacts on such resources are not evaluated.

5.11.2 Existing Conditions

As shown in **Figure 5.11-1**, the AWTF site is undeveloped, relatively flat, and thickly wooded. It is visible from residential properties along Maple Avenue to the west, the Calabro Ballfields to the north, the Mastic Beach Fire Department Substation #1 to the east, and the Sunrise Highway Service Road to the south. It provides a visual barrier between the residential area to the west and Sunrise Highway to the south.

As shown in **Figure 5.11-2**, the pump station sites are primarily undeveloped lands, most of which are wooded. The sites are all visible from surrounding commercial and residential uses and area roadways.

AWTF Site Existing Visual Character
Forge River Watershed Sewer Project
Louis Berger

Figure 5.11-1. AWTF Site Existing Visual Character Site

View of AWTF Site
looking North

View of Pump Station 1 Site
looking North

View of Pump Station 3 Site
looking East

View of Pump Station 4 Site
looking Northeast

Existing Visual Character
of AWTF and Pump Station Sites

Forge River Watershed
Sewer Project

Louis Berger

Figure 5.11-2. Existing Visual Character of Pump Station Sites

Viewsheds in the remainder of the study area are characterized by a mixture of dense development in one- and two-story commercial and residential buildings. Commercial properties are concentrated along Montauk Highway, William Floyd Parkway, and Mastic Road and generally include detached one- to two-story buildings set back from the roadways by parking lots, interspersed with wooded, undeveloped lands. Along Mastic Road, residential uses mix with commercial uses. The residential uses in the project area are a mix of one-story gable front cottages, one-story ranches, and larger early 20th century homes, each on individual lots surrounded by lawns and mature landscaping.

Street trees line the sidewalks on Montauk Highway. Sidewalks along other primary roadways generally do not contain street trees. Local roadways in residential neighborhoods do not contain sidewalks or street trees. Roadways are lined with telephone poles that carry electrical and communications lines.

The study area does not fall within a Scenic Area of Statewide Significance, and it does not contain State Scenic Byways. Section 5.10, Cultural Resources, includes a discussion of existing cultural resources, designated buildings, and historic districts.

5.11.3 Potential Impacts and Proposed Mitigation

5.11.3.1 Construction

The Proposed Action would result in temporary construction-related visual impacts at the AWTF site, the 12 pump station locations (if a combined collection system is pursued), and along the lines of the collection and conveyance systems.

Site clearing, excavation, and grading would all occur at the AWTF site. In addition, a mix of mature and younger growth trees would be removed. These activities would open up views of the site from some locations along the Sunrise Highway Service Road to the south, from the recreational fields to the north, and (to a lesser extent) from locations along Maple Avenue to the west. For the four-year duration of excavation and construction, the AWTF site would be characterized by the presence of construction vehicles and equipment. Trees would be retained for 150 feet along the western edge of the site, which would provide minimal screening of the AWTF for the properties along Maple Avenue.

If a combined collection system is pursued, the pump station locations would also be affected by tree removal, site grading, and the presence of construction vehicles and equipment. However, construction activities at the 12 pump stations would be of a shorter duration than construction at the AWTF site.

Work along any one block of the collection and conveyance system would occur for a maximum of two weeks. Pipeline and main installation would occur entirely within the paved right-of-way and would not affect street trees along main thoroughfares. To the extent practicable, laterals would be installed to avoid existing mature vegetation at each parcel, although some landscaping could be removed.

Overall, during the construction period, there would be short-term, minor, adverse impacts on aesthetic resources and viewsheds from tree removal and the presence of construction equipment. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.11.3.2 Operation

Once construction is complete, the proposed AWTF, the cleared area for the associated subsurface leaching ponds, and 12 new pump stations (if pursued) would be visible from adjacent areas. These buildings would be set back from adjacent roadways, and each site would include landscaping. The proposed AWTF would present a visual departure from the currently densely wooded, vacant character of the existing site. However, the one-story nature of the AWTF buildings would not substantially adversely affect the character of the surrounding area. The buildings are expected to be approximately 30 feet tall, and based on preliminary engineering performed by the design team, they would be located approximately 350 feet from the nearest residence. Approximately 150 feet of vegetation would be maintained between the proposed facilities and the nearest residence. Along Maple Avenue, only six properties with direct line of sight into the parcel would be affected. A similar 150-foot buffer would be maintained along the Sunrise Highway Service Road, and an approximately 100-foot buffer would be maintained between the AWTF and the existing recreational fields.

Similarly, if a combined collection system is pursued, the new pump station buildings would present a minor visual departure from the previously vacant nature of each parcel. However, the buildings would be a maximum of one-story and would not present major new visual features in each neighborhood. The study area properties would remain a mixture of dense development in one- and two-story commercial and residential buildings, with commercial development set back by parking lots along Montauk Highway. The overall densely developed suburban character of the project area would remain. As a result, long-term impacts on aesthetic resources and viewsheds would be minor. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.11.3.3 Indirect Impacts from Growth Inducement

Indirect growth along the Montauk Highway Corridor could result in a built form that would be slightly taller and denser than existing development. In the place of existing one-story buildings, new buildings up to three stories could be constructed. No aesthetic resources would be affected. Any new developments would be subject to existing zoning and design standards (e.g., height and setback provisions), including the stipulations of the 2004 and 2010 rezonings of parcels along Montauk Highway.

5.12 Land Use and Planning

5.12.1 Methodology

5.12.1.1 Regulations

Regulations that govern land use and planning in New York State require that towns and villages prepare and adopt a comprehensive plan and that all land use regulations be in accordance with the adopted plan. Existing plans that were reviewed to determine land use consistency for the project and its potential effects include

- *Town of Brookhaven, Comprehensive Land Use Plan* (1996)
- *Town of Brookhaven, Montauk Highway Corridor Study & Land Use Plan for Mastic & Shirley: Phases I and II* (2004, 2009)

- *Generic Environmental Impact Statement for the Montauk Highway Corridor Study & Land Use Plan for Mastic & Shirley Phase II as a Supplement to the Generic Environmental Impact Statement for the Montauk Highway Corridor and Land Use Plan for Mastic and Shirley, NY* (Nelson, Pope & Voorhis, LLC 2010)
- *Cleaner Greener Long Island Regional Sustainability Plan* (AECOM and Regional Plan Association 2013)
- *Suffolk County Comprehensive Water Resources Management Plan* (2015a)
- *Mastic Beach and Smith Point of Shirley – New York Rising Community Reconstruction Plan* (Jacobs and Cameron Engineering 2014)
- *Town of Brookhaven Proposed Airport Layout Plan* (TransPlan Incorporated 2017)

The zoning codes for the Town of Brookhaven (2014) and Village of Mastic Beach (2013) regulate and establish limits on the use of land and building size, shape, height, and setbacks within the project area for the promotion of the public health, safety, morals, comfort, convenience, and general welfare as well as an orderly pattern of development.

A Transfer of Development rights program permitted by the Town of Brookhaven Board of Review regulates the transfer of development rights pertaining to sanitary disposal from one district to another within the project area. This is a form of incentive zoning regulated by New York State Town Law Section 261-a and Village Law Section 7-701.

As discussed in Section 5.4, Water Quality, SCDHS enacted policies under the Suffolk County Sanitary Code to protect water quality and groundwater to ensure the availability of an adequate and safe source of water supply (Suffolk County Sanitary Code, Chapter 760). Article 6 of the Suffolk County Sanitary Code establishes a linkage between parcel size, residential density, and the appropriate method of sewage disposal depending on the location of each new realty subdivision or development. Specific to the project area, the article mandates that a community sewage system method of sewage disposal is required when any parcel in the new subdivision or development is less than 40,000 square feet, unless the realty subdivision or development has a population density equivalent to or less than that of a realty subdivision or development of single-family residences in which all parcels consist of an area of at least 40,000 square feet.

The New York State Smart Growth Public Infrastructure Act directs New York State agencies, authorities, and public corporations to screen their infrastructure programs and investments to ensure that they are not funding inefficient, redundant, and costly sprawl (2010 A8011-b/S5560-b). Suffolk County Resolution No. 212 (2000) establishes a "smart growth" policy for Suffolk County through the *Suffolk County Smart Growth Master Plan*.

FAA Order 5050.4b and 49 USC 47106(a)(1) require the FAA Office of Airport Planning and Programming, Airports Planning and Environmental Division to assess the compatibility of land uses in the vicinity of an airport to ensure the proposed uses do not adversely affect safe aircraft operations. The Proposed Action would also require a modification to the *Brookhaven Airport Layout Plan* for a land release from FAA to the Town of Brookhaven for the proposed AWTF location. Additional applicable statutes and implementing regulations pertaining to land use and the *Airport Layout Plan* include:

- 49 USC 47107(a)(10), formerly Section 511(a)(5) of the 1982 Airport Act, requires that appropriate action, including the adoption of zoning laws, has been or will be taken, to the

extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. The assurance must be related to existing and planned land uses.

- 49 USC 47101 et seq., Airport Development Grant Program, requires that a project may not be approved unless the Secretary of Transportation is satisfied that the project is consistent with plans (existing at the time a project is approved) of public agencies for development of the area in which the airport is located.

Other regulations that require FAA approval to implement the Proposed Action include the following (FAA 2015):

- 49 USC 40103(b) and 47107(a)(16) require unconditional FAA approval of the *Brookhaven Airport Layout Plan* to depict the subject land release.
- 49 USC 47153 requires FAA approval to release portions of the Calabro Airport property for non-aeronautical use.
- 14 CFR Parts 77 and 157 and 49 USC 44718 requires a determination and approval of the Proposed Action's effects on the safe and efficient utilization of navigable airspace.
- 49 USC 47107 requires a determination that proceeds from the release and sale of property, which was acquired with federal funds, meet the eligibility requirements of the Airport Improvement Program.
- 49 USC 40101(d)(1) and 47105(b)(3) require a determination as to whether the Proposed Action meets applicable design and engineering standards set forth in FAA Advisory Circulars.
- 49 USC 44502(b) requires that the airport development be determined to be reasonably necessary for use in air commerce or in the interests of national defense before approval.
- 14 CFR Part 77 requires that GOSR/FEMA, Suffolk County, and the Town of Brookhaven maintain continued close coordination with Calabro and appropriate FAA program offices, as required, for safety during construction.

5.12.1.2 Study Area

The study area for land use is contained within the boundaries of the Forge River project area.

5.12.1.3 Approach

A land use analysis was conducted to characterize the use and development trends within the study area that may be affected by the Proposed Action and to determine if they are compatible or would be affected by the Proposed Action. The analysis also considered compliance with the study area's zoning and other applicable land use policies, the policies and regulations mentioned above that affect the area, and any changes anticipated to occur by the time construction of the Proposed Action is proposed. To the extent that information was publicly available, planned developments and initiatives located within the study area that are scheduled, funded, approved via permits, or otherwise committed were reviewed.

Direct effects on land use were evaluated by first reviewing areas where construction would be required for the Proposed Action outside the existing rights-of-way. Direct effects on land use and

zoning were also evaluated by reviewing existing plans and current town and village zoning regulations. Indirect effects on land use were evaluated by considering the potential for changes in growth patterns associated with the Proposed Action.

A land use impact analysis was conducted to determine if land acquisition would be required to accommodate construction and operation and to identify the ownership, use, and zoning of parcels designated for acquisition. The analysis also determined potential changes in land use and zoning.

5.12.2 Existing Conditions

This section describes the existing land uses, adopted regional and local plans, and existing zoning within the study area.

5.12.2.1 Existing Land Use

As shown in **Figure 3-2**, existing land uses in the study area are a mix of residential (low, medium, and high density), commercial, industrial, institutional, recreation and open space, agricultural, transportation, utilities, waste handling and management, vacant, and underwater land. The majority of the land within the study area is single-family residential on small lots that range in size from 4,000 to 10,000 square feet. A strip within the northern portion of the study area, running east and west along the Montauk Highway Corridor, is predominantly commercial uses. Undeveloped wetland areas exist along the western edge of the Forge River, but the study area as a whole is largely fully developed. Many of the uses within the area that are classified as institutional are owned or occupied by the William Floyd Union Free School District, the Town of Brookhaven, and the Poospatuck Reservation.

The 13.7-acre and 17-acre parcels identified as the AWTF site within the Calabro Airport boundaries in the northernmost portion of the study area are currently vacant and classified as transportation use. Based on review of aerial mapping and additional mapping provided by the County, the pump stations would be located in vacant areas within residential neighborhoods, commercial areas, or recreation and open space. **Table 5.12-1** provides parcel ID numbers in addition to land use and zoning information for all proposed alternate parcels identified for pump station location. Note that the exact locations of pump stations 1 and 6 have not been finalized; as such, two parcels have been identified and analyzed for each of these stations, as listed in **Table 5.12-1**.

Table 5.12-1. Proposed Pump Station Location Land Use and Zoning

Pump Station ID	Location	Parcel ID - SCTM Number	Land Use	Vacant or Developed	Zoning
1	PS-1B	0200850000300024001	Commercial	Developed	J-Business-2
1	PS-1C	0200879000100038001	Commercial	Developed	J-Business-2
2	PS-2A	0200851000300039000	Vacant	Vacant	J-Business-6
3	PS-3A	0200825000300001001	Commercial	Developed	A-Residence-2
4	PS-4A	0200853000200038000	Medium Density Residential	Developed	A-Residence-1

Pump Station ID	Location	Parcel ID - SCTM Number	Land Use	Vacant or Developed	Zoning
5	PS-5A	Paper Street (Gillen Pl)	Vacant/ Transportation	Vacant	A-Residence-1
5	PS-5B	0200882000500027001	Medium Density Residential	Developed	A-Residence-1
6	PS-6A	0200882000700054000	Vacant	Vacant	A-Residence-1
6	PS-6B	0200882000700041000	Vacant	Vacant	A-Residence-1
7	PS-7B	0200909000700031000	Vacant	Vacant	A-Residence-1
8	PS-8A	0200910000300020000	Medium Density Residential	Developed	A-Residence-1
9	PS-9	0209012000300004002	Recreation and Open Space	Vacant	R-1 Residence District
10	PS-10	0209013000300037000	Recreation and Open Space	Vacant	R-1 Residence District
11	PS-11	0200787000300023002	Recreation and Open Space	Vacant	A-Residence-1
12	PS-12	0200824000700048001	Recreation and Open Space	Vacant	A-Residence-1

Local Plans

Since the mid-1960s, six land use plans have been prepared that cover the proposed study area. The latest adopted plans include the *Tri-Hamlet Comprehensive Plan for Mastic, Mastic Beach and Shirley* (Town of Brookhaven 1995), *the Town of Brookhaven, Comprehensive Land Use Plan* (Town of Brookhaven 1996) and the *Town of Brookhaven, Montauk Highway Corridor Study & Land Use Plan for Mastic & Shirley: Phases I and II* (2004, 2009).

According to the 1996 *Comprehensive Land Use Plan*, the current land use designations for the study area include low-, medium- and high-density residential consisting of development with an overall net density of two dwelling units or more per acre and commercial uses. The land use designation for the AWTF parcel is public and semi-public, and the land use designations for the 12 proposed pump station locations (including both potential parcels for pump station 1 and both potential parcels for pump station 6) include residential, commercial, and transportation right-of-way.

The Town has been working on a new comprehensive plan entitled *Town of Brookhaven, Comprehensive Plan, 2030 Planning the Future*, but the plan has not yet been finalized or adopted. The Town conducted public outreach as a component of drafting this more recent plan and a related report released in 2007 explains that Coastal Resources and Main Street Development were the top two issues identified by more than 500 Town stakeholders (Town of Brookhaven 2007). According to the report results, participants indicated "the need to preserve and protect their water resources…including coastal resources such as the Long Island Sound and the Great South Bay;

shoreline beaches such as Cedar Beach, Shoreham Beach, Fire Island National Seashore and West Meadow Beach; inland water resources as the Peconic River, Forge River, Flax Pond, Lake Ronkonkoma, Carman's River and scattered wetlands; and ground water resources and recharge zones." The results also note the participants' awareness of, and concern for, the degradation of water resources due to "poor drainage, lack of sewers and high water table in the low-lying, high density residential areas of Shirley and Mastic." Lack of sewers was a principal issue throughout the report while "expand(ing) community facilities and services" and "protect(ing) coastal, inland water, groundwater and natural resources" were two of the six most important issues identified in the conclusion.

According to the *Suffolk County Comprehensive Plan 2035* (Suffolk County 2011), the Suffolk County Planning Commission identified six "critical county-wide priorities" that will affect the future of Suffolk County and will require regional policy solutions: environmental protection, economic development, housing diversity, transportation, energy, and public safety. Issues of consideration within the plan include whether existing wastewater and transportation infrastructure will accommodate future growth while protecting the drinking water, bays and beaches, and air quality; the condition of the environment if current land use patterns remain unchanged; and the impact of sea level rise in Suffolk County and what it will mean for future development along the coastline.

In 2016, the Village of Mastic Beach was in the process of developing a comprehensive plan. However, in November 2016, the Village voted to revert to an unincorporated area. A formal dissolution plan will be voted on later; this analysis, therefore, analyzes the Proposed Action in the context of the Village's existing zoning regulations.

The Town of Brookhaven revised the *Proposed Airport Layout Plan* for the Calabro Airport in March 2017 to include the proposed AWTF 13.7-acre and 17-acre parcels, both surrounded by county lease lines.

5.12.2.2 Existing Zoning

Much of the residential development within the study area was developed prior to the enactment of 1-acre zoning in 1988; most of the study area development is on lots of a quarter-acre or less, but the applicable zoning requires a minimum lot area of 40,000 square feet (Town of Brookhaven 1995). The zoning of the study area within the Town along Montauk Highway has also evolved to reflect the Main Street Business District's regulations, pursuant to the *Montauk Highway Corridor Study and Land Use Plan* (and *Montauk Highway Corridor Study and Land Use Plan, Phase II* (Town of Brookhaven 2004; Nelson, Pope & Voorhis LLC 2010).

As depicted in **Figure 5.12-1**, the study area comprises a mix of zoning classifications. Within the Town, the zoning classifications include the single-family residential zones A-1 and A-2, industrial zone L-1, business zones J-2, J-5, J-6, and K, the Planned Retirement Community zone, and some instances of split A-1 residence and J-2 business. Within the Village, the zoning classifications include R1 and R2 residence districts, B1 and B2 business districts, R/B residence/business district, and WD waterfront district. A portion of the parcels within the study area are included within the Montauk Highway Corridor Transitional Area Overlay District, which contains more than 10 street blocks and is zoned as business J-2. The Overlay District is the area generally bounded by Park Avenue to the west, Clinton and Carlton Avenues to the south, Cumberland Street and Lambert Drive to the east, and Hoover Court/Smith Street to the north and is located between two fully developed town centers along the Montauk Highway corridor that are zoned as J-6.

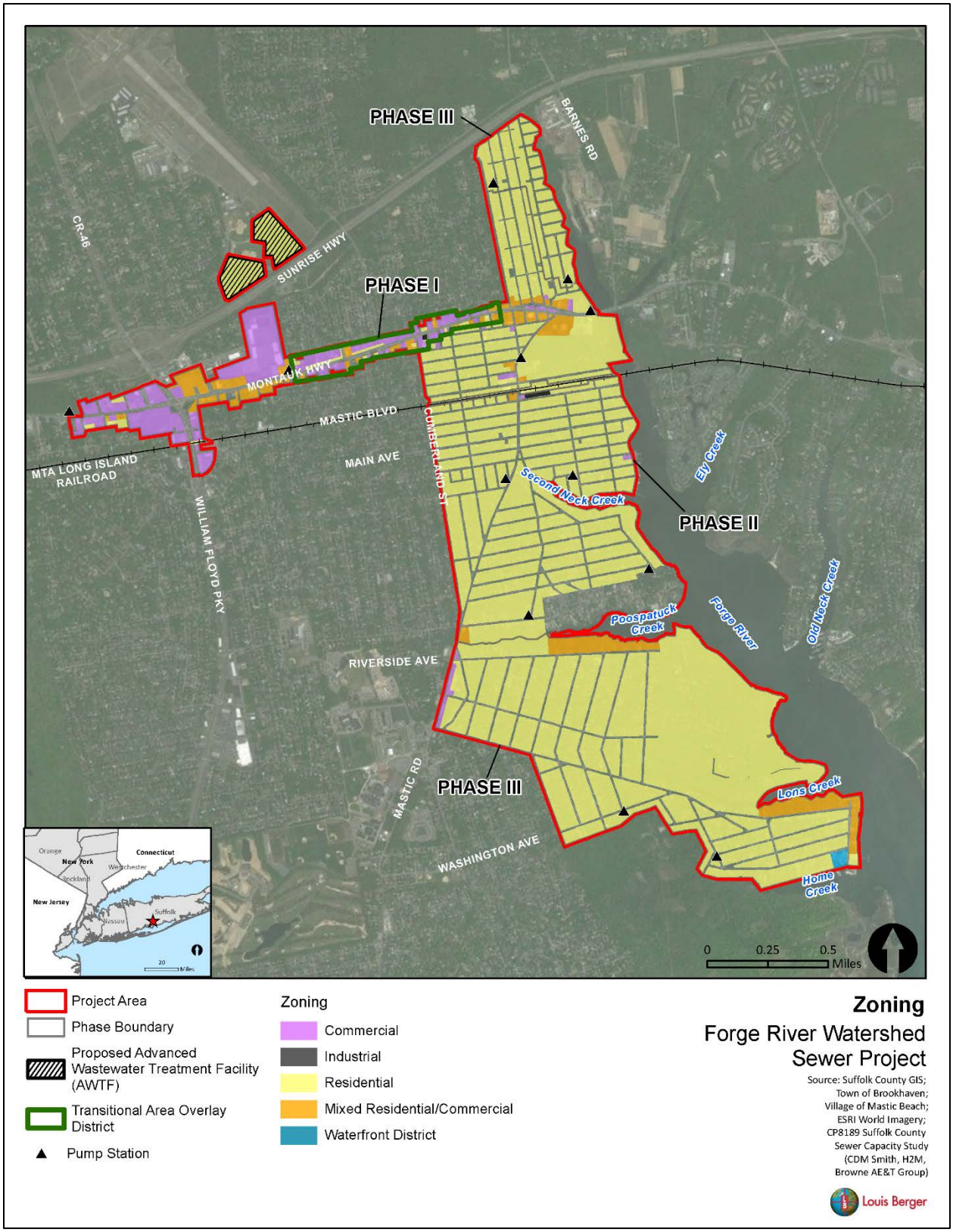

Figure 5.12-1. Zoning

The existing zoning of both AWTF parcels are also A-1, as are the proposed sites for 9 of the 12 pump stations. One pump station is proposed within the J-6 business zone in the Town, while two others are proposed within the R-1 residence district in the Village.

The zoning classifications applicable to the proposed AWTF and pump station locations are further defined as follows:

Town Zoning

Most of the study area is zoned A-1, or single-family residential, with a minimum lot area of 40,000 square feet and a maximum building size of 15,000 square feet. The other pertinent zone is J-6 business (Main Street Business), which requires a minimum lot area of 4,000 square feet. This district encourages development and redevelopment of fully integrated mixed-use, pedestrian-oriented main street centers, and thus provides for higher density and encourages mixed-use buildings (allowing only residential and office use on second floor). J-6 zoning allows six units per acre and mixed use on the first and second floors, as well as alcohol-serving businesses, which are often more intense from the perspective of sanitary waste (Town of Brookhaven 2016a). According to the Town zoning code, the Town Planning Board is authorized, as part of its site plan review, to grant zoning incentives in this zone to encourage development that offers special identified public benefits. Incentives include increased floor area ratios, reduced parking requirements, and the provision of additional sewer capacity, which is in excess of minimum, required on-site demand.

Village Zoning

The R-1 residence district is for single-family residential use, of no more than 30 feet or two stories in height, on lots with an area of 7,500 square feet or more, and a total building area that does not exceed 35 percent of the lot area.

5.12.3 Potential Impacts and Proposed Mitigation

5.12.3.1 Construction

Based on current plans, construction of the AWTF and pump stations (if a combined collection system is pursued) would require some land acquisition. As such, Suffolk County would coordinate with the applicable property owners of potential acquisition sites and enter into either purchase option agreements for permanent acquisition or temporary compensation agreements for the purpose of temporary construction easements. Long-term impacts on land use are discussed in the following section. Short-term impacts on land use would involve easements for construction access. These impacts would not impair the ability of the existing surrounding uses to function as they currently do, and as such, these impacts would be local and negligible. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.12.3.2 Operation

Land Use

Implementation of the Proposed Action would result in direct, long-term impacts on the function and land use of both AWTF parcels. In addition, if a combined collection system is pursued, the Proposed Action would result in direct, long-term impacts on the function and land use of the 12 pump station locations.

Long-term impacts would result from Proposed Action. The land uses on 14 parcels would change from commercial, residential, or vacant to public utility, and the ownership of parcels would change in cases of full parcel acquisition. Any current development on the parcels proposed for pump stations would be demolished. Any vacant land in the area designated for locating the AWTF or proposed pump stations would be disturbed and developed.

The Proposed Action would not affect the safety, health, welfare, comfort, convenience, or order of the Town's land uses. The change in use is not expected to prevent the orderly and reasonable use of adjacent properties or impair their value or be unreasonably near a church, school, theater, or place of public assembly. In addition, the change in use is not expected to produce an undesirable change in the character of the surrounding neighborhoods within the study area or create a detriment to nearby properties.

The Proposed Action would have measurable impact on existing land uses, but the changes would be small and localized and would not impair the ability of the existing surrounding uses to function as they currently do. These impacts would only affect 14 parcels. Direct, long-term impacts on existing land uses would be negligible to minor. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

Local Plans and Zoning

The 1996 *Town of Brookhaven Comprehensive Land Use Plan* discusses how the creation of a "sense of place" has been and continues to be an objective of the Town planning process (i.e., development that distinguishes the community with unique characteristics such as downtown central business districts that are actively used during more hours than just the traditional work day and provide a "wide range of activity"). The plan also includes a direct recommendation for the Mastic Tri-Hamlet area to encourage the expansion of existing commercial uses. The Proposed Action would be consistent with these objectives of the comprehensive plan since the connection to a new sewage treatment system and added sewage capacity would allow for more dense and compact development thereby to aid future expansion that could create more of a sense of place.

According to the 1995 *Tri-Hamlet Comprehensive Plan*, the compatibility of land uses within the vicinity of the airport is associated with the extension of noise exposure attributable to the airport. A 65-day night noise level (Ldn) is considered the FAA threshold of incompatibility as it relates to residential and institutional land uses. The Proposed Action would site only the AWTF within the 65 Ldn noise contour. Because the AWTF is not considered a sensitive land use, the Proposed Action would be compatible with this portion of the plan. The *Tri-Hamlet Comprehensive Plan* also encourages expansions of existing commercial uses. The Proposed Action would be consistent with the plan because more sewage treatment capacity would support such expansions, consistent with zoning.

The *Proposed Airport Layout Plan* provided by the Town and prepared by TransPlan Incorporated, (2017) shows the proposed AWTF on the airport property; thus, the Proposed Action is consistent with this proposed plan.

The Proposed Action would be consistent with the *Suffolk County Comprehensive Master Plan, Framework for The Future* (Suffolk County 2015c). The plan states, "the County has many thriving communities that should be supported through infrastructure investments and incentives that encourage additional housing options…Funding needs to be targeted toward existing communities, for multi-family transit oriented development, expanded wastewater infrastructure,

and land recycling to support community revitalization and increase resiliency." Specifically, a priority action of the comprehensive master plan is to "continue coordination between *New York Rising* and the County." Another priority action area within the plan is to "Build for Resiliency" with actions, including identifying locations for wastewater upgrades and locations for new water/sewer infrastructure. As indicated below under Indirect Impacts from Growth Inducement, the Proposed Action would facilitate increased density along the Montauk Highway Corridor, furthering multi-family transit-oriented development, consistent with the existing zoning and policies in the *Suffolk County Comprehensive Master Plan* (Suffolk County 2015c).

The Proposed Action would be consistent with the *Suffolk County Comprehensive Water Resources Management Plan* that states that nitrogen flowing from OWTS (as well as from fertilizers) is the principal reason for degraded groundwater quality and thus drinking water supply (Suffolk County 2015a). The plan also notes that particular attention should be paid to the "360,000 sub and non-performing septic/cesspools in the County, accounting for well over 75 percent of the homes" that are vulnerable to nitrate contamination and demonstrate a need for additional groundwater protection measures. The Proposed Action would close approximately 3,400 of these OWTS, resulting in a beneficial effect on land use that is consistent with the *Suffolk County Comprehensive Water Resources Management Plan*. There would be no conflicts with local plans.

Regarding zoning, no governmental or utility uses are listed as a permitted use in either the A-Residence-I or J-Business-2 zones where the proposed AWTF and all alternate locations for 10 of the 12 proposed pump stations would be located within the Town. Similarly, such uses are not listed as permitted in the R-1 Residence District where proposed pump stations 9 and 10 would be located within the Village. The parcels could require a special permit or rezoning to allow for operation of the proposed uses. The special permit or rezoning would be pursuant to the requirements of both the Town and Village. In addition, the AWTF and pump stations would be installed on existing publicly owned vacant parcels. As such, development of these uses would not conflict with the spirit of the zoning or restrict use of the parcels by other uses (i.e., a pump station would not eliminate use of a property by a residence because residences would not be constructed on publicly owned land). The impact on zoning would be negligible. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.12.3.3 Indirect Impacts from Growth Inducement

The Suffolk County Sanitary Code currently limits the developable floor area and number of residential units for lots that use OWTS. In some cases, these development limits are stricter than the limits under current zoning. Therefore, connection to a sewer system, as a result of the Proposed Action, could indirectly facilitate development because it would allow for development up to the density and intensity specified in the existing zoning code.

Specifically, development intensity could increase along the Montauk Highway Corridor. While Suffolk County does not intend to connect vacant parcels to the sewer district, if the vacant parcels with development potential are included in the sewer district during the design phase, the implementation of the Proposed Action could indirectly result in development of these parcels in the long-term. The use of these parcels would therefore change from vacant to residential or commercial, which would be consistent with the applicable zoning approved by the Town of Brookhaven and Village of Mastic Beach. All development would need to adhere to existing regulations and be compatible with surrounding land uses.

Indirect, long-term effects from induced growth would be beneficial because they would conform to existing zoning, which was approved by the Town of Brookhaven and the Village of Mastic Beach.

5.13 Socioeconomics

For the Proposed Action, the primary sources of construction costs used in this analysis of impacts on socioeconomics are the HGMP grant application and the *Draft Mastic Shirley Feasibility Study, Map and Plan* (Suffolk County 2015b; CDM Smith 2013). Both documents include a conservative analysis of the costs associated with establishing a new sewer system comprising both gravity and low-pressure collection and conveyance system elements.

If an exclusively low-pressure sewer system is constructed, construction costs are anticipated to be lower than those presented in this analysis because an exclusively low-pressure collection and conveyance system would entail less overall excavation, less de-watering, and no pump stations. A reduction in the construction costs would lead to a lower assessment for households and, because the annual maintenance cost to the property owner is the same for gravity and low-pressure systems, lower annual cost to households. Therefore, this socioeconomic impact analysis presents a conservative assessment of impacts; impacts of an exclusively low-pressure system would most likely be less than those presented in this section. Because of the lower construction cost, the number of jobs that would be generated during the construction period of an exclusively low-pressure system may be less than the number of jobs that would be generated by the construction of a system using both gravity and low-pressure collection and conveyance system elements.

5.13.1 Methodology

5.13.1.1 Regulations

A proposed action's impact on the human environment may include economic factors. Any potential property acquisition would occur in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. This federal law establishes minimum standards for federally funded programs and projects that require the acquisition of real property.

5.13.1.2 Study Area

Any potential adverse impacts or benefits to the surrounding community are expected to occur within a 0.5-mile radius of the project area. Therefore, the study area for the socioeconomic analysis is defined as those census block groups that are at least partially within a 0.5-mile radius from the project area. The study area includes 29 block groups as presented in **Figure 5.13-1**. For data elements that are not available at the block group level, a census tract level study, which is defined as all census tracts that have at least one block group in the block group level study area, was conducted.

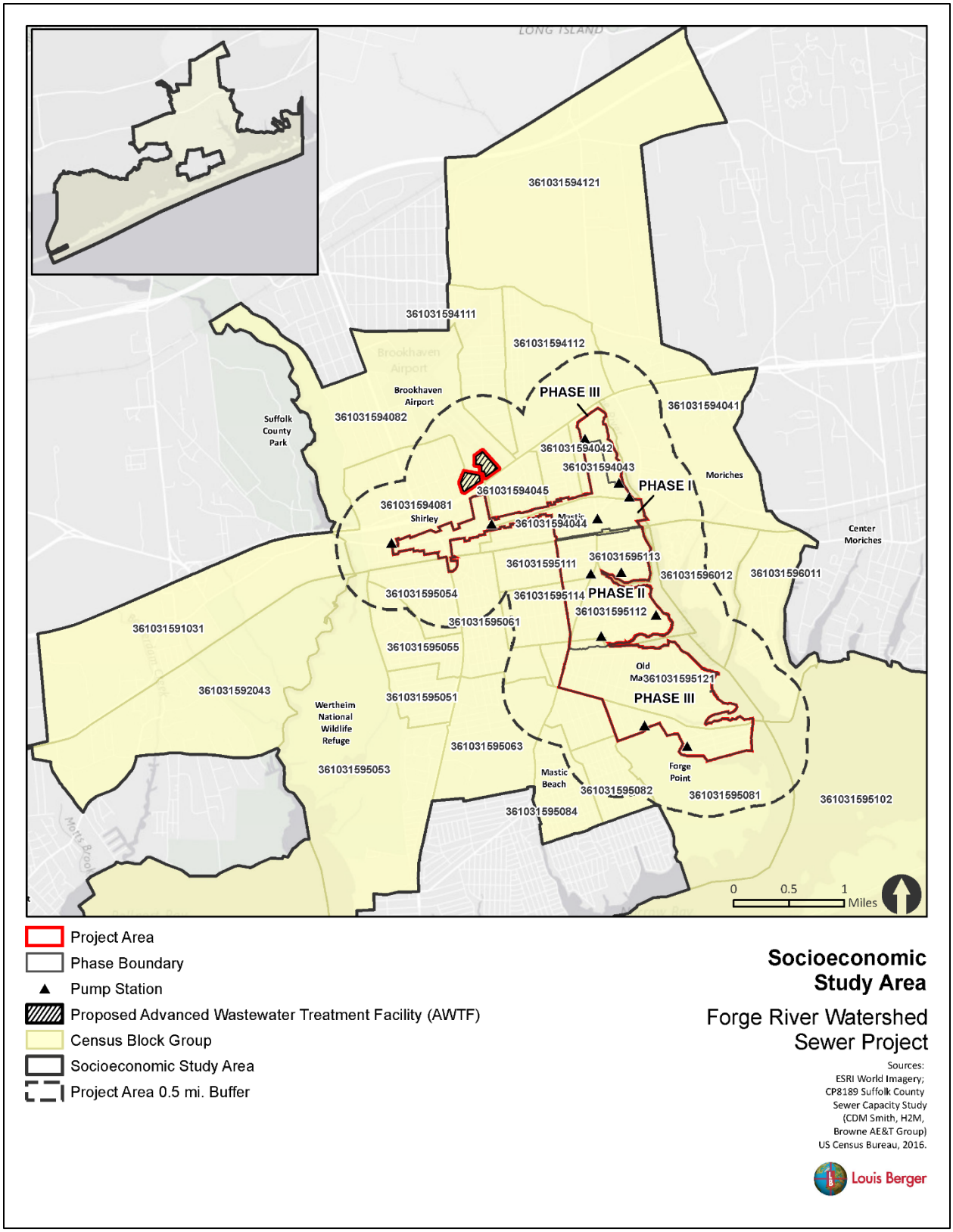

Figure 5.13-1. Socioeconomic Study Area

5.13.1.3 Approach

This section provides an overview of the socioeconomic conditions of the study area and compares them to the conditions in Suffolk County, the Towns of Brookhaven, Mastic, Shirley, and the Village of Mastic Beach. The socioeconomic profile is based on data from the U.S. Census Bureau, the New York Office of the State Comptroller, and the New York Metropolitan Transportation Council (NYMTC). The potential for project-related induced growth was assessed using geographic information systems, in consultation with local planners in the Town of Brookhaven, Village of Mastic Beach, and Suffolk County.

Direct and indirect impacts of the Proposed Action on the jurisdictions in the study area in terms of population and employment levels, property values, fiscal revenues and expenditures, avoided property losses, access to the proposed sewer system, and cost to residents and businesses were assessed. A more detailed description of the approach can be found in Appendix B.14.

5.13.2 Existing Conditions

According to the 2011–2015 American Community Survey, the census block group study area includes 15,883 housing units, 91 percent of which are occupied by households. The study area includes 14,431 households with an average household size is 2.97 persons. The study area's owner-occupancy rate is 72 percent. Homeowners typically had a higher household income than renters. Median household income was $83,568 for homeowners and $50,244 for renters. More information on the study area socioeconomic characteristics can be found in Appendix B.14.

5.13.3 Potential Impacts and Proposed Mitigation

As indicated above, the primary sources of construction costs used in this analysis of impacts on socioeconomics are the HMGP grant application and the *Draft Mastic Shirley Feasibility Study, Map & Plan* (Suffolk County 2015b; CDM Smith 2013). Both documents provide a conservative analysis of the costs associated with establishing a new sewer system comprising both gravity and low-pressure collection and conveyance system elements. If an exclusively low-pressure sewer system is constructed, construction costs are anticipated to be lower than those presented in this analysis because an exclusively low-pressure collection and conveyance system would entail less overall excavation, less de-watering, and no pump stations. A reduction in the construction costs would lead to a lower assessment for households and because the annual operation and maintenance cost to households are the same for gravity and low-pressure systems, lower annual cost to households. Therefore, this socioeconomic impact analysis presents a conservative assessment of impacts; impacts of an exclusively low-pressure system would likely be less than those presented in this section. Because of the lower construction cost, the number of jobs that would be generated during the construction period of an exclusively low-pressure system may be lower than the number of jobs that would be generated by the construction of a mixed system.

5.13.3.1 Construction

Under the Proposed Action, employment would experience a short-term, beneficial effect during the construction period.

The capital cost estimates associated with planning, design, and construction of the Phases I/II of the Proposed Action, including OWTS abandonment and grinder pump purchasing, were obtained from the HMGP grant application. For Phase III, total costs were obtained from the *Draft Mastic*

Shirley Feasibility Study, Map & Plan (Suffolk County 2015b; CDM Smith 2013). The total construction cost of the project would be $294.5 million (**Table 5.13-1**) (Suffolk County 2015b; CDM Smith 2013).[2] The FEMA HMGP grant application includes a total cost for Phase I/II of $188.1 million. The FEMA HMGP grant would fund $168 million and an Empire State Development (ESD) grant would fund $2 million.

Table 5.13-1. One-Time Project Costs (in Millions of Dollars)

	Total*
Phases I/II	$188.1*
Phase III	$106.4*
Total	$294.5*

Source: Suffolk County (2015b); CDM Smith (2013)
*Note: The HMGP grant application and 2013 study provide a conservative analysis of the costs associated with establishing a new sewer system comprising both a gravity and low-pressure collection and conveyance system. Construction of an exclusively low-pressure system would likely result in lower costs.

Using the IMPLAN input-output model for Suffolk County, $294.5 million in spending is expected to generate the equivalent of 1,946 one-year jobs in construction, architecture and engineering, and related industries in Suffolk County. If the construction period lasts four years, an average of 486 jobs (calculated as 1,946 divided by 4) would be created per year. In addition, these contractors, construction workers, and other employees would make purchases at other businesses in Suffolk County, which, in turn, would make purchase at other local businesses, and so on. Including these different rounds economic activity (i.e., multiplier effects), planning, design, construction, and related activities would generate the equivalent of 3,110 one-year jobs, $182.6 million in earnings, and $467.8 million in total revenues in Suffolk County. For a four-year construction period, the average impact per year would be 777 jobs, $45.6 million in earnings, and $117.0 million in total revenues. With an all low-pressure sewer system, the total jobs, earnings, and revenues generated by the construction may be lower because the construction cost of an all low-pressure system is likely to be lower than that of a system using both gravity and low pressure.

Cost to Households and Businesses

Each property would incur a one-time up-front cost associated with connecting to the district, including abandonment of existing OWTS and connection to the collection system. For properties served by low-pressure sewer, this cost would also include the purchase of a grinder station.

The FEMA HMGP grant estimates $11.5 million in costs for connection and abandonment. The HMGP grant would cover 90 percent of the one-time connection cost for Phase I/II properties, and an ESD grant would be used to pay down $2 million of borrowing before conversion to a long-term financing with the Environmental Facilities Corporation. For the purpose of the analysis, it was assumed that the remaining connection cost for Phase I/II and the connection cost for Phase III

[2] The HMGP grant application and 2013 study provide a conservative analysis of the costs associated with establishing a new sewer system comprising both a gravity and low-pressure collection and conveyance system. Construction of an exclusively low-pressure system would likely result in substantial cost savings and reduced socioeconomic impacts.

would be included in the project bond amount such that property owners would not be directly responsible for the upfront cost.

5.13.3.2 Operations

Cost to Households and Businesses

Under the Proposed Action, properties connected to the sewer infrastructure would experience annual expenses for operation and maintenance and a sewer district assessment. The annual expenses would be partly offset by the avoided maintenance cost of OWTS.

Annual Sewer District Assessment

Annual Sewer District Assessment—Property owners would be responsible for an annual sewer district assessment. The annual sewer district assessment would be levied to cover the debt service associated with the project bond. Because the FEMA HMGP grant would cover $167.8 million of the $188.1 million total cost for Phase I/II, the project bond amount would be $18.3 million, net of the ESD grant of $2 million (**Table 5.13-2**). The resulting assessment for a typical residential property would be $305 to $491 per year (**Table 5.13-2**).

Because the FEMA HMGP grant would not fund Phase III, the project bond amount for Phase III would be the total Phase III project cost of $106.4 million. The annual assessment for a typical residential property would range from $2,103 to $3,384 per year. However, should Phase III be implemented, additional grant funding would be pursued to decrease these costs.

Table 5.13-2. Sewer District Assessments for Typical Residential Property

Phase	Project Cost (in $M)	FEMA (in $M)	Bond Amount less ESD Grant (in $M)	Cost Per Typical Property Bonding Option 1	Cost Per Typical Property Bonding Option 2	Cost Per Typical Property Bonding Option 3
Phase I/II	$188.1	$167.8	$18.3	$491*	$387*	$305*
Phase III	$106.4	$ --	$106.4	$3,384*	$2,666*	$2,103*

Source: Suffolk County (2015b); CDM Smith (2013)
*Note: The HMGP grant application and 2013 study provide a conservative analysis of the costs associated with establishing a new sewer system comprising both a gravity and low-pressure collection and conveyance system. Construction of an exclusively low-pressure system would likely result in substantially lower costs.

Table 5.13-2 presents the assessment for a typical residential property based on three different bonding options. The bond amount is based on the project cost, including the connection cost, as presented in **Table 5.13-1** and on the FEMA HMGP grant amount. The bonding options are a 4 percent interest rate with a 20-year term, a 4 percent interest rate with a 30-year term and a 2 percent interest rate with a 30-year term. The last includes a 1.84 percent fee on the total bond amount.

Annual Operation and Maintenance Expenses—Property owners would incur annual operation and maintenance expenses. This expense would likely be a user fee to the Sewer District for its operation and maintenance expenditures, including chemicals, utilities, and salaries and would be

based on the volume of wastewater generated, as well as electricity costs (which would be higher if a grinder pump is used). A grinder pump typically has an annual energy consumption rate of 200 kilowatt hours (kWh), and the associated electrical costs would be paid by property owners (Citizens Energy Group 2013). In total, annual operation and maintenance costs per connected property are estimated at $450 for residential properties and $2,565 to $2,940 for commercial properties (CDM Smith 2013). Annual expenditures would be about $2,000 higher for businesses because commercial properties generate more wastewater.

Affordability Analysis—As described above, property owners would not incur the upfront one-time connection cost if the unfunded portion of the cost is included in the project bond amount. In terms of the annual sewer district assessment and operations and maintenance costs presented above, Phase I/II households are estimated to have annual expenses of $755 to $941 (**Table 5.13-3**). Phase III households are estimated to have annual expenses of $2,102 to $3,834. Once the project bond has been paid off, the annual cost to residential property owners would decrease to include only the fee charged for operation and maintenance.

These annual expenses would be partially offset by the avoided costs of the current OWTS, which typically includes pumping every 3 to 5 years and reconstruction after 20 to 30 years. CDM Smith (2013) estimates an annual avoided cost of $425 for an average single-family home. The study does not estimate the avoided cost for commercial properties but notes that the avoided cost may be considerably higher.

Table 5.13-3. Typical Total Cost to Owners of Residential Properties

	Phase I/II	Phase III
One-time Connection Cost	$0	$0
Annual Cost		
Sewer District Assessment	$305–$491*	$2,202–$3,384*
Operations and Maintenance Cost	$450*	$450*
Combined Annual Cost	**$755–$941***	**$2,102–$3,834***

*Note: The HMGP grant application and 2013 study provide a conservative analysis of the costs associated with establishing a new sewer system comprising both a gravity and low-pressure collection and conveyance system. Construction of an exclusively low-pressure system would likely result in substantially lower costs.

After deducting the maintenance cost of the existing OWTS, the typical cost of the sewer infrastructure to homeowners in Phase I/II accounts for 0.4 to 0.6 percent of the study area's median household income; for homeowners in Phase III, it accounts for 2.6 percent to 4.1 percent (**Table 5.13-4**). The cost is affordable to most Phase I/II households based on the EPA affordability analysis that considers a cost of more than 2 percent of the median household income a high cost burden (CDM Smith 2013). For Phase III, the cost exceeds 2 percent of the median household income and would be considered unaffordable for a large portion of the households without additional grant funding. In addition, based on the 2011–2015 American Community Survey, housing costs already account for at least 30 percent of the income for 49 percent of the homeowners in the study area (U.S. Census Bureau n.d.). Thirty percent of income is a standard threshold for housing affordability (HUD 2017).

Table 5.13-4. Affordability for Typical Household Connected to Gravity or Low-Pressure Sewer

	Phase I/II	Phase III
Typical Combined Annual Cost (in 2013 dollars)	$755–$941*	$2,102–$3,834*
Avoided Cost of OWTS (in 2013 dollars)	$(425)	$(425)
Total net cost (in 2013 dollars)	$330–$516*	$2,127–$3,409*
Total net cost (in 2015 dollars)	$335–$523*	$2,158–$3,458*
Median Household Income Homeowners in Study Area	$83,568	$83,568
Sewer Cost as a Percent of Household Income	0.4%–0.6%*	2.6%–4.1%*

Source: Suffolk County (2015b); CDM Smith (2013); U.S. Census Bureau (n.d.)
*Note: The HMGP grant application and 2013 study provide a conservative analysis of the costs associated with establishing a new sewer system comprising both a gravity and low-pressure collection and conveyance system. Construction of an exclusively low-pressure system would likely result in lower costs.

A similar affordability analysis was not conducted for businesses. Some businesses, unlike households, may potentially see increased revenues from induced growth facilitated by the Proposed Action (as noted under Indirect Impacts from Growth Inducement, below). As a result, the negative impact of the cost of sewer infrastructure on net business revenue is expected to be smaller than for households.

In summary, under the Proposed Action, all owners of properties connected to the sewer would experience long-term, beneficial effects, including a reduction of the risk associated with OWTS flooding and flood-related damages. Under the Proposed Action, the majority of the households connected to the sewer infrastructure in Phase I/II are not expected to experience long-term, adverse impacts. However, for most households that would be connected as part of Phase III, the annual cost for the sewer would exceed 2 percent of their household income, which would be considered a long-term, adverse effect. Households for which the cost would exceed 2 percent of their household income would require a subsidy as mitigation. In addition, businesses connected to the sewer infrastructure would incur higher costs (approximately $2,000 more in operating and maintenance costs) but may be able to offset some of this cost with increased sales associated with induced growth.

Employment

Two full-time employees would be needed to maintain of the sewer system (CDM Smith 2013). Non-labor operating and maintenance spending by the sewer district, household spending by its employees at businesses within Suffolk County, subsequent purchases by those businesses and their employees at other businesses, and so on (i.e., the multiplier effect) would support a small number of other jobs in Suffolk County.

If a combined collection and conveyance system is pursued to construct the associated pump stations, three commercial properties, comprising several commercial uses, may be acquired as outlined in Section 5.12, Land Use and Planning. Commercial uses include a laundromat, a retail store, a nursery, a construction company, three medical/dental offices, and two other health and

service providers. The employment at these businesses is currently unknown but it can be reasonably expected that these businesses account for less than 1 percent of the total study area employment of 6,102 and that the overall impact would be negligible.

Any potential acquisitions would comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (49 CFR 24), including providing relocation advisory services, providing a minimum of 90 days of written notice to vacate prior to requiring possession, and reimbursing for moving expenses.

Avoided Losses from Flooding

The Proposed Action would reduce the risk associated with flooding and flood-related damages because the sewer system would be less affected by increased groundwater or floods than conventional OWTS. In addition, the Proposed Action would reduce groundwater and Forge River surface water nitrogen concentrations, which would result in enhanced ecosystems and improved wave energy and flood attenuation. The avoided damages are not quantified as part of this study. The avoided loss would be a long-term, beneficial effect for the community.

Property Values

Under the Proposed Action, access to sewer infrastructure and the reduction of the risk of flooding may potentially lead to higher property values, and property owners would also face user fees and operation and maintenance costs in excess of the maintenance of conventional OWTS. The impact of the Proposed Action on property values is expected to be negligible.

Fiscal Flows

To finance the capital costs, a sewer district assessment would be levied on benefiting property owners. While the County's Assessment Stabilization Reserve Fund would subsidize the operation and maintenance of the sewer district for the first few years, the district is expected to be self-sufficient, covering its annual operation and maintenance costs with user fees and covering the debt service with assessments. Therefore, the long-term impact of the Proposed Action on local government expenditures would be negligible.

A limited number of property acquisitions are expected to occur as outlined in Section 5.12, Land Use and Planning. When the acquisitions are completed, these properties would no longer generate property tax revenues for the town. The list of affected properties has not been finalized and the impact of the property tax revenue is unknown. However, the market value of all properties currently under consideration for acquisition accounts for only 0.01 percent of the Town of Brookhaven's full value of $48.2 billion and 0.1 percent of the full value of all properties in the William Floyd School District. Therefore, it can be concluded that the long-term impact of the Proposed Action on local government revenues would be negligible.

Acquisitions and Displacement

Three residential properties may be acquired as outlined in Section, 5.12, Land Use and Planning. If the acquisitions occur, and assuming the residences are occupied at the time that acquisition is initiated, three households or nine people based on the study area's average household size of 2.97, would be directly displaced under the Proposed Action. The displaced population would account for only 0.02 percent of the total study area population of 46,597. Therefore, the long-term impact of the Proposed Action on population would be negligible.

Any potential acquisitions would comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (49 CFR 24), including providing relocation advisory services to displaced tenants and owner occupants, providing a minimum of 90 days of written notice to vacate prior to requiring possession, reimbursing for moving expenses, and providing payments for the added cost of renting or purchasing comparable replacement housing.

5.13.3.3 Indirect Impacts from Growth Inducement

The Proposed Action is expected to facilitate redevelopment of properties along Montauk Highway, both within and outside the Transit Area Overlay District, and facilitate new development of vacant parcels that would be connected to the sewer, which would in turn generate employment and population growth. It could be reasonably expected that new businesses would locate in the District and/or that existing business would expand and/or experience increased sales revenue because of increased foot traffic and population. Improving the Main Street Business District may also lead to quality of life improvements for the community and increase property values. The fiscal effects of these changes would include an increase in local property tax base and Suffolk County sales tax revenue as well as increased demand for local government services.

As indicated in Appendix B.13, Unbuilt Floor Area Analysis, the Suffolk County Sanitary Code currently limits the developable floor area and number of residential units for lots that use OWTS. In some cases, these development limits are stricter than the limits under current zoning. Therefore, connection to a sewer system under the Proposed Action would facilitate development because it would allow for development up to the density and intensity specified in the existing zoning.

The growth-inducement analysis assumes that the Proposed Action could gradually result in development up to existing zoning limits on the following properties:

1) Parcels along Montauk Highway that were rezoned in 2004 from J-2 to J-6.
2) Parcels along Montauk Highway located in the Transit Area Overlay District, which was established in 2010.
3) Vacant parcels throughout the study area.

To understand the potential impact of the additional buildable square feet, two hypothetical development scenarios were calculated: one that maximizes residential development (with ground-floor commercial spaces in the parcels along Montauk Highway) and another that maximizes commercial development as shown in **Table 5.13-5**. Because the effects are expected to be long-term, the resulting employment and household numbers were compared to the overall employment and household level in the census tract study area in 2030 as reported by NYMTC.

Table 5.13-5. Hypothetical Scenarios of Long-Term (Re)development Facilitated by the Proposed Action

	Hypothetical Scenario 1	Hypothetical Scenario 2
Commercial square feet	133,202	386,515
Residential Units	344	122
Jobs (assumes 400 square foot per job)	333	966
Households	344	122

	Hypothetical Scenario 1	Hypothetical Scenario 2
Census Tract Study Area Jobs in 2030	14,182	14,182
Census Tract Study Area Households in 2030	75,604	75,604
Percent of Study Area Jobs	2.3%	6.8%
Percent of Study Area Households	0.5%	0.2%

It is important to note that the Proposed Action would not directly result in this new development. This growth would occur according to prevailing market conditions and development trends in the Shirley-Mastic and Mastic Beach areas of the Town of Brookhaven.

These scenarios demonstrate that the induced growth would likely be limited relative to the overall population and employment level in the census tract study area in 2030; therefore, the growth is not expected to generate any significant indirect population or business displacement. In addition, because of limited increase in households and the fact that the new residential units would likely be apartments, which typically house fewer school-age children than single-family houses, the growth is not expected to lead to a net negative fiscal flow for the school district or municipality. Indirect, long-term impacts on socioeconomics would be negligible.

5.14 Environmental Justice

5.14.1 Methodology

5.14.1.1 Regulations

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires that a federal agency "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations." The executive order also addresses the importance of public participation in the review process. If environmental justice populations are identified, the public participation process should ensure their full and fair participation in the decision-making process.

Title VI of the Civil Rights Act of 1964 (42 USC 2000d) requires nondiscrimination on the basis of race, color, or national origin in programs or activities receiving federal financial assistance.

New York State Commissioner Policy 29, Environmental Justice and Permitting, provides guidance for incorporating environmental justice concerns into the NYSDEC environmental permit review process and application of SEQRA.

5.14.1.2 Study Area

The study area for the environmental justice analysis is defined as those census block groups that are shown in **Figure 5.13-1**).

5.14.1.3 Approach

The impact analysis presented in this EIS involves four basic steps:

1) Identify the study area, which is the area where the project may cause significant and adverse impacts.
2) Examine race and ethnicity and poverty data for the project area to determine whether it includes minority or low-income communities.
3) If minority and/or low-income communities are identified, assess whether the Proposed Action has potentially significant, adverse impacts on these communities.
4) Evaluate the potential significant adverse impacts on minority and low-income communities relative to the overall effects of the Proposed Action to determine whether any potential significant, adverse impacts on those communities would be disproportionate.

Environmental justice communities were identified using race, ethnicity, and poverty status data from the U.S. Census Bureau (2011–2015 American Community Survey at the block group level; U.S. Census Bureau n.d.). The environmental justice population was determined by comparing the block-group level race, ethnicity, and income characteristics to those of Suffolk County. All census tracts with proportionally more minority or low-income persons than Suffolk County as a whole were identified as environmental justice communities.

As defined by the Environmental Justice Guidance Under NEPA (CEQ 1997), "minority populations" include persons who identify themselves as Asian or Pacific Islander, Native American or Alaskan Native, Black (not of Hispanic origin), or Hispanic. Race refers to census respondents' self-identification of racial background. Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, and central or South American.

CEQ guidance requires minority communities to be identified where the minority population exceeds 50 percent, or where the minority population percentage is meaningfully greater than the minority population in the reference area. In Suffolk County, the reference area for the Proposed Action, the minority population composes 30 percent of the total population. Therefore, to provide a conservative assessment of impacts on environmental justice communities, this analysis considers any study area block group with a minority population of more than 30 percent to be an environmental justice community.

CEQ guidance does not specify a threshold to be used for identifying clusters of low-income populations. To provide a conservative assessment of impacts on environmental justice communities, any census block group with a greater share of its population living in poverty than in the reference area was considered a low-income community. In Suffolk County, the population in poverty accounts for 4.8 percent of the total population. Therefore, this analysis considers any study area block group with a poverty rate of more than 4.8 percent to be an environmental justice community.

If adverse impacts on the human environment were identified in other resource topics of the EIS—specifically air quality, noise, transportation, public health and safety—this analysis considers whether the adverse impacts on environmental justice populations would be disproportionately high or would be borne predominantly by the environmental justice populations. Environmental justice populations are considered to experience disproportionately high and adverse impacts if

they would predominantly bear the impact or if they bear an impact that would be considerably more severe or greater in magnitude than the impact on the general population. The assessment also considers the benefits to the environmental justice population, including access to the proposed sewer system, avoidance of OWTS costs, access to construction and sewer maintenance jobs, and property value increases. Mitigation, enhancement, and avoidance strategies are also considered.

5.14.2 Existing Conditions

Based on the 2011–2015 American Community Survey, 30 percent of the residents of Suffolk County belong to a minority group (**Table 5.14-1**). In 15 of the 29 study area block groups, minority residents account for a higher percentage of total population than they do in Suffolk County. These 15 block groups comprise an environmental justice community based on race and ethnicity (**Figure 5.14-1**).

Poverty thresholds, which are income levels below which a family is considered to be living in poverty and are the basis of the U.S. Census Bureau's poverty data, depend on family size, composition, and age. In 2016, the poverty thresholds ranged from $11,511 to $53,413 (U.S. Census Bureau 2016). The study area's average household size was 2.97. The average poverty threshold for a family of three was $19,105. The estimates of the percent of population in poverty developed by the US Bureau of Census for counties, census block groups and other geographies take into account family size and composition and age of each individual family included in the sample.

Table 5-14-1. Environmental Justice Communities Based on Minority Status

Geography	Population	Not Hispanic: White alone	Not Hispanic: Black or African American alone	Not Hispanic: American Indian and Alaska Native alone	Not Hispanic: Asian alone	Not Hispanic: Native Hawaiian, and other Pacific. Islander alone	Not Hispanic: Some other race alone	Not Hispanic: Two or more races:	Hispanic:	Minority	EJ Community
Census Tract 1594.04 Block Group 1	1,876	71%	13%	2%	5%	0%	0%	6%	4%	29%	No
Census Tract 1594.04 Block Group 2	719	73%	14%	0%	2%	0%	0%	4%	6%	27%	No
Census Tract 1594.04 Block Group 3	1,638	41%	7%	0%	1%	0%	0%	8%	43%	59%	**Yes**
Census Tract 1594.04 Block Group 4	1,935	58%	15%	0%	0%	0%	0%	0%	27%	42%	**Yes**
Census Tract 1594.04 Block Group 5	1,467	38%	0%	0%	31%	0%	0%	0%	31%	62%	**Yes**
Census Tract 1594.08 Block Group 1	2,983	69%	7%	0%	5%	0%	0%	1%	19%	31%	**Yes**
Census Tract 1594.08 Block Group 2	1,196	63%	5%	4%	8%	0%	0%	3%	17%	37%	**Yes**
Census Tract 1595.05 Block Group 4	1,964	43%	1%	0%	6%	0%	0%	31%	18%	57%	**Yes**
Census Tract 1595.06 Block Group 1	2,054	54%	7%	0%	1%	0%	0%	0%	39%	46%	**Yes**

Geography	Population	Not Hispanic: White alone	Not Hispanic: Black or African American alone	Not Hispanic: American Indian and Alaska Native alone	Not Hispanic: Asian alone	Not Hispanic: Native Hawaiian, and other Pacific. Islander alone	Not Hispanic: Some other race alone	Not Hispanic: Two or more races:	Hispanic:	Minority	EJ Community
Census Tract 1595.08 Block Group 1	1,815	79%	11%	1%	2%	0%	0%	0%	7%	21%	No
Census Tract 1595.11 Block Group 1	2,490	63%	5%	0%	0%	0%	0%	0%	32%	37%	**Yes**
Census Tract 1595.11 Block Group 2	1,756	66%	4%	14%	3%	0%	0%	2%	11%	34%	**Yes**
Census Tract 1595.11 Block Group 3	975	56%	25%	0%	7%	0%	2%	0%	10%	44%	**Yes**
Census Tract 1595.11 Block Group 4	1,795	80%	4%	0%	0%	0%	0%	0%	15%	20%	No
Census Tract 1595.12 Block Group 1	2,420	76%	6%	0%	0%	0%	0%	2%	16%	24%	No
Census Tract 1591.03 Block Group 1	836	53%	24%	0%	0%	0%	0%	6%	17%	47%	**Yes**
Census Tract 1592.04 Block Group 3	1,536	95%	2%	0%	0%	0%	0%	0%	4%	5%	No
Census Tract 1594.11 Block Group 1	2,062	82%	5%	0%	0%	0%	0%	0%	13%	18%	No
Census Tract 1594.11 Block Group 2	1,415	85%	0%	0%	4%	0%	0%	2%	9%	15%	No

Geography	Population	Not Hispanic: White alone	Not Hispanic: Black or African American alone	Not Hispanic: American Indian and Alaska Native alone	Not Hispanic: Asian alone	Not Hispanic: Native Hawaiian, and other Pacific. Islander alone	Not Hispanic: Some other race alone	Not Hispanic: Two or more races:	Hispanic:	Minority	EJ Community
Census Tract 1594.12 Block Group 1	945	99%	1%	0%	0%	0%	0%	0%	0%	1%	No
Census Tract 1595.05 Block Group 1	1,929	90%	0%	0%	0%	0%	0%	0%	10%	10%	No
Census Tract 1595.05 Block Group 3	1,122	73%	16%	0%	5%	0%	0%	0%	6%	27%	No
Census Tract 1595.05 Block Group 5	1,997	53%	0%	0%	0%	0%	0%	0%	47%	47%	**Yes**
Census Tract 1595.06 Block Group 3	1,650	57%	10%	0%	22%	0%	0%	0%	10%	43%	**Yes**
Census Tract 1595.08 Block Group 2	1,363	72%	0%	0%	0%	0%	0%	3%	25%	28%	No
Census Tract 1595.08 Block Group 4	2,487	52%	20%	0%	0%	0%	0%	6%	22%	48%	**Yes**
Census Tract 1595.10 Block Group 2	14	79%	0%	0%	21%	0%	0%	0%	0%	21%	No
Census Tract 1596.01 Block Group 1	1,691	99%	0%	0%	0%	0%	0%	0%	1%	1%	No
Census Tract 1596.01 Block Group 2	827	96%	0%	0%	2%	0%	0%	0%	2%	4%	No

Geography	Population	Not Hispanic: White alone	Not Hispanic: Black or African American alone	Not Hispanic: American Indian and Alaska Native alone	Not Hispanic: Asian alone	Not Hispanic: Native Hawaiian, and other Pacific. Islander alone	Not Hispanic: Some other race alone	Not Hispanic: Two or more races:	Hispanic:	Minority	EJ Community
Project Area	46,957	68%	7%	1%	3%	0%	0%	3%	18%	32%	**Yes**
Suffolk County, New York	1,501,373	70%	7%	0%	4%	0%	0%	1%	18%	**30%**	No
Brookhaven town, Suffolk County, New York	488,930	74%	5%	0%	4%	0%	0%	1%	15%	26%	No
Mastic Beach village, New York	14,883	67%	10%	0%	2%	0%	0%	4%	17%	33%	No

Source: U.S. Census Bureau (n.d.)

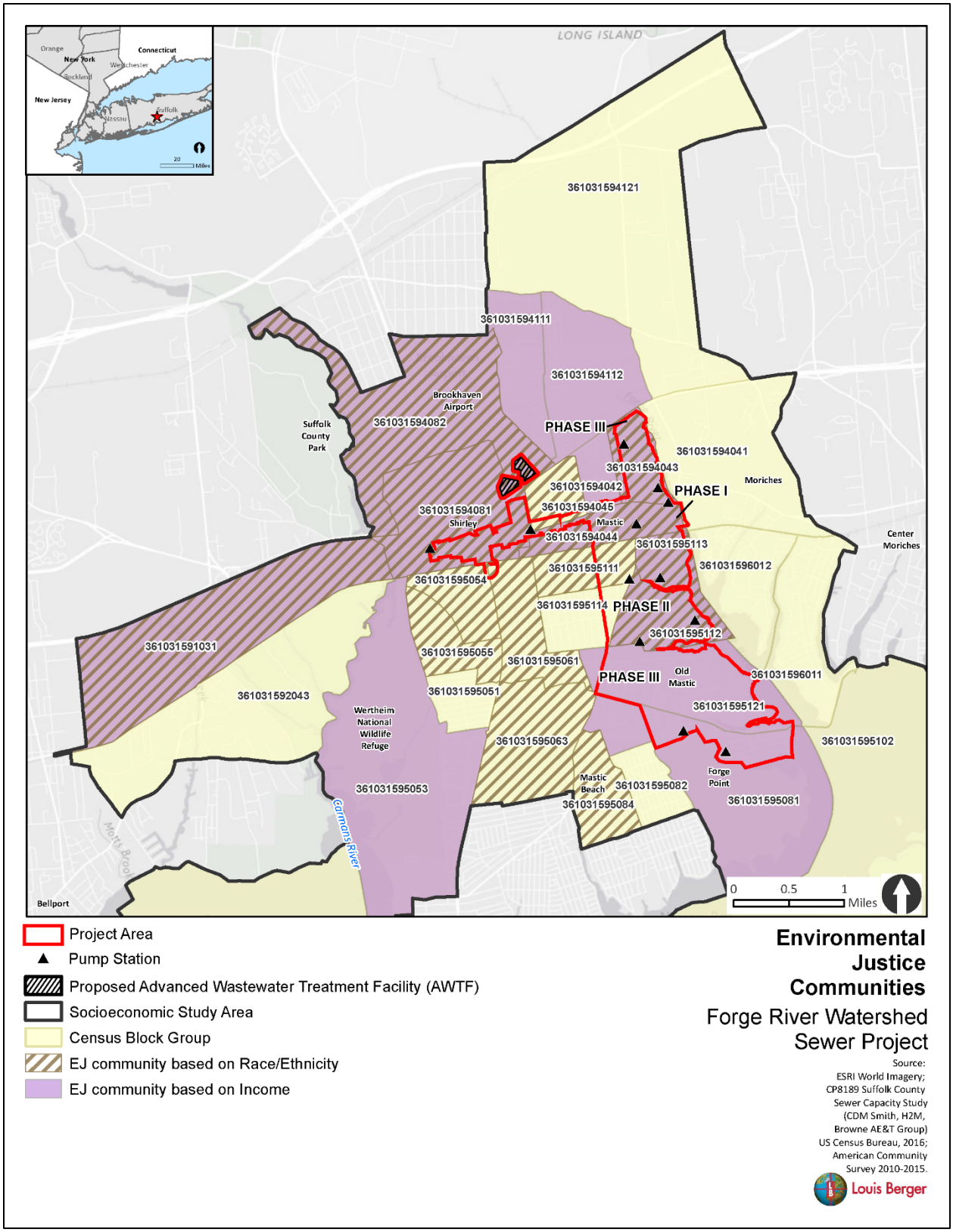

Figure 5.14-1. Environmental Justice Communities

As shown in **Table 5.14-2**, 4.8 percent of Suffolk County families have incomes below the national poverty level thresholds described above. In 13 of the 29 study area block groups, the percent of families in poverty exceeds the County rate. These 13 block groups comprise an environmental justice community based on income (**Figure 5.14-1**). Twenty of the 29 study area block groups are environmental justice communities based on race/ethnicity, income, or both. With the exception of a small area that is part of Phase II, the entire project area is an environmental justice community.

Table 5.14-2. Environmental Justice Communities Based on Income

Geography	Median Household Income	Percent Families with Incomes below Poverty Level	Environmental Justice Community
Census Tract 1594.04 Block Group 1	$106,667	4.5	No
Census Tract 1594.04 Block Group 2	$79,338	10.1	**Yes**
Census Tract 1594.04 Block Group 3	$83,235	20.5	**Yes**
Census Tract 1594.04 Block Group 4	$82,031	20.1	**Yes**
Census Tract 1594.04 Block Group 5	$86,766	0.0	No
Census Tract 1594.08 Block Group 1	$85,481	6.8	**Yes**
Census Tract 1594.08 Block Group 2	$56,897	18.7	**Yes**
Census Tract 1595.05 Block Group 4	$61,811	3.7	No
Census Tract 1595.06 Block Group 1	$92,457	2.2	No
Census Tract 1595.08 Block Group 1	$97,441	19.4	**Yes**
Census Tract 1595.11 Block Group 1	$140,949	0.0	No
Census Tract 1595.11 Block Group 2	$30,768	11.4	**Yes**
Census Tract 1595.11 Block Group 3	$24,934	22.8	**Yes**
Census Tract 1595.11 Block Group 4	$26,552	2.1	No
Census Tract 1595.12 Block Group 1	$63,125	9.7	**Yes**
Census Tract 1591.03 Block Group 1	$74,519	6.5	**Yes**
Census Tract 1592.04 Block Group 3	$90,333	0.0	No
Census Tract 1594.11 Block Group 1	$64,569	12.1	**Yes**
Census Tract 1594.11 Block Group 2	$85,000	11.5	**Yes**
Census Tract 1594.12 Block Group 1	$41,212	0.0	No
Census Tract 1595.05 Block Group 1	$52,969	0.0	No
Census Tract 1595.05 Block Group 3	$75,954	13.2	**Yes**
Census Tract 1595.05 Block Group 5	$130,679	0.0	No
Census Tract 1595.06 Block Group 3	$88,811	3.0	No

Geography	Median Household Income	Percent Families with Incomes below Poverty Level	Environmental Justice Community
Census Tract 1595.08 Block Group 2	$96,458	0.0	No
Census Tract 1595.08 Block Group 4	$95,536	0.0	No
Census Tract 1595.10 Block Group 2	$35,833	0.0	No
Census Tract 1596.01 Block Group 1	$51,042	0.0	No
Census Tract 1596.01 Block Group 2	$77,432	0.0	No
Project Area	$79,264	6.7	**Yes**
Suffolk County	$88,663	**4.8**	
Town of Brookhaven	$87,040	5.2	
Mastic Beach Village	$62,602	13.0	

Source: U.S. Census Bureau (n.d.)

5.14.3 Potential Impacts and Proposed Mitigation

This section addresses the final two steps of the environmental justice analysis. The third step considers whether the Proposed Action would have an adverse impact on minority or low-income populations, and the fourth step evaluates the potential adverse impacts of the Proposed Action on minority and low-income communities relative to its overall effects to determine whether any impacts on those communities would be disproportionately high and adverse.

5.14.3.1 Construction

During the construction period, study area populations may experience minor, adverse impacts on air quality, water quality, transportation, community services and facilities, public health and safety, and aesthetic resources and moderate, adverse impacts from noise. All these impacts would be temporary and would be mitigated. Therefore, the impact on environmental justice populations would not be considerably more severe or greater in magnitude than the impact on the general population. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.14.3.2 Operation

Once construction of the Proposed Action is complete, the study area population may experience minor, adverse air quality impacts associated with emissions near the AWTF. As indicated in Section 5.3, odors and VOC emissions would be controlled. Incorporating advanced odor control technology during the design process would ensure that hydrogen sulfide concentrations at the nearest sensitive receptors would be well below the New York State ambient air quality standard and well below *de minimis* standards. The mitigation proposed in Section 5.3 to minimize emissions from backup power generators require new equipment with a power rating of 50 horsepower and above to comply with the New Source Performance Standards. Generators would have engines compatible with the Maximum Achievable Control Technology Reciprocating

Internal Combustion Engines requirements. The effect on environmental justice populations would not be considerably more severe or greater in magnitude than the effect on the general population.

The Proposed Action could have a long-term, adverse impact on groundwater quality because of the discharge of small quantities of PPCPs. However, it would have a long-term beneficial effect on groundwater quality and surface waters from nitrogen removal and increased pollution treatment levels achieved by the AWTF and the reduced risk of sanitary wastewater releases from OWTS. The impact on environmental justice populations would not be considerably more severe or greater in magnitude than the impact on the general population, and the environmental justice communities would experience the same benefits from the Proposed Action as the general population.

For low-income populations, the cost of the sewer infrastructure would account for a larger share of their household incomes than for higher income households. However, all owners of properties connected to the sewer would also experience long-term, beneficial effects, including access to sewer infrastructure and a reduction of the risk associated with OWTS flooding and flood-related damages. A subsidy in the form of grants to property owners for whom the annual cost of the sewer infrastructure would exceed 2 percent of their income, for the portion of the cost exceeding the 2 percent, would be required as mitigation.

Based on **Table 5.13-4**, the typical net cost for a Phase I/II household to be connected to the sewer system ranges from $335 to $523 per year, depending on the bonding option selected. This means that any household with an annual income of less than $16,740 would require a subsidy as mitigation because the cost would exceed 2 percent of their household income. Households with a cost at the upper end of the range would require a subsidy if their annual income is less than $26,170. **Table 5.13-4** shows that the typical net cost for a Phase III household to be connected to the sewer system ranges from $2,158 to $3,458 per year. Any Phase III household with an income of less than $107,889 would require a subsidy. For properties where the net cost would be at the upper end of the range, all households with incomes of less than $172,911 would require a subsidy.[3]

Similarly, grants could be provided to tenants who experience significant rent increases directly because of the sewer cost. This would mitigate potential adverse impacts on low-income households. In summary, the adverse impact on owners of connected properties in environmental justice communities would not be greater than for the general population. However, for lower income households, the cost would account for a larger portion of their income. The owners of properties in the environmental justice communities would experience the same benefits from the Proposed Action as the general population. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.14.3.3 Indirect Impacts from Growth Inducement

The potential induced growth presented Section 5.13 is not expected to generate substantial indirect population growth or business displacement. As indicated in the remainder of Section 5, induced growth would not result in impacts on other resources and would not result in impacts that

[3] The analysis of impacts on socioeconomics conservatively analyzes the costs associated with establishing a new sewer system comprising both a gravity and low-pressure collection and conveyance system. Construction of an exclusively low-pressure system would likely result in substantially lower costs.

would be considerably more severe or greater in magnitude on the environmental justice population than on the general population.

5.15 Noise

5.15.1 Methodology

5.15.1.1 Regulations

Noise Control Act of 1972

The Noise Control Act of 1972 required EPA to create a set of noise criteria. In response, EPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* in 1974, which explains the impact of noise on humans (EPA 1974). The EPA report found that keeping the maximum 24-hour Ldn value below 70 A-weighted decibels (dBA) would protect the majority of people from hearing loss. EPA recommends an outdoor Ldn of 55 dBA.

Code of the Town of Brookhaven

The Code of the Town of Brookhaven, Chapter 50 Noise Control, outlines maximum permissible sound levels by receiving property category, including residential, commercial, and industrial. These limits, discussed below, pertain to the levels at the lot line of the receiving property. Noise from construction activity is exempt from the requirements detailed below, but is limited to the hours of 7:00 a.m. to 6:00 p.m. on weekdays.

5.15.1.2 Study Area

The study area for the analysis of construction noise impacts encompasses the project area. Implementation of the Proposed Action may elevate noise levels near the proposed collection and conveyance systems, the pump stations, and the AWTF. As such, the study area for the evaluation of noise generated by operation includes the vicinity of the AWTF, collection and conveyance systems, and the proposed pump stations.

5.15.1.3 Approach

Noise Descriptors and Thresholds

Noise is typically defined as unwanted or undesirable sound. The basic parameters of environmental noise that affect human subjective response are (1) intensity or level, (2) frequency content, and (3) variation with time. Appendix B.7 provides information regarding the various metrics and descriptors used to evaluate noise levels and the effects of noise on receptors sensitive to noise.

Sound pressure level is used to measure the magnitude of sound and is expressed in decibels (dB). Because the sensitivity of human hearing varies with frequency, the “A-weighting system” is commonly used when measuring environmental noise to provide a single number descriptor that correlates with human subjective response. Sound levels measured using this weighting system are called A-weighted sound levels (dBA). Throughout this section, all sound levels are expressed with dBA weighting. Examples of A-weighted sound pressure levels are presented in **Table 5.15-1**. Equivalent noise level (Leq) is the average of sound energy over time, such as one hour (Leq(h)).

Table 5.15-1. Examples of Common Sounds: A-weighted Sound Level in Decibels (dBA)

dBA	Overall Level	Noise Environment
120	Uncomfortably loud (32 times as loud as 70 dBA)	Military jet airplane takeoff at 50 feet
100	Very loud (8 times as loud as 70 dBA)	Jet flyover at 1,000 feet; locomotive pass-by at 100 feet
80	Loud (2 times as loud as 70 dBA)	Propeller plane flyover at 1,000 feet; diesel truck 40 miles per hour at 50 feet
70	Moderately loud	Freeway at 50 feet from pavement edge at 10 a.m.; vacuum cleaner (indoor)
60	Relatively quiet (1/2 as loud as 70 dBA)	Air condition unit at 100 feet; dishwasher at 10 feet (indoor)
50	Quiet (1/4 as loud as 70 dBA)	Large transformers; small private office (indoor)
40	Very quiet (1/8 as loud as 70 dBA)	Birds calls; lowest limit of urban ambient sound
10	Extremely quiet	Just audible; (1/64 as loud as 70 dBA)
0		Threshold of hearing

Source: Federal Interagency Committee on Noise (1992)

The maximum noise level (Lmax) is a measure of the maximum sound pressure level. Finally, Ldn is used to measure the average sound impacts for the purpose of guidance for compatible land use. It weights the impact of sound as it is perceived at night against the impact of the same sound heard during the day. This is done by adding 10 dBA to all noise levels measured between 10:00 p.m. and 7:00 a.m.

The noise impact criteria for the Proposed Action are based on the Town of Brookhaven Noise Code and the Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment* (FTA 2006) guidance document. The noise limits established by the Town of Brookhaven Noise Code would be applicable for assessing the operational effects of the Proposed Action. Because the Noise Code does not provide quantitative construction noise thresholds, FTA guidelines would be applicable for the evaluation of construction noise impacts. While it is not the purpose of the FTA guidelines to specify standardized criteria for construction noise impact, the guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction.

Operational Impact Criteria

The Town of Brookhaven Noise Code noise thresholds are provided in **Table 5.15-2**.

Table 5.15-2. Town of Brookhaven Noise Code Criteria

Sound Source Property Category	Residential Receiving Property* 7:00 a.m. to 10:00 p.m. (Lmax dBA)	Residential Receiving Property* 10:00 p.m. to 7:00 a.m. (Lmax dBA)	Commercial Receiving Property* All Times (Lmax dBA)	Industrial Receiving Property* All Times (Lmax dBA)
Residential	55	50	65	75
Commercial, public lands or rights-of-way	65	50	65	75
Industrial	65	50	65	75

Source: Town of Brookhaven (1987)
Notes: *Noise level at the lot line of receiving property.

Construction Impact Criteria

To account for a worst-case condition, for the evaluation of construction-related noise impacts, noise levels over the 8-hour workday (8-hour Leq dBA) were modeled to be the same as the peak noise identified in **Tables 5.15-3**, **5.15-4, and 5.15-5**. For such a condition, FTA suggests that for residential receptors (and receptors of similar sensitivity), an 8-hour Leq dBA exceeding 80 may be considered an adverse impact.

Table 5.15-3. Collection and Conveyance System Construction Noise Impacts

	Construction Noise Levels	Monitored Ambient	Increase over Existing	Increase over FTA Construction Criteria
Excavation	83.4 dBA	50.5 dBA	32.9 dBA	3.4 dBA
Construction	80.1 dBA	50.5 dBA	29.6 dBA	0.1 dBA

Table 5.15-4. Pump Station Construction Noise Impacts

	Construction Noise Levels	Monitored Ambient	Increase Over Existing	Increase over FTA Construction Criteria
Excavation	84.1 dBA	50.5 dBA	33.6 dBA	4.1 dBA
Concrete	79.9 dBA	50.5 dBA	29.4 dBA	--
Facility construction	82.2 dBA	50.5 dBA	31.7 dBA	2.2 dBA

Table 5.15-5. AWTF and Leaching Structure Construction Noise Impacts

	Construction Noise Levels	Monitored Ambient	Increase over Existing	Increase over FTA Construction Criteria
Excavation	71.5 dBA	58.2 dBA	13.3 dBA	--
Concrete	68.7 dBA	58.2 dBA	10.5 dBA	--
Facility construction	69.2 dBA	58.2 dBA	11.0 dBA	--

Existing Noise Levels

Existing noise levels were established by monitoring noise levels at two representative locations, shown in **Figure 5.15-1**. Monitoring Location 1 (ML 1) is near the AWTF, park, and residential land uses. Monitoring Location 2 (ML 2) is located near a residential area typical of the location of the pump stations, on a vacant and wooded lot at the east end of the Jay Street cul-de-sac, adjacent to backyards along Babylon Street. This site is representative of single-family residential dwellings and the proposed location of a Phase II pump station, north of Second Neck Creek.

Long-term background noise level data within the study area were compiled to identify existing ambient noise levels during both weekday and weekend periods. Several metrics were documented, including the Leq, Lmax, minimum noise level (Lmin), and L90 (noise levels exceeded 90 percent of the time) and logged every 10 minutes. Monitoring equipment included Larson Davis Model 831 (Type 1) and Rion NL-52 (Type 1) sound level meters. Field calibration was performed using a Larson Davis Model CAL200 calibrator. Appendix B.6, Noise Monitoring Technical Memorandum, includes all monitoring data and equipment calibration certificates. Monitoring commenced on Friday, May 20, 2016, and ended on Friday, May 27, 2016.

Construction Noise Methodology

Typical noise emission levels from construction equipment were derived from and modeled with the Federal Highway Administration's Roadway Construction Noise Model. The model calculates noise by using empirical data for noise generated by construction equipment, mathematical formulae relating noise attenuation with distance, and information regarding the percentage of time that a certain piece of equipment is expected to be operated at maximum power while on-site during construction (i.e., the acoustical usage factor). The results of the noise model were used as a basis to evaluate potential construction-related noise impacts at the property boundary of receptor locations near the Proposed Action.

AWTF Noise Methodology

Noise levels at sensitive receptors near the AWTF during operation would depend on design specifications for the facility, including equipment to be used, enclosures where the equipment is placed, and the distance between the facility and area receptors. Design requirements have not been developed at this time and could result in modifications to the estimated demands based on chosen building and equipment elements and/or operational procedures.

Figure 5.15-1. Noise Monitoring Locations and Sensitive Receptors

5.15.2 Existing Conditions

Sensitive noise receptors that could be affected by the Proposed Action include residences, parks, places of worship, schools, and libraries. Sensitive receptors near the AWTF include residences north of Sunrise Highway and east of Pinelawn Avenue, residences north of the highway and east of Winters Drive, and users of Ziegler Park (see **Figure 5.15-1**). If a combined collection system is pursued, pump stations would be constructed at 12 locations throughout the study area, including those located in residential neighborhoods. **Figure 5.15-1** illustrates the locations of the proposed AWTF, pump stations, and the noise monitoring stations. Specific sensitive receptors are not identified on **Figure 5.15-1** because impacts are evaluated for any receptor in the vicinity of noise-generating equipment or activity.

The existing noise environment at ML 1, near the AWTF, is characterized by highway noise from the adjacent Sunrise Highway and the service road to the highway. The existing noise environment at ML 2 is typical of a quiet residential neighborhood with slow and infrequent traffic on streets. The results of the existing conditions noise monitoring are compared with noise levels permitted by the Town of Brookhaven Noise Code and are presented in **Tables 5.15-6** and **5.15-7**. At ML 1, existing noise levels exceed the levels permitted by the Noise Code during the daytime and nighttime on weekdays and slightly exceed daytime levels on the weekend. At ML 2, noise levels are within permitted levels.

Table 5.15-6. Existing Weekday Noise Levels

Monitoring Location	Daytime Noise Level Leq(h) (dBA)	Nighttime Noise Level Leq(h) (dBA)	Daytime/Nighttime Permitted Residential Noise Levels – Leq(h) (dBA)
ML 1	58.2	54.5	55/50
ML 2	50.5	45.5	55/50

Table 5.15-7. Existing Weekend Noise Levels

Monitoring Location	Daytime Noise Level Leq(h) (dBA)	Nighttime Noise Level Leq(h) (dBA)	Daytime/Nighttime Permitted Residential Noise Levels – Leq(h) (dBA)
ML 1	56.4	48.8	55/50
ML 2	49.5	40.3	55/50

5.15.3 Potential Impacts and Proposed Mitigation

5.15.3.1 Construction

Construction activities associated with the Proposed Action would contribute to an increase in noise levels.

A noise assessment for each of the project components (collection and conveyance systems, pump stations, and AWTF and leaching structures) evaluated stationary source construction impacts, mobile source construction impacts, and operational impacts. See Appendix B.7, Noise Technical

Analysis, for a description of equipment, equipment noise levels, and other information used in running the Roadway Construction Noise Model and output sheets for the model runs.

Stationary Source Noise

For construction of the collection and conveyance systems, pump stations (if a combined collection system is pursued), AWTF, and leaching structures, construction noise was calculated for a worst-case condition—when all construction equipment on any given site would be operating concurrently. The amount of time under this worst-case condition would be much shorter than the total construction duration. Furthermore, similar to other elements of the Proposed Action, construction work would be conducted between 7:00 a.m. and 6:00 p.m., when the municipal noise code exempts construction from prohibited activities.

- **Collection and Conveyance**: As shown in **Table 5.15-3**, construction of the collection and conveyance systems would result in noise increases at the exterior walls of sensitive receptors between 32.9 dBA, during excavation, and 29.6 dBA for construction of the systems, at a distance of 50 to 60 feet.
- **Pump Stations (if combined collection system pursued)**: As shown in **Table 5.15-4**, construction of the pump stations would result in noise increases at the exterior walls of sensitive receptors between 29.4 dBA, during concrete foundation work, and 33.6 dBA, during excavation.
- **AWTF**: As shown in **Table 5.15-5**, because of the distance separating the AWTF from sensitive receptors, construction of the AWTF would generate noise increases at the exterior walls of sensitive receptors of 13.3 dBA for excavation for the facility and leaching pools and 10.5 dBA during concrete pours for the facility.

Mobile Source Noise

According to the Federal Highway Administration, as long as the vehicle mix remains constant, a doubling of traffic would increase traffic noise by approximately 3 dB, a barely perceptible change in relative loudness. To account for conditions where the vehicle mix would change, as expected in the case of the Proposed Action, the City Environmental Quality Review Technical Manual suggests the use of "noise passenger car equivalents" (PCEs), where the noise generated by a medium truck is equivalent to the noise generated by 13 passenger cars, the noise generated by a bus is equivalent to the noise generated by 18 cars, and the noise generated by a heavy truck is equivalent to the noise generated by 47 cars. Vehicle trips required to remove excavate, deliver construction supplies, and transport construction workers were calculated to determine if construction traffic would create an adverse noise impact (see Appendix B.7).

- **Collection and Conveyance**: Trips would not double noise PCEs or result in 3 dBA or greater increase in traffic noise over existing conditions on the least traveled roadways in the study area during the peak traffic period. However, during off-peak traffic periods, the addition of project-related construction traffic may result in a doubling of noise PCEs, and thus elevate ambient noise levels by 3 dBA or more.
- **Pump Stations (if combined collection system pursued)**: Construction-related traffic would, at times, more than double PCEs on some roadways. This condition would only occur for a couple of days during peak excavation and peak concrete foundation work.

- **AWTF**: During the peak period of concrete work for the AWTF, PCEs would more than double. However, due to the nature of this type of construction (periods of construction involving the preparation of concrete forms, installation of reinforcement bars, and other preparation activities), the increase in traffic due to concrete delivery would only occur for 8 or 10 days, followed by another period of preparation work.

In summary, the Proposed Action would result in short-term, moderate, adverse noise impacts. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.15.3.2 Operation

All physical components of the Proposed Action—conveyance systems, grinder pumps, pump stations, and machinery for the AWTF—would be enclosed within concrete walls, within a sound enclosure, or located underground. Furthermore, a forested buffer of at least 150 feet would remain around the AWTF, providing some shielding of operational noise generated by the facility.

Some trees in the center of the AWTF parcel would be removed for development of the facility. However, because tree removal would occur at the center of the parcel and a forested buffer of at least 150 feet adjacent to the Sunrise Highway Service Road, Maple Avenue, and Dawn Drive would remain, no significant increase in noise levels is expected at the residences on Maple Avenue and Dawn Drive from traffic on Sunrise Highway.

Emergency generators would be operated only in the event of a power failure. The generators would be located in the control room or within some other sound enclosure and vented outdoors, and noise is expected to create short-term, minor, adverse impacts during emergency situations and during testing of equipment.

The flow in any installed sewer lines would be inaudible. Pump stations would be buried or situated within sound-dampening enclosures and would not exceed noise thresholds. Grinder pumps would not increase noise levels because these small units would be buried or in household basements. The Proposed Action would not substantially increase traffic, other than a negligible increase in trips for AWTF operation and system maintenance, and thus, would not significantly increase traffic noise. With incorporation of design specifications described under mitigation, below, impacts would be negligible. These determinations apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

In summary, operation of the Proposed Action would result in long-term, intermittent, negligible noise impacts.

5.15.3.3 Indirect Impacts from Growth Inducement

A noise impact analysis for the indirect impacts of the Proposed Action is not necessary because the provision of sewer infrastructure would have long-term, minor effects on traffic patterns, and the increased densities described in Appendix B.13 would not be substantial enough to result in a perceptible increase in mobile source noise. Indirect, long-term noise impacts would be negligible.

5.15.3.4 Mitigation

Mitigation measures to reduce noise impacts, in addition to applicable local regulations, have been identified for construction activities.

Construction Noise Mitigation

The following measures would be implemented for construction of the collection and conveyance systems, pump stations, and AWTF.

- All construction equipment would be required to be equipped with well-maintained mufflers and other sound control devices equal to or better performing than those originally supplied by the manufacturer.
- Noisy portable equipment, such as generators and compressors, would be located as far away from residential receptors as practical and muffled within enclosures.
- Equipment would not be allowed to idle for long periods; equipment not being used would be shut off.
- Construction haul routes would be designated to minimize impacts on residential receptors.
- Noise level limits would be specified in construction contract documents for certain construction equipment such as internal combustion engine-powered generators, compressors, excavators, loaders, and graders.
- Any construction activities required outside exempt daytime hours would only be conducted under an exemption permit or variance. If an exemption permit or variance is granted for nighttime construction activities, the noise level limits for residential land use during nighttime hours will be applied.

Operational Noise Mitigation

At this early phase of project development, equipment has not been selected nor sized to a level of detail adequate to support a calculated or vendor-supplied noise level. Further, the equipment would be generally housed within structures, and noise reductions for those structures would be controlled by application of architectural and mechanical features to the degree required to meet the design criteria. The following general mitigation measures would be implemented for AWTF and pump station operation.

The AWTF would be designed to operate at noise levels below the applicable regulated nighttime noise levels (50 dBA per Town of Brookhaven Noise Code), and therefore, below the thresholds promulgated by EPA's Noise Reduction Act of 1972, at the nearest noise-sensitive receptor.

- All equipment would be housed in buildings or below ground.
- Ventilation air intakes and exhausts of equipment rooms would be placed in a direction facing away from sensitive receivers whenever possible. Noise reduction rated acoustic louvers and duct silencers would be selected to reduce transmission of indoor noise to the outdoors.
- Influent and effluent pump station ventilation systems design would include attenuation of fan noise and pump and motor noise to meet the specified noise level limits.

5.16 Transportation

5.16.1 Methodology

5.16.1.1 Regulations

The traffic service and operating conditions are qualitatively expressed in terms of six level of service (LOS) categories "A" through "F," where LOS A represents the best traffic flow condition with little or no delay, and LOS F describes the worst operating condition with extensive congestion and delays. In between, LOS C represents a stable flow of good traffic operation, and is normally used as the desirable design objective. LOS D is generally considered to be a minimum acceptable traffic operating condition in urban areas for short periods. LOS E represents the theoretical capacity of the particular intersection approach and is defined as the maximum flow volume that can reasonably be expected to pass a point or a uniform section of a lane or roadway under the prevailing roadway, travel demand, and traffic control conditions. **Table 5.16-1** shows the LOS criteria for signalized intersections, and **Table 5.16-2** shows the LOS criteria for unsignalized intersections.

Table 5.16-1. Level of Service Criteria—Signalized Intersections

LOS	Control Delay (seconds/vehicle)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	> 80.0

Source: Highway Capacity Manual (2000)

Table 5.16-2. Level of Service Criteria—Unsignalized Intersections

LOS	Control Delay (seconds/vehicle)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

Source: Highway Capacity Manual (2000)

Specifically for traffic, there are no predetermined federal or state regulatory requirements or thresholds to determine transportation impacts of the Proposed Action. However, an increase in

the average delay of 10 or more seconds for any intersection under the Proposed Action when LOS worsens to between a mid-LOS D and LOS F is generally considered a perceptible change for the traveling public that could require action.

5.16.1.2 Study Area

The study area for traffic was based on intersection locations that could be affected by construction activity and detour routing. Five key intersections were selected for detailed analysis within the boundaries of the study area as illustrated in **Figure 5.16-1**:

- Mastic Road and Mastic Beach Road
- Mastic Road and Southaven Avenue/Poospatuck Lane
- Montauk Highway (CR 80) and Herkimer Street/Washington Avenue
- Montauk Highway (CR 80) and Hawthorne Street/Titmus Drive
- Sunrise Highway Service Road North and Maple Avenue

A sixth intersection that does not yet exist, Sunrise Highway Service Road North and the AWTF driveway, was also analyzed under the Proposed Action, as applicable.

5.16.1.3 Approach

Construction-related traffic in the study area was analyzed, including trips made by construction workers, construction vehicles, and delivery vehicles arriving to and departing from the proposed AWTF site. In addition, the construction impact analysis evaluated a conceptual-level plan for control, maintenance, and protection of traffic associated with installation of the collection and conveyance system.

The construction traffic analysis was conducted at five intersections during the weekday AM and PM peak periods for existing conditions (defined as year 2016), in the future without the Proposed Action (the No Action Condition), and with construction of the Proposed Action. A sixth intersection—the AWTF driveway and the Sunrise Highway Service Road North—was added to the analysis for the construction of the Proposed Action. Traffic analysis results include LOS, volume/capacity ratios, and stopped delay values for intersection analyses that were computed in accordance with the standard procedure prescribed in the Highway Capacity Manual. Mitigation measures were applied where adverse impacts were identified.

Construction of the Proposed Action would occur between 2019 and 2022. To provide a conservative estimate, the peak construction year of 2019 was used in the analysis because it includes the installation of the collection and conveyance system and the peak construction trips associated with the AWTF and leaching structures. According to the Town of Brookhaven Traffic Safety Department, no approved projects would affect the roadway network traffic volumes beyond background growth through the construction analysis year. As a result, the 2016 Existing Condition traffic volumes were increased using a 1 percent per year background growth rate as directed by the Town of Brookhaven Traffic Safety Department.

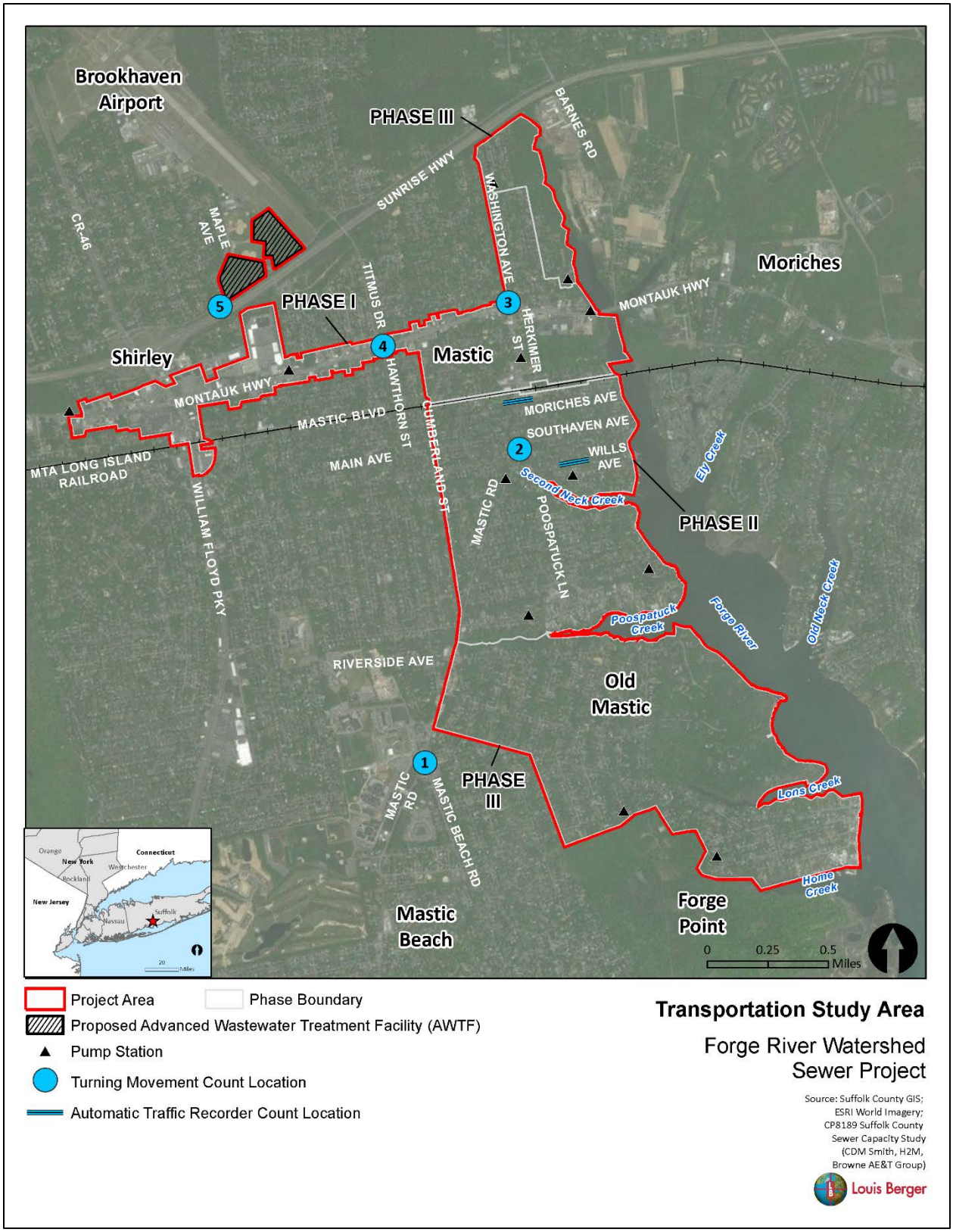

Figure 5.16-1. Transportation Study Area

5.16.2 Existing Conditions

Detailed intersection capacity analyses were performed at the five critical intersections within the study area using Highway Capacity Software (HCS) to assess existing and proposed traffic conditions. Traffic volumes and intersection geometry were used in the analysis. The results of the intersection analyses for the 2016 Existing Conditions weekday AM and PM in terms of LOS are summarized in **Tables 5.16-3** through **5.16-9**. The detailed analysis results tables in terms of volume/capacity ratios, delays, queues, and LOS, as well as HCS outputs, are provided in Appendix B.12.

Table 5.16-3. Construction Trip Generation Summary

Peak Hour In/Out	Trips
Construction Worker AM	
In	64
Out	0
Total	64
Background AM	
In	44
Out	37
Total	81
Construction Worker PM	
In	28
Out	77
Total	105
Background PM	
In	9
Out	26
Total	35

Table 5.16-4. Signalized LOS Summary—Weekday Background AM Peak Hour (8:00 a.m.–9:00 a.m.)

Intersection	Existing Delay (sec/veh)	Existing LOS	No Action Delay (sec/veh)	No Action LOS	Proposed Action Delay (sec/veh)	Proposed Action LOS
Mastic Road at Mastic Beach Road	38.3	D	40.2	D	57.2	E
Mastic Road at Southaven Avenue	14.6	B	14.2	B	11.0	B
Montauk Highway at Herkimer Street	23.3	C	24.7	C	26.2	C
Montauk Highway at Hawthorne Street	12.2	B	12.4	B	13.1	B

Notes: sec/veh – seconds per vehicle

Table 5.16-5. Signalized LOS Summary—Weekday Background PM Peak Hour (5:00 p.m.–6:00 p.m.)

Intersection	Existing Delay (sec/veh)	Existing LOS	No Action Delay (sec/veh)	No Action LOS	Proposed Action Delay (sec/veh)	Proposed Action LOS
Mastic Road at Mastic Beach Road	31.5	C	30.0	C	48.9	D
Mastic Road at Southaven Avenue	16.1	B	16.1	B	12.2	B
Montauk Highway at Herkimer Street	35.0	C	34.2	C	42.8	D
Montauk Highway at Hawthorne Street	35.6	D	38.8	D	43.4	D

Notes: sec/veh – seconds per vehicle

Table 5.16-6. Unsignalized LOS Summary—Weekday Background AM Peak Hour (8:00 a.m.–9:00 a.m.)

Intersection	Existing Delay (sec/veh)	Existing LOS	No Action Delay (sec/veh)	No Action LOS	Proposed Action Delay (sec/veh)	Proposed Action LOS
Sunrise Highway Service Road North at Maple Avenue						
Eastbound Left/Thru	8.0	A	8.1	A	8.2	A
Southbound Left/Right	12.2	B	12.4	B	12.9	B
Sunrise Highway Service Road North at Proposed Site Driveway						
Eastbound Left/Thru	--	--	--	--	9.0	A
Southbound Left/Right	--	--	--	--	14.0	B

Notes: sec/veh – seconds per vehicle

Table 5.16-7. Unsignalized LOS Summary—Weekday Background PM Peak Hour (5:00 p.m.–6:00 p.m.)

Intersection	Existing Delay (sec/veh)	Existing LOS	No Action Delay (sec/veh)	No Action	No Action Delay (sec/veh)	No Action LOS
Sunrise Highway Service Road North at Maple Avenue						
Eastbound Left/Thru	8.0	A	8.0	A	8.2	A
Southbound Left/Right	12.3	B	12.4	B	13.4	B
Sunrise Highway Service Road North at Proposed Site Driveway						
Eastbound Left/Thru	--	--	--	--	8.5	A
Southbound Left/Right	--	--	--	--	12.3	B

Notes: sec/veh – seconds per vehicle

Table 5.16-8. Unsignalized LOS Summary—Weekday Construction Worker AM Peak Hour (6:00 a.m.–7:00 a.m.)

Intersection	Existing Delay (sec/veh)	Existing	No Action Delay (sec/veh)	No Action LOS	Proposed Action Delay (sec/veh)	Proposed Action LOS
Sunrise Highway Service Road North at Maple Avenue						
Eastbound Left/Thru	8.0	A	8.0	A	8.0	A
Southbound Left/Right	11.7	B	11.8	B	12.1	B
Sunrise Highway Service Road North at Proposed Site Driveway						
Eastbound Left/Thru	--	--	--	--	8.1	A
Southbound Left/Right	--	--	--	--	--	--

Notes: sec/veh – seconds per vehicle

Table 5.16-9. Unsignalized LOS Summary—Weekday Construction Worker PM Peak Hour (3:00 p.m.–4:00 p.m.)

Intersection(s)	Existing		No Action		Proposed Action	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Sunrise Highway Service Road North at Maple Avenue						
Eastbound Left/Thru	8.0	A	8.0	A	8.2	A
Southbound Left/Right	12.4	B	12.6	B	13.4	B
Sunrise Highway Service Road North at Proposed Site Driveway						
Eastbound Left/Thru	--	--	--	--	8.8	A
Southbound Left/Right	--	--	--	--	15.1	C

Note: sec/veh – seconds per vehicle

The 2016 Existing Conditions analysis results show that all movements at the five studied intersections operate at LOS D or better during both peak hours. The following movements operate at LOS E or F during the studied peak hours:

- The westbound approach at the intersection of Mastic Beach Road (EB/WB) at Mastic Road (NB/SB) operates at LOS E during the weekday AM peak hour.

- The northbound shared through/right approach at the intersection of Mastic Beach Road (EB/WB) at Mastic Road (NB/SB) operates at LOS E during the weekday PM peak hour.
- The eastbound and westbound approaches at the intersection of Southaven Avenue (EB/WB) at Mastic Road (NB/SB)/Poospatuck Lane (NWB) operates at LOS E during both studied peak hours.
- The northwestbound approach at the intersection of Southaven Avenue (EB/WB) at Mastic Road (NB/SB)/Poospatuck Lane (NWB) operates at LOS E during both studied peak hours.
- The southbound left-turn movement at the intersection of Southaven Avenue (EB/WB) at Mastic Road (NB/SB)/Poospatuck Lane (NWB) operates at capacity during the weekday PM peak hour and at LOS E during the weekday AM peak hour.
- The southbound approach at the intersection of Montauk Highway (EB/WB) at Hawthorne Street (NB)/Titmus Drive (SB) operates at capacity during both the weekday PM peak hour.

It should be noted that the existing operation issues for these movements stem from the signal cycle lengths that range between 90 and 150 seconds, which causes the minor approaches and protected movements to have long red times.

5.16.3 Potential Impacts and Proposed Mitigation

5.16.3.1 Construction

No Action Condition

Analysis of the Proposed Action requires establishment of a future transportation "No Action Condition" without implementation of the Proposed Action.

Four peak periods were analyzed. The weekday background AM and PM peak hours represent the periods when traffic volumes were identified to be the highest. These periods were analyzed at all five intersections for both the construction of the proposed AWTF and collection and conveyance systems. The weekday construction worker AM and PM peak hours were analyzed for only the two intersections adjacent to the AWTF because they represent the hours when the majority of employees would arrive or depart the construction site. The peak hours analyzed include:

- Weekday construction worker AM peak hour 6:00 a.m.–7:00 a.m.
- Weekday background AM peak hour 8:00 a.m.–9:00 a.m.
- Weekday construction worker PM peak hour 3:00 p.m.–4:00 p.m.
- Weekday background PM peak hour 5:00 p.m.–6:00 p.m.

Proposed Action

The determinations below apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

Construction

Collection and Conveyance Systems

Under the Proposed Action, all movements at the four intersections studied for the collection and conveyance system construction are projected to operate at levels consistent with the No Action Condition during both peak hours, with the exception of the following approaches:

- The northbound approach at the intersection of Mastic Beach Road (EB/WB) at Mastic Road (NB/SB) is projected to operate at LOS E during the weekday background AM peak hour and at capacity during the weekday background PM peak hour. Both of these increases in delay would be more than 10 seconds and would be noticeable to drivers.
- The southbound at the intersection of Mastic Beach Road (EB/WB) at Mastic Road (NB/SB) is projected to operate at LOS E during the weekday background PM peak hour. This increase in delay would be more than 10 seconds and would be noticeable to drivers.
- The eastbound approach at the intersection of Montauk Highway (EB/WB) and Washington Avenue (NB)/Hemiker Street (SB) is projected to operate at LOS D during the weekday background PM peak hour. This increase in delay would be more than 7 seconds and could be noticeable to drivers.

AWTF Site

Based on the proposed AWTF construction activity, the projected trip generation was calculated by the arrival and departure of construction workers, construction vehicles, and delivery vehicles during the construction of the AWTF. A vehicle occupancy rate of 1.09 was developed for construction workers traveling to the site based on the Census 2000 Reverse Journey-to-Work data for Census Tract 1594.08. The results are shown in **Table 5.16-3**.

For the construction of the AWTF, two intersections adjacent to the AWTF site were analyzed: Sunrise Highway Service Road North at Maple Avenue, and Sunrise Highway Service Road North at the proposed AWTF driveway (this intersection does not currently exist). All movements at the two intersections adjacent to the AWTF construction site are projected to operate at LOC C or better during the four periods analyzed. Therefore, there would be no short-term effect on these intersections from the construction activities at these two intersections.

Conclusion

Overall, construction of the Proposed Action would result in short-term, minor, adverse impacts on transportation. It should be noted that the analysis of the construction-related traffic impacts on these intersections was extremely conservative. The construction of the stormwater sewers would be a short-term endeavor and would only last for up to two weeks at four of the six studied intersections, and no short-term effects would occur at the other two intersections adjacent to the AWTF. Lane closure permits would be obtained from applicable agencies; these permits would address maintenance of adequate emergency access.

Operation

Operational traffic was not modeled for operation of the AWTF or the collection and conveyance system. Worker traffic of a few employees per day to the proposed AWTF site during the peak commuting hours would be minimal (far fewer than the construction traffic analyzed) and does not warrant detailed traffic modeling. The completion of the collection and conveyance system

construction would return the traffic operations at the study area intersections back to their current conditions. Operation of the proposed sewer system would have no long-term effect on traffic and transportation infrastructure.

Indirect Impacts from Growth Inducement

Induced growth related to the provision of sewer infrastructure would be gradual, but it would nonetheless increase the use of existing roadways, specifically the Montauk Highway Corridor. As indicated in the *Draft Generic Environmental Impact Statement for the Montauk Highway Corridor Study & Land Use Plan for Mastic & Shirley*, development of increased intensity pursuant to zoning along the Montauk Highway Corridor, in combination with recommended roadway improvements identified in that document, would minimize the potential for significant adverse impacts on traffic and transportation (Nelson, Pope & Voorhis 2010). Long-term, indirect transportation impacts would be negligible.

Mitigation

Because the detailed plans for the construction have not been developed, the conservative assumption that one turn lane would be closed during construction along Montauk Highway and Mastic Road in each direction was used in the analysis. Once the plans are developed, it could be determined that no reduction in lanes would be necessary, or shoulder lanes could potentially be used as temporary mitigation to maintain the same number of lanes. If the turning lanes need to be closed at an affected intersection, construction would be limited to between 9:00 a.m. and 5:00 p.m. to avoid the background peak hours. If lane closures were required, highway work permits would be obtained from the Town of Brookhaven and/or Suffolk County to ensure continued function of the roadways and intersections, as well as continued emergency vehicle access to nearby locations.

5.17 Community Services and Facilities

5.17.1 Methodology

5.17.1.1 Regulations

While no specific regulations govern community services and facilities, the SEQRA handbook notes that the reviewing agency must understand the current capacity of those services and how the Proposed Action may affect the provision of these services.

5.17.1.2 Study Area

The study area for community services and facilities is the geographical area within a 0.5-mile radius of the project area.

5.17.1.3 Approach

This section evaluates the impacts on community services and facilities that may result from the Proposed Action. Impacts are based on a comparison of existing services and facilities in the study area and the anticipated state of such services and facilities. The Proposed Action could physically displace, alter, or burden (from a change in population) community services and facilities. For the purposes of this assessment, community services and facilities include public or publicly funded schools, libraries, and private childcare centers. Impacts on health care facilities and fire and police protection are discussed later within Section 5.18, Public Health and Safety.

5.17.2 Existing Conditions

This section describes the limited number of existing community services and facilities within the predominantly residential study area.

The study area is located wholly within the William Floyd Union Free School District. Five district schools are located in the study area.

Ten childcare-related facilities are located in the study area and are listed in **Table 5.17-1**. No libraries are located in the study area.

Table 5.17-1. Project Area Community Facilities

Facility	Address	Type
Moriches Elementary School	16 Louis Avenue, Moriches	Public Elementary School
Nathaniel Woodhull Elementary School	6 Francis Landau Place, Shirley	Public Elementary School
John S. Hobart Elementary	230 Van Buren Street, Shirley	Public Elementary School
William Floyd High School	240 Mastic Beach Road, Mastic Beach	Public High School
William Paca Middle School	338 Blanco Drive, Mastic Beach	Public Middle School
Tangier Smith Elementary School	336 Blanco Drive, Mastic Beach	Public Elementary School
Bell Bell's Child Care of Long Island	190 Cumberland Street, Mastic	Daycare Facility
Colonial Youth and Family Services	2 Coraci Boulevard, Shirley (also operating out of John S. Hobart Elementary School)	Youth and Family Services
Harriet's Day Care	52 Dana Avenue, Mastic	Daycare Facility
Imagine & Learn Castle Kids	1401 Montauk Highway, Mastic	Childcare / Daycare / Preschool Facility
The Infantree, Inc.	21 Holy Lane, Shirley	Daycare Facility
Just Kidding Around Daycare, Inc.	204 Mastic Beach Road, Mastic Beach	Daycare Facility
Memory Lane Daycare	142 Monroe Street, Mastic	Childcare / Preschool
Nanny's Daycare Service of L.I. Inc.	17 Smith Street, Mastic	Childcare Search Service
Part of the Family Child Care	75 Montgomery Avenue, Mastic	Childcare
Rubber Ducky Child Care	132 Monroe Drive, Mastic Beach	Daycare Facility
Treehouse Childcare Inc.	4 Dover Avenue, Mastic	Childcare / Daycare Facility

Source: Care.com (2016); Colonial Youth and Family Services (2015); New York State Division of Children and Family Services (n.d.); and additional information from the Yellow Pages and Google Earth.

5.17.3 Potential Impacts and Proposed Mitigation

The determinations below apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

The Proposed Action is not anticipated to affect the level of service provided by schools, libraries, and daycare centers because parcels that would be connected to the new sewer system have already been developed.

5.17.3.1 Construction

Construction of the Proposed Action would result in short-term, minor, adverse impacts on community services and facilities. Facility properties would be disturbed during construction of proposed laterals. Sections 5.3, Air Quality; 5.15, Noise; and 5.16, Transportation, describe other construction-related effects. No substantial demolition activity would be needed to connect to the new collection and conveyance system, although small areas of front and side yards would be disturbed to construct the proposed laterals, and small areas of other paved areas (and possibly small portions of landscaped areas) would likely be removed to connect to the conveyance system. This could result in minor impacts on access to community services and facilities. The Proposed Action would not result in additional direct effects because it would otherwise not physically alter or displace other community services and facilities.

5.17.3.2 Operation

Operation of the Proposed Action would provide new sewage collection and treatment capacity for existing community services and facilities. These new facilities would replace the existing OWTS, which would reduce potential for community facility closure or limited service due to storm-related failures. The Proposed Action would not directly result in an increase in the residential population and would not create additional demand for public school seats or daycare services. Therefore, the Proposed Action would result in long-term beneficial effects on community facilities or services.

5.17.3.3 Indirect Impacts from Growth Inducement

Buildout of the proposed sewer district could facilitate increased development and increased development intensity within the project area. Specifically, development intensity could increase along the Montauk Highway Corridor. Suffolk County does not intend to connect vacant parcels to the sewer district, but any future development on vacant parcels would result in new residents. The increase in residential and employee population would be gradual, but it would nonetheless increase demand for community services and facilities. New developments would be subject to local taxes and development fees to fund such services. As such, indirect, long-term impacts on community facilities would be negligible.

5.18 Public Health and Safety

5.18.1 Methodology

5.18.1.1 Regulations

Public health and safety refers to the publicly funded activities that take place within a community that promote the creation and maintenance of healthy environments in which people can live, learn, work, and play. Regulation surrounding the protection and improvement of the health and safety

of communities includes laws protecting vulnerable populations from risk and harm and risk and harm to the physical environments in which they live. Examples of this type of regulation include, Executive Order 13045, Protection of Children, which requires federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children. Another similar regulation is Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which was discussed in Section 5.14, Environmental Justice.

Other relevant regulations include those that protect the physical environment in which the population lives like Suffolk County Article 6 (see Section 5.4, Water Quality), as well as the standards for public health and the environment put in place and enforced by the U.S. Department of Health and Human Services and EPA. These specific environmental regulations are discussed under other resource topics.

The National Response Framework (January 2008; updated May 2013) is a guide to how the United States conducts all-hazards response and is intended to capture specific authorities and best practices for managing both local events and catastrophic natural disasters (FEMA 2014). The New York State Department of Health maintains public and human health standards, while NYSDEC protects the environment and public health and safety from environmental hazards.

5.18.1.2 Study Area

The study area for public health and safety is contained within the boundaries of the Forge River project area.

5.18.1.3 Approach

This analysis does not consider impacts on air quality and noise from construction or increased vehicular traffic because these topics are discussed at greater length in Section 5.3, Air Quality; Section 5.15, Noise; and Section 5.16, Transportation. Similarly, exceedances of quantitative water quality standards are discussed in Section 5.4, Water Quality. This section qualitatively assesses the impacts of the Proposed Action on the public health and safety within the study area, including whether or not the Proposed Action increases exposure to contaminants or pathogens. Because exposure to contaminants or pathogens is analyzed in Section 5.4, Water Quality, a detailed public health and safety analysis is not required in this section; however, as a conservative measure, a public health screening was performed.

5.18.2 Existing Conditions

5.18.2.1 Service Agencies

The 7th Precinct of the Suffolk County Police Department in Shirley, the Town of Brookhaven Public Safety Department, and various Suffolk County agencies are responsible for the general protection of public health and safety in the study area. The 7th Precinct station is located at 1491 William Floyd Parkway in Shirley, New York, approximately 2.3 miles from the study area.

The Mastic Fire Department and the County Fire Rescue and Emergency Services provide fire protection services in the study area. The Mastic Fire District comprises 9 square miles and includes approximately 17,000 residents. In addition to the 106 volunteer members, the volunteer department consists of 2 chiefs, 1 captain, 1 first lieutenant, 4 second lieutenants, and 14 administrative staff. The department has five fire engines, a mini pumper, a marine incident response team boat, a heavy rescue truck, a high water rescue truck, four staff vehicles, and a heavy

brush vehicle. Suffolk County assigns a Town Chief Fire Marshal to the Town of Brookhaven. The marshal is a New York State-certified Code Enforcement Official who supports the County Office of Emergency Management during emergencies (Suffolk County 2016a). Mastic Beach also has two fire marshals to enforce Village and State codes through education, inspections, investigations, and building plan reviews (Village of Mastic Beach 2015a). Mastic Beach also has an office of Public Safety and employs a Public Safety Supervisor to ensure compliance with Village codes to protect the health and safety of Village residents (Village of Mastic Beach 2015b).

The Brookhaven Public Safety Department is charged with administering the Office of Emergency Management for the Town of Brookhaven and actively participates in all phases, including hurricane preparedness, hazardous material mitigation, and all natural or human-made disasters that may affect the township. The Office of Emergency Management is part of the FEMA Hurricane Preparedness Program and includes personnel trained by the State Emergency Management Office, National Hurricane Center, and the Suffolk County Office of Emergency Preparedness. During times of emergency, the Office of Emergency Management fully integrates with these agencies and with other public and private entities to provide disaster relief, emergency evacuation, and transportation for dislocated residents.

SCDHS is affiliated with nine family health centers, including one located within the study area, the HRHCare Marilyn Shellabarger Health Center at Shirley, a non-profit, New York State-licensed, federally qualified health center. The Suffolk County Division of Emergency Medical Services provides education and support to the Suffolk County Emergency Medical Services agencies and coordinates the components of the Emergency Medical Services system. The Suffolk County Bureau of Public Health Preparedness is responsible for developing plans for the public health response to human-made and natural health emergencies within the study area.

The study area is currently served by the Mastic Ambulance Company and the Shirley Community Ambulance Service. These entities provide emergency medical transport within Mastic and Shirley, respectively. However, no hospitals are located in the study area. Brookhaven Memorial Hospital Medical Center in Patchogue is the closest hospital.

5.18.2.2 Wastewater Treatment

Conventional OWTS may fail during storm events, which creates risks to public health and safety because of potential exposure to untreated sewage. Illness can arise from contact with untreated sewage. Most illnesses are caused by pathogens—biological agents that cause disease or illness in a host. The most common pathogens in sewage are bacteria, parasites, and viruses. Exposure to pathogens causes a wide variety of ailments, including temporary stomach cramps, diarrhea, and infections. Vulnerable populations, including pregnant women, young children, the elderly, and people with suppressed immune systems, are most at risk from exposure to pathogens.

The presence of pathogens and toxic chemicals in untreated or inadequately treated sewage does not necessarily lead to the onset of disease. A variety of factors are considered, including the volume of sewage, the pathogenic load (the concentration of pathogens and/or chemicals), the type and duration of exposure (e.g., inhalation, ingestion, or dermal), and the ability of an exposed person to resist the disease (immunity). Along with pathogens and industrial chemicals, sewage contains pollutants that can directly or indirectly affect public health by altering the environment into which they are released. As stated in Section 5.4, Water Quality, water samples from multiple stations in the Forge River have frequently exceeded total coliform standards (Cameron Engineering 2012); coliform is a common bacterial indicator for wildlife and waterfowl

contamination, discharge from WWTPs, stormwater, or contributions from failing OWTS via groundwater. Elevated coliform concentrations were widespread throughout the watershed.

According to the August 2015 *Forge River Nitrogen Reduction Report*, Forge River is an impaired waterbody included on NYSDEC's 303(d) list for pathogens, nitrogen, and dissolved oxygen/oxygen demand (CDM Smith 2015). This impairment degrades the Forge River ecosystem, which reduces the ecosystem's ability to attenuate storm surges.

5.18.3 Potential Impacts and Proposed Mitigation

5.18.3.1 Construction

As indicated in Sections 5.3, Air Quality, and 5.15, Noise, construction activities would generate dust, and construction equipment would produce emissions and generate noise, resulting in short-term, minor, impacts on air quality and noise near construction activity. To mitigate potential effects during construction, all construction activities would be performed using qualified personnel and in accordance with the standards specified in the Occupational Safety and Health Administration's regulations. Contractors would adhere to federal, state, and local regulations, including those dealing with air quality and noise. Appropriate signage and barriers would be in place prior to construction activities to alert pedestrians and motorists of project activities. Construction of the Proposed Action would result in short-term, minor, adverse impacts on public health and safety. As noted in Section 5.16.3, arrangements would be made to ensure continued function of roadways, intersections, and emergency vehicle access to nearby locations should lane closures be necessary.

5.18.3.2 Operation

The Proposed Action would avoid the damage resulting from failing OWTS during storm events in the study area, which would eliminate the exposure pathway to untreated sewage during storm events, thereby increasing public health. Fewer OWTS failures would require less assistance from public health and safety providers during storm events, which would allow emergency providers to focus on other emergencies, as needed. The Proposed Action would also reduce nitrogen and pathogen concentrations in Forge River, which could improve ecosystem values and enhance the storm-surge attenuation abilities of the ecosystem, improving public safety and reducing demands on service providers. The Proposed Action would have a long-term, beneficial effect on public health and safety.

5.18.3.3 Indirect Impacts from Growth Inducement

As discussed in Section 5.13, Socioeconomics, buildout of the proposed sewer district could facilitate increased development and increased development intensity within the project area. Future development on vacant parcels would result in new residents. These developments would be connected to the sewer district, and as such would not result in public health and safety risks associated with flooding OWTS.

The increase in residential and employee population would be gradual, but it would nonetheless increase demand for police, fire protection, and emergency medical services. New developments would be subject to local taxes and development fees to fund such services. As such, indirect, long-term impacts on public health and safety would be negligible.

5.19 Climate Change

5.19.1 Methodology

5.19.1.1 Regulations

Executive Order 13693, Planning for Federal Sustainability in the Next Decade, sets sustainability targets for the environmental, energy, and economic performance of federal agencies and calls for specific management strategies for agencies to improve sustainability with greenhouse gas reduction as a key priority.

New York State's Community Risk and Resiliency Act, signed in September 2014, provides guidance and requirements for state funding, permits, and regulatory decisions to consider sea level rise, storm surge, and flooding in planning and development. The objective is to enhance the resiliency of the coastal resources of the State and reduce risks to infrastructure, land, the economy, and the public from climate change.

The *Suffolk County Comprehensive Water Resources Management Plan* (Suffolk County 2015a) and the *Long Island South Shore Estuary Reserve Comprehensive Management Plan* (South Shore Estuary Reserve Council 2001) contain potential recommendations to address climate change and associated impacts on the resources of the region.

5.19.1.2 Study Area

The study area for greenhouse gas emissions is the same as the study area for air quality—the project area. Emissions from electricity consumption within the study area are included in the methodology, even though such emissions may be generated at facilities outside the study area.

Several anticipated effects of climate change include sea level rise, rising groundwater elevations, or increased precipitation. The study area for the assessment of these climate change impacts includes the proposed sewer district within the Forge River watershed but also considers regional coastal resources surrounding Moriches Bay and the larger South Shore Estuary Reserve system.

5.19.1.3 Approach

This analysis considers the potential effects of the alternatives on climate change as indicated by its greenhouse gas emissions, as well as the implications of climate change for the environmental effects of the alternatives.

Greenhouse gases contributing to climate change include carbon dioxide, methane, nitrous oxide, and fluorinated gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. For construction of the Proposed Action and operation of backup generators under the Proposed Action, the relevant greenhouse gases are carbon dioxide and nitrous oxide. For operation of the Proposed Action, the relevant greenhouse gases for discussion are those associated with wastewater treatment processes: methane and nitrous oxide (EPA 2014b). Wastewater treatment does not result in emissions of hydrofluorocarbons, perfluorocarbons, or sulfur hexafluoride (EPA 2014b).

The only stationary air emission sources would be associated with the Proposed Action and would include the proposed AWTF and the backup generators. Greenhouse emissions associated with electricity consumption by the proposed AWTF were quantified consistent with the methodology recommended by NYSDEC in the document *Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements* (NYSDEC 2009). The methodology is based on

the annual electricity consumption of the facility and the average carbon dioxide-equivalent (CO_2e) emissions factor for the applicable utility provider. Energy use estimates for the proposed AWTF are based on estimated flows.

Wastewater treatment processes can produce greenhouse gas emissions in the form of methane and nitrous oxide. For the Proposed Action, methane from the AWTF were estimated based on the national average per capita emissions intensity of centrally treated aerobic systems from EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2013 (EPA 2015b). This methodology is not specific to the proposed MBR or SBR technology, but it does provide a conservative order of magnitude emissions estimate. A literature review was conducted, and no emissions estimate methodologies specific to MBR were located.

Because of the high uncertainty of the measurements for nitrous oxide from septic systems, estimates of nitrous oxide emissions were not included in the greenhouse gas emissions analysis (EPA, 2014b). For the existing conditions, the EPA average per capita emissions intensity of OWTS emissions were used to calculate emissions.

A review of relevant climate projections was provided from scientific sources, including the Intergovernmental Panel on Climate Change and National Research Council. Future climate change would affect the natural environment within the Forge River watershed and the surrounding South Shore ecosystem. In addition, implementation of the Proposed Action would have some impact on the natural environment. This analysis and methodology considered how the changing climate could alter the impacts that the Proposed Action has on natural and environmental resources. The methodology for climate change was based on an evaluation of impacts on the study area from climate-related elements, including sea level rise, higher groundwater elevations, increased frequency and intensity of precipitation events, greater storm surges, and increased coastal flooding. The analysis compared the environmental conditions before and after the implementation of the Proposed Action.

5.19.2 Existing Conditions

5.19.2.1 Greenhouse Gases

OWTS in the study area generate methane emissions. Based on national average per capita emission factors for OWTS and the existing population of the study area (46,957 persons, **Table 5.19-1**), annual methane emissions from OWTS total 3,765 metric tons on a CO_2e basis. (There are six major greenhouse gases, each with a different global warming potential. For example, each molecule of methane has 28 to 36 the Global Warming Potential of each molecule of carbon dioxide. Therefore, greenhouse gases are typically converted into CO_2e to present a single value that encompasses all six gases [EPA 2016c].)

Table 5.19-1. Existing Study Area Methane Emissions

Project Area Population (persons)	OWTS Per Capita Emission Factor (CO_2e/person)[a]	Existing OWTS Total Emissions (Metric Tons CO_2e)
46,957	0.0802	3,765.4

Notes [a]Source: EPA (2014b)

Additional emissions are generated by trucks during occasional OWTS servicing, which should occur once every three to five years.

5.19.2.2 Storms and Sea Level Rise

As noted previously, Suffolk County experiences frequent flood events from unnamed seasonal storms, larger nor'easters, and hurricanes such as Hurricane Sandy in 2012, Hurricane Irene in 2011, and a nor'easter in 2009. As global sea levels rise and catastrophic storms increase in frequency, Suffolk County's 980 miles of coastline become even more vulnerable. Climate projections vary widely, with the most recent report from the Intergovernmental Panel on Climate Change (IPCC 2013) predicting that climate warming will cause a global mean increase of 1.4 to 2.4 feet in sea level by 2100, while the National Research Council (2012) predicts an even larger increase of 1.7 to 4.6 feet by 2100 (**Figure 5.19-1**). Sea level rise projections for the Long Island region predict an increase of 1.25 to 6 feet by 2100 (6 NYCRR Part 490). The *Suffolk County Comprehensive Water Resources Management Plan* uses a sea level rise of approximately 2.8 feet to project an anticipated 1- to 3-foot rise in groundwater near Forge River (Suffolk County 2015a). Within the study area, the areas close to Forge River and its tributaries would experience greater rises in groundwater compared to areas farther away. Increased flooding is expected in areas of rising sea levels and depth to groundwater. In addition to sea level rise, additional evidence indicates that precipitation is increasing, and that the number of extreme precipitation events is increasing in the northeastern United States (Georgakakos et al. 2014; Walsh et al. 2014). Intense storm events can deliver large amounts of water within concentrated periods with the potential to overwhelm both natural and developed drainage mechanisms and result in flooding. An increased potential for rising sea level, more frequent and intense storm events, and storm surges are all associated with climate change and would result in an increase in flooding and flooding-related impacts and hazards from both surface water, groundwater, and tidal inundation.

5.19.3 Potential Impacts and Proposed Mitigation

The determinations below apply regardless of whether a combined collection system or an exclusively low-pressure collection system is pursued.

5.19.3.1 Greenhouse Gases

Construction

Construction greenhouse gas emissions were quantified using the same methodologies discussed in Section 5.3.3, Air Quality, Potential Impacts and Proposed Mitigation, Construction. Climate change emissions include both on- and off-road equipment and vehicles (construction vehicles, as well as haul truck trips and construction employee commutes). To provide a conservative analysis, a one-way travel distance of 50 miles per trip was assumed for trucks and employee commutes. Using these assumptions, peak year (first year) construction emissions would total 5,271 metric tons CO_2e. Assuming emissions in the other three years of construction would be 50 percent of those in the peak year, total construction emissions are estimated to be 13,177 metric tons CO_2e. Mitigation measures to minimize criteria pollutant emissions, including idling restrictions and use of newer equipment, discussed in Section 5.3, Air Quality, would also reduce temporary greenhouse gas emissions from equipment and haul trucks during construction. Construction-related greenhouse gas impacts would be short term, minor, and adverse.

Figure 5.19-1. Sea Level Rise

Operation

Table 5.19-2 summarizes the operational greenhouse gas emissions expected under the Proposed Action. Although providing centralized treatment is expected to reduce greenhouse gas emissions, this reduction would be more than offset by the electricity consumption required by the AWTF and related infrastructure. As a result, the Proposed Action would result in a net greenhouse gas emissions increase of 7,123.5 metric tons CO_2e per year. Each element of the greenhouse gas emission estimate is discussed in detail below.

Table 5.19-2. Summary of Operational Greenhouse Gas Emissions Net Change Compared to No Action

Action Component	Net Change in CO_2e (Metric Tons CO_2e/year)
Wastewater treatment (methane), shift from OWTS to centralized treatment	-3,248.6
Fuel consumption (backup generators)	+1,572.0
Electricity consumption (AWTF, pump stations, grinders)	+8,800.1
Net emissions	**+7,123.5**

Wastewater Treatment

Although treatment technology-specific emission estimates are not available, EPA data generally show centralized treatment systems emit substantially less methane on a per capita basis compared to OWTS. As shown in **Table 5.19-3**, methane emissions would be reduced to approximately 517 tons/year CO_2e. The estimate does not account for non-residential land uses served by the AWTF but provides a general demonstration of the overall beneficial effect of providing centralized treatment.

Table 5.19-3. Change in Methane Emissions from Shift to Centralized Treatment

Project Area Population (persons)	OWTS Per Capita Emission Factor (CO_2e/person)[a]	Existing OWTS Total Emissions (Metric Tons CO_2e)	Centralized Treatment Per Capita Emission Factor (CO_2e/person)[a]	Centralized Treatment Total Emissions (Metric Tons CO_2e)	Change in Total Emissions (Metric Tons CO_2e)
46,957	0.0802	3,765.4	0.0110	516.8	-3,248.6

Note: [a]Source: EPA (2014b)

Fuel Consumption

Diesel fuel would be used by emergency generators at the AWTF and pump stations (if a combined collection system is pursued) for periodic testing and during power outages. For emission estimating purposes, 500 hours of annual operation was conservatively assumed. While actual operation would likely be less, the estimate accounts for monthly testing of the generators and includes hours for power outages. The methods used to quantify the generator emissions are discussed in Section 5.3, Air Quality, and the technical backup is provided in Appendix B.9. The

use of generators at the AWTF and pump stations could generate up to 1,572 metric tons CO_2e per year.

Electricity Consumption

As documented in Section 5.20, Public Services and Utilities, the Proposed Action would use 15.68 gigawatt hours (GWh) per year (15,680-megawatt hours), taking into account the AWTF, pump stations, and grinder stations.

EPA's eGRID database of electric utility greenhouse gas-intensity shows that the Long Island subregion generates approximately 1,237.3 pounds CO_2e per megawatt hour (EPA 2017). Assuming a mixed gravity and low-pressure sewer system, expected electricity consumption for the AWTF, pump stations, and grinder stations would result in 8,800.1 metric tons CO_2e per year. Electricity consumption, and associated greenhouse gas emissions, would be lower with an exclusively low-pressure sewer system.

Operational Emissions Summary

The Proposed Action, with a combined collection system, would result in a net greenhouse gas emissions increase of 7,123.5 metric tons CO_2e per year. If an exclusively low-pressure system is pursued, the Proposed Action would consume less fuel and emit proportionally less greenhouse gas. The increase in emissions would have a long-term, minor, adverse impact on global greenhouse gas emissions.

5.19.3.2 Storms and Sea Level Rise

Climate change would not affect the proposed AWTF because the AWTF would be constructed outside the floodplain and beyond the extent of projected sea level rise. Climate change could increase the frequency or severity of storms. However, stormwater management facilities at the AWTF would mitigate potential effects from increased precipitation.

Sewer lines would be constructed of pressure-rated materials, tested to ensure tightness, and would consider surrounding soil and groundwater conditions. Grinder pumps that are buried rather than housed in the basement of buildings would be made watertight. If any pump stations are placed within the floodplain, the structures would be flood proofed. Flood proofing certification would require that these non-residential structures are designed and constructed to be watertight, non-corrodible, and structurally sound. Structures that are not flood proofed would be elevated above the base flood elevation in consideration of future impacts from climate change. Therefore, the Proposed Action would maintain full performance under future conditions projected to result from climate change.

Removal of the existing OWTS and construction of sewers in the study area would result in long-term benefits by eliminating the discharge of nutrients and pathogens and the potential for flood damages associated with conventional OWTS, especially as rising sea levels lead to rising groundwater elevations. Reducing contaminants in regional waters would help slow the degradation of tidal wetlands, which if healthy, can slow water velocity and attenuate wave action, stabilize the shoreline through sediment deposition, and provide a buffer against climate change for human life and property as well as regional wetlands and floodplains. Therefore, the Proposed Action would have an indirect, beneficial effect by increasing coastal resiliency and mitigating the potential effects of climate change, especially from increased tidal flooding and storm surge.

5.19.3.3 Indirect Impacts from Growth Inducement

The Proposed Action would have negligible, long-term effects on the trip generation or traffic patterns; therefore, an analysis of mobile source greenhouse gas emissions is not necessary. Induced growth would be concentrated along Montauk Highway, away from sea level rise impacts. The Proposed Action would have long-term, negligible effects related to climate change.

5.20 Public Services and Utilities

The public services and utilities addressed in this section are limited to (1) wastewater treatment sludge generation, and (2) energy utilities, including natural gas and electricity. Impacts on wastewater and water supply are discussed in Section 5.4, Water Quality.

5.20.1 Methodology

5.20.1.1 Regulations

Regulatory requirements and policies that affect the design, use, and the forecasted use of utilities in Suffolk County include the NYSDEC policy document, *Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements*; the State's Smart Growth Public Infrastructure Act; the *2013 Cleaner Greener Long Island Regional Sustainability Plan*; the Suffolk County Sanitary Code; SCDHS's design criteria; and zoning.

5.20.1.2 Study Area

The study area for evaluating impacts on utilities is the service area for each affected utility provider.

5.20.1.3 Approach

Potential impacts on these services could result from increases or decreases in demand for a particular utility, construction of new utilities, changes to the quality or quantity of the available supply, and/or disruption of service to other utility users.

The methodology for evaluating impacts on energy involves identifying the elements of each alternative that would require energy to operate, including pump stations, grinder pumps, and the proposed AWTF; estimating the energy required to operate these project elements; and identifying and evaluating impacts resulting from construction and operation of the new infrastructure.

5.20.2 Existing Conditions

The majority of existing OWTS operate via gravity and use biological treatment processes that do not require energy to function. A few systems, particularly large commercial systems, may use pumps that require small amounts energy.

5.20.2.1 Sludge Generation and Disposal

Under existing conditions, no centralized wastewater treatment service exists in the project area. Existing on-site systems must be periodically pumped to remove accumulated sludge. This service is performed by private contractors, and they transport the sludge to a regulated disposal facility, such as a regional WWTP. Information quantifying the sludge currently generated in the project area is not available.

5.20.2.2 Electricity: Public Service Enterprise Group Incorporated Long Island

Public Service Enterprise Group Incorporated (PSEG) Long Island is the public utility company operating the Long Island Power Authority's transmission and distribution system. PSEG took over management of Long Island Power Authority's electric system in 2013, operating the transmission and distribution system under a 12-year contract. In 2015, PSEG Long Island provided service to more than 1.1 million customers residing in in Nassau and Suffolk counties and the Rockaway Peninsula in Queens (PSEG Long Island 2016). The project area is located in the Eastern Suffolk Division, one of four divisions served by PSEG, a large geographic area characterized by isolated forks with limited major thoroughfares for ingress and egress.

According to the New York Independent System Operator, Long Island (Nassau and Suffolk Counties) consumed 21,906 GWh in 2015, which was a 1.6 percent increase from 2014 (New York Independent System Operator 2016).

5.20.2.3 Natural Gas: National Grid

National Grid, a private company that originated in the United Kingdom and entered U.S. markets after 2000, widely provides natural gas service to the project area and across the Northeast United States. National Grid now serves more than 3.6 million natural gas customers in the U.S. throughout Massachusetts, Rhode Island, and New York, from a liquefied natural gas storage facility in Holtsville, New York (National Grid 2016a). The company forecasts, plans for and procures around 16 billion standard cubic meters of gas each year for its entire service area (National Grid 2016b).

5.20.2.4 Petroleum

New York State consumes petroleum products provided by refineries in New Jersey and Pennsylvania (USEIA 2016a). New York State consumed approximately 130 million barrels of gasoline and 61 million gallons of diesel fuel and fuel oil (distillate fuel oil) in 2015 (USEIA 2015, 2016b).

5.20.3 Potential Impacts and Proposed Mitigation

5.20.3.1 Construction

Construction of the proposed collection and conveyance system, AWTF, and leaching structures would require expenditure of gasoline, diesel, and electricity. Construction energy consumption would be distributed over a four-year construction period, with peak energy usage anticipated to occur during the first year (2018), when the majority of hauling for soils removal and sand delivery would occur. Diesel fuel oil and gasoline would be used in construction vehicles and equipment. This petroleum consumption would represent a negligible fraction of the overall energy consumption in New York State. The short-term energy impact would be negligible.

5.20.3.2 Operation

Sludge Generation and Disposal

The AWTF would generate sludge as a byproduct of the treatment process. The sludge would require disposal. Sludge thickening would be provided at the AWTF to increase the solids concentration to 3 percent prior to liquid sludge trucking to, and disposal at, the Bergen Point WWTF in accordance with regulatory requirements (CDM Smith 2014).

The amount of sludge generation is expected to be similar to the existing conditions, given that the same number of users would contribute wastewater. No effects are expected to result from the generation of sludge during AWTF operations.

Energy

Operation of the AWTF, pump systems, and grinder pumps would require electrical energy. For the AWTF, energy consumption, measured in kWh, would range from 22 to 30 kWh per 1,000 gallons. With an estimated 1 mgd for Phase I/II and 1.4 mgd for the total project, energy consumption would average about 26,000 kWh/day for Phase I/II and 36,400 kWh/day after Phase III is completed. Annual consumption would be 13.29 GWh.

If the combined collection system is pursued, the 12 proposed pump stations are estimated to consume 6,400 kWh per day. If the exclusively low-pressure system is pursued, no pump stations would be included.

One grinder pump typically has an annual energy consumption rate of 200 kWh, which would result in approximately 164 kWh per day for the entire 300 parcels that would require grinders (combined gravity and low-pressure system), or 0.06 GWh annually. Grinder pump operation requires a control panel at each property to pump wastewater to the main line. Operation of the panel would result in in a negligible, adverse impact from the incremental amount of electricity expended at each property (similar to that of a 40-watt incandescent light bulb) (Citizens Energy Group 2013).

Assuming a combined collection system is pursued, for the entire system, including pump stations and necessary grinder pumps, annual energy consumption would be 15.68 GWh. This total represents approximately 0.07 percent of the approximately 21,900 GWh that Long Island consumes annually. If an entirely low-pressure system were implemented, the total energy consumption would be 13.96 GWh. PSEG indicated that there would be no issues supplying this electric load, although the AWTF may require a line extension to bring power to the plant (PSEG Long Island 2017). Therefore, long-term energy impacts would be negligible.

In the event of power loss, grinder pumps could hold approximately three days of effluent, and backup generators would provide energy in the event of power disruption at the AWTF and 12 pump stations. Natural gas-powered generators would be installed to the maximum extent possible where gas utility service is available. In those parts of the project area where natural gas is unavailable, diesel-powered generators may be required. The AWTF generator would be powered by on-site storage of 3,000 gallons of diesel fuel, and the backup generators for each pump station would hold from 250–1,000 gallons of diesel fuel. Portable generators would be made available to power grinder pumps, if necessary.

5.20.3.3 Indirect Impacts from Growth Inducement

New commercial and residential uses associated with future development of vacant parcels would incrementally increase sludge generation, as well as electrical and petroleum consumption compared to existing conditions. The pedestrian-oriented nature of the development along Montauk Highway could encourage alternative modes of travel, thereby offsetting some of this increased energy demand. Regardless, long-term impacts on sludge generation and energy would be negligible because of the limited potential increase in development compared to the size of the service areas for these utility systems.

5.21 Cumulative Impacts

5.21.1 Methodology

5.21.1.1 Regulations

At the federal level, the statutory basis for considering cumulative impacts of federal actions is NEPA (42 USC 4321 et seq.). According to CEQ regulations, cumulative impacts represent the "impact on the environment which results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what federal agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

In addition to NEPA, other statutes require federal agencies to consider cumulative impacts. These include the Clean Air Act, regulations implementing Section 106 of the NHPA, and regulations implementing Section 7 of the Endangered Species Act.

At the state level, the statutory basis for considering cumulative impacts of state actions is SEQR (6 NYCRR Part 617.7(c)), *Criteria for determining significance*. As stated there, two or more actions, none of which has or would have a significant impact on the environment, may result in an impact when considered cumulatively.

5.21.1.2 Study Area and Temporal Scale

The study area for cumulative impacts comprises the boundaries of the Forge River project area and actions beyond but in relative proximity to the project area that may result in cumulative impacts. Past, present, and reasonably foreseeable future projects are contained within the hamlets of Mastic and Shirley, the Town of Brookhaven, and Village of Mastic Beach. Where applicable, other projects or plans along the South Shore of Long Island are also considered. The temporal scale for the cumulative impacts analysis includes past actions since Hurricane Sandy through reasonably foreseeable future actions.

5.21.1.3 Approach

Cumulative impacts were determined by combining the impacts of the Proposed Action with other past, present, and reasonably foreseeable future actions that would also result in beneficial effects or adverse effects. Because some of these actions are in the early planning stages, the evaluation of cumulative impacts is based on a general description of the projects. The combined effects of these actions are evaluated to determine if they could result in any cumulative impacts.

Cumulative impacts are most likely to arise when a relationship or synergy exists between the Proposed Action with other actions expected to occur in a similar location or during a similar period. Actions overlapping with or in proximity to the Proposed Action are expected to have more potential for a relationship than those with a greater degree of spatial separation. Likewise, actions closer in time to the Proposed Action are expected to have more potential for a relationship than those with a greater degree of temporal separation.

The first step was to determine cumulative impacts using the same impact scale and evaluation criteria presented in Section 5.1, namely: no effect; negligible impact; minor, adverse impact; moderate, adverse impact; major, adverse impact; and beneficial effect.

The second step was to define the contribution of the Proposed Action to each cumulative impact. In defining the contribution of the Proposed Action to cumulative impacts, the following thresholds and terminology are used:

- **Imperceptible**: The incremental impact contributed by the Proposed Action to the overall cumulative impact is such a small increment that it is impossible or extremely difficult to discern.
- **Noticeable**: The incremental impact contributed by the Proposed Action, while evident and observable, is still relatively small in proportion to the overall cumulative impact.
- **Appreciable**: The incremental impact contributed by the Proposed Action constitutes a large portion of the overall cumulative impact.

5.21.1.4 Projects Considered for Analysis of Cumulative Impacts

Projects considered in this analysis include the Suffolk County Coastal Resiliency Initiative; the Forge River Watershed Phase IV; the Suffolk County Reclaim Our Water Initiative; the Greater Moriches Comprehensive Zoning Re-evaluation Study of the Montauk Highway Corridor for Moriches, Center Moriches, East Moriches and Eastport; the Mastic Beach and Smith Point of Shirley Stormwater Management Plan; the Brookhaven Calabro Municipal Airport Obstruction Tree Removal and Perimeter Road Project; a USACE study; and solar projects in the vicinity of the study area.

Suffolk County Coastal Resiliency Initiative

As discussed in Section 1.1, the Suffolk County Coastal Resiliency Initiative would be accomplished through five projects in areas that are particularly prone to stormwater flooding and storm surge. In addition to the Proposed Action as evaluated in this EIS, these projects include SSD #3, in which new service laterals connecting residential parcels to existing collection and conveyance systems would be installed, as well as the Carlls, Connetquot, and Patchogue River watershed projects, in which new collection systems would be constructed.

As the remaining projects in the Suffolk County Coastal Resiliency Initiative are further developed and advance into the environmental review process, the potential for cumulative impacts will be analyzed in each environmental review document to ensure that separate environmental review processes for each project are no less protective of human health and the environment.

Forge River Watershed Project Phase IV

This project would extend the Proposed Action to sewer an additional approximately 1,900 parcels in the Village of Mastic Beach. The additional area sewered would extend to Narrow Bay to the south and Great South Bay to the west. It would be east of Mastic Road and south of Commack Road, Neighborhood Road, and Baybright Drive West. Forge Point would not be sewered. Approximately 60 percent of the parcels are residential in use, and 35 percent of the parcels are open space, recreation, or vacant (CDM Smith 2014).

The Phase IV collection system would include 32 miles of gravity sewers, plus 33 miles of high-density polyethylene, low-pressure sewers with associated grinder pumps at each property. The conveyance system would include approximately 4.4 miles of force main and 12 additional pump stations within the Phase IV area. A 2.6-mile force main would convey wastewater up to the gravity collection system in Drainage Zone II. Sewering of Phase IV would add approximately

1.8 mgd of flows to the AWTF, for a total flow of 3.2 mgd, which would necessitate expansion of the treatment works and leaching structures onto the 17-acre expansion parcel. An additional approximately 5 acres of leaching fields would be required.

Greater Moriches Comprehensive Zoning Re-evaluation Study of the Montauk Highway Corridor for the Moriches, Center Moriches, East Moriches and Eastport

The Greater Moriches Zoning Re-Evaluation Study was aimed at resolving lingering zoning issues within the Greater Moriches area that were identified in previous plans and studies. In 1995, with cooperation from the Town of Brookhaven, the Greater Moriches communities undertook a planning exercise and formulated an official Hamlet Plan. The *Moriches Four-Hamlet Comprehensive Plan* was summarized in the Town's official 1996 *Comprehensive Land Use Plan* and included as an addendum.

In the past 20 years, many of the recommendations within the *Hamlet Plan* remain relevant but were not implemented for various reasons. These recommendations include changes to zoning and land use, which the subject study aimed to resolve. The study area covers approximately 7 miles of Montauk Highway, from Forge River to the Southampton town line and along Frowein Road and the coastal areas of the Moriches and Eastport communities. The goals and objectives of this study are to achieve an appropriate level of future commercial and industrial development within the study area and balance existing uses, including residential uses and areas of protected open space while recognizing the need for growth.

The Town of Brookhaven implemented the recommendations of the study through a July 12, 2016, rezoning of approximately 1,400 parcels in the 1,200-acre study area. The rezoning changed residential properties from A-1 to A-2 to eliminate or reduce potential future dwellings in the Forge and Terrell River watersheds, eliminated the K-Business district (which permitted duck farming and had adverse impacts on local surface waters), and encouraged downtown and transitional uses in appropriate areas to foster growth of the hamlet (Town of Brookhaven 2016b).

Brookhaven Calabro Municipal Airport Obstruction Tree Removal and Perimeter Road Project, and Associated Clearing/Planting, Security Fencing and Drainage Structure Installation

This tree removal and perimeter road project would remove flight obstructions at the airport and install a perimeter road/security fencing. The project would clear 3 acres of trees, top 7 acres of trees, plant 750 trees, install topsoil, seed 3 acres, and install two stormwater leaching basins. Additionally, a perimeter road and fencing would be installed around the airport. In total, 20.5 acres of trees would be removed, and the underlying land would be graded. Another 13.2 acres of paved road would be installed in the cleared area. Unpaved graded areas would be seeded, and drainage structures would be installed.

Obstruction removal is needed to protect public safety and preserve the existing published instrument arrival and departure procedures. The project is a safety maintenance project to remove or top trees that penetrate either the approach surface and associated transitional surface or the departure surface.

The FAA recommended and encouraged installing the perimeter road and fencing to meet Transportation Security Administration standards. The new fence would (1) prevent wildlife from entering the airport grounds, (2) provide security in terms of limiting unauthorized access, and (3) decrease the potential for runway incursions by providing alternative internal circulation. The

new road would also facilitate fence maintenance and allow vehicles to respond to emergencies without having to cross runways and airport grounds.

All construction traffic associated with the project would use William Floyd Parkway; no vehicle access onto any local roadways would occur.

Middle Island Solar Farm

A developer proposed to build a 67,000-panel photovoltaic solar energy farm project, capable of generating approximately 19.2 megawatts of renewable electricity for distribution onto the PSEG Long Island power grid (VHB 2015). This project would be constructed on 100 acres located north of Sunrise Highway, south of Moriches-Middle Island Road, and east of Cranford Boulevard and the Brookhaven Calabro Airport. The project site comprises forested woodlands. The project would retain 32 acres of natural buffers, and it would convert 61 acres of forest cover to shrub cover comprising native plants and grasses within areas cleared for the solar arrays.

American Capital Energy Solar Project

This project would construct a solar system consisting of two array locations, a northern system (approximately 5.5 acres), which would connect to a utility feeder that runs along the north side of the airport property and a southern system (approximately 5 acres), which would connect to a utility feeder located along Dawn Drive near the main airport entrance. The northern array would include modules that are mounted at the end of Runway #15 and along the north side of the Runway #6 approach. The southern array would occupy space at the end of Runway #33. Neither of the proposed systems would involve the removal of trees or vegetation (American Capital Energy 2017).

U.S. Army Corps of Engineers Feasibility Phase Watershed Study

USACE initiated a watershed study to evaluate various environmental restoration improvements at the Forge River watershed to combat water quality impacts and habitat degradation. However, the watershed study was not completed because of an interruption in federal funds (USACE 2017).

5.21.2 Potential Cumulative Impacts

Because the Proposed Action would have no measurable impacts on the following resources, there is no potential for cumulative impacts; therefore, these resources are not discussed further:

- Topography and Soils
- Aesthetic Resources
- Environmental Justice
- Transportation
- Community Services and Facilities
- Public Services and Utilities: Energy

5.21.2.1 Air Quality

As indicated in Section 5.3, during the peak construction year, the Proposed Action would result in construction emissions well below General Conformity *de minimis* thresholds, resulting in a minor, adverse impact. Most construction emissions would be associated with excavating and

hauling soils for the new AWTF and leaching fields. The past, present, and reasonably foreseeable future projects listed above would not have similar soil hauling or associated emissions. Operation of the Proposed Action would also result in minor, adverse impacts because emissions would be well below General Conformity *de minimis* thresholds. Construction and operation of past, present, and reasonably foreseeable future projects are expected to result in minor, adverse impacts. The Proposed Action would result in a noticeable contribution to the minor, adverse impacts on air quality.

5.21.2.2 Water Quality

The potential for cumulative impacts resulting from the Proposed Action and the projects proposed for SSD #3 and the Carlls, Connetquot, and Patchogue River watersheds was considered for this analysis. The Carlls River, Connetquot River, and Patchogue River project areas are approximately 28, 19, and 12 miles west of the study area, respectively. In addition, each of the project areas is hydraulically disconnected,. Because of their geographic and hydraulic separation, the implementation of these projects would not result in cumulative impacts locally in the respective watersheds. Regionally, however, all four projects would cumulatively improve the groundwater quality of the Upper Glacial Aquifer by lowering the total nitrogen load. The Proposed Action would make a noticeable contribution to this beneficial effect.

Each of these watersheds contributes independently to the water quality in the Great South Bay–Moriches Bay estuarine system. During construction of any of these four projects, minor, adverse cumulative impacts on the water quality of the estuarine system are expected, but potential impacts would be mitigated through appropriate BMPs for soil erosion and sediment control. Ultimately, the four projects would result in noticeable beneficial cumulative effects on the water quality of the estuarine system. Specifically, the lower total nitrogen loads carried in the discharged groundwater would result in lower nitrogen concentrations in the estuarine system, which in turn would decrease the spatial extent of algae blooms, low oxygen conditions, and fish kills. Additional beneficial cumulative effects on the water quality of the estuarine system are expected from the implementation of the Forge River Watershed Project Phase IV. The Proposed Action would make a noticeable contribution to this beneficial effect.

Removing existing OWTS throughout the Phases I through III project area would reduce shallow groundwater recharge, although the impact on the elevation of the groundwater table in this area would be minor. Considering groundwater flow directions, implementation of the Forge River Watershed Project Phase IV could further lower the water table elevation in the southern part of the Phase III area, although this potential cumulative impact is expected to be imperceptible.

The substantially higher recharge rate of treated effluent from the added Phase IV project would result in contributions to the water supply in at least one of the four community wells at the Lambert Avenue and Main Street well fields; these wells are operated by the Suffolk County Water Authority. According to the simulations from the Suffolk County Groundwater Model, the treated effluent would be less than 5 percent of the supply well discharge in two Main Street wells and in Lambert Avenue well S-71882 (see Appendix B.5 for the report). However, for Lambert Avenue well S-71881, the treated effluent would contribute between 45 and 50 percent of the pumped well water. These simulations are based on current average pumping rates at these four wells. The percent contributions from the recharged effluent would increase with higher future pumping rates. Therefore, if Phase IV were implemented, the impact on the water supply from these four wells should be analyzed to develop appropriate mitigation strategies for protecting human health.

A 61-acre area would be cleared for solar array construction, approximately 13.2 acres of paved surface would be added with the airport perimeter road, and approximately 4.8 acres of impervious surface would be added by the Proposed Action. Induced growth from the sewering projects and the Greater Moriches rezoning project could also add new impervious surface areas to this geographic area. Construction of these projects, combined with the construction required for the Proposed Action, would add noticeable quantities of permanent impervious surfaces to the geographic area. The added impervious areas would result in long-term, minor, adverse impacts on stormwater runoff. Effects from the Proposed Action would be minimized by keeping the addition of impervious surface area to the minimum and allowing for infiltration into the ground to the extent possible. The Proposed Action would make an imperceptible contribution to this minor, adverse impact.

5.21.2.3 Wetlands and Coastal Resources

Construction of past, present, and reasonably foreseeable future projects could potentially result in minor, adverse cumulative impacts on wetlands and coastal resources through increased erosion and degradation of stormwater runoff. These effects would be mitigated through implementation of construction BMPs and stormwater management techniques, and the Proposed Action would make an imperceptible contribution. Completion of the sewer and stormwater management projects listed above would result in beneficial cumulative effects on freshwater and tidal wetlands by reducing storm-related sewage discharge and nitrogen concentrations in groundwater and surfaces waters. The Proposed Action would make a noticeable contribution to this beneficial cumulative effect.

5.21.2.4 Floodplains

Floodplains occur within the study areas of most of the past, present, and reasonably foreseeable future projects. If floodplains cannot be avoided, construction activities within floodplains could result in minor, adverse impacts from temporary increased soil compaction, vegetation and soil disturbance, and degradation of floodplain functions. Ground disturbance associated with the construction of past, present, and reasonably foreseeable future projects would alter existing stormwater runoff and drainage patterns and potentially degrade the quality of stormwater runoff through increased erosion and degradation, which would result in minor, adverse cumulative impacts. These impacts on floodplains and stormwater runoff would be mitigated through compliance with permits and implementation of construction BMPs and stormwater management techniques. Additionally, once construction is complete, temporarily disturbed floodplain areas would be filled and revegetated or paved over to return them to pre-construction conditions, depending on the location, to avoid long-term impacts. Operation of the past, present, and reasonably foreseeable future sewer projects; the Suffolk County Coastal Resiliency Initiative; and the Forge River Watershed Project Phase IV would result in indirect, beneficial cumulative effects on floodplains. Removing conventional failing OWTS and reducing pollutant and nitrogen loads would reduce regional floodplain degradation and allow tidal wetlands and floodplains to better attenuate wave energy and mitigate flooding associated with tidal surge. The *Mastic Beach and Smith Point of Shirley Stormwater Management Plan* would also improve stormwater drainage and reduce localized flooding, which would result in beneficial effects. Benefits from past, present, and reasonably foreseeable future sewer and stormwater management projects would also result by decreasing the risk of flood loss and impacts of floods on human life and property. The Proposed Action would make a noticeable contribution to the beneficial cumulative effect.

5.21.2.5 Vegetation

Future development, combined with the construction required for the Proposed Action, would permanently remove vegetation, resulting in long-term, moderate, adverse impacts. To the extent practicable, tree removal would be kept to the minimum necessary in these areas. Because approximately 30 acres of vegetation would be cleared during implementation of the Proposed Action, its contribution to this moderate, adverse impact would be appreciable. Operationally, the cumulative projects would result in beneficial effects on the health of upland and wetland vegetation in the study area by preventing sanitary wastewater overflows and reducing groundwater nitrogen concentrations. The Proposed Action would make a noticeable contribution to this beneficial cumulative effect.

5.21.2.6 Wildlife and Fish

Vegetation removal for cumulative projects, when combined with the tree removal for the Proposed Action, could result in minor, adverse impacts on migratory birds because of a loss of breeding habitat. Removing trees outside the breeding seasons for migratory birds would limit the impacts on migratory bird species. Construction of the Proposed Action and past, present, and reasonably foreseeable future projects would result in short-term increases in turbidity and sedimentation in local surface waters. Erosion and sedimentation BMPs would be implemented to minimize these minor, adverse impacts. Once completed, the Proposed Action and cumulative sewer projects would result in long-term, beneficial effects on fish by reducing pollutant and nitrogen loads in groundwater and surface waters. The Proposed Action would make a noticeable contribution to this beneficial cumulative effect.

5.21.2.7 Threatened and Endangered Species and Critical Habitats

Vegetation removal for cumulative projects, when combined with the tree removal for the Proposed Action, could result in minor, adverse impacts on northern long-eared bats because of a loss of roosting habitat. As discussed in Section 5.9, tree removal for the Proposed Action would be undertaken between November 1 and March 31 when northern long-eared bats are hibernating to minimize impacts and avoid any incidental take. Therefore, the Proposed Action would make an imperceptible contribution to this minor, adverse impact. Once completed, the Proposed Action and cumulative sewer projects would result in long-term, beneficial effects on groundwater and surface waters by reducing pollutant and nitrogen loads, ultimately benefiting aquatic and wetland habitats that threatened and endangered species use. The Proposed Action would make a noticeable contribution to this cumulative effect.

5.21.2.8 Cultural Resources

Construction of past, present, and reasonably foreseeable future projects could result in minor, adverse impacts on archaeological resources or historic vegetated landscapes, depending on the extent of ground disturbance. To the extent these projects would disturb areas known for archaeological or historic sensitivity, mitigation would be implemented to reduce these effects. The Proposed Action would have no cumulative impacts on archaeological resources and negligible impacts on vegetated landscapes. As such, the Proposed Action would imperceptibly contribute to cumulative impacts on historic resources.

Similar to the Proposed Action, operation of the projects considered for cumulative effects would have no effects on cultural resources because operation would involve no in-ground disturbance or change to significant historic architectural features.

5.21.2.9 Aesthetic Resources

Construction of the Proposed Action would occur near the Obstruction Tree Removal and Perimeter Road Project and the installation of solar arrays in the area of Brookhaven Calabro Airport. Together, these projects would remove trees across large properties to the north of Sunrise Highway. However, each project would incorporate a vegetated buffer that would reduce effects on local viewsheds. The Proposed Action would have an imperceptible contribution to this negligible, adverse impact.

5.21.2.10 Land Use and Planning

The Proposed Action would result in indirect, beneficial effects on land use and planning because it would remove a barrier to redevelopment along the Montauk Highway Corridor, consistent with existing zoning. Combined with the Greater Moriches Comprehensive Rezoning of the Montauk Highway Corridor, land use would intensify along Montauk Highway, as approved by the Town of Brookhaven. The Proposed Action would have a noticeable contribution to this beneficial cumulative effect.

5.21.2.11 Socioeconomics

Potential cumulative socioeconomic beneficial effects of the projects listed above include improved public health from reduced or eliminated OWTS flooding and avoided losses for property owners from the tidal flood mitigation benefits. For these reasons, past, present, and reasonably foreseeable future projects, in combination with the Proposed Action, would result in beneficial cumulative socioeconomic effects. However, long-term, minor, adverse impacts on business and households associated with increased user fees for these systems would occur. The Proposed Action would make a noticeable contribution to these cumulative effects.

5.21.2.12 Noise

Construction of the Proposed Action would occur near the Obstruction Tree Removal and Perimeter Road Project and the installation of solar arrays in the area of Brookhaven Calabro Airport. As such, construction traffic and operation of construction equipment could combine to result in short-term, minor, adverse noise impacts on sensitive land uses. The Proposed Action's contribution would be noticeable. There would be no operational cumulative noise effects.

5.21.2.13 Public Health and Safety

The Proposed Action, when combined with the Suffolk County Resiliency Initiative and the Forge River Watershed Project Phase IV, would have a noticeable contribution to beneficial cumulative effects on public health and safety by minimizing the risk of discharging partially treated or untreated sewage into the area and effectively mitigating the moderate, adverse public health and safety risks that would otherwise persist. These projects, as well as the *Mastic Beach and Smith Point of Shirley Stormwater Management Plan*, would also directly and indirectly reduce health and safety risks associated with stormwater flooding and storm surge and result in a beneficial cumulative effect on public health and safety. The Proposed Action would make a noticeable contribution to this effect.

5.21.2.14 Climate Change

Most of the past, present, and reasonably foreseeable future projects would directly or indirectly address climate change. The solar arrays would address a portion of Long Island's energy demand

with a renewable power source, potentially lowering demand for energy generated by burning fossil fuels. The sewer projects and stormwater management plans would increase the region's resiliency to sea level rise and other storm events, resulting in beneficial effects. The sewer projects associated with the Suffolk County Coastal Resiliency Initiative and the Forge River Watershed Project Phase IV would remove existing OWTS and/or construct or enhance existing sewer systems, which would eliminate the discharge of contaminants and the potential for flood damages associated with conventional OWTS especially as rising sea levels and increased precipitation lead to rising groundwater elevations. The reduction of contaminants would decrease degradation of tidal wetlands, which slow water velocity and attenuate wave action, stabilize the shoreline, and provide a buffer against climate change impacts. The *Mastic Beach and Smith Point of Shirley Stormwater Management Plan* would result in beneficial effects from improved stormwater drainage. When combined with other past, present, and reasonably foreseeable future projects, the Proposed Action would contribute to reduced future flood events and decreased nutrient loading, which would result in a noticeable contribution to beneficial cumulative effects of mitigating potential climate change impacts.

5.22 Irreversible and Irretrievable Impacts

Resources, both natural and human-made, would be expended in the construction and operation of the Proposed Action. An estimated 658,000 cubic yards of soil would be removed from the project area. Construction of the Proposed Action would require the irreversible and irretrievable commitment of energy, construction materials, and funds necessary to install the collection and conveyance systems, AWTF, and leaching structures. Trees would be permanently removed at the AWTF, leaching field locations, and pump station locations. Operation of the project also would require the irreversible and irretrievable commitment of an incremental amount of energy that would consumed by the proposed pump stations, AWTF, and grinder pumps to provide sewer service to approximately 3,400 parcels. These resources are considered an irretrievable commitment because they would be irretrievably committed to or consumed by the Proposed Action and would be unavailable for use elsewhere.

6.0 ALTERNATIVES

This section evaluates reasonable and practicable alternatives to the Proposed Action. Typically, under SEQRA, the alternatives considered during an environmental review process should reduce or eliminate impacts of the Proposed Action while substantively meeting the purpose and need of the project. Alternatives identify the possible options to the Proposed Action for the decision makers and the public, in addition to providing the context that is necessary to enable comparisons of potential impacts and effectiveness in meeting project objectives.

The analyses below describe and analyze the No Action Alternative, as required by SEQRA, and the I/A OWTS Alternative. Impacts are summarized in **Table 6.4-1**, at the end of this section. This section also presents alternatives considered but dismissed from detailed analysis.

6.1 No Action Alternative

6.1.1 No Action Alternative Description

Under the No Action Alternative, no new sewer district would be established, and no additional sewer infrastructure or wastewater treatment facilities would be constructed to provide sanitary

sewer service. The unsewered parcels in the project area would continue to use in-place conventional OWTS and would continue to contribute to sewage backups during storm events. No measures to reduce nitrogen and pathogen pollution would be pursued, and no efforts would be undertaken to prevent untreated wastewater from entering waterbodies via shallow groundwater and tidal flooding. The No Action Alternative would not include large-scale replacement of existing OWTS.

6.1.2 No Action Alternative Impacts

6.1.2.1 Topography and Soils

The No Action Alternative would not include large-scale replacement of existing OWTS or construction of the AWTF, and as such would not affect topography or disturb soils.

6.1.2.2 Air Quality

Under the No Action Alternative, no temporary construction emissions would occur. No new stationary sources of emissions would be created, and mobile source emissions related to OWTS maintenance (vehicle use to periodically clean out on-site systems) would continue similar to existing conditions. There would be no effects on air quality.

6.1.2.3 Water Quality

Impacts during Flood Events

The No Action Alternative would maintain the risk of discharge of sanitary wastewater from failing OWTS to the Forge and Carmans Rivers in the event of future flooding. Overflowing wastewater would continue to be transported into these surface waters either through point or non-point source runoff or after first infiltrating into groundwater and discharging later into these surface waters. Continued pollution from future flooding could affect these waterbodies. OWTS flooded during storm events would also continue to pose health risks when bacteria and viruses from OWTS mix with floodwaters.

Groundwater Quality

The average daily flow density for the entire study area is approximately 970 gpd/acre, which is more than three times the 300 gpd/acre wastewater flow rate established for Groundwater Management Zone VI (CDM Smith 2013). As a result, the water quality in the ground would continue to exceed Suffolk County's total nitrogen concentration target of 4 mg/L for Groundwater Management Zone VI. Contamination from flooding and failing OWTS would not affect the deeper Magothy Aquifer that provides the community water supplies; therefore, the two public water supply well fields on Lambert Avenue and Main Street would remain unaffected. However, failing OWTS could continue to pose health risks of bacteria and nitrogen loading for nearby non-community wells and any private wells. The drinking water standard for nitrate in New York State is 10 mg/L (as nitrogen).

Loading to Surface Waters

The No Action Alternative would not remove any nitrogen loading from surface waters. Nitrogen would continue to enter the Forge and Carmans Rivers from OWTS and impair the designated beneficial uses of these waters. The No Action Alternative would result in long-term, moderate, adverse impacts on water quality.

6.1.2.4 Wetlands and Coastal Resources

The No Action Alternative would not address the current water quality and ecological health issues attributed to the failure of OWTS in the Forge River watershed. Freshwater, tidal wetlands, and coastal resources would continue to degrade over time because of storm-related sewage discharges and because high concentrations of nitrogen and pathogens in groundwater would continue to discharge into the Forge River estuary and its tributaries, including Wills, Poospatuck, Middle Forge West, Lons, and Homes Creeks. Because the wetlands would continue to degrade, long-term impacts on wetlands and coastal resources would be major and adverse.

6.1.2.5 Floodplains

Under the No Action Alternative, surface water and groundwater flooding would continue to result in OWTS failures, and untreated wastewater would continue to enter local waterbodies. Additionally, nitrogen and pathogen pollution would persist at existing levels in the regional waters. The untreated wastewater and high levels of nitrogen and pathogens would continue to degrade tidal wetlands, which would reduce the ability of the floodplains in the study area and Great South Bay to reduce wave heights and provide natural protection against storm surge and flooding. Therefore, the No Action Alternative would result in direct, long-term, moderate, adverse impacts from the ongoing potential for flood risks associated with inundated OWTS and indirect, long-term, moderate, adverse impacts from the continued reduction of floodplain and wetland functions, including storage of floodwaters and flood attenuation benefits provided by tidal wetlands.

6.1.2.6 Vegetation

Under the No Action Alternative, potential sanitary wastewater overflow from future flood events could potentially damage vegetation in the study area and would continue to contribute to degradation of adjacent vegetated wetlands. Within adjacent wetlands, invasive wetland vegetation, if already present, may continue to spread to vulnerable areas, particularly along weakened wetland edges. Continued nitrogen loading could impair currently healthy wetland vegetation and further deteriorate existing impaired vegetation within tidal wetlands of Forge River and downstream within Moriches Bay. Therefore, the No Action Alternative could have minor, adverse impacts on vegetation.

6.1.2.7 Wildlife and Fish

Under the No Action Alternative, the risk of adverse impacts on aquatic animal species from sewage overflows into waterways during future flood events would continue. Impacts of untreated sewage releases on fish and wildlife species could range from stress on species, degradation of food sources, destruction of breeding grounds, and physical harm. OWTS wastewater releases would continue to contribute to hypoxic events, algal blooms, and fish kills in Forge River and its tributaries and downstream receiving waters of Moriches Bay and Narrow Bay. Ongoing water quality impairments from storm-related sewage releases would continue to degrade EFH for designated species and their forage species in area waters, limiting use by these species. Water quality impairments would also continue to adversely affect benthic habitat, depressing abundance and diversity of shellfish and other benthic invertebrates. Overall, the No Action Alternative would result in long-term, moderate, adverse impacts.

6.1.2.8 Threatened and Endangered Species and Critical Habitats

Under the No Action Alternative, potential habitat for threatened and endangered species near the project area would continue to be at risk from degradation from sewage overflows into nearby waterways during future flood events, as well as from elevated total nitrogen concentrations in groundwater and surface waters. Potential habitat for threatened or endangered plant species (e.g., swamp sunflower, marsh straw sedge, water pygmyweed, and seabeach amaranth) is present in the coastal waters and wetland areas located adjacent to and outside the project area. This habitat may be affected by sewage discharges and nitrogen migration to Forge River. Therefore, the No Action Alternative would result in minor, adverse impacts on nearby potential habitat for protected species.

6.1.2.9 Cultural Resources

The No Action Alternative would have no effect on cultural resources because no changes would be made to any of the historic properties with the APE. No ground disturbance would occur that could affect archaeological resources.

6.1.2.10 Aesthetic Resources

Under the No Action Alternative, no tree removal or site grading would occur, and no new aboveground or below-grade infrastructure or buildings would be placed on the landscape. As a result, aesthetic resources and viewsheds would not be affected.

6.1.2.11 Land Use and Planning

As indicated above, most of the study area is fully developed. Under the No Action Alternative, redevelopment could occur along Montauk Highway in accordance with the *Montauk Highway Corridor Study and Land Use Plan* (Town of Brookhaven 2004) and in compliance with existing zoning. However, the capacities of conventional OWTS would limit redevelopment potential and would constrain land use density and intensity to levels similar to existing conditions. It is unlikely that vacant parcels elsewhere in the study area would be developed. As a result, neither land use nor zoning would be affected.

6.1.2.12 Socioeconomics

Under the No Action Alternative, no additional sewer infrastructure or wastewater treatment facilities would be constructed; therefore, there would be no beneficial economic impact generated by construction. The unsewered parcels in the project area would continue to use in-place conventional OWTS and property owners would continue to pay for the maintenance of the OWTS, which includes pumping every three to five years and reconstruction after 20 to 30 years. Property owners would be at risk for unpredictable cost due to sewage backups during storm events. The *Draft Mastic Shirley Feasibility Study, Map & Plan* estimates the maintenance cost for the average single-family home OWTS at $425. The study does not estimate the avoided cost on commercial properties but states that the avoided cost may be considerably higher (CDM Smith 2013). The maintenance expenses would continue to support the maintenance jobs.

6.1.2.13 Environmental Justice

Under the No Action Alternative, the study area population may experience long-term, moderate, adverse impacts from the public health hazards associated with OWTS failures and increased

coastal flood hazards. The impact on environmental justice populations would not be considerably more severe or greater in magnitude than the impact on the general population.

6.1.2.14 Noise

The No Action Alternative would not involve construction or the operation of pump stations and an AWTF; therefore, there would be no effects related to noise.

6.1.2.15 Transportation

The No Action Alternative would be consistent with the No Action Condition, as presented in Section 5.16. The results of the intersection analyses for the No Action Alternative weekday background AM and PM peak hours in terms of LOS are summarized in **Tables 5.16-4** and **5.16-5** for signalized intersections and **Tables 5.16-6** and **5.16-7** for unsignalized intersections. The detailed analysis tables for volume/capacity ratios, delays, queues, LOS, and the HCS outputs are provided in Appendix B.12.

The No Action Alternative weekday construction worker AM and PM peak hours traffic volumes are provided in Appendix B.12. The results of the unsignalized intersection analyses for the No Action Alternative weekday construction worker AM and PM peak hours in terms of LOS are summarized in **Tables 5.16-8** and **5.16-9**, respectively. The detailed analysis tables for volume/capacity ratios, delays, queues, and the HCS outputs are provided in Appendix B.12.

All movements at the five studied intersections are projected to operate at levels consistent with Existing Conditions during all peak hours under future conditions without the project. There would be no impacts.

6.1.2.16 Community Facilities and Services

Under the No Action Alternative, community services and facilities within the study area would continue to operate similar to the existing conditions. The residential population in the study area would naturally increase, with an associated change in demand for community services and facilities. However, a substantial increase in demand for community services and facilities would not occur. The No Action Alternative would not affect community services and facilities.

6.1.2.17 Public Health and Safety

The No Action Alternative would not address the risk of discharge of contaminants to the Forge and Carmans Rivers in the event of future flooding and failing OWTS. As noted in Section 6.1.2.3, No Action Alternative, Water Quality, flooded OWTS during storm events would continue to pose health risks to the community because bacteria and viruses from OWTS would mix with floodwaters, which would create exposure pathways. In addition, the high nitrogen and pathogen concentrations in Forge River would continue to degrade the ecosystem, further reducing the ecosystem's ability to attenuate storm surges.

Under the No Action Alternative, future damages during storm events could require increased assistance from public health and safety forces because OWTS would continue to be unable to withstand storm-induced floods. This increased demand could affect the ability of police, fire, and emergency medical services to effectively meet response time goals, as well as to respond to needs elsewhere in the community during storm events. The No Action Alternative would result in moderate, long-term, adverse impacts on public health and safety.

6.1.2.18 Climate Change

Greenhouse Gases

Under the No Action Alternative, the OWTS in the study area would continue to generate methane emissions. Based on national average per capita emission factors for OWTS (EPA 2014b) and the existing population of the project area (46,957 persons, **Table 5.19-1**), annual methane emissions from OWTS would total 3,765 metric tons on a CO_2e basis. Localized mobile source emissions from trucks servicing the OWTS would continue. Therefore, greenhouse gas emissions under the No Action Alternative would have a long-term, negligible impact.

Storms and Sea Level Rise

The effects from climate change—including higher groundwater elevations, sea level rise, increased extreme precipitation or storm events, and a greater incidence of coastal flooding and tidal or storm surges—would result in increased OWTS failures from flooding and inundation from more frequent storm events. The increased OWTS failures and associated discharge of nutrients and pathogens would continue to affect water quality and result in coastal wetland degradation and decreased wave attenuation, flood mitigation, and protection benefits from regional tidal wetlands. More frequent OWTS failures would result in increased potential for harm to human safety and property from flooding, flood risks, and increased water contamination.

In summary, the No Action Alternative would result in indirect, short-term, moderate, adverse impacts from the ongoing potential for flood risks associated with discharge from inundated OWTS and direct, long-term, moderate adverse impacts from the alteration of natural tidal wetland functions, including storage of floodwaters and flood and wave attenuation.

6.1.2.19 Public Services: Energy

Under the No Action Alternative, there would be no new facilities and the demand for electricity or natural gas would not change; therefore, the No Action Alternative would have no effect on energy.

6.2 On-site Treatment and Disposal—Replacing Existing On-Site Wastewater Treatment and Disposal Systems with Innovative/Alternative On-Site Wastewater Treatment and Disposal Systems (I/A OWTS Alternative)

6.2.1 I/A OWTS Alternative Description

Under the I/A OWTS Alternative, all cesspools and conventional OWTS in Phases I through III would be upgraded with modern I/A OWTS pursuant to the Suffolk County Septic Demonstration Program (SCDPW 2016b). This would apply to all 3,398 parcels in Phases I through III.

To allow for environmental analysis of this alternative, it is assumed that some or all I/A OWTS under evaluation would be approved for general use. Following is a brief description of each I/A treatment methods (SCDHS 2016).

6.2.1.1 Treatment Methods

I/A OWTS are miniature variations of typical wastewater treatment processes found in large scale treatment plants. They can be attached-growth processes or suspended-growth processes or a mix. First, wastewater is directed to a primary clarifier, where solids are settled. Afterwards, in a

separate tank(s), suspended-growth microorganisms are applied to the wastewater to break down wastes into carbon dioxide, water, and other inorganic compounds. Aeration, such as spraying liquid in the air or diffusing air into the liquid, is used to speed the reactions. Secondary clarifiers then remove any biological growth that results from the activated sludge treatment, and the treated effluent is disposed from the system.

All I/A OWTS require a leaching structure. As indicated in the Alternatives Screening Report (Appendix B.3), I/A OWTS achieve an effluent quality of at most 19 mg/L for total nitrogen, compared to 40 mg/L for total nitrogen under conventional OWTS.

The biological treatment processes employ a medium—such as metal, plastic, or other natural or synthetic solid material—that supports biomass on its surface and within its porous structure. The medium may be held in place and stationary relative to wastewater flow, such as in a trickling filter system (EPA 2002), it may be in motion relative to the wastewater, or both may occur. Fixed-film systems may employ continuous aeration to speed treatment, or they may employ extended aeration to reduce the need for sludge digestion/disposal. Some systems may employ additional anaerobic filtration to further remove nitrogen and other compounds. Systems that Suffolk County is currently evaluating are installed below grade. The types systems under evaluation are described below.

- **Media Filters**: These systems consist of a lined or watertight structure filled with media that treat wastewater using physical and biological processes. Effluent is collected in a tank and then pumped over the filter media, which provides surface area for bacteria and other microorganisms. The treated effluent trickles down through the media, is collected, and is recirculated between the tank and media several times before discharge. This combination of aerobic and anaerobic conditions converts dissolved nitrogen to nitrogen gas.
- **MBRs**: MBRs rely on a combination of membrane processes like microfiltration or ultrafiltration with a suspended growth bioreactor. Effluent enters a setting tank and is moved to an aeration chamber where aerobic bacteria treat the wastewater. Following aeration, the effluent enters the membrane chamber where it is filtered through the membrane and recirculated to the aeration chamber for further treatment and ultimately discharged to the leach field.
- **Aerobic Treatment Units**: Aerobic treatment units rely on air injection and blowers to create an oxygenated (aerobic) environment, which aids bacteria as they break down organic material. Three popular types of aerobic treatment units include suspended-growth systems with free-floating bacteria and a clarification chamber, fixed-film reactors in which bacteria grow in media suspended in the tank, and SBRs where all treatment occurs in one tank.

6.2.1.2 Implementation and Construction

Phased installation of I/A OWTS would occur throughout Phases I through III, on lots with adequate size and configuration. To compare impacts among alternatives, this environmental document assumes that the systems would be installed over a period of four years across all 3,398 parcels. All but one of the system types under evaluation would be installed below grade.

Construction of I/A OWTS would in most cases require removal of the existing OWTS (see description of removal approach under the Proposed Action). Based on site-specific conditions, where sufficient land area is available on the property to meet all regulatory setbacks, then the new

I/A OWTS could potentially be installed at a different location, and the existing OWTS could be abandoned in place.

I/A OWTS would be constructed at depths similar to conventional OWTS, requiring an excavation of approximately 6 to 10 feet bgs. Specific construction techniques would vary based on I/A OWTS design. Some I/A OWTS would use concrete tanks, while others would use fiberglass or thermoplastic tanks. The major components would come ready to assemble or largely preassembled. All I/A OWTS would require power to operate and would include a control panel and alarm system. Wastewater would typically flow from a building to I/A OWTS via gravity. Power would generally be required for blowers and/or recirculation pumps within I/A OWTS tanks themselves and to energize the controls and alarm. Interruption of sewer service to the building should be expected during construction.

Treated effluent from I/A OWTS would be discharged to leaching structure for further treatment by the surrounding soil and eventual discharge to groundwater. Reuse of existing leaching structure may be possible if they are properly sized and fully functioning. If an existing leaching structure is deemed to be substandard, then a new leach field would need to be constructed in accordance with SCDHS standards. I/A OWTS would require regular servicing for removal of solids, similar to the existing OWTS.

6.2.2 I/A OWTS Alternative Impacts

6.2.2.1 Topography and Soils

Topography Impacts

Implementation of the I/A OWTS Alternative would have negligible effect on the topography of the study area. Similar to construction of the new collection system planned for the Proposed Action, installation of the subgrade individual I/A OWTS at each location would require temporary excavation, which would be backfilled to pre-construction grade once the system was completed. In locations where the water table is elevated, the alternative could require local topography increases to bury the systems. These increased elevations would be localized. Excess material would be characterized and hauled off-site for beneficial re-use or disposal, based on characterization results.

I/A OWTS operation would have negligible effect on the topography of the study area.

Soil Impacts

Construction of the alternative would have minor, adverse impacts on soils in the study area. Construction activities would result in similar impacts to those noted under the Proposed Action, including a reduction in soil quality from the loss of nutrients, organic matter and nutrient holding capacity, as well as increased density and compaction. These impacts would be less than those under the Proposed Action because the I/A OWTS Alternative would entail substantially less ground disturbance because it would not require a collection and conveyance system or a centralized treatment plant.

Mitigation

To mitigate construction impacts, BMPs, including soil and erosion control measures, would be employed during construction to minimize potential, temporary soil erosion effects. These measures are described in detail in Section 5.4.3.4, the mitigation section for the Proposed Action.

Because less ground would be disturbed under the I/A OWTS Alternative than under the Proposed Action, BMPs would be implemented to a lesser extent.

6.2.2.2 Air Quality

Construction

Construction of I/A OWTS at approximately 3,400 properties over four years would result in temporary criteria pollutant emissions from the use of heavy equipment, fugitive dust, and worker commutes. However, the amount of soil excavated and extent of construction equipment required would be substantially less than that required for construction of the AWTF and sewer infrastructure under the Proposed Action because the I/A OWTS Alternative would not require construction of a centralized treatment plant, force mains, or pump stations. Because emissions under the Proposed Action would be well under the General Conformity *de minimis* thresholds, emissions under the I/A OWTS Alternative would also be under the thresholds. Therefore, air quality impacts during construction would be short-term and negligible.

Operation

Suffolk County is evaluating several I/A OWTS technologies. Because of the relatively new nature of the technology, no information is available to provide a detailed assessment of how emissions of I/A OWTS designs would vary from conventional OWTS in the study area. A literature review was conducted, and no information on I/A OWTS emissions of VOC was identified. This document discloses that information on the operational emissions of I/A OWTS is unavailable. The information is relevant to the assessment of the operational impacts of the I/A OWTS Alternative. However, assuming I/A OWTS emissions are similar to traditional OWTS already present in the study area, long-term, negligible impacts on air quality would be anticipated.

Mitigation

Mitigation measures regarding dust control, utilization of new equipment, and idling limits, similar to those described under the Proposed Action, would be implemented.

6.2.2.3 Water Quality

Construction

Construction of I/A OWTS

I/A OWTS describe a category of high-tech OWTS that are designed to achieve a higher level of wastewater treatment than standard OWTS. In September 2016, Suffolk County adopted a new section to its Sanitary Sewer Code (Article 19) that governs the approval and management of I/A OWTS. Numerous different systems are on the market with varying treatment performance records. In 2014, Suffolk County began a demonstration project for I/A OWTS, and 14 technologies are currently being tested. The County has an approval process in place for manufacturers to follow to get their systems reviewed and approved for use in Suffolk County.

Stormwater Impacts during Construction of I/A OWTS

Construction of the I/A OWTS Alternative would require excavating, dewatering, and stockpiling soil and gravel, which could adversely affect water quality. Construction of I/A OWTS would require removal or abandonment of the existing OWTS. I/A OWTS would be constructed at depths similar to conventional OWTS (i.e., requiring excavation of approximately 6 to 10 feet bgs).

Dewatering would be required for installing some I/A OWTS, particularly those in areas with shallow depths to groundwater. Water removed from excavations via dewatering would be handled according to the protocols established in the SWPPP, and BMPs similar to those described for the Proposed Action, would be employed during construction.

No construction would occur within the vicinity of the surface waterbodies in the study area nor would any work modify them directly. Construction activities would result in minor, short-term, adverse impacts on water quality that would be minimized through BMPs as identified under Section 5.4.3.4, the mitigation section for the Proposed Action.

Hazardous Materials Handling during Construction of I/A OWTS

Construction of I/A OWTS would require fuel, oil, solvents, and lubricants for the operation of the construction equipment. Negligible, short-term hazardous-material-related impacts are expected to result from the handling of fuel, excavated soils, and other potentially hazardous materials during construction. The potential risk for uncovering hazardous materials during excavation for this project is low, based on a search of the NYSDEC Division of Environmental Remediation database (NYSDEC 2016a). Similar spill prevention, prompt spill notification and response, and soil handling techniques would be used to reduce the potential for polluting receiving waters with contaminants, as described under Section 5.4.3.4, the mitigation section for the Proposed Action.

Operation

I/A OWTS Operation

Suffolk County only recognizes and approves I/A OWTS systems that are designed to reduce the total nitrogen concentration in treated effluent to 19 mg/L. However, effective operation and maintenance for I/A OWTS would be essential to ensure that treatment goals are met continuously. I/A OWTS that are not regularly inspected and only occasionally monitored would not achieve treatment objectives (Heufelder et al. 2008). Article 19 of the Suffolk County Sanitary Code requires that all I/A OWTS owners register their systems with the County and maintain an operation and maintenance contract with a licensed I/A treatment system service provider. At a minimum, that service provider must perform annual maintenance on I/A OWTS, including the following procedures (in addition to any specific procedures required by the system manufacturer): the settling tank chamber must be measured for solids and accumulation be pumped out as required; all electrical components, control switches, timers, and alarms must be checked annually for functionality and safety; all effluent screens must be cleaned and biosolids must be hosed off of filters, pumps, and pump vaults; and treatment material must be placed into the inlet end of the septic tank.

The total nitrogen concentration in the treated effluent of I/A OWTS of no higher than 19 mg/L would represent a significant improvement in treatment performance compared to conventional OWTS; the total nitrogen concentration in the effluent from conventional OWTS is about twice as high at 40 mg/L (H2M 2013). Implementation of the I/A OWTS Alternative would have a long-term, beneficial effect on water quality in the study area as a result of nitrogen removal.

The *Suffolk County Comprehensive Water Resources Management Plan* identifies the following additional pollutants of concern potentially present in domestic wastewater: VOC, PPCPs, microplastics, and 1,4-dioxane. The primary purpose of the project is nitrogen removal, and I/A OWTS are not designed to specifically remove these pollutants of concern. However, the aerobic treatment processes within I/A OWTS are expected to achieve better removal of these pollutants

than the existing OWTS (Suffolk County 2015a). When compared to existing conditions, the effects on groundwater quality would be long term and beneficial because of the higher level of treatment achieved by I/A OWTS.

Impacts during Flood Events

Although I/A OWTS can generally operate in areas with shallower groundwater tables compared to conventional OWTS, I/A OWTS also face water quality risks during floods because of similar or more complex components (e.g., control and electrical panels and external blowers that could be damaged during a flood). The capacity of the leaching structure would be diminished under mounded water table conditions, and the effluent would flood at the surface, similar to conventional OWTS. Inundation flooding could damage I/A OWTS that are not properly designed to prevent flotation. Erosive velocities during storm events also could expose portions of I/A OWTS. In addition, I/A OWTS require operation of aerators and/or pumps to provide treatment. Electrical power may need to be switched off during flood events to prevent electrical shock, thereby preventing a portion of the system from functioning and achieving its intended effectiveness. These disruptions in treatment by I/A OWTS during floods would result in adverse impacts on water quality and human health through exposure to bacteria in the wastewater. The extent of such impacts would vary substantially between individual storms.

Impact on Groundwater

I/A OWTS installed on all parcels throughout the study area would discharge approximately 220 pounds/day of total nitrogen to groundwater, based on an effluent total nitrogen concentration of 19 mg/L and extrapolated load data from CDM Smith (2014). This load would be about half of the load discharged by conventional OWTS under the No Action Alternative, considering the difference in treatment performance of the two types of OWTS. After mixing the effluent discharge from I/A OWTS with groundwater, the resulting total nitrogen concentration in groundwater would be lower than under existing conditions with conventional OWTS; however, model results are not available to determine the resulting total nitrogen concentrations in groundwater. Large parts of the study area are still not expected to meet the target of 4 mg/L for Groundwater Management Zone VI.

Effects on groundwater quality for the I/A OWTS Alternative would be long term and beneficial compared to existing conditions because of the higher level of effluent treatment that I/A OWTS would provide compared to conventional OWTS. However, the water quality effects would not be as beneficial as those under the Proposed Action, which would achieve effluent nitrogen concentration of 3 to 5 mg/L compared to effluent nitrogen concentrations of 19 mg/L by I/A OWTS.

Loading to Surface Waters

The total nitrogen load from I/A OWTS of up to 220 pounds/day that would be discharged to Forge River would be about four times higher than the load entering Forge River under the Proposed Action, thus the level of improvement to the water quality of Forge River and Moriches Bay would be correspondingly smaller. This load would be approximately half of the load discharged by conventional OWTS under the No Action Alternative; therefore, the overall effect would be beneficial. For Carmans River, the total nitrogen load of 7 pounds/day contributed from the study area under existing conditions would be reduced, but considering the overall small load, the long-term, beneficial effect on the water quality of Carmans River would not be substantial.

Mitigation

Stormwater (during construction), hazardous materials handling (during construction), and OWTS removal mitigation measures, similar to those described under the Proposed Action, would be implemented.

I/A OWTS Operation

- Enforce the requirements under Suffolk County Sanitary Code Article 19 for registration of all I/A OWTS.
- Enforce requirements for annual maintenance of I/A OWTS because proper maintenance is essential to ensure that treatment goals are met.

6.2.2.4 Wetlands and Coastal Resources

Construction

The construction of the I/A OWTS Alternative is not anticipated to result in direct or indirect impacts on freshwater or tidal wetlands or adjacent areas. All construction would occur on existing commercial and residential properties. BMPs would be used to control runoff and stabilize soils to minimize the potential for sediment, nutrient, and turbid water discharges to wetlands and surface waters during the construction period. These measures would be specified as part of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity permit application, which would also include an Erosion and Sediment Control Plan and SWPPP. Short-term impacts on wetlands and coastal resources would be minor and adverse. Mitigation measures to reduce effects are identified below.

Operation

Once operational, the I/A OWTS Alternative would have no direct impacts on freshwater or tidal wetlands and adjacent areas during normal operation. This alternative could potentially benefit wetlands and coastal resources by reducing nutrients and pathogens transported to area waters. However, the potential for beneficial effects on wetlands and open waters associated with the I/A OWTS Alternative would be less than those associated with the Proposed Action because future flood events could still contribute to the escape of untreated sewage in some low-lying areas because the bulk of I/A OWTS would be below grade. In addition, I/A OWTS could fail due to component failure or maintenance negligence. Overall, the I/A OWTS Alternative would result in a long-term, beneficial effect, but it would likely result in a smaller reduction in pollution and less beneficial effects on wetlands and the Forge River estuary would not be as great as those under the Proposed Action.

Mitigation

Construction would use BMPs to control runoff and stabilize soils to minimize the potential for sediment, nutrient, and turbid water discharges to wetlands and surface waters during the construction period. These measures would be specified as part of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity permit application, which would also include an Erosion and Sediment Control Plan and SWPPP.

6.2.2.5 Floodplains

Construction

Installation of the I/A OWTS Alternative would require excavation of a pit on each parcel. The amount of floodplain disturbance from the construction activities would not be known until the completion of the detailed design process and selection of I/A OWTS types by each property owner. Because the majority of the study area is located outside the floodplain, adverse impacts on floodplains from the construction activities are anticipated to be small, if any. If floodplains cannot be avoided, construction (e.g., excavation) and the use and storage of heavy equipment within floodplains could result in short-term, adverse impacts from soil compaction, vegetation and soil disturbance, and degradation of floodplain functions. Ground disturbance associated with the construction would alter the existing stormwater runoff and drainage patterns and potentially degrade the quality of stormwater runoff. These temporary changes and interruptions to existing stormwater drainage and water quality would result in short-term, adverse impacts. Compliance with permitting and regulatory requirements and the use of BMPs, stormwater management techniques, and sediment and erosion control plans would minimize the temporary, adverse impacts on floodplains and stormwater. In accordance with permit requirements, temporarily disturbed floodplain areas on- or off-site would be filled to restore the grade and revegetated or paved over, depending on the location, once construction is complete to avoid long-term impacts. Therefore, construction activities would disturb floodplain functions, natural values, and stormwater runoff and result in direct, short-term, minor, adverse impacts.

Operation

Operation of the proposed I/A OWTS would not result in substantially increased impervious surfaces that could increase stormwater runoff and affect the floodplain. Although most of I/A OWTS would be constructed below ground, one model could be constructed aboveground, which could result in additional impervious surface. Additional impervious surface would alter stormwater drainage patterns, but the effect would be negligible. If any aboveground I/A OWTS were constructed within the floodplain, they would slightly modify floodplain functions within an individual parcel, resulting in direct, long-term, negligible, adverse impacts. Long-term, indirect impacts on floodplains from increased stormwater runoff would be minimized through compliance with regulations and the use of mitigation measures and stormwater management to ensure that the post-development conditions do not adversely affect downstream areas.

I/A OWTS can generally operate in areas with shallower groundwater tables compared to conventional OWTS. However, the placement of most of I/A OWTS below ground would not prevent system failures associated with increased groundwater levels and overland flooding caused by heavy precipitation and/or tidal and storm surges. The issues that I/A OWTS could experience include reduced drain field capacity, exposure of or damage to components, and electrical power interruption. Therefore, during flood events, the operation of I/A OWTS could result in repetitive, minor, adverse impacts from increased flood risks to human life and property in localized areas.

Overall, I/A OWTS would decrease the discharge of pollutants that degrade the floodplains and tidal wetlands in the region. As described under the Proposed Action, reducing floodplain and wetland degradation would allow these resources to better dissipate wave energy and mitigate flooding associated with tidal surge, which in turn would reduce hazards to human health caused by flooding and storm-related failure of OWTS. However, the capability of the systems to reduce nitrogen would be hindered during flooding and sea level rise. Therefore, effects on floodplains

would be indirect, long-term, and beneficial from the reduced floodplain degradation caused by pollutants. A decrease in the risk of flood loss and risks on human life and property from flooding would result in indirect, long-term, beneficial effects. There would also be direct, localized, minor, adverse impacts from groundwater flooding and localized flood risks and loss from the failure of individual I/A OWTS from precipitation.

Mitigation

Mitigation measures, including stormwater management and erosion and sediment control, that could be implemented during and after completion of construction activities to prevent and minimize impacts on floodplains and stormwater runoff would be the same as those discussed under the Proposed Action.

6.2.2.6 Vegetation

Construction

Under the I/A OWTS Alternative, minimal vegetation removal at residences and businesses may be required. Impacts on vegetation from construction would be significantly less than those described under the Proposed Action because areas of disturbance would be limited to upgrades in landscaped residential and commercial areas. Impacts would be further minimized by the mitigation measures identified below. Therefore, construction of the I/A OWTS Alternative would have a short-term, negligible impact on vegetation.

Operation

Similar to the Proposed Action, the I/A OWTS Alternative would have a long-term, beneficial effect on vegetation within the study area because it would reduce sanitary wastewater overflow and, to a lesser extent, groundwater nitrogen concentrations. However, under the I/A OWTS Alternative, flood events could still contribute to the escape of untreated sewage in some low-lying areas, and some I/A OWTS could fail due to component failure or maintenance negligence. As such, short-term, repetitive, adverse impacts on vegetation associated with failure of OWTS caused by natural hazards would continue to occur. Therefore beneficial effects on vegetation under the Proposed Action would be greater than those under the I/A OWTS Alternative.

Mitigation

Impacts on vegetation under the I/A OWTS Alternative would be mitigated by incorporating BMPs to avoid soil erosion and the spread or introduction of invasive plants and revegetation or re-landscaping with native species following construction.

6.2.2.7 Wildlife and Fish

Construction

Minimal tree removal at residences and businesses may be required as part of the I/A OWTS Alternative but would be unlikely to significantly affect migratory bird species because street trees do not provide high quality nesting habitat because of their proximity to human disturbance. Removing trees outside the breeding season would limit the impacts on migratory bird species. The alternative may also cause temporary disturbance to wildlife from noise and activity during construction.

For fish and aquatic resources, impacts from the I/A OWTS Alternative would be similar to those described for the Proposed Action. Short-term impacts on surface water quality from transport of eroded soils to waterways would be less substantial than for the Proposed Action because less overall excavation would occur under the I/A OWTS Alternative.

Overall, under the I/A OWTS Alternative, construction impacts on wildlife and fish would be minor and adverse.

Operation

Once operational, the I/A OWTS Alternative would have no effects on terrestrial wildlife. This alternative could potentially benefit wildlife and fish in nearby aquatic habitat because the amount of nutrients and pathogens being transported to area waters would be reduced. However, the I/A OWTS Alternative would have less potential for beneficial effects on fish habitat than the Proposed Action because future flood events could still contribute to the escape of untreated sewage in some low-lying areas because the bulk of I/A OWTS is below grade. The potential also exists for failure of some I/A OWTS because of component failure or maintenance negligence. Overall, I/A OWTS would likely result in a smaller reduction in pollution and have less intense long-term, beneficial effects on fish than the Proposed Action.

Mitigation

Tree removal associated with the I/A OWTS Alternative would take place outside the migratory bird breeding season (i.e., between April 1 and August 31).

6.2.2.8 Threatened and Endangered Species and Critical Habitats

Construction

Under the I/A OWTS Alternative, I/A OWTS upgrades would primarily occur in residential and commercial landscaped or paved areas (including lawns with minimal shrub plantings), with very limited tree removal required. Because of their proximity to human disturbance, these trees would not provide suitable maternity colony or summer roost habitat for northern long-eared bats.

Construction of the I/A OWTS Alternative would not affect potential habitat for all other threatened or endangered plant or wildlife species identified within or near the study area because areas of work would be limited to upgrades in residential and commercial areas, where potential habitat for listed species is not found.

Construction of the I/A OWTS Alternative would have no effect on threatened and endangered species.

Operation

Operationally, the I/A OWTS Alternative could potentially benefit threatened and endangered species in nearby coastal habitats by reducing transportation of nutrients and pathogens to area waters. However, this alternative would have less potential for beneficial effects on threatened and endangered species habitat than the Proposed Action. Future flood events could still contribute to the escape of untreated sewage in some low-lying areas because almost all I/A OWTS under evaluation by Suffolk County would be below grade. Some I/A OWTS could fail because of component failure or maintenance negligence. Overall, I/A OWTS would result in a smaller reduction in pollution than the Proposed Action. Under the I/A OWTS Alternative, the long-term effect would be beneficial, but not as beneficial as the effect under the Proposed Action.

6.2.2.9 Cultural Resources

Construction

Most I/A OWTS under consideration would be entirely below-grade systems. For these systems, the alternative would have minor, adverse impacts or no effects on archaeological resources, depending on where the below-grade systems are installed. The Phase IA investigations for the project (Appendix B.2) identified several areas of moderate to high sensitivity for historic archaeological resources. These areas are associated with early settlement of the study area along the Montauk Highway Corridor, Lafayette Avenue, Main Road (and its associated side streets), and the southeast portion of the APE that lies within the Poospatuck Reservation. In these areas, construction could affect archaeological resources, but mitigation described below would ensure any adverse impacts would be minor.

The below-grade systems would have negligible impacts on historic architectural resources because only the landscape would be disturbed. Any significant landscaping features would be replanted once construction is completed.

Construction of the any aboveground I/A OWTS components would have short-term, negligible impacts on architectural historic resources. The small size of the aboveground components, which would presumably be placed along a side or rear elevation of a building, would not affect the character-defining features of a historic property.

Operation

Operation of either the above- or below-ground systems would have no effect on historic archaeological or architectural resources.

Mitigation

If below-grade systems are chosen for parcels within areas of moderate to high sensitivity for archaeological resources, a Secretary of the Interior qualified archaeologist should monitor any ground-disturbing activities on the parcel to ensure that archaeological resources are not present. Monitoring procedures would need to be described within a Programmatic Agreement among FEMA, GOSR, and the NYSHPO for continued Section 106 consultation.

6.2.2.10 Aesthetic Resources

Construction

The I/A OWTS Alternative would replace existing conventional OWTS with I/A OWTS. At each of the parcels that would undergo this process, temporary construction-related effects would include ground disturbance, stockpiling of excavated soils, storage of construction equipment, and vegetation or landscaping removal. Impacts on local viewsheds would be short term, minor, and adverse, similar to those described under the Proposed Action.

Operation

Eleven of the 12 I/A OWTS types under consideration would be installed underground. Therefore, upon completion of construction and revegetation of each excavated area, the visual character of each parcel would be substantially similar to the existing visual character. These new aboveground systems would be small, and they would not substantially alter the visual character of the

residential or commercial buildings they serve. These systems would not substantially change the residential and commercial built character of the study area.

6.2.2.11 Land Use and Planning

Implementation and construction of the I/A OWTS Alternative would not result in any impacts on land use or zoning within the study area because existing OWTS would simply be replaced. Construction would not require temporary easements. No AWTF or corresponding pump stations would be constructed, and the alternative would not necessitate a change in land use on study area parcels.

6.2.2.12 Socioeconomics

Construction

Under the I/A OWTS Alternative, employment would experience a beneficial effect during the construction period. The total cost to replace the OWTS for individual homes (cesspools and septic systems) and commercial treatment systems serving larger buildings with I/A OWTS is estimated at $15,000 to $20,000 per parcel (Suffolk County 2016b). With a total of approximately 3,400 parcels and using the midpoint of $17,500 per parcel, the total construction cost would be approximately $60 million.

Using the IMPLAN input-output model for Suffolk County, $60 million in spending is estimated to generate the equivalent of 396 one-year jobs in construction, architecture and engineering, and related industries in Suffolk County. In addition, these contractors, construction workers, and other employees would make purchases at other businesses in the County, which, in turn, would make purchase at other local businesses, and so on. Including these different rounds of economic activity (i.e., the multiplier effect), the planning, design, construction, and related activities would generate the equivalent of 634 one-year jobs, $37.2 million in earnings, and $95.3 million in total revenues in Suffolk County. Construction of I/A OWTS would have a short-term, beneficial effect on socioeconomics.

Operation

Cost to Households and Businesses

Under the I/A OWTS Alternative, property owners would incur a monthly cost of between $5 and $20 for maintenance of the system. After five years, the owners would have to pay an annual maintenance service contract of between $200 and $400. Thus in the first five years, the average maintenance cost per property would be $150, while it would increase to $450 in subsequent years (Suffolk County 2016b).

These costs would be partially offset by the avoided cost of the current on-lot OWTS, which typically includes pumping every three to five years and reconstruction after 20 to 30 years. The *Draft Mastic Shirley Feasibility Study, Map & Plan* estimates an annual avoided cost of $425 for the average single-family home. The study does not estimate the avoided cost on commercial properties but states that the avoided cost may be considerably higher (CDM Smith 2013).

Based on the 2011–2015 American Community Survey, the median household income for home owners was $83,568 (U.S. Census Bureau n.d.). Even when not subtracting avoided costs, the total costs would less than 1 percent of the household income. As reported in CDM Smith (2013), the

EPA affordability analysis considers a cost of more than 2 percent of the median household income a high cost burden.

In summary, households included in the I/A OWTS Alternative are expected to experience no adverse impacts. Similarly, because of the low annual cost, businesses included in the I/A OWTS Alternative are not expected to experience adverse impacts.

Employment

While data on the labor required for maintaining I/A OWTS are not available, the benefit is assumed to be very small or negligible. No direct business displacement would occur as a result of the I/A OWTS Alternative. In summary, the I/A OWTS Alternative would generate a small or negligible positive employment effect.

Avoided Losses from Flooding

The I/A OWTS Alternative would reduce the risk associated with flooding and flood-related damages, but it would do so to a lesser extent than the Proposed Action. I/A OWTS are less susceptible to treatment failure from increased groundwater levels or floods than conventional OWTS. In addition, groundwater and surface water nitrogen concentrations would be reduced, which would enhance ecosystems and improve wave energy and flood attenuation, although to a lesser extent than the Proposed Action. The reduced damages are not quantified as part of this study.

Property Values

Under the I/A OWTS Alternative, the effect of I/A OWTS on the property values of affected properties is likely to be negligible because property value is based on a wide range of housing and location characteristics.

Fiscal Flows

Pursuant to the existing I/A OWTS demonstration program, Suffolk County would incur the installation costs. The County would also incur capital costs of $60 million (Suffolk County 2016b). No information is available about how these costs would be funded. Owners would be responsible for operation and maintenance costs.

Acquisitions and Displacement

No direct population displacement would occur under the I/A OWTS Alternative because work would involve only replacement of existing systems.

6.2.2.13 Environmental Justice

Construction

During the construction period, study area populations may experience minor, adverse impacts in terms of public health and safety, community services and facilities, air quality, water quality, and noise. These effects would be temporary and would be mitigated. The impact on environmental justice populations would not be considerably more severe or greater in magnitude than the impact on the general population.

Operation

Upon completion of the I/A OWTS Alternative, beneficial effects on groundwater and surface water quality would be less substantial than under the Proposed Action. I/A OWTS installations would be subject to flooding at the system surface, posing risk for damage to non-flood resistant equipment, decreased system efficiency, and risk to human health and the environment, similar to existing conditions.

Under the I/A OWTS Alternative, the beneficial effects on public health would be less substantial than those under the Proposed Action.

The adverse impacts on environmental justice populations would not be considerably more severe or greater in magnitude than the impact on the general population, and the environmental justice communities would experience the same benefits as the general population.

6.2.2.14 Noise

Construction

Under the I/A OWTS Alternative, no noise would be experienced by the residential receptors west of Maple Avenue and north of Sunrise Highway or users of recreational facilities southeast of the airport and north of Sunrise Highway. This alternative would not generate noise associated with the installation of sewage lines, including construction equipment and materials deliveries, along roadways in the neighborhoods south of Sunrise Highway.

However, noise generated during the removal of old OWTS and excavation and installation of new I/A OWTS at each of the parcels in the study area would affect the property subject to the I/A OWTS installation (subject property) and other properties in the vicinity.

Stationary Impacts

For the evaluation of noise for the I/A OWTS Alternative, several assumptions were made:

- equipment required would include a heavy truck (to dispose the old OWTS and any excavation, and later, to deliver the new I/A OWTS), a backhoe, and other construction equipment);
- I/A OWTS would be installed on the subject property, approximately 15 feet from the residence or structure;
- construction at each property would take approximately two weeks; and
- ambient noise at each property is represented by the monitored noise levels at ML 2 (50.4 dBA).

For the subject property, the Roadway Construction Noise Model was populated with the indicated equipment at a distance ranging from 15 feet to 20 feet. For the adjoining properties, equipment was placed at a distance ranging from 30 to 50 feet, and for properties farther from the subject property, equipment was placed at a distance ranging from 100 to 120 feet.

Roadway Construction Noise Model noise level results are presented in **Table 6.2-1**.

As shown in the table, significant noise impacts are expected during construction work for I/A OWTS installation. At times during the two-week construction period at any one property, noise levels could reach 92 dBA or higher. Properties in the vicinity could reach 84 dBA.

Table 6.2-1. I/A OWTS Alternative Construction Noise Impacts

I/A OWTS Installation				
	Construction Noise Levels	**Monitored Ambient**	**Increase over Existing**	**Increase over FTA Construction Criteria**
Subject Property	92.4 dBA	50.4 dBA	42.0 dBA	12.4 dBA
Property Adjacent	84.0 dBA	50.4 dBA	33.6 dBA	4.0 dBA
Further Properties	75.8 dBA	50.4 dBA	25.4 dBA	--

Mobile Impacts

As noted earlier, a doubling of traffic, in terms of noise PCEs, would generate an approximately 3 dBA increase in traffic noise. Expected construction traffic would consist of two or four heavy truck trips over the course of the two-week construction duration at each property. The addition of this traffic, plus several daily worker trips, traffic, in terms of noise PCEs, would not double PCEs.

Summary

Implementation of the I/A OWTS Alternative would generate moderate, adverse noise impacts on receptors at each of the parcels within the study area. Although the impact experienced at the subject property and adjacent properties would at times exceed the FTA 8-hour Leq (dBA) impact criteria, the construction duration is relatively short—approximately two weeks. These impacts would be short-term and temporary. Mitigation is identified below.

Operation

I/A OWTS would primarily be installed below ground on each property. Operation of these systems would not generate substantial noise that would affect sensitive receptors. Operation of the I/A OWTS Alternative would result in no effects on noise.

Mitigation

Mitigation measures similar to those described under Section 5.15.3.4, Mitigation, would be implemented.

6.2.2.15 Transportation

Construction

Expected construction traffic would consist of two to four heavy truck trips over the course of the two-week construction duration at each property. The addition of this traffic, plus several daily worker trips, would be dispersed geographically across the study area. It would also be dispersed across the four years of gradual OWTS replacement. Impacts would be short-term and negligible at each location.

Operation

Operational traffic for the I/A OWTS Alternative would consist of regular maintenance and solids removal, similar to existing conditions. There would be no long-term effects because there would be no change from current conditions.

6.2.2.16 Community Services and Facilities

Construction of the I/A OWTS Alternative would involve excavation and connection of the new systems to existing buildings. This construction activity could temporarily limit access to community facility amenities (e.g., an outdoor area at a day care)) and could result in construction-related impacts on air, noise, and transportation, as documented in other sections of this document. These impacts would be short-term, minor, and adverse.

Operation of the I/A OWTS Alternative would not increase area residential or employee populations. It would not disrupt operation of community facilities and services. There would be no long-term effects.

6.2.2.17 Public Health and Safety

Construction

Similar to construction of the Proposed Action, construction of the I/A OWTS Alternative would result in short-term, minor impacts on air quality and noise in the vicinity of construction activity, which would be addressed through adherence to Occupational Safety and Health Administration regulations and mitigation measures identified in Sections 5.3 and 5.15. Construction of the I/A OWTS Alternative would result in short-term, minor, adverse impacts on public health and safety.

Operation

The replacement of the existing failing OWTS with I/A OWTS below ground would reduce the number of existing system failures but would still potentially allow for system failures associated with increased groundwater levels and overland flooding caused by precipitation and/or tidal and storm surges. Therefore, operation of I/A OWTS could result in continued sewage and pathogen exposure during storm events. There would be a long-term, moderate, adverse impact on public health and safety, similar to the No Action Alternative.

The I/A OWTS Alternative would, however, decrease the discharge of pollutants that degrade the floodplains and tidal wetlands in the region. As described under the Proposed Action, reducing floodplain and wetland degradation would allow these resources to better dissipate wave energy and mitigate flooding associated with tidal surge, which in turn would reduce public health and safety effects caused by flooding and storm-related failure of OWTS. Therefore, from this perspective, effects on public health and safety would be long term and beneficial.

Overall the I/A OWTS Alterative would result in long-term, beneficial effects on public health and safety.

6.2.2.18 Climate Change

Greenhouse Gases

Temporary construction emissions would occur, but they would be of a smaller magnitude than those required for extensive excavation and earthmoving under the Proposed Action. Construction-related greenhouse gas impacts would be short-term and negligible.

Information on the direct greenhouse gas emissions of I/A OWTS is not available. Indirectly, each OWTS system results in approximately 980 kWh per year of electricity demand (Reclaim Our Water 2017). The alternative would annually result in 1,868.92 metric tons CO2e generated by electricity use.

Storms and Sea Level Rise

Under the I/A OWTS Alternative, the amount of nitrogen and pathogens discharged to groundwater or surface water would be reduced, resulting in indirect climate change benefits. Reduced nutrient discharge from I/A OWTS compared to conventional OWTS would help tidal wetlands in the region to mitigate potential climate change effects by attenuating wave action, reducing the effects of storm surge, and slowing flood flows.

Although I/A OWTS are better able to function under higher groundwater levels than conventional OWTS, they would still be susceptible to effects from inundation associated with storm or tidal flooding. Furthermore, the projected sea level rise of approximately 1 to 4 feet (National Climate Assessment 2014) would also result in higher groundwater levels that would lead to more failures; the greater the sea level rise the more failures would likely occur. Therefore, climate change effects such as rising sea level and increased frequency and intensity of storms would reduce the performance of I/A OWTS, resulting in adverse impacts.

In summary, although the I/A OWTS Alternative would help slow wetland degradation and allow regional wetlands to mitigate flooding, it would not remain fully functional as groundwater levels rise, resulting in long-term, adverse impacts.

6.2.2.19 Public Services and Utilities

Sludge Generation and Disposal

This alternative would result in no change in sludge generation and disposal. This service would continue to be performed by private contractors, and they would truck the sludge to a regulated disposal facility, such as a regional WWTP. There would be no long-term impact.

Energy

Installation of I/A OWTS would consume diesel fuel oil, and gasoline would be used in construction vehicles and equipment. This consumption would represent a negligible fraction of the overall energy consumption in New York State, or even on Long Island. The short-term energy impact would be negligible.

IA/OWTS provide on-site aerobic metabolism of waste material. Aggregated energy consumption of these systems would be lower than with traditional AWTF and pump station methods for wastewater treatment, given that wastewater would not be required to be pumped to a centralized treatment plant. Energy consumption for the entire area would total 1.6 GWh, or less than 0.01 percent of the energy PSEG generates annually. Therefore, the long-term energy impact for the I/A OWTS Alternative would be negligible.

6.3 Alternatives Considered but Dismissed

Three other alternatives were considered. Each of these three alternatives was evaluated in the Alternatives Screening Report (Appendix B.3) and dismissed. These alternatives differ in terms of wastewater treatment technology, collection system, and AWTF location, as discussed below.

6.3.1 Centralized System with Different Wastewater Treatment Technology

This alternative is similar to the Proposed Action. It would entail installation of a combination low-pressure and gravity sewer collection system with centralized wastewater treatment. However,

instead of an MBR or SBR as proposed under the Proposed Action, a Modified Ludzack-Ettinger process would be used to remove nitrogen.

The Modified Ludzack-Ettinger process requires an oxygen-deficient pre-anoxic zone for denitrification followed by an oxygen-rich aeration zone for nitrification and a secondary clarifier for sludge removal. Flow into the pre-anoxic zone comprises screened treatment plant influent and recycled process flow from the downstream aeration zone and secondary clarifier. The primary advantage of a Modified Ludzack-Ettinger process is the energy savings obtained over time.

This alternative was dismissed because the Modified Ludzack-Ettinger process would result in higher nitrogen concentration in the effluent than would an MBR or SBR process. Therefore, in terms of nitrogen removal, this alternative would not be cost-effective for the proposed sanitary service area. For more details, refer to Appendix B.3, Alternatives Screening Report.

6.3.2 Centralized System with Different Collection System Infrastructure

This alternative is similar to the Proposed Action. It would entail installation of a combination low-pressure and gravity sewer collection system with centralized wastewater treatment. However, this alternative would construct a combination of gravity and *vacuum* sewers rather than low-pressure sewers.

Vacuum sewers rely on vacuum pumps to create a pressure differential to convey wastewater from individual properties to the treatment facility. The pressure differential is created by a vacuum pump located at a centralized pump station. The pump is connected to an enclosed collection tank that is directly connected to the collection system pipes. Wastewater from individual properties first flows into an on-site storage tank. Once it reaches a particular level in the tank, a pneumatic valve opens, and the induced vacuum suction causes wastewater to flow into the collection system piping and to the enclosed collection tank at the pump station. It is then conveyed to the treatment facility via dry pit sewage pumps and force mains. The main advantage of vacuum sewers is their reduced capital cost associated with simpler trenching at shallower depths and other factors.

Vacuum sewers are only effective in relatively flat areas with less than 10 feet of static head. The technology has not experienced widespread use; therefore, it is generally unknown to both utility contractors and operators. The applications to date have been for generally smaller service areas in newer developments.

This alternative was dismissed because it would have relatively high capital costs and would require substantial investment in locations where static lift exceeds 10 feet. For more details, refer to Appendix B.3, Alternatives Screening Report.

6.3.3 Centralized System with Alternative Location(s) for the AWTF

Under this alternative, an AWTF using an MBR or SBR treatment process and associated leaching area would be located at one of several alternative locations:

- William Floyd Estate in Mastic Beach
- Brookhaven Calabro Airport at the intersection east and south of the two runways
- Brookhaven Calabro Airport on Moriches Middle Island Road northeast of the airport
- The New York State Department of Transportation Complex

- A development on William Floyd Parkway north of the Long Island Expressway
- Miles Development north of Sunrise Highway and west of Weeks Avenue
- Links at Shirley Golf Course in southern Shirley east of William Floyd Parkway

These alternative AWTF locations were dismissed because the alternative sites were found to have insufficient depths to groundwater, were located too close to residential neighborhoods, had unsuitable site dimensions, and/or were located too far from the area to be sewered (resulting in higher costs) (CDM Smith 2014; Henderson and Bodwell 1999, 2004; SCDPW 2009). For more details, refer to Appendix B.3, Alternatives Screening Report.

6.4 Alternatives Impact Summary

Table 6.4-1 summarizes the impacts of the alternatives.

Table 6.4-1. Alternatives Summary of Impacts

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Topography and Soils	*Construction:* Negligible impacts on topography from alteration of the elevation of land surface outside the footprint of the facility. Negligible impacts from construction of the proposed sewer district. Minor, adverse impacts on soils from erosion and compaction, and increase in impermeable surfaces. Adverse impacts would be minimized by BMPs for soil erosion and stormwater protection, compliance measures, and engineering controls. *Operation:* Replacing permeable land with impermeable surfaces (e.g., buildings and parking lots) would have a minor, adverse impact on soils.	No effect.	*Construction:* Negligible impacts on topography. Potential minor, adverse impacts on soils if excavation and grading activities were required for upgrades. Adverse impacts would be minimized using mitigation measures similar to those described for the Proposed Action. *Operation:* No effect.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Air Quality	*Construction:* Short-term, minor adverse impacts from emissions associated with construction equipment and vehicles. Adverse impacts would be minimized by EPA equipment compliance measures and performance standards, minimization of idling times, and implementation of a fugitive dust control plan. *Operation:* Negligible impact on air quality from VOC emissions associated with treatment operations and long-term, minor, adverse impacts on air quality from backup power generator use. Adverse impacts would be minimized by following EPA equipment compliance measures and performance standards, minimizing idling times, and implementing a fugitive dust control plan.	No effect.	*Construction:* Short-term, negligible impacts from emissions associated with construction equipment and vehicles; there would be substantially less soil excavation and construction equipment compared to the Proposed Action. Adverse impacts would be minimized using mitigation measures similar to those described for the Proposed Action. *Operation:* Long-term, negligible impacts if emissions of the system were similar to traditional OWTS; there is incomplete information available at this time to determine the level of this impact.
Water Quality	*Construction:* Short-term, minor, adverse impacts on water quality from soil erosion. Short-term, negligible impacts related to hazardous material associated with the removal of the existing OWTS. Short-term, negligible impacts from fuel handling, excavated soils, and potential to uncover hazardous materials. Adverse impacts would be minimized through implementation of BMPs and compliance measures. *Operation:* Potential long-term, adverse impact on groundwater quality as a	Long-term, moderate, adverse impacts on water quality from continued groundwater and surface water pollution associated with the ongoing risk of discharge of sanitary wastewater from OWTS failure during flood events.	*Construction:* Minor, short-term, adverse impacts would be similar to those described under the Proposed Action. Adverse impacts would be minimized using mitigation measures similar to those described for the Proposed Action. Negligible, short-term hazardous-material-related impacts would be expected to result from the handling of fuel, excavated soils, and other potentially hazardous materials during construction. *Operation:* Long-term, adverse impacts would be similar to those described under

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
	result of the discharge of small quantities of PPCPs with long-term, significant, beneficial effect on groundwater quality and surface waters from nitrogen removal and increased pollution treatment levels achieved by the AWTF. Short-term, adverse impacts on groundwater quality because of repair activities. Long-term, negligible to minor, adverse impacts from required handling and storage of hazardous materials, increased generation of sludge, increased use of potable water, and addition of impervious surfaces. Long-term, beneficial effects on water quality as a result of improved sewer system and substantial reduction of the risk of sanitary wastewater releases. Adverse impacts would be minimized through BMPs, compliance measures, and adherence to standard operating procedures.		the Proposed Action; however, beneficial effects on groundwater and surface water quality would be proportionately smaller. Although the system would achieve reduced nitrogen levels compared to existing levels, these levels would not be as beneficial as the levels achieved under the Proposed Action. Potential for additional impacts because of reduced capacity of the leach field during a flood event, which could result in effluent flooding at the system surface and pose a risk for damage to non-flood resistant equipment, decreased system efficiency, and increased risk to human health and the environment. Adverse impacts would be minimized using mitigation measures similar to those described for the Proposed Action.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Wetlands and Coastal Resources	*Construction:* Potential indirect, short-term, minor impacts on downstream wetlands and surface water from soil erosion and sedimentation. Short-term, negligible, adverse impacts on coastal resources. Adverse impacts would be minimized by BMPs and compliance measures. *Operation:* Long-term, beneficial effects on freshwater and tidal wetlands and open waters from a reduction in storm-related sanitary wastewater discharges and high nitrogen concentrations in groundwater and surface water.	Long-term, major, adverse impacts from the continued degradation of wetlands and coastal resources associated with the release of contaminants from OWTS failure during flood events.	*Construction:* Short-term, minor, adverse impacts similar to those described under the Proposed Action. Adverse impacts would be minimized using mitigation measures similar to those described for the Proposed Action. *Operation:* Long-term, beneficial effects similar to those described under the Proposed Action in that there would be a reduction in nutrients and pathogens to area waters, however, reduction levels and other beneficial effects would be proportionately smaller.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Floodplains	*Construction:* Potential short-term, minor, adverse impacts from disturbance of floodplain function, reduction of natural floodplain values, and increases in stormwater runoff from construction if floodplains cannot be avoided. Adverse impacts would be minimized by avoidance and minimization where possible, BMPs, and compliance measures. *Operation:* Long-term, indirect impacts on floodplains from increased runoff from the increase in impervious surfaces. Long-term, indirect, beneficial effects from reduced degradation by pollutants and decrease in the risk of flood loss and flood impacts on human life and property. Adverse impacts would be minimized through BMPs and implementation of flood proofing and design elements. Potential short-term, adverse impacts on the operation of the sewer system from flooding.	Direct, long-term, moderate, adverse impacts from ongoing potential for flood risks associated with inundated OWTS. Indirect, long-term, moderate, adverse impacts from continued reduction of floodplain and wetland functions associated with nitrogen in groundwater.	*Construction:* Short-term, minor, adverse impacts similar to those described under the Proposed Action. *Operation:* Temporary, moderate, adverse impacts and beneficial effects similar to those described under the Proposed Action, with the additional short-term, moderate, adverse impacts from OWTS failure during flood events, and associated increased flood risks to human life and property.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Vegetation	*Construction:* Long-term, moderate, localized, adverse impacts on vegetation from permanent loss of up to 30.7 acres of pine-oak forest vegetation from AWTF and leaching structure construction, and permanent loss of vegetation from pump station construction. Potential impacts from soil erosion and ground disturbance could damage vegetation and allow for non-native invasive plant species to spread or become established. Adverse impacts would be minimized through BMPs and compliance measures. *Operation:* Long-term, beneficial effects from the improved health of upland and wetland vegetation through the prevention of sanitary wastewater overflow during future flood events and reduction in groundwater nitrogen concentrations.	Potential minor, adverse impacts associated with continued nitrogen loading from discharge of sanitary wastewater from OWTS failure during flood events.	*Construction:* Short-term, negligible impacts on vegetation. Adverse impacts would be minimized using mitigation measures similar to those described for the Proposed Action. *Operation:* Beneficial effects similar to those described under the Proposed Action in that there would be a reduction in nutrients and pathogens to area waters, however, reduction levels and other beneficial effects would be proportionately smaller. Additional short-term, repetitive, adverse impacts on vegetation associated with the failure of the OWTS caused by natural hazards and associated flooding.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Wildlife and Fish	*Construction:* Short-term, minor, adverse impacts on wildlife from noise and construction activities. Minor, adverse impacts on migratory bird species from removal of 30.7 acres of trees. Potential impacts on fish and aquatic resources from short-term increases in turbidity and sedimentation in local surface waters. Adverse impacts would be mitigated by BMPs and compliance measures. *Operation:* Minor impacts on terrestrial wildlife. Long-term, beneficial effects on fish and aquatic resources from improved water and sediment quality. Long-term, beneficial effect on the airport area because tree removal would reduce the risk of wildlife hazards to aircraft. Adverse impacts would be minimized through BMPs and compliance measures.	Long-term, moderate impacts from continued risk to aquatic animal species from sewage overflows into waterways during future flood events.	*Construction:* Minor, adverse impacts on wildlife from noise and construction activities would be the same as those described under the Proposed Action, with limited impacts on migratory bird species from minimal tree removal. Impacts on fish and aquatic resources would be similar to those described under the Proposed Action, although adverse impacts would be proportionately less. Adverse impacts would be minimized using mitigation measures similar to those described for the Proposed Action. *Operation:* No impacts on terrestrial wildlife, fish, and aquatic resources. Beneficial effects would be similar to those described under the Proposed Action because the amount of nutrients and pathogens released to area waters would be reduced; however, reduction levels and other beneficial effects would be proportionately smaller and to a lesser degree.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Threatened and Endangered Species and Critical Habitats	*Construction:* Potential short-term, minor, adverse impacts on northern long-eared bats from noise and tree removal associated with construction activities. Potential impacts on silvery aster from increased sedimentation. Adverse impacts would be minimized by conducting tree removal activity outside active northern long-eared bat roosting seasons and by conducting a biological survey prior to construction activities to observe presence or absence of silvery aster. *Operation:* Long-term, beneficial effects from reduction in storm-related sanitary wastewater discharges and of high nitrogen concentrations in wetlands and surface water, which would result in improved water quality.	Minor, adverse impacts on nearby potential habitat for protected species.	*Construction:* No effect. *Operation:* Beneficial effects similar to those described under the Proposed Action. Nutrients and pathogens released to area waters would be reduced; however, reduction levels and other beneficial effects would be proportionately smaller.
Cultural Resources	*Construction:* No effects on archaeological resources. Potential negligible impacts on historic architectural resources from minor landscape disturbance. *Operation:* No impact on archaeological resources or historic architectural resources.	No effect.	*Construction:* Potential minor, adverse impacts on archaeological resources in several areas identified as moderate to high sensitivity. Short-term, negligible impacts on architectural historic resources from the addition of small sized, aboveground components. *Operation:* No effect.
Aesthetic Resources	*Construction:* Short-term, minor, adverse impacts on aesthetic resources and viewsheds from tree removal and the presence of construction equipment.	No effect.	*Construction:* Short-term, minor, adverse impacts similar to those described under the Proposed Action from presence of construction equipment.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
	Operation: Long-term, minor impacts on aesthetic resources and viewsheds from new infrastructure that would present minor new visual features to the surrounding area.		*Operation:* No effect.
Land Use and Planning	*Construction:* Potential short-term, local, negligible impacts if land acquisition is required. *Operation:* Long-term, direct, negligible to minor impacts on the function and land use of 14 parcels from the change in use. Impacts on zoning from proposed government and utility uses in zones A-Residence-I and J-Business-2, which are not currently permitted uses.	No effect.	*Construction:* No effect. *Operation:* No effect.
Socioeconomics	*Construction:* Short-term, beneficial effect on employment because of new construction jobs and associated spending at local businesses in Suffolk County. *Operation:* No effects on businesses and households incurring user, maintenance, and operation fees. Long-term, beneficial effect from access to sewer infrastructure by residential and commercial properties, and long-term, beneficial effect for the community from avoided property loss associated with enhanced ecosystems and improved flood attenuation.	No effect.	*Construction:* Short-term, beneficial effect on employment because of new construction jobs and associated spending at local businesses in Suffolk County. *Operation:* No adverse impacts on businesses and households because long-term maintenance and user costs would be similar to existing conditions. Long-term, beneficial effects from reduced flood risks, but to a lesser extent than the Proposed Action. Negligible effect on property values, and no direct displacement or other effect on population.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Environmental Justice	*Construction:* Minor, adverse impacts in terms of air quality, water quality, transportation, community services and facilities, public health and safety, and aesthetic resources and moderate, adverse impact in terms of noise. The impact on environmental justice populations would not be considerably more severe or greater in magnitude than the impact on the general population. *Operation:* The adverse fiscal impact on owners of connected properties in environmental justice communities would not be greater than for the general population. However, for lower income households, the cost would account for a larger portion of their income. The owners of properties in the environmental justice communities would experience the same benefits from the Proposed Action as the general population.	Long-term, moderate adverse impacts on public health from hazards associated with OWTS failures and increased coastal flood hazards. The impact on environmental justice populations would not be considerably more severe or greater in magnitude than the impact on the general population.	*Construction:* Short-term, minor, adverse impacts in terms of public health and safety, community services and facilities, air quality, water quality, and noise. The impact on environmental justice populations would not be considerably more severe or greater in magnitude than the impact on the general population. *Operation:* The beneficial effect on public health would be less substantial than those under the Proposed Action. The adverse impacts on environmental justice populations would not be considerably more severe or greater in magnitude than the impact on the general population and the environmental justice communities would experience the same benefits as the general population.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Noise	*Construction:* Short-term, moderate, adverse impacts from stationary sources while constructing components of the AWTF, collection system and pump stations, and associated mobile sources (construction traffic). Adverse impacts would be mitigated by implementation of BMPs and conformance with construction work hours and local noise ordinances. Impacts could also be mitigated through specific design requirements (i.e., generally housing equipment within structures and controlling noise by the application of architectural and mechanical features to the degree required to meet the design criteria. *Operation:* Long-term, negligible impacts. Adverse impacts would be mitigated by BMPs, compliance measures, and engineering controls.	No effect.	*Construction:* Moderate, adverse impacts similar to those described under the Proposed Action. Adverse impacts would be minimized using mitigation measures similar to those described for the Proposed Action. *Operation:* No effect.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Transportation	*Construction:* Short-term, minor, adverse impacts associated with construction of sewers. Delays would be anticipated at the northbound and southbound approaches at the intersection of Mastic Beach Road (EB/WB) and Mastic Road (NB/SB); and at the eastbound approach at the intersection of Montauk Highway (EB/WB) and Washington Ave (NB) / Hemiker Street (SB). Adverse impacts would be mitigated by limiting construction times to between 9:00 a.m. and 5:00 p.m. if turning lanes need to be closed at an affected intersection to avoid background peak hours. *Operation:* No effect.	No effect.	*Construction:* Short-term, negligible impacts from construction traffic and added worker trips. *Operation:* No effect.
Community Services and Facilities	*Construction:* Short-term, minor, adverse impacts from temporary property disturbance required to connect to collection and conveyance system. No impact on emergency services during construction. *Operation:* No effect.	No effect.	*Construction:* Short-term, minor, adverse impacts would be similar to those described under the Proposed Action. *Operation:* No effect.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Public Health and Safety	*Construction:* Short-term, minor, adverse impacts from associated air quality and noise impacts that would generate dust, emissions, and noise. In addition, lane closures would require appropriate permitting to ensure maintenance of adequate emergency access. Adverse impacts would be mitigated by compliance measures. *Operation:* Long-term, beneficial effects from the reduction in storm-related OWTS discharges and of high nitrogen and pathogen concentrations in groundwater and surface water. Less assistance would be required from public health and safety providers during storm events from the combination of reduced discharges and the enhanced storm-surge attenuation abilities of the ecosystem.	Long-term, moderate, adverse impacts on public health and safety from contamination and degradation of water quality and the continued poor health of the tidal marshes that would continue to provide poor protection from storm surge and sea level rise also resulting in a continued reduced ability for emergency services to effectively respond during a real emergency.	*Construction:* Short-term, minor, adverse impacts would be similar to those described under the Proposed Action. Adverse impacts would be mitigated using measures similar to those described for the Proposed Action. *Operation:* Long-term, beneficial effect on public health and safety.

Area of Evaluation	Proposed Action	No Action Alternative	I/A OWTS Alternative
Climate Change	*Construction:* Short-term, minor, adverse impacts from peak-year construction greenhouse gas emissions of 5,271 metric tons CO_2e. *Operation:* Long-term, minor, adverse impacts from a net greenhouse gas increase in 7,123.5 metric tons CO_2e per year, with beneficial effects from reduced methane emissions. Long-term, indirect benefits on proposed project of less direct discharge and nitrogen and pathogen loading due to increased coastal resiliency.	Long-term, negligible greenhouse gas emissions. Indirect, short-term, moderate, adverse impacts from the ongoing potential for flood risks associated with discharge from inundated OWTS and direct, long-term, moderate adverse impacts from the alteration of natural tidal wetland functions, including storage of floodwaters and flood and wave attenuation.	*Construction:* Short-term, negligible, adverse impacts from temporary greenhouse gas emissions from equipment and haul trucks. *Operation:* Long-term, adverse impacts because system operations would only be partially functional as groundwater levels rise. Beneficial effects similar to those described under the Proposed Action.
Public Services and Utilities	*Construction:* Short-term, negligible impact on energy from expenditure of gasoline, diesel, and electricity and negligible contribution to overall energy consumption in New York State from petroleum consumption. *Operation:* No effects from sludge disposal. Long-term, negligible impacts on energy; system operations would contribute 0.07% to annual Long Island GWh consumption.	No effect.	*Construction:* Short-term, negligible contribution to overall energy consumption in New York State from petroleum consumption. *Operation:* Long-term, negligible impacts on energy; system operations would contribute 0.01% to annual PSEG generation.

7.0 PERMITS, REVIEWS, AND APPROVALS

GOSR and Suffolk County are responsible for obtaining all applicable federal, state, and local permits; reviews and other authorizations for project implementation prior to construction; and adherence to all permit conditions. Any substantive change to the approved scope of work will require re-evaluations by FEMA for compliance with NEPA, GOSR for compliance with SEQRA, and other laws and executive orders. The anticipated permits, reviews, and approvals required to complete the project are provided in **Table 7-1**.

Table 7-1. Anticipated Permits, Reviews, and Approvals

Federal Permits, Approvals, and/or Consultation	Agency
Section 106, NHPA / Tribal consultation	NYSHPO
Section 7 Threatened and Endangered Species consultation	USFWS
Section 1424(e) Safe Drinking Water Act of 1974 – Sole Source Aquifer Protection Program	EPA
FAA Order 5050.4B	FAA
FAA Order 1050.1F	FAA
New York State Permits, Approvals, and/or Consultations	**Agency**
Freshwater Wetlands – ECL Article 24	NYSDEC
SPDES discharge permit	NYSDEC
SPDES General Permit for Stormwater Discharges from Construction Activity / SWPPP	NYSDEC
NYNHP species consultation	NYSDEC
Water Withdrawal Permit for dewatering activities	NYSDEC
Coastal Zone Management – State Coastal Consistency Concurrence	NYSDOS
Section 14.09 New York State Historic Preservation Act	NYSHPO
Road opening permits and/or easements	New York State Department of Transportation
State Highway Access and/or State Highway Road Permit	New York State Department of Transportation
Approval of design and construction for infrastructure crossing Long Island Rail Road	Metropolitan Transportation Authority, Long Island Rail Road
Part 85 Approval of costs ensuring tax impacts on property owners are not increased	Office of the New York State Comptroller

Local Permits, Approvals and/or Consultations	Agency
Inter-municipal agreement	Town of Brookhaven
Suffolk County Article 6 and Article 7	SCDHS
Approval of design and space requirements	SCDHS, SCDPW
Road opening permits	SCDPW
Suffolk County Sanitary Code Article 9 and Article 12	SCDHS

8.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

This EIS will be made available for agency and public review and comment for a period of 30 days. The public information process will include a public notice with information about the Proposed Action and its alternatives in the Long Island Advance weekly newspaper. The EIS will also be made available for download at http://stormrecovery.ny.gov/environmental-docs.

A hard copy of the EIS will be available for review at the following locations:

New York State Governor's Office of Storm Recovery
25 Beaver Street, 5th Floor
New York, NY 10004
Monday–Friday, 9:00 a.m.–4:00 p.m.

Brookhaven Free Library
273 Beaver Dam Road
Brookhaven, NY 11719
Monday–Thursday, 9:30 a.m.–8:00 p.m.; Friday, 9:30 a.m.–5:00 p.m.; and Saturday, 9:30 a.m.–5:00 p.m.

Mastic Moriches Shirley Community Library
407 William Floyd Parkway
Shirley, NY 11967
Monday–Thursday, 9:00 a.m.–9:00 p.m.; Friday, 9:00 a.m.–6:00 p.m.; Saturday, 9:00 a.m.–5:00 p.m.; Sunday, 12:00p.m.–4:00p.m.

Town of Brookhaven
Town Clerk
1 Independence Hill
Farmingville, NY 11738
Monday–Friday, 9:00 a.m.–4:00 p.m.

Suffolk County
Division of Planning & Environment
H. Lee Dennison Building, 4th Floor
100 Veterans Memorial Hwy
Hauppauge, NY 11788
Monday–Friday, 9:00 a.m.–4:00 p.m.

Suffolk County District 3
Legislator Rudy A. Sunderman
1120 Montauk Highway, Suite G
Mastic, NY 11950

Town of Brookhaven
Councilman Daniel J. Panico
1 Independence Hill
Farmingville, NY 11738

Town of Brookhaven
Councilwoman Valerie M. Cartright
1 Independence Hill
Farmingville, NY 11738

Interested parties may download an electronic copy of the EIS at https://stormrecovery.ny.gov/environmental-docs. This EIS reflects the evaluation and assessment of the State of New York, the decision maker for the state action; however, GOSR will consider any substantive comments received during the public review period to inform the preparation of the final EIS and final decision regarding project implementation. The public is invited to submit written comments by emailing NYSCDBG_DR_ER@nyshcr.org or via mail to:

Matt Accardi
Governor's Office of Storm Recovery
25 Beaver Street, 5th Floor
New York, New York 10004

Part 1 of the Full Environmental Assessment Form was published on the New York Storm Recovery website. On November 13, 2015, GOSR submitted lead agency letters to the following potentially involved or interested agencies: Town of Brookhaven; Town of Brookhaven Planning Board; SCDHS; SCDPW; Suffolk County CEQ; Suffolk County Department of Economic Development and Planning; Suffolk County Planning Commission; Suffolk County Police Department, 7th Precinct; Mastic Fire Department; Mastic Ambulance Company; Shirley Ambulance Company; NYSDEC – Region 1; NYSHPO; NYSDOS, Division of Coastal Resources; New York State Department of Health; Metropolitan Transportation Authority, Long Island Rail Road; Long Island Regional Planning Council, New York State Environmental Facilities Corporation; New York State Department of Transportation; New York State Division of Homeland Security and Emergency Services; and New York Office of State Comptroller, Division of Legal Services under the coordinated review procedure in accordance with SEQRA. No agency objected to GOSR acting as lead agency for the purpose of implementing SEQRA.

On August 25, 2015, FEMA invited EPA-Region 2, by letter, to be a cooperating agency. EPA confirmed cooperation on the same day. On October 20, 2015, FEMA invited FAA, by letter, to be a cooperating agency to which FAA confirmed cooperation on December 2, 2015.

Phase IA archaeological sensitivity and architectural resource assessments were submitted to the NYSHPO for review and comment. On May 30, 2017, the NYSHPO concurred with the architectural resource assessment finding that no historic properties would be affected. For the archaeological review, the NYSHPO requested additional Phase IB testing at several pump station

sites and the AWTF that had potential for archaeological remains. The Phase IB survey was submitted to the NYSHPO for review and comment and received concurrence of the findings on February 9, 2018.

Consultation with NYSDOS was initiated on December 29, 2016, to assess compliance with the State Coastal Management Program policies under the Coastal Zone Management Act. On January 27, 2016, NYSDOS determined that the project meets the program's general consistency concurrence criteria (Appendix C.1).

The public outreach program for the Proposed Action has been complemented by the website developed for the project: www.forgewatershedsewers.com and the public review process required under NEPA and SEQRA, which involves compliance with Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands. Compliance with Executive Orders 11988 and 11990 includes the early notice of the Proposed Action, which was published on the GOSR website: http://stormrecovery.ny.gov/environmental-docs and in the Environmental Notice Bulletin on December 23, 2015, in a combined early notice of a proposal in a 100-year floodplain and wetlands and notice of SEQRA Positive Declaration, public scoping meeting, public comment period, NEPA environmental assessment, and Notice of Section 106 NHPA review. The notice invited all interested agencies, tribes, groups, and persons to submit written comments regarding on the Proposed Action and the Draft Scope of Work.

9.0 LIST OF PREPARERS

U.S. Federal Emergency Management Agency (FEMA) – Region 2
26 Federal Plaza
New York, NY 10278-0002

New York State Governor's Office of Storm Recovery
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Suffolk County
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100 Veterans Memorial Highway, 4th Floor
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10.0 REFERENCES

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