LONG ISLAND POWER AUTHORITY
BETHPAGE 3
ENERGY CENTER

ENVIRONMENTAL ASSESSMENT

PREPARED BY:

AKRF, INC.
CARTER, LEDYARD & MILBURN, LLP

BASED ON MATERIALS SUBMITTED BY:

CALPINE

EARTHTECH

State Environmental Quality Review
NEGATIVE DECLARATION
Notice of Determination of Non-Significance

Project Number: _____ Date: May 26, 2004

This notice is issued pursuant to Part 617 of the implementing regulations pertaining to Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law.

The Long Island Power Authority, as lead agency, has determined that the proposed action described below will not have a significant environmental impact and a Draft Impact Statement will not be prepared.

Name of Action: Bethpage 3 Energy Center, LLC Combined Cycle Project

SEQR Status: Type 1 x__
Unlisted ___
Type II emergency action __

Conditioned Negative Declaration: ___ Yes
_x_ No

Description of Action:

As a result of a Request for Proposals for new, on-island combined cycle generation projects for early summer 2005, the Long Island Power Authority (LIPA) is considering entering into a power purchase agreement with Calpine Corporation or its affiliates to purchase output from the proposed electrical generating facility to be constructed on property located in the unincorporated community of Hicksville in the Town of Oyster Bay, Nassau County, Long Island. The proposed facility, to be called the Bethpage 3 Energy Center, LLC Combined Cycle Project, would consist of a 79.9 megawatts natural gas-fired General Electric (GE) LM 6000 combustion turbine with a once through steam generator equipped with duct burners, a steam turbine generator and a five-cell cooling tower. The proposed facility is expected to be operational by summer 2005. Process water would be supplied by wells owned and operated by Northrop Grumman Corporation.

The project would also involve the construction of a new 12-inch natural gas pipeline, approximately one-mile long, that would run parallel to the existing 8-inch natural gas pipeline under Route 107. In addition, a new 2.5-mile 69-kilovolt electric transmission line would be built, mostly above ground, from the Calpine site to the existing Bethpage Substation.

Location:

The proposed facility would be located adjacent to existing Calpine power generation facilities on the east side of Hicksville-Massapequa Road (NYS Route 107) within the southwest portion of the Grumman Bethpage complex in the west/central portion of the Town of Oyster Bay.

Reasons Supporting This Determination:

A comprehensive Environmental Assessment (EA) was completed, and a determination of significance was issued by the LIPA Board of Trustees on May 26, 2004. The EA analyzed potential environmental impacts of the project related to land use and zoning, community facilities, cultural resources, visual resources, socioeconomic and environmental justice, traffic and transportation, air quality, noise, infrastructure, contaminated materials, soils, geology and seismology, natural resources, water resources and chemical handling, construction, and cumulative impacts and found that no significant adverse impacts would result from the proposed project in any of such areas. Based upon the EA, LIPA has determined that the proposed project would not have any significant adverse impact on the environment and, accordingly, that an environmental impact statement is not required for the proposed project. A full statement of the reasons supporting LIPA's determination that no significant adverse environmental impacts would result from the proposed project is set forth in the EA.

For Further Information:

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A. INTRODUCTION

As part of the Long Island Power Authority (LIPA) program to satisfy the need for additional generating capacity and improve system reliability on Long Island, LIPA issued a Request for Proposal (RFP) seeking developers to provide power from new, on-Island combined cycle electric generating facilities. The RFP specified a maximum electric output of 79.9 megawatts (MW) to be available early in the summer of 2005 for a period up to 20 years. LIPA received fifteen proposals. They were evaluated by a Selection Committee consisting of an interdisciplinary group of experts. The Selection Committee ranked the proposals and made recommendations to a team of senior LIPA executives. The Bethpage 3 Energy Center, LLC, a subsidiary of the Calpine Corporation (Calpine), was selected as one of two that best meets the terms of the RFP and LIPA's needs to ensure on-Island system power and system reliability. The evaluation and selection process is described in more detail below in this Project Description chapter.

Calpine proposes to construct and operate a state-of-the-art combined cycle unit (proposed project) in the unincorporated community of Hicksville located in the Town of Oyster Bay, Nassau County, New York. The location of the proposed project is shown in Figure S-1. The proposed project would be located on a site (proposed project site) adjacent to existing Calpine power generation facilities on the east side of Hicksville-Massapequa Road (NYS Route 107), in the west/central portion of the Town of Oyster Bay. Calpine would build, own and operate the proposed generating facility on land that is currently owned or leased by a subsidiary of Calpine. LIPA would acquire, either by direct purchase, condemnation or transfer of jurisdiction, the 1.7-acre project site and then would lease the site back to Calpine. Electricity generated by the proposed project would be purchased by LIPA to satisfy the demand for additional electricity and to increase system reliability on Long Island.

The proposed project would entail the construction and operation of a General Electric (GE) LM6000 SPRINT combustion turbine (CT) generator. The project schedule calls for the new combustion turbine to be in commercial operation during June 2005. The major equipment includes the GE LM6000 combustion turbine generator, an IST once through steam generator (OTSG) equipped with duct burners, a Siemens Westinghouse steam turbine generator, and a five-cell cooling tower. The electric generating facility would operate in a combined-cycle mode, using the waste heat from the combustion turbine to generate additional electricity in the steam turbine generator. The proposed project's output would be 79.9 MW. The CT would use natural gas from KeySpan as its fuel. Process water would be supplied by wells owned and operated by Northrop Grumman Corporation (NGC).

The existing adjacent Calpine power generation facilities consist of 1) a cogeneration facility owned and operated by TBG Cogen Partners and 2) a simple-cycle gas turbine owned and operated by CPN Bethpage 3rd Turbine, Inc. Both entities are subsidiaries of Calpine. The cogeneration facility includes two GE LM2500 PE combustion turbine generators, two heat

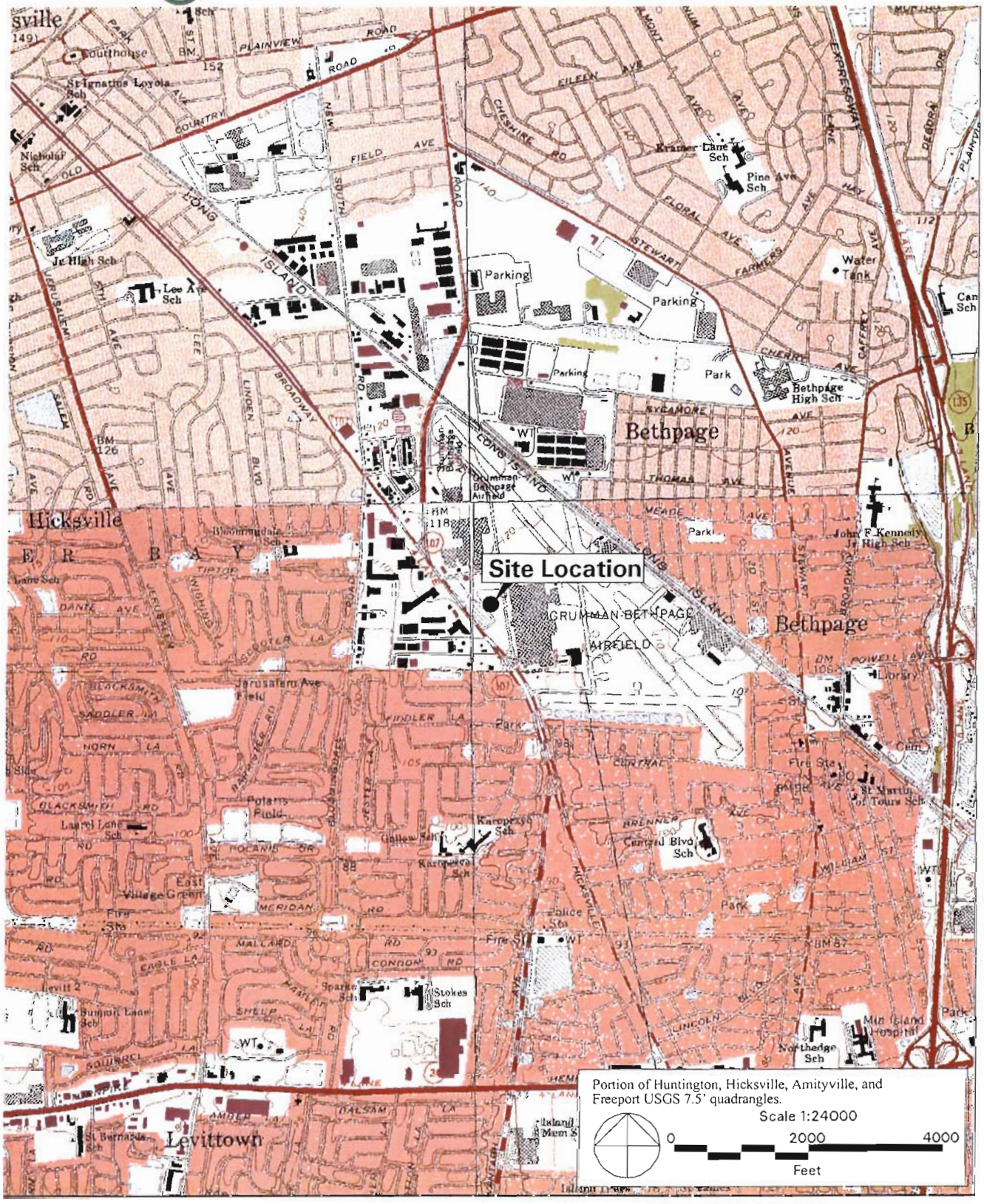


Figure S-1

Site Locus Map

recovery steam generators, and one steam turbine generator. The cogeneration units are fired primarily with natural gas with distillate fuel oil as a backup and have a combined net electrical power output of approximately 57 MW. The simple-cycle gas turbine includes a single GE LM6000 SPRINT combustion turbine generator, the same type of turbine to be installed for the proposed project. The simple-cycle unit is fired exclusively with natural gas and has a nominal net electrical power output of approximately 47 MW. Electrical power from the Calpine power plant is sold under existing power purchase arrangements with both the Northrop Grumman Corporation (NGC) and LIPA. Steam generated at the cogeneration plant is sold to the NGC.

This Environmental Assessment (EA) for the proposed project has been prepared in accordance with the requirements of the New York State Environmental Quality Review (SEQR) Act and its implementing regulations. The EA provides an analysis of the potential environmental impacts of the proposed project to allow for an informed determination of whether the project may result in any significant adverse environmental effects. The analysis of potential environmental impacts includes all relevant environmental disciplines, including land use and zoning, community facilities, cultural resources, visual resources, socioeconomics and environmental justice, noise, air quality, infrastructure, contaminated materials, soils, natural resources, water resources and chemical handling, and construction. Because it is expected that the proposed project would be constructed and operating in about 12 months and that no material changes in the area are expected in that time frame, future conditions without the proposed project are expected to be the same as existing conditions. Therefore, potential impacts are assessed by comparing future conditions with the proposed project to existing conditions.

Although the proposed project constitutes a discrete action under SEQR and is not dependent on any other facility being approved, this EA nevertheless includes, where relevant, the cumulative effects and potential impacts from other facilities, either operating or proposed for LIPA, to ensure a conservative analysis.

B. PURPOSE AND NEED

LIPA has determined that there is a need for an additional 116 MW to meet the energy needs of the LIPA service area by the summer of 2005, and to prevent Long Island's generating capacity from slipping below prudent levels in future years. This shortfall assumes that the 330 MW Cross Sound Cable is permitted to also operate to meet Long Island's energy needs. Without the Cross Sound Cable, the prospects of meeting Long Island's energy needs are far more dire. LIPA's projections of future energy needs on Long Island indicate that the peak demand will grow each year by approximately 70 to 80 MW between now and 2012. The energy requirements are projected to increase approximately 22,000,000 megawatt hours (MWh) per year during this period.

In 2002, the need for additional generating capacity on Long Island became very evident. On July 3, 2002, during a heat wave, LIPA's power demand reached a new record high of 5,030 MW. On July 29, 2002, that record was broken when the demand for electricity reached an all time high of 5,059 MW. During the 2003 summer peak period, LIPA delivered nearly 10 percent more power than the prior record set in 2001. On an annual basis, LIPA's summer demand has been increasing at about 5 percent per year. The summer of 2003 did not produce a new peak demand record, because it was cooler than normal. However, electricity demand models projected that an extreme heat wave similar to August 2001 could have driven LIPA's peak-hour demand as high as 5,300 MW, translating into a growth of about 5 percent.

Additionally, LIPA experienced new winter peaks in 2004. In January, LIPA set a new one–hour winter peak demand record of 3,606 MW. This represents a 159 MW, or 4.6 percent, increase over the previous winter peak of 3,447 MW that occurred January 27, 2003.

Given this level of growth, the loss of a large generating unit or major transmission interconnection could have a devastating impact on LIPA's electrical system. To maintain system reliability and to guard against these potentially severe consequences, LIPA has developed a stringent set of criteria that takes into consideration the specific operational conditions or contingencies that impact LIPA's resource planning for its service area. These criteria require LIPA to have sufficient resources available to ensure uninterrupted service to the residents of Long Island.

The New York Independent System Operator (NYISO) requires LIPA to either own, or have contracts for, generating capacity and other resources to meet peak summer demand, plus a reserve of 18 percent. Resources available to satisfy this demand include power generation facilities and other demand-side resources. The reserve requirement is necessary in the event of possible forced outages of power plants, as well as weather conditions that may be warmer than anticipated, as experienced during the past several of the past summers.

In addition to requiring the above referenced 18 percent reserve, NYISO also requires LIPA to maintain a certain percent of its generating resources within LIPA's service area due to the limited transmission capacity to this area. This is called the "locational based installed capacity requirement." LIPA's transmission capacity is limited because of Long Island's geographical separation from the major transmission infrastructure in New York State's electric grid. The LIPA service area is one of only two areas in the state on which this requirement is imposed – the other is New York City. This locational requirement was set at 95 percent of the expected summer peak demand in 2003. However, this requirement was updated by NYISO in February 2004 to 99 percent. This increase can be attributed to improvements in the reliability evaluation methodology, the shape of the load growth, and outages experienced on underwater transmission cables connecting Long Island to the rest of the power grid. These outages negatively impacted the NYISO's assessment of the reliability of LIPA's interties, resulting in the increase in LIPA's locational installed capacity requirement.

The recent rescission of the United States Department of Energy (DOE) emergency order, which previously allowed the Cross Sound Cable to operate, increases the need for capacity on Long Island. In essence, Long Island has already experienced its second largest contingency. The failure of the largest contingency or two of the next largest contingencies could easily put LIPA in the position of interrupting load to customers in order to preserve the bulk power system reliability. Additionally it is unclear how the NYISO will respond to the effects of the DOE order. It is possible that NYISO requirements may increase to higher levels as a result of the DOE order. LIPA intends to request an emergency order from the DOE, however, there is no assurance that it will be approved, or issued in a timely fashion. Therefore, in keeping with prudent planning practices, LIPA may undertake alternate emergency measures to address this emergency situation.

Maintaining the high level of availability from LIPA's existing generating resources is also a concern. Long Island's transmission and capacity constraints are aggravated by the fact that the generating infrastructure in LIPA's electrical system is relatively old. The majority of the generating resource capacity comes from facilities that are more than 30 years old, and a significant portion of the generating capacity is derived from facilities that are more than 40 years old. During the summer of 2002 peak demand period, virtually all of the LIPA generating

facilities were operating, and well over 95 percent of the generating capacity was available -- this exceeded LIPA's availability expectations for such units. Due to regional demands for electricity, LIPA's ability to receive additional capacity from other areas to LIPA's service area was extremely constrained. Had any significant equipment failures occurred on LIPA's system, emergency measures and possibly rolling area blackouts would have been necessary to maintain the integrity of the system. The situation in the summer of 2003 would have been similar if normal, rather than cooler, weather conditions occurred.

The proposed facilities would provide additional generating capacity to the LIPA system of 160 MW for the summer of 2005. These proposed facilities, as, as well as temporary projects and energy conservation initiatives, would enable LIPA to meet the projected annual increase in demand for electricity in the summer of 2005.

C. REQUEST FOR PROPOSALS AND SELECTION PROCESS

In order to meet the power needs of the LIPA service area on Long Island and in New York City with new efficient generation capacity, LIPA issued a formal RFP on February 23, 2004. The new capacity is necessary to meet the growing needs of LIPA's customers, improve reliability and to meet New York Independent System Operator (NYISO) on-Long Island generation requirements. The RFP was sent to known energy developers, advertised on LIPA's web site and published in print publications. The RFP's main requirements included:

- Location in LIPA Control Area with the site controlled by the proposer;
- Combined cycle generation equipment with no restriction on manufacturer;
- A maximum output to the electric grid of 79.9 MW;
- Firm pricing valid through September 30, 2004;
- A commercial operation date of early summer 2005 with a contract length of up to 20 years;
- Either natural gas or liquid fuel; and
- Compliance with all permitting requirements and use of Best Available Control Technology (BACT) for air emissions.

A total of 15 proposals were received. They were subjected to a four step review process by an interdisciplinary team of experts, composed of LIPA staff and consultants. The Selection Committee areas of expertise included legal, contractual and payment terms, economic and financial analysis, power generation, power transmission and distribution, Public Service Commission and NYISO regulatory requirements, and environmental and permitting review. The four-step review process started with a review for conformance with general submittal requirements. Then conformance with financial and technical requirements was confirmed. A general qualitative and quantitative review was followed by a detailed general qualitative and quantitative review. At each step, the findings of the Selection Committee were reviewed and approved by an Executive Committee comprised of LIPA senior staff. The Executive Committee provided an outside check on the workings of the Selection Committee.

Based on the general qualitative and quantitative review, the Selection Committee, after review and approval by the Executive Committee, recommended that five proposers move forward to the detailed qualitative and quantitative review. The detailed review included financial modeling, Multi-Area Production Simulation (MAPS) computer modeling of effects on the electric generation, transmission and distribution systems, and environmental and permitting analyses. The five proposers were sent additional clarifying questions and invited to a formal interview. The interviews typically lasted three hours, and the questions included all areas of

concern. At the end of the detailed qualitative and quantitative review, the Selection Committee, after review and approval by the Executive Committee, are recommending that the Board of Trustees approve LIPA's entering into contract negotiations with Calpine Bethpage 3 Energy Center, along with a second project. The second project, Pinelawn Power, will undergo its own separate environmental review with the Town of Babylon as the lead agency and LIPA as an involved agency.

D. DESCRIPTION OF THE PROPOSED PROJECT

EXISTING SITE AND SURROUNDING CONDITIONS

Calpine proposes to construct and operate a natural-gas-fired, combined-cycle unit on a site located adjacent to the site of existing Calpine power generation facilities. The existing Calpine power generation site is part of a larger assemblage of parcels that historically encompassed the Grumman Bethpage Complex, which was used by Northrop Grumman Corporation to develop and manufacture aviation and related products. Current NGC activities at the Grumman Bethpage Complex occur on only a limited number of parcels; the remaining parcels have been sold for continuing commercial use or are presently owned by the federal government.

NGC's Central Steam Plant is situated to the immediate north-northwest of the site of the existing Calpine power generation facilities and the NGC Navy Plant 5 site is situated to the immediate north of the Central Steam Plant and the site of the existing Calpine power generation facilities. Old South Oyster Bay Road borders the existing power generation site on the east; a LIPA substation and office buildings comprising portions of the Bethpage Business Park are located opposite the existing power generation site on the east side of the Old South Oyster Bay Road. These office buildings were previously part of the Grumman Bethpage Complex. The property to the immediate south of the proposed project site is a paved parking area for tenants of the Bethpage Business Park. Two groundwater recharge basins associated with the NGC storm water management system are situated to the immediate west of the existing power generation and proposed project sites. Hicksville-Massapequa Road (NYS Route 107) runs in a north/south direction immediately west of two recharge basins. Commercial strip development is present on the west side of Hicksville-Massapequa Road.

A view (looking from the south) of the existing Calpine cogeneration and gas turbine facilities site (the existing Calpine power generation site) and proposed project site is shown in Figure S-2. The existing power generation site is dedicated to the operation and support of the existing Calpine power plant. The existing power generation site is entirely paved and is surrounded by perimeter fencing with locking vehicle access gates. A portion of the proposed project site was previously occupied by two aeration basins, which have since been deactivated. Primary vehicle ingress/egress to the site is provided from the west from Hicksville-Massapequa Road via a short paved driveway extending between the two groundwater recharge basins. Two access control gates are provided along the east site perimeter for secondary site ingress/egress purposes. These gates are used on an infrequent, as-needed basis and are kept locked when not in active use. The existing site access and security controls would continue to be utilized for the proposed project.

Land use in the immediate vicinity of the existing Calpine power generation site is light industrial, generally associated with the historical Grumman Bethpage Complex. Residential uses predominate further away from the existing Calpine power generation site, together with a mixture of business uses along primary roadways.

Figure S-2
View of the Existing Facility from the South

PROJECT COMPONENTS

The site arrangement is shown of Figure S-3. The project would be located on two parcels of land, totaling approximately 1.7-acres. The first parcel is about 1.1 acre in size and located immediately south of the existing Calpine power generation facilities. It is owned by a subsidiary of Calpine. The second parcel is known as the Lostritto Parcel, and Calpine has an executed, binding, long-term ground lease with Los Steel III, owner of the land. Calpine currently has a lease on the land, which will become effective on May 31, solely at Calpine's discretion. LIPA would acquire, either by direct purchase, condemnation or transfer of jurisdiction, the 1.7-acre project site and then would lease the site back to Calpine. All the major equipment would be located on these 1.7-acres.

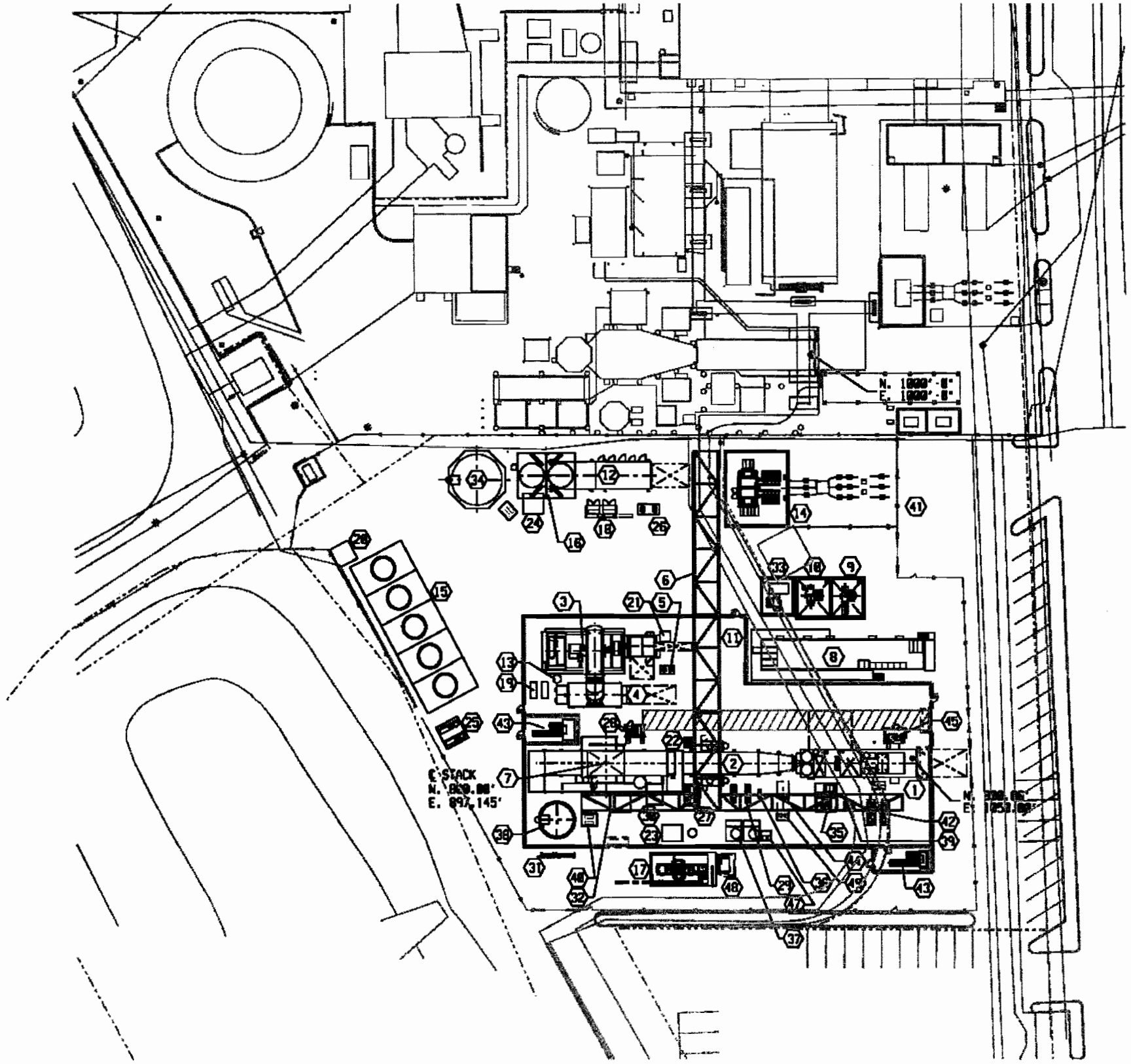
The proposed project's primary equipment components would be a natural-gas-fired General Electric LM6000 SPRINT combustion turbine generator with associated OTSG, duct burners, and steam turbine generator with an electrical output of 79.9 MW. The project would utilize natural gas as its sole fuel. The combustion turbine generator would be able to operate in the range of 50 percent to 100 percent load, and be capable of multiple startups and shutdowns. The following sections describe the components of the combined-cycle electric generating facility.

COMBUSTION TURBINE GENERATOR

The GE LM6000 SPRINT combustion turbine is designed to operate under fast startup conditions in simple cycle mode to provide peak reserve power and assist in balancing the transmission grid. The LM6000 combustion turbine was originally designed for aircraft propulsion (commonly referred to as an aeroderivative). As part of the performance enhancements, the combustion turbine would be equipped with a GE SPRINT evaporative intercooling system. The SPRINT system involves the injection of water into strategic locations to provide an after-cooling effect. This after-cooling allows for enhanced power generation by reducing the air temperature and increasing the mass flow through the combustion turbine. Additionally, the combustion turbine would be equipped with inlet air chillers to increase the density of the incoming combustion air during operation at high ambient temperatures. With evaporative intercooling and inlet air chilling, the LM6000 PC can provide a constant electrical power output of approximately 47 MW operating in simple cycle mode over a wide range of ambient temperatures. In combined cycle mode, the power output to the electric grid would be limited to 79.9 MW.

In the combustion turbine, air enters the compressor inlet through inlet air chilling and filtration system. The air is compressed by a series of rotating and stationary compressor blades. The SPRINT system injects an atomized water spray between the high-pressure and low-pressure compressors. The compressed air then passes into the combustor section where natural gas is fired into a number of burners that form a ring around the circumference of the combustion turbine section casing. The combustor is equipped with a water injection system to limit the production of nitrogen oxides (NO_x).

The hot gas from the combustor combines with the compressed air resulting in a high-pressure gas stream. In the turbine section, the high-pressure gases pass through a series of stationary and rotating turbine blades. The stationary blades channel the hot gas onto the rotating stages in a manner that produces a motive force that turns the rotating section attached to a shaft, which in turn drives a generator.



ITEM	DESCRIPTION	NOTES
1	GAS TURBINE GENERATOR	
2	ONCE THRU STEAM GENERATOR (OTSG)	
3	STEAM TURBINE	
4	CONDENSER	
5	CONDENSATE PUMPS	
6	PIPE RACK	
7	OTSG STACK	
8	POWER DISTRIBUTION CENTER (PDC)	
9	4.16KV AUX. TRANSFORMER	
10	480V AUX. TRANSFORMER	
11	ELECTRICAL EQUIPMENT AREA	COMBINED CYCLE
12	CHILLER	
13	STEAM TURBINE LUBE OIL TANK	
14	GSU TRANSFORMER	
15	COOLING TOWER	
16	AUXILIARY COOLING TOWER	
17	FUEL GAS COMPRESSOR SKID	
18	INLET AIR HEATER SKID	
19	CONDENSER VACUUM PUMPS	
20	COOLING TOWER CHEM. FEED	
21	GENERATOR GROUNDING EQUIPMENT	
22	DRUM BLOWER SKID	
23	AIR COMPRESSOR & RECEIVER	
24	AUX. COOLING TOWER CHEM. FEED	
25	CIRCULATING WATER PUMPS	
26	AUXILIARY COOLING WATER PIPE	
27	STGS CHEMICAL FEED SKID	
28	AMMONIA FLOW CONTROL UNIT	
29	HP BOILER FEED PUMPS	
30	STEAM SAMPLE PANEL	
31	DUCT BURNER SKID	
32	CEMS SKID	
33	INLET AIR HEATER AUX. TRANSFORMER	
34	DEMINERALIZED WATER TANK & PUMPS	100,000 GAL
35	CT AUXILIARY SKID	
36	LP BOILER FEED PUMP	
37	CONDENSATE POLISHERS	
38	CONDENSATE STORAGE TANK	30,000 GAL
39	CT SPRINT SKID	
40	CONDENSATE TRANSFER PUMPS	
41	HIGH VOLTAGE UTILITY INTERFACE	
42	CT WATER INJECTION SKIDS	
43	STAIR WELL	
44	OIL/WATER SEPARATOR	BELOW GRADE
45	CT WASH WATER DRAIN TANK	BELOW GRADE
46	NOT USED	
47	MIXED BED BLOWERS	
48	GAS COMPRESSOR DRAINS TANK	
49	GENERATION BUILDING SUMP AND PUMPS	

NOTES

1. COORDINATE SYSTEM AND PLANT NORTH ARE LOCAL. SEE CIVIL DRAWING C2-1 FOR STATE PLANE COORDINATES AND TRUE NORTH.

0 15 30 60 90 FEET
1" = 30'

Figure S-3
Site Plan

USERNAME ########## DATE/TIME ##########

CP8_M1-1.DGN

INTER-DISCIPLINE REVIEW						
DISC	ARCH	CIVIL	ELECT	I&C	MECH	STRUCT
DATE						
INIT						

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD	REFERENCE DRAWINGS
A	ISSUED FOR REVIEW		LED	LED	KAP		

DSGN	LED	3/16/84
DRN	LED	3/16/84
CKD	KAP	3/11/84
SCALE:	1" = 30'-0"	

FOR BECHTEL ENG ONLY

CALPINE
BETHPAGE
ENERGY CENTER 3
PLAN VIEW
SITE ARRANGEMENT

JOB NUMBER 184975 REV A
DRAWING NUMBER M1-1

ONCE THROUGH STEAM GENERATOR (OTSG)

The combustion turbine exhaust passes into an OTSG, which provides a function similar to a conventional heat recovery steam generator, extracting, heat energy from the exhaust that is used to generate steam. In combined-cycle mode, the steam produced by the OTSG would be delivered to the steam turbine generator for additional power production.

The OTSG is divided into six major components: inlet duct, inlet plenum, environmental controls, steam generator modules, exhaust hood, and exhaust stack. The bulk of the component material consists generally of alloy tubes with carbon steel or stainless steel fins arranged in a horizontal serpentine bundle within the steam generator modules. The OTSG does not employ conventional economizer, evaporator or superheater sections. The point at which the steam-water interface exists is free to move through the horizontal tube bank depending on the heat input, the mass flow rate, and the pressure of the water. The single point of control for the OTSG is the feedwater control valve; valve actuation depends on predefined operating conditions that are set at the distributed control system (DCS), providing steady state superheated steam conditions.

The OTSG does not have steam drums, mud drums, or blowdown systems. The absence of a blowdown system limits thermal losses and lowers the feedwater make up requirements. Water quality is maintained using conventional deionization and polishing exchange equipment. The OTSG has the ability to be run dry. This provides the combustion turbine generator with the ability to be run in simple-cycle mode. The OTSG's full dry running capabilities allow for continued combustion turbine generator operation without the need for a bypass stack or diverter valve system. Environmental controls in the OTSG include noise silencing, selective catalytic reduction, and oxidation catalyst.

DUCT BURNERS

The duct burners within the OTSG are used for supplementary firing to increase steam output when the combustion turbine is operating at 100 percent load. The duct burners would be fired with natural gas only and have a maximum heat input rate of 260 million British thermal units (Btu) per hour (MMBtu/hr) based upon the higher heating value of the natural gas.

AIR POLLUTION CONTROL DEVICES

The proposed project would be designed to minimize emissions of fine particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC). Particulate, SO_2, and VOC emissions would be controlled by the inherent design of the combustion units, implementation of good operating practices, and the use of natural gas. The natural gas would have a sulfur content of about 0.5 grains per 100 dry standard cubic feet. Nitrogen oxide and CO emissions would be controlled by means of combustion controls in combination with flue gas treatment.

The LM6000 CT would utilize a water injection system to reduce the production of NO_x. With this system, water is injected into the combustor through ports in the fuel nozzles to suppress NO_x production, while maintaining low CO and VOC emissions. To further reduce NO_x emission, the combustion turbine would be equipped with a selective catalytic reduction (SCR) system. The SCR system would be designed to limit NO_x emissions to 2.5 parts per million by volume on a dry basis (ppmvd), corrected to 15 percent oxygen (O_2).

The LM6000 CT is designed to minimize the formation of CO and VOC. To further reduce CO and VOC emissions, the CT would also be equipped with an oxidation catalyst system. The oxidation catalyst system would be designed to reduce CO emissions to no more than 0.017 pound per million British thermal units (lb/MMBtu) of heat input.

The emissions of NO_x and CO would be monitored by a continuous emission monitoring system (CEMS) that meets the performance standards established by the United States Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (NYSDEC).

STEAM TURBINE GENERATOR

The steam turbine generator would be a reheat condensing design. It would receive superheated steam from the OTSG and would have the capability to produce approximately 35 MW of electrical power. The combined-cycle unit would be limited to a total electrical power output of 79.9 MW to the electric grid.

COOLING TOWERS

The cooling tower serving the OTSG condenser would be a mechanical draft wet tower design with five cells. The circulating water would be used in the surface condenser to absorb the heat rejected from the OTSG. The cooling tower would employ a drift eliminator designed to reduce water drift to no greater than 0.0005 percent of the circulating water flow. A second cooling tower would also be installed to serve inlet air chillers and miscellaneous cooling needs. This cooling tower would be a mechanical draft wet tower design with two cells. Again, this cooling tower would employ a drift eliminator with a drift elimination efficiency of 0.0005 percent.

STACK

The combustion turbine and duct burner exhaust gases would be routed to the stack, consisting of a rectangular, steel structure with exit dimensions of 10.2 by 8.9 feet and a height of 100 feet above grade. The height of the stack was designed to minimize both ambient air quality and visual impacts. Access platforms for air testing and monitoring equipment would be provided. The stack would not require lighting pursuant to air navigation guidelines established by the Federal Aviation Administration (FAA).

UTILITY INTERCONNECTIONS

The proposed project would require natural gas and electrical interconnections, as well as access to water supply and sewer system.

NATURAL GAS AND ELECTRICAL INTERCONNECTIONS

The existing Calpine power generation facilities receive natural gas from KeySpan Corporation via a 1-mile long gas pipeline that runs under Route 107. This 8-inch diameter pipeline starts south of the proposed site, near the intersection of Acova Avenue and Route 107, and goes directly to the existing Calpine power plant in the Route 107 right-of-way. The existing gas pipeline would not have sufficient capacity to serve both the existing Calpine generating facilities and the proposed facility. KeySpan would build a new 12-inch pipeline parallel to the existing 8-inch to deliver sufficient natural gas to the proposed project. A cross connection between the 8- and 12-inch pipelines would be built just outside of the existing Calpine power

plant. The 12-inch line would enter the site and connect to the proposed power generating facility and to the existing Calpine facilities. An electric gas compressor would be provided onsite to compress the natural gas to the required operating pressures. Separate meters would also be installed to measure gas flow to the proposed project.

The site of the existing power generation facilities includes an electrical substation for power distribution to LIPA via underground transmission lines to an existing LIPA substation. However after study, KeySpan found that the existing substation could not accommodate the additional power from the proposed project. A new electric transmission line going to the existing Bethpage Substation was found to be the most economical and efficient way to send the power into the electric grid. The new electric transmission line from the proposed facility to the existing LIPA Bethpage Substation would cover a distance of about 2.5 miles. The line would be mostly overhead on wooden poles and have three conductors carrying 69 kilovolt (kV). Exiting the proposed facility underground, the transmission line would go above ground and cross NGC property in a northerly direction. At the Long Island Railroad tracks, the line would turn to the southeast and follow the railroad tracks. The Bethpage Substation is located next to the tracks near Merritts Road and Hempstead Turnpike. Foundations for new circuit breakers would have to be installed in the Bethpage Substation, which would not have to be physically expanded.

WATER AND SEWER SYSTEM INTERCONNECTIONS

The existing Calpine power generation facilities are supplied with both potable and process water by NGC and the Hicksville Water District. Potable water is supplied to the existing Calpine power generation facilities by NGC, and received by NGC from the Hicksville Water District. This existing source and onsite connection would be likewise used to supply potable water to the proposed project. Process water would come from NGC's existing water withdrawal wells, via onsite connection to the existing Calpine power generation site's process waterline. This water is not required for groundwater recharge or other purposes.

Sanitary wastes and process wastewater generated by the existing plant are discharged to the Nassau County sewer system via a connection located on NGC property. Process wastewater generated by the proposed project would likewise be discharged via the existing onsite connection to the Nassau County Sewer System.

The existing Calpine power generation site and proposed project site are situated within the interior of Long Island, approximately 12 miles from Long Island Sound (to the north) and approximately 10 miles to the Atlantic Ocean (to the south). The site elevation is approximately 110 feet above mean sea level and is essentially flat. The existing Calpine power generation site is paved, with no vegetation present onsite. Storm water runoff from the existing Calpine power generation site is collected by a series of interconnected catch basins/storm drains that discharge to the larger NGC storm water drainage system, which in turn conveys the storm water to the two groundwater recharge basins located immediately west of the site. These two groundwater recharge basins would also receive storm water runoff from the proposed project.

E. PUBLIC OUTREACH

As part of the project's planning and development efforts, Calpine and LIPA representatives have met with representatives of state, county and local governments and agencies. The intent of the outreach effort is to inform the individuals and groups of the need for, and purpose of, the planned generating facility, and to solicit and exchange information about the project. An open

house was held on November 17, 2003, at which project representatives presented information about the proposed project and were available to answer questions from officials and the public. Calpine and LIPA will continue these public outreach efforts and schedule another public open house in June. At this public open house, representatives of Calpine and LIPA will be available to discuss the project and answer questions with various governmental officials, the surrounding community, environmental interest groups, residents, and other interested parties.

F. PERMITS AND APPROVALS

Development and operation of the proposed project would require the following state regulatory permits, approvals, and actions.

Long Island Power Authority

- Facility power purchase agreement;
- Acquisition by purchase, condemnation or lease of the project site and lease back to Calpine.

New York State Department of Environmental Conservation

- 6 NYCRR Part 201 Air State Facility permit, incorporating Part 231-2 requirements (application submitted October 3, 2003);
- Title IV Acid Rain permit (application submitted October 3, 2003); and
- 6 NYCRR Part 751 State Pollutant Discharge Elimination System (SPDES) permit for construction (granted October 29, 2003).

New York State Public Services Commission

- Section 68 Certificate of Public Convenience and Necessity;
- Article VII approval of new gas pipeline
- Revision of water utility regulation of Northrop Grumman Corporation.

G. PROBABLE IMPACTS OF THE PROPOSED PROJECT

LAND USE

The existing Calpine power generating facilities and NGC's Central Steam Plant co-exist with the various industrial, business and residential uses present within the site vicinity. The proposed project would add a comparable use to the area. No significant adverse land use impacts would be expected to occur as a result of the proposed project with either of the three alternative site plans.

Because LIPA is a state agency, the proposed project does not require local permits, variances, or approvals and is not required to comply with local zoning regulations. Nevertheless, in order to ensure an adequate evaluation of potential impacts of the proposed project with regard to zoning, an assessment of the project conformance with local zoning regulations has been performed. The proposed project would be in substantial compliance with the requirements for the granting of all zoning approvals and variances, with the exception of the height requirements and possibly minimum and/or maximum setback distances. The height variance for the proposed stack reflects an appropriate balance between minimizing visual impacts, while maximizing

exhaust gas dispersion. The height of the proposed turbine and boiler building has been minimized to the maximum extent practical. Minimum and maximum setback distances for the proposed project have also been designed to be consistent with the bulk regulations to the maximum extent practical. The proposed project would be consistent with the requirements for issuance of a special use permit, site plan approval, and variances for height and setbacks. No significant adverse zoning impacts would be expected to occur with any of the three alternative site plans as a result of the proposed project.

COMMUNITY FACILITIES

Development of the proposed project would not have a significant adverse impact on community facilities.

The proposed project would operate in conjunction with ongoing operation of the existing Calpine power generation facilities. One or two additional employees would be required for operation of the proposed new facility. If conservatively it were assumed that these additional employees were new residents to the area, they would require a very small amount of additional community services (i.e., police, fire, ambulance, health, etc.) and would, at most, result in a very small number of additional students in local schools. Accordingly, these new employees would not significantly increase the demand for services.

With regard to potential visual, air quality emissions and noise impacts from the proposed project site on nearby community facilities, these community facilities are located relatively far from the site (i.e., between three-quarters to one mile from the site). With the possible exception of the stack, the proposed facility would not be visible from community facilities within one mile of the project site. Even at locations where the project site or stack is visible, the proposed facility would not have any significant adverse visual impacts. The proposed project, maximum pollutant concentrations due to emissions from the proposed project would be below significant impact levels (SIL) established by the Environmental Protection Agency (EPA). The proposed facility would not cause any significant adverse air quality impacts. In addition, noise due to the proposed project would not significantly increase ambient noise levels at any residential receptor location or at the project site boundaries.

The proposed project would not significantly increase the demand for public safety services, such as police, fire, and ambulance services, nor have a significant adverse impact on public safety services. The site is located within the Eighth Precinct of the Nassau County Police Department. The Eighth Precinct is located approximately one mile south of the site at 286 Wantagh Avenue in Levittown. The site is within the service area of the Bethpage Volunteer Fire Department. The Fire Department has three stations within Bethpage; the nearest station to the project site is approximately one mile northeast of the site at Stewart and Farmers Avenue. In terms of ambulance services, the project site is within the service area of the Nassau County Police Department and the Bethpage Volunteer Fire Department. The proposed project would not significantly increase the demand for police, fire, or ambulance services.

The proposed project would not have a significant adverse impact on community facilities.

CULTURAL RESOURCES

There are no sites listed on the National or State Register of Historic Places located within one mile of the project site. Consequently, the analysis of potential project impacts focused on the two sites determined to be eligible for listing on the National Register (Navy Plants #3 and #5).

Development of the proposed project would not significantly adversely impact either of the two potential historic resources identified above.

The visual impact analysis concluded that the existing Calpine power generating facilities and NGC's Central Steam Plant would screen views of the proposed project from the north, with the exception of views of the uppermost portion of the new turbine building and the new stack. These would generally blend with the existing plant and the Central Steam Plant, including the seven existing stacks present at or adjacent to the existing site. Accordingly, there would be no significant adverse visual impacts to viewers at Navy Plants #3 and #5.

The air quality impact analysis concluded that the proposed project, maximum pollutant concentrations due to emissions from the project site would be below significant impact levels established by the EPA. The proposed facility would not cause any significant adverse air quality impacts. Accordingly, the proposed project would not have an adverse air impact on Navy Plants #3 and #5.

The acoustical impact analysis concludes that the proposed project, noise due to the proposed project would not significantly increase ambient noise levels at any receptor location, including locations at the project site boundaries. Accordingly, the proposed project would not have a significant adverse noise impact on Navy Plants 3 and 5, which are located to the north of the existing site.

Detailed project information, along with the results of the analysis of potential project impacts on Navy Plants #3 and #5, were submitted to the OPRHP on October 8 and 19, 2003. On October 31, 2003, OPRHP confirmed that the proposed project would have no effect on the eligibility of Navy Plants #3 and #5 to be listed in the National Register.

Therefore, the proposed project would not have a significant adverse impact on cultural resources.

VISUAL RESOURCES

The proposed project would generally not be visible from sensitive receptors, such as the four parks and recreational fields within one mile of the project site. It could be seen from Grumman Navy Plants 3 and 5, which are eligible for the National Historic Register. However, these are eligible because of their industrial history, and are set in an industrial context. Adding to that context would not be considered a significant adverse impact. The proposed project would be visible from viewpoints to the south; however, the proposed project would generally blend with the existing "cluster" of built structures provided by the existing Calpine power generation plant, NGC's Central Steam Plant, and Navy Plant #5. The proposed project would replace the view of the simple-cycle gas turbine with a finished building. The existing Calpine power plant and NGC's Central Steam Plant would screen the proposed project from the north, with the exception of views of the uppermost portion of the new turbine building and enclosed stack. Accordingly, visual impacts to viewers from the north would not be significant. The water vapor plumes that would occasionally be released from the stack and the cooling towers would also not have significant adverse visual impacts. Based upon the above, no significant adverse visual impacts would be expected with the proposed project.

SOCIOECONOMIC AND ENVIRONMENTAL JUSTICE

Based on the analysis conducted above, no potential environmental justice communities or communities of concern (COCs) are located within the 1-mile project radius. Maximum

pollutant concentrations due to emissions from the project site would be below significant impact levels established by EPA; and the proposed facility would not cause any significant adverse air quality impacts. Therefore, the project would not result in any disproportionate, adverse impacts to any COC. As a result, the project would not be subject to an enhanced federal or state public participation plan.

NYSDEC confirmed in its letter dated September 26, 2003 that, due to the absence of a COC, the "permit review process for this project can continue independently of the elements of NYSDEC Commissioner Policy 29, Environmental Justice and Permitting." Therefore, no further analysis relative to environmental justice is necessary.

TRAFFIC AND TRANSPORTATION

Calpine staffs the existing Calpine power generation facilities, adjacent to the project site, on a continuous basis. Staff from the existing Calpine power generation facilities would also operate the proposed project. One or two additional employees would likely be required for operation of the proposed project, resulting in a very small number of additional employee vehicle trips per day, and a maximum of two additional vehicle trips in an hour. Based on the relatively high volume of traffic on Hicksville-Massapequa Road, the very small number of additional employee vehicle trips per day and during the peak hour would be negligible. Accordingly, increased employee vehicle trips due to the proposed project would not have an insignificant adverse impact on traffic conditions near the proposed project site.

Additional material deliveries for operation of the proposed project would consist of slightly increased frequencies of existing deliveries of aqueous ammonia (less than 20 percent concentration), sodium hydroxide (caustic), sulfuric acid, and water treatment chemicals. These materials would continue to be delivered to the site by a tanker truck on an approximately weekly basis. In addition, periodic maintenance would require some additional equipment delivery trips. However, at the most, a maximum of four vehicle trips would occur in any given hour with the proposed project. This limited number of increased site deliveries would have a negligible impact on existing traffic levels.

Therefore, for both Phase 1 and Phase 2 operations of the proposed facility, the proposed project would not have a significant adverse impact on traffic conditions in the vicinity of the proposed site.

AIR QUALITY

INTRODUCTION

For Clean Air Act (CAA) permitting purposes, because the existing cogeneration facility has potential emissions greater than 100 tons per year, it qualifies as a "major source" requiring a Title V facility permit under NYCRR Part 201-6. If selected, Calpine would file an application to modify the current Title V facility permit for the TBG Cogen Partners facility within one year of operation of the new unit in accordance with Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Subpart 201-6.

The proposed facility would be a modification of an existing major source of nitrogen oxides (NO_x) located in a severe ozone nonattainment area. Therefore, the Nonattainment New Source Review (NNSR) provisions contained in 6 NYCRR Part 231-2 would apply to the project, including the application of air pollution controls capable of achieving LAER (lowest achievable

emission rate) and the acquisition of emission reduction credits to offset the potential emissions from the source.

The proposed project would be located in a region classified as either attainment or unclassified for (PM_{10}), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and lead (Pb). The potential emissions of all criteria pollutants are less than the corresponding emission rate thresholds triggering Prevention of Significant Deterioration (PSD) review. The proposed project, therefore, is not subject to the requirements of the PSD regulations.

PROJECT DESCRIPTION

Calpine proposes to construct and operate a new combined-cycle, combustion turbine generator at the site of the existing Calpine power plant in Hicksville, New York.

Design and Performance Criteria

The estimated emissions from the proposed combustion turbine are primarily based upon guarantees received from General Electric and the air pollution control equipment vendors. The estimated PM_{10} and $PM_{2.5}$ emissions from the combustion turbine are based upon performance tests conducted on similar units by Calpine. The emission estimates are as follows:

- NO_x emissions would be controlled by the use of natural gas, water injection, and a selective catalytic reduction (SCR) system with an outlet concentration of no more than 2.5 parts per million volume dry (ppmvd) corrected to 15 percent oxygen (O_2). This is equivalent to a maximum NO_x emission rate of 6.60 pounds per hour (lb/hr).
- CO emissions would be controlled by the use of natural gas, good combustion practices, and an oxidation catalyst with CO emissions of no more than 0.0171 pounds per million British Thermal Units (lb/MMBtu). This is equivalent to a maximum CO emission rate of 10.30 lb/hr.
- PM_{10} and $PM_{2.5}$ emissions would be minimized by the use of natural gas and high efficiency combustion with a maximum emission rate of no more than 3.54 lb/hr. Note that the PM_{10} emissions account for both condensable and non-condensable particulate material, including ammonium salts potentially formed downstream of the SCR system.
- SO_2 emissions would be minimized by the exclusive use of natural gas with an extremely low sulfur content of approximately 0.5 grams per 100 standard cubic feet (gr/100 scf). The maximum SO_2 emission rate is 0.95 lb/hr.
- Volatile organic compounds (VOC) emissions would be controlled by the use of natural gas, good combustion practice, and an oxidation catalyst with VOC emissions of no more than 0.0035 lb/MMBtu. This is equivalent to a maximum VOC emission rate of 2.64 lb/hr.
- H_2SO_4 emissions would be minimized by the exclusive use of natural gas with a maximum sulfur content of 0.5 gr/100 scf. The maximum H_2SO_4 emission rate is 1.04 lb/hr.
- Ammonia (NH_3) emissions would be controlled by the design and operation of the SCR system with a guaranteed outlet concentration of no more than 10 ppmvd corrected to 15 percent O_2. This is equivalent to a maximum NH_3 emission rate of 9.70 lb/hr.

Air Pollutant Emissions

The maximum hourly criteria pollutant emission rates from the new combustion turbine over the anticipated loads and meteorological conditions are presented in Table S-1. The maximum hourly emission rates for the non-criteria pollutants H_2SO_4 and NH_3 are also presented in this table.

Table S-1
Maximum Criteria Pollutant Emissions

Parameter Load (%)	100%			75%			50%		
Ambient Temp (°)	-10	59	110	-10	59	110	-10	59	110
Duct Burner (On/Off)	On	On	On	Off	Off	Off	Off	Off	Off
Heat Input (MMBtu/hr)	711.22	729.92	684.11	352.23	364.53	331.64	262.82	269.72	248.32
Fuel Consumption (lb/hr)	30,038	30,828	28,893	14,876	15,396	14,007	11,100	11,392	10,488
Flow Rate (acfm)	327,061	277,658	281,746	268,547	231,375	232,447	223,893	186,507	187,368
Stack Temperature (°F)	180.0	180.0	180.0	160.0	160.0	160.0	160.0	160.0	160.0
NO_x (lb/hr)	6.41	6.60	6.20	3.18	3.30	3.00	2.37	2.44	2.24
CO (lb/hr)	10.30	5.10	3.50	5.90	1.60	0.50	3.90	1.10	0.40
PM_{10} (lb/hr)	3.54	3.54	3.54	2.50	2.50	2.50	2.50	2.50	2.50
SO_2 (lb/hr)	0.92	0.95	0.89	0.46	0.47	0.43	0.34	0.35	0.32
VOC (lb/hr)	2.64	1.44	1.24	1.20	0.20	0.20	0.80	0.20	0.20
H_2SO_4 (lb/hr)[1]	0.29	0.67	0.61	0.15	0.38	0.44	0.09	0.31	0.33
NH_3 (lb/hr)[1]	6.04	6.33	5.73	4.71	4.88	4.44	3.51	3.61	3.32

Note: [1] H_2SO_4 and NH_3 are not criteria pollutants regulated under the NAAQS.

PROJECTED AIR QUALITY IMPACTS

An air dispersion modeling analysis was performed in order to predict ambient concentrations of NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_2. Increased emission rates of NO_x and CO during periods of start-up, shutdown and malfunctions were also included in the analysis. The EPA Industrial Source Complex Short-term (ISCST3) model was used to assess the impacts at all receptors, both below stack top (simple terrain) and above stack top (complex terrain). In addition, the EPA screening complex terrain model, VALLEY, was used to assess impacts at receptors in complex terrain. Because the emissions would be released from stacks below good engineering practices (GEP) stack height, the SCREEN3 model was used to assess potential for emissions being entrained into the re-circulation zone (cavity) of nearby structures. The maximum impacts predicted by the three models were then used to demonstrate compliance with the significant impact levels (SILs) and NAAQS.

Table S-2 presents the maximum predicted impacts of NO_2, PM_{10}, SO_2, and CO emitted from the combustion turbine and chiller cooling tower. As shown in the table, the maximum concentrations are less than the corresponding SILs for all pollutants and averaging periods.

Table S-2

Maximum ISCST3 Predicted Pollutant Concentrations for the Proposed Project

Pollutant	Averaging Period	Operating Condition		Receptor Location		Maximum Concentration ($\mu g/m^3$)	SILs ($\mu g/m^3$)
		Load (%)	Temperature (°F)	Direction (degrees)	Distance (m)		
NO_2	Annual[1]	100	59	31	1,807	0.07	1
PM_{10}	24-hour	50	59	323	237	1.28	5
	Annual[1]	50	59	31	907	0.06	1
SO_2	3-hour	100	59	8	155	0.84	25
	24-hour	100	59	216	241	0.25	5
	Annual[1]	100	59	31	1,807	0.01	1
CO	1-hour	100	-10	4	248	10.8	2,000
	8-hour	75	-10	344	243	4.93	500

Notes:

[1] Annual impacts for NO_2, PM_{10}, and SO_2 adjusted to account for restriction on annual heat input to the duct burner of 1,768,000 million Btu during any consecutive 12-month period.

The air quality modeling analyses indicate that the proposed project would have only minor impacts on air quality. The maximum predicted impacts of the project by itself are below the SILs and, therefore would neither cause nor contribute to a violation of the NAAQS.

$PM_{2.5}$ IMPACT

An assessment was made of the potential effects of fine particulate matter ($PM_{2.5}$) on public health and welfare. The term $PM_{2.5}$ refers to the particle size range equivalent to 2.5 micrometers and smaller. Particles within this range are considered "inhalable particulates." The assessment examined the basis of the EPA $PM_{2.5}$ standards (i.e., 24-hour $PM_{2.5}$ concentration of 65 micrograms per cubic meters [$\mu g/m^3$] and annual $PM_{2.5}$ concentration of 15 $\mu g/m^3$), how it relates to protecting public health, and potential health effects of emissions of $PM_{2.5}$ from the proposed Calpine Bethpage 3 Energy Center facility on the nearby community.

Based upon the assumption that 100 percent of PM_{10} emissions are $PM_{2.5}$ and using the PM_{10} air quality modeling results, the maximum 24-hour concentration for $PM_{2.5}$ under any of the site alternatives would be 1.28 $\mu g/m^3$. The maximum annual concentration for $PM_{2.5}$ under any of the site alternatives is 0.06 $\mu g/m^3$. The maximum predicted 24-hour and annual $PM_{2.5}$ concentrations are well below the NYSDEC 24-hour and annual significance thresholds of 5 $\mu g/m^3$ on a 24-hour average and 0.3 $\mu g/m^3$ on an annual average.

In addition to the primary $PM_{2.5}$ that may be emitted by the proposed facility, NO_x, SO_2 and ammonia are most likely to affect the formation of secondary particles. The reactions of these compounds are quite slow and may take several hours to many days, the rates depending on many factors such as background concentrations of trace-level and catalytic species, sunlight, temperature, relative humidity, and others. As such, these secondary particulates will not affect or contribute to the maximum air quality concentrations of $PM_{2.5}$ particulate resulting from the primary emissions.

The slow reaction times cause the plume to be very widely dispersed. Where dispersion has not diluted the emissions greatly, very little of the NO_x, SO_2 and ammonia would be converted to particles because of the time required for the transformation. Far from the facility where more of

these gases would have been transformed, physical dispersion of the emissions would have diluted the impact to such an extent that it would be insignificant relative to background levels. As such, the proposed project is expected to have no significant impact as a result of secondary fine particulates.

In conclusion, the proposed project would contribute only a small amount to both the annual and the short-term concentrations of $PM_{2.5}$, and these contributions are not expected to significantly effect $PM_{2.5}$ concentrations. Emissions of $PM_{2.5}$ from the proposed facility would not significantly affect compliance with $PM_{2.5}$ standards. These standards are set to protect the public health with an adequate margin of safety. In addition, impacts of $PM_{2.5}$ were predicted to be below the NYSDEC $PM_{2.5}$ policy significance threshold levels. Therefore, the proposed facility would not be expected to result in any significant adverse $PM_{2.5}$ health effects.

CLIMATE CHANGE

The project's impact on climate change due to emissions of greenhouse or climate change gases (GHGs) was assessed. GHGs contribute to climate change by increasing the ability of the atmosphere to trap heat. The principal GHGs are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). To express emissions of the different gases in a comparable way, a weighing factor called the Global Warming Potential (GWP) is often used, which relates the ability of each greenhouse gas to trap heat in the atmosphere to a single gas (CO_2).

The proposed project would fire natural gas. The greatest proportion of the potential GHG emissions from the project would be as CO_2 from the combustion process. Trace amounts of CH_4 and N_2O would also be emitted, however, emissions of these compounds are considered negligible when compared to the total CO_2 emissions, even taking into consideration their GWP, and are therefore not considered significant to the climate change issues.

As a conservative estimate, maximum CO_2 emissions were calculated as approximately 647 million pounds per year, or 0.293 tetragrams of CO_2 equivalent (Tg CO_2 Eq.) per year. To assess the proposed project's impact on climate change, the project's maximum GWP was compared to state, national, and global estimates of man-made CO_2 emissions. The worst-case annual emissions from the proposed project would be approximately 0.15 percent of the total New York CO_2 inventory. On a national scale, the proposed project would contribute only approximately 0.0051 percent. Finally, the proposed emissions of CO_2 from the project would be approximately 0.0013 of the total annual global emission rate. However, because of the market based economy for providing electrical power in New York State, energy generated by the proposed project would in all likelihood displace some electricity that would have been otherwise generated by less efficient facilities, which produce more emissions of GHG on a per megawatt basis than the proposed project.

In conclusion, the operation of the proposed facility would result in a negligible contribution to the state, national and global inventories of CO_2 emissions, and therefore the impacts to general public health from project-related operations would be insignificant.

CUMULATIVE AIR IMPACT ASSESSMENT

Introduction

Potential cumulative air quality impacts due to the six combustion turbine projects that were constructed for LIPA for the summer of 2002 (i.e., facilities located in Shoreham, Edgewood, Glenwood, Port Jefferson, Bethpage, and Bayswater), the two projects that were constructed for

LIPA for the summer of 2003 (i.e., facilities located in Jamaica Bay and Greenport), projects which are expected to be operational for the summer of 2004 (i.e., a facility located at Freeport and mobile generating units at Holtsville and Shoreham), and combustion turbine projects that LIPA plans for the summer of 2005 (i.e., facilities to be located in Pinelawn, and the facility assessed herein, Bethpage). In addition, an analysis was prepared to examine the cumulative air quality impacts of the proposed project, the existing Calpine power plant, the Northrop Grumman Corporation (NGC) central steam plant, and other nearby emission sources.

Cumulative Impact Assessment of LIPA Facilities

Cumulative effects of the LIPA 2002-2005 facilities on localized air quality were addressed by 1) examination of the relative locations of the projects, and the extent of the individual project concentrations downwind; and, 2) the distribution of overlapping project air quality impacts relative to the prevailing winds.

With regard to the first item, the LIPA facilities are widely spaced throughout Nassau, Suffolk, and Queens Counties. This distribution of projects spreads the relatively low air emissions from each facility through a wide geographical area. All of the projects have individually demonstrated insignificant air quality impacts (i.e., the maximum concentrations predicted by modeling are below the SILs). The maximum concentrations for each facility would occur very close to the combustion turbine(s) for each project. The concentrations would continue to decrease with distance from the sources, such that the concentrations would be nearly immeasurable at the nearest adjacent LIPA project.

With regard to the second item, it can be concluded that no significant cumulative interaction of the facilities would occur based upon an examination of the prevailing wind directions.

The modeling results and standards are presented in Table S-3. As shown in this table, the total concentrations (i.e., the cumulative effect of the LIPA projects and worst-case background levels) would not exceed the ambient air quality standards. Therefore, the cumulative effect of all the LIPA projects would not cause adverse air quality impacts.

Table S-3

Cumulative Air Quality Impacts of LIPA Projects with the Bethpage Facility

Pollutant	Averaging Period	Maximum Concentration ($\mu g/m^2$)	UTM Coordinates		Background Concentration ($\mu g/m^2$)	Total Concentration ($\mu g/m^2$)	NAAQS ($\mu g/m^2$)
			Easting	Northing			
CO	1-hour	539.91	663,392	4,520,358	7,100	7,640	40,000
	8-hour	185.74			5,200	5,386	10,000
SO_2	3-hour	20.10	663,426	4,520,355	149	169	1,300
	24-hour	5.83	663,392	4,523,358	73	79	365
	Annual	0.094	681,238	4,534,983	16	16	80
PM_{10}	24-hour	5.83	663,392	4,520,358	41	47	150
	Annual	0.13	630,000	4,515,000	17	17	50
NO_2	Annual	0.69	663,584	4,520,388	47	48	100

Cumulative Air Impact Assessment of Project and Nearby Emission Sources

Cumulative air quality impact analyses were performed to obtain total concentration predictions for the combined emissions of the proposed project and several existing nearby sources: the Calpine power plant, NGC's central steam plant, and Keyspan's power generation plant on Spagnoli Road. The NGC plant does not operate simultaneously with the cogeneration facility at the existing Calpine power plant pursuant to a covenant with the Town of Oyster Bay. When the cogeneration units are out of service, only one boiler at the NGC plant is required to meet the steam demand of the groundwater treatment system on NGC property. Therefore, two scenarios were addressed in the air quality modeling analysis; (1) the proposed unit operating simultaneously with the existing Calpine power plant and the Keyspan plant, and (2) the proposed unit operating coincidentally with the simple-cycle turbine at the existing Calpine power plant, one boiler at the NGC plant, and the Keyspan plant.

The cumulative impact analysis was performed based on the conservative assumption that all the aforementioned nearby sources operate at their maximum rated capacities under the two scenarios, except as noted above for the existing Calpine power plant and NGC plant. Tables S-4 and S-5 provide a summary of the cumulative impacts analysis for the two scenarios above. The modeling results demonstrate that the total predicted concentrations attributable to the combined emissions of the proposed project and aforementioned nearby sources, including measured background concentrations, are well below the NAAQS.

Table S-4

Cumulative Air Quality Impacts of Proposed Project, Calpine Cogeneration and Peaking Plants and KeySpan Project

Pollutant	Averaging Period	Maximum Concentration (ug/m^3)			Location		Background Conc. (ug/m^3)	Total Conc. (ug/m^3)	NAAQS (ug/m^3)
		Calpine Plant	Keyspan Plant	Total	Distance (m)	Direction (degrees)			
CO	1-Hour	247.68	0.00	247.68	250	90	7,100	7,348	40,000
	8-Hour	86.03	0.00	86.03	300	90	5,200	5,286	10,000
SO_2	3-Hour	97.70	0.00	97.70	200	80	149	247	1,300
	24-Hour	24.26	0.00	24.26	300	10	73	97	365
	Annual	0.64	<<0.01	0.64	2,000	30	16	17	80
PM_{10}	24-Hour	2.52	0.00	2.52	300	10	41	44	150
	Annual	0.15	<<0.01	0.15	1,800	30	17	17	50
NO_2	Annual	1.11	<<0.01	1.11	2,000	30	47	48	100

Table S-5

Cumulative Air Quality Impacts of Proposed Project, Calpine Peaking Plant, NGC Steam Plant and KeySpan Project

Pollutant	Averaging Period	Maximum Concentration (ug/m^3)				Location		Background Conc. (ug/m^3)	Total Conc. (ug/m^3)	NAAQS (ug/m^3)
		Calpine Plant	NGC Plant	Keyspan Plant	Total	Distance (m)	Direction (degrees)			
CO	1-Hour	0.00	17.06	0.00	17.06	300	30	7,100	7,117	40,000
	8-Hour	0.00	6.36	0.00	6.36	250	40	5,200	5,206	10,000
SO_2	3-Hour	0.00	120.35	0.00	120.35	250	30	149	269	1,300
	24-Hour	<<0.01	44.71	0.00	44.71	175	90	73	118	365
	Annual	<<0.01	4.54	<<0.01	4.54	150	90	16	21	80
PM_{10}	24-Hour	0.03	7.71	0.00	7.74	175	90	41	49	150
	Annual	<<0.01	0.79	<<0.01	0.80	150	90	17	18	50
NO_2	Annual	<<0.01	4.30	<<0.01	4.30	150	90	47	51	100

OTHER POTENTIAL IMPACTS

The proposed project has the potential for impacts due to: (1) the formation of visible water vapor plumes from emissions from the combustion turbine and OTSG stack; and (2) plume fogging, rime icing, and elevated visible plumes from operation of the proposed cooling towers.

Combustion Turbine Stack Visible Water Vapor Plumes

Since the combustion turbine exhaust gas contains appreciably more water vapor than the ambient air, an analysis was performed to determine if the exhaust plume could condense and become visible under normal atmospheric conditions. The potential frequency and extent of visible plumes resulting from steam condensation was conservatively assessed as a worst case using the CALPUFF model. The model results indicate that the plume from the combustion turbine stack would be visible due to water vapor condensation approximately 18 percent of the daylight hours, excluding hours of inclement weather (rain, snow, or fog). Visible plumes would occur principally in winter during periods with low ambient temperatures. The plume would most likely occur during the morning hours (around dawn) and would not be expected to be visually intrusive. Due to the height of the stack and high exhaust velocities, the plume would occur relatively high above ground level and, therefore, would not cause or contribute to any ground fogging effects. In summary, there would be no significant adverse visual impacts expected due to the steam plume from the combustion turbine stack.

Cooling Tower Impact Assessment

The project would include both the five-cell and two-cell cooling towers. Potential cooling tower impacts consist of plume fogging, rime icing, and elevated visible plumes. To evaluate these effects, a cooling tower impact assessment was conducted using the CALPUFF model with the PRIME downwash option. Each of the three alternative site arrangements was modeled.

The CALPUFF model predicted that the cooling tower would cause an average of one hour of plume-induced fogging and possibly two hours of plume-induced icing per year simulated or (6 hours of fogging and 8 hours of icing over five years). The frequency of occurrence would cause minimal impact on nearby roadways. In summary, the proposed cooling tower is not expected to result in any significant adverse environmental impacts.

Transmission Lines

Neither the natural gas transmission line nor the electric transmission line would have any emissions, and they would not have an adverse impact on air quality.

NOISE

Noise measurements taken outside of sensitive receptors near the proposed facility found that noise levels ranged from 43 to 53 decibels, A-Weighted (dBA). Within houses, the noise level would be less. The causes of the noise include road traffic, rail transportation, natural sounds (birds, insects) and the existing industrial facilities. This level of noise is equivalent to conversational speech and is not considered intrusive. NYSDEC guidelines state that if a project would increase the background noise level by 6 dBA, the increase may be noticeable and further investigation may be warranted. The proposed project would increase noise levels less than 6 dBA at all off-site locations. Although LIPA is a New York State agency and is not subject to local regulations, the compliance of the proposed project with the Town of Oyster Bay Noise Code was examined. The proposed project would meet the noise code at all residences.

Therefore, the increase in ambient noise levels due to the proposed project would not result in any significant adverse noise impacts.

INFRASTRUCTURE

WATER SUPPLY

The potable water required for the proposed project would be obtained from the Hicksville Water District, and the process water would be obtained from remediation wells operated by NGC. The Hicksville Water District currently maintains 14 wells in its jurisdiction, each with a maximum withdrawal rate of 1,200 to 1,400 gallons per minute. The Hicksville Water District is restricted by a cap on the withdrawal rate from these wells established by NYSDEC. The cap is 2,782,000,000 gallons per year or about 7.6 million gallons per day on average. The Hicksville Water District has confirmed that it can supply the minimal potable water needed for about 2 new employees, washing and fire protection needed by the proposed project. After restrictions to meet it obligations to remediate groundwater, Calpine has negotiated with NGC an agreement to supply 650,000 gallons per day of process water to the proposed project and an additional 350,000 gallons per day to the existing Calpine projects.

The water use by the proposed project would be 8 698,400 gallons on a maximum day during Phase 2. NGC can meet the demand of a maximum day. Hicksville Water District has confirmed that it could supply sufficient potable water to the proposed project without lowering water pressure or supply to their existing or projected future customers. NGC has confirmed that it can supply sufficient water to the proposed project and still meet the requirements of it Record of Decision with NYSDEC for remediation of contaminated groundwater and recharge of clean water. Therefore, no significant adverse impacts to the water supply systems are expected.

SANITARY AND PROCESS WASTEWATER

In summary, sanitary and process wastewater generated by the proposed project would be discharged to the Nassau County Department of Public Works (NCDPW) sanitary sewer system, following modification by the NCDPW of the plant's existing sewer connection permit and industrial discharge permit. It is expected that the NCDPW would be able to accept the increased process wastewater discharge flow (i.e., increased quantity) from the proposed project, following review and action on the pending sewer connection permit modification application. In addition, due to the nature of the proposed project, it is expected that the quality of the process wastewater flow from the proposed project would be similar to the existing Calpine power generation plant's discharge and would meet the NCDPW's sewer discharge limitations or the EPA's Categorical Pretreatment Standards for New Sources. Accordingly, it is expected that the proposed increased process wastewater flow would not have an adverse impact on Cedar Creek Sewage Treatment Plant's ability to properly treat sewage and discharge its effluent.

ENERGY

Natural gas demands for the proposed project are considered to be insignificant in light of available supplies and the capacity of the existing gas transmission system. Demands for the proposed project would not impact regional energy systems nor would they significantly affect or preclude service to other users. Increasing the amount of electricity into the grid would also not affect electricity transmission, nor would it preclude connections from other suppliers with the proposed generating projects in the area. Moreover, the proposed project would serve a vital

public need by providing additional electric power to Long Island and would assist in improving system reliability.

SOLID WASTE

The proposed project would generate small quantities of hazardous and non-hazardous wastes during operation and maintenance of the project. The process of electrical generation does not produce appreciable amounts of hazardous and non-hazardous wastes when natural gas is utilized as the primary fuel source.

Small waste streams of off-specification used/waste oil and wastewater would also be generated during maintenance activities at the project. These wastes would be recycled off site at licensed receiving facilities in accordance with the solid waste regulations of the State of New York. Spent catalysts from the air pollution control systems would generate a waste stream approximately every six to eight years depending upon operational use and the evolution of the catalyst technology. The supplying vendor would recycle these spent catalysts during these maintenance periods or would remove them for disposal at a licensed waste management facility.

The solid waste generated by the proposed project is related mainly to miscellaneous worker trash, including paper, cardboard, aluminum, and glass. A recycling program would be implemented for these non-hazardous waste streams consistent with local solid waste vendor programs. It is estimated the project would generate less than 10 cubic yards of general trash per month. Solid waste containers would be sized appropriately to minimize the need for waste transportation related trips to the site and would include recycling options.

These quantities and types of solid waste and hazardous wastes from the proposed project would not have a significant adverse impact on the solid and hazardous waste handling systems. In addition, these properly handled wastes would not pose a public safety threat or significant adverse impact on public safety.

CONTAMINATED MATERIALS

Construction of the proposed facility would involve shallow excavation only into the upper surficial site soils, for installation of foundation slabs and footings and subsurface drainage features. Previous investigations in the site vicinity indicate that the groundwater occurring beneath the proposed site is contaminated. However, since the groundwater occurs approximately 45 to 50 feet below grade and site construction would be limited to shallow excavations, exposure to the contaminated groundwater would not occur as a result of construction or operation of the proposed facility. Water supply for the proposed facility would come from offsite sources.

Previous investigations in the site vicinity do not indicate the potential for contamination of onsite soils, particularly for the shallow surficial zone within which facility construction would occur. The Phase I Environmental Site Assessments did not identify the potential for contamination of the surficial site soils. Accordingly, contaminated soils would not likely be encountered during construction of the proposed facility.

The existing Calpine power generation facility has implemented an Operational Health and Safety Plan to protect workers and the public's health and safety. This plan would be modified to include operations of the proposed facility. In addition, a Construction Health and Safety Plan

would be developed and implemented for the construction period. These measures would prevent any adverse impacts from the proposed project.

SOILS, GEOLOGY AND SEISMOLOGY

The existing site is essentially level and bedrock lies several hundred feet below grade. Neither rock blasting nor foundation pilings to bedrock would be necessary (nor feasible) for the proposed project construction, regardless of the site arrangement. Therefore, no bedrock impacts are anticipated from construction of the proposed project.

Based on existing site construction, it is expected that the underlying site soils (both native soils and engineered fill) would be suitable to support the proposed project structures, regardless of the site arrangement. This would be confirmed by the pending geotechnical investigation and final engineering design. The seismic design for the proposed project would be based on the requirements of the New York State Building Code. Adherence to these requirements would minimize potential risks associated with seismic events.

Excavation and grading would be required to promote good site drainage and control runoff and to install subsurface features, such as foundation slabs and footings and drainage structures. Excavation spoils are expected to be minimal in quantity and would be removed from the site for appropriate reuse or authorized disposal. Temporary soil erosion and sediment controls and associated best management practices would be used during construction to preclude offsite conveyance of silt.

WATER RESOURCES AND CHEMICAL HANDLING

The material management provisions, together with ongoing collection and discharge of stormwater runoff from the proposed project to the two existing groundwater recharge basins under jurisdiction of NGC's existing SPDES permit, would ensure that the stormwater discharges from the project site would not result in significant adverse impacts to water resources in the area.

CONSTRUCTION

Construction activities would take place in accordance with good construction practices and the requirements of the various permits required for construction and operation. Any disturbances during construction would be temporary in nature and would not result in significant adverse impacts.

CUMULATIVE IMPACTS

A cumulative impact analysis was performed to examine whether the proposed project, cumulative with other relevant facilities (i.e., facilities built for LIPA from 2002 through 2003, approved for 2004 and planned for the summer of 2005), would have the potential for causing significant adverse environmental impacts. The cumulative impact analysis considered each of the environmental categories (i.e., land use and zoning, community facilities, cultural resources, contaminated materials, traffic, air quality, noise, etc.) as assessed above. Because of the very localized extent of the project's impacts, in all areas other than air quality, the new and proposed LIPA electric generating facilities would have no potential for significant cumulative impacts. The overall consumption of groundwater for LIPA projects is minimal compared to the existing

demand, which can be safely met by Long Island's groundwater resources. The proposed project would not have a significant adverse cumulative impact on groundwater.

With respect to air quality, the LIPA facilities would also have only very localized effects, although other larger facilities (not part of the LIPA system) could have broader impacts. Consequently, quantified analyses were performed to assess the potential cumulative air quality impacts of the proposed project together with the LIPA and other nearby facilities. The detailed cumulative analyses demonstrate that the cumulative impacts associated with other LIPA facilities and other nearby facilities would be below the applicable ambient air quality standards. Therefore, the proposed project would not have, either individually or cumulatively, any significant adverse environmental impacts on air quality. ✷

Chapter 1: Project Description

A. INTRODUCTION

As part of the Long Island Power Authority (LIPA) program to satisfy the need for additional generating capacity and improve system reliability on Long Island, LIPA issued a Request for Proposal (RFP) seeking developers to provide power from new, on-Island combined cycle electric generating facilities. The RFP specified a maximum electric output of 79.9 megawatts (MW) to be available early in the summer of 2005 for a period up to 20 years. LIPA received fifteen proposals. They were evaluated by a Selection Committee consisting of an interdisciplinary group of experts. The Selection Committee ranked the proposals and made recommendations to a team of senior LIPA executives. The Bethpage 3 Energy Center, LLC, a subsidiary of the Calpine Corporation (Calpine), was selected as one of two that best meets the terms of the RFP and LIPA's needs to ensure on-Island system power and system reliability. The evaluation and selection process is described in more detail below in this Project Description chapter.

Calpine proposes to construct and operate a state-of-the-art combined cycle unit (proposed project) in the unincorporated community of Hicksville located in the Town of Oyster Bay, Nassau County, New York. The location of the proposed project is shown in Figure 1-1. The proposed project would be located on a site (proposed project site) adjacent to existing Calpine power generation facilities on the east side of Hicksville-Massapequa Road (NYS Route 107), in the west/central portion of the Town of Oyster Bay. Calpine would build, own and operate the proposed generating facility on land that is currently owned or leased by a subsidiary of Calpine. LIPA would acquire, either by direct purchase, condemnation or transfer of jurisdiction, the 1.7-acre project site and then would lease the site back to Calpine. Electricity generated by the proposed project would be purchased by LIPA to satisfy the demand for additional electricity and to increase system reliability on Long Island.

The proposed project would entail the construction and operation of a General Electric (GE) LM6000 SPRINT combustion turbine (CT) generator. The project schedule calls for the new combustion turbine to be in commercial operation during June 2005. The major equipment includes the GE LM6000 combustion turbine generator, an IST once through steam generator (OTSG) equipped with duct burners, a Siemens Westinghouse steam turbine generator, and a five-cell cooling tower. The electric generating facility would operate in a combined-cycle mode, using the waste heat from the combustion turbine to generate additional electricity in the steam turbine generator. The proposed project's output would be 79.9 MW. The CT would use natural gas from KeySpan as its fuel. Process water would be supplied by wells owned and operated by Northrop Grumman Corporation (NGC).

The existing adjacent Calpine power generation facilities consist of 1) a cogeneration facility owned and operated by TBG Cogen Partners and 2) a simple-cycle gas turbine owned and operated by CPN Bethpage 3rd Turbine, Inc. Both entities are subsidiaries of Calpine. The cogeneration facility includes two GE LM2500 PE combustion turbine generators, two heat

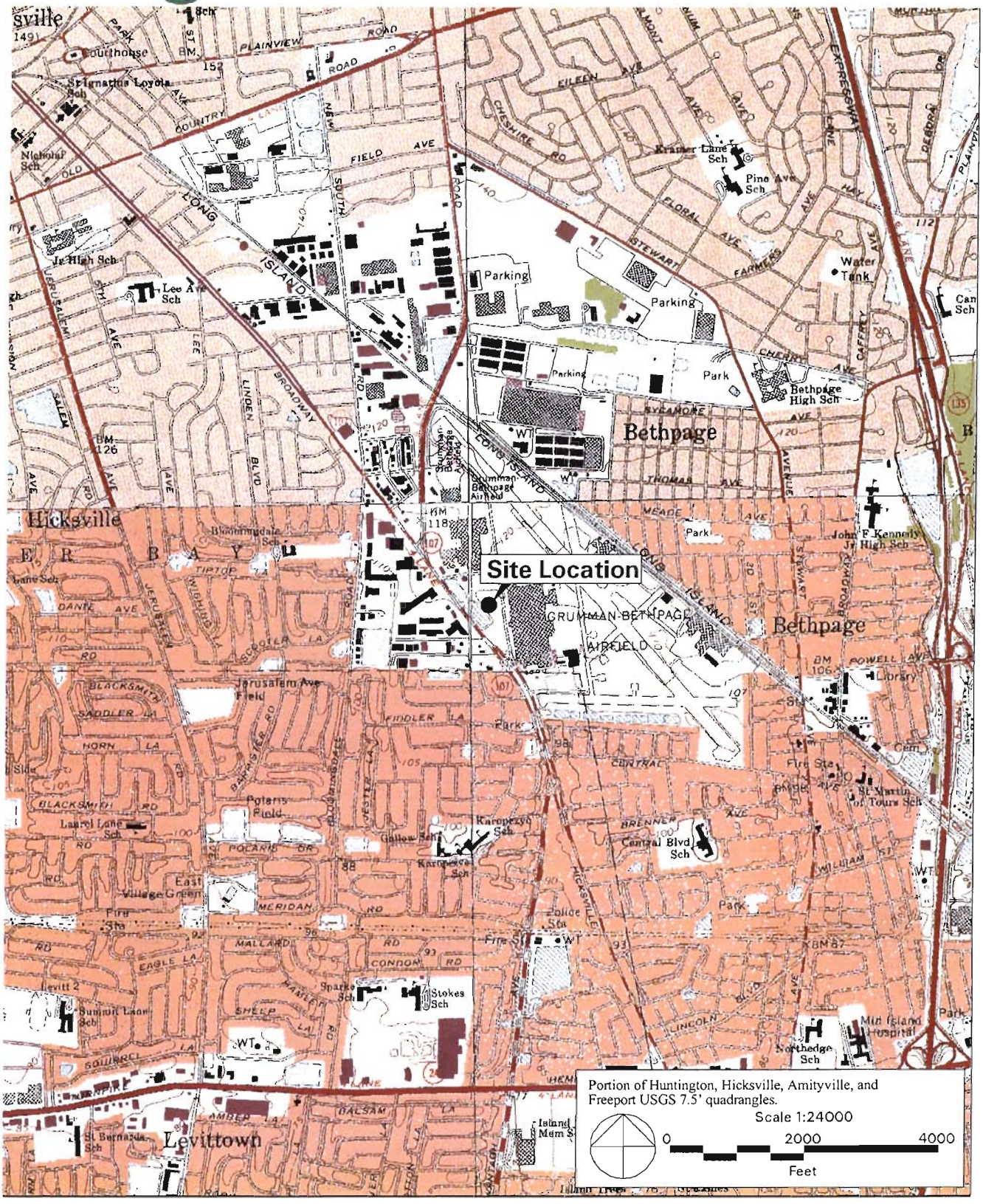


Figure 1-1
Site Locus Map

recovery steam generators, and one steam turbine generator. The cogeneration units are fired primarily with natural gas with distillate fuel oil as a backup and have a combined net electrical power output of approximately 57 MW. The simple-cycle gas turbine includes a single GE LM6000 SPRINT combustion turbine generator, the same type of turbine to be installed for the proposed project. The simple-cycle unit is fired exclusively with natural gas and has a nominal net electrical power output of approximately 47 MW. Electrical power from the Calpine power plant is sold under existing power purchase arrangements with both the Northrop Grumman Corporation (NGC) and LIPA. Steam generated at the cogeneration plant is sold to the NGC.

This Environmental Assessment (EA) for the proposed project has been prepared in accordance with the requirements of the New York State Environmental Quality Review (SEQR) Act and its implementing regulations. The EA provides an analysis of the potential environmental impacts of the proposed project to allow for an informed determination of whether the project may result in any significant adverse environmental effects. The analysis of potential environmental impacts includes all relevant environmental disciplines, including land use and zoning, community facilities, cultural resources, visual resources, socioeconomics and environmental justice, noise, air quality, infrastructure, contaminated materials, soils, natural resources, water resources and chemical handling, and construction. Because it is expected that the proposed project would be constructed and operating in about 12 months and that no material changes in the area are expected in that time frame, future conditions without the proposed project are expected to be the same as existing conditions. Therefore, potential impacts are assessed by comparing future conditions with the proposed project to existing conditions. A completed Environmental Assessment Form (EAF) for the proposed project is provided in Appendix A.

Although the proposed project constitutes a discrete action under SEQR and is not dependent on any other facility being approved, this EA nevertheless includes, where relevant, the cumulative effects and potential impacts from other facilities, either operating or proposed for LIPA, to ensure a conservative analysis.

B. PURPOSE AND NEED

LIPA has determined that there is a need for an additional 110 MW to meet the energy needs of the LIPA service area by the summer of 2005, and to prevent Long Island's generating capacity from slipping below prudent levels in future years. This shortfall assumes that the 330 MW Cross Sound Cable is permitted to also operate to meet Long Island's energy needs. Without the Cross Sound Cable, the prospects of meeting Long Island's energy needs are far more dire. LIPA's projections of future energy needs on Long Island indicate that the peak demand will grow each year by approximately 70 to 80 MW between now and 2012. The energy requirements are projected to increase approximately 22,000,000 megawatt hours (MWh) per year during this period.

In 2002, the need for additional generating capacity on Long Island became very evident. On July 3, 2002, during a heat wave, LIPA's power demand reached a new record high of 5,030 MW. On July 29, 2002, that record was broken when the demand for electricity reached an all time high of 5,059 MW. During the 2003 summer peak period, LIPA delivered nearly 10 percent more power than the prior record set in 2001. On an annual basis, LIPA's summer demand has been increasing at about 5 percent per year. The summer of 2003 did not produce a new peak demand record, because it was cooler than normal. However, electricity demand models projected that an extreme heat wave similar to August 2001 could have driven LIPA's peak-hour demand as high as 5,300 MW, translating into a growth of about 5 percent.

Additionally, LIPA experienced new winter peaks in 2004. In January, LIPA set a new one–hour winter peak demand record of 3,606 MW. This represents a 159 MW, or 4.6 percent, increase over the previous winter peak of 3,447 MW that occurred January 27, 2003.

Given this level of growth, the loss of a large generating unit or major transmission interconnection could have a devastating impact on LIPA's electrical system. To maintain system reliability and to guard against these potentially severe consequences, LIPA has developed a stringent set of criteria that takes into consideration the specific operational conditions or contingencies that impact LIPA's resource planning for its service area. These criteria require LIPA to have sufficient resources available to ensure uninterrupted service to the residents of Long Island.

The New York Independent System Operator (NYISO) requires LIPA to either own, or have contracts for, generating capacity and other resources to meet peak summer demand, plus a reserve of 18 percent. Resources available to satisfy this demand include power generation facilities and other demand-side resources. The reserve requirement is necessary in the event of possible forced outages of power plants, as well as weather conditions that may be warmer than anticipated, as experienced during the past several of the past summers.

In addition to requiring the above referenced 18 percent reserve, NYISO also requires LIPA to maintain a certain percent of its generating resources within LIPA's service area due to the limited transmission capacity to this area. This is called the "locational based installed capacity requirement." LIPA's transmission capacity is limited because of Long Island's geographical separation from the major transmission infrastructure in New York State's electric grid. The LIPA service area is one of only two areas in the state on which this requirement is imposed – the other is New York City. This locational requirement was set at 95 percent of the expected summer peak demand in 2003. However, this requirement was updated by NYISO in February 2004 to 99 percent. This increase can be attributed to improvements in the reliability evaluation methodology, the shape of the load growth, and outages experienced on underwater transmission cables connecting Long Island to the rest of the power grid. These outages negatively impacted the NYISO's assessment of the reliability of LIPA's interties, resulting in the increase in LIPA's locational installed capacity requirement.

The recent rescission of the United States Department of Energy emergency order, which previously allowed the Cross Sound Cable to operate, increases the need for capacity on Long Island. In essence, Long Island has already experience its second largest contingency. The failure of the largest contingency or two of the next largest contingencies could easily put LIPA in the position of interrupting load to customers in order to preserve the bulk power system reliability. Additionally it is unclear how the NYISO will respond to the effects of the DOE order. It is possible that NYISO requirements may increase to higher levels as a result of the DOE order. LIPA intends to request an emergency order from the DOE, however, there is no assurance that it will be approved, or issued in a timely fashion. Therefore, in keeping with prudent planning practices, LIPA may undertake alternate emergency measures to address this emergency situation.

Maintaining the high level of availability from LIPA's existing generating resources is also a concern. Long Island's transmission and capacity constraints are aggravated by the fact that the generating infrastructure in LIPA's electrical system is relatively old. The majority of the generating resource capacity comes from facilities that are more than 30 years old, and a significant portion of the generating capacity is derived from facilities that are more than 40 years old. During the summer of 2002 peak demand period, virtually all of the LIPA generating

facilities were operating, and well over 95 percent of the generating capacity was available -- this exceeded LIPA's availability expectations for such units. Due to regional demands for electricity, LIPA's ability to receive additional capacity from other areas to LIPA's service area was extremely constrained. Had any significant equipment failures occurred on LIPA's system, emergency measures and possibly rolling area blackouts would have been necessary to maintain the integrity of the system. The situation in the summer of 2003 would have been similar if normal, rather than cooler, weather conditions occurred.

The proposed facilities would provide additional generating capacity to the LIPA system of 160 MW for the summer of 2005. These proposed facilities, as, as well as temporary projects and energy conservation initiatives, would enable LIPA to meet the projected annual increase in demand for electricity in the summer of 2005.

C. REQUEST FOR PROPOSALS AND SELECTION PROCESS

In order to meet the power needs of the LIPA service area on Long Island and in New York City with new efficient generation capacity, LIPA issued a formal RFP on February 23, 2004. The new capacity is necessary to meet the growing needs of LIPA's customers, improve reliability and to meet New York Independent System Operator (NYISO) on-Long Island generation requirements. The RFP was sent to known energy developers, advertised on LIPA's web site and published in print publications. The RFP's main requirements included:

- Location in LIPA Control Area with the site controlled by the proposer;
- Combined cycle generation equipment with no restriction on manufacturer;
- A maximum output to the electric grid of 79.9 MW;
- Firm pricing valid through September 30, 2004;
- A commercial operation date of early summer 2005 with a contract length of up to 20 years;
- Either natural gas or liquid fuel; and
- Compliance with all permitting requirements and use of Best Available Control Technology (BACT) for air emissions.

A total of 15 proposals were received. They were subjected to a four step review process by an interdisciplinary team of experts, composed of LIPA staff and consultants. The Selection Committee areas of expertise included legal, contractual and payment terms, economic and financial analysis, power generation, power transmission and distribution, Public Service Commission and NYISO regulatory requirements, and environmental and permitting review. The four-step review process started with a review for conformance with general submittal requirements. Then conformance with financial and technical requirements was confirmed. A general qualitative and quantitative review was followed by a detailed general qualitative and quantitative review. At each step, the findings of the Selection Committee were reviewed and approved by an Executive Committee comprised of LIPA senior staff. The Executive Committee provided an outside check on the workings of the Selection Committee.

Based on the general qualitative and quantitative review, the Selection Committee, after review and approval by the Executive Committee, recommended that five proposers move forward to the detailed qualitative and quantitative review. The detailed review included financial modeling, Multi-Area Production Simulation (MAPS) computer modeling of effects on the electric generation, transmission and distribution systems, and environmental and permitting analyses. The five proposers were sent additional clarifying questions and invited to a formal interview. The interviews typically lasted three hours, and the questions included all areas of

concern. At the end of the detailed qualitative and quantitative review, the Selection Committee, after review and approval by the Executive Committee, are recommending that the Board of Trustees approve LIPA's entering into contract negotiations with Calpine Bethpage 3 Energy Center, along with a second project. The second project, Pinelawn Power, will undergo its own separate environmental review with the Town of Babylon as the lead agency and LIPA as an involved agency.

D. DESCRIPTION OF THE PROPOSED PROJECT

EXISTING SITE AND SURROUNDING CONDITIONS

Calpine proposes to construct and operate a natural-gas-fired, combined-cycle unit on a site located adjacent to the site of existing Calpine power generation facilities. The existing Calpine power generation site is part of a larger assemblage of parcels that historically encompassed the Grumman Bethpage Complex, which was used by Northrop Grumman Corporation to develop and manufacture aviation and related products. Current NGC activities at the Grumman Bethpage Complex occur on only a limited number of parcels; the remaining parcels have been sold for continuing commercial use or are presently owned by the federal government.

NGC's Central Steam Plant is situated to the immediate north-northwest of the site of the existing Calpine power generation facilities and the NGC Navy Plant 5 site is situated to the immediate north of the Central Steam Plant and the site of the existing Calpine power generation facilities. Old South Oyster Bay Road borders the existing power generation site on the east; a LIPA substation and office buildings comprising portions of the Bethpage Business Park are located opposite the existing power generation site on the east side of the Old South Oyster Bay Road. These office buildings were previously part of the Grumman Bethpage Complex. The property to the immediate south of the proposed project site is a paved parking area for tenants of the Bethpage Business Park. Two groundwater recharge basins associated with the NGC storm water management system are situated to the immediate west of the existing power generation and proposed project sites. Hicksville-Massapequa Road (NYS Route 107) runs in a north/south direction immediately west of two recharge basins. Commercial strip development is present on the west side of Hicksville-Massapequa Road.

A view (looking from the south) of the existing Calpine cogeneration and gas turbine facilities site (the existing Calpine power generation site) and proposed project site is shown in Figure 1-2. The existing power generation site is dedicated to the operation and support of the existing Calpine power plant. The existing power generation site is entirely paved and is surrounded by perimeter fencing with locking vehicle access gates. A portion of the proposed project site was previously occupied by two aeration basins, which have since been deactivated. Primary vehicle ingress/egress to the site is provided from the west from Hicksville-Massapequa Road via a short paved driveway extending between the two groundwater recharge basins. Two access control gates are provided along the east site perimeter for secondary site ingress/egress purposes. These gates are used on an infrequent, as-needed basis and are kept locked when not in active use. The existing site access and security controls would continue to be utilized for the proposed project.

Land use in the immediate vicinity of the existing Calpine power generation site is light industrial, generally associated with the historical Grumman Bethpage Complex. Residential uses predominate further away from the existing Calpine power generation site, together with a mixture of business uses along primary roadways.

Figure 1-2
View of the Existing Facility from the South

PROJECT COMPONENTS

The site arrangement is shown of Figure 1-3. The project would be located on two parcels of land, totaling approximately 1.7-acres. An aerial view is shown on Figure 1-4. The first parcel is about 1.1 acre in size and located immediately south of the existing Calpine power generation facilities. It is owned by a subsidiary of Calpine. The second parcel is known as the Lostritto Parcel, and Calpine has an executed, binding, long-term ground lease with Los Steel III, owner of the land. Calpine currently has a lease on the land, which will become effective on May 31, solely at Calpine's discretion. LIPA would acquire, either by direct purchase, condemnation or transfer of jurisdiction, the 1.7-acre project site and then would lease the site back to Calpine. All the major equipment would be located on these 1.7-acres.

The proposed project's primary equipment components would be a natural-gas-fired General Electric LM6000 SPRINT combustion turbine generator with associated OTSG, duct burners, and steam turbine generator with an electrical output of 79.9 MW. The project would utilize natural gas as its sole fuel. The combustion turbine generator would be able to operate in the range of 50 percent to 100 percent load, and be capable of multiple startups and shutdowns. The following sections describe the components of the combined-cycle electric generating facility.

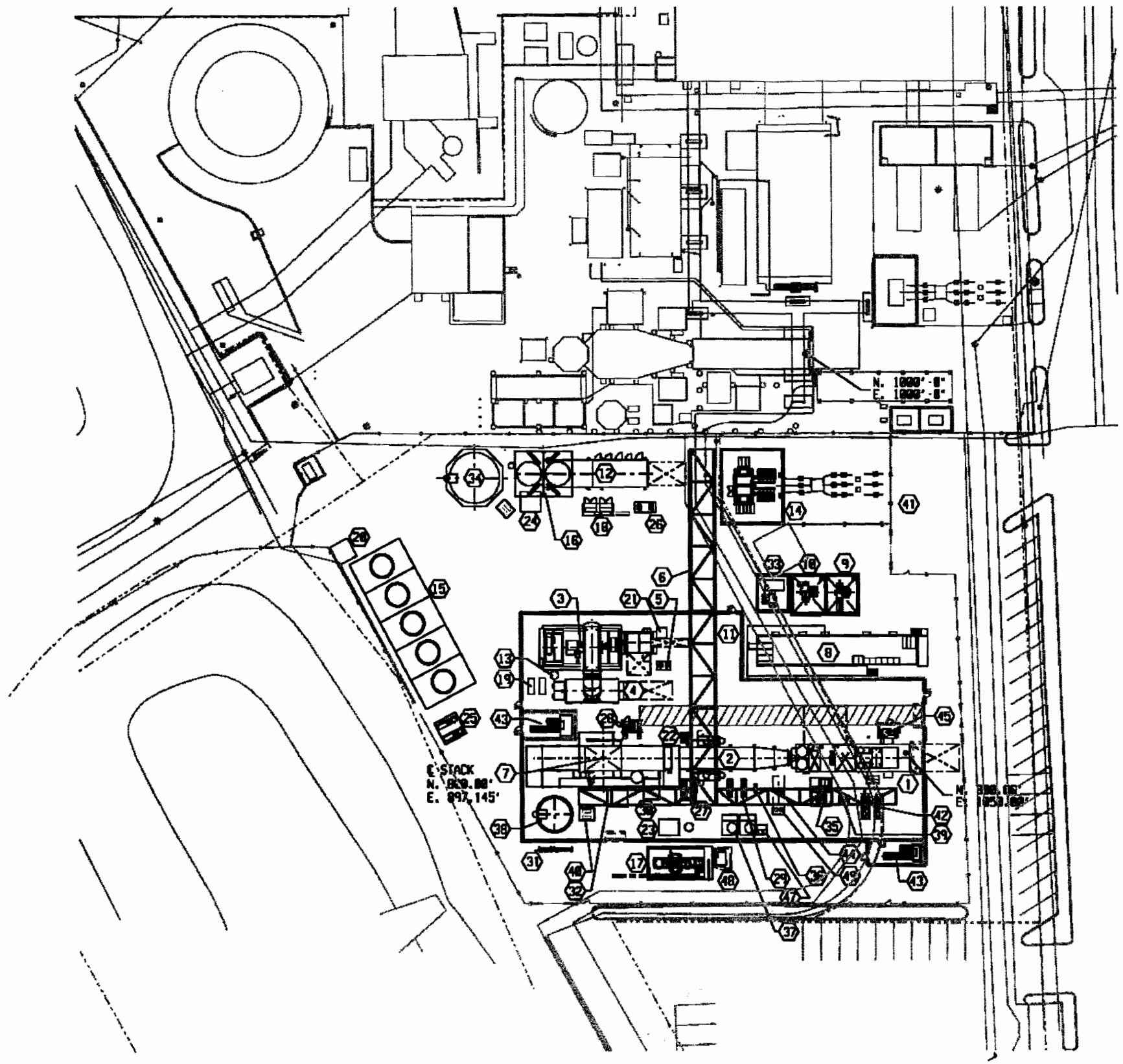
COMBUSTION TURBINE GENERATOR

The GE LM6000 SPRINT combustion turbine is designed to operate under fast startup conditions in simple cycle mode to provide peak reserve power and assist in balancing the transmission grid. The LM6000 combustion turbine was originally designed for aircraft propulsion (commonly referred to as an aeroderivative). As part of the performance enhancements, the combustion turbine would be equipped with a GE SPRINT evaporative intercooling system. The SPRINT system involves the injection of water into strategic locations to provide an after-cooling effect. This after-cooling allows for enhanced power generation by reducing the air temperature and increasing the mass flow through the combustion turbine. Additionally, the combustion turbine would be equipped with inlet air chillers to increase the density of the incoming combustion air during operation at high ambient temperatures. With evaporative intercooling and inlet air chilling, the LM6000 PC can provide a constant electrical power output of approximately 47 MW operating in simple cycle mode over a wide range of ambient temperatures. In combined cycle mode, the power output to the electric grid would be limited to 79.9 MW. A brief technical description of the GE LM6000 combustion turbine is provided in Appendix B.

In the combustion turbine, air enters the compressor inlet through inlet air chilling and filtration system. The air is compressed by a series of rotating and stationary compressor blades. The SPRINT system injects an atomized water spray between the high-pressure and low-pressure compressors. The compressed air then passes into the combustor section where natural gas is fired into a number of burners that form a ring around the circumference of the combustion turbine section casing. The combustor is equipped with a water injection system to limit the production of nitrogen oxides (NO_x).

The hot gas from the combustor combines with the compressed air resulting in a high-pressure gas stream. In the turbine section, the high-pressure gases pass through a series of stationary and rotating turbine blades. The stationary blades channel the hot gas onto the rotating stages in a manner that produces a motive force that turns the rotating section attached to a shaft, which in turn drives a generator.

PLANT NORTH



ITEM	DESCRIPTION	NOTES
1	GAS TURBINE GENERATOR	
2	ONCE THRU STEAM GENERATOR (OTSG)	
3	STEAM TURBINE	
4	CONDENSER	
5	CONDENSATE PUMPS	
6	PIPE RACK	
7	GTGS STACK	
8	POWER DISTRIBUTION CENTER (PDC)	
9	4.16KV AUX. TRANSFORMER	
10	480V AUX. TRANSFORMER	
11	ELECTRICAL EQUIPMENT AREA	COMBINED CYCLE
12	CHILLER	
13	STEAM TURBINE DRAINS TANK	
14	GSU TRANSFORMER	
15	COOLING TOWER	
16	AUXILIARY COOLING TOWER	
17	FUEL GAS COMPRESSOR SKID	
18	INLET AIR HEATER SKID	
19	CONDENSER VACUUM PUMPS	
20	COOLING TOWER CHEM. FEED	
21	GENERATOR BREAKING EQUIPMENT	
22	DFGG BLOWER SKID	
23	AIR COMPRESSOR & RECEIVER	
24	AUX. COOLING TOWER CHEM. FEED	
25	CIRCULATING WATER PUMPS	
26	AUXILIARY COOLING WATER PIPE	
27	GTGS CHEMICAL FEED SKID	
28	AMMONIA FLOW CONTROL UNIT	
29	HP BOILER FEED PUMPS	
30	STEAM SAMPLE PANEL	
31	DUCT BURNER SKID	
32	CEMS SKID	
33	INLET AIR HEATER AUX. TRANSFORMER	
34	DEMINERALIZED WATER TANK & PUMPS	100,000 GAL
35	CT AUXILIARY SKID	
36	LP BOILER FEED PUMP	
37	CONDENSATE POLISHERS	
38	CONDENSATE STORAGE TANK	35,000 GAL
39	CT SPRINT SKID	
40	CONDENSATE TRANSFER PUMPS	
41	HIGH VOLTAGE UTILITY INTERFACE	
42	CT WATER INJECTION SKIDS	
43	STAIR WELL	
44	OIL/WATER SEPARATOR	BELOW GRADE
45	CT WASH WATER DRAIN TANK	BELOW GRADE
46	DOT WELL	
47	MIXED BED BLOWERS	
48	CAS COMPRESSOR DRAINS TANK	
49	GENERATION BUILDING SUMP AND PUMPS	

NOTES

1. COORDINATE SYSTEM AND PLANT NORTH ARE LOCAL. SEE CIVIL DRAWING C2-1 FOR STATE PLANE COORDINATES AND TRUE NORTH.

0 15 30 60 90 FEET
1" = 30'

Figure 1-3
Site Plan

CPB_M1-1.DGN

USERNAME ########## DATE/TIME ##########

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INTER-DISCIPLINE REVIEW

DISC	ARCH	CIVIL	ELECT	I&C	MECH	STRUCT
DATE						
INIT						

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD	REFERENCE DRAWINGS
A	ISSUED FOR REVIEW		LED	LED	KAP		

DSGN	LED	3/16/94
DRN	LED	3/16/94
CKD	KAP	3/11/94

SCALE: 1" = 30'-0"
FOR BIDDING ONLY

PERRY ENGINEERING, INC.

CALPINE
BETHPAGE
ENERGY CENTER 3
PLAN VIEW
SITE ARRANGEMENT

JOB NUMBER 104975
REV A
DRAWING NUMBER M1-1

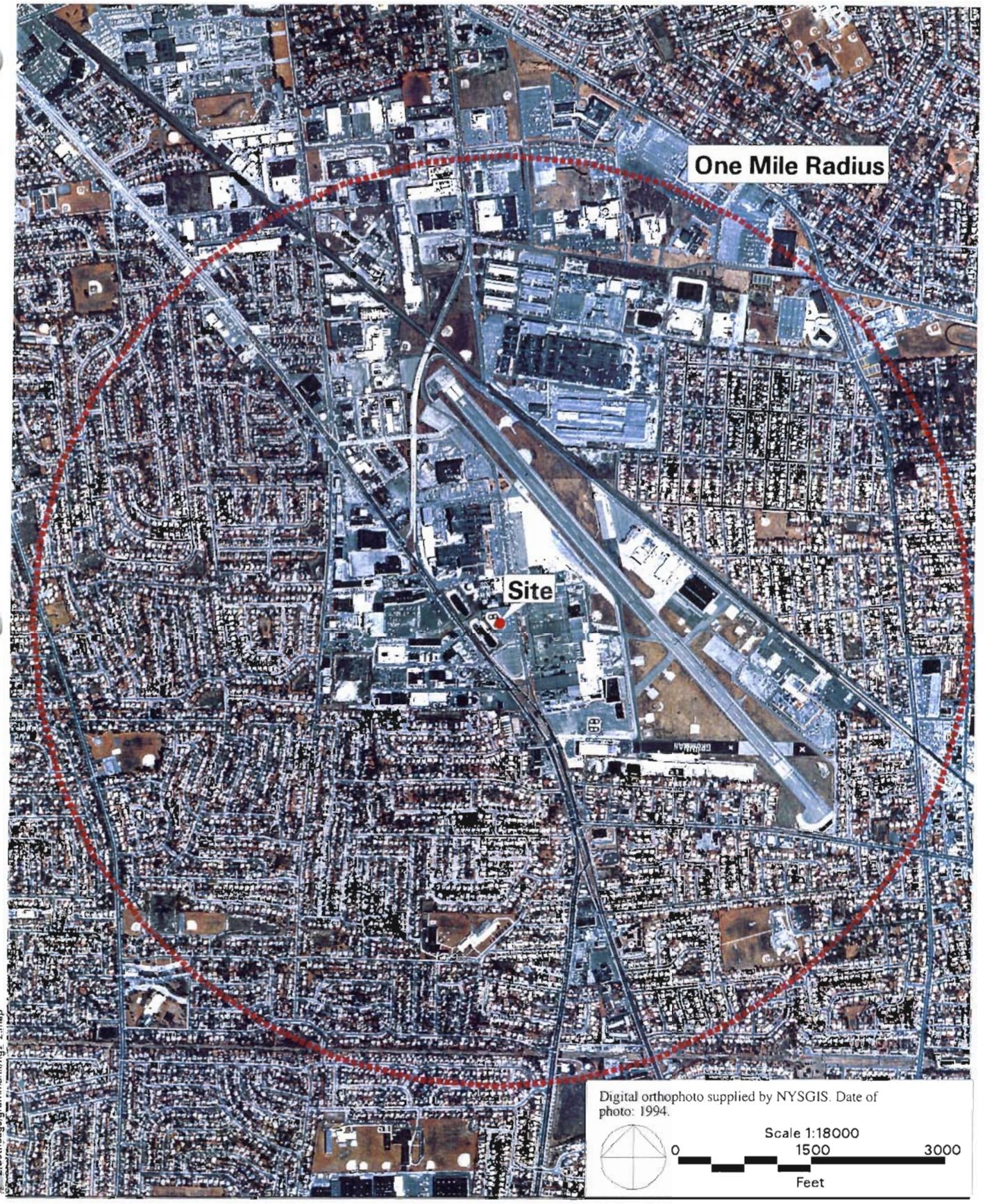

Figure 1-4
Site Aerial View

ONCE THROUGH STEAM GENERATOR (OTSG)

The combustion turbine exhaust passes into an OTSG, which provides a function similar to a conventional heat recovery steam generator, extracting, heat energy from the exhaust that is used to generate steam. In combined-cycle mode, the steam produced by the OTSG would be delivered to the steam turbine generator for additional power production.

The OTSG is divided into six major components: inlet duct, inlet plenum, environmental controls, steam generator modules, exhaust hood, and exhaust stack. The bulk of the component material consists generally of alloy tubes with carbon steel or stainless steel fins arranged in a horizontal serpentine bundle within the steam generator modules. The OTSG does not employ conventional economizer, evaporator or superheater sections. The point at which the steam-water interface exists is free to move through the horizontal tube bank depending on the heat input, the mass flow rate, and the pressure of the water. The single point of control for the OTSG is the feedwater control valve; valve actuation depends on predefined operating conditions that are set at the distributed control system (DCS), providing steady state superheated steam conditions.

The OTSG does not have steam drums, mud drums, or blowdown systems. The absence of a blowdown system limits thermal losses and lowers the feedwater make up requirements. Water quality is maintained using conventional deionization and polishing exchange equipment. The OTSG has the ability to be run dry. This provides the combustion turbine generator with the ability to be run in simple-cycle mode. The OTSG's full dry running capabilities allow for continued combustion turbine generator operation without the need for a bypass stack or diverter valve system. Environmental controls in the OTSG include noise silencing, selective catalytic reduction, and oxidation catalyst.

DUCT BURNERS

The duct burners within the OTSG are used for supplementary firing to increase steam output when the combustion turbine is operating at 100 percent load. The duct burners would be fired with natural gas only and have a maximum heat input rate of 260 million British thermal units (Btu) per hour (MMBtu/hr) based upon the higher heating value of the natural gas.

AIR POLLUTION CONTROL DEVICES

The proposed project would be designed to minimize emissions of fine particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC). Particulate, SO_2, and VOC emissions would be controlled by the inherent design of the combustion units, implementation of good operating practices, and the use of natural gas. The natural gas would have a sulfur content of about 0.5 grains per 100 dry standard cubic feet. Nitrogen oxide and CO emissions would be controlled by means of combustion controls in combination with flue gas treatment.

The LM6000 CT would utilize a water injection system to reduce the production of NO_x. With this system, water is injected into the combustor through ports in the fuel nozzles to suppress NO_x production, while maintaining low CO and VOC emissions. To further reduce NO_x emission, the combustion turbine would be equipped with a selective catalytic reduction (SCR) system. The SCR system would be designed to limit NO_x emissions to 2.5 parts per million by volume on a dry basis (ppmvd), corrected to 15 percent oxygen (O_2).

The LM6000 CT is designed to minimize the formation of CO and VOC. To further reduce CO and VOC emissions, the CT would also be equipped with an oxidation catalyst system. The oxidation catalyst system would be designed to reduce CO emissions to no more than 0.017 pound per million British thermal units (lb/MMBtu) of heat input.

The emissions of NO_x and CO would be monitored by a continuous emission monitoring system (CEMS) that meets the performance standards established by the United States Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (NYSDEC).

STEAM TURBINE GENERATOR

The steam turbine generator would be a reheat condensing design. It would receive superheated steam from the OTSG and would have the capability to produce approximately 35 MW of electrical power. The combined-cycle unit would be limited to a total electrical power output of 79.9 MW to the electric grid.

COOLING TOWERS

The cooling tower serving the OTSG condenser would be a mechanical draft wet tower design with five cells. The circulating water would be used in the surface condenser to absorb the heat rejected from the OTSG. The cooling tower would employ a drift eliminator designed to reduce water drift to no greater than 0.0005 percent of the circulating water flow. A second cooling tower would also be installed to serve inlet air chillers and miscellaneous cooling needs. This cooling tower would be a mechanical draft wet tower design with two cells. Again, this cooling tower would employ a drift eliminator with a drift elimination efficiency of 0.0005 percent.

STACK

The combustion turbine and duct burner exhaust gases would be routed to the stack, consisting of a rectangular, steel structure with exit dimensions of 10.2 by 8.9 feet and a height of 100 feet above grade. The height of the stack was designed to minimize both ambient air quality and visual impacts. Access platforms for air testing and monitoring equipment would be provided. The stack would not require lighting pursuant to air navigation guidelines established by the Federal Aviation Administration (FAA).

UTILITY INTERCONNECTIONS

The proposed project would require natural gas and electrical interconnections, as well as access to water supply and sewer system.

NATURAL GAS AND ELECTRICAL INTERCONNECTIONS

The existing Calpine power generation facilities receive natural gas from KeySpan Corporation via a 1-mile long gas pipeline that runs under Route 107. This 8-inch diameter pipeline starts south of the proposed site, near the intersection of Acova Avenue and Route 107, and goes directly to the existing Calpine power plant in the Route 107 right-of-way. The existing gas pipeline would not have sufficient capacity to serve both the existing Calpine generating facilities and the proposed facility. KeySpan would build a new 12-inch pipeline parallel to the existing 8-inch to deliver sufficient natural gas to the proposed project. A cross connection between the 8- and 12-inch pipelines would be built just outside of the existing Calpine power

plant. The 12-inch line would enter the site and connect to the proposed power generating facility and to the existing Calpine facilities. An electric gas compressor would be provided onsite to compress the natural gas to the required operating pressures. Separate meters would also be installed to measure gas flow to the proposed project.

The site of the existing power generation facilities includes an electrical substation for power distribution to LIPA via underground transmission lines to an existing LIPA substation. However after study, KeySpan found that the existing substation could not accommodate the additional power from the proposed project. A new electric transmission line going to the existing Bethpage Substation was found to be the most economical and efficient way to send the power into the electric grid. The new electric transmission line from the proposed facility to the existing LIPA Bethpage Substation would cover a distance of about 2.5 miles. The line would be mostly overhead on wooden poles and have three conductors carrying 69 kilovolt (kV). Exiting the proposed facility underground, the transmission line would go above ground and cross NGC property in a northerly direction. At the Long Island Railroad tracks, the line would turn to the southeast and follow the railroad tracks. The Bethpage Substation is located next to the tracks near Merritts Road and Hempstead Turnpike. Foundations for new circuit breakers would have to be installed in the Bethpage Substation, which would not have to be physically expanded.

WATER AND SEWER SYSTEM INTERCONNECTIONS

The existing Calpine power generation facilities are supplied with both potable and process water by NGC and the Hicksville Water District. Potable water is supplied to the existing Calpine power generation facilities by NGC, and received by NGC from the Hicksville Water District. This existing source and onsite connection would be likewise used to supply potable water to the proposed project. Process water would come from NGC's existing water withdrawal wells, via onsite connection to the existing Calpine power generation site's process waterline. This water is not required for groundwater recharge or other purposes.

Sanitary wastes and process wastewater generated by the existing plant are discharged to the Nassau County sewer system via a connection located on NGC property. Process wastewater generated by the proposed project would likewise be discharged via the existing onsite connection to the Nassau County Sewer System.

The existing Calpine power generation site and proposed project site are situated within the interior of Long Island, approximately 12 miles from Long Island Sound (to the north) and approximately 10 miles to the Atlantic Ocean (to the south). The site elevation is approximately 110 feet above mean sea level and is essentially flat. The existing Calpine power generation site is paved, with no vegetation present onsite. Storm water runoff from the existing Calpine power generation site is collected by a series of interconnected catch basins/storm drains that discharge to the larger NGC storm water drainage system, which in turn conveys the storm water to the two groundwater recharge basins located immediately west of the site. These two groundwater recharge basins would also receive storm water runoff from the proposed project.

E. PUBLIC OUTREACH

As part of the project's planning and development efforts, Calpine and LIPA representatives have met with representatives of state, county and local governments and agencies. The intent of the outreach effort is to inform the individuals and groups of the need for, and purpose of, the planned generating facility, and to solicit and exchange information about the project. An open

house was held on November 17, 2003, at which project representatives presented information about the proposed project and were available to answer questions from officials and the public. Calpine and LIPA will continue these public outreach efforts and schedule another public open house in June 2004. At this public open house, representatives of Calpine and LIPA will be available to discuss the project and answer questions with various governmental officials, the surrounding community, environmental interest groups, residents, and other interested parties.

F. PERMITS AND APPROVALS

Development and operation of the proposed project would require the following state regulatory permits, approvals, and actions.

Long Island Power Authority

- Facility power purchase agreement;
- Acquisition by purchase, condemnation or lease of the project site and lease back to Calpine.

New York State Department of Environmental Conservation

- 6 NYCRR Part 201 Air State Facility permit, incorporating Part 231-2 requirements (application submitted October 3, 2003);
- Title IV Acid Rain permit (application submitted October 3, 2003); and
- 6 NYCRR Part 751 State Pollutant Discharge Elimination System (SPDES) permit for construction (granted October 29, 2003).

New York State Public Services Commission

- Section 68 Certificate of Public Convenience and Necessity;
- Article VII approval of new gas pipeline
- Revision of water utility regulation of Northrop Grumman Corporation. ✷

Chapter 2: Land Use and Zoning

A. INTRODUCTION

This section describes the proposed project's relationship to existing land uses and local zoning and development standards.

B. LAND USE

EXISTING LAND USE

The proposed project would be located in the unincorporated community of Hicksville, in the Town of Oyster Bay, Nassau County, New York. The proposed project would be located on an approximately 1.7 acre parcel adjacent to the 2.3-acre existing Calpine power plant site. Some of the equipment for the proposed project, including the five-cell cooling towers, the auxiliary cooling tower, the chiller, the transformer skid, and a new administrative building, would be located in the western portion of the site of the existing Calpine power generation facilities.

The existing Calpine power generation facilities consist of two separate facilities: a cogeneration facility and a simple-cycle combustion turbine facility. The cogeneration facility began operations in 1989 and includes two combustion turbine generators, two heat recovery steam generators, and one steam turbine generator. The cogeneration units are fired with both natural gas and distillate fuel oil and have a combined net electrical power output of approximately 57 megawatts (MW). The simple-cycle combustion turbine generator facility began operations in 2002. This unit is fired exclusively with natural gas and has a nominal net electrical power output of approximately 47 MW. Electrical power from the existing power generation facilities is sold under existing power purchase arrangements with both Northrop Grumman Corporation (NGC) and the Long Island Power Authority (LIPA). Steam generated at the cogeneration facility is sold to NGC. The existing units would continue to operate after construction of the proposed project. NGC's Central Steam Plant is situated to the immediate north-northwest of the existing Calpine power generation site. The Central Steam Plant does not operate unless the Calpine cogeneration facility is out of service.

The Town of Oyster Bay consists of 33 diverse communities covering 110 square miles, extending from the Atlantic Ocean on the south to the Long Island Sound on the north. It is home to residential, commercial and some industrial uses. The unincorporated community of Hicksville is predominantly residential, with some commercial and industrial areas situated along designated corridors. To classify the surrounding community land use, a one-mile radius surrounding the proposed project site was used to focus on the specific attributes of the local communities. Figure 2-1 shows generalized existing land uses within this one-mile study area. Figure 2-2 provides an aerial photograph highlighting the one-mile site vicinity radius.

The one-mile study area encompasses the adjacent Town of Hempstead, located to the southwest of the site, in addition to the Town of Oyster Bay. Within the Town of Hempstead, the

community of Levittown is located within the one-mile site vicinity radius. Within the Town of Oyster Bay, the one-mile site vicinity radius encompasses the unincorporated community of Hicksville, which includes the project site and points westward, and the unincorporated community of Bethpage, which is immediately east of the site.

As shown in Figure 2-1, land uses within the one-mile site vicinity radius generally mirror zoning designations (which are shown in Figure 2-2 and discussed below). The one-mile site vicinity is bisected by Hicksville-Massapequa Road (NYS Route 107) and the Long Island Rail Road commuter rail line, both of which run through the site vicinity in a general northwest/southeast direction and divide the one-mile site vicinity radius into three general areas, as follows:

- The area between Hicksville-Massapequa Road and the Long Island Rail Road, which includes the proposed site, is predominantly zoned as light industrial, centered around the historical Grumman Bethpage complex and the (abandoned) Grumman Bethpage Airport. The far northwestern portion of this area is a mixture of light industrial, business, and residential uses. The far southeastern portion of this area is predominantly residential, intermixed with business uses.
- The areas to the west/southwest of Hicksville-Massapequa Road are all residential areas, with the exception of a small triangular area to the immediate west of Hicksville-Massapequa Road, across from the existing site, within the community of Hicksville. A small area in the extreme southern portion of the one-mile site vicinity radius, between Hicksville-Massapequa Road and Wantagh Avenue, is also a mixture of residential and business uses.
- In the areas to the east/northeast of the Long Island Rail Road, light industrial and business uses dominate the northern portion of this area, generally associated with the historical Grumman Bethpage complex. Residential uses with a small mixture of business uses dominate the southern portion of this area.

PROBABLE IMPACTS OF THE PROPOSED PROJECT

INTRODUCTION

An analysis was performed to evaluate probable impacts of the proposed project including the proposed transmission line with regard to land use. The results of this analysis are presented below.

The existing Calpine power generating facilities currently operate on an approximately 1.6-acre site. The proposed project would purchase the approximately 1.1-acre parcel of land immediately south of the existing Calpine power generation facilities and lease an adjacent slightly less than 0.6-acre parcel that is currently used for parking. Leasing of the additional approximately 0.6-acre parcel currently used for parking would displace some parkers, but would not have any significant adverse effect on parking availability or land use (the current parking lots are not fully used). Because of these existing onsite and adjacent uses for power generation facilities, land use conditions at the site would not substantively change as a result of operation of the proposed project. The proposed site is within an area designated by the Town of Oyster Bay for industrial uses, such as the proposed project. In addition, the existing site already has a natural gas pipeline connection, electrical transmission interconnection, and water supply and wastewater discharge lines. Siting the proposed project within and immediately adjacent to

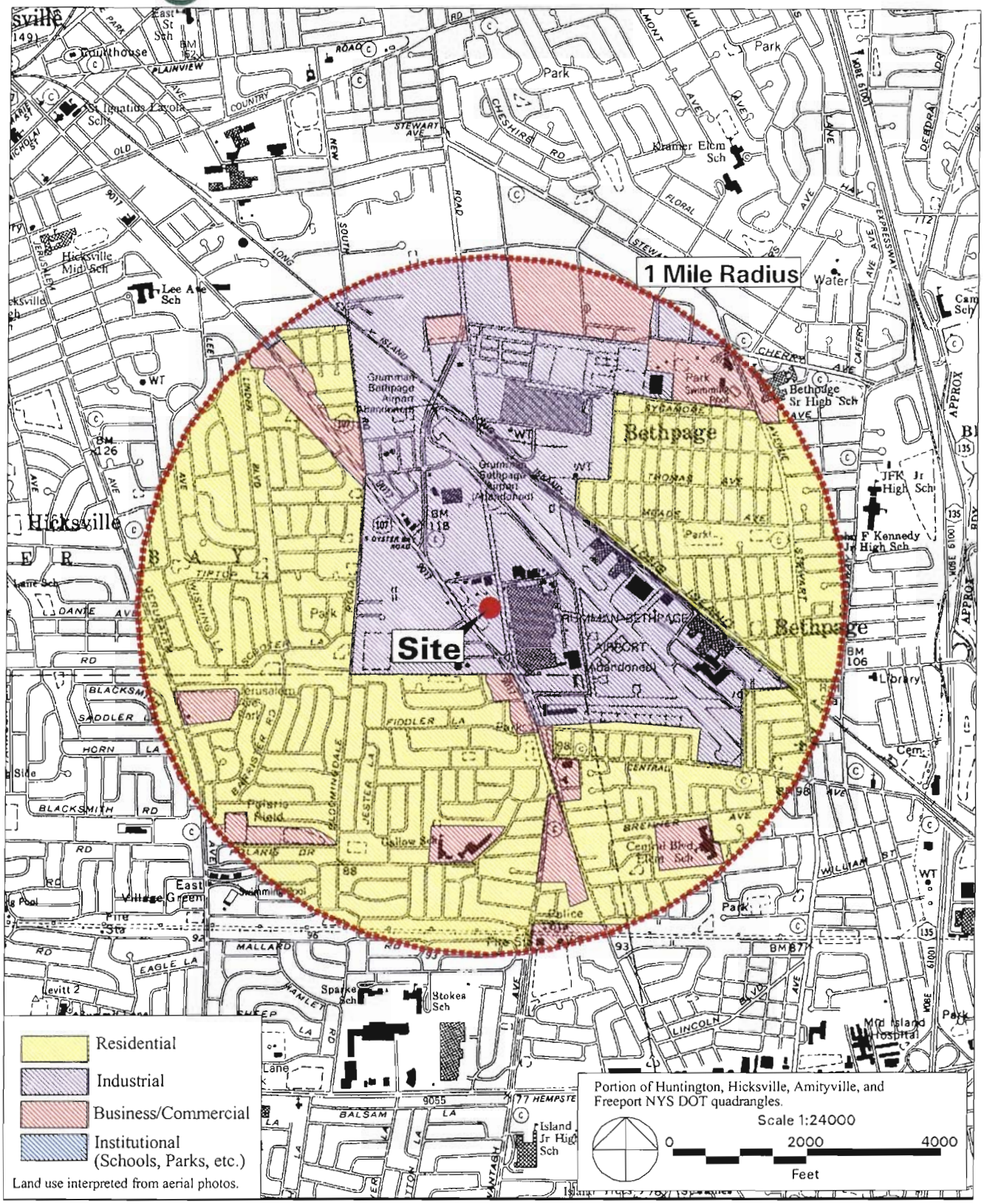

Figure 2 - 1
Generalized Land Use

existing power facilities provides the project with the ability to utilize the existing infrastructure associated with these facilities, thereby minimizing the amount of land requiring disturbance and associated impacts.

Accordingly, the proposed land use change for the parcels would not have a significant adverse land use impact in terms of loss of the previous use and function of this land. Further, the existing power generation facilities and NGC's Central Steam Plant adjacent to the proposed project site co-exist with the various residential and business uses present within the site vicinity. Based upon the above, no significant adverse land use impacts would be expected as a result of the proposed project.

TRANSMISSION LINES

The gas transmission line would be in the right-of-way of Route 107 and would not result in a significant adverse impact on land use. The electric transmission line would cross the industrial lands of NGC and follow the Long Island Railroad tracks. Neither location would have a significant adverse impact on land use.

C. ZONING

SETTING

The various municipal zoning designations within the one-mile site vicinity radius are shown in Figure 2-2. The site is zoned as "LI Light Industry District" ("LI District") under the Town of Oyster Bay's ("Town") Zoning Code ("Code"). According to the Code (Town of Oyster Bay, 2003), the purpose for the LI Industry District is "to provide the opportunity and encouragement of manufacturing, assembly, warehousing, research and development and other compatible types of jobs established in a light industrial area." Development of public utility buildings and structures are a permitted use in the LI District by a Special Use Permit issued by the Town of Oyster Bay.

Zoning designations within a one-mile radius of the site within the Town of Oyster Bay and the Town of Hempstead are briefly described below (Town of Oyster Bay 2003 and Town of Hempstead 2003). The zoning designations are shown on Figure 2-2. Note that in some areas of the site vicinity, the zoning designations vary on an individual parcel basis; in these areas, each pertinent zoning classification is designated on Figure 2-2.

TOWN OF OYSTER BAY

- LI (H): Non-residence District. Light industry with a 1-acre minimum lot area including electric substations, warehouses and storage facilities, lumber yards, auto dealerships, funeral homes, animal and human hospitals, fast food restaurants, office complexes, and government uses are permitted principal uses within this district. Public utility buildings and structures are allowed within the district by special use permit.
- R1-7 (D): Residence District. Single and multi-family residences with a 7,000-square-foot lot area minimum, public parks, colleges, public schools, churches, agriculture, and municipal and governmental uses are permitted principal uses within this district.

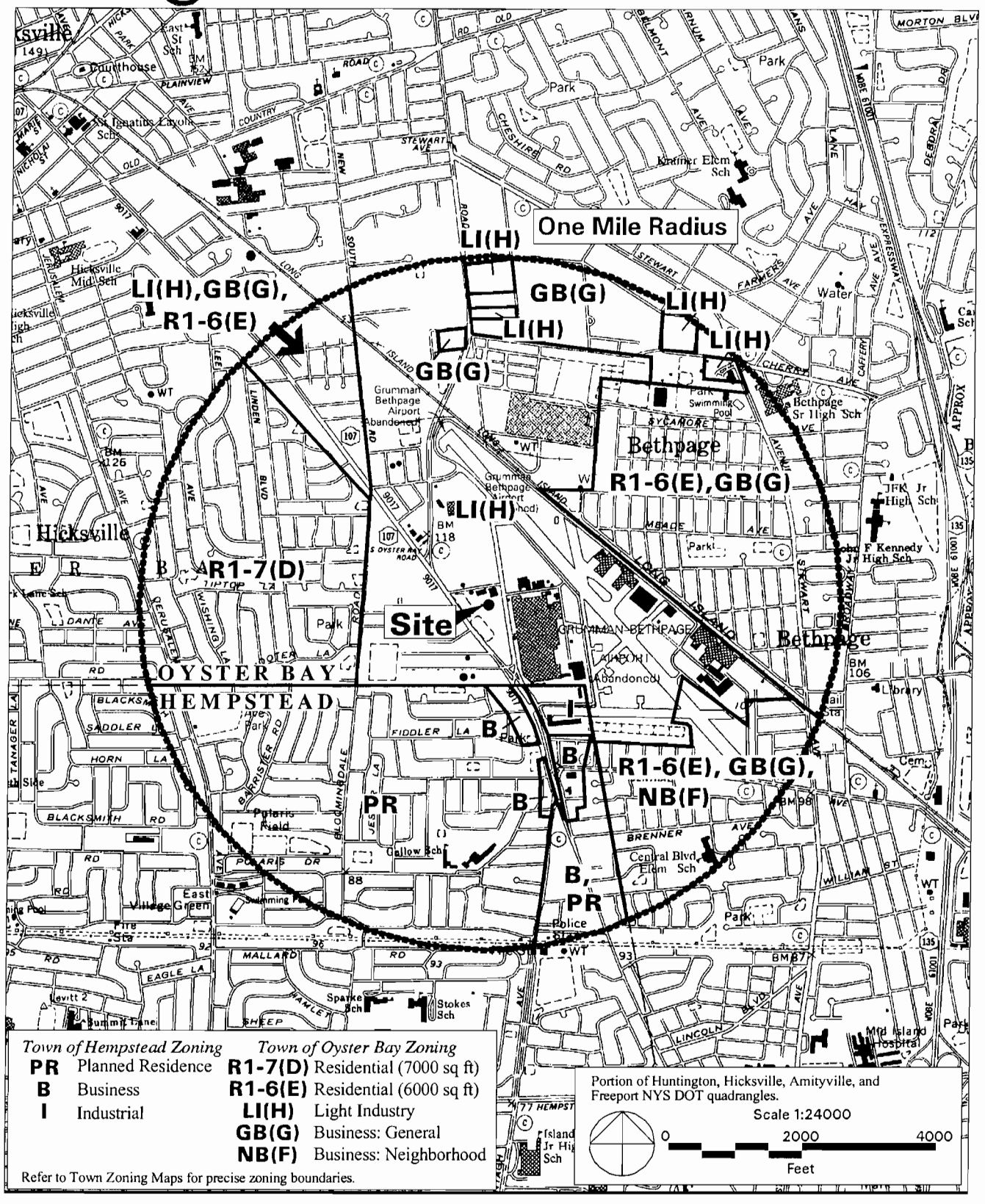

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Figure 2-2
Vicinity Zoning

- R1-6 (E): Residence District. Single and multi-family residences with 6,000-square-foot lot area minimum, public parks, colleges, public schools, churches, agriculture, and municipal and governmental uses are permitted principal uses within this district.
- NB (F): Non-residence District. Neighborhood retail businesses with a minimum of 10,000-square-foot lot area, hospitals, country clubs, public parks, banks, churches, restaurants, auto dealerships, and municipal and governmental uses are permitted principal uses within this district.
- GB (G): General Business. General businesses with no specified minimum lot area, country clubs, parks, schools, hospitals, fast food restaurants, offices, auto dealerships, and municipal and governmental uses are permitted principal uses within this district.

TOWN OF HEMPSTEAD

- PR: Planned Residence. Continuing the intent of the original planned suburban community of Levittown as developed by Levitt & Sons, Inc., single-family residences with a 6,000-square-foot lot area minimum, public and private schools, churches, agricultural and nursery, municipal recreational, and railway passenger stations are permitted principal uses within this district.
- B: Business. General businesses with no specified minimum lot area, single and two-family dwellings, schools, hospitals, agricultural and nursery, municipal recreational, railway passenger stations, offices, retail sales, and restaurants are permitted principal uses within this district.
- I: Industrial: Lawful industrial activities and processes with no specified minimum lot area, except for specific listed uses that are prohibited, are the permitted principal uses within this district.

PROBABLE IMPACTS OF THE PROPOSED PROJECT

INTRODUCTION

Because LIPA is a state authority and would have jurisdiction over the land, the proposed project does not require local permits, variances, or approvals and is not required to comply with local zoning regulations. Nevertheless, in order to ensure an adequate evaluation of potential impacts of the proposed project with regard to zoning, an assessment of the project's conformance with local zoning regulations has been performed. Specifically, this assessment examines whether the proposed project would be consistent with the requirements for granting the following discretionary approvals from the Town of Oyster Bay: (1) special use permit and site plan approval; and (2) area variances for height and possibly for minimum and/or maximum setback distances.

The proposed site is within the LI Zoning District as outlined in the Town Code. This district allows for the development of "public utility buildings and structures" by a special use permit. Absent LIPA being a state authority, a special use permit would be required to locate a "public utility building" in an LI zoning district. A special use permit has already been issued by the Town Board for a portion of the property upon which the existing power generation facilities are situated. The proposed project is to be constructed within and immediately adjacent to this property.

SPECIAL USE PERMIT

The proposed project is an allowable use within the LI Zoning District as defined by the Town Code pursuant to the Town of Oyster Bay Town Board Resolution No. 214-1988. The proposed project, as demonstrated below, would comply with the special use permit standards established by §246-9.4 of the Town Code and the Declaration of Restrictive Covenants annexed to the Town of Oyster Bay Town Board Resolution No. 214-1988 (actual zoning text is indicated in italics):

> *Standards. ....A Special Use Permit shall conform to the regulations of the Zoning District in which the use is located (Code §246-9.4.).*

The proposed project when viewed in the context of the existing site would comply with the majority of the applicable area and bulk requirements of the LI Zoning District (see Table 2-1), except that the proposed 100-foot stack and turbine building would exceed the maximum building height limitation of 50 feet and minimum and/or maximum setback distances may be exceeded. The proposed stack height is necessary to provide proper dispersion of the exhaust from the proposed project, while maintaining a relatively low profile for aesthetics. The proposed project's conformance with applicable Code bulk regulations is illustrated in Table 2-1.

Table 2-1
Bulk Regulations of the "LI" Zoning District, Town of Oyster Bay, New York

Category	LI District Requirement	Existing Plant and Proposed Project[1,2]
Principal Buildings		
Minimum Lot Area	1 acre	±3.4 acres
Maximum Dwelling Unit Density	N/A	N/A
Minimum Lot Width	50'	±150'
Maximum Building Coverage	50%	>50%
Maximum Floor Area Ratio	---	---
Maximum Front Yard Setback	60'	48'(W)/4'(E)
Minimum Front Yard	50'	35'(W)/4'(E)
Minimum Side Yard	10'[(3)]	N/A
Minimum Rear Yard	30'	N/A
Maximum Building Height	50'	64' and 77'
Accessory Buildings		
Minimum Front Yard	50'	57'(W)/60'(E)
Minimum Side Yard	10'[2]	N/A
Minimum Rear Yard	30'	N/A
Maximum Building Height	35'	N/A
Maximum Building Coverage of Required Rear Yard	0%	N/A

Notes: [1] These are estimated figures subject to the completion of a current site plan. As a result, such figures are not final and may be subject to change.

[2] In order to further serve the purpose of the Bulk Regulations, the proposed project should not be examined by itself, but in the context of the existing plant (even though they are separate entities) due to the fact that the

properties of both facilities are interconnected.

[2] 10' side yards required when adjacent to a Residence District.

The location and size of the special permit use and nature and intensity of the operations involved in it or conducted in connection with it, the size of the site in relation to it and the location of the site with respect to streets given access to it shall be such that it will be in harmony with the appropriate and orderly development of the area in which it is located (Code §246-9.4.1).

The proposed site lies within an area designated for the development of industrial uses, such as the proposed project. Additionally, because of the existing power generating uses on adjacent properties (i.e., the Calpine power generation facilities and the adjacent NGC Central Steam Plant), land use conditions would not change as a result of operation of the proposed project. The existing Calpine power generation facilities and NGC's Central Steam Plant have successfully co-existed with the various residential and business uses present within the site vicinity. The site has most recently been used for aeration basins, which were decommissioned. On the basis of these previous/existing site uses, significant impacts to the existing land uses within the site vicinity are not anticipated as a result of development of the proposed project.

The location, nature and height of buildings, walls and fences and the nature and extent of existing or proposed plantings on the site shall be such that the special permit use will not hinder or discourage the appropriate development and use of adjacent lands and buildings (Code §246-9.4.2).

Operations in connection with any special permit use shall not be more objectionable to nearby properties by reason of noise, traffic, fumes, vibration or other characteristics than would be the operations and impacts of permitted uses not requiring a Special Use Permit in that Zoning District (Code §246-9.4.3).

As described below, the presence of the proposed project would not adversely affect surrounding communities. Air emissions from the proposed project would comply with applicable regulations and not cause significant air quality impacts. The proposed project would not result in a contravention of state and local air and water quality standards; would comply with the Town of Oyster Bay noise ordinance at residential receptors; and would not result in a significant adverse visual impact to the surrounding community.

Parking facilities shall be of adequate size for the particular special permit use properly located and suitably screened from adjoining residential uses, and the entrance and exit drive(s) shall be designed to achieve maximum convenience and safety (Code §246-9.4.4).

Adequate parking to serve both the existing and proposed project operations would be provided on site.

AREA VARIANCE FOR HEIGHT AND SETBACKS

The proposed project would also require the grant of an "area variance" for height and possibly for minimum and/or maximum setback distances by the Zoning Board of Appeals. An area variance is referenced in Section 12.3.5.2 of the Town Code as follows:

Where an applicant requests a variance of the lot area or other dimensional requirements of this Chapter, the Zoning Board of Appeals may grant a variance in the application of the

provisions of this Chapter in the specific case, provided that as a condition to the grant of any such variance the Board shall consider the benefit to the applicant if the variance is granted, as weighed against the detriment to the health, safety and welfare of the neighborhood or community by such grant.

The proposed project, which is an allowable use within the "LI" Zoning District, would serve a vital public need by providing electric power to Long Island and by improving system reliability. It is proposed that the project would be constructed with one 100-foot stack, to assure that air quality impacts from the project would be below the regulatory defined significance levels. The height of the proposed turbine and boiler building has been minimized to the maximum extent practical; the turbine building would be constructed with four distinct tier heights, the highest being the 69-foot tier. The area of each tier decreases with increasing height of the tier level. Setback distances for the proposed project have also been designed to be consistent with the bulk regulations to the maximum extent practical. With respect to the proposed stack height, the requested variance would be the same as the height of existing onsite stacks and would not be detrimental to the health, safety, and welfare of the community.

As established in the Town Code, in granting an area variance, the Board of Appeals shall consider the following:

How substantial the variance is in relation to the requirement (Code §246-12.3.5.2.1).

An area variance for the height for the stack would result in a 50-foot increase in allowable height, while an area variance for the turbine and boiler building would result in a maximum 19-foot increase in allowable height. The stack is a single feature with a small area and would not be obtrusive. The 19-foot increase in height for the building is not considered to be substantial. Setback distances have been designed consistent with the bulk regulations to the maximum extent practical.

Whether an adverse effect or impact will be created on the physical or environmental conditions in the neighborhood or district (Code §246-12.3.5.2.2).

As discussed in subsequent sections of this EA, significant adverse environmental impacts are not anticipated as a result of the proposed project. The proposed project would not result in significant air quality impacts; would not result in a contravention of state and local water quality standards; would comply with applicable performance standards; and would not impact cultural resources or existing traffic conditions in the project area. As shown in photographs of the existing site, a total of seven stacks are currently associated with the existing Calpine power generation facilities and adjacent Central Steam Plant. The existing Calpine power generating facilities include three 100-foot stacks; while NGC's adjacent Central Steam Plant includes four 100-foot stacks. The stack for the proposed project would be added to this set of existing stacks. The addition of one new stack would not adversely impact the physical or environmental conditions in the neighborhood or LI District.

Whether an undesirable change will be produced in the character of the neighborhood or a detriment to nearby properties created (Code §246-12.3.5.2.3).

The presence of the proposed project would not adversely affect surrounding communities. The proposed project would be located on an existing industrial site, currently developed for power generation use and previously used for two aeration basins. Therefore, the existing neighborhood character would not change significantly as a result of the operation of the proposed project, and as such, the development and use of adjacent lands and buildings would not be affected.

Moreover, the proposed project stack would not adversely affect the existing visual character of the communities surrounding the proposed development site. The area immediately surrounding the proposed project is currently utilized for industrial and commercial uses. A total of seven stacks currently exist on and immediately adjacent to the site. The proposed project would be incorporated into this existing industrial/commercial viewshed, resulting in an insignificant visual change to the existing landscape.

Whether the benefit sought by the applicant can be achieved by some method feasible for the applicant to pursue, other than a variance (Code §246-12.3.5.2.4).

The proposed site was selected for development of the proposed project because it has convenient access to utility interconnections and already hosts a power plant. Specifically, the site already has electrical transmission lines, natural gas connections, and water supply and wastewater discharge connections that would enable the project to be operational by the summer of 2005. Locating the power plant at another location may involve building or extending the existing infrastructure and probably could not be completed in time to meet LIPA's critical need for power during the summer of 2005.

Whether the hardship or difficulty claimed as a ground for the variance has been created by the owner or by a predecessor in title. Mere purchase of the land subject to the restrictions sought to be varied shall not in itself constitute a self-created hardship (Code §246-12.3.5.2.5).

The need for area variances, if required, would not be self-created. The proposed project development is allowed, where proposed, by the Town Code. The height of the proposed project stack is not related to the size or configuration of the site. The height of the proposed turbine and boiler building has been minimized to the maximum extent practical. Minimum and maximum setback distances for the proposed project have also been designed to be consistent with the bulk regulations to the maximum extent practical.

The Zoning Board of Appeals shall grant the minimum variance it shall deem necessary and adequate and at the same time preserve and protect the character of the neighborhood and the health, safety and welfare of the community (Code §246-12.3.5.2.6).

The height variance for the proposed stack reflects an appropriate balance between minimizing visual impacts, while maximizing exhaust gas transport and dispersion. The height of the proposed turbine and boiler building has been minimized to the maximum extent practical. Minimum and maximum setback distances for the proposed project have also been designed to be consistent with the bulk regulations to the maximum extent practical.

TRANSMISSION LINES

KeySpan has a franchise to install and operate gas transmission facilities in the Town of Oyster Bay. The natural gas pipeline would be allowed under that franchise, and it would comply with the franchise's requirements. KeySpan on behalf of LIPA would obtain easements from NGC and Long Island Railroad for the electric transmission line.

D. CONCLUSIONS

In summary, the existing Calpine power generating facilities and NGC's Central Steam Plant co-exist with the various residential and business uses present within the site vicinity. The proposed

project would add a comparable use to the area. No significant adverse land use impacts would be expected to occur as a result of the proposed project.

With regard to zoning, the proposed project would be in substantial compliance with the requirements for the granting of all zoning approvals and variances, with the exception of the height requirements and possibly minimum and/or maximum setback distances. The height variance for the proposed stack reflects an appropriate balance between minimizing visual impacts, while maximizing exhaust gas dispersion. The height of the proposed turbine and boiler building has been minimized to the maximum extent practical. Minimum and maximum setback distances for the proposed project have also been designed to be consistent with the bulk regulations to the maximum extent practical. Absent LIPA's status as a state authority, the proposed project would be consistent with the requirements for issuance of a special use permit, site plan approval, and variances for height and setbacks. No significant adverse zoning impacts would be expected to occur as a result of the proposed project. ✷

A. EXISTING CONDITIONS

An inventory of community facilities (schools, hospitals, religious facilities, etc.) has been taken within a one-mile radius of the project site to assess potential impacts, if any, of the proposed project on these facilities. The facilities identified by this inventory are shown on Figure 3-1. They include the following:

SCHOOLS

- Bethpage Senior High School located approximately one mile northeast of the site in Bethpage.
- Central Boulevard Elementary School located approximately one mile southeast of the site in Bethpage.
- Gallow Middle School located approximately three-quarters of a mile south of the site in Levittown.
- Karcpczyc School located approximately three-quarters of a mile south of the site in Levittown.

PLACES OF WORSHIP

There are no places of worship located within a one-mile radius of the site.

HOSPITALS AND NURSING FACILITIES

There are no hospitals or nursing facilities within a one-mile radius of the site.

LIBRARIES

There are no libraries located within a one-mile radius of the site.

PARKS AND RECREATIONAL RESOURCES

- The Bethpage Community Park is located approximately one mile northeast of the site in Bethpage.
- The Meade Avenue Recreation Fields are located approximately three-quarters of a mile east of the site in Bethpage.

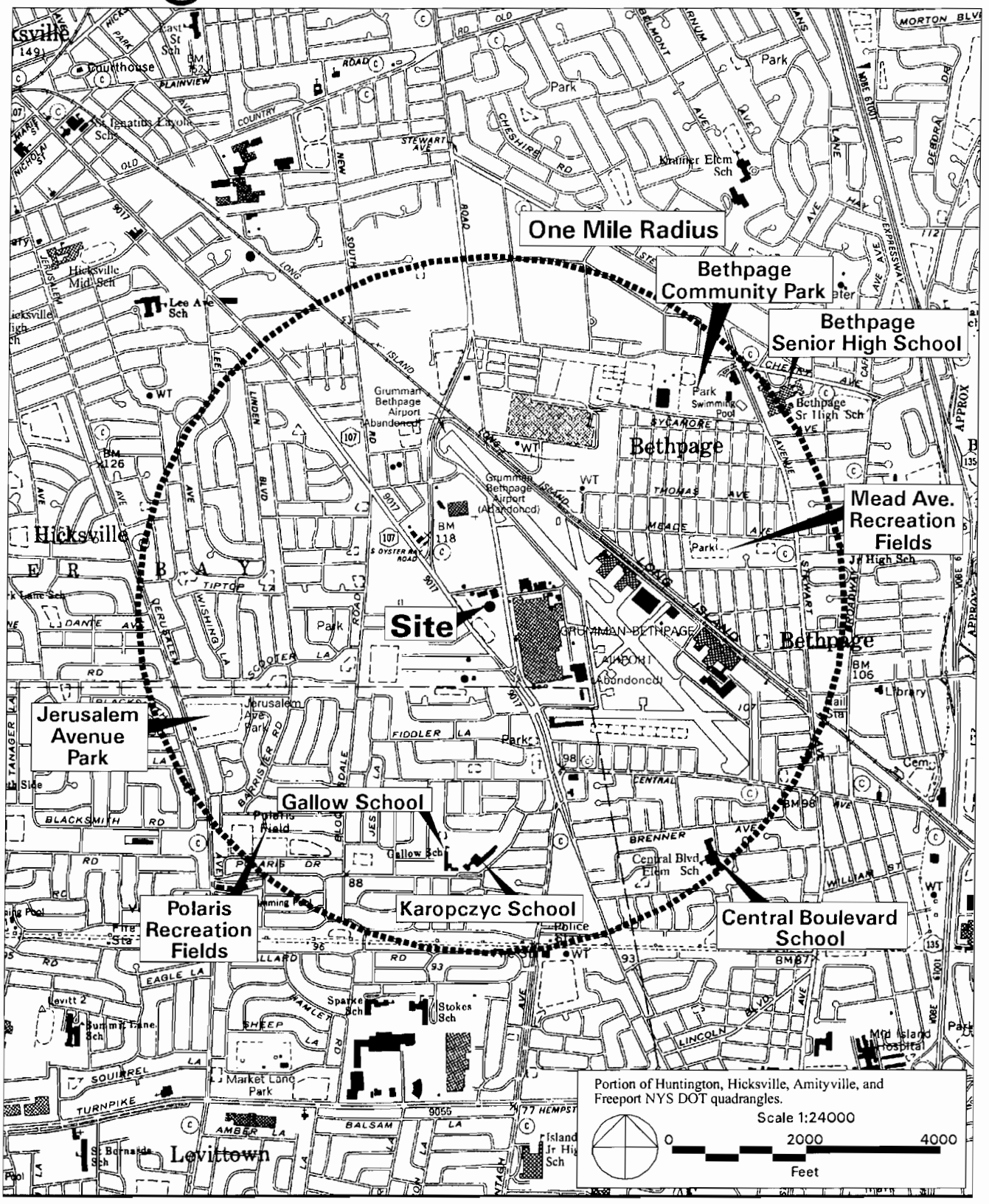

Figure 3 - 1

Community Facilities Map

- The Jerusalem Avenue Park is located approximately three-quarters of a mile southwest of the site in Levittown.
- The Polaris Recreation Field is located approximately one mile southwest of the site in Levittown.

B. PROBABLE IMPACTS OF THE PROPOSED PROJECT

INTRODUCTION

An analysis was performed to evaluate probable impacts of the proposed project with regard to community facilities. The results of this analysis are presented below.

PROPOSED PROJECT

Development of the proposed project would not have a significant adverse impact the community facilities identified above.

The proposed project would operate in conjunction with ongoing operation of the existing Calpine power generation facilities. One or two additional employees would be required for operation of the proposed new facility. If, conservatively, it were assumed that these additional employees were new residents to the area, they would require a very small amount of additional community services (i.e., police, fire, ambulance, health, etc.) and would, at most, result in a very small number of additional students in local schools. Accordingly, these new employees would not significantly increase the demand for services.

With regard to potential visual, air quality emissions and noise impacts from the proposed project site on nearby community facilities, as shown in Figure 3-1, in general these facilities are located relatively far from the site (i.e., between three-quarters to one mile from the site) and these impacts are very small. As discussed in Chapter 5, with the possible exception of the stack, the proposed facility would not be visible from community facilities within one mile of the project site. Even at locations where the project site or stack is visible, the proposed facility would not have any significant adverse visual impacts. As discussed in Chapter 8, maximum pollutant concentrations due to emissions from the proposed project would be below significant impact levels established by the United States Environmental Protection Agency (EPA), and thus the proposed facility would not cause any significant adverse air quality impacts. In addition, as discussed in Chapter 9, noise due to the proposed project would not significantly increase ambient noise levels at any residential receptor location or at the project site boundaries.

The proposed project would not significantly increase the demand for public safety services, such as police, fire, and ambulance services, nor have a significant adverse impact on public safety services. The site is located within the Eighth Precinct of the Nassau County Police Department. The Eighth Precinct is located approximately one mile south of the site at 286 Wantagh Avenue in Levittown. The site is within the service area of the Bethpage Volunteer Fire Department. The Fire Department has three stations within Bethpage; the nearest station to the project site is approximately one mile northeast of the site at Stewart and Farmers Avenue. The proposed project would have its own on-site fire suppression system In terms of ambulance services, the project site is within the service area of the Nassau County Police Department and the Bethpage Volunteer Fire Department. The proposed project would not significantly increase the demand for police, fire, or ambulance services.

Therefore, the proposed project would not have a significant adverse impact on community facilities.

TRANSMISSION LINES

Neither the natural gas transmission line nor the electric transmission line would have an adverse impact on the use or enjoyment of community facilities. ✷

A. EXISTING CULTURAL RESOURCES

The proposed project site is situated within a light industrial area in the unincorporated community of Hicksville, within the southwest portion of the Grumman Bethpage Complex. There are no sites within one mile of the project site listed on the National or State Register of Historic Places. Likewise, there are no sites within one mile of the project site classified as a Town of Oyster Bay Historic Site.

Correspondence from the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) dated June 12, 2001, for the simple-cycle gas turbine, which is part of the existing Calpine power generation facilities, indicates that portions of the Grumman Bethpage Complex have been evaluated for eligibility for inclusion in the National Register. This evaluation determined that two sites within the complex, Navy Plants #3 and #5, might be eligible for the National Register due to their association with World War II and Cold War era defense production. The location of these two sites in relation to the proposed project site is shown on Figure 4-1. The OPRHP further noted in their correspondence that additional surviving portions of the Grumman Bethpage Complex might also be found to meet the criteria for inclusion in the National Register.

Neither the site of the existing Calpine power generation facilities nor the site of the proposed project has been identified by the OPRHP as a potential archaeological site. The site of the existing Calpine power generation facilities is disturbed across its entire extent with built structures or pavement existing across the entire site. Two aeration basins were previously located on the site of the proposed project. These basins have been decommissioned. Based on these conditions, there does not appear to be any potential for onsite subsurface remains that antedate the industrial use of the project area.

B. PROBABLE PROJECT IMPACTS

As noted above, there are no sites listed on the National or State Register of Historic Places located within one mile of the project site. Consequently, the analysis of potential project impacts focused on the two sites determined to be eligible for listing on the National Register (Navy Plants #3 and #5) and examined possible air quality, noise, and visual impacts. The results of this analysis are presented below.

Development of the proposed project would not significantly adversely impact either of the two potential historic resources identified above.

An analysis of the potential visual impact of the site plan caused by the proposed project, based on existing historic architectural resources within the project area is provided in Chapter 5. Based on this analysis, the existing Calpine power generating facilities and Northrop Grumman Corporation's (NGC) Central Steam Plant would screen views of the proposed project from the north, with the exception of views of the uppermost portion of the new turbine building and the

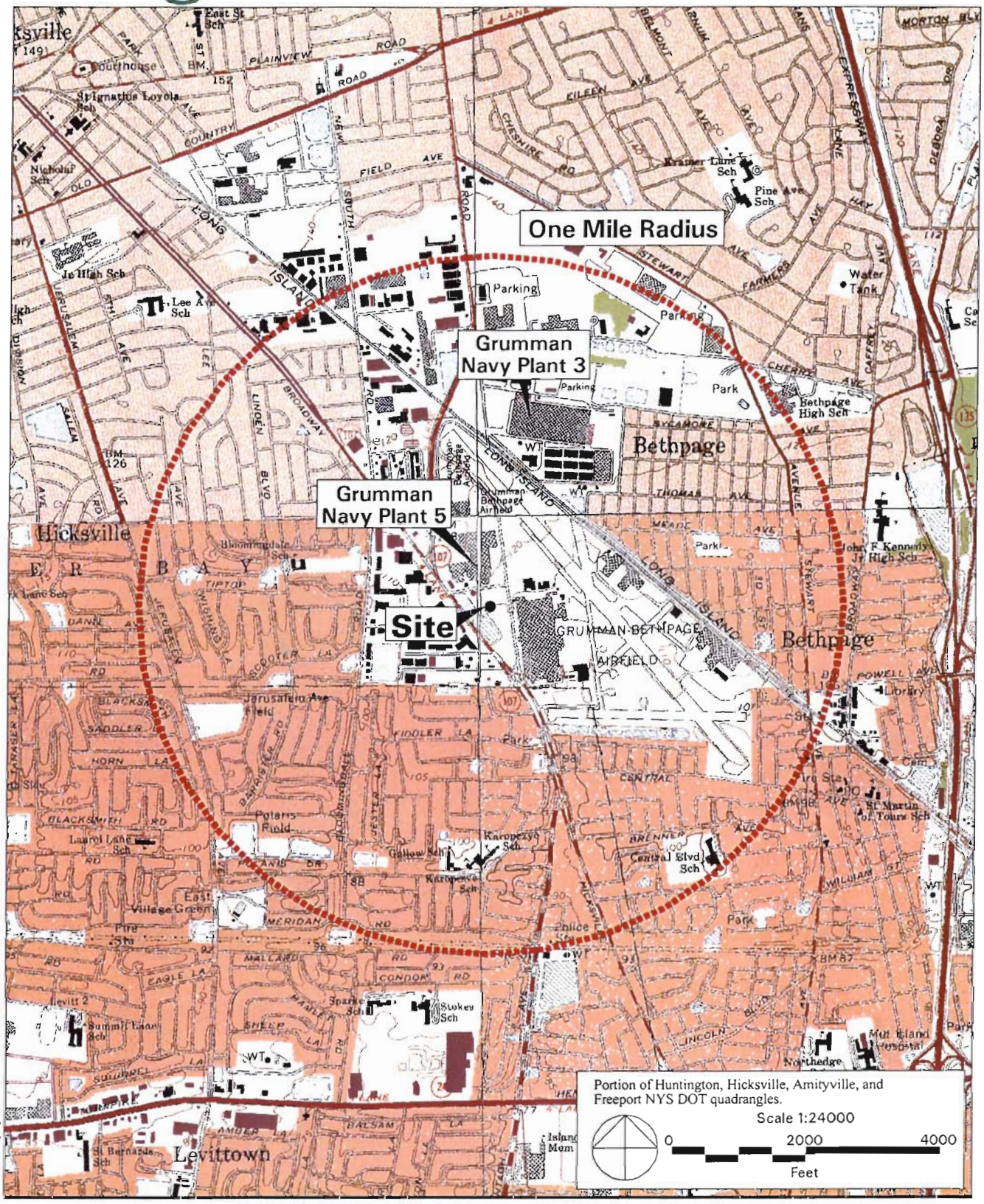

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Figure 4 - 1
Cultural Resources

new stack. These would generally blend with the existing plant and the Central Steam Plant, including the seven existing stacks present at or adjacent to the existing site. Accordingly, there would be no significant adverse visual impacts to viewers at Navy Plants #3 and #5.

A detailed analysis of potential air quality impacts arising from operation of the proposed project, including the results of state-of-the-art air dispersion simulation modeling, is provided in Chapter 8. That analysis concludes that the maximum pollutant concentrations due to emissions from the proposed project would be below significant impact levels established by the United States Environmental Protection Agency (EPA), and thus the proposed facility would not cause any significant adverse air quality impacts. Accordingly, the proposed project would not have an adverse air impact on Navy Plants #3 and #5.

A detailed analysis of potential noise impacts arising from operation of the proposed project is provided in Chapter 9. The acoustical analysis concludes that noise due to the proposed project would not significantly increase ambient noise levels at any receptor location, including locations at the project site boundaries. Accordingly, the proposed project would not have a significant adverse noise impact on Navy Plants 3 and 5, which are located to the north of the proposed project site.

Detailed project information, along with the results of the analysis of potential project impacts on Navy Plants #3 and #5, were submitted to the OPRHP on October 8 and 19, 2003. On October 31, 2003, OPRHP confirmed that the proposed project would have no effect on the eligibility of Navy Plants #3 and #5 to be listed in the National Register. Copies of the OPRHP correspondence are provided in Appendix C.

Therefore, the proposed project would not have a significant adverse impact on cultural resources.

TRANSMISSION LINES

The natural gas pipeline would be buried in a right-of-way that has been heavily disturbed with the placement of other utility lines. Any archaeological resource would have been disturbed by previous work, and the proposed natural gas transmission line would not have a significant adverse impact on archaeological resources. The line, being buried, would not be visible from any historic structures and would not have an adverse impact on them. The proposed electric transmission line would cross disturbed industrial land and a transportation corridor. Any archaeological resource would have been disturbed by previous work, and the proposed electric transmission line would not have a significant adverse impact on archaeological resources. The electric transmission line may be visible from Grumman Navy Plant 3 and Plant 5, which could be eligible for the National Register due to their association with World War II and Cold War era defense production. These were industrial facilities and are located in an industrial setting. The electric transmission line would conform to this context and would not have a significant adverse impact. ✷

The following sections characterize the project area, describe the visual quality of the surrounding communities, existing historic architectural resources and recreational resources within the project area, and the potential visual impact of the proposed project on these resources.

A. EXISTING ENVIRONMENTAL SETTING

The proposed project would be located within and immediately adjacent to the 2.3-acre existing Calpine power generation site. Specifically, the majority of the proposed project would be located within an aproximately1.7-acre site situated to the immediate south of the existing site. Some project equipment, including the five-cell cooling tower, the auxiliary cooling tower, the transformer skid, and a new administration building, would be located in the western portion of the existing site. The existing and proposed sites are located east of Hicksville-Massapequa Road (NYS Route 107) in the unincorporated community of Hicksville, in the west/central portion of the Town of Oyster Bay. Both the existing and proposed sites are part of a larger assemblage of parcels that historically encompassed the Grumman Bethpage Complex. Existing conditions at the existing site are shown in the photograph of the existing Calpine Power Generating Plant (Figure 1-2, above). As illustrated by this photograph, the existing site is dedicated to operation and support of the existing Calpine power generation plant. At present, built structures and pavement extends across the majority of the existing site. The existing plant includes various structures and enclosures, and a total of three stacks. Two decommissioned aeration basins that were previously located on a 1.1-acre parcel and an adjacent 0.6-acre parking lot would comprise the proposed site.

The Northrop Grumman Corporation's (NGC) Central Steam Plant is situated to the immediate north/northwest of the existing site and the NGC Navy Plant #5 site is situated to the immediate north of the Central Steam Plant and the existing site. Old South Oyster Bay Road borders the existing site on the east; a LIPA substation and office buildings comprising portions of the Bethpage Business Park are located on the east side of the Old South Oyster Bay Road, opposite the existing site. These office buildings were previously part of the Grumman Bethpage Complex. The property to the immediate east and south of the parcels is a paved parking area for tenants of the Bethpage Business Park. Two groundwater recharge basins, part of the NGC Navy Plant #5 site, are situated to the immediate west of the existing site, and Hicksville-Massapequa Road (NYS Route 107) runs in a north/south direction immediately west of two recharge basins. Commercial strip development is present on the west side of Hicksville-Massapequa Road. The nearest residences to the project site are approximately 2,000 feet due west of the site on the west side of Bloomingdale Road and approximately 1,000 feet to the south on the west side of Hicksville-Massapequa Road. The intervening area is developed with light industrial and commercial land uses.

As shown in Figure 1-2, above, Navy Plant #5 includes a more recent two-story white addition, which extends in a southwest direction from the original Navy Plant #5 building towards the

west side of the NGC's Central Steam Plant. Figure 1-2 shows that the existing Calpine power plant, NGC's Central Steam Plant, and Navy Plant #5 provide a collective "cluster" of built structures and associated development, when viewed from a distance.

The project site is at an elevation of approximately 110 feet above mean sea level (msl) and is essentially flat. The topography across the one-mile radius site vicinity is generally flat, with little noticeable relief. Industrial and commercial land uses predominate in the immediate vicinity of the project site and in areas to the north, northeast and southeast of the site. Much of this existing development, to the north and southeast of the site, is part of the Grumman Bethpage Complex, consisting of relatively large one- and two-story industrial and office-type buildings. In general, due to the relatively low height of these built structures and the flat topography, the existing plant and NGC's Central Steam Plant are visible from various points within these developed areas in the near site vicinity. Localized visual screening is provided in various locations by vegetation and intervening structures.

The localized "cluster" of built structures provided by the existing Calpine power plant, NGC's Central Steam Plant, and Navy Plant #5 is also visible from roadway corridors that extend directly toward the site. In particular, the cluster is visible from an increased distance, in comparison to adjacent areas, when approaching the site along Hicksville-Massapequa Road and from South Oyster Bay Road.

Residential areas are located west, south, southeast, and east/northeast of the project site, away from the more developed industrial and commercial areas in the immediate site vicinity. In general, these residential areas are "tree-lined" with mature deciduous and evergreen trees. The tree line and the residential structures, together with the relatively flat topography of the site area, generally provide a visual barrier to distant points. In general, the existing plant and NGC Central Steam Plant (as visually characterized by the seven existing stacks) are not visible from the various residential areas, particularly as the distance from the project site increases. In the residential areas located nearest to the site, the existing stacks may be visible during winter periods ("leaf-off conditions"), depending on the presence of intervening structures.

B. HISTORIC STRUCTURES AND RECREATION AREAS

An inventory of sites listed on the National and State Register of Historic Places and recreation areas has been taken within a one-mile radius of the proposed project site. There are no sites listed on the National and State Register of Historic Places within one mile of the project site. The New York State Office of Parks, Recreation, and Historic Preservation (OPRHP), however, has indicated (see Chapter 4, above) that Navy Plants #3 and #5, part of the Grumman Bethpage Complex, are eligible for listing in the National Register. The locations of these potentially eligible sites and parks and recreational facilities are shown in Figure 5-1.

Parks and recreational facilities occurring within the one-mile site vicinity radius include the following:

- Bethpage Community Park approximately one mile northeast of the project site, in Bethpage.
- Meade Avenue Park approximately three-quarters of a mile east/northeast of the project site, in Bethpage.
- Polaris Recreation Fields approximately one mile southwest of the project site, in Levittown.

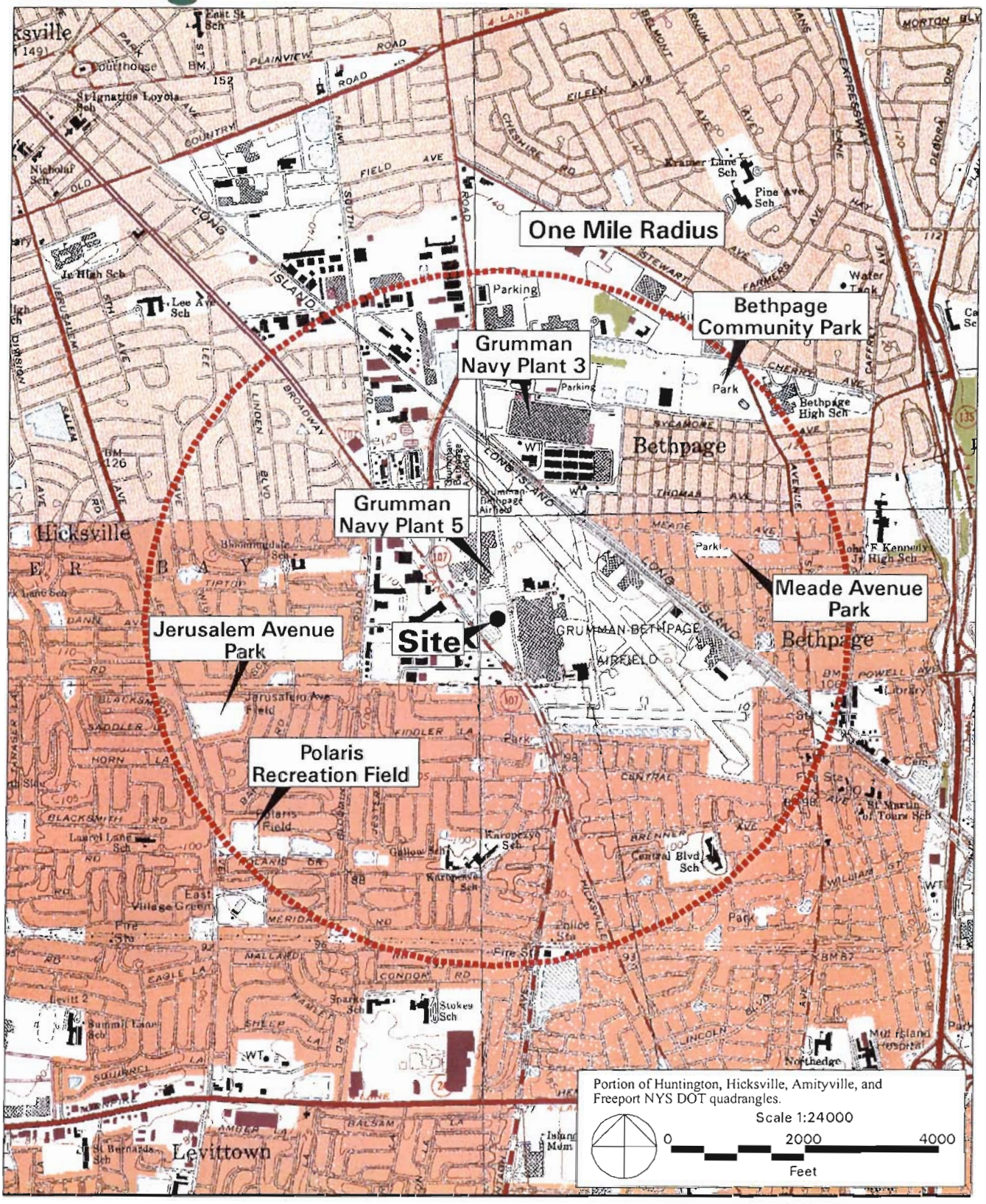


Figure 5 - 1
Historic and Cultural Resources

- Jerusalem Avenue Park approximately four-fifths of a mile southwest of the project site, in Levittown.

POTENTIAL VISUAL IMPACTS OF THE PROPOSED PROJECT

Figure 1-3 shows the primary existing features within the existing site in relation to the locations for the proposed project structures and features. Based on the location of the proposed project being generally to the south of the existing plant and NGC's Central Steam Plant, the most prominent view of the proposed project would be from the near south. Figure 5-2 provides a photosimulation of the proposed project as it would appear from the near south. This photosimulation is conservative because it shows the proposed building about 4 feet higher than it would be. As shown by these figures, the proposed project, as seen from the near south, would be viewed against the backdrop of the localized "cluster" of built structures provided by the existing plant, NGC's Central Steam Plant and Navy Plant #5, within a Light Industrial zoned district. When viewed from the south, the proposed project would serve to "screen" some of the existing structures to the north at the Calpine power plant and NGC Central Steam Plant. As a consequence, the continuing visual "projection" of the localized cluster of built structures and industrial uses would actually decrease from this view, as the relatively "finished" look of the new building displaces the view of the "unfinished" simple cycle gas turbine. The proposed 100-foot stack would be enclosed and would be the same height as the four existing stacks associated with the NGC Central Steam Plant and the three existing stacks associated with the Calpine power plant. As shown in Figure 5-2, the enclosed nature of the proposed stack would render it visually different from the seven existing stacks.

Figure 5-3 provides a photosimulation of the proposed project as it would appear from the main historical parking lot for Navy Plant #5. Navy Plant #5 is the brown two-story building visible in the far right portion of the photosimulation. This photosimulation is conservative because it shows the proposed building about 4 feet higher than it would be. As shown by the photosimulation, only the very uppermost portion of the new turbine building and the enclosed stack would be visible from this viewing location. The view of the proposed project from this location would essentially be the same with a minor shift in the location of the stack relative to the existing stacks. The existing structures associated with the existing plant and NGC's Central Steam Plant would provide visual screening of the remaining portions of the proposed project, from this viewing location. As shown by Figure 5-3, the uppermost portion of the new turbine building and the enclosed stack would visually blend with the existing plant's industrial structures and would not be significantly discernable to the casual viewer from this viewing location.

Figure 5-4 provides a photosimulation of the proposed project as it would appear from near the front entrance to Navy Plant #3, along South Oyster Bay Road. Navy Plant #3 is the tan one-story building visible in the far left portion of the photosimulation. This photosimulation is conservative because it shows the proposed building about 4 feet higher than it would be. As shown by this photosimulation, only the extreme uppermost portion of the new turbine building and the enclosed stack would be visible from this viewing location to a careful observer. The view of the proposed project from this location would essentially be the same with a minor relocation of the stack relative to the existing stacks. The new turbine building and enclosed stack would blend with the existing plant structures and likely would not be noticeable by casual viewers from this location, in comparison to the existing plant structures.

Existing ▲

Proposed ▼

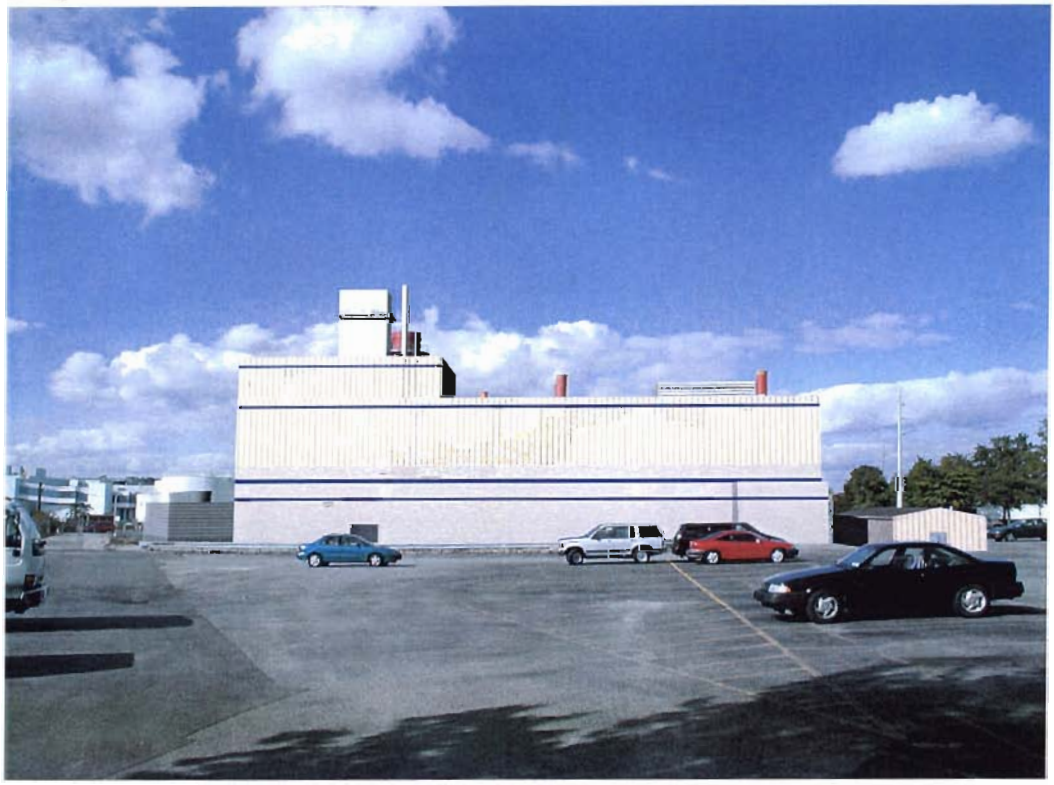


Figure 5-2
Photosimulation from the South

Existing ▲

Proposed ▼

Figure 5-3
Photosimulation from Navy Plant #5

Existing ▲

Proposed ▼

Figure 5-4
Photosimulation from Navy Plant #3

In general, the proposed project, as characterized by the new turbine building and the enclosed stack, would not be visible from the various residential areas, particularly as the distance from the project site increases. In the residential areas located nearest to the site, the upper portions of the existing and proposed buildings and stacks may be visible to discerning viewers during winter periods ("leaf-off conditions"), depending on the occurrence of localized intervening structures. However, this possible limited view from residential areas located nearest to the site of the proposed stack would not be a significant visual impact, as the proposed project would visually blend with the existing plant and the NGC's Central Steam Plant.

Furthermore, the proposed project would not be visible from Jerusalem Avenue Park and the Polaris Recreation Fields to the west-southwest, due to intervening obstructions. The uppermost portion of the new turbine building and stack may be visible to discerning viewers in certain locations within the local vicinity of Bethpage Community Park and Meade Avenue Park, at locations where the lack of intervening obstructions provides a clear view towards the site. However, this general viewing direction from these areas would be towards areas presently zoned and developed for light industrial and commercial uses, such that the proposed project would not stand out as a differing or significant view.

TRANSMISSION LINES

The natural gas pipeline would be underground and not visible. Therefore, it would not have a significant adverse visual impact. The electric transmission line would be mostly above ground and visible. It would be located in an industrial area and along a transportation corridor. Both of these areas currently contain a number of industrial facilities and transmission lines. As discussed above in Chapter 4 "Cultural Resources", Grumman Navy Plant 3 and 5, eligible for listing on the National Register, are industrial facilities. The proposed electric line would conform to this setting and would not have an adverse impact on these facilities. The proposed electric line would not be visible from the parks, and therefore would not have a significant adverse impact on these uses.

VISUAL IMPACT OF WATER VAPOR PLUMES FROM THE STACK AND COOLING TOWER

The results of a detailed analysis of the effects of water vapor emitted from the combustion turbine stack and cooling towers are presented in Chapter 8, "Air Quality" under the Other Potential Impacts section. Visible plumes from the combustion turbine would occur principally in winter during periods with low ambient temperatures, especially during the morning hours (around dawn). Due to the height of the stack and high exhaust velocities, any visible plume would occur relatively high above ground level and thus would not cause or contribute to any ground fogging effects. Visible plumes from the cooling towers would occur with more regularity. The vast majority of the time, the cooling tower plume would be contained within the immediate vicinity of the Calpine power plant sites. Under circumstances where an extended plume may occur, the plume would be well above the ground level and would not affect visibility. In summary, there would be no significant adverse visual impacts expected due to the water vapor plumes from the combustion turbine or cooling towers.

C. CONCLUSIONS

In summary, the proposed project would be visible from viewpoints to the south; however, the proposed project would generally blend with the existing "cluster" of built structures provided

by the existing Calpine power generation plant, NGC's Central Steam Plant, and Navy Plant #5. The proposed project would actually be an improvement to the view of the site from this location, as it would replace the view of the simple-cycle gas turbine with a finished building. The existing Calpine power plant and NGC's Central Steam Plant would screen the proposed project from the north, with the exception of views of the uppermost portion of the new turbine building and enclosed stack. Accordingly, visual impacts to viewers from the north would not be significant. The water vapor plumes that would occasionally be released from the stack and the cooling towers would also not have significant adverse visual impacts. Based upon the above, no significant adverse visual impacts would be expected with the proposed project. ✷

A. INTRODUCTION

This section contains an environmental justice analysis to determine whether the construction and operation of the proposed project would have a significant adverse effect on an "environmental justice community." As part of the environmental justice analysis, socioeconomic characteristics of the proposed project area have been examined to determine whether the proposed project would disproportionately impact any minority or low-income population. The analysis examines whether the proposed project would produce potentially adverse impacts on minority or low-income population subgroups given their location relative to the proposed project site.

B. REGULATORY AND POLICY GUIDANCE

FEDERAL GUIDANCE

The Office of Environmental Justice in the United States Environmental Protection Agency (EPA) Headquarters defines Environmental Justice as follows:

> *Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.*

The concept of performing an environmental justice analysis for a proposed project is related to the establishment of Executive Order 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations" (February 11, 1994). The order requires federal agencies to consider disproportionate adverse human health and environmental impacts on minority and low-income populations.

The focus of an environmental justice analysis is the determination of whether the construction and operation of a proposed project would have both adverse and disproportionate impacts on an environmental justice community. The "Interim Environmental Justice Policy" (EPA Region 2, 2000) provides guidance in making this determination as follows:

> *Evaluating Adverse Burden. There is no established methodology for evaluating cumulative risk and there are uncertainties associated with assessing environmental burden. In any event, when an acknowledged health standard for the burden in question is exceeded, the Region will consider the burden to be adverse unless otherwise indicated by supportive data.*

The glossary that is included in the Interim Policy defines "adverse environmental burden" as follows:

> *When there is an acknowledged health or welfare standard for the burden in question, the burden is adverse when it exceeds that standard. When there is no standard, the decision is based on site-specific analysis.*

Air quality modeling prepared as part of this environmental assessment (see Chapter 8) shows that air emissions from the proposed project would result in concentrations that are below significant impact levels (SILs) developed by the EPA. Based on the Interim Policy criteria, therefore, the air quality impact of the proposed project would not be considered adverse. Nevertheless, an analysis was conducted to determine whether any minority or low-income populations would be subject to a disproportionate environmental burden.

NEW YORK STATE GUIDANCE

In response to concerns raised on environmental justice and to ensure community participation in the environmental permitting process, New York State Department of Environmental Conservation (NYSDEC) announced on October 4, 1999, a new program to address these issues—NYSDEC Environmental Justice Program. On January 2, 2002, NYSDEC published "Recommendations for the New York State Department of Environmental Conservation Environmental Justice Program." This report sets forth recommendations for how environmental justice can be incorporated into permit review, SEQR procedures, and some components of NYSDEC's enforcement, public participation, and grants programs. The report and public comment generated from the report served as the basis for NYSDEC's *CP-29, Environmental Justice and Permitting* policy, which was issued on March 19, 2003, and became effective on April 18, 2003. The NYSDEC policy is applicable to projects under NYSDEC review, like the proposed project. Air quality permits must be obtained from NYSDEC.

The purpose of the NYSDEC policy is to determine whether or not there is the potential for environmental impacts related to a project that are "likely to adversely affect a minority community or low income community." The policy recommends that the NYSDEC environmental justice screening process utilize the methodology employed by EPA Region 2 in its Interim Environmental Justice Policy (Interim Policy). If, during the screening process, a project is determined to be located in an area with a substantial percentage of minority or low-income populations and the project is likely to have an adverse impact, then under the NYSDEC policy, the project becomes subject to a requirement for an enhanced public participation plan.

Because the proposed project requires permits from NYSDEC, the NYSDEC policy has been followed in this analysis.

C. METHODOLOGY

A socioeconomic analysis was conducted, based on minority population and income (i.e., poverty rate) statistics, to identify the presence of any Communities of Concern (COC). Minority and income population statistics were obtained from the Bureau of the Census (2000) data, and supplemented with environmental justice screening data provided by the NYSDEC Division of Permits (Kispert 2003). The 2000 Census provides data for smaller geographic areas, such as census tracts, allowing communities with high minority sub-populations to be identified. To obtain the total minority population for a census tract, the "not Hispanic or Latino, white alone" population was subtracted from the total population. It should be noted that, using this

methodology, any individual identified as "other race" or "two or more races" is considered a member of a minority. Poverty status data at the census tract and block level were also obtained using 2000 (1999) Census data and the NYSDEC environmental justice screening data. Low-income population includes all persons with an income less than the poverty level.

Data from eight census tracts falling within the 1-mile project radius (incorporating the total of all census blocks within each tract) were used to evaluate potential COCs. NYSDEC environmental justice screening data included the parts of these eight tracts and associated blocks located within the 1-mile project radius. The eight census tracts within the 1-mile project radius are shown in Figure 6-1. The NYSDEC environmental justice screening results are shown in Figure 6-2. The percentage of minority and low-income populations in the eight census tracts were then compared to the NYSDEC and EPA Region 2 statewide thresholds defining a COC.

D. STATISTICAL REFERENCE AREA

To analyze the demographic data, the statistical cluster analysis approach was applied using census block group data. The block group represents the resolution of least-size where the most important data sets are readily available (i.e., both for population and income). Several census block groups make up a census tract. Data were evaluated on a state-specific basis. The following Census Bureau definitions for urban and rural were utilized:

- Urban: All territory, population, and housing units located in urbanized areas (UA) and in places of 2,500 or more inhabitants outside of UAs. An urbanized area is a continuously built-up area with a population of 50,000 or more.
- Rural: Territory, population, and housing units that the Census Bureau does not classify as urban are classified as rural. Since all census tracts considered have more than 2,500 inhabitants, the area is considered urban.

The project area, therefore, is considered an urban setting as defined by the Census Bureau.

E. ANALYSIS OF MINORITY STATUS

The NYSDEC and EPA Region 2 policies define minority communities as those having a minority population equal to or greater than 51.1 percent in urban areas. None of the census blocks within the eight census tracts comprising the 1-mile screening analysis area exceeds the 51.1-percent threshold (see Figure 6-1). Population and race data from the eight tracks (incorporating all census blocks within each tract) are shown in Table 6-1. Furthermore, the NYSDEC Division of Environmental Permits staff conducted a preliminary environmental justice screening analysis for this project, which also concluded that the total minority population within the census blocks comprising the 1-mile project radius is approximately 7.9 percent (see Figure 6-2), substantially lower than that for the entire eight census tracts in Table 6-1. Therefore, the analysis concludes that there is no potential minority COCs within the project study area.

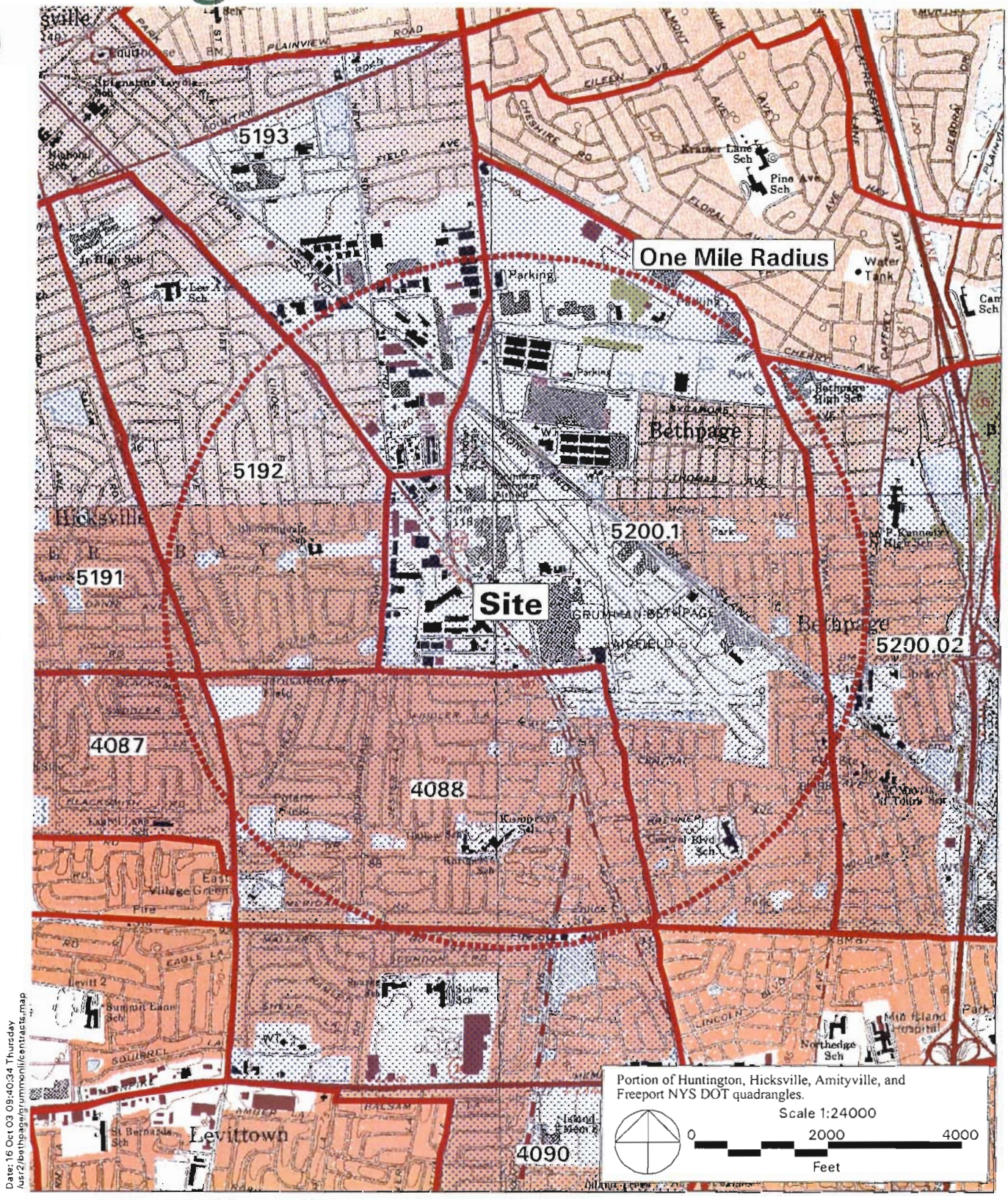


Figure 6 - 1
Census Tracts Within 1 Mile of the Project Site

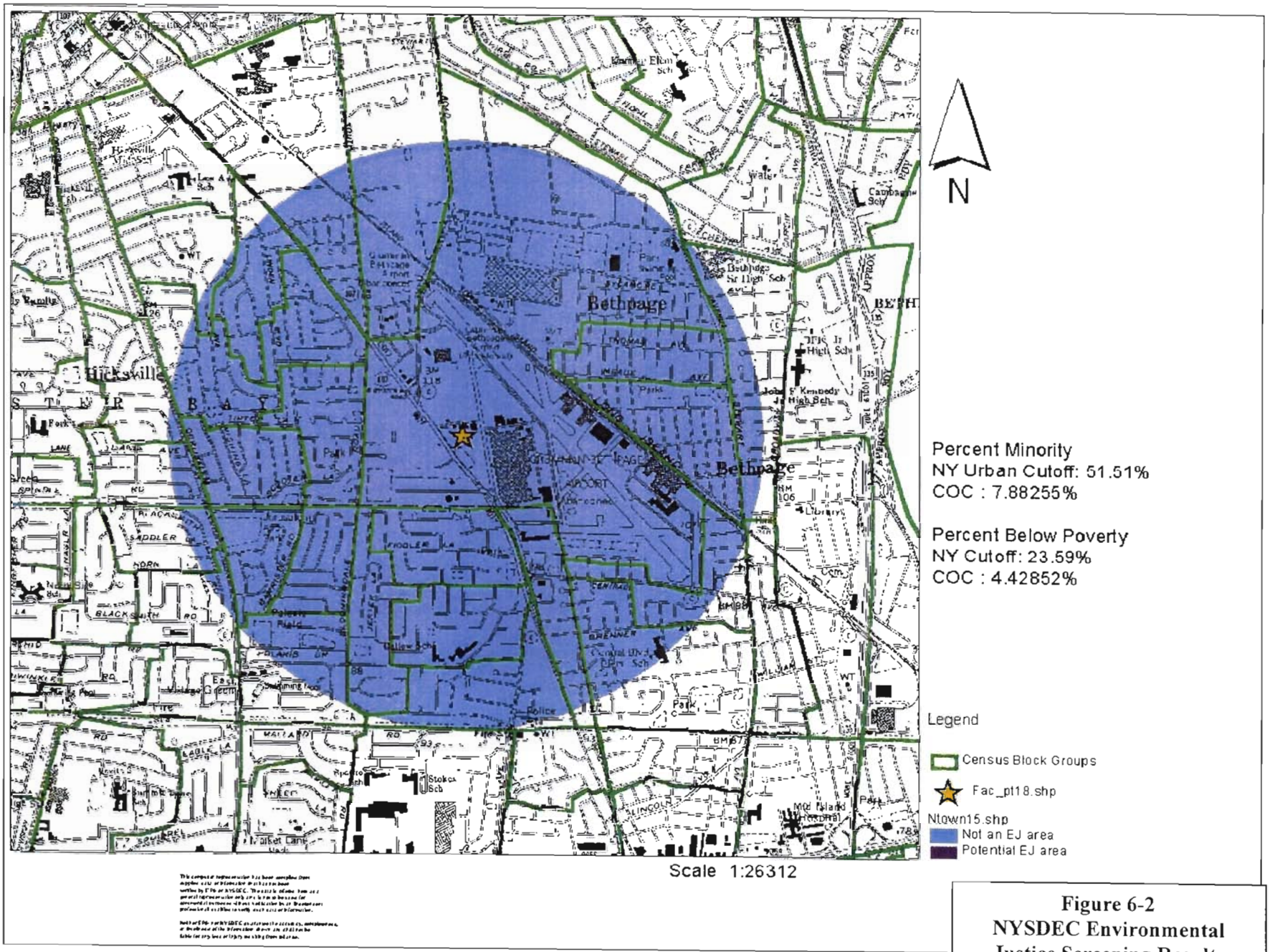


Figure 6-2
NYSDEC Environmental Justice Screening Results

Table 6-1
2000 Population and Race Data for Census Tracts Within 1 Mile of the Project Site

	New York	Nassau County	Tract 4087	Tract 4088	Tract 4090	Tract 5191	Tract 5192	Tract 5193	Tract 5200.01	Tract 5200.02
Total Population	18,976,457	1,334,544	4,920	7,041	5,953	6,072	5,932	5,958	6,838	4,324
Total Minority Population (%)*	38.0	26.0	13.4	11.9	12.8	17.5	14.5	30.5	9.5	8.0
White alone (%)	62.0	74.0	86.6	88.1	87.2	82.5	85.5	69.5	90.5	92.0
Hispanic or Latino (%)	15.1	10.0	7.2	7.6	8.6	7.9	6.7	17.8	5.3	4.9
Black or African American alone (%)	15.9	10.1	0.7	0.4	0.5	0.5	0.3	0.3	0.2	0.5
American Indian/Alaska Native alone (%)	0.4	0.2	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0
Asian alone (%)	5.5	4.7	4.0	2.8	3.2	7.6	6.8	11.5	2.7	2.0
Native Hawaiian/Pacific Islander alone (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0
Two or more races (%)	3.1	2.1	1.1	1.2	0.3	1.8	1.3	2.7	2.0	0.8
Other race alone (%)	7.1	3.6	0.3	1.0	0.2	2.5	1.7	6.4	1.2	1.0

Note:
* All population groups, other than non-Hispanic whites, consistent with the definition of minorities in the EPA guidance.

F. ANALYSIS OF INCOME STATUS

The NYSDEC and EPA Region 2 policies define low-income communities as those having a low-income population equal to or greater than 23.59 percent in urban areas. The percentages of persons below the poverty level for the screening analysis area, Nassau County and New York State, are shown below in Table 6-2. According to these policies for percentages of low-income populations, none of the eight census tracts in the study area exceeded the poverty threshold. Furthermore, the NYSDEC Division of Environmental Permits staff conducted a preliminary environmental justice screening analysis for this project, which also concluded that the total low-income population within the census blocks comprising the 1-mile project radius is approximately 4.4 percent (see Figure 6-2), approximately the same as that for the entire eight census tracts as shown in Table 6-1. Therefore, the analysis concludes that there are no potential low-income COCs within the project study area.

Table 6-2
Percentages of Persons Below the Poverty Level, 1999

	New York	Nassau County	Tract 4087	Tract 4088	Tract 4090	Tract 5191	Tract 5192	Tract 5193	Tract 5200.01	Tract 5200.02
Percent of persons below poverty level	15.0	5.2	1.9	6.5	3.2	3.5	3.1	7.1	4.0	2.2

G. PROBABLE IMPACTS OF THE PROPOSED PROJECT ON ENVIRONMENTAL JUSTICE

Based on the analysis conducted above, no potential environmental justice communities or COCs are located within the 1-mile project radius. In addition, as discussed in Chapter 8, maximum pollutant concentrations due to emissions from the proposed project would be below significant impact levels established by EPA, and thus the proposed facility would not cause any significant adverse air quality impacts. Therefore, the project would not result in any disproportionate, adverse impacts to any COC. As a result, the project would not be subject to an enhanced federal or state public participation plan.

NYSDEC confirmed in its letter dated September 26, 2003 that, due to the absence of a COC, the "permit review process for this project can continue independently of the elements of NYSDEC Commissioner Policy 29, Environmental Justice and Permitting" (Kispert 2003). Therefore, no further analysis relative to environmental justice is necessary.

TRANSMISSION LINES

The electric and gas transmission lines would not affect a COC and would not have significant adverse impacts. ✷

Chapter 7: Traffic and Transportation

A. INTRODUCTION

This section examines the impact of the proposed project on traffic and the transportation network in the vicinity of the proposed site. The potential traffic and transportation impacts arising from construction of the proposed project are discussed in Chapter 15, "Construction."

B. EXISTING CONDITIONS

Primary access to the existing Calpine power generation site is from Hicksville-Massapequa Road (NYS Route 107). Hicksville-Massapequa Road is a high-volume, primary arterial road. From Hicksville-Massapequa Road, a paved driveway extends approximately 230 feet eastward to the existing Calpine power generation site's entrance control gate. A traffic light is situated on Hicksville-Massapequa Road, approximately 100 feet south of the driveway entrance. The traffic light is provided for vehicles utilizing the commercial establishments situated on the west side of Hicksville-Massapequa Road. The traffic light and the paved driveway allow for efficient ingress and egress without congestion or traffic interruption on Hicksville-Massapequa Road. Hicksville-Massapequa Road and the site's existing driveway would continue to be used for access to the proposed project site under any of the alternative site arrangements.

C. PROBABLE IMPACTS OF THE PROPOSED PROJECT

Calpine staffs the existing Calpine power generation facilities, adjacent to the project site, on a continuous basis. Staff from the existing Calpine power generation facilities would also operate the proposed project. One or two additional employees would likely be required for operation of the proposed project, resulting in a very small number of additional employee vehicle trips per day, and a maximum of two additional vehicle trips in an hour. Based on the relatively high volume of traffic on Hicksville-Massapequa Road, the very small number of additional employee vehicle trips per day and during the peak hour would be negligible. Accordingly, increased employee vehicle trips due to the proposed project would not have a significant adverse impact on traffic conditions near the proposed project site.

Additional material deliveries for operation of the proposed project would consist of slightly increased frequencies of existing deliveries of aqueous ammonia (less than 20 percent concentration), sodium hydroxide (caustic), sulfuric acid, and water treatment chemicals. These materials would continue to be delivered to the site by a tanker truck on an approximately weekly basis. In addition, periodic maintenance would require some additional equipment delivery trips. However, at the most, a maximum of four vehicle trips would occur in any given hour with the proposed project. This limited number of increased site deliveries would have a negligible impact on existing traffic levels.

Therefore, operation of the proposed facility would not have a significant adverse impact on traffic conditions in the vicinity of the proposed site.

TRANSMISSION LINES

Neither the operation of the natural gas transmission line nor the electric transmission line would have an adverse impact on traffic. ✷

This section examines the air quality impacts associated with the operation of the proposed project and its compliance with applicable ambient air quality standards and guidelines established by the United State Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (NYSDEC).

A. AIR QUALITY REGULATIONS

The EPA and NYSDEC have promulgated regulations that establish ambient air quality standards and permitting requirements, including: (1) National and New York Ambient Air Quality Standards (NAAQS and NYAAQS); (2) State permits and registration; (3) Nonattainment New Source Review (NNSR); and (4) Prevention of Significant Deterioration (PSD) rules. The requirements imposed by these regulations and their implications for the proposed project are discussed in the following sections.

NATIONAL AMBIENT AIR QUALITY STANDARDS

The EPA has established NAAQS for six air contaminants, known as criteria pollutants, for the protection of public health and welfare. These criteria pollutants are particulate with a mean diameter of 10 microns or less (PM_{10}), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and lead (Pb). The EPA established both primary standards, intended to protect human health, and secondary standards, intended to protect public welfare from adverse effects associated with air pollution, such as damage to property or vegetation. The NYSDEC essentially adopted the Federal standards in developing the NYAAQS. They also issued standards for several other pollutants, namely total suspended particulate (TSP), photochemical oxidants, fluorides (F^-), beryllium (Be), and hydrogen sulfide (H_2S). The NAAQS and NYAAQS, including both short-term and long-term standards, are presented in Table 8-1.

On July 18, 1997, the EPA promulgated a new NAAQS for fine particulate ($PM_{2.5}$) and established a transition program from PM_{10} to $PM_{2.5}$. The EPA is conducting a nationwide ambient air quality monitoring program for $PM_{2.5}$, and is preparing regulatory guidance for implementing the $PM_{2.5}$ standards. Until promulgation of final regulations, the EPA's guidance directs the states to rely on an assessment PM_{10} emissions to demonstrate compliance with the $PM_{2.5}$ standard. The NYSDEC has taken the initiative to develop its own $PM_{2.5}$ policy that requires that the owners or operators of a new or modified source to demonstrate compliance with the $PM_{2.5}$ standards as part of the State Environmental Quality Review (SEQR) process.

One of the basic goals of federal and state regulations is to ensure that ambient air quality, including the impacts of both existing sources and new sources, complies with the NAAQS and NYAAQS. To this end, the EPA has classified all areas in the country as "attainment,"

Table 8-1
National and New York Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS and NYAQS ($\mu g/m^3$)		Significant Impact Levels ($\mu g/m^3$)
		Primary	Secondary	
NO_2	Annual[1]	100	Same	1
SO_2	Annual[1]	80	--	1
	24-hour[2]	365	--	5
	3-hour[2]	--	1,300	25
PM_{10}	Annual[3]	50	--	1
	24-hour[4]	150	--	5
$PM_{2.5}$[5]	Annual[3]	15	--	0.3
	24-hour[6]	65	--	5
CO	8-hour[2]	10,000	Same	500
	1-hour[2]	40,000	Same	2,000
O_3	8-hour[7]	157	Same	--
	1-hour[2]	235	Same	--
Pb	3-month[1]	1.5	--	--
TSP[8]	Annual[9]	50	--	--
	24-hour[2]	250	--	--
Photochemical Oxidants[5]	1-hour	160	--	--
F[8]	12-hour[1]	3.70	--	--
	24-hour[1]	2.85	--	--
	1-week[1]	1.65	--	--
	1-month[1]	0.80	--	--
Be[8]	1-month[1]	0.01	--	--
H_2S[8]	1-hour[1]	14.0	--	--

Notes:
1 Not to be exceeded.
2 Not to be exceeded more than once per year.
3 Not to be exceeded by the average of the annual arithmetic averages over 3 successive years.
4 Fourth highest concentration over a three year period.
5 NYSDEC policy.
6 Not to be exceeded by the average of the 98th percentile of the 24-hour averages over 3 successive years.
7 Three year average of annual 4th highest concentration.
8 NYSDEC standard only.
9 Not to be exceeded by the geometric mean of 24-hour average standard over a 12-month period.
$\mu g/m^3$ – micrograms per cubic meter

Source: 40 CFR Part 50 and 6 NYCRR Part 257.

"nonattainment," or "unclassifiable," with respect to the ambient air quality standards. Hicksville is located in the New York City Air Quality Control Region. This region is currently classified as either an attainment or unclassifiable area for PM_{10}, SO_2, NO_2, CO, and Pb. On the other hand, the entire region is classified as a severe nonattainment area for O_3.

To identify those new sources with the potential to violate or contribute to a violation of an ambient air quality standard, impacts are compared to the EPA significant impact levels (SILs) for NO_2, SO_2, CO, and PM_{10} (see Table 8-1). If the impacts of a new or modified source exceed the SILs, a more refined dispersion modeling analysis is required to assess compliance with ambient air quality standards. This analysis must consider the combined impacts associated with the new or modified source, existing sources, and measured background levels. If the impacts do not exceed the SILs, a refined analysis is not required to assess compliance with ambient air quality standards. The NYSDEC has also proposed significant impact thresholds for $PM_{2.5}$ in its $PM_{2.5}$ policy.

SOURCE PERMITTING AND REGISTRATION

The NYSDEC has established permitting and registration requirements for new or modified sources in the State under 6 NYCRR Part 201. If a new source qualifies as a "major source," the owner or operator must obtain a Title V facility permit from the NYSDEC in accordance with the requirements set forth in 6 NYCRR Subpart 201-6. Otherwise, the owner or operator must obtain a state facility permit from the NYSDEC in accordance with the requirements under 6 NYCRR Subpart 201-5. According to 6 NYCRR Subpart 201-2, a facility is classified as a major source if it meets any of the following criteria:

- The facility has the potential to emit 100 tons per year (tpy) or more of any regulated air pollutant.
- The facility is located in a severe O_3 nonattainment area and has the potential to emit 25 tpy or more of either nitrogen oxides (NO_x) or volatile organic compounds (VOC).
- The facility has the potential to emit 10 tpy or more of any individual hazardous air pollutant (HAP) or 25 tpy or more of all HAPs combined.
- The facility is subject to the NSPS, NESHAP, or Acid Rain Provisions under the Clean Air Act.

Because the existing cogeneration facility has potential emissions greater than 100 tpy, it qualifies as a "major source" requiring a Title V facility permit under Part 201-6. TBG Cogen Partners received approval of a Title V facility permit for the existing facility from the NYSDEC on October 27, 1998 (Permit No. 1-2824-00947/00004). A Title V permit modification application is pending with the NYSDEC that would add the simple cycle gas turbine installed in 2002.

On October 3, 2003, Calpine filed a Part 201 preconstruction permit application for the proposed project with the NYSDEC in accordance with the requirements of 6 NYCRR Subpart 201-5. Calpine, if selected, would also file an application to modify the current Title V facility permit within one year of operation of the new unit in accordance with 6 NYCRR Subpart 201-6. The specific requirements for a complete permit application are included in 6 NYCRR Parts 200 and 201, as well as 6 NYCRR Part 621, "Uniform Procedures."

NONATTAINMENT NEW SOURCE REVIEW

The NNSR regulations apply to any new major source or a major modification to an existing major source on a pollutant-specific basis in areas classified as nonattainment with respect to ambient air quality standards (6 NYCRR Part 231). The NNSR regulations impose stringent requirements on major new sources or major modifications, including the application of air pollution controls capable of achieving the Lowest Achievable Emission Rate (LAER) and the acquisition of

emission reduction credits to more than offset the potential emissions of the subject pollutant from the source.

The proposed project would be located in a region classified as a severe nonattainment area for O_3. The EPA and NYSDEC consider O_3 a secondary pollutant formed by the interaction of NO_x and VOC in the atmosphere. In a severe O_3 nonattainment area, a new source is subject to NNSR if the potential NO_x or VOC emissions associated with the source by itself are equal to or greater than the major source thresholds of 25 tons per year (tpy). For modifications to an existing major source, NNSR applies if the modification is part of a significant source project (*i.e.*, potential NO_x or VOC emissions are greater than 2.5 tpy) and it will result in a net increase of NO_x or VOC emissions greater than the major source thresholds of 25 tpy. A major new source or major modification in a severe O_3 nonattainment area must obtain emission reduction credits to offset potential emissions in a ratio of at least 1.3:1.

Table 8-2 compares the net change in the potential emissions associated with installation of the proposed combined-cycle combustion turbine, as well as the contemporaneous emission increases associated with the simple cycle gas turbine that commenced operation in June 2002 and the inlet air fogging system that was installed on the existing cogeneration units in May 2000, with the thresholds triggering NNSR. As shown in Table 8-2, the net increase in the potential NO_x emissions exceeds the corresponding significant emission rate, while the net increase in potential VOC emissions is less than the significant emission rate. The proposed project, therefore, is subject to the requirements of NNSR for NO_x only, including the application of air pollution controls capable of achieving LAER and the acquisition of emission reduction credits to offset the potential emissions from the source.

Table 8-2
NNSR Applicability Determination

Pollutant	Net Change in Potential Emission (tpy)[1]				Significant Emission Rates (tpy)[2]
	Addition of New Unit	Addition of Peaking Unit	Modification of Existing Units	Total	
NO_x	26.6	19.1	3.4	49.1	25
VOC	5.3	5.3	1.0	11.6	25

Notes:
[1] The potential emission increases for the proposed unit and the contemporaneous emission increases associated with the existing peaking unit that commenced operations in June 2002 and the inlet air fogging system installed on the existing cogeneration units in May 2000.
[2] The significant emission rates cited in 6 NYCRR Part 231.

PREVENTION OF SIGNIFICANT DETERIORATION REVIEW

The PSD regulations establish a federally mandated program that applies to new major sources or major modifications to existing major sources of any regulated pollutant located in an attainment areas for that pollutant (40 CFR Part 52.21). The PSD regulations require new major sources or major modifications to control pollutant emissions through the application of Best Available Control Technology (BACT). New major sources or major modifications are also required to demonstrate compliance with ambient air quality standards and PSD allowable increments and to assess the impacts on Class I areas, vegetation and soils, and the effects of secondary growth.

The proposed project would be located in a region classified as either attainment or unclassified for PM_{10}, SO_2, NO_2, and Pb. A new source included in a list of source categories listed in 40 CFR Part 52.21 is subject to PSD review if it has potential emissions of any regulated pollutant equal to or greater than 100 tpy. These requirements apply not only to pollutants emitted in quantities of 100 tpy or more, but also all other pollutants emitted in quantities equal to or greater than their respective significant emission thresholds. A modification to an existing major source is subject to PSD review if the net increase in the potential emissions of any regulated pollutant is equal to or greater than the respective significant emission rates. The proposed project could be a source of the following regulated pollutants potentially subject to PSD review: PM_{10}, SO_2, NO_2, CO, and sulfuric acid mist (H_2SO_4).

Table 8-3 compares the net change in the potential emissions associated with the new combined-cycle project with the significant emission thresholds triggering PSD review. As shown in this table, the potential emissions of all criteria pollutants are less than the corresponding significant emission rates. The proposed project, therefore, is not subject to the requirements of the PSD regulations. In addition, the net increase in potential $PM_{2.5}$ emissions is less than the corresponding significant emission rate.

Table 8-3
PSD Applicability Determination

Pollutant	Potential Emissions (tpy)[1]	Major Source Threshold (tpy)[2]	Significant Emission Rates (tpy)[2]
NO_x	26.6	100	40
CO	19.8	100	100
PM_{10}	14.5	100	25/15
$PM_{2.5}$[3]	14.5	100	15
SO_2	3.8	100	40
H_2SO_4	2.9	100	7
Others[4]	Nil	NA	NA

Notes:
1. The potential emissions assume the combustion turbine operating at 100-percent load for 8,760 hour per year and the duct burners operating at 100-percent load for 6,800 hours per year.
2. The PSD major source thresholds and significant emission rates are cited in CFR Part 52.21.
3. The $PM_{2.5}$ significant emission rate cited in the NYSDEC's $PM_{2.5}$ policy.
4. The other pollutants include Pb, Be, F^-, H_2S, total reduced sulfur, and reduced sulfur compounds.

B. PROJECT DESCRIPTION

Calpine proposes to construct and operate a new combined-cycle, combustion turbine generator on a 1.7-acre site adjacent to the existing Calpine power plant in Hicksville, New York. The project design and performance criteria and potential air pollutant emissions are described in the following sections.

DESIGN AND PERFORMANCE CRITERIA

The estimated emissions from the proposed combustion turbine are primarily based upon guarantees received from General Electric and the air pollution control equipment vendors. The

estimated PM_{10} and $PM_{2.5}$ emissions from the combustion turbine are based upon performance tests conducted on similar units by Calpine. The emission estimates are as follows:

- NO_x emissions would be controlled by the use of natural gas, water injection, and a selective catalytic reduction (SCR) system with an outlet concentration of no more than 2.5 parts per million volume, dry basis (ppmvd) corrected to 15 percent oxygen (O_2). This is equivalent to a maximum NO_x emission rate of 6.60 pounds per hour (lb/hr).
- CO emissions would be controlled by the use of natural gas, good combustion practices, and an oxidation catalyst with CO emissions of no more than 0.0171 pounds per million British thermal units (lb/MMBtu). This is equivalent to a maximum CO emission rate of 10.30 lb/hr.
- PM_{10} and $PM_{2.5}$ emissions would be minimized by the use of natural gas and high efficiency combustion with a maximum emission rate of no more than 3.54 lb/hr. Note that the PM_{10} emissions account for both condensable and non-condensable particulates, including ammonium salts potentially formed downstream of the SCR system.
- SO_2 emissions would be minimized by the exclusive use of natural gas with an extremely low sulfur content of approximately 0.5 grams per 100 standard cubic feet (gr/100 scf). The maximum SO_2 emission rate is 0.95 lb/hr.
- VOC emissions would be controlled by the use of natural gas, good combustion practice, and an oxidation catalyst with VOC emissions of no more than 0.0035 lb/MMBtu. This is equivalent to a maximum VOC emission rate of 2.64 lb/hr.
- H_2SO_4 emissions would be minimized by the exclusive use of natural gas with a maximum sulfur content of 0.5 gr/100 scf. The maximum H_2SO_4 emission rate is 1.04 lb/hr.
- Ammonia (NH_3) emissions would be controlled by the design and operation of the SCR system with a guaranteed outlet concentration of no more than 10 ppmvd corrected to 15 percent O_2. This is equivalent to a maximum NH_3 emission rate of 9.70 lb/hr.

During commissioning, performance tests would be conducted under the full range of operating conditions to demonstrate compliance with these performance criteria. Thereafter, a continuous emission monitoring system (CEMS) would be employed to ensure continued compliance with specified criteria.

AIR POLLUTANT EMISSIONS

The maximum hourly criteria pollutant emission rates from the new combustion turbine over the anticipated loads and meteorological conditions are presented in Table 8-4. Criteria pollutants include those pollutants for which ambient air quality standards have been developed by the EPA (40 CFR Part 50). The maximum hourly emission rates for the non-criteria pollutants H_2SO_4 and NH_3 are also presented in these tables.

The maximum hourly non-criteria pollutant emissions from the project are presented in Table 8-5. The non-criteria pollutant emissions (except for formaldehyde) from the proposed unit are based upon the maximum heat input rate and emission factors cited in EPA Document No. AP-42 (EPA 2000). Formaldehyde emissions, on the other hand, are based upon stack test data compiled for similar installations by Calpine.

Table 8-4
Maximum Criteria Pollutant Emissions

Parameter Load (%)	100%			75%			50%		
Ambient Temp (°)	-10	59	110	-10	59	110	-10	59	110
Duct Burner (On/Off)	On	On	On	Off	Off	Off	Off	Off	Off
Heat Input (MMBtu/hr)	711.22	729.92	684.11	352.23	364.53	331.64	262.82	269.72	248.32
Fuel Consumption (lb/hr)	30,038	30,828	28,893	14,876	15,396	14,007	11,100	11,392	10,488
Flow Rate (acfm)	327,061	277,658	281,746	268,547	231,375	232,447	223,893	186,507	187,368
Stack Temperature (°F)	180.0	180.0	180.0	160.0	160.0	160.0	160.0	160.0	160.0
NO_x (lb/hr)	6.41	6.60	6.20	3.18	3.30	3.00	2.37	2.44	2.24
CO (lb/hr)	10.30	5.10	3.50	5.90	1.60	0.50	3.90	1.10	0.40
PM_{10} (lb/hr)	3.54	3.54	3.54	2.50	2.50	2.50	2.50	2.50	2.50
SO_2 (lb/hr)	0.92	0.95	0.89	0.46	0.47	0.43	0.34	0.35	0.32
VOC (lb/hr)	2.64	1.44	1.24	1.20	0.20	0.20	0.80	0.20	0.20
H_2SO_4 (lb/hr)[1]	0.29	0.67	0.61	0.15	0.38	0.44	0.09	0.31	0.33
NH_3 (lb/hr)[1]	6.04	6.33	5.73	4.71	4.88	4.44	3.51	3.61	3.32

Note: [1] H_2SO_4 and NH_3 are not criteria pollutants regulated under the NAAQS.

Table 8-5
Maximum Non-criteria Pollutant Emissions

Pollutant	CAS No.	Emission Factor[1] (lb/MMBtu)	Maximum Emission Rate (lb/hr)
1-3-Butadiene	106-99-0	<4.30E-07	1.57E-04
Acetaldehyde	75-07-0	4.00E-05	2.92E-02
Acrolein	107-02-8	6.40E-06	4.67E-03
Benzene	71-43-2	1.20E-05	8.76E-03
Ethylbenzene	100-41-4	3.20E-05	2.34E-02
Formaldehyde[2]	50-00-0	3.60E-04	2.63E-01
Naphthalene	91-20-3	1.30E-06	9.49E-04
PAH	13049-29-2	2.20E-06	1.61E-03
Propylene Oxide	75-56-9	<2.90E-05	1.06E-02
Toluene	108-88-3	1.30E-04	9.49E-02
Xylenes	1330-20-7	6.40E-05	4.67E-02

Notes:
[1] Based on 100-percent load conditions and AP-42 emission factors.
[2] Based on 100-percent load conditions and stack test data compiled by Calpine.

The maximum PM_{10} and $PM_{2.5}$ emissions from the two cooling towers are presented in Table 8-6. The $PM_{10}/PM_{2.5}$ emissions are based upon cooling tower design, the circulating water flow rate, the drift eliminator efficiency, and makeup water composition. The $PM_{10}/PM_{2.5}$ emissions assume that 10 percent of the total drift is less than 10 microns based upon a particle size distribution for cooling towers equipped with high efficiency drift eliminators provided by the NYSDEC (NYSDEC, 2003).

Table 8-6
Maximum PM_{10} Emissions from Cooling Towers

Parameter	Condenser Cooling Tower		Chiller Cooling Tower	
	Per Cell	Total	Per Cell	Total
Number of Cells	1	5	1	2
Water Flow Rate (gpm)	6,837	34,185	3,000	6,000
Number of Cycles	10	10	10	10
Makeup Water Solids (mg/l)	100	100	100	100
Air Flow Rate (acfm)	410,840	2,054,200	289,300	578,600
Drift Efficiency (%)	0.0005	0.0005	0.0005	0.0005
Drift Rate (gpm)	0.034	0.171	0.015	0.030
Fraction <10 microns (%)[1]	10.00	10.00	10.00	10.00
Tower Height (ft)	27.75	27.75	19.81	19.81
Exit Temperature (°F)	91.90	91.90	85.00	85.00
Exit Velocity (fps)	44.50	44.50	42.65	42.65
Exit Diameter (ft)	14.00	14.00	12.00	12.00
$PM_{10}/PM_{2.5}$ (lb/hr)	0.00171	0.00856	0.00075	0.00150

Note: [1] Based upon a particle size distribution provided by the NYSDEC.

C. AIR QUALITY MODELING PROCEDURES

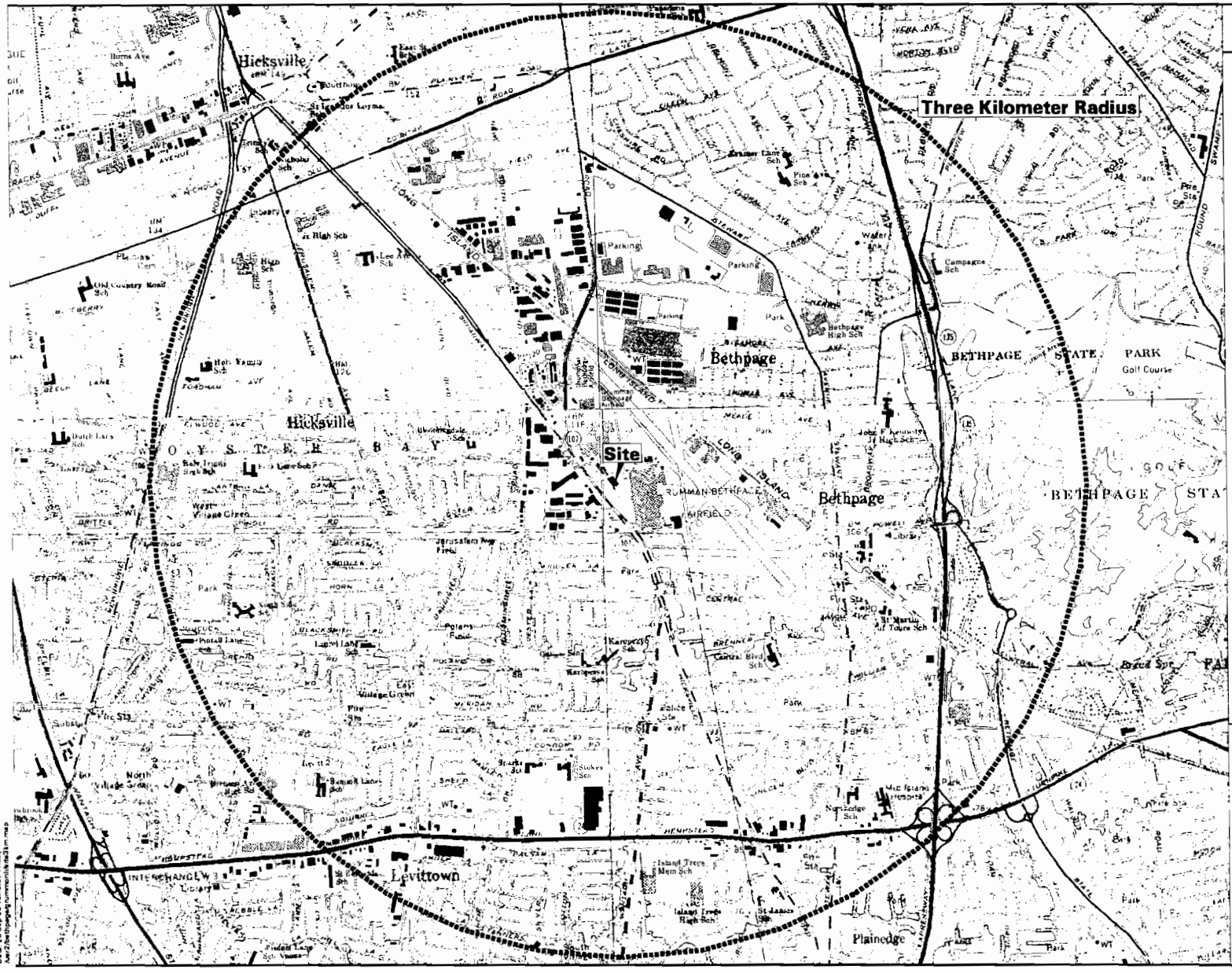
The air quality impact assessment is intended to determine if the projected impacts of the proposed action will comply with applicable Federal and state ambient air quality standards. This section describes the procedures employed in the compliance assessment, including model selection, input data, and results of the air quality modeling analysis. The modeling procedures were documented in the air quality modeling protocol (Earth Tech, 2003), which was approved by the NYSDEC on October 1, 2003.

LAND USE

A land use determination was made following the classification technique suggested by Auer (Auer) and recommended by the EPA. The classification determination was conducted by assessing land use categories within a 3-kilometer radius of the site using USGS land-use files. Figure 8-1 provides a section of USGS map showing the site and a 3-kilometer radius around the site. The analysis showed that more than 65 percent of the land use in the 3-kilometer radius was classified as residential and most closely matches the common residential category of the Auer scheme. Therefore, rural dispersion coefficients were used in the air quality modeling analysis.

METEOROLOGICAL DATA

According to NYSDEC Air Guide-26 (NYSDEC, 1996), air quality modeling analyses should use five (5) years of nearby, representative observations compiled by the National Weather Service (NWS). The nearest NWS meteorological tower with hourly surface observations is located at Republic Airport in Farmingdale, New York (FAA Identifier FRG), approximately 6.8 kilometers east-southeast of the project site. Beginning in 1997, a nearly complete data record is



EARTH TECH

Scanned USGS quadsheets supplied by NYS GIS.
Portion of Huntington, Hicksville, Amityville and Freeport
USGS 7.5' quadrangles

Figure 8-1

Land Use Within Three Kilometers of Project

Scale 1:24000
0 2000 4000
Feet

available from this station. The station changed from observer-based to an Automated Station Observing System (ASOS) on August 4, 1999.

The most recent five-year period (1998-2002) was used in the air quality modeling analysis. Surface observations were obtained from the National Climatic Data Center in DATSAV3 format and converted to HUSWO format. This meteorological database was more than 90 percent complete for each of the five years. Simultaneous observations collected at MacArthur Airport in Islip, New York (FAA Identifier ISP) were used to replace missing data compiled from Republic Airport. The frequency distribution of wind direction and wind speed for this meteorological database is shown in the wind rose in Figure 8-2.

The nearest upper air soundings for the same five-year period were compiled in Brookhaven, New York (FAA Identifier OKX). These soundings were used in conjunction with the surface observations from MacArthur Airport to develop mixing heights used in the modeling analysis. The EPA programs MIXHTS and PCRAMMET were used to process the meteorological data.

GOOD ENGINEERING PRACTICE STACK HEIGHT

A Good Engineering Practice (GEP) stack height analysis considering existing and proposed buildings and structures at and near the project site was conducted in accordance with EPA guidance (EPA 1995). The GEP formula height (H_{GEP}) is calculated in the following manner:

$$H_{GEP} = H_B + 1.5L$$

where: H_B is the height of adjacent or nearby structure, and

L is the lesser dimension (height or projected width of the adjacent or nearby structure)

Building parameters (building heights and projected widths as a function of wind direction sector) were determined through the use of the EPA Building Profile Input Program (BPIP).

The controlling structure (i.e., the structure that yields the highest associated GEP formula height) corresponds to the proposed turbine building. This structure has a roof height of approximately 69 feet above local grade, and its projected width exceeds its height for wind directions for which the proposed stack is downwind and within the range of influence of the structure. The GEP formula for squat structures reduces to 2.5 times the structure height, and the maximum GEP formula height for this structure is 172.5 feet (2.5 times 69 feet). The proposed stack height is less than the GEP formula height. Therefore, in accordance with EPA guidance, the dispersion modeling analyses conducted for the project considered the potential for building wake and cavity effects on stack emissions.

The release heights for the two cooling towers are also less than the GEP formula height. The heights are also low enough that the cooling tower emissions could be subject to building cavity effects. Therefore, the dispersion modeling considered the potential for building wake and cavity effects on cooling tower emissions. The cavity analysis was conducted using screening techniques referenced in NYSDEC guidance.

BACKGROUND AIR QUALITY

The proposed project would be located in Nassau County, which is currently designated as an attainment area for NO_2, CO, PM_{10}, and SO_2, The nearest NYSDEC monitoring station is Eisenhower Park (NYSDEC Site No. 2950-10) located approximately 7.5 km west of the site. At

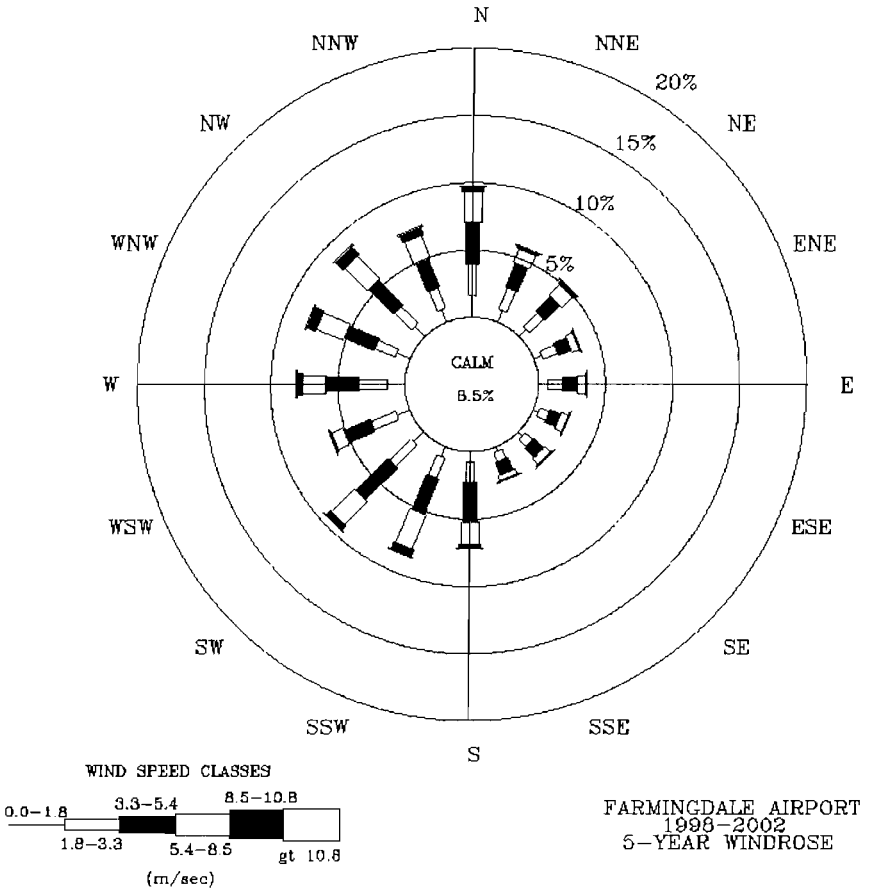


Figure 8-2

Republic Airport (FRG) Five-Year Wind Rose
(1998-2002)

this site, the NYSDEC maintains monitors for NO_2, CO, PM_{10}, and SO_2. Ambient background concentrations are based on the highest annual average concentrations and the highest, second-highest short-term concentrations measured at this monitoring station over the latest three-year period at Eisenhower Park. Table 8-7 summarizes criteria pollutant monitoring data at Eisenhower Park from 1999 through 2001.

Table 8-7
Background Concentrations of Criteria Pollutants (1999-2001)[1]

Pollutant	Averaging Period	1999 Background Concentration ($\mu g/m^3$)	2000 Background Concentration ($\mu g/m^3$)	2001 Background Concentration ($\mu g/m^3$)	Highest Background Concentration ($\mu g/m^3$)
NO_2	Annual	47	45	45	47
CO	1-hour	7,100	6,400	4,100	7,100
	8-hour	5,200	2,900	2,900	5,200
PM_{10}	24-hour	41	38	41	41
	Annual	16	17	17	17
SO_2	3-hour	141	149	110	149
	24-hour	73	66	63	73
	Annual	16	16	13	16

Note: [1] Maximum second-highest, short-term and maximum annual average concentrations measured at Eisenhower Park, Nassau County (New York Site No. 2950-10).

STACK AND EMISSION PARAMETERS

The stack parameters and criteria pollutant emission rates for the new combustion turbine operating under combined cycle mode are provided in Table 8-8. The stack parameters and PM_{10} emissions for the new cooling towers are then provided in Table 8-9. Criteria pollutants include those pollutants for which ambient air quality standards have been developed by the EPA (6 NYCRR 257).

In addition to the criteria pollutants, the NYSDEC has established ambient air quality standards for fluorides, hydrogen sulfide, and beryllium. None of these pollutants, however, would be emitted from the proposed project.

PROJECTED AIR QUALITY IMPACTS

The EPA Industrial Source Complex Short-term (ISCST3) model was used to assess the impacts at all receptors, both below stack top (simple terrain) and above stack top (complex terrain). In addition, the EPA screening complex terrain model, VALLEY, was used to assess impacts at receptors in complex terrain. Because the emissions would be released from stacks below GEP stack height, the SCREEN3 model was used to assess potential for emissions being entrained into the recirculation zone (cavity) of nearby structures. The maximum impacts predicted by the three models were then used to demonstrate compliance with the SILs and NAAQS.

Table 8-8
Stack Parameters for the Proposed Combustion Turbine and Duct Burner

Parameter	Units	Combined-Cycle Combustion Turbine								
Load	%	100			75			50		
Temperature	°F	-10	59	110	-10	59	110	-10	59	110
Relative Humidity	%	20	60	20	20	60	20	20	60	20
Duct Burner	On/Off	On	On	On	Off	Off	Off	Off	Off	Off
UTM Northing	km	4511.4	4511.4	4511.4	4511.4	4511.4	4511.4	4511.4	4511.4	4511.4
UTM Easting	km	626.7	626.7	626.7	626.7	626.7	626.7	626.7	626.7	626.7
Stack Height	m	30.48	30.48	30.48	30.48	30.48	30.48	30.48	30.48	30.48
Exit Temperature	°K	355.52	355.52	355.52	344.41	344.41	344.41	344.41	344.41	344.41
Exit Velocity	m/s	18.30	15.53	15.76	15.03	12.94	13.01	12.53	10.40	10.48
Exit Diameter	m	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28
NO_x	g/s	0.808	0.832	0.782	0.401	0.416	0.378	0.299	0.307	0.283
CO	g/s	1.299	0.643	0.441	0.745	0.202	0.063	0.492	0.139	0.050
PM_{10}	g/s	0.446	0.446	0.446	0.315	0.315	0.315	0.315	0.315	0.315
SO_2	g/s	0.116	0.119	0.112	0.058	0.060	0.054	0.043	0.044	0.041

Table 8-9
Stack Parameters for the Proposed Cooling Towers

Parameter	Units	Condenser Cooling Tower		Chillers Cooling Tower	
		Per Cell	Total	Per Cell	Total
Number of Cells	NA	1	5	1	2
UTM Northing[1]	km	4511.4691	4511.4846	4511.4583	4511.4626
UTM Easting[1]	km	626.6461	626.6346	626.6748	626.6743
Stack Height	m	8.46	8.46	6.04	6.04
Exit Temperature	°K	306.3	306.3	302.4	302.4
Exit Velocity	m/s	13.56	13.56	13.00	13.00
Exit Diameter	m	4.27	4.27	3.66	3.66
PM_{10}	g/s	0.00022	0.00108	0.00009	0.00019

Notes:
[1] Cooling tower is operational during Phase 2 only.
[2] Cooling tower is operational during both Phases 1 and 2.
[3] Coordinates are for endpoint cells of each cooling tower.

SIMPLE TERRAIN MODELING

The EPA ISCST3 model was used to assess the impacts at all receptors, both below stack top (simple terrain) and above stack top (complex terrain). The ISCST3 model, receptor array, and modeling results are discussed in the following sections.

ISCST3 Modeling Approach

A refined modeling analysis was conducted using the EPA ISCST3 model (Version 02035). According to the EPA's Guideline on Air Quality Models (40 CFR 51 Appendix W), this model is the most appropriate to address potential pollutant impacts from the proposed project. The ISCST3 model was applied using only simple terrain dispersion procedures by selecting the control keyword NOCMPL. The non-default option HE>ZI was selected because many receptors are below stack base elevation and this option protects against the mixing height dropping below the plume centerline and yielding anomalously large concentrations from the image source. Because more than 65 percent of the land area within 3 kilometers of the site can be characterized as rural, the ISCST3 model was run with rural dispersion coefficients using the regulatory defaults for all other options.

ISCST3 Model Receptors

A refined polar receptor grid centered on the new stack was developed for the ISCST3 modeling analysis. The receptors were located every 10 degrees at the following distances (excluding receptors located inside the facility fence line):

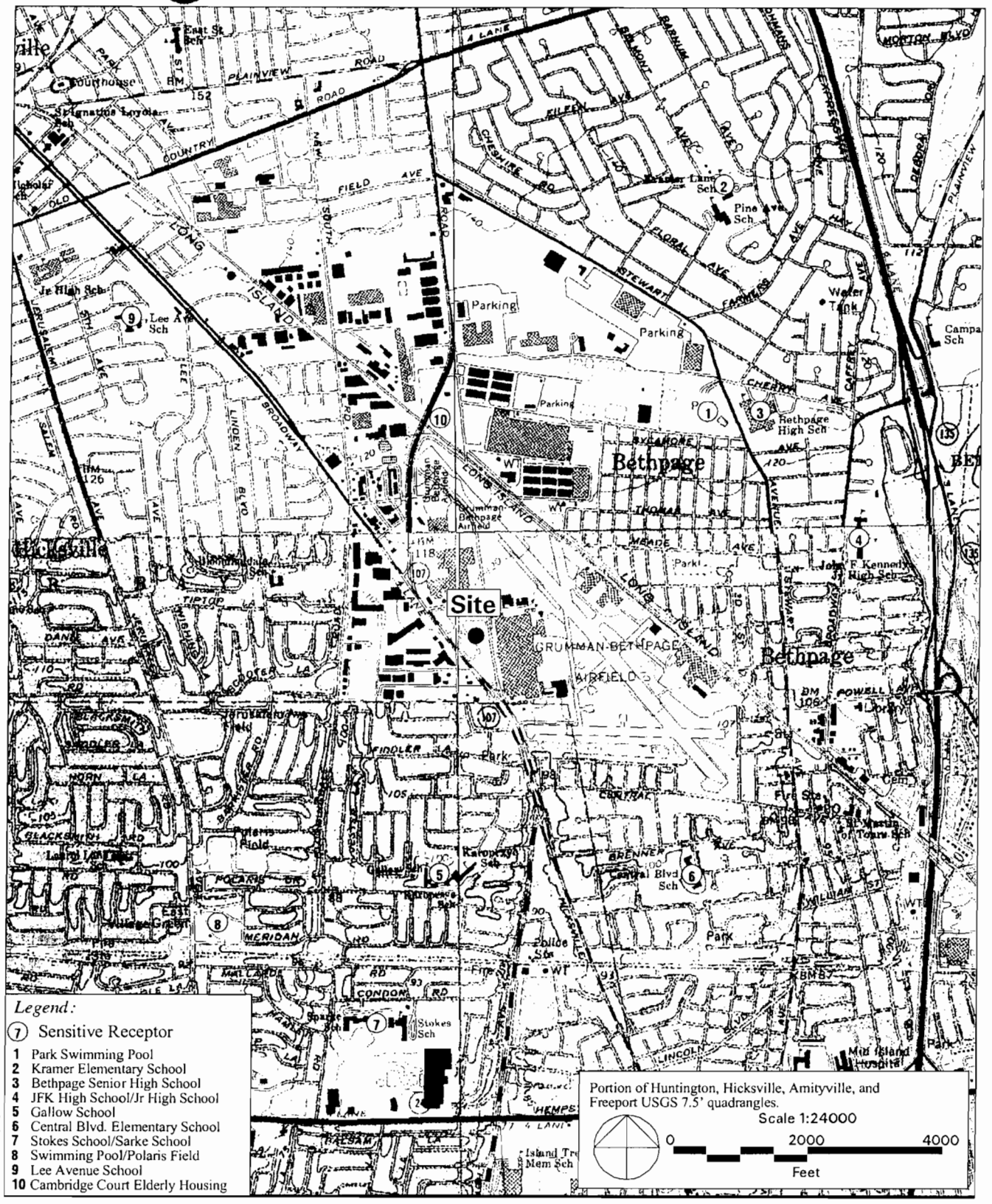
At 10-meter intervals from 10 to 100 meters;
At 25-meter intervals from 100 to 200 meters;
At 50-meter intervals from 200 to 500 meters;
At 100-meter intervals from 500 to 2,000 meters;
At 250-meter intervals from 2,000 to 5,000 meters; and
At 1,000-meter intervals from 5,000 to 10,000 meters.

Discrete receptors were also placed along the property boundary at 10-meter intervals. A fence would surround the entire plant property boundary. In addition, discrete receptors were also placed at nearby schools, parks, and other sensitive receptors. The locations of these sensitive receptors are shown in Figure 8-3. Terrain elevations at the receptors were extracted and reformatted from U.S.G.S. 10-meter digital terrain data using the Earth Tech TERREL program.

ISCST3 Model Results

This section presents the maximum predicted impacts of criteria pollutants associated with the combustion turbine operating in combined cycle mode during both steady-state operations and startup, shutdown and malfunctions.

Table 8-10 presents the maximum predicted impacts of NO_2, PM_{10}, SO_2, and CO emitted from the combustion turbine and chiller cooling tower in combined cycle mode. As shown in the table, the maximum concentrations are less than the corresponding SILs for all pollutants and averaging periods. By definition, the proposed project would neither cause nor contribute to a violation of the NAAQS and NYAAQS. Consequently, interactive source modeling was not required to demonstrate compliance with the ambient air quality standards pursuant to the modeling guidance of both the EPA and NYSDEC.



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/usr2/bethpage/grummonli/senstec.map

Figure 8-3
Sensitive Receptors

Table 8-10
Maximum ISCST3 Predicted Pollutant Concentrations for the Proposed Project

Pollutant	Averaging Period	Operating Condition		Receptor Location		Maximum Concentration ($\mu g/m^3$)	SILs ($\mu g/m^3$)
		Load (%)	Temperature (°F)	Direction (degrees)	Distance (m)		
NO_2	Annual[1]	100	59	31	1,807	0.07	1
PM_{10}	24-hour	50	59	323	237	1.28	5
	Annual[1]	50	59	31	907	0.06	1
SO_2	3-hour	100	59	8	155	0.84	25
	24-hour	100	59	216	241	0.25	5
	Annual[1]	100	59	31	1,807	0.01	1
CO	1-hour	100	-10	4	248	10.8	2,000
	8-hour	75	-10	344	243	4.93	500

Notes:
[1] Annual impacts for NO_2, PM_{10}, and SO_2 adjusted to account for restriction on annual heat input to the duct burner of 1,768,000 million Btu during any consecutive 12-month period.

ISCST3 Model Results for Sensitive Receptors

To determine the maximum impacts at sensitive receptors, the ISCST3 model was used to predict the maximum concentrations associated with combustion turbine operating in combined cycle mode. Table 8-11 presents the maximum predicted impacts at sensitive receptors in the vicinity of the site. As shown in this table, the maximum concentrations at these sensitive receptors are at least one order of magnitude less than the corresponding SILs for all pollutants and averaging periods. Therefore, the proposed unit would not cause or contribute to a violation of the NAAQS and NYAAQS at these sensitive receptors near the site.

Table 8-11
Maximum ISCST3 Predicted Pollutant Concentrations at Sensitive Receptors for the Proposed Project [1]

Pollutant	Period	Maximum Concentration ($\mu g/m^3$)										SILs ($\mu g/m^3$)
		1	2	3	4	5	6	7	8	9	10	
NO_2	Annual	0.05	0.06	0.04	0.02	0.02	0.04	0.02	0.04	0.040	0.03	1
PM_{10}	24-hour	0.43	0.38	0.43	0.30	0.31	0.36	0.31	0.45	0.26	0.56	5
	Annual	0.04	0.04	0.03	0.02	0.02	0.03	0.01	0.03	0.03	0.02	1
SO_2	3-hour	0.4	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.4	25
	24-hour	0.11	0.11	0.10	0.06	0.05	0.08	0.05	0.09	0.07	0.09	5
	Annual	0.01	0.01	0.01	<0.01	<0.01	0.01	<0.01	0.01	0.01	<0.01	1
CO	1-hour	3.9	3.2	3.7	2.9	3.2	2.9	3.2	2.4	2.6	4.3	2,000
	8-hour	1.9	1.4	2.1	1.2	1.0	1.4	0.8	1.3	1.2	1.4	500

Notes:
[1] The sensitive receptors in the vicinity of the Bethpage site are identified as follows (see Figure 8-3): (1) Park and Swimming Pool; (2) Kramer Elementary School; (3) Bethpage Senior High School; (4) JFK Middle School; (5) Gallow School; (6) Central Boulevard Elementary School; (7) Stokes School and Sarke School; (8) Polaris Field and Swimming Pool; (9) Cambridge Court Elderly Housing; and (10) Lee Avenue School.

ISCST3 Model Results for Startup, Shutdown and Malfunctions

During startup, the maximum short-term NO_x and CO concentrations could increase due to the higher emissions from the combustion turbine under these conditions. The worst-case condition is startup due to longer duration of such occurrences. To estimate the maximum 1-hour and 8-hour CO concentrations during startup, the steady-state CO emissions were adjusted to account for the increased emissions occurring during startup. During startup, CO emissions could be as high as 20 pounds over the 20 minutes duration of such an occurrence. The maximum CO emissions, therefore, would increase to about 25.2 lb/hr on a 1-hour average and 14.8 lb/hr on an 8-hour average assuming the turbine underwent startup once during these averaging periods. Based upon the adjusted emission rates, the maximum 1-hour and 8-hour CO concentrations associated with any of the alternative site arrangements would be about 26.4 $\mu g/m^3$ and 12.6 $\mu g/m^3$, respectively. These maximum CO concentrations are well below the corresponding SILs. Using the same approach, the maximum 1-hour NO_x emissions during combined cycle operations would increase to about 10.8 lb/hr. Based upon the adjusted emission rate, the maximum 1-hour NO_x concentration would be about 11.3 $\mu g/m^3$. The annual average NO_x emissions should not change significantly as the higher emissions occurring during startup would be more than offset by the downtime between startups. The maximum annual NO_x concentration, therefore, would be 0.07 $\mu g/m^3$, well below the SIL of 1.0 $\mu g/m^3$.

For NO_2, there is no short-term NAAQS since the primary concern from a health standpoint is due to its long-term effects. However, NO_2 and, more generally, NO_x, are precursors of ozone, which is regulated by a 1-hour and 8-hour NAAQS. Some states have adopted short-term standards or guideline concentrations for NO_2. For example, California has established a 1-hour ambient air quality standard equivalent to 470 $\mu g/m^3$, while Massachusetts has a guideline of 320 $\mu g/m^3$. Therefore, short-term impacts of NO_2 were evaluated. As discussed above, the maximum predicted 1-hour impact during start up is 11.3 $\mu g/m^3$. This concentration is well below the 1-hour NO_2 limits established in other states. Therefore, the proposed project would not result in any potential significant impacts with respect to short-term NO_2 concentrations.

COMPLEX TERRAIN MODELING

The EPA screening complex terrain model, VALLEY, was used to assess impacts at receptors in complex terrain. The VALLEY model, receptor array, and modeling results are provided in the following sections.

VALLEY Modeling Approach

The EPA-approved VALLEY model (as coded in the EPA SCREEN3 model version 96043) was used to evaluate the proposed project's impact in complex terrain (terrain at stack top elevation and above). At each distance ring in the polar grid used in the ISC3 model, the highest terrain elevation was determined. Those elevations above stack height were used as input to VALLEY. The distances and associated elevations of complex terrain features are: 4,750 meters at 225 feet msl; 5,000 meters at 258 feet msl; 6,000 meters at 294 feet msl; 7,000 meters at 310 feet msl; 8,000 meters at 343 feet msl; 9,000 meters at 373 feet msl; and 10,000 meters at 389 feet msl. The terrain elevations decrease beyond those distances. The maximum predicted impacts with either model were used for demonstration of compliance with the NAAQS and NYAQS.

The VALLEY model produces a maximum 24-hour concentration (assuming a wind persistence of six hours). For the 1-hour, 3-hour, 8-hour and annual averaging times, the following NYSDEC procedure was used:

1. The 24-hour concentration is multiplied by 4 to obtain a 1-hour concentration.
2. The 1-hour concentration is scaled to other averaging times using the SCREEN3 scaling factors; 0.9 for 3-hour concentrations, 0.7 for 8-hour concentrations, and 0.08 for annual average concentrations.

The maximum concentrations of criteria pollutants predicted by the VALLEY model were also compared to the SILs.

VALLEY Model Results

Table 8-12 presents the maximum impacts of NO_2, PM_{10}, SO_2 and CO emitted from the proposed project. As shown in this table, the maximum concentrations are less than corresponding SILs for all pollutants and averaging periods. Since predicted concentrations for the cooling towers were less than 0.002 $\mu g/m^3$ for both the 24-hour and annual averaging period, they were excluded from further complex terrain analyses. Based upon this analysis, the proposed project would neither cause nor contribute to a violation of the NAAQS and NYAAQS.

Table 8-12
Maximum VALLEY Predicted Pollutant Concentrations for the Proposed Project

Pollutant	Averaging Period	Maximum Concentration ($\mu g/m^3$)[1]	Elevation (ft msl)	Distance (m)	SILs ($\mu g/m^3$)
NO_2	Annual[1]	0.10	343	8000	1
PM_{10}	24-hour	0.17	343	8000	5
	Annual[1]	0.05	343	8000	1
SO_2	3-hour	0.17	343	8000	25
	24-hour	0.05	343	8000	5
	Annual[1]	0.02	343	8000	1
CO	1-hour	1.9	373	9000	2,000
	8-hour	1.3	373	9000	500

Notes: [1] Annual impacts for NO_2, PM_{10}, and SO_2 adjusted to account for restriction on annual heat input to the duct burner of 1,768,000 million Btu during any consecutive 12-month period.

Cavity Zone Analysis

Because pollutant emissions from the combustion turbine, duct burners, and cooling towers would be released from stacks that are below Good Engineering Practice stack height, the potential for emissions being entrained into the recirculation zone (cavity) was considered in the air quality analysis. The cavity zone analyses were conducted using the SCREEN3 model.

The 54-foot and 69-foot tiers of the turbine building would dominate any recirculation cavities. The turbine stack cavity analysis was performed assuming the single building allowed by SCREEN3 was 110 feet wide, 200 feet long, and 69 feet high. This is a conservative assumption, considering that the majority of the building complex is 54 feet tall. The SCREEN3 model predicted a cavity height of 25.2 m (83 feet). Therefore, for the turbine stack, no cavity concentrations were predicted for any of the operating scenarios.

For the 5-cell cooling tower, the only winds that would result in cavity concentrations were flows towards the southeast. With the conservative assumption that no other buildings influenced dispersion for this direction, the cooling tower dimensions were used for input to the SCREEN3 model. The 2-cell tower also was modeled using the dimensions of the cooling tower. The results of the cavity analyses are summarized in Table 8-13. As shown in this table, the maximum predicted concentrations are well below the 24-hour and annual PM_{10} SILs of 5 $\mu g/m^3$ and 1 $\mu g/m^3$, respectively.

Table 8-13
Maximum SCREEN3 Predicted PM_{10} Concentrations for the Proposed Cooling Towers

Parameter	Condenser Cooling Tower	Chiller Cooling Tower
Building Height (m)	8.5	6.0
Min. Horizontal Dimension (m)	8.7	6.8
Max. Horizontal Dimension (m)	24.6	28.1
Max. Cavity Length (m)	28.4	26.2
24-hour PM_{10} Conc. ($\mu g/m^3$)	0.25	0.05
Annual PM_{10} Conc. ($\mu g/m^3$)	0.05	0.01

D. ANALYSIS OF POTENTIAL AIR QUALITY AND HEALTH EFFECTS OF PROJECT-RELATED $PM_{2.5}$

INTRODUCTION AND OVERVIEW

In the previous section, the potential effects of NO_x, CO, PM_{10}, and SO_2 emissions from the proposed project were assessed using air quality models to demonstrate compliance with ambient air quality standards. This section assesses the potential effects of $PM_{2.5}$[1] emissions from the proposed project on ambient air quality and public health. The term $PM_{2.5}$ refers to not a single pollutant, but instead to an array of fine inhalable materials. There are, for example, thousands of forms of natural ambient $PM_{2.5}$ and perhaps as many forms of man-made $PM_{2.5}$. While all the disparate forms of $PM_{2.5}$ can be inhaled, their toxicologic properties can differ dramatically. Some particulate matter (PM) is emitted directly to the atmosphere (i.e., primary PM), while other types of particulate matter are formed in the atmosphere through various chemical reactions and physical transformations (i.e., secondary PM). The secondary formation of $PM_{2.5}$ is one determinant of ambient air quality and, thus far, is extremely difficult to model.

The major constituents of $PM_{2.5}$ are typically sulfates, nitrates, organic carbon, elemental carbon (soot), ammonium, and metallic elements (not including sulfur). Secondary sulfates and nitrates are formed from the precursor gaseous pollutants, SO_2 and NO_x, at some distance from the source due to the time needed for the chemical conversion within the atmosphere. Elemental carbon and metallic elements are primary components, while organic carbon can be either emitted directly from a source or formed as a secondary pollutant in the atmosphere. Due to the influence of these "secondary" pollutants from distant or regional sources, regional ambient

[1] $PM_{2.5}$ refers to particles with an aerodynamic diameter equal to or less than 2.5 microns and is a subset of PM_{10}.

levels of $PM_{2.5}$ are typically more evenly distributed than their related class of pollutants, PM_{10}, which is more highly influenced by local sources. The expected composition of regional $PM_{2.5}$ collected in New York City is shown in Table 8-14.

Table 8-14
$PM_{2.5}$ Component Contribution

Pollutant Component	Botanical Gardens, Bronx, New York (%)	Queens College, Queens, New York (%)
Sulfate	31	33
Organic Carbon	31	30
Ammonium	14	14
Nitrate	11	12
Elemental Carbon	8	6
Metallic Elements (minus Sulfur)	5	5

Source: NYSDEC, Report to the Examiners on Consolidated Edison's East River Article X Project, Case No. 99-F-1314, February 2002.

Data from the Botanical Gardens in the Bronx, New York, and Queens College in Queens, New York, indicate that the greatest contributors to ambient $PM_{2.5}$ concentrations are sulfates and organic carbon (approximately two thirds of the total $PM_{2.5}$ mass). Additional studies confirming the contribution of long-range transport to ambient $PM_{2.5}$ levels compare the data from New York City monitors to data from monitors at a remote site within the state, downwind from other states. These data show that high levels of sulfate and other pollutants come into New York State from areas to the west and south of New York. The data also indicate that urban sites are more likely to experience increased nitrate and carbon levels than rural sites.[1]

Although the issue of health effects due to $PM_{2.5}$ is complex, several basic facts lead to the conclusion that, as discussed below, $PM_{2.5}$ impacts from this proposed project would be negligible. First, the combustion turbine and duct burners involved are highly efficient and operate on the cleanest of fossil fuels, natural gas. Accordingly, emissions of primary particulate matter from the combustion turbine under both operating modes are very small on the basis of the kilowatt-hours of electricity generated. Moreover, the near absence of sulfur in the natural gas means that the amount of secondary, sulfate-based $PM_{2.5}$ from this project would be essentially nil. Second, the specific types and amount of $PM_{2.5}$ associated with combustion of natural gas are not known to adversely impact health, and are expected to be benign at the concentrations that would be in ambient air with the operation of the turbine.

This section discusses the yet-to-be implemented standard for acceptable levels of $PM_{2.5}$ in ambient air adopted by the EPA. The analytical framework for the analysis of $PM_{2.5}$ impacts from the proposed project, the results of the $PM_{2.5}$ air quality modeling, the effects of secondary $PM_{2.5}$ formation on the composition of various forms of $PM_{2.5}$, and the potential public health effects associated with the types and levels of ambient $PM_{2.5}$ from this proposed project are also addressed. Finally, the estimated increments to $PM_{2.5}$ levels resulting from the proposed project are compared with current levels of $PM_{2.5}$ in ambient air in Long Island.

[1] NYSDEC, Report to the Examiners on Consolidated Edison's East River Article X Project, Case No. 99-F-1314, February, 2002.

THE NATIONAL AMBIENT AIR QUALITY STANDARD FOR $PM_{2.5}$

Section 108 of the Clean Air Act (CAA) directs the EPA to identify criteria pollutants that may reasonably be anticipated to endanger public health and welfare. Section 109 of the CAA requires the EPA to establish NAAQS and periodically revise them for such criteria pollutants. Primary NAAQS are mandated to protect public health with an adequate margin of safety. In setting the NAAQS, the EPA must account for uncertainties associated with inconclusive scientific and technical information and potential hazards not yet identified, and the standard must be adequate to protect the health of any sensitive group of the population. Secondary NAAQS are defined as standards that are necessary to prevent adverse impacts on public welfare such as impacts to crops, soils, water, vegetation, wildlife, weather, visibility, and climate.

Beginning in 1994, the EPA conducted its five-year review of the NAAQS for particulate matter, which included an in-depth examination of epidemiologic and toxicologic studies. The EPA also held public meetings across the nation and received over 50,000 oral and written comments regarding these studies, particularly as to whether $PM_{2.5}$ is correlated with adverse health effects, and at what ambient air concentrations of $PM_{2.5}$ these correlations hold. The studies are summarized in the EPA's Criteria Document for Particulates, Chapters 10-13 (EPA 1996); the EPA's Staff Papers on Particulates, particularly Chapter V[1]; and the EPA's proposed NAAQS for particulates, found in the December 13, 1996 Federal Register at page 65638. Based on this extensive analysis, in June of 1997, the EPA revised its NAAQS for particulate matter and adopted a new standard for $PM_{2.5}$ consisting of both a long-term (annual) limit of 15 micrograms per cubic meter ($\mu g/m^3$) and a short-term (24-hour) limit of 65 $\mu g/m^3$.[2]

The new standard was immediately challenged in court by a number of industry groups, and, in May 1999, the U.S. Court of Appeals for the District of Columbia in American Trucking Assoc., Inc. vs. EPA, 175 F.3d 1027 (D.C. Cir. 1999) vacated the new standard and instructed the EPA to revisit the matter. In February 2000, the U.S. Supreme Court overturned the Court of Appeals decision and remanded the case to EPA and the lower court.[3] A separate decision on March 26, 2002 rejected the remaining claims that EPA's decision was arbitrary and capricious and not supported by the evidence. The EPA has not yet implemented the new $PM_{2.5}$ standard and, as discussed below, implementation is not expected to occur until 2005 (at the earliest) because of the absence of background data and modeling techniques.

Although the new $PM_{2.5}$ standards were subject to litigation, $PM_{2.5}$ monitoring stations were installed across the nation in the late 1990's. Ambient $PM_{2.5}$ concentrations are measured on a 24-hour basis by determining the amount of particulate matter deposited on a filter that has had a known volume of airflow through it in that 24-hour period. The EPA recommends sampling occur every third day, with approximately 120 samples per year. For a given area, the annual standard would be met if the three-year average of the annual arithmetic mean of the 24-hour concentrations does not exceed 15.0 $\mu g/m^3$. The monitored concentrations could be from a single monitor or from a spatial average of several population-oriented monitors. Annual averages are based on the averaging of quarterly averages, each of which must have valid observations for 75

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[1] Many of the studies are found on EPA's web page at http://www.epa.gov/ttn/oarpg/t1sp.html. EPA's second and third external review draft of the PM criteria document are available on EPA's website as well.

[2] 62 Federal Register 38652 (July 18, 1997).

[3] Whitman v. American Trucking Assoc., Inc., #531 U.S. 457 (2001).

percent of the potential samples; annual averages are rounded to the nearest 0.1 $\mu g/m^3$. To comply with the 24-hour standard, the three-year average of the annual 98th percentile measurement cannot exceed 65 $\mu g/m^3$ at each monitor in an area. The 98th percentile measurement for each year is the measured 24-hour concentration that is equal to or greater than 98 percent of the year's measurements. The determination of the 98th percentile concentration is a function of the number of samples obtained in that year. For example, if valid, quality assured measurements are recorded every third day for a year and the measurements were placed in order (lowest to highest), the 118th value (120 x 0.98 = 117.6, is rounded up to 118) is taken as the 98th percentile.[1] For evaluation of the 24- hour standard, measured values are rounded to the nearest $\mu g/m^3$. Note that in this example, the 98th percentile is also equivalent to the third highest value.

CURRENT STATUS OF $PM_{2.5}$ REGULATIONS

Even when the new $PM_{2.5}$ standard was first enacted in 1997, the EPA did not intend to implement the standards until 2005. Several stages of sampling, analysis, and planning must be completed as part of the full implementation program. First, the EPA requires the states to measure and compile three years of ambient monitoring data in order to determine which areas are in compliance with the new standard. Second, the chemical composition of $PM_{2.5}$ for areas not meeting the standard must be determined in order to evaluate possible control strategies for non-attainment areas. Third, the states then have three years to develop regulations to control $PM_{2.5}$ emissions and their precursors in nonattainment areas, after which the EPA must then approve these regulations for incorporation into the State Implementation Plan (SIP). Finally, the EPA must develop modeling methods and emission factors to enable individual facilities to estimate $PM_{2.5}$ emission impacts from new projects, to compare the predicted increases relative to the new standards, and to determine the effects of such increases relative to the NAAQS.

On February 13, 2004 New York State formally recommended that EPA designate the five counties of the New York City Metropolitan Area as non–attainment for $PM_{2.5}$; EPA will finalize the designations by December 31, 2004. Once non–attainment designations take effect, the state and local governments have three years to develop implementation plans designed to meet the standards.

Given the lack of background data on $PM_{2.5}$ and the difficulties associated with modeling it, the EPA has recommended for permitting purposes that facilities continue to examine PM_{10} emissions from proposed projects because any analysis of PM_{10} will necessarily include an examination of $PM_{2.5}$. Because $PM_{2.5}$ is a subset of PM_{10}, controlling emissions of PM_{10} will generally afford control of $PM_{2.5}$ emissions as well.[2]

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[1] Methods for calculating annual average and 98th percentile concentrations are given in the Code of Federal Regulations at 40 CFR Part 50, Appendix N.

[2] Memorandum by John Seitz, Director of EPA's Office of Air Quality Planning and Standards, October 21, 1997. See also, September 19, 2000 letter by Jeanne M. Fox, EPA Region 2 Regional Administrator, (suggesting that a qualitative discussion of increased bus and truck traffic is an appropriate analysis of $PM_{2.5}$ for a new highway project because quantitative modeling tools are not currently available for examining $PM_{2.5}$ emissions from mobile sources or point sources); January 7, 2002 letter by George Pavlou, Director, EPA Region 2, Division of Environmental Planning and Protection, to Carl Johnson, Deputy Commissioner, NYSDEC.

NYSDEC GUIDANCE ON $PM_{2.5}$ ESTIMATION

The NYSDEC established procedures for evaluating the potential for adverse impacts resulting from $PM_{2.5}$ emissions from a proposed project of under SEQR in its $PM_{2.5}$ policy, *Assessing and Mitigating Impacts of Fine Particulate Matter Emissions* (NYSDEC). The first step in assessing $PM_{2.5}$ emissions is determining the potential emissions from the proposed project. If the primary PM_{10} emissions from the project are less than the significant emission rate of 15 tpy, the $PM_{2.5}$ impacts are deemed to be insignificant requiring no further assessment under the NYSDEC policy. If the primary PM_{10} emissions are equal to or greater than 15 tpy, the impacts of primary $PM_{2.5}$ must be assessed using modeling procedures approved by the NYSDEC. Further, a qualitative assessment must be performed to assess the potential impacts of secondary formation of $PM_{2.5}$.

The second step is determining the potential significance of $PM_{2.5}$ emissions from a proposed project on ambient air quality. The NYSDEC adopted the NAAQS of 65 $\mu g/m^3$ (24-hour) and 15 $\mu g/m^3$ (annual average) as the relevant health benchmarks in the assessment. The SILs were established at 5 $\mu g/m^3$ on a 24-hour average and 0.3 $\mu g/m^3$ on an annual average. If the maximum predicted concentrations of primary $PM_{2.5}$ as determined by modeling are less than or equal to the corresponding SILs, the project is assumed to have an insignificant impact and, by definition, would neither cause nor contribute to a violation of the NAAQS. If the maximum predicted concentrations of primary $PM_{2.5}$ are more than the SILs, the project would have a significant impact and would be required to prepare an Environmental Impact Statement (EIS). The EIS must assess the severity of the potential impacts of $PM_{2.5}$ and evaluate alternative mitigation measures *to minimize the $PM_{2.5}$ impacts from the source to the maximum extent practicable.*

ANALYTICAL FRAMEWORK FOR INCREMENTAL $PM_{2.5}$ ESTIMATION

The first step in determining the impacts of the proposed project on $PM_{2.5}$ ambient concentrations is to determine the $PM_{2.5}$ emissions rates from the proposed combustion turbine and duct burners. The ratio of $PM_{2.5}$ to PM_{10} for an electric generating facility varies depending on the type of fuels used. While particulate emission rates for natural gas are quite low, the size distribution of such particulates may be almost entirely in the $PM_{2.5}$ range.[1] Thus, for analysis purposes, this assessment assumes that all PM_{10} emissions are $PM_{2.5}$ emissions. Table 8-4 presents the maximum hourly emission rates for PM_{10}, NO_x and SO_2 (which are precursors to the formation of secondary $PM_{2.5}$) from the combustion turbine in combined cycle mode. Table 8-3 presents the annual potential emissions from the project. As can be seen in this table, the proposed project has the potential to emit only 14.5 tpy of $PM_{2.5}$, below the significant emission rate of 15 tpy established by the NYSDEC. The proposed project, therefore, is assumed to have an insignificant impact on $PM_{2.5}$ concentrations according to the NYSDEC $PM_{2.5}$ policy.

Although the proposed project has insignificant $PM_{2.5}$ emissions, an air quality modeling analysis was conducted to determine the potential impact of the proposed project on ambient air quality in accordance with the modeling protocol approved by NYSDEC. Air quality impacts from $PM_{2.5}$ emissions from the proposed project were evaluated using the same procedures

[1] *Compilation of Air Pollutant Emission Factors* AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources (AP-42). Environmental Protection Agency, Office of Air Quality Planning and Standards, (2001), Research Triangle Park, NC: Available on-line at http://www.epa.gov/ttn/chief/ap42/index.html

described earlier in this section for the other pollutants of concern. The maximum predicted concentrations of $PM_{2.5}$ were based on the maximum anticipated emission rates. Because NO_x is a precursor to the formation of secondary $PM_{2.5}$, the highest NO_x concentration was also addressed in the analysis. Sulfur dioxide is the most significant precursor to the formation of ambient secondary $PM_{2.5}$ in the Eastern portion of the United States. By burning natural gas, the proposed project would emit less than 4 tpy of SO_2; hence, the air quality impacts associated with SO_2 would be very small.

POTENTIAL PROJECT-RELATED $PM_{2.5}$ IMPACTS

Table 8-15 presents the maximum predicted 24-hour and annual average concentrations of $PM_{2.5}$, the maximum predicted 3-hour, 24-hour, and annual average concentrations of SO_2, and the maximum predicted annual average concentration for NO_x due to emissions from the proposed project. As shown in the table, the maximum predicted 24-hour and annual $PM_{2.5}$ concentrations are well below the 24-hour and annual significance thresholds established by the NYSDEC. Note that the NO_x and SO_2 concentrations are presented to support the qualitative secondary $PM_{2.5}$ analysis below.

Table 8-15
Maximum Predicted Pollutant Concentrations ($\mu g/m^3$)

Pollutant	Averaging Period	Project Impact
NO_2	Annual	0.07
SO_2	3-hour	0.84
	24-hour	0.25
	Annual	0.01
$PM_{2.5}$	24-hour	1.28
	Annual	0.06

These predicted local $PM_{2.5}$ increments are far too conservative to be good indicators of ambient levels that the public may be exposed to on a continuous basis for the purposes of assessing potential public health risk. The modeling of maximum predicted concentrations is typically used to determine compliance with the NAAQS and SILs in the permitting process. As such, the modeled concentration represents conservative upper bound levels that the local population might experience. Although the EPA has not yet determined SILs for $PM_{2.5}$ to be used in any future modeling analyses, the NYSDEC has established significance thresholds to be used in the department's review of proposed projects under SEQR.

CURRENT LEVELS OF $PM_{2.5}$ IN AMBIENT AIR

The NYSDEC initiated monitoring for $PM_{2.5}$ in Region 1 (Nassau-Suffolk County) in January 1999. Typically, the results of that monitoring become available for use approximately six months after the monitoring period; $PM_{2.5}$ data are currently available through the first quarter of 2003.

The NYSDEC $PM_{2.5}$ monitoring data was used to characterize background levels within the community around the proposed project. The nearest continuously operating $PM_{2.5}$ monitor to the proposed project is located at Briarcliffe College in Bethpage (Site No. 2950-21). This monitor has been in operation since February 21, 2000. Additional $PM_{2.5}$ monitors have been in operation in Region 1 since January 1999, at Babylon NAM (Site No. 5150-02) and Lawrence

High School in Hempstead (Site No. 2950-18), and since July 2000 at East Hills School in Roslyn. These data are available on NYSDEC's website through the end of 2003 for the Hempstead site, and through the third quarter of 2003 for the Babylon and Roslyn sites.

The annual $PM_{2.5}$ standard is based upon a 3-year, spatially-averaged concentration based on three annual mean concentrations, each of which is based on the average of four quarterly mean concentrations (i.e., 12 valid quarters of data are required). Because the early quarters of data from the three continuously operating monitors in Region 1 failed to meet the 75 percent data completeness requirement, the most recent 12 quarters of $PM_{2.5}$ monitoring data (from April 2000 through March 2003) from the three stations have been analyzed to yield an annual average concentration for three years. The quarterly data for each of the following monitoring stations satisfy the 75 percent data completeness requirement: Briarcliffe College (Bethpage); Babylon MAM (Babylon); and Lawrence High School (Hempstead). Based on the 12 quarters of monitoring data, the annual spatially-averaged $PM_{2.5}$ concentration is 12.1 $\mu g/m^3$, below the annual ambient standard of 15 $\mu g/m^3$.

The 24-hour $PM_{2.5}$ standard is based upon the 98th percentile monitored concentration in each of three years of monitoring data. The 98th percentile concentration in each of the three years are then averaged to determine a value that is compared to the ambient standard. Use of the most recent 12 quarters (three years) of available data from the Briarcliffe College yields a 24-hour $PM_{2.5}$ concentration of 31 $\mu g/m^3$. This concentration is well below the 24-hour ambient standard of 65 $\mu g/m^3$.

FORMATION OF SECONDARY $PM_{2.5}$

As mentioned earlier, some secondary particulate matter is formed when gaseous chemicals react and condense to form non-gaseous compounds within liquid aerosols or as solid particles. Within urban eastern U.S. environments, a large portion of $PM_{2.5}$ is comprised of secondary particles, and the largest portion of this secondary particulate matter is made up of ammonium sulfate $[(NH_4)_2SO_4]$. Of the chemicals to be released from the turbine, nitrogen oxides (NO_x) are most likely to affect the formation of secondary particles. Formation of secondary particles from SO_2 from combustion of natural gas is insignificant.

The modeling of secondary particle formation and dispersion is extremely complex. Due to the small size of the inputs from the proposed project, and the minor contribution expected from the formation of secondary particulate to the background $PM_{2.5}$ levels found on Long Island, it is not currently reasonable to predict such a small an increment with any precision. Therefore, a qualitative description of secondary $PM_{2.5}$ impacts from the proposed project is presented below.

Three factors must be kept in mind when addressing the incremental impact of secondary particle formation caused by emissions from individual sources. First, the processes by which gases are transformed into particles depend on many factors. The chemical oxidation rates of the gases SO_2 and NO_x depend on the presence and behavior of low-level, short-lived, and highly reactive species such as O_3, hydroxyl radicals (OH), and hydrogen peroxide (H_2O_2). Among the important chemical reactions, there are homogeneous gas-phase reactions, aqueous-phase reactions, and catalyzed heterogeneous reactions. The governing atmospheric chemistry varies over both time and space. The overall conversion rates for SO_2 and NO_x emitted from a specific source depend on the background concentrations of trace-level and catalytic species, sunlight, temperature, relative humidity, and many other factors.

Second, because the overall conversion rates are generally on the order of a few percent per hour or lower, the secondary PM are formed at significant distances from the source of the gases, and well after the emissions have been physically dispersed. This effect is responsible for the regional, non-localized, nature of secondary $PM_{2.5}$ levels.

Third, only a portion of the precursor species emitted to the atmosphere is ever converted to particles. Before they form particles, the relevant gases (e.g., SO_2 and NO_x), and the intermediate compounds (e.g., H_2SO_4 and HNO_3) may be removed from the atmosphere either directly (by dry deposition) or in precipitation (by wet deposition).

Reactions involving secondary sulfate formation include gas phase conversion of SO_2 to H_2SO_4 initiated by reaction with OH radicals and aqueous-phase reactions of SO_2 with H_2O_2, O_3 or O_2. In the eastern U.S., the peak conversion rate is about 5 percent per hour under more polluted conditions, but typically varies between 1 and 3 percent per hour during summer daytime conditions.

According to the National Acid Precipitation Assessment Program State of Science and Technology Report (NAPAP, 1990), the principal nitrogen oxide in anthropogenic emissions is nitric oxide (NO), which is oxidized by ozone to NO_2. NO_2 may then follow two different oxidation paths to become nitric acid (HNO_3). During the daytime, the conversion is primarily due to oxidation by the hydroxyl radical, the concentration of which is a function of many parameters including solar ultraviolet radiation, relative humidity, and the background concentrations of nitrogen oxides, volatile organic compounds, and carbon monoxide. Estimates for the daytime conversion rate of NO_x to HNO_3 are about 8 percent per hour in the summer and about 0.8 percent per hour in the winter. At night, the conversion pathway includes the oxidation of NO_2 by O_3 which produces the nitrate radical NO_3 and the combined form nitrogen pentoxide (N_2O_5). The reaction with ozone is the rate-limiting step, with estimated nighttime conversion rates of the same order as the daytime summer rates.

Based on how secondary PM forms, the contribution of the proposed project to $PM_{2.5}$ levels in Long Island due to secondary particle formation would be significantly less than the small effect the proposed project would have on primary $PM_{2.5}$ levels. As can be seen in Table 8-4, the maximum NO_x emission rates from the combustion turbine and duct burners are roughly comparable to the primary $PM_{2.5}$ emission rates. However, under typical atmospheric conditions, only a few percent of the emitted NO_x would be converted to HNO_3, and only a portion of this would be converted to particulate matter. Where dispersion has not diluted the emissions greatly, very little of the NO_x would be converted to particles because of the time required for the transformation. Far from the project, where more of the NO_x would have been transformed, physical dispersion of the emissions would have diluted the concentration to such an extent that it would be insignificant relative to background levels.

POTENTIAL PUBLIC HEALTH EFFECTS

The potential for $PM_{2.5}$ to affect public health is dependent on the amount of particulate material in the atmosphere (i.e., the higher the ambient $PM_{2.5}$ concentration, the more likely that it will have an impact), and the composition of the material. The evidence cited by EPA in establishing the NAAQS for $PM_{2.5}$ is derived from observational epidemiologic studies that found, at typical ambient levels, PM concentrations are statistically correlated with increased levels of morbidity

and mortality.[1] It is also unclear what forms of PM and what physiological mechanisms are responsible for the observed health effects. However, the extent of any adverse public health effect related to an increase in PM concentrations is expected to be proportional in some way to the concentration increase—a small increase in PM concentrations can, at most, lead to a small increase in PM related public health effects. As discussed above, based on modeled results, the proposed project would have an insignificant effect on ambient levels of $PM_{2.5}$.

In establishing the NAAQS for $PM_{2.5}$, the EPA conservatively assumed that moderate levels of airborne PM of any chemical, physical, or biological form might harm health, thus requiring additional regulation. In setting the NAAQS, the EPA was required to account for uncertainties associated with inconclusive scientific and technical information and for potential hazards not yet identified. In setting the value of the annual average NAAQS for $PM_{2.5}$, the EPA found that an annual average $PM_{2.5}$ concentration of 15 $\mu g/m^3$ is below the range of data most strongly associated with both short- and long-term exposure effects. The EPA Administrator concluded that an annual NAAQS of 15 $\mu g/m^3$ "will provide an adequate margin of safety against the effects observed in the epidemiological studies."[2] The annual standard is supplemented by a 24-hour standard of 65 $\mu g/m^3$ to protect against short-term exposures in areas with strong local or seasonal sources.[3]

Although the NAAQS for $PM_{2.5}$ is based on the measurement of simple particle mass concentrations (i.e., in terms of $\mu g/m^3$), the EPA recognized the need for further research into the relationships between PM composition and PM-related health effects. Indeed, a major requirement of 40 CFR Part 58 (Ambient Air Quality Surveillance) is the chemical speciation of $PM_{2.5}$ at fifty monitoring sites across the country. A great deal of current PM research, including studies conducted under the U.S EPA's Office of Research and Development[4], is focused on attempting to better understand the biological, chemical, and physical characteristics of PM underlying its potentially toxic effects. A basic finding among these studies is that different forms of $PM_{2.5}$ differ substantially in their toxicologic significance.

As noted above, unlike the other ambient air pollutants regulated at the national level— CO, NO_2, O_3, SO_2 , and lead—PM (PM_{10} or $PM_{2.5}$) is hardly a single molecule or small set of

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[1] Some scientists doubt that PM concentrations and these health effects are causal. Compare *Air Quality Criteria for Particulate Matter, Second External Review Draft*, EPA 600/P-99/002aB (2001). Pope, III, C. A. (2000), "Epidemiology of fine particulate air pollution and human health: Biologic mechanisms and who's at risk?" *Environ Health Perspect*, 108(4), 713-23; and Samet, J. M., Dominici, F., Curriero, F., C., Coursac, I., & Zeger. S. L. (2000), "Fine particulate air pollution and mortality in 20 U.S. cities, 1987-1994," *N Engl J Med*, 343(24), 1742-1749; with Lipfert, F.W., Perry, Jr., H. M., Miller, J. P., Baty, J. D. Wyzga, R. E., & Carmody, S. E. (2000), The Washington University-EPRI Veteran's "Cohort Mortality Study: Preliminary Results," *Inhalation Toxicology*, 12(4), 41-73; and Gamble, J. F. (1998). " $PM_{2.5}$ and mortality in long-term prospective cohort studies: Cause-effect or statistical associations?" *Environ. Health Perspect.*, 106, 535-549.

[2] 62 Federal Register 28652, 38676 (July 18, 1997).

[3] Although some advocates for a new $PM_{2.5}$ standard identified $PM_{2.5}$ as a "non-threshold" pollutant, and the Appellate Division in its NYPA vs. UPROSE decision agreed with this position, the EPA Administrator rejected this view when promulgating the $PM_{2.5}$ NAAQS, finding that up to 15 $\mu g/m^3$ of $PM_{2.5}$ could be present in ambient air without causing adverse health effects.

[4] EPA Office of Research and Development, Research and Development, Fiscal Years 1997-1998 Research Accomplishments, EPA 60-R-99-106.

molecules, but is instead a sundry collection of complex aerosols and microscopic solids with widely varying physical, chemical, and biological properties. The vast differences among various chemical and biological forms of $PM_{2.5}$ mean that these forms also differ significantly in their toxicologic effects.

Considerable research will be required in order to identify, quantify, and rank the myriad components of $PM_{2.5}$ in terms of their potential importance for public health. The National $PM_{2.5}$ Speciation Program[1], established under 40 CFR Part 58 as mentioned above, will serve as only a modest, first-cut analysis, as it will provide no information on the biologic content of ambient air PM, and only limited information on some metallic, ionic, and organic constituents of ambient PM. Although chemical and toxicologic knowledge of ambient $PM_{2.5}$ is limited, current evidence, as outlined below, suggests that $PM_{2.5}$ that is rich in either biologically-active material or in various metals is significantly more harmful than $PM_{2.5}$ that has little to no biologic or metallic content.

BIOLOGICALLY ACTIVE $PM_{2.5}$ MAY BE HARMFUL

Particulate matter rich in pollen and other aero-allergens is well known to exacerbate respiratory problems, especially among people with allergic asthma and sufferers of hay fever (also called seasonal allergic rhinitis).[2] Other common forms of PM, present year- round, may aggravate respiratory problems because of their biologic content. Fine particulate matter from "ordinary" resuspended dust, for example, is a complex mixture of biologically and immunologically active materials, such as macromolecules, derived from molds, grasses, trees, cat and dog dander-epithelium, and latex rubber (Miguel et al., 1999).

Inhalation of metals of various types may harm the upper respiratory tract, lungs, and other organs.[3] Although such problems have long plagued various occupational settings, environmental scientists at the EPA and elsewhere are now focusing on whether the heavy metal content of some forms of respirable PM may be responsible for correlations between ambient air PM and morbidity and mortality in studied populations. For example, the EPA scientists have demonstrated that extracts of metal-rich PM cause lung inflammation in human volunteers.[4] In particular, they evaluated ambient PM collected in the late 1980's from the Utah Valley, where PM was rich in copper, zinc, lead, and nickel because of the dominance of a major steel mill in that valley. Compared with extracts of "ordinary" ambient PM (obtained when the mill was closed), the metal-rich extracts induced several signs of inflammatory injury. The investigators conclude that "metal content, and consequent oxidative stress that paralleled metal concentrations" caused the injury they observed, so that "mass may not be the most appropriate metric to use in assessing

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[1] id.

[2] American Lung Association, 2001, http://www.lungusa.org/air/envhayfever.html.

[3] Kelleher, P.T., Pacheco, K., and Newman, L.S. (2000), Inorganic Dust Pneumonia: The Metal-Related Parenchymal Disorders, Environ. Health Perspect. 108, Supplement 4, 685-696.

[4] Ghio, A. J. and Devlin, R.B. (2001), Inflammatory Lung Injury after Bronchial Instillation of Air Pollution Particles, Am J Respir Crit Care Med 164: 704-708.

health effects after PM exposure, but rather specific components must be identified and assessed." Similar studies have been carried out in laboratory rats, with similar results reported.[1]

$PM_{2.5}$ FROM NATURAL GAS-FIRED COMBUSTION

Natural gas is well known to be the cleanest-burning fossil fuel. Airborne emissions from combustion of natural gas consist primarily of water vapor and carbon dioxide. Also emitted are low levels of CO and nitric oxide (NO), small amounts of NO_2 and N_2O, and trace amounts of VOC, SO_2, methane, and particulate matter (AP42, External Combustion Sources, Section 1.4, July, 1998).

Particulate matter emitted from gas-fired generators consists primarily of organic products of incomplete combustion, and is very low in metal content (AP42, Section 3.1, April, 2000). Further, this PM contains no biological material. Small amounts of nitrates and sulfates may be present in this PM (given the gas-phase presence of NO_x and SO_2), and NO_x emissions may lead to further (but much more diffuse) formation of secondary PM, but these constituents, when present at less than 1 $\mu g/m^3$ levels in air—even at the maximally affected locations, do not appear to harm health.[2] Many toxicological studies have shown that sulfate or nitrate concentrations on the order of hundreds of micrograms per cubic meter of air are required before even minimal changes in respiratory or other function can be observed, even in asthmatic subjects or in sensitive laboratory rodents.[3]

Despite more than 1,000 studies of the potential toxicity of particulate matter of various types and from various sources (National Library of Medicine, 2001), there appears to be no published studies of the toxicity of PM specifically derived from gas-fired power plants. Possible reasons for this absence of study are the very small amounts of PM emitted to the atmosphere by such plants, and the expected low levels or non-toxic nature of the constituents of this form of PM.

CONCLUSION

As shown above, the operation of the proposed combustion turbine and duct burners would yield impacts well below the NAAQS established by EPA to protect public health and welfare. Further, the impacts would be less than the significance thresholds established by the NYSDEC $PM_{2.5}$ policy to determine if the $PM_{2.5}$ emissions from a proposed project would have a significant effect on public health under SEQR. Based on the composition of the proposed project-related $PM_{2.5}$ emissions, there would be no significant public health effect associated with operation of this proposed project.

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[1] Dye, J. A., Lehmann, J. R., McGee, J. K., Winsett, D. W., Ledbetter, A. D., Everitt, J. I., Ghio, A. J., & Costa, D.L. (2001), Acute pulmonary toxicity of particulate matter filter extracts in rats: Coherence with epidemiologic studies in Utah Valley Residents. EHP Supplement, 109(3), 395 - 404.

[2] Concentrations of at least 100 micrograms of sulfate or nitrate per cubic meter of air are required before even minimal changes in respiratory function can be observed, even in asthmatic subjects or in sensitive laboratory rodents. See EPA 2001 (PM Criteria Document Draft) for extended discussion and references.

[3] See EPA 2001 (PM Criteria Document Draft) for extended discussion and references.

E. CLIMATE CHANGE

SUMMARY OF THE KYOTO PROTOCOL

For more than a century, scientists have known about the possibility that man-made carbon dioxide (CO_2) emissions may cause an increase in the average temperature of the atmosphere. However, widespread public concern about climate change did not exist until the late 1980's when unseasonable high temperatures, predictions from general atmospheric circulation computer models, and concern about the greenhouse effect jointly attracted public attention. Recognizing the needs of policy-makers for up-to-date scientific information, the United Nations Environment Programme and the World Meteorological Organization jointly established the Intergovernmental Panel on Climate Change (IPCC) in 1988. The IPCC issued its first climate report in 1990, which called for a global treaty to address the issue.

In 1989, the United Nations approved a resolution calling for an environmental summit, which was held in Rio de Janeiro in June 1992. At that meeting, the attending nations agreed to participate in the Framework Convention on Climate Change, an ongoing series of meetings the purpose of which was to develop agreements that reduce greenhouse gas emissions. After years of intense negotiations, the treaty known as the Kyoto Protocol was adopted in Kyoto, Japan in December 1997. The Kyoto Protocol outlined basic mechanisms to address the climate change concern, but did not provide a clear picture of the treaty's detailed requirements, or "rulebook". Further negotiations were conducted in Buenos Aries in November 1998, the Hague in November 2000, Bonn, Germany in July 2001, and finally in Marrakesh, Morocco in November 2001. The Marrakesh Accords, which contain a detailed rulebook for the Kyoto Protocol, consist of the five main elements discussed below.

- ***Commitments***. The Protocol establishes a set of legally-binding emissions targets for Annex I Parties (relatively wealthy industrialized nations, as well as the Russian Federation, the Baltic States, and several Central and Eastern European States), for the six main greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF6). These targets represent a total cut among all Annex I Parties of at least 5 percent from 1990 (some countries have a baseline other than 1990) levels by 2008-2012.

- ***Implementation.*** To meet the emissions targets, Annex I Parties that have ratified the Protocol must establish domestic policies to cut their greenhouse gas emissions. Increasing the removal of greenhouse gases by carbon sinks may offset emissions. In addition to domestic actions, Parties may also use three mechanisms—joint implementation (implementing projects in the territories of other Annex I Parties), the clean development mechanism (implementing projects in the territories of non-Annex I Parties), and emissions trading (trading emission reduction amounts from other Annex I Parties)—to gain credit for emissions reduced (or greenhouse gases removed) at lower cost abroad than at home.

- ***Minimizing Impacts on Developing Countries.*** Provisions are included in the Protocol to address the specific needs and concerns of developing countries, especially those most vulnerable to the adverse effects of climate change and to the economic impact of response measures.

- ***Accounting, Reporting and Review.*** The Protocol has established several safeguards, including an accounting system, requirements for regular reporting by Parties, and in-depth review of reports by expert review teams.

- ***Compliance.*** The Protocol has established a Compliance Committee to assess and deal with any cases of non-compliance by participating nations.

UNITED STATES GLOBAL CLIMATE CHANGE POLICY

Although the U.S. has decided against participating in the Kyoto Protocol, it has established a climate change policy, whereby the aims of the Protocol—the overall reduction of greenhouse gas emissions—are maintained. In February 2002, the U.S. Department of Energy (DOE) began steps to recommend reforms to its existing voluntary greenhouse gas registry to: (1) ensure that businesses that register voluntary reductions are not penalized under a future climate policy, and (2) give credit to companies that can show real emissions reductions.

REGIONAL GREENHOUSE GAS INITIATIVE

In 2003, New York State proposed an initiative that would involve developing a market-based emissions trading system to require power generators to reduce emissions in the Northeast. New York, Connecticut, Vermont, New Hampshire, Delaware, Maine, New Jersey, Massachusetts and Rhode Island have agreed to work on the regional CO_2 emission reduction strategy. The overall goal of the group is to reach an agreement by April 2005 on a flexible, market-based cap and trade program initially targeting power plants in the participating states.

NEW YORK STATE CLIMATE CHANGE POLICY

The 2002 *State Energy Plan and Final Environmental Impact Statement* (Energy Plan) encompasses policies that address fairly priced, clean, and efficient energy resources. The Energy Plan directs the State to take advantage of technological developments among the most advanced uses of energy, and to participate in emerging markets for valuing and trading environmental attributes associated with energy use. Section 1.3 of the Energy Plan presents the policy recommendations for climate change related issues. Part 4.D of the Energy Plan, Promoting and Achieving a Cleaner and Healthier Environment, states that "the State should lead the nation in taking actions to reduce greenhouse gas emissions, stressing the aggressive implementation of existing, and development of new technologies and strategies that would significantly reduce emissions."

In the summer of 2001, the State announced the formation of the Greenhouse Gas Task Force, comprised of representatives from the business community, environmental organizations, State agencies, and universities, to develop policy recommendations that would be considered for incorporation into the Energy Plan. The following recommendations were adopted in the Plan.[1]

1. Commit to a statewide goal of reducing greenhouse gas (GHG) emissions 5 percent below 1990 levels by 2010, and 10 percent below 1990 levels by 2020.
2. Develop a GHG emission registry program for registering baseline GHG emissions and emission reductions from actions implemented at facilities.
3. Emphasize the greenhouse gas emission reduction potential, most notably of carbon dioxide (CO_2), as a criterion in developing new program initiatives in the State's public benefits programs.

[1] New York State Energy Research and Development Authority, 2002 State Energy Plan and Final Environmental Impact Statement, June 2002.

4. Expand the State's efforts to improve the efficiency of electricity generation and encourage use of indigenous and renewable energy resources, including solar, wind, waste methane, geothermal, sustainable biomass, combined heat and power, and clean and efficient distributed generation.
5. Adopt a specific plan to develop an indigenous bio-fuels industry in New York to produce, refine, and market transportation and other fuels from indigenous biomass resources.
6. Develop a program that allows businesses to enter into voluntary agreements to meet certain energy efficiency targets and reduce greenhouse gas emissions. To assist businesses in meeting such voluntary agreements, the State should offer technical assistance, public recognition, expedited regulatory permit review, and financial incentives, as appropriate or necessary.
7. Redirect transportation funding toward energy-efficient transportation alternatives, including public transportation, walking, and bicycling, and provide incentives to encourage greater use of related alternatives that improve transportation efficiency.
8. Include in the State transportation planning and State Environmental Quality Review Act (SEQR) related processes, consideration of CO_2 production and mitigation strategies, as appropriate.
9. Target open space funding to prevent suburban sprawl, promote Quality Communities, reduce vehicle miles traveled, and support, adopt, and enhance transportation measures that reduce energy use and pollutant emissions.
10. Support, adopt, and enhance transportation measures that reduce energy use and pollutant emissions, such as Commuter Choice, Ozone Action Days, diesel vehicle retrofits, improved traffic signal coordination with light emitting diode (LED) replacement technology, transportation system management, and other similar actions.
11. Encourage low-cost, passive building efficiency measures, such as white roofs, passive solar design, and improved foundation membranes, and incorporate such measures in the State's building construction codes. In addition, the State should support local building and development projects that include funding for open space conservation and urban forestry and that reduce the need for air-conditioning in urban "heat islands."
12. Expand research, development, and demonstration (RD&D) of energy and GHG-efficient vehicle technologies, add GHG goals to vehicle tax credits and incentives, and coordinate with other states to encourage improvements in vehicle fuel economy.
13. Working with regional and local planning organizations, analyze and quantify the energy use and air pollution emissions expected to result from transportation plans and programs.
14. Support the design and construction of energy-efficient and environmentally friendly "green buildings" through financial incentives, technical assistance, and related program initiatives.

New York State will continue to evaluate the economic and environmental benefits of all the policy recommendations of the Greenhouse Gas Task Force.

NASSAU COUNTY CARBON DIOXIDE EMISSIONS REGULATION

On April 22, 2002, the Nassau County Legislature enacted Title 49 – Carbon Dioxide Emissions Regulation, a local law to address the growing demand for electricity by Nassau County

customers, and the subsequent construction of new power generation facilities. The law encourages owners of existing and proposed power plants and steam generating facilities to maximize efficiency through the incorporation of technological advances that increase electricity generation through the establishment of a rate of allowable CO_2 emissions per megawatt-hour (MWh). The key requirements of the law are outlined below:

- The law applies to every electric and steam generating unit (defined as having a capacity of more than 25 megawatts) within the County of Nassau.
- As of July 1, 2002, a maximum CO_2 emission rate (set by the County Department of Health) of 1,800 pounds of CO_2 per gross MWh or equivalent MWh of electricity generated, will apply to all electric and steam generating units. (Equivalent MWh is defined as 100 percent of a unit's gross electrical energy production plus one half the gross useful thermal output of the unit converted to MWh.).
- The allowable County-wide CO_2 emission rate will be reduced by 1 percent on July 1, 2002 and every July 1 thereafter for every one hundred MW of electric generating capacity installed within the County during the previous year. This annual reduction will continue until the allowable County-wide CO_2 emission rate has been reduced by 20 percent. Any new capacity above the baseline emission rate will be excluded; however, all new electric generating capacity will be required to meet the lower emission rate.
- A CO_2 emission credit trading mechanism may be used by the operators of all electric and steam generating units to achieve compliance with the emission standard. This may be achieved through the purchase of emission credits, or by acquiring the equivalent value of such credits by investments in energy conservation, energy efficiency, research, and development of alternative energy sources. Operators may also be permitted to achieve compliance through donation of penalties to community environmental organizations.
- Operators of electric and steam generating units who fail to comply with this law are subject to fines of two dollars per ton of CO_2 emissions above the limit in the first year and an additional one dollar per ton of CO_2 above the limit for each consecutive year thereafter that the facility fails to meet the limit.

During natural gas firing, the maximum CO_2 emission rate from the project would be 80,291 lb/hr. Conservatively assuming 100 percent conversion of CO to CO_2 by the oxidation catalyst gives an emission rate of 80,299 lb/hr. The emission per gross MWh based on the design electrical output of 79.9 MW is therefore approximately 1,005 lb CO_2/MWh, which is well below the 1,800 lbs CO_2/MWh limit established for Nassau County electric generation units.

POTENTIAL PROJECT EMISSIONS OF GREENHOUSE GASES

Greenhouse or climate change gases contribute to climate change by increasing the ability of the atmosphere to trap heat. The principal greenhouse gases (GHG) are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Because these gases differ in their ability to trap heat, one ton of CO_2 in the atmosphere has a different effect on warming than one ton of CH_4. To express emissions of the different gases in a comparable way, atmospheric chemists often use a weighing factor called the Global Warming Potential (GWP). The concept of a GWP was developed to compare the ability of each greenhouse gas to trap heat in the atmosphere relative to another gas. To be consistent with international practices and IPCC guidelines, carbon dioxide

(CO_2) was chosen as the reference gas, and therefore the GWP is taken as the equivalent heat-trapping ability of one teragram (Tg or 1 billion kilograms) of CO_2, expressed as Tg CO_2 Equivalents (Eq.).

The proposed project would fire natural gas exclusively. The greatest proportion of the potential GHG emissions from the proposed project would be as CO_2 from the combustion process. Trace amounts of CH_4 and N_2O would also be emitted, however, emissions of these compounds are considered negligible when compared to the total CO_2 emissions, even taking into consideration their GWP, and are therefore not considered significant to the climate change issues.

During natural gas firing, CO_2 would be emitted at a rate of approximately 110 pounds of CO_2/MMBtu (AP42, Stationary Gas Turbines, Section 3.1, April, 2000). The proposed project would fire natural gas at a maximum rate of approximately 5,885 million cubic feet per year (equivalent to about 5,885,000 MMBtu/year). Therefore, potential CO_2 emissions from the proposed project were calculated as approximately 647 million pounds per year, or 0.293 Tg CO_2 Eq. per year.

COMPARISON TO STATE, NATIONAL AND GLOBAL EMISSIONS

As shown above, the proposed project could potentially emit approximately 0.293 Tg CO_2 Eq. per year. The annual emission of CO_2 for the state of New York for the years 1990 through 1999 is shown in Table 8-16. As shown, the average annual emissions of CO_2 over the most recent five years of available data has been around 195 Tg CO_2 Eq. Therefore, based on this highly conservative analysis, the annual emissions from the proposed project would be approximately 0.15 percent of the total New York CO_2 inventory.

Table 8-16
New York State—CO_2 Emissions Inventory by Sector (Tg CO_2 Eq.)

Sector	1995	1996	1997	1998	1999
New York Total	189.42	195.95	198.95	198.33	191.80
Commercial	26.55	27.65	29.59	27.68	30.62
Industrial	26.84	30.10	28.60	26.77	29.04
Residential	33.84	36.81	35.09	31.75	34.32
Transportation	62.88	65.96	6.96	66.51	67.69
Utility	39.31	35.42	39.71	45.58	30.18

Sources: http://yosemite.epa.gov/oar/globalwarming.nsf/content/EmissionsStateEnergyCO2Inventories.html

The annual emission of CO_2 for the United States is presented in Table 8-17. As shown in this table, the annual emissions have gradually increased each year to an annual value of 5,795 Tg CO_2 Eq. On a national scale, the proposed project would contribute only approximately 0.0051 percent to the total national emissions inventory of CO_2.

Global emissions of CO_2 in 1999 were estimated to be on the order of 22,367 Tg CO_2 Eq. (U.S. DOE, EIA, International Energy Annual 1999, February, 2002). At this scale, the proposed emissions of CO_2 from the proposed project would be approximately 0.0013 percent (full load basis) of the total annual global emission rate.

Table 8-17

United States—CO_2 Emissions Inventory for Electricity Generation (Tg CO_2 Eq.)

Sector	1995	1996	1997	1998	1999	2000	2001
U.S. Total	5,334.4	5,514.8	5,595.4	5,614.2	5,680.7	5,883.1	5,794.8
Electricity Generation	1,931.8	2,003.9	2,070.8	2,160.3	2,173.5	2,277.8	2,242.8

Notes: Electricity Generation includes fuel consumption by both regulated utilities and non-utilities (e.g., independent power producers, qualifying co-generators, and other small power producers).

Sources: EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2001, April, 2003.

It is difficult to quantify the importance of the emissions of the proposed project as it relates to increasing the emissions of GHG for the benefit of the common good (i.e., providing electricity). However, the emissions of this proposed project can be related to existing electrical power generating sources of GHG. In general, because of the market based economy for providing electrical power in New York State, energy generated by the proposed project would in all likelihood displace some electricity that would have been otherwise generated by less efficient facilities. The operation of these sources would result in more emissions of GHG on a per magawatt basis than the proposed project. The nature of the market driven sale of electrical energy favors higher efficiency electrical generating sources such as combined cycle combustion turbines.

CONCLUSION

As shown above, the operation of the proposed project would result in a negligible contribution to the state, national and global inventories of CO_2 emissions and, therefore, the impacts to general public health from proposed project-related operations would correspondingly be negligible.

F. CUMULATIVE AIR IMPACT ASSESSMENT

INTRODUCTION

This section addresses potential cumulative air quality impacts due to the six combustion turbine projects that were constructed for LIPA for the summer of 2002 (i.e., facilities located in Shoreham, Edgewood, Glenwood, Port Jefferson, Bethpage, and Bayswater), the two projects that were constructed for LIPA for the summer of 2003 (i.e., facilities located in Jamaica Bay and Greenport), projects which are expected to be operational for the summer of 2004 (i.e., a facility located at Freeport and mobile generating units at Holtsville and Shoreham), and combustion turbine projects that LIPA plans for the summer of 2005 (i.e., a facility to be located in Pinelawn, and the facility assessed herein, Bethpage). In addition, this section presents the results of an analysis that was prepared to examine the cumulative air quality impacts of the proposed project, the existing Calpine power plant, the Northrop Grumman Corporation (NGC) central steam plant, and other nearby emission sources.

CUMULATIVE IMPACT ASSESSMENT OF LIPA FACILITIES

The LIPA 2002-2005 projects are widely spaced throughout Nassau, Suffolk, and Queens Counties. This distribution of projects spreads the relatively low air emissions from each facility

through a wide geographical area, such that no single community is generally affected by more than one project. The distribution of the projects is illustrated in Figure 8-4. The study area selected for air quality modeling of the LIPA projects includes 100-meter spaced polar receptors within 3-kilometers of each project, as well as a Cartesian grid with 2-kilometer spaced receptors which covers all of Long Island. All of the projects have individually demonstrated insignificant air quality impacts (i.e., the maximum concentrations predicted by modeling are below the SILs). The maximum concentrations for each facility would occur very close to the combustion turbine(s) for each project. The concentrations would continue to decrease with distance from the sources, such that the concentrations would be nearly immeasurable at the nearest adjacent LIPA project.

The stack parameters and emissions for the aforementioned projects are presented in Table 8-18. Note that different parameters and/or emissions for some sources reflect the worst-case operating loads for those pollutants. The cumulative impact assessment of these sources was performed using the same modeling procedures that were used for assessing impacts of the proposed project alone. The maximum total concentrations were determined by adding together the modeling results and representative "worst case" background values. These values were compared to the applicable NAAQS and NYAAQS. The modeling results and standards are presented in Table 8-19. As shown in this table, the total concentrations (i.e., the cumulative effect of all recent LIPA generation projects and worst-case background levels) would not exceed the ambient air quality standards, as shown on Table 8-19. Therefore, the cumulative effect of all the LIPA projects would not cause adverse air quality impacts.

A second demonstration supporting little or no cumulative interaction of the projects may be made by an examination of the prevailing wind directions. In order to have cumulative concentrations, the emitted plumes would need to align in the same direction. Figure 8-2 presents a windrose (wind direction and speed distribution) based on meteorological data obtained from Republic Airport in Farmingdale, New York. This data was used for assessing the air quality impact of the proposed project and is recognized by NYSDEC to be representative of the meteorology of central Long Island. By comparing the distribution of winds one can discern that the prevailing directions are from the southwest and northwest directions. Southwesterly winds are more typical of summertime conditions, when the peaking units would likely be operating simultaneously. The proposed project's plume would overlap the existing Calpine Bethpage simple cycle gas turbine, and may overlap slightly with Edgewood, and the Bayswater/Jamaica Bay facilities' plume may overlap slightly with Freeport. As stated previously, any potential combination of the plumes at a distance would result in maximum concentrations well below the SILs. Therefore, there would be no adverse cumulative impact from simultaneous operation of all LIPA projects.

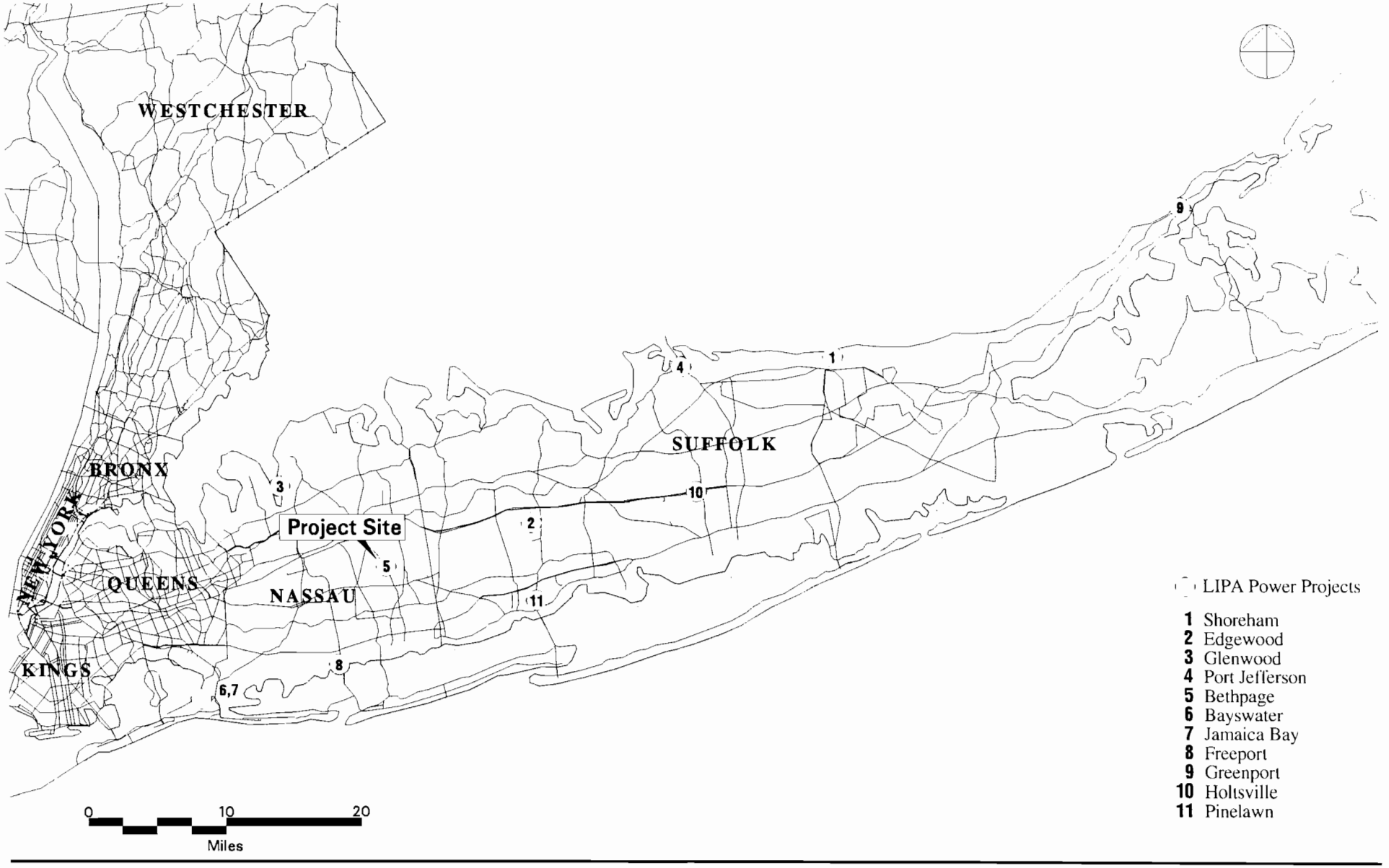


Figure 8-4
Location of LIPA Power Projects

Table 8-18
Stack Parameters for LIPA Projects

Name	UTM East (meters)	UTM North (meters)	Elevation (m)	Stack Height (m)	Stack Diameter (m)	PM10			CO			NO_x			SO_2		
						Temp. (deg.K)	Velocity (m/s)	Emission (g/s)	Temp. (deg.K)	Velocity (m/s)	Emission (g/s)	Temp. (deg.K)	Velocity (m/s)	Emission (g/s)	Temp. (deg.K)	Velocity (m/s)	Emission (g/s)
Shoreham PPL	679,505.88	4,535,983.00	20.00	33.53	3.66	585.0	18.8	3.160	585.0	18.8	3.160	585.0	18.8	2.360	585.0	18.8	3.460
Edgewood	644,030.63	4,516,504.00	30.18	32.00	3.66	679.0	17.6	0.958	641.0	25.9	5.418	641.0	25.9	1.034	641.0	25.9	0.248
Glenwood 1	614,043.74	4,520,752.24	4.12	38.10	3.05	649.3	37.9	2.170	645.4	38.0	26.770	649.3	37.9	1.910	649.3	37.9	2.380
Glenwood 2	614,047.65	4,520,727.27	4.26	38.10	3.05	649.3	37.9	2.170	645.4	38.0	26.770	649.3	37.9	1.910	649.3	37.9	2.380
Port Jefferson	661,717.00	4,534,790.50	4.57	80.77	4.31	649.3	37.9	4.100	645.4	38.0	53.540	649.3	37.9	3.820	648.3	37.9	3.580
Bayswater	604,720.15	4,496,119.60	2.13	33.53	4.57	733.0	21.4	0.830	678.0	23.8	2.160	733.0	21.7	0.610	678.0	23.8	0.230
Bethpage 1	626,707.50	4,511,462.70	36.57	30.48	4.12	654.7	13.0	0.380	654.7	18.1	0.460	654.7	21.7	0.490	654.7	15.3	0.060
Jamaica Bay	604,690.00	4,495,964.00	2.13	33.53	4.57	756.0	20.7	5.509	679.0	23.8	2.186	721.0	24.2	0.680	734.0	23.0	3.694
Freeport	621,056	4,500,028	3.51	54.86	3.20	719.0	33.4	5.100	641.0	33.8	2.709	647.0	34.0	1.920	647.0	34.0	2.820
Freeport Equus	621,038	4,500,010	3.51	54.86	3.20	719.0	33.4	5.100	641.0	33.8	2.709	647.0	34.0	1.920	647.0	34.0	2.820
Greenport	720,298.76	4,553,570.50	3.05	19.81	3.05	657.0	44.7	5.922	657.0	44.7	0.945	657.0	44.7	1.764	657.0	44.7	3.528
Shoreham MGU[1]	679,600	4,536,600	12.0	8.69/13.72 [2]	0.71/0.46 [2]	719	16.84/40.75 [2]	0.018/0.082 [2]	719	16.84/40.75 [2]	0.37	719	16.84/40.75 [2]	0.52	719	0.0064	0.852
Holtsville MGU[1]	663,100	4,520,100	29.0	13.72	0.71	719	16.84	0.0018	719	16.84	0.37	719	16.84	0.52	719	0.0064	0.852
Pinelawn	636,045	4,510,460	24.3	44.196	3.29	470	20.7	5.2	395	18.7	1.3	392.6	18.3	0.73	470/392.6[3]	20.7/18.3[3]	2.8/0.12[3]
Bethpage 2	626,729.58	4,511,398.56	36.58	30.48	3.28	344.4	10.4	0.315	355.5	18.3	1.299	355.5	15.5	0.832	355.5	15.5	0.127
Bethpage-Cool1	626,646.09	4,511,469.13	36.58	8.46	4.27	306.5	13.6	0.0002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bethpage-Cool2	626,643.22	4,511,473.01	36.58	8.46	4.27	306.5	13.6	0.0002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bethpage-Cool3	626,640.34	4,511,476.89	36.58	8.46	4.27	306.5	13.6	0.0002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bethpage-Cool4	626,637.47	4,511,480.76	36.58	8.46	4.27	306.5	13.6	0.0002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bethpage-Cool5	626,634.59	4,511,484.64	36.58	8.46	4.27	306.5	13.6	0.0002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bethpage-Cool6	626,674.76	4,511,458.32	36.58	6.04	3.66	302.6	13.0	0.0001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bethpage-Cool7	626,674.27	4,511,462.57	36.58	6.04	3.66	302.6	13.0	0.0001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Notes:

1 Source only operates during May to October from 12 PM to 8 PM.

2 The first value is used for 18 units equipped with oxidation catalyst and particulate traps, and the second value is used for 6 units equipped with oxidation catalyst systems.

3 The first value was used for short-term modeling; the second value was used for annual modeling.

Table 8-19
Cumulative Air Quality Impacts of LIPA Projects with Bethpage Facility

Pollutant	Averaging Period	Maximum Concentration ($\mu g/m^3$)	UTM Coordinates Easting (m)	UTM Coordinates Northing (m)	Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS (ug/m^3)
CO	1-Hour	539.91	663,392	4,520,358	7,100	7,640	40,000
	8-Hour	185.74	663,392	4,520,358	5,200	5,386	10,000
SO_2	3-Hour	20.10	663,426	4,520,355	149	169	1,300
	24-Hour	5.83	663,392	4,523,358	73	79	365
	Annual	0.094	681,238	4,534,983	16	16	80
PM_{10}	24-Hour	5.83	663,392	4,520,358	41	47	150
	Annual	0.13	630,000	4,515,000	17	17	50
NO_2	Annual	0.69	663,584	4,520,388	47	48	100

CUMULATIVE AIR IMPACT ASSESSMENT OF PROJECT AND NEARBY EMISSION SOURCES

Cumulative air quality impact analyses were performed using the ISCST3 dispersion model to obtain total concentration predictions for the combined emissions of the proposed project and several existing nearby sources. The existing sources are the existing Calpine power plant, NGC's central steam plant, and Keyspan's power generation plant on Spagnoli Road. The NGC plant does not operate coincidentally with the cogeneration facility at the existing Calpine power plant pursuant to a covenant with the Town of Oyster Bay. When the cogeneration units are out of service, only one boiler at the NGC plant is required to meet the steam demand of the groundwater treatment system on NGC property. Therefore, two scenarios were addressed in the air quality modeling analysis; (1) the proposed unit operating coincidentally with the existing Calpine power plant and the Keyspan plant, and (2) the proposed unit operating coincidentally with the simple cycle turbine at the existing Calpine power plant, one boiler at the NGC plant, and the Keyspan plant.

Table 8-20 presents the stack parameter and emissions data for the nearby sources that were included in the cumulative air quality impact modeling analyses. The modeling procedures and data described earlier were used in the modeling analysis to determine the maximum predicted impact associated with the proposed project and other nearby sources. The cumulative impact analysis was performed based on the conservative assumption that all the aforementioned nearby sources operate at their maximum rated capacities under the two scenarios.

Tables 8-21 and 8-22 provide a summary of the cumulative impacts analysis for the two scenarios above. The table lists the maximum predicted impacts of the proposed project, the maximum predicted combined impacts of the proposed project and other nearby sources, the maximum measured concentrations at representative background monitoring sites, and the maximum predicted total concentrations, including the measured background concentrations, for comparison to the NAAQS. The modeling results demonstrate that the total predicted concentrations attributable to the combined emissions of the proposed project and aforementioned nearby sources, including measured background concentrations, are well below the NAAQS.

Table 8-20
Stack Parameters for Proposal Project and Nearby Sources

Name	UTM East (meters)	UTM North (meters)	Elevation (m)	Stack Height (m)	Stack Diameter (m)	PM10 24-Hour			PM_{10} - Annual			CO 1-Hour and 8-Hour			NO_x Annual			SO_2 3-Hour & 24-Hour			SO_2 Annual		
						Temp. (deg.K)	Velocity (m/s)	Emission (g/s)	Temp. (deg.K)	Velocity (m/s)	Emission (g/s)	Temp. (deg. K)	Velocity (m/s)	Emission (g/s)	Temp. (deg.K)	Velocity (m/s)	Emission (g/s)	Temp. (deg.K)	Velocity (m/s)	Emission (g/s)	Temp. (deg.K)	Velocity (m/s)	Emission (g/s)
Bethpage Combined Cycle	626,729.581	451,1398.562	36.58	30.48	3.28	344.41	10.44	0.315	344.41	10.44	0.315	355.52	18.30	0.643	355.52	15.53	0.764	355.52	15.53	0.127	355.52	15.53	0.117
Bethpage Simple Cycle	626,700.100	4,511,462.008	36.58	30.48	3.81	716.00	15.96	0.380	716.00	15.96	0.360	716.00	20.06	0.460	716.00	26.02	0.550	716.00	26.02	0.120	716.00	26.02	0.120
Bethpage Cogeneration 1[1]	626,753.216	4,511,512.005	36.58	30.48	2.01	398.56	22.86	0.985	398.56	22.86	0.675	398.56	22.86	16.650	398.56	22.86	7.00	398.56	22.86	10.900	398.56	22.86	4.196
Bethpage Cogeneration 2[1]	626,715.557	4,511,507.486	36.58	30.48	2.01	398.56	22.86	0.985	398.56	22.86	0.675	398.56	22.86	16.650	398.56	22.86	7.00	398.56	22.86	10.900	398.56	22.86	4.196
NGC Steam Plant[1,2]	626,694.504	4,511,529.436	36.58	30.48	1.52	394.11	6.87	0.800	394.11	6.87	0.800	394.11	6.87	0.400	394.11	6.87	4.390	716.00	6.87	4.640	716.00	6.87	4.640
Keyspan Plant	632,300.000	4,513,190.000	53.80	59.44	5.49	716.00	23.20	2.440	716.00	23.20	2.440	376.50	6.87	0.783	376.50	23.20	1.800	641.00	23.20	0.410	641.00	23.20	0.410

Notes:
[1] The Bethpage cogeneration plant and NGC steam plant do not operate simultaneously pursuant to a covenant with the Town of Oyster Bay.
[2] Only one unit at the NGC steam plant operates at any time because of the limits on steam demands at the Bethpage Grumman Complex

Table 8-21
Cumulative Air Quality Impacts of Proposed Project, Calpine Cogeneration and Peaking Plants and KeySpan Project

Pollutant	Averaging Period	Maximum Concentration (ug/m^3)			Location		Background Conc. (ug/m^3)	Total Conc. (ug/m^3)	NAAQS (ug/m^3)
		Calpine Plant	Keyspan Plant	Total	Distance (m)	Direction (degrees)			
CO	1-Hour	247.68	0.00	247.68	250	90	7,100	7,348	40,000
	8-Hour	86.03	0.00	86.03	300	90	5,200	5,286	10,000
SO_2	3-Hour	97.70	0.00	97.70	200	80	149	247	1,300
	24-Hour	24.26	0.00	24.26	300	10	73	97	365
	Annual	0.64	<<0.01	0.64	2,000	30	16	17	80
PM_{10}	24-Hour	2.52	0.00	2.52	300	10	41	44	150
	Annual	0.15	<<0.01	0.15	1,800	30	17	17	50
NO_2	Annual	1.11	<<0.01	1.11	2,000	30	47	48	100

Table 8-22
Cumulative Air Quality Impacts of Proposed Project, Calpine Peaking Plant, NGC Steam Plant and KeySpan Project

Pollutant	Averaging Period	Maximum Concentration (ug/m^3)				Location		Background Conc. (ug/m^3)	Total Conc. (ug/m^3)	NAAQS (ug/m^3)
		Calpine Plant	NGC Plant	Keyspan Plant	Total	Distance (m)	Direction (degrees)			
CO	1-Hour	0.00	17.06	0.00	17.06	300	30	7,100	7,117	40,000
	8-Hour	0.00	6.36	0.00	6.36	250	40	5,200	5,206	10,000
SO_2	3-Hour	0.00	120.35	0.00	120.35	250	30	149	269	1,300
	24-Hour	<<0.01	44.71	0.00	44.71	175	90	73	118	365
	Annual	<<0.01	4.54	<<0.01	4.54	150	90	16	21	80
PM_{10}	24-Hour	0.03	7.71	0.00	7.74	175	90	41	49	150
	Annual	<<0.01	0.79	<<0.01	0.80	150	90	17	18	50
NO_2	Annual	<<0.01	4.30	<<0.01	4.30	150	90	47	51	100

G. OTHER POTENTIAL IMPACTS

INTRODUCTION

The proposed project has the potential for impacts due to: (1) the formation of visible water vapor plumes from emissions from the combustion turbine and OTSG stack; and (2) plume fogging, rime icing, and elevated visible plumes from operation of the proposed cooling towers.

COMBUSTION TURBINE STACK VISIBLE WATER VAPOR PLUMES

A major exhaust byproduct of the combined cycle turbine combustion process is water vapor. With each pound of natural gas fired, over two pounds of water vapor are formed. Additional water vapor is formed through injection of a water spray in the compressor section of the combustion turbine. Since the exhaust gas contains appreciably more water vapor than the ambient air, an analysis was performed to determine if the exhaust plume could condense and become visible under normal atmospheric conditions. A visible plume formed under such conditions is called a mixed vapor plume. When hot, humid exhaust gas is vented to a cooler, humid atmosphere, the combination may be at or above the saturation level and a visible plume forms. This is similar to seeing one's breath on a cold morning. In the following visibility analysis the condensed vapor plume was considered to be visible if it occurred during conditions that would allow it to be viewed by the general public. This definition would normally exclude plumes formed at night, and during periods of bad weather (rain, snow, or fog) that obscure visibility. Although steam plumes are not regulated by the EPA or NYSDEC, an analysis of the frequency of a visible plume was performed for disclosure purposes.

Visible steam plumes may occur when operating in a combined cycle mode due to the lower stack exit temperatures. Consequently, the potential frequency and extent of visible plumes resulting from steam condensation was conservatively assessed as a worst case using the CALPUFF model. The SACTI model does not consider combustion turbine sources for visible plume analyses. Five years of meteorological data were used in the CALPUFF simulations. The model results indicate that the plume from the project stack would be visible due to water vapor condensation approximately 18 percent of the daylight hours, excluding hours of inclement weather (rain, snow, or fog). Visible plumes would occur principally in winter during periods with low ambient temperatures. The plume would most likely occur during the morning hours (around dawn) and would not be expected to be visually intrusive. Due to the height of the stack and high exhaust velocities, the plume would occur relatively high above ground level and, therefore, would not cause or contribute to any ground fogging effects. In summary, there would be no significant adverse visual impacts expected due to the steam plume from the combustion turbine stack.

COOLING TOWER IMPACT ASSESSMENT

The project would include both the five-cell and two-cell cooling towers. Potential cooling tower impacts consist of plume fogging, rime icing, and elevated visible plumes. To evaluate these effects, a cooling tower impact assessment was conducted using the CALPUFF model with the PRIME downwash option. Water vapor concentrations were predicted at 260 receptors located on the surrounding roadways and parking areas spaced at 15-meter intervals.

The CALPUFF model predicted that the cooling tower would cause an average of one hour of plume-induced fogging and possibly two hours of plume-induced icing per year simulated or (6

hours of fogging and 8 hours of icing over five years). This is a minimal impact on the nearby roadways.

TRANSMISSION LINES

Neither the natural gas transmission line nor the electric transmission line would have any emissions, and they would not have an adverse impact on air quality.

CONCLUSIONS

The air quality modeling analyses indicate that the proposed project would have only minor impacts on air quality. The maximum predicted impacts of the project by itself are below the SILs and, therefore would neither cause nor contribute to a violation of the NAAQS. In addition, impacts of $PM_{2.5}$ were predicted to be below the NYSDEC $PM_{2.5}$ policy significance threshold levels. Emissions of GHG are negligible relative to the overall inventories of CO_2 emissions on a state, national, and global basis, and the proposed project would likely displace existing, less energy efficient facilities. The cumulative impact assessment involving the project and other nearby sources indicates that total modeled concentrations would also be well below the NAAQS. The cumulative impact analysis of 2002-2005 LIPA combustion turbine projects, as well as the proposed project and nearby sources, showed that the total combined impacts of the projects would be below the SILs and that the sum of the predicted impacts and existing air pollutant concentrations would be well below the NAAQS. Additional analyses examining the potential formation of visible plumes from the combustion turbine stack and two cooling tower impacts showed that these impacts would be insignificant. In conclusion, the proposed project would not have a significant impact on air quality. ✷

A. INTRODUCTION

A noise impact assessment was conducted to examine potential impacts due to the operation of the proposed project. The assessment consisted of: (1) determining existing noise levels based on monitoring at nearby residences potentially affected by noise generated by operation of the proposed project; (2) predicting noise levels associated with project operations at sensitive receptor locations using computer modeling techniques; and (3) comparing projected noise levels with the proposed project to applicable noise impact criteria, (i.e., a 6 decibel (dBA) increase in $L_{eq(1\text{-hour})}$ noise levels was considered to be a significant impact). For informational purposes, an additional analysis was performed to evaluate consistency of the proposed project's noise levels to limits established in the Town of Oyster Bay's Noise Control Ordinance. The noise impacts associated with the construction of the proposed project are discussed in Chapter 15, "Construction."

B. DESCRIPTION OF PROJECT STUDY AREA

The proposed project would be located on a parcel of land adjacent to the existing Calpine power plant site in the Town of Hicksville, New York (see Figure 1-1 above). Industrial and commercial uses immediately border the site to the north and east, with commercial uses located to the west across Route 107. As shown in Figure 9-1, the nearest residential and noise-sensitive areas are located approximately 1,200 feet south of the site, along Dolores Avenue and Ivy Court East.

C. GENERAL INFORMATION ON NOISE

To facilitate the review of the noise monitoring surveys and impact analysis, this section briefly discusses the most commonly used metrics for reporting and describing environmental noise levels.

SOUND LEVEL METERS

Noise is measured using a standardized instrument called the "sound level meter." All sound level meters are equipped with small microphones that detect minute changes in atmospheric pressure caused by the mechanical vibration of air molecules. Healthy human hearing can detect pressures as low as 0.00002 Pascals (threshold of hearing) to as high as 20 Pascals (threshold of pain).[1] Because this represents an enormous dynamic range (one million to one), sound pressures are instead reported using a logarithmic scale, which compresses the numbers to make them more manageable. Once converted, they are referred to as sound pressure levels, followed by

[1] As pounds are measure of weight, Pascals are a measure of pressure, equivalent to about 0.02 pounds per square foot (lbs/ft^2). A single Pascal of pressure will produce a sound pressure level of 94 dB.

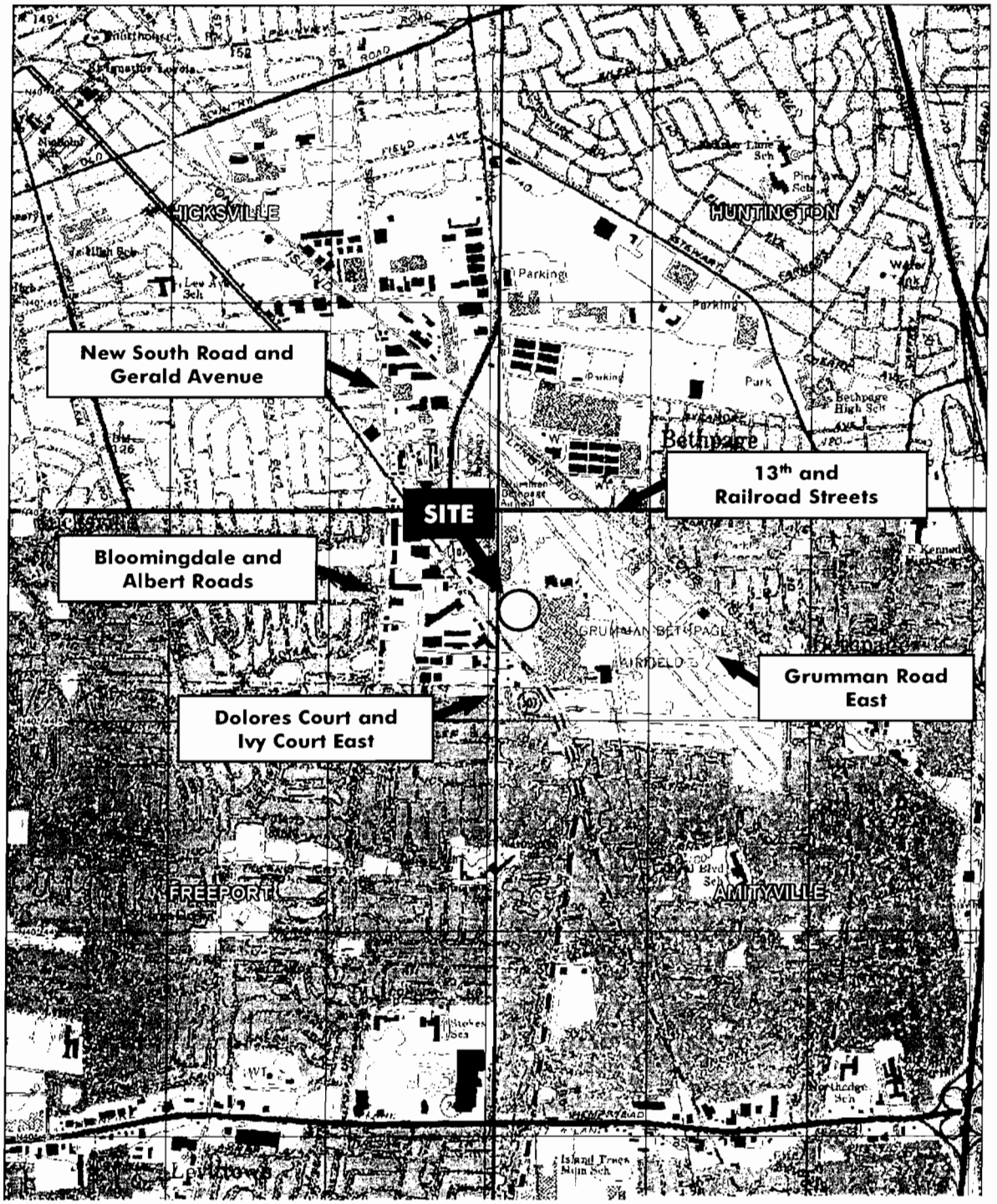


Figure 9-1

Noise Sensitive Receptors

"decibels" (dB) as the unit of measure. On a logarithmic scale, the threshold of hearing becomes zero decibels and the threshold of pain 120 decibels.

A-WEIGHTED LEVELS

Noise can be measured using various "apparent" scales, similar to reporting temperature in terms of wind chill or heat index, or humidity in terms of dewpoint. The latter are better indicators of perceived cold, warmth, or dampness, respectively. Similarly, sound level measurements are often reported using the "A-weighting" scale of a sound level meter. A-weighting slightly boosts high frequency sound, while reducing low frequency levels (similar to the way stereo bass and treble controls work), providing a better indicator of perceived loudness at relatively modest volumes. These sound level measurements are called A-weighted levels and are reported in units of dBA. A-weighting tends to simulate the response of the human ear. Figure 9-2 illustrates ranges of A-weighted levels for common noise sources.

FREQUENCY ANALYSIS

Humans do not respond to sounds of different frequencies equally. Consequently, for measurement purposes, sounds are frequently divided into frequency bands or ranges, and sound level meters are often equipped with octave band filters. As shown in Table 9-1, octave band filters typically are used to divide complex sounds into nine "frequency-bins" much like a prism separates white light into bands of different color (or wavelength).

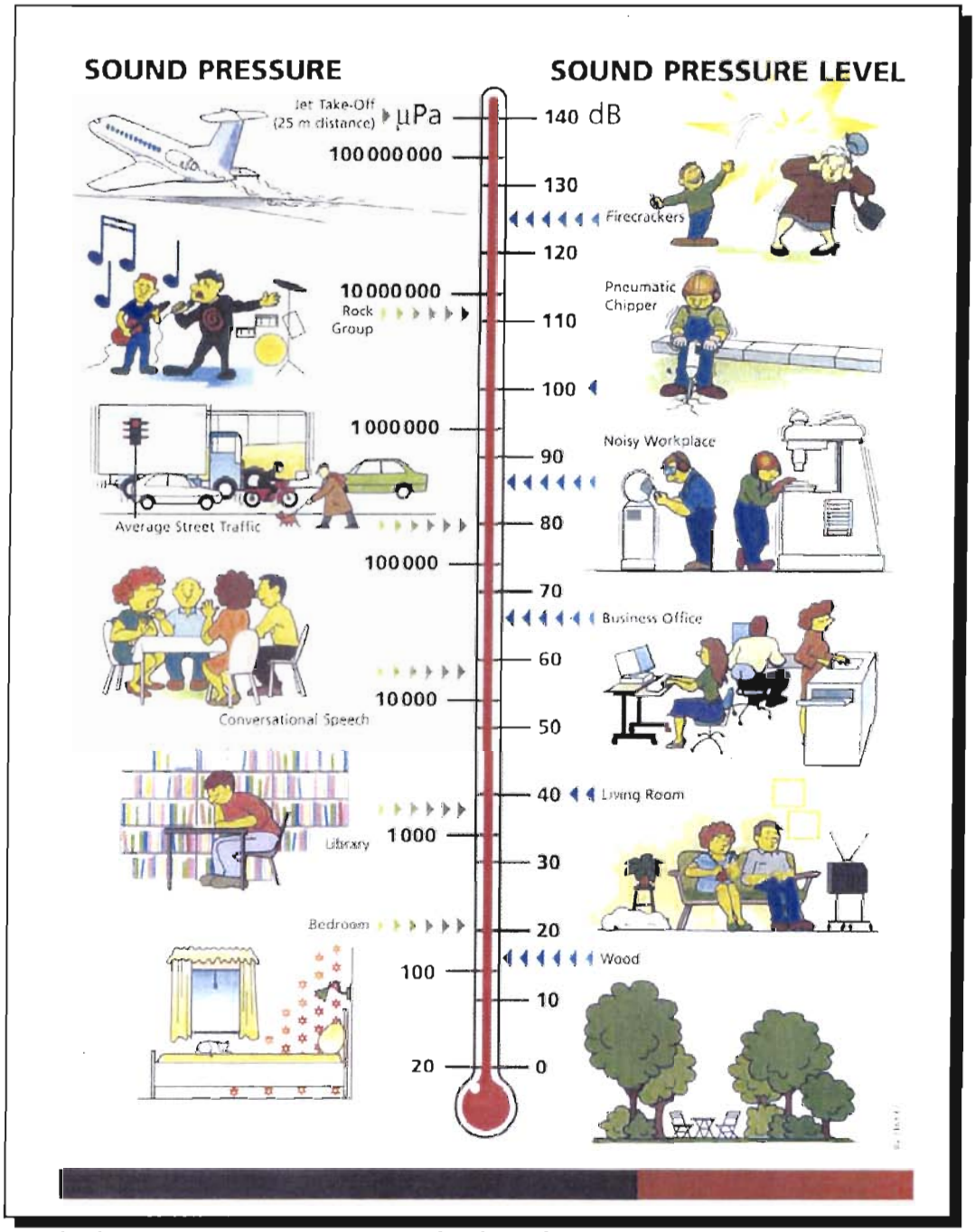
Table 9-1
Octave Band Frequency Rates (Hertz)

Octave Band Center Frequency	Frequency Range
31.5	22–44
63	44–88
125	88–177
250	177–355
500	355–710
1000	710–1420
2000	1420–2840
4000	2840–5680
8000	5680–11360

Source: *Noise & Vibration Control Engineering*, ed., Beranek, Ver, 1992.

PERCENTILE LEVELS

Because environmental noise levels typically fluctuate, percentile or "exceedance" measurements are often used to quantify them. These metrics help describe the average noise level, as well as the range of highs to lows. Equally important, they allow us to separate loud, intrusive noises from steady state, low-level background sounds. As shown in Figure 9-3, percentile sound levels include the following:



SOURCE: BRÜEL & KJÆR, DENMARK

Figure 9-2

Typical Sound Pressure Levels

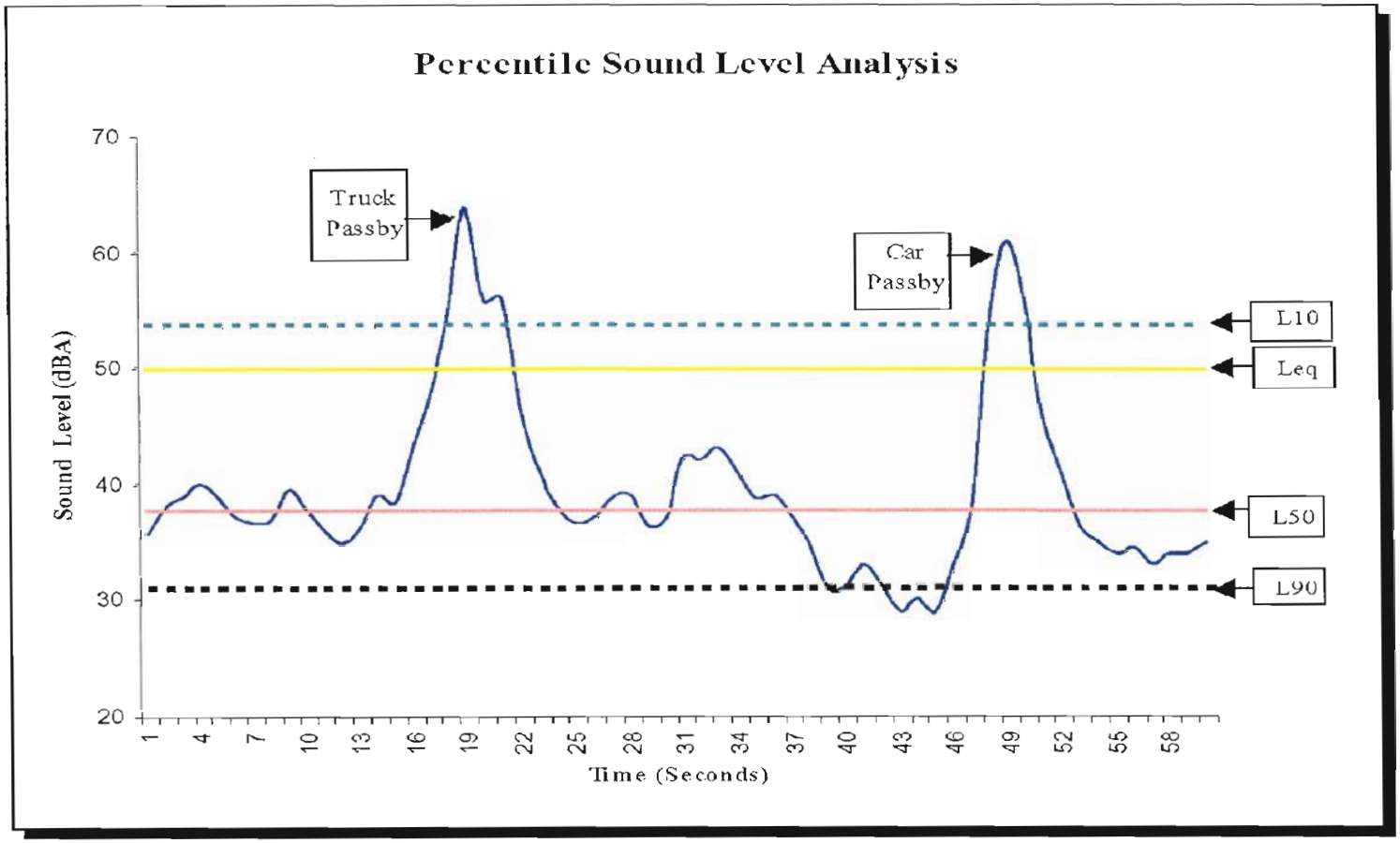


Figure 9-3

Example Percentile Analysis

- L_{10} ("L-Ten") is the level exceeded 10 percent of the time; that is, levels are higher than this value only 10 percent of the measurement time. The L_{10} typically represents the loudest, shortest duration and most intrusive noise events, such as car and truck passes and aircraft flyovers.
- L_{50} ("L-Fifty") is the sound level exceeded 50 percent of the time. Levels will be above and below this value exactly one-half of the measurement time; therefore, the L_{50} is sometimes referred to as the "median" sound level.
- L_{90} ("L-Ninety") is the sound level exceeded 90 percent of the time and is often called the background sound level. Ninety percent of the time, measured levels are higher than this value and, therefore, the L_{90} represents the environment at its quietest periods.

EQUIVALENT ENERGY LEVEL

Noise levels may also be reported in terms of "equivalent energy levels" or L_{eq}. An L_{eq} is "equivalent" in energy to the actual fluctuating noise for any given measurement period. As shown in Figure 9-3, a noise level of 50 dBA (L_{eq}) for a period of one minute is equivalent in energy to the fluctuating noise level for the same period, produced by the car and truck passes, which range in level from less than 30 dBA to more than 60 dBA. The L_{eq} typically falls between the L_{10} and L_{50} and is the preferred metric of the New York State Department of Environmental Conservation (NYSDEC) for assessing environmental noise and its potential impact.

COMMUNITY RESPONSE TO CHANGES IN NOISE LEVELS

The ability of an individual to perceive changes in noise levels is well documented (see Table 9-2). Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners, whereas 10 dBA changes are normally perceived as doublings (or halvings) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

Table 9-2
Average Ability to Perceive Changes in Noise Levels

Change in Sound Pressure Level (dBA)	Human Perception of Sound
2–3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A "dramatic change"
40	Difference between a faintly audible sound and a very loud sound

Source: Bolt Beranek and Newman, Inc., *Fundamentals and Abatement of Highway Traffic Noise, Report No. PB-222-703.* Prepared for Federal Highway Administration, June 1973.

It is also possible to characterize the effects of noise by studying the aggregate response of people in communities. The rating method used for this purpose is based on a statistical analysis of the fluctuation in community noise levels during a known period of time, most typically during 1 hour or 24 hours. Various government and research institutions have proposed criteria that attempt to relate changes in noise levels to community response. One commonly applied criterion for estimating response is incorporated into the community response scale proposed by

the International Standards Organization (ISO) of the United Nations (see Table 9-3). This scale relates changes in noise level to the degree of community response and permits direct estimation of the probable response of a community to a predicted change in noise level.

Table 9-3
Community Response to Increases in Noise Levels

Change in Sound Pressure Level (dBA)	Category	Description
0	None	No observed reaction
5	Little	Sporadic complaints
10	Medium	Widespread complaints
15	Strong	Threats of community action
20	Very strong	Vigorous community action

Source: International Standards Organization, *Noise Assessment with Respect to Community Responses, ISO/TC 43.* (New York: United Nations, November 1969).

D. NOISE REGULATIONS AND IMPACT CRITERIA

There is a variety of noise standards and guidelines that have been promulgated by various local, state, and federal agencies. A number of these agencies' criteria are discussed below; however, none of these criteria are directly applicable to the proposed project.

TOWN OF OYSTER BAY NOISE CONTROL ORDINANCE

Section 10.3.1.2. of Chapter 246 of the Oyster Bay Town Code has a noise regulation that, absent LIPA's standing as a state authority, would limit the noise produced by operation of the proposed project. More specifically, the Town Code limits allowable noise levels from a facility by octave band levels utilizing pre-1960s octave band ranges. The octave band ranges are currently considered to be obsolete. The Oyster Bay standard reduces allowable sound levels by six decibels, if the project lot lies within 200 feet of a residential district. The 6 dB reduction also applies to nighttime hours (9 PM to 7 AM) and all day on Sunday. Because the proposed project would potentially operate during nighttime hours and on Sundays, the 6 dB reduction would be applicable. The allowable decibel levels for the project (assuming the 6 dB reduction) for both the obsolete and the current preferred frequency ranges are presented Table 9-4.

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

The New York State Department of Transportation (NYSDOT) has noise criteria that it uses for projects subject to its jurisdiction. NYSDOT has adopted the noise criteria of the Federal Highway Administration (FHWA) at 23 CFR 772. These criteria have two components: "fixed" noise criteria and "relative" noise criteria.

The fixed noise criteria consist of the FHWA Noise Abatement Criteria (NAC), which are shown in Table 9-5. These NAC depend on task interference due to noise interruption of various activities involving speech, and vary by land use. By NYSDOT policy, substantial fixed noise impacts occur when predicted traffic-noise levels equal or exceed the applicable NAC from this table.

Table 9-4
Town of Oyster Bay Noise Control Ordinance

Pre-1960 Octave Band Range (Frequency Range, Hertz)	Maximum Allowable Sound Pressure Levels (dB)	Current Octave Band Ranges (Frequency Range, Hertz)	Maximum Allowable Sound Pressure Levels (dB)
0–74	60	44–88	58
75–149	52	88–177	51
150–299	49	177–355	48
300–599	44	355–710	43
600–1,199	39	710–1420	38
1,200–2,399	36	1,420–2,840	35
2,400–4,799	32	2,840–5,680	31
4,800–20,000	29	5,680–11,360	28

Table 9-5
FHWA Fixed Noise Criteria

Activity Category	L_{eq}[1]	Description of Activity
A	57 Outdoors	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Outdoors	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 Outdoors	Developed lands, properties, or activities not included in Categories A or B above.
D	None	Undeveloped lands.
E	52 Indoors	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Note: [1] Equivalent Sound Level (dBA)
Source: *Highway Traffic Noise Analysis and Abatement*, USDOT, FHWA, 1995.

The second type of criterion is based upon the change in noise level relative to existing noise levels. Substantial relative noise impacts occur when predicted noise levels increase by 6 decibels or more above existing noise levels.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

The New York State Department of Environmental Conservation (NYSDEC) guidelines are defined in Assessing and Mitigating Noise Impacts (Revised February 2001). This document states that sound pressure level (SPL) increases from 0–3 dB should have no appreciable effect on receptors, increases of 3–6 dB may have the potential for adverse impact only in cases where the most sensitive of receptors are present, and increases of more than 6 dB may require a closer analysis of impact potential depending on existing noise levels and the character of surrounding land use and receptors. The guideline further states that, in terms of threshold values, the addition of any noise source in a non-industrial setting should not raise the ambient noise level (SPL) above a maximum of 65 dBA, and ambient noise levels (SPL) in industrial or commercial

areas may exceed 65 dBA with a high end of approximately 79 dBA. Projects that exceed these guidance levels should explore the feasibility of implementing mitigation.

NOISE CONTROL ACT OF 1972

As a result of the Noise Control Act of 1972, the EPA published the document entitled *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* in 1974. Table 9-6 shows the noise criteria established by the EPA. These criteria do not constitute enforceable federal regulations or standards. Nevertheless, the EPA noise criteria represent a valid basis for evaluating the effect of project noise on public health and welfare.

Table 9-6
Noise Levels Identified as Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety

Effect	Level	Area
Hearing loss	$L_{eq(24)} \leq 70$ dB	All areas
Outdoor activity interference	$L_{dn} \leq 55$ dB	Outdoors in residential areas and farms, other outdoor areas where people spend widely varying amounts of time, and other places in which quiet is a basis for use.
	$L_{eq(24)} \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} \leq 45$ dB	Indoor residential areas.
	$L_{eq(24)} \leq 45$ dB	Other indoor areas with human activities, such as schools, etc.
Source: *Report No. EPA-550/9-74-004*, March 1974.		

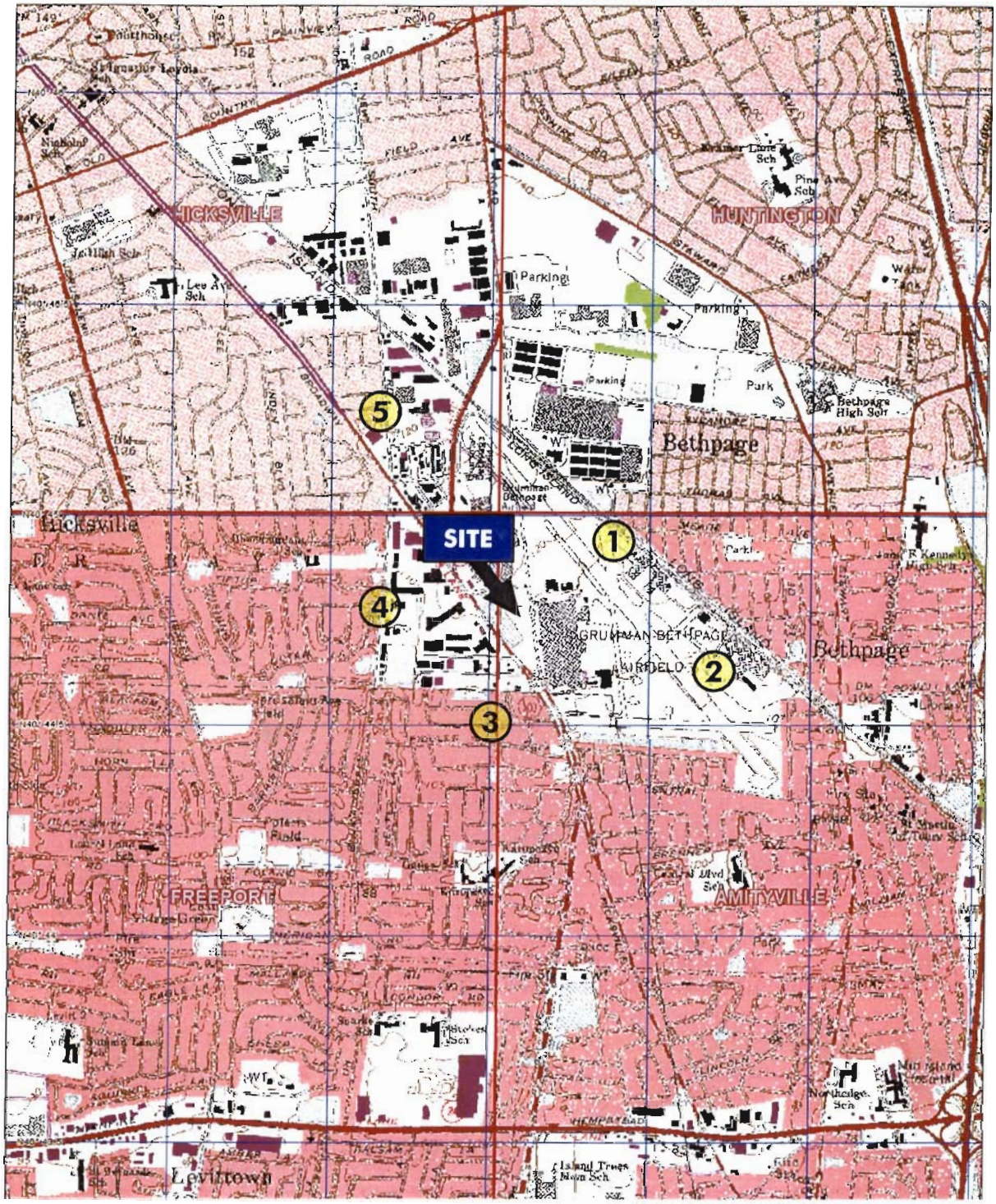
IMPACT CRITERIA

For purposes of evaluating impact of the proposed project, a significant impact is defined as an increase in $L_{eq(1\text{-}Hour)}$ (or $L_{eq(1)}$) noise levels over future conditions without the project of 6 dBA or more at the nearest sensitive receptors. This is consistent with the NYSDEC guidance document recommendation that, if a proposed project's impact exceeds 6 dBA, closer analysis is required, depending on the character of local land use and receptors. For informational purposes, an additional analysis was performed to evaluate consistency of the proposed project's noise levels with limits established in the Town of Oyster Bay's Noise Control Ordinance.

E. EXISTING NOISE LEVEL CONDITIONS

AMBIENT NOISE LEVEL SURVEY

The existing noise environment surrounding the proposed project has been characterized through ambient noise monitoring (conducted on October 10th through 12th, 2001 and again on September 17th through 18th, 2003) at selected noise sensitive areas, which were identified through use of aerial photographs and USGS topographic maps and later confirmed during a field reconnaissance of the project study area prior to the noise monitoring programs. Five noise-monitoring locations were selected to provide adequate spatial representation of nearby sensitive receptors, and are shown in Figure 9-4 and described in Table 9-7.



0 650 1950

Scale in Feet

Figure 9-4

Noise Monitoring Locations

Table 9-7
Noise Monitoring Locations

Receptor Site	Description
Location 1	Intersection of 13th and Railroad Street
Location 2	Northernmost end of Grumman Road East ("Apollo" and "Sunny Lane" Communities)
Location 3	Dolores Court and Ivy Court East
Location 4	Intersection of Bloomingdale Road and Albert Road
Location 5	Intersection of New South Road and Gerald Avenue

Short-term monitoring (20 minutes in duration at each location) was conducted several times during the day and late at night at each location, and observations of audible noise sources were noted. All measurements were collected using a Brüel & Kjær Model 2260 Sound Level Meter, which was calibrated before and after each measurement set with a Brüel & Kjær Model 4231 Acoustic Calibrator. The instrument was configured to measure and store L_{eq} octave band and overall noise levels for each location. L_{eq} values were used to assess impacts for this project in accordance with NYSDEC's Noise Guidance Document.

NOISE MONITORING RESULTS

A summary of the lowest A-weighted Leq data collected at each location is presented in Table 9-8. Measured noise levels ranged from 43 to 53 dBA, and were lowest during late night hours, which is typical for this setting, as local activities decrease late at night. Existing noise sources in the area during the day consisted of a combination of local vehicular traffic noise (commercial activities and light rail transportation) as well as industrial noise, natural sounds (birds, insects), and aircraft. Late at night, when vehicular traffic was less pronounced, industrial noise was noticeable to some extent at all locations.

Table 9-8
Noise Monitoring Results (in dBA)

Receptor Site	Description	Lowest Measured Noise Level (L_{eq})
Location 1	Intersection of 13th and Railroad Street	50
Location 2	Northernmost end of Grumman Road East ("Apollo" and "Sunny Lane" Communities)	49
Location 3	Dolores Court and Ivy Court East (Nearest Residence)	43
Location 4	Intersection of Bloomingdale Road and Albert Road	51
Location 5	Intersection of New South Road and Gerald Avenue	53

F. NOISE LEVEL PROJECTIONS WITH THE PROPOSED PROJECT

The proposed project would consist of a GE LM6000 combustion turbine generator, a once-through steam generator (OTSG) equipped with duct burners, and a steam turbine generator. Auxiliary support equipment would include a condenser cooling tower, an inlet air chiller cooling tower, and a gas compressor.

ACOUSTICAL MODELING

To assess the potential noise impacts of the proposed project, a noise modeling analysis was conducted using SoundPLAN® Version 6.1.[1] This software was developed for estimating noise levels from industrial facilities. The analysis considered all major noise sources associated with the proposed project. The major noise sources and their associated noise levels are presented in Table 9-9. Noise level data for most noise sources was obtained from equipment vendors. In cases where specific data were not available, octave band spectra were developed following accepted industry procedures found in Edison Electric Institute's Electric Power Plant Environmental Noise Guide.

Table 9-9
Major Noise Sources Modeled

Description	Sound Power Level (dBA)
Chiller Enclosure	80 dBA/surface
Circulating Water Pumps	95 dBA
Cooling Water Pumps	93 dBA
Cooling Tower	104 dBA
Cooling Tower Chemical Feed Skid	98 dBA
CTG Building Walls & Roof	78 dBA/surface
CTG Air Intake	94 dBA
CTG Building Ventilation Fans	88 dBA
CTG Generator Compartment Vent Fan & Motor	90 dBA
CTG Turbine Compartment Vent Fan & Motor	91 dBA
Duct Burner Skid	94 dBA
Gas Compressor Building Walls & Roof	81 dBA/surface
Main Step-Up Transformer	98 dBA
OTSG Building Walls & Roof	78 dBA/surface
OTSG Stack	90 dBA
OTSG Stack Exhaust	98 dBA
Steam Turbine Building Walls & Roof	88 dBA/surface

Modeling receptors were selected at the same residential locations where background monitoring was performed to allow a direct comparison of the projected noise levels with existing noise levels. Additional receptors were placed at property boundaries for each of the alternative site arrangements in order to determine the maximum expected noise levels associated with the proposed project.

Receiver noise levels were calculated by accounting for the reduction of sound with distance (hemispherical divergence); absorption of sound by air (air absorption); absorption and reflection of sound by the ground (ground effect); and changes in source level with direction (directivity). Sound levels were further adjusted by the transmission loss of buildings, if appropriate, as well as the shielding effects of onsite and offsite buildings, equipment, and significant site

[1] SoundPLAN® Version 6.1, Baunstein + Berndt, GmbH, Acoustical Modeling Software

topography (hills, berms, etc.) to estimate far-field project noise levels. The analysis assumed that the design of the proposed project would include the following noise controls:

- Combustion turbine air-intake silencer
- OTSG transition duct silencer
- Combustion turbine and generator compartment ventilation fan silencers
- Steam-vent silencers
- Compressor bleed vent silencer
- Enclosure for gas compressor skid
- Low-noise generator step-up transformer
- Generation building
- Low-noise cooling towers

MODELING RESULTS

The projected noise levels at residential locations associated with the proposed project are shown in Table 9-10. The table shows calculated noise levels due to noise generated by the proposed facility alone, measured or ambient late-night existing noise levels, projected future late-night noise levels with the proposed facility, and the increase in late-night noise levels with the proposed facility. The values shown are for the combined cycle operations. As shown in Table 9-10, the projected noise levels at nearby homes due to noise generated by the proposed facility alone would range from 32 to 45 dBA. Noise level contours due to noise generated by the proposed facility alone are presented in Figure 9-5. Table 9-10 also shows the measured late-night ambient L_{eq} noise levels and projected increases for each location. The late night ambient noise levels were evaluated because ambient levels were lowest at night, resulting in a more conservative analysis. The maximum increase in noise levels due to the project at the nearest residences would be 4 dBA. Changes of this magnitude would be below the project's 6 dBA impact criteria and, therefore, the proposed project would not cause a significant adverse noise impact at the nearest residences.

Table 9-10
Projected Noise Levels at Nearest Residences (in dBA)

Location	Calculated Project Noise Level (L_{eq})	Measured Ambient Late Night (L_{eq})	Projected Future Late Night (L_{eq})[1]	Increase Over Existing Late Night (L_{eq})
13th & Railroad Streets	39	50	50	1
Grumman Road East	34	49	49	0
Dolores & Ivy Court East	45	43	47	4
Bloomingdale & Albert	37	51	51	0
New South & Gerald	32	53	53	0

Note: [1] Existing background plus proposed project.

Table 9-11 shows similar quantities to Table 9-10 at the property boundaries (i.e., calculated noise levels due to noise generated by the proposed facility alone, measured or estimated existing noise levels, projected future noise levels with the proposed facility, and the increase in

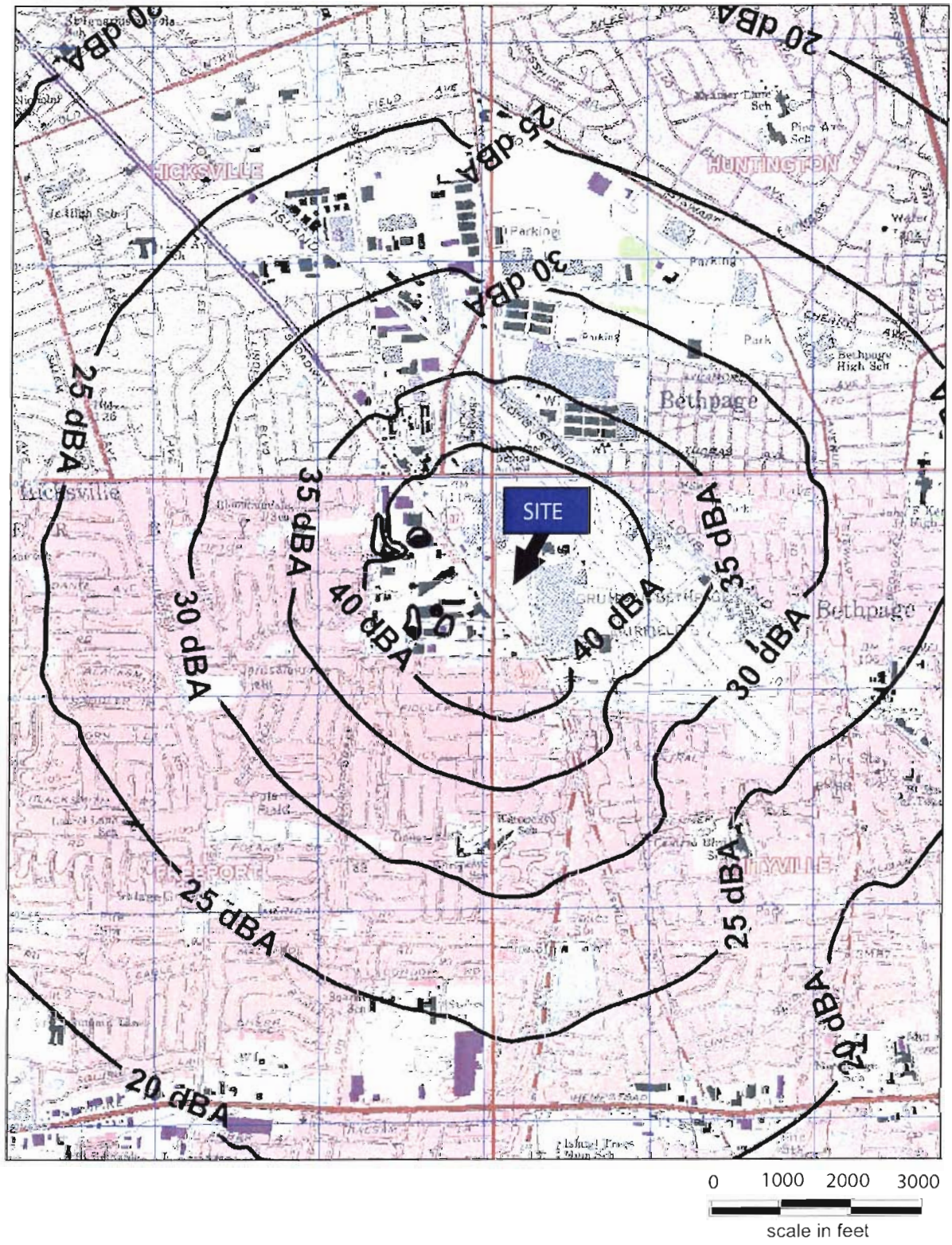


Figure 9-5
Noise Level Contours

noise levels with the proposed facility). The maximum increase in noise levels due to the project at the property boundaries would be 4 dBA. Changes of this magnitude would be below the project's 6 dBA impact criteria and, therefore, the proposed project would not cause a significant adverse noise impact at the property boundaries.

Table 9-11
Projected Noise Levels at Property Lines (in dBA)

Location	Predicted Project Noise Level (L_{eq})	Ambient Noise Level (L_{eq})	Projected Future Noise Level (L_{eq})[1]	Ambient Noise Level Increase (L_{eq})
Property Line–North	47	60[2]	60	0
Property Line–South	56	61	62	1
Property Line–East	61	59[2]	63	4
Property Line–West	62	66[2]	67	1

Notes:
1 Existing background plus proposed project.
2 Estimated.

Although the Town of Oyster Bay Noise Ordinance is not applicable to the proposed project, given LIPA's standing as a state authority, an additional analysis was performed to evaluate consistency of the proposed project's noise levels to limits established in the Town Code in order to present a full analysis and disclosure of potential effects of the proposed project. Predicted noise levels due to noise from the proposed facility alone, at the nearest residential locations to the proposed project, are shown in Table 9-12. As can be seen in this table, projected noise levels at all residential locations resulting from operation of the project would be below the levels specified in the Town of Oyster Bay Noise Ordinance. Predicted project noise levels due to noise from the proposed facility alone, at the property boundaries to the proposed project, are shown in Table 9-13. Although projected noise levels would exceed the levels specified in the Town of Oyster Bay Noise Ordinance at most octave bands on the property boundaries, the projected increases in $L_{eq(1)}$ noise levels at the property boundaries would not be significant and these exceedances of the Town of Oyster Bay Noise Ordinance would not constitute a significant impact.

Table 9-12
Projected Octave Band Noise Levels at Residential Locations Compared to Oyster Bay Noise Ordinance (in dB)

Location	Octave Band Center Frequency (Hz)								
	31	63	125	250	500	1000	2000	4000	8000
Oyster Bay Noise Standard	--	58	51	48	43	38	35	31	28
13th & Railroad Street	--	52	45	41	37	33	28	18	< 0
Grumman Road East	--	47	40	35	31	28	23	10	< 0
Dolores Court & Ivy Court East	--	56	49	47	43	38	34	27	4
Bloomingdale & Albert	--	48	41	39	35	31	26	15	< 0
New South & Gerald	--	45	38	34	31	26	19	2	< 0

Table 9-13
Projected Octave Band Noise Levels at Property Boundaries Compared to Oyster Bay Noise Ordinance (in dB)

Location	Octave Band Center Frequency (Hz)								
	31	63	125	250	500	1000	2000	4000	8000
Oyster Bay Noise Standard	--	58	51	48	43	38	35	31	28
Property Line–North	--	60	54	51	45	39	35	27	17
Property Line–South	--	75	66	60	49	43	39	34	31
Property Line–East	--	68	63	63	60	55	51	47	38
Property Line–West	--	71	67	63	61	56	53	49	42

TRANSMISSION LINES

Neither the natural gas transmission line nor the electric transmission line produce noise, and they would not have an adverse noise impact.

G. CONCLUSIONS

Based on the discussion above, the increase in ambient noise levels due to the proposed project would not result in any significant adverse noise impacts. ✷

A. INTRODUCTION

This section addresses the potential impacts of the proposed project on water supply systems, wastewater handling and treatment plants, energy sources, and solid waste management.

B. WATER SUPPLY

GROUNDWATER RESOURCES

In 1978, the United States Environmental Protection Agency (EPA) identified the aquifer system underlying Nassau and Suffolk Counties as the Nassau-Suffolk Aquifer System and characterized it as a Sole Source Aquifer. A Sole Source Aquifer is defined by the EPA as an aquifer that is the sole or principal drinking water source for an area, which, if contaminated, would create a significant hazard to public health. To assure the integrity of the Nassau-Suffolk Aquifer System, all water withdrawals in Nassau County require permits from the Nassau County Department of Health (NCDOH), New York State Department of Health (NYSDOH), and New York State Department of Environmental Conservation (NYSDEC).

Water in the Nassau-Suffolk Aquifer System originates as precipitation, which slowly percolates down through the soil. Three primary formations lay one on the other and together comprise the Long Island Aquifer System. From the shallowest to the deepest, these formations are:

- Upper Glacial Aquifer. This aquifer contains the youngest or newest water to the groundwater system and provides water for irrigation and a large percentage of the potable drinking water for the two counties. Virtually all private wells draw from the Glacial Aquifer.
- Magothy Aquifer. This aquifer is the largest of the three formations and holds the most water, much of which is hundreds of years old. The Magothy Aquifer is the source of water for many public water distribution systems, including the Hicksville Water District.
- Lloyd Aquifer. This aquifer is a largely untapped layer that contains the oldest water, some of which has been held in the aquifer system for more than 5,000 years.

The movement of groundwater through these units is a function of hydraulic conductivity, which is the capacity of the deposit to transmit water. The hydraulic conductivity of the Upper Glacial Aquifer is approximately six times greater than that of the underlying Magothy Aquifer. The horizontal hydraulic conductivities of the Upper Glacial Aquifer (270 feet per day) and the Magothy Aquifer (50 feet per day) are greater than the corresponding vertical hydraulic conductivities (27 feet per day for the Upper Glacial Aquifer; 1.4 feet per day for the Magothy Aquifer). Therefore, water moves faster laterally than vertically through these units.

A groundwater divide is located in the center of the island in an east-west direction. Based on location relative to the divide, groundwater will either flow to the north towards the Long Island

Sound or south towards the Atlantic Ocean (Olcott 1995). The proposed project site is located to the south of the drainage divide; accordingly, the proposed site's groundwater flows towards the Atlantic Ocean.

The Long Island Ground Water Management Plan (developed pursuant to Section 208 of the Clean Water Act) divides the groundwater of Long Island into various hydrogeologic zones. The proposed site is located in Zone II, which extends across the central portion of the Town of Oyster Bay. Zone II is not characterized as a deep recharge area on Long Island.

The Long Island Regional Planning Board (LIRPB) has also designated nine Special Groundwater Protection Areas (SGPA). The SGPAs are significant, largely undeveloped, or sparsely developed geographic areas of Long Island that provide recharge to portions of the deep flow aquifer system. Protection of these groundwaters is a first-order priority of the LIRPB. The proposed project site area is not located in an SGPA.

EXISTING WATER DEMAND AND SUPPLY

POTABLE WATER SUPPLY

The existing Calpine power generation plant currently uses approximately 2,000 gallons per day (gpd) of potable water, supplied to the site by Northop Grumman Corporation (NGC), which in turn receives its potable water supply from the local municipal supply, the Hicksville Water District. Potable water use by the existing Calpine power generation plant is limited to drinking and sanitary uses. This existing potable water use would continue as part of ongoing operation of the proposed project, in conjunction with continuing operation of the existing plant. The Hicksville Water District obtains potable water from a total of 14 groundwater withdrawal wells, each with a capacity of between 1,200 and 1,400 gallons per minute (gpm), which is equivalent to 1,728,000 and 2,016,000 gpd.

PROCESS WATER SUPPLY

The existing Calpine power generation plant has a maximum process water demand of approximately 430,000 gpd, with the highest single use being approximately 84,000 gpd required for the water-injection system used to control nitrogen oxide (NO_x) emissions during auxiliary oil firing conditions for the cogeneration plant. Process water for the existing Calpine power generation plant is supplied by NGC. Historically, NGC utilized a combination Navy-owned and company-owned groundwater withdrawal wells to supply process water and non-contact cooling water drawn from the Magothy Aquifer to various users across the Grumman Bethpage Complex. A total of 14 wells were available during peak production, each with a permitted capacity of 1,200 gpm. This is equivalent to just over 1.7 million gallons per day (mgd) for each well and 24 mgd total for all 14 wells. Typical warm-weather production has exceeded 12 mgd. Since this historical peak production period, various wells have been lost due to groundwater contamination in the site area (see Chapter 11, "Contaminated Materials"), as well as the return of a number of wells to the Navy. Some of NGC's existing groundwater withdrawal wells are also actively utilized as part of NGC's ongoing "pump and treat" remedial measures being provided in response to the area's groundwater contamination.

NGC has indicated that it and Calpine have negotatiated a water supply agreement for the Bethpage 3 Energy Center for 650 gpm or 936,000 gpd. The water would come from NGC's remediation system. Groundwater is conveyed to the treatment system for the removal of trace volatile organic constituents. After treatment, the water effluent meets drinking water standards.

The proposed water supply arrangement between Northrop Grumman Corporation (NGC) and the proposed project would not require modification to the Record of Decision (ROD) for the groundwater remediation program between NGC and NYSDEC (Record of Decision, Operable Unit 2 Groundwater, Northrop Grumman and Naval Weapons Industrial Reserve Plant Sites, Nassau County, Site Numbers 1-30-003A & B, March 2001, NYSDEC). The ROD specifies the construction and long-term operation of a remedial system designed to remove volatile organic compounds (VOC) from groundwater and to prevent the migration of contaminated groundwater. The system consists of two air-stripping towers and associated pumping systems designed to transfer VOC contamination in the groundwater onto activated carbon filters. Compliance with ROD requirements, including minimum groundwater recharge volumes, is documented in quarterly monitoring reports submitted to NYSDEC. The minimum recharge requirements were determined by NGC in conjunction with NYSDEC through extensive groundwater modeling combined with a groundwater monitoring program designed to confirm the efficacy of the model.

The groundwater remediation system that would be the primary source of water for the proposed project currently receives a flow of 1,500 gallons per minute (gpm) and is supplied by two wells NG-1 (1075 gpm) and NG-3 (425 gpm). This system discharges either into a recharge basin or a wet well that is part of the NGC process water supply system. Groundwater modeling provided to NYSDEC indicates that a minimum flow of 100 gpm must be maintained to the west recharge basins in order to ensure plume containment; therefore, 1,400 gpm is available for process water needs.

The second air-stripping system receives a flow of 2,300 gpm from three wells: GP-17 (1,000 gpm), GP-18 (600 gpm) and GP-19 (700 gpm). NGC must maintain a minimum flow of 2,300 gpm to the south recharge basins, with any overflow going to the wet well feeding the NGC process water supply. In anticipation of additional process water needs on the NGC campus, each of these wells were developed to safely yield up to 1,100 gpm each, for a total capacity of 3,300 gpm. Thus, this second system has the ability to supply 1,000 gpm to the NGC process water supply system, and could serve as backup should the primary remediation system be off-line for maintenance.

The Hicksville Water District currently maintains 14 wells, each with a maximum withdrawal rate of 1,200 to 1,400 gpm (1.7 to 1.8 mgd). However, the Hicksville Water District under its NYSDEC Long Island Well permit is limited to an annual withdrawal of 2,782,000,000 gallons, which is equivalent to 7.6 mgd on average. The annual average of the past 5 years withdrawal has been 2,632,000,000, which is the equivalent of 7.2 mgd. The Hicksville Water District has said that it could supply 126,000,000 gallons per year to the proposed project. This annual amount is equivalent to 0.345 mgd on average.

EXPECTED WATER DEMAND FOR THE PROPOSED PROJECT

POTABLE WATER

Only one to two new employees would be required for operation of the proposed project. Accordingly, the proposed project would result in a minimal demand for potable water above existing levels. Based on an employee using about 25 gpd, the increased maximum demand would be about 50 gpd, an inconsequential amount. Potable water for the ongoing site operations (e.g., combined existing and proposed facilities) would be supplied to the site by the Hicksville Water District or, if necessary, alternatively by NGC.

PROCESS WATER

The largest water demand is to replace the evaporative losses and blowndown from the cooling tower. On an average day, this use would consume about 270,720 gpd and about 603,360 gpd on the maximum day. For NO_x control, about 79,200 gpd would be required on an average day and 80,860 gpd on the maximum day. The NO_x control system exhibits little change between the average day and maximum day because the system is in operation when the combustion turbines are running. The cooling tower demand varies based on temperature and load conditions. Service water for cleaning and similar uses is about 2,880 to 14,400 gpd. The estimated instantaneous peak demand is 603 gpm. The average and maximum peak water demands for the proposed project are summarized in Table 10-1.

To minimize total water demands and wastewater discharge requirements, internally generated waste streams would be recycled or reused internally in the process. For example, water from once through steam generator (OTSG) sample drains and floor drains would be recycled and reused in the cooling towers. The net water savings through internal recycle/reuse (as well as the reduction in wastewater generated) is estimated to be approximately 21,600 gpd under typical operating conditions.

Table 10-1
Average and Maximum
Water Demands for the Proposed Project

Operating Condition	Cooling Tower Demand (gpd)	NO_x Control Demand (gpd)	Service Water Demand (gpd)	Total Water Demand (gpd)
Average Daily Demand	270,720	79,200	2,880	352,400
Maximum Daily Demand	603,360	80,640	14,400	698,400

PROBABLE IMPACT OF THE PROPOSED PROJECT FROM EXPECTED WATER DEMAND

Potable and process water for the proposed project would be obtained from both NGC and the Hicksville Water District. Both NGC and the Hicksville Water District have confirmed that they could supply sufficient water to the proposed project without lowering water pressure or supply to their existing and expected future customers. The onsite and supply water lines are capable of handling the expected maximum instantaneous flow of about 603 gpm. It is expected that Hicksville Water District would continue to supply potable water for drinking and sanitary purposes as well as for fire fighting. The addition of 1 to 2 employees would add minimal water demand and would not have a significant adverse impact on the Hicksville Water Supply District. With the safety procedures in place and the on-site fire suppression system, the demand for fire fighting water would be sporadic, if at all, and would not have a significant adverse impact. The process water would come from NGC groundwater remediation system. The remediation water meets drinking water standards. NGC has available about 1,400 gpm of remediation water after satisfying its requirement for recharge of the aquifer. Calpine has negotiated an agreement for NGC to supply up to 650 gpm to the proposed project as well as 350 gpm to the existing Calpine facilities. In addition, NGC has another groundwater remediation system that could serve as a backup if the primary system is closed for maintenance

or other purposes. Therefore, the proposed project would not a significant adverse impact on water supply systems or on the quantity of groundwater.

C. SANITARY AND PROCESS WASTEWATER

EXISTING WASTEWATER DISCHARGES AND DISPOSAL

Sanitary and process wastewaters from the existing Calpine power generation plant are currently discharged to the Nassau County Department of Public Works (NCDPW) sanitary sewer system under authorization of Special Sewer Connection Permit issued by the NCDPW on December 16, 1988 (Permit No. S-131289) and Industrial Permit No. 72 issued by the NCDPW on February 6, 2002. The existing wastewater discharge includes sanitary wastes, cooling tower blowdown, boiler blowdown, demineralization effluent, and turbine washwater. On average, the existing plant discharges approximately 172,000 gpd of combined sanitary and process wastewater to the NCDPW sewer. The current permit includes specific discharge limitations for pH, oil and grease, various metals, phenols, and total organics in process wastewater discharges.

The wastewater discharges from the existing plant are conveyed to the Cedar Creek Water Pollution Control Plant (Cedar Creek WPCP). The Cedar Creek WPCP has a design capacity of 70 mgd and provides primary (physical) and secondary (biological) treatment for a service population of approximately 550,000 people and various commercial and industrial users. The Cedar Creek WPCP is not under any federal or state compliance actions that would prohibit acceptance of increased flows and is currently operating at approximately 60 percent of its design capacity of 70 mgd.

In addition to local requirements, the existing cogeneration plant is subject to the Categorical Pretreatment Standards for Steam Electric Power Plants promulgated by the EPA at 40 CFR Part 423.17. According to these regulations, the existing plant is subject to the pretreatment standards for cooling tower blowdown and gas turbine washes, as well as monitoring, recordkeeping, and reporting requirements. The federal pretreatment standards are summarized in Table 10-2.

Table 10-2
EPA Categorical Pretreatment Standards for Steam Electric Power Plants

Waste Type	Pretreatment Standards		
	Pollutant	Maximum	Average
All Wastes	pH	6.0-9.0	6.0-9.0
	PCBs	None	None
Metal Cleaning Waste	Copper, Total	1.0	1.0
Cooling Tower Blowdown	Chromium, Total	0.2	0.2
	Zinc, Total	1.0	1.90
	126 Priority Pollutants	NDA[1]	NDA

Notes: [1] Denotes "no detectable amount."
Sources: 40 CFR Part 423.17

EXPECTED WASTEWATER DISCHARGES FROM THE PROPOSED PROJECT

The proposed project would generate sanitary and process wastewater. Process wastewater streams include demineralizer regeneration wastewater; cooling tower blowdown; boiler drains and sample drains; compressor wash waters; miscellaneous service water uses (equipment wash downs, floor drains); waters from periodic testing of the emergency fire water system; and storm

water from secondary containment basins. The proposed project would have an average wastewater discharge of approximately 28,800 gpd and a maximum discharge of approximately 64,800 gpd. Of the total maximum discharge, approximately 61,800 gpd would be due to blowdown from the two cooling towers. Because only one or two additional employees would be required to be hired, the quantity of sanitary wastewater generated at the proposed project is expected to minimally increase above existing levels.

Cation/anion exchange resins in the demineralized water makeup system for the proposed project would require periodic regeneration. Regeneration is performed by intermittently dosing the resin beds with sulfuric acid or sodium hydroxide. The acid or caustic dosing restores the exchange capacity of the "exhausted" resin beds. Following regeneration, regenerant wastewater and rinse water from the ion exchange vessels would be routed to a neutralization tank for pH adjustment prior to discharge to the NCDPW sewer. The neutralization tank would be equipped with acid and caustic feed systems to ensure that the pH of the discharge remains within allowable local limits.

Cooling tower blowdown, required to prevent the excessive buildup of dissolved solids in the tower, also would be discharged to the NCDPW sewer. Table 10-3 provides estimated discharge concentrations for constituents expected in cooling tower blowdown. The temperature of the discharge is estimated to range between 60°F and 90°F. The proposed cooling tower maintenance chemicals, required to limit scale, corrosion, and biofouling, are listed in Table 10-4.

Table 10-3
Projected Wastewater Discharge Characteristics for Cooling Tower Blowdown

Constituent	Projected Concentration (milligrams per liter)
Oil and Grease	< 15
Total Suspended Solids	10 to 30
Total Dissolved Solids[1]	1300
Biochemical Oxygen Demand	5 to 30
Calcium	150
Chloride	250
Iron	1.2
Lead	0.01
Magnesium	35
Manganese	0.25
Nitrate	40
Phosphate, total	3.5
Sodium	103
Total Residual Chlorine	0.2
Ammonia, total	0.5 to 2.0
Temperature	60 °F to 90 °F
PH	6.0 to 9.0

Notes: [1] Total dissolved solids result primarily from concentration (i.e., cycle up) of the naturally occurring dissolved salts and minerals present in the raw water makeup supply.

Table 10-4
Cooling Tower Maintenance Chemicals

Product	Purpose
Sodium Hypochlorite	Prevent biofouling of heat exchanger surfaces.
Scale Inhibitor (TBD)	Prevent scale formation
Sulfuric Acid	pH adjustment, maintain pH of the discharge within required local limits.

Steam turbine drains and water analysis panel drains would be routed directly to the cooling tower. The blowdown stream would consist essentially of demineralized water containing low concentrations of boiler water chemical conditioners. Given the low dissolved solids contained in this waste stream, it is suitable for reuse in the cooling tower without additional treatment. Trench type floor drains would be used to collect and convey equipment and floor wash water to an oil water separator, which would recycle this waste stream to the cooling tower. Floor and equipment wash water would be obtained from NGC. Following processing through the oil/water separator, this waste stream is likely to contain low levels of oil and/or grease (i.e., less than 15 milligrams per liter [mg/l]), low levels of detergents or surfactants used for various cleaning/maintenance activities and low levels of suspended solids. The suspended solids concentration of the discharge is expected to range from 10 to 30 mg/l.

The remaining constituents in the wastewater are anticipated to be at concentrations approximately equivalent to the quality of the raw water makeup supply from the NGC water supply system. This applies to the following constituents or constituent groups: heavy metals, calcium, magnesium, iron, manganese, sodium, chloride, sulfate, and phosphate. The sludge/oil collected in the oil water separator would be managed off site at an appropriately licensed facility.

The compressors serving the combustion turbine require periodic cleaning to maintain operating efficiency and prevent excessive wear and tear on internal components. Compressor cleaning can be performed when the combustion turbines are on-line or off-line. Off-line washes are generally performed on a weekly or bi-weekly basis. An off-line compressor wash consists of injecting a demineralized water/detergent mixture into the compressor when the combustion turbine is off-line to remove accumulated dust, dirt or other contaminants that cannot be removed during an on-line wash. In general, for an LM6000 unit, the cleaning solution would consist of 25 percent detergent and 75 percent demineralized water. The resultant wastewater would be collected and discharged to the NCDPW sewer.

PROBABLE IMPACT OF THE PROPOSED PROJECT FROM WASTEWATER DISCHARGES

An application would be made to the NCDPW for modification of the plant's existing sewer connection permit and industrial discharge permit to allow for the wastewater discharges associated with the proposed project. The NCDPW would review the application information relative to the expected quantity, discharge rate, and quality of the proposed wastewater discharge. The NCDPW's review of the project wastewater discharge would also confirm compliance with its industrial pretreatment program limit. The quality of the process wastewater flow from the proposed project would be similar to the existing Calpine power generation

plant's discharge and would meet the NCDPW's sewer discharge limitations and EPA's Categorical Pretreatment Standards for New Sources. Accordingly, the quantity and quality of the wastewater flow would not have a significant adverse impact on Cedar Creek WPCP's ability to properly treat sewage and discharge its effluent.

D. ENERGY

Natural gas demands for the proposed project are considered to be insignificant in light of available supplies and the capacity of the existing gas transmission system. Demands for the proposed project would not impact regional energy systems nor would they significantly affect or preclude service to other users. Increasing the amount of electricity into the grid would also not affect electricity transmission, nor would it preclude connections from other suppliers with the proposed generating projects in the area. Moreover, the proposed project would serve a vital public need by providing additional electric power to Long Island and would assist in improving system reliability.

E. SOLID WASTE

The proposed project would generate small quantities of hazardous and non-hazardous wastes during operation and maintenance of the project. The process of electrical generation does not produce appreciable amounts of hazardous and non-hazardous wastes when natural gas is utilized as the primary fuel source.

The proposed project would be classified as a Conditionally Exempt Small Quantity Generator (CESQG) of hazardous waste under the Resource Conservation and Recovery Act (RCRA). A facility is classified as a CESQG if it generates 100 kilograms (kg) or less of hazardous waste in a given month and a Small Quantity Generator if it generates greater than 100 kg, but less than 1,000 kg, in a given month. The hazardous waste generated would primarily be related to maintenance of the proposed equipment, including such items as spent aerosol cans, waste cleaning solvents, and/or waste paint.

Small waste streams of off-specification used/waste oil and wastewater would also be generated during maintenance activities at the project. These wastes would be recycled off site at licensed receiving facilities in accordance with the solid waste regulations of the State of New York.

Spent catalysts from the air pollution control systems would generate a waste stream approximately every six to eight years depending upon operational use and the evolution of the catalyst technology. The supplying vendor would recycle these spent catalysts during these maintenance periods or would remove them for disposal at a licensed waste management facility.

Solid waste would be generated at the proposed project. The solid waste is related mainly to miscellaneous worker trash, including paper, cardboard, aluminum, and glass. A recycling program would be implemented for these non-hazardous waste streams consistent with local solid waste vendor programs. It is estimated the project would generate less than 10 cubic yards of general trash per month. Solid waste containers would be sized appropriately to minimize the need for waste transportation related trips to the site and would include recycling options.

These quantities and types of solid waste and hazardous wastes from the proposed project would not have a significant adverse impact on the solid and hazardous waste handling systems. In

addition, these properly handled wastes would not pose a public safety threat or significant adverse impact on public safety.

F. TRANSMISSION LINES

Neither the natural gas transmission line nor the electric transmission line would have any infrastructure demands, and they would not cause adverse impacts on the infrastructure systems.✷

A. INTRODUCTION

This chapter describes the degree and extent of groundwater and soil contamination on and in the vicinity of the proposed site.

B. OFFSITE CONTAMINATION

The existing Calpine power generation site and the proposed site are part of a larger assemblage of parcels that historically encompassed the Grumman Bethpage Complex, which was used by Northrop Grumman and its predecessor companies to develop and manufacture aviation and related products. The existing Calpine power generation site and the proposed site are situated within the far south/southwest portion of the complex, in an area historically used for facility parking.

The Grumman Bethpage Complex was first listed by the New York State Department of Environmental Conservation (NYSDEC) on the New York State (NYS) Registry of Inactive Hazardous Waste Disposal Sites in 1983 as a Class 2a site. Class 2a is a temporary classification assigned to sites for which additional data are necessary for final classification. A Class 2 designation was subsequently assigned to the Complex by NYSDEC in 1988. Class 2 sites are sites that pose a significant threat to the public health or the environment, requiring remedial action. In 1992, the Complex was separated into two sites, the Naval Weapons Industrial Reserve Plant (NWIRP) Site and the Grumman Aerospace Bethpage Facility Site. The existing Calpine power generation site and the proposed site are within the latter. The Grumman Aerospace Corporation (a predecessor company to Northrop Grumman Corporation [NGC]) subsequently entered into a consent order with NYSDEC to conduct an onsite and offsite Remedial Investigation/Feasibility Study (RI/FS) of the Grumman Aerospace Bethpage Facility Site. The RI was completed during 1992–1994.

The RI report states that the depth to groundwater in the proposed project site vicinity is approximately 45 to 50 feet below grade. The report also indicates that the horizontal flow of groundwater in the shallowest zone of the Upper Glacial (or water table) aquifer is generally to the south and southeast, but is greatly affected by localized groundwater pumping from Grumman production wells and recharge, mainly from Grumman recharge basins. Localized groundwater monitoring was done near Navy Plant 5, situated just north of the proposed project site, and at the Ruco Polymer Corporation site, located approximately three-quarters of a mile north of the proposed project site. The Ruco Polymer site is listed on the NYS Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 site and is also listed on the United States Environmental Protection Agency's (EPA) National Priorities List (NPL) of uncontrolled or abandoned hazardous waste sites under the federal Superfund Program.

Groundwater sampling conducted as part of the RI/FS identified two plumes of groundwater contamination (eastern plume and western plume) near the center of the Grumman Bethpage

Complex. The eastern plume includes trichloroethene (TCE); tetrachloroethene or perchlorethylene (PCE); 1,1,1-trichloroethance (1,1,1-TCA); 1.2-dichloroethene (1,2-DCE); 1,1-dichloroethene (1,1-DCE); and 1,1-dichloroethane (1,1-DCA). The eastern plume is located northeast and southeast of the proposed site. Due to the location of this plume and the reported direction of shallow groundwater flow, the plume is not likely to impact either the existing Calpine power generating site or the proposed site (Dvirka and Bartilucci 1998). The western plume consists primarily of TCE and is located to the north, northeast, east, and south of the existing Calpine power generating facility and the proposed site. Due to the location of this plume and the reported direction of shallow groundwater flow, the western plume may extend beneath the existing site (Dvirka and Bartilucci 1998).

The RI/FS report also identified an area of groundwater contamination near the border of the Ruco Polymer site, consisting of TCE, PCE, 1,1,1-TCA, 1,1-DCE and vinyl chloride. No discrete plumes were identified as being associated with these detections. The RI/FS report further noted that contaminants have been detected in groundwater south and southeast of the proposed site (hydraulically downgradient). Groundwater contamination in these areas is not likely to impact the proposed site (Dvirka and Bartilucci 1998).

The RI/FS report identified a TCE storage tank at Plant 2, located to the east of the proposed site, as a source of groundwater contamination. A soil vapor extraction (SVE) system has been installed at the source area and is designed to remove TCE in unsaturated soils in that location, to prevent further groundwater contamination. Plant 2 is located hydraulically downgradient of the proposed site and, therefore, groundwater contamination from the TCE storage tank is not likely to impact the proposed site.

In addition, the RI/FS report identified Plant 15 (located to the north of the proposed site) as a possible source of PCE contamination, based on the results of soil gas monitoring. The impacted site was remediated by SVE technology in 1996. Remediation of this impacted area was accepted as complete by NYSDEC in 1996. Accordingly, it is not likely that this previous contamination will impact the proposed site (Dvirka and Bartilucci 1998).

The RI/FS report also contained a summary of the results of the RI/FS conducted on the NWIRP site during 1992–1993. The NWIRP site is located to the north and northeast of the proposed site and may be hydraulically upgradient from the proposed site for at least a portion of the year (Dvirka and Bartilucci 1998). The RI/FS for the NWIRP site indicated soil and groundwater contamination in several locations. Soil contamination included PCE, TCE, polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), and various pesticide and inorganic constituents. Groundwater contamination included TCE, PCE, 1,1,1-TCA, 1,1-DCA, 1,2-DCE, and toluene. The RI/FS report for the NWIRP site indicated that the specific sources of contamination were not fully delineated on the NWIRP site; however, the groundwater flow and quality data compiled from previous investigations indicate that the contamination likely originated from one or more sources on the NWIRP and Ruco Polymer sites and from at least one source on the Grumman Aerospace Bethpage Facility site.

In addition to the remedial investigations summarized above, beginning in 1985 the United States Geological Survey (USGS) conducted an investigation of groundwater quality over a wide area that included the proposed site. The USGS's study area extended across the Bethpage-Hicksville-Levittown area and included, in part, the Grumman Aerospace Bethpage Facility Site, the NWIRP site, and the Ruco Polymer site. The USGS identified the presence of a plume of groundwater contamination primarily consisting of several volatile organic compounds including TCE, PCE, 1,1,1-TCA, 1,2-DCE, 1,1-DCA, and vinyl chloride. The plume was described as

being beneath and extending southward from the Ruco Polymer site, the NWIRP site, and the Grumman Aerospace Bethpage Facility Site. The USGS estimated the plume to be approximately 5,700 feet wide, 12,000 feet long, and greater than 500 feet thick (as of 1987). Information provided in USGS's project report indicated that the portion of the plume present beneath the proposed site contained 1,1,1-TCA, 1,2-DCE, and vinyl chloride.

In 1993, a delisting petition to modify the boundaries of the Grumman Aerospace Bethpage Facility Site, as it was identified on the NYS Registry of Inactive Hazardous Waste Disposal Sites, was submitted to NYSDEC. Specifically, the delisting petition was for deletion of Navy Plant 5 from the Registry. As part of this delisting petition, groundwater sampling was conducted on groundwater wells installed in the vicinity of Plant 5. Although the groundwater sampling program results included detections of TCE and tetrachloroethene, the petition described these results as characteristic of localized ambient groundwater conditions (i.e., the various sources summarized above) and not from Navy Plant 5 itself. The delisting petition was approved by NYSDEC in 1995, removing Navy Plant 5 (and the 2.3-acre existing site) from the NYS Registry of Inactive Hazardous Waste Disposal Sites.

Investigation and remedial response measures for the Grumman Bethpage Complex, the NWIRP site, and the Ruco Polymer site are ongoing, based on the presence of these three sites on the NYS Registry of Inactive Hazardous Waste Disposal Sites, under NYSDEC and EPA oversight (the later jurisdiction for the Ruco Polymer site based on its listing on the federal NPL).

In summary, previous investigations in the site vicinity indicate that the proposed site is located hydraulically downgradient from known sources of groundwater contamination. Previous investigations have documented groundwater contamination in the vicinity of and beneath the existing site. These investigations indicate that groundwater at the proposed site occurs at a depth of approximately 45 to 50 feet below grade. The previous investigations do not provide information that would indicate soil contamination beneath the proposed site.

C. ONSITE CONTAMINATION

A Phase I Environmental Site Assessment (ESA) of the proposed site was conducted for NGC in 2002 (Dvirka and Bartilucci 2002). Updated ESAs of the existing Calpine power generation site were performed by Earth Tech for Calpine Corporation in June 2002 and December 2002. The Phase I Site Assessments were conducted in accordance with the American Society for Testing and Materials (ASTM) Standard E1527-97 entitled "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Procedures." The purpose of the Phase I ESA is to identify recognized environmental conditions at a site, including the presence or likely presence of any hazardous substances or petroleum products on the site that may indicate an existing release, a past release, or material threat of a release of such substances to the environment. As part of this analysis, recommendations for additional site investigative work (i.e., Phase II investigations) are provided, as warranted.

Each of the Phase I ESAs included a comprehensive site inspection, an evaluation of record sources, and interviews with site and agency personnel. The 2002 Phase I ESA recommended that no additional investigation would be necessary. The Phase I ESAs also noted the documented groundwater contamination occurring in the vicinity, including areas hydraulically upgradient. These previous investigations indicate groundwater contamination beneath both the existing Calpine power generation site and the proposed site due to offsite sources. In reliance on the continuing investigations and remedial measures in place for these offsite sources, under

oversight of NYSDEC and EPA, the Phase I ESAs indicated that onsite subsurface investigation and/or groundwater monitoring by Calpine was not warranted.

The Phase I ESAs also noted that the existing Calpine power generation facility accumulates polychlorinated biphenyl (PCB)-contaminated oil in a 300-gallon aboveground storage tank equipped with secondary containment. The PCB contaminated oil is entrained in the natural gas fuel for the existing turbines. Condensation of the natural gas stream generates approximately 400 to 500 gallons per year of PCB-contaminated oil. The oil is temporarily accumulated within the 300-gallon tank and the oil is subsequently transferred to 55-gallon drums for permitted offsite disposal. The PCB-contaminated oil is regulated under the federal Toxic Substance Control Act (TSCA) and its implementing regulations (40 CFR Part 761), under jurisdiction of EPA. In accordance with the requirements of TSCA, the existing power generation facility maintains a Notification of PCB Activity on file with the EPA. The PCB-contaminated oil is also regulated as a hazardous waste under the federal Resource Conservation and Recovery Act (RCRA) and its implementing regulations (40 CFR Parts 260-265), under jurisdiction of EPA. In accordance with the requirements of RCRA, the existing power generation facility has filed a Notification of Regulated Waste Activity with the EPA and has obtained an EPA Hazardous Waste Identification Number. Under these two federal regulatory programs, the existing power generation facility is classified solely as a generator of TSCA-regulated material and RCRA hazardous waste. Due to the short time frames that the oil is retained onsite prior to offsite transport; the existing power generation facility is not a TSCA or RCRA-regulated storage facility.

Identical with the existing power generation facility, PCB-contaminated oil would be generated by the proposed facility, due to condensation of the natural gas stream. With or without the proposed project, CPN Bethpage will continue to manage the PCB-contaminated oil in accordance with all requirements of TSCA and RCRA.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

Construction of the proposed facility would involve shallow excavation only into the upper surficial site soils, for installation of foundation slabs and footings and subsurface drainage features. Previous investigations in the site vicinity indicate that the groundwater occurring beneath the proposed site is contaminated. However, since the groundwater occurs approximately 45 to 50 feet below grade and site construction would be limited to shallow excavations, exposure to the contaminated groundwater would not occur as a result of construction or operation of the proposed facility. Water supply for the proposed facility would come from offsite sources.

Previous investigations in the site vicinity do not indicate the potential for contamination of onsite soils, particularly for the shallow surficial zone within which facility construction would occur. The Phase I ESAs do not identify the potential for contamination of the surficial site soils. Accordingly, contaminated soils would not likely be encountered during construction of the proposed facility.

PCB-contaminated oil would continue to be generated as part of the operation of the proposed facility, due to condensation of the natural gas stream. With or without the proposed project, Calpine would continue to manage this oil in accordance with requirements under TSCA and RCRA. The additional generation and handling of this oil during operation of the proposed facility is not expected to have an adverse environmental impact.

As discussed in Chapter 14, the existing Calpine power generation facility has implemented an Operational Health and Safety Plan to protect workers and the public's health and safety. This plan would be modified to include operations of the proposed facility. In addition, as discussed in Chapter 15, a Construction Health and Safety Plan would be developed and implemented for the construction period. These measures would prevent any adverse impacts from the proposed project.

TRANSMISSION LINES

The two transmission lines would be installed in areas that have been found not to have been contaminated by previous use. An Operational Health and Safety Plan would be developed and implemented to protect the workers and the public. No significant adverse impacts are expected from the proposed transmission lines. ✷

A. INTRODUCTION

This section describes the existing geological setting within the project area, including the local geology (topography, bedrock, and surface geology), site soils, and regional seismology. It also describes the onsite investigations that would be conducted to determine geotechnical conditions of the site.

B. EXISTING CONDITIONS

LOCAL GEOLOGY

The proposed project site is situated in the west/central portion of the Town of Oyster Bay, within the far southern extent of the central morainal terrain, at an elevation of approximately 110 feet above mean sea level. Slopes in the proposed site vicinity are considered to be moderate.

The Town of Oyster Bay is situated within the western portion of Nassau County. Nassau County, as well as all of Long Island, is part of the Atlantic Coastal Plain Physiographic Province. Nassau County, including the Town of Oyster Bay, is composed of three general topographical areas: 1) undulating terrain with hills and bluffs along its northern coast; 2) a rough moraine strip characterized by rolling topography across the central areas; and 3) and a flat plain sloping gently southward on the south.

Elevations in the county range from sea level along the coasts to approximately 340 feet above mean sea level near the eastern edge of the county in Mannetto Hills. The rolling topography along the central portion of Nassau County was deposited by glaciers as a terminal moraine. These areas are characterized by irregular topography bisected by deep glacial drainage channels near the north shore that empty into the numerous bays occurring along the shoreline.

Bedrock beneath Nassau County is found at relatively deep depths and consists largely of cretaceous sedimentary layers. The bedrock floor dips in a general southeastern direction, from surface outcrops occurring in the Bronx and Queens to the west, to depths approaching 1,000 feet in the eastern portions of Long Island. In the site vicinity bedrock occurs at a depth of several hundred feet.

The surficial deposits of Long Island are composed of glacial deposits accumulated during the last glacial event in the northeastern United States, ending approximately 10,000 years ago, during the Pleistocene Epoch. At the proposed project site, the surficial deposits consist of outwash sand and gravels characterized by coarse to fine gravel with sand, occurring at a thickness of between 2 and 20 meters (USGS 1989).

SOILS

Soils occurring at and adjacent to the proposed project site are mapped by the Nassau County Soil Survey (USDA 1987) as "Urban Land (Ug) Complex." Urban Land in the county is considered to be areas where at least 85 percent of the surface is covered with asphalt, concrete, or other impervious building material, with most of the remaining areas being well drained Riverhead, Hempstead or Enfield soils, or excessively drained Udipsaments (nearly level). Udipsaments (nearly level) are defined as man-made fill or borrow areas, most of which are grassed with 0 to 3 percent slopes, which consist of very deep soils that are excessively drained to well-drained. Constructed surface features dominate this soil complex, no hazards for soil erosion or building limitations are noted by the Nassau County Soil Survey.

SEISMIC CONDITIONS

Due to the relatively deep depth of bedrock in the proposed site vicinity, information regarding the seismic characteristics of the bedrock is limited. Long Island is located in the middle of a tectonic plate where earthquakes occur infrequently, in contrast to interior plate boundaries where earthquakes are more common. However, moderate energy earthquakes are possible in mid-plate regions such as where the proposed site is located.

Using the United States Geologic Survey (USGS)'s Earthquake Database (USGS 2003), a 10-mile (16 km) radial search of all recorded earthquakes was performed for the proposed site. This search revealed that there were four relatively minor earthquakes recorded within 10 miles of the proposed project. Table 12-1 summarizes the search results.

Table 12-1
10-Mile Radial Earthquake Search

Year	Magnitude (mb)[1]	Distance from Site (km)
1990	4.2	12
1990	5.0	12
1996	4.0	11
2000	3.9	9

Notes: [1] The term "mb" denotes bodywave magnitude.

The USGS's National Seismic Hazard Mapping Project (USGS 1991) has estimated that there is a 2 percent probability every 50 years of an earthquake exceeding a peak ground acceleration of 0.17 g and a 0.2-second spectral acceleration of 0.32 g (where g equals force relative to gravity) for the project area. Peak acceleration is a measure of the maximum force experienced by a small mass located at the surface of the earth during an earthquake. The proposed site is located within Zone C of the New York State Building Code, with a peak ground acceleration estimated at 0.15 g (Building Seismic Safety Council 1994); therefore, the structures used to support the proposed project would be designed in full accordance with the New York State Seismic Building Code.

GEOTECHNICAL INVESTIGATION

A geotechnical investigation would be conducted as part of the final engineering design of the proposed project to gather geotechnical engineering information for design of the foundations for project structures and equipment. The geotechnical investigation would include shallow test

borings, soil sampling, and laboratory testing to determine index properties and physical properties of the foundation soils and development of foundation recommendations. Based on the successful construction of the existing Calpine power generation plant and other structures in the immediate site vicinity, it is expected that the existing soils would provide an acceptable subbase for the proposed project construction. It is expected that the foundations for the proposed project would consist of spread footings or similar types of shallow foundations.

C. PROBABLE IMPACTS OF THE PROPOSED PROJECT

The existing site is essentially level and bedrock lies several hundred feet below grade. Neither rock blasting nor foundation pilings to bedrock would be necessary (nor feasible) for the proposed project construction, regardless of the site arrangement. Therefore, no bedrock impacts are anticipated from construction of the proposed project.

Based on existing site construction, it is expected that the underlying site soils (both native soils and engineered fill) would be suitable to support the proposed project structures, regardless of the site arrangement. This would be confirmed by the pending geotechnical investigation and final engineering design. The seismic design for the proposed project would be based on the requirements of the New York State Building Code. Adherence to these requirements would minimize potential risks associated with seismic events.

Excavation and grading would be required to promote good site drainage and control runoff and to install subsurface features, such as foundation slabs and footings and drainage structures. Excavation spoils are expected to be minimal in quantity and would be removed from the site for appropriate reuse or authorized disposal. Temporary soil erosion and sediment controls and associated best management practices would be used during construction to preclude offsite conveyance of silt or excess sedimentation in the detention basins.

TRANSMISSION LINES

The natural gas transmission line would involve burying a pipeline in disturbed soils, and the electric transmission line would have wooden poles buried in the earth. The design would meet the Building Code for seismic design, and the backfill in Route 107 would be compacted to prevent settling of the roadway. Neither the natural gas transmission line nor the electric transmission line would have a significant adverse impact on soils. ✷

A. INTRODUCTION

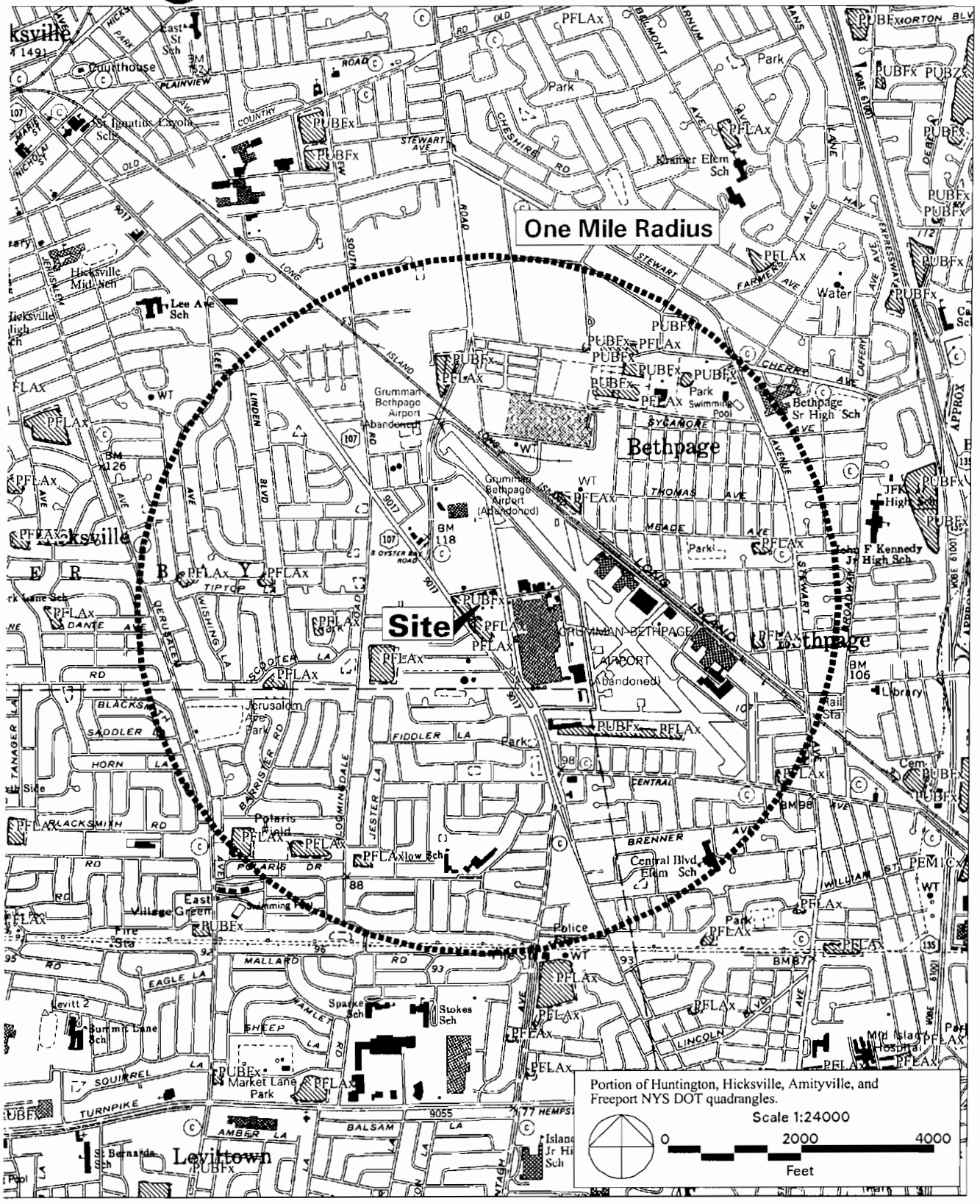
This section examines the potential impacts of the proposed project on natural resources in the vicinity of and on the proposed site.

B. EXISTING CONDITIONS

There are no natural surface water bodies, streams, or wetlands on the proposed project site. Two aeration basins and a parking lot were previously located on the proposed site; however, these basins have since been decommissioned. One aeration basin was filled during construction of the simple cycle turbine in 2002, and both basins have been disconnected from the Northrop Grumman Corporation (NGC) stormwater management system. Ultimately, the entire proposed site would be used by the proposed project. Based on the existing conditions, development of the proposed project would not impact surface water resources. Since the decommissioning of the aeration basin, sparse invasive vegetation has become re-established in portions of the one abandoned aeration basin and on portions of the temporary soil stockpile. Minimal vegetation is found on the parking lot. These existing conditions indicate that the site does not provide wildlife habitat; minimal wildlife has been observed onsite. The site does not host significant natural resources.

Correspondence received from the United States Fish and Wildlife Service (USFWS) indicates that, except for occasional transient individuals, no federally listed or proposed endangered or threatened species or their critical habitat are known to exist in the site area. A copy of this correspondence is provided in Appendix C. Correspondence has also been received from the New York State Natural Heritage Program relative to the known occurrence of rare or state-listed animals and plants, significant natural communities, or other significant habitat in the site area. The Natural Heritage Program indicates that one state-listed endangered plant species, the Few-Flowered Nutrush (*Scleria pauciflora var caroliniana*), is known to occur in the Towns of Hempstead and Oyster Bay. The detailed location and general habitat and quality for this plant, as reported by the Natural Heritage Program, indicates that this plant does not occur at or near the site. A copy of the Natural Heritage Program's correspondence is provided in Appendix C.

Figure 13-1 shows federal-jurisdiction wetlands within one mile of the site, as mapped by the USFWS under the National Wetlands Inventory (NWI) program. As shown by this figure, the two recharge basins situated immediately west/southwest of the site are designated as wetlands on the NWI map. These recharge basins receive stormwater runoff from the proposed site and adjacent NGC properties (see Chapter 14, "Water Resources and Chemical Handling"). A State Pollutant Discharge Elimination System (SPDES) permit, issued by NYSDEC, regulates the discharge of stormwater to these basins. Wetlands shown on NWI maps are frequently designated by remote analysis, such as by examination of aerial photographs. In their project correspondence (see Appendix C), the USFWS notes that the NWI maps should not be used in lieu of field surveys for determining the presence of wetlands or delineation of wetlands



PUBFx NWI Wetland

Note: No DEC wetlands present within mapping area.

Figure 13-1
NWI Wetlands

boundaries for federal regulatory purposes. Because the proposed project would minimally affect the existing flows into the basins, a site-specific survey was not conducted. The slight increase in runoff caused by the increased impermeable surface area would be minimal compared to the current total flow into the basins.

C. PROBABLE IMPACTS OF THE PROPOSED PROJECT

No protected or sensitive animals, plants and natural communities, and/or significant wildlife habitat are present on the site. Accordingly, the proposed project would have no impact on these natural resources.

Stormwater runoff from the proposed project would continue to be collected and conveyed to the two recharge basins, under NGC's existing SPDES Permit (see Chapter 14, "Water Resources and Chemical Handling"). Good housekeeping practices, the erosion control program, best management practices, and engineering controls would be used to ensure that stormwater runoff from the proposed project does not impact the quality of the site runoff. Accordingly, stormwater runoff discharged from the proposed project would not have a significant impact on natural resources.

TRANSMISSION LINES

Route 107, where the natural gas pipeline would be placed, does not support any natural resources. The route of the electric transmission line is across developed industrial land and along a heavily used transportation corridor. Minimal natural resources exist in either location. Neither the natural gas transmission line nor the electric transmission line would have a significant adverse impact on natural resources. ✷

Chapter 14: Water Resources and Chemical Handling

A. INTRODUCTION

This section examines the potential impacts of the proposed project on surface water resources in the vicinity of the proposed site. It also examines the effectiveness of the proposed stormwater management and chemical systems in protecting these resources.

B. SURFACE WATER RESOURCES

There are no natural surface water bodies or streams on the project site. Two aeration basins were previously located on the larger portion of the site; however, these basins have since been decommissioned. One basin was filled during construction of the simple cycle turbine in 2002, and both basins have been disconnected from the Northrop Grumman Corporation (NGC) stormwater management system. The second basin remains abandoned on the site. A parking area is located on the smaller parcel. Ultimately, the entire proposed site would be restored through the construction of the proposed project. Based on these existing site conditions, therefore, development of the proposed project would not impact surface water resources.

C. STORM WATER MANAGEMENT

STORM WATER DISCHARGES

The vast majority of the existing Calpine power generation site is occupied by built structures or is paved. All stormwater runoff from this site, including roof drainage, is collected by a series of interconnected catch basins and storm drains for gravity discharge to the larger NGC stormwater management system, which in turn conveys stormwater to two recharge basins located immediately west/southwest of the site. The recharge basins also receive stormwater runoff from an offsite area encompassing NGC Plant 25, Plant 5 and adjacent areas, in accordance with NGC's State Pollutant Discharge Elimination System (SPDES) Permit No. NY0096792, issued by NYSDEC. Stormwater runoff from non-process areas of the proposed project would also be collected and discharged on an ongoing basis through existing Outfall 006 in accordance with NGC's existing SPDES permit, which would not need to be modified to accommodate the proposed project. Stormwater from all process and containment areas would be hauled offsite by a licensed contractor for treatment at an authorized facility. Runoff during construction is addressed in Chapter 15.

MATERIALS MANAGEMENT

The proposed project would utilize the existing ammonia, acid, and caustic bulk storage tanks and associated support systems presently provided for the existing Calpine power generation plant. These existing material supply systems would be modified to provide material and chemical feed to the proposed project. All new tanks, piping, fittings, and connections for the

modified material feed systems would be fabricated, constructed, and installed in a manner that would prevent the escape of toxic materials to the ground, groundwater, or surface waters of Nassau County. The tanks, piping, fittings, and connections would be designed consistent with Article XI (Toxic and Hazardous Materials Storage, Handling and Control) of the Nassau County Public Health Ordinance. In part, tanks, piping, fittings and connections would be:

- protected against corrosion by the use of noncorrodible materials;
- designed, constructed, and installed with access points to permit periodic pressure testing of all underground piping without the need of extensive excavation;
- constructed and installed with a simple, effective, reliable means of monitoring the installation for leakage, including a warning device to indicate the presence of a leak, spill, or other failure or breach of integrity for piping installed underground or in areas where piping is not clearly visible; and
- constructed in durable product-tight galleries.

The tanks, piping, fittings and connections for hazardous substances would also be designed to comply with the requirements for secondary containment, corrosion protection, leak detection, and installation under 6 NYCRR Part 599, Standards for New or Modified Hazardous Substance Storage Facilities.

Calpine presently maintains a Toxic or Hazardous Materials Storage Facility Permit No. 001217 for the existing Calpine power generation plant, as issued by the Nassau County Department of Health (NCDOH) under jurisdiction of Article XI of the Nassau County Public Health Ordinance. Calpine would apply to the NCDOH for an amendment to Permit No. 001217 to incorporate the proposed project.

New transformers would be provided with secondary containment with adequate volume to accommodate transformer fluid, as well as stormwater retention. Stormwater within the containment dike would be removed for offsite disposal at an appropriately licensed facility.

The proposed project operations would include handling and storage of limited amounts of lubricating oils, used oils, and certain other industrial chemicals in drums and containers. Handling and storage of these materials would be provided in accordance with Section 16 (Container Storage) and related sections of Article XI of the Nassau County Public Health Ordinance. These requirements include, in part, container storage in an impervious surface and within an enclosed berm or dike of impermeable construction. Incompatible materials (e.g., acid and caustic) would be stored in separate containment areas. Any solids or liquids found within the container containment areas would be collected for offsite disposal at an appropriately licensed facility. Containers would not be stacked more than two high without using a properly designed storage rack for that purpose. In addition, portable containers would not be stacked without adequate equipment.

Employees responsible for the handling, storage, and management of oil or chemicals would be familiar with proper drum handling methods and procedures in order to prevent spills or leaks from oil/chemical storage drums when in use outside of enclosed containment areas. All employees handling chemicals would receive training in the management of toxic and/or hazardous materials according to hazard communication (HAZCOM) standards pursuant to the respective manufacturer's recommendations and the Occupational Safety and Health Act (OSHA).

Empty containers or drums, which previously contained toxic or hazardous materials that are empty and no longer in use, would be labeled as such, and not reused unless they are properly relabeled with their contents. Unless containers are labeled empty, they would be treated as active containers. Empty containers would be stored in a way that prevents precipitation from entering the containers. Any water or material observed in an empty container would be presumed to be contaminated with the previous contents of the container.

Calpine currently maintains a Spill Prevention, Control and Countermeasure (SPCC) Plan for the existing Calpine power generation plant. The SPCC Plan identifies all relevant spill prevention, control, and countermeasures necessary at the plant, to minimize the potential for accidental material spills or releases, and to respond to spills that might occur. Calpine would amend its existing SPCC Plan to incorporate requirements for the proposed project. Likewise, Calpine currently maintains a Best Management Practices (BMP) Plan for the existing Calpine power generation plant, for the purpose of preventing or minimizing the potential for a significant release of toxic or hazardous pollutants to surface waters. Calpine would amend its existing BMP Plan to incorporate the proposed project.

D. PROABLE IMPACTS OF THE PROPOSED PROJECT

The material management provisions, together with ongoing collection and discharge of stormwater runoff from the proposed project to the two existing groundwater recharge basins under jurisdiction of NGC's existing SPDES permit, would ensure that the stormwater discharges from the project site would not result in significant adverse impacts to water resources in the area. Revision of the existing Toxic or Hazardous Materials Storage Facility Permit, SPCC Plan and BMP Plan as well as abiding by all relevant chemical use and storage rules and regulations would prevent significant adverse impacts from the handling and storage of potentially hazardous chemicals.

TRANSMISSION LINES

The natural gas pipeline and the electric transmission line do not cross or affect any water bodies. Neither the natural gas transmission line nor the electric transmission line would have an adverse impact on water resources. Minimal chemical uses are associated with the transmission lines, and their use is regulated, both by law and by standard operating practices, which would be adhered to. No adverse impacts from chemical uses associated with the transmission lines are expected. ✷

A. INTRODUCTION

Construction activities for the proposed project would take approximately a total of 12 months for all construction, assembly, utility connection, and testing and startup activities. The installation of the natural gas and electric transmission lines would take place during the construction of the electric generating facility.

Construction activities and their potential environmental impacts are summarized in the following sections.

B. CONSTRUCTION DESCRIPTION

PRECONSTRUCTION SITE PREPARATION

Construction laydown areas would be established at adjacent and nearby parcels, similar to the recently constructed simple-cycle combustion turbine. Trailers or similar portable structures would be provided onsite and at the construction laydown area for temporary offices and for employee comfort facilities.

Limited excavation and site grading would occur during the initial stages of construction. This would be followed by the installation of the equipment foundations for the new LM6000 unit. Installation of the equipment pad would require excavation to accommodate a subbase and concrete foundation for the unit. Excavation for the combustion turbine foundation would extend beyond the actual footprint of the pad to accommodate concrete forms and to enable the placement of select fill, as needed. Excavated material would be either stockpiled on site for reuse or removed from the site for offsite recycling or disposal in accordance with all applicable rules and regulations. Soil erosion and sedimentation controls would be installed to reduce the potential for erosion and soil loss. It is not expected that there would be the transport of significant soil from the site.

Construction of the equipment pads would require the pouring of approximately 4,200 cubic yards of concrete. Engineering properties of the soils would be confirmed as part of the geotechnical investigations. Concrete would be poured following testing of the exposed foundation subbase soils. Concurrently, excavation and trenching for utility connections (gas and water piping and electrical conduits) would occur.

Site preparation would require heavy equipment for grading, excavation, and pad construction. This would include backhoes, front-end loaders, dump trucks, and concrete trucks. Site preparation should last approximately four months. During this period, an estimated 125 workers would be at the site. Truck trips would be heaviest during the pad installation and would amount to about 40 per day, primarily for concrete delivery.

UNIT ASSEMBLY AND SITE FINISH

Much of the equipment including the combustion turbine generator unit, gas compressor, electric transformer would be delivered to the project site in a modular form on trucks, ready for placement on concrete foundation pads. An onsite crane would be required to lift the components from the transport vehicles for placement on the individual equipment pads.

While the major units of the proposed project would be delivered in modular form, other elements of the project would be transported to the site in component parts for final on-site fabrication and assembly. This would include the once through steam generator (OTSG with associated air pollution control equipment and stack), equipment housing for air compressors, SPRINT skid, water injection pumps, water filtration systems, gas and water piping, and electrical conduits. Onsite fabrication would generally require welding and bolting of pieces.

Separate steel reinforced concrete pads would be constructed for support equipment (e.g., transformers, and gas compressors). Construction of the pads for these equipment pieces would be similar, consisting of excavation and cast-in-place concrete. This construction would occur in the sequence that the equipment arrives at the site. Final site installation activities would include restoring all disturbed site areas and, as necessary, installation of additional security lighting and fencing.

During the peak phase, which would last approximately four months, about 300 employees would be at the site with the average number of construction workers being 150. Equipment would include cranes, air compressors, and hand-held equipment.

UTILITY CONNECTIONS

The proposed project would require connections to a natural gas pipeline, an electrical substation, and water and sewer services. A 69-kilovolt (kV) overhead electric feeder would connect the generating unit to the existing onsite switchyard. The electric line would then run to the Long Island Railroad right-of-way and connect to the existing Bethpage Substation. Natural gas would be piped to the new combustion turbine unit via a new 12-inch underground pipeline connecting to an existing pipeline under Hicksville Road and Route 107. The new 12-inch pipeline would be parallel to the existing 8-inch gas pipeline under Route 107. The two pipelines would be cross-connected just outside of the existing Calpine generating facilities. A water line would have to be trenched and installed between the project site and NGC's water remediation system. This line would be located on NGC property. Water and sanitary sewer connections would be made onsite, via connection to the existing onsite service lines. The utility connections would require the use of backhoes, front-end loaders, dump trucks, and utility line trucks. This construction period would overlap with installation of the power generating unit.

STARTUP AND TESTING

The combustion turbine generator and ancillary systems would undergo testing prior to startup and commercial operations. Although the combustion turbine generator would be pre-tested off site, there would also be testing of all systems on site. Testing would include the combustion turbine generator, OTSG, steam turbine, fuel management system, alarm and shutdown devices, auxiliary systems, and unit vibration. Water injection valves and piping would be checked for completeness and operation. Interconnection testing would also occur to ensure that all connections are secure and safe for operation.

The interconnection testing includes high-pressure testing of gas and liquid pipelines and weld testing of all piping during construction in accordance with American Society of Mechanical Engineers (ASME) B31.1 of the Pressure Piping Code. Electrical testing includes point-to-point, high-voltage, and resistance tests of electrical cables to detect integrity of electrical connections and insulation in accordance with the latest edition of the National Electric Code (NEC). The combustion turbine generator set is again fully re-tested, including calibration of valves and voltage regulator.

C. PROBABLE IMPACTS OF THE PROJECT

All construction activities would take place in accordance with good construction practices and the requirements of the various permits required for construction and operation.

TRAFFIC

During construction of the proposed project, there would be two categories of vehicle trips: worker trips and equipment/supply deliveries. The first category, worker trips, includes construction workers traveling to and from the job site. The maximum projected peak number of construction workers employed at any one time would be approximately 300, with an average of 150 construction workers through the 12-month construction schedule. The peak construction workforce would only be required during about four months. During off-peak construction times, traffic would be considerably less.

Construction may occur over 10 hours, 6 days per week with no work on Sundays. It is expected that evening activities would be necessary for certain construction tasks (e.g., concrete pours), but would require a smaller number of workers than during peak daytime hours. Based upon the typical construction workday, it is anticipated that the majority of the construction workers would arrive at and depart the proposed project site outside of peak roadway hours. It is anticipated that construction workers would park their vehicles off-street or at the adjacent lot.

Truck movements for materials delivery and removal would be spread throughout the day on weekdays and would generally occur between the hours of 8 AM and 4 PM, depending on the period of construction. Extensions of this basic workday, or moderate amounts of evening or weekend work, would likely occur. The maximum number of trucks would be about 40 per day. Trucks would enter via Hicksville/Massapequa Road or Old South Oyster Bay Road.

The installation of the natural gas pipeline would close one or two lanes of traffic for two to three months during work hours. The trench would be closed or covered during non-work hours.

Based upon the amount of construction-related traffic expected, the hours when trips would occur, the limited duration of peak construction, and existing roadway traffic volumes and capacity, it is not anticipated that construction activities would result in any significant adverse traffic impacts.

HAZARDOUS MATERIALS

A Construction Health and Safety Plan would be developed and implemented by the proposed project's general contractor prior to construction to ensure that the potential for exposure of construction workers, workers on nearby sites, and others in the area to any hazards on site is minimized. The Construction Health and Safety Plan would define worker safety training and monitoring procedures, personal protective equipment, air monitoring equipment, action levels,

and appropriate protective measures. In addition, the construction workers would be required to comply with the existing Calpine health and safety programs. All material removed from the proposed project site would be managed in compliance with all applicable laws and regulations. Hazardous materials required during construction would be stored in designated areas and provided with secondary containment. With these measures, no significant adverse impacts would occur during construction.

AIR QUALITY

Construction-related emissions can be classified into two distinct sources: criteria pollutant emissions from private and construction vehicle internal combustion engines; and fugitive dust resulting from vehicle movement over paved and unpaved roads, material handling, earth moving/grading, and other construction activities.

Construction-related emissions from the two types of sources vary with the types of activities associated with the three typical phases of a construction project. The United States Environmental Protection Agency (EPA), in Section 13.2.3 of its AP-42 emission factor guidance (EPA 1995), identifies three phases of a heavy construction project with respect to construction-related emissions: (1) debris removal; (2) site preparation; and (3) general construction. According to AP-42, the following activities take place during each phase of construction:

- Phase 1. Debris removal of any man-made or natural obstructions can include blasting, explosion, mechanical removal, material loading/unloading, and vehicular traffic over unpaved areas;
- Phase 2. Site preparation is grading and soil stabilization, and cut and fill activities, which can include movement of large earth-moving equipment over disturbed surfaces, material/ aggregate loading and unloading, vehicular traffic over unpaved areas; and
- Phase 3. General construction is foundation work, structural steel, exterior/interior operations, piping/electrical work, and final landscaping.

Potential criteria pollutant and fugitive dust emissions associated with the 12-month construction schedule are discussed below.

Vehicle emissions can occur as a result of traffic and/or added trip length from private vehicles that encounter roadway diversions or detours associated with the proposed project, as well as from emissions from the actual construction vehicles. If the diversions and detours are significant, or impact a large number of private vehicles, an air quality analysis is recommended by the New York State Department of Transportation, Environmental Analysis Bureau. For the construction of the project, there would be only brief road closures or diversion for utility line road crossings or receiving large equipment. Therefore, an air impact analysis for this aspect of construction is not necessary.

Construction vehicles would emit criteria pollutants. However, impacts are expected to be minimal for several reasons. During site preparation, limited demolition would be required because the proposed project site is clear of existing structures. While there may be some grading required of the site during site preparation, it is anticipated that heavy construction activity likely would be limited to a short period. During unit assembly and site finish, impacts would be minimal since much of the equipment is prefabricated prior to arrival at the proposed project site. In addition, construction vehicles to be used would be well maintained, resulting in

efficient fuel combustion and minimal criteria pollutant emissions, such as carbon monoxide and particulate matter (PM_{10} and $PM_{2.5}$). The number of vehicles would be modest and would not cause a significant adverse impact.

Regarding fugitive dust, heavy construction activities would be minimal, as demolition and grading activities are not anticipated to be significant. In addition, the nearest residences are sufficiently distant from the proposed project site to ensure minimal impacts from fugitive dust emissions. Several measures would be employed during construction activities to ensure that dust suspension is kept low. These include:

- keeping construction vehicle speed low;
- covering exposed stockpiles of soil and gravel or, as an alternative, minimizing the height of these piles;
- washing paved surfaces during dry periods; and
- spraying water on stockpiles and unpaved roads during dry periods.

Therefore, no significant air quality impacts are anticipated during the construction of the proposed project.

NOISE

Construction of the proposed project would result in increased noise levels for a limited period of time. The noise levels caused by construction activities would vary widely, depending on the phase of construction and specific tasks being performed. For power plant projects, construction generally occurs in the following phases: initial grading and excavation, concrete pouring, steel erection and building assembly, equipment installation, and exterior finish and cleanup.

Typical noise levels of construction equipment that may be employed during the construction process are shown in Table 15-1 (BBN 1977). Noise from construction equipment is regulated by EPA noise emission standards. These federal requirements mandate that certain classes of construction equipment meet specified noise emission standards and that construction material be handled and transported in such a manner as not to create unnecessary noise. Construction noise is primarily generated from diesel engine exhausts; therefore, maintaining functional mufflers on all equipment would be a requirement of the project.

An acoustical model of construction operations and equipment was developed using SoundPLAN® Version 6.1 and industry standard algorithms to predict noise levels at the nearest sensitive receptors, which were identified in Chapter 9, "Noise." Equivalent energy levels (L_{eq}) were estimated for each of five major construction phases: (1) grading and excavation, (2) concrete pouring, (3) building erection, (4) equipment installation, and (5) finishing and clean-up. Adjustments for hemispherical divergence, atmospheric absorption, and ground effect were included in the analysis. Noise levels were further modified for shielding effects of existing buildings, both on site and off site, to estimate far-field construction noise levels. The noise levels expected outdoors are presented in Table 15-2. As shown in this table, L_{eq} levels are predicted to range from a low of 39 dBA to a high of 59 dBA at the nearest receptors. It should be noted that a building or home would provide significant attenuation of outdoor noise levels. Specifically, noise levels within homes and dwellings would be up to 27 dBA lower (windows closed). Even in homes with open windows, indoor noise levels would be up to 17 dBA lower than outdoor levels (EPA 1974).

Table 15-1
Typical Noise Emission Levels for Construction Equipment

Equipment Item	Noise Level at 50 Feet (dBA)	Equipment Item	Noise Level at 50 Feet (dBA)
Air Compressors	76–89	Generators (Portable)	71–87
Backhoes	81–90	Jackhammers	69–85
Concrete Batch Plant	80–85	Rock Drills	83–99
Concrete Pumps	74–84	Pile Drivers	81–107
Concrete Vibrators	68–81	Pumps	68–80
Cranes (Derrick)	79–86	Steel Rollers	75–82
Cranes (Mobil)	80–85	Shovels	77–90
Dozers	77–90	Trucks	81–87
Front-End Loaders	77–90	Vibratory Conveyors	70–80
Graders	79–89	Welders	66–75

Source: *Power Plant Construction Noise Guide*, Bolt Beranek and Newman, Inc., May 1977.

Table 15-2
Projected Construction Noise Levels

Position	Construction Phase				
	Grading & Excavation (L_{eq})	Concrete Pouring (L_{eq})	Steel Erection (L_{eq})	Equipment Installation (L_{eq})	Finishing[1] (L_{eq})
Location 1	54	50	54	49	44
Location 2	49	45	49	44	39
Location 3	59	55	59	54	49
Location 4	55	51	55	50	45
Location 5	47	43	47	42	37

Notes:
1 Assumes steam blowout silencing is used during plan clean-out phase.
2 See Chapter 9, "Noise," for location.
Source: Michael Theriault Acoustics, Inc.

In general, it is anticipated that construction noise would be near or below current ambient noise levels at most residential locations. Moreover, noise due to construction, while discernable at some locations, would not be expected to significantly increase ambient noise levels at sensitive receptor locations for any appreciable period of time, and therefore would not create any adverse noise impacts.

Increases in noise levels caused by delivery trucks, employees traveling to and from the site, and other construction vehicles would not be significant based on the short duration of construction anticipated and the modest amount of construction-related traffic expected relative to the volume of traffic already on Route 107.

Although LIPA is not subject to the requirements of the Town of Oyster Bay noise ordinance, a discussion of compliance with these requirements is provided here for informational purposes. The Town of Oyster Bay noise ordinance prohibits noise from construction activities creating a disruption across a residential real property boundary or within a noise-sensitive zone between the hours of 10 PM and 7 AM, Monday through Saturday and all day on Sunday and legal holidays. It is likely that some evening and weekend construction activities would be required periodically throughout the construction schedule. Any nighttime or weekend construction activities would likely be similar to the "finishing phase" of construction, which is typically 10 decibels quieter than for other phases. Also, the size of the nighttime work force would be significantly smaller than during typical daytime, weekday hours, further reducing noise levels. Finally, since the majority of nighttime and weekend work (e.g., electrical, piping, craft work etc.) will likely take place within the generation building, noise due to construction operations and activities would be further attenuated.

Therefore, no significant noise impacts are anticipated during the construction of the proposed project.

VIBRATION IMPACTS

Table 15-3 shows architectural/structural damage risk and perceptibility distances for residential/historic structures for various activities that may occur during construction of the proposed project. Architectural damage includes cosmetic damage, such as cracked plaster, and is not considered potentially dangerous. No residences are located within distances for potential architectural damage or perceptible vibration and, therefore, no significant vibration impacts would result.

Table 15-3
Structural Damage Risk and Perceptibility Distances Due to Vibration

Activity	Perceptible Distance (feet)	Historic	Residential	Structural
Blasting	1,000	400	300	60
Pile Driving	200	90	50	12
Pavement Breaking	150	60	40	8
Bulldozing	60	30	20	3
Heavy Truck Traffic	50	20	15	3
Jackhammers	30	15	10	2

Sources: Wiss, John F. "Construction Vibrations: States-of-the-art," *Journal of the Geotechnical Engineering Division, Proceedings of the American Society of Civil Engineers*, Volume 107, No. GT0, February 1981. "Standard Recommended Practice for Evaluation of Transportation Related Earthborne Vibrations," ASHTO Designation: R8-81 (1986).

EROSION CONTROL

Stormwater management during construction activities would be performed through implementation of a site-specific erosion and sedimentation control plan. In accordance with NYSDEC regulations, the erosion and sedimentation control plan would include both structural and non-structural components. The structural components are expected to consist of hay bale barriers/silt fencing, inlet protection for existing or newly installed catch basins, and installation of a stabilized construction entrance or other appropriate means to limit potential offsite transport of sediment. The non-structural "best management practices" would include routine inspection, dust control, cleaning, and maintenance programs; instruction on the proper management, storage, and handling of potentially hazardous materials; and identification of parties responsible for implementation and ongoing maintenance programs. All temporary control measures would be maintained until disturbed areas of the site are stabilized and a permanent stormwater management system is complete and operational.

A Construction Stormwater Pollution Prevention Plan (SWPPP) would be developed for the overall project construction activity in accordance with the requirements of NYSDEC's SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-02-01). The SWPPP would include fully designed and engineered stormwater management practices with all necessary maps, plans and construction drawings, providing the site-specific erosion and sediment control plan and best management practices. The SWPPP would include designation of responsible parties and personnel, including all contractors and subcontractors who would have a role in management of construction stormwater runoff. The SWPPP would outline a routine site inspection and reporting program for identification and prompt repair of any deficiencies for the erosion and sediment control structures or practices. With the Construction SWPPP in place and enforced, no significant adverse impacts from runoff and sedimentation are expected.

For the proposed project, stormwater discharges during the construction require authorization by NYSDEC under an SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-02-01). On October 29, 2003, NYSDEC confirmed that the project would be covered under the SPDES General Permit in accordance with Part I.D.7 of Permit GP-02-01.

*

Chapter 16: Cumulative Impacts

A cumulative impact analysis was performed to examine whether the proposed project, cumulative with other relevant facilities (i.e., facilities built for LIPA from 2002 through 2003, approved for 2004 and planned for the summer of 2005), would have the potential for causing significant adverse environmental impacts. The cumulative impact analysis considered each of the environmental categories (i.e., land use and zoning, community facilities, cultural resources, contaminated materials, traffic, air quality, noise, etc.) as assessed above. Because of the very localized extent of the project's impacts, in all areas other than air quality, the new and proposed LIPA electric generating facilities would have no potential for significant cumulative impacts. The overall consumption of groundwater for LIPA projects is minimal compared to the existing demand, which can be safely met by Long Island's groundwater resources. The proposed project would not have a significant adverse cumulative impact on groundwater.

With respect to air quality, the LIPA facilities would also have only very localized effects, although other larger facilities (not part of the LIPA system) could have broader impacts. Consequently, quantified analyses were performed to assess the potential cumulative air quality impacts of the proposed project together with the LIPA and other nearby facilities. The detailed cumulative analyses contained in Chapter 8, "Air Quality," demonstrate that the cumulative impacts associated with other LIPA facilities and other nearby facilities would be below the applicable ambient air quality standards. Therefore, the proposed project would not have, either individually or cumulatively, any significant adverse environmental impacts on air quality. ✷

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Appendix A

Full Environmental Assessment Form

617.20
Appendix A
State Environmental Quality Review

FULL ENVIRONMENTAL ASSESSMENT FORM

Purpose: The full EAF is designed to help applicants and agencies determine, in an orderly manner, whether a project or action may be significant. The question of whether an action may be significant is not always easy to answer. Frequently, there are aspects of a project that are subjective or unmeasurable. It is also understood that those who determine significance may have little or no formal knowledge of the environment or may not be technically expert in environmental analysis. In addition, many who have knowledge in one particular area may not be aware of the broader concerns affecting the question of significance.

The full EAF is intended to provide a method whereby applicants and agencies can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

Full EAF Components: The full EAF is comprised of three parts:

Part 1: Provides objective data and information about a given project and its site. By identifying basic project data, it assists a reviewer in the analysis that takes place in Parts 2 and 3.

Part 2: Focuses on identifying the range of possible impacts that may occur from a project or action. It provides guidance as to whether an impact is likely to be considered small to moderate or whether it is a potentially large impact. The form also identifies whether an impact can be mitigated or reduced.

Part 3: If any impact in Part 2 is identified as potentially large, then Part 3 is used to evaluate whether or not the impact is actually important.

DETERMINATION OF SIGNIFICANCE — Type 1 and Unlisted Actions

Identify the Portions of EAF completed for this project: ☒ Part 1 ☒ Part 2 ☒ Part 3

Upon review of the information recorded on this EAF (Parts 1 and 2 and 3 if appropriate), and any other supporting information, and considering both the magnitude and importance of each impact, it is reasonably determined by the lead agency that:

☒ A. The project will not result in any large and important impact(s) and, therefore, is one which will not have a significant impact on the environment, therefore **a negative declaration will be prepared.**

☐ B. Although the project could have a significant effect on the environment, there will not be a significant effect for this Unlisted Action because the mitigation measures described in PART 3 have been required; therefore **a CONDITIONED negative declaration will be prepared.**

☐ C. The project may result in one or more large and important impacts that may have a significant impact on the environment; therefore, **a positive declaration will be declared.**

A Conditioned Negative Declaration is only valid for Unlisted Actions

Bethpage 3 Energy Center, LLC Combined Cycle Project
Name of Action

Long Island Power Authority
Name of Lead Agency

Edward J. Grilli	**Chief of Staff**
Print or Type Name of Responsible Officer in Lead Agency	Title of Responsible Officer
Edward J. Grilli	
Signature of Responsible Officer in Lead Agency	Signature of Preparer (If different from responsible officer)

May 26, 2004
Date

PART 1--PROJECT INFORMATION
Prepared by Project Sponsor

NOTICE: This document is designed to assist in determining whether the action proposed may have a significant effect on the environment. Please complete the entire form, Parts A through E. Answers to these questions will be considered as part of the application for approval and may be subject to further verification and public review. Provide any additional information you believe will be needed to complete Parts 2 and 3.

It is expected that completion of the full EAF will be dependent on information currently available and will not involve new studies, research or investigation. If information requiring such additional work is unavailable, so indicate and specify each instance.

NAME OF ACTION Bethpage Energy Center 3		
LOCATION OF ACTION (INCLUDE STREET ADDRESS, MUNICIPALITY AND COUNTY) 939 South Broadway, Hicksville, NY 11801-5032		
NAME OF APPLICANT/SPONSOR Bethpage Energy Center 3, LLC	BUSINESS TELEPHONE (617) 557-5302	
ADDRESS Two Atlantic Avenue, Third Floor		
CITY/PO Boston	STATE MA	ZIP CODE 02110
NAME OF OWNER (IF DIFFERENT)	BUSINESS TELEPHONE ( )	
ADDRESS		
CITY/PO	STATE	ZIP CODE
DESCRIPTION OF ACTION **Construction and operation by Bethpage Energy Center 3, LLC, a subsidiary of Calpine, of a combined-cycle, natural gas fired power plant consisting of a General Electric LM 6000 SPRINT combustion turbine and associated heat recovery equipment situated within and immediately adjacent to the existing Calpine energy generation facility located in the Town of Oyster Bay, Nassau County, New York. Other major equipment includes a once through steam generator equipped with duct burners, a steam turbine generator and a five-cell cooling tower. The project will have a nominal net electrical power output of 79.9 megawatts or less for distribution on the Long Island Power Authority electrical distribution grid.**		

Please Complete Each Question--Indicate N.A. if not applicable

A. SITE DESCRIPTION

Physical setting of overall project, both developed and undeveloped areas.

1. Present Land Use: ☐ Urban ☒ Industrial ☐ Commercial ☐ Residential (suburban) ☐ Rural (non-farm) ☐ Forest ☐ Agriculture ☐ Other **Existing Energy Plant; decommissioned aeration basin**

2. Total acreage of project area: **±3.0** acres.

	PRESENTLY		AFTER COMPLETION	
APPROXIMATE ACREAGE		acres		acres
Meadow or Brushland (Non-agricultural)		acres		acres
Forested		acres		acres
Agricultural (Includes orchards, cropland, pasture, etc.)		acres		acres
Wetland(Freshwater or tidal as per Articles 24,25 of ECL)		acres		acres
Water Surface Area		acres		acres
Unvegetated (Rock, earth or fill)	± 0.7	acres		acres
Roads, buildings and other paved surfaces		acres		acres
Other (Indicate type) **Energy Plant**	± 2.3	acres	± 3.0	acres

3. What is predominant soil type(s) on project site? **Urban Land; some engineered fill and pavement**
   a. Soil drainage: ☒ Well drained **100** % of site ☐ Moderately well _____ % of site. ☐ Poorly drained _____ % of site
   b. If any agricultural land is involved, how many acres of soil are classified within soil group 1 through 4 of the NYS Land Classification System? **N/A** Acres (see 1NYCRR 370).
4. Are there bedrock outcroppings on project site? ☐ YES ☒ NO
   a. What is depth to bedrock? (in feet) **> 50 feet**
5. Approximate percentage of proposed project site with slopes: ☒ 0-10% _____ % ☐ 10-15% _____ % ☐ 15% or greater _____ %

6. Is project substantially contiguous to, or contain a building, site, or district, listed on the State or National Registers of Historic Places? ☐ YES ☒ NO
7. Is project substantially contiguous to a site listed on the Register of National Natural Landmarks? ☐ YES ☒ NO
8. What is the depth of the water table? ± 50 feet (in feet)
9. Is site located over a primary, principal, or sole source aquifer? ☒ YES ☐ NO
10. Do hunting, fishing or shell fishing opportunities presently exist in the project area? ☐ YES ☒ NO
11. Does project site contain any species of plant or animal life that is identified as threatened or endangered? ☐ YES ☒ NO
    According to: N/A
    Identify each species: N/A
12. Are there any unique or unusual land forms on the project site? (i.e., cliffs, dunes, other geological formations? ☐ YES ☒ NO
    Describe: N/A
13. Is the project site presently used by the community or neighborhood as an open space or recreation area? ☐ YES ☒ NO
    If yes, explain:
14. Does the present site include scenic views known to be important to the community? ☐ YES ☒ NO
15. Streams within or contiguous to project area: None
    a. Name of Stream and name of River to which it is tributary N/A / N/A
16. Lakes, ponds, wetland areas within or contiguous to project area:
    a. Name: None
    b. Size (in acres): N/A
17. Is the site served by existing public utilities? ☒ YES ☐ NO
    a. If YES, does sufficient capacity exist to allow connection? ☒ YES ☐ NO
    b. If YES, will improvements be necessary to allow connection? ☐ YES ☒ NO
18. Is the site located in an agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? ☐ YES ☒ NO
19. Is the site located in or substantially contiguous to a Critical Environmental Area designated pursuant to Article 8 of the ECL, and 6 NYCRR 617? ☐ YES ☒ NO
20. Has the site ever been used for the disposal of solid or hazardous wastes? ☐ YES ☒ NO

B. Project Description

1. Physical dimensions and scale of project (fill in dimensions as appropriate).
   a. Total contiguous acreage owned or controlled by project sponsor ± 3.0 acres.
   b. Project acreage to be developed: ±0.7 acres initially; ±0.7 acres ultimately.
   c. Project acreage to remain undeveloped -0- acres.
   d. Length of project, in miles: N/A (if appropriate)
   e. If the project is an expansion, indicate percent of expansion proposed N/A %
   f. Number of off-street parking spaces existing ± 5; proposed ± 5
   g. Maximum vehicular trips generated per hour -0- (upon completion of project)?
   h. If residential: Number and type of housing units:

	One Family	Two Family	Multiple Family	Condominium
Initially	N/A			
Ultimately	N/A			

   i. Dimensions (in feet) of largest proposed structure ± 69 height; ± 110 width; ± 200 length.
   j. Linear feet of frontage along a public thoroughfare project will occupy is? N/A ft.

2. How much natural material (i.e. rock, earth, etc.) will be removed from the site? Minor (excavation spoil) tons/cubic yards.

3. Will disturbed areas be reclaimed? [X] N/A [ ] YES [ ] NO

   a. If yes, for what intended purpose is the site being reclaimed? N/A

   b. Will topsoil be stockpiled for reclamation? [ ] YES [ ] NO

   c. Will upper subsoil be stockpiled for reclamation? [ ] YES [ ] NO

4. How many acres of vegetation (trees, shrubs, ground covers) will be removed from site? -0- acres.

5. Will any mature forest (over 100 years old) or other locally-important vegetation be removed by this project? [ ] YES [X] NO

6. If single phase project: Anticipated period of construction N/A months, (including demolition)

7. If multi-phased:

   a. Total number of phases anticipated 2 (number)

   b. Anticipated date of commencement phase 1 January month 2004 year, (including demolition)

   c. Approximate completion date of final phase June month 2005 year.

   d. Is phase 1 functionally dependent on subsequent phases? [ ] YES [X] NO

8. Will blasting occur during construction [ ] YES [X] NO

9. Number of jobs generated: during construction ± 250 ; after project is complete 1-2

10. Number of jobs eliminated by this project -0-

11. Will project require relocation of any projects or facilities? [ ] YES [X] NO
    If yes, explain: N/A

12. Is surface liquid waste disposal involved? [ ] YES [X] NO

    a. If yes, indicate type of waste (sewage, industrial, etc) and amount N/A

    b. Name of water body into which effluent will be discharged N/A

13. Is subsurface liquid waste disposal involved? Type _____ [ ] YES [X] NO

14. Will surface area of an existing water body increase or decrease by proposal? [ ] YES [X] NO
    If yes, explain: N/A

15. Is project or any portion of project located in a 100 year flood plain? [ ] YES [X] NO

16. Will the project generate solid waste? [X] YES [ ] NO

    a. If yes, what is the amount per month < 10 tons

    b. If yes, will an existing solid waste facility be used? [X] YES [ ] NO

    c. If yes, give name To be determined ; location To be determined

    d. Will any wastes not go into a sewage disposal system or into a sanitary landfill? [X] YES [ ] NO

    e. If yes, explain: Solid wastes will be reused, reclaimed and/or recycled to the maximum extent practicable

17. Will the project involve the disposal of solid waste? [ ] YES [X] NO

    a. If yes, what is the anticipated rate of disposal? N/A tons/month.

    b. If yes, what is the anticipated site life? N/A years.

18. Will project use herbicides or pesticides? [ ] YES [X] NO

19. Will project routinely produce odors (more than one hour per day)? [ ] YES [X] NO

20. Will project produce operating noise exceeding the local ambient noise levels? [X] YES [ ] NO

21. Will project result in an increase in energy use? [X] YES [ ] NO
    If yes, indicate type(s) Increased use of natural gas for the production of electricity

22. If water supply is from wells, indicate pumping capacity ± 5,000 gallons/minute.

23. Total anticipated water usage per day 698,400 (max.) 351, 360 (ave.) gallons/day.

25. Approvals Required			Type	Submittal Date
City, Town, Village Board	☐ Yes	☐ No		
City, Town, Village Planning Board	☐ Yes	☐ No		
ity, Town Zoning Board	☐ Yes	☐ No		
City, County Health Department	☐ Yes	☐ No		
Other Local Agencies	■ Yes	☐ No	**Hicksville Water District** **Nassau County DPW**	**TBD** **TBD**
Other Regional Agencies	☐ Yes	☐ No		
State Agencies	■ Yes	☐ No	**NYS DEC Air Permit** **Title IV Acid Rain permit** **SPDES Cons.** **NYS PSC Section 68** **Art. VII pipeline approval**	**Oct 3, 2003** **Oct 3, 2003** **granted** **TBD** **TBD**
Federal Agencies	☐ Yes	☐ No		

C. Zoning and Planning Information

1. Does proposed action involve a planning or zoning decision? ☐ Yes ■ No

   If Yes, indicate decision required:

   ☐ zoning amendment ☐ zoning variance ☐ special use permit ☐ subdivision ☐ site plan

   ☐ new/revision of master plan ☐ resource management plan ☐ other _____

2. What is the zoning classification(s) of the site? **Light industrial**
3. What is the maximum potential development of the site if developed as permitted by the present zoning?

   NA

4. What is the proposed zoning of the site? **Light Industial**
5. What is the maximum potential development of the site if developed as permitted by the proposed zoning?

   NA

6. Is the proposed action consistent with the recommended uses in adopted local land use plans? ■ Yes ☐ No
7. What are the predominant land use(s) and zoning classifications within a ¼ mile radius of proposed action?

   Light industrial and residential

8. Is the proposed action compatible with adjoining/surrounding land uses within a ¼ mile? ■ Yes ☐ No
9. If the proposed action is the subdivision of land, how many lots are proposed? _____

   a. What is the minimum lot size proposed? _____

10. Will proposed action require any authorization(s) for the formation of sewer or water districts? ☐ Yes ■ No
11. Will the proposed action create a demand for any community provided services (recreation, education, police, fire protection)? ☐ Yes ■ No

    a. If yes, is existing capacity sufficient to handle projected demand? ☐ Yes ☐ No

12. Will the proposed action result in the generation of traffic significantly above present levels? ☐ Yes ■ No

    a. If yes, is existing road network adequate to handle the additional traffic? ☐ Yes ☐ No

D. Informational Details

Attach any additional information as may be needed to clarify your project. If there are or may be any adverse impacts associated with your proposal, please discuss such impacts and the measures which you propose to mitigate or avoid them.

E. Verification

I certify that the information provided above is true to the best of my knowledge.

Applicant/Sponsor Name **Edward J. Grilli** Date **May 26, 2004**

Signature Edward Grilli Title **Chief of Staff**

PART 2—PROJECT IMPACTS AND THEIR MAGNITUDE

Responsibility of Lead Agency

General Information (Read Carefully)

- In completing the form the reviewer should be guided by the question: Have my responses and determinations been **reasonable?** The reviewer is not expected to be an expert environmental analyst.
- The **Examples** provided are to assist the reviewer by showing types of impacts and wherever possible the threshold of magnitude that would trigger a response in column 2. The examples are generally applicable throughout the State and for most situations. But, for any specific project or site, other examples and/or lower thresholds may be appropriate for a Potential Large Impact response, thus requiring evaluation in Part 3.
- The impacts of each project, on each site, in each locality, will vary. Therefore, the examples are illustrative and have been offered as guidance. They do not constitute an exhaustive list of impacts and thresholds to answer each question.
- The number of examples per question does not indicate the importance of each question.
- In identifying impacts, consider long term, short term and cumulative effects.

Instructions (Read carefully)

a. Answer each of the 20 questions in PART 2. Answer **Yes** if there will be any impact.
b. **Maybe** answers should be considered as **Yes** answers.
c. If answering **Yes** to a question, then check the appropriate box (column 1 or 2) to indicate the potential size of the impact. If impact threshold equals or exceeds any example provided, check column 2. If impact will occur but threshold is lower than example, check column 1.
d. Identifying that an impact will be potentially large (column 2) does not mean that it is also necessarily **significant**. Any large impact must be evaluated in PART 3 to determine significance. Identifying an impact in column 2 simply asks that it be looked at further.
e. If reviewer has doubt about size of the impact, then consider the impact as potentially large and proceed to PART 3.
f. If a potentially large impact checked in column 2 can be mitigated by change(s) in the project to a small to moderate impact, also check the **Yes** box in column 3. A **No** response indicates that such a reduction is not possible. This must be explained in Part 3.

IMPACT ON LAND

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
1. Will the proposed action result in a physical change to the project site? ☒ NO ☐ YES			
Examples that would apply to column 2			
• Any construction on slopes of 15% or greater, (15 foot rise per 100 foot of length), or where the general slopes in the project area exceed 10%.	☐	☐	☐ Yes ☐ No
• Construction on land where the depth to the water table is less than 3 feet.	☐	☐	☐ Yes ☐ No
• Construction of paved parking area for 1,000 or more vehicles.	☐	☐	☐ Yes ☐ No
• Construction on land where bedrock is exposed or generally within 3 feet of existing ground surface.	☐	☐	☐ Yes ☐ No
• Construction that will continue for more than 1 year or involve more than one phase or stage.	☐	☐	☐ Yes ☐ No
• Excavation for mining purposes that would remove more than 1,000 tons of natural material (i.e., rock or soil) per year.	☐	☐	☐ Yes ☐ No
• Construction or expansion of a sanitary landfill.	☐	☐	☐ Yes ☐ No
• Construction of a designated floodway.	☐	☐	☐ Yes ☐ No
• Other impacts _____	☐	☐	☐ Yes ☐ No
2. Will there be an effect to any unique or unusual land forms found on the site? (i.e., cliffs, dunes, geological formations, etc.) ☒ NO ☐ YES			
• Specific land forms: _____	☐	☐	☐ Yes ☐ No

IMPACT ON WATER

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
3. Will the proposed action affect any water body designated as protected? (Under Articles 15, 24, 25 of the Environmental Conservation Law, ECL) ☒NO ☐ YES			
Examples that would apply to column 2			
• Developable area of site contains a protected water body.	☐	☐	☐ Yes ☐ No
• Dredging more than 100 cubic yards of material from channel of a protected steam.	☐	☐	☐ Yes ☐ No
• Extension of utility distribution facilities through a protected water body.	☐	☐	☐ Yes ☐ No
• Construction in a designated freshwater or tidal wetland.	☐	☐	☐ Yes ☐ No
• Other impacts: _____	☐	☐	☐ Yes ☐ No
4. Will proposed action affect any non-protected existing or new body of water? ☒NO ☐ YES			
Examples that would apply to column 2			
• A 10% increase or decrease in the surface area of any body of water or more than a 10-acre increase or decease.	☐	☐	☐ Yes ☐ No
• Construction of a body of water that exceeds 10 acres of surface area.	☐	☐	☐ Yes ☐ No
• Other impacts. _____	☐	☐	☐ Yes ☐ No
5. Will Proposed Action affect surface or groundwater quality or quantity? ☒NO ☐ YES			
Examples that would apply to column 2			
• Proposed Action will require a discharge permit.	☐	☐	☐ Yes ☐ No
• Proposed Action requires use of a source of water that does not have approval to serve proposed (project) action.	☐	☐	☐ Yes ☐ No
• Proposed Action requires water supply from wells with greater than 45 gallons per minute pumping capacity.	☐	☐	☐ Yes ☐ No
• Construction or operation causing any contamination of a water supply system.	☐	☐	☐ Yes ☐ No
• Proposed Action will adversely affect groundwater.	☐	☐	☐ Yes ☐ No
• Liquid effluent will be conveyed off the site to facilities which presently do not exist or have inadequate capacity.	☐	☐	☐ Yes ☐ No
• Proposed Action would use water in excess of 20,000 gallons per day.	☒	☐	☐ Yes ☒ No
• Proposed Action will likely cause siltation or other discharges into an existing body of water to the extent that there will be an obvious visual contrast to natural conditions.	☐	☐	☐ Yes ☐ No
• Proposed Action will require the storage of petroleum or chemical products greater than 1,100 gallons.	☐	☐	☐ Yes ☐ No
• Proposed Action will allow residential uses in areas without water and/or sewer services.	☐	☐	☐ Yes ☐ No
• Proposed Action locates commercial and/or industrial uses which may require new or expansion of existing waste treatment and/or storage facilities.	☐	☐	☐ Yes ☐ No
• Other impacts: _____	☐	☐	☐ Yes ☐ No
6. Will proposed action alter drainage flow or patterns, or surface water runoff? ☒NO ☐ YES			
Examples that would apply to column 2			
• Proposed Action would change flood water flows.	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
• Proposed Action may cause substantial erosion.	☐	☐	☐ Yes ☐ No
• Proposed Action is incompatible with existing drainage patterns.	☐	☐	☐ Yes ☐ No
• Proposed Action will allow development in a designated floodway.	☐	☐	☐ Yes ☐ No
• Other impacts: _____	☐	☐	☐ Yes ☐ No
IMPACT ON AIR			
7. Will proposed action affect air quality? ☐NO ☒ YES			
Examples that would apply to column 2			
• Proposed Action will induce 1,000 or more vehicle trips in any given hour.	☐	☐	☐ Yes ☐ No
• Proposed Action will result in the incineration of more than 1 ton of refuse per hour.	☐	☐	☐ Yes ☐ No
• Emission rate of total contaminants will exceed 5 lbs. per hour or a heat source producing more than 10 million BTU's per hour.	☒	☐	☐ Yes ☒ No
• Proposed action will allow an increase in the amount of land committed to industrial use.	☐	☐	☐ Yes ☐ No
• Proposed action will allow an increase in the density of industrial development within existing industrial areas.	☐	☐	☐ Yes ☐ No
• Other impacts: _____	☐	☐	☐ Yes ☐ No
IMPACT ON PLANTS AND ANIMALS			
8. Will Proposed Action affect any threatened or endangered species? ☒NO ☐ YES			
Examples that would apply to column 2			
• Reduction of one or more species listed on the New York or Federal list, using the site, over or near site or found on the site.	☐	☐	☐ Yes ☐ No
• Removal or any portion of a critical or significant wildlife habitat.	☐	☐	☐ Yes ☐ No
• Application of pesticide or herbicide more than twice a year, other than for agricultural purposes.	☐	☐	☐ Yes ☐ No
• Other impacts: _____	☐	☐	☐ Yes ☐ No
9. Will Proposed Action substantially affect non-threatened or non-endangered species? ☒NO ☐ YES			
Examples that would apply to column 2			
• Proposed Action would substantially interfere with any resident or migratory fish, shellfish or wildlife species.	☐	☐	☐ Yes ☐ No
• Proposed Action requires the removal or more than 10 acres of mature forest (over 100 years of age) or other locally important vegetation.	☐	☐	☐ Yes ☐ No
IMPACT ON AGRICULTURAL LAND RESOURCES			
10. Will the proposed Action affect agricultural land resources? ☒NO ☐ YES			
Examples that would apply to column 2			
• The proposed action would sever, cross or limit access to agricultural land (includes cropland, hayfields, pasture, vineyard, orchard, etc.)	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
• Construction activity would excavate or compact the soil profile of agricultural land.	☐	☐	☐ Yes ☐ No
• The proposed action would irreversibly convert more than 10 acres of agricultural land or, if located in an Agricultural District, more than 2.5 acres of agricultural land.	☐	☐	☐ Yes ☐ No
• The proposed action would disrupt or prevent installation of agricultural land management systems (e.g., subsurface drain lines, outlet ditches, strip cropping); or create a need for such measures (e.g., cause a farm field to drain poorly due to increased runoff).	☐	☐	☐ Yes ☐
• Other impacts: _____	☐	☐	☐ Yes ☐ No

IMPACT ON AESTHETIC RESOURCES

11. Will proposed action affect aesthetic resources? ☒ NO ☐ YES
(If necessary, use the Visual EAF Addendum in Section 617.20, Appendix B.)

Examples that would apply to column 2

• Proposed land uses, or project components obviously different from or in sharp contrast to current surrounding land use patterns, whether man-made or natural.	☐	☐	☐ Yes ☐ No
• Proposed land uses, or project components visible to users of aesthetic resources which will eliminate or significantly reduce their enjoyment of the aesthetic qualities of that resource.	☐	☐	☐ Yes ☐ No
• Project components that will result in the elimination or significant screening of scenic views known to be important to the area.	☐	☐	☐ Yes ☐ No
• Other impacts: _____	☐	☐	☐ Yes ☐ No

IMPACT ON HISTORIC AND ARCHAEOLOGICAL RESOURCES

12. Will Proposed Action impact any site or structure of historic, pre-historic or paleontological importance? ☒ NO ☐ YES

Examples that would apply to column 2

• Proposed Action occurring wholly or partially within or substantially contiguous to any facility or site listed on the State or National Register of Historic Places.	☐	☐	☐ Yes ☐ No
• Any impact to an archaeological site or fossil bed located within the project site.	☐	☐	☐ Yes ☐ No
• Proposed Action will occur in an area designated as sensitive for archaeological sites on the NYS Site Inventory.	☐	☐	☐ Yes ☐ No
• Other impacts: _____	☐	☐	☐ Yes ☐ No

IMPACT ON OPEN SPACE AND RECREATION

13. Will Proposed Action affect the quantity or quality of existing or future open spaces or recreational opportunities? ☒ NO ☐ YES

Examples that would apply to column 2

• The permanent foreclosure of a future recreational opportunity.	☐	☐	☐ Yes ☐ No
• A major reduction of an open space important to the community.	☐	☐	☐ Yes ☐ No
• Other impacts: _____	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change

IMPACT ON CRITICAL ENVIRONMENTAL AREAS

14. Will Proposed Action impact the exceptional or unique characteristics of a critical environmental area (CEA) established pursuant to subdivision 6 NYCRR 617.14(g)? ☒ NO ☐ YES

List the environmental characteristics that caused the designation of the CEA.

_____

_____

_____

_____

_____

Examples that would apply to column 2

	1	2	3
• Proposed Action to locate within the CEA?	☐	☐	☐ Yes ☐ No
• Proposed Action will result in a reduction in the quantity of the resource?	☐	☐	☐ Yes ☐ No
• Proposed Action will result in a reduction in the quality of the resource?	☐	☐	☐ Yes ☐ No
• Proposed action will impact the use, function or enjoyment of the resource?	☐	☐	☐ Yes ☐ No
• Other impacts: _____	☐	☐	☐ Yes ☐ No

_____

IMPACT ON TRANSPORTATION

15. Will there be an effect to existing transportation systems? ☒ NO ☐ YES

Examples that would apply to column 2

	1	2	3
• Alteration of present patterns of movement of people and/or goods.	☐	☐	☐ Yes ☐ No
• Proposed Action will result in major traffic problems.	☐	☐	☐ Yes ☐ No
• Other impacts. _____	☐	☐	☐ Yes ☐ No

_____

IMPACT ON ENERGY

16. Will proposed action affect the community's sources of fuel or energy supply? ☐ NO ☒ YES

Examples that would apply to column 2

	1	2	3
• Proposed Action will cause a greater than 5% increase in the use of any form of energy in the municipality.	☐	☐	☐ Yes ☐ No
• Proposed Action will require the creation or extension of an energy transmission or supply system to serve more than 50 single or two family residences or to serve a major commercial or industrial use.	☐	☐	☐ Yes ☐ No
• Other impacts: **New turbine would provide needed energy to Long Island.**	☒	☐	☐ Yes ☒ No

NOISE AND ODOR IMPACTS

17. Will there be objectionable odors, noise, or vibration as a result of the Proposed Action? ☒ NO ☐ YES

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
Examples that would apply to column 2			
• Blasting within 1,500 feet of a hospital, school or other sensitive facility.	☐	☐	☐ Yes ☐ No
• Odors will occur routinely (more than one hour per day).	☐	☐	☐ Yes ☐ No
• Proposed Action will produce operating noise exceeding the local ambient noise levels for noise outside of structures.	☐	☐	☐ Yes ☐ No
• Proposed Action will remove natural barriers that would act as a noise screen.	☐	☐	☐ Yes ☐ No
• Other impacts: _____	☐	☐	☐ Yes ☐ No

IMPACT ON PUBLIC HEALTH

18. Will Proposed Action affect public health and safety? ☒ NO ☐ YES

Examples that would apply to column 2			
• Proposed Action may cause a risk of explosion or release of hazardous substances (i.e., oil, pesticides, chemicals, radiation, etc.) in the event of accident or upset conditions, or there may a be a chronic low level discharge or emission.	☐	☐	☐ Yes ☐ No
• Proposed Action may result in the burial of "hazardous wastes" in any form (i.e., toxic, poisonous, highly reactive, radioactive, irritating, infectious, etc.)	☐	☐	☐ Yes ☐ No
• Storage facilities for one million or more gallons of liquefied natural gas or other flammable liquids.		☐	☐ Yes ☐ No
• Proposed action may result in the excavation or other disturbance within 2,000 feet of a site used for the disposal of solid or hazardous waste.	☐	☐	☐ Yes ☐ No
• Other impacts. _____	☐	☐	☐ Yes ☐ No

IMPACT ON GROWTH AND CHARACTER OF COMMUNITY OR NEIGHBORHOOD

19. Will proposed action affect the character of the existing community? ☒ NO ☐ YES

Examples that would apply to column 2			
• The permanent population of the city, town or village in which the project is located is likely to grow by more than 5%.	☐	☐	☐ Yes ☐ No
• The municipal budget for capital expenditures or operating services will increase by more than 5% per year as a result of this project.	☐	☐	☐ Yes ☐ No
• Proposed action will conflict with officially adopted plans or goals.	☐	☐	☐ Yes ☐ No
• Proposed action will cause a change in the density of land use.	☐	☐	☐ Yes ☐ No
• Proposed Action will replace or eliminate existing facilities, structures or areas of historic importance to the community.	☐	☐	☐ Yes ☐ No
• Development will create a demand for additional community services (e.g., schools, police and fire, etc.)	☐	☐	☐ Yes ☐ No
• Proposed Action will set an important precedent for future projects.	☐	☐	☐ Yes ☐ No
• Proposed Action will create or eliminate employment.	☐	☐	☐ Yes ☐ No
• Other impacts: _____	☐	☐	☐ Yes ☐ No

20. Is there, or is there likely to be, public controversy related to potential adverse environmental impacts? ☒ No ☐ Yes

If any action in Part 2 is identified as a potential large impact or if you cannot determine the magnitude of impact, proceed to Part 3.

PART 3—EVALUATION OF THE IMPORTANCE OF IMPACTS

Responsibility of Lead Agency

Part 3 must be prepared if one or more impact(s) is considered to be potentially large, even if the impact(s) may be mitigated.

Instructions

Discuss the following for each impact identified in Column 2 of Part 2:

1. Briefly describe the impact.
2. Describe (if applicable) how the impact could be mitigated or reduced to a small to moderate impact by project change(s).
3. Based on the information available, decide if it is reasonable to conclude that this impact is important.

   To answer the question of importance, consider:

   - The probability of the impact occurring
   - The duration of the impact
   - Its irreversibility, including permanently lost resources of value
   - Whether the impact can or will be controlled
   - The regional consequences of the impact
   - Its potential divergence from local needs and goals
   - Whether known objections to the project relate to this impact.

   (Continue on attachments)

See attached Environmental Assessment for detailed analysis of all potential significant adverse impacts of which there would be none.

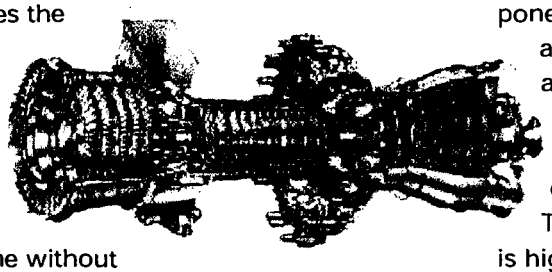
Appendix B

Brief Description of LM 6000

LM6000 SPRINT™ Gas Turbine Generator Set

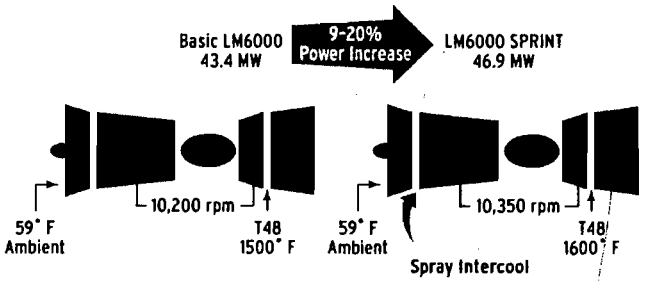
The Inter-cooled Engine that Increases Power Output

The LM6000 SPRINT™ combines the best simple-cycle heat rate of any industrial gas turbine in its class today with a spray inter-cooling design that significantly increases the mass airflow by cooling the air during the compression process. The result is more power, a better heat rate and a gas turbine without any increase in maintenance costs.



The Hotter It Gets, The More Effectively It Runs

SPRINT's™ effectiveness is even more pronounced in hot weather—power output is increased by 9% at ISO and is increased by more than 20% on 90° days. It is like having an evaporative cooler built within the gas turbine. As ambient temperature rises, the benefits of a SPRINT™ engine become more significant.



The SPRINT™ Solution

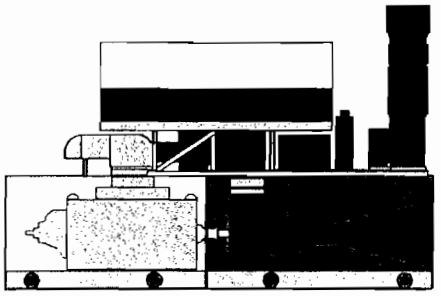
The SPRINT™ system is based on an atomized water spray injected through spray nozzles into the compressor. Water is atomized using high-pressure air taken off of eighth stage air bleed. The water-flow rate is metered, using the appropriate engine control schedules.

The SPRINT™ Solution at Work

On high-pressure ratio gas turbines such as the LM6000, the compressor discharge temperature is often the criteria that limits power output because compressed air is used to cool the hot section components. By pre-cooling the LM6000 compressor with a mico-mist of water, the compressor inlet temperature and outlet temperature are significantly reduced. Thus, the compressor outlet temperature limitation is reduced allowing the LM6000 to operate on its natural firing temperature control. The result is higher output and better efficiency.

SPRINT 60-Hz Generator Sets

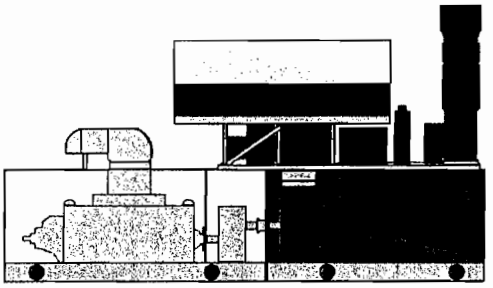
Base Plate Length	56' 6"	(17.22 m)
Base Plate Width	13' 6"	(4.11 m)
Enclosure Height	14' 6"	(4.42 m)
Overall Length	56' 9"	(17.30 m)
Overall Width*	49' 9"	(15.16 m)
Overall Height*	36' 2"	(11.02 m)
Base Plate Foundation Load*	476,000 lb	(214,200 kg)



	Power kW	Heat Rate Btu/kWh LHV	Heat Rate kJ/kWh LHV	No. Shafts	Pressure Ratio	Shaft Speed rpm	Exhaust Flow lb/s	Exhaust Flow kg/s	Exhaust Temp. °F	Exhaust Temp. °C
LM6000PC SPRINT*	50080	8434	8916	2	30.9	3600	295	134	826	441
LM6000PC	43417	8112	8549	2	29.1	3600	281	127	831	444
LM6000PD SPRINT	46824	8235	8688	2	30.7	3600	290	131	837	447
LM6000PD	42336	8308	8765	2	29.3	3600	278	126	846	452
LM6000PD (liquid fuel)	40212	8415	8878	2	28.1	3600	268	122	857	458
LM2500PK	30676	8834	9300	2	23.6	3600	192	87.1	958	514
LM2500PV	30463	8854	9069	2	22.6	6100	186	84.3	931	499
LM2500PH**	27763	8391	8775	2	20.2	3600	167	75.9	926	497
LM2500PE	22719	9311	9789	2	19.1	3600	153	69.4	992	533

SPRINT 50-Hz Generator Sets

Base Plate Length	64' 7"	(19.69 m)
Base Plate Width	13' 6"	(4.11 m)
Enclosure Height	14' 6"	(4.42 m)
Overall Length	64' 10"	(19.76 m)
Overall Width*	49' 3"	(15.01 m)
Overall Height*	37' 11"	(11.56 m)
Base Plate Foundation Load*	522,000 lb	(234,900 kg)



	Power kW	Heat Rate Btu/kWh LHV	Heat Rate kJ/kWh LHV	No. Shafts	Pressure Ratio	Shaft Speed rpm	Exhaust Flow lb/s	Exhaust Flow kg/s	Exhaust Temp. °F	Exhaust Temp. °C
LM6000PC SPRINT*	50041	8461	8961	2	31.0	3627	297	135	821	438
LM6000PC	42890	8173	8617	2	29.1	3627	282	128	825	441
LM6000PD SPRINT	46902	8272	8739	2	30.9	3627	292	133	834	446
LM6000PD	41711	8374	8846	2	29.3	3627	279	127	838	448
LM6000PD (liquid fuel)	40376	8452	8917	2	28.5	3627	272	123	853	456
LM2500PK	29244	9177	9675	2	22.8	3000	193	87.7	967	519
LM2500PV	30349	8577	9069	2	21.5	6100	186	84.3	931	499
LM2500PH**	26463	8673	9080	2	19.4	3000	168	76.2	932	500
LM2500PE	21719	9653	10141	2	18	3000	154	69.8	1000	538

Mechanical-Drive Sets

	Heat Rate Btu/kWh LHV	No. Shafts	Pressure Ratio	Shaft Speed rpm	Exhaust Flow lb/s	Exhaust Flow kg/s	Exhaust Temp. °F	Exhaust Temp. °C
LM6000PC	5941	2	29.1	3600	281.9	127.8	825	440
LM2500PK	6442	2	22.5	3600	192.0	87.1	958	514
LM2500PV	6187	2	21.5	6100	186.0	84.3	931	499
LM2500PE	6773	2	22.8	3600	153.0	69.4	992	533

Note: Performance based on 59° F amb. Temp. 60% RH, sea level, no inlet/exhause losses on gas fuel without NOx media, unless otherwise specified.

*SPRINT 2002 deck is used with water injection to 25ppmvd for power enhancement

**Rating includes use of 50,000 lb/hr steam injection.

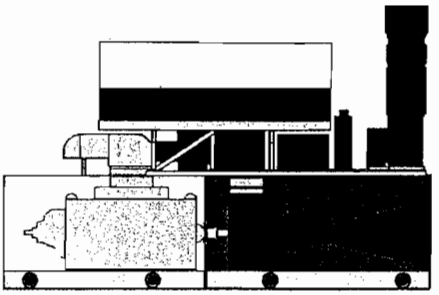
GE Aero Energy Products

A GE Power Systems Business

2707 North Loop West • Houston, TX 77008 • Phone: 713.803.0900 • Fax: 713.803.0362 • www.gepower.com

SPRINT™ 60-Hz Generator Sets

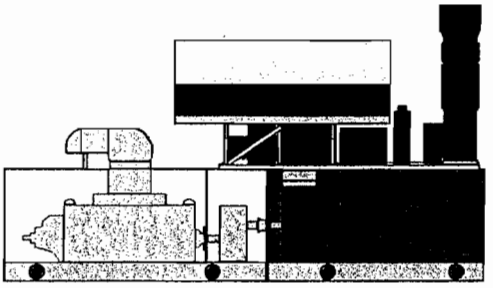
Base Plate Length	56' 6"	(17.22 m)
Base Plate Width	13' 6"	(4.11 m)
Enclosure Height	14' 6"	(4.42 m)
Overall Length	56' 9"	(17.30 m)
Overall Width*	49' 9"	(15.16 m)
Overall Height*	36' 2"	(11.02 m)
Base Plate Foundation Load*	476,000 lb	(214,200 kg)



	Power kW	Heat Rate Btu/kWh LHV	Heat Rate kJ/kWh LHV	No. Shafts	Pressure Ratio	Shaft Speed rpm	Exhaust Flow lb/s	Exhaust Flow kg/s	Exhaust Temp. °F	Exhaust Temp. °C
LM6000PC SPRINT™ *	50080	8434	8916	2	30.9	3600	295	134	826	441
LM6000PC	43417	8112	8549	2	29.1	3600	281	127	831	444
LM6000PD SPRINT™	46824	8235	8688	2	30.7	3600	290	131	837	447
LM6000PD	42336	8308	8765	2	29.3	3600	278	126	846	452
LM6000PD (liquid fuel)	40212	8415	8878	2	28.1	3600	268	122	857	458
LM2500PK	30676	8834	9300	2	23.6	3600	192	87.1	958	514
LM2500PV	30463	8854	9069	2	22.6	6100	186	84.3	931	499
LM2500PH**	27763	8391	8775	2	20.2	3600	167	75.9	926	497
LM2500PE	22719	9311	9789	2	19.1	3600	153	69.4	992	533

SPRINT™ 50-Hz Generator Sets

Base Plate Length	64' 7"	(19.69 m)
Base Plate Width	13' 6"	(4.11 m)
Enclosure Height	14' 6"	(4.42 m)
Overall Length	64' 10"	(19.76 m)
Overall Width*	49' 3"	(15.01 m)
Overall Height*	37' 11"	(11.56 m)
Base Plate Foundation Load*	522,000 lb	(234,900 kg)



	Power kW	Heat Rate Btu/kWh LHV	Heat Rate kJ/kWh LHV	No. Shafts	Pressure Ratio	Shaft Speed rpm	Exhaust Flow lb/s	Exhaust Flow kg/s	Exhaust Temp. °F	Exhaust Temp. °C
LM6000PC SPRINT™ *	50041	8461	8961	2	31.0	3627	297	135	821	438
LM6000PC	42890	8173	8617	2	29.1	3627	282	128	825	441
LM6000PD SPRINT™	46902	8272	8739	2	30.9	3627	292	133	834	446
LM6000PD	41711	8374	8846	2	29.3	3627	279	127	838	448
LM6000PD (liquid fuel)	40376	8452	8917	2	28.5	3627	272	123	853	456
LM2500PK	29244	9177	9675	2	22.8	3000	193	87.7	967	519
LM2500PV	30349	8577	9069	2	21.5	6100	186	84.3	931	499
LM2500PH**	26463	8673	9080	2	19.4	3000	168	76.2	932	500
LM2500PE	21719	9653	10141	2	18	3000	154	69.8	1000	538

Mechanical-Drive Sets

	Heat Rate Btu/kWh LHV	No. Shafts	Pressure Ratio	Shaft Speed rpm	Exhaust Flow lb/s	Exhaust Flow kg/s	Exhaust Temp. °F	Exhaust Temp. °C
LM6000PC	5941	2	29.1	3600	281.9	127.8	825	440
LM2500PK	6442	2	22.5	3600	192.0	87.1	958	514
LM2500PV	6187	2	21.5	6100	186.0	84.3	931	499
LM2500PE	6773	2	22.8	3600	153.0	69.4	992	533

Note: Performance based on 59° F amb. Temp. 60% RH, sea level, no inlet/exhause losses on gas fuel without NOx media, unless otherwise specified.

*SPRINT™ 2002 deck is used with water injection to 25ppmvd for power enhancement

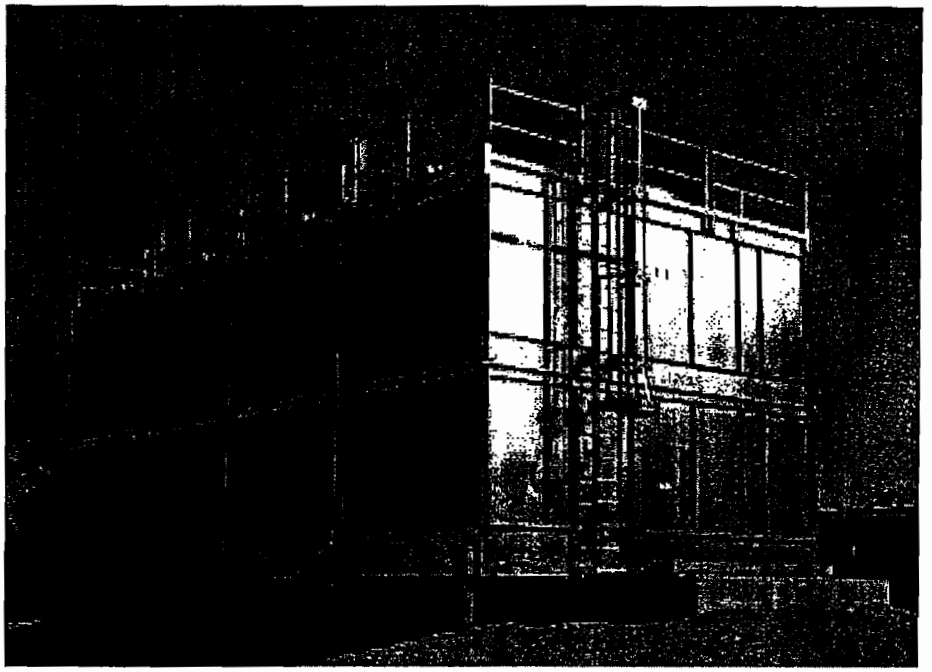
**Rating includes use of 50,000 lb/hr steam injection.

NC® class

Quiet By Design

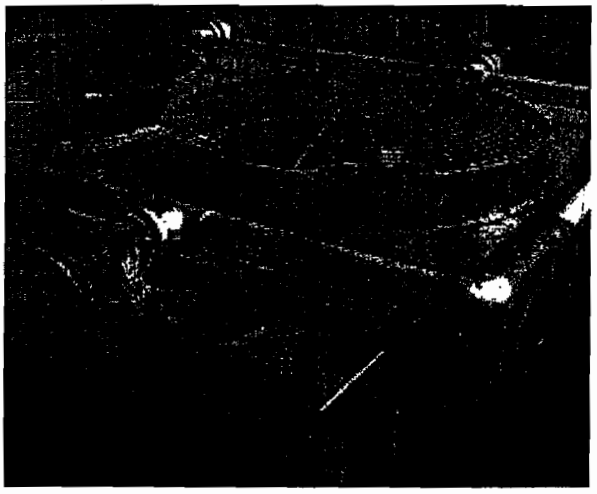
100 Factory Assembled Models
Cell Capacities of 131—1300 Tons

Marley
Cooling Technologies



Four-cell NC Class cooling tower serving a municipal power plant.

The Result of Sound Engineering



The NC Class not only sets the benchmark for low sound levels it also sets the benchmark for some of the highest crossflow tonnage densities per box in the industry. For over 50 years NC cooling towers have delivered thermal performance, low maintenance, versatility of options and outstanding value. But, of even greater significance, the NC Class is now quieter.

The redevelopment, redesign, the "evolution" of the NC cooling tower into the NC Class was the first project at Marley Cooling Tower to fully utilize and employ our new ISO 9001 Certified "Product Development Process."

■ Long Life Construction

Available in series 304 stainless steel or rugged G-235 heavy mill galvanized steel. Marley ISO certified plants assure quality factory-assembly. Plus, the NC Class Diamond Series stainless steel tower comes with Marley's exclusive 5-year limited warranty.

■ Low Operating Costs

Marley's high-efficiency fill and fans, gravity-flow water distribution, and efficient Geareducer® drive work together to offer maximum cooling with minimum power use.

■ All Season Performance

Performs as specified in the heat of summer—responds well to energy-management techniques in the spring and fall—operates virtually ice-free in the dead of winter—and offers simple maintenance all year long.

■ Real World Design

Designed for severe wind, seismic, shipping, operating and live loads.

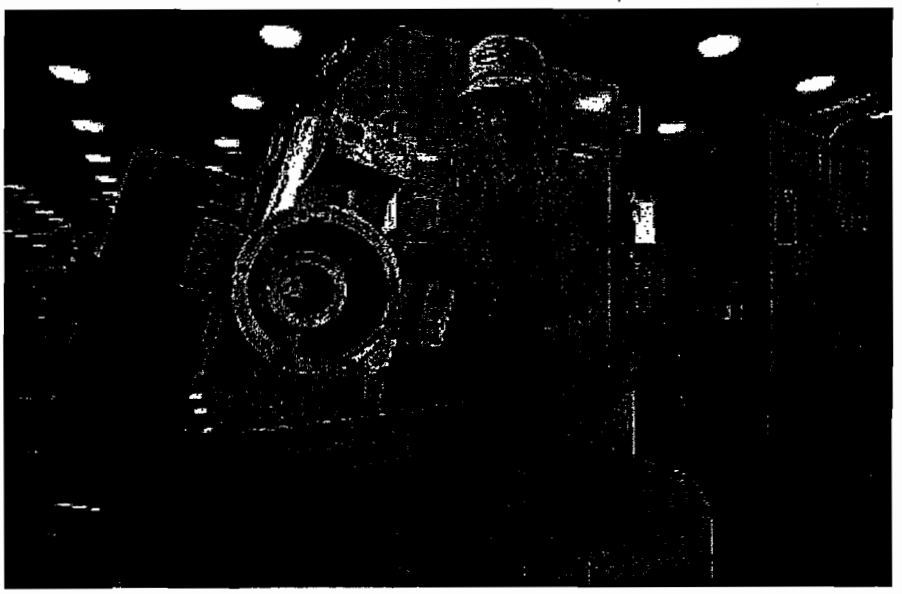
■ CTI Certified

Plus, Marley guarantees the thermal performance of each tower as installed.

■ Factory Mutual Approved

Currently 60 NC Class tower models are FM approved without any added cost.

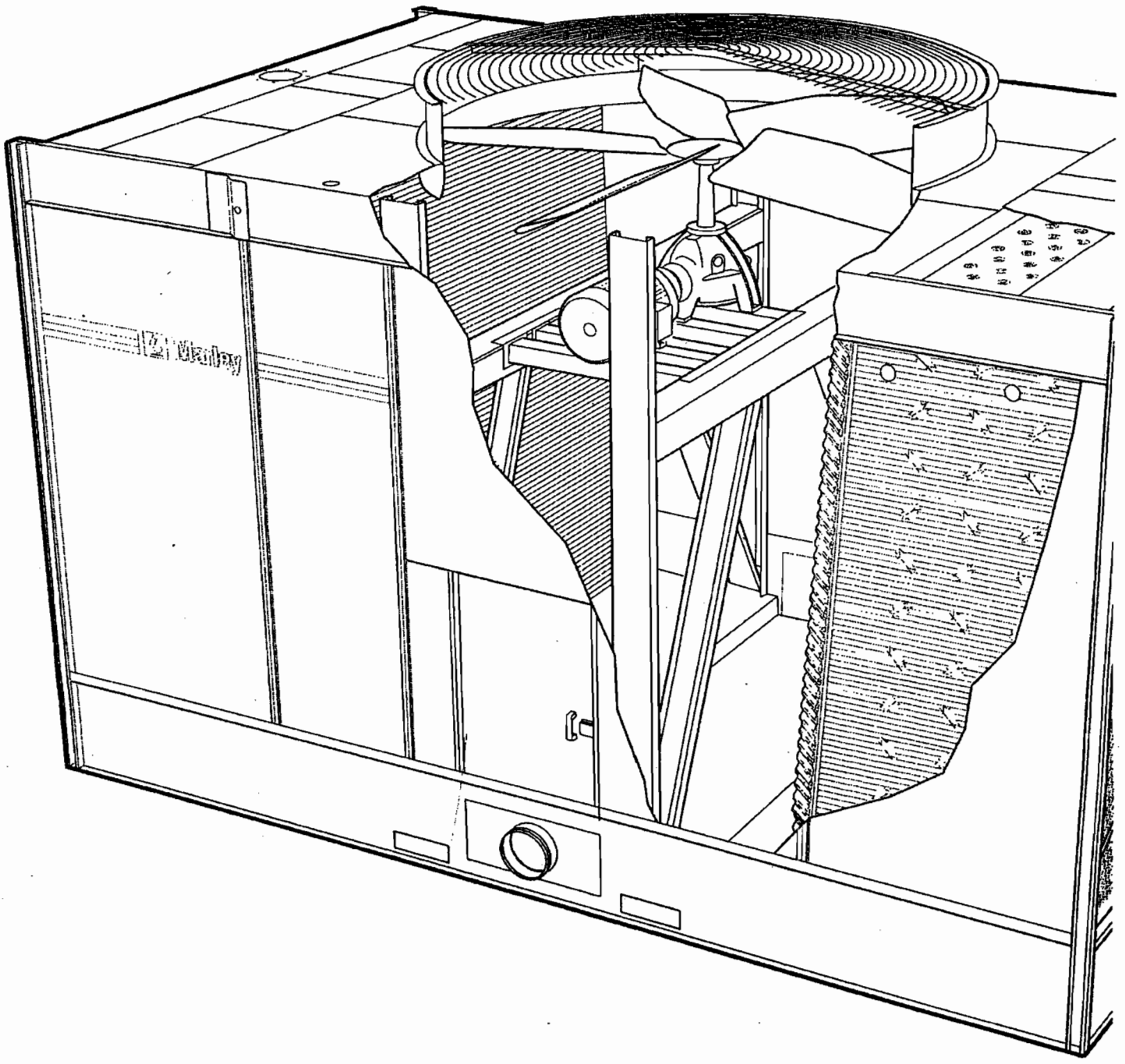
Proven Design Guaranteed Performance



All of Marley's major production facilities are ISO 9002 certified. Assures confidence your NC Class tower will perform as promised.

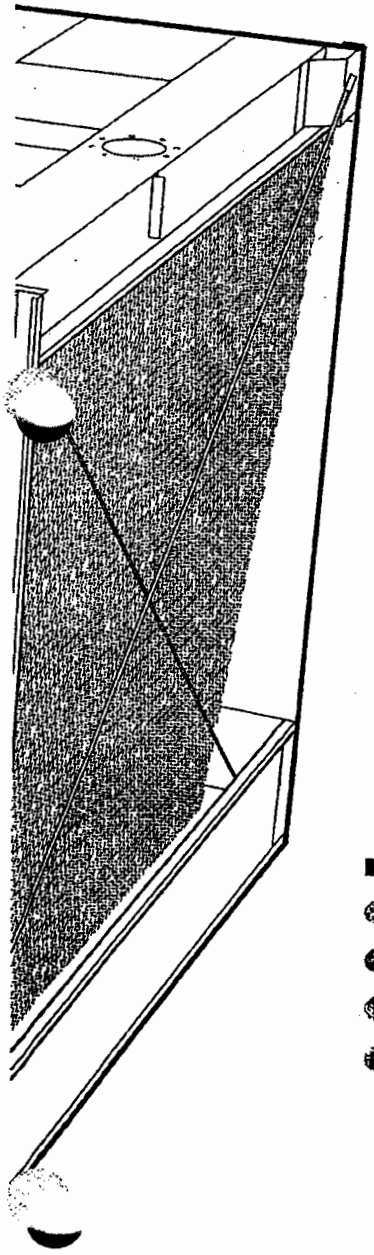
NC® class

In a Class by Itself



■ Air Movement Package

- Removable fan guard—welded heavy gauge rods. Hot dip galvanized after fabrication.
- Eased inlet fan cylinder—ensures full area, low turbulent airflow through the cylinder.
- High efficiency fan—wide-chord design for maximum efficiency at low fan tip speeds.
- Marley System 5 Geareducer—requires no oil changes for five full years. Offers significant savings in maintenance costs.
- Marley SofTork™ coupling—absorbs excessive shock loads at start-up. Forgives minor misalignment between the motor and Geareducer.
- TEFC Fan Motor—1.15 service factor, variable torque, and specially insulated for cooling tower duty.
- The NC Class air movement package including the structural support—guaranteed against failure for a period of five full years. The motor is warranted separately by the motor manufacturer.

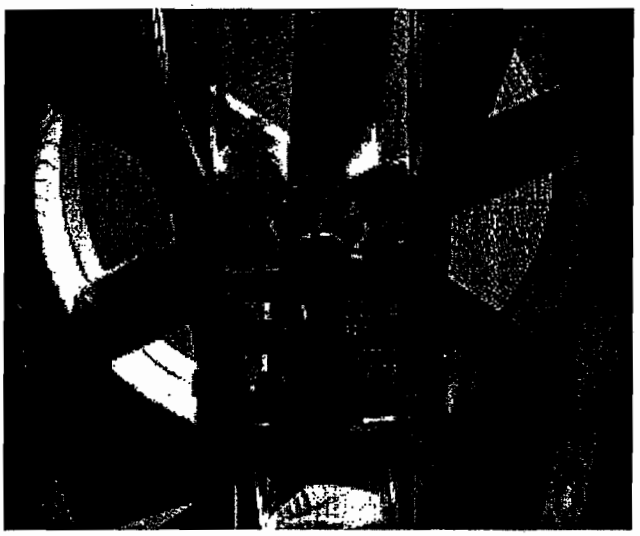


■ Water Distribution System

- SystemConnect choices of piping connection options—single inlet, dual inlet, top, side or bottom inlet, side outlet or bottom outlet—designed to have the right connections for your application.
- Gravity flow distribution system—allows easy, nonrestrictive maintenance. Basin covers are standard.
- Marley Spiral Target polypropylene nozzles—delivers precise distribution over water of the fill area.
- Marley MX thermoformed PVC film fill—suspended from structural steel tubing. Integral louvers keep circulating water confined to fill, even at low air rates.
- Drift Eliminators—limit drift losses to no more than .005% of the design GPM flow rate.

■ Structure

- Crossflow configuration—provides easier and safer maintenance.
- Series 304 stainless steel or G-235 heavy mill galvanized steel construction.
- Factory assembled—ensures final field installation will be hassle-free.
- Two large access doors—provides nonconfining, quick visual inspection of cold water basin, internal structure, drift eliminators and mechanical equipment in the plenum area.



All NC Class cooling towers are designed for low sound levels using high blade-count, wide-chord fans for maximum efficiency at low tip speeds. For those extreme, low sound applications, consider Marley's NC Class low sound *"L"* models. To achieve the very lowest possible sound levels while maintaining efficiency, Marley carefully selected the best available combination of motor, gear ratio, fan blade count and blade profile for all *"L"* models.

Mechanically Correct Quiet by Design

■ High Efficiency Axial Fan

Adjustable-pitch fan blades permit maximum utilization of rated horsepower—allows field adjustments to optimize tower performance.

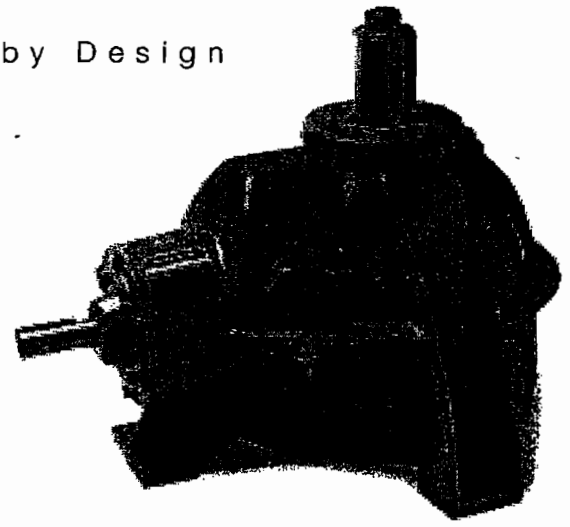
■ System 5 Geareducer

No oil changes required for five full years—the lowest maintenance requirements in the industry. Reduced waste stream and environmental impact.

Independent testing has proven a Marley Geareducer is up to 4 dBA quieter than the gearboxes used by most other cooling tower manufacturers.

■ Fan Motor

TEFC 1.15 service factor, horizontal-shaft motor designed to Marley specifications for cooling tower duty. Specially insulated for humid cooling tower service.



Marley 2400 Geareducer

■ SofTork Coupling

Absorbs excessive shock loads at start-up—forgives minor misalignment between the motor and Geareducer.

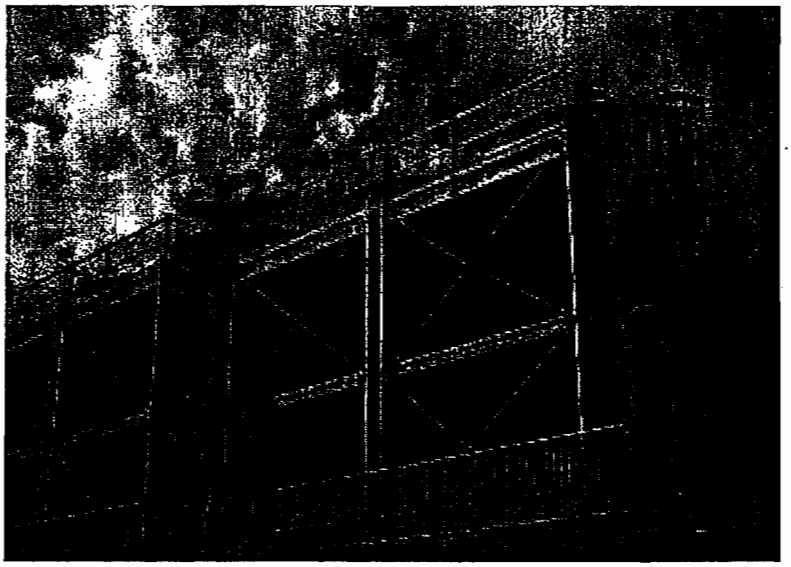
■ Five-Year Mechanical Warranty

Five-year total mechanical equipment warranty including mechanical equipment support, plus Marley's exclusive 5-year maintenance-free Geareducer.

Available Options

- Single Inlet Connection—choose from either side inlet or bottom inlet connections. All piping form the inlet connection to the distribution basins is part of the tower package*.
- Handrail and Ladder—provides sturdy and stable access to the top of your tower. Ladder safety cages and ladder extensions are also available.
- Access Door Platform—steel structure and bar-grating attached to and supported by the tower. Full length bar grating interior walkways are also available.
- Mechanical Access Platform—provides internal ladder to elevated bar-grating platform with handrail, facilitates maintenance access. Exterior platform with ladder and handrail also available for outside motor option. *Modular tower only.*
- Motor Location Outside—easily accessible and is not subjected to the constant humidity that exists inside the tower plenum. This option uses a Marley full-floating stainless steel driveshaft.
- Distribution Basin Dam—allows significant variations in flow rates while protecting the tower from the disadvantages of poor water distribution—icing, fill scaling and erratic performance. Permits the operator to stage chillers and pumps, and still circulate water efficiently over all cooling tower cells with the benefit of dramatically reduced fan hp for a given heat load.
- Control Systems—ranges in sophistication from standard fan starters and disconnects to Programmable Logic Controllers that work in conjunction with your building or process system.
- Variable Speed Drive—provides the ultimate in temperature control, energy management, sound control and mechanical equipment longevity.
- Solid State Water Level Control Package—monitor basin water level with solenoid-valve water makeup. Configurations include makeup along with high and low water level alarm and cutoff and electric basin heater cutoff.
- *MARLEY*OZONE™—water treatment for the 21st century. Usually removes the requirement for other chemical treatment feed systems.
- Stainless Steel Collection Basin—all collection basin parts exposed to the circulating water including structural members projecting into the basin, plus attaching hardware, and all basin options, including sumps are heavy-gauge series 300 stainless steel. *Galvanized steel tower option.*
- Stainless Steel Distribution Basins—corrosion is usually most aggressive in the hot water distribution basins. Stainless steel provides long, trouble-free service life. *Galvanized steel tower option.*
- Extended Geareducer Oil Line—includes a dipstick to check Geareducer oil level. Located at the fan deck level near the side of the tower.
- Air Inlet Screens—keep leaves and debris out of the tower with factory-installed, U-edged, galvanized wire mesh screens over the air inlets.

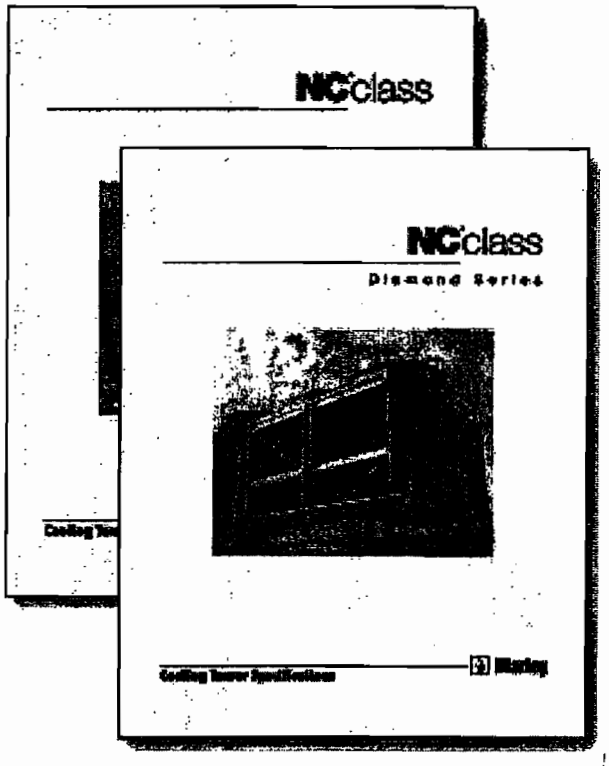
** Standard pipe material is schedule 40 PVC. Steel piping is available as an option and/or where FM approval is required.*

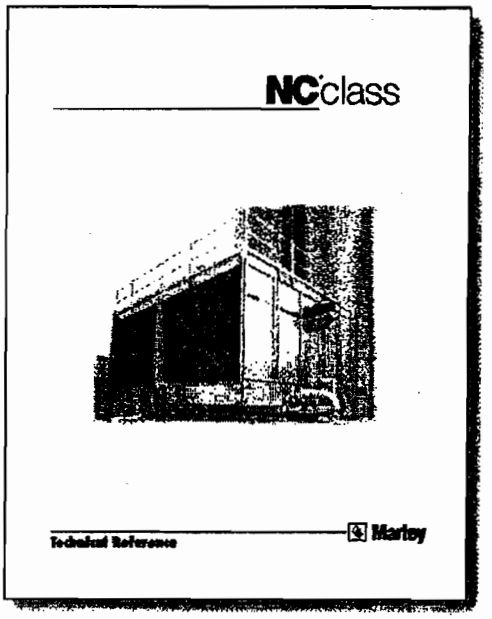


One of the larger multicell NC Class models with a variety of options including: motor outside, handrail, ladder, ladder safety cage.

Technical Reference Manual TECH NC provides quick thermal ratings at typical operating conditions, along with engineering schematics, data, and information necessary for initial tower layout. See your Marley sales representative for a copy.

Product Specifications SPEC SSNC and SPEC NC detail the tower in the form of specification language, and provide technical as well as common-sense information on the importance of your specifications. SPEC SSNC applies to the stainless steel NC Class models and SPEC NC applies to the galvanized NC Class models. See your Marley sales representative for a copy of each.





Marley's UPDATE™ software provides model selections perfectly tuned to your cooling water system. Functions include model selection, specifications, sound data, model optimization, performance curves, engineering data, and *free cooling* applications. See your Marley sales representative for a copy.

If we can help in any way, feel free to call us. To find the Marley representative nearest you call 913 664 7400 or check the internet at www.marleycoolingtower.com.

Marley
Cooling Technologies

7401 W 129 Street • Overland Park, KS 66213 • 913 664 7400
www.marleyct.com • email: info@marleyct.com

NC-01A

Note: For economical transportation, NC Class towers are normally packaged unassembled when shipped from the US by sea or air freight.

Appendix C

Pertinent Correspondence

New York State Department of Environmental Conservation

Air Resources Division

196 Baker Avenue Extension, Concord, Massachusetts 01742

September 25, 2003

Mr. Leon Sedefian
New York State Department of Environmental Conservation
Air Resources Division
625 Broadway
Albany, NY 12233-3250

Subject: **Air Quality Modeling Protocol**
Bethpage Facility Expansion
Calpine Corporation

Dear Leon:

Based on discussions at our meeting with you on September 23, this letter documents the protocol for the air quality modeling analysis to be performed for the proposed expansion of the Calpine Corporation's Bethpage Facility in Hicksville, New York. The protocol describes the procedures for the air quality modeling analysis that will be used to demonstrate that the predicted air quality impacts associated with the proposed expansion will comply with applicable federal and state ambient air quality standards. This protocol is intended for your review and comment prior to the submission of the preconstruction permit application for the new combustion turbine to the New York State Department of Environmental Conservation (NYSDEC).

Telephone
978.371.4000
Facsimile
978.371.2468

Project Overview

The Calpine Corporation of San Jose, California proposes to construct and operate a new combined-cycle combustion turbine at the site of the existing TBG Cogen Partners facility in Hicksville, New York (see Figure 1). The facility currently consists of two combined-cycle General Electric (GE) LM2500 PE combustion turbines and a single simple-cycle GE LM6000 PC combustion turbine. Power from the facility is sold both to the Northrop Grumman Corporation and to the Long Island Power Authority (LIPA) under existing power purchase arrangements. Steam generated at the facility is sold to the Northrop Grumman Corporation.

The proposed combustion turbine will be constructed in two phases. Phase 1 will entail the construction and operation of a new simple-cycle General Electric (GE) LM6000 SPRINT combustion turbine generator with rated capacity of less than 50 megawatts (MW). The project schedule calls for the new combustion turbine to be in commercial operation no later than June 2004. During the summer of 2003, the LM6000 will operate in a simple-cycle mode. In Phase 2, the new combustion turbine generator will be converted to a combined-cycle unit with the construction of a once through steam generator (OTSG) equipped with duct burners, a steam turbine generator, and a condenser and associated five-cell cooling tower. A second two-cell cooling tower will also be installed to serve chillers on site. Upon completion of Phase 2 during the second quarter of 2004, the combustion turbine will operate in a combined-cycle mode, utilizing the waste heat from the combustion turbine to generate additional electricity in the steam turbine generator. The combined-cycle combustion turbine will have a rated capacity of less than 80 MW. A site plan showing the location of major structures and equipment on site is provided in Figure 2.

The existing facility is classified as a major source and is located in attainment or unclassified areas for fine particulate (PM_{10}), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and carbon monoxide (CO) and a severe nonattainment area for ozone (O_3). Before initiating construction of the new combustion turbine, Calpine must obtain a preconstruction permit from the NYSDEC in accordance with 6 NYCRR Part 201-5. Because potential emissions are below the significant emissions rates, the proposed combustion turbine is not classified as a major modification of an existing major source and, hence, is not subject to the additional requirements of the Prevention of Significant Deterioration (PSD) Rules (40 CFR Part 52.21). The proposed combustion turbine, however, does have potential nitrogen oxide (NO_x) emissions above the corresponding significant emission rate and, hence, is subject to the additional requirements of Nonattainment New Source Review (NNSR) for NO_x only (6 NYCRR Part 225-2).

Modeling Procedures

This section describes the procedures to be employed in the air quality modeling analysis, including the models to be employed, model input options, and supporting data. The purpose of the air quality impact analysis is to demonstrate that the Project's predicted air quality impacts will comply with applicable federal and state ambient air quality standards.

Land Use

A land use determination was made following the classification technique suggested by Auer and recommended by EPA. The classification determination was conducted by assessing land use categories within a three-kilometer radius of the site using USGS land-use files. Figure 3 provides a section of USGS map showing the site and 3-km radius around the site. The analysis showed that more than 65 percent of the land use in the 3-km radius was classified as residential and most closely matches the common residential category of the Auer scheme. Therefore, rural dispersion coefficients are proposed for the air quality modeling.

Meteorological Data

According to NYSDEC Air Guide-26 (NYSDEC 1996), modeling analyses should use five (5) years of nearby, representative observations compiled by the National Weather Service (NWS). The nearest NWS meteorological tower with hourly surface observations is located at Republic Airport in Farmingdale, New York (FAA Identifier FRG), approximately 6.8 kilometers east-southeast of the Project site. Beginning in 1997, a nearly complete data record is available from this station. The station changed from observer-based to an Automated Station Observing System (ASOS) on August 4, 1999. The most recent five-year period (1998-2002) is proposed for the modeling analysis. Surface observations were obtained from the National Climatic Data Center in DATSAV3 format and converted to HUSWO format. This meteorological database was more than 90 percent complete for each of the five years. Simultaneous observations collected at MacArthur Airport in Islip, New York (ISP) were used to replace missing data compiled from Republic Airport. The frequency distribution of wind direction and wind speed is shown in the wind rose in Figure 4.

The nearest upper air soundings during this period were from Brookhaven, New York (OKX) for the same five-year period. These soundings were used in conjunction with the surface observations from MacArthur Airport (ISP) to develop mixing heights to be used in the modeling analysis. The EPA programs MIXHTS and PCRAMMET were used to process the meteorological data.

Source Parameters

The stack parameters and criteria pollutant emission rates from the new combustion turbine operating at 100, 75 and 50 percent load are provided in Tables 1 through 3, respectively. The stack parameters and PM10 emissions for the new cooling towers are then provided in Table 2. Criteria pollutants include those pollutants for which ambient air quality standards have been developed by the EPA (6NYCRR 257). In addition to the criteria pollutants, the NYSDEC has established ambient air quality standards for fluorides, hydrogen sulfide, and beryllium. None of these pollutants, however, will be emitted from the new combustion turbine.

Table 1: Stack Parameters for the Proposed Combustion Turbine at 100-Percent Load

Parameter	Units	Value					
Temperature	°F	-10	-10	59	59	110	110
Relative Humidity	%	20	20	60	60	20	20
Duct Burner	On/Off	Off	On	Off	On	Off	On
Stack Height	m	30.48	30.48	30.48	30.48	30.48	30.48
Exit Temperature	°K	644.97	355.52	714.41	355.52	716.63	355.52
Exit Velocity	m/s	32.68	18.30	33.40	15.53	31.54	15.76
Exit Diameter	m	3.28	3.28	3.28	3.28	3.28	3.28
NO_x	g/s	0.514	0.808	0.539	0.832	0.488	0.782
CO	g/s	0.971	1.299	0.315	0.643	0.114	0.441
PM10	g/s	0.315	0.479	0.315	0.479	0.315	0.479
SO_2	g/s	0.078	0.124	0.082	0.127	0.074	0.119

Table 2: Stack Parameters for the Proposed Combustion Turbine at 75-Percent Load

Parameter	Units	Value					
Temperature	°F	-10	-10	59	59	110	110
Relative Humidity	%	20	20	60	60	20	20
Duct Burner	On/Off	Off	Off	Off	Off	Off	Off
Stack Height	m	30.48	30.48	30.48	30.48	30.48	30.48
Exit Temperature	°K	626.08	344.41	684.41	344.41	709.97	344.41
Exit Velocity	m/s	27.32	15.03	28.59	12.94	26.81	13.01
Exit Diameter	m	3.28	3.28	3.28	3.28	3.28	3.28
NO_x	g/s	0.401	0.401	0.416	0.416	0.378	0.378
CO	g/s	0.745	0.745	0.202	0.202	0.063	0.063
PM10	g/s	0.315	0.315	0.315	0.315	0.315	0.315
SO_2	g/s	0.061	0.061	0.063	0.063	0.058	0.058

Table 3: Stack Parameters for the Proposed Combustion Turbine at 50-Percent Load

Parameter	Units	Value					
Temperature	°F	-10	-10	59	59	110	110
Relative Humidity	%	20	20	60	60	20	20
Duct Burner	On/Off	Off	Off	Off	Off	Off	Off
Stack Height	m	30.48	30.48	30.48	30.48	30.48	30.48
Exit Temperature	°K	611.63	344.41	689.41	344.41	709.41	344.41
Exit Velocity	m/s	22.25	12.53	22.63	11.30	23.40	11.36
Exit Diameter	m	3.28	3.28	3.28	3.28	3.28	3.28
NO_x	g/s	0.299	0.299	0.307	0.307	0.283	0.283
CO	g/s	0.492	0.492	0.139	0.139	0.050	0.050
PM10	g/s	0.315	0.315	0.315	0.315	0.315	0.315
SO_2	g/s	0.046	0.046	0.047	0.047	0.043	0.043

Table 4: Stack Parameters for the Proposed Cooling Towers

Parameter	Units	Condenser Cooling Tower		Chillers Cooling Tower	
Number of Cells	NA	1	5	1	2
Stack Height	m	8.46	8.46	6.04	6.04
Exit Temperature	°K	306.3	306.3	302.4	302.4
Exit Velocity	m/s	13.56	13.56	13.00	13.00
Exit Diameter	m	4.27	4.27	3.66	3.66
PM10	g/s	0.00022	0.00108	0.00009	0.00019

GEP Stack Height Analysis

The new turbine building is the controlling building in the determination of GEP formula height (i.e., building height plus 1.5 times the lesser of the building height or projected width). Therefore, the formula GEP height for the proposed stack is 172.5 feet (2.5 times 69 feet). The GEP height would be the *de minimis* value of 213.25 feet (65 meters).

Calpine proposes to construct a 100-foot stack to serve the new combustion turbine. The stack has been evaluated with the Building Profile Input Program (BPIP) for all potential influencing structures (including the new turbine building, the existing turbine building, and the central heating plant on a parcel adjacent to the site) to determine building dimensions for model input. The proposed stack and building structures are presented in Figure 5. The BPIP input and output files are being sent to you in electronic form.

Simple Terrain Modeling

Refined modeling will be conducted using the EPA ISCST3 model (Version 02035). In accordance with the EPA's Guideline on Air Quality Models, as revised (40 CFR 51 Appendix W), this model is the most appropriate to address potential pollutant impacts from the proposed combustion turbine. The ISCST3 dispersion model will be used to evaluate only simple terrain by selecting the control keyword NOCMPL. The non-default option HE>ZI will be selected because many receptors are below stack base elevation and this option protects against the mixing height dropping below the plume centerline and yielding anomalously large concentrations from the image source. The rural mode option will also be selected.

A refined polar receptor grid centered on the new combined cycle stack will be developed. Receptors will be located every 10 degrees at the following distances (excluding receptors located inside the facility fence line):

- At 10-meter intervals from 10 to 100 meters;
- At 25-meter intervals from 100 to 200 meters;
- At 50-meter intervals from 200 to 500 meters;
- At 100-meter intervals from 500 to 2,000 meters;
- At 250-meter intervals from 2,000 to 5,000 meters;
- At 1,000-meter intervals from 5,000 to 10,000 meters.

The near-field receptor array is graphically displayed in Figure 6. In addition, discrete receptors will be placed along the property boundary at 10-meter intervals and at nine schools nearest the Project site. Terrain elevations at receptors will be extracted and reformatted from USGS 10-meter digital terrain data using the Earth Tech TERREL program. A dense grid of receptors with spacing of about 50 meters will be placed near the largest concentrations predicted with this receptor grid to ensure that the maximum value is captured.

The maximum concentrations from the ISCST3 model for criteria pollutants will be compared with the significant impacts levels (SILs) to determine compliance with the National Ambient Air Quality Standards (NAAQS).

Complex Terrain Modeling

The EPA-approved VALLEY model (as coded in the EPA SCREEN3 model version 96043) will be used to evaluate the Project's impact in complex terrain (terrain at stack top elevation and above). At each distance ring in the polar grid used in the ISC3 model, the highest terrain elevation will be determined. Those elevations above stack height will be used as input to VALLEY.

The VALLEY model produces a maximum 24-hour concentration. For the 1-hour, 3-hour, 8-hour and annual averaging times, the following NYSDEC procedure will be used:

1. The 24-hour concentration is multiplied by 4 to obtain a 1-hour concentration; and

2. The 1-hour concentration is scaled to other averaging times using the SCREEN3 scaling factors; 0.9 for 3-hour concentrations, 0.7 for 8-hour concentrations, and 0.08 for annual average concentrations.

The maximum concentrations from the VALLEY model for criteria pollutants will also be compared with the SILs to determine compliance with the NAAQS.

Cavity Zone Analysis

Because emissions from the combustion turbine will be released from a stack that is below GEP stack height, the potential for emissions being entrained into the recirculation zone (cavity) will be considered in the air quality analysis. The PM10 emissions from the cooling towers being entrained into the cavity will also be considered in the analysis. The cavity zone analysis will be conducted using the SCREEN3 model consistent with EPA guidance.

Modeling Scenarios

The basic modeling scenario to be considered in the compliance demonstration for the proposed combustion turbine is the operation of the combustion turbine units over the full range of expected operating loads (50, 75 and 100 percent) and ambient temperatures (-10, 59 and 110°F). The combustion turbine will not operate at less than 50-percent load except during startup and shutdown. For the simple-cycle operating mode planned for the summer of 2004, however, the exhaust temperatures and exhaust speeds would be higher than during combined-cycle operations. This leads to larger plume rise. Furthermore, the pollutant emission rates under the simple-cycle operating mode would be the same or lower than those associated with combined-cycle operations. Consequently, the maximum predicted concentrations will be smaller with the simple-cycle operating mode. The modeling analysis, therefore, will consider only the worst-case operating scenario of the combustion turbine operating in the combined-cycle mode. The modeling analysis will also consider PM10 emissions from the cooling towers for the combined-cycle mode.

The purpose of the air quality modeling analysis is to demonstrate that the proposed combustion turbines and cooling towers will comply with the NAAQS. To determine compliance with the NAAQS, the maximum predicted pollutant concentrations will initially be compared to the SILs for criteria pollutants consistent with the EPA's *New Source Review Workshop Manual* (Draft, 1990). The NAAQS and SILs are summarized in Table 3. For this analysis, a conservative NO_x to NO_2 conversion of 100 percent is proposed for predicting annual NO_2 concentrations. It is anticipated that the air quality modeling analysis will demonstrate that the maximum predicted concentrations would be less than corresponding SILs. In this event, no additional air quality modeling with other regional sources will be required by the NYSDEC.

Table 5: SILs, NAAQS, and PSD Increments*

Pollutant	Averaging Time	Units	Significant Impact Level	NAAQS
SO_2	3-hour	$\mu g/m^3$	25	1,300
	24-hour	$\mu g/m^3$	5	365
	Annual	$\mu g/m^3$	1	80
PM_{10}	24-hour	$\mu g/m^3$	5	150
	Annual	$\mu g/m^3$	1	50
TSP	24-hour	$\mu g/m^3$	5	250
	Annual	$\mu g/m^3$	1	45
NO_2	Annual	$\mu g/m^3$	1	100
CO	1-hour	$\mu g/m^3$	2,000	40,000
	8-hour	$\mu g/m^3$	500	10,000
Ozone (O_3)	1-hour	ppm	NA	NA
Lead (Pb)	Quarterly	$\mu g/m^3$	NA	1.5
Beryllium	1-month	$\mu g/m^3$	NA	0.01
NMHC	3-hour	ppm	NA	0.24
Hydrogen Sulfide	1-hour	$\mu g/m^3$	NA	14

* Compliance with PM_{10} 24-hour NAAQS is based on the 99 percentile, which equates to the fourth highest concentration. For all other averaging periods, except annuals, the standard must not be exceeded more than once per year. For the annual averaging period, the standard must never to be exceeded.

If you have any question regarding the proposed air quality modeling protocol, please do not hesitate to contact me at (978) 371-4000.

Sincerely yours,

Earth Tech, Inc.

Lloyd Schulman

Lloyd L. Schulman, Ph.D.
Manager, Atmospheric
Modeling Section

196 Baker Avenue Concord, Massachusetts

October 3, 2003

Mr. Kevin A. Kispert
New York Department of Environmental Conservation
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, NY 12233-1750

Subject: **Part 201 Preconstruction Permit Application**
Bethpage Energy Center 3, Inc.
Hicksville, New York

On behalf of Bethpage Energy Center 3, LLC, Earth Tech, Inc. is submitting herewith four (4) copies of the Part 201 preconstruction permit application for the proposed expansion of the existing power generation facility in Hicksville, New York. The proposed expansion entails the installation of a new General Electric (GE) LM6000 SPRINT combustion turbine generator and associated heat recovery equipment to generate up to 79.9 MW of electrical power. The preconstruction permit application has been prepared in accordance with the requirements of the New York State Department of Environmental Conservation (NYSDEC) set forth in 6 NYCRR Subpart 201-5.

Telephone
978.371.4000
Facsimile
978.371.2468

Bethpage Energy Center 3, LLC proposes to construct and operate a new combined-cycle, combustion turbine generator at the site of the existing TBG Cogen Partners and CPN Bethpage 3rd Turbine, Inc. facility in Hicksville, New York. TBG Cogen Partners and CPN Bethpage 3rd Turbine, Inc. are both subsidiaries of the Calpine Corporation. The facility currently consists of a cogeneration plant and a simple-cycle power plant. The cogeneration plant includes two GE LM2500 PE combustion turbine generators, two heat recovery steam generators, and one steam turbine generator. The simple-cycle power plant includes a single GE LM6000 SPRINT simple-cycle, combustion turbine generator. Because the existing facility qualifies as a "major source" under 6 NYCRR Part 201, TBG Cogen Partners currently operates the facility under a Title V facility permit issued by the NYSDEC on October 27, 1998 (Permit No. 1-2824-00947/00004). An application for a Title V permit modification to add the CPN Bethpage 3rd Turbine is pending with the NYSDEC.

The proposed project will be constructed in two distinct phases. Phase 1 will entail the construction and operation of the new GE LM6000 SPRINT combustion turbine generator with a nominal electrical power output of less than 50 megawatts.. The project schedule calls for the new combustion turbine to be in commercial operation in a simple-cycle mode no later than June 2004. In Phase 2, the combustion turbine generator will be converted to a combined-cycle unit with the activation of a once through steam generator (OTSG) equipped with duct burners, and a steam turbine generator. Upon completion of Phase 2 in June 2005, the combustion turbine generator will operate in a combined-cycle mode, utilizing the waste heat from the combustion turbine to generate additional electricity in the steam turbine generator. The combined-cycle project will have a nominal electrical power output of 79.9 MW or less.

If you have any questions or require further information, please do not hesitate to contact either Donald Neal of the Calpine at (617) 557-5333 or me at (978) 371-4393.

Sincerely yours,

Earth Tech, Inc.

Ian B. Thomson

Ian B. Thomson, P.E.
Senior Project Manager

United States Department of the Interior

Fish and Wildlife Service

40 British American Boulevard, Latham, New York 12110

October 8, 2003

Mr. David A. Stillwell
Field Supervisor
United States Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: ***Request for Review***
Proposed Bethpage Energy Center 3
Hicksville, New York

Dear Mr. Stillwell:

This letter requests review by the United States Fish and Wildlife Service as to the known occurrence of federally-listed or proposed endangered or threatened species and/or their critical habitat at or in the immediate vicinity of the proposed Bethpage Energy Center 3 project located in Hicksville, Nassau County, New York. I've attached a site location map that identifies the specific site location. As shown on this map, the site is located in the extreme northwest corner of USGA's Amityville, New York 7.5 Minute Quad Map, just to the east of New York State route 107. The entire existing/proposed site is presently developed.

Telephone
518.95 2300
Facsimile
518.951.2300

Please contact me at (518) 051-2273 if you have any questions on this request. We appreciate the assistance of you and your staff.

Very truly yours,

Earth Tech, Inc.

Kenneth G. Gelting

Kenneth G. Gelting, PE
Project Engineer

Attachment: 1) Site Location Map

C. Don Neal, Calpine Corporation
Ian Thomson, Calpine Corporation

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

October 22, 2003

Mr. Kenneth G. Gelting, P.E.
Project Engineer
Earth Tech
40 British American Boulevard
Latham, NY 12110

Dear Mr. Gelting:

This responds to your letter of October 8, 2003, requesting information on the presence of endangered or threatened species in the vicinity of the proposed Bethpage Energy Center 3 in the vicinity of the Grumman-Bethpage Airfield in the Town of Hempstead, Nassau County, New York.

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project impact area. In addition, no habitat in the project impact area is currently designated or proposed "critical habitat" in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). Therefore, no further Endangered Species Act coordination or consultation with the U.S. Fish and Wildlife Service (Service) is required. Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered. The most recent compilation of Federally listed and proposed endangered and threatened species in New York* is available for your information.

The above comments pertaining to endangered species under our jurisdiction are provided pursuant to the Endangered Species Act. This response does not preclude additional Service comments under other legislation.

For additional information on fish and wildlife resources or State-listed species, we suggest you contact the appropriate New York State Department of Environmental Conservation regional office(s),* and:

New York State Department of Environmental Conservation
New York Natural Heritage Program Information Services
625 Broadway
Albany, NY 12233-4757
(518) 402-8935

Since wetlands may be present, you are advised that National Wetlands Inventory (NWI) maps may or may not be available for the project area. However, while the NWI maps are reasonably accurate, they should not be used in lieu of field surveys for determining the presence of wetlands or delineating wetland boundaries for Federal regulatory purposes. Copies of specific NWI maps can be obtained from:

Cornell Institute for Resource Information Systems
302 Rice Hall
Cornell University
Ithaca, NY 14853
(607) 255-4864

Work in certain waters of the United States, including wetlands, may require a permit from the U.S. Army Corps of Engineers (Corps). If a permit is required, in reviewing the application pursuant to the Fish and Wildlife Coordination Act, the Service may concur, with or without recommending additional permit conditions, or recommend denial of the permit depending upon potential adverse impacts on fish and wildlife resources associated with project construction or implementation. The need for a Corps permit may be determined by contacting the appropriate Corps office(s).*

If you require additional information or assistance please contact Michael Stoll at (607) 753-9334.

Sincerely,

Mark W. Clough
Acting For

David A. Stilwell
Field Supervisor

cc: NYSDEC, Stony Brook, NY (Environmental Permits)
NYSDEC, Albany, NY (Natural Heritage Program)
COE, New York, NY

New York State Department of Environmental Conservation

Division of Fish, Wildlife & Marine Resources

40 British American Boulevard, Latham, New York 12110

October 8, 2003

Ms. Heidi J. Krahling
Information Services
New York Natural Heritage Program
Wildlife Resources Center
Division of fish, Wildlife and Marine Resources
New York State Department of Environmental Conservation
625 Broadway, 5th Floor
Albany, New York 12233-4757

Subject: ***Request for Review***
Proposed Bethpage Energy Center 3
Hicksville, New York

Telephon

518.951.2200

Facsimil

Dear Ms. Krahling:

This letter requests review by the New York State Natural Heritage Program as to the known occurrence of rare or State-listed animals or plants, significant natural communities or other significant habitat at or in the immediate at or in the immediate vicinity of the proposed Bethpage Energy Center 3 project located in Hicksville, Nassau County, New York. I've attached a site location map that identifies the specific site location. As shown on this map, the site is located in the extreme northwest corner of USGA's Amityville, New York 7.5 Minute Quad Map, just to the east of New York State route 107. The entire existing/proposed site is presently developed.

Please contact me at (518) 051-2273 if you have any questions on this request. We appreciate the assistance of you and your staff.

Very truly yours,

Earth Tech, Inc.

Kenneth G. Gelting

Kenneth G. Gelting, PE
Project Engineer

Attachment: 1) Site Location Map

C. Don Neal, Calpine Corporation
Ian Thomson, Calpine Corporation

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

October 28, 2003

Kenneth G Gelting
Earth Tech
40 British American Blvd
Latham, NY 12110

Dear Mr. Gelting:

In response to your recent request, we have reviewed the New York Natural Heritage Program databases with respect to an Environmental Assessment for the proposed Bethpage Energy Center 3, site as indicated on a map you provided, located Hicksville, Town of Oyster Bay, Nassau County.

> We have no records of known occurrences of rare or state-listed animals or plants, significant natural communities, or other significant habitats, on or in the immediate vicinity of your sites.

The absence of data does not necessarily mean that rare or state-listed species, natural communities or other significant habitats do not exist on or adjacent to the proposed site. Rather, our files currently do not contain any information which indicates their presence. For most sites, comprehensive field surveys have not been conducted. For these reasons, we cannot provide a definitive statement on the presence or absence of rare or state-listed species, or of significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

This response applies only to known occurrences of rare or state-listed animals and plants, significant natural communities and other significant habitats maintained in the Natural Heritage Databases. Your project may require additional review or permits; for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

Sincerely,

Heidi Krahling

Heidi J. Krahling, Information Services
New York Natural Heritage Program

Enc.
cc: Reg. 1, Wildlife Mgr.

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau

40 British American Boulevard, Latham, New York 12110

October 8, 2003

Ms. Ruth L. Pierpont
Director
Historic Preservation Field Services Bureau
New York State Office of Parks, Recreation and Historic Preservation
Peebles Island
P.O. Box 189
Waterford, New York 12188-0189

Subject: ***Request for Review***
Proposed Bethpage Energy Center 3
Hicksville, Nassau County, New York

Telephone
518.95
Facsimile
518.951.2300

Dear Ms Pierpont:

This letter is submitted as a request for review by the New York State Historic Preservation Field Services Bureau as to potential impacts to cultural and/or historic resources, including sites or resources listed or eligible for listing in the State and/or Natural Register of Historic Places, for the proposed Bethpage Energy Center 3 project located in Hicksville, Nassau County, New York, pursuant to Section 14.09 of the New York Stat Parks, Recreation and Historic Preservation Law.

Attachment 1 to this letter provides the completed Project Review Cover Form for the proposed project. Attachment 2 provides a Site Location Map for the existing/proposed project site and Attachment 3 provides an aerial photograph the proposed project site vicinity.

The project consists of the proposed expansion by Bethpage Energy Center 3, LLC, a subsidiary of the Calpine Corporation (Calpine), of Calpine's existing power generation facility located in Hicksville, New York. Specifically, Bethpage Energy Center 3, LLC proposes to construct and operate a new combined-cycle, combustion turbine generator at the site of the existing TBG Cogen Partners and CPN Bethpage 3rd Turbine, Inc. facility in Hicksville. TBG Cogen Partners and CPN Bethpage 3rd Turbine, Inc. are both subsidiaries of Calpine. The facility currently consists of a cogeneration plant and a simple-cycle power plant. The proposed project entails the installation of a new combustion turbine generator and associated heat recovery equipment to generate up to 79.9 Megawatts of electrical power. The electrical power from the new combustion turbine will be sold under a Power Purchase Agreement with the Long Island Power Authority.

Attachment 4 provides a "close-in" aerial color photograph of the existing power generation facility, taken from southeast. The new combustion turbine will be installed in the site area to the immediate south of the existing power production infrastructure. With reference to the photograph provided in Attachment 4, the new combustion turbine and its supporting infrastructure will be installed in the general location of two former aeration basins shown in the very lower left hand corner of the photograph. The aeration basins have been decommissioned since this photograph was taken. Additional supporting infrastructure for the proposed new turbine will also be installed

within the limits of the existing power production facility.

Please contact me at (518) 951-2273 if you have any questions or require additional information on this request. We appreciate the assistance of you and your staff.

Very truly yours,

Earth Tech, Inc.

Kenneth G. Gelting

Kenneth G. Gelting, PE
Project Engineer

Attachments: As described.

C. Don Neal, Calpine Corporation
Ian Thomson, Earth Tech
Kevin Kispert, NYSDEC Central Office

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island Resource Center, PO Box 189, Waterford, NY 12188-0189

PROJECT REVIEW COVER FORM

Please complete this form and attach it to the top of any and all information submitted to this office for review. Accurate and complete forms will assist this office in the timely processing and response to your request.

☐ This information relating to a previously submitted project
PROJECT NUMBER ____PR_____
(Previous number assigned to this project by this office)

If you have checked this box and noted the previous Project Review (PR) number assigned by this office you do not need to continue unless any of the required information below has changed.

☒ This is a new project

If you have checked this box you will need to complete ALL of the following information.

Project Name PROPOSED BETHPAGE ENERGY CENTER 3

Location 939 S. BROADWAY
You MUST include street number, street name and/or County, State of Interstate route number if applicable

City/Town/Village HICKSVILLE, NY 11801-5032
List the correct municipality in which your project is being undertaken. If in a NON-INCORPORATED hamlet/village you must also provide the name of the town.

County Nassau

If your project covers multiple communities/counties please attach a list defining all municipalities/counties included.

TYPE OF REVIEW REQUIRED/REQUESTED

1. Is this project being developed using New York State funds ? ☐ Federal funds ? ☐

If you checked either or both of these boxes list the New York State and/or Federal Agency or Program that is providing the funding:

2. Does this project requires a New York State permit ? ☒ Federal permit ? ☐

If you checked either or both of these boxes list the New York State and/or Federal Agency or Program that is providing the permit and the type of permit being requested: 6 NYCRR PART 201 PRE-CONSTRUCTION PERMIT
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

3. SEQRA ☐ New York State Environmental Quality Review Act

4. Information Request ☐ No state or federal funding or permit(s) involved

CONTACT PERSON FOR PROJECT

Name KENNETH Gelting **Title** ENVIRONMENTAL ENGINEER

Firm/Agency EARTH TECH

Address 40 BRITISH AMERICAN Boulevard **City** LATHAM **STATE** NY **Zip** 12110

Phone (518) 951-2273 **Fax** (518) 951-2300

The Historic Preservation Review Process in New York State

In order to insure that historic preservation is carefully considered in publicly-funded or permitted undertakings, there are laws at each level of government that require projects to be reviewed for their potential impact/effect on historic properties. At the federal level, Section 106 of the National Historic Preservation Act of 1966 (NHPA) direct the review of federally funded, licensed or permitted projects. At the state level, Section 14.09 of the New York State Parks, Recreation and Historic Preservation Law of 1980 performs a comparable function. Local environmental review for municipalities is carried out under the State Environmental Quality Review Act (SEQRA) of 1978.

Project review is conducted in two stages. First, the Field Service's Bureau assesses a property to determine whether or not is listed in the New York State or National Registers of Historic Places. If not, it is reviewed to determine whether or not it meets the criteria to be included in the registers. If listed or determined eligible for listing, then the second stage of the review is undertaken. This portion of the review determines whether or not the proposed action/project will have an impact on the qualities of the property that make it eligible.

ALL PROJECTS SUBMITTED FOR REVIEW SHOULD INCLUDE THE FOLLOWING MATERIAL(S):

☒ **Project Description** Provided in attached letter

Attach a full description of the nature and extent of the work to be undertaken as part of this project. Relevant portions of the project applications or environmental statements may be submitted.

☒ **Maps Locating Project** Letter Attachment 1

Include a map locating the project in the community. The map must clearly show street and road names surrounding the project area as well as the location of all portions of the project. Appropriate maps include tax maps, Sanborn Insurance maps, and/or USGS quadrangle maps.

☒ **Photographs** Letter Attachments 2 and 3

Photographs may be black and white prints, color prints, or color laser/photo copies; standard (black and white) photocopies are NOT acceptable.

- *If the project involves rehabilitation*, include photographs of the building(s) involved. Label each exterior view to a site map and label all interior views.

- *If the project involves new construction*, include photographs of the surrounding area looking out from the project site. Include photographs of any buildings (more than 50 years old) that are located on the project property or on adjoining property.

40 British American Boulevard, Latham, New York 12110

October 24, 2003

Ms. Ruth L. Pierpont
Director
Hew York State Office of Parks, Recreation
and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, P.O. Box 189
Waterford, New York 12188-1089

Subject: **Proposed Bethpage Energy Center 3**
Hicksville, Nassau County, New York
Supplemental Project Information

Telephone
518.951
Facsimile
518.951.2300

Dear Ms. Pierpont.

This letter and attachments are submitted to provide additional project information in supplement of my initial submittal of October 8, 2003 for the referenced project.

Project Summary

Calpine Corporation, through its subsidiary companies TBG Cogen Partners and CPN Bethpage 3rd Turbine, Inc., currently operates an existing cogeneration power plant and an simple-cycle power plant (collectively the "existing facility") located on the east side of Hicksville-Massapequa Road in the unincorporated community of Hicksville in the Town of Oyster Bay, Nassau County. The existing facility is situated on a 2.3-acre parcel owned by Northrop Grumman Corporation ("NGC") and leased to the Calpine subsidiaries. The existing cogeneration plant includes two combustion turbine generators, two heat recovery steam generators, and one steam turbine generator. The cogeneration units are fired with both natural gas and distillate fuel oil and have a combined net electrical power output of approximately 57 megawatts (MW). The existing simple-cycle power plant includes a single simple-cycle combustion turbine generator. The simple-cycle unit is fired exclusively with natural gas and has a nominal net electrical power output of approximately 47 MW. The electrical power from the existing facility is sold under existing power purchase arrangements with both Northrup Grumman Corporation and the Long Island Power Authority (LIPA). Steam generated at the existing facility is sold to the Northrup Grumman Corporation. NGC's Central Steam Plant is situated to the immediate north/northwest of the existing site.

In conjunction with LIPA, Calpine, via its subsidiary company Bethpage Energy Center 3, is proposing to construct and operate a new combined-cycle combustion turbine within and immediately adjacent to the 2.3-acre existing site. Specifically, the majority of the proposed facility would be located within a 1.1-acre proposed site situated to the immediately south of the

existing site. Two aeration basins were previously located on the 1.1-acre proposed site; these basins have since been decommissioned. The proposed site will be ultimately restored via construction of the proposed facility. Within this site area, the proposed facility equipment and machinery would be fully enclosed within an approximate 2,100 square foot new steel turbine and boiler building, of varying height, with a maximum height of 64 feet. A single enclosed stack will rise from within the new turbine building interior and will attain a height of 100 feet. In this manner, the proposed facility, as characterized by the new turbine building, would generally be situated to the south of the existing facility and the NGC Central Steam Plant. Facilities supporting the proposed facility, including the five-cell cooling towers, the auxiliary cooling tower, the chiller, the GSU transformer skid and a new facility administrative building, would be located in the western portion of the 2.3-acre existing site. The existing facility would continue to operate under separate ownership after construction of the proposed facility.

The proposed combined-cycle combustion turbine will be fired exclusively with natural gas and will have a nominal net electrical power output of less than 79.9 MW for distribution on the LIPA electrical distribution grid. All utility connections for the new unit will be made onsite, such that the project work will be limited to the existing 2.3-acre site and the 11.1-acre proposed site. Permits are required for the proposed project from the New York State Department of Environmental Conservation (NYSDEC), the New York Sate Public Service Commission, and LIPA. As part of the permitting process, a Full Environmental Assessment Form (Full EAF) has been prepared for the proposed project to address the requirements of the State Environmental Quality Review Act (SEQR).

Both the 2.3-acre existing site and the 1.1-acre proposed site are part of a larger assemblage of parcels that historically encompassed the Grumman Bethpage Complex. Previous correspondence from the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) dated June 12, 2001 for the existing facility indicates that portions of the Grumman Complex have been evaluated – specifically Navy Plants #3 and #5 – and have been determined to be eligible for inclusion in the Natural Register of Historic Places. This correspondence further notes that additional surviving portions of the Grumman Complex may also be found to meet the criteria for inclusion in the National Register for their association with World War II and Cold Era defense production. This current submittal is intended to provide additional information on the proposed facility with respect to potential impacts to cultural resources. The attached figure (Full EAF Figure 5-1 Cultural Resources) shows the site location together with the locations of Navy Plant #3 and #5.

Existing & Proposed Site

A previous site study (Phase I ESA, Dvirka and Bartilucci, 1998) indicates that the 2.3-acre existing site was purchased by NGC in 1943. This study also indicates that the site was vacant and undeveloped as of 1950, with the site being used for parking by NGC employees from this time until development of the existing facility. Construction of the existing facility commenced in 1988 and became operational in 1989. As noted, an aeration basin was previously located on the 1.1-acre proposed site; this basin has been decommissioned and the site will be restored via construction of the proposed facility

Both the 2.3-acre existing site and the 1.1-acre proposed site are part of a larger assemblage of parcels that historically encompassed the Grumman Bethpage Complex, which was used by Grumman and its predecessor companies to develop and manufacture aviation and related products. Current NGC activities at the Grumman

Bethpage Complex occur on only a limited number of parcels; the remaining parcels have been sold for continuing commercial use or are presently owned by the federal government.

Both the existing 2.3-acre existing site and the 1.1-acre proposed site are zoned within a LI-Light Industrial Zoning District by the Town of Oyster Bay. This zoning district allows for the development of utility buildings and structures by special use permit issued by the Town of Oyster Bay Zoning Board of Appeals. The immediate site vicinity is predominately zoned as light industrial, centered around the historic Grumman Bethpage Complex and the (abandoned) Grumman Bethpage Airport.

Within the 2.3-acre existing site as well as the 1.1-acre proposed site, the specific site for the proposed facility will be acquired by LIPA either by direct sale or condemnation and leased to Bathpage Energy Center 3 for construction and operation of the proposed facility. Specific delineation of the site limits for the proposed facility will be determined as part of the pending land transfer.

Primary features for the existing 2.3-acre are shown in the enclosed site photograph (Full EAF Figure 5-2 Photosimulation From The South). Primary features for the existing site include the white three-story metal turbine building for the cogeneration plant, the gray turbine building for the simple-cycle power plant, the one-story gas compressor building, the elevated condenser tower, the 69-kilovolt substation, the 132,000-gallon aboveground demineralization tank, the one-story demineralization water closure building, the one-story fuel forwarding building and the 500,000-gallon aboveground No. 2 fuel oil storage tank with associated diking. Two exhaust stacks rise from the top of the white turbine building for the cogeneration plant and extend to a height of 100 feet (above grade). One exhaust stack associated with the simple-cycle power plant rises to a height of 100 feet (above grade).

NGC's Central Steam Plant is situated to the immediate north/northwest of the existing site and the NGC Navy Plant #5 site is situated to the immediate north the existing site and the Central Steam Plant. Four exhaust stacks reaching a height of 100 feet (above grade) are associated with NGC's Central Steam Plant. The NGC Navy Plant #5 site is presently owned by the federal government. An extension of South Oyster Bay Road borders the existing site on the east; a LIPA substation and office buildings comprising portions of the Bethpage Business Park are located on the east side of the South Oyster Bay Road extension, opposite the existing site. These office buildings were previously part of the Grumman Bethpage Complex. The property to the immediate south and east of the 1.1-acre proposed site is a paved parking area for tenants of the Bethpage Business Park. Two groundwater recharge basins, part of the NGC Navy Plant #5 site, are situated to the immediate west of the existing site, and Hicksville-Massapequa Road (NYS Route 107) runs in a north/south direction immediately west of two recharge basins. Commercial strip development is present on the west side of Hicksville-Massapequa Road.

The proposed facility will be constructed in two distinct phases. Phase I will entail the construction and operation of a state-of-the-art General Electric LM6000 SPRINT combustion turbine generator with a nominal electrical output of less than 50 MW. A two-cell cooling tower will also be installed to serve the chillers on site during Phase I. The project schedule calls for the new combustion turbine to be in commercial operation in simple-cycle mode no later than June 2004. In Phase 2, the combustion turbine generator will be converted to a combined-cycle unit with the activation of a once through steam generator equipped with duct burners, a steam turbine generator and a five-celled cooling tower. Upon completion of Phase 2, no later than June 2005, the

combustion turbine will operate in combined-cycle mode, utilizing the waste heat from the combustion turbine to generate additional electricity in the steam turbine generator. The combined-cycle project will have a nominal electrical output of 79.9 MW or less. The electrical power from the new unit will be sold under a power purchase agreement with LIPA. PC simple-cycle, combustion turbine designed to operate under fast start-up conditions and thus provide peak reserve power and assist in balancing the electrical power transmission grid.

The LM6000 combustion turbine utilizes a highly efficient combustion system to control emissions, with further control of emissions provided by a selective catalytic reduction (SCR) system and oxidation catalyst systems. Treated exhaust gas will be emitted through the new enclosed stack that will be approximately 100 feet in height (above grade). Air emissions from the stack will be monitored by means of a continuous emissions monitoring system (CEMS).

Potential Project Impacts and Mitigation Measures

The project site is situated within the extreme south central portion of the historic Grumman Bethpage Complex. Potential project impacts and associated mitigation measures specific to Navy Plants #3 and #5 are summarized below. It is anticipated that in the event that other properties within the Grumman Bethpage Complex are subsequently determined eligible for inclusion on the National or State Register, potential project impacts (or the lack thereof) would be similar to the results of the project impact analysis summarized below for Navy Plants #3 and #5.

Potential impacts of the proposed project on Navy Plants #3 and #5 consist of possible visual, air quality, and noise impacts.

Visual

With respect to potential visual impacts, it is first noted that as shown in the enclosed photograph of the existing site conditions (Full EAF Figure 5-2), Navy Plant #5 includes a more recent two-story white addition, which extends in a southwest direction from the original Navy Plant #5 building, towards the west side of NGC's Central Steam Plant. This photograph shows that the existing facility, NGC's Central Steam Plant and Navy Plant #5 provide a collective "cluster" of built structures and associated development, when viewed from a distance.

Full EAF Figure 5-3 provides a photosimulation of the proposed facility, as it would appear from the main historical parking lot for Navy Plant #5. Navy Plant #5 is the brown two-story building visible in the far right portion of the photosimulation. As shown by this photosimulation, only the very uppermost portion of the new turbine building and the enclosed stack would be visible from this viewing location. Existing structures associated with the existing facility and NGC's Central Steam Plant would provide visual screening of the remaining portions of the proposed facility, from this viewing location. As shown by Figure 5-3, the uppermost portion of the new turbine building and the enclosed stack would visually blend with the existing facility industrial structures and would not be significantly discernable to the casual viewer from this viewing location

Figure 5-4 provides a photosimulation of the proposed facility, as it would appear from near the front entrance to Navy Plant #3, along South Oyster Bay Road. Navy Plant #3 is the tan one-story building visible in the far left portion of the photosimulation. As shown by this photosimulation, only the extreme uppermost portion of the new turbine building and the enclosed stack would be visible from this viewing location, to a careful observer. The new turbine building and the enclosed stack would blend with the existing facility structures and likely would not be noticeable by casual viewers from this location, in comparison to the existing facility structures.

In summary, based on the photosimulations described above, the existing facility and NGC's Central Steam Plant will screen the proposed facility for views from the north, with the exception of views of the uppermost portion of the new turbine building and the new stack, which will generally blend with the seven existing stacks present at or adjacent to the existing site. Accordingly, visual impacts of the project will not be significant to viewers at Navy Plants #3 and #5.

Air Quality

The Full EAF provides a detailed analysis of potential air quality impacts arising from operation of the proposed facility and includes the results of state-of-the-art air dispersion simulation modeling. This detailed analysis confirms that air emissions produced from the proposed facility will not cause nor contribute to a violation of the National Ambient Air Quality Standards or the New York Ambient Air Quality Standards. Accordingly, the proposed facility will not have an adverse air impact on offsite locations, including Navy Plants #3 and #5.

Noise

The Full EAF includes a detailed analysis of potential noise impacts arising from operation of the proposed facility and includes the results of state-of-the-art three-dimensional acoustical modeling. The acoustical modeling was performed, in part, to confirm compliance with NYSDEC guidelines for control of noise from new sources. The acoustical modeling results confirm that, at the north property line of the 2.3-acre existing facility, the projected noise level from the proposed will not increase the noise level above existing (ambient) levels. Accordingly, the proposed will not have an adverse noise impact on Navy Plants #3 and #5, which are located to the north of the 2.3-acre existing site.

The information summarized above confirms that the proposed project will not have a significant adverse impact on Navy Plants #3 and #5. We believe that this information will allow the OPRHP to issue an opinion that the proposed project will have No Effect upon the qualities of Navy Plants #3 and #5, which cause these two facilities to be eligible for listing in the National Register (or issuance of a similar administrative project finding).

As noted above, the NYSDEC has permitting jurisdiction for the proposed project. The NYSDEC's Project Manager for this project is Kevin Kispert at the Department's Central Office in Albany. He may be contacted at (518) 402-9161. We trust that this information meets with your requirements in this matter. Please contact me at your earliest convenience at (518) 435-7273 if you have any questions or require additional information.

Very truly yours,

Earth Tech, Inc.

Kenneth G. Gelting

Kenneth G. Gelting, PE
Project Engineer

Attachments: As noted

c. Kevin Kispert, NYSDEC
Phil Spears, Allee, King, Rosen & Fleming, Inc.
Don Neal, Calpine
Ian Thomson, Earth Tech

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643

Bernadette Castro
Commissioner

October 31, 2003

NOV 5 2003

Kenneth G. Gelting
Earth Tech
40 British American Boulevard
Latham, New York 12110

Re: DEC
Bethpage Energy Center 3 (Calpine) 79.9 Mw
Facility/Broadway, Hicksville-Bethpage
(Grumman Site)
Oyster Bay, Nassau County
03PR05090

Dear Mr. Gelting:

Thank you for requesting the comments of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the project in accordance with the New York State Parks, Recreation and Historic Preservation Law, Section 14.09.

Based upon this review, it is the OPRHP's opinion that your project will have No Adverse Impact upon cultural resources in or eligible for inclusion in the State and National Registers of Historic Places.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

Ruth L. Pierpont
Director

RLP:cmp

New York State Department of Environmental Conservation

Division of Environmental Permits

40 British American Boulevard, Latham, New York

October 29, 2003

Mr. Kevin Kispert
Project Manager
New York State Department of Environmental Conservation
Division of Environmental Permits
4th Floor
625 Broadway
Albany, New York

Subject: ***Proposed Bethpage Energy Center 3***
Hicksville, Nassau County
DEC #1-2824-00947
Proposed SPDES Permit Coverage

Telephone
518.951.2200
Facsimile
518.951.2300

Dear Mr. Kispert:

As you are aware, the Calpine Corporation (Calpine), through its subsidiary Bethpage Energy Center 3, LLC, and in conjunction with Long Island Power Authority (LIPA), is proposing to construct and operate a natural gas-fired, combined cycle power plant on a 1.1-acre site located adjacent to the exiting Calpine power plant site in Hicksville, Nassau County. It is anticipated that Phase I of the project would start construction in the first quarter of 2004 and be operational by June 1, 2004.

It is anticipated that greater than 1 acre (but less than 5 acres) of the project site would be temporarily disturbed during the construction phase of the project. Storm water discharges from the project site during construction would be discharged under controlled conditions to existing groundwater recharge basins (i.e., Waters of New York State) situated adjacent to the site. Accordingly, the storm water discharges during the construction phase of the project are required to be authorized under a State Pollutant Discharge Elimination System (SPDES) permit as issued by the Department. It is anticipated that this permit coverage can be provided by the Department's SPDES General Permit for Storm Water Discharges from Construction Activity (Permit No. GP-02-01). To this end, in accordance with the provisions of Part I.D.7 of Permit GP-02-01, we are submitting preliminary project information herein on behalf of Calpine. In accordance with Part I.D.7, it is anticipated that this preliminary project information will allow the Department to confirm that coverage under Permit No. GP-02-01 for the project's construction phase is appropriate. Specifically, this submittal provides the minimum preliminary project information outlined in Appendix B of Permit No. GP-02-01.

Background

A Site Location Map for the proposed facility is attached. The proposed facility would primarily be situated on an approximate 1.1-acre parcel located immediately adjacent to the 2.3-acre existing power plant site. Cooling towers for the proposed facility would be provided within the

limits of the existing 2.3-acre site. The 1.1-acre project site is presently owned by the Northrop Grumman Corporation (NGC); Calpine has an option to purchase the 1.1-acre site from NGC. Two groundwater aeration basins operated by NGC were previously located within a portion of the 1.1-acre project site. The groundwater aeration basins are not longer required by NGC. One basin was filled during previous construction of the simple-cycle power plant in 2002 and both basins have been disconnected from NGC local storm water management system. The remainder of the 1.1-acre site is occupied by paved parking areas. Overall, the 1.1-acre project site would be restored through construction of the proposed facility.

Storm water runoff from the 2.3-acre existing site, as well as the 1.1-acre project site, is presently collected by a series of interconnected catch basins and storm drains for gravity discharge to the larger NGC stormwater management system, which in turn conveys storm water to two recharge basins located immediately west-southwest of the site. The recharge basins also receive storm water runoff from an offsite area encompassing NGC Plant 25, Plant 5 and adjacent areas, in accordance with NGC's State Pollutant Discharge Elimination System (SPDES) Permit No. NY0096792. Storm water discharges from these locations, including the 1.1-acre project site, is encompassed and monitored by NGC under Outfall 006 of NGC's SPDES Permit. Following completion of construction, storm water runoff from non-process areas of the proposed facility would be collected and discharged on an ongoing basis through existing Outfall 006 in accordance with and under jurisdiction of NGC's existing SPDES permit. Storm water from all process and containment areas would be hauled off site by a licensed contractor for treatment at a licensed facility.

Separately, Calpine maintains SPDES Individual Permit No. NY 027 0407 from the Department for the existing power plant for discharge of storm water collected within process containment areas. As part of this existing SPDES Permit coverage, Calpine has developed and implemented a Best Management Practices (BMP) Plan to prevent, or minimize, the potential for release of pollutants to the waters of the State. The BMP Plan includes, in part, best management practices for erosion and sediment control and management of runoff. The BMP Plan has been reviewed by NYSDEC Region 1 Division of Water staff.

Preliminary Project Information

As noted, Appendix B of Permit No. GP-02-01 outlines minimum preliminary project information that is to be submitted in accordance with Part I.D.7. This information is provided below.

A. Location and Nature of Construction Activity

The proposed facility will primarily be situated on a 1.1-acre parcel located adjacent to the exiting 2.3-acre site. A Site Location Map is attached. Cooling towers for the proposed facility will be constructed within the limits of the existing 2.3-acre site. Construction of the proposed facility would include shallow excavation for foundation work and site grading. All excavated soils would either be removed from the project site for authorized offsite disposal or stockpiled onsite for subsequent onsite reuse. Appropriate erosion and sediment controls would be installed to reduce the potential for erosion and soil loss.

B. Total Site Area and Excavation Area

As noted, the proposed facility will primarily be situated on a 1.1-acre parcel located adjacent to the exiting 2.3-acre site. Cooling towers for the proposed facility will be constructed within the limits of the existing 2.3-acre site. The pending construction-level design plans will include designation of the construction limit of disturbance for the project construction work. For purposes of this submittal, the site area that is expected to undergo excavation during the life of the permit is taken as 1.1 acre.

C. Control of Pollutants in Storm Water Discharges During Construction

Storm water management during the construction activities would be performed through implementation of a site-specific erosion and sediment control plan, to be developed as part of the project's pending Storm Water Pollution Prevention Plan. The erosion and sediment control plan would include both structural and non-structural components. The structural components are expected to consist of hay bale barriers/silt fencing, inlet protection for existing or newly installed catch basins, and installation of a stabilized construction entrance or other appropriate means to limit potential off-site transport of sediment. The non-structural "best management practices" would include routine inspection, dust control, cleaning and maintenance programs, instruction on the proper management, storage and handling of potentially hazardous materials, as well as identification of parties responsible for implementation and on-going maintenance programs. All temporary control measures would be maintained until disturbed areas of the site are stabilized and a permanent storm water management system is complete and operational.

The project's pending erosion and sediment control plan will be developed consistent with the current version of the *New York Standards and Specifications for Erosion and Sediment Control*, as published by the Empire State Chapter of the Soil and Water Conservation Society.

D. Control of Pollutants in Storm Water Discharges after Completion of Construction

As noted, following completion of construction, storm water runoff from non-process areas of the proposed facility would be collected and discharged on an ongoing basis through existing Outfall 006 in accordance with and under jurisdiction of NGC's existing SPDES permit. Storm water from all process and containment areas would be hauled off site by a licensed contractor for treatment at a licensed facility.

E. Fill Material Nature, Runoff Coefficient and Impervious Area

As noted, the 1.1-acre project site consists of two decommissioned aeration basins and paved parking areas. Soils occurring at and adjacent to the project site are mapped by the Nassau County Soil Survey as *Urban Land (Ug) Complex. Urban Land* in the county is considered to be areas where at least 85 percent of the surface is covered with asphalt, concrete or other impervious building material, with most of the remaining areas being well drained Riverhead, Hempstead or Enfield soils, or excessively drained Udipsaments (nearly level). Udipsaments (nearly level) are defined as manmade fill or borrow areas, most of which are grassed with 0 to 3 percent slopes, which consist of very deep soils that are excessively drained to well-drained.

New fill material required for the project will consist primarily of engineered foundation soils and aggregates obtained from offsite sources. All excavated soils would either be removed from the project site for authorized offsite disposal or stockpiled onsite for subsequent onsite reuse.

The proposed facility will include development across the majority of the 1.1-acre site, including construction of the main turbine building, associated structures and features and paved support areas. Based on this type of development, the runoff coefficient for the completed 1.1-acre site is expected to approach 0.95. The impervious area of the 1.1-acre site will increase in comparison to existing site conditions, as a result of development of the proposed facility in the specific location of the two former groundwater recharge basins. The site's overall impervious area is estimated to increase by approximately 50%. However, as described above, all storm water falling on non-process areas of the completed proposed facility will be collected and conveyed for subsequent groundwater recharge under jurisdiction of NGC's existing SPDES permit. In this manner, the project will result in only a negligible loss of groundwater recharge volume.

F. Receiving Waters

As described, storm water runoff from the project site will be collected and conveyed to NGC's existing groundwater recharge basins. The receiving waters from these recharge basins is New York State Class GA groundwater.

Following satisfaction of the State Environmental Quality Review Act (SEQRA) for the proposed facility and issuance by the Department of the necessary project permits, Calpine would submit a completed Notice of Intent to gain coverage under Permit No. GP-02-01 for the project construction work. At this time, Calpine would also complete development of the project's SWPPP, in conjunction with final (construction-level) design for the proposed facility. In reliance upon Calpine's current NYSDEC-reviewed BMP Plan, the SWPPP would take the form of an amendment to the existing BMP Plan. The SWPPP would include fully designed and engineered storm water management practices with all necessary maps, plans and construction drawings, providing the site-specific erosion and sediment control plan and best management practices. The SWPPP would include designation of responsible parties and personnel, including all contractors and subcontractors who would have a role in management of construction storm water runoff. The SWPPP would outline a routine site inspection and reporting program for identification and prompt repair of any deficiencies for the erosion and sediment control structures or practices.

We trust that this information meets with the Department's needs on this subject. If you have any questions or require additional information, please contact me at any time at (518) 951-2273. On behalf of Calpine, we appreciate the assistance of you and the Department staff.

Very truly yours,

Earth Tech, Inc.

Kenneth G. Gelting, PE
Project Engineer

Enclosure: Site Location Map

C. Don Neal, Calpine Corporation
Ian Thomsen, Earth Tech
Steve Rosen, AKRF

Federal Aviation Administration

Air Traffic Division

Please Type or Print on This Form

Form Approved OMB No. 2120-0001

U.S. Department of Transportation
Federal Aviation Administration

Failure To Provide All Requested Information May Delay Processing of Your Notice

Notice of Proposed Construction or Alteration

FOR FAA USE ONLY
Aeronautical Study Number
- - -

1. Sponsor *(person, company, etc. proposing this action)* :
Attn. of: Bethpage Energy Center 3, LLP
Name: Donald Neal
Address: Two Atlantic Avenue, 3rd Floor
City: Boston State: MA Zip: 02110
Telephone: (617) 557-5333 Fax:

2. Sponsor's Representative *(if other than #1)* .
Attn. of:
Name:
Address:
City: State: Zip:
Telephone: Fax:

3. Notice of: ☒ New Construction ☐ Alteration ☐ Existing

4. Duration: ☒ Permanent ☐ Temporary (months, days)

5. Work Schedule: Beginning January 2004 End June 2004

6. Type: ☐ Antenna Tower ☐ Crane ☐ Building ☐ Power Line ☐ Landfill ☐ Water Tank ☒ Other Stack

7. Marking/Painting and/or Lighting Preferred:
☐ Red Lights and Paint ☐ Dual - Red and Medium Intensity White
☐ White - Medium Intensity ☐ Dual - Red and High Intensity White
☐ White - High Intensity ☐ Other

8. FCC Antenna Structure Registration Number *(if applicable)*:
Not Applicable

9. Latitude: 40° 44' 45.60"

10. Longitude: 73° 29' 56.40"

11. Datum: ☒ NAD 83 ☐ NAD 27 ☐ Other

12. Nearest: City: Town of Oyster Bay State: New York

13. Nearest Public-use (not private-use) or Military Airport or Heliport:
Republic Airport (Farmingdale, NY); Nassau County Police Department Heliport (Bethpage, NY)

14. Distance from #13. to Structure: Republic Airport: Approx. 4.2 miles

15. Direction from #13. to Structure: NCPD Heliport: Approx. 0.5 miles

16. Site Elevation *(AMSL)*: 120 ft.

17. Total Structure Height *(AGL)*: 100 ft.

18. Overall height *(#16. + #17.)* *(AMSL)*: 220 ft.

19. Previous FAA Aeronautical Study Number (if applicable):
98-AEA-2629-OE and 01-AEA-5209-OE - OE

20. Description of Location: (Attach a USGS 7.5 minute Quadrangle Map with the precise site marked and anycertified survey.)
See attached site location map and site plan.

21. Complete Description of Proposal:

Bethpage Energy Center 3, LLP proposes to erect a 100-foot stack for a new combined-cycle combustion turbine at the existing power generation facility owned and operated by TBG Cogen Partners and CPN Bethpage 3rd Turbine in Hicksville, New York. Currently, there are three 100-foot stacks serving the three existing combustion turbines at the facility. Construction on the new stack will commence in January 2004 and will be completed no later than June 2004.

Frequency/Power (kW)	

Notice is required by 14 Code of Federal Regulations, part 77 pursuant to 49 U.S.C., Section 44718. Persons who knowingly and willingly violate the notice requirements of part 77 are subject to a civil penalty of $1,000 per day until the notice is received, pursuant to 49 U.S.C., section 46301 (a).

I hereby certify that all of the above statements made by me are true, complete, and correct to the best of my knowledge. In addition, I agree to mark and/or light the structure in accordance with established marking and lighting standards as necessary.

Date	Typed or Printed name and Title of Person Filing Notice	Signature
10/27/03	Donald Neal	Donald Neal

Please Type or Print on This Form — Form Approved OMB No. 2120-0001

U.S. Department of Transportation
Federal Aviation Administration

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Notice of Proposed Construction or Alteration

FOR FAA USE ONLY
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Name: Donald Neal
Address: Two Atlantic Avenue, 3rd Floor
City: Boston State: MA Zip: 02110
Telephone: (617) 557-5333 Fax:

2. Sponsor's Representative *(if other than #1)* :
Attn. of:
Name:
Address:
City: State: Zip:
Telephone: Fax:

3. Notice of: ☒ New Construction ☐ Alteration ☐ Existing

4. Duration: ☐ Permanent ☒ Temporary (6 months, 0 days)

5. Work Schedule: Beginning January 2004 End June 2004

6. Type: ☐ Antenna Tower ☒ Crane ☐ Building ☐ Power Line
☐ Landfill ☐ Water Tank ☐ Other

7. Marking/Painting and/or Lighting Preferred:
☐ Red Lights and Paint
☐ White - Medium Intensity
☐ White - High Intensity
☐ Dual - Red and Medium Intensity White
☐ Dual - Red and High Intensity White
☐ Other

8. FCC Antenna Structure Registration Number *(if applicable)*:
Not Applicable

9. Latitude: 40° 44' 46.60"

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11. Datum: ☒ NAD 83 ☐ NAD 27 ☐ Other

12. Nearest: City: Town of Oyster Bay State: New York

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Republic Airport (Farmingdale, NY); Nassau County Police Department Heliport (Bethpage, NY)

14. Distance from #13. to Structure: Republic Airport: Approx. 4.2 miles

15. Direction from #13. to Structure: NCPD Heliport: Approx. 0.5 miles

16. Site Elevation *(AMSL)*: 120 ft.

17. Total Structure Height *(AGL)*: 180 ft.

18. Overall height (#16. + #17.) *(AMSL)*: 300 ft.

19. Previous FAA Aeronautical Study Number (If applicable):
98-AEA-2629-OE and 01-AEA-5209-OE - OE

20. Description of Location: (Attach a USGS 7.5 minute Quadrangle Map with the precise site marked and any certified survey.)
See attached site location map and site plan.

21. Complete Description of Proposal:

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Frequency/Power (kW)	

Notice is required by 14 Code of Federal Regulations, part 77 pursuant to 49 U.S.C., Section 44718. Persons who knowingly and willingly violate the notice requirements of part 77 are subject to a civil penalty of $1,000 per day until the notice is received, pursuant to 49 U.S.C., section 46301 (a).

I hereby certify that all of the above statements made by me are true, complete, and correct to the best of my knowledge. In addition, I agree to mark and/or light the structure in accordance with established marking and lighting standards as necessary.

Date	Typed or Printed name and Title of Person Filing Notice	Signature
10/23/03	Donald Neal	Donald Neal

FAA Form 7460-1 (2-99) Supercedes Previous Edition

NSN: 0052-00-012-0006