

**WEST DEPTFORD TOWNSHIP  
PUBLIC SCHOOL DISTRICT**

**RED BANK ELEMENTARY SCHOOL**

**192 PHILADELPHIA AVENUE  
THOROFARE, NJ 08086**

**FACILITY ENERGY REPORT**

**TABLE OF CONTENTS**

I.	HISTORIC ENERGY CONSUMPTION/COST.....	2
II.	FACILITY DESCRIPTION .....	7
III.	MAJOR EQUIPMENT LIST .....	10
IV.	ENERGY CONSERVATION MEASURES.....	11
V.	ADDITIONAL RECOMMENDATIONS .....	28

Appendix A – ECM Cost & Savings Breakdown

Appendix B – New Jersey Smart Start® Program Incentives

Appendix C – Portfolio Manager “Statement of Energy Performance”

Appendix D – Major Equipment List

Appendix E – Investment Grade Lighting Audit

## I. HISTORIC ENERGY CONSUMPTION/COST

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

Electric Utility Provider:	Public Service Electric & Gas
Electric Utility Rate Structure:	Large Power & Lighting Service (LPLS)
Third Party Supplier:	South Jersey Energy Company

Natural Gas Utility Provider:	Public Service Electric & Gas
Utility Rate Structure:	Large Volume Gas (LVG)
Third Party Supplier:	Hess

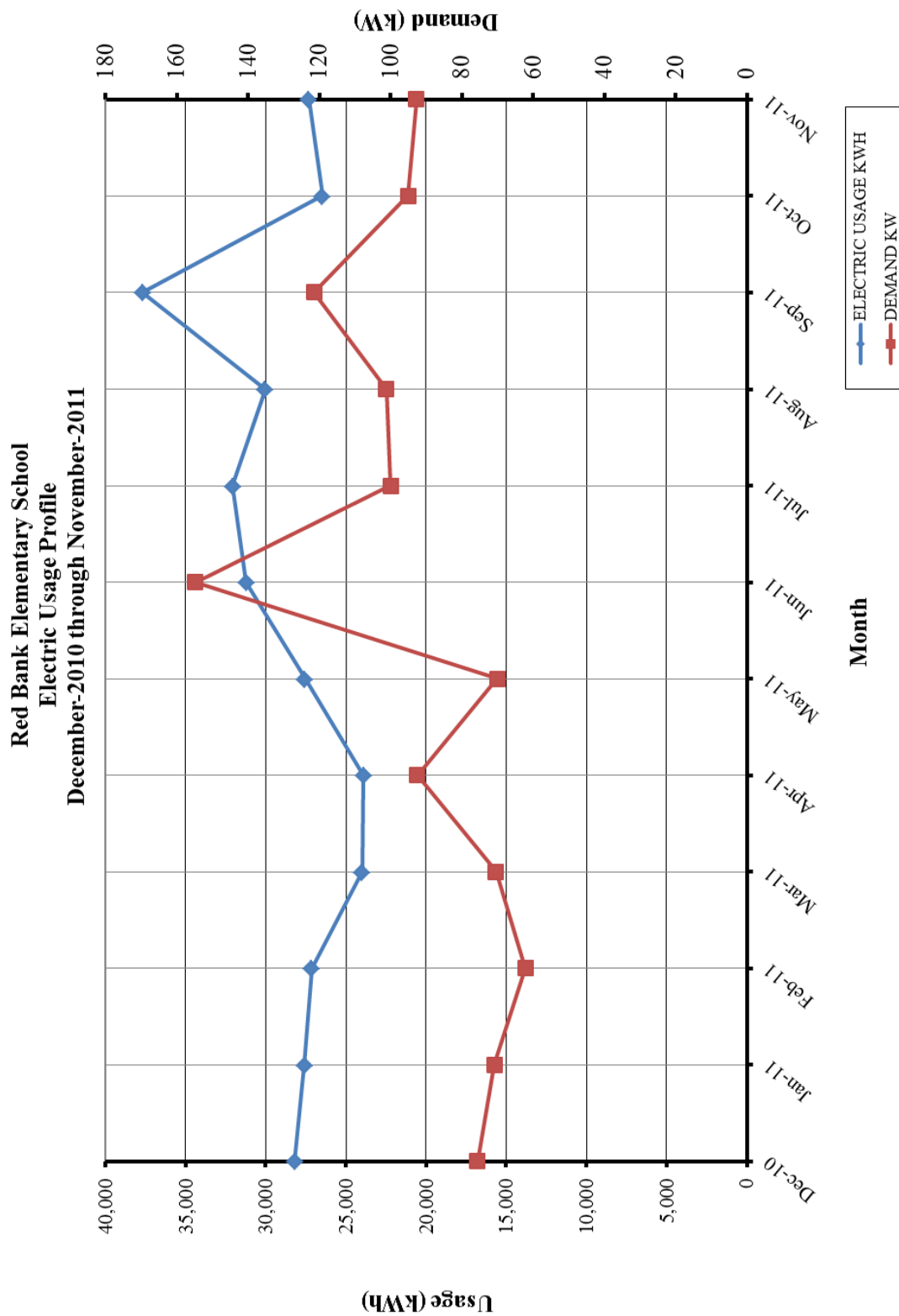
The electric usage profile represents the actual electrical usage for the facility. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts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

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

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

<b>ELECTRIC USAGE SUMMARY</b>			
Utility Provider: PSE&G Rate: LPLS Meter No: 9197944 Account # 42 001 486 09 Third Party Utility Provider: South Jersey Energy TPS Meter / Acct No: -			
<b>MONTH OF USE</b>	<b>CONSUMPTION KWH</b>	<b>DEMAND KW</b>	<b>TOTAL BILL</b>
Dec-10	28,200	76	\$4,373
Jan-11	27,600	71	\$4,224
Feb-11	27,135	62	\$4,137
Mar-11	23,985	70	\$3,719
Apr-11	23,915	93	\$3,532
May-11	27,570	70	\$4,090
Jun-11	31,225	155	\$4,648
Jul-11	32,080	100	\$5,695
Aug-11	30,051	101	\$5,176
Sep-11	37,706	121	\$6,358
Oct-11	26,470	95	\$3,890
Nov-11	27,322	93	\$4,010
<b>Totals</b>	<b>343,259</b>	<b>155 Max</b>	<b>\$53,852</b>
<p align="center"> <b>AVERAGE DEMAND      90.9 KW average</b>  <b>AVERAGE RATE      \$0.157 \$/kWh</b> </p>			

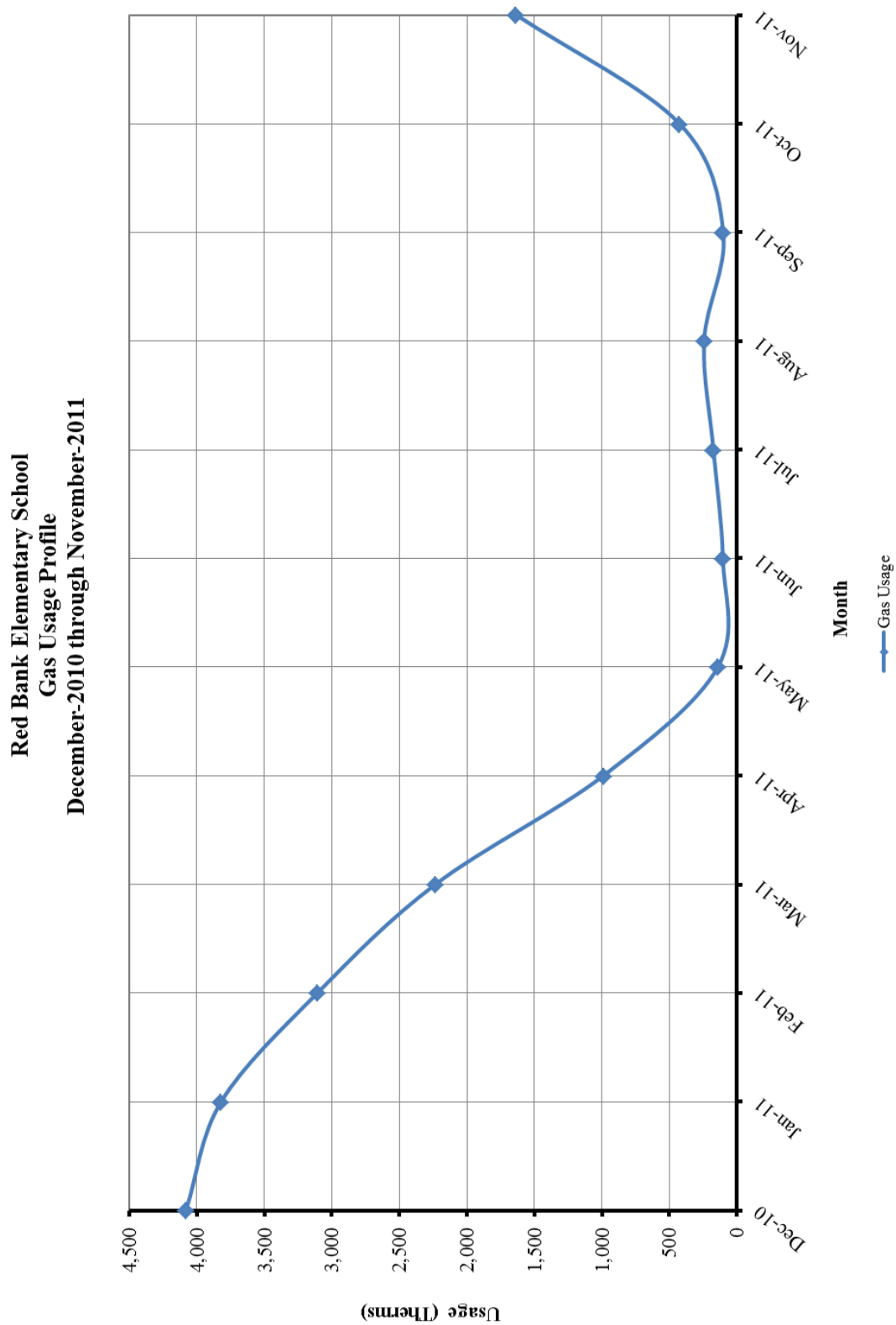
**Figure 1**  
**Electricity Usage Profile**



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

<b>NATURAL GAS USAGE SUMMARY</b>		
Utility Provider: PSE&G Rate: LVG Meter No: 2643521 Account Number 4200148609 Third Party Utility Provider: Hess TPS Account No: 367237/368001		
<b>MONTH OF USE</b>	<b>CONSUMPTION (THERMS)</b>	<b>TOTAL BILL</b>
Dec-10	4,081	\$3,998
Jan-11	3,820	\$3,771
Feb-11	3,107	\$3,182
Mar-11	2,233	\$1,060
Apr-11	988	\$855
May-11	141	\$202
Jun-11	105	\$112
Jul-11	175	\$236
Aug-11	244	\$233
Sep-11	102	\$170
Oct-11	427	\$388
Nov-11	1,636	\$1,875
<b>TOTALS</b>	<b>17,059</b>	<b>\$16,082</b>
<b>AVERAGE RATE:</b> <b>\$0.94</b> <b>\$/THERM</b>		

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



## II. FACILITY DESCRIPTION

The Red Bank Elementary School is located at 192 Philadelphia Avenue in Thorofare, New Jersey. The 34,358 SF Red Bank Elementary School was built in 1954. The building is a single-story structure and consists of office space for administrative use, all-purpose room, classrooms, kitchen and mechanical rooms.

### Occupancy Profile

The typical hours of operation for Red Bank Elementary School are Monday through Friday between 8:00 am and 4:30 pm, with custodial services running until 11:00 pm. The elementary school has a 12 month administrative occupancy of 43 people and 10 month occupancy with students of 258. Also, during the summer months summer recreation programs utilize available space to conduct their programs until approximately 4:30 pm.

### Building Envelope

Exterior walls for the Red Bank Elementary School are brick faced with a concrete block construction. The amount of insulation within the walls is unknown. The windows throughout the elementary school are in average condition. The roof is a flat, built up rubber roof that appears to be in good condition. The amount of insulation below the roof is unknown. Exterior doors had air gaps ranging in size of 1/16" to 1/8" in some areas and should be addressed with either re-aligning the doors or replacing the weather stripping entirely.

### Heating Plant

Heating is provided to the facility from the Mechanical Room housing two natural gas fired, cast iron sectional hot water boilers made by Weil McLain. Boiler #1 and #2 have equivalent heating capacity characteristics with both having an input capacity of 1,647 MBH and output of 1,372 MBH for a combined output of 2,744 MBH. Both boilers appear to be well maintained and in good condition. Combustion tests were not available for review but based on age the assumption is the overall fuel-to-thermal efficiency for the boilers is approximately 75%, based on radiation losses and inefficiencies in operation inherent to the older technology. Both boilers are approximately 15 years old with a projected 20 years of their ASHRAE service life remaining. At this time, the boilers are not recommended for replacement. The heating hot water is circulated throughout the building via a constant speed inline pump set located in the Mechanical Room. The pumps are driven with standard efficiency motors that are recommended to be replaced with NEMA premium efficient motors. The hot water heating system provides heating hot water to the unit ventilators, hot water fin-tube radiators and heating and ventilation units throughout the facility.

### HVAC Systems

The Library and adjacent areas are conditioned via a packaged natural gas heating, direct expansion cooling rooftop unit as manufactured by Trane. This unit provides approximately 11 cooling tons and 240 MBH of heating. The unit is well past its ASHRAE service life and is in need of replacement.



The Guidance/OT area is conditioned via a 4-ton split system manufactured by Goodman. The unit appears to have been installed approximately three years ago and is in good condition.

The All-Purpose Room is conditioned by two 20-ton split system units manufactured by Trane. The units are nearing the end of their service life and should be reviewed for replacement if the Owner begins to experience operational issues.

The majority of classrooms within the facility are conditioned via a packaged, vertical air-handler as manufactured by Marvair. The units are approximately 15 years of age and have now equaled their projected ASHRAE service life. These units are air-to-air heat pumps with supplemental hot water heating coils. Typically, a recommendation to replace these units would be made however; the market for this style unit does not offer a super high-efficiency replacement. The Computer Lab classroom contains a vertical, packaged unit ventilator that conditions the room. This unit is approximately 12 years old but appears to be functioning as required.

There is multiple window-type air conditioner units located throughout the facility. These units appear to provide approximately 1 nominal ton of cooling to their respective spaces. There is no work recommended for these units.

#### Exhaust System

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

#### HVAC System Controls

The HVAC systems within the Red Bank Elementary School are controlled by a Barber Coleman Network 8000<sup>TM</sup> control module that provides supervisory control and monitoring to the Facilities Director.

#### Domestic Hot Water

The main source of domestic hot water for Red Bank Elementary School is an AO Smith 250 MBH gas fired water heater with an integrated storage capacity of 100 gallons. The hot water heater is passed its ASHRAE service life of 12 years but appears to be in working condition. The hot water heater is recommended for replacement in the near future.

#### Lighting

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

Solar Photovoltaic

The Red Bank Elementary School currently has a rooftop solar array equaling approximately 46.8 kW and producing 56,707 kWh based on numbers gathered at the array's data panels.

### III. MAJOR EQUIPMENT LIST

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

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

#### IV. ENERGY CONSERVATION MEASURES

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

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

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	DESCRIPTION	NET INSTALLATION COST <sup>A</sup>	ANNUAL SAVINGS <sup>B</sup>	SIMPLE PAYBACK (Yrs)	SIMPLE LIFETIME ROI
ECM #1	Lighting Upgrade (CFL's)	\$611	\$164	3.7	301.5%
ECM #2	Lighting Controls Upgrades	\$8,095	\$1,796	4.5	232.8%
ECM #3	NEMA Premium Motor Replacements	\$1,616	\$40	40.4	-55.4%
ECM #4	Domestic Hot Water Heater Upgrade	\$12,602	\$559	22.5	-46.8%
ECM #5	AC Unit Replacements	\$83,766	\$4,468	18.7	-20.0%
ECM #6	Computer Standby or Hibernate	\$767	\$1,115	0.7	2080.6%
<b>Notes:</b>	A. Cost takes into consideration applicable NJ Smart Start <sup>TM</sup> incentives.				
	B. Savings takes into consideration applicable maintenance savings.				

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

<b>ENERGY CONSERVATION MEASURES (ECM's)</b>				
<b>ECM NO.</b>	<b>DESCRIPTION</b>	<b>ANNUAL UTILITY REDUCTION</b>		
		<b>ELECTRIC DEMAND (KW)</b>	<b>ELECTRIC CONSUMPTION (KWH)</b>	<b>NATURAL GAS (THERMS)</b>
ECM #1	Lighting Upgrade (CFL's)	0.8	1,042	0
ECM #2	Lighting Controls Upgrades	0	11,438	0
ECM #3	NEMA Premium Motor Replacements	0.0	255	0
ECM #4	Domestic Hot Water Heater Upgrade	0.0	0	559
ECM #5	AC Unit Replacements	14.2	28,458	0
ECM #6	Computer Standby or Hibernate	0.0	7,100	0

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

<b>ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT</b>					
<b>ENERGY CONSERVATION MEASURES</b>	<b>ANNUAL ENERGY SAVINGS (\$)</b>	<b>PROJECT COST (\$)</b>	<b>SMART START INCENTIVES</b>	<b>CUSTOMER COST</b>	<b>SIMPLE PAYBACK</b>
Lighting Upgrade (CFL's)	\$164	\$611	\$0	\$611	3.7
Lighting Controls Upgrades	\$1,796	\$8,950	\$855	\$8,095	4.5
NEMA Premium Motor Replacements	\$40	\$1,736	\$120	\$1,616	40.4
Domestic Hot Water Heater Upgrade	\$559	\$13,000	\$398	\$12,602	22.5
AC Unit Replacements	\$4,468	\$83,950	\$184	\$83,766	18.7
Computer Standby or Hibernate	\$1,115	\$767	\$0	\$767	0.7
<i>Design / Construction Extras (15%)</i>	<i>\$0</i>	<i>\$16,352</i>	<i>\$0</i>	<i>\$16,352</i>	
<b>Total Project</b>	<b>\$8,141</b>	<b>\$125,366</b>	<b>\$1,557</b>	<b>\$123,809</b>	<b>15</b>

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

## ECM #1: Lighting Upgrade – General

### Description:

The majority of the interior lighting throughout Red Bank Elementary School is provided with fluorescent fixtures with older generation, 700 series and 741/ECO 32W T8 lamps and electronic ballasts. Although these T8 lamps are considered fairly efficient, further energy savings can be achieved by replacing the existing T8 lamps with new generation, 800 series 28W T8 lamps without compromising light output. Concord Engineering recommends that these fixtures remain unmodified due to the extensive costs which will be incurred if these fixtures are to be re-lamped and re-ballasted, which results in a long payback period.

The ECM includes replacement of any incandescent lamps with compact fluorescent lamps. Compact fluorescent lamps (CFL's) were designed to be direct replacements for the standard incandescent lamps which are common to table lamps, spot lights, hi-hats, bathroom vanity lighting, etc. The light output of the CFL has been designed to resemble the incandescent lamp. The color rendering index (CRI) of the CFL is much higher than standard fluorescent lighting, and therefore provides a much "truer" light. The CFL is available in a myriad of shapes and sizes depending on the specific application. Typical replacements are: a 13-Watt CFL for a 60-Watt incandescent lamp, an 18-Watt CFL for a 75-Watt incandescent lamp, and a 26-Watt CFL for a 100-Watt incandescent lamp. The CFL is also available for a number of "brightness colors" that is indicated by the Kelvin rating. A 2700K CFL is the "warmest" color available and is closest in color to the incandescent lamp. CFL's are also available in 3000K, 3500K, and 4100K. The 4100K would be the "brightest" or "coolest" output. A CFL can be chosen to screw right into your existing fixtures, or hardwired into your existing fixtures. Where the existing fixture is controlled by a dimmer switch, the CFL bulb must be compatible with a dimmer switch. In some locations the bulb replacement will need to be tested to make sure the larger base of the CFL will fit into the existing fixture. The energy usage of an incandescent compared to a compact fluorescent approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours. However, the maintenance savings due to reduced lamp replacement is offset by the higher cost of the CFL's compared to the incandescent lamps.

### Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed retrofits, costs, savings, and payback periods for each set of fixtures in the each building.

**Energy Savings Summary:**

<b>ECM #1 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$611
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$0
<b>Net Installation Cost (\$):</b>	\$611
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$164
<b>Total Yearly Savings (\$/Yr):</b>	\$164
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	3.7
<b>Simple Lifetime ROI</b>	301.5%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$2,453
<b>Internal Rate of Return (IRR)</b>	26%
<b>Net Present Value (NPV)</b>	\$1,341.22



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

### Description:

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

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

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

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

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

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

### Energy Savings Calculations:

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

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

**Rebates and Incentives:**

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

Smart Start Incentive

$$= (\# \text{ Wall mount sensors} \times \$20 \text{ per sensor}) \\ + (\# \text{ Ceiling mount sensors} \times \$35 \text{ per sensor})$$

**Energy Savings Summary:**

<b>ECM #2 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$8,950
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$855
<b>Net Installation Cost (\$):</b>	\$8,095
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$1,796
<b>Total Yearly Savings (\$/Yr):</b>	\$1,796
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	4.5
<b>Simple Lifetime ROI</b>	232.8%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$26,937
<b>Internal Rate of Return (IRR)</b>	21%
<b>Net Present Value (NPV)</b>	\$13,343.37

### ECM #3: Install NEMA Premium® Efficiency Motors

#### Description:

The improved efficiency of the NEMA Premium® efficient motors is primarily due to better designs with use of better materials to reduce losses. Surprisingly, the electricity used to power a motor represents 95 % of its total lifetime operating cost. Because many motors operate continuously 24 hours a day, even small increases in efficiency can yield substantial energy and dollar savings.

The electric motors driving the hot water pumps are candidates for replacing with premium efficiency motors. These standard efficiency motors run considerable amount of time over a year.

This energy conservation measure replaces existing inefficient electric motors with NEMA Premium® efficiency motors. NEMA Premium® is the most efficient motor designation in the marketplace today.

IMPLEMENTATION SUMMARY					
EQMT ID	FUNCTION	MOTOR HP	HOURS OF OPERATION	EXISTING EFFICIENCY	NEMA PREMIUM EFFICIENCY
HWP-1	Hot Water Pump	2	2,745	84.0%	86.5%
HWP-2	Hot Water Pump	2	2,745	84.0%	86.5%

#### Energy Savings Calculations:

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$$\text{Electric usage, kWh} = \frac{\text{HP} \times \text{LF} \times 0.746 \times \text{Hours of Operation}}{\text{Motor Efficiency}}$$

where, HP = Motor Nameplate Horsepower Rating

LF = Load Factor

Motor Efficiency = Motor Nameplate Efficiency

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$\text{Electric cost savings} = \text{Electric Usage Savings} \times \text{Electric Rate} \left( \frac{\$}{\text{kWh}} \right)$$

The calculations were carried out and the results are tabulated in the table below:

PREMIUM EFFICIENCY MOTOR CALCULATIONS							
EQMT ID	MOTOR HP	LOAD FACTOR	EXISTING EFFICIENCY	NEMA PREMIUM EFFICIENCY	POWER SAVINGS kW	ENERGY SAVINGS kWh	COST SAVINGS
HWP-1	2	90%	84.0%	86.5%	0.05	128	\$20
HWP-2	2	90%	84.0%	86.5%	0.05	128	\$20
<b>TOTAL</b>					<b>0.1</b>	<b>255</b>	<b>\$40</b>

### Equipment Cost and Incentives

Below is a summary of SmartStart Building® incentives for premium efficiency motors:

INCENTIVES	
HORSE POWER	NJ SMART START INCENTIVE
2	\$60

The following table outlines the summary of motor replacement costs and incentives:

MOTOR REPLACEMENT SUMMARY						
EQMT ID	MOTOR POWER HP	INSTALLED COST	SMART START INCENTIVE	NET COST	TOTAL SAVINGS	SIMPLE PAYBACK
HWP-1	2	\$868	\$60	\$808	\$20	40.4
HWP-2	2	\$868	\$60	\$808	\$20	40.4
<b>TOTAL</b>	<b>Totals:</b>	<b>\$1,736</b>	<b>\$120</b>	<b>\$1,616</b>	<b>\$40</b>	<b>40.4</b>

**Energy Savings Summary:**

<b>ECM #3 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$1,736
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$120
<b>Net Installation Cost (\$):</b>	\$1,616
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$40
<b>Total Yearly Savings (\$/Yr):</b>	\$40
<b>Estimated ECM Lifetime (Yr):</b>	18
<b>Simple Payback</b>	40.4
<b>Simple Lifetime ROI</b>	-55.4%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$720
<b>Internal Rate of Return (IRR)</b>	-7%
<b>Net Present Value (NPV)</b>	(\$1,065.86)

**ECM #4: High Efficiency Gas Hot Water Heater****Description:**

The Red Bank Elementary School has one A.O. Smith gas-fired hot water heater that serves the entirety of the original building. The gas fired heater has surpassed its life expectancy of a typical hot water heater.

This ECM will replace the original gas fired domestic water heaters with Natural Gas fired 98.5% thermal efficient Bradford White eF Series. The unit will be replaced with a 199 MBH and 100 gallon heater.

**Energy Savings Calculations:**

<b>DOM. HOT WATER HEATER CALCULATIONS</b>			
<b>ECM INPUTS</b>	<b>EXISTING</b>	<b>PROPOSED</b>	<b>SAVINGS</b>
<b>ECM INPUTS</b>	Existing Gas Hot Water Heater	High Efficiency Heater	
<b>Building Type</b>	Education		
<b>Building Square-foot</b>	34,358	34,358	
<b>Domestic Water Usage, kBtu</b>	178,661.60	178,661.60	
<b>DHW Heating Fuel Type</b>	Gas	Gas	
<b>Heating Efficiency</b>	75%	98%	23%
<b>Total Usage (kBtu)</b>	238,215	182,308	55,908
<b>Nat Gas Cost (\$/Therm)</b>	\$ 1.000	\$ 1.000	
<b>ENERGY SAVINGS CALCULATIONS</b>			
<b>ECM RESULTS</b>	<b>EXISTING</b>	<b>PROPOSED</b>	<b>SAVINGS</b>
<b>Natural Gas Usage (Therms)</b>	2,382	1,823	559
<b>Energy Cost (\$)</b>	\$2,382	\$1,823	\$559
<b>COMMENTS:</b>	Savings are based on Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information		

Energy Density for “Education” type building = 5.2 kBtu / SF / year

$$DHW \text{ Heat Usage} = \text{Energy Density} \left( \frac{kBtu \text{ yr}}{SF} \right) \times \text{Building Square Footage (SF)}$$

$$DHW \text{ Total Usage} = \frac{\text{Dom HW Heat Cons. (Btu)}}{\text{Heating Eff. (\%)} \times \text{Fuel Heat Value} \left( \frac{BTU}{\text{Fuel Unit}} \right)}$$

$$\text{Energy Cost} = \text{Heating Fuel Usage (Fuel Units)} \times \text{Ave Fuel Cost} \left( \frac{\$}{\text{Fuel Unit}} \right)$$

**Energy Savings Summary:**

<b>ECM #4 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$13,000
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$398
<b>Net Installation Cost (\$):</b>	\$12,602
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$559
<b>Total Yearly Savings (\$/Yr):</b>	\$559
<b>Estimated ECM Lifetime (Yr):</b>	12
<b>Simple Payback</b>	22.5
<b>Simple Lifetime ROI</b>	-46.8%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$6,708
<b>Internal Rate of Return (IRR)</b>	-9%
<b>Net Present Value (NPV)</b>	<b>(\$7,037.71)</b>

## ECM #5: Replace AC Units with High Efficiency Units

### Description:

The Red Bank Elementary School utilizes split system cooling only units as well as a packaged rooftop unit with gas heat to condition the library and all-purpose rooms. The unit capacities range from 11 tons 20 tons. Please refer to the **Major Equipment List Appendix** for further information about these units.

These units are in average condition though the current units in operation are not high efficiency units. These units are approximately nineteen years old and have surpassed their ASHRAE service life of fifteen years.

These units can be replaced with new higher efficiency units. New split system units provide higher full load and part load efficiencies due to advances in inverter motor technologies, heat exchangers and higher efficiency refrigerants such as R410A which would be used in place of R22 that is currently used in the units.

This ECM includes one-for-one replacement of the older packaged and split system units with new higher efficiency systems which include new evaporator coils and refrigerant lines as well as indoor units. It is recommended to fully evaluate the capacity needed for all new systems prior to moving forward with this ECM. A summary of the unit replacements for this ECM can be found in the table below:

IMPLEMENTATION SUMMARY					
ECM INPUTS	SERVICE FOR	NUMBER OF UNITS	COOLING CAPACITY, BTU/HR	TOTAL CAPACITY, TONS	REPLACE UNIT WITH
RTU	Trane BYC130	1	132,000	11.0	Carrier 48HC
SS	Trane TTA240	2	240,000	20.0	Carrier 38AUZ25
<b>Total</b>		<b>3</b>	<b>612,000</b>	<b>51.0</b>	

The manufacturers used as the basis for the calculation is Carrier. The unit pricing and install cost were estimated based on current rates quotes and labor rates. The payback may change based on actual unit pricing and install costs if the ECM is implemented.

### Energy Savings Calculations:

#### Cooling Energy Savings:

Seasonal energy consumption of the air conditioners at the cooling mode is calculated with the equation below:

$$\text{Energy Savings, kWh} = \text{Cooling Capacity, } \frac{\text{BTU}}{\text{Hr}} \times \left( \frac{1}{\text{SEER}_{\text{Old}}} - \frac{1}{\text{SEER}_{\text{New}}} \right) \times \frac{\text{Operation Hours}}{1000 \frac{\text{W}}{\text{kWh}}}$$



$$\text{Demand Savings, kW} = \frac{\text{Energy Savings (kWh)}}{\text{Hours of Cooling}}$$

$$\text{Cooling Cost Savings} = \text{Energy Savings, kWh} \times \text{Cost of Electricity} \left( \frac{\$}{\text{kWh}} \right)$$

ENERGY SAVINGS CALCULATIONS							
ECM INPUTS	COOLING CAPACITY, BTU/Hr	ANNUAL COOLING HOURS	EXISTING UNITS SEER	SPLIT UNITS SEER	# OF UNITS	ENERGY SAVINGS kWh	DEMAND SAVINGS kW
RTU	132,000	2,002	9 EER	13 EER	1	9,035	4.5
SS	240,000	2,003	9 EER	11 EER	2	19,423	9.7
<b>Total</b>					3	28,458	14.2

### Project Cost, Incentives and Maintenance Savings

Summary of cost, savings and payback for this ECM is below.

COST & SAVINGS SUMMARY							
ECM INPUTS	INSTALLED COST	# OF UNITS	TOTAL COST	REBATES	NET COST	ENERGY SAVING	PAY BACK YEARS
RTU	\$13,250	1	\$13,250	\$0	\$13,250	\$1,418	9.3
SS	\$70,700	2	\$70,700	\$184	\$70,516	\$3,049	23.1
<b>Total</b>	<b>\$83,950</b>	<b>3</b>	<b>\$83,950</b>	<b>\$184</b>	<b>\$83,766</b>	<b>\$4,468</b>	<b>18.7</b>

### Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$83,950
NJ Smart Start Equipment Incentive (\$):	\$184
Net Installation Cost (\$):	\$83,766
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$4,468
Total Yearly Savings (\$/Yr):	\$4,468
Estimated ECM Lifetime (Yr):	15
Simple Payback	18.7
Simple Lifetime ROI	-20.0%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$67,020
Internal Rate of Return (IRR)	-3%
Net Present Value (NPV)	(\$30,427.31)

## ECM #6: Set Computers to Automatic Stand-by or Hibernate Modes

### Description:

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

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

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

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

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

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

### Energy Savings Calculations:

No. of Computers:	46
Operating Weeks per Year:	42
Estimated percentage of computers left ON overnight:	75%

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

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

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

Implementation Costs:       = # Computers X Configuration Time X Cost per Hour  
                                       = 46 Computers X 10 Minutes/Computer X \$100 per Hour  
                                       = \$767

<b>AUTOMATIC SLEEP OR HIBERNATE MODES FOR COMPUTERS</b>			
<b>ECM INPUTS</b>	<b>EXISTING</b>	<b>PROPOSED</b>	<b>SAVINGS</b>
<b>ECM INPUTS</b>	Manual Operation	Auto Power Save	-
<b># of Computers</b>	46	46	-
<b>% Computers left ON</b>	75%	75%	-
<b>Power when left ON (Watt)</b>	50	50	-
<b>Power at Stand-by (Watt)</b>	5	5	-
<b>Power at Hibernate (Watt)</b>	4	4	-
<b>Power when OFF (Watt)</b>	0	0	-
<b>Operating Weeks per Yr</b>	42	42	-
<b>Operating Hours per Week</b>	168	168	-
<b>Hours/Wk Computers ON</b>	120	20	-
<b>Hours/Wk at Sleep Mode</b>	0	20	-
<b>Hours/Wk at Hibernate Mode</b>	0	80	-
<b>Hours/Wk at Power Down</b>	48	48	-
<b>Elec Cost (\$/kWh)</b>	0.157	0.157	-
<b>ENERGY SAVINGS CALCULATIONS</b>			
<b>ECM RESULTS</b>	<b>EXISTING</b>	<b>PROPOSED</b>	<b>SAVINGS</b>
<b>Electric Usage (kWh)</b>	8,694	1,594	7,100
<b>Energy Cost (\$)</b>	\$1,365	\$250	\$1,115
<b>COMMENTS:</b>	Calculation assumes computers currently run throughout work week and get shut down over the weekend.		

**Energy Savings Summary:**

<b>ECM #6 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$767
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$0
<b>Net Installation Cost (\$):</b>	\$767
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$1,115
<b>Total Yearly Savings (\$/Yr):</b>	\$1,115
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	0.7
<b>Simple Lifetime ROI</b>	2080.6%
<b>Simple Lifetime Maintenance Savings</b>	0
<b>Simple Lifetime Savings</b>	\$16,725
<b>Internal Rate of Return (IRR)</b>	145%
<b>Net Present Value (NPV)</b>	\$12,543.80

## V. ADDITIONAL RECOMMENDATIONS

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

- A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
- B. Maintain all weather stripping on windows and doors.
- C. Clean all light fixtures to maximize light output.
- D. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.
- E. Turn off computers when not in use. Ensure computers are not running in screen saver mode.
- F. Ensure outside air dampers are functioning properly and only open during occupied mode.

## **APPENDIX A**

**ECM COST & SAVINGS BREAKDOWN**

CONCORD ENGINEERING GROUP

West Deptford BOE - Red Bank Elementary School

**ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY**

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)		
		(\$)	(\$)	(\$)	(\$)	(\$/Yr)	(\$/Yr)	(\$/Yr)		(\$)	(\$)	(%)	(Yr)	(\$)	(\$)
ECM #1	Lighting Upgrade (CFL's)	\$125	\$486	\$0	\$611	\$164	\$0	\$164	15	\$2,453	\$0	301.5%	3.7	25.92%	\$1,341.22
ECM #2	Lighting Controls Upgrades	\$7,500	\$1,450	\$855	\$8,095	\$1,796	\$0	\$1,796	15	\$26,937	\$0	232.8%	4.5	20.90%	\$13,343.37
ECM #3	NEMA Premium Motor Replacements	\$1,280	\$456	\$120	\$1,616	\$40	\$0	\$40	18	\$720	\$0	-55.4%	40.4	-7.40%	(\$1,065.86)
ECM #4	Domestic Hot Water Heater Upgrade	\$10,500	\$2,500	\$398	\$12,602	\$559	\$0	\$559	12	\$6,708	\$0	-46.8%	22.5	-8.58%	(\$7,037.71)
ECM #5	AC Unit Replacements	\$57,500	\$26,450	\$184	\$83,766	\$4,468	\$0	\$4,468	15	\$67,020	\$0	-20.0%	18.7	-2.67%	(\$30,427.31)
ECM #6	Computer Standby or Hibernate	\$0	\$767	\$0	\$767	\$1,115	\$0	\$1,115	15	\$16,725	\$0	2080.6%	0.7	145.37%	\$12,543.80

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

## **APPENDIX B**



# Concord Engineering Group, Inc.

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



## SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of February 15, 2011:

### **Electric Chillers**

Water-Cooled Chillers	\$12 - \$170 per ton
Air-Cooled Chillers	\$8 - \$52 per ton

Energy Efficiency must comply with ASHRAE 90.1-2007

### **Gas Cooling**

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

### **Desiccant Systems**

\$1.00 per cfm – gas or electric
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### **Electric Unitary HVAC**

Unitary AC and Split Systems	\$73 - \$92 per ton
Air-to-Air Heat Pumps	\$73 - \$92 per ton
Water-Source Heat Pumps	\$81 per ton
Packaged Terminal AC & HP	\$65 per ton
Central DX AC Systems	\$40- \$72 per ton
Dual Enthalpy Economizer Controls	\$250
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	\$75 per thermostat

Energy Efficiency must comply with ASHRAE 90.1-2007

### **Gas Heating**

Gas Fired Boilers < 300 MBH	\$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	\$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	\$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	\$300 - \$400 per unit, AFUE ≥ 92%

### Ground Source Heat Pumps

Closed Loop	\$450 per ton, EER $\geq$ 16 \$600 per ton, EER $\geq$ 18 \$750 per ton, EER $\geq$ 20
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Energy Efficiency must comply with ASHRAE 90.1-2007

### Variable Frequency Drives

Variable Air Volume	\$65 - \$155 per hp
Chilled-Water Pumps	\$60 per VFD rated hp
Compressors	\$5,250 to \$12,500 per drive
Cooling Towers $\geq$ 10 hp	\$60 per VFD rated hp

### Natural Gas Water Heating

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

### Prescriptive Lighting

Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	\$10 per fixture (1-4 lamps)
Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	\$25 per fixture (1-4 lamps)
Replacement of incandescent with screw-in PAR 38 or PAR 30 (CFL) bulb	\$7 per bulb
T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	\$10 per fixture
Hard-Wired Compact Fluorescent	\$25 - \$30 per fixture
Metal Halide w/Pulse Start Including Parking Lot	\$25 per fixture
T-5 and T-8 High Bay Fixtures	\$16 - \$200 per fixture
HID $\geq$ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	\$50 per fixture
HID $\geq$ 100w Replacement with new HID $\geq$ 100w	\$70 per fixture

### Prescriptive Lighting - LED

LED New Exit Sign Fixture Existing Facility < 75 kw Existing Facility > 75 kw	\$20 per fixture \$10 per fixture
LED Display Case Lighting	\$30 per display case
LED Shelf-Mtd. Display & Task Lights	\$15 per linear foot
LED Portable Desk Lamp	\$20 per fixture
LED Wall-wash Lights	\$30 per fixture
LED Recessed Down Lights	\$35 per fixture
LED Outdoor Pole/Arm-Mounted Area and Roadway Luminaries	\$175 per fixture
LED Outdoor Pole/Arm-Mounted Decorative Luminaries	\$175 per fixture
LED Outdoor Wall-Mounted Area Luminaries	\$100 per fixture
LED Parking Garage Luminaries	\$100 per fixture
LED Track or Mono-Point Directional Lighting Fixtures	\$50 per fixture
LED High-Bay and Low-Bay Fixtures for Commercial & Industrial Bldgs.	\$150 per fixture
LED High-Bay-Aisle Lighting	\$150 per fixture
LED Bollard Fixtures	\$50 per fixture
LED Linear Panels (2x2 Troffers only)	\$100 per fixture
LED Fuel Pump Canopy	\$100 per fixture
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	\$42 per 5 foot \$65 per 6 foot

### Lighting Controls – Occupancy Sensors

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

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

Occupancy hi-low	\$75 per fixture controlled
Daylight Dimming	\$75 per fixture controlled
Daylight Dimming - office	\$50 per fixture controlled

### Premium Motors

Three-Phase Motors	\$45 - \$700 per motor
Fractional HP Motors Electronic Communicated Motors (replacing shaded pole motors in refrigerator/freezer cases)	\$40 per electronic communicated motor

### Other Equipment Incentives

Performance Lighting	\$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1- 2007 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive
Custom Measures	\$0.16 KWh and \$1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and a IRR of at least 10%.
Multi Measures Bonus	15%

## **APPENDIX C**



# STATEMENT OF ENERGY PERFORMANCE

## West Deptford School District - Red Bank Elementary School

Building ID: 3278891

For 12-month Period Ending: November 30, 2011<sup>1</sup>

Date SEP becomes ineligible: N/A

Date SEP Generated: November 16, 2012

**Facility**

West Deptford School District - Red Bank  
Elementary School  
192 Philadelphia Avenue  
Thorofare, NJ 08086

**Facility Owner**

West Deptford Township Public School  
District  
675 Grove Road  
West Deptford, NJ 08066

**Primary Contact for this Facility**

William Thompson  
675 Grove Road  
West Deptford, NJ 08066

Year Built: 1954

Gross Floor Area (ft<sup>2</sup>): 34,358Energy Performance Rating<sup>2</sup> (1-100) 48**Site Energy Use Summary<sup>3</sup>**

Electricity - Grid Purchase(kBtu)	1,171,200
Electricity - On-Site Solar(kBtu)	200,256
Natural Gas (kBtu) <sup>4</sup>	1,705,900
Total Energy (kBtu)	3,077,356

**Energy Intensity<sup>4</sup>**

Site (kBtu/ft <sup>2</sup> /yr)	90
Source (kBtu/ft <sup>2</sup> /yr)	172

**Emissions (based on site energy use)**

Greenhouse Gas Emissions (MtCO <sub>2</sub> e/year)	257
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**Electric Distribution Utility**

Public Service Electric &amp; Gas Co

**National Median Comparison**

National Median Site EUI	88
National Median Source EUI	169
% Difference from National Median Source EUI	1%
Building Type	K-12 School

Stamp of Certifying Professional

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

**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

**Certifying Professional**

Michael Fischette  
520 South Burnt Mill Road  
Voorhees, NJ 08043

**Notes:**

1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Values represent energy intensity, annualized to a 12-month period.
5. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

## 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>	West Deptford School District - Red Bank Elementary 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>	192 Philadelphia Avenue, Thorofare, NJ 08086	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"/>
Red Bank Elementary School (K-12 School)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
<b>Gross Floor Area</b>	34,358 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	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>	46	Is this the number of personal computers in the K12 School?		<input type="checkbox"/>
<b>Number of walk-in refrigeration/freezer units</b>	1	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	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>	90 %	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 %	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>	10(Optional)	Is this school in operation for at least 8 months of the year?		<input type="checkbox"/>

High School?	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.	<input type="checkbox"/>
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# ENERGY STAR® Data Checklist for Commercial Buildings

## Energy Consumption

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

Fuel Type: Electricity		
<b>Meter: electric (kWh (thousand Watt-hours))</b> <b>Space(s):</b> Entire Facility <b>Generation Method:</b> Grid Purchase		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
11/01/2011	11/30/2011	27,322.00
10/01/2011	10/31/2011	26,470.00
09/01/2011	09/30/2011	37,706.00
08/01/2011	08/31/2011	30,051.00
07/01/2011	07/31/2011	32,080.00
06/01/2011	06/30/2011	31,225.00
05/01/2011	05/31/2011	27,570.00
04/01/2011	04/30/2011	23,915.00
03/01/2011	03/31/2011	23,985.00
02/01/2011	02/28/2011	27,135.00
01/01/2011	01/31/2011	27,600.00
12/01/2010	12/31/2010	28,200.00
<b>electric Consumption (kWh (thousand Watt-hours))</b>		<b>343,259.00</b>
<b>electric Consumption (kBtu (thousand Btu))</b>		<b>1,171,199.71</b>
<b>Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))</b>		<b>1,171,199.71</b>
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		<input type="checkbox"/>
<b>Meter: Solar (kWh (thousand Watt-hours))</b> <b>Space(s):</b> Entire Facility <b>Generation Method:</b> On-Site Solar		
Start Date	End Date	Energy Used On-Site (kWh (thousand Watt-hours))
11/01/2011	11/30/2011	3,297.00
10/01/2011	10/31/2011	4,351.00
09/01/2011	09/30/2011	4,381.00
08/01/2011	08/31/2011	6,256.00
07/01/2011	07/31/2011	7,105.00
06/01/2011	06/30/2011	5,302.00
05/01/2011	05/31/2011	6,534.00
04/01/2011	04/30/2011	5,340.00
03/01/2011	03/31/2011	5,777.00
02/01/2011	02/28/2011	3,535.00

01/01/2011	01/31/2011	1,829.00
<b>Solar Consumption (kWh (thousand Watt-hours))</b>		<b>53,707.00</b>
<b>Solar Consumption (kBtu (thousand Btu))</b>		<b>183,248.28</b>
<b>Total Electricity (On-Site Solar) Consumption (kBtu (thousand Btu))</b>		<b>183,248.28</b>
Is this the total amount of solar electricity generated on site and used at this facility?		<input type="checkbox"/>
<b>Fuel Type: Natural Gas</b>		
<b>Meter: gas (therms)</b> <b>Space(s): Entire Facility</b>		
<b>Start Date</b>	<b>End Date</b>	<b>Energy Use (therms)</b>
11/01/2011	11/30/2011	1,636.00
10/01/2011	10/31/2011	427.00
09/01/2011	09/30/2011	102.00
08/01/2011	08/31/2011	244.00
07/01/2011	07/31/2011	175.00
06/01/2011	06/30/2011	105.00
05/01/2011	05/31/2011	141.00
04/01/2011	04/30/2011	988.00
03/01/2011	03/31/2011	2,233.00
02/01/2011	02/28/2011	3,107.00
01/01/2011	01/31/2011	3,820.00
12/01/2010	12/31/2010	4,081.00
<b>gas Consumption (therms)</b>		<b>17,059.00</b>
<b>gas Consumption (kBtu (thousand Btu))</b>		<b>1,705,900.00</b>
<b>Total Natural Gas Consumption (kBtu (thousand Btu))</b>		<b>1,705,900.00</b>
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		<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

West Deptford School District - Red Bank Elementary School  
192 Philadelphia Avenue  
Thorofare, NJ 08086

## Facility Owner

West Deptford Township Public School District  
675 Grove Road  
West Deptford, NJ 08066

## Primary Contact for this Facility

William Thompson  
675 Grove Road  
West Deptford, NJ 08066

## General Information

West Deptford School District - Red Bank Elementary School	
Gross Floor Area Excluding Parking: (ft <sup>2</sup> )	34,358
Year Built	1954
For 12-month Evaluation Period Ending Date:	November 30, 2011

## Facility Space Use Summary

Red Bank Elementary School	
Space Type	K-12 School
Gross Floor Area (ft <sup>2</sup> )	34,358
Open Weekends?	No
Number of PCs	46
Number of walk-in refrigeration/freezer units	1
Presence of cooking facilities	Yes
Percent Cooled	90
Percent Heated	100
Months °	10
High School?	No
School District °	West Deptford

## Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 11/30/2011)	Baseline (Ending Date 11/30/2011)	Rating of 75	Target	National Median
Energy Performance Rating	48	48	75	N/A	50
Energy Intensity					
Site (kBtu/ft <sup>2</sup> )	90	90	69	N/A	88
Source (kBtu/ft <sup>2</sup> )	172	172	132	N/A	169
Energy Cost					
\$/year	N/A	N/A	N/A	N/A	N/A
\$/ft <sup>2</sup> /year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
MtCO <sub>2</sub> e/year	257	257	198	N/A	254
kgCO <sub>2</sub> e/ft <sup>2</sup> /year	7	7	5	N/A	7

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

Notes:

o - This attribute is optional.

d - A default value has been supplied by Portfolio Manager.

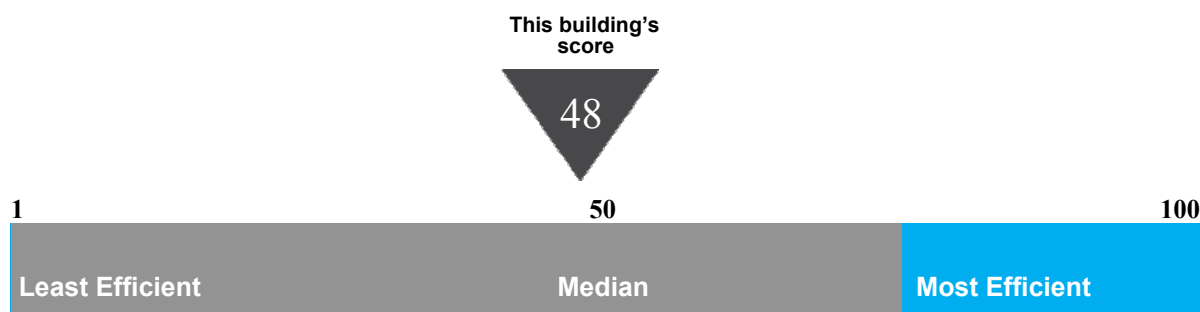
# Statement of Energy Performance

## 2011

West Deptford School District - Red Bank  
Elementary School  
192 Philadelphia Avenue  
Thorofare, NJ 08086

Portfolio Manager Building ID: 3278891

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 172 kBtu per square foot per year.\*

\*Based on source energy intensity for the 12 month period ending November 2011

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



## **APPENDIX D**

## **MAJOR EQUIPMENT LIST**

### **Concord Engineering Group**

#### **Redbank Elementary School**

### **AC Units**

<b>Tag</b>	<b>AC-1</b>	<b>AC-2</b>	<b>AC-3,4</b>
<b>Unit Type</b>	Gas/Electric Packaged	AC Only	Split System Condensing
<b>Qty</b>	1	1	2
<b>Location</b>	Roof	Roof	Roof
<b>Area Served</b>	Library & Adjacent Rooms	Teacher's Areas & Guidance	All Purpose Room
<b>Manufacturer</b>	Trane	Goodman	Trane
<b>Model #</b>	BYC130G3H0CA	GSC140481AE	TTA240B300BD
<b>Serial #</b>	S2114403	709057643	N244543AH
<b>Cooling Type</b>	DX/R-22	DX/R-22	DX/R-22
<b>Cooling Capacity (Tons)</b>	11	4	20
<b>Cooling Efficiency (SEER/EER)</b>	9 EER	14 SEER	9 EER
<b>Heating Type</b>	Gas Fired Heating	N/A	N/A
<b>Heating Input (MBH)</b>	300	N/A	N/A
<b>Efficiency</b>	80%	N/A	N/A
<b>Fuel</b>	Natural Gas	N/A	N/A
<b>Approx Age</b>	26	3	14
<b>ASHRAE Service Life</b>	15	15	15
<b>Remaining Life</b>	(11)	12	1
<b>Comments</b>			

**Note:**

"N/A" = Not Applicable.

"-" = Info Not Available

## AC Units

Tag	AC-5 to 20	R-1	AC-21
Unit Type	Heat Pump	Refrigerator	AC Only
Qty	15	1	1
Location	Classrooms	Kitchen	Computer Lab
Area Served	Designated Classroom	Kitchen	Computer Lab
Manufacturer	Marvair/Scholar	Bohn	Snyder General
Model #	VAI36HPC99HII-200-96	ADT700A	EDBEVLBSH261...
Serial #	HJ19567	DBD0303	7 ZH07337 00
Cooling Type	DX/R-22	-	-
Cooling Capacity (Tons)	3.5 (EST.)	70000 BTU/HR	-
Cooling Efficiency (SEER/EER)	10.5 SEER & 9.05 EER	-	-
Heating Type	Heat Pump	N/A	N/A
Heating Input (MBH)	34000 BTU	N/A	N/A
Efficiency	-	N/A	N/A
Fuel	Hot Water	N/A	N/A
Approx Age	15	10	12
ASHRAE Service Life	15	15	15
Remaining Life	0	5	3
Comments		115V/1P/60HZ/3.3A	

**Note:**

"N/A" = Not Applicable.

"-" = Info Not Available

## AC Units

<b>Tag</b>	<b>AC-22</b>		
<b>Unit Type</b>	Split System Heat Pump		
<b>Qty</b>	1		
<b>Location</b>	Outside Shed/Shop		
<b>Area Served</b>	Shed/Shop		
<b>Manufacturer</b>	LG		
<b>Model #</b>	LAN24		
<b>Serial #</b>	-		
<b>Cooling Type</b>	DX, R410A		
<b>Cooling Capacity (Tons)</b>	2		
<b>Cooling Efficiency (SEER/EER)</b>	20 SEER		
<b>Heating Type</b>	Heat Pump		
<b>Heating Input (MBH)</b>	24		
<b>Efficiency</b>	11 HSPF		
<b>Fuel</b>	Heat Pump		
<b>Approx Age</b>	3		
<b>ASHRAE Service Life</b>	15		
<b>Remaining Life</b>	12		
<b>Comments</b>			

**Note:**

"N/A" = Not Applicable.

"-" = Info Not Available



# **MAJOR EQUIPMENT LIST**

## **Concord Engineering Group**

### **Redbank Elementary School**

#### **Boilers**

<b>Tag</b>	<b>B-1,2</b>		
<b>Unit Type</b>	Cast Iron Sect	Burner Only	
<b>Qty</b>	2	2	
<b>Location</b>	Boiler Room	Boiler Room	
<b>Area Served</b>	Entire Building	Hot Water Boilers	
<b>Manufacturer</b>	Weil Mclain	Weil Mclain	
<b>Model #</b>	P-1278-W	WCR2-G-15	
<b>Serial #</b>	1	59884694	
<b>Input Capacity (Btu/Hr)</b>	1,647,000	1,647,000	
<b>Rated Output Capacity (Btu/Hr)</b>	1,372,000	-	
<b>Approx. Efficiency %</b>	75.0%	75.0%	
<b>Fuel</b>	Natural Gas & Oil	Natural Gas	
<b>Approx Age</b>	15	15	
<b>ASHRAE Service Life</b>	35	35	
<b>Remaining Life</b>	20	20	
<b>Comments</b>			

**Note:**

"N/A" = Not Applicable.

"-" = Info Not Available

# **MAJOR EQUIPMENT LIST**

## **Concord Engineering Group**

### **Redbank Elementary School**

#### **Domestic Water Heaters**

<b>Tag</b>	<b>DHW-1</b>		
<b>Unit Type</b>	Domestic Water Heater		
<b>Qty</b>	1		
<b>Location</b>	Boiler Room		
<b>Area Served</b>	Entire Building		
<b>Manufacturer</b>	A.O. Smith		
<b>Model #</b>	BTC 250 970		
<b>Serial #</b>	MG98-0756249-970		
<b>Size (Gallons)</b>	100		
<b>Input Capacity (MBH/KW)</b>	250 MBH		
<b>Recovery (Gal/Hr)</b>	227.3		
<b>Efficiency %</b>	75%		
<b>Fuel</b>	Natural Gas		
<b>Approx Age</b>	15		
<b>ASHRAE Service Life</b>	12		
<b>Remaining Life</b>	(3)		
<b>Comments</b>			

**Note:**

"N/A" = Not Applicable.

"-" = Info Not Available

## **MAJOR EQUIPMENT LIST**

**Concord Engineering Group**

**Redbank Elementary School**

### **Pumps**

<b>Tag</b>	<b>P-1,2</b>	<b>P-3,4</b>	
<b>Unit Type</b>	Base Mounted Hot Water	Inline Pumps	
<b>Qty</b>	2	2	
<b>Location</b>	Boiler Room	Boiler Room	
<b>Area Served</b>	Hot Water Loop	Circulation Pumps	
<b>Manufacturer</b>	Bell & Gossett	Bell & Gossett	
<b>Model #</b>	-	-	
<b>Serial #</b>	-	2123227	
<b>Horse Power</b>	2	1/4	
<b>Flow</b>	197 GPM @ 23 FTHD	20 GPM @ 15 FTHD	
<b>Motor Info</b>	B&G / Baldor	B&G	
<b>Electrical Power</b>	208-220/440/3/60	-	
<b>RPM</b>	1725	1800	
<b>Motor Efficiency %</b>	84.0%	-	
<b>Approx Age</b>	15	15	
<b>ASHRAE Service Life</b>	20	20	
<b>Remaining Life</b>	5	5	
<b>Comments</b>			

**Note:**

"N/A" = Not Applicable.

"-" = Info Not Available

## **APPENDIX E**

CEG Project #: 9C12051  
Facility Name: Red Bank Elementary  
Address: 192 Philadelphia Avenue  
City, State, Zip: Thorofare, NJ 08086

Fixture Reference #	Location	Average Burn Hours	Existing Fixtures					Proposed Fixtures Retrofit						Retrofit Energy Savings			Lighting Retrofit Costs				Simple Payback	Control Ref #	Proposed Lighting Controls						
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor			Total All	Rolback Estimate	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$
8	Entrance Lobby	3000	2x4, 4 Lamp, 32w, TR, Recessed, Prismatic Lens	4	106.7	4	0.43	1,280	Existing to Remain	Existing to Remain	4	106.7	0	0.43	1,280	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
4	Main Office	2600	1x4, 2 Lamp, 32w, TR, Recessed, Prismatic Lens	2	62	4	0.25	645	Existing to Remain	Existing to Remain	2	62	0	0.25	645	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	129	\$20
1	Printer Area	2600	1x4, 1 Lamp, 32w, TR, Surface Mnt, No lens	1	33.2	2	0.07	173	Existing to Remain	Existing to Remain	1	33.2	0	0.07	173	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	35	\$5
7	Office Vault	600	1x4, 2 Lamp, 32w, TR, Surface Mnt, No lens	2	62	2	0.12	74	Existing to Remain	Existing to Remain	2	62	0	0.12	74	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
4	Office Reception	2600	1x4, 2 Lamp, 32w, TR, Recessed, Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	64	\$10
5	Principal's Office	2600	1x4, 2 Lamp, 32w, TR, Pendant Mnt, Prismatic Lens	2	62	4	0.25	645	Existing to Remain	Existing to Remain	2	62	0	0.25	645	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	129	\$20
2	Principal RR	1200	Vanity Fixture, 2L 40w Incandescent	2	80	1	0.08	96	Relamp	(2) 9w CFL	2	18	1	0.02	22	0.06	74	\$12	\$10.00	\$27.00	\$37.00	\$0.00	3.1675913	0	No New Controls	0	0.0%	0	\$0
3	Principal RR	1200	Vent/Light combination 40w Incandescent	1	40	1	0.04	48	Relamp	(1) 9w CFL	1	9	1	0.01	11	0.03	37	\$6	\$5.00	\$27.00	\$32.00	\$0.00	5.4790768	0	No New Controls	0	0.0%	0	\$0
6	Principal Office	2600	4x4, 2 Lamp, 32w, TR, Surface Mnt, Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
2	Main Office RR	1200	Vanity Fixture, 2L 40w Incandescent	2	80	1	0.08	96	Relamp	(2) 9w CFL	2	18	1	0.02	22	0.06	74	\$12	\$10.00	\$27.00	\$37.00	\$0.00	3.1675913	0	No New Controls	0	0.0%	0	\$0
3	Main Office RR	1200	Vent/Light combination 40w Incandescent	1	40	1	0.04	48	Relamp	(1) 9w CFL	1	9	1	0.01	11	0.03	37	\$6	\$5.00	\$27.00	\$32.00	\$0.00	5.4790768	0	No New Controls	0	0.0%	0	\$0
4	Nurse's Office	2600	1x4, 2 Lamp, 32w, TR, Recessed, Prismatic Lens	2	62	6	0.37	967	Existing to Remain	Existing to Remain	2	62	0	0.37	967	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	193	\$30
1	Nurse RR 1	1200	1x4, 1 Lamp, 32w, TR, Surface Mnt, No lens	1	33.2	1	0.03	40	Existing to Remain	Existing to Remain	1	33.2	0	0.03	40	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
2	Nurse RR 1	1200	Vanity Fixture, 2L 40w Incandescent	2	80	1	0.08	96	Relamp	(2) 9w CFL	2	18	1	0.02	22	0.06	74	\$12	\$10.00	\$27.00	\$37.00	\$0.00	3.1675913	0	No New Controls	0	0.0%	0	\$0
13	Nurse RR 2	1200	40w Incandescent	1	40	1	0.04	48	Relamp	(1) 9w CFL	1	9	1	0.01	11	0.03	37	\$6	\$5.00	\$27.00	\$32.00	\$0.00	5.4790768	0	No New Controls	0	0.0%	0	\$0
9	Classroom 1	2600	1x4, 2 Lamp, 32w, TR, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
9	Classroom 2	2600	1x4, 2 Lamp, 32w, TR, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
9	Classroom 3	2600	1x4, 2 Lamp, 32w, TR, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
9	Classroom 4	2600	1x4, 2 Lamp, 32w, TR, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
9	Classroom 125	2600	1x4, 2 Lamp, 32w, TR, Surface Mnt, Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	\$61
9	Classroom 5	2600	1x4, 2 Lamp, 32w, TR, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
9	Classroom 6	2600	1x4, 2 Lamp, 32w, TR, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
8	East Wing Hallway	3000	2x4, 4 Lamp, 32w, TR, Recessed, Prismatic Lens	4	106.7	20	2.13	6,402	Existing to Remain	Existing to Remain	4	106.7	0	2.13	6,402	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
9	Boys Lav	1200	1x4, 2 Lamp, 32w, TR, Surface Mnt, Prismatic Lens	2	62	5	0.31	372	Existing to Remain	Existing to Remain	2	62	0	0.31	372	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
9	Girls Lav	1200	1x4, 2 Lamp, 32w, TR, Surface Mnt, Prismatic Lens	2	62	4	0.25	298	Existing to Remain	Existing to Remain	2	62	0	0.25	298	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0

Fixture Reference #	Location	Average Burn Hours	Existing Fixtures						Proposed Fixtures Retrofit						Retrofit Energy Savings			Lighting Retrofit Costs				Simple Payback	Proposed Lighting Controls						
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All		Rebate Estimate	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$
13	Storage	600	40w Incandescent	1	40	1	0.04	24	Relamp	(1) 9w CFL	1	9	1	0.01	5	0.03	19	\$3	\$5.00	\$27.00	\$32.00	\$0.00	10.958154	0	No New Controls	0	0.0%	0	\$0
5	Utility 1	600	1x4, 2 Lamp, 32w, T8, Pendant Mnt, Prismatic Lens	2	62	1	0.06	37	Existing to Remain	Existing to Remain	2	62	0	0.06	37	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
9	Utility 2	600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	1	0.06	37	Existing to Remain	Existing to Remain	2	62	0	0.06	37	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
12	Handicapped Bathroom	1200	2x4, 2 Lamp, 32w, T8, Recessed, Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
11	Faculty Room	2600	2x2, 2 Lamp, 17w F017, Recessed, Prismatic Lens	2	33	2	0.07	172	Existing to Remain	Existing to Remain	2	33	0	0.07	172	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	0.5	20.0%	34	\$5	
12	Faculty Room	2600	2x4, 2 Lamp, 32w, T8, Recessed, Prismatic Lens	2	62	7	0.43	1,128	Existing to Remain	Existing to Remain	2	62	0	0.43	1,128	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	0.5	20.0%	226	\$35	
8	Speech Room	2600	2x4, 4 Lamp, 32w, T8, Recessed, Prismatic Lens	4	106.7	2	0.21	555	Existing to Remain	Existing to Remain	4	106.7	0	0.21	555	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	111	\$17	
12	Conference Room	2600	2x4, 2 Lamp, 32w, T8, Recessed, Prismatic Lens	2	62	4	0.25	645	Existing to Remain	Existing to Remain	2	62	0	0.25	645	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	129	\$20	
9	Book Room	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	3	0.19	484	Existing to Remain	Existing to Remain	2	62	0	0.19	484	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	97	\$15	
8	Library Office	2600	2x4, 4 Lamp, 32w, T8, Recessed, Prismatic Lens	4	106.7	2	0.21	555	Existing to Remain	Existing to Remain	4	106.7	0	0.21	555	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	111	\$17	
9	R.C.	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	6	0.37	967	Existing to Remain	Existing to Remain	2	62	0	0.37	967	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	193	\$30	
8	Library	2600	2x4, 4 Lamp, 32w, T8, Recessed, Prismatic Lens	4	106.7	20	2.13	5,548	Existing to Remain	Existing to Remain	4	106.7	0	2.13	5,548	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
8	OT	2600	2x4, 4 Lamp, 32w, T8, Recessed, Prismatic Lens	4	106.7	4	0.43	1,110	Existing to Remain	Existing to Remain	4	106.7	0	0.43	1,110	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	222	\$35	
8	Guidance	2600	2x4, 4 Lamp, 32w, T8, Recessed, Prismatic Lens	4	106.7	4	0.43	1,110	Existing to Remain	Existing to Remain	4	106.7	0	0.43	1,110	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	222	\$35	
8	Library Hallway	3000	2x4, 4 Lamp, 32w, T8, Recessed, Prismatic Lens	4	106.7	4	0.43	1,280	Existing to Remain	Existing to Remain	4	106.7	0	0.43	1,280	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
8	Behind Stage Hallway	3000	2x4, 4 Lamp, 32w, T8, Recessed, Prismatic Lens	4	106.7	5	0.53	1,601	Existing to Remain	Existing to Remain	4	106.7	0	0.53	1,601	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
9	Computer Lab	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	27	1.67	4,352	Existing to Remain	Existing to Remain	2	62	0	1.67	4,352	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	870	\$137	
1	Storage	2600	1x4, 1 Lamp, 32w, T8, Surface Mnt, No lens	1	33.2	8	0.27	691	Existing to Remain	Existing to Remain	1	33.2	0	0.27	691	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
15	All Purpose Room	2600	2x4, 3 Lamp, 32w, T8, Recessed, Prismatic	3	86.2	39	3.36	8,741	Existing to Remain	Existing to Remain	3	86.2	0	3.36	8,741	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
5	Stage	2600	1x4, 2 Lamp, 32w, T8, Pendant Mnt, Prismatic Lens	2	62	8	0.50	1,290	Existing to Remain	Existing to Remain	2	62	0	0.50	1,290	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
16	Stage	600	40w Incandescent, Pendant Mnt	1	40	2	0.08	48	Relamp	(1) 9w CFL	1	9	2	0.02	11	0.06	37	\$6	\$10.00	\$54.00	\$64.00	\$0.00	10.958154	0	No New Controls	0	0.0%	0	\$0
13	Stage	600	40w Incandescent	1	40	2	0.08	48	Relamp	(1) 9w CFL	1	9	2	0.02	11	0.06	37	\$6	\$10.00	\$54.00	\$64.00	\$0.00	10.958154	0	No New Controls	0	0.0%	0	\$0
1	Hallway Display Case 1	3000	1x4, 1 Lamp, 32w, T8, Surface Mnt, No lens	1	33.2	5	0.17	498	Existing to Remain	Existing to Remain	1	33.2	0	0.17	498	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
1	Hallway Display Case 2	3000	1x4, 1 Lamp, 32w, T8, Surface Mnt, No lens	1	33.2	5	0.17	498	Existing to Remain	Existing to Remain	1	33.2	0	0.17	498	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
1	West wing Hallway	3000	1x4, 1 Lamp, 32w, T8, Surface Mnt, No lens	1	33.2	2	0.07	199	Existing to Remain	Existing to Remain	1	33.2	0	0.07	199	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
8	West wing Hallway	3000	2x4, 4 Lamp, 32w, T8, Recessed, Prismatic Lens	4	106.7	19	2.03	6,082	Existing to Remain	Existing to Remain	4	106.7	0	2.03	6,082	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	

Fixture Reference #	Location	Average Burn Hours	Existing Fixtures						Proposed Fixtures Retrofit						Retrofit Energy Savings			Lighting Retrofit Costs					Simple Payback	Control Ref #	Proposed Lighting Controls				
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Rebate Estimate			Controls Description	Qty of Controls	Hour Reduction, %	Energy Savings, kWh	Energy Savings, \$
14	West wing Hallway	3000	2 Lamp, 40w Incandescent, Recessed, Prismatic Lens	2	80	2	0.16	480	Relamp	(2) 9w CFL	2	18	2	0.04	108	0.12	372	\$58	\$20.00	\$54.00	\$74.00	\$0.00	1.2670365	0	No New Controls	0	0.0%	0	\$0
9	Boiler Room	600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	7	0.43	260	Existing to Remain	Existing to Remain	2	62	0	0.43	260	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
9	West Wing Boys Lav	1200	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	5	0.31	372	Existing to Remain	Existing to Remain	2	62	0	0.31	372	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
9	West Wing Girls Lav	1200	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	5	0.31	372	Existing to Remain	Existing to Remain	2	62	0	0.31	372	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
12	Janitor	600	2x4, 2 Lamp, 32w, T8, Recessed, Prismatic Lens	2	62	2	0.12	74	Existing to Remain	Existing to Remain	2	62	0	0.12	74	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
13	Janitor	600	40w Incandescent	1	40	1	0.04	24	Relamp	(1) 9w CFL	1	9	1	0.01	5	0.03	19	\$3	\$5.00	\$27.00	\$32.00	\$0.00	10.958154	0	No New Controls	0	0.0%	0	\$0
9	Classroom 7	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
9	Classroom 8	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
9	Classroom 9	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
9	Classroom 10	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
9	Classroom 11	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
9	Classroom 12	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	\$91
9	Classroom 13	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	26	1.61	4,191	Existing to Remain	Existing to Remain	2	62	0	1.61	4,191	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	838	\$132
2	Classroom 13 RR	1200	Vanity Fixture, 2L 40w Incandescent	2	80	1	0.08	96	Relamp	(2) 9w CFL	2	18	1	0.02	22	0.06	74	\$12	\$10.00	\$27.00	\$37.00	\$0.00	3.1675913	0	No New Controls	0	0.0%	0	\$0
3	Classroom 13 RR	1200	Vent/Light combination 40w Incandescent	1	40	1	0.04	48	Relamp	(1) 9w CFL	1	9	1	0.01	11	0.03	37	\$6	\$5.00	\$27.00	\$32.00	\$0.00	5.4790768	0	No New Controls	0	0.0%	0	\$0
2	Classroom 13 RR	1200	Vanity Fixture, 2L 40w Incandescent	2	80	1	0.08	96	Relamp	(2) 9w CFL	2	18	1	0.02	22	0.06	74	\$12	\$10.00	\$27.00	\$37.00	\$0.00	3.1675913	0	No New Controls	0	0.0%	0	\$0
3	Classroom 13 RR	1200	Vent/Light combination 40w Incandescent	1	40	1	0.04	48	Relamp	(1) 9w CFL	1	9	1	0.01	11	0.03	37	\$6	\$5.00	\$27.00	\$32.00	\$0.00	5.4790768	0	No New Controls	0	0.0%	0	\$0
9	Classroom 14	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	15	0.93	2,418	Existing to Remain	Existing to Remain	2	62	0	0.93	2,418	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	484	\$76
9	Kitchen	2600	1x4, 2 Lamp, 32w, T8, Surface Mnt, Prismatic Lens	2	62	15	0.93	2,418	Existing to Remain	Existing to Remain	2	62	0	0.93	2,418	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
TOTAL				146	4519.4	556	38	97,397				18	38	96,356	1	1,042	164	125	486	611	0				29	6	11,438	1,796	