

**ROXBURY BOARD OF EDUCATION  
ROXBURY HIGH SCHOOL  
ENERGY ASSESSMENT**

**For**

**NEW JERSEY  
BOARD OF PUBLIC UTILITIES**

**CHA PROJECT NO. 24454**

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Prepared by:



6 Campus Drive  
Parsippany, NJ 07054

(973) 538-2120

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## **REPORT DISCLAIMER**

This audit was conducted in accordance with the standards developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) for a Level II audit. Cost and savings calculations for a given measure were estimated to within  $\pm 20\%$ , and are based on data obtained from the owner, data obtained during site observations, professional experience, historical data, and standard engineering practice. Cost data does not include soft costs such as engineering fees, legal fees, project management fees, financing, etc.

A thorough walkthrough of the school was performed, which included gathering nameplate information and operating parameters for all accessible equipment and lighting systems. Unless otherwise stated, model, efficiency, and capacity information included in this report were collected directly from equipment nameplates and /or from documentation provided by the owner during the site visit. Typical operation and scheduling information was obtained from interviewing school staff and spot measurements taken in the field.

## 1.0 EXECUTIVE SUMMARY

The Roxbury Board of Education recently engaged CHA to perform an energy audit in connection with the New Jersey Board of Public Utilities' Local Government Energy Audit Program. This report details the results of the energy audit conducted for:

Building Name	Address	Square Feet	Construction Date
Roxbury High School	1 Bryant Drive Succasunna, NJ	218,740	Original: 1971

The Energy Conservation Measures (ECMs) identified in this report will allow for a more efficient use of energy and if pursued have the opportunity to qualify for the New Jersey SmartStart Buildings Program. Potential annual savings of \$42,995 for the recommended ECMs may be realized with a combined payback of 2.4 years. A summary of the costs, savings, and paybacks for the recommended ECMs follow:

Energy Conservation Measure		Approx. Costs (\$)	Approx. Savings (\$/year)	Payback (Years) w/o Incentive	Potential Incentive (\$)*	Payback (Years) w/ Incentive	Recommended For Implementation
ECM-1	Install New High Efficiency Natural Gas HVAC Roof Top Units	2,990,000	24,700	121.1	1,950	121.0	
ECM-2	Replace 150 Gallon Electric DHW Tank With HE Natural Gas Unit	12,300	7,200	1.7	300	1.7	X
ECM-3	Install Economizers on HVAC Roof Top Units	1,900	300	6.3	250	5.5	X
ECM-4	Install Demand Control Ventilation For the Gym, Cafeteria and Faculty Dining Room AHU's	4,000	5,300	0.8	300	0.7	X
ECM-5	Replace Roof and Upgrade Insulation	3,400,000	6,800	500.0	0	500.0	
ECM-6	Install Natural Gas Dishwasher Booster Heater	15,100	7,800	1.9	0	1.9	X
ECM-7	Replace Windows	115,200	500	230.4	0	230.4	
ECM-8	Upgrade Current Lighting Fixtures	16,395	8,400	2.0	3,195	1.6	X
ECM-9	Install Occupancy Sensors	50,625	13,092	3.9	8,750	3.2	
ECM-10	Replace Lighting and Install Occupancy Sensors	67,020	19,949	3.4	11,945	2.8	

Incentives based on the SmartStart Program

## 2.0 INTRODUCTION AND BACKGROUND

New Jersey's Clean Energy Program, funded by the New Jersey Board of Public Utilities, supports energy efficiency and sustainability for Municipal and Local Government Energy Audits. Through the support of a utility trust fund, New Jersey is able to assist state and local authorities in reducing energy consumption while increasing comfort.

The Roxbury High School is a high school located in Succasunna, NJ, is a 281,740 square foot, two story block structure with exterior brick facing. The roof is rolled asphalt with a layer of mineral stone on top. The building was constructed in the 1971 with an addition in 2006. Occupancy includes approximately 1,600 students and 145 faculty and staff members. The school is open and occupied by maintenance personnel Monday through Friday from 4:00 am to approximately 11:30 pm during the school year, and until 4:30 pm during the summer to accommodate a condensed summer session. Students are typically in the school between 7:30 am and 3:00 pm.



## EXISTING CONDITIONS

### 2.1 Building - General

Built in the 1971 with an addition in 2006, the Roxbury High School building is a 281,740 square foot, two story school with high bay areas for the multipurpose room, cafeteria, gym, and auditorium.

The school has approximately 1600 students and 145 faculty and staff, and appeared fully utilized during the field survey. The building can be assumed to be fully occupied until 3:00 pm during the week. Custodial staff is typically in the building until 11:30 pm during the week. The hours of operation are:

- Monday through Friday 4:00 am to 11:30 pm (staff)
- Monday through Friday 7:30 am to 3:00 pm (students)
- Saturday & Sunday, open as needed

The original building is constructed of block walls and brick veneer. The interior walls are a mixture of painted block walls finished with gypsum board. The new addition is of similar architectural appearance. The windows in the original section of the school are single pane aluminum units. The roof is flat rolled asphalt with mineral stone on top. The windows and doors in this section are from the initial construction in 1971 and in poor condition.

### 2.2 Utility Usage

Utilities include electricity, natural gas, and potable water. Electricity is delivered by JCP&L and supplied by Hess. Natural gas is delivered and supplied by NJNG. See Appendix A for a detailed utility analysis.

The school has a shared electric meter with the Eisenhower Middle School and one gas meter. For the 12-month period ranging from June 2011 through May 2012, the utilities usage for the building was as follows:

#### Actual Cost & Site Usage by Utility

Electric		
Annual Usage	3,713,590	kWh/yr.
Annual Cost	460,339	\$
Blended Rate	0.124	\$/kWh
Demand Rate	4.80	\$/kW
Peak Demand	1026.2	kW
Min. Demand	833.6	kW
Avg. Demand	932.3	kW
Natural Gas		
Annual Usage	52,862	therms/yr.
Annual Cost	60,349	\$
Rate	1.14	\$/Therm

## Annual Cost & Site Energy Usage

Electrical usage was generally higher in the summer months when air conditioning equipment was operational. Natural gas consumption was highest in winter months for heating.

The delivery component of the electric and natural gas bills will always be the responsibility of the utility that connects the school to the power grid or gas line; however, the supply can be purchased from a third party; as is currently the case with electricity and natural gas. The electricity or natural gas commodity supply entity will require submission of one to three years of past energy bills. Contract terms can vary among suppliers.

Under New Jersey's energy deregulation law, the supply portion of the electric (or natural gas) bill is separated from the delivery portion. With the supply portion open to competition, customers can shop around for the best price on their energy supplies. Their electric and natural gas distribution utilities will still deliver those supplies through their wires and pipes – and respond to emergencies, should they arise – regardless of where those supplies are purchased. Purchasing your energy supplies from a company other than your electric or gas utility is purely an economic decision; it has no impact on the reliability or safety of your service. Additional information on selecting a third party energy supplier is available here: <http://www.state.nj.us/bpu/commercial/shopping.html>. See Appendix A for a list of third-party energy suppliers licensed by the Board of Public Utilities to sell within the building's service area.

### **2.3 HVAC Systems**

The systems and equipment described below serve the school building. Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

#### **3.3.1 Heating Hot Water Systems**

The 2006 addition has two Buderus Logano natural gas hot water condensing boilers for heating purposes. The boilers supply hot water to fin tube radiation and unit heaters located in the locker rooms, weight rooms and shower areas. The boilers are integrated into the Automated Logic EMS system

#### **3.3.2 Package DX Cooling & Natural Gas Heating Rooftop Units**

There are approximately 24 Nesbitt natural gas heating with DX cooling multi zone roof top units which serve all . The roof top units are divided into six master zones for control purposes and each rooftop is then divided into at least six subzones with a maximum of nine subzones. The Nesbitt units were original equipment installed in 1971 and are in very poor condition. These units supply conditioned air to all of the original school section which includes all classrooms, administration office, cafeteria and gym areas. The control system for these units is analog time clocks which must be adjusted each week once the occupancy schedule is presented to the school energy manager.

Corridors and some spaces with exterior wall exposures are heated by perimeter hot water radiators with wall mounted thermostats.



### 3.3.7 Exhaust Systems

Common exhaust plenums serve classrooms with rooftop mounted constant volume exhaust fans. Larger classrooms and spaces, including the gym and multipurpose room, boys and girls locker room have dedicated exhaust fans. Exhaust fans are used for ventilating restrooms and custodial closets throughout the building. There are several hood exhaust systems serving the kitchen, however the kitchen make-up air unit is locked off at the motor control center, at the time of this audit the facility staff did not know why the unit was locked off.

## 2.4 Control Systems

The control system for the majority of the school is the original pneumatic system. The pneumatic control system works in combination with time clocks located in several electric control rooms located in different areas of the school. The school is divided up into six master zones and each master zone can operate up to nine air handlers. The master zones are controlled by analog time clocks which are programmed manually each week by the school energy manager once the occupancy schedule is known.

The school does have a very limited Automated Logic DDC system at the present time which controls several AHUs and several hot water boilers in the 2006 addition. The DDC system is updated as HVAC equipment is replaced and then integrated into the existing system.

## 2.5 Lighting/Electrical Systems

The interior lighting has been upgraded to T-8 fixtures having 32 watt lamps. The auditorium and gym areas utilize 400 watt metal halide fixtures for lighting. There are also several small areas such as closets and utility areas with some incandescent bulbs. There is very limited use of occupancy sensors, with most classrooms and office areas using manual switching. The corridor lighting is controlled by the main breaker panel as the switches were vandalized and never replaced.

Exterior lights consist of metal halide bulbs in wall pack fixtures on daylight sensors and timers. There are also some large 2000 watt metal halide fixtures mounted to the rear of the building to illuminate a sports field. This lighting is manually controlled on and off as needed.

## 2.6 Plumbing Systems

### 3.6.1 Domestic Hot Water System

There is an 80 gallon Bradford White natural gas fired water heater located in the kitchen service area which provides hot water to the kitchen, cafeteria, teacher's cafeteria and kitchen service areas. The hot water for the rest rooms and locker room areas is supplied by a 150 gallon 96 kW electric water heater located in the women's towel room. This water heater is operated by a timer from the hours of 8 am to 8 pm daily. The domestic hot water is maintained at 140 degrees and mixed down to 105 degrees for hand washing and showering. The kitchen also has a commercial 53.7kW electric DHW booster heater for the dishwasher.

### 3.6.2 Plumbing Fixtures

The majority of the school's lavatories, water closets, and urinals and shower areas have the original high flow fixtures.

### 3.0 ENERGY CONSERVATION MEASURES

#### 3.1 ECM-1 Replace Roof Top HVAC Units

The existing Nesbitt HVAC units are currently 41 years old and well beyond the useful life for this type of equipment. The normal life span of multi zone roof top units is 15 years. The efficiency of the air conditioning compressors, combustion efficiency of the heating section and fan motors have degraded over time and have become very inefficient.

These units could be replaced with modern energy efficient units. Energy savings would be achieved with an increase in compressor efficiency and combustion efficiency.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

#### Install New High Efficiency Natural Gas HVAC Roof

##### ECM-1 Top Units

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$	\$	Years	Years	
2,990,000	112,800	0	9,412	24,700	0	24,700	(0.9)	1,950	>20	>20

Expected Life: 15 years

Lifetime Savings: 1,692,000 kWh      141,200 therms      \$ 370,500

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

#### 3.2 ECM-2 Replace 150 Gallon Electric Water Heater

The existing 150 gallon electric water heater consumes energy by maintaining the water temperature at 140 degrees at all times even when not needed. Additionally, the water heater insulation is minimal, allowing for unnecessary heat transfer; which contributes to inefficiency of the water heater. The existing water heater could be replaced with a high efficiency natural gas on demand water heater. The on demand water heater uses technology to sense the flow of water and instantaneously heat the water to the desired temperature. The energy savings from this measure is the elimination of the 150 gallon tank of water being heated to 140 degrees even without demand for hot water

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

##### ECM-2 Replace 150 Gallon Electric DHW Tank With HE Natural Gas Unit

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$	\$	Years	Years	
12,300	86,523	0	-3,093	7,200	0	7,200	7.8	300	1.7	1.7

Expected Life: 15 years

Lifetime Savings: 1,297,800 kWh      -46,400 therms      \$ 108,000

This measure is recommended.

### 3.3 ECM-3 Install Economizers On Rooftop Units

The energy measure would call for installing economizers on each rooftop unit to utilize “free cooling “when outside conditions would permit. The free cooling could be utilized when the outside air enthalpy is less than the return air enthalpy which would be calculated by an enthalpy controller located in the HVAC unit. During our site visit it was observed that the mechanical cooling was in operation when the OA temperature was in the low 40’s when the free cooling mode could have been in operation. Energy savings would be achieved by utilizing the free cooling mode rather than the operation of the mechanical cooling compressor. This ECM would be in combination with ECM 1.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-3 Install Economizers on HVAC Roof Top Units										
Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 1,900	2,817	0	0	300	\$ 0	\$ 300	1.8	\$ 0	6.3	6.3

Expected Life: 15 years

Lifetime Savings: 42,300 kWh      0 therms      \$ 4,500

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommende

### 3.4 ECM-4 Install Demand Control Ventilation For The Gym, Cafeteria and Faculty Dining Areas

Heating and ventilation AHUs serve the gym (AHU-2, 3 and 5), cafeteria (AH-6 and 7), faculty dining room (AHU-8) are assumed to provide the full occupancy design ventilation outside air flow even during times of low or no occupancy. By reducing the amount of outside air during low occupancy periods will reduce heating and cooling energy. Installing carbon dioxide sensors (CO<sub>2</sub>) will allow the quantity of ventilation air to be based on maintaining an acceptable carbon dioxide (CO<sub>2</sub>) level in the space as an indicator of indoor air quality. A limit of 1000 PPM of CO<sub>2</sub> is recommended in ASHRAE Standard 62-2010, Ventilation for Acceptable Indoor Air Quality. Sensors could be installed to measure the building air CO<sub>2</sub> concentration, and the control sequence of operation programmed into the BAS to control the position of the outdoor air dampers. During unoccupied periods, the outside air dampers should be closed.

For the analysis, estimated savings for demand control ventilation are based on reducing the total average volume of outside air by 50% based on observed space usage. The energy savings are the differences in utility usage

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

**Note: This calculation is on a per unit basis.**

**ECM-4 Install Demand Control Ventilation For the Gym, Cafeteria and Faculty Dining Room AHU's**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$	kWh	kW	Therms	\$	\$	\$		\$	Years	Years
4,000	2,160	0	4,432	5,300	0	5,300	(0.9)	0	0.8	0.8

Expected Life: 25 years  
 Lifetime Savings: 54,000 kWh      110,800 therms      \$ 132,500

This measure is recommended.

**3.5 ECM-5 Replace Roof And Upgrade Insulation**

The roof is constructed of metal roof decking, insulation, and a rubber mat system. The roof has surpassed its useful life and should be replaced. This ECM addresses replacing the roof to minimize heating and cooling energy losses.

To calculate the savings, the heat losses through the roof assembly of the facility was found using the existing roof's R-value of 13.0 and bin weather data for nearby Newark, NJ. The values were totaled to determine the existing annual energy losses.. The annual energy savings of replacing the roof is detailed in the summary table below.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

**ECM-5 Replace Roof and Upgrade Insulation**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$	kWh	kW	Therms	\$	\$	\$		\$	Years	Years
3,400,000	2,454	0	5,699	6,800	0	6,800	500.0	0	>20	>20

Expected Life: 30 years  
 Lifetime Savings: 73,600 kWh      171,000 therms      \$ 204,000

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

The payback for this measure is greater than 20 yrs. and usually would not be recommended however; the roof is originally installed in 1971 and in very poor condition. This measure is recommended.

**3.6 ECM-6 Replace Electric Dishwasher Booster Heater With a Natural Gas Unit**

The school uses a 56.7 kW DHW heater for increasing the incoming hot water from 140 degrees to 180degrees. The school uses this heater for four hours per day for 180 days per year, over a 10 month period. The school currently has natural gas available for this conversion. Energy cost savings would be achieved through the lower cost of natural gas versus electricity.

The calculation uses electrical consumption and annual electrical cost as the baseline, which was converted to natural gas for the proposed case. The difference between the two values is the energy cost savings.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

**ECM-6      Install Natural Gas Dishwasher Booster Heater**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 15,100	9,331	130	-391	7,800	\$ 0	\$ 7,800	6.7	\$ 0	1.9	1.9

Expected Life: 15 years  
 Lifetime Savings: 140,000 kWh      -5,900 therms      \$ 117,000

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

### 3.7 ECM-7 Replace Windows

The buildings existing windows are from the original construction of the building in 1971. There are approximately 70 original windows in the school. The windows are single pane, aluminum frame units, over time the window seals can deteriorate and start to leak unconditioned air in or conditioned air out causing unnecessary energy consumption. The windows could be replaced with energy efficient double pane units with a higher thermal resistance to prevent air infiltration and heat transfer through the glazing.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below;

**ECM-7      Replace Windows**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 115,200	429	0	387	500	\$ 0	\$ 500	(0.9)	\$ 0	>20	>20

Expected Life: 15 years  
 Lifetime Savings: 6,400 kWh      5,800 therms      \$ 7,500

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended.

### 3.8 ECM-8 Lighting Replacements

The building's classrooms and occupied spaces generally use linear fluorescent fixtures with T-8s. A comprehensive fixture survey was conducted of the entire building. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established (Appendix C). There is an opportunity to reduce consumption by upgrading the existing T-12 fixtures to T-8 fixtures.

Energy savings for this measure were calculated by applying the existing and proposed fixture wattages to estimated times of operation. Supporting calculations, including assumptions for lighting hours and annual energy usage for each fixture, are provided in Appendix C.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-8 Lighting Replacement / Upgrades										
Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$	kWh	kW	Therms	\$	\$	\$	\$	Years	Years	
16,395	55,998	30	0	8,400	0	8,400	3.5	0	2.0	2.0

Expected Life: 15 years

Lifetime Savings: 840,000 kWh 0 therms \$ 126,000

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended

### 3.9 ECM-9 Install Occupancy Sensors

The school lighting is controlled by manual switches and in some cases by the circuit breaker. Lights are generally turned on in the morning at 6am and shut off at night at 11pm. During occupied times, there are rooms that are not occupied; however, the lights remain on. Adding occupancy controls to the individual rooms will automatically control the lights based on occupancy. The occupancy sensor can be wall mounted near the switch or placed at the ceiling for larger room coverage. All occupancy sensors are equipped with a manual override feature. These sensors are generally not recommended for use in public toilet rooms.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below

ECM-9 Install Lighting Controls (Occupancy Sensors)										
Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$	kWh	kW	Therms	\$	\$	\$	\$	Years	Years	
50,625	122,358	0	0	13,092	0	13,100	2.3	0	3.9	3.9

Expected Life: 15 years

Lifetime Savings: 1,835,400 kWh 0 therms \$ 196,400

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended in lieu of ECM 8.

### 3.10 ECM-10 Replace Lighting and Install Occupancy Sensors

Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative. This measure is a combination of ECM-8 and ECM-9 to reflect actual expected energy and demand reduction.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below

ECM-10 Lighting Replacements with Lighting Controls (Occupancy Sensors)										
Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 67,020	163,928	30	0	19,949	0	19,900	(0.7)	0	3.4	3.4

Expected Life: 15 years

Lifetime Savings: 2,458,900 kWh      0 therms      \$ 299,200

This measure is not recommended in lieu of ECM 8.

### 3.11 System Improvement Opportunities

The following items can be implemented by the owner to provide additional energy savings:

- HV-6 which is the kitchen make up air unit was locked off at the motor control center. The school staff was unaware of why this unit was locked off.

## 4.0 PROJECT INCENTIVES

### 4.1 Incentives Overview

#### 4.1.1 New Jersey Pay For Performance Program

The school may be eligible for incentives from the New Jersey Office of Clean Energy. The most significant incentives are available from the New Jersey Pay for Performance (P4P) Program. The P4P program is designed for qualified energy conservation projects applied to facilities whose demand in any of the preceding 12 months exceeds 100 kW. This average minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations, however. Facilities that meet this criterion must also achieve a minimum performance target of 15% energy reduction by using the EPA Portfolio Manager benchmarking tool before and after implementation of the measure(s). If the participant is a municipal electric company customer, and a customer of a regulated gas New Jersey Utility, only gas measures will be eligible under the Program. Available incentives are as follows:

Incentive #1: Energy Reduction Plan – This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP).

- Incentive Amount: \$0.10/SF
- Minimum incentive: \$5,000
- Maximum Incentive: \$50,000 or 50% of School annual energy cost

The standard incentive pays \$0.10 per square foot, up to a maximum of \$50,000, not to exceed 50% of school annual energy cost, paid after approval of application. For building audits funded by the New Jersey Board of Public Utilities, which receive an initial 75% incentive toward performance of the energy audit, facilities are only eligible for an additional \$0.05 per square foot, up to a maximum of \$25,000, rather than the standard incentive noted above.

Incentive #2: Installation of Recommended Measures – This incentive is based on projected energy savings as determined in Incentive #1 (Minimum 15% savings must be achieved), and is paid upon successful installation of recommended measures.

#### Electric

- Base incentive based on 15% savings: \$0.09/ per projected kWh saved.
- For each % over 15% add: \$0.005 per projected kWh saved.
- Maximum incentive: \$0.11/ kWh per projected kWh saved

#### Gas

- Base incentive based on 15% savings: \$0.90/ per projected Therm saved.
- For each % over 15% add: \$0.05 per projected Therm saved.
- Maximum incentive: \$1.25 per projected Therm saved

Incentive cap: 25% of total project cost

Incentive #3: Post-Construction Benchmarking Report – This incentive is paid after acceptance of a report proving energy savings over one year utilizing the Environmental Protection Agency (EPA) Portfolio Manager benchmarking tool.

#### Electric

- Base incentive based on 15% savings: \$0.09/ per projected kWh saved.
- For each % over 15% add: \$0.005 per projected kWh saved.
- Maximum incentive: \$0.11/ kWh per projected kWh saved



## Gas

- Base incentive based on 15% savings: \$0.90/ per projected Therm saved.
- For each % over 15% add: \$0.05 per projected Therm saved.
- Maximum incentive: \$1.25 per projected Therm saved

Incentives #2 and #3 can be combined to yield additive savings.

The table below shows the summary of incentives available through the Pay for Performance program for this building. The total ECM savings did not meet the minimum 15% annual savings required to obtain incentives # 2 and #3, hence they are zero. Detailed calculations can be found in Appendix D.

	Incentives \$		
	Elec	Gas	Total
<b>Incentive #1</b>	\$0	\$0	\$21,874
<b>Incentive #2</b>	\$0	\$0	\$0
<b>Incentive #3</b>	\$0	\$0	\$0
<b>Total All Incentives</b>	<b>\$0</b>	<b>\$0</b>	<b>\$21,874</b>

The current ECM's does not meet the minimum savings of 15% and therefore the building will not be eligible for incentives #2 and #3. See Appendix D for additional details.

### 4.1.2 New Jersey Smart Start Program

For this program, specific incentives for energy conservation measures are calculated on an individual basis utilizing the 2011 New Jersey Smart Start incentive program. This program provides incentives dependent upon mechanical and electrical equipment. If applicable, incentives from this program are reflected in the ECM summaries and attached appendices.

If the complex qualifies and enters into the New Jersey Pay for Performance Program, all energy savings will be included in the total site energy reduction, and savings will be applied towards the Pay for Performance incentive. A project is not applicable for both New Jersey incentive programs.

### 4.1.3 Direct Install Program

The Direct Install Program targets small and medium sized facilities where the peak electrical demand does not exceed 150 kW in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric or natural gas utility companies. On a case-by-case basis, the program manager may accept a project for a customer that is within 10% of the 150 kW peak demand threshold.

Direct Install is funded through New Jersey's Clean Energy Program and is designed to provide capital for building energy upgrade projects to fast track implementation. The program will pay up to 70% of the costs for lighting, HVAC, motors, natural gas, refrigeration, and other equipment upgrades with higher efficiency alternatives. If a building is eligible for this funding, the Direct Install Program can significantly reduce the implementation cost of energy conservation projects.

The program pays 70% of each project cost up to \$75,000 per electrical utility account; total funding for each year is capped at \$250,000 per customer. Installations must be completed by a Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website at

<http://www.njcleanenergy.com>. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this document.

Due to the peak demand observed from the utility bills of 333 kW, this building is not eligible for the Direct Install program

#### 4.1.4 Energy Savings Improvement Plans (ESIP)

The Energy Savings Improvement Program (ESIP) allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the ESIP provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

ESIP allows local units to use “energy savings obligations” to pay for the capital costs of energy improvements to their facilities. This can be done over a maximum term of 15 years. Energy savings obligations are not considered “new general obligation debt” of a local unit and do not count against debt limits or require voter approval. They may be issued as refunding bonds or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach. The “Local Finance Notice” outlines how local governments can develop and implement an ESIP for their facilities (see Appendix E). The ESIP can be prepared internally if the entity has qualified staff. If not, the ESIP must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs

## 5.0 ALTERNATIVE ENERGY SCREENING EVALUATION

### 5.1 Solar

#### 5.1.1 Photovoltaic Rooftop Solar Power Generation

The school was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The building's roof has sufficient room to install a solar cell array. It is recommended to install a permanent PV array at this time.

The PVWATTS solar power generation model was utilized to calculate PV power generation. The closest city available in the model is Newark, New Jersey and a fixed tilt array type was utilized to calculate energy production. The PVWATT solar power generation model is provided in Appendix F.

Federal tax credits are also available for renewable energy projects up to 30% of installation cost. Since the school is a non-profit organization, federal taxes are paid and this project is eligible for this incentive.

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The average SREC value per credit is estimated to be about \$65/ SREC per year based on current market data, and this number was utilized in the cash flow for this report.

The existing load justifies the use of a 90 kW PV solar array. The system costs for PV installations were derived from contractor budgetary pricing in the state of New Jersey for estimates of total cost of system installation. It should be noted that the cost of installation is currently about \$4.00 per watt or \$4,000 per kW of installed system. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

The implementation cost and savings related to this ECM are presented in Appendix F and summarized as follows:

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated	Total	Federal Tax Credit	New Jersey Renewable	Payback	Payback
					Maintenance	Savings		** SREC	(without incentive)	(with incentive)
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years	
360,000.00	90.00	112,407.00	-	13,938.00	-	13,938.00	-	7,306.00	25.83	16.95

\*\* Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= 65.00 /1000kwh

No federal tax credit currently available.

\*\* Solar Renewable Energy Certificate Program (SREC) for 2012 is \$65/1000kwh

This measure is not recommended due to the long payback time. It is suggested, however, that the market for SREC credits is closely monitored. This market is fluctuating, and if the value per SREC is increased the measure could potentially show for a shorter payback in the near future.

### 5.1.2 Solar Thermal Hot Water Plant

Active solar thermal systems use solar collectors to gather the sun's energy to heat water, another fluid, or air. An absorber in the collector converts the sun's energy into heat. The heat is then transferred by circulating water, antifreeze, or sometimes air to another location for immediate use or storage for later utilization. Applications for active solar thermal energy include providing hot water, heating swimming pools, space heating, and preheating air in residential and commercial buildings.

A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually placed on the roof of the building, oriented south, and tilted around the site's latitude, to maximize the amount of radiation collected on a yearly basis.

Several options exist for using active solar thermal systems for space heating. The most common method involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system). The most practical system would transfer the heat from the panels to thermal storage tanks and transfer solar produced thermal energy to use for domestic hot water production. DHW is presently produced by gas-fired water heaters and, therefore, this measure would offer natural gas utility savings.

## 6.0 EPA PORTFOLIO MANAGER

The EPA Portfolio Manager benchmarking tool was used to assess the building's energy performance. Portfolio Manager provides a Site and Source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft<sup>2</sup>/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive an Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed ECMs, the Energy Star rating will increase.

The Site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a school in the form of primary energy, which is raw fuel burned to create heat or electricity (such as natural gas or oil), or as secondary energy, which is the product created from a raw fuel (such as electricity or district steam). Site EUI is a measure of a building's annual energy utilization per square foot. Site EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types.

$$\text{Site Energy Intensity} = \frac{(\text{Electric Usage in kBtu} + \text{Natural Gas in kBtu})}{\text{Building Square Footage}}$$

To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, the Portfolio Manager uses the convention of Source EUIs. The source energy also accounts for all losses incurred in production, storage, transmission, and delivery of energy to the site; which provides an equivalent measure for various types of buildings with different energy sources.

$$\text{Source Energy Intensity} = \frac{(\text{Electric Usage in kBtu} \times \text{Site/Source Ratio} + \text{Natural Gas in kBtu} \times \text{Site/Source Ratio})}{\text{Building Square Footage}}$$

The EPA Score, Site EUI, and Source EUI for Roxbury High School are as follows:

Energy Intensity	Roxbury High School	National Average
EPA Score	33	50
Site (kBtu/sf/year)	64	79
Source (kBtu/sf/year)	170	199

To be eligible to receive a national Energy Star score, a building must meet all three of these requirements:

1. Building designation – More than 50 percent of the building's gross floor area must be one of the spaces eligible to receive an Energy Star score. The remainder of the building must abide by specific rules for each space type.
2. Operating characteristics – To ensure the building is consistent with the peer group used for comparison, each space in your building must meet certain minimum and maximum thresholds for key operating characteristics.
3. Energy data – At least 12 full consecutive calendar months for all active meters, accounting for all energy use (regardless of fuel type) in the building.

In addition, a Licensed Professional (meaning a Professional Engineer or Registered Architect) must verify that all energy use is accounted for accurately, that the building characteristics have been properly reported

(including the square footage of the building), that the building is fully functional in accordance with industry standards, and that each of the indoor environment criteria has been met.

The Roxbury High School is considered a lower than average energy consumer by the EPA Portfolio Manager which gives it a lower than average EPA score. For the School to qualify for the Energy Star label the EPA score is required to be above 75. There are several energy conservation measures recommended in this report, that if implemented will further reduce the energy use intensity and increase the EPA score of the High School. This building does not appear to be eligible for Energy Star certification at this time.

The Portfolio Manager account can be accessed by entering the username and password shown below at the login screen of the Portfolio Manager website (<https://www.energystar.gov/istar/pmpam/>).

A full EPA Energy Star Portfolio Manager Report is located in Appendix G.

The user name (“*roxburyboe*”) and password (“*energystar*”) for the building’s EPA Portfolio Manager Account has been provided to the Roxbury of Education.

## 7.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Roxbury High School identified potential ECMs for lighting and control replacement, HVAC replacement, DHW replacement, demand controlled ventilation. Potential annual savings of \$42,995 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

### Replace 150 Gallon Electric DHW Tank With HE Natural Gas

#### ECM-2 Unit

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 12,300	86,523	0.0	-3,090	\$ 7,200	\$ 0	\$ 7,200	7.8	\$ 300	1.7 Years	1.7 Years

### Install Economizers on HVAC Roof Top

#### ECM-3 Units

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 1,900	2,817	0.0	0	\$ 300	\$ 0	\$ 300	1.8	\$ 250	6.3 Years	5.5 Years

### Install Demand Control Ventilation For the Gym, Cafeteria and Faculty Dining Room AHU's

#### ECM-4

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 4,000	2,160	0	4,432	\$ 5,300	\$ 0	\$ 5,300	(0.9)	\$ 0	0.8 Years	0.8 Years

Expected Life: 25 years

Lifetime Savings: 54,000 kWh      110,800 therms      \$ 132,500

**Install Natural Gas Dishwasher Booster  
Heater**

**ECM-6**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	RO I	Incentive *	Payback (without incentive ) Years	Payback (with incentive ) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
15,100	9,331	130	-391	7,800	0	7,800	6.7	0	1.9	1.9

Expected Life: 15 years

Lifetime Savings: 140,000 kWh      -5,900 therms      \$ 117,000

**Lighting Replacement /  
Upgrades**

**ECM-8**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	RO I	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
16,395	55,998	30	0	8,400	0	8,400	3.5	0	2.0	2.0

Expected Life: 15 years

Lifetime Savings: 840,000 kWh      0 therms      \$ 126,000



## **APPENDIX A**

### **Utility Usage Analysis**

Roxbury Township BOE  
 42 Hillside Ave.  
 Succasunna, NJ 07876

Electric Service  
 Delivery - JCP&L  
 Supplier - Hess

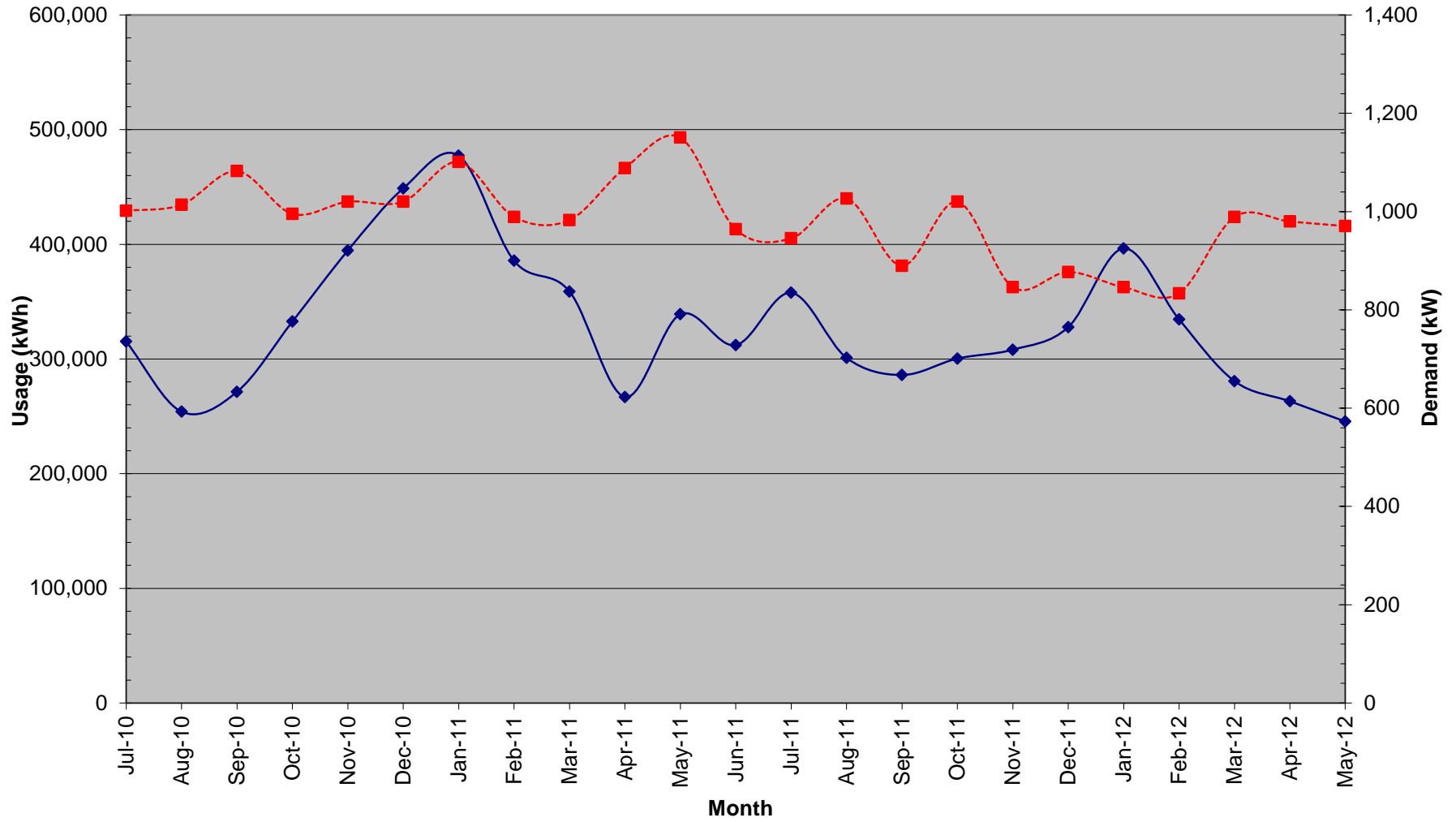
For Service at: Roxbury High School  
 Account No.: 100000-1566-36 (Shared between HS and MS)  
 Meter No.: 21050205

Month	Consumption (kWh)	Demand (kW)	Charges			Unit Costs		
			Total (\$)	Delivery (\$)	Supply (\$)	Blended Rate (\$/kWh)	Consumption (\$/kWh)	Demand (\$/kW)
July-10	315,235	1,001.52	\$ 41,608.84			\$ 0.132	\$ 0.132	\$ -
August-10	254,061	1,013.98	\$ 35,030.98			\$ 0.138	\$ 0.138	\$ -
September-10	271,344	1,082.45	\$ 36,843.08			\$ 0.136	\$ 0.136	\$ -
October-10	332,654	995.33	\$ 42,944.82			\$ 0.129	\$ 0.129	\$ -
November-10	394,613	1,020.24	\$ 49,711.42			\$ 0.126	\$ 0.126	\$ -
December-10	448,813	1,020.24	\$ 55,622.46			\$ 0.124	\$ 0.124	\$ -
January-11	477,377	1,101.10	\$ 59,245.63			\$ 0.124	\$ 0.124	\$ -
February-11	385,682	989.14	\$ 46,910.69			\$ 0.122	\$ 0.122	\$ -
March-11	358,902	982.87	\$ 42,808.20			\$ 0.119	\$ 0.119	\$ -
April-11	266,844	1,088.64	\$ 34,229.66			\$ 0.128	\$ 0.128	\$ -
May-11	339,024	1,150.56	\$ 54,274.02			\$ 0.160	\$ 0.160	\$ -
June-11	312,088	964.08	\$ 37,424.42			\$ 0.120	\$ 0.120	\$ -
July-11	357,793	945.36	\$ 52,297.46			\$ 0.146	\$ 0.146	\$ -
August-11	300,990	1,026.72	\$ 38,308.41			\$ 0.127	\$ 0.127	\$ -
September-11	286,050	889.56	\$ 36,210.19			\$ 0.127	\$ 0.127	\$ -
October-11	300,410	1,020.24	\$ 36,906.12			\$ 0.123	\$ 0.123	\$ -
November-11	308,135	846.00	\$ 37,340.83			\$ 0.121	\$ 0.121	\$ -
December-11	327,775	877.10	\$ 39,496.71			\$ 0.120	\$ 0.120	\$ -
January-12	396,466	846.00	\$ 46,277.42			\$ 0.117	\$ 0.117	\$ -
February-12	334,590	833.62	\$ 39,174.22			\$ 0.117	\$ 0.117	\$ -
March-12	280,703	989.14	\$ 34,077.00			\$ 0.121	\$ 0.121	\$ -
April-12	263,098	979.78	\$ 32,301.39			\$ 0.123	\$ 0.123	\$ -
May-12	245,493	970.42	\$ 30,525.78			\$ 0.124	\$ 0.124	\$ -
<b>Total (12-months)</b>	<b>3,713,590</b>	<b>1,026.72</b>	<b>\$460,339.95</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$ 0.124</b>	<b>\$ 0.124</b>	<b>\$ -</b>

(\*All values estimated based on sq. ft. percentage between HS and MS)

(\*Blue text indicates estimation due to no available bill)

### Electric Usage - Roxbury High School



Roxbury Township BOE  
 42 Hillside Ave.  
 Succasunna, NJ 07876

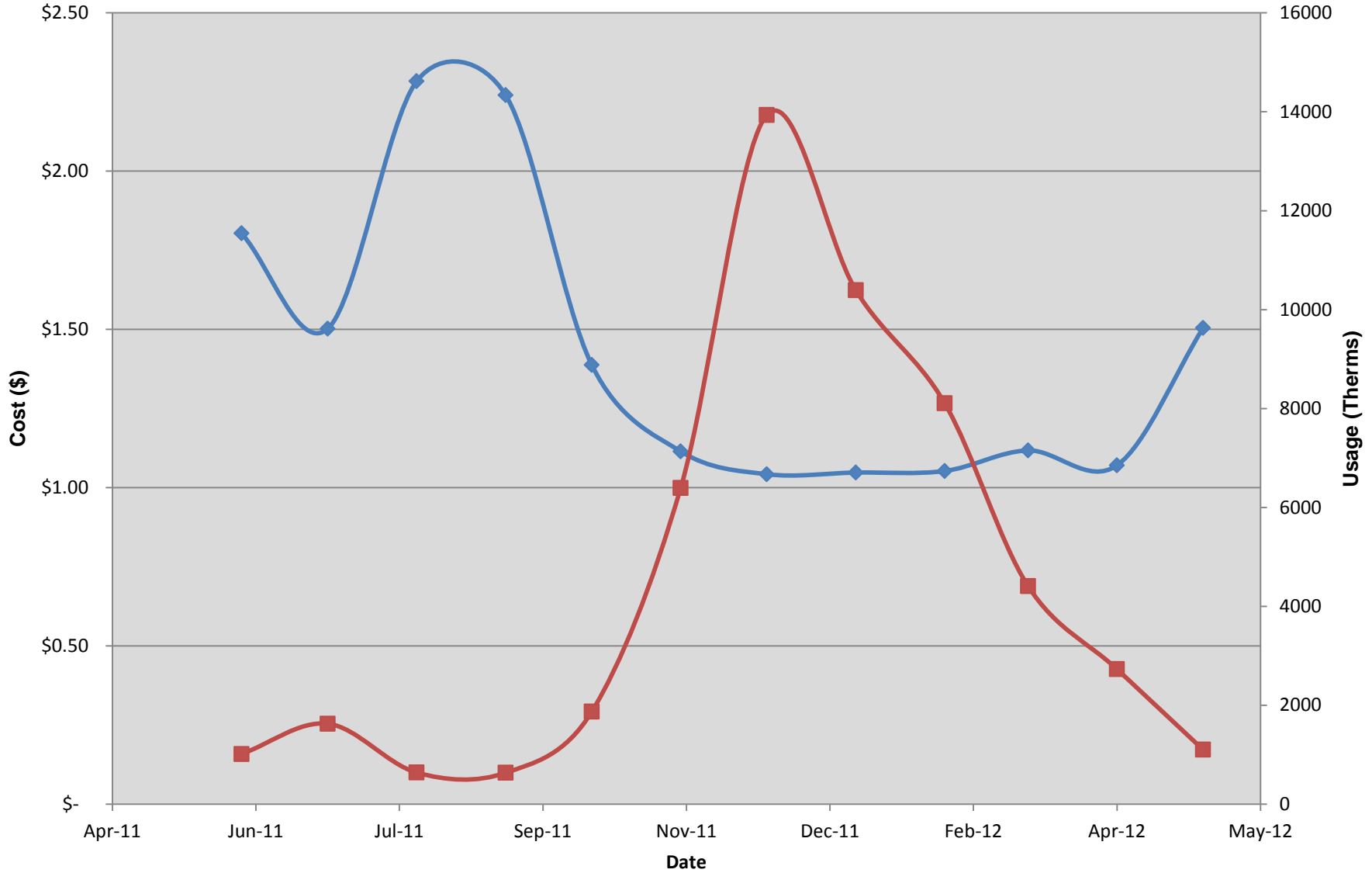
Gas Service  
 Delivery - NJNG  
 Supplier -

For Service at: Roxbury High School  
 Account No.: 03-1111-4965-17  
 Meter No.: 00810551

Month	Total (\$)	Delivery (\$)	Supplier (\$)	Total Therms	\$/Therm
Sep-10	\$ 1,747.36			1016.4	\$ 1.72
Oct-10	\$ 4,589.26			3709.6	\$ 1.24
Nov-10	\$ 9,372.57			8445.6	\$ 1.11
Dec-10	\$ 16,995.67			15607.3	\$ 1.09
Jan-11	\$ 15,156.18			14063.8	\$ 1.08
Feb-11	\$ 11,710.31			10401.8	\$ 1.13
Mar-11	\$ 9,637.01			8550.2	\$ 1.13
Apr-11	\$ 5,712.91			4757.4	\$ 1.20
May-11	\$ 3,476.41			2658	\$ 1.31
Jun-11	\$ 1,831.36			1015.5	\$ 1.80
Jul-11	\$ 2,444.73			1627.7	\$ 1.50
Aug-11	\$ 1,461.19			639.8	\$ 2.28
Sep-11	\$ 1,422.94			635.2	\$ 2.24
Oct-11	\$ 2,595.46			1870	\$ 1.39
Nov-11	\$ 7,129.54			6395.6	\$ 1.11
Dec-11	\$ 14,529.83			13936.8	\$ 1.04
Jan-12	\$ 10,888.41			10392	\$ 1.05
Feb-12	\$ 8,532.21			8105.2	\$ 1.05
Mar-12	\$ 4,929.85			4410.7	\$ 1.12
Apr-12	\$ 2,924.13			2731.1	\$ 1.07
May-12	\$ 1,659.56			1103	\$ 1.50
<b>Total (12-months)</b>	<b>\$ 60,349.21</b>	<b>\$ -</b>	<b>\$ -</b>	<b>52862.60</b>	<b>\$ 1.14</b>

# Natural Gas Usage - Roxbury High School (12 Months)

◆ \$/Therm    ■ Total Therms



**APPENDIX B**

**Equipment Inventory**

New Jersey BPU Energy Audit Program

CHA #24454

Roxbury BOE

Roxbury High School

Original Construction Date:

1971

Renovation/Addition Date:

2006

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size/Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
RTU-1	1	Trane	RA4004A		AC Condenser	5 HP CD Fan	Roof	School	1971	-26	
RTU-2	1	Trane	RA4004A		AC Condenser	1/3 HP	Roof	Faculty	1971	-26	
RTU-3	1	Lennox	LGA240H2BH2G		NG/DX	470/376 MBH / (1) 7.5 HP & (5) 1/3 HP	Roof	School	1995	-2	
RTU-4	1	Lennox	LGA240H2BH2G		NG/DX	470/376 MBH / (1) 7.5 HP & (5) 1/3 HP	Roof	School	1995	-2	
RTU-5	1	Nesbitt	RMA100NG4032H7CB04 A470100	9608-64380	AC Unit		Roof	School	1971	-26	
RTU-6	1	4 Seasons	6MJF21-0232-TN3.5-07SE	BB202-0712-01	AC UNIT	500/375 MBH / (1) 5 HP, (1) .75 HP & (3) 1.5 HP	Roof	School	2012	15	
RTU-7	1	Nesbitt	RMA100NC5C32H5BB07 A170100	96086438	NG/DX	500/375 MBH / (1) 10 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-8	1	Nesbitt	RMA100NG5032H5BB08 A170100AC50	960804382	NG/DX	(1) 2 HP, (1) .5 HP & (3) 1 HP	Roof	School	1971	-26	
RTU-9	1	Trane	RA4004A		AC Condenser	5 HP CD Fan	Roof	School	1971	-21	
RTU-10	1	Nesbitt	RMA100NG5C32H5BB08 A170100	9608-64383	NG/DX	500/375 MBH / (1) 5 HP, (1) .75 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-11	1	Nesbitt	RMA100NG532H5BB0A1 70100A050	9608-64384	NG/DX	500/375 MBH / (1) 5 HP, (1) .75 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-12	1	Nesbitt	RMA100NG532H5BB0A1 70100A050		NG/DX	500/375 MBH / (1) 7.5 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-13	1	Trane	RA-6004A		AC Condenser	7.5 HP	Roof	School	1971	-21	
RTU-14	1	Nesbitt	RMA100NG532H5BB0A1 70100A050		NG/DX	500/375 MBH / (1) 7.5 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-15	1	Nesbitt	RMA100NG5C32H5CB09 A170100	9608-64383	NG/DX	500/375 MBH / (1) 7.5 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-16	1	Nesbitt	RMA100NG532H5BB0A1 70100A050		NG/DX	500/375 MBH / (1) 5 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-17	1	Trane	RA4004A		AC Condenser	5 HP CD Fan	Roof	School	1971	-21	
RTU-18	1	Nesbitt	RMA100NG4C32H5BB07 A170100A050	9608-64388	NG/DX	400/300 MBH / (1) 5 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-19	1	Nesbitt	RMA100NG5C3205BB07 A170100	9608-64389	NG/DX	400/300 MBH / (1) 5 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-20	1	4 Seasons	6MJI21-0292-TN5.0-07SE	BB202-0712-02	NG/DX	500/375 MBH / (1) 5 HP, (1) .75 HP & (3) 1.5 HP	Roof	School	2012	15	
RTU-21	1	Nesbitt	RMA100NG532H5BB0A1 70100A050		NG/DX	500/375 MBH / (1) 5 HP, (1) .75 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-22	1	Nesbitt	_A_035C1702AB02A2007 080		NG/DX	400/300 MBH / (1) 7.5 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-23	1	Nesbitt	RMA100NG532H5BB0A1 70100A050		NG/DX	500/375 MBH / (1) 5 HP, (1) .75 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-24	1	Nesbitt	RMA100NG532H0CB04A 370100A050	9608-64390	NG/DX	500/375 MBH / (1) 5 HP, (1) .75 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-25	1	Nesbitt			NG/DX	850/655 MBH / (1) 5 HP, (1) .5 HP & (3) 1 HP	Roof	School	1971	-26	

New Jersey BPU Energy Audit Program

CHA #24454

Roxbury BOE

Roxbury High School

Original Construction Date:

1971

Renovation/Addition Date:

2006

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size/Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
RTU-26	1	Nesbitt	RMA100NG532H5BB0A1 70100A050		NG/DX	500/375 MBH / (1) 7.5 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-27	1	Nesbitt	RMA100NG5C32H7CB04 A470100A050	9608-64379	NG/DX	500/375 MBH / (1) 5 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-28	1	Nesbitt	RMA100NG532H5BB0A1 70100A051	9608-64387	NG/DX	500/375 MBH / (1) 5 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-29	1	Nesbitt	RMA100NG532H5BB0A1 70100A050	9608-64385	NG/DX	500/375 MBH / (1) 5 HP, (1) .75 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-30	1	Nesbitt	RMA100NG532H5BB0A1 70100A051		NG/DX	500/375 MBH / (1) 5 HP, (1) .75 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-31	1	Nesbitt	RMA100NG532H5BB0A1 70100A051		NG/DX	500/375 MBH / (1) 5 HP, (1) 1 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-32	1	Nesbitt	RMA100NG532H5BB0A1 70100A051		NG/DX	500/375 MBH / (1) 5 HP, (1) .75 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-33	1	Lennox	LGC156H2BS1G		NG/DX	260/208 MBH / (1) 5 HP, (1) 1/3 HP	Roof	School	1971	-26	
RTU-34	1	Nesbitt	RMA100NG532H5BB0A1 70100A051		NG/DX	500/375 MBH / (1) 5 HP, (1) .75 HP & (3) 1.5 HP	Roof	School	1971	-26	
RTU-35	1	Lennox	LGA240H2BH2G		NG/DX	470/376 MBH / (1) 7.5 HP & (5) 1/3 HP	Roof	School	1971	-26	
RTU-36	1	Trane			NG/DX		Roof	School	1971	-26	
RTU-37	1	Trane	SAH 304-B		NG/DX		Roof	School	1971	-26	
B-1	1	Buderus	G234		Boiler / NG	Input: 266 MBH / Output: 218 MBH	Weight Room MER	Gym	1971	-16	
B-2	1	Buderus	G234		Boiler / NG	Input: 266 MBH / Output: 218 MBH	Weight Room MER	Gym	1971	-16	
PP	2				HW Pump	2 HP	Weight Room MER	Gym	1971	-31	
AHU-1	1				HW Preheat	125 kW 10 HP Fan @ 89.5 Eff.	South Gym MER	Gym	1971	-26	
AHU-2	1				HW Preheat	50 kW 1 HP Fan	South Gym MER	Gym	1971	-26	
AHU-3	1				HW Preheat	125 kW 10 HP Fan @ 89.5 Eff.	South Gym MER	Gym	1971	-26	
AHU-4	1				HW Preheat	50 kW 1 HP Fan	South Gym MER	Gym	1971	-26	
DHW-1	1	PK Electric			DHW / Electric	96 kW / 150 Gal.	Women's Towel Room	Gym	1971	-16	
DHW-2	1	Bradford White			DHW / NG	505 MBH / 80 Gal.	Kitchen	Kitchen	1971	-16	
AHU-5	1	Nesbitt			Electric Heat	5 HP Fan	Kitchen	Kitchen	1971	-26	
AHU-6	1	Trane	Climate Changer		HW Preheat / w/DX Reheat	5 HP Fan @ 87.5 Eff.	Kitchen	Kitchen	1971	-26	
Dishwasher	1	Hobart			Dishwasher / Electric	53.7 kW	Kitchen	Kitchen	1971	-26	
B-3	1	Buderus	G334		Boiler / NG	Input: 378 MBH / Output: 314 MBH	Band MER	Band Room	1971	-16	
B-4	1	Buderus	G334		Boiler / NG	Input: 378 MBH / Output: 314 MBH	Band MER	Band Room	1971	-21	
PP	2				In-Line Pump	2 HP	Band MER	Band Room	1971	10	



New Jersey BPU Energy Audit Program

CHA #24454

Roxbury BOE

Roxbury High School

Original Construction Date: 1971

Renovation/Addtion Date: 2006

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size/Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.

Energy Audit of Roxbury High School  
 CHA Project No.24454  
 Existing Lighting

Cost of Electricity: **\$0.107** \$/kWh  
**\$6.74** \$/kW

EXISTING CONDITIONS											
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Retrofit Control	Annual kWh
15	Main Office/Guidance Common	Offices	45	S 32 C F 2 (ELE)	F42LL	60	2.70	SW	2400	C-OCC	6,480
15	Main Office/Guidance Common	Offices	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728
4	Main Office/Guidance Common	Offices	10	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.72	SW	2400	C-OCC	1,728
15	Main Office N.W. Storage Small	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60
15	Main Office N.W. Storage Large	Storage Areas	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	1000	SW	180
15	Main Office Copy Room	Offices	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2400	C-OCC	432
15	Principal's Office	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Assistant Principal's Office 1	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Assistant Principal's Office 2	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
245	Conference Room	Offices	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	C-OCC	1,056
15	School Resource	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Central Main Office Closet 1	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120
15	Central Main Office Closet 2	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120
15	Main Office Men's Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
198	Main Office Men's Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62
15	Main Office Women's Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
198	Main Office Women's Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62
15	Counselor	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Counselor A	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Guidance Director Office	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Guidance Storage Small	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120
15	Guidance Storage Large	Storage Areas	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	1000	SW	360
15	Counselor B	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Counselor C	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Counselor E	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Counselor F	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Counselor G	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Counselor H	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Guidance Meeting Room	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Guidance Conference Room	Offices	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	Assistant Principal's Office 3	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Athletic Office	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
146	Gym	Classrooms	29	High Bay MH 400	MH400/1	458	13.28	SW	2400	C-OCC	31,877
254	Gym	Classrooms	6	T 32 R F 4 (ELE)	F44LL	118	0.71	SW	2400	C-OCC	1,699
15	Gym	Classrooms	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2400	C-OCC	432
15	Gym	Classrooms	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2400	C-OCC	432
15	N. Gym Closet	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60
15	S. Gym Closet	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60
15	Aux Gym Small	Classrooms	32	S 32 C F 2 (ELE)	F42LL	60	1.92	SW	2400	C-OCC	4,608
20	Aux Gym Small Storage	Storage Areas	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	1000	SW	128
15	Aux Gym Large	Classrooms	40	S 32 C F 2 (ELE)	F42LL	60	2.40	SW	2400	C-OCC	5,760
20	Aux Gym Large Storage	Storage Areas	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	1000	SW	128
15	Gym Area Boy's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480
15	Gym Area Girl's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480
15	Boy's Locker Room	Locker	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2800	C-OCC	672
15	Boy's Locker Room	Locker	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2800	C-OCC	1,008
20	Boy's Locker Room	Locker	27	S 32 C F 1 (ELE)	F41LL	32	0.86	SW	2800	C-OCC	2,419
15	Boy's Locker Room	Locker	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	2800	C-OCC	1,680
108	Boy's Locker Room	Locker	12	I 65	I65/1	65	0.78	SW	2800	C-OCC	2,184
245	Boy's Locker Room	Locker	12	T 32 R F 3 (ELE)	F43LE	110	1.32	SW	2800	C-OCC	3,696
20	Boy's Locker Room	Locker	27	S 32 C F 1 (ELE)	F41LL	32	0.86	SW	2800	C-OCC	2,419
20	Boy's Locker Room	Locker	8	S 32 C F 1 (ELE)	F41LL	32	0.26	SW	2800	C-OCC	717
15	Boy's Locker Room	Locker	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2800	C-OCC	504
245	Boy's Locker Room	Locker	22	T 32 R F 3 (ELE)	F43LE	110	2.42	SW	2800	C-OCC	6,776
20	Boy's Locker Room	Locker	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2800	C-OCC	538

Energy Audit of Roxbury High School  
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Cost of Electricity: **\$0.107** \$/kWh  
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EXISTING CONDITIONS												
Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Retrofit Control	Annual kWh		
15	Boy's Locker Room	Locker	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2800	C-OCC	336	
15	Boy's Locker Room Office	Offices	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864	
15	Boy's Locker Room Office	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120	
15	Boy's Locker Room Office	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
254	Training Room	Storage Areas	7	T 32 R F 4 (ELE)	F44LL	118	0.83	SW	1000	SW	826	
15	Training Room	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120	
245	Training Room A	Storage Areas	12	T 32 R F 3 (ELE)	F43LE	110	1.32	SW	1000	SW	1,320	
20	Girl's Locker Room	Locker	27	S 32 C F 1 (ELE)	F41LL	32	0.86	SW	2800	C-OCC	2,419	
15	Girl's Locker Room	Locker	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	2800	C-OCC	1,680	
108	Girl's Locker Room	Locker	12	I 65	I65/1	65	0.78	SW	2800	C-OCC	2,184	
20	Girl's Locker Room	Locker	27	S 32 C F 1 (ELE)	F41LL	32	0.86	SW	2800	C-OCC	2,419	
15	Girl's Locker Room	Locker	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2800	C-OCC	672	
15	Girl's Locker Room	Locker	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2800	C-OCC	672	
245	Girl's Locker Room	Locker	12	T 32 R F 3 (ELE)	F43LE	110	1.32	SW	2800	C-OCC	3,696	
15	Girl's Locker Room Office	Offices	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864	
15	Girl's Locker Room Office	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120	
15	Girl's Locker Room Office	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
20	Gym Area Custodian Closet	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	SW	64	
129	Gym Area Custodian Closet	Storage Areas	1	SP 75 I	I75/1	75	0.08	SW	1000	SW	75	
254	Weight Room	Classrooms	16	T 32 R F 4 (ELE)	F44LL	118	1.89	SW	2400	C-OCC	4,531	
15	Weight Room Exitway	Hallways	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2280	SW	274	
15	Weight Room Electrical	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120	
213	Weight Room Office	Offices	2	T 32 R F 3 (ELE) (TWO SWITCH)	F43ILL/2	90	0.18	SW	2400	C-OCC	432	
15	S.E. Gym Area Boy's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480	
15	S.E. Gym Area Girl's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480	
79	Auditorium	Auditorium	46	SP I 100	I100/1	100	4.60	SW	1000	C-OCC	4,600	
79	Auditorium	Auditorium	80	SP I 100	I100/1	100	8.00	SW	1000	C-OCC	8,000	
8	Auditorium	Auditorium	18	MH 175	MH175/1	215	3.87	SW	1000	C-OCC	3,870	
1	Auditorium	Auditorium	12	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.37	SW	1000	C-OCC	372	
108	Auditorium	Auditorium	3	I 65	I65/1	65	0.20	SW	1000	C-OCC	195	
108	Auditorium	Auditorium	3	I 65	I65/1	65	0.20	SW	1000	C-OCC	195	
108	Auditorium	Auditorium	1	I 65	I65/1	65	0.07	SW	1000	C-OCC	65	
15	Stage	Auditorium	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	1000	C-OCC	720	
20	Stage	Auditorium	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	1000	C-OCC	128	
8	Stage	Auditorium	4	MH 175	MH175/1	215	0.86	SW	1000	C-OCC	860	
15	Stage Storage	Storage Areas	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	1000	SW	360	
15	H Hall Boy's Bathroom	Bath Room	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	2000	SW	600	
15	H Hall Girl's Bathroom	Bath Room	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	2000	SW	600	
20	H171	Classrooms	23	S 32 C F 1 (ELE)	F41LL	32	0.74	SW	2400	C-OCC	1,766	
20	H171	Classrooms	23	S 32 C F 1 (ELE)	F41LL	32	0.74	SW	2400	C-OCC	1,766	
15	H171A	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
15	H171B	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
15	H171C	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
15	H171D	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288	
15	H171E	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288	
20	H173	Classrooms	20	S 32 C F 1 (ELE)	F41LL	32	0.64	SW	2400	C-OCC	1,536	
20	H173	Classrooms	20	S 32 C F 1 (ELE)	F41LL	32	0.64	SW	2400	C-OCC	1,536	
20	H173	Classrooms	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	C-OCC	307	
15	H173A	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120	
20	H174	Classrooms	28	S 32 C F 1 (ELE)	F41LL	32	0.90	SW	2400	C-OCC	2,150	
20	H174	Classrooms	28	S 32 C F 1 (ELE)	F41LL	32	0.90	SW	2400	C-OCC	2,150	
15	H174A	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288	
15	H174B	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120	
20	H175	Classrooms	28	S 32 C F 1 (ELE)	F41LL	32	0.90	SW	2400	C-OCC	2,150	
20	H175	Classrooms	28	S 32 C F 1 (ELE)	F41LL	32	0.90	SW	2400	C-OCC	2,150	



Energy Audit of Roxbury High School  
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Cost of Electricity: **\$0.107** \$/kWh  
**\$6.74** \$/kW

EXISTING CONDITIONS											
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Retrofit Control	Annual kWh
15	H175A	Offices	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	C-OCC	144
15	H175B	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60
15	H176	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728
15	K181	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728
15	K181	Classrooms	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	2400	C-OCC	1,152
15	K181A	Storage Areas	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	SW	240
15	K181B	Storage Areas	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	SW	240
15	K182	Classrooms	17	S 32 C F 2 (ELE)	F42LL	60	1.02	SW	2400	C-OCC	2,448
15	K182	Classrooms	16	S 32 C F 2 (ELE)	F42LL	60	0.96	SW	2400	C-OCC	2,304
254	K182A	Storage Areas	1	T 32 R F 4 (ELE)	F44LL	118	0.12	SW	1000	SW	118
254	K182B	Storage Areas	2	T 32 R F 4 (ELE)	F44LL	118	0.24	SW	1000	SW	236
254	K182C	Storage Areas	1	T 32 R F 4 (ELE)	F44LL	118	0.12	SW	1000	SW	118
15	K182D	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300
20	K182E	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
15	K182F	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120
15	K182G	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120
15	I100	Classrooms	40	S 32 C F 2 (ELE)	F42LL	60	2.40	SW	2400	C-OCC	5,760
15	I101	Classrooms	40	S 32 C F 2 (ELE)	F42LL	60	2.40	SW	2400	C-OCC	5,760
15	Cafeteria	Cafeteria	39	S 32 C F 2 (ELE)	F42LL	60	2.34	SW	1600	C-OCC	3,744
15	Cafeteria	Cafeteria	37	S 32 C F 2 (ELE)	F42LL	60	2.22	SW	1600	C-OCC	3,552
108	Cafeteria	Cafeteria	48	I 65	I65/1	65	3.12	SW	1600	C-OCC	4,992
5	Teacher's Cafeteria	Cafeteria	15	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.90	SW	1600	C-OCC	1,440
15	E. Kitchen Service	Cafeteria	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	1600	C-OCC	1,440
15	W. Kitchen Service	Cafeteria	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	1600	C-OCC	1,440
15	Cafeteria Closet	Storage Areas	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	SW	240
15	Kitchen	Cafeteria	21	S 32 C F 2 (ELE)	F42LL	60	1.26	SW	1600	C-OCC	2,016
15	Kitchen	Cafeteria	26	S 32 C F 2 (ELE)	F42LL	60	1.56	SW	1600	C-OCC	2,496
20	Kitchen Storage A	Storage Areas	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	1000	SW	128
15	Kitchen Storage B	Storage Areas	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	1000	SW	180
15	Kitchen Storage C	Storage Areas	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	1000	SW	180
20	Kitchen Storage D	Storage Areas	12	S 32 C F 1 (ELE)	F41LL	32	0.38	SW	1000	SW	384
15	Kitchen Office	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Kitchen Office	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Kitchen Bathroom/Locker	Bath Room	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	2000	SW	600
20	N. Mechanical Room	Offices	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845
20	N. Mechanical Room Storage	Storage Areas	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	1000	SW	192
15	N. Mechanical Room Locker	Locker	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2800	C-OCC	1,008
15	N. Mechanical Room Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480
15	A102	Classrooms	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2400	C-OCC	2,880
15	A103	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	A104	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728
15	A105	Classrooms	24	S 32 C F 2 (ELE)	F42LL	60	1.44	SW	2400	C-OCC	3,456
15	A106	Classrooms	14	S 32 C F 2 (ELE)	F42LL	60	0.84	SW	2400	C-OCC	2,016
15	A106	Classrooms	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2400	C-OCC	1,008
15	A Principal	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	Special Services	Offices	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	Special Services	Offices	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2400	C-OCC	432
15	Special Services	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	B Hall Men's Bathroom	Bath Room	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2000	SW	360
198	B Hall Men's Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62
15	B Hall Women's Bathroom	Bath Room	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2000	SW	360
198	B Hall Women's Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62
20	B&G Side Office	Offices	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	C-OCC	307
15	Home Economics Office	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	B113	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296

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Cost of Electricity: **\$0.107** \$/kWh  
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EXISTING CONDITIONS											
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Retrofit Control	Annual kWh
15	B113	Classrooms	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	2400	C-OCC	720
15	B114	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	B115	Classrooms	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2400	C-OCC	2,160
15	B116	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	B117	Classrooms	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2400	C-OCC	2,160
15	C121	Classrooms	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2400	C-OCC	2,160
15	C122	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728
15	C123	Classrooms	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2400	C-OCC	2,160
15	Health Office	Offices	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864
15	Health Office	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Health Office	Offices	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864
108	Health Office	Offices	6	I 65	I65/1	65	0.39	SW	2400	C-OCC	936
15	Health Office Bathroom 1	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
15	Health Office Bathroom 2	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
15	C Hall Conference Room	Offices	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
52	Library	Classrooms	28	S 32 6 Square	F46LL	182	5.10	SW	2400	C-OCC	12,230
15	Library Office Small	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Library Office Large	Offices	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864
15	C124	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	C124A	Offices	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	C-OCC	144
15	C124B	Offices	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	C-OCC	144
15	C124C	Offices	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	C-OCC	144
15	C125	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	C126	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	C127	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	D131	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
5	D135S	Classrooms	6	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.36	SW	2400	C-OCC	864
108	D135S	Classrooms	10	I 65	I65/1	65	0.65	SW	2400	C-OCC	1,560
15	D133	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	D134	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	D135	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	D138	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	D139	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	E141	Classrooms	24	S 32 C F 2 (ELE)	F42LL	60	1.44	SW	2400	C-OCC	3,456
15	E141A	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	E141B	Offices	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2400	C-OCC	432
5	E141C	Storage Areas	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	1000	SW	60
15	E142	Classrooms	24	S 32 C F 2 (ELE)	F42LL	60	1.44	SW	2400	C-OCC	3,456
15	E143	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	District Data Processing	Storage Areas	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	1000	SW	540
15	District Data Processing	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60
20	District Data Processing	Storage Areas	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	1000	SW	128
15	F104	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728
254	F104A	Storage Areas	2	T 32 R F 4 (ELE)	F44LL	118	0.24	SW	1000	SW	236
111	F104B	Storage Areas	1	W 34 C F 1 (MAG)	F41EE	43	0.04	SW	1000	SW	43
15	F151	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
20	F151A	Offices	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230
20	F152S	Classrooms	10	S 32 C F 1 (ELE)	F41LL	32	0.32	SW	2400	C-OCC	768
15	F153	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
20	F153 Office 1	Offices	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230
20	F153 Office 2	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154
15	B&G	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
5	B&G	Offices	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	2400	C-OCC	144
15	B&G Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
5	A.S.	Offices	4	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.24	SW	2400	C-OCC	576



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Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Retrofit Control	Annual kWh	
20	F154S	Classrooms	8	S 32 C F 1 (ELE)	F41LL	32	0.26	SW	2400	C-OCC	614
15	F154S Back Room	Storage Areas	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	1000	SW	360
15	F Hall Boy's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480
15	F Hall Girl's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480
20	F Hall Closet	Storage Areas	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	1000	SW	96
15	G161	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	G162	Classrooms	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2400	C-OCC	2,160
15	G163	Classrooms	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2400	C-OCC	2,160
15	G164	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	G165	Classrooms	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2400	C-OCC	2,160
15	G165/G166 Storage	Storage Areas	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	1000	SW	420
15	G166	Classrooms	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2400	C-OCC	2,160
15	G167	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	G168	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
245	E. Main Entrance Lobby	Hallways	12	T 32 R F 3 (ELE)	F43LE	110	1.32	SW	2280	SW	3,010
245	W. Main Entrance Lobby	Hallways	13	T 32 R F 3 (ELE)	F43LE	110	1.43	SW	2280	SW	3,260
129	W. Main Entrance Lobby	Hallways	5	SP 75 I	I75/1	75	0.38	SW	2280	SW	855
15	A Hallway	Hallways	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2280	SW	2,052
245	A Hallway	Hallways	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2280	SW	1,003
15	B Hallway	Hallways	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2280	SW	2,052
245	B Hallway	Hallways	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2280	SW	752
15	C Hallway	Hallways	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2280	SW	2,052
245	C Hallway	Hallways	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2280	SW	752
15	D Hallway	Hallways	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2280	SW	2,052
245	D Hallway	Hallways	2	T 32 R F 3 (ELE)	F43LE	110	0.22	SW	2280	SW	502
15	E Hallway	Hallways	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2280	SW	1,642
15	F Hallway	Hallways	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2280	SW	2,736
15	G Hallway	Hallways	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2280	SW	2,736
15	H Hallway	Hallways	19	S 32 C F 2 (ELE)	F42LL	60	1.14	SW	2280	SW	2,599
245	H Hallway	Hallways	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2280	SW	752
15	I Hallway	Hallways	22	S 32 C F 2 (ELE)	F42LL	60	1.32	SW	2280	SW	3,010
15	K Hallway	Hallways	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	2280	SW	1,094
15	Cafeteria Hallway	Hallways	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2280	SW	1,642
15	Weight Room Hallway	Hallways	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2280	SW	410
129	Weight Room Hallway	Hallways	4	SP 75 I	I75/1	75	0.30	SW	2280	SW	684
15	Weight Room Hallway	Hallways	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	2280	SW	684
129	Weight Room Hallway	Hallways	5	SP 75 I	I75/1	75	0.38	SW	2280	SW	855
15	S. Rear Entranceway 1	Hallways	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2280	SW	410
15	S. Rear Entranceway 2	Hallways	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2280	SW	410
15	S. Rear Entranceway 3	Hallways	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2280	SW	410
245	A Hall Stairwell	Hallways	5	T 32 R F 3 (ELE)	F43LE	110	0.55	SW	2280	SW	1,254
245	B Hall Stairwell	Hallways	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2280	SW	1,003
245	C Hall Stairwell	Hallways	5	T 32 R F 3 (ELE)	F43LE	110	0.55	SW	2280	SW	1,254
245	D Hall Stairwell	Hallways	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2280	SW	1,003
245	E. Main Entrance Stairwell	Hallways	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2280	SW	1,505
245	W. Main Entrance Stairwell	Hallways	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2280	SW	1,505
245	Auditorium Stairwell	Hallways	9	T 32 R F 3 (ELE)	F43LE	110	0.99	SW	2280	SW	2,257
79	Auditorium Balcony	Auditorium	18	SP I 100	I100/1	100	1.80	SW	1000	C-OCC	1,800
8	Auditorium Balcony	Auditorium	10	MH 175	MH175/1	215	2.15	SW	1000	C-OCC	2,150
108	Auditorium Balcony	Auditorium	4	I 65	I65/1	65	0.26	SW	1000	C-OCC	260
108	Auditorium Balcony	Auditorium	8	I 65	I65/1	65	0.52	SW	1000	C-OCC	520
138	Auditorium Balcony	Auditorium	7	SP 26 P CF 2	CFQ25/2	66	0.46	SW	1000	C-OCC	462
15	Auditorium Balcony	Auditorium	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	C-OCC	120
20	Auditorium Balcony Closet	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	SW	64
20	Auditorium Lobby Electrical	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32

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Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Retrofit Control	Annual kWh		
15	L201	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296	
15	L203	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
15	L204	Classrooms	18	S 32 C F 2 (ELE)	F42LL	60	1.08	SW	2400	C-OCC	2,592	
15	L205	Classrooms	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	2400	C-OCC	1,152	
15	L206	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
198	L206	Classrooms	2	2T 17 R F 2 (ELE)	F22LL	31	0.06	SW	2400	C-OCC	149	
20	L206	Classrooms	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154	
15	L206 Storage	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300	
15	L207	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
198	L207	Classrooms	2	2T 17 R F 2 (ELE)	F22LL	31	0.06	SW	2400	C-OCC	149	
20	L207	Classrooms	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154	
15	L207 Storage	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300	
15	L208	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
198	L208	Classrooms	2	2T 17 R F 2 (ELE)	F22LL	31	0.06	SW	2400	C-OCC	149	
20	L208	Classrooms	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154	
15	L208 Storage	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300	
15	L209	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
198	L209	Classrooms	2	2T 17 R F 2 (ELE)	F22LL	31	0.06	SW	2400	C-OCC	149	
20	L209	Classrooms	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154	
15	L209 Storage	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300	
15	M211	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296	
15	M212	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296	
15	M213	Classrooms	18	S 32 C F 2 (ELE)	F42LL	60	1.08	SW	2400	C-OCC	2,592	
15	M214	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
4	M Hall Supply Room	Storage Areas	9	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.65	SW	1000	SW	648	
15	M Hall Men's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480	
20	M Hall Men's Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
15	M Hall Women's Bathroom	Bath Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	SW	480	
20	M Hall Women's Bathroom	Bath Room	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2000	SW	64	
15	M215	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
198	M215	Classrooms	2	2T 17 R F 2 (ELE)	F22LL	31	0.06	SW	2400	C-OCC	149	
20	M215	Classrooms	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154	
15	M215 Storage	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300	
15	M216	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
198	M216	Classrooms	2	2T 17 R F 2 (ELE)	F22LL	31	0.06	SW	2400	C-OCC	149	
20	M216	Classrooms	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154	
15	M216 Storage	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300	
15	M217	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
198	M217	Classrooms	2	2T 17 R F 2 (ELE)	F22LL	31	0.06	SW	2400	C-OCC	149	
20	M217	Classrooms	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154	
15	M217 Storage	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300	
15	M218	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
198	M218	Classrooms	2	2T 17 R F 2 (ELE)	F22LL	31	0.06	SW	2400	C-OCC	149	
20	M218	Classrooms	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154	
15	M218 Storage	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300	
15	N221	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296	
15	N222	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296	
15	N223	Classrooms	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	C-OCC	1,728	
15	N223A	Storage Areas	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	SW	240	
15	N223B	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120	
15	N224	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296	
15	N225	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576	
15	N225A	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
15	N226	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296	
15	N227	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296	



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Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Retrofit Control	Annual kWh	
15	N228	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	N229	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	O231	Classrooms	13	S 32 C F 2 (ELE)	F42LL	60	0.78	SW	2400	C-OCC	1,872
20	O232 Book Room	Storage Areas	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	1000	SW	128
15	O233	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	O234	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	O235	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	O236	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	O237	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	O238	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
20	O Hall S. Mechanical Room	Storage Areas	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	1000	SW	192
20	O Hall N. Mechanical Room	Storage Areas	8	S 32 C F 1 (ELE)	F41LL	32	0.26	SW	1000	SW	256
15	P241	Classrooms	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2400	C-OCC	2,880
15	P242	Classrooms	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2400	C-OCC	2,880
15	P243	Classrooms	15	S 32 C F 2 (ELE)	F42LL	60	0.90	SW	2400	C-OCC	2,160
15	P244	Classrooms	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2400	C-OCC	2,880
15	P245	Classrooms	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2400	C-OCC	2,880
15	P246	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	P247	Classrooms	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2400	C-OCC	2,880
15	P248	Classrooms	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2400	C-OCC	2,880
15	P249	Classrooms	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2400	C-OCC	2,880
20	Q251	Offices	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	C-OCC	307
15	Q251	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
15	Q251A	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120
15	Q251B	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120
15	Q Hall Boy's Bathroom	Bath Room	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	2000	SW	600
15	Q Hall Girl's Bathroom	Bath Room	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	2000	SW	600
20	Q Hall Electrical Room 1	Storage Areas	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	1000	SW	128
20	Q Hall Electrical Room 2	Storage Areas	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	1000	SW	96
20	Q Hall Electrical Room 2	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	SW	64
20	Q255C	Offices	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
15	Upper Library Entranceway	Hallways	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2280	SW	547
52	Upper Library Balcony	Classrooms	16	S 32 6 Square	F46LL	182	2.91	SW	2400	C-OCC	6,989
15	Upper Library Office	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
20	AV Room	Offices	14	S 32 C F 1 (ELE)	F41LL	32	0.45	SW	2400	C-OCC	1,075
15	Copy Room	Offices	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	Teacher's Lounge	Offices	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864
5	Teacher's Lounge Kitchen	Offices	4	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.24	SW	2400	C-OCC	576
15	TV Room 1	Offices	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864
15	TV Room 2	Offices	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
20	TV Room 2	Offices	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2400	C-OCC	77
15	TV Room 2	Offices	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	C-OCC	288
15	TV Room 2	Offices	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	C-OCC	144
15	R260	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	R261	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	R262	Classrooms	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	C-OCC	864
15	R262	Classrooms	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	C-OCC	576
20	R262	Classrooms	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154
15	R263	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
20	R264C	Offices	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	C-OCC	307
15	R265	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	R266	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	R267	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	R268	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296
15	R269	Classrooms	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	C-OCC	1,296



Energy Audit of Roxbury High School  
 CHA Project No.24454  
 Existing Lighting

Cost of Electricity: \$0.107 \$/kWh  
\$6.74 \$/kW

EXISTING CONDITIONS											
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Retrofit Control	Annual kWh
15	L Hallway	Hallways	16	S 32 C F 2 (ELE)	F42LL	60	0.96	SW	2280	SW	2,189
245	L Hallway	Hallways	12	T 32 R F 3 (ELE)	F43LE	110	1.32	SW	2280	SW	3,010
15	M Hallway	Hallways	16	S 32 C F 2 (ELE)	F42LL	60	0.96	SW	2280	SW	2,189
245	M Hallway	Hallways	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2280	SW	752
15	N Hallway	Hallways	16	S 32 C F 2 (ELE)	F42LL	60	0.96	SW	2280	SW	2,189
245	N Hallway	Hallways	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2280	SW	752
15	O Hallway	Hallways	16	S 32 C F 2 (ELE)	F42LL	60	0.96	SW	2280	SW	2,189
245	O Hallway	Hallways	5	T 32 R F 3 (ELE)	F43LE	110	0.55	SW	2280	SW	1,254
15	P Hallway	Hallways	19	S 32 C F 2 (ELE)	F42LL	60	1.14	SW	2280	SW	2,599
15	Q Hallway	Hallways	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2280	SW	2,736
15	R Hallway	Hallways	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2280	SW	2,736
245	2nd Floor Auditorium Lobby	Hallways	6	T 32 R F 3 (ELE)	F43LE	110	0.66	SW	2280	SW	1,505
68	Exterior	Outdoor Lighting	19	175 MH WALL	MH175/1	215	4.09	SW	4368	SW	17,843
231	Exterior	Outdoor Lighting	14	WP400MH1	MH400/1	458	6.41	SW	4368	SW	28,008
79	Exterior	Outdoor Lighting	14	SP I 100	I100/1	100	1.40	SW	4368	SW	6,115
	<b>Total</b>		<b>3,439</b>				<b>240</b>				<b>534,671</b>

## **APPENDIX C**

### **ECM Calculations**

**Summary of Energy Conservation Measures**

Energy Conservation Measure		Approx. Costs	Approx. Savings	Payback (Years) w/o Incentive	Potential Incentive (\$)*	Payback (Years)	Recommended For Implementation
		(\$)	(\$/year)			w/ Incentive	
ECM-1	Install New High Efficiency Natural Gas HVAC Roof Top Units	2,990,000	24,700	121.1	1,950	121.0	
ECM-2	Replace 150 Gallon Electric DHW Tank With HE Natural Gas Unit	12,300	7,200	1.7	300	1.7	X
ECM-3	Install Economizers on HVAC Roof Top Units	1,900	300	6.3	250	5.5	X
ECM-4	Install Demand Control Ventilation For the Gym, Cafeteria and Faculty Dining Room AHU's	4,000	5,300	0.8	300	0.7	X
ECM-5	Replace Roof and Upgrade Insulation	3,400,000	6,800	500.0	0	500.0	
ECM-6	Install Natural Gas Dishwasher Booster Heater	15,100	7,800	1.9	0	1.9	X
ECM-7	Replace Windows	115,200	500	230.4	0	230.4	
ECM-8	Upgrade Current Lighting Fixtures	16,395	8,400	2.0	3,195	1.6	X
ECM-9	Install Occupancy Sensors	50,625	13,092	3.9	8,750	3.2	
ECM-10	Replace Lighting and Install Occupancy Sensors	67,020	19,949	3.4	11,945	2.8	

**Roxbury BOE - NJBPU  
CHA Project #24454  
Roxbury High School**

**ECM Summary Sheet**

**ECM-1 Install New High Efficiency Natural Gas HVAC Roof Top Units**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
2,990,000	112,800	0	9,412	24,700	0	24,700	(0.9)	1,950	>20	>20
Expected Life: 15 years										
Lifetime Savings: 1,692,000 kWh      141,200 therms      \$ 370,500										

**ECM-2 Replace 150 Gallon Electric DHW Tank With HE Natural Gas Unit**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
12,300	86,523	0	-3,093	7,200	0	7,200	7.8	300	1.7	1.7
Expected Life: 15 years										
Lifetime Savings: 1,297,800 kWh      -46,400 therms      \$ 108,000										

**ECM-3 Install Economizers on HVAC Roof Top Units**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
1,900	2,817	0	0	300	0	300	1.8	0	6.3	6.3
Expected Life: 15 years										
Lifetime Savings: 42,300 kWh      0 therms      \$ 4,500										

**ECM-4 Install Demand Control Ventilation For the Gym, Cafeteria and Faculty Dining Room AHU's**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
4,000	2,160	0	4,432	5,300	0	5,300	(0.9)	0	0.8	0.8
Expected Life: 25 years										
Lifetime Savings: 54,000 kWh      110,800 therms      \$ 132,500										

**ECM-5 Replace Roof and Upgrade Insulation**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
3,400,000	2,454	0	5,699	6,800	0	6,800	500.0	0	>20	>20
Expected Life: 30 years										
Lifetime Savings: 73,600 kWh      171,000 therms      \$ 204,000										

**ECM-6 Install Natural Gas Dishwasher Booster Heater**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
15,100	9,331	130	-391	7,800	0	7,800	6.7	0	1.9	1.9
Expected Life: 15 years										
Lifetime Savings: 140,000 kWh      -5,900 therms      \$ 117,000										

**ECM-7 Replace Windows**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
115,200	429	0	387	500	0	500	(0.9)	0	>20	>20
Expected Life: 15 years										
Lifetime Savings: 6,400 kWh      5,800 therms      \$ 7,500										

**ECM-8 Lighting Replacement / Upgrades**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
16,395	55,998	30	0	8,400	0	8,400	3.5	0	2.0	2.0
Expected Life: 15 years										
Lifetime Savings: 840,000 kWh      0 therms      \$ 126,000										

**ECM-9 Install Lighting Controls (Occupancy Sensors)**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
50,625	122,358	0	0	13,092	0	13,100	2.3	0	3.9	3.9
Expected Life: 15 years										
Lifetime Savings: 1,835,400 kWh      0 therms      \$ 196,400										

**ECM-10 Lighting Replacements with Lighting Controls (Occupancy Sensors)**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
67,020	163,928	30	0	19,949	0	19,900	(0.8)	0	3.4	3.4
Expected Life: 15 years										
Lifetime Savings: 2,458,900 kWh      0 therms      \$ 299,200										

Roxbury BOE - NJBPU  
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Utility Costs	Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
\$ 0.124 \$/kWh blended	3,175,588	0.00042021	218,740	Electric	Natural Gas
\$ 0.080 \$/kWh supply	3,713,590	0.00042021		\$ 460,339	\$ 60,349
\$ 4.80 \$/kW	1,026.72	0			
\$ 1.14 \$/Therm	52,862	0.00533471			
\$ - \$/kgals	-	0			

Roxbury High School

Item	Savings					Cost	Simple Payback	MTCDE	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings					ROI		
	kW	kWh	therms	cooling kWh	kgal/yr										\$	kW	kWh	therms	cooling		kgal/yr	\$
ECM-1	0.0	112,800	9,412	0	0	\$ 24,700	\$ 2,990,000	121.1	97.6	15	\$ 1,950	\$ -	\$ 1,950	121.0	0.0	1,692,000	141,180	0	0	\$ 370,754	(0.9)	
ECM-2	0.0	86,523	(3,093)	0	0	\$ 7,200	\$ 12,300	1.7	19.9	15	\$ 300	\$ -	\$ 300	1.7	0.0	1,297,841	(46,395)	0	0	\$ 108,042	7.8	
ECM-3	0.0	2,817	0	0	0	\$ 300	\$ 1,900	6.3	1.2	15	\$ 250	\$ -	\$ 250	5.5	0.0	42,254	0	0	0	\$ 5,240	1.8	
ECM-4	0.0	2,160	4,432	0	0	\$ 5,300	\$ 4,000	0.8	24.6	25	\$ 300	\$ -	\$ 300	0.7	0.0	54,000	110,808	0	0	\$ 133,017	32.3	
ECM-5	0.0	2,454	5,699	0	0	\$ 6,800	\$ 3,400,000	500.0	31.4	30	\$ -	\$ -	\$ -	500.0	0.0	73,623	170,984	0	0	\$ 204,051	-0.93999	
ECM-6	129.6	9,331	(391)	0	0	\$ 7,800	\$ 15,100	1.9	1.8	15	\$ -	\$ -	\$ -	1.9	1,944.0	139,968	(5,865)	0	0	\$ 116,486	6.7	
ECM-7	0.0	429	387	0	0	\$ 500	\$ 115,200	230.4	2.2	15	\$ -	\$ -	\$ -	230.4	0.0	6,430	5,804	0	0	\$ 7,414	(0.9)	
ECM-8	29.8	55,998	0	0	0	\$ 8,400	\$ 16,395	2.0	23.5	15	\$ 3,195	\$ -	\$ 3,195	1.6	446.7	839,974	0	0	0	\$ 92,928	4.7	
ECM-9	0.0	122,358	0	0	0	\$ 13,092	\$ 50,625	3.9	51.4	15	\$ 8,750	\$ -	\$ 8,750	3.2	0.0	1,835,367	0	0	0	\$ 227,586	3.5	
ECM-10	29.8	163,928	0	0	0	\$ 19,949	\$ 67,020	3.4	68.9	15	\$ 11,945	\$ -	\$ 11,945	2.8	446.7	2,458,916	0	0	0	\$ 222,443	2.3	
<b>Total (Does Not Include ECM-8 and ECM-9)</b>	<b>130</b>	<b>338,871</b>	<b>16,447</b>	<b>0</b>	<b>0</b>	<b>\$ 94,042</b>	<b>\$ 6,672,540</b>	<b>71.0</b>		<b>18</b>	<b>\$ 26,690</b>	<b>\$ -</b>	<b>\$ 26,690</b>	<b>70.7</b>	<b>893</b>	<b>8,300,404</b>	<b>382,381</b>	<b>-</b>	<b>-</b>	<b>\$ 1,371,473</b>	<b>(0.8)</b>	
<b>Total Measures with Payback &lt;10</b>	<b>159</b>	<b>276,370</b>	<b>948</b>	<b>0</b>	<b>0</b>	<b>\$ 41,793</b>	<b>\$ 100,320</b>	<b>2.4</b>		<b>33</b>	<b>\$ 283</b>	<b>\$ -</b>	<b>\$ 3,534</b>	<b>2.3</b>	<b>Sum if Payback &lt; 10 and ROI &gt; 0</b>	<b>2,391</b>	<b>4,209,404</b>	<b>58,548</b>	<b>-</b>	<b>-</b>	<b>\$ 683,298</b>	<b>5.8</b>
<b>% of Existing</b>	<b>13%</b>	<b>9%</b>	<b>31%</b>	<b>0%</b>	<b>0%</b>	<b>#DIV/0!</b>																

EQUIPMENT	AREA/EQUIPMENT SERVED	Cooling Capacity (Tons)	COOLING CAPACITY (MBH)	HEATING CAPACITY (MBH)	Model EER	
RTU		30	360	500	15.0	
RTU						
RTU		0	0	0		
		Total Electric Cooling:		360 MBH	500 MBH	15.0 EER

HEATING CAPACITY (MBH) - Input	Heating Efficiency (MBH)
200	80%
0	
0	
200 MBH	80%

**ECM-1: Rooftop Unit Replacement**

Proposed Conditions	Comments
Electric Cost \$0.124 / kWh	
Average run hours per Week 30 Hours	
Space Balance Point 55 F	
Space Cooling Temperature Setpoint 72 deg F	
Space Heating Temperature Setpoint 66 deg F	
BTU/Hr Rating of proposed units 240,000 Btu / Hr	
Average EER 15.0	Based off average EER of units listed above
Proposed Annual Electric Usage 4,029 kWh	

Item	Value	Units	Comments
Natural Gas Cost \$1.140 / Therm			
BTU/Hr Rating of proposed units (Output) 180,000 Btu / Hr			
Average Efficiency 80%			Based off average Efficiency of units listed above
BTU/Hr Rating of proposed units (Input) 200,000 Btu / Hr			
Annual Heating Hours 752 Hours			Based on Bin temperature data
Proposed Fuel Usage 150,318 Btu / Yr			
Proposed Fuel Usage 1,503 Therms			

ANNUAL SAVINGS	
Annual Electrical Usage	4,029 kWh
Annual Natural Gas Usage	1,503 Therms
Annual Cost	\$2,213

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above Balance Point	Assumed % of time of operation (Cooling)	Assumed hrs of Operation (Cooling)	Heating Hrs at Temp Below Setpoint	Assumed % of time of Operation (Heating)	Assumed hrs of Operation (Heating)
102.5	0	0	100%	0	0	0%	0
97.5	0	0	100%	0	0	0%	0
92.5	23	4	88%	4	0	0%	0
87.5	96	17	76%	13	0	0%	0
82.5	275	49	65%	32	0	0%	0
77.5	440	79	53%	42	0	0%	0
72.5	621	111	41%	46	0	0%	0
67.5	611	109	29%	32	0	0%	0
62.5	907	0	18%	0	0	0%	0
57.5	674	0	6%	0	0	0%	0
52.5	579	0	0%	0	0	0%	0
47.5	637	0	0%	0	114	65%	74
42.5	579	0	0%	0	103	82%	85
37.5	959	0	0%	0	171	100%	171
32.5	749	0	0%	0	134	100%	134
27.5	470	0	0%	0	84	100%	84
22.5	304	0	0%	0	54	100%	54
17.5	452	0	0%	0	81	100%	81
12.5	216	0	0%	0	39	100%	39
7.5	103	0	0%	0	18	100%	18
2.5	54	0	0%	0	10	100%	10
0.0	11	0	0%	0	2	100%	2
0.0	0	0	0%	0	0	0%	0
<b>Total</b>	8,760	369	45%	168	810	93%	752

EQUIPMENT	AREA/EQUIPMENT SERVED	Cooling Capacity (Tons)	COOLING CAPACITY (MBH)	HEATING CAPACITY (MBH)	Model EER
RTU		20	240	400	15.0
RTU					
RTU		0	0	0	
<i>Total Electric Cooling:</i>			240	400	15.0
			<i>MBH</i>	<i>MBH</i>	<i>EER</i>

HEATING CAPACITY (MBH) - Input	Heating Efficiency (MBH)
200	80%
0	
0	
200	80%
<i>MBH</i>	

**ECM-1: Rooftop Unit Replacement**

Proposed Conditions	Comments
Electric Cost \$0.124 / kWh	
Average run hours per Week 30 Hours	
Space Balance Point 55 F	
Space Cooling Temperature Setpoint 72 deg F	
Space Heating Temperature Setpoint 66 deg F	
BTU/Hr Rating of proposed units 240,000 Btu / Hr	
Average EER 15.0	Based off average EER of units listed above
Proposed Annual Electric Usage 2,686 kWh	

Item	Value	Units	Comments
Natural Gas Cost \$1.140 / Therm			
BTU/Hr Rating of proposed units (Output) 180,000 Btu / Hr			
Average Efficiency 80%			Based off average Efficiency of units listed above
BTU/Hr Rating of proposed units (Input) 200,000 Btu / Hr			
Annual Heating Hours 752 Hours			Based on Bin temperature data
Proposed Fuel Usage 150,318 Btu / Yr			
Proposed Fuel Usage 1,503 Therms			

ANNUAL SAVINGS	
Annual Electrical Usage	2,686 kWh
Annual Natural Gas Usage	1,503 Therms
Annual Cost	\$2,047

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above Balance Point	Assumed % of time of operation (Cooling)	Assumed hrs of Operation (Cooling)	Heating Hrs at Temp Below Setpoint	Assumed % of time of Operation (Heating)	Assumed hrs of Operation (Heating)
102.5	0	0	100%	0	0	0%	0
97.5	0	0	100%	0	0	0%	0
92.5	23	4	88%	4	0	0%	0
87.5	96	17	76%	13	0	0%	0
82.5	275	49	65%	32	0	0%	0
77.5	440	79	53%	42	0	0%	0
72.5	621	111	41%	46	0	0%	0
67.5	611	109	29%	32	0	0%	0
62.5	907	0	18%	0	0	0%	0
57.5	674	0	6%	0	0	0%	0
52.5	579	0	0%	0	0	0%	0
47.5	637	0	0%	0	114	65%	74
42.5	579	0	0%	0	103	82%	85
37.5	959	0	0%	0	171	100%	171
32.5	749	0	0%	0	134	100%	134
27.5	470	0	0%	0	84	100%	84
22.5	304	0	0%	0	54	100%	54
17.5	452	0	0%	0	81	100%	81
12.5	216	0	0%	0	39	100%	39
7.5	103	0	0%	0	18	100%	18
2.5	54	0	0%	0	10	100%	10
0.0	11	0	0%	0	2	100%	2
0.0	0	0	0%	0	0	0%	0
<b>Total</b>	8,760	369	45%	168	810	93%	752

EQUIPMENT	AREA/EQUIPMENT SERVED	Cooling Capacity (Tons)	COOLING CAPACITY (MBH)	HEATING CAPACITY (MBH)	Model EER
RTU		5	60	0	15.0
RTU					
RTU		0	0	0	
		Total Electric Cooling:		60	15.0
			MBH	MBH	EER

HEATING CAPACITY (MBH) - Input	Heating Efficiency (MBH)
0	1%
0	
0	
0	1%
MBH	

**ECM-1: Rooftop Unit Replacement**

Proposed Conditions	Comments
Electric Cost \$0.124 / kWh	
Average run hours per Week 60 Hours	
Space Balance Point 55 F	
Space Cooling Temperature Setpoint 72 deg F	
Space Heating Temperature Setpoint 68 deg F	
BTU/Hr Rating of proposed units 60,000 Btu / Hr	
Average EER 15.0	Based off average EER of units listed above
Proposed Annual Electric Usage 1,343 kWh	

Item	Value	Units	Comments
Natural Gas Cost \$1.140 / Therm			
BTU/Hr Rating of proposed units (Output) 400,000 Btu / Hr			
Average Efficiency 1%			Based off average Efficiency of units listed above
BTU/Hr Rating of proposed units (Input) - Btu / Hr			
Annual Heating Hours 1,511 Hours			Based on Bin temperature data
Proposed Fuel Usage - Btu / Yr			
Proposed Fuel Usage 0 Therms			

ANNUAL SAVINGS	
Annual Electrical Usage 1,343 kWh	
Annual Natural Gas Usage 0 Therms	
Annual Cost \$167	

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above Balance Point	Assumed % of time of operation (Cooling)	Assumed hrs of Operation (Cooling)	Heating Hrs at Temp Below Setpoint	Assumed % of time of Operation (Heating)	Assumed hrs of Operation (Heating)
102.5	0	0	100%	0	0	0%	0
97.5	0	0	100%	0	0	0%	0
92.5	23	8	88%	7	0	0%	0
87.5	96	34	76%	26	0	0%	0
82.5	275	98	65%	64	0	0%	0
77.5	440	157	53%	83	0	0%	0
72.5	621	222	41%	91	0	0%	0
67.5	611	218	29%	64	0	0%	0
62.5	907	0	18%	0	0	0%	0
57.5	674	0	6%	0	0	0%	0
52.5	579	0	0%	0	0	0%	0
47.5	637	0	0%	0	228	67%	153
42.5	579	0	0%	0	207	84%	173
37.5	959	0	0%	0	343	100%	343
32.5	749	0	0%	0	268	100%	268
27.5	470	0	0%	0	168	100%	168
22.5	304	0	0%	0	109	100%	109
17.5	452	0	0%	0	161	100%	161
12.5	216	0	0%	0	77	100%	77
7.5	103	0	0%	0	37	100%	37
2.5	54	0	0%	0	19	100%	19
0.0	11	0	0%	0	4	100%	4
0.0	0	0	0%	0	0	0%	0
<b>Total</b>	8,760	738	45%	336	1,619	93%	1,511



EQUIPMENT	AREA/EQUIPMENT SERVED	Cooling Capacity (Tons)	COOLING CAPACITY (MBH)	HEATING CAPACITY (MBH)	Model EER
RTU		0	0	225	15.0
RTU					
RTU		0	0	0	
		Total Electric Cooling:		0	225
			MBH	MBH	EER

HEATING CAPACITY (MBH) - Input	Heating Efficiency (MBH)
275	82%
0	
0	
275	82%
MBH	

**ECM-1: Rooftop Unit Replacement**

Proposed Conditions	Comments
Electric Cost \$0.124 / kWh	
Average run hours per Week 60 Hours	
Space Balance Point 55 F	
Space Cooling Temperature Setpoint 72 deg F	
Space Heating Temperature Setpoint 68 deg F	
BTU/Hr Rating of proposed units 0 Btu / Hr	
Average EER 15.0	Based off average EER of units listed above
Proposed Annual Electric Usage 0 kWh	

Item	Value	Units	Comments
Natural Gas Cost \$1.140		/ Therm	
BTU/Hr Rating of proposed units (Output) 275,000		Btu / Hr	
Average Efficiency 82%			Based off average Efficiency of units listed above
BTU/Hr Rating of proposed units (Input) 225,000		Btu / Hr	
Annual Heating Hours 1,511		Hours	Based on Bin temperature data
Proposed Fuel Usage 339,929		Btu / Yr	
Proposed Fuel Usage 3,399		Therms	

ANNUAL SAVINGS	
Annual Electrical Usage	0 kWh
Annual Natural Gas Usage	3,399 Therms
Annual Cost	\$3,875

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above Balance Point	Assumed % of time of operation (Cooling)	Assumed hrs of Operation (Cooling)	Heating Hrs at Temp Below Setpoint	Assumed % of time of Operation (Heating)	Assumed hrs of Operation (Heating)
102.5	0	0	100%	0	0	0%	0
97.5	0	0	100%	0	0	0%	0
92.5	23	8	88%	7	0	0%	0
87.5	96	34	76%	26	0	0%	0
82.5	275	98	65%	64	0	0%	0
77.5	440	157	53%	83	0	0%	0
72.5	621	222	41%	91	0	0%	0
67.5	611	218	29%	64	0	0%	0
62.5	907	0	18%	0	0	0%	0
57.5	674	0	6%	0	0	0%	0
52.5	579	0	0%	0	0	0%	0
47.5	637	0	0%	0	228	67%	153
42.5	579	0	0%	0	207	84%	173
37.5	959	0	0%	0	343	100%	343
32.5	749	0	0%	0	268	100%	268
27.5	470	0	0%	0	168	100%	168
22.5	304	0	0%	0	109	100%	109
17.5	452	0	0%	0	161	100%	161
12.5	216	0	0%	0	77	100%	77
7.5	103	0	0%	0	37	100%	37
2.5	54	0	0%	0	19	100%	19
0.0	11	0	0%	0	4	100%	4
0.0	0	0	0%	0	0	0%	0
<b>Total</b>	8,760	738	45%	336	1,619	93%	1,511

Roxbury BOE - NJBPU  
 CHA Project #24454  
 Roxbury High School

**ECM-1: Replace HVAC Roof top Units**

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
30 Ton HVAC Roof top Unit	24	EA	\$ 105,000	\$ 5,000					\$ 2,525,000	
20 Ton HVAC Roof Top Unit	3	EA	\$ 70,000	\$ 5,000					\$ 215,000	
5 Ton HVAC Unit	6	EA	\$ 20,000	\$ 5,000					\$ 125,000	
Make Up Air Unit	4	EA	\$ 30,000	\$ 5,000					\$ 125,000	

\$ 2,990,000	Subtotal
\$ -	0% Contingency
\$ -	0% Contractor O&P
\$ -	Engineering
<b>\$ 2,990,000</b>	<b>Total</b>

Roxbury BOE - NJBPU  
 CHA Project #24454  
 Roxbury High School

**ECM-2: Replace Electric DHW Heater With A Condensing Gas-Fired DHW Heater**

**Summary**

\* Replace Electric DHW Heater With A Condensing, Gas-Fired DHW Heater

Item	Value	Units	Formula/Comments
Occupied days per week	5	days/wk	
Water supply Temperature	55	'F	Temperature of water coming into building
Hot Water Temperature	140	'F	
Hot Water Usage per day	1,500	gal/day	Calculated from usage below
Annual Hot Water Energy Demand	276,140	MBTU/yr	Energy required to heat annual quantity of hot water to setpoint
Existing Tank Size	150	Gallons	Per manufacturer nameplate
Hot Water Temperature	140	'F	Per building personnel
Average Room Temperature	70	'F	
Standby Losses (% by Volume)	2.5%		( 2.5% of stored capacity per hour, per U.S. Department of Energy )
Standby Losses (Heat Loss)	2.2	MBH	
Annual Standby Hot Water Load	19,163	MBTU/yr	
Total Annual Hot Water Demand (w/ standby losses)	295,302	Mbtu/yr	Building demand plus standby losses
Existing Water Heater Efficiency	100%		Per Manufacturer
Total Annual Energy Required	295,302	Mbtu/yr	
<b>Total Annual Electric Required</b>	<b>86,523</b>	<b>kWh/yr</b>	<b>Electrical Savings</b>
Average Annual Electric Demand	9.88	kW	
<b>Peak Electric Demand</b>		<b>kW</b>	
New Tank Size	3	Gallons	
Hot Water Temperature	140	'F	
Average Room Temperature	70	'F	
Standby Losses (% by Volume)	2.5%		( 2.5% of stored capacity per hour, per U.S. Department of Energy )
Standby Losses (Heat Loss)	0.0	MBH	
Annual Standby Hot Water Load	434	MBTU/yr	
Prop Annual Hot Water Demand (w/ standby losses)	276,574	MBTU/yr	
Proposed Avg. Hot water heater efficiency	90%		Based on Lochinvar Model AW-399
Proposed Total Annual Energy Required	307,304	MBTU/yr	
Proposed Fuel Use	3,073	Therms/yr	Standby Losses and inefficient DHW heater eliminated
Elec Utility Demand Unit Cost	\$4.80	\$/kW	
Elec Utility Supply Unit Cost	\$0.12	\$/kWh	
NG Utility Unit Cost	\$1.14	\$/Therm	
Existing Operating Cost of DHW	\$10,729	\$/yr	
Proposed Operating Cost of DHW	\$3,503	\$/yr	
<b>Annual Utility Cost Savings</b>	<b>\$7,226</b>	<b>\$/yr</b>	

**Daily Hot Water Demand**

FIXTURE	*BASE WATER USE GPM	DURATION OF USE (MIN)	#USES PER DAY		FULL TIME OCCUPANTS**		TOTAL GAL/DAY
			MALE	FEMALE	MALE	FEMALE	
LAVATORY (Low-Flow Lavs use 0.5 GPM)	2.5	0.25	3	3	800	800	3000
SHOWER	2.5	5	1	1			0
KITCHEN SINK	2.5	0.5	1	1			0
MOP SINK	2.5	2	1	1			0

Roxbury BOE - NJBPU  
 CHA Project #24454  
 Roxbury High School

**ECM-2 Replace Electric DHW Heater**

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
80 Gallon Gas Fired Condensing Hot Water Heater	1	EA	\$ 10,000	\$ 1,000					\$ 11,000	
Miscellaneous Electrical	1	EA	\$ 150			\$ 150	\$ -	\$ -	\$ 150	
Venting Kit	1	EA	\$ 450	\$ 650		\$ -	\$ -	\$ -	\$ -	
Miscellaneous Piping and Valves	1	LS	\$ 200			\$ -	\$ -	\$ -	\$ 1,100	

\$ 12,250	Subtotal
\$ -	0% Contingency
\$ -	0% Contractor O&P
\$ -	Engineering
<b>\$ 12,300</b>	<b>Total</b>

ECM # 3

TITLE: **Enthalpy Economizer**  
 PROJECT: **CHA Project # 24454**  
 SITE: **Roxbury High School**

DESCRIPTION: Use outside air to cool the building whenever the outside air has a lower total heat content (enthalpy) than the return air. Outside enthalpy conditions below the return air conditions (24 btu/#) can be used to cool the building. (Confirm Cooling and Heating Operation).

GIVEN:	Electrical Energy Cost	=		\$ 0.1240 /kWh	(From Bill)	
	Conversion Factor	=		3,413 Btu/Kw		
	Conversion Factor	=		12,000 Btu/Ton		
ASSUMPTION:	Air Handling Unit Capacity (Cfm)	=		12,000 cfm	(From Site)	
	Maximum Outdoor Air Available	=		2,030 cfm		
	Percent Ventilation Air	=		16.9%		
	Cooling Efficiency	=		1.40 Kw/Ton		
	Summer Return Air Temperature	=	50% RH	80 F	30 Enthalpy	Design
	Non-Summer Return Air Temperature	=	30% RH	72	24 Enthalpy	Minimum
	Wet Bulb-Enthalpy Setpoint	=			23.5 btu/# air	
	OA Temperature for start of cooling system =				55 F	(Assumption)
	OA Temperature for start of heating system =				50 F	(Assumption)
	Cooling Supply Air Temperature (SAT) =				55 F	(Assumption)
Cooling Supply Air Enthalpy (SAH) =				23 btu/# air	(Assumption)	

FORMULA:

Mixed Air Temperature (MAT) = (OA% x (OAT-RAT))-RAT OAT=Outside Air Temperature, RAT=Return Air Temperature  
 Mixed Air Enthalpy (MAH) = (OA% x (OAH-RAH))-RAH OAH=Outside Air Enthalpy, RAH=Return Air Enthalpy  
 Cooling Load (MBH) = (4.5 x cfm x (Mixed Air Enthalpy - Return Air Enthalpy) [Calculated for each bin-hr]  
 Chiller Load (MBH) = Same as Cooling load if chiller is on [Calculated for each bin-hr]  
 Economizer Savings (mbh) = (4.5 x Return Air CFM x (RA Enthalpy - OA Enthalpy) [Calculated for each bin-hr]  
 Total Cooling Load (MBH) = (Cooling Load x hours/bin x (1 MBH/1000 btu)) [Calculated for each bin]  
 Cooling Energy (kwh) = (Ventilation Cooling Load x (1 Ton/12 MBH) x Cooling Efficiency)  
 Return Air Quantity (cfm) = Air Handling Unit Capacity (Cfm) x (1-Percent Ventilation Air)  
 Energy Cost = (Energy) x \$/kwh  
 Energy Savings = (Original Energy) - (Proposed Energy)  
 Energy Savings Cost = (Original Ventilation Energy Cost) - (Proposed Ventilation Energy Cost)  
 Cost of Cooling (\$/MMbh) = (Electrical Cost (\$/Kwh)) x (Cooling Efficiency (Kw/Ton)) / (12,000 btu/Ton) x (1,000,000 btu/MMbh)

Calculations

Sample for chart below

% OA	OA Temp.	RA Temp.	RA Temp.	
Mixed Air Temperature = ((	16.9%	) x (	91 - 80	) + (
				80)
				= 81.9 F
Mixed Air Enthalpy = ((	16.9%	) x (	37.6 - 30.0	) + (
				30.0)
				= 31.3 F
Cooling Load = (	4.5	) x (	12,000	) x (
				31.3 - 23)
				= 447,426 MBH
Economizer Savings (mbh) = (	4.5	) x (	9,970	) x (
				24.0 - 24.9)
				= (40,378) MBH
Total Cooling Load = (	447,426	) x (	57	) / (
				1,000)
				= 25,503 MBH

REFERENCES:

Below are the annual outside temperature bins from Bin Maker Plus (a weather analysis software) Choose data based on drybulb with enthalpy reference based on hours of operation. When comparing drybulb to enthalpy economizer, drybulb set point must be reduced to operate properly.

CALCULATION:

OA Temp	Constant	RA CFM	RA Enthalpy	OA Enthalpy	Hours	Mixed Air Enthalpy at Min. OA	Bin Cooling Load w/o Economizer	Bin Chiller Load w/o Economizer	Bin Economiz er Savings	Wet Bulb Economiz er Status	Total Cooling w/o Economizer	Total Cooling with Economiz er
91	( 4.5 )*(	9,970 )*(	30.0 -	37.6	57	31.3	447,426	447,426	-	Cooling	25,503	25,503
89	( 4.5 )*(	9,970 )*(	29.6 -	37.1	58	30.9	424,865	424,865	-	Cooling	24,642	24,642
87	( 4.5 )*(	9,970 )*(	29.0 -	36.3	73	30.2	388,766	388,766	-	Cooling	28,380	28,380
85	( 4.5 )*(	9,970 )*(	27.8 -	34.8	88	28.9	321,082	321,082	-	Cooling	28,255	28,255
83	( 4.5 )*(	9,970 )*(	26.5 -	33.2	104	27.6	248,885	248,885	-	Cooling	25,884	25,884
81	( 4.5 )*(	9,970 )*(	26.4 -	33.1	149	27.5	244,373	244,373	-	Cooling	36,412	36,412
79	( 4.5 )*(	9,970 )*(	25.3 -	31.8	147	26.4	185,713	185,713	-	Cooling	27,300	27,300
77	( 4.5 )*(	9,970 )*(	25.1 -	31.5	110	26.2	172,176	172,176	-	Cooling	18,939	18,939
75	( 4.5 )*(	9,970 )*(	24.9 -	31.3	211	26.0	163,151	163,151	-	Cooling	34,425	34,425
73	( 4.5 )*(	9,970 )*(	24.6 -	30.9	352	25.7	145,102	145,102	-	Cooling	51,076	51,076
71	( 4.5 )*(	9,970 )*(	24.0 -	29.1	246	24.9	100,589	100,589	-	Cooling	24,745	24,745
69	( 4.5 )*(	9,970 )*(	24.0 -	28.8	270	24.8	97,848	97,848	-	Cooling	26,419	26,419
67	( 4.5 )*(	9,970 )*(	24.0 -	27.3	283	24.6	84,145	84,145	-	Cooling	23,813	23,813
65	( 4.5 )*(	9,970 )*(	24.0 -	26.1	332	24.4	73,183	73,183	-	Cooling	24,297	24,297
63	( 4.5 )*(	9,970 )*(	24.0 -	24.9	301	24.2	62,221	62,221	-	Cooling	18,729	18,729
61	( 4.5 )*(	9,970 )*(	24.0 -	23.5	339	23.9	49,432	49,432	22,433	Economize	16,758	9,153
59	( 4.5 )*(	9,970 )*(	24.0 -	22.6	173	23.8	41,211	41,211	41,211	Economize	7,130	0
57	( 4.5 )*(	9,970 )*(	24.0 -	21.5	302	23.6	31,162	31,162	31,162	Economize	9,411	-
55	( 4.5 )*(	9,970 )*(	24.0 -	20.3	454	23.4	20,200	-	-	Heating	-	-
53	( 4.5 )*(	9,970 )*(	24.0 -	19.2	282	23.2	10,152	-	-	Heating	-	-
51	( 4.5 )*(	9,970 )*(	24.0 -	17.8	287	23.0	-	-	-	Heating	-	-
49	( 4.5 )*(	9,970 )*(	24.0 -	16.7	195	22.8	-	-	-	Heating	-	-
47	( 4.5 )*(	9,970 )*(	24.0 -	16.1	237	22.7	-	-	-	Heating	-	-
45	( 4.5 )*(	9,970 )*(	24.0 -	15.3	205	22.5	-	-	-	Heating	-	-
43	( 4.5 )*(	9,970 )*(	24.0 -	14.5	259	22.4	-	-	-	Heating	-	-
41	( 4.5 )*(	9,970 )*(	24.0 -	13.7	194	22.3	-	-	-	Heating	-	-
39	( 4.5 )*(	9,970 )*(	24.0 -	13	258	22.1	-	-	-	Heating	-	-
37	( 4.5 )*(	9,970 )*(	24.0 -	12.3	402	22.0	-	-	-	Heating	-	-
35	( 4.5 )*(	9,970 )*(	24.0 -	11.5	267	21.9	-	-	-	Heating	-	-
33	( 4.5 )*(	9,970 )*(	24.0 -	10.6	323	21.7	-	-	-	Heating	-	-
31	( 4.5 )*(	9,970 )*(	24.0 -	9.9	277	21.6	-	-	-	Heating	-	-
29	( 4.5 )*(	9,970 )*(	24.0 -	9.2	238	21.5	-	-	-	Heating	-	-
27	( 4.5 )*(	9,970 )*(	24.0 -	8.5	185	21.4	-	-	-	Heating	-	-
25	( 4.5 )*(	9,970 )*(	24.0 -	7.8	157	21.3	-	-	-	Heating	-	-
23	( 4.5 )*(	9,970 )*(	24.0 -	7.1	127	21.1	-	-	-	Heating	-	-
21	( 4.5 )*(	9,970 )*(	24.0 -	6.4	129	21.0	-	-	-	Heating	-	-
19	( 4.5 )*(	9,970 )*(	24.0 -	5.9	161	20.9	-	-	-	Heating	-	-
17	( 4.5 )*(	9,970 )*(	24.0 -	5.3	110	20.8	-	-	-	Heating	-	-
15	( 4.5 )*(	9,970 )*(	24.0 -	4.6	81	20.7	-	-	-	Heating	-	-
13	( 4.5 )*(	9,970 )*(	24.0 -	4	61	20.6	-	-	-	Heating	-	-
11	( 4.5 )*(	9,970 )*(	24.0 -	3.4	49	20.5	-	-	-	Heating	-	-
9	( 4.5 )*(	9,970 )*(	24.0 -	2.9	51	20.4	-	-	-	Heating	-	-
7	( 4.5 )*(	9,970 )*(	24.0 -	2.4	42	20.3	-	-	-	Heating	-	-
5	( 4.5 )*(	9,970 )*(	24.0 -	1.8	30	20.2	-	-	-	Heating	-	-
3	( 4.5 )*(	9,970 )*(	24.0 -	1.3	25	20.2	-	-	-	Heating	-	-
1	( 4.5 )*(	9,970 )*(	24.0 -	0.7	24	20.1	-	-	-	Heating	-	-
-1	( 4.5 )*(	9,970 )*(	24.0 -	0.2	11	20.0	-	-	-	Heating	-	-

<b>RESULT:</b>	Subtotal =	8716	2,050,627	2,020,274	94,806	373,591	349,446
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	Mbh	BTU/Ton	Kw/Ton	Mbh/MMBH			
Existing =	( 373,591 ) / (	12,000 ) x (	1.40 ) x (	1000 ) =		43,586 kwh	
New =	( 349,446 ) / (	12,000 ) x (	1.40 ) x (	1000 ) =		40,769 kwh	2,817
	kwh						
Existing =	( 43,586 ) x (	\$ 0.124 ) =				\$ 5,405	
New =	( 40,769 ) x (	\$ 0.124 ) =				\$ 5,055	

Result	Annual Existing Costs (kWh)	43,586 kWh/yr	\$5,405	
	Annual Existing Costs \$		\$5,405	
	Annual New Costs (kWh)	40,769 kWh/yr	\$5,055	
	Annual New Costs \$		\$5,055	
100%	Annual Savings (kWh)	2,817 kWh/yr	\$349	
	Total Savings \$		\$349	6.5% of existing
80%	Annual Savings (kWh)	2,254 kWh/yr	\$279	
	Total Savings \$		\$279	5.2% of existing

COMMENTS:



Roxbury BOE - NJBPU  
 CHA Project #24454  
 Roxbury High School

**ECM 3 Install Enthalpy Economizers On Rooftop Units**

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Enthalpy Economizer Hood	1	1	\$ 1,200	\$ 200		\$ 1,200	\$ 200	\$ -	\$ 1,400	
Miscellaneous Electrical	1	1	\$ 500	\$ -		\$ 500	\$ -	\$ -	\$ 500	

\$ 1,900	Subtotal
\$ -	0% Contingency
\$ -	0% Contractor O&P
\$ -	Engineering
<b>\$ 1,900</b>	<b>Total</b>

Roxbury BOE - NJBPU  
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 Roxbury High School

**ECM-4 Install Demand Control Ventilation For the Gym, Cafeteria and Faculty Dining Room AHU's**

Assumed RTU total CFM= 12000  
 Assumed OA % =20% =2400 CFM  
 Assumed reduction in OA to 10%- 1200 CFM

**Appendix H - ECM Calculations**

Blended Electric Rate	\$	0.124 per kWh
Blended Natural Gas Rate	\$	1.140 per therm

**ECM-1 Demand Control Ventilation**

Facility Ventilation Heating Load		492,480 BTU/Hour <sup>1,2,3</sup>
Facility Ventilation Cooling Load(Sensible)		12,960 BTU/Hour <sup>1,2,4</sup>
Existing Ventilation Heating Usage		4,925 therms <sup>5</sup>
Proposed Ventilation Heating Load		49,248 BTU/Hour <sup>1,2,3</sup>
Proposed Ventilation Cooling Load		10,800 BTU/Hour <sup>1,2,4</sup>
Proposed Ventilation Heating Usage		492 therms
<b>Total heating savings</b>		<b>4432 therms</b>
<b>Total cooling savings</b>		<b>2160 kWh</b>
<b>Total cost savings</b>	<b>\$</b>	<b>829</b>
<b>Estimated Total Project Cost</b>	<b>\$</b>	<b>2,000</b>
<b>Simple Payback</b>		<b>2.4 years</b>

Assumptions

- 1 12,000 AHU OA flow (20% of 4000 cfm- assumed)
- 2 1,200 Proposed AHU OA flow (20% of 4000 cfm- assumed)
- 3 38 °F, Assumed average heating Δt
- 4 10 °F, Assumed average cooling Δt
- 5 1,000 AHU run hours per heating/cooling seasons
- 6 50% Estimated OA reduction during low occupancy periods





Roxbury BOE - NJBPU  
 CHA Project #24454  
 Roxbury High School

**ECM-4 Install Demand Control Ventilation For the Gym, Cafeteria and Faculty Dining Room AHU's Cost**

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
CO2 Sensors	2	EA	\$ 750	\$ 500		\$ 1,500	\$ 1,000	\$ -	\$ 2,500	
DDC Programming	1	EA	\$ -	\$ 750		\$ -	\$ 750	\$ -	\$ 750	
Miscellaneous Electrical	1	EA	\$ 500	\$ 250		\$ 500	\$ 250	\$ -	\$ 750	

\$ 4,000	Subtotal
\$ -	0% Contingency
\$ -	0% Contractor O&P
<b>\$ 4,000</b>	<b>Total</b>

Roxbury BOE - NJBPU  
 CHA Project #24454  
 Roxbury High School

ECM-5 Replace Roof and Upgrade Insulation

Area of Roof	170,000 SF	Cooling System Efficiency	1.4 kW/ton	Heating System Efficiency	75%
Existing Infiltration Factor	0.20 cfm/SF	Ex Occupied Cng Temp.	72 *F	Heating On Point	55 *F
Proposed Infiltration Factor	0.20 cfm/SF	Ex Unoccupied Cng Temp.	78 *F	Ex Occupied Htg Temp.	72 *F
Existing U Value	0.053 Btuh/SF*F	Cooling Occ Enthalpy Setpoint	27.5 Btu/lb	Ex Unoccupied Htg Temp.	65 *F
Proposed U Value	0.033 Btuh/SF*F	Cooling Unocc Enthalpy Setpoint	27.5 Btu/lb	Electricity	\$ 0.124 \$/kWh
				Natural Gas	\$ 1.14 \$/Therm

Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	EXISTING LOADS			PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY			
		Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Occupied		Unoccupied		Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy therms	Proposed Heating Energy therms
					Wall Infiltration & Heat Load BTUH	Wall Infiltration & Heat Load BTUH	Wall Infiltration & Heat Load BTUH	Wall Infiltration & Heat Load BTUH				
A		B	C	D	E	F	G	H	I	J	K	L
97.5	55.7	9	3	6	-4,542,758	-4,489,074	-4,459,100	-4,425,100	4734	4659	0	0
92.5	49.1	69	25	44	-3,488,221	-3,434,537	-3,420,967	-3,386,967	27802	27363	0	0
87.5	42.5	132	47	85	-2,433,684	-2,380,000	-2,382,833	-2,348,833	36947	36359	0	0
82.5	39.5	344	123	221	-1,929,947	-1,876,263	-1,895,500	-1,861,500	76070	75196	0	0
77.5	36.6	566	202	364	-1,441,511	0	-1,423,467	0	33996	33570	0	0
72.5	34.0	755	270	485	-998,974	0	-997,333	0	31426	31374	0	0
67.5	31.6	780	279	501	0	0	0	0	0	0	0	0
62.5	29.2	889	318	572	0	0	0	0	0	0	0	0
57.5	27.0	742	265	477	0	0	0	0	0	0	0	0
52.5	24.5	627	224	403	890,514	570,842	826,540	529,833	0	0	5,727	5,315
47.5	21.4	725	259	466	1,118,851	799,179	1,038,473	741,767	0	0	8,829	8,195
42.5	18.7	795	284	511	1,347,187	1,027,516	1,250,407	953,700	0	0	12,102	11,232
37.5	16.2	784	280	504	1,575,524	1,255,853	1,462,340	1,165,633	0	0	14,321	13,292
32.5	14.4	682	244	438	1,803,861	1,484,189	1,674,273	1,377,567	0	0	14,534	13,490
27.5	12.6	345	123	222	2,032,198	1,712,526	1,886,207	1,589,500	0	0	8,403	7,799
22.5	10.7	229	82	147	2,260,535	1,940,863	2,098,140	1,801,433	0	0	6,275	5,824
17.5	8.6	189	68	122	2,488,872	2,169,200	2,310,073	2,013,367	0	0	5,754	5,341
12.5	6.8	70	25	45	2,717,208	2,397,537	2,522,007	2,225,300	0	0	2,344	2,176
7.5	5.5	20	7	13	2,945,545	2,625,874	2,733,940	2,437,233	0	0	731	678
2.5	4.1	8	3	5	3,173,882	2,854,211	2,945,873	2,649,167	0	0	317	294
<b>TOTALS</b>		<b>8,760</b>	<b>3,129</b>	<b>5,631</b>					210975	208521	<b>79,336</b>	<b>73,637</b>

Existing Ceiling Infiltration	34,000 cfm
Existing Ceiling Heat Transfer	8,947 Btuh*F
Proposed Ceiling Infiltration	34,000 cfm
Proposed Ceiling Heat Transfer	5,667 Btuh*F

Savings	5,699	Therms	\$ 6,497
	2,454	kWh	\$ 304
			<b>\$ 6,802</b>

**Roxbury BOE - NJBPU  
CHA Project #24454  
Roxbury High School**

**ECM-6 Booster Heater Conversion (Electric to Gas)**

**DESCRIPTION:** When fuel costs are less expensive than electric, converting from electric to fuel heating results in reduce cost.

<b>GIVEN:</b>	Electrical Energy Cost	=	\$0.124	\$/kWh
	Electrical Demand Cost	=	\$ 4.80	\$/kW
	Fuel Energy Cost	=	\$1.14	\$/Therm (Nat'l Gas)
	Booster Heater Capacity	=	54	Kw
	Operation (Hours/Day)	=	4.00	Hours/Day
	Operation (Days/Year)	=	180.00	Day/Year
	Operation (Hours/Year)	=	720	Hours/Year
<b>ASSUMPTION:</b>	Efficiency (Fuel)	=	80%	
	Efficiency (Electric)	=	100%	
	Operating Months per Year	=	10	
	Scheduled Usage	=	30%	
	Utilization Factor (Demand)	=	30%	

**FORMULA:**  
 Energy Use (Kwh) = (Capacity(Kw)) x (Hours of Operation/Year) x (Scheduled Usage) / (Efficiency)  
 Fuel Use (Unit) = (Electrical Use(Kwh)) x (3413 btu/kw) x (Electrical Efficiency) / (Fuel Efficiency) / (Heating Value of Fuel)  
 Energy Demand (Kw) = (Capacity (Kw)) x (Months/Year) x (Demand Utilization Factor)  
 Electrical Energy Cost (\$) = (Energy Cost (Kwh) x (\$/Kwh)) + (Demand (Kw) x (\$/Kw))  
 Fuel Energy Cost (\$) = ((Fuel Use(Unit) x Fuel Cost(\$/Unit))

**CALCULATION:**

Electric Usage = (	Capacity	Hours/Year	Scheduled Usage	Efficiency	=	11,664 Kwh	
	54 )x(	720 )x(	30% )/(	100% ) =			
Fuel Usage = (	Electrical Use	Conversion	Efficiency (Electric)	Efficiency (Fuel)	Conversion	=	498 Therm
	11,664 )x(	3,413 ) x (	100% )/(	80% )/(	100,000 ) =		
Electric Demand = (	Capacity	Months/Year	Utilization Factor	=	162 Kw		
	54 )*(	10 )*(	30% ) =				
Existing Energy Cost = (	Kwh	\$/kwh	Kw	\$/Kw	=	\$ 2,224	
	11,664 )*(	\$0.124 )+(	162 )*(	\$4.80 ) =			
Proposed Energy Cost = (	Therm	\$/fuel unit	=	\$ 567			
	498 )*(	\$1.140 ) =					

**Result**

<b>Existing Annual Use=</b>	11,664 Kwh	162 Kw	\$ 2,224
<b>Proposed Annual Use=</b>		498 Therm	\$ 567
<b>100% Annual Savings=</b>	11,664 Kwh	162 Kw	\$ 1,657
<b>Savings as Percent of Existing</b>	=	(498) Therm	74%
<b>80% Annual Savings=</b>	9,331 Kwh	130 Kw	\$ 1,325
<b>Savings as Percent of Existing</b>	=	(398) Therm	60%

**COMMENTS:**

\$/MCF (Nat'l Gas)	1	1,030,000	btu/MCF	MCF	Mbh/MCF	1.030	MMbh/MCF	1.030
\$/CCF (Nat'l Gas)	2	103,000	btu/CCF	CCF	Mbh/CCF	103	MMbh/CCF	0.103
\$/CF (Nat'l Gas)	3	1,030	btu/CF	CF	Mbh/CF	1.030	MMbh/CF	0.001
\$/Therm (Nat'l Gas)	4	100,000	btu/Therm	Therm	Mbh/Therm	100	MMbh/Therm	0.100
\$/gal (LP Gas)	5	91,500	btu/gallon	gallons	Mbh/gallon	91.5	MMbh/gallon	0.092
\$/gal (Fuel Oil #2)	6	139,000	btu/gallon	gallons	Mbh/gallon	139	MMbh/gallon	0.139
\$/lb Steam	7	975	btu/lb Steam	lb Steam	Mbh/lb Steam	0.975	MMbh/lb Steam	0.001
\$/1000 lbs Steam	8	975,000	btu/1000 lbs Steam	1000 lbs Steam	Mbh/1000 lbs Steam	975	MMbh/1000 lbs Steam	0.975

Roxbury BOE - NJBPU  
 CHA Project #24454  
 Roxbury High School

**ECM 6 Replace Electric Dishwasher Booster Heater**

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Electric Booster Heater Removal	1	LS		\$ 300		\$ -	\$ 300	\$ -	\$ 300	
(1) Natural Gas Fired Booster Heater	1	LS	\$ 10,750	\$ 600		\$ 10,750	\$ 600	\$ -	\$ 11,350	
Miscellaneous Electrical	1	LS	\$ 450			\$ 450	\$ -	\$ -	\$ 450	
Miscellaneous Piping and Valves	1	LS	\$ 3,000			\$ 3,000	\$ -	\$ -	\$ 3,000	

\$ 15,100	Subtotal
\$ -	0% Contingency
\$ -	0% O&P
\$ -	Engineering
<b>\$ 15,100</b>	<b>Total</b>

Roxbury BOE - NJBPU  
 CHA Project #24454  
 Roxbury High School

**ECM-7 Replace Windows**

Linear Feet of window Edge	1,048.0 LF	Cooling System Efficiency	1.4 kW/ton	Heating System Efficiency	80%
Area of window glass	1,152.0 SF	Ex Occupied Cng Temp.	74 °F	Heating On Temp.	55 °F
Existing Infiltration Factor	0.20 cfm/LF	Ex Unoccupied Cng Temp.	78 °F	Ex Occupied Htg Temp.	68 °F
Proposed Infiltration Factor	0.10 cfm/LF	Cooling Occ Enthalpy Setpoint	27.5 Btu/lb	Ex Unoccupied Htg Temp.	60 °F
Existing U Value	0.60 Btuh/SF°F	Cooling Unocc Enthalpy Setpoint	27.5 Btu/lb	Electricity	\$ 0.124 \$/kWh
Proposed U Value	0.45 Btuh/SF°F			Natural Gas	\$ 1.14 \$/therm

Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	EXISTING LOADS			PROPOSED LOADS				COOLING ENERGY		HEATING ENERGY	
		Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Occupied Window	Unoccupied Window	Occupied Window	Unoccupied Window	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy Therms	Proposed Heating Energy Therms
					Infiltration & Heat Load BTUH	Infiltration & Heat Load BTUH	Infiltration & Heat Load BTUH	Infiltration & Heat Load BTUH				
A		B	C	D	E	F	G	H	I	J	K	L
102.5	50.1	0	0	0	-41,016	-38,251	-25,433	-23,359	0	0	0	0
97.5	42.5	3	1	2	-30,391	-27,626	-19,256	-17,183	10	6	0	0
92.5	39.5	34	11	23	-24,106	-21,341	-15,250	-13,176	88	55	0	0
87.5	36.6	131	43	88	-17,914	-15,150	-11,290	-9,216	245	151	0	0
82.5	34.0	500	164	336	-12,006	-9,241	-7,472	-5,398	592	354	0	0
77.5	31.6	620	203	417	-6,286	0	-3,748	0	149	89	0	0
72.5	29.2	664	217	447	0	0	0	0	0	0	0	0
67.5	27.0	854	280	574	0	0	0	0	0	0	0	0
62.5	24.5	927	303	624	0	0	0	0	0	0	0	0
57.5	21.4	600	196	404	0	0	0	0	0	0	0	0
52.5	18.7	610	200	410	14,222	6,882	9,790	4,737	0	0	71	49
47.5	16.2	611	200	411	18,810	11,470	12,947	7,895	0	0	106	73
42.5	14.4	656	215	441	23,398	16,057	16,105	11,053	0	0	151	104
37.5	12.6	1,023	335	688	27,986	20,645	19,263	14,211	0	0	295	203
32.5	10.7	734	240	494	32,574	25,233	22,421	17,369	0	0	254	175
27.5	8.6	334	109	225	37,162	29,821	25,579	20,526	0	0	135	93
22.5	6.8	252	83	170	41,749	34,409	28,737	23,684	0	0	116	80
17.5	5.5	125	41	84	46,337	38,997	31,895	26,842	0	0	65	45
12.5	4.1	47	15	32	50,925	43,584	35,053	30,000	0	0	27	19
7.5	2.6	22	7	15	55,513	48,172	38,211	33,158	0	0	14	10
2.5	1.0	13	4	9	60,101	52,760	41,369	36,316	0	0	9	6
0.0	0.0	0	0	0	62,395	55,054	42,948	37,895	0	0	0	0
<b>TOTALS</b>		<b>8,760</b>	<b>2,868</b>	<b>5,892</b>					1084	656	<b>1,241</b>	<b>855</b>

Existing Window Infiltration	210 cfm	<b>Savings</b>	387 Therms	\$ 441
Existing Window Heat Transfer	691 Btuh/°F		429 kWh	\$ 53
Proposed Window Infiltration	105 cfm			
Proposed Window Heat Transfer	518 Btuh/°F			\$ 494

Window ID	Location	Quantity	Width (ft)	Height (ft)	Linear Feet (LF)	Area (SF)	Infiltration Rate (CFM/LF)	U Value (Btuh/SF°F)	Infiltration (CFM)	Heat Transfer (Btuh/°F)
1	North Top	12	3.5	8	276.0	336.0	0.2	0.6	55.2	201.6
2	North Bottom	12	3.5	8	276.0	336.0	0.2	0.6	55.2	201.6
3	South Top	18	6	2.5	306.0	270.0	0.2	0.6	61.2	162.0
4	South Bottom	0	3.5	3.5	0.0	0.0	0.2	0.6	0.0	0.0
5	East Top	0	3.5	2.5	0.0	0.0	0.2	0.6	0.0	0.0
6	East Bottom	0	3.5	3.5	0.0	0.0	0.2	0.6	0.0	0.0
7	West Top	0	3.5	2.5	0.0	0.0	0.2	0.6	0.0	0.0
8	West Bottom	10	6	3.5	190.0	210.0	0.2	0.6	38.0	126.0
<b>Total</b>		<b>52</b>	<b>33</b>	<b>34</b>	<b>1,048.0</b>	<b>1,152.0</b>	<b>0.20</b>	<b>0.60</b>	<b>209.6</b>	<b>691.2</b>

**Energy Audit of Roxbury High School**  
**CHA Project No.24454**

**ECM-1 Lighting Replacements**

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
<b>\$16,395</b>	<b>29.8</b>	<b>55,998</b>	<b>0</b>	<b>\$8,400</b>	<b>0</b>	<b>\$8,400</b>	<b>\$3,195</b>	<b>2.0</b>	<b>1.6</b>

\*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

**ECM-2 Install Occupancy Sensors**

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
<b>\$50,625</b>	<b>0.0</b>	<b>122,358</b>	<b>0</b>	<b>\$13,092</b>	<b>0</b>	<b>\$13,092</b>	<b>\$8,750</b>	<b>3.9</b>	<b>3.2</b>

\*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

**ECM-3 Lighting Replacements with Occupancy Sensors**

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
<b>\$67,020</b>	<b>29.8</b>	<b>163,928</b>	<b>0</b>	<b>\$19,949</b>	<b>0</b>	<b>\$19,949</b>	<b>\$11,945</b>	<b>3.4</b>	<b>2.8</b>

\*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures



Energy Audit of Roxbury High School  
 CHA Project No.24454  
 ECM-1 Lighting Replacements

Cost of Electricity: \$0.107 \$/kWh  
 \$6.74 \$/kWh

EXISTING CONDITIONS									RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS								
Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback	
15 Main Office/Guidance Common	45	S 32 C F 2 (ELE)	F42LL	60	2.7	SW	2400	6,480	45	S 32 C F 2 (ELE)	F42LL	60	2.7	SW	2400	6480	0.00	0.00	\$ -	\$ -	\$ -			
15 Main Office/Guidance Common	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1728	0.00	0.00	\$ -	\$ -	\$ -			
4 Main Office/Guidance Common	10	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.7	SW	2400	1,728	10	2T 17 R F 2 (ELE)	F22LL	33	0.33	SW	2400	792	936.00	0.39	\$ 131.70	\$ 1,012.50	\$ 100.00	7.7	1.0	
15 Main Office N.W. Storage Small	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	60	0.00	0.00	\$ -	\$ -	\$ -			
15 Main Office N.W. Storage Large	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	1000	180	0.00	0.00	\$ -	\$ -	\$ -			
15 Main Office Copy Room	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2400	432	0.00	0.00	\$ -	\$ -	\$ -			
15 Principal's Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -			
15 Assistant Principal's Office 1	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -			
15 Assistant Principal's Office 2	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -			
245 Conference Room	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2400	1056	0.00	0.00	\$ -	\$ -	\$ -			
15 School Resource	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -			
15 Central Main Office Closet 1	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -			
15 Central Main Office Closet 2	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -			
15 Main Office Men's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	\$ -	\$ -	\$ -			
198 Main Office Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -			
15 Main Office Women's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	\$ -	\$ -	\$ -			
198 Main Office Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -			
15 Counselor	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -			
15 Counselor A	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -			
15 Guidance Director Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -			
15 Guidance Storage Small	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -			
15 Guidance Storage Large	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	360	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	1000	360	0.00	0.00	\$ -	\$ -	\$ -			
15 Counselor B	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -			
15 Counselor C	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -			
15 Counselor E	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -			
15 Counselor F	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -			
15 Counselor G	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -			
15 Counselor H	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -			
15 Guidance Meeting Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -			
15 Guidance Conference Room	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1296	0.00	0.00	\$ -	\$ -	\$ -			
15 Assistant Principal's Office 3	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -			
15 Athletic Office	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -			
146 Gym	29	High Bay MH 400	MH400/1	458	13.3	SW	2400	31,877	29	P 54 C F 4	FC20	20	0.58	SW	2400	1,392	30,484.80	12.70	\$ 4,289.21	\$ 8,700.00	\$ 2,900.00	2.0	0.2	
254 Gym	6	T 32 R F 4 (ELE)	F44LL	118	0.7	SW	2400	1,699	6	T 32 R F 4 (ELE)	F44LL	118	0.708	SW	2400	1699.2	0.00	0.00	\$ -	\$ -	\$ -			
15 Gym	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2400	432	0.00	0.00	\$ -	\$ -	\$ -			
15 Gym	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2400	432	0.00	0.00	\$ -	\$ -	\$ -			
15 N. Gym Closet	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	60	0.00	0.00	\$ -	\$ -	\$ -			
15 S. Gym Closet	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	60	0.00	0.00	\$ -	\$ -	\$ -			
15 Aux Gym Small	32	S 32 C F 2 (ELE)	F42LL	60	1.9	SW	2400	4,608	32	S 32 C F 2 (ELE)	F42LL	60	1.92	SW	2400	4608	0.00	0.00	\$ -	\$ -	\$ -			
20 Aux Gym Small Storage	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	1000	128	0.00	0.00	\$ -	\$ -	\$ -			
15 Aux Gym Large	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2400	5,760	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2400	5760	0.00	0.00	\$ -	\$ -	\$ -			
15 Aux Gym Large Storage	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	1000	128	0.00	0.00	\$ -	\$ -	\$ -			
15 Gym Area Boys' Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	480	0.00	0.00	\$ -	\$ -	\$ -			
15 Gym Area Girls' Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	480	0.00	0.00	\$ -	\$ -	\$ -			
15 Boy's Locker Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2800	672	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2800	672	0.00	0.00	\$ -	\$ -	\$ -			
15 Boy's Locker Room	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2800	1,008	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2800	1008	0.00	0.00	\$ -	\$ -	\$ -			
20 Boy's Locker Room	27	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2800	2,419	27	S 32 C F 1 (ELE)	F41LL	32	2.864	SW	2800	2419.2	0.00	0.00	\$ -	\$ -	\$ -			
15 Boy's Locker Room	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2800	1,680	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2800	1680	0.00	0.00	\$ -	\$ -	\$ -			
108 Boy's Locker Room	12	I65	I65/1	65	0.8	SW	2800	2,184	12	CF 26	CF026/1-L	27	0.324	SW	2800	907.2	1276.80	0.46	\$ 173.50	\$ 243.00	\$ -	1.4	0.2	
245 Boy's Locker Room	12	T 32 R F 3 (ELE)	F43LE	110	1.3	SW	2800	3,696	12	T 32 R F 3 (ELE)	F43LE	110	1.32	SW	2800	3696	0.00	0.00	\$ -	\$ -	\$ -			
20 Boy's Locker Room	27	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2800	2,419	27	S 32 C F 1 (ELE)	F41LL	32	2.864	SW	2800	2419.2	0.00	0.00	\$ -	\$ -	\$ -			
20 Boy's Locker Room	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2800	717	8	S 32 C F 1 (ELE)	F41LL	32	0.256	SW	2800	716.8	0.00	0.00	\$ -	\$ -	\$ -			
15 Boy's Locker Room	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2800	504	3	S 32 C F 2 (ELE)	F42LL													



EXISTING CONDITIONS									RETROFIT CONDITIONS						COST & SAVINGS ANALYSIS									
Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Incentive	Simple Payback With Out Incentive	Simple Payback	
15 H174A	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 H174B	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20 H175	28	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2400	2,150	28	S 32 C F 1 (ELE)	F41LL	32	0.896	SW	2400	2,150.4	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20 H175	28	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2400	2,150	28	S 32 C F 1 (ELE)	F41LL	32	0.896	SW	2400	2,150.4	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 H175A	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	144	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 H175B	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	60	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 H176	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1,728	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 K181	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1,728	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 K181	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,152	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	2400	1,152	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 K181A	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	240	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 K181B	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	240	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 K182	17	S 32 C F 2 (ELE)	F42LL	60	1.0	SW	2400	2,448	17	S 32 C F 2 (ELE)	F42LL	60	1.02	SW	2400	2,448	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 K182	16	S 32 C F 2 (ELE)	F42LL	60	1.0	SW	2400	2,304	16	S 32 C F 2 (ELE)	F42LL	60	0.96	SW	2400	2,304	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
254 K182A	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	1000	118	1	T 32 R F 4 (ELE)	F44LL	118	0.118	SW	1000	118	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
254 K182B	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	1000	236	2	T 32 R F 4 (ELE)	F44LL	118	0.236	SW	1000	236	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
254 K182C	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	1000	118	1	T 32 R F 4 (ELE)	F44LL	118	0.118	SW	1000	118	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 K182D	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20 K182F	2	S 32 C F 2 (ELE)	F42LL	60	0.0	SW	1000	32	2	S 32 C F 2 (ELE)	F42LL	60	0.032	SW	1000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 K182G	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 I100	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2400	5,760	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2400	5,760	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 I101	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2400	5,760	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2400	5,760	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Cafeteria	39	S 32 C F 2 (ELE)	F42LL	60	2.3	SW	1600	3,744	39	S 32 C F 2 (ELE)	F42LL	60	2.34	SW	1600	3,744	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Cafeteria	37	S 32 C F 2 (ELE)	F42LL	60	2.2	SW	1600	3,552	37	S 32 C F 2 (ELE)	F42LL	60	2.22	SW	1600	3,552	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
108 Cafeteria	48	I65	I65/1	65	3.1	SW	1600	4,992	48	CF 26	CFQ26/1-L	27	1.296	SW	1600	2073.6	2918.40	1.82	\$ 459.79	\$ 972.00	\$ -	2.1	0.3	
5 Teacher's Cafeteria	15	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.9	SW	1600	1,440	15	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.9	SW	1600	1,440	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 E. Kitchen Service	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	1600	1,440	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	1600	1,440	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 W. Kitchen Service	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	1600	1,440	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	1600	1,440	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Cafeteria Closet	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	240	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Kitchen	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	1600	2,016	21	S 32 C F 2 (ELE)	F42LL	60	1.26	SW	1600	2,016	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Kitchen	26	S 32 C F 2 (ELE)	F42LL	60	1.6	SW	1600	2,496	26	S 32 C F 2 (ELE)	F42LL	60	1.56	SW	1600	2,496	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20 Kitchen Storage A	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	1000	128	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Kitchen Storage B	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	1000	180	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Kitchen Storage C	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	1000	180	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20 Kitchen Storage D	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	1000	384	12	S 32 C F 1 (ELE)	F41LL	32	0.384	SW	1000	384	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Kitchen Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Kitchen Office	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Kitchen Bathroom/Locker	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20 N. Mechanical Room	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20 N. Mechanical Room Storage	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	1000	192	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 N. Mechanical Room Locker	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2800	1,008	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2800	1,008	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 N. Mechanical Room Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2000	1,488	4	S 32 C F 2 (ELE)	F42LL	60	1.24	SW	2000	480	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 A102	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 A103	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 A104	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1,728	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 A105	24	S 32 C F 2 (ELE)	F42LL	60	1.4	SW	2400	3,456	24	S 32 C F 2 (ELE)	F42LL	60	1.44	SW	2400	3,456	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 A106	14	S 32 C F 2 (ELE)	F42LL	60	0.8	SW	2400	2,016	14	S 32 C F 2 (ELE)	F42LL	60	0.84	SW	2400	2,016	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 A106	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	1,008	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	2400	1,008	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 A Principal	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Special Services	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Special Services	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2400	432	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Special Services	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 B Hall Men's Bathroom	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	360	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2000	360	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
198 B Hall Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 B Hall Women's Bathroom	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	360	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2000	360	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
198 B Hall Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20 B&G Side Office	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	2400	307.2	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Home Economics Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 B113	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 B113	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2400	720	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2400	720								



EXISTING CONDITIONS									RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS								
Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Incentive	Simple Payback With Out Incentive	Simple Payback	
20 F152S	10	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	768	10	S 32 C F 1 (ELE)	F41LL	32	0.32	SW	2400	768	0.00	0.00	\$ -	\$ -	\$ -			
15 F153	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -			
20 F153 Office 1	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2400	230.4	0.00	0.00	\$ -	\$ -	\$ -			
20 F153 Office 2	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2400	153.6	0.00	0.00	\$ -	\$ -	\$ -			
15 B&G	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -			
5 B&G	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2400	144	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	2400	144	0.00	0.00	\$ -	\$ -	\$ -			
15 B&G Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	\$ -	\$ -	\$ -			
5 A.S.	4	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2400	576	4	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -			
20 F154S	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	614	8	S 32 C F 1 (ELE)	F41LL	32	0.256	SW	2400	614.4	0.00	0.00	\$ -	\$ -	\$ -			
15 F154S Back Room	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	360	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	1000	360	0.00	0.00	\$ -	\$ -	\$ -			
15 F Hall Boys Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	480	0.00	0.00	\$ -	\$ -	\$ -			
15 F Hall Girls Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2000	480	0.00	0.00	\$ -	\$ -	\$ -			
20 F Hall Closet	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1000	96	0.00	0.00	\$ -	\$ -	\$ -			
15 G161	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -			
15 G162	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160	0.00	0.00	\$ -	\$ -	\$ -			
15 G163	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160	0.00	0.00	\$ -	\$ -	\$ -			
15 G164	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -			
15 G165	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160	0.00	0.00	\$ -	\$ -	\$ -			
15 G165/G166 Storage	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	420	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	1000	420	0.00	0.00	\$ -	\$ -	\$ -			
15 G166	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160	0.00	0.00	\$ -	\$ -	\$ -			
15 G167	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -			
15 G168	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -			
245 E. Main Entrance Lobby	12	T 32 R F 3 (ELE)	F43LE	110	1.3	SW	2280	3,010	12	T 32 R F 3 (ELE)	F43LE	110	1.32	SW	2280	3,009.6	0.00	0.00	\$ -	\$ -	\$ -			
245 W. Main Entrance Lobby	13	T 32 R F 3 (ELE)	F43LE	110	1.4	SW	2280	3,264	13	T 32 R F 3 (ELE)	F43LE	110	1.43	SW	2280	3,260.4	0.00	0.00	\$ -	\$ -	\$ -			
129 W. Main Entrance Lobby	5	SP 75 I	I75 I	75	0.4	SW	2280	855	5	CF 26	CFQ26/1-L	27	0.135	SW	2280	307.8	547.20	0.24	\$ 77.96	\$ 101.25	\$ 35.00	1.3	0.1	
15 A Hallway	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	0.00	0.00	\$ -	\$ -	\$ -			
245 A Hallway	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2280	1,003	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2280	1,003.2	0.00	0.00	\$ -	\$ -	\$ -			
15 B Hallway	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	0.00	0.00	\$ -	\$ -	\$ -			
245 B Hallway	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2280	752	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2280	752.4	0.00	0.00	\$ -	\$ -	\$ -			
15 C Hallway	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	0.00	0.00	\$ -	\$ -	\$ -			
245 C Hallway	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2280	752	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2280	752.4	0.00	0.00	\$ -	\$ -	\$ -			
15 D Hallway	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	0.00	0.00	\$ -	\$ -	\$ -			
245 D Hallway	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2280	502	2	T 32 R F 3 (ELE)	F43LE	110	0.22	SW	2280	501.6	0.00	0.00	\$ -	\$ -	\$ -			
15 E Hallway	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2280	1,642	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2280	1,641.6	0.00	0.00	\$ -	\$ -	\$ -			
15 F Hallway	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736	0.00	0.00	\$ -	\$ -	\$ -			
15 G Hallway	20	S 32 C F 2 (ELE)	F42LL	60	1.1	SW	2280	2,736	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736	0.00	0.00	\$ -	\$ -	\$ -			
15 H Hallway	19	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,599	19	S 32 C F 2 (ELE)	F42LL	60	1.14	SW	2280	2,599.2	0.00	0.00	\$ -	\$ -	\$ -			
245 H Hallway	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2280	752	3	T 32 R F 3 (ELE)	F43LE	110	0.33	SW	2280	752.4	0.00	0.00	\$ -	\$ -	\$ -			
15 I Hallway	22	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	2280	3,010	22	S 32 C F 2 (ELE)	F42LL	60	1.32	SW	2280	3,009.6	0.00	0.00	\$ -	\$ -	\$ -			
15 K Hallway	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,094	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	2280	1,094.4	0.00	0.00	\$ -	\$ -	\$ -			
15 Cafeteria Hallway	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2280	1,642	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2280	1,641.6	0.00	0.00	\$ -	\$ -	\$ -			
15 Weight Room Hallway	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2280	410.4	0.00	0.00	\$ -	\$ -	\$ -			
129 Weight Room Hallway	4	SP 75 I	I75 I	75	0.3	SW	2280	684	4	CF 26	CFQ26/1-L	27	0.108	SW	2280	246.24	437.76	0.19	\$ 62.37	\$ 81.00	\$ 28.00	1.3	0.1	
15 Weight Room Hallway	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2280	684	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2280	684	0.00	0.00	\$ -	\$ -	\$ -			
129 Weight Room Hallway	5	SP 75 I	I75 I	75	0.4	SW	2280	855	5	CF 26	CFQ26/1-L	27	0.135	SW	2280	307.8	547.20	0.24	\$ 77.96	\$ 101.25	\$ 35.00	1.3	0.1	
15 S. Rear Entranceway 1	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2280	410.4	0.00	0.00	\$ -	\$ -	\$ -			
15 S. Rear Entranceway 2	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2280	410.4	0.00	0.00	\$ -	\$ -	\$ -			
15 S. Rear Entranceway 3	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2280	410.4	0.00	0.00	\$ -	\$ -	\$ -			
245 A Hall Stairwell	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2280	1,254	5	T 32 R F 3 (ELE)	F43LE	110	0.55	SW	2280	1,254	0.00	0.00	\$ -	\$ -	\$ -			
245 B Hall Stairwell	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2280	1,003	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2280	1,003.2	0.00	0.00	\$ -	\$ -	\$ -			
245 C Hall Stairwell	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2280	1,254	5	T 32 R F 3 (ELE)	F43LE	110	0.55	SW	2280	1,254	0.00	0.00	\$ -	\$ -	\$ -			
245 D Hall Stairwell	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2280	1,003	4	T 32 R F 3 (ELE)	F43LE	110	0.44	SW	2280	1,003.2	0.00	0.00	\$ -	\$ -	\$ -			



EXISTING CONDITIONS									RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS							
Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Incentive	Simple Payback With Incentive	Simple Payback
20	M218	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2400	153.6	0.00	0.00	\$ -	\$ -	\$ -		
15	M218 Storage	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	0.00	0.00	\$ -	\$ -	\$ -		
15	N221	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	N222	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	N223	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728	12	S 32 C F 2 (ELE)	F42LL	60	0.72	SW	2400	1,728	0.00	0.00	\$ -	\$ -	\$ -		
15	N223A	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	240	0.00	0.00	\$ -	\$ -	\$ -		
15	N223B	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -		
15	N224	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	N225	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -		
15	N225A	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	60	0.00	0.00	\$ -	\$ -	\$ -		
15	N226	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	N227	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	N228	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	N229	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	O231	S 32 C F 2 (ELE)	F42LL	60	0.8	SW	2400	1,872	13	S 32 C F 2 (ELE)	F42LL	60	0.78	SW	2400	1,872	0.00	0.00	\$ -	\$ -	\$ -		
20	O232 Book Room	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	1000	128	0.00	0.00	\$ -	\$ -	\$ -		
15	O233	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	O234	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	O235	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	O236	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	O237	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	O238	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
20	O Hall S. Mechanical Room	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	1000	192	0.00	0.00	\$ -	\$ -	\$ -		
20	O Hall N. Mechanical Room	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	1000	256	8	S 32 C F 1 (ELE)	F41LL	32	0.256	SW	1000	256	0.00	0.00	\$ -	\$ -	\$ -		
15	P241	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	0.00	0.00	\$ -	\$ -	\$ -		
15	P242	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	0.00	0.00	\$ -	\$ -	\$ -		
15	P243	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160	0.00	0.00	\$ -	\$ -	\$ -		
15	P244	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	0.00	0.00	\$ -	\$ -	\$ -		
15	P245	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	0.00	0.00	\$ -	\$ -	\$ -		
15	P246	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	P247	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	0.00	0.00	\$ -	\$ -	\$ -		
15	P248	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	0.00	0.00	\$ -	\$ -	\$ -		
15	P249	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880	0.00	0.00	\$ -	\$ -	\$ -		
20	Q251	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	2400	307.2	0.00	0.00	\$ -	\$ -	\$ -		
15	Q251	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -		
15	Q251A	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -		
15	Q251B	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -		
15	Q Hall Boys Bathroom	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600	0.00	0.00	\$ -	\$ -	\$ -		
15	Q Hall Girls Bathroom	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600	0.00	0.00	\$ -	\$ -	\$ -		
20	Q Hall Electrical Room 1	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	1000	128	0.00	0.00	\$ -	\$ -	\$ -		
20	Q Hall Electrical Room 2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1000	96	0.00	0.00	\$ -	\$ -	\$ -		
20	Q Hall Electrical Room 2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	1000	64	0.00	0.00	\$ -	\$ -	\$ -		
20	Q255C	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
15	Upper Library Entranceway	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	547	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2280	547.2	0.00	0.00	\$ -	\$ -	\$ -		
52	Upper Library Balcony	S 32 6 Square	F46LL	182	2.9	SW	2400	6,989	16	S 32 6 Square	F46LL	182	2.912	SW	2400	6,988.8	0.00	0.00	\$ -	\$ -	\$ -		
15	Upper Library Office	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -		
20	AV Room	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	1,075	14	S 32 C F 1 (ELE)	F41LL	32	0.448	SW	2400	1,075.2	0.00	0.00	\$ -	\$ -	\$ -		
15	Copy Room	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	Teacher's Lounge	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	864	0.00	0.00	\$ -	\$ -	\$ -		
5	Teacher's Lounge Kitchen	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2400	576	4	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -		
15	TV Room 1	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	864	0.00	0.00	\$ -	\$ -	\$ -		
15	TV Room 2	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -		
20	TV Room 2	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2400	77	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2400	76.8	0.00	0.00	\$ -	\$ -	\$ -		
15	TV Room 2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2400	288	0.00	0.00	\$ -	\$ -	\$ -		
15	TV Room 2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	144	0.00	0.00	\$ -	\$ -	\$ -		
15	R260	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	R261	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
15	R262	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2400	864	0.00	0.00	\$ -	\$ -	\$ -		
15	R262	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2400	576	0.00	0.00	\$ -	\$ -	\$ -		
20	R262	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2400	153.6	0.00	0.00	\$ -	\$ -	\$ -		
15	R263	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296	9	S 32 C F 2 (ELE)	F42LL	60	0.54	SW	2400	1,296	0.00	0.00	\$ -	\$ -	\$ -		
20	R264C	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	S 32 C F 1 (ELE)													



EXISTING CONDITIONS										RETROFIT CONDITIONS						COST & SAVINGS ANALYSIS							
Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
15 Main Office/Guidance Common	45	S 32 C F 2 (ELE)	F42LL	60	2.7	SW	2400	6,480.0	45	S 32 C F 2 (ELE)	F42LL	60	2.7	C-OCC	1200	3240	3240.00	0.00	\$ 346.68	\$ 202.50	\$ 35.00	0.6	0.5
15 Main Office/Guidance Common	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1200	864	864.00	0.00	\$ 92.45	\$ 202.50	\$ 35.00	2.2	1.8
4 Main Office/Guidance Common	10	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.7	SW	2400	1,728.0	10	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.7	C-OCC	1200	864	864.00	0.00	\$ 92.45	\$ 202.50	\$ 35.00	2.2	1.8
15 Main Office N.W. Storage Small	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Main Office N.W. Storage Large	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180.0	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Main Office Copy Room	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	216	216.00	0.00	\$ 23.11	\$ 202.50	\$ 35.00	8.8	7.2
15 Principal's Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4
15 Assistant Principal's Office 1	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4
15 Assistant Principal's Office 2	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4
245 Conference Room	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2400	1,056.0	4	T 32 R F 3 (ELE)	F43LE	110	0.4	C-OCC	1200	528	528.00	0.00	\$ 56.50	\$ 202.50	\$ 35.00	3.6	3.0
15 School Resource	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9
15 Central Main Office Closet 1	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Central Main Office Closet 2	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Main Office Men's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Main Office Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Main Office Women's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Main Office Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Counselor	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9
15 Counselor A	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9
15 Guidance Director Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4
15 Guidance Storage Small	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Guidance Storage Large	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	360.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	360	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Counselor B	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9
15 Counselor C	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9
15 Counselor E	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9
15 Counselor F	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9
15 Counselor G	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9
15 Counselor H	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9
15 Guidance Meeting Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4
15 Guidance Conference Room	4	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1200	648	648.00	0.00	\$ 69.34	\$ 202.50	\$ 35.00	2.9	2.4
15 Assistant Principal's Office 3	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9
15 Athletic Office	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9
146 Gym	29	High Bay MH 400	MH400/1	458	13.3	SW	2400	31,876.8	29	High Bay MH 400	MH400/1	458	13.3	C-OCC	1680	22313.76	9563.04	0.00	\$ 1,023.25	\$ 202.50	\$ 35.00	0.2	0.2
254 Gym	6	T 32 R F 4 (ELE)	F44LL	118	0.7	SW	2400	1,699.2	6	T 32 R F 4 (ELE)	F44LL	118	0.7	C-OCC	1680	1189.44	509.76	0.00	\$ 54.54	\$ 202.50	\$ 35.00	3.7	3.1
15 Gym	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1680	302.4	129.60	0.00	\$ 13.87	\$ 202.50	\$ 35.00	14.6	12.1
15 Gym	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1680	302.4	129.60	0.00	\$ 13.87	\$ 202.50	\$ 35.00	14.6	12.1
15 N. Gym Closet	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 S. Gym Closet	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Aux Gym Small	32	S 32 C F 2 (ELE)	F42LL	60	1.9	SW	2400	4,608.0	32	S 32 C F 2 (ELE)	F42LL	60	1.9	C-OCC	1680	3225.6	1382.40	0.00	\$ 147.92	\$ 202.50	\$ 35.00	1.4	1.1
20 Aux Gym Small Storage	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128.0	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Aux Gym Large	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2400	5,760.0	40	S 32 C F 2 (ELE)	F42LL	60	2.4	C-OCC	1680	4032	1728.00	0.00	\$ 184.90	\$ 202.50	\$ 35.00	1.1	0.9
20 Aux Gym Large Storage	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128.0	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Gym Area Boys' Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Gym Area Girls' Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Boy's Locker Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2800	672.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	2000	480	192.00	0.00	\$ 20.54	\$ 202.50	\$ 35.00	9.9	8.2
15 Boy's Locker Room	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2800	1,008.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	2000	720	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4
20 Boy's Locker Room	27	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2800	2,419.2	27	S 32 C F 1 (ELE)	F41LL	32	0.9	C-OCC	2000	1728	691.20	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
15 Boy's Locker Room	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	2800	1,680.0	10	S 32 C F 2 (ELE)	F42LL	60	0.6	C-OCC	2000	1200	480.00	0.00	\$ 51.36	\$ 202.50	\$ 35.00	3.9	3.3
108 Boy's Locker Room	12	I65	I65/1	65	0.8	SW	2800	2,184.0	12	I65	I65/1	65	0.8	C-OCC	2000	1560	624.00	0.00	\$ 66.77	\$ 202.50	\$ 35.00	3.0	2.5
245 Boy's Locker Room	12	T 32 R F 3 (ELE)	F43LE	110	1.3	SW	2800	3,696.0	12	T 32 R F 3 (ELE)													



EXISTING CONDITIONS										RETROFIT CONDITIONS						COST & SAVINGS ANALYSIS								
Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback	
15 H174A	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9	
15 H174B	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
20 H175	28	S 32 C F 1 (ELE)	F41LL	32	0.9	SW	2400	2,150.4	28	S 32 C F 1 (ELE)	F41LL	32	0.9	C-OCC	1680	1505.28	645.12	0.00	\$ 69.03	\$ 202.50	\$ 35.00	2.9	2.4	
15 H175A	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	72	72.00	0.00	\$ 7.70	\$ 202.50	\$ 35.00	26.3	21.7	
15 H175B	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 H176	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1680	1209.6	518.40	0.00	\$ 55.47	\$ 202.50	\$ 35.00	3.7	3.0	
15 K181	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1680	1209.6	518.40	0.00	\$ 55.47	\$ 202.50	\$ 35.00	3.7	3.0	
15 K181A	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,152.0	8	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	806.4	345.60	0.00	\$ 36.98	\$ 202.50	\$ 35.00	5.5	4.5	
15 K181B	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 K182	17	S 32 C F 2 (ELE)	F42LL	60	1.0	SW	2400	2,448.0	17	S 32 C F 2 (ELE)	F42LL	60	1.0	C-OCC	1680	1713.6	734.40	0.00	\$ 78.58	\$ 202.50	\$ 35.00	2.6	2.1	
15 K182A	16	S 32 C F 2 (ELE)	F42LL	60	1.0	SW	2400	2,304.0	16	S 32 C F 2 (ELE)	F42LL	60	1.0	C-OCC	1680	1612.8	691.20	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3	
254 K182B	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	1000	118.0	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	1000	118	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
254 K182C	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	1000	236.0	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	1000	236	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 K182D	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	1000	118.0	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	1000	118	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 K182E	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300.0	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
20 K182F	2	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 K182G	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 I100	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2400	5,760.0	40	S 32 C F 2 (ELE)	F42LL	60	2.4	C-OCC	1680	4032	1728.00	0.00	\$ 184.90	\$ 202.50	\$ 35.00	1.1	0.9	
15 I101	40	S 32 C F 2 (ELE)	F42LL	60	2.4	SW	2400	5,760.0	40	S 32 C F 2 (ELE)	F42LL	60	2.4	C-OCC	1680	4032	1728.00	0.00	\$ 184.90	\$ 202.50	\$ 35.00	1.1	0.9	
15 Cafeteria	39	S 32 C F 2 (ELE)	F42LL	60	2.3	SW	1600	3,744.0	39	S 32 C F 2 (ELE)	F42LL	60	2.3	C-OCC	1200	2808	936.00	0.00	\$ 100.15	\$ 202.50	\$ 35.00	2.0	1.7	
15 Cafeteria	37	S 32 C F 2 (ELE)	F42LL	60	2.2	SW	1600	3,552.0	37	S 32 C F 2 (ELE)	F42LL	60	2.2	C-OCC	1200	2664	888.00	0.00	\$ 95.02	\$ 202.50	\$ 35.00	2.1	1.8	
108 Cafeteria	48	I65	I65/1	65	3.1	SW	1600	4,992.0	48	I65	I65/1	65	3.1	C-OCC	1200	3744	1248.00	0.00	\$ 133.54	\$ 202.50	\$ 35.00	1.5	1.3	
5 Teacher's Cafeteria	15	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.9	SW	1600	1,440.0	15	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.9	C-OCC	1200	1080	360.00	0.00	\$ 38.52	\$ 202.50	\$ 35.00	5.3	4.3	
15 E. Kitchen Service	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	1600	1,440.0	15	S 32 C F 2 (ELE)	F42LL	60	0.9	C-OCC	1200	1080	360.00	0.00	\$ 38.52	\$ 202.50	\$ 35.00	5.3	4.3	
15 W. Kitchen Service	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	1600	1,440.0	15	S 32 C F 2 (ELE)	F42LL	60	0.9	C-OCC	1200	1080	360.00	0.00	\$ 38.52	\$ 202.50	\$ 35.00	5.3	4.3	
15 Cafeteria Closet	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 Kitchen	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	1600	2,016.0	21	S 32 C F 2 (ELE)	F42LL	60	1.3	C-OCC	1200	1512	504.00	0.00	\$ 53.93	\$ 202.50	\$ 35.00	3.8	3.1	
15 Kitchen	26	S 32 C F 2 (ELE)	F42LL	60	1.6	SW	1600	2,496.0	26	S 32 C F 2 (ELE)	F42LL	60	1.6	C-OCC	1200	1872	624.00	0.00	\$ 66.77	\$ 202.50	\$ 35.00	3.0	2.5	
20 Kitchen Storage A	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128.0	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 Kitchen Storage B	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180.0	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 Kitchen Storage C	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180.0	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	180	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
20 Kitchen Storage D	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	1000	384.0	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	1000	384	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 Kitchen Office	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4	
15 Kitchen Office	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9	
15 Kitchen Bathroom/Locker	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600.0	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
20 N. Mechanical Room	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1200	422.4	422.40	0.00	\$ 45.20	\$ 202.50	\$ 35.00	4.5	3.7	
20 N. Mechanical Room Storage	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192.0	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 N. Mechanical Room Locker	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2800	1,008.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	2000	720	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4	
15 N. Mechanical Room Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2000	480.0	4	S 32 C F 2 (ELE)	F42LL	60	1.2	C-OCC	1200	480	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	-	-
15 A102	20	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	2,880.0	20	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	2016	864.00	0.00	\$ 92.45	\$ 202.50	\$ 35.00	2.2	1.8	
15 A103	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15 A104	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1680	1209.6	518.40	0.00	\$ 55.47	\$ 202.50	\$ 35.00	3.7	3.0	
15 A105	24	S 32 C F 2 (ELE)	F42LL	60	1.4	SW	2400	3,456.0	24	S 32 C F 2 (ELE)	F42LL	60	1.4	C-OCC	1680	2419.2	1036.80	0.00	\$ 110.94	\$ 202.50	\$ 35.00	1.8	1.5	
15 A106	14	S 32 C F 2 (ELE)	F42LL	60	0.8	SW	2400	2,016.0	14	S 32 C F 2 (ELE)	F42LL	60	0.8	C-OCC	1680	1411.2	604.80	0.00	\$ 64.71	\$ 202.50	\$ 35.00	3.1	2.6	
15 A106	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	1,008.0	7	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	1680	705.6	302.40	0.00	\$ 32.36	\$ 202.50	\$ 35.00	6.3	5.2	
15 A Principal	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9	
15 Special Services	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1200	648	648.00	0.00	\$ 69.34	\$ 202.50	\$ 35.00	2.9	2.4	
15 Special Services	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	216	216.00	0.00	\$ 23.11	\$ 202.50	\$ 35.00	8.8	7.2	
15 Special Services	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9	
15 B Hall Men's Bathroom	3	S 32 C F 2 (ELE)	F4																					



EXISTING CONDITIONS									RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS							
Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
20 F152S	10	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	768.0	10	S 32 C F 1 (ELE)	F41LL	32	0.3	C-OCC	1680	537.6	230.40	0.00	\$ 24.65	\$ 202.50	\$ 35.00	8.2	6.8
15 F153	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4
20 F153 Office 1	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230.4	3	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	115.2	115.20	0.00	\$ 12.33	\$ 202.50	\$ 35.00	16.4	13.6
20 F153 Office 2	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	153.6	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	76.8	76.80	0.00	\$ 8.22	\$ 202.50	\$ 35.00	24.6	20.4
15 B&G	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4
5 B&G	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2400	144.0	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	C-OCC	1200	72	72.00	0.00	\$ 7.70	\$ 202.50	\$ 35.00	26.3	21.7
15 B&G Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	120	120.00	0.00	\$ -	\$ -	\$ -	-	-
5 A.S.	4	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2400	576.0	4	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4
20 F154S	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	614.4	8	S 32 C F 1 (ELE)	F41LL	32	0.3	C-OCC	1680	430.08	184.32	0.00	\$ 19.72	\$ 202.50	\$ 35.00	10.3	8.5
15 F154S Back Room	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	360.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	360	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 F Hall Boy's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 F Hall Girl's Bathroom	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2000	480	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 F Hall Closet	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96.0	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 G161	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0
15 G162	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160.0	15	S 32 C F 2 (ELE)	F42LL	60	0.9	C-OCC	1680	1512	648.00	0.00	\$ 69.34	\$ 202.50	\$ 35.00	2.9	2.4
15 G163	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160.0	15	S 32 C F 2 (ELE)	F42LL	60	0.9	C-OCC	1680	1512	648.00	0.00	\$ 69.34	\$ 202.50	\$ 35.00	2.9	2.4
15 G164	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0
15 G165	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160.0	15	S 32 C F 2 (ELE)	F42LL	60	0.9	C-OCC	1680	1512	648.00	0.00	\$ 69.34	\$ 202.50	\$ 35.00	2.9	2.4
15 G165/G166 Storage	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	420.0	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	420	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 G166	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160.0	15	S 32 C F 2 (ELE)	F42LL	60	0.9	C-OCC	1680	1512	648.00	0.00	\$ 69.34	\$ 202.50	\$ 35.00	2.9	2.4
15 G167	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0
15 G168	9	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0
245 E. Main Entrance Lobby	12	T 32 R F 3 (ELE)	F43LE	110	1.3	SW	2280	3,009.6	12	T 32 R F 3 (ELE)	F43LE	110	1.3	SW	2280	3,009.6	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 W. Main Entrance Lobby	13	T 32 R F 3 (ELE)	F43LE	110	1.4	SW	2280	3,264.0	13	T 32 R F 3 (ELE)	F43LE	110	1.4	SW	2280	3,264.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
129 W. Main Entrance Lobby	5	SP 75 1	I75/1	75	0.4	SW	2280	855.0	5	SP 75 1	I75/1	75	0.4	SW	2280	855	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 A Hallway	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052.0	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 A Hallway	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2280	1,003.2	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2280	1,003.2	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 B Hallway	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052.0	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 B Hallway	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2280	752.4	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2280	752.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 C Hallway	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052.0	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 C Hallway	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2280	752.4	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2280	752.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 D Hallway	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052.0	15	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 D Hallway	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2280	501.6	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2280	501.6	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 E Hallway	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2280	1,641.6	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2280	1,641.6	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 F Hallway	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736.0	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 G Hallway	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736.0	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 H Hallway	19	S 32 C F 2 (ELE)	F42LL	60	1.1	SW	2280	2,592.0	19	S 32 C F 2 (ELE)	F42LL	60	1.1	SW	2280	2,592	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 H Hallway	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2280	752.4	3	T 32 R F 3 (ELE)	F43LE	110	0.3	SW	2280	752.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 I Hallway	22	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	2280	3,009.6	22	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	2280	3,009.6	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 K Hallway	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,094.4	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,094.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Cafeteria Hallway	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2280	1,641.6	12	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2280	1,641.6	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 W. Main Entrance Hallway	3	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052.0	3	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2280	2,052	0.00	0.00	\$ -	\$ -	\$ -	-	-
129 Weight Room Hallway	4	SP 75 1	I75/1	75	0.3	SW	2280	854.4	4	SP 75 1	I75/1	75	0.3	SW	2280	854	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Weight Room Hallway	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2280	684.0	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2280	684	0.00	0.00	\$ -	\$ -	\$ -	-	-
129 Weight Room Hallway	5	SP 75 1	I75/1	75	0.4	SW	2280	855.0	5	SP 75 1	I75/1	75	0.4	SW	2280	855	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 S. Rear Entranceway 1	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410.4	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 S. Rear Entranceway 2	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410.4	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 S. Rear Entranceway 3	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410.4	3	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	410.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 A Hall Stairwell	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2280	1,254.0	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2280	1,254	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 B Hall Stairwell	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2280	1,003.2	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2280	1,003.2	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 C Hall Stairwell	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2280	1,254.0	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2280	1,254	0.00	0.00	\$ -	\$ -			



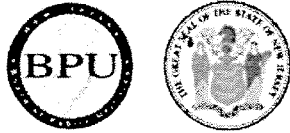
EXISTING CONDITIONS									RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS								
Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback	
20	M218	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	153.6	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1680	107.52	46.08	0.00	\$ 4.93	\$ 202.50	\$ 35.00	41.1	34.0	
15	M218 Storage	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300.0	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	1000	300	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15	N221	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	N221	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	N223	S 32 C F 2 (ELE)	F42LL	60	0.7	SW	2400	1,728.0	12	S 32 C F 2 (ELE)	F42LL	60	0.7	C-OCC	1680	1209.6	518.40	0.00	\$ 55.47	\$ 202.50	\$ 35.00	3.7	3.0	
15	N223A	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15	N223B	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15	N224	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	N225	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4	
15	N225A	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15	N226	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	N227	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	N228	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	N229	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	O231	S 32 C F 2 (ELE)	F42LL	60	0.8	SW	2400	1,872.0	13	S 32 C F 2 (ELE)	F42LL	60	0.8	C-OCC	1680	1310.4	561.60	0.00	\$ 60.09	\$ 202.50	\$ 35.00	3.4	2.8	
20	O232 Book Room	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128.0	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15	O233	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	O234	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	O235	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	O236	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	O237	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	O238	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
20	O Hall S. Mechanical Room	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192.0	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20	O Hall N. Mechanical Room	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	1000	256.0	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	1000	256	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15	P241	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880.0	20	S 32 C F 2 (ELE)	F42LL	60	1.2	C-OCC	1680	2016	864.00	0.00	\$ 92.45	\$ 202.50	\$ 35.00	2.2	1.8	
15	P242	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880.0	20	S 32 C F 2 (ELE)	F42LL	60	1.2	C-OCC	1680	2016	864.00	0.00	\$ 92.45	\$ 202.50	\$ 35.00	2.2	1.8	
15	P243	S 32 C F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160.0	15	S 32 C F 2 (ELE)	F42LL	60	0.9	C-OCC	1680	1512	648.00	0.00	\$ 69.34	\$ 202.50	\$ 35.00	2.9	2.4	
15	P244	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880.0	20	S 32 C F 2 (ELE)	F42LL	60	1.2	C-OCC	1680	2016	864.00	0.00	\$ 92.45	\$ 202.50	\$ 35.00	2.2	1.8	
15	P245	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880.0	20	S 32 C F 2 (ELE)	F42LL	60	1.2	C-OCC	1680	2016	864.00	0.00	\$ 92.45	\$ 202.50	\$ 35.00	2.2	1.8	
15	P246	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1680	907.2	388.80	0.00	\$ 41.60	\$ 202.50	\$ 35.00	4.9	4.0	
15	P247	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880.0	20	S 32 C F 2 (ELE)	F42LL	60	1.2	C-OCC	1680	2016	864.00	0.00	\$ 92.45	\$ 202.50	\$ 35.00	2.2	1.8	
15	P248	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880.0	20	S 32 C F 2 (ELE)	F42LL	60	1.2	C-OCC	1680	2016	864.00	0.00	\$ 92.45	\$ 202.50	\$ 35.00	2.2	1.8	
15	P249	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2400	2,880.0	20	S 32 C F 2 (ELE)	F42LL	60	1.2	C-OCC	1680	2016	864.00	0.00	\$ 92.45	\$ 202.50	\$ 35.00	2.2	1.8	
20	Q251	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307.2	4	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	153.6	153.60	0.00	\$ 16.44	\$ 202.50	\$ 35.00	12.3	10.2	
15	Q251	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4	
15	Q251A	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15	Q251B	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15	Q Hall Boy's Bathroom	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600.0	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15	Q Hall Girl's Bathroom	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600.0	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2000	600	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20	Q Hall Electrical Room 1	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128.0	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20	Q Hall Electrical Room 2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96.0	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20	Q Hall Electrical Room 2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20	Q255C	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1200	230.4	230.40	0.00	\$ 24.65	\$ 202.50	\$ 35.00	8.2	6.8	
15	Upper Library Entranceway	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	547.2	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2280	547.2	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
52	Upper Library Balcony	S 32 6 Square	F46LL	182	2.9	SW	2400	6,988.8	16	S 32 6 Square	F46LL	182	2.9	C-OCC	1680	4892.16	2096.64	0.00	\$ 224.34	\$ 202.50	\$ 35.00	0.9	0.7	
15	Upper Library Office	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4	
20	AV Room	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	1,075.2	14	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1200	537.6	537.60	0.00	\$ 57.52	\$ 202.50	\$ 35.00	3.5	2.9	
15	Copy Room	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2400	1,296.0	9	S 32 C F 2 (ELE)	F42LL	60	0.5	C-OCC	1200	648	648.00	0.00	\$ 69.34	\$ 202.50	\$ 35.00	2.9	2.4	
15	Teacher's Lounge	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	1200	432	432.00	0.00	\$ 46.22	\$ 202.50	\$ 35.00	4.4	3.6	
5	Teacher's Lounge Kitchen	T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2400	576.0	4	T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4	
15	TV Room 1	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	S 32 C F 2 (ELE)	F42LL	60	0.4	C-OCC	1200	432	432.00	0.00	\$ 46.22	\$ 202.50	\$ 35.00	4.4	3.6	
15	TV Room 2	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	C-OCC	1200	288	288.00	0.00	\$ 30.82	\$ 202.50	\$ 35.00	6.6	5.4	
20	TV Room 2	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2400	76.8	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	1200	38.4	38.40	0.00	\$ 4.11	\$ 202.50	\$ 35.00	49.3	40.8	
15	TV Room 2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	144	144.00	0.00	\$ 15.41	\$ 202.50	\$ 35.00	13.1	10.9	
15	TV Room 2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1200	72	72.00	0.00	\$ 7.70	\$ 202.50	\$ 35.00	26.3	21.7	
15	R260	S 32 C																						

**APPENDIX D**

**New Jersey Pay For Performance  
Incentive Program**



**HOME**      **RESIDENTIAL**      **COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT**      **RENEWABLE**



**COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT**

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[PAY FOR PERFORMANCE](#)

[EXISTING BUILDINGS](#)

[PARTICIPATION STEPS](#)

[APPLICATIONS AND FORMS](#)

[APPROVED PARTNERS](#)

[NEW CONSTRUCTION](#)

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[BECOME A PARTNER](#)

[COMBINED HEAT & POWER AND FUEL CELLS](#)

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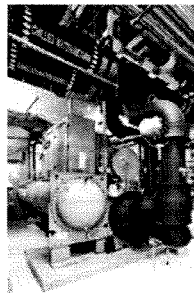
Home » Commercial & Industrial » Programs » Pay for Performance

**Pay for Performance - Existing Buildings**

**Download program applications and incentive forms.**

**The Greater the Savings, the Greater Your Incentives**

Take a comprehensive, whole-building approach to saving energy in your existing facilities and earn incentives that are directly linked to your savings. Pay for Performance relies on a network of program partners who provide technical services under direct contract to you. Acting as your energy expert, your partner will develop an energy reduction plan for each project with a whole-building technical component of a traditional energy audit, a financial plan for funding the energy efficient measures and a construction schedule for installation.



**Eligibility**

Existing commercial, industrial and institutional buildings with a peak demand over 100 kW for any of the preceding twelve months are eligible to participate including hotels and casinos, large office buildings, multi-family buildings, supermarkets, manufacturing facilities, schools, shopping malls and restaurants. Buildings that fall into the following five customer classes are not required to meet the 100 kW demand in order

to participate in the program: hospitals, public colleges and universities, 501(c)(3) non-profits, affordable multifamily housing, and local governmental entities. Your energy reduction plan must define a comprehensive package of measures capable of reducing the existing energy consumption of your building by 15% or more.

Exceptions to the 15% threshold requirement may be made for certain industrial, manufacturing, water treatment and datacenter building types whose annual energy consumption is heavily weighted on process loads. Details are available in the high energy intensity section of the FAQ page.

**ENERGY STAR Portfolio Manager**

Pay for Performance takes advantage of the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all of their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings and determine an energy performance benchmark score. You can then assess energy management goals over time, identify strategic opportunities for savings, and receive EPA recognition for superior energy performance.



This rating system assesses building performance by tracking and scoring energy use in your facilities and comparing it to similar buildings. That can be a big help in locating opportunities for cost-justified energy efficiency upgrades. And, based on our findings, you may be invited to participate in the Building Performance with ENERGY STAR initiative and receive special recognition as an industry leader in energy efficiency.

**Incentives**

Pay for Performance incentives are awarded upon the satisfactory completion of three program milestones:

**Incentive #1** - Submittal of complete energy reduction plan prepared by an approved program partner - Contingent on moving forward, incentives will be between \$5,000 and \$50,000 based on approximately \$.10 per square foot, not to exceed 50% of the facility's annual energy expense.

**Incentive #2** - Installation of recommended measures - Incentives are based on the projected level of electricity and natural gas savings resulting from the installation of comprehensive energy-efficiency measures.

**Incentive #3** - Completion of Post-Construction Benchmarking Report - A completed report verifying energy reductions based on one year of post-implementation results. Incentives for electricity and natural gas savings will be paid based on actual savings, provided that the minimum performance threshold of 15% savings has been achieved.



**Program**

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A detailed Incentive Structure document is available on the applications and forms page.

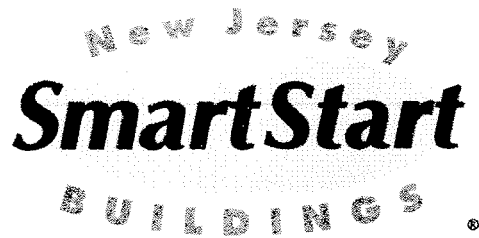
**Energy Efficiency Revolving Loan Fund (EE RLF)**

New Jersey-based commercial, institutional or industrial entities (including 501(c)(3) organizations) that have received an approved energy reduction plan under Pay for Performance may be eligible for supplemental financing through the EE RLF. The financing, in the form of low-interest loans, can be used to support up to 80% of total eligible project costs, not to exceed \$2.5 million or 100% of total eligible project costs from all public state funding sources. Visit the NJ EDA website for details.

**Steps to Participation**

[Click here](#) for a step-by-step description of the program.

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# 2012 PAY FOR PERFORMANCE PROGRAM Existing Buildings Incentive Structure

## Incentive #1: Energy Reduction Plan

Incentive Amount:..... \$0.10 per sq ft  
Minimum Incentive:..... \$5,000  
Maximum Incentive:..... \$50,000 or 50% of facility annual energy cost (whichever is less)

This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP) and is paid upon ERP approval. Incentive is contingent on implementation of recommended measures outlined in the ERP.

## Incentive #2: Installation of Recommended Measures

Minimum Performance Target:..... 15%

### Electric Incentives

Base Incentive based on 15% savings:.....\$0.09 per projected kWh saved  
For each % over 15% add:.....\$0.005 per projected kWh saved  
Maximum Incentive:.....\$0.11 per projected kWh saved

### Gas Incentives

Base Incentive based on 15% savings:.....\$0.90 per projected Therm saved  
For each % over 15% add:.....\$0.05 per projected Therm saved  
Maximum Incentive:.....\$1.25 per projected Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive is based on projected energy savings outlined in the ERP. Incentive is paid upon successful installation of recommended measures.

## Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target:..... 15%

### Electric Incentives

Base Incentive based on 15% savings:.....\$0.09 per actual kWh saved  
For each % over 15% add:.....\$0.005 per actual kWh saved  
Maximum Incentive:.....\$0.11 per actual kWh saved

### Gas Incentives

Base Incentive based on 15% savings:.....\$0.90 per actual Therm saved  
For each % over 15% add:.....\$0.05 per actual Therm saved  
Maximum Incentive:.....\$1.25 per actual Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive will be released upon submittal of a Post-Construction Benchmarking Report that verifies that the level of savings actually achieved by the installed measures meets or exceeds the minimum performance threshold. To validate the savings and achievement of the Energy Target, the EPA Portfolio Manager shall be used. Savings should be rounded to the nearest percent. Total value of Incentive #2 and Incentive #3 may not exceed 50% of the total project cost. Incentives will be limited to \$1 million per gas and electric account per building; maximum of \$2 million per project. See Participation Agreement for details.

**New Jersey Pay For Performance Incentive Program**

**Note:** The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2012. Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governments or non-profit organizations. Values used in this calculation are for measures with a positive return on investment (ROI) only.

Total Building Area (Square Feet)	218,740
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilities (BPU)

Incentive #1		
Audit is funded by NJ BPU	\$0.10	\$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	\$460,339	\$60,349
Existing Usage (from utility)	3,713,590	52,862
Proposed Savings	276,370	948
Existing Total MMBtus	17,961	
Proposed Savings MMBtus	1,038	
% Energy Reduction	5.8%	
Proposed Annual Savings	\$41,793	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
	\$/kWh	\$/therm	\$/kWh	\$/therm	\$/kWh	\$/therm	\$/kWh	\$/therm
Incentive #2	\$0.09	\$0.90	\$0.005	\$0.05	\$0.11	\$1.25	\$0.00	\$0.00
Incentive #3	\$0.09	\$0.90	\$0.005	\$0.05	\$0.11	\$1.25	\$0.00	\$0.00

	Incentives \$		
	Elec	Gas	Total
Incentive #1	\$0	\$0	\$21,874
Incentive #2	\$0	\$0	\$0
Incentive #3	\$0	\$0	\$0
<b>Total All Incentives</b>	<b>\$0</b>	<b>\$0</b>	<b>\$21,874</b>

<b>Total Project Cost</b>	\$100,320
---------------------------	-----------

		Allowable Incentive
% Incentives #1 of Utility Cost*	4.2%	\$21,874
% Incentives #2 of Project Cost**	0.0%	\$0
% Incentives #3 of Project Cost**	0.0%	\$0
<b>Total Eligible Incentives***</b>		<b>\$21,874</b>
<b>Project Cost w/ Incentives</b>		<b>\$78,446</b>

Project Payback (years)	
w/o Incentives	w/ Incentives
2.4	1.9

\* Maximum allowable incentive is 50% of annual utility cost if not funded by NJ BPU, and %25 if it is.

\*\* Maximum allowable amount of Incentive #2 is 25% of total project cost.

Maximum allowable amount of Incentive #3 is 25% of total project cost.

\*\*\* Maximum allowable amount of Incentive #1 is \$50,000 if not funded by NJ BPU, and \$25,000 if it is.

Maximum allowable amount of Incentive #2 & #3 is \$1 million per gas account and \$1 million per electric account; maximum 2 million per project

## **APPENDIX E**

### **Energy Savings Improvement Plan Information**



**Your Power to Save**  
At Home, for Business, and for the Future

HOME

RESIDENTIAL

COMMERCIAL, INDUSTRIAL  
AND LOCAL GOVERNMENT

RENEWABLE ENERGY



## COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

### PROGRAMS

- ▶ NJ SMARTSTART BUILDINGS
- ▶ PAY FOR PERFORMANCE
- ▶ COMBINED HEAT & POWER AND FUEL CELLS
- ▶ LOCAL GOVERNMENT ENERGY AUDIT
- LARGE ENERGY USERS PILOT
- ENERGY SAVINGS IMPROVEMENT PLAN
- ▶ DIRECT INSTALL
- ENERGY BENCHMARKING
- T-12 SCHOOLS LIGHTING INITIATIVE
- OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
- EDA PROGRAMS
- ▶ TEACH
- ▶ ARRA
- ▶ TECHNOLOGIES
- ▶ TOOLS AND RESOURCES
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## Energy Savings Improvement Plan

A new State law allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the "Energy Savings Improvement Program" (ESIP), provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

This [Local Finance Notice](#) outlines how local governments can develop and implement an ESIP for their facilities. Below are two sample RFPs:

- ▶ [Local Government](#)
- ▶ [School Districts \(K-12\)](#)

The Board also adopted [protocols](#) to measure energy savings.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs. Local units considering an ESIP should carefully review the Local Finance Notice, the law, and consult with qualified professionals to determine how they should approach the task.

### FIRST STEP – ENERGY AUDIT

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. As explained in the Local Finance Notice, this may be done internally if an agency has qualified staff to conduct the audit. If not, the audit must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

Pursuing a [Local Government Energy Audit](#) through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach - and it's free. **Incentives provide 100% of the cost of the audit.**

### ENERGY REDUCTION PLANS

If you have an ESIP plan you would like to submit to the Board of Public Utilities, please email it to [ESIP@bpu.state.nj.us](mailto:ESIP@bpu.state.nj.us). Please limit the file size to 3MB (or break it into smaller files).

- ▶ [Frankford Township School District](#)
- ▶ [Northern Hunterdon-Voorhees Regional High School](#)
- ▶ [Manalapan Township \(180 MB - Right Click, Save As\)](#)

### Program Updates

- ▶ [Board Order - Standby Charges for Distributed Generation Customers](#)
  - ▶ [T-12 Schools Lighting Replacement Initiative - Funding Allocation Reached](#)
- [Other updates posted.](#)

### Featured Success Story

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Continued Commitment to Saving Energy



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## **APPENDIX F**

### **Photovoltaic (PV) Rooftop Solar Power Generation**

**Photovoltaic (PV) Solar Power Generation - Screening Assessment**

**Roxbury Township Board Of Education  
Roxbury High School**

Cost of Electricity	\$0.124	/kWh
Electricity Usage	3,713,590	kWh/yr
System Unit Cost	\$4,000	/kW

**Photovoltaic (PV) Solar Power Generation - Screening Assessment**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
	\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
360000	90	112407	0	13938	0	13938	0	7306	25.82866982	16.94596121

\*\* Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= 65 /1000kwh

**Area Output\***

1715.764 m2  
18,468 ft2

**Perimeter Output\***

124.632 m  
409 ft

**Available Roof Space for PV:**

(Area Output - 10 ft x Perimeter) x 85%  
12,222 ft2

**Approximate System Size:**

Is the roof flat? (Yes/No) **Yes**

8 watt/ft2  
97,780 DC watts  
90 kW

Enter into PV Watts

**PV Watts Inputs\*\*\***

Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)

Array Tilt Angle 20  
Array Azimuth 180  
Zip Code 07876  
DC/AC Derate Factor 0.83

if pitched - enter estimated roof angle  
Enter into PV Watts (default)  
Enter into PV Watts  
Enter info PV Watts

**PV Watts Output**

112,407 annual kWh calculated in PV Watts program

**% Offset Calc**

Usage 3,713,590 (from utilities)  
PV Generation 112,407 (generated using PV Watts )  
% offset 3%



\* <http://www.freemaptools.com/area-calculator.htm>  
\*\* <http://www.flettexchange.com>  
\*\*\* [http://gisatnrel.nrel.gov/PVWatts\\_View/index.html](http://gisatnrel.nrel.gov/PVWatts_View/index.html)



\*\*\*

# AC Energy & Cost Savings



(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	90.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	74.7 kW
Array Type:	Fixed Tilt
Array Tilt:	20.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	12.4 ¢/kWh

Results			
Month	Solar Radiation (kWh/m <sup>2</sup> /day)	AC Energy (kWh)	Energy Value (\$)
1	2.78	6574	815.18
2	3.54	7574	939.18
3	4.35	10028	1243.47
4	4.95	10629	1318.00
5	5.69	12341	1530.28
6	5.86	11937	1480.19
7	5.73	11918	1477.83
8	5.47	11259	1396.12
9	4.91	10087	1250.79
10	3.99	8749	1084.88
11	2.68	5872	728.13
12	2.35	5438	674.31
Year	4.36	112407	13938.47

Output Hourly Performance Data

Output Results as Text

\*

[About the Hourly Performance Data](#)

[Saving Text from a Browser](#)

Run [PVWATTS v.1](#) for another US location or an International location  
 Run [PVWATTS v.2](#) (US only)

Please send questions and comments regarding PVWATTS to [Webmaster](#)

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## **APPENDIX G**

### **EPA Portfolio Manager**



# STATEMENT OF ENERGY PERFORMANCE

## Roxbury High School

Building ID: 3209986  
 For 12-month Period Ending: May 31, 2012<sup>1</sup>  
 Date SEP becomes ineligible: N/A

Date SEP Generated: August 17, 2012

**Facility**  
 Roxbury High School  
 1 Bryant Dr  
 Succasunna, NJ 07876

**Facility Owner**  
 N/A

**Primary Contact for this Facility**  
 N/A

**Year Built:** 1971  
**Gross Floor Area (ft<sup>2</sup>):** 281,740

**Energy Performance Rating<sup>2</sup> (1-100)** 33

### Site Energy Use Summary<sup>3</sup>

Electricity - Grid Purchase(kBtu)	12,670,772
Natural Gas (kBtu) <sup>4</sup>	5,286,260
Total Energy (kBtu)	17,957,032

### Energy Intensity<sup>4</sup>

Site (kBtu/ft <sup>2</sup> /yr)	64
Source (kBtu/ft <sup>2</sup> /yr)	170

### Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO <sub>2</sub> e/year)	2,076
---	-------

### Electric Distribution Utility

Jersey Central Power & Light Co [FirstEnergy Corp]

### National Median Comparison

National Median Site EUI	55
National Median Source EUI	146
% Difference from National Median Source EUI	16%
Building Type	K-12 School

### Meets Industry Standards<sup>5</sup> for Indoor Environmental Conditions:

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

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

**Certifying Professional**  
 N/A

#### Notes:

- 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.
- 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.
- Values represent energy consumption, annualized to a 12-month period.
- Values represent energy intensity, annualized to a 12-month period.
- 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.

## 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	<input checked="" type="checkbox"/>
<b>Building Name</b>	Roxbury High School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		<input type="checkbox"/>
<b>Type</b>	K-12 School	Is this an accurate description of the space in question?		<input type="checkbox"/>
<b>Location</b>	1 Bryant Dr, Succasunna, NJ 07876	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		<input type="checkbox"/>
<b>Single Structure</b>	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.		<input type="checkbox"/>
School (K-12 School)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
<b>Gross Floor Area</b>	281,740 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.		<input type="checkbox"/>
<b>Open Weekends?</b>	No (Default)	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.		<input type="checkbox"/>
<b>Number of PCs</b>	493 (Default)	Is this the number of personal computers in the K12 School?		<input type="checkbox"/>
<b>Number of walk-in refrigeration/freezer units</b>	3 (Default)	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		<input type="checkbox"/>
<b>Presence of cooking facilities</b>	Yes (Default)	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".		<input type="checkbox"/>
<b>Percent Cooled</b>	100 % (Default)	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		<input type="checkbox"/>
<b>Percent Heated</b>	100 % (Default)	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		<input type="checkbox"/>
<b>Months</b>	N/A(Optional)	Is this school in operation for at least 8 months of the year?		<input type="checkbox"/>

<b>High School?</b>	Yes	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'.		<input type="checkbox"/>
---------------------	-----	--	--	--------------------------

## ENERGY STAR® Data Checklist for Commercial Buildings

### Energy Consumption

**Power Generation Plant or Distribution Utility:** Jersey Central Power & Light Co [FirstEnergy Corp]

Fuel Type: Electricity		
<b>Meter: Electricity (kWh (thousand Watt-hours))</b> <b>Space(s): Entire Facility</b> <b>Generation Method: Grid Purchase</b>		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
05/01/2012	05/31/2012	245,493.00
04/01/2012	04/30/2012	263,098.00
03/01/2012	03/31/2012	280,703.00
02/01/2012	02/29/2012	334,590.00
01/01/2012	01/31/2012	396,466.00
12/01/2011	12/31/2011	327,775.00
11/01/2011	11/30/2011	308,135.00
10/01/2011	10/31/2011	300,410.00
09/01/2011	09/30/2011	286,050.00
08/01/2011	08/31/2011	300,990.00
07/01/2011	07/31/2011	357,793.00
06/01/2011	06/30/2011	312,088.00
<b>Electricity Consumption (kWh (thousand Watt-hours))</b>		<b>3,713,591.00</b>
<b>Electricity Consumption (kBtu (thousand Btu))</b>		<b>12,670,772.49</b>
<b>Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))</b>		<b>12,670,772.49</b>
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		<input type="checkbox"/>
Fuel Type: Natural Gas		
<b>Meter: Natural Gas (therms)</b> <b>Space(s): Entire Facility</b>		
Start Date	End Date	Energy Use (therms)
05/01/2012	05/31/2012	1,103.00
04/01/2012	04/30/2012	2,731.10
03/01/2012	03/31/2012	4,410.70
02/01/2012	02/29/2012	8,105.20
01/01/2012	01/31/2012	10,392.00
12/01/2011	12/31/2011	13,936.80
11/01/2011	11/30/2011	6,395.60
10/01/2011	10/31/2011	1,870.00
09/01/2011	09/30/2011	635.20
08/01/2011	08/31/2011	639.80

07/01/2011	07/31/2011	1,627.70
06/01/2011	06/30/2011	1,015.50
<b>Natural Gas Consumption (therms)</b>		<b>52,862.60</b>
<b>Natural Gas Consumption (kBtu (thousand Btu))</b>		<b>5,286,260.00</b>
<b>Total Natural Gas Consumption (kBtu (thousand Btu))</b>		<b>5,286,260.00</b>
<b>Is this the total Natural Gas consumption at this building including all Natural Gas meters?</b>		<input type="checkbox"/>

<b>Additional Fuels</b>	
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.	<input type="checkbox"/>

<b>On-Site Solar and Wind Energy</b>	
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.	<input type="checkbox"/>

## 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**  
Roxbury High School  
1 Bryant Dr  
Succasunna, NJ 07876

**Facility Owner**  
N/A

**Primary Contact for this Facility**  
N/A

## General Information

Roxbury High School	
Gross Floor Area Excluding Parking: (ft <sup>2</sup> )	281,740
Year Built	1971
For 12-month Evaluation Period Ending Date:	May 31, 2012

## Facility Space Use Summary

School	
Space Type	K-12 School
Gross Floor Area (ft <sup>2</sup> )	281,740
Open Weekends? <sup>d</sup>	No
Number of PCs <sup>d</sup>	493
Number of walk-in refrigeration/freezer units <sup>d</sup>	3
Presence of cooking facilities <sup>d</sup>	Yes
Percent Cooled <sup>d</sup>	100
Percent Heated <sup>d</sup>	100
Months <sup>o</sup>	N/A
High School?	Yes
School District <sup>o</sup>	N/A

## Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 05/31/2012)	Baseline (Ending Date 07/31/2011)	Rating of 75	Target	National Median
Energy Performance Rating	33	19	75	N/A	50
Energy Intensity					
Site (kBtu/ft <sup>2</sup> )	64	79	43	N/A	55
Source (kBtu/ft <sup>2</sup> )	170	199	114	N/A	146
Energy Cost					
\$/year	\$ 520,689.16	\$ 630,016.61	\$ 350,366.46	N/A	\$ 447,985.46
\$/ft <sup>2</sup> /year	\$ 1.85	\$ 2.24	\$ 1.24	N/A	\$ 1.59
Greenhouse Gas Emissions					
MtCO <sub>2</sub> e/year	2,076	2,447	1,397	N/A	1,786
kgCO <sub>2</sub> e/ft <sup>2</sup> /year	7	9	5	N/A	6

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:

<sup>o</sup> - This attribute is optional.

<sup>d</sup> - A default value has been supplied by Portfolio Manager.

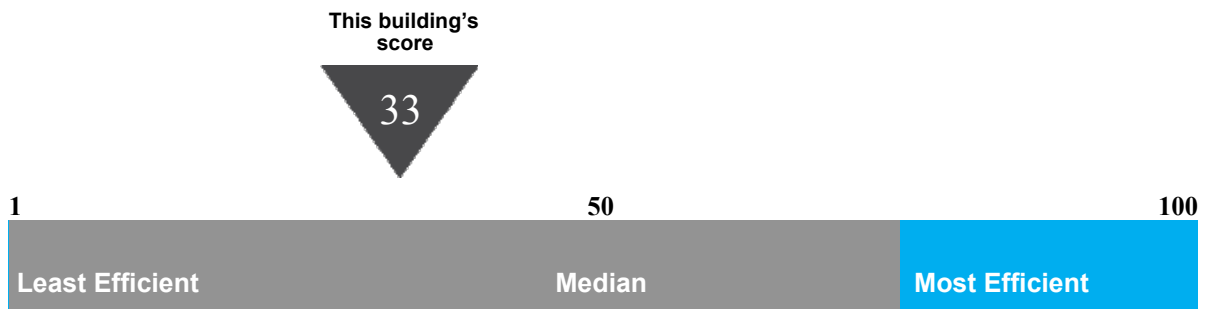
# Statement of Energy Performance

## 2012

Roxbury High School  
1 Bryant Dr  
Succasunna, NJ 07876

Portfolio Manager Building ID: 3209986

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](http://energystar.gov/benchmark).



This building uses 170 kBtu per square foot per year.\*

\*Based on source energy intensity for the 12 month period ending May 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](http://energystar.gov)

Date of certification

