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Local Government Energy Program
Energy Audit Final Report

Borough of Park Ridge

Borough Hall/Public Library
53 Park Avenue
Park Ridge, NJ 07656

Project Number: LGEA62

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EXECUTIVE SUMMARY

The Borough of Park Ridge Borough Hall/Public Library are adjoined, each is a two-story building. The Borough Hall building has a basement. The buildings comprise a total conditioned floor area of 24,000 square feet. The original structure was built in 1930, with major renovations in 1986 and 2001. The following chart provides an overview of current energy usage in the buildings based on the analysis period of January 2009 through January 2010:

Table 1: State of Building—Energy Usage

	Electric Usage, kWh/yr	Gas Usage, therms/yr	Current Annual Cost of Energy, $	Site Energy Use Intensity, kBtu/sq ft yr	Joint Energy Consumption, MMBtu/yr
Current	210,221	4,722	$33,367	47.0	1,190
Proposed	118,753	4,719	$21,289	34.6	877
Savings	91,468	3	12,078	12	313
% Savings	44%	0.1%	36%	26%	26%

SWA has also entered energy information about the Borough Hall/Public Library in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* energy benchmarking system. The buildings are comprised of mixed use non-eligible ("Other") space types and therefore do not receive an Energy Star rating.

Based on the current state of the building and its energy use, SWA recommends implementing various energy conservation measures from the savings detailed in Table 1. The measures are categorized by payback period in Table 2 below:

Table 2: Energy Conservation Measure Recommendations

ECMs	First Year Savings ($)	Simple Payback Period (years)	Initial Investment, $	CO2 Savings, lbs/yr
0-5 Year	4,385	0.6	2,709	16,375
5-10 Year	39,199	6.8	267,402	147,435
>10 year	0	0	0	0
Total	43,584	6.2	270,111	163,809

SWA estimates that implementing the recommended ECMs is equivalent to removing approximately 1 car from the roads each year or avoiding the need of 40 trees to absorb the annual CO_2 generated.

Other recommendations to increase building efficiency pertaining to operations and maintenance and capital improvements are listed below:

Further Recommendations:

SWA recommends that the Borough Hall/Public Library further explore the following:

Capital Improvements

- Install premium motors when replacements are required
  - Repair damaged sections of EIFS on Public Library exterior walls
  - Overgrown ground vegetation on Public Library roof flashing should be removed
  - Apply water sealer to leaking, below-grade slab in Borough Hall pump room

Operations and Maintenance

- Replace broken/deteriorated bricks and re-point cracked mortar joints
- Efflorescence-coated brick and masonry materials need to dry out
- Slope roof surface to drain effectively at time of re-roofing
- Maintain seals at all windows for airtight performance
- Thoroughly and evenly insulate space above the ceiling tiles
- Maintain downspouts and cap flashing
- Provide weather-stripping/air-sealing
- Repair/seal wall cracks and penetrations
- Provide water-efficient fixtures and controls
- SWA recommends that the building considers purchasing the most energy-efficient equipment, including Energy Star labeled appliances
- Use smart power electric strips
- Create an energy educational program

Financial Incentives and Other Program Opportunities

There are various incentive programs that the Borough of Park Ridge could apply for that could also help lower the cost of installing the ECMs.

Although the Borough of Park Ridge is their own electric provider and does not pay a societal benefit charge, as of April 1, 2010, the Borough's buildings are eligible for NJ Clean Energy Program incentives. The funds for this change are provided by the American Recovery and Reinvestment Act, ARRA. Therefore, applicants are subject to federal ARRA terms and conditions. The Borough of Park Ridge should investigate the procedure to obtain NJ Clean Energy incentives such as Direct Install and Pay for Performance under ARRA conditions. For more information including other programs that are available because the Borough is a regulated gas customer, call 866-NJSMART or visit NJCleanEnergy.com.

Also, in lieu of the need for a 30kW generator to operate the hydroelectric system, the Borough of Park Ridge may be interested in applying for a federal grant called a Qualified Energy Conservation Bonds (QECBs).

SWA could work with the Borough of Park Ridge, as already done with other clients, to provide all required data and applications for incentives such as Pay for Performance and other programs, as a continuation to this audit. Please refer to Appendix F for details.

INTRODUCTION

Launched in 2008, the Local Government Energy Audit (LGEA) Program provides subsidized energy audits for municipal and local government-owned facilities, including offices, courtrooms, town halls, police and fire stations, sanitation buildings, transportation structures, schools and community centers. The Program will subsidize up to 100% of the cost of the audit as long as the facility spends 25% in energy saving measures within a year. The Board of Public Utilities (BPUs) Office of Clean Energy has assigned TRC Energy Services to administer the Program.

Steven Winter Associates, Inc. (SWA) is a 38-year-old architectural/engineering research and consulting firm, with specialized expertise in green technologies and procedures that improve the safety, performance, and cost effectiveness of buildings. SWA has a long-standing commitment to creating energy-efficient, cost-saving and resource-conserving buildings. As consultants on the built environment, SWA works closely with architects, developers, builders, and local, state, and federal agencies to develop and apply sustainable, 'whole building' strategies in a wide variety of building types: commercial, residential, educational and institutional.

SWA performed an energy audit and assessment for the Borough Hall/Public Library at 53 Park Avenue, Park Ridge, NJ. The process of the audit included facility visits on March 10, 2010 and March 24, 2010, benchmarking and energy bills analysis, assessment of existing conditions, energy modeling, energy conservation measures and other recommendations for improvements. The scope of work includes providing a summary of current building conditions, current operating costs, potential savings, and investment costs to achieve these savings. The facility description includes energy usage, occupancy profiles and current building systems along with a detailed inventory of building energy systems, recommendations for improvement and recommendations for energy purchasing and procurement strategies.

The goal of this Local Government Energy Audit is to provide sufficient information to the Borough of Park Ridge to make decisions regarding the implementation of the most appropriate and most cost-effective energy conservation measures for the Borough Hall/Public Library.

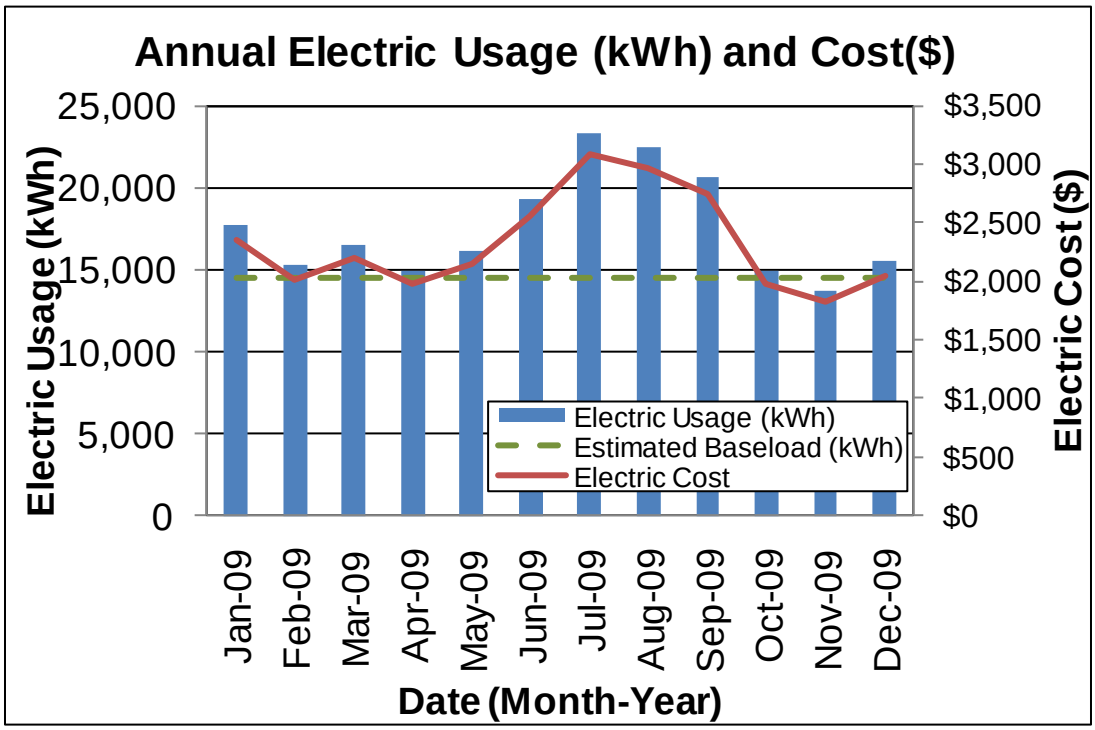
HISTORICAL ENERGY CONSUMPTION

Energy usage, load profile and cost analysis

SWA reviewed utility bills from January 2008 through January 2010 that were received from the utility companies supplying the Borough Hall/Public Library with electricity and natural gas. A 12 month period of analysis from January 2009 through January 2010 was used for all calculations and for purposes of benchmarking the building.

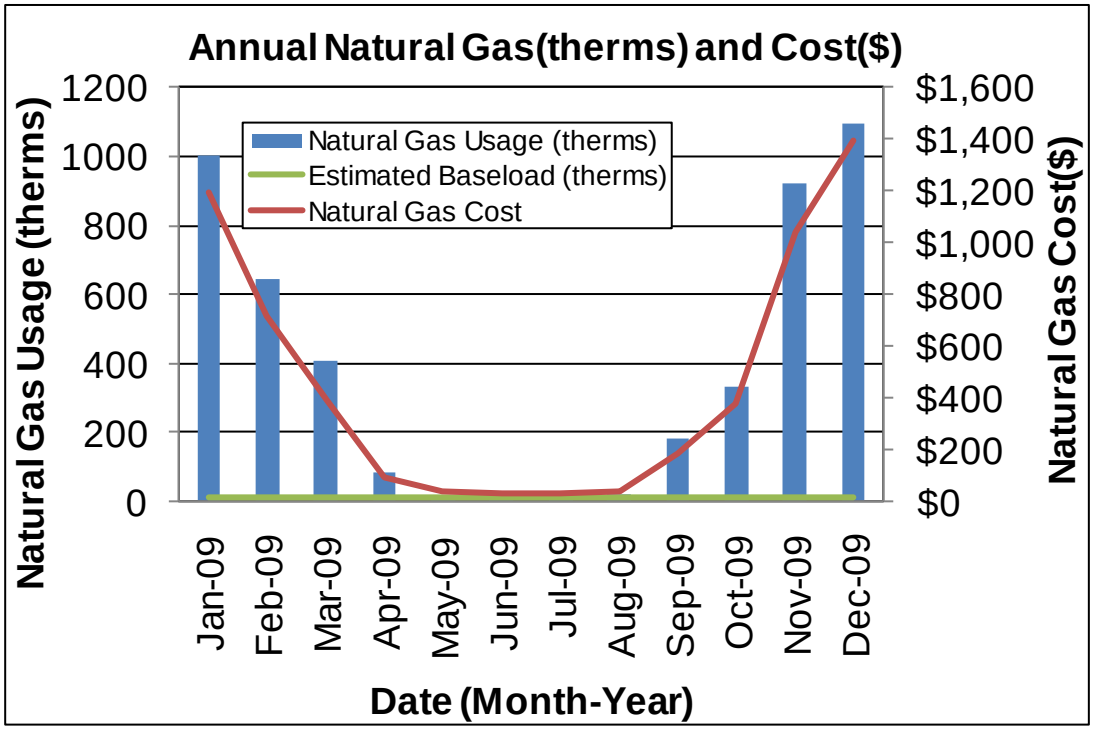
Electricity - The Borough Hall/Public Library is currently served by three electric meters, two for the Borough Hall and one for the Public Library. The Borough Hall/Public Library currently buys electricity from the Borough's own utility company, Park Ridge Electric, at **an average aggregated rate of $0.132/kWh**. The Borough Hall/Public Library purchased **approximately 210,221 kWh or $27,840 worth of electricity,** in the previous year. The average monthly demand was 66.0 kW and the annual peak demand was 86.9 kW.

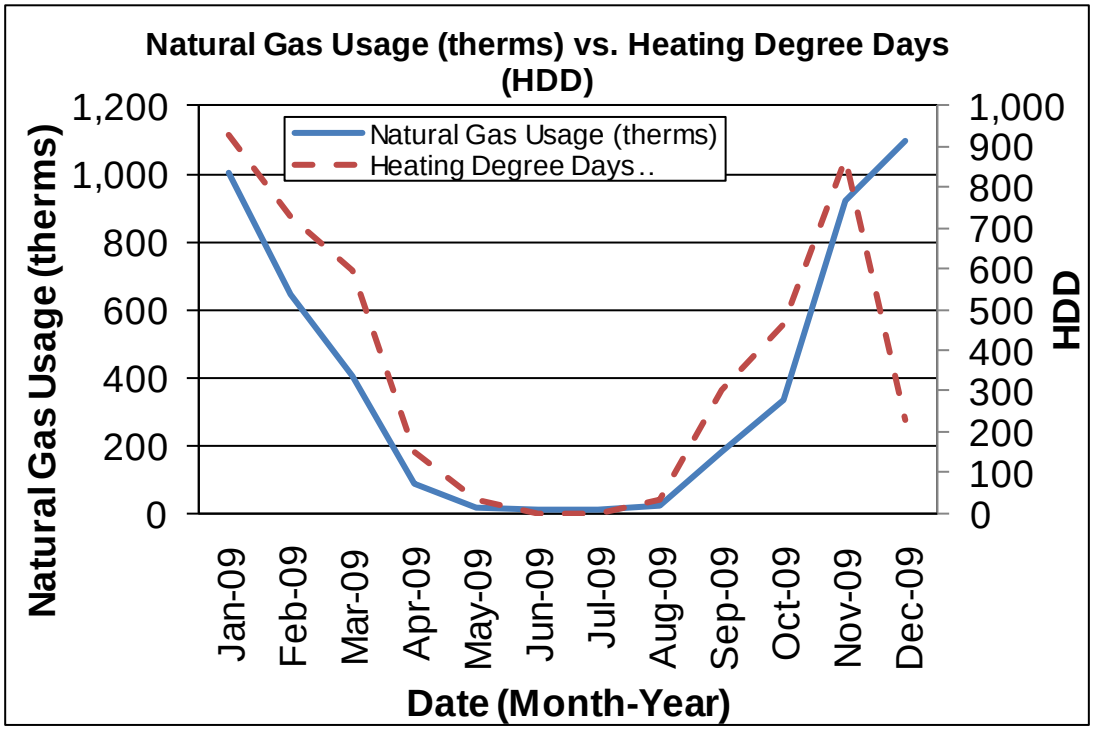
The chart below shows the monthly electric usage and costs. The dashed green line represents the approximate baseload or minimum electric usage required to operate the Borough Hall/Public Library.



Natural gas - The Borough Hall/Public Library is currently served by two meters for natural gas. The Borough Hall/Public Library currently buys natural gas from PSE&G at **an average aggregated rate of $1.170/therm**. The Borough Hall/Public Library purchased **approximately 4,722 therms, or $5,527 worth of natural gas,** in the previous year.

The chart below shows the monthly natural gas usage and costs. The green line represents the approximate baseload or minimum natural gas usage required to operate the Borough Hall/Public Library.

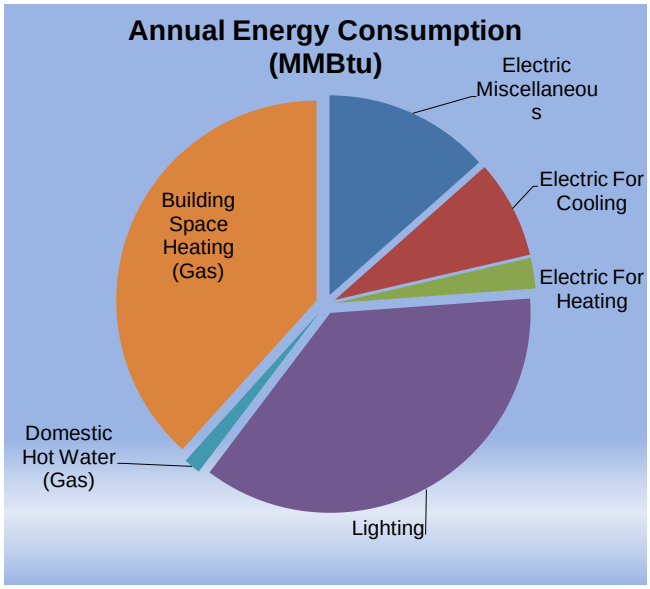


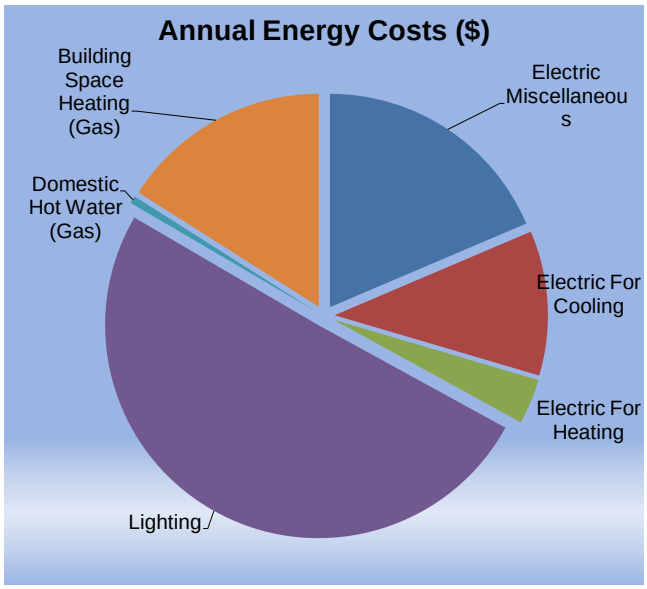


The chart above shows the monthly natural gas usage along with the heating degree days or HDD. Heating degree days is the difference of the average daily temperature and a base temperature, on a particular day. The heating degree days are zero for the days when the average temperature exceeds the base temperature. SWA's analysis used a base temperature of 65 degrees Fahrenheit.

The following graphs, pie charts, and table show energy use for the Borough Hall/Public Library based on utility bills for the 12 month period. Note: electrical cost at $39/MMBtu of energy is over three times as expensive as natural gas at $12/MMBtu.

Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	$	% $	$/MMBtu
Electric Miscellaneous	160	13%	$6,200	19%	39
Electric For Cooling	94	8%	$3,664	11%	39
Electric For Heating	29	2%	$1,143	3%	39
Lighting	434	36%	$16,830	50%	39
Domestic Hot Water (Gas)	16	1%	$190	1%	12
Building Space Heating (Gas)	456	38%	$5,336	16%	12
Totals	1,190	100%	$33,367	100%	
Total Electric Usage	717	60%	$27,840	83%	39
Total Gas Usage	472	40%	$5,527	17%	12
Totals	1,190	100%	$33,367	100%	



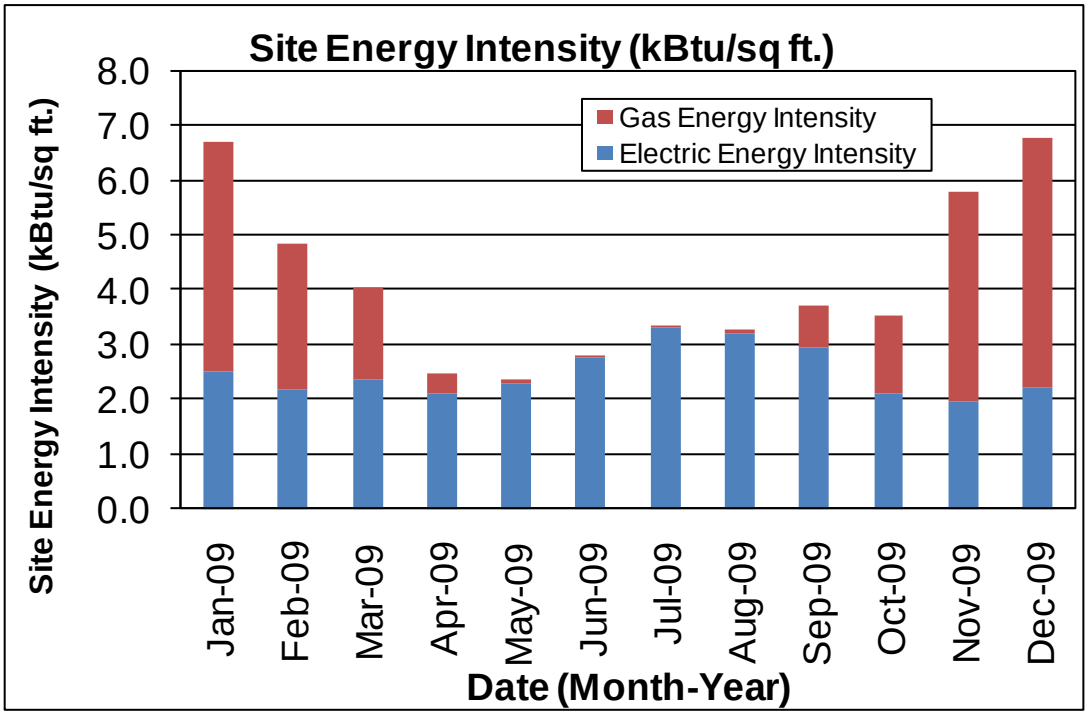


Energy benchmarking

SWA has entered energy information about the Borough Hall/Public Library in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* energy benchmarking system. This Office facility is categorized as a mixed-use ("Other") space type. Because it is an "Other" space type, there is no rating available. Consequently, the Borough Hall/Public Library is not eligible to receive a national energy performance rating at this time. The Site Energy Use

Intensity is 46.0 kBtu/ft^2-yr compared to the national average of an office building consuming 77.0 kBtu/ft^2-yr. See ECM section for guidance on how to further improve the building's rating.

Due to the nature of its calculation based upon a survey of existing buildings of varying usage, the national average for "Other" space types is very subjective, and is not an absolute bellwether for gauging performance.



Per the LGEA program requirements, SWA has assisted the Borough of Park Ridge to create an *Energy Star Portfolio Manager* account and share the Borough Hall/Public Library facilities information to allow future data to be added and tracked using the benchmarking tool. SWA has shared this Portfolio Manager account information with the Borough (user name of "parkridgeboro" with a password of "1parkridge1") and TRC Energy Services (user name of "TRC-LGEA").

Tariff analysis

As part of the utility bill analysis, SWA evaluated the current utility rates and tariffs. Tariffs are typically assigned to buildings based on size and building type.

Tariff analysis is performed to determine if the rate that a Borough of Park Ridge is contracted to pay with each utility provider is the best rate possible resulting in the lowest costs for electric and gas provision. Typically, the natural gas prices increase during the heating months when natural gas is used by the hot water boiler units. Some high gas price per therm fluctuations in the summer may be due to high energy costs that recently occurred and low use caps for the non-heating months.

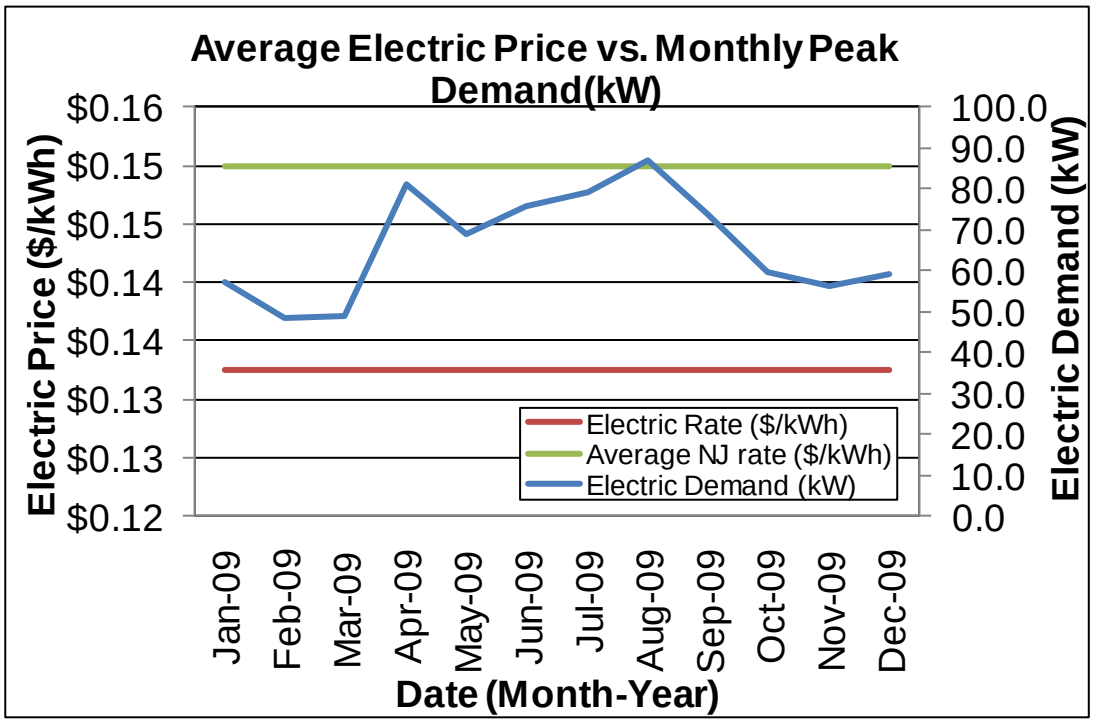
Typically, electricity prices also increase during the cooling months when electricity is used by rooftop units and condensers. The Borough of Park Ridge, however, is its own electric supplier

and therefore is exempt from regional and demand service charges. The building is direct metered and is charged a constant rate throughout the year, with no fluctuations due to season or usage.

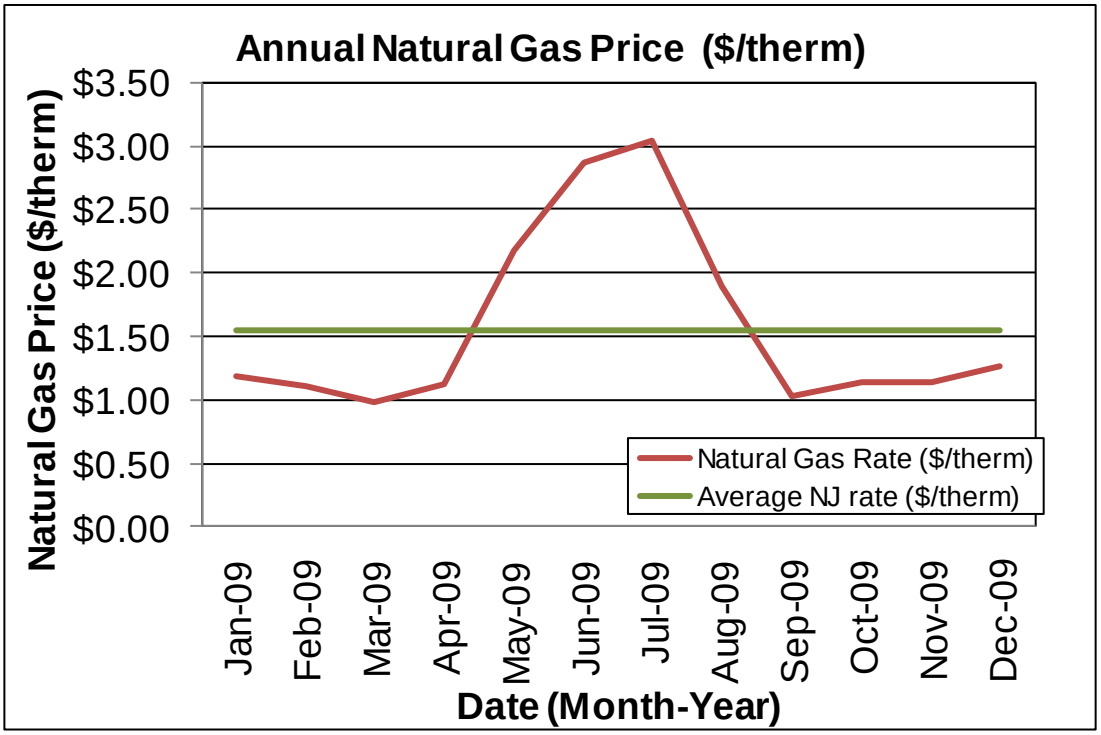
Energy Procurement strategies

Billing analysis is conducted using an average aggregated rate that is estimated based on the total cost divided by the total energy usage per utility per 12 month period. Average aggregated rates do not separate demand charges from usage, and instead provide a metric of inclusive cost per unit of energy. Average aggregated rates are used in order to equitably compare building utility rates to average utility rates throughout the state of New Jersey.

The average estimated NJ commercial utility rates for electric are $0.150/kWh, while Borough Hall/Public Library pays a rate of $0.132/kWh. The Borough Hall/Public Library pays a highly competitive rate for electricity since the Borough is its own provider. The chart below shows that the electric rate for the building is far below the average NJ rate and the rate was chosen based on historical usage so that it can be billed at a constant rate that does not fluctuate with demand.



The average estimated NJ commercial utility rates for gas are $1.550/therm, while the Borough Hall/Public Library pays a rate of $1.170/therm. Natural gas bill analysis shows fluctuations up to 68% over the most recent 12 month period.



The spike in gas rate during the summer is due to fixed meter rates even though the usage is nearly zero. Utility rate fluctuations may have been caused by adjustments between estimated and actual meter readings; others may be due to unusual high and recent escalating energy costs.

SWA recommends that the Borough Hall/Public Library further explore opportunities of purchasing natural gas from third-party suppliers in order to reduce rate fluctuation and ultimately reduce the annual cost of energy for the Borough Hall/Public Library. Appendix C contains a complete list of third-party energy suppliers for the Borough of Park Ridge service area.

EXISTING FACILITY AND SYSTEMS DESCRIPTION

This section gives an overview of the current state of the facility and systems. Please refer to the Proposed Further Recommendations section for recommendations for improvement.

Based on visits from SWA March 10, 2010 and March 24, 2010 the following data was collected and analyzed.

Building Characteristics

The Borough Hall is two-story, (including a partial basement) with approximately 17,200 square feet. The building was originally constructed in the 1930s with additions/alterations completed in 1986 and 2001. The Borough Hall houses administration offices, a court room, clerk's office, meeting rooms, police reserve offices and police reserve meeting areas.

Arial View Borough Hall/Public Library

Rear Façade Borough Hall/Library


Front Façade Right Borough Hall


Front Façade Left Borough Hall

East Façade Borough Hall

Partial North Façade Borough Hall

The Public Library is two-story slab on grade at approximately 6,800 square feet and houses reading areas, offices and open book stacks. A one-story corridor was built to connect the two buildings in 2006 and houses an entrance vestibule and hallway.

West Façade Public Library

South Façade Public Library

Building Occupancy Profiles

The Borough Hall building occupancy is approximately 35 administrative employees daily from 8:00am to 4:30pm and up to 100 visitors when court is in session twice per month.

The Public Library has 3 to 4 staff members daily and up to 30 visitors. The Library is open Monday, Tuesday and Thursday from 9:30am to 9:00pm, Wednesday and Friday from 9:30am to 5:00pm, Saturday from 9:30 am to 3:00pm and Sunday 12:00pm to 4:00pm.

Building Envelope

Due to unfavorable weather conditions (min. 18 deg. F delta-T in/outside and no/low wind), no exterior envelope infrared (IR) images were taken during the field audit.

Exterior Walls

The exterior wall envelope of the Borough Hall is mostly constructed of brick veneer and some stucco accents, over concrete block with an unconfirmed level of insulation. The interior is mostly painted gypsum wallboard and some painted CMU (Concrete Masonry Unit) in utility areas.

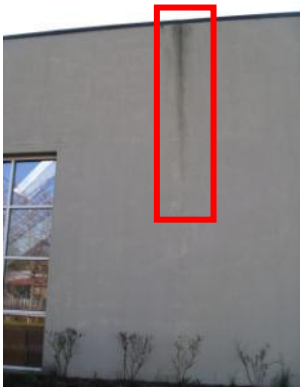
The Library wall envelope is constructed of EIFS (Exterior Insulation Finishing System) over concrete block with an unconfirmed level of insulation. The interior is mostly painted gypsum wallboard and some painted CMU (Concrete Masonry Unit).

Note: Wall insulation levels could not be verified in the field or on construction plans, and are based upon similar wall types and time of construction.

Exterior and interior wall surfaces were inspected during the field audit. They were found to be in overall acceptable condition with some signs of uncontrolled moisture, air-leakage and other energy-compromising issues located on both the Borough Hall and Public Library exterior walls.

The following specific exterior wall problem spots and areas were identified:

Uncontrolled roof water run-off due to missing gutters and downspouts – Borough Hall



Uncontrolled roof water run-off due to missing gutters and downspouts - Library

Damaged EIFS – Library

Cracked/deteriorated brick and mortar joints – Borough Hall

Efflorescence on brick and masonry walls indicate moisture presence within the wall cavity- Borough Hall.

Efflorescence on brick and masonry walls indicate moisture presence within the wall cavity- Borough Hall.

Roof

The roof of the Borough Hall is a flat and parapet type over steel decking, with a dark-colored EPDM single membrane finish and was replaced recently. Eight inches of fiberglass batt attic/ceiling insulation were visible in roof rafters.

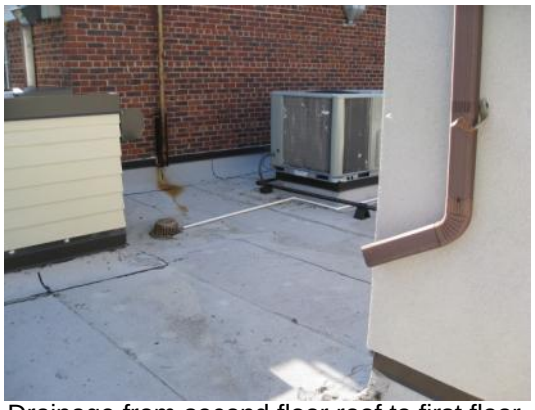
The Public Library roof is a combination of a flat parapet type and a low-pitch shed type over a wood structure with an asphalt shingle finish. This roof is approximately 25 years ago.

Note: Roof insulation levels were verified by construction plans.

Roofs, related flashing, gutters and downspouts were inspected during the field audit. They were reported to be in overall good condition, with only a few signs of uncontrolled moisture, air-leakage or other energy-compromising issues mostly detected on flat roof areas.

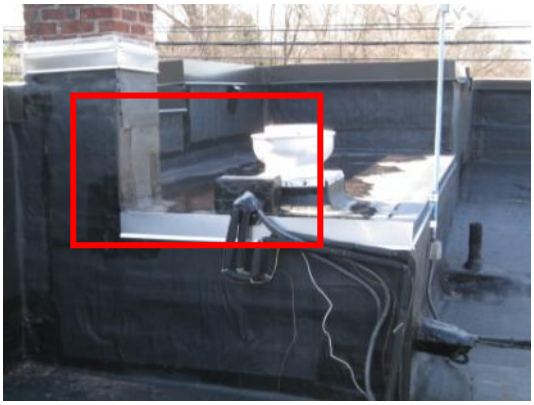
The following specific roof problem spots were identified:

Uncontrolled vegetation growth on roof of Public Library



Drainage from second floor roof to first floor roof above connection area between Borough Hall and Public Library

Signs of standing water/pooling



Signs of standing water/pooling – Borough Hall roof

Base

The Borough Hall building's base is composed of a below-grade basement with a slab floor with a perimeter foundation and no detectable slab edge/perimeter insulation.

The Public Library's base is a slab-on-grade floor with a perimeter foundation and no detectable slab edge insulation.

Slab/perimeter insulation levels could not be verified in the field or on construction plans, and are based upon similar wall types and time of construction.

The building's base and its perimeter were inspected for signs of uncontrolled moisture or water presence and other energy-compromising issues. Overall the base was reported to be in acceptable condition with only a few signs of uncontrolled moisture, air-leakage and/ or other energy-compromising issues detected in some areas inside.

The following specific base problem spots were identified:

Water/moisture seepage through cracks detected in the slab in Borough Hall pump room

Windows

The buildings contains several different types of windows:

<u>Borough Hall:</u>

1. One or two fixed type decorative block pattern windows with clear double glazing and no interior or exterior shading devices. The windows are located on the second floor of the Borough Hall.

2. Most are double-hung type windows with a wood frame clear double glazing and no interior or exterior shading devices. The windows are located on the main floor and second floor of the Borough Hall and were replaced approximately 25 years ago

3. Several fixed type windows with a non-insulated aluminum frame, low-E coated, clear double glazing and no interior or exterior shading devices. The windows are located on the back entrance of the Borough Hall buildings and were replaced recently.

Public Library:

4. Several fixed type windows with a non-insulated aluminum frame, low-E coated, clear double glazing and no interior or exterior shading devices. The windows are located on the main floor and back of the Public Library and were replaced recently.

5. Over eight double-hung type windows with a non-insulated aluminum frame, low-E coated, clear double glazing and interior roller blinds. The windows are located on the second floor of the Public Library and were replaced recently

6. Over six skylight type windows with a non-insulated aluminum frame, plastic bubble-round glazing and no interior or exterior shading devices. The windows are located on the second floor of the Public Library and were replaced recently.

Windows, shading devices, sills, related flashing and caulking were inspected as far as accessibility allowed for signs of moisture, air-leakage and other energy compromising issues. Overall, the windows were found to be in acceptable condition with only a few signs of uncontrolled moisture, on the older windows of the Borough Hall.

The following specific window problem spots were identified:

Damaged/aged window frame – Borough Hall

Exterior mold/water damage signs on areas around windows- Borough Hall

Exterior doors

The buildings contain basically two types of exterior door:

1. Most are glass with metal frame type exterior doors. They are located throughout the building and were installed as the building was renovated in 1986 or 2001.

2. The Borough Hall front entrance has a glass with wood frame type exterior door, which is original.

All exterior doors, thresholds, related flashing, caulking and weather-stripping were inspected for signs of moisture, air-leakage and other energy-compromising issues. Overall,

the doors were found to be in good condition with no signs of uncontrolled moisture, air-leakage and/ or other energy-compromising issues.

Building air-tightness

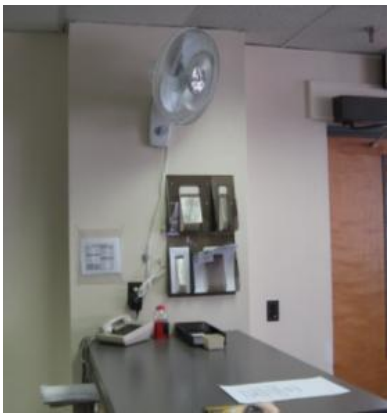
Overall the field auditors found the buildings to be reasonably air-tight, considering the building's use and occupancy, as described in more detail earlier in this chapter.

The air tightness of buildings helps maximize all other implemented energy measures and investments, and minimizes potentially costly long-term maintenance, repair and replacement expenses.

Mechanical Systems

Heating Ventilation Air Conditioning

There are no major comfort issues in the Borough Hall or Library. The second floor of the Public Library and Borough Hall can be slightly hot in the summer, which explains the recent addition of wall-mounted fans.



Borough Hall entrance, wall mounted rotating fan.

Equipment

The Borough Hall/Public Library is heated and cooled by several packaged rooftop units and furnaces. A comprehensive Equipment List can be found in Appendix A.

The rooftop units contain a natural gas burner for heating and a direct expansion (DX) system for cooling made up of an evaporator, condenser and refrigerant loop. The furnace units also contain a natural gas burner for heating and an evaporator section, but the condenser is a separate unit located outside or on the roof. In both arrangements the burner provides heat to the passing air through the combustion of natural gas; for cooling the R-22 refrigerant absorbs heat from the passing air in the evaporator coil and transfers the heat to the atmosphere in the condenser.
The rooftop units have open-close type outside air dampers and therefore the system is not set up for economizer mode. There are also gravity dampers on the return section of the units which purge excess air out of the system in order to maintain pressure equilibrium. For

the furnaces which are installed inside, outside air intake and combustion air intake is ducted to the furnaces through Fresh Air Intake louvers on the exterior walls with motorized 2-way dampers.

The Public Library is served by two Luxaire rooftop units; their installation date is not known, but based on visual inspection the units are over 15 years old. There is one visible fan installed on the Public Library roof for toilet exhaust.

Public Library Roof: Old Luxaire Rooftop Unit

In 2006 a Trane rooftop unit was installed for heating and cooling the corridor between the Borough Hall and Library. There is also one exhaust fan in the ceiling of the corridor for general ventilation.

Central Corridor Roof: Trane Rooftop Unit

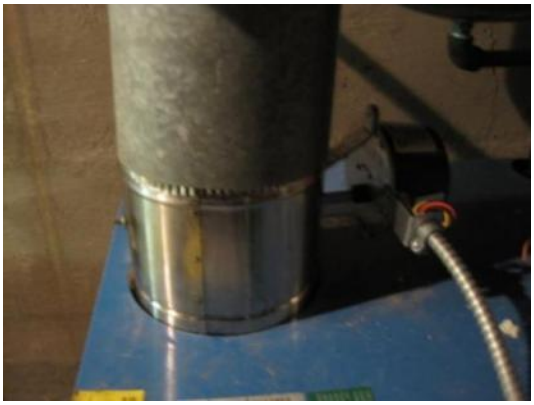
The Borough Hall is served by three Bryant packaged rooftop units as well as seven Luxaire direct vented furnaces installed in mechanical rooms and utility closets throughout the building. The rooftop units and furnaces were installed in 2000/2001 and appear in good operating condition.

Rooftop units, fans and chimneys on Borough Hall new EPDM flat roof

Borough Hall Roof: Three Luxaire condensers with insulated refrigerant pipes leading to building furnaces

Due to the phases of renovation of the Borough Hall in 1986 and 2001 there are also supplemental heating systems serving the building. A Crown Condensing Boiler installed in 1999 provides hot water to perimeter radiators for the South side of the 1st floor, which used to be the Fire Department garage. At the basement level, the Police Reserve area has electric perimeter radiant heaters. There are also has several electric humidifiers, used intermittently during the winter in the basement.

The boiler as well as each furnace has a flue pipe which allows the combustion gases to be vented outside through the roof. The boiler flue pipe has an automatic flue damper which shuts when the boiler is not operating to ensure that outside air does not enter the building through the stack.



Crown condensing boiler with automatic flue damper providing radiant heat for Borough Hall 1st floor

The Borough Hall uses well water for the building domestic water, which is supplied by a 1.15 HP submersible well pump.

Three exhaust fans located on the Borough Hall roof are used for toilets and general exhaust from the attic return plenum. Based on visual inspection, most of the exhaust fans have an estimated 10% useful operating life or less remaining. There is also a natural ventilation opening on the roof in the Borough Hall above the 1st floor.

Distribution Systems

A typical rooftop unit arrangement draws in fresh air and brings it into a mixing box, where it is combined with return air from the building. A small portion of the return air is purged and vented outside prior to entering the mixing box. The mixed air inside the unit is sent through a filter before passing through the evaporator or direct expansion (DX) coil. The air handler fan then pushes the air through the furnace section before the conditioned air is distributed to occupied spaces.

Return air is delivered to the units through a ceiling return plenum which is designed to be air tight. In the basement mechanical room, the insulation on the supply and return ductwork was found to be damaged and falling off.

The Borough Hall and Public Library have constant volume air systems with manual volume dampers to control the amount of air to each section of the building.

Damaged insulation on ductwork in Borough Hall Mechanical Room

Controls

Each furnace and rooftop unit is controlled by a separate programmable thermostat, creating 10 temperature zones in the Borough Hall and 2 zones in the Library, and 1 in the corridor between the buildings.

Each zone has a dedicated Honeywell programmable thermostat which allow staff to set a temperature set point schedule based on season and occupancy with allowed overrides. Typically there is at least a 3˚F dead band built into the thermostats; this indicates that the heating and cooling equipment will not operate when the space is within a set temperature range, usually 69˚F to 71˚F.

Typical Programmable Thermostat for 13 zones (left); Damper Controls for Offices based on temperature (Right)

Domestic Hot Water

The domestic hot water (DHW) for the Borough Hall is provided by two natural gas heaters; one is a Bradford White, 75,000 Btu/hr heater with a 75 gallon storage tank. According to building staff the heater only serves one sink and has a damaged natural gas valve. All other hot water for the Borough Hall is provided by a Rheem, 40,000 Btu/hr heater with 40 gallons of storage.

The hot water for the Public Library sinks is provided by a small electric Bradford White heater.

All heaters were installed in 2000 or later, and appear in good operating condition.

Electrical systems

Lighting

See attached lighting schedule in Appendix B for a complete inventory of lighting throughout the building including estimated power consumption and proposed lighting recommendations.

Interior Lighting - The Borough Hall/Public Library currently contains mostly T12 fixtures, with sporadic use of incandescent lights. The Public Library has a combination of T8 and T5 high efficiency fixtures. Based on measurements of lighting levels for each space, there are no vastly over-illuminated areas. There are some concerns with both interior and exterior visibility in a few places.

Exit Lights - Exit signs were found to be a combination of Incandescent and LED type.

Exterior Lighting - The exterior lighting surveyed during the building audit was found to be a mix of Metal Halide lamp and High Pressure Sodium lights. Exterior lighting is controlled by timers.

Appliances and process

SWA has conducted a general survey of larger, installed equipment. Appliances and other miscellaneous equipment account for a significant portion of electrical usage within the building. Typically, appliances are referred to as “plug-load” equipment, since they are not inherent to the building’s systems, but rather plug into an electrical outlet. Equipment such as process motors, computers, computer servers, radio and dispatch equipment, refrigerators, vending machines, printers, etc. all create an electrical load on the building that is hard to separate out from the rest of the building’s energy usage based on utility analysis.

Elevators

The Borough Hall/Public Library does not have an installed elevator.

Other electrical systems

There are not currently any other significant energy-impacting electrical systems installed at the Borough Hall/Public Library. Katolight Diesel Generator located in the Fire Department and provides the Borough Hall/Public Library with emergency power.

RENEWABLE AND DISTRIBUTED ENERGY MEASURES

Renewable energy is defined as any power source generated from sources which are naturally replenished, such as sunlight, wind and geothermal. Technology for renewable energy is improving, and the cost of installation is decreasing, due to both demand and the availability of state and federal government-sponsored funding. Renewable energy reduces the need for using either electricity or fossil fuel, therefore lowering costs by reducing the amount of energy purchased from the utility company. Technology such as photovoltaic panels or wind turbines, use natural resources to generate electricity on the site. Geothermal systems offset the thermal loads in a building by using water stored in the ground as either a heat sink or heat source. Solar thermal collectors heat a specified volume of water, reducing the amount of energy required to heat water using building equipment. Cogeneration or CHP allows you to generate electricity locally, while also taking advantage of heat wasted during the generation process.

Existing systems

Currently there are no renewable energy systems installed in the building.

Evaluated Systems

Solar Photovoltaic

Photovoltaic panels convert light energy received from the sun into a usable form of electricity. Panels can be connected into arrays and mounted directly onto building roofs, as well as installed onto built canopies over areas such as parking lots, building roofs or other open areas. Electricity generated from photovoltaic panels is generally sold back to the utility company through a net meter. Net-metering allows the utility to record the amount of electricity generated in order to pay credits to the consumer that can offset usage and demand costs on the electric bill. In addition to generation credits, there are incentives available called Solar Renewable Energy Credits (SRECs) that are subsidized by the state government. Specifically, the New Jersey State government pays a market-rate SREC to facilities that generate electricity in an effort to meet state-wide renewable energy requirements.

Based on utility analysis and a study of roof conditions, the Borough Hall/Public Library is a good candidate for a 35 kW Solar Panel installation. See ECM# 6 for details.

Solar Thermal Collectors

Solar thermal collectors are not cost-effective for this building and would not be recommended due to the insufficient and intermittent use of domestic hot water throughout the building to justify the expenditure.

Geothermal

The Borough Hall/Public Library is not a good candidate for geothermal installation since it would require replacement of the entire existing HVAC system, of which major components still have between30% and 70% remaining useful life.

Combined Heat and Power

The Borough Hall/Public Library is not a good candidate for CHP installation and would not be cost-effective due to the size and operations of the building. Typically, CHP is best suited for buildings with a high electrical baseload to accommodate the electricity generated, as well as a means for using waste heat generated. Typical applications include buildings with an absorption chiller, where waste heat would be used efficiently.

Hydroelectric

A dam was originally designed in 1930 for the purpose of providing 30kW of hydroelectric power generation for the Borough Hall building. The dam was built within the past 10 years however the generator has not yet been installed.

PROPOSED ENERGY CONSERVATION MEASURES

Energy Conservation Measures (ECMs) are recommendations determined for the building based on improvements over current building conditions. ECMs have been determined for the building based on installed cost, as well as energy and cost-savings opportunities.

Recommendations: Energy Conservation Measures

ECM#	Description of Highly Recommended 0-5 Year Payback ECMs
1	Lighting Upgrades: Replace Incandescent with CFL
2	Lighting Upgrades: Replace HPS with T5
3	Lighting Upgrades: Replace Inc Exit Signs with LED
	Description of Recommended 5-10 Year Payback ECMs
4	Replace Two RTU's with New , 90% Eff., 14.5 SEER
5	Lighting Upgrades: Replace T12 fixtures with T8
6	Install 35 kW Solar PV System
7	Replace three Condensers with High Efficiency 14.5 SEER

Assumptions: Discount Rate: 3.2%; Energy Price Escalation Rate: 0%
Note: A 0.0 electrical demand reduction/month indicates that it is very low/negligible

ECM#1: *Building Lighting Upgrades- Replace 55 Inc with CFL*

SWA completed a lighting inventory of the Park Ridge Borough Hall/Public Library (see Appendix B). There are over 50 incandescent lights used throughout the building which can be replaced with compact fluorescent lights. CFL lights typically produce the same lumen output as Incandescent using a third of the power.

Installation cost:

Estimated installed cost: $1,567 (includes $250 of labor)
Source of cost estimate: RS *Means; Published and established costs, NJ Clean Energy Program*

ECM #	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	annual return on investment, %	CO_2 reduced, lbs/yr
1	1,567	none at this time	1,567	7,322	1.53	0	1.0	2,191	3,157	5	15787	0.5	321	13,109

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA also assumed an aggregated 5 hrs/yr to replace aging burnt out lamps vs. newly installed.

Rebates/financial incentives:

- *None currently*

See Appendix F for further Incentive and Rebate information.

ECM#2: *Building Lighting Upgrades- Replace Five HPS lights with T5*

SWA completed a lighting inventory of the Park Ridge Borough Hall/Public Library (see Appendix B). There are several interior High Pressure Sodium lights in the hallway of the 1st floor. Substantial energy can be saved by replacing these with 4'T5 fixtures with electronic ballasts. T5's are energy efficient and produce a bright light, appropriate for ceiling mounted applications.

Installation cost: Estimated installed cost: $570 (includes $150 of labor)
Source of cost estimate: RS *Means; Published and established costs, NJ Clean Energy Program*

ECM #	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	annual return on investment, %	CO_2 reduced, lbs/yr
2	570	80	490	499	0.10	0	0.1	628	693	15	10,401	0.7	263	894

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA also assumed an aggregated 5 hrs/yr to replace aging burnt out lamps vs. newly installed.

Rebates/financial incentives:

- *NJ Clean Energy – HID lights to T5's - $16/light – Maximum $80*

ECM#3: *Building Lighting Upgrades- Replace Five Inc Exit Sign with LED*

Five of the exit signs were found to be using incandescent lights and due to the fact that the exit signs are always illuminated, there are energy savings in switching to LED type Exit Signs.

Installation cost: Estimated installed cost: $753 (includes $150 of labor)
Source of cost estimate: RS *Means; Published and established costs, NJ Clean Energy Program*

ECM #	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	annual return on investment, %	CO_2 reduced, lbs/yr
3	753	100	653	1,325	0.28	0	0.2	360	534	15	8,016	1.2	130	2,372

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA also assumed an aggregated 15 hrs/yr to replace aging burnt out lamps vs. newly installed.

Rebates/financial incentives:

- *NJ Clean Energy – Inc Exit with LED ($20 per fixture) - Maximum incentive amount is $100.*

ECM#4: *Replace Two Rooftop Package Units with High Efficiency Type*

SWA conducted a thorough mechanical equipment assessment and determined that the two packaged rooftop units serving the Public Library are beyond their useful life and should be replaced. The rated capacity of each unit is: 5 Tons and 125 MBH, and 7.5 Tons and 204 MBH. SWA recommends replacing both rooftop units with similar capacity rooftop units, with rated efficiency of 90% for heating and 14.5 SEER for cooling.

Installation cost: Estimated installed cost: $17,188 (includes $5,000 of labor)
Source of cost estimate: RS *Means; Published and established costs, NJ Clean Energy Program*

ECM #	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	annual return on investment, %	CO_2 reduced, lbs/yr
4	18,000	813	17,188	9,379	2.97	3.21	0.8	1,820	3,062	20	61,235	5.6	23	16,828

Assumptions: SWA calculated the savings for this measure using Energy Star savings calculator for the library space.

Rebates/financial incentives:

- *NJ Clean Energy – Package Terminal Unit >12,000 Btuh, >10 EER - $65/ton, $813 total*

ECM#5: *Building Lighting Upgrades- Replace 283 T12 Fixtures with T8 Fixtures*

SWA completed a lighting inventory of the Park Ridge Borough Hall/Public Library(see Appendix B). The vast majority of the main lighting is provided by T12 lamps with Magnetic ballasts. SWA recommends replacing all 283 of the T12 fixtures with T8 lamps and electronic ballasts. T8 lamps and electronic ballasts use less wattage for the same lumen output and do not degrade as quickly. Appendix B shows each location. The Borough of Park Ridge may decide to perform this work with in-house resources from its Maintenance Department on a scheduled, longer timeline than otherwise performed by a contractor, to obtain savings.

Installation cost: Estimated installed cost: $28,910 (includes $8,000 of labor)
Source of cost estimate: RS *Means; Published and established costs, NJ Clean Energy Program*

ECM #	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	annual return on investment, %	CO_2 reduced, lbs/yr
5	37,400	8,490	28,910	20,100	4.19	0	2.9	1,909	4,562	15	68,428	6.3	16	35,990

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA also assumed an aggregated 15 hrs/yr to replace aging burnt out lamps vs. newly installed.

Rebates/financial incentives:

- *NJ Clean Energy – T12 to T8 ($30 per fixture) - Maximum incentive amount is $8,490.*

ECM#6: Install 35 kW Solar PV System

SWA presents below the economics, and recommends at this time that Borough of Park Ridge further review installing a 35 kW PV system to offset electrical demand and reduce the annual net electric consumption for the building, and review guaranteed incentives from NJ rebates to justify the investment. As an electricity supplier, reducing the Borough's electric load allows for more capacity for the town and also serves as an example of energy efficiency for the community.

The size of the system was determined using the amount of roof surface area as a limiting factor, as well as the facilities annual base load. A PV system could be installed on a portion of the sloped roof that faces South or West. A commercial multi-crystalline 123 watt panel (17.2 volts, 7.16 amps) has 10.7 square feet of surface area (11.51 watts per square foot). A 35 kW system needs approximately 285 panels, which would take up 3,043 square feet, nearly 35% of the current roof area.

Installation cost: Estimated installed cost: $210,000 (includes $105,000 of labor)
Source of cost estimate: RS *Means; Published and established costs, NJ Clean Energy Program*

ECM #	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	annual return on investment, %	CO_2 reduced, lbs/yr
6	245,000	35,000	210,000	41,300	35.00	0	5.9	0	30,052	25	751,290	7.0	10	73,948

25 Year Cash flow Breakdown													
Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Sub total	-210,000	30,052	30,052	30,052	30,052	30,052	30,052	30,052	30,052	30,052	30,052	30,052	30,052
Year	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Sub total	30,052	30,052	30,052	5,452	5,452	5,452	5,452	5,452	5,452	5,452	5,452	5,452	5,452

Assumptions: SWA estimated the cost and savings of the system based on past PV projects. SWA projected physical dimensions based on a typical Polycrystalline Solar Panel (123 Watts, Model ND-123UJF). PV systems are sized based on 35,000 Watts, and physical dimensions for an array will differ with the efficiency of a given solar panel (W/sq ft).

Rebates/financial incentives:

- *NJ Clean Energy - Renewable Energy Incentive Program, Incentive based on $1.00/watt Solar PV application for systems 10 kW or less. Incentive amount for this application is $35,000 for the Park Ridge Borough Hall/Public Library*
  http://www.njcleanenergy.com/renewable-energy/programs/renewable-energy-incentive-program

- *NJ Clean Energy - Solar Renewable Energy Certificate Program. Each time a solar electric system generates 1,000kWh (1MWh) of electricity, a SREC is issued which can then be sold or traded separately from the power. The buildings must also become net-metered in order to earn SRECs as well as sell power back to the electric grid. A total of $24,600/year, based on $600/SREC, has been incorporated in the above costs for a period of 15 years; however it requires proof of performance, application approval and negotiations with the utility.*

ECM#7: *Replace Three Condensers with 14.5 SEER Models*

There are three small condensers on the roof of the Borough Hall that appear to serve the basement furnaces. The condensers appear to be at the end of their useful life. The rated efficiency of the units is 10 SEER, and there are currently higher performance condensers readily available on the market. SWA recommends replacing the units with those having 14.5 SEER rating, and comparable cooling capacity.

Installation cost: Estimated installed cost: $11,304 (includes $3,000 of labor)
Source of cost estimate: RS *Means; Published and established costs, NJ Clean Energy Program*

ECM #	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	annual return on investment, %	CO_2 reduced, lbs/yr
7	12,500	1,196	11,304	11,544	3.66	0	1.6	0	1,524	15	22,857	7.4	7	20,670

Assumptions: SWA calculated the savings for this measure based on a performance increase from 10 SEER to 14.5 SEER.

Rebates/financial incentives:

- *NJ Clean Energy – Unitary HVAC - <5.4 Tons & 14.0 SEER - $92/ton - $1196 total*

PROPOSED FURTHER RECOMMENDATIONS

Capital Improvements

Capital Improvements are recommendations for the building that may not be cost-effective at the current time, but that could yield a significant long-term payback. These recommendations should typically be considered as part of a long-term capital improvement plan. Capital improvements should be considered if additional funds are made available, or if the installed costs can be shared with other improvements, such as major building renovations. SWA recommends the following capital improvements for the Borough Hall/Public Library.

- Install premium motors when replacements are required - Select NEMA Premium motors when replacing motors that have reached the end of their useful operating lives.
- Repair damaged sections of EIFS on Public Library exterior walls.
- Overgrown ground vegetation on Public Library roof flashing should be removed and the roofing resealed.
- Apply water sealer to leaking, below-grade slab in Borough Hall pump room.

Operations and Maintenance

Operations and Maintenance measures consist of low/no cost measures that are within the capability of the current building staff to handle. These measures typically require little investment, and they yield a short payback period. These measures may address equipment settings or staff operations that, when addressed will reduce energy consumption or costs.

- Replace broken/deteriorated bricks and re-point cracked mortar joints.
- Efflorescence-coated brick and masonry materials need to dry out, and possible cause of water infiltration into wall cavities should be investigated, Borough Hall.
- Slope roof surface to drain effectively at time of reroofing. SWA recommends regular maintenance to verify water is draining correctly.
- Maintain sealants at all windows for airtight performance.
- Thoroughly and evenly insulate space above the ceiling tiles and plug all ceiling penetration. All missing ceiling tiles should be put back in place.
- Maintain downspouts and cap flashing - Repair/install missing downspouts and cap flashing as needed to prevent water/moisture infiltration and insulation damage. SWA recommends round downspout elbows to minimize clogging.
- Provide weather-stripping/air-sealing - Doors and vestibules should be observed annually for deficient weather-stripping and replaced as needed. The perimeter of all window frames should also be regularly inspected, and any missing or deteriorated caulking should be re-caulked to

provide an unbroken seal around the window frames. Any other accessible gaps or penetrations in the thermal envelope penetrations should also be sealed with caulk or spray foam.

- Repair/seal wall cracks and penetrations - SWA recommends as part of the maintenance program installing weep holes, installing proper flashing and correct masonry efflorescence, and sealing wall cracks and penetrations wherever necessary in order to keep insulation dry and effective.

- Provide water-efficient fixtures and controls - Adding controlled on/off timers on all lavatory faucets is a cost-effective way to reduce domestic hot water demand and save water. Building staff can also easily install faucet aerators and/or low-flow fixtures to reduce water consumption. There are many retrofit options, which can be installed now or incorporated as equipment is replaced. Routine maintenance practices that identify and quickly address water leaks are a low-cost way to save water and energy. Retrofitting with more efficient water-consumption fixtures/appliances will reduce energy consumption for water heating, while also decreasing water/sewer bills.

- SWA recommends that the building considers purchasing the most energy-efficient equipment, including Energy Star labeled appliances, when equipment is installed or replaced. More information can be found in the “Products” section of the Energy Star website at: http://www.energystar.gov.

- Use smart power electric strips - in conjunction with occupancy sensors to power down computer equipment when left unattended for extended periods of time.

- Create an energy educational program - that teaches how to minimize energy use. The U.S. Department of Energy offers free information for hosting energy efficiency educational programs and plans. For more information please visit: http://www1.eere.energy.gov/education/.

APPENDIX A: EQUIPMENT LIST

Inventory

Building System	Description	Location	Model #	Fuel	Space Served	Year Installed	Estimated Remaining Useful Life %
Cooling	**Condenser , R-22, 5 Tons, 10 SEER**	**Rooftop**	**HABA-T060SA, WGGP128339**	**Electric**	**Basement**	**1980**	**0%**
Cooling	**Condenser , R-22, 4 Tons, 10 SEER**	**Rooftop**	**EABA-T048SA, WNJM000416**	**Electric**	**Basement**	**1980**	**0%**
Cooling	**Condenser , R-22, 4 Tons, 10 SEER**	**Rooftop**	**EABA-T048SA, WNJM018748**	**Electric**	**Basement**	**1980**	**0%**
Cooling	(Acc-1)Condenser , R-22, 5 Tons, 10 SEER	Back of Bldg Outside	Luxaire; HABA-T060SA; WDKM018234	Electric	Boro Hall Basement	2000	30%
Cooling	Condenser , R-22, 5 Tons, 10 SEER	Back of Bldg Outside	Luxaire; HABA-T060SA; WCJP163038	Electric	Boro Hall 1st Fl	2000	30%
Cooling	Condenser , R-22, 5 Tons, 10 SEER	Back of Bldg Outside	Luxaire; HABA-T060SA; WGHP181306	Electric	Boro Hall 1st Fl	2000	30%
Cooling	(acc-6) Condenser , R-22, 5 Tons, 10 SEER	Back of Bldg Outside	Luxaire; HABA-T060SA; WDKM028285	Electric	Boro Hall Basement	2000	30%
Domestic Hot Water	Domestic Hot water Heater	Library Sink	brad ford white; M12U6SS-1NAL; DM10004929; TJ6739175	Electric	Library Sink	2000	30%
Domestic Hot Water	Heater with Damaged natural gas valve, 75,000 Btu/hr, 75 Gal	Boro Hall mech room	brad ford white; M17556CN12; TJ6739175	Natural Gas	Borough Hall One Sink	2000	30%
Domestic Hot Water	Domestic Hot water Heater, 40,000 Btu/hr, 40 gallon tank	Boro Hall Basement Mech Rm	Rheem; 42V40-40F; RHLN 0504523640	Natural Gas	Boro Hall Bathrooms	2004	60%
Heating	Condensing Boiler, with Flue Damper, 175,000 Btu/hr, 80% Eff	Boro Hall Basement Mech Rm	Crown/Hartford Boiler; ABF-1758PD; 234698	Natural Gas	Boro Hall One side Hot water radiators, 1st Fl	1999	30%
Heating	Electric Baseboard	Boro Hall Basement	NA	Electric	Boro Hall Basement	2001	40%
Heating / Cooling	**Packaged RTU's, 7.5 Tons, 204,000 Btu.hr, 80% Eff.**	**Library Rooftop**	**Luxaire DCUC-T090N205E, NFCMC56494**	**Natural Gas/Electric**	**Library**	**1980**	**0%**

Building System	Description	Location	Model #	Fuel	Space Served	Year Installed	Estimated Remaining Useful Life %
Heating / Cooling	**Packaged RTU's, 5 Tons, 125,000Btu/hr 80% Eff.**	**Library Rooftop**	**Luxaire DHUC-T060N125A, NBMM014190**	**Natural Gas/Electric**	**Library**	**1980**	**0%**
Heating / Cooling	Packaged RTU's, 180,000 Btu/h, 80% Eff.	Rooftop Boro Hall	Bryant, 580FPV090180AB, 3904G50801,	Natural Gas/Electric	Boro Hall 1st Fl	2000	30%
Heating / Cooling	Packaged RTU's, 180,000 Btu/h, 80% Eff.	Rooftop Boro Hall	Bryant, 580FPV090180AB, 3603G50652	Natural Gas/Electric	Boro Hall 1st Fl	2000	30%
Heating / Cooling	Packaged RTU's, 224,000 Btu/h, 80% Eff.	Rooftop Boro Hall	Bryant, 580FPV090180AB, 2505G40650	Natural Gas/Electric	Boro Hall 1st Fl	2000	30%
Heating / Cooling	Packaged RTU's, 130,000 Btu/hr, 83% Eff.	Rooftop Connection	Trane, YHC063A3RHA0RF00A, 610101440L	Natural Gas/Electric	Connection Area	2006	70%
Heating / Cooling	Furnace, 130,000 Btu/hr, 80% AFUE	Main Fl. Mech Rm	Luxaire; PCUHDLD20N130C; ELHM820072	Natural Gas/Electric	Boro Hall	2001	40%
Heating / Cooling	Furnace, 130,000 Btu/hr, 80% AFUE	Main Fl. Mech Rm	Luxaire; PCUHDLD20N130C; ELHM724884	Natural Gas/Electric	Boro Hall	2001	40%
Heating / Cooling	(AC-1) Furnace, 130,000 Btu/hr, 80% AFUE, controlled by thermostat in meeting room	Main Fl. Mech Rm	Luxaire; PCUHDLD20N130C; ELHM754891	Natural Gas/Electric	Borough Hall Basement Meeting Room	2001	40%
Heating / Cooling	(AC-5) Air Conditioning Unit, 4 Tons Cooling, with Electric heat- 5 kW controlled based on programmable thermostat	Boro Hall Basement Closet	Luxaire; N1VSC1606A; EDKS121350; AC: G2FD048H21A; EMJS267026	Electric	Borough Hall Part of Police Reserve Lounge	2001	40%
Heating / Cooling	(AC-6) condensing finance, 5 tons, 100,000 Btu/hr, 95.5% Eff.	Main Fl. Mech Rm	Luxaire; Heater: G9T10020UPC13C; ENJM560858; AC: G1UA060S21B; ECKS068158	Natural Gas/Electric	Borough Hall Meeting Room Basement	2001	40%

Building System	Description	Location	Model #	Fuel	Space Served	Year Installed	Estimated Remaining Useful Life %
Heating / Cooling	(AC-2) Condensing Furnace, 100,000 Btu/hr, 4 Tons, controlled by programmable thermostat in meeting room	Basement, Small Closet by Exit Sign	Luxaire; Heater: G9T10020UPC13C; ENJM560995: AC: G1UA048S21B; EFJS151841	Natural Gas/Electric	Borough Hall Basement Reserve Meeting Hall	2001	40%
Heating / Cooling	(AC-3) condensing finance, 100,000 Btu/hr, 95.5% Eff., 5 Tons, controlled by programmable thermostat in Bar area	Basement, Utility Closet	Luxaire; Heater: G9T10020UPC13C; EHHM715469: AC: G-UA060S21B; EBGS023486	Natural Gas/Electric	Borough Hall Reserve Lounge	2001	40%
Well Pump	**Submersible well pump, 1.15 HP w/ Yokogawa flow meter**	**Basement**	**Unknown; 2366056010**	**Electric**	Borough Hall **City Water**	**1980?**	**0%**
Ventilation	EF-2. 100 CFM, 1/6 HP	Rooftop Boro Hall	Cook, Gemini 5-10	Electric	Borough Hall Toilets	2000	30%
Ventilation	EF-1, 400 CFM, 1/4 HP	Rooftop Boro Hall	Cook, 150C38	Electric	Borough Hall Toilets	2000	30%
Ventilation	Large Exhaust Fan next to Bryant RTU	Rooftop Boro Hall	Amca	Electric	Boro Hall	2000	30%
Ventilation	**Exhaust Fan, 1/25HP, 1550 RPM,**	**Rooftop Boro Hall**	**4HZ33,**	**Electric**	**Boro Hall**	**1980?**	**0%**
Ventilation	Ceiling Installed Exhaust Fans	Corridor ceiling	NA	Electric	Connection Area	2006	70%
Ventilation	**Exhaust Fan**	**Rooftop Public Library**		**Electric**	**Library Toilets**	**1980?**	**0%**

Note: The remaining useful life of a system (in %) is an estimate based on the system date of built and existing conditions derived from visual inspection.

Appendix B: Lighting Study

Location			Existing Fixture Information												Retrofit Information												Annual Savings		
Marker	Floor	Room Identification	Fixture Type	Ballast	Lamp Type	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Controls	Operational Hours per Day	Operational Days per Year	Ballast Wattage	Total Watts	Energy Use kWh/year	Category	Fixture Type	Lamp Type	Ballast	Controls	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Operational Hours per Day	Operational Days per Year	Ballast Watts	Total Watts	Energy Use kWh/year	Fixture Savings (kWh)	Controls Savings (kWh)	Total Savings (kWh)
PUBLIC LIBRARY																													
4	1	Lib Meeting Rm	Ceiling Mounted	E	4'T8 U-shaped	8	2	32	Sw	8	260	5	552	1,148	N/A	Ceiling Mounted	4'T8 U-Shaped	E	Sw	8	2	32	8	260	5	552	1148	0	0	0
5	1	Lib Office	Ceiling Mounted	E	4'T8 U-shaped	3	2	32	Sw	9	260	5	207	484	N/A	Ceiling Mounted	4'T8 U-Shaped	E	Sw	3	2	32	9	260	5	207	484	0	0	0
6	1	Lib Bathroom	Ceiling Mounted	E	4'T8 U-shaped	1	2	32	Sw	9	260	5	69	161	N/A	Ceiling Mounted	4'T8 U-Shaped	E	Sw	1	2	32	9	260	5	69	161	0	0	0
7	1	quiet reading room	Ceiling Mounted	E	4'T8 U-shaped	6	2	32	Sw	9	260	5	414	969	N/A	Ceiling Mounted	4'T8 U-Shaped	E	Sw	6	2	32	9	260	5	414	969	0	0	0
21	2	Library Hallway	Exit Sign	S	LED	1	1	5	N	24	365	1	6	48	N/A	Exit Sign	LED	S	N	1	1	5	24	365	1	6	48	0	0	0
22	1	Library Hallway	Exit Sign	S	LED	2	1	5	N	24	365	1	11	96	N/A	Exit Sign	LED	S	N	2	1	5	24	365	1	11	96	0	0	0
23	1	Library Hallway	Exit Sign	S	Inc	1	1	40	N	24	365	0	40	350	LEDex	Exit Sign	LED	S	N	1	1	5	24	365	1	6	48	302	0	302
34	1	Library Hallway	Ceiling Mounted	E	4'T5	16	3	28	Sw	12	260	4	1,408	4,393	N/A	Ceiling Mounted	4'T5	E	Sw	16	3	28	12	260	4	1408	4393	0	0	0
35	1	Library Hallway	Ceiling Mounted	E	4'T8	16	3	32	Sw	12	260	5	1,616	5,042	N/A	Ceiling Mounted	4'T8	E	Sw	16	3	32	12	260	5	1616	5042	0	0	0
36	1	Library Hallway	Ceiling Mounted	E	4'T8	16	3	32	Sw	9	260	5	1,616	3,781	N/A	Ceiling Mounted	4'T8	E	Sw	16	3	32	9	260	5	1616	3781	0	0	0
37	1	Library Hallway	Ceiling Mounted	E	4'T8	35	2	32	Sw	9	260	5	2,415	5,651	N/A	Ceiling Mounted	4'T8	E	Sw	35	2	32	9	260	5	2415	5651	0	0	0
38	1	Reading Room	Ceiling Mounted	E	4'T8	4	3	32	Sw	8	260	5	404	840	N/A	Ceiling Mounted	4'T8	E	Sw	4	3	32	8	260	5	404	840	0	0	0
43	1	Lib Lobby	Ceiling Mounted	E	CFL	2	2	15	Sw	8	260	0	60	125	N/A	Ceiling Mounted	CFL	E	Sw	2	2	15	8	260	0	60	125	0	0	0
89	2	Reading Area	Recessed	M	4'T12	16	4	40	Sw	9	260	12	2,752	6,440	T8	Recessed	4'T8	E	Sw	16	4	32	9	260	5	2128	4980	1460	0	1460
97	2	Reading Area	Ceiling Mounted	S	CFL	5	1	32	Sw	9	260	0	160	374	N/A	Ceiling Mounted	CFL	S	Sw	5	1	32	9	260	0	160	374	0	0	0
98	1	Library Hallway	Ceiling Mounted	S	Inc	6	1	60	Sw	12	260	0	360	1,123	CFL	Ceiling Mounted	CFL	S	Sw	6	1	20	12	260	0	120	374	749	0	749
99	1	Lib spotlights	Ceiling Mounted	S	Inc	8	1	60	Sw	9	260	0	480	1,123	CFL	Ceiling Mounted	CFL	S	Sw	8	1	20	9	260	0	160	374	749	0	749
100	1	Lib Bathroom	Ceiling Mounted	S	Inc	1	2	60	Sw	9	260	0	120	281	CFL	Ceiling Mounted	CFL	S	Sw	1	2	20	9	260	0	40	94	187	0	187
MUNICPAL BUILDING																													
1	1	Bathroom Women	Ceiling Mounted	M	4'T12 U-shaped	1	2	40	Sw	9	260	12	92	215	T8	Ceiling Mounted	4'T8 U-Shaped	E	Sw	1	2	32	9	260	5	69	161	54	0	54
2	2	Bathroom Women	Ceiling Mounted	M	4'T12 U-shaped	1	2	40	Sw	9	260	12	92	215	T8	Ceiling Mounted	4'T8 U-Shaped	E	Sw	1	2	32	9	260	5	69	161	54	0	54
3	2	Staircase	Ceiling Mounted	M	4'T12 U-shaped	1	2	40	Sw	16	260	12	92	383	T8	Ceiling Mounted	4'T8 U-Shaped	E	Sw	1	2	32	16	260	5	69	287	96	0	96
8	1	Office Area (1)	Exit Sign	M	LED	1	1	5	N	24	365	1	6	48	N/A	Exit Sign	LED	M	N	1	1	5	24	365	1	6	48	0	0	0
9	1	Office Area (1)	Exit Sign	S	Inc	1	1	40	N	24	365	0	40	350	LEDex	Exit Sign	LED	S	N	1	1	5	24	365	1	6	48	302	0	302
10	1	Office Area	Exit Sign	S	LED	2	1	5	N	24	365	1	11	96	N/A	Exit Sign	LED	S	N	2	1	5	24	365	1	11	96	0	0	0
11	1	Office Area	Exit Sign	S	Inc	1	1	40	N	24	365	0	40	350	LEDex	Exit Sign	LED	S	N	1	1	5	24	365	1	6	48	302	0	302
12	2	violations	Exit Sign	S	Inc	1	1	40	N	24	365	0	40	350	LEDex	Exit Sign	LED	S	N	1	1	5	24	365	1	6	48	302	0	302
13	2	Hallway	Exit Sign	S	LED	2	1	5	N	24	365	1	11	96	N/A	Exit Sign	LED	S	N	2	1	5	24	365	1	11	96	0	0	0
14	2	Staircase	Exit Sign	S	LED	1	1	5	N	24	365	1	6	48	N/A	Exit Sign	LED	S	N	1	1	5	24	365	1	6	48	0	0	0
15	1	corridor	Exit Sign	S	LED	1	1	5	N	24	365	1	6	48	N/A	Exit Sign	LED	S	N	1	1	5	24	365	1	6	48	0	0	0
16	2	Court Room	Exit Sign	S	LED	2	1	5	N	24	365	1	11	96	N/A	Exit Sign	LED	S	N	2	1	5	24	365	1	11	96	0	0	0
17	Bsmt	Meeting Rm	Exit Sign	S	LED	2	1	5	N	24	365	1	11	96	N/A	Exit Sign	LED	S	N	2	1	5	24	365	1	11	96	0	0	0
18	Bsmt	Meeting Rm	Exit Sign	S	LED	2	1	5	N	24	365	1	11	96	N/A	Exit Sign	LED	S	N	2	1	5	24	365	1	11	96	0	0	0
19	Bsmt	Hallway	Exit Sign	S	LED	2	1	5	N	24	365	1	11	96	N/A	Exit Sign	LED	S	N	2	1	5	24	365	1	11	96	0	0	0
20	Bsmt	reservelounge	Exit Sign	S	LED	1	1	5	N	24	365	1	6	48	N/A	Exit Sign	LED	S	N	1	1	5	24	365	1	6	48	0	0	0
24	1	assessor	Ceiling Mounted	M	4'T12	2	3	40	Sw	8	260	12	264	549	T8	Ceiling Mounted	4'T8	E	Sw	2	3	32	8	260	5	202	420	129	0	129
25	1	computer	Ceiling Mounted	M	4'T12	2	3	40	Sw	8	260	12	264	549	T8	Ceiling Mounted	4'T8	E	Sw	2	3	32	8	260	5	202	420	129	0	129
26	1	finance	Ceiling Mounted	M	4'T12	2	4	40	Sw	9	260	12	344	805	T8	Ceiling Mounted	4'T8	E	Sw	2	4	32	9	260	5	266	622	183	0	183
27	1	Office Area (1)	Ceiling Mounted	M	4'T12	32	4	40	Sw	9	260	12	5,504	12,879	T8	Ceiling Mounted	4'T8	E	Sw	32	4	32	9	260	5	4256	9959	2920	0	2920
28	1	Lobby	Ceiling Mounted	M	4'T12	4	3	40	Sw	8	260	12	528	1,098	T8	Ceiling Mounted	4'T8	E	Sw	4	3	32	8	260	5	404	840	258	0	258
29	1	Office Area	Ceiling Mounted	M	4'T12	19	3	40	Sw	9	260	12	2,508	5,869	T8	Ceiling Mounted	4'T8	E	Sw	19	3	32	9	260	5	1919	4490	1378	0	1378
30	1	admin	Ceiling Mounted	M	4'T12	2	3	40	Sw	9	260	12	264	618	T8	Ceiling Mounted	4'T8	E	Sw	2	3	32	9	260	5	202	473	145	0	145
31	1	clerk	Ceiling Mounted	M	4'T12	2	3	40	Sw	9	260	12	264	618	T8	Ceiling Mounted	4'T8	E	Sw	2	3	32	9	260	5	202	473	145	0	145
32	1	operations	Ceiling Mounted	M	4'T12	2	3	40	Sw	9	260	12	264	618	T8	Ceiling Mounted	4'T8	E	Sw	2	3	32	9	260	5	202	473	145	0	145
33	2	Office	Ceiling Mounted	M	4'T12	4	3	40	Sw	9	260	12	528	1,236	T8	Ceiling Mounted	4'T8	E	Sw	4	3	32	9	260	5	404	945	290	0	290
39	1	Utility Rm	Recessed	M	4'T12	2	2	40	Sw	2	260	12	184	96	T8	Recessed	4'T8	E	Sw	2	2	32	2	260	5	138	72	24	0	24
40	2	Bathroom Men	Ceiling Mounted	S	CFL	2	2	15	Sw	9	260	0	60	140	N/A	Ceiling Mounted	CFL	S	Sw	2	2	15	9	260	0	60	140	0	0	0
41	2	Bathroom Women	Ceiling Mounted	S	CFL	1	2	15	Sw	9	260	0	30	70	N/A	Ceiling Mounted	CFL	S	Sw	1	2	15	9	260	0	30	70	0	0	0
42	1	corridor	Ceiling Mounted	S	CFL	7	2	15	Sw	16	260	0	210	874	N/A	Ceiling Mounted	CFL	S	Sw	7	2	15	16	260	0	210	874	0	0	0
44	1	vault	Recessed	M	4'T12	2	2	40	Sw	2	260	12	184	96	T8	Recessed	4'T8	E	Sw	2	2	32	2	260	5	138	72	24	0	24
45	1	file room	Recessed	M	4'T12	2	2	40	Sw	2	260	12	184	96	T8	Recessed	4'T8	E	Sw	2	2	32	2	260	5	138	72	24	0	24
46	1	Bathroom Women	Recessed	M	2'T12	1	2	20	Sw	9	260	6	46	108	T8	Recessed	2'T8	E	Sw	1	2	17	9	260	2	36	84	23	0	23
47	2	violations	Recessed	M	4'T12	7	4	40	Sw	9	260	12	1,204	2,817	T8	Recessed	4'T8	E	Sw	7	4	32	9	260	5	931	2179	639	0	639
48	2	violations	Recessed	M	4'T12	1	3	40	Sw	9	260	12	132	309	T8	Recessed	4'T8	E	Sw	1	3	32	9	260	5	101	236	73	0	73
49	2	Hallway	Recessed	M	4'T12	7	4	40	Sw	16	260	12	1,204	5,009	T8	Recessed	4'T8	E	Sw	7	4	32	16	260	5	931	3873	1136	0	1136
50	2	Bathroom Women	Recessed	M	2'T12	1	2	20	Sw	9	260	6	46	108	T8	Recessed	2'T8	E	Sw	1	2	17	9	260	2	36	84	23	0	23
51	2	Bathroom Men	Recessed	M	4'T12	1	2	40	Sw	9	260	12	92	215	T8	Recessed	4'T8	E	Sw	1	2	32	9	260	5	69	161	54	0	54
52	2	Bathroom Men	Recessed	M	4'T12	1	3	40	Sw	9	260	12	132	309	T8	Recessed	4'T8	E	Sw	1	3	32	9	260	5	101	236	73	0	73

Location			Existing Fixture Information												Retrofit Information													Annual Savings		
Marker	Floor	Room Identification	Fixture Type	Ballast	Lamp Type	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Controls	Operational Hours per Day	Operational Days per Year	Ballast Wattage	Total Watts	Energy Use kWh/year	Category	Fixture Type	Lamp Type	Ballast	Controls	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Operational Hours per Day	Operational Days per Year	Ballast Watts	Total Watts	Energy Use kWh/year	Fixture Savings (kWh)	Controls Savings (kWh)	Total Savings (kWh)
53	2	Staircase	Recessed	M	4'T12	1	2	40	Sw	16	260	12	92	383	T8	Recessed	4'T8	E	Sw	1	2	32	16	260	5	69	287	96	0	96
54	2	Court Room	Recessed	M	4'T12	33	2	40	Sw	8	260	12	3,036	6,315	T8	Recessed	4'T8	E	Sw	33	2	32	8	260	5	2277	4736	1579	0	1579
55	2	Court Clerk	Recessed	M	4'T12	3	4	40	Sw	8	260	12	516	1,073	T8	Recessed	4'T8	E	Sw	3	4	32	8	260	5	399	830	243	0	243
56	2	Office	Recessed	M	4'T12	2	4	40	Sw	9	260	12	344	805	T8	Recessed	4'T8	E	Sw	2	4	32	9	260	5	266	622	183	0	183
57	2	Court Room	Recessed	M	4'T12	6	4	40	Sw	8	260	12	1,032	2,147	T8	Recessed	4'T8	E	Sw	6	4	32	8	260	5	798	1660	487	0	487
58	2	Court Room	Recessed	M	4'T12	27	2	40	Sw	8	260	12	2,484	5,167	T8	Recessed	4'T8	E	Sw	27	2	32	8	260	5	1863	3875	1292	0	1292
59	2	Office	Recessed	M	4'T12	2	4	40	Sw	9	260	12	344	805	T8	Recessed	4'T8	E	Sw	2	4	32	9	260	5	266	622	183	0	183
60	2	Meeting Rm	Recessed	M	4'T12	2	4	40	Sw	8	260	12	344	716	T8	Recessed	4'T8	E	Sw	2	4	32	8	260	5	266	553	162	0	162
61	2	emergency management	Recessed	M	4'T12	2	4	40	Sw	8	260	12	344	716	T8	Recessed	4'T8	E	Sw	2	4	32	8	260	5	266	553	162	0	162
62	Bsmt	Meeting Rm	Recessed	M	4'T12	17	3	40	Sw	8	260	12	2,244	4,668	T8	Recessed	4'T8	E	Sw	17	3	32	8	260	5	1717	3571	1096	0	1096
63	Bsmt	Meeting Rm	Recessed	M	4'T12	12	3	40	Sw	8	260	12	1,584	3,295	T8	Recessed	4'T8	E	Sw	12	3	32	8	260	5	1212	2521	774	0	774
64	Bsmt	Server Room With Work Station	Recessed	M	4'T12	2	3	40	Sw	8	260	12	264	549	T8	Recessed	4'T8	E	Sw	2	3	32	8	260	5	202	420	129	0	129
65	Bsmt	Mechanical Rm	Recessed	M	4'T12	2	1	40	Sw	2	260	12	104	54	T8	Recessed	4'T8	E	Sw	2	1	32	2	260	5	74	38	16	0	16
66	Bsmt	Mechanical Rm	Recessed	M	8'T12	2	2	80	Sw	2	260	20	360	187	T8	Recessed	8'T8	E	Sw	2	2	59	2	260	7	250	130	57	0	57
67	Bsmt	Utility Rm	Recessed	M	4'T12	2	2	40	Sw	2	260	12	184	96	T8	Recessed	4'T8	E	Sw	2	2	32	2	260	5	138	72	24	0	24
68	Bsmt	Storage Rm	Recessed	M	4'T12	1	4	40	Sw	2	260	12	172	89	T8	Recessed	4'T8	E	Sw	1	4	32	2	260	5	133	69	20	0	20
69	Bsmt	Hallway	Recessed	M	4'T12	9	3	40	Sw	16	260	12	1,188	4,942	T8	Recessed	4'T8	E	Sw	9	3	32	16	260	5	909	3781	1161	0	1161
70	Bsmt	Hallway	Recessed	M	4'T12	1	2	40	Sw	16	260	12	92	383	T8	Recessed	4'T8	E	Sw	1	2	32	16	260	5	69	287	96	0	96
71	Bsmt	vault	Recessed	M	4'T12	3	2	40	Sw	16	260	12	276	1,148	T8	Recessed	4'T8	E	Sw	3	2	32	16	260	5	207	861	287	0	287
72	Bsmt	Storage Rm	Recessed	M	4'T12	1	2	40	Sw	2	260	12	92	48	T8	Recessed	4'T8	E	Sw	1	2	32	2	260	5	69	36	12	0	12
73	Bsmt	Storage Rm	Recessed	M	4'T12	1	2	40	Sw	2	260	12	92	48	T8	Recessed	4'T8	E	Sw	1	2	32	2	260	5	69	36	12	0	12
74	Bsmt	Kitchen	Recessed	M	4'T12	2	3	40	Sw	9	260	12	264	618	T8	Recessed	4'T8	E	Sw	2	3	32	9	260	5	202	473	145	0	145
75	Bsmt	Bathroom Women	Recessed	M	4'T12	3	3	40	Sw	9	260	12	396	927	T8	Recessed	4'T8	E	Sw	3	3	32	9	260	5	303	709	218	0	218
76	Bsmt	Bathroom Women	Recessed	M	4'T12	1	2	40	Sw	9	260	12	92	215	T8	Recessed	4'T8	E	Sw	1	2	32	9	260	5	69	161	54	0	54
77	Bsmt	Bathroom Men	Recessed	M	4'T12	1	2	40	Sw	9	260	12	92	215	T8	Recessed	4'T8	E	Sw	1	2	32	9	260	5	69	161	54	0	54
78	Bsmt	Bathroom Men	Recessed	M	4'T12	3	3	40	Sw	9	260	12	396	927	T8	Recessed	4'T8	E	Sw	3	3	32	9	260	5	303	709	218	0	218
79	Bsmt	Meeting Rm	Recessed	M	4'T12	6	3	40	Sw	8	260	12	792	1,647	T8	Recessed	4'T8	E	Sw	6	3	32	8	260	5	606	1260	387	0	387
80	Bsmt	Men's Locker Room	Recessed	M	4'T12	2	3	40	Sw	8	260	12	264	549	T8	Recessed	4'T8	E	Sw	2	3	32	8	260	5	202	420	129	0	129
81	Bsmt	squad	Recessed	M	4'T12	2	3	40	Sw	8	260	12	264	549	T8	Recessed	4'T8	E	Sw	2	3	32	8	260	5	202	420	129	0	129
82	Bsmt	Storage Rm	Recessed	M	4'T12	2	1	40	Sw	2	260	12	104	54	T8	Recessed	4'T8	E	Sw	2	1	32	2	260	5	74	38	16	0	16
83	Bsmt	Office	Recessed	M	4'T12	2	3	40	Sw	9	260	12	264	618	T8	Recessed	4'T8	E	Sw	2	3	32	9	260	5	202	473	145	0	145
84	Bsmt	Bathroom	Recessed	M	4'T12	1	4	40	Sw	9	260	12	172	402	T8	Recessed	4'T8	E	Sw	1	4	32	9	260	5	133	311	91	0	91
85	Bsmt	reserve lounge	Recessed	M	4'T12	1	3	40	Sw	9	260	12	132	309	T8	Recessed	4'T8	E	Sw	1	3	32	9	260	5	101	236	73	0	73
86	Bsmt	freezer	Recessed	M	4'T12	2	3	40	Sw	9	260	12	264	618	T8	Recessed	4'T8	E	Sw	2	3	32	9	260	5	202	473	145	0	145
87	Bsmt	freezer	Recessed	M	4'T12	2	2	40	Sw	9	260	12	184	431	T8	Recessed	4'T8	E	Sw	2	2	32	9	260	5	138	323	108	0	108
88	Bsmt	Storage Rm	Recessed	M	4'T12	2	3	40	Sw	2	260	12	264	137	T8	Recessed	4'T8	E	Sw	2	3	32	2	260	5	202	105	32	0	32
90	1	corridor	Ceiling Mounted	S	HPS	5	1	70	Sw	16	260	14	420	1,747	T5	Ceiling Mounted	4'T5	E	Sw	5	2	28	16	260	4	300	1248	499	0	499
91	Bsmt	Mechanical Rm	Ceiling Mounted	S	Inc	1	1	60	Sw	2	260	0	60	31	CFL	Ceiling Mounted	CFL	S	Sw	1	1	20	2	260	0	20	10	21	0	21
92	Bsmt	Hallway	Ceiling Mounted	S	Inc	2	1	60	Sw	16	260	0	120	499	CFL	Ceiling Mounted	CFL	S	Sw	2	1	20	16	260	0	40	166	333	0	333
93	Bsmt	Hallway	Recessed	M	4'T12	4	3	40	Sw	16	260	12	528	2,196	T8	Recessed	4'T8	E	Sw	4	3	32	16	260	5	404	1681	516	0	516
94	Bsmt	Hallway	Recessed	M	4'T12	1	2	40	Sw	16	260	12	92	383	T8	Recessed	4'T8	E	Sw	1	2	32	16	260	5	69	287	96	0	96
95	Bsmt	reserve lounge	Ceiling Mounted	S	Inc	24	1	60	Sw	9	260	0	1,440	3,370	CFL	Ceiling Mounted	CFL	S	Sw	24	1	20	9	260	0	480	1123	2246	0	2246
96	Bsmt	well room	Ceiling Mounted	S	Inc	2	1	60	Sw	3	260	0	120	94	CFL	Ceiling Mounted	CFL	S	Sw	2	1	20	3	260	0	40	31	62	0	62
110	Ext	Exterior	Ceiling Mounted	S	Inc	11	1	100	T	16	260	0	1,100	4,576	CFL	Ceiling Mounted	CFL	S	T	11	1	35	16	260	0	385	1602	2974	0	2974
111	Ext	Exterior	Ceiling Mounted	S	HPS	4	1	75	T	16	260	15	360	1,498	N/A	Ceiling Mounted	HPS	S	T	4	1	75	16	260	15	360	1498	0	0	0
112	Ext	Exterior	Ceiling Mounted	S	MH	1	1	100	T	16	260	28	128	532	N/A	Ceiling Mounted	MH	S	T	1	1	100	16	260	28	128	532	0	0	0
0	Bsmt	Hallway	Exit Sign	M	Fl.	1	1	17	N	24	365	2	19	164	LEDex	Exit Sign	LED	M	N	1	1	5	24	365	1	6	48	116	0	116
Totals:						**494**	**233**	**3,858**				**849**	**51,132**	**127,088**						**494**	**234**				**406**	**39,639**	**97,843**	**29,246**	**0**	**29,246**

Rows Highlighed Yellow Indicate an Energy Conservation Measure is recommended for that space

Proposed Lighting Summary Table			
Total Surface Area (SF)	24,000		
Average Power Cost ($/kWh)	0.1320		
Exterior Lighting	**Existing**	**Proposed**	**Savings**
Exterior Annual Consumption (kWh)	6,606	3,632	**2,974**
Exterior Power (watts)	1,588	873	**715**
Total Interior Lighting	**Existing**	**Proposed**	**Savings**
Annual Consumption (kWh)	120,482	94,211	**26,271**
Lighting Power (watts)	49,544	38,766	**10,778**
Lighting Power Density (watts/SF)	2.06	1.62	**0.45**
Estimated Cost of Fixture Replacement ($)	31,619		
Estimated Cost of Controls Improvements ($)	0		
Total Consumption Cost Savings ($)	**8,947**		

Legend:

Fixture Type	Lamp Type	Control Type	Ballast Type	Retrofit Category
Exit Sign	LED	N (None)	N/A (None)	N/A (None)
Screw-in	Inc (Incandescent)	S (Switch)	E (Electronic)	T8 (Installl new T8)
Pin	1'T5	OS (Occupancy Sensor)	M (Magnetic)	T5 (Install new T5)
Parabolic	2'T5	T (Timer)		CFL (Install new CFL)
Recessed	3'T5	PC (Photocell)		LEDex (Install new LED Exit)
2'U-shape	4'T5	D (Dimming)		LED (Install new LED)
Circiline	2'T8	DL (Daylight Sensor)		D (Delamping)
Exterior	3'T8	M (Microphonic Sensor)		C (Controls Only)
HID (High Intensity Discharge)	4'T8			
	6'T8			
	8'T8			
	2'T12			
	3'T12			
	4'T12			
	6'T12			
	8'T12			
	CFL (Compact Fluorescent Lightbulb)			
	MR16			
	Halogen			
	MV (Mercury Vapor)			
	MH (Metal Halide)			
	HPS (High Pressure Sodium			
	LPS (Low Pressure Sodium)			

APPENDIX C: THIRD PARTY ENERGY SUPPLIERS

http://www.state.nj.us/bpu/commercial/shopping.html

Third Party Gas Suppliers for PSEG Service Territory	Telephone & Web Site
Cooperative Industries 412-420 Washington Avenue Belleville, NJ 07109	(800) 628-9427 www.cooperativenet.com
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com
Dominion Retail, Inc. 395 Highway 170, Suite 125 Lakewood, NJ 08701	(866) 275-4240 www.retail.dom.com
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com
UGI Energy Services, Inc. 704 East Main Street, Suite 1 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com
Great Eastern Energy 116 Village Riva, Suite 200 Princeton, NJ 08540	(888) 651-4121 www.greateastern.com
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com
Hudson Energy Services, LLC 545 Route 17 South Ridgewood, NJ 07450	(877) 483-7669 www.hudsonenergyservices.com
Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	(800) 724-1880 www.intelligentenergy.org
Keil & Sons 1 Bergen Blvd. Fairview, NJ 07002	(877) 797-8786 www.systrumenergy.com
Metro Energy Group, LLC 14 Washington Place Hackensack, NJ 07601	(888) 536-3876 www.metroenergy.com
MxEnergy, Inc. 510 Thornall Street, Suite 270 Edison, NJ 08837	(800) 375-1277 www.mxenergy.com
NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	(800) 840-4427 www.natgasco.com
Pepco Energy Services, Inc. 112 Main Street Lebanon, NJ 08833	(800) 363-7499 www.pepco-services.com

Third Party Gas Suppliers for PSEG Service Territory	Telephone & Web Site
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com
Sempra Energy Solutions 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.semprasolutions.com
South Jersey Energy Company One South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 756-3749 www.southjerseyenergy.com
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	(800) 225-1560 www.spragueenergy.com
Stuyvesant Energy LLC 10 West Ivy Lane, Suite 4 Englewood, NJ 07631	(800) 646-6457 www.stuyfuel.com
Woodruff Energy 73 Water Street Bridgeton, NJ 08302	(800) 557-1121 www.woodruffenergy.com

APPENDIX D: GLOSSARY AND METHOD OF CALCULATIONS

Net ECM Cost: The net ECM cost is the cost experienced by the customer, which is typically the total cost (materials + labor) of installing the measure minus any available incentives. Both the total cost and the incentive amounts are expressed in the summary for each ECM.

Annual Energy Cost Savings (AECS): This value is determined by the audit firm based on the calculated energy savings (kWh or Therm) of each ECM and the calculated energy costs of the building.

Lifetime Energy Cost Savings (LECS): This measure estimates the energy cost savings over the lifetime of the ECM. It can be a simple estimation based on fixed energy costs. If desired, this value can factor in an annual increase in energy costs as long as the source is provided.

Simple Payback: This is a simple measure that displays how long the ECM will take to break-even based on the annual energy and maintenance savings of the measure.

ECM Lifetime: This is included with each ECM so that the owner can see how long the ECM will be in place and whether or not it will exceed the simple payback period. Additional guidance for calculating ECM lifetimes can be found below. This value can come from manufacturer's rated lifetime or warranty, the ASHRAE rated lifetime, or any other valid source.

Operating Cost Savings (OCS): This calculation is an annual operating savings for the ECM. It is the difference in the operating, maintenance, and / or equipment replacement costs of the existing case versus the ECM. In the case where an ECM lifetime will be longer than the existing measure (such as LED lighting versus fluorescent) the operating savings will factor in the cost of replacing the units to match the lifetime of the ECM. In this case or in one where one-time repairs are made, the total replacement / repair sum is averaged over the lifetime of the ECM.

Return on Investment (ROI): The ROI is expresses the percentage return of the investment based on the lifetime cost savings of the ECM. This value can be included as an annual or lifetime value, or both.

Net Present Value (NPV): The NPV calculates the present value of an investment's future cash flows based on the time value of money, which is accounted for by a discount rate (assumes bond rate of 3.2%).

Internal Rate of Return (IRR): The IRR expresses an annual rate that results in a break-even point for the investment. If the owner is currently experiencing a lower return on their capital than the IRR, the project is financially advantageous. This measure also allows the owner to compare ECMs against each other to determine the most appealing choices.

Gas Rate and Electric Rate ($/therm and $/kWh): The gas rate and electric rate used in the financial analysis is the total annual energy cost divided by the total annual energy usage for the 12 month billing period studied. The graphs of the monthly gas and electric rates reflect the total monthly energy costs divided by the monthly usage, and display how the average rate fluctuates throughout the year. The average annual rate is the only rate used in energy savings calculations.

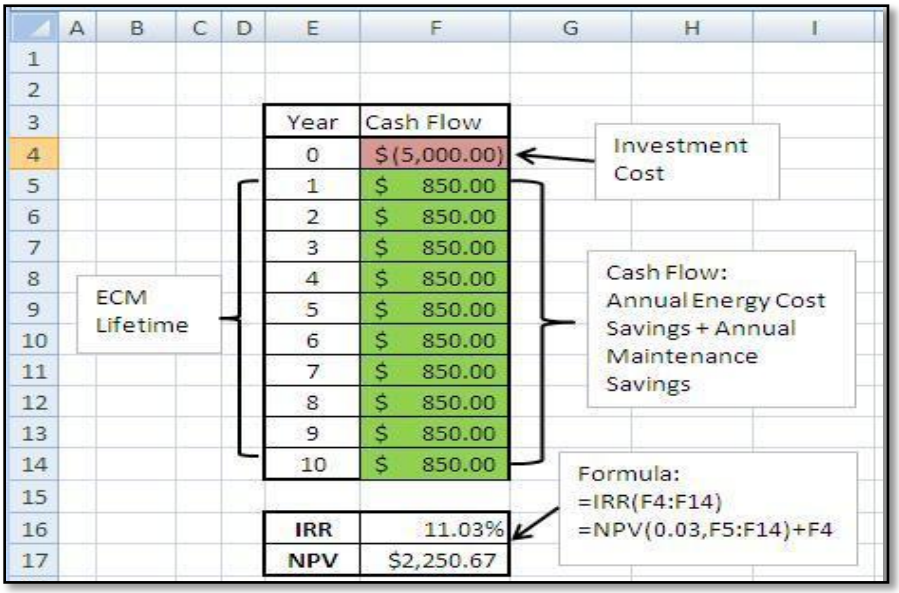
Calculation References

Term	Definition
ECM	Energy Conservation Measure
AOCS	Annual Operating Cost Savings
AECS	Annual Energy Cost Savings
LOCS*	Lifetime Operating Cost Savings
LECS	Lifetime Energy Cost Savings
LCS	Lifetime Cost Savings
NPV	Net Present Value
IRR	Internal Rate of Return
DR	Discount Rate
Net ECM Cost	Total ECM Cost – Incentive
LECS	AECS X ECM Lifetime
AOCS	LOCS / ECM Lifetime
LCS	LOCS+LECS
Simple Payback	Net ECM Cost / (AECS + AOCS)
Lifetime ROI	(LECS + LOCS – Net ECM Cost) / Net ECM Cost
Annual ROI	(Lifetime ROI / Lifetime) = [(AECS + OCS) / Net ECM Cost – (1 / Lifetime)]

* The lifetime operating cost savings are all avoided operating, maintenance, and/or component replacement costs over the lifetime of the ECM. This can be the sum of any annual operating savings, recurring or bulk (i.e. one-time repairs) maintenance savings, or the savings that comes from avoiding equipment replacement needed for the existing measure to meet the lifetime of the ECM (e.g. lighting change outs).

Excel NPV and IRR Calculation

In Excel, function =IRR (values) and =NPV(rate, values) are used to quickly calculate the IRR and NPV of a series of annual cash flows. The investment cost will typically be a negative cash flow at year 0 (total cost - incentive) with years 1 through the lifetime receiving a positive cash flow from the annual energy cost savings and annual maintenance savings. The calculations in the example below are for an ECM that saves $850 annually in energy and maintenance costs (over a 10 year lifetime) and takes $5,000 to purchase and install after incentives:



Solar PV ECM Calculation

There are several components to the calculation:

Costs:	Material of PV system including panels, mounting and net-metering + Labor
Energy Savings:	Reduction of kWh electric cost for life of panel, 25 years
Incentive 1:	NJ Renewable Energy Incentive Program (REIP), for systems of size 50kW or less, $1/Watt incentive subtracted from installation cost
Incentive 2:	Solar Renewable Energy Credits (SRECs) – Market-rate incentive. Calculations assume $600/Megawatt hour consumed per year for a maximum of 15 years; added to annual energy cost savings for a period of 15 years. (Megawatt hour used is rounded to nearest 1,000 kWh)
Assumptions:	A Solar Pathfinder device is used to analyze site shading for the building and determine maximum amount of full load operation based on available sunlight. When the Solar Pathfinder device is not implemented, amount of full load operation based on available sunlight is assumed to be 1,180 hours in New Jersey.

Total lifetime PV energy cost savings =
kWh produced by panel * [$/kWh cost * 25 years + $600/Megawatt hour /1000 * 15 years]

ECM and Equipment Lifetimes
Determining a lifetime for equipment and ECM's can sometimes be difficult. The following table contains a list of lifetimes that the NJCEP uses in its commercial and industrial programs. Other valid sources are also used to determine lifetimes, such as the DOE, ASHRAE, or the manufacturer's warranty.

Lighting is typically the most difficult lifetime to calculate because the fixture, ballast, and bulb can all have different lifetimes. Essentially the ECM analysis will have different operating cost savings (avoided equipment replacement) depending on which lifetime is used.

When the bulb lifetime is used (rated burn hours / annual burn hours), the operating cost savings is just reflecting the theoretical cost of replacing the existing case bulb and ballast over the life of the recommended bulb. Dividing by the bulb lifetime will give an annual operating cost savings.

When a fixture lifetime is used (e.g. 15 years) the operating cost savings reflects the avoided bulb and ballast replacement cost of the existing case over 15 years minus the projected bulb and ballast replacement cost of the proposed case over 15 years. This will give the difference of the equipment replacement costs between the proposed and existing cases and when divided by 15 years will give the annual operating cost savings.

New Jersey Clean Energy Program Commercial & Industrial Lifetimes

Measure	Life Span
Commercial Lighting — New	15
Commercial Lighting — Remodel/Replacement	15
Commercial Custom — New	18
Commercial Chiller Optimization	18
Commercial Unitary HVAC — New - Tier 1	15
Commercial Unitary HVAC — Replacement - Tier 1	15
Commercial Unitary HVAC — New - Tier 2	15
Commercial Unitary HVAC — Replacement Tier 2	15
Commercial Chillers — New	25
Commercial Chillers — Replacement	25
Commercial Small Motors (1-10 HP) — New or Replacement	20
Commercial Medium Motors (11-75 HP) — New or Replacement	20
Commercial Large Motors (76-200 HP) — New or Replacement	20
Commercial VSDs — New	15
Commercial VSDs — Retrofit	15
Commercial Comprehensive New Construction Design	18
Commercial Custom — Replacement	18
Industrial Lighting — New	15
Industrial Lighting — Remodel/Replacement	15
Industrial Unitary HVAC — New - Tier 1	15
Industrial Unitary HVAC — Replacement - Tier 1	15
Industrial Unitary HVAC — New - Tier 2	15
Industrial Unitary HVAC — Replacement Tier 2	15
Industrial Chillers — New	25
Industrial Chillers — Replacement	25
Industrial Small Motors (1-10 HP) — New or Replacement	20
Industrial Medium Motors (11-75 HP) — New or Replacement	20
Industrial Large Motors (76-200 HP) — New or Replacement	20
Industrial VSDs — New	15
Industrial VSDs — Retrofit	15
Industrial Custom — Non-Process	18
Industrial Custom — Process	10
Small Commercial Gas Furnace — New or Replacement	20
Small Commercial Gas Boiler — New or Replacement	20
Small Commercial Gas DHW — New or Replacement	10
C&I Gas Absorption Chiller — New or Replacement	25
C&I Gas Custom — New or Replacement (Engine Driven Chiller)	25
C&I Gas Custom — New or Replacement (Gas Efficiency Measures)	18
O&M savings	3
Compressed Air (GWh participant)	8

APPENDIX E: STATEMENT OF ENERGY PERFORMANCE FROM ENERGY STAR

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Borough of Park Ridge - Borough Hall and Library

Building ID: 2252994
For 12-month Period Ending: December 31, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: April 20, 2010

Facility	Facility Owner	Primary Contact for this Facility
Borough of Park Ridge - Borough Hall and Library 53 Park Avenue Park Ridge, NJ 07656	N/A	N/A

Year Built: 1930
Gross Floor Area (ft²): 24,000

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	717,274
Natural Gas (kBtu)[4]	393,440
Total Energy (kBtu)	1,110,714

Energy Intensity[5]

Site (kBtu/ft²/yr)	46
Source (kBtu/ft²/yr)	117

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	130

Electric Distribution Utility
Borough of Park Ridge

National Average Comparison

National Average Site EUI	77
National Average Source EUI	182
% Difference from National Average Source EUI	-36%
Building Type	Office

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Certifying Professional
N/A

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

EPA Form 5900-16

APPENDIX F: INCENTIVE PROGRAMS

New Jersey Clean Energy Pay for Performance

The NJ Clean Energy Pay for Performance (P4P) Program relies on a network of Partners who provide technical services to clients. LGEA participating clients who are not receiving Direct Energy Efficiency and Conservation Block Grants are eligible for P4P. SWA is an eligible Partner and can develop an Energy Reduction Plan for each project with a whole-building traditional energy audit, a financial plan for funding the energy measures and an installation construction schedule.

The Energy Reduction Plan must define a comprehensive package of measures capable of reducing a building's energy consumption by 15+%. P4P incentives are awarded upon the satisfactory completion of three program milestones: submittal of an Energy Reduction Plan prepared by an approved Program Partner, installation of the recommended measures and completion of a Post-Construction Benchmarking Report. Theincentives for electricity and natural gas savings will be paid based on actual savings, provided that the minimum 15%performance threshold savings has been achieved.

For further information, please see: http://www.njcleanenergy.com/commercial-industrial/programs/pay-performance/existing-buildings .

Direct Install 2010 Program

Direct Install is a division of the New Jersey Clean Energy Programs' Smart Start Buildings. It is a turn-key program for small to mid-sized facilities to aid in upgrading equipment to more efficient types. It is designed to cut overall energy costs by upgrading lighting, HVAC and other equipment with energy efficient alternatives. The program pays **up to 80%** of the retrofit costs, including equipment cost and installation costs.

Eligibility:

- Existing small and mid-sized commercial and industrial facilities with peak electrical demand **below 200 kW** within 12 months of applying
- Must be located in New Jersey
- Must be served by one of the state's public, regulated or natural gas companies
    - Electric: Atlantic City Electric, Jersey Central Power & Light, Orange Rockland Electric, PSE&G
    - Natural Gas: Elizabethtown Gas, New Jersey Natural Gas, PSE&G, South Jersey Gas

For the most up to date information on contractors in New Jersey who participate in this program, go to: http://www.njcleanenergy.com/commercial-industrial/programs/direct-install

Smart Start

New Jersey's SmartStart Building Program is administered by New Jersey's Office of Clean Energy. The program also offers design support for larger projects and technical assistance for smaller projects. If your project specifications do not fit into anything defined by the program, there are even incentives available for custom projects.

There are a number of improvement options for commercial, industrial, institutional, government, and agricultural projects throughout New Jersey. Alternatives are designed to enhance quality while building in energy efficiency to save money. Project categories included in this program are New Construction and Additions, Renovations, Remodeling and Equipment Replacement.

For the most up to date information on how to participate in this program, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings.

Renewable Energy Incentive Program

The Renewable Energy Incentive Program (REIP) provides incentives that reduce the upfront cost of installing renewable energy systems, including solar, wind, and sustainable biomass. Incentives vary depending upon technology, system size, and building type. Current incentive levels, participation information, and application forms can be found at the website listed below.

Solar Renewable Energy Credits (SRECs) represent all the clean energy benefits of electricity generated from a solar energy system. SRECs can be sold or traded separately from the power, providing owners a source of revenue to help offset the cost of installation. All solar project owners in New Jersey with electric distribution grid-connected systems are eligible to generate SRECs. Each time a system generates 1,000 kWh of electricity an SREC is earned and placed in the customer's account on the web-based SREC tracking system.

The *Energy Improvement and Extension Act of 2008*, enacted in October 2008, authorized the issuance of Qualified Energy Conservation Bonds (QECBs) that may be used by state, local and tribal governments to finance certain types of energy projects. QECBs are qualified tax credit bonds, and in this respect are similar to new Clean Renewable Energy Bonds or CREBs. The October 2008 enabling legislation set a limit of $800 million on the volume of energy conservation tax credit bonds that may be issued by state and local governments. *The American Recovery and Reinvestment Act of 2009*, enacted in February 2009, expanded the allowable bond volume to $3.2 billion. In April 2009, the IRS issued Notice 2009-29 providing interim guidance on how the program will operate and how the bond volume will be allocated. Subsequently, H.R. 2847 enacted in March 2010 introduced an option allowing issuers of QECBs and New CREBs to recoup part of the interest they pay on a qualified bond through a direct subsidy from the Department of Treasury.

For the most up to date information on how to participate in this program, go to: http://www.njcleanenergy.com/renewable-energy/home/home.

Utility Sponsored Programs

Check with your local utility companies for further opportunities that may be available.

Federal and State Sponsored Programs

Other federal and state sponsored funding opportunities may be available, including BLOCK and R&D grant funding. For more information, please check http://www.dsireusa.org/.

APPENDIX G: ENERGY CONSERVATION MEASURES

	ECM #	ECM description	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
0-5 Year Payback	1	**55 New CFL fixtures to be installed with incentives**	0	1,567	7,322	1.5	0	1.0	2,191	3,157	5.0	15,787	0.5	1607	321	201	12,811	13,109
	2	**5 New T5 fixtures to be installed with incentives**	80	490	499	0.1	0	0.1	628	693	15.0	10,401	0.7	3944	263	142	7,669	894
	3	**5 New LED exit sign fixtures to be installed with incentives**	100	653	1,325	0.3	0	0.2	360	534	15.0	8,016	1.2	1955	130	82	5,636	2,372
5-10 Year Payback	4	**Replace (2) packaged Rooftop Units, 5 Ton/125,000 Btu/hr and 7.5 Ton/204,000Btu/ hr 80% eff. with high efficiency, 90% eff units, 14.5 SEER**	813	17,188	9,379	3.0	3	0.8	1,820	3,062	20.0	61,235	5.6	468	23	14	27,533	16,828
	5	**283 New T8 fixtures to be installed with incentives**	8,490	28,910	20,100	4.2	0.0	2.9	1,909	4,562	15.0	68,428	6.3	236	16	12	24,770	35,990

	6	**Install 35 kW Solar Photovoltaic system**	35,000	210,000	41,300	35.0	0	5.9	0	30,052	25.0	751,290	7.0	258	10	9	301,820	73,948
	7	**Replace Three Condensers with SEER 14.5 Condenser**	1,196	11,304	11,544	3.7	0	1.6	0	1,524	15.0	22,857	7.4	102	7	8	6,627	20,670

APPENDIX H: METHOD OF ANALYSIS

Assumptions and tools

Energy modeling tool:	Established/standard industry assumptions
Cost estimates:	RS Means 2009 (Facilities Maintenance & Repair Cost Data) RS Means 2009 (Building Construction Cost Data) RS Means 2009 (Mechanical Cost Data) Published and established specialized equipment material and labor costs Cost estimates also based on utility bill analysis and prior experience with similar projects

Disclaimer

This engineering audit was prepared using the most current and accurate fuel consumption data available for the site. The estimates that it projects are intended to help guide the owner toward best energy choices. The costs and savings are subject to fluctuations in weather, variations in quality of maintenance, changes in prices of fuel, materials, and labor, and other factors. Although we cannot guarantee savings or costs, we suggest that you use this report for economic analysis of the building and as a means to estimate future cash flow.

THE RECOMMENDATIONS PRESENTED IN THIS REPORT ARE BASED ON THE RESULTS OF ANALYSIS, INSPECTION, AND PERFORMANCE TESTING OF A SAMPLE OF COMPONENTS OF THE Borough Hall/Public Library SITE. ALTHOUGH CODE-RELATED ISSUES MAY BE NOTED, SWA STAFF HAVE NOT COMPLETED A COMPREHENSIVE EVALUATION FOR CODE-COMPLIANCE OR HEALTH AND SAFETY ISSUES. THE OWNER(S) AND MANAGER(S) OF THE Borough Hall/Public Library(S) CONTAINED IN THIS REPORT ARE REMINDED THAT ANY IMPROVEMENTS SUGGESTED IN THIS SCOPE OF WORK MUST BE PERFORMED IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS THAT APPLY TO SAID WORK. PARTICULAR ATTENTION MUST BE PAID TO ANY WORK WHICH INVOLVES HEATING AND AIR MOVEMENT SYSTEMS, AND ANY WORK WHICH WILL INVOLVE THE DISTURBANCE OF PRODUCTS CONTAINING MOLD, ASBESTOS, OR LEAD.