# NEW BRUNSWICK
# BOARD OF EDUCATION

# LINCOLN ELEMENTARY SCHOOL

**66 BARTLETT STREET**
**NEW BRUNSWICK, NJ 08901**

# FACILITY ENERGY REPORT

# TABLE OF CONTENTS

## I. HISTORIC ENERGY CONSUMPTION/COST

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner.

| | |
|---|---|
| Electric Utility Provider: | Public Service Electric & Gas |
| Electric Utility Rate Structure: | Large Power & Lighting Service (LPLS) |
| Third Party Supplier: | Direct Energy |

| | |
|---|---|
| Natural Gas Utility Provider: | Public Service Electric & Gas |
| Utility Rate Structure: | Large Volume Gas (LVG) |
| Third Party Supplier: | None |

The electric usage profile represents the actual electrical usage for the facility. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

The gas usage profile within each facility report shows the actual natural gas energy usage for the facility. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy.

**Table 1**
**Electricity Billing Data**

**ELECTRIC USAGE SUMMARY**

Utility Provider: PSE&G
Rate: LPLS
Meter No: 278003253 ; 278004055
Account # 70-051-334-04
Third Party Utility Provider: Direct Energy
TPS Meter / Acct No: N/A

| MONTH OF USE | CONSUMPTION KWH | DEMAND KW | TOTAL BILL |
|---|---|---|---|
| Dec-11 | 34,740 | 114.0 | $4,254 |
| Jan-12 | 24,885 | 111.9 | $3,668 |
| Feb-12 | 25,666 | 109.5 | $3,937 |
| Mar-12 | 21,300 | 117.0 | $3,258 |
| Apr-12 | 23,440 | 81.9 | $2,887 |
| May-12 | 32,573 | 127.2 | $4,213 |
| Jun-12 | 29,003 | 94.2 | $3,733 |
| Jul-12 | 9,360 | 88.7 | $2,409 |
| Aug-12 | 19,995 | 62.4 | $1,863 |
| Sep-12 | 12,870 | 96.9 | $3,160 |
| Oct-12 | 17,085 | 116.3 | $1,145 |
| Nov-12 | 12,735 | 132.2 | $2,018 |
| **Totals** | **263,651** | **132.2 Max** | **$36,543** |

**AVERAGE DEMAND** **104.4 KW average**
**AVERAGE RATE** **$0.139 $/kWh**

**Figure 1**
**Electricity Usage Profile**

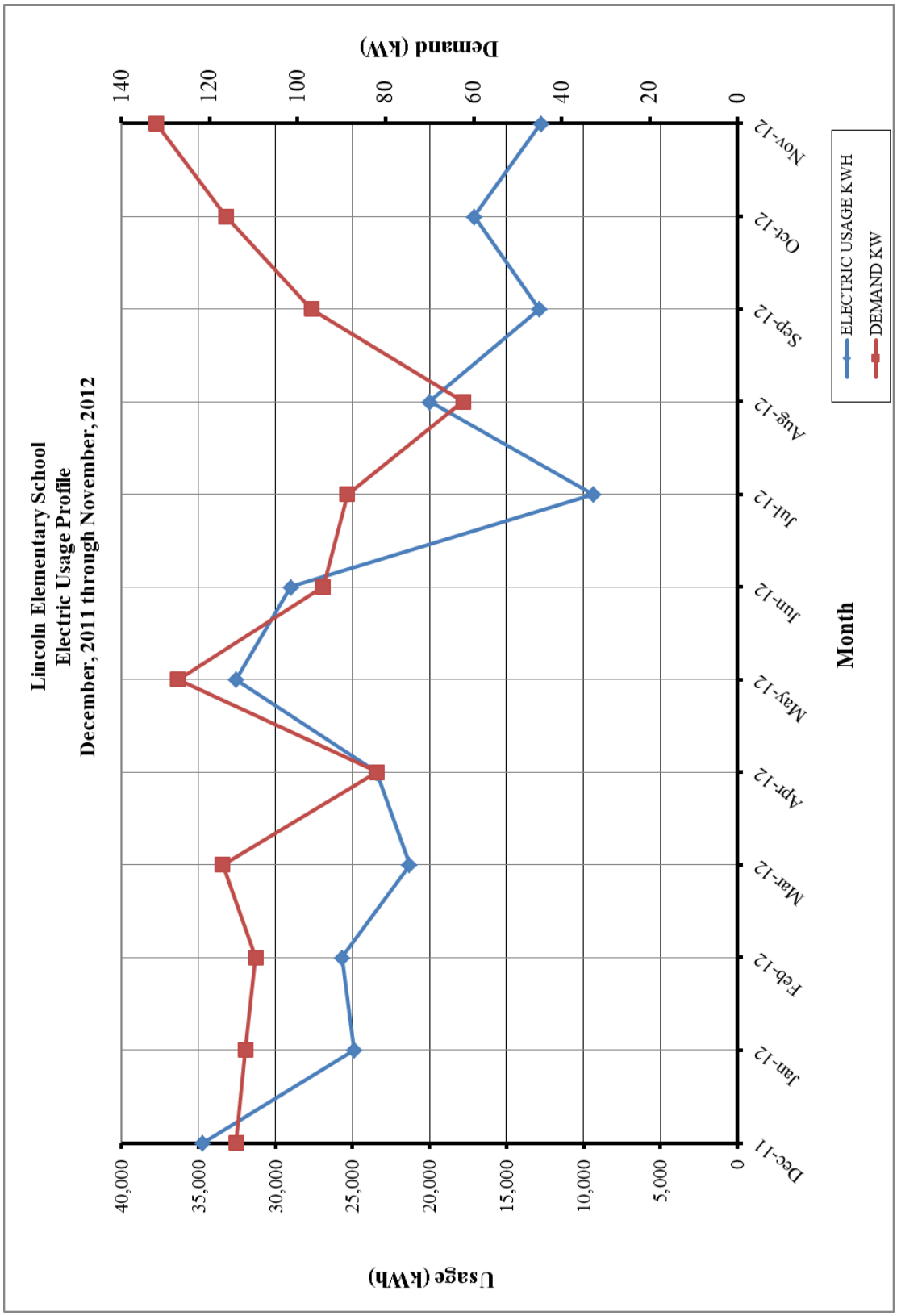
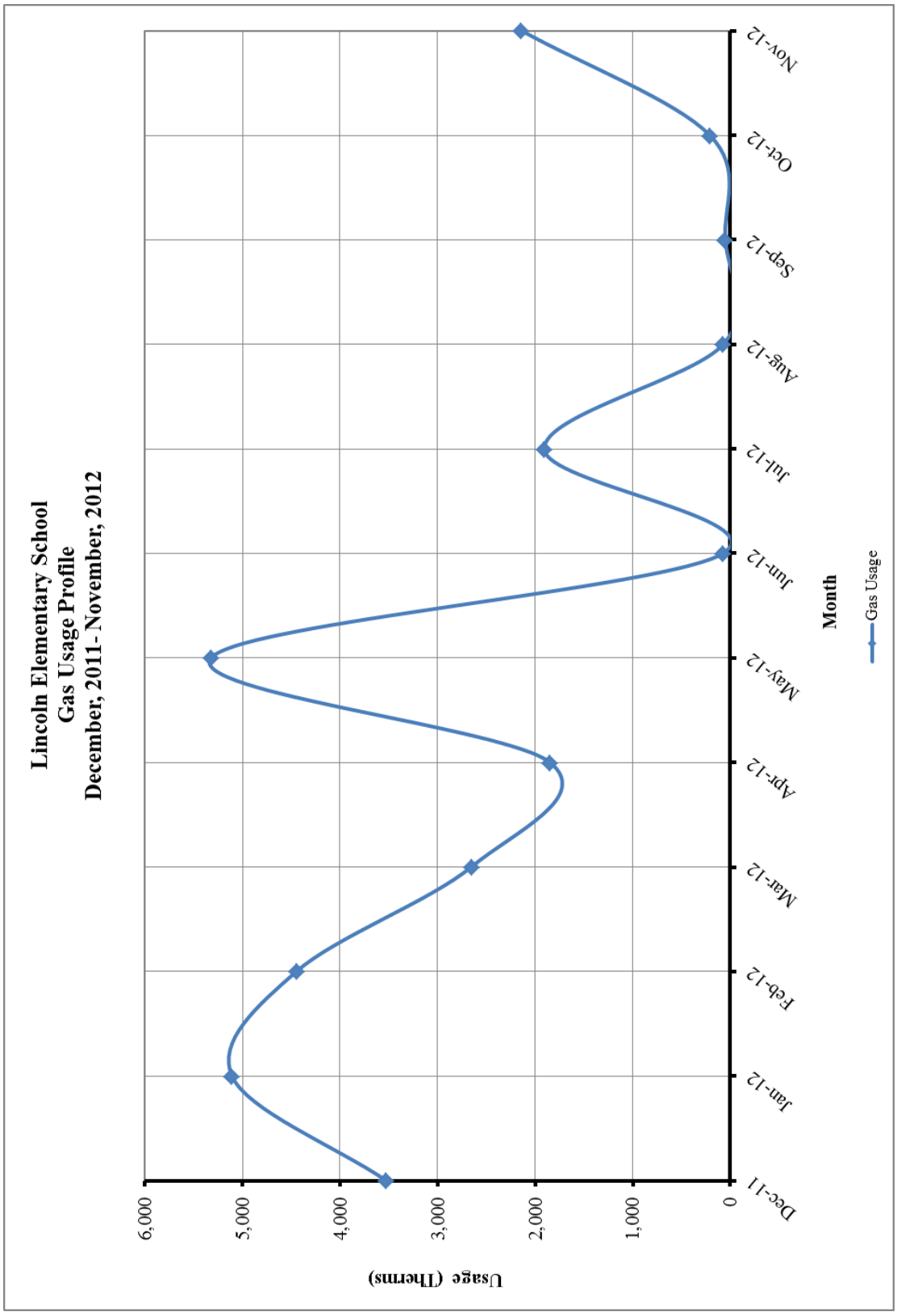


**Table 4**
**Natural Gas Billing Data**

| NATURAL GAS USAGE SUMMARY | | |
|---|---|---|
| Utility Provider: PSE&G | | |
| Rate: LVG | | |
| Meter No: 2413462 | | |
| Point of Delivery ID: 70-051-877-09 | | |
| Third Party Utility Provider: N/A | | |
| TPS Meter No: N/A | | |
| **MONTH OF USE** | **CONSUMPTION (THERMS)** | **TOTAL BILL** |
| Dec-11 | 3,530.00 | $3,133.32 |
| Jan-12 | 5,110.00 | $4,633.96 |
| Feb-12 | 4,447.00 | $3,904.35 |
| Mar-12 | 2,654.00 | $2,498.46 |
| Apr-12 | 1,851.00 | $1,212.49 |
| May-12 | 5,321.00 | $4,302.29 |
| Jun-12 | 75.00 | $146.27 |
| Jul-12 | 1,908.00 | $1,325.74 |
| Aug-12 | 71.00 | $247.41 |
| Sep-12 | 52.00 | $135.17 |
| Oct-12 | 212.00 | $245.43 |
| Nov-12 | 2,144.00 | $2,518.43 |
| **TOTALS** | **27,375.00** | **$24,303.32** |
| **AVERAGE RATE:** | **$0.89** | **$/THERM** |

**Figure 2**
**Natural Gas Usage Profile**



## II. FACILITY DESCRIPTION

The Lincoln Elementary School is located at 66 Bartlett Street in New Brunswick, New Jersey. The 50,000 SF Lincoln Elementary School was built in 1910 with an addition in 1918. The building is a three-story structure and consists of office space for administrative use, gymnasium, classrooms, kitchen, media center, cafeteria and mechanical rooms.

Occupancy Profile

The typical hours of operation for Lincoln Elementary School are Monday through Friday between 8:00 am and 3:30 pm, with custodial services running until 11:00 pm. The elementary school has a student population of 713 present for 10 months, and a year round occupancy of 68 administrative staff.

Building Envelope

Exterior walls for the Lincoln Elementary School are brick faced with a concrete block construction. The windows in the school are in below average condition with single pane windows. The roof is a flat, built up rubber roof that appears to be in good condition.

Heating Plant

Heating is provided to the facility from the Boiler Room which houses two natural gas fired, cast iron sectional steam boilers made by H.B. Smith. Both boilers have equivalent heating capacity characteristics having an estimated input capacity of 3,067 MBH and output of 2,262 MBH for a combined output of 4,524 MBH. Both boilers appear to be maintained and in average condition. Combustion tests were not available for review but based on age the estimated fuel-to-thermal efficiency for the boilers is 70%, based on radiation losses and inefficiencies in operation inherent to the older technology. Both boilers are approximately 24 years old and have not exceeded their typical ASHRAE service life of 35 years. The steam is returned to the boilers by a steam condensate return system manufactured by HT Pump Specialties. The steam heating system provides steam to the classroom unit ventilators, hot water fin-tube radiators and heating and ventilation units throughout the facility.

HVAC Systems

Various classrooms throughout the facility contain window air conditioning units which provide cooling for select classrooms.

Bard wall mounted air conditioning units are mounted on the exterior of the modular classrooms at the rear of the facility. These bard units are equipped with 15 KW electric heating coils for the heating months.

Exhaust System

Air is exhausted from the toilet rooms and other areas of the facility through the roof exhaust fans.

HVAC System Controls

The steam boiler system within the Lincoln Elementary School is controlled via Johnson Metasys Controls panel. The boilers operate based on outside air temperature. The controls system also operates based on the average of five zone temperatures. The remainder of the building operates on pneumatic controls.

Domestic Hot Water

The main source of domestic hot water for Lincoln Elementary School is an AO Smith 75 MBH gas fired water heater with an integrated storage capacity of 98 gallons.

Lighting

Refer to the **Investment Grade Lighting Audit Appendix** for a detailed list of the lighting throughout the facility and estimated operating hours per space.

## III. MAJOR EQUIPMENT LIST

The equipment list contains major energy consuming equipment that through implementation of energy conservation measures could yield substantial energy savings. The list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment in some cases if a manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Refer to the **Major Equipment List Appendix** for this facility.

# IV. ENERGY CONSERVATION MEASURES

Energy Conservation Measures are developed specifically for this facility. The energy savings and calculations are highly dependent on the information received from the site survey and interviews with operations personnel. The assumptions and calculations should be reviewed by the owner to ensure accurate representation of this facility. The following ECMs were analyzed:

**Table 1**
**ECM Financial Summary**

| ENERGY CONSERVATION MEASURES (ECM's) | | | | | |
|---|---|---|---|---|---|
| **ECM NO.** | **DESCRIPTION** | **NET INSTALLATION COST[A]** | **ANNUAL SAVINGS[B]** | **SIMPLE PAYBACK (Yrs)** | **SIMPLE LIFETIME ROI** |
| ECM #1 | Gym Lighting Upgrade | $7,860 | $651 | 12.1 | 24.2% |
| ECM #2 | Lighting Controls Upgrade | $12,985 | $1,641 | 7.9 | 89.6% |
| ECM #3 | Window Replacement | $163,800 | $3,393 | 48.3 | -68.9% |
| ECM #4 | Computer Automatic Standby or Hibernate Modes | $1,800 | $2,817 | 0.6 | 682.5% |
| ECM #5 | Boiler Burner and Controls Upgrade | $26,000 | $1,073 | 24.2 | -13.3% |
| **RENEWABLE ENERGY MEASURES (REM's)** | | | | | |
| **ECM NO.** | **DESCRIPTION** | **NET INSTALLATION COST** | **ANNUAL SAVINGS** | **SIMPLE PAYBACK (Yrs)** | **SIMPLE LIFETIME ROI** |
| REM #1 | 34.31 KW PV System | $216,903 | $13,087 | 16.6 | -9.5% |
| **Notes:** | A. Cost takes into consideration applicable NJ Smart StartTM incentives. | | | | |
| | B. Savings takes into consideration applicable maintenance savings. | | | | |

**Table 2**
**ECM Energy Summary**

| ENERGY CONSERVATION MEASURES (ECM's) | | | | |
|---|---|---|---|---|
| **ECM NO.** | **DESCRIPTION** | **ANNUAL UTILITY REDUCTION** | | |
| | | **ELECTRIC DEMAND (KW)** | **ELECTRIC CONSUMPTION (KWH)** | **NATURAL GAS (THERMS)** |
| ECM #1 | Gym Lighting Upgrade | 1.8 | 4,680 | - |
| ECM #2 | Lighting Controls Upgrade | - | 11,806 | - |
| ECM #3 | Window Replacement | - | - | 3,813 |
| ECM #4 | Computer Automatic Standby or Hibernate Modes | - | 16,670 | - |
| ECM #5 | Boiler Burner and Controls Upgrade | - | - | 1,205 |
| **RENEWABLE ENERGY MEASURES (REM's)** | | | | |
| **ECM NO.** | **DESCRIPTION** | **ANNUAL UTILITY REDUCTION** | | |
| | | **ELECTRIC DEMAND (KW)** | **ELECTRIC CONSUMPTION (KWH)** | **NATURAL GAS (THERMS)** |
| REM #1 | 34.31 KW PV System | 34.3 | 39,647 | - |

**Table 3**
**Facility Project Summary**

| ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT | | | | | |
|---|---|---|---|---|---|
| **ENERGY CONSERVATION MEASURES** | **ANNUAL ENERGY SAVINGS ($)** | **PROJECT COST ($)** | **SMART START INCENTIVES** | **CUSTOMER COST** | **SIMPLE PAYBACK** |
| Gym Lighting Upgrade | $651 | $9,060 | $1,200 | $7,860 | 12.1 |
| Lighting Controls Upgrade | $1,641 | $14,230 | $1,245 | $12,985 | 7.9 |
| ~~Window Replacement~~ | ~~$3,393~~ | ~~$163,800~~ | ~~$0~~ | ~~$163,800~~ | ~~48.3~~ |
| Computer Automatic Standby or Hibernate | $2,817 | $1,800 | $0 | $1,800 | 0.6 |
| Boiler Burner and Controls Upgrade | $1,073 | $26,000 | $0 | $26,000 | 24.2 |
| *Design / Construction Extras (15%)* | *$0* | *$7,664* | *$0* | *$7,664* | |
| **Total Project** | **$6,182** | **$58,754** | **$2,445** | **$56,309** | **9** |

Note: ECM's with the strike-through font are not included in the ESIP.

Design / Construction Extras is shown as an additional cost for the facility project summary. This cost is included to estimate the costs associated with construction management fees for a larger combined project.

## ECM #1: Lighting Upgrade – Gymnasium

**Description:**

The gymnasium at Lincoln Elementary School is currently lit via 400 watt Metal Halide HID fixtures. The space would be better served with a more efficient, fluorescent lighting system. Concord Engineering recommends upgrading the lighting to an energy-efficient T5 high output system that includes new six lamp, 54 watt high output fixtures.

This measure replaces all the HID, 400 watt HID MH fixtures with a well-designed T5 high output (HO) system. T5 High output fixtures with reflectors and wire guards will be required in order to meet the mandated 50 foot-candle average within the spaces.

**Energy Savings Calculations:**

A detailed Investment Grade Lighting Audit can be found in **Investment Grade Lighting Audit Appendix** that outlines the proposed retrofits, costs, savings, and payback periods.

**Energy Savings Summary:**

| ECM #1 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $9,060 |
| **NJ Smart Start Equipment Incentive ($):** | $1,200 |
| **Net Installation Cost ($):** | $7,860 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $651 |
| **Total Yearly Savings ($/Yr):** | $651 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 12.1 |
| **Simple Lifetime ROI** | 24.2% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $9,765 |
| **Internal Rate of Return (IRR)** | 3% |
| **Net Present Value (NPV)** | ($88.40) |

## ECM #2: Lighting Controls Upgrade – Occupancy Sensors

**Description:**

Some of the lights in the Lincoln Elementary School are left on unnecessarily. In many cases the lights are left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. This is common in rooms that are occupied for only short periods and only a few times per day. In some instances lights are left on due to the misconception that it is better to keep the lights on rather than to continuously switch lights on and off. Although increased switching reduces lamp life, the energy savings outweigh the lamp replacement costs. The payback timeframe for when to turn the lights off is approximately two minutes. If the lights are expected to be off for at least a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is adequate to provide reduced lighting levels when full light output is not needed. Occupancy sensors detect motion and will switch the lights on when the room is occupied. Occupancy sensors can either be mounted in place of a current wall switch, or on the ceiling to cover large areas.

The U.S. Department of Energy sponsored a study to analyze energy savings achieved through various types of building system controls. The referenced savings is based on the "Advanced Sensors and Controls for Building Applications: Market Assessment and Potential R&D Pathways," document posted for public use April 2005. The study has found that commercial buildings have the potential to achieve significant energy savings through the use of building controls. The average energy savings are as follows based on the report:

- Occupancy Sensors for Lighting Control 20% - 28% energy savings.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 20% of the total light energy controlled by occupancy sensors (The majority of the savings is expected to be after school hours when rooms are left with lights on)

This ECM includes installation of ceiling or switch mount sensors for individual offices, classrooms, large bathrooms, and Media Centers. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent. The **Investment Grade Lighting Audit Appendix** of this report includes the summary of lighting controls implemented in this ECM and outlines the proposed controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by the applicable percent savings for each area that includes lighting controls.

**Energy Savings Calculations:**

$$\text{Energy Savings} = \left(\%\ \text{Savings} \times \text{Controlled Light Energy}\ \left(\text{kWh/Yr}\right)\right)$$

$$\text{Savings.} = \text{Energy Savings}\left(\text{kWh}\right) \times \text{Ave Elec Cost}\left(\frac{\$}{\text{kWh}}\right)$$

**Rebates and Incentives:**

From the **NJ Smart Start® Program Incentives Appendix**, the installation of a lighting control device warrants the following incentive:

Smart Start Incentive
= (# Wall mount sensors × $20 per sensor)
+ (# Ceiling mount sensors × $35 per sensor)

**Energy Savings Summary:**

| ECM #2 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $14,230 |
| **NJ Smart Start Equipment Incentive ($):** | $1,245 |
| **Net Installation Cost ($):** | $12,985 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $1,641 |
| **Total Yearly Savings ($/Yr):** | $1,641 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 7.9 |
| **Simple Lifetime ROI** | 89.6% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $24,615 |
| **Internal Rate of Return (IRR)** | 9% |
| **Net Present Value (NPV)** | $6,604.83 |

## ECM #3: Window Replacement

**Description:**

The Lincoln Elementary School's envelope consists of single pane windows with aluminum frames.

The windows account for significant energy use through leakage heat loss and conductive heat loss. The age and condition of the windows contribute to the leakage rate of the building. The single pane construction allows higher thermal (conductive) energy loss. These factors lead to increased energy use in the heating season. The heating loss due to single pane glass is combined with heat loss due to poor seals at each operable window. New double pane windows with low E glazing offer a substantial improvement in thermal performance in the summer months.

This ECM includes the replacement of all remaining older windows single pane glass in the facility with double pane windows with low emissivity glass. The proposed windows include reduced outside air leakage. In addition the double pane structure will significantly increase the insulation value compared to the existing single pane window structure.

The basis for this ECM is Serious Windows at $40 per SF of window installed.

**Energy Savings Calculations:**

$$\text{Infiltration}\left(\frac{\text{Ft}^3}{\text{Min.}}\right) = \text{Window Area}\left(\text{Ft}^2\right) \times \text{Estimated Infiltration per SF of Window}\left(\frac{\text{CFM}}{\text{Ft}^2}\right)$$

$$\text{Heat Load}\left(\frac{\text{Btu}}{\text{Hr.}}\right) = 1.1 \times \text{Infiltration}\left(\frac{\text{Ft}^3}{\text{Min}}\right) \times \text{Design Temperature Difference}\left(^\circ\text{F}\right)$$

$$\text{Cooling Load}\left(\text{Ton}\right) = \text{Infiltration}\left(\frac{\text{Ft}^3}{\text{Min}}\right) \times \frac{1\,\text{Ton Cooling}}{400\left(\frac{\text{Ft}^3}{\text{Min}}\right)}$$

$$\text{Heating Leakage Energy}\left(\text{Therms}\right) = \frac{\text{Heat Load}\left(\frac{\text{Btu}}{\text{Hr.}}\right) \times \text{HDD}\left(\text{Day}\,^\circ\text{F}\right) \times 24\left(\frac{\text{Hr.}}{\text{Day}}\right) \times \left(0.60\right)}{65\left(^\circ\text{F}\right) \times \text{Fuel Heat Value}\left(\frac{\text{Btu}}{\text{Therms}}\right) \times \text{Heating Efficiency}\left(\%\right)}$$

$$\text{Cooling Leakage Energy}\left(\text{kWh}\right)=\frac{\text{Cooling Load}\left(\text{Ton}\right)\times\left(\frac{12{,}000\ \text{Btu}}{\text{Ton Hr.}}\right)\times\ \text{Full Load Cooling Hours}}{\frac{1000\ \text{W.h}}{\text{kWh}}\times\text{Cooling Efficiency}\left(\text{EER}\right)}$$

$$\text{Conductive Energy}\left(\text{Therms}\right)=\frac{\text{U}-\text{Value}\times\text{Area}\left(\text{Ft}^2\right)\times\text{HDD}\left(\text{Day }^\circ\text{F}\right)\times 24\left(\frac{\text{Hr.}}{\text{Day}}\right)\times\left(0.60\right)}{65\left(^\circ\text{F}\right)\times\text{Fuel Heat Value}\left(\frac{\text{Btu}}{\text{Therms}}\right)\times\text{Heating Efficiency}\left(\%\right)}$$

$$\text{Heating Energy Cost} = \text{Total Heating Energy}\left(\text{Therms}\right)\times\text{Ave Fuel Cost}\left(\frac{\$}{\text{Therms}}\right)$$

$$\text{Cooling Energy Cost} = \text{Total Cooling Energy}\left(\text{kWh}\right)\times\text{Ave Fuel Cost}\left(\frac{\$}{\text{kWh}}\right)$$

| WINDOW REPLACEMENT CALCULATIONS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Description:** | Existing Single Pane Windows | Double Pane Low-E Windows | |
| Window (SF) | 3,780 | 3,780 | |
| U-Value (BTU/HR/SF*°F) | 1.0 | 0.45 | 0.55 |
| Infiltration Rate (CFM/SF) | 0.6 | 0.3 | 0.30 |
| Indoor Temperature Heating (°F) | 70 | 70 | |
| Average Thermal Loss Rate Heating (BTU/HR) | 95,040 | 42,768 | 52,272 |
| Heating Degree Days (65°F) | 4157 | 4157 | |
| Thermal Losses Heating (kBtu) | 485,261 | 218,368 | 266,894 |
| Heating System Efficiency (%) | 70.0% | 70.0% | |
| Natural Gas Cost ($/Therm) | $0.89 | $0.89 | - |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| Natural Gas Usage (Therm) | 6,932 | 3,120 | 3,813 |
| Energy Cost Savings ($) | $6,170 | $2,776 | $3,393 |
| **Comments:** | 1. Proposed window U-value Based on ASHRAE 90.1 - 2007<br>2. Savings Based on Avg. Monthly Temperature for Sep-11 to Aug-12 | | |

**Energy Savings Summary:**

| ECM #3 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $163,800 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $163,800 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $3,393 |
| **Total Yearly Savings ($/Yr):** | $3,393 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 48.3 |
| **Simple Lifetime ROI** | -68.9% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $50,900 |
| **Internal Rate of Return (IRR)** | -12% |
| **Net Present Value (NPV)** | ($123,290.26) |

## ECM #4: Set Computers to Automatic Stand-by or Hibernate Modes

**Description:**

During the survey, it was noticed that the majority of the computers were left at ON position with the monitors at Screen Saver or OFF positions.

Many personal computers (PC) came equipped with automatic Sleep Mode or Hibernate (power down) mode features. Normally computers boot up from Sleep Mode or Hibernate mode much faster than powering up from Shut Down position.

Based on an independent study by the U.S. Department of Energy, Energy star® rated computers use approximately 70% less power during Sleep Mode. It is recommended to set up the PCs at this facility to switch into Sleep Mode after a short period of inactivity and Hibernate mode after a long period of inactivity.

This ECM includes configuring the computers in the classrooms and the offices such that they automatically switch into:

- Sleep Mode after 15 minutes of inactivity
- Hibernate after 60 minutes of inactivity

The inactivity times above can be adjusted based on experience or preference. Even though this ECM can be implemented easily in house, the calculations assume an independent computer technician performing the task at a typical market rate.

**Energy Savings Calculations:**

| | |
|---|---|
| No. of CRT Computers: | 108 |
| Operating Weeks per Yr: | 42 |
| Estimated percentage of computers left ON over night: | 75% |

$$\text{Electric Usage} = \frac{\#\text{of Computers} \times \text{Computer Power (W)} \times \text{Operation (Hrs)}}{1000\left(\frac{\text{W}}{\text{KW}}\right)}$$

$$\text{Energy Cost} = \text{Electric Usage(kWh)} \times \text{Ave Elec Cost}\left(\frac{\$}{\text{kWh}}\right)$$

The cost of configuring the computers to automatically sleep or hibernate is based on 10 minutes per computer per technician at an hourly rate indicated below.

Implementation Costs: = # Computers X Configuration Time X Cost per Hour
= 108 Monitors X 10 Minutes/Computer X $100 per Hour

= $1,800

| AUTOMATIC SLEEP OR HIBERNATE MODES FOR COMPUTERS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | Manual Operation | Auto Power Save | - |
| **# of Computers** | 108 | 108 | - |
| **% Computers left ON** | 75% | 75% | - |
| **Power when left ON (Watt)** | 50 | 50 | - |
| **Power at Stand-by (Watt)** | 5 | 5 | - |
| **Power at Hibernate (Watt)** | 4 | 4 | - |
| **Power when OFF (Watt)** | 0 | 0 | - |
| **Operating Weeks per Yr** | 42 | 42 | - |
| **Operating Hours per Week** | 168 | 168 | - |
| **Hours/Wk Computers ON** | 120 | 20 | - |
| **Hours/Wk at Sleep Mode** | 0 | 20 | - |
| **Hours/Wk at Hibernate Mode** | 0 | 80 | - |
| **Hours/Wk at Power Down** | 48 | 48 | - |
| **Elec Cost ($/kWh)** | 0.169 | 0.169 | - |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Electric Usage (kWh)** | 20,412 | 3,742 | 16,670 |
| **Energy Cost ($)** | $3,450 | $632 | $2,817 |
| **COMMENTS:** | Calculation assumes computers currently run throughout work week and get shut down over the weekend. | | |

**Energy Savings Summary:**

| ECM #4 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $1,800 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $1,800 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $2,817 |
| **Total Yearly Savings ($/Yr):** | $2,817 |
| **Estimated ECM Lifetime (Yr):** | 5 |
| **Simple Payback** | 0.6 |
| **Simple Lifetime ROI** | 682.5% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $14,085 |
| **Internal Rate of Return (IRR)** | 155% |
| **Net Present Value (NPV)** | $11,101.04 |

## ECM #5: Steam Boiler Burner & Controls Uprgrade

**Description:**

The majority of the heating is provided to the school facility by H.B. Smith 73.2 Boiler Horsepower (BHP) natural gas-fired boilers that produces steam for the heating season. The boilers are 1989 vintage and are well maintained and currently should be capable of achieving an efficiency rating of 70 to 75 percent while operating. Given the limitations of the current system burner and controls and the vast improvement in boiler controls today over what was available then, it is recommended that a burner and new controls upgrade be performed.

This ECM will install new Cleaver Brooks Profire burner with Honeywell, CB780E controls on each of these boilers with separate motors that will control fuel flow, excess air oxygen trim and variable speed on the blower. Installation of this system will result in improved operating efficiency of the boilers and less cycling of boilers since the boilers can operate closer to the demanded load requirement.

**Energy Savings Using Hand Calculations:**

Annual Heating Energy Savings = Existing Fuel Consumption x 8% Efficiency Increase

Heating Cost Savings = Annual Heating Energy Savings x Fuel Cost ($/Unit)**Error! Bookmark not defined.Error! Bookmark not defined.**
**Error! Bookmark not defined.Error! Bookmark not defined.**
**Energy Savings Summary:**

| ECM #5 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $26,000 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $26,000 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $1,073 |
| **Total Yearly Savings ($/Yr):** | $1,073 |
| **Estimated ECM Lifetime (Yr):** | 21 |
| **Simple Payback** | 24.2 |
| **Simple Lifetime ROI** | -13.3% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $22,533 |
| **Internal Rate of Return (IRR)** | -1% |
| **Net Present Value (NPV)** | ($9,459.68) |

## REM #1: 34.31 kW Solar System

**Description:**

The Lincoln Elementary School has available roof space that could accommodate a significant amount of solar generation. Based on the available areas a 34.31 kilowatt solar array could be installed, assuming the existing roof structure is capable of supporting an array. The array will produce approximately 39,647 kilowatt-hours annually that will reduce the overall electric usage of the facility by 15.04%.

**Energy Savings Calculations:**

See **Renewable / Distributed Energy Measures Calculations Appendix** for detailed financial summary and proposed solar layout areas. Financial results in table below are based on 100% financing of the system over a fifteen year period.

**Energy Savings Summary:**

| REM #1 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **System Size ($KW_{DC}$):** | 34.31 |
| **Electric Generation (KWH/Yr):** | 39,647 |
| **Installation Cost ($):** | $216,903 |
| **SREC Revenue ($/Yr):** | $7,576 |
| **Energy Savings ($/Yr):** | $5,511 |
| **Total Yearly Savings ($/Yr):** | $13,087 |
| **ECM Analysis Period (Yr):** | 15 |
| **Simple Payback (Yrs):** | 16.6 |
| **Analysis Period Electric Savings ($):** | $102,497 |
| **Analysis Period SREC Revenue ($):** | $109,746 |
| **Net Present Value (NPV)** | ($89,240.85) |

## V. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures with attractive paybacks. These measures are not eligible for the Smart Start Buildings incentives from the office of Clean Energy but save energy none the less.

A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

D. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

E. Turn off computers when not in use. Ensure computers are not running in screen saver mode which saves the monitor screen not energy.

F. Ensure outside air dampers are functioning properly and only open during occupied mode.

G. Replace any older model window air conditioning units with new energy star rated window air conditioning units.

H. Steam Trap Replacement Survey and Analysis by Spirax/Sarco is a recommendation for the school to provide additional energy and operational savings.

# APPENDIX A

# ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

**New Brunswick Board of Education - Lincoln Elementary School**

| ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ECM NO. | DESCRIPTION | INSTALLATION COST | | | | YEARLY SAVINGS | | | ECM LIFETIME | LIFETIME ENERGY SAVINGS | LIFETIME MAINTENANCE SAVINGS | LIFETIME ROI | SIMPLE PAYBACK | INTERNAL RATE OF RETURN (IRR) | NET PRESENT VALUE (NPV) |
| | | MATERIAL | LABOR | REBATES, INCENTIVES | NET INSTALLATION COST | ENERGY | MAINT. / SREC | TOTAL | | (Yearly Saving * ECM Lifetime) | (Yearly Maint Svaing * ECM Lifetime) | (Lifetime Savings - Net Cost) / (Net Cost) | (Net cost / Yearly Savings) | $\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$ | $\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$ |
| | | ($) | ($) | ($) | ($) | ($/Yr) | ($/Yr) | ($/Yr) | (Yr) | ($) | ($) | (%) | (Yr) | ($) | ($) |
| ECM #1 | Gym Lighting Upgrade | $3,000 | $6,060 | $1,200 | $7,860 | $651 | $0 | $651 | 15 | $9,765 | $0 | 24.2% | 12.1 | 2.84% | ($88.40) |
| ECM #2 | Lighting Controls Upgrade | $11,985 | $2,245 | $1,245 | $12,985 | $1,641 | $0 | $1,641 | 15 | $24,615 | $0 | 89.6% | 7.9 | 9.31% | $6,604.83 |
| ECM #3 | Window Replacement | $151,200 | $12,600 | $0 | $163,800 | $3,393 | $0 | $3,393 | 15 | $50,900 | $0 | -68.9% | 48.3 | -11.98% | ($123,290.26) |
| ECM #4 | Computer Automatic Standby or Hibernate Modes | $0 | $1,800 | $0 | $1,800 | $2,817 | $0 | $2,817 | 5 | $14,085 | $0 | 682.5% | 0.6 | 155.05% | $11,101.04 |
| ECM #5 | Boiler Burner and Controls Upgrade | $26,000 | $0 | $0 | $26,000 | $1,073 | $0 | $1,073 | 21 | $22,533 | $0 | -13.3% | 24.2 | -1.27% | ($9,459.68) |
| **REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY** | | | | | | | | | | | | | | | |
| REM #1 | 34.31 KW PV System | $216,903 | $0 | $0 | $216,903 | $5,511 | $7,576 | $13,087 | 15 | $196,303 | $113,639 | -9.5% | 16.6 | -1.22% | ($60,673.01) |

**Notes:**
1) The variable Cn in the formulas for Internal Rate of Return and Net Present Value stands for the cash flow during each period.
2) The variable DR in the NPV equation stands for Discount Rate
3) For NPV and IRR calculations: From n=0 to N periods where N is the *lifetime of ECM* and Cn is the *cash flow during each period* .

# APPENDIX B

# Concord Engineering Group, Inc.

520 BURNT MILL ROAD
VOORHEES, NEW JERSEY 08043
PHONE: (856) 427-0200
FAX: (856) 427-6508

## SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of February 11, 2013:

### Electric Chillers

| | |
|---|---|
| Water-Cooled Chillers | $16 - $170 per ton |
| Air-Cooled Chillers | $8 - $52 per ton |

Energy Efficiency must comply with ASHRAE 90.1-2007

### Gas Cooling

| | |
|---|---|
| Gas Absorption Chillers | $185 - $400 per ton |
| Gas Engine-Driven Chillers | Calculated through custom measure path) |

### Desiccant Systems

| |
|---|
| $1.00 per cfm – gas or electric |

### Electric Unitary HVAC

| | |
|---|---|
| Unitary AC and Split Systems | $73 - $92 per ton |
| Air-to-Air Heat Pumps | $73 - $92 per ton |
| Water-Source Heat Pumps | $81 per ton |
| Packaged Terminal AC & HP | $65 per ton |
| Central DX AC Systems | $40- $72 per ton |
| Dual Enthalpy Economizer Controls | $250 |
| Occupancy Controlled Thermostat (Hospitality & Institutional Facility) | $75 per thermostat |
| A/C Economizing Controls | ≤ 5 tons $85/unit; >5 tons $170/unit |

Energy Efficiency must comply with ASHRAE 90.1-2007

### Gas Heating

| | |
|---|---|
| Gas Fired Boilers < 300 MBH | $2.00 per MBH, but not less than $300 per unit |
| Gas Fired Boilers ≥ 300 - 1500 MBH | $1.75 per MBH |
| Gas Fired Boilers ≥1500 - ≤ 4000 MBH | $1.00 per MBH |
| Gas Fired Boilers > 4000 MBH | (Calculated through Custom Measure Path) |
| Gas Furnaces | $400 per unit, AFUE ≥ 95% |
| Boiler Economizing Controls | $1,200 - $2,700 |
| Low Intensity Infrared Heating | $300 - $500 per unit |

## Ground Source Heat Pumps

| | |
|---|---|
| Closed Loop | $450 per ton, EER ≥ 16<br>$600 per ton, EER ≥ 18<br>$750 per ton, EER ≥ 20 |

Energy Efficiency must comply with ASHRAE 90.1-2007

## Variable Frequency Drives

| | |
|---|---|
| Variable Air Volume | $65 - $155 per hp |
| Chilled-Water Pumps | $60 per VFD rated hp |
| Compressors | $5,250 to $12,500 per drive |
| Cooling Towers ≥ 10 hp | $60 per VFD rated hp |
| Boiler Fans ≥ 5 HP | $65 to $155 per hp |
| Boiler Feed Water Pumps ≥ 5 HP | $60 to $155 per hp |
| Commercial Kitchen Hood up to 50 HP | Retrofit $55 – $300 per hp<br>New Hood $55 - $250 per hp |

## Natural Gas Water Heating

| | |
|---|---|
| Gas Water Heaters ≤ 50 gallons, 0.67 energy factor or better | $50 per unit |
| Gas-Fired Water Heaters > 50 gallons | $1.00 - $2.00 per MBH |
| Gas-Fired Booster Water Heaters | $17 - $35 per MBH |
| Gas Fired Tankless Water Heaters | $300 per unit |

## Prescriptive Lighting

| | |
|---|---|
| Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities (Expires 3/1/2013) | $10 per fixture (1-4 lamps) |
| Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities (Expires 3/1/2013) | $25 per fixture (1-4 lamps) |
| T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement | $10 per fixture |
| For retrofit of T-8 fixtures by permanent de-lamping & new reflectors (Electronic ballast replacement required) | $15 per fixture |
| T-5 and T-8 High Bay Fixtures | $16 - $200 per fixture |
| Metal Halide w/Pulse Start Including Parking Lot | $25 per fixture |
| HID ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system) | $50 per fixture |
| HID ≥ 100w Replacement with new HID ≥ 100w | $70 per fixture |

## Prescriptive Lighting - LED

| | |
|---|---|
| LED Display Case Lighting | $30 per display case |
| LED Shelf-Mtd. Display & Task Lights | $15 per linear foot |
| LED Portable Desk Lamp | $20 per fixture |
| LED Wall-wash Lights | $30 per fixture |
| LED Recessed Down Lights | $35 per fixture |
| LED Outdoor Pole/Arm-Mounted Area and Roadway Luminaries | $175 per fixture |
| LED Outdoor Pole/Arm-Mounted Decorative Luminaries | $175 per fixture |
| LED Outdoor Wall-Mounted Area Luminaries | $100 per fixture |
| LED Parking Garage Luminaries | $100 per fixture |
| LED Track or Mono-Point Directional Lighting Fixtures | $50 per fixture |
| LED High-Bay and Low-Bay Fixtures for Commercial & Industrial Bldgs. | $150 per fixture |
| LED High-Bay-Aisle Lighting | $150 per fixture |
| LED Bollard Fixtures | $50 per fixture |
| LED Linear Panels (1x4, 2x2, 2x4 Troffers only) | $100 per fixture |
| LED Fuel Pump Canopy | $100 per fixture |
| LED Screw-based & Pin-based (PAR, MR, BR, R) Standards (A-Style) and Decorative Lamps | $20 per lamp |
| LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case | $30 per 4 foot<br>$42 per 5 foot<br>$65 per 6 foot |
| LED Retrofit Kits | To be evaluated through the customer measure path |

## Lighting Controls – Occupancy Sensors

| | |
|---|---|
| Wall Mounted | $20 per control |
| Remote Mounted | $35 per control |
| Daylight Dimmers | $25-$50 per fixture |
| Occupancy Controlled hi-low Fluorescent Controls | $25 per fixture controlled |

## Lighting Controls – HID or Fluorescent Hi-Bay Controls

| | |
|---|---|
| Occupancy hi-low | $75 per fixture controlled |
| Daylight Dimming | $75 per fixture controlled |

## Premium Motors

| | |
|---|---|
| Three-Phase Motors (Expires 3/1/2013) | $45 - $700 per motor |
| Fractional HP Motors Electronic Commutated Motors (replacing shaded pole motors in refrigerator/freezer cases) | $40 per electronic commutated motor |

## Refrigeration Doors/Covers

| | |
|---|---|
| Energy-Efficient Doors/Covers for Installation on Open Refrigerated Cases | $100 per door |
| Aluminum Night Curtains for Installation on Open Refrigerated Cases | $3.50 per linear foot |

## Refrigeration Controls

| | |
|---|---|
| Door Heater Controls | $50 per control |
| Electric Defrost Controls | $50 per control |
| Evaporator Fan Controls | $75 per control |
| Novelty Cooler Shutoff | $50 per control |

## Other Equipment Incentives

| | |
|---|---|
| Performance Lighting | $1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2007 for New Construction and Complete Renovation |
| Custom Electric and Gas Equipment Incentives | not prescriptive |
| Custom Measures | $0.16 KWh and $1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and an IRR of at least 10%. |

# APPENDIX C

OMB No. 2060-0347

# STATEMENT OF ENERGY PERFORMANCE
# 3-New Brunswick BOE - Lincoln Elementary School

**Building ID:** 3415928
**For 12-month Period Ending:** October 31, 2012[1]
**Date SEP becomes ineligible:** N/A
**Date SEP Generated:** February 04, 2013

**Facility**
3-New Brunswick BOE - Lincoln Elementary School
66 Bartlett Street
New Brunswick, NJ 08901

**Facility Owner**
New Brunswick Board of Education
268 Baldwin Street 3rd Floor
New Brunswick, NJ 08901

**Primary Contact for this Facility**
Jack Humma
268 Baldwin Street 3rd Floor
New Brunswick, NJ 08901

**Year Built:** 1910
**Gross Floor Area (ft²):** 50,000

**Energy Performance Rating**[2] (1-100) 22

| **Site Energy Use Summary**[3] | |
|---|---|
| Electricity - Grid Purchase(kBtu) | 917,059 |
| Natural Gas (kBtu)[4] | 2,740,657 |
| Total Energy (kBtu) | 3,657,716 |

| **Energy Intensity**[4] | |
|---|---|
| Site (kBtu/ft²/yr) | 73 |
| Source (kBtu/ft²/yr) | 119 |

| **Emissions** (based on site energy use) | |
|---|---|
| Greenhouse Gas Emissions ($MtCO_2e$/year) | 276 |

**Electric Distribution Utility**
Public Service Electric & Gas Co

| **National Median Comparison** | |
|---|---|
| National Median Site EUI | 57 |
| National Median Source EUI | 92 |
| % Difference from National Median Source EUI | 29% |
| Building Type | K-12 School |

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**
Michael Fischette
520 South Burnt Mill Road
Voorhees, NJ 08043

| **Meets Industry Standards**[5] **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. Values represent energy intensity, annualized to a 12-month period.
5. 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.

The government estimates the average time needed to fill out this form is 6 hours (includes the time for entering energy data, Licensed Professional facility inspection, and notarizing the SEP) and welcomes suggestions for reducing this level of effort. Send comments (referencing OMB control number) to the Director, Collection Strategies Division, U.S., EPA (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

# ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) or a Registered Architect (RA) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE or RA in double-checking the information that the building owner or operator has entered into Portfolio Manager.

**Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.**
NOTE: You must check each box to indicate that each value is correct, OR include a note.

| CRITERION | VALUE AS ENTERED IN PORTFOLIO MANAGER | VERIFICATION QUESTIONS | NOTES | ☑ |
|---|---|---|---|---|
| **Building Name** | 3-New Brunswick BOE - Lincoln Elementary School | Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings? | | ☐ |
| **Type** | K-12 School | Is this an accurate description of the space in question? | | ☐ |
| **Location** | 66 Bartlett Street, New Brunswick, NJ 08901 | Is this address accurate and complete? Correct weather normalization requires an accurate zip code. | | ☐ |
| **Single Structure** | Single Facility | Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building. | | ☐ |
| Lincoln ES (K-12 School) | | | | |
| **CRITERION** | **VALUE AS ENTERED IN PORTFOLIO MANAGER** | **VERIFICATION QUESTIONS** | **NOTES** | ☑ |
| **Gross Floor Area** | 50,000 Sq. Ft. | Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area. | | ☐ |
| **Open Weekends?** | No | Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days. | | ☐ |
| **Number of PCs** | 108 | Is this the number of personal computers in the K12 School? | | ☐ |
| **Number of walk-in refrigeration/freezer units** | 0 | Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas. | | ☐ |
| **Presence of cooking facilities** | No | Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no". | | ☐ |
| **Percent Cooled** | 10 % | Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment? | | ☐ |
| **Percent Heated** | 100 % | Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment? | | ☐ |
| **Months** | 10(Optional) | Is this school in operation for at least 8 months of the year? | | ☐ |

| | | | | |
|---|---|---|---|---|
| **High School?** | No | Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'. | | ☐ |

# ENERGY STAR® Data Checklist for Commercial Buildings

## *Energy Consumption*

***Power Generation Plant or Distribution Utility:*** Public Service Electric & Gas Co

| **Fuel Type: Electricity** | | |
|---|---|---|
| **Meter: Electric # 278003253 (kWh (thousand Watt-hours))**<br>**Space(s):** Entire Facility<br>**Generation Method:** Grid Purchase | | |
| **Start Date** | **End Date** | **Energy Use (kWh (thousand Watt-hours))** |
| 09/19/2012 | 10/18/2012 | 13,785.00 |
| 08/19/2012 | 09/18/2012 | 10,080.00 |
| 07/19/2012 | 08/18/2012 | 14,205.00 |
| 06/19/2012 | 07/18/2012 | 4,590.00 |
| 05/19/2012 | 06/18/2012 | 51,585.00 |
| 04/19/2012 | 05/18/2012 | 0.00 |
| 03/19/2012 | 04/18/2012 | 16,450.00 |
| 02/19/2012 | 03/18/2012 | 14,850.00 |
| 01/19/2012 | 02/18/2012 | 15,060.00 |
| 12/19/2011 | 01/18/2012 | 12,585.00 |
| 11/19/2011 | 12/18/2011 | 21,510.00 |
| **Electric # 278003253 Consumption (kWh (thousand Watt-hours))** | | **174,700.00** |
| **Electric # 278003253 Consumption (kBtu (thousand Btu))** | | **596,076.40** |
| **Meter: Electric Meter # 278004055 (kWh (thousand Watt-hours))**<br>**Space(s):** Entire Facility<br>**Generation Method:** Grid Purchase | | |
| **Start Date** | **End Date** | **Energy Use (kWh (thousand Watt-hours))** |
| 09/19/2012 | 10/18/2012 | 3,300.00 |
| 08/19/2012 | 09/18/2012 | 2,790.00 |
| 07/19/2012 | 08/18/2012 | 5,790.00 |
| 06/19/2012 | 07/18/2012 | 4,770.00 |
| 05/19/2012 | 06/18/2012 | 3,210.00 |
| 04/19/2012 | 05/18/2012 | 6,780.00 |
| 03/19/2012 | 04/18/2012 | 6,990.00 |
| 02/19/2012 | 03/18/2012 | 6,450.00 |
| 01/19/2012 | 02/18/2012 | 10,606.00 |
| 12/19/2011 | 01/18/2012 | 12,300.00 |
| 11/19/2011 | 12/18/2011 | 13,230.00 |
| **Electric Meter # 278004055 Consumption (kWh (thousand Watt-hours))** | | **76,216.00** |
| **Electric Meter # 278004055 Consumption (kBtu (thousand Btu))** | | **260,048.99** |
| **Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))** | | **856,125.39** |

| | |
|---|---|
| **Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?** | ☐ |

| **Fuel Type: Natural Gas** | | |
|---|---|---|
| **Meter: Gas Meter # 2413462 (therms)**<br>**Space(s):** Entire Facility | | |
| **Start Date** | **End Date** | **Energy Use (therms)** |
| 09/19/2012 | 10/18/2012 | 212.00 |
| 08/19/2012 | 09/18/2012 | 52.00 |
| 07/19/2012 | 08/18/2012 | 71.00 |
| 06/19/2012 | 07/18/2012 | 1,908.00 |
| 05/19/2012 | 06/18/2012 | 75.00 |
| 04/19/2012 | 05/18/2012 | 5,321.00 |
| 03/19/2012 | 04/18/2012 | 1,851.00 |
| 02/19/2012 | 03/18/2012 | 2,654.00 |
| 01/19/2012 | 02/18/2012 | 4,447.00 |
| 12/19/2011 | 01/18/2012 | 5,110.00 |
| 11/19/2011 | 12/18/2011 | 3,530.00 |
| **Gas Meter # 2413462 Consumption (therms)** | | **25,231.00** |
| **Gas Meter # 2413462 Consumption (kBtu (thousand Btu))** | | **2,523,100.00** |
| **Total Natural Gas Consumption (kBtu (thousand Btu))** | | **2,523,100.00** |
| **Is this the total Natural Gas consumption at this building including all Natural Gas meters?** | | ☐ |

| **Additional Fuels** | |
|---|---|
| Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility. | ☐ |

| **On-Site Solar and Wind Energy** | |
|---|---|
| Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported. | ☐ |

## Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same PE or RA that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

# FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

**Facility**
3-New Brunswick BOE - Lincoln Elementary School
66 Bartlett Street
New Brunswick, NJ 08901

**Facility Owner**
New Brunswick Board of Education
268 Baldwin Street 3rd Floor
New Brunswick, NJ 08901

**Primary Contact for this Facility**
Jack Humma
268 Baldwin Street 3rd Floor
New Brunswick, NJ 08901

## General Information

| 3-New Brunswick BOE - Lincoln Elementary School | |
|---|---|
| Gross Floor Area Excluding Parking: ($ft^2$) | 50,000 |
| Year Built | 1910 |
| For 12-month Evaluation Period Ending Date: | October 31, 2012 |

## Facility Space Use Summary

| Lincoln ES | |
|---|---|
| Space Type | K-12 School |
| Gross Floor Area ($ft^2$) | 50,000 |
| Open Weekends? | No |
| Number of PCs | 108 |
| Number of walk-in refrigeration/freezer units | 0 |
| Presence of cooking facilities | No |
| Percent Cooled | 10 |
| Percent Heated | 100 |
| Months ° | 10 |
| High School? | No |
| School District ° | new brunswick |

## Energy Performance Comparison

| | Evaluation Periods | | Comparisons | | |
|---|---|---|---|---|---|
| **Performance Metrics** | **Current** (Ending Date 10/31/2012) | **Baseline** (Ending Date 10/31/2012) | **Rating of 75** | **Target** | **National Median** |
| Energy Performance Rating | 22 | 22 | 75 | N/A | 50 |
| Energy Intensity | | | | | |
| *Site (kBtu/$ft^2$)* | 73 | 73 | 44 | N/A | 57 |
| *Source (kBtu/$ft^2$)* | 119 | 119 | 72 | N/A | 92 |
| Energy Cost | | | | | |
| *$/year* | $ 58,212.67 | $ 58,212.67 | $ 35,269.80 | N/A | $ 45,105.87 |
| *$/$ft^2$/year* | $ 1.16 | $ 1.16 | $ 0.70 | N/A | $ 0.90 |
| Greenhouse Gas Emissions | | | | | |
| $MtCO_2e$/year | 276 | 276 | 167 | N/A | 214 |
| $kgCO_2e/ft^2$/year | 6 | 6 | 4 | N/A | 5 |

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Median column presents energy performance data your building would have if your building had a median rating of 50.

Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.

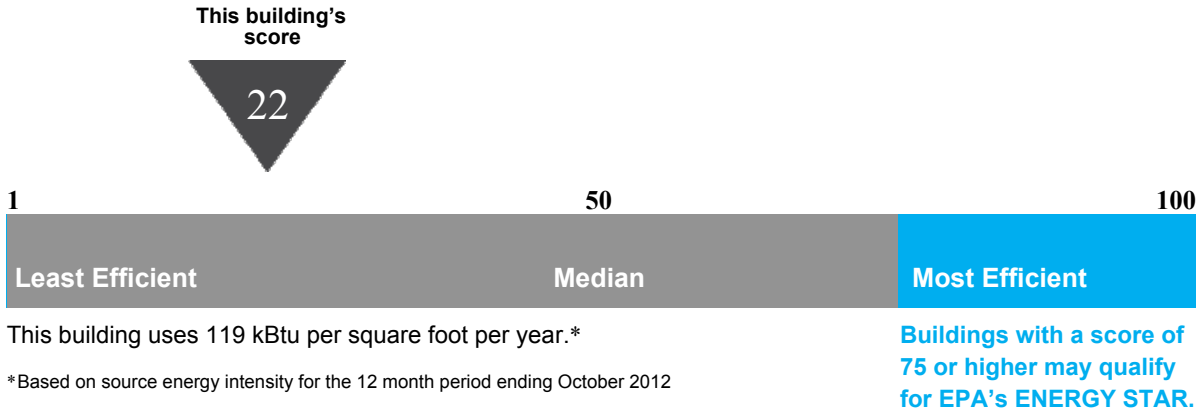
# Statement of Energy Performance

## 2012

3-New Brunswick BOE - Lincoln Elementary School
66 Bartlett Street
New Brunswick, NJ 08901

Portfolio Manager Building ID: 3415928

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.




This building uses 119 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending October 2012

**Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.**

I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 02/04/2013

# APPENDIX D

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Lincoln Elementary School

## AC Units

| Tag | | | |
|---|---|---|---|
| **Unit Type** | Wall Mount Air | Window Air Conditioner | Split System |
| **Qty** | 5 | 12 | 1 |
| **Location** | Outdoor Modular Classrooms | Classrooms/Offices | Outside Front |
| **Area Served** | Modular Classrooms | Classrooms/Offices | - |
| **Manufacturer** | BARD | Assorted Mfg's | Fujitsu |
| **Model #** | WA402-A15XX4XXX | - | A0U24CL1 |
| **Serial #** | 149F011633701-02 | - | GDN 0 0 4 0 0 7 |
| **Cooling Type** | | DX, R-22 | DX, R-410A |
| **Cooling Capacity (Tons)** | 3.5 Tons | 1-2 Tons | 2 Tons |
| **Cooling Efficiency (SEER/EER)** | 9 EER | 9 SEER | 10 EER/ 17.5 SEER |
| **Heating Type** | Electric Heat | N/A | N/A |
| **Heating Input (MBH)** | 15 KW | N/A | N/A |
| **Efficiency** | 100% | N/A | N/A |
| **Fuel** | Electric | N/A | N/A |
| **Approx Age** | 5 | 10 | 6 |
| **ASHRAE Service Life** | 15 | 15 | 15 |
| **Remaining Life** | 10 | 5 | 9 |
| **Comments** | | | |

**Note:**
"N/A" = Not Applicable.
"-" = Info Not Available

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Lincoln Elementary School

## Boilers

| | | | |
|---|---|---|---|
| **Tag** | | | |
| **Unit Type** | Steam Cast Iron Sectional Boiler | | |
| **Qty** | 2 | | |
| **Location** | Boiler Room | | |
| **Area Served** | Steam System | | |
| **Manufacturer** | H.B. Smith | | |
| **Model #** | Series 28-10 | | |
| **Serial #** | N88-573 | | |
| **Input Capacity (Btu/Hr)** | 3,067 | | |
| **Rated Output Capacity (Btu/Hr)** | 2,262 | | |
| **Approx. Efficiency %** | 73.0% | | |
| **Fuel** | Natural Gas | | |
| **Approx Age** | 24 | | |
| **ASHRAE Service Life** | 35 | | |
| **Remaining Life** | 11 | | |
| **Comments** | | | |

**Note:**
"N/A" = Not Applicable.
"-" = Info Not Available

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Lincoln Elementary School

## Domestic Water Heaters

| | | | |
|---|---|---|---|
| **Tag** | | | |
| **Unit Type** | Gas Fired Domestic Hot Water Heater | | |
| **Qty** | 1 | | |
| **Location** | Boiler Room | | |
| **Area Served** | Domestic Loop | | |
| **Manufacturer** | A.O. Smith | | |
| **Model #** | BT 100 112 | | |
| **Serial #** | K04M001760 | | |
| **Size (Gallons)** | 98 | | |
| **Input Capacity (MBH/KW)** | 75,100 Btu/hr | | |
| **Recovery (Gal/Hr)** | 72.82 | | |
| **Efficiency %** | 80% | | |
| **Fuel** | Natural Gas | | |
| **Approx Age** | 9 | | |
| **ASHRAE Service Life** | 12 | | |
| **Remaining Life** | 3 | | |
| **Comments** | | | |

**Note:**
"N/A" = Not Applicable.
"-" = Info Not Available

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Lincoln Elementary School

## Pumps

| Tag | | | |
|---|---|---|---|
| **Unit Type** | Steam Condensate Return | Vacuum Blower System | |
| **Qty** | 1 | 2 | |
| **Location** | Boiler Room | Boiler Room | |
| **Area Served** | Steam System | Condenstate Return | |
| **Manufacturer** | HT Pump Specialties | HT Pump Specialties | |
| **Model #** | PBFCRHCLR4-IT5 | - | |
| **Serial #** | 123109 | - | |
| **Horse Power** | 1/2 | 2 | |
| **Flow** | - | - | |
| **Motor Info** | Bluffington | Tuthill | |
| **Electrical Power** | 208-230/460 | 208-230/460 | |
| **RPM** | 3450 RPM | 3450 RPM | |
| **Motor Efficiency %** | - | 78.5% | |
| **Approx Age** | 1 | 1 | |
| **ASHRAE Service Life** | 18 | 18 | |
| **Remaining Life** | 17 | 17 | |
| **Comments** | | | |

**Note:**
"N/A" = Not Applicable.
"-" = Info Not Available

# APPENDIX E

**CEG Project #:** 9C12064
**Facility Name:** Lincoln Elementary School
**Address:** 66 Bartlett Street
**City, State, Zip** New Brunswick, NJ 08901

| | | | Existing Fixtures | | | | | | Proposed Fixtures Retrofit | | | | | | | Retrofit Energy Savings | | | Lighting Retrofit Costs | | | | | Proposed Lighting Controls | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fixture Reference # | Location | Average Burn Hours | Description | Lamps per Fixture | Watts per Fixture | Qty of Fixtures | Total kW | Usage kWh/Yr | Work Description | Equipment Description | Lamps per Fixture | Watts per Fixture | Qty of Fixtures | Total kW | Usage kWh/Yr | Energy Savings, kW | Energy Savings, kWh | Energy Savings, $ | Material | Total Labor | Total All | Rebate Estimate | Simple Payback | Control Ref # | Controls Description | Qty of Controls | Hour Reduction % | Energy Savings, kWh | Energy Savings, $ |
| 221.11 | B1-Boiler Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 149 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 149 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | B1-Boiler Room Pumps | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 149 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 149 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 222.21 | B1 - Office Common Area | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 5 | 0.31 | 806 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.31 | 806 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 222.21 | B1-Small Office 1 | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 161 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 1 | 20.0% | 32 | $4 |
| 222.21 | B1-Small Office 2 | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 161 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 1 | 20.0% | 32 | $4 |
| 222.21 | B1-Small office 3 | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 161 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 1 | 20.0% | 32 | $4 |
| 768 | B1-Gymnasium | 2600 | 400w MH, Hi-Bay | 1 | 465 | 12 | 5.58 | 14,508 | Remove and Return | 1x4, 6 Lamp, 54w T5HO, Elect. Ballast, Lo Bay | 6 | 315 | 12 | 3.78 | 9,828 | 1.80 | 4,680 | $651 | $3,000.00 | $6,060.00 | $9,060.00 | $1,200.00 | 12.08 | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 227.21 | B1-Gymnasium | 2600 | 2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 65 | 6 | 0.39 | 1,014 | Existing to Remain | Existing to Remain | 2 | 65 | 0 | 0.39 | 1,014 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | B1-Gym Storage | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 3 | 0.19 | 223 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.19 | 223 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | B1-Gym Hallway | 3000 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 3 | 0.19 | 558 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.19 | 558 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 241.11 | B1-Main Hallway | 3000 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 7 | 0.75 | 2,247 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.75 | 2,247 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | B1-Main Hallway | 3000 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 186 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 186 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 241.11 | B1-Custodian Area | 2600 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 1 | 0.11 | 278 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.11 | 278 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 0.3 | 20.0% | 56 | $8 |
| 221.11 | B1-Custodian Area | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 161 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 0.3 | 20.0% | 32 | $4 |
| 211.41 | B1-Custodian Area | 2600 | 1x4, 1 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic Lens | 1 | 33 | 2 | 0.07 | 172 | Existing to Remain | Existing to Remain | 1 | 33 | 0 | 0.07 | 172 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 0.3 | 20.0% | 34 | $5 |
| 221.11 | B1-Custodian Office | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 161 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 1 | 20.0% | 32 | $4 |
| 221.11 | B1-Storage | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 3 | 0.19 | 223 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.19 | 223 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | B1-CST Office | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 161 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 1 | 20.0% | 32 | $4 |
| 221.11 | B1-Storage | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | B1-Side Hall | 3000 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 186 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 186 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 232.21 | B1-Faculty Toilet | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 3 | 86 | 1 | 0.09 | 224 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.09 | 224 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 232.21 | B1-Boys Restroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 3 | 86 | 3 | 0.26 | 671 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.26 | 671 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 232.21 | B1-Girls Restroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 3 | 86 | 3 | 0.26 | 671 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.26 | 671 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | B1-Equipment Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |

| | | | Existing Fixtures | | | | | | Proposed Fixtures Retrofit | | | | | | | Retrofit Energy Savings | | | Lighting Retrofit Costs | | | | | Proposed Lighting Controls | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fixture Reference # | Location | Average Burn Hours | Description | Lamps per Fixture | Watts per Fixture | Qty of Fixtures | Total kW | Usage kWh/Yr | Work Description | Equipment Description | Lamps per Fixture | Watts per Fixture | Qty of Fixtures | Total kW | Usage kWh/Yr | Energy Savings, kW | Energy Savings, kWh | Energy Savings, $ | Material | Total Labor | Total All | Rebate Estimate | Simple Payback | Control Ref # | Controls Description | Qty of Controls | Hour Reduction % | Energy Savings, kWh | Energy Savings, $ |
| 221.11 | B1-Storage | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | B1-Warming Kitchen | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 322 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 322 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | B1-Kitchen Office 1 | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 161 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | B1- Kitchen Office 2 | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 161 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 241.11 | B1-Music Room | 2600 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 12 | 1.28 | 3,338 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 1.28 | 3,338 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 668 | $93 |
| 241.11 | B1-Classroom 3B | 2600 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 9 | 0.96 | 2,504 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.96 | 2,504 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 501 | $70 |
| 241.11 | B1-SGI 4 | 2600 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 241.11 | B1-SGI 5 | 2600 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 241.11 | B1-SGI 6 | 2600 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 241.11 | B1-SGI 7 | 2600 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 241.11 | B1-Speech | 2600 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 4 | 0.43 | 1,113 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.43 | 1,113 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 223 | $31 |
| 241.11 | B1-Cafeteria | 2600 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 18 | 1.93 | 5,008 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 1.93 | 5,008 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 241.11 | Stairs 1 | 3000 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 3 | 0.32 | 963 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.32 | 963 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | Stairs 1 | 3000 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 186 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 186 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 222.21 | Stairs 1 | 3000 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 186 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 186 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | Stairs 2 | 3000 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 3 | 0.19 | 558 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.19 | 558 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | Stairs 3 | 3000 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 3 | 0.19 | 558 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.19 | 558 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 242.21 | 1F-Classroom 102 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 242.21 | 1F-Classroom 103 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 241.11 | 1F-Small Hallway | 3000 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 2 | 0.21 | 642 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.21 | 642 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | 1F-Small Hallway | 3000 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 186 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 186 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 241.11 | 1F-Main Front Hallway | 3000 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,926 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,926 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | 1F-Main Front Hallway | 3000 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 372 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 372 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 241.11 | 1F-Side Hallway | 3000 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 4 | 0.43 | 1,284 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.43 | 1,284 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 242.21 | 1F-Classroom 105 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 221.11 | 1F-Classroom 105 Coat Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |

| | | | Existing Fixtures | | | | | | Proposed Fixtures Retrofit | | | | | | | Retrofit Energy Savings | | | Lighting Retrofit Costs | | | | | Proposed Lighting Controls | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fixture Reference # | Location | Average Burn Hours | Description | Lamps per Fixture | Watts per Fixture | Qty of Fixtures | Total kW | Usage kWh/Yr | Work Description | Equipment Description | Lamps per Fixture | Watts per Fixture | Qty of Fixtures | Total kW | Usage kWh/Yr | Energy Savings, kW | Energy Savings, kWh | Energy Savings, $ | Material | Total Labor | Total All | Rebate Estimate | Simple Payback | Control Ref # | Controls Description | Qty of Controls | Hour Reduction % | Energy Savings, kWh | Energy Savings, $ |
| 242.21 | 1F-Classroom 104 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 221.11 | 1F-Classroom 104 Coat Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 227.21 | 1F-Principal Office | 2600 | 2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 65 | 4 | 0.26 | 676 | Existing to Remain | Existing to Remain | 2 | 65 | 0 | 0.26 | 676 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 1 | 20.0% | 135 | $19 |
| 60 | 1F-Principal Office Bathroom | 1200 | Wall Mount 25w CFL | 1 | 25 | 1 | 0.03 | 30 | Existing to Remain | Existing to Remain | 1 | 25 | 0 | 0.03 | 30 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 242.21 | 1F-Main Office | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 1 | 0.11 | 278 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.11 | 278 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 1 | 20.0% | 56 | $8 |
| 211.41 | 1F-Main office Bathroom | 1200 | 1x4, 1 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic Lens | 1 | 33 | 1 | 0.03 | 40 | Existing to Remain | Existing to Remain | 1 | 33 | 0 | 0.03 | 40 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 242.21 | 1F-Classroom 106 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 221.11 | 1F-Classroom 106 Coat Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 242.21 | 1F-Classroom 107 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 221.11 | 1F-Classroom 107 Coat Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 242.21 | 1F-Classroom 108 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 221.11 | 1F-Classroom 108 Coat Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | 1F-Hallway Storage | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 242.21 | 1F-Classroom 109 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 242.21 | 1F-Classroom 110 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 242.21 | 1F-Classroom 111 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 242.21 | 1F-Classroom 112 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 242.21 | 1F-Classroom 113 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 211.41 | 1F-Classroom 113 Toilet 1 | 1200 | 1x4, 1 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic Lens | 1 | 33 | 1 | 0.03 | 40 | Existing to Remain | Existing to Remain | 1 | 33 | 0 | 0.03 | 40 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 211.41 | 1F-Classroom 113 Toilet 2 | 1200 | 1x4, 1 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic Lens | 1 | 33 | 1 | 0.03 | 40 | Existing to Remain | Existing to Remain | 1 | 33 | 0 | 0.03 | 40 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 242.21 | 1F-Classroom 115 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 222.21 | 1F-Nurse Waiting Area | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 161 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.21 | 1F-Nurse Office | 2600 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 2 | 62 | 2 | 0.12 | 322 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 322 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 211.41 | 1F-Nurse Bathroom | 1200 | 1x4, 1 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic Lens | 1 | 33 | 1 | 0.03 | 40 | Existing to Remain | Existing to Remain | 1 | 33 | 0 | 0.03 | 40 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 222.21 | 1F-Speech | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 161 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 161 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 32 | $4 |
| 232.21 | 1F-Boys Restroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 3 | 86 | 2 | 0.17 | 447 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.17 | 447 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |

| | | | Existing Fixtures | | | | | | Proposed Fixtures Retrofit | | | | | | | Retrofit Energy Savings | | | Lighting Retrofit Costs | | | | | Proposed Lighting Controls | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fixture Reference # | Location | Average Burn Hours | Description | Lamps per Fixture | Watts per Fixture | Qty of Fixtures | Total kW | Usage kWh/Yr | Work Description | Equipment Description | Lamps per Fixture | Watts per Fixture | Qty of Fixtures | Total kW | Usage kWh/Yr | Energy Savings, kW | Energy Savings, kWh | Energy Savings, $ | Material | Total Labor | Total All | Rebate Estimate | Simple Payback | Control Ref # | Controls Description | Qty of Controls | Hour Reduction % | Energy Savings, kWh | Energy Savings, $ |
| 232.21 | 1F-Girls Restroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 3 | 86 | 2 | 0.17 | 447 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.17 | 447 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 242.21 | 2F-Classroom 202 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 242.21 | 2F-Classroom 203 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 241.11 | 2F-Office | 2600 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 1 | 0.11 | 278 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.11 | 278 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 1 | 20.0% | 56 | $8 |
| 222.21 | 2F-Small Hallway | 3000 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 372 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 372 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 222.21 | 2F-Classroom 205 | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 6 | 0.37 | 967 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.37 | 967 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 193 | $27 |
| 221.11 | 2F-Classroom 205 Coat Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 222.21 | 2F-Classroom 204 | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 6 | 0.37 | 967 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.37 | 967 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 193 | $27 |
| 221.11 | 2F-Classroom 204 Coat Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 222.21 | 2F-Classroom 206 | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 9 | 0.56 | 1,451 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.56 | 1,451 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 290 | $40 |
| 221.11 | 2F-Classroom 206 Coat Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 222.21 | 2F-Classroom 207 | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 6 | 0.37 | 967 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.37 | 967 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 193 | $27 |
| 222.21 | 2F-Computer Room | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 4 | 0.25 | 645 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.25 | 645 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 0.5 | 20.0% | 129 | $18 |
| 242.21 | 2F-Computer Room | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 4 | 0.43 | 1,113 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.43 | 1,113 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 0.5 | 20.0% | 223 | $31 |
| 242.21 | 2F-Library 208 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 9 | 0.96 | 2,504 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.96 | 2,504 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 501 | $70 |
| 221.11 | 2F-Library 208 Coat Room | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 222.21 | 2F-Main Hallway | 3000 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 7 | 0.43 | 1,302 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.43 | 1,302 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 241.11 | 2F-Side Hallway | 3000 | 1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 3 | 0.32 | 963 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.32 | 963 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | 2F-Side Hallway | 3000 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 372 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 372 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 242.21 | 2F-School Store | 1200 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 1 | 0.11 | 128 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.11 | 128 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 222.21 | 2F-Storage | 1200 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 222.21 | 2F-Classroom 209 | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 6 | 0.37 | 967 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.37 | 967 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 193 | $27 |
| 222.21 | 2F-Classroom 210 | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 6 | 0.37 | 967 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.37 | 967 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 193 | $27 |
| 242.21 | 2F-Classroom 211 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 242.21 | 2F-Classroom 212 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| 242.21 | 2F-Classroom 213 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |

| | | | Existing Fixtures | | | | | | Proposed Fixtures Retrofit | | | | | | | Retrofit Energy Savings | | | Lighting Retrofit Costs | | | | | Proposed Lighting Controls | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fixture Reference # | Location | Average Burn Hours | Description | Lamps per Fixture | Watts per Fixture | Qty of Fixtures | Total kW | Usage kWh/Yr | Work Description | Equipment Description | Lamps per Fixture | Watts per Fixture | Qty of Fixtures | Total kW | Usage kWh/Yr | Energy Savings, kW | Energy Savings, kWh | Energy Savings, $ | Material | Total Labor | Total All | Rebate Estimate | Simple Payback | Control Ref # | Controls Description | Qty of Controls | Hour Reduction % | Energy Savings, kWh | Energy Savings, $ |
| 222.21 | 2F-Teacher Lounge | 2600 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 2 | 62 | 2 | 0.12 | 322 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.12 | 322 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 5 | Dual Technology Occupancy Sensor - Switch Mnt. | 1 | 20.0% | 64 | $9 |
| 221.11 | 2F-Teacher Lounge Bathroom | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 221.11 | 2F-Janitor Closet | 1200 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 2 | 62 | 1 | 0.06 | 74 | Existing to Remain | Existing to Remain | 2 | 62 | 0 | 0.06 | 74 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 232.21 | 2F-Boys Restroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 3 | 86 | 2 | 0.17 | 447 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.17 | 447 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 232.21 | 2F-Girls Restroom | 2600 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 3 | 86 | 2 | 0.17 | 447 | Existing to Remain | Existing to Remain | 3 | 86 | 0 | 0.17 | 447 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 0 | No New Controls | 0 | 0.0% | 0 | $0 |
| 242.21 | 2F-Classroom 214 | 2600 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 4 | 107 | 6 | 0.64 | 1,669 | Existing to Remain | Existing to Remain | 4 | 107 | 0 | 0.64 | 1,669 | 0.00 | 0 | $0 | $0.00 | $0.00 | $0.00 | $0.00 | - | 4 | Dual Technology Occupancy Sensor - Remote Mnt. | 1 | 20.0% | 334 | $46 |
| | **TOTAL** | | | | | **384** | **39** | **100,144** | | | | | **12** | **37** | **95,464** | **2** | **4,680** | **651** | **3,000** | **6,060** | **9,060** | **1,200** | **13.93** | | | **45** | | **11,806** | **1,641** |

# APPENDIX F

| Location Description | Area (Sq FT) | Panel | Qty | Panel Sq Ft | Panel Total Sq Ft | Total $KW_{DC}$ | Total Annual kWh | Total $KW_{AC}$ | Panel Weight (41.9 lbs) | W/SQFT |
|---|---|---|---|---|---|---|---|---|---|---|
| Lincoln ES | 3575 | SHARP NU-U235F2 | 146 | 17.5 | 2,561 | 34.31 | 39,647 | 27.8 | 6,117 | 13.40 |


.= Proposed PV Layout = Proposed Parking PV Layout

Notes:

1. Estimated kWH based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.

**Project Name:** **LGEA Solar PV Project - Lincoln ES**
**Location:** **New Brunswick, NJ**
**Description:** **Photovoltaic System 100% Financing - 15 year**

**Simple Payback Analysis**

| | Photovoltaic System 100% Financing - 15 year |
|---|---|
| Total Construction Cost | $216,903 |
| Annual kWh Production | 39,647 |
| Annual Energy Cost Reduction | $5,511 |
| Average Annual SREC Revenue | $7,576 |

Simple Payback: **16.57** Years

**Life Cycle Cost Analysis**

Analysis Period (years): 15
Discount Rate: 3%
Average Energy Cost ($/kWh) **$0.139**
Financing Rate: 6.00%
Financing %: 100%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
Average SREC Value ($/kWh) $0.191

| Period | Additional Cash Outlay | Energy kWh Production | Energy Cost Savings | Additional Maint Costs | SREC Revenue | Interest Expense | Loan Principal | Net Cash Flow | Cumulative Cash Flow |
|---|---|---|---|---|---|---|---|---|---|
| 0 | $0 | 0 | 0 | 0 | $0 | 0 | 0 | 0 | 0 |
| 1 | $0 | 39,647 | $5,511 | $0 | $9,912 | $12,764 | $9,200 | ($6,542) | ($6,542) |
| 2 | $0 | 39,449 | $5,676 | $0 | $9,862 | $12,196 | $9,768 | ($6,426) | ($12,967) |
| 3 | $0 | 39,252 | $5,847 | $0 | $9,813 | $11,594 | $10,370 | ($6,305) | ($19,272) |
| 4 | $0 | 39,055 | $6,022 | $0 | $9,764 | $10,954 | $11,010 | ($6,178) | ($25,451) |
| 5 | $0 | 38,860 | $6,203 | $400 | $9,715 | $10,275 | $11,689 | ($6,447) | ($31,897) |
| 6 | $0 | 38,666 | $6,389 | $398 | $7,733 | $9,554 | $12,410 | ($8,241) | ($40,138) |
| 7 | $0 | 38,472 | $6,580 | $396 | $7,694 | $8,789 | $13,175 | ($8,086) | ($48,224) |
| 8 | $0 | 38,280 | $6,778 | $394 | $7,656 | $7,976 | $13,988 | ($7,925) | ($56,149) |
| 9 | $0 | 38,089 | $6,981 | $392 | $7,618 | $7,114 | $14,851 | ($7,758) | ($63,906) |
| 10 | $0 | 37,898 | $7,191 | $390 | $5,685 | $6,198 | $15,767 | ($9,479) | ($73,386) |
| 11 | $0 | 37,709 | $7,406 | $388 | $5,656 | $5,225 | $16,739 | ($9,290) | ($82,676) |
| 12 | $0 | 37,520 | $7,628 | $386 | $5,628 | $4,193 | $17,771 | ($9,094) | ($91,770) |
| 13 | $0 | 37,333 | $7,857 | $385 | $5,600 | $3,097 | $18,868 | ($8,892) | ($100,662) |
| 14 | $0 | 37,146 | $8,093 | $383 | $3,715 | $1,933 | $20,031 | ($10,539) | ($111,201) |
| 15 | $0 | 36,960 | $8,336 | $381 | $3,696 | $697 | $21,267 | ($10,313) | ($121,514) |
| | **Totals:** | 574,335 | $102,497 | $4,294 | $109,746 | $112,560 | $216,903 | ($121,514) | ($885,753) |

**Net Present Value (NPV)** **($89,241)**