2.1 INTRODUCTION

Chapter 2 provides a detailed description of the proposed Caithness Long Island Energy Center II (CLI-II). This includes information on surrounding land use; the physical characteristics of the proposed site; the type, size and use of the proposed facility; and the anticipated project schedule.

2.2 SITE DESCRIPTION

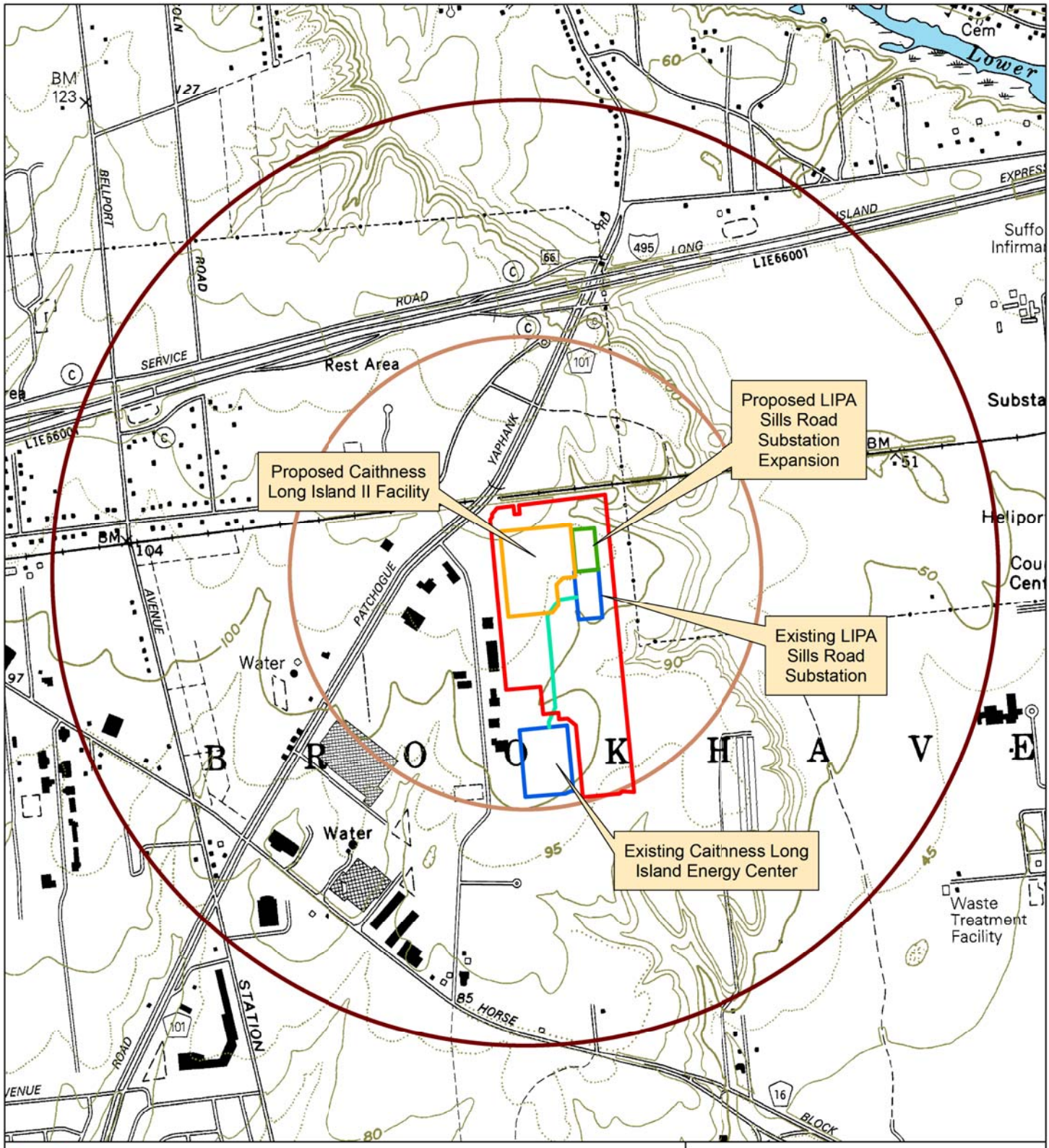
The proposed facility would be located on an approximately 81-acre parcel that is controlled by the project sponsor. The project site is located south of the Sills Road interchange (Exit 66) of the Long Island Expressway (LIE) (Interstate 495), within the Town of Brookhaven, Long Island, New York. The project site's southwestern border is adjacent to an existing electric generating facility operated by Caithness Long Island, LLC, which is an affiliate of Caithness Long Island II, LLC. Figure 2-1 shows the approximate site boundary and fence line for the new facility on a New York State Department of Transportation (NYSDOT) 7.5-minute map (Bellport, New York Quadrangle). Figure 2-2 shows an aerial photo of the proposed project site.

The project site is located at the terminus of Zorn Boulevard in the Town of Brookhaven's L-Industrial-1 District, which permits electric generating facilities by special permit issued by the Town Board. As noted above, the project site's southwestern border is adjacent to an existing electric generating facility operated by Caithness Long Island, LLC. Farther south of the existing electric generating facility is the Zorn Industrial Park. Immediately adjacent to the project site to the west is the Sills Industrial Park, located off Old Dock Road.

The most prominent nearby land uses include the former Grucci Fireworks manufacturing plant, which is now vacant, a LIPA transmission line right-of-way (ROW), and a main line of the Long Island Railroad. The recently completed Yaphank Correctional Facility is beyond the LIPA ROW and a proposed hydroponic farm is to the southeast. The Brookhaven Landfill is approximately 1.5 miles to the south. The proposed electric generating facility will be located approximately 0.3 miles from the nearest residences which are to the northwest across the Long Island Railroad ROW and Sills Road (Route 101). The Patchogue-Yaphank Road (County Route 101) interchange with the Long Island Expressway (LIE) is located approximately 2,300 feet (0.4 miles) north of the property.

West of the proposed project site is the Medford area of the Town of Brookhaven, while northwest and northeast are the areas of Gordon Heights and Yaphank, respectively. The community of Shirley is located to the southeast while Bellport is to the south and Patchogue is located to the southwest.

The proposed site lies within Long Island's coastal outwash plane, which slopes gently toward the south until reaching the Atlantic Ocean. Southern Long Island's topography is generally flat, rising from mean sea level (MSL) to approximately 110 ft above MSL at the project site.



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SITE LOCATION MAP

CAITHNESS LONG ISLAND ENERGY CENTER II

TOWN OF BROOKHAVEN, NEW YORK

FIGURE 2-1	OCTOBER 2013

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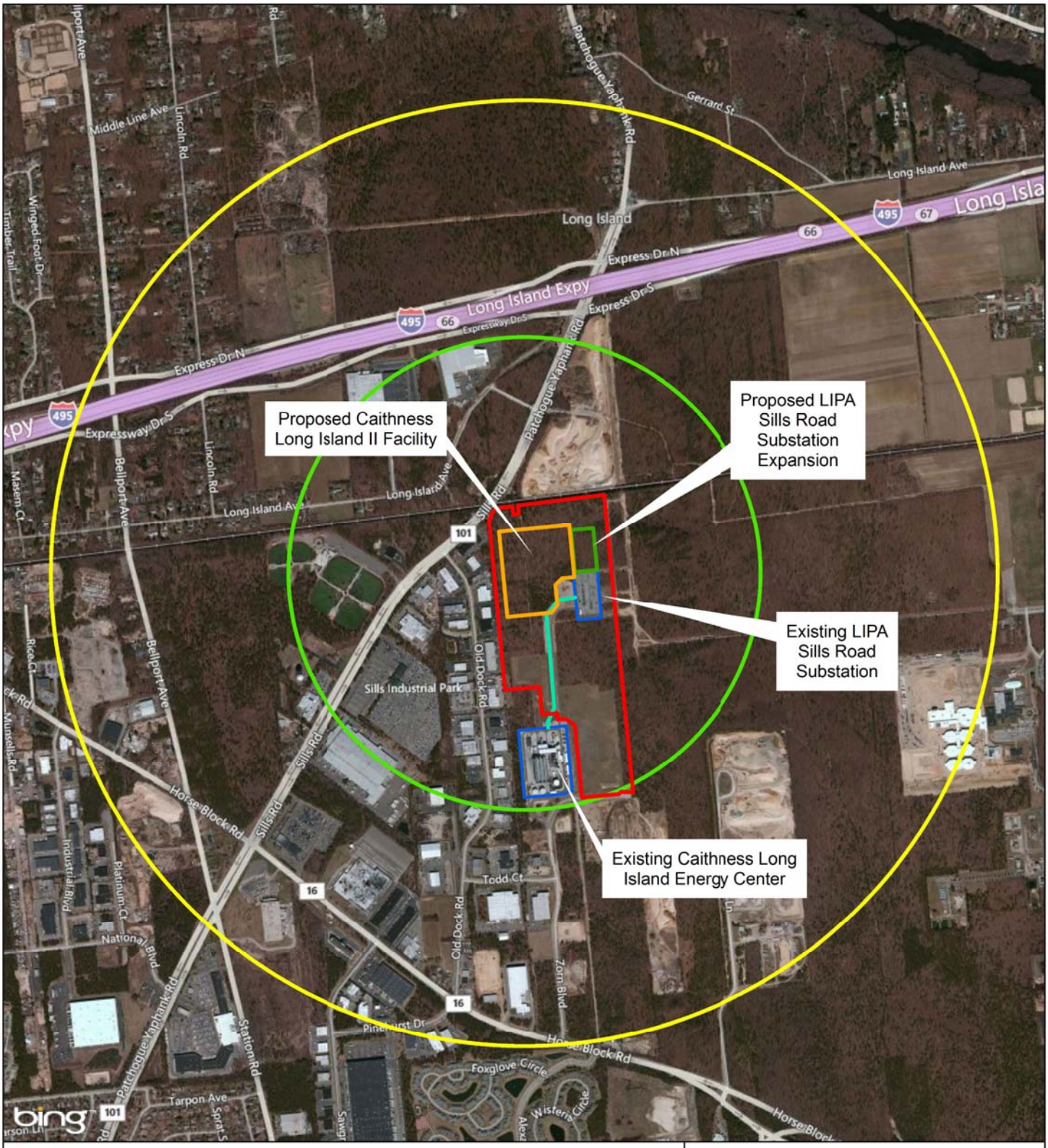

Approximate Site Boundary
Principal Area of New Development
Proposed LIPA Facility
Existing Transmission Line
Existing Facility
1/2 Mile Radius
1 Mile Radius

0 0.25 0.5 Miles

Bae Map: Image courtesy of USGS State of Michigan © 2013

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SITE LOCATION AERIAL

CAITHNESS LONG ISLAND ENERGY CENTER II

TOWN OF BROOKHAVEN, NEW YORK

FIGURE 2-2	OCTOBER 2013

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The project would interconnect with LIPA's 138-kilovolt (kV) transmission system at LIPA's existing Sills Road Substation, which is located within the CLI-II site. An expansion of the LIPA switchyard will be required to accommodate the project. Natural gas would be delivered to the project site through one of several pipeline projects that are under consideration. Securing the requisite permits and approvals for the new natural gas pipeline would be the responsibility of the pipeline developer. The new natural gas pipeline, once constructed, would serve the facility and other Long Island users.

The principal area of development (i.e., the area within the CLI-II facility fence line), would cover approximately 15-acres. It is situated east of Old Dock Road, north of Horseblock Road and south of the Long Island Rail Road (LIRR). Site access would be provided off Zorn Boulevard. During construction, approximately 29 acres of the approximately 81-acre parcel would be temporarily disturbed for materials and equipment laydown, construction trailers, and construction parking. The new LIPA switchyard expansion would occupy approximately 2.8-acres.

Surface elevations across the approximately 81-acre parcel range from approximately 95 feet (ft) above mean sea level (MSL) to approximately 110 ft above MSL. Elevations within the approximately 15-acre principal area of development range from approximately 105 ft above MSL to 110 ft above MSL. The project's base elevation within the facility fence line is expected to be about 107 ft above MSL.

2.3 PLANT OVERVIEW

The CLI-II facility would nominally generate 752 megawatts (MW) of electricity using state-of-the-art combined cycle (CC) technology. The proposed CLI-II power block would consist of two F-Class heavy duty combustion turbines (CTs) that would drive two combustion turbine generators (CTGs) to produce electric power. Each CT would be equipped with a heat recovery steam generator (HRSG). The HRSGs would provide steam through a common header to a single steam turbine (ST), which would drive a steam turbine generator (STG) to produce additional electric power. Each HRSG would be equipped with natural gas-fired duct burners (i.e., supplemental firing system). The facility would be designed to operate as a base load electric generating plant.

The spent steam exhausting from the steam turbine would be condensed and recycled to the HRSGs in an air cooled condenser (ACC). Selective catalytic reduction technology (SCR) and oxidation catalyst would be installed in the HRSGs to control the emissions of oxides of nitrogen (NO_x) and carbon monoxide (CO), respectively. The proposed facility would also be equipped with emergency diesel generators to provide emergency power for safe shutdown and start readiness in the event of a system-wide power outage. To enhance fire protection capabilities, the facility would have both electric and diesel powered fire water pumps.

Natural gas would be utilized as the primary fuel with provisions to use ultra-low sulfur distillate (ULSD) for up to 720 hours per year as a back-up fuel. Providing back-up fuel capability enhances electrical distribution system reliability if natural gas supplies are disrupted or needed to meet residential heating or other demands. To accommodate short-term operation using ULSD, the project would include two 800,000-gallon fuel oil storage tanks and associated facilities, which include safety systems, off-loading facilities, transfer

piping, and feed systems. ULSD would be delivered to the facility via tanker truck, and off-loaded at a tanker truck unloading area specifically designed for this purpose.

Consistent with New York State and Suffolk County Department of Health Services (SCDHS) requirements, the fuel oil storage tanks would be double-walled to provide for secondary containment of the tank contents. In addition, distillate fuel transfer piping would be double-walled when located outside alternative secondary containment structures. The distillate fuel off-loading facilities, which would be capable of handling up to four (4) tanker trucks simultaneously, would have a separate secondary containment system.

Ancillary equipment at the facility would include an auxiliary boiler, combustion turbine inlet air evaporative coolers, power transformers, emergency generator(s), raw water and demineralized water storage tanks, a fin-fan cooler, and a makeup water demineralization system. The auxiliary boiler primarily would be used to establish vacuum on the ACC, supply steam to the steam turbine shaft seals and to keep the HRSG warm during periods of turbine shutdown. The auxiliary boiler would be capable of firing natural gas or ULSD. The emergency generators would be used during maintenance shutdowns or when the grid is unavailable to maintain essential services.

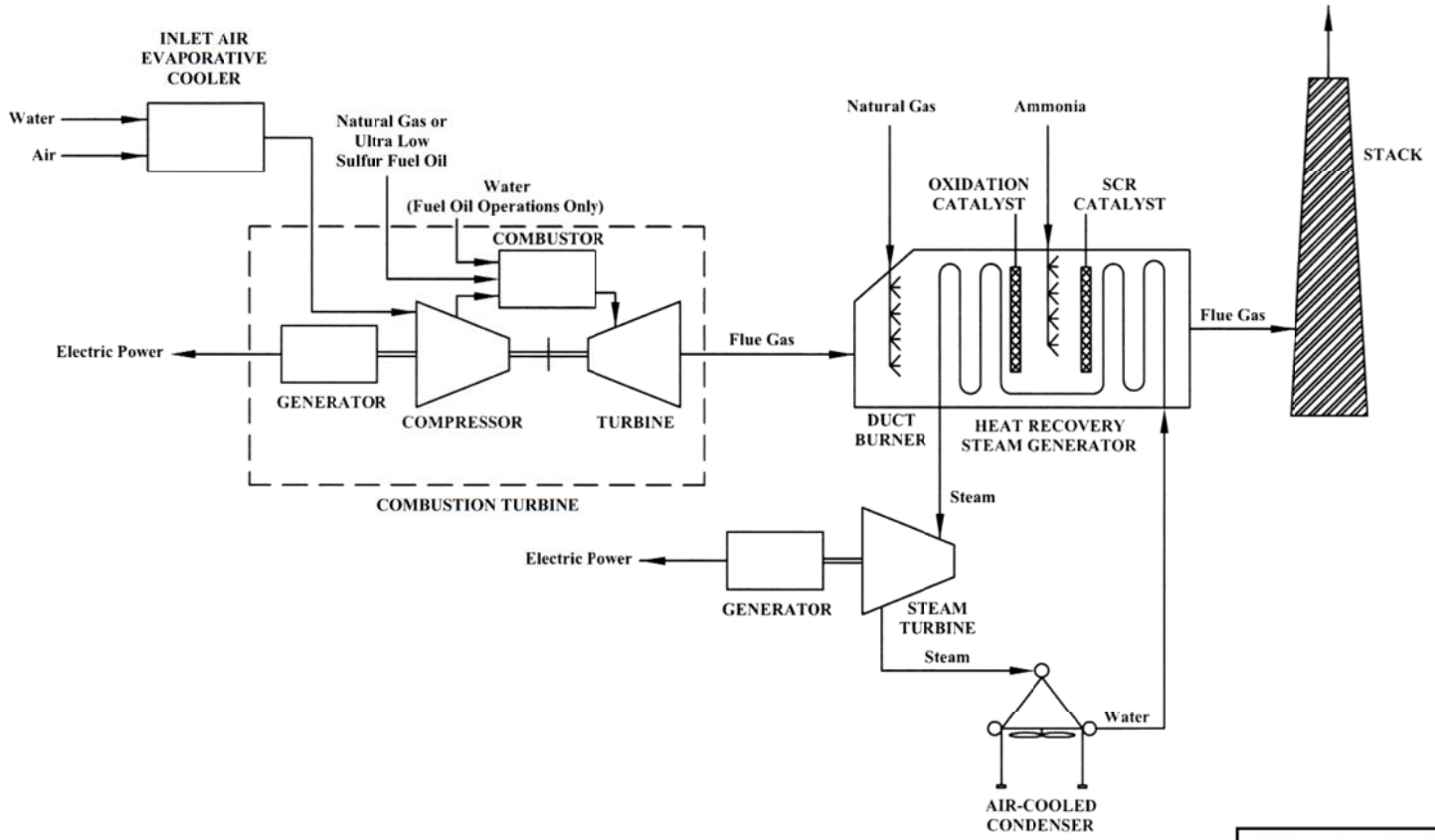
Depending on the natural gas supplier, the facility may also have a natural gas dew point heater and/or natural gas compressors. The natural gas dew point heater would be either natural gas fired or electric and used to prevent liquids from condensing out of the natural gas. The demineralization system would be used to further purify water from the municipal distribution system for use as HRSG makeup.

2.4 OVERVIEW OF COMBINED CYCLE OPERATION

Figure 2-3 shows a conceptual flow diagram of a combined cycle power generation facility. The process of utilizing both the power generated from a combustion turbine generator and a steam turbine generator is referred to as "combined cycle" electric generation. A combined cycle plant uses waste heat (i.e., hot exhaust gases) from a combustion turbine as the heat source to produce steam to drive a steam turbine.

The CT consists of a compressor, combustor, and turbine sections. The fuel (natural gas or ULSD) is fired in the combustor section with high-pressure air from the compressor. The resulting exhaust gases created by the combustion process are expanded through the turbine sections. The expanding exhaust gas causes the turbine blades and shaft to rotate. A generator is coupled to the turbine shaft to convert rotational mechanical energy into electrical energy.

The heated exhaust gas from the CT is then routed via ductwork to the HRSG. Heat from the exhaust gas is transferred to the water/steam tubes that are immersed in the HRSG gas flow path, first to convert water into steam and then to superheat the steam for use in the steam turbine. Following extraction of heat, the exhaust gas exits the HRSG through a stack.



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Caithness Long Island Energy Center II
Town of Brookhaven, Suffolk County,

Figure 2-3. Combined Cycle Conceptual Flow Diagram

Source: TRC Environmental Corp. November 2013

The expansion of steam in the steam turbine rotates the steam turbine shaft. A generator is coupled to the steam turbine shaft to convert rotational mechanical energy into electrical energy. Residual steam exiting the steam turbine is then forwarded to an air-cooled condenser, where it is converted back into water and pumped to the HRSG for reuse.

The proposed "combined cycle" technology for CLI-II is up to 30 percent more efficient than new conventional steam electric power generation technologies or simple cycle combustion turbine generation technologies. Since a combined cycle plant uses less fuel than either a steam turbine or a simple cycle combustion turbine to generate a kilowatt-hour of electricity, the savings in fuel costs and energy supply are significant.

2.5 PLANT LAYOUT

The CLI-II facility would be designed to be compatible with the nearby and surrounding land uses. An artist's rendering of the proposed facility is presented in Figure 2-4. Figure 2-5 provides a site general alignment plan and Figure 2-6 provides a general arrangement plan of facility buildings and sub-systems, including the Turbine Building, station transformers, and distillate fuel oil and water storage tanks. Figure 2-7 provides cross-sectional views of the facility illustrating component and structure heights. Engineering drawings for the project are included in Appendix B.

2.5.1 BUILDINGS AND STRUCTURES

The combustion turbines, steam turbine and steam turbine generator would be housed in a Turbine Building. The Turbine Building also encloses other mechanical equipment, such as pumps, piping and electrical equipment needed for plant operation. The building would have overhead cranes to facilitate equipment maintenance activities. Elevated platforms would be provided for access to equipment and piping. The roof of the structure would be designed to support metal decking and insulating panels. The walls would be constructed using insulated metal siding supported on a steel frame.

An Administration/Maintenance Building containing office space, a meeting room, kitchen, warehouse, maintenance shop and restroom facilities would be located southwest of the Turbine Building.

Approximate building dimensions and heights for major facility components are listed in Table 2-1. Table 2-2 provides approximate heights, diameters and storage volumes for outdoor storage tanks.