CLIFTON PUBLIC SCHOOLS
PUBLIC SCHOOL #12

165 CLIFTON AVENUE
CLIFTON, NEW JERSEY 07011

FACILITY ENERGY REPORT

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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:	General Lighting & Power (GLP)
Third Party Supplier:	Champion Energy Services LLC

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

ELECTRIC USAGE SUMMARY

Utility Provider: PSE&G
Rate: GLP
Meter No: 678004398
Account No: 65 498 912 07
Third Party Utility Provider: Champion Energy Services LLC
TPS Meter / Acct No: PE000008624489623036

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Mar-12	32,700	123.0	$4,664
Apr-12	24,225	104.3	$3,653
May-12	24,750	90.8	$4,504
Jun-12	18,975	93.0	$3,818
Jul-12	10,575	102.0	$3,012
Aug-12	10,575	53.3	$2,396
Sep-12	23,025	102.8	$3,427
Oct-12	24,825	103.5	$3,622
Nov-12	35,625	122.3	$4,782
Dec-12	37,575	124.5	$5,000
Jan-13	39,975	126.0	$5,333
Feb-13	40,125	125.3	$5,357
Totals	**322,950**	**126.0 Max**	**$49,568**

AVERAGE DEMAND **105.9 KW average**
AVERAGE RATE **$0.153** **$/kWh**

Figure 1
Electricity Usage Profile

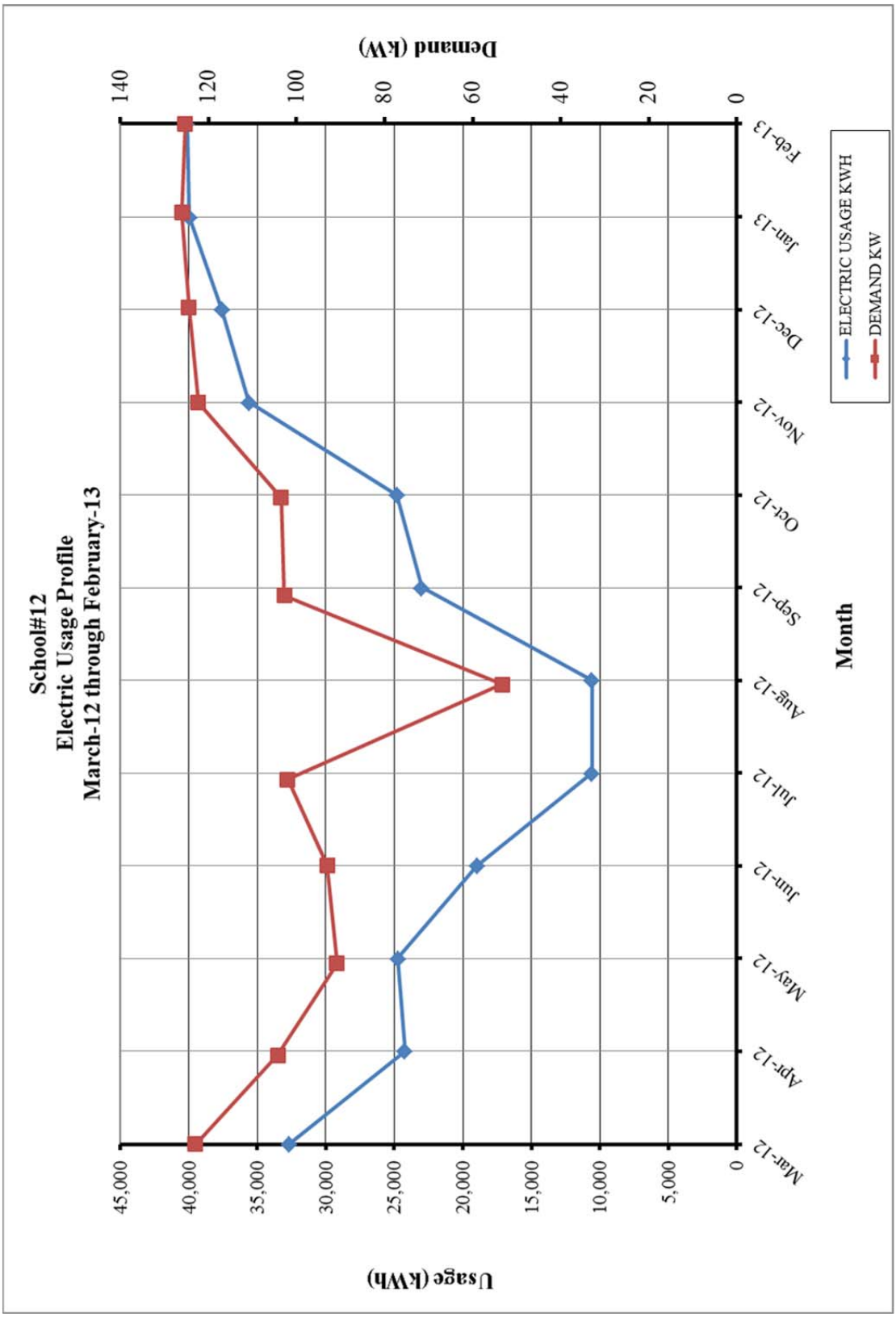
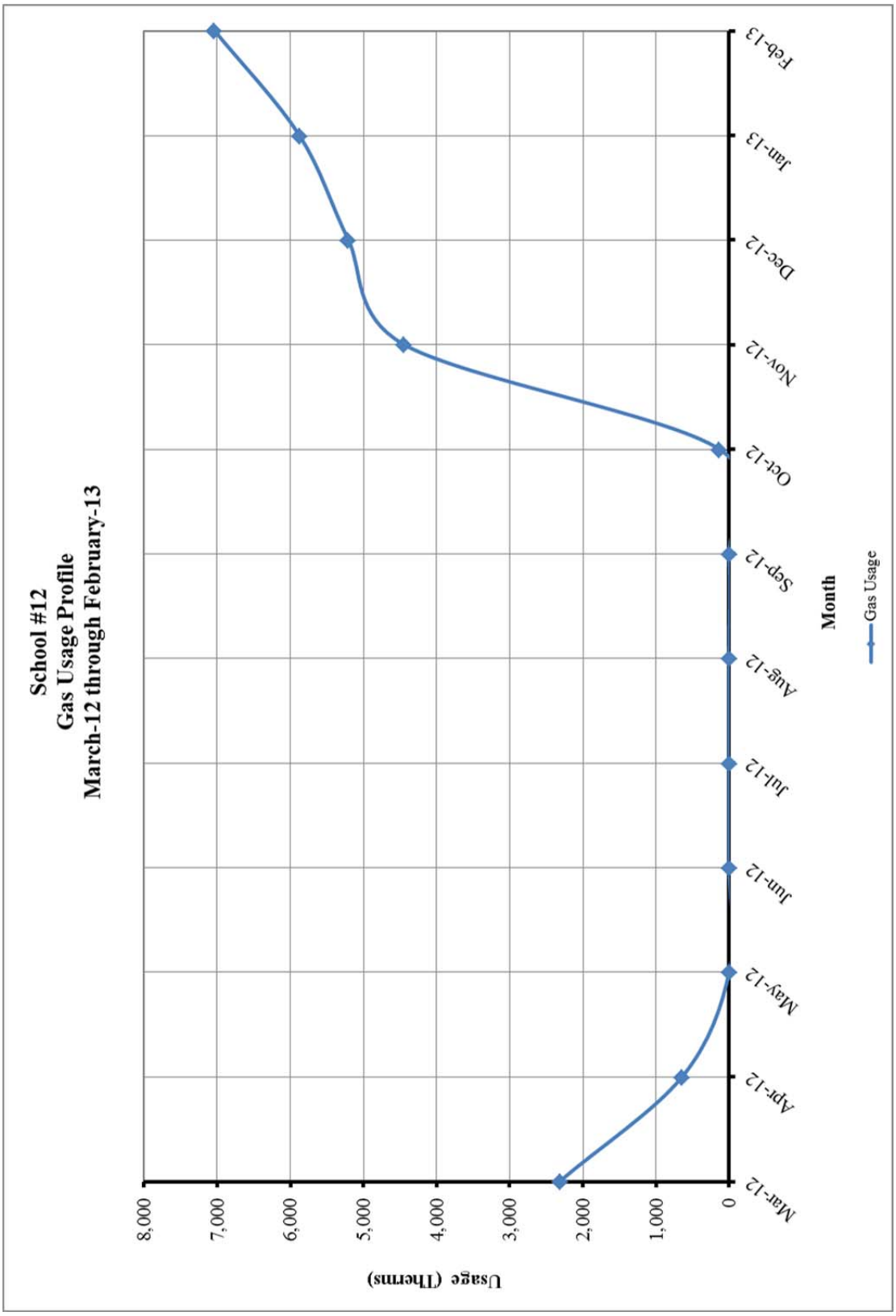


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: PSE&G		
Rate: LVG		
Meter No: 2415242		
Account No: 65 498 912 07		
Third Party Utility Provider: Hess		
TPS Meter No: 446757/446932		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Mar-12	2,318.37	$1,550.13
Apr-12	643.34	$421.39
May-12	0.00	$99.50
Jun-12	0.00	$99.50
Jul-12	0.00	$99.50
Aug-12	0.00	$99.50
Sep-12	0.00	$99.50
Oct-12	137.22	$792.85
Nov-12	4,450.13	$3,969.81
Dec-12	5,207.63	$4,654.52
Jan-13	5,877.81	$5,092.71
Feb-13	7,038.18	$6,165.99
TOTALS	**25,672.67**	**$23,144.90**
AVERAGE RATE:	**$0.90**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

School #12 is located at 165 Clifton Avenue in Clifton, New Jersey. This 70,000 SF school was built in 1910 with major additions/renovations in 1959 and 1994. The original school structure is H-shaped and forms the core of the building. The building is a 3-story facility with a partial basement comprised of storage rooms, boiler room and custodial office. The first thru third floors are comprised of administration offices, teacher's room, art room, general classrooms, kindergarten, special education classrooms, small group instruction rooms, and nurse's office, kitchen serving area, gym/stage, and cafeteria/music area.

Occupancy Profile

The typical hours of operation for School #12 are Monday through Friday between 7:00 am and 4:00 pm. Maintenance staff is present in the building as early as 6:00 am, and nighttime cleaning staff present until 10:00 pm. The school's enrollment is approximately 600 students and has 62 teachers, support staff, and administrative personnel.

Building Envelope

Exterior walls for this school are brick faced with some stone work in the original structure and concrete block/steel construction. The amount of insulation within the walls is unknown. The windows throughout the school are in good condition and appear to be well maintained. Typical windows throughout the school are double pane, operable, ¼" clear glass with aluminum frames. The roofing is built-up asphalt sheets over cover board, rigid roof insulation and metal decking along with a covering of light colored gravel. The amount of roofing insulation is unknown.

HVAC Systems

School #12 HVAC systems consists of two (2) heating hot water boilers, two (2) heating hot water pumps, classroom heating and ventilating units, and approximately seventeen (17) window air conditioning units. In addition, a heating & ventilating unit (HV-1) that serves the corridors is located in the basement.

The two (2) boilers are gas-fired, cast iron sectional hot water boilers approximately 17 years old with a rated input of 3,844 MBH each and a rated output of 3,031 (when new). Manufactured by H. B. Smith and having an existing thermal efficiency of approximately 75%, these boilers feed hot water coils throughout the facility. Hot water is circulated throughout the facility via two (2) TACO Model 2510E base-mounted, end suction centrifugal pumps. These pumps supply hot water to classroom unit ventilators, fin-tube radiators, cabinet/unit heaters, etc. The third boiler was found to be inoperative with the sides and one of the cast sections removed.

Various offices and classrooms are cooled by window air conditioning units. Nine (9) of the seventeen (17) units are in very poor condition along with being very inefficient (EER= 7.0) and should be replaced with Energy Star rated units with a cooling efficiency of 10.8 EER.

Fresh air is supplied to the classrooms via the unit ventilators & outside air intake louvers for the storage rooms, mechanical rooms, and modular classrooms. The central air handling unit that provides fresh air to the corridors was found to be inoperative.

Exhaust System

Air is exhausted from the toilet rooms through the roof exhausters. There are also several roof exhausters for the offices, storage rooms, mechanical rooms, classrooms/corridors, etc.

HVAC System Controls

The two (2) hot water boilers and pumps are controlled by a Heat-Timer® HWE Multi-Stage controller that stages the boilers, system pumps, and hot water supply temperature. The hot water supply temperature is reset via an outside air temperature sensor. A central control panel is used to manual set the classrooms and library into occupied or unoccupied mode via toggle switches along with hot water pumps P-1 and P-2. Each unit ventilator in the classrooms is controlled by a thermostat on the opposite wall with a temperature control dial that allows the occupant local temperature control. The cabinet/unit heaters are controlled by local thermostats.

Domestic Hot Water

Domestic hot water for the facility is supplied by a Rheem-Ruud ES120 electric hot water heater with a 120-gallon storage capacity and an input of 18 kW. A 1/15 HP Bell & Gossett pump circulates the domestic hot water throughout the facility.

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.

Miscellaneous

The serving kitchen is equipped with two (2) True Refrigerators, EPCO rack heater, Vulcan portable ovens and two milk refrigerators owned by the vendor.

III. MAJOR EQUIPMENT LIST

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

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

IV. ENERGY CONSERVATION MEASURES

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

Table 1
ECM Financial Summary

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Lighting Upgrade - General	$38,514	$4,321	8.9	68.3%
ECM #2	Lighting Upgrade - Gym	$5,000	$219	22.8	-34.3%
ECM #3	Lighting Controls Upgrade	$8,260	$2,420	3.4	339.4%
ECM #4	Boiler Upgrade	$131,624	$4,269	30.8	-18.9%
ECM #5	NEMA Premium Motors	$5,120	$510	10.0	79.3%
ECM #6	Pipe Insulatin	$6,330	$1,939	3.3	359.5%
ECM #7	Domestic Hot Water Heater Converstion	$29,760	$6,344	4.7	155.8%
ECM #8	Water Conservation	$238	$1,224	0.2	7614.3%
ECM #9	DDC Controls Upgrade	$268,020	$3,102	86.4	-82.6%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	99.17 KW PV System	$607,785	$39,431	15.4	-2.7%
Notes:	A. Cost takes into consideration applicable NJ Smart StartTM incentives.				
	B. Savings takes into consideration applicable maintenance savings.				

Table 2
ECM Energy Summary

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
ECM #1	Lighting Upgrade - General	12.1	28,241	-
ECM #2	Lighting Upgrade - Gym	0.6	1,430	0
ECM #3	Lighting Controls Upgrade	-	15,814	-
ECM #4	Boiler Upgrade	-	-	4,744
ECM #5	NEMA Premium Motors	1.0	3,332	-
ECM #6	Pipe Insulatin	-	-	2,155
ECM #7	Domestic Hot Water Heater Converstion	-	52,298	(1,841)
ECM #8	Water Conservation	-	6590 (43,200 Gallons of water)	-
ECM #9	DDC Controls Upgrade	-	5,170	2,567
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
REM #1	99.17 KW PV System	99.2	114,596	0

Table 3
Facility Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Lighting Upgrade - General	$4,321	$42,154	$3,640	$38,514	8.9
Lighting Upgrade - Gym	$219	$5,500	$500	$5,000	22.8
Lighting Controls Upgrade	$2,420	$9,400	$1,140	$8,260	3.4
Boiler Upgrade	$4,269	$134,624	$3,000	$131,624	30.8
NEMA Premium Motors	$510	$5,120	$0	$5,120	10.0
Pipe Insulatin	$1,939	$6,330	$0	$6,330	3.3
Domestic Hot Water Heater Converstion	$6,344	$30,000	$240	$29,760	4.7
Water Conservation	$1,224	$238	$0	$238	0.2
~~DDC Controls Upgrade~~	~~$3,102~~	~~$268,020~~	~~$0~~	~~$268,020~~	~~86.4~~
Design / Construction Extras (15%)		$35,005		*$35,005*	
Total Project	**$21,246**	**$268,370**	**$8,520**	**$259,850**	**12.2**

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

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

ECM #1: Lighting Upgrade – General

Description:

The majority of the interior lighting throughout Clifton Elementary School #12 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 most of 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. For other areas that are over lit, Concord Engineering recommends that the fixture be retrofitted with new Super T-8 lamps/reflector, de-lamped to the appropriate light levels, and a new high-efficiency electronic ballast be installed. Finally, there are some fixtures that can be retrofitted to the Super T-8 lamp and Ballast system along with a reflector that would produce an economical payback period.

This ECM also 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. 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. 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. 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:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$42,154
NJ Smart Start Equipment Incentive ($):	$3,640
Net Installation Cost ($):	$38,514
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$4,321
Total Yearly Savings ($/Yr):	$4,321
Estimated ECM Lifetime (Yr):	15
Simple Payback	8.9
Simple Lifetime ROI	68.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$64,815
Internal Rate of Return (IRR)	7%
Net Present Value (NPV)	$13,069.82

ECM #2: Lighting Upgrade – Gymnasium

Description:

The gymnasium at Clifton Elementary School #12 is currently lit via 250 watt Metal Halide HID fixtures. The space would be better served with a more efficient, fluorescent lighting system. Concord Engineering recommends upgrading the lighting to an energy-efficient T5 high output system that includes new four lamp, 54 watt high output fixtures.

This measure replaces all the HID, 250 watt HID MH fixtures with a well-designed T5 high output (HO) system. T5 High output fixtures with reflectors and wire guards will be required in order to meet the mandated 50 foot-candle average within the spaces.

Energy Savings Calculations:

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

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$5,500
NJ Smart Start Equipment Incentive ($):	$500
Net Installation Cost ($):	$5,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$219
Total Yearly Savings ($/Yr):	$219
Estimated ECM Lifetime (Yr):	15
Simple Payback	22.8
Simple Lifetime ROI	-34.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$3,285
Internal Rate of Return (IRR)	-5%
Net Present Value (NPV)	($2,385.59)

ECM #3: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the Clifton Elementary School #12 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:

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

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

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

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$9,400
NJ Smart Start Equipment Incentive ($):	$1,140
Net Installation Cost ($):	$8,260
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,420
Total Yearly Savings ($/Yr):	$2,420
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.4
Simple Lifetime ROI	339.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$36,294
Internal Rate of Return (IRR)	29%
Net Present Value (NPV)	$20,625.21

ECM #4: Condensing Boiler Installation

Description:

There are two existing Smith cast iron hot water boilers which are used as the primary source of heat for Clifton Elementary School #12. These boilers operate as primary and standby, meaning only one boiler operates at a time. These boilers are connected to pumps which then distribute hot water to the air handling units and unit ventilators throughout the system.

The Smith boilers are approximately 19 years old and have not yet surpassed their life expectancy of a typical cast iron boiler. However, these boilers are fairly inefficient when compared to newer, condensing boilers, which makes replacement of these boilers an option that will provide substantial energy savings.

New condensing boilers could substantially improve the operating efficiency of the heating system of the building. Condensing boiler's peak efficiency tops out at 99% depending on return water temperature. Due to the operating conditions of the building, the annual average operating efficiency of the proposed condensing boiler is expected to be 92%. The existing boiler's efficiency is approximately 75%, which makes the condensing boilers a 17% increase in efficiency. This ECM is based on variable supply water temperature adjusted based on outdoor temperature.

This ECM includes installation of one (1) condensing gas fired boiler to replace one (1) of the existing Smith cast iron boilers. The basis for this ECM is Aerco condensing boiler; model number BMK-3.0. The boiler installation is based on a one for one replacement based on capacity of the existing boiler. The other Smith boiler will remain and only serve as a backup to the new boiler.

Energy Savings Calculations:

Total Gas Therms Used: 25,673 Therms

Boiler Usage: 25,673 Therms

$$Bldg\ Heat\ \mathrm{Re}quired = Existing\ Nat\ Gas\ (Therms) \times Heating\ Eff.(\%) \times Fuel\ HeatValue\left(\frac{BTU}{Therm}\right)$$

$$\mathrm{Pr}oposed\ Heating\ Gas\ Usage = \frac{Bldg\ Heat\ \mathrm{Re}quired\ (BTU)}{Heating\ Eff.(\%) \times Fuel\ Heat\ Value\left(\frac{BTU}{Therm}\right)}$$

$$Energy\ Cost = Heating\ Gas\ Usage(Therms) \times Ave\ Fuel\ Cost\left(\frac{\$}{Therm}\right)$$

CONDENSING BOILER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Cast Iron Boilers	New Condensing Boilers	
Existing Nat Gas (Therms)	25,673	0	
Boiler Efficiency (%)	75%	92%	17%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	
Equivalent Building Heat Usage (MMBTUs)	1,925	1,925	
Gas Cost ($/Therm)	0.90	0.90	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	25,673	20,929	4,744
Energy Cost ($)	$23,105	$18,836	$4,269
COMMENTS:			

Note: Concord Engineering is utilizing a seasonal average efficiency of 92% to account for efficiencies based on an outside air reset schedule.

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$134,624
NJ Smart Start Equipment Incentive ($):	$3,000
Net Installation Cost ($):	$131,624
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$4,269
Total Yearly Savings ($/Yr):	$4,269
Estimated ECM Lifetime (Yr):	25
Simple Payback	30.8
Simple Lifetime ROI	-18.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$106,737
Internal Rate of Return (IRR)	-2%
Net Present Value (NPV)	($57,278.47)

ECM #5: 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 air handling units, hot water pumps and condensate return 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**
P-1	HW Pump	10	3,391	85.5%	92.4%
P-2	HW Pump	10	3,391	85.5%	92.4%

Energy Savings Calculations:

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

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
P-1	10	75%	85.5%	92.4%	0.49	1,666	$255
P-2	10	75%	85.5%	92.4%	0.49	1,666	$255
TOTAL					**1.0**	**3,332**	**$510**

Equipment Cost

The following table outlines the summary of motor replacement costs:

MOTOR REPLACEMENT SUMMARY					
EQMT ID	MOTOR POWER HP	INSTALLED COST	NET COST	TOTAL SAVINGS	SIMPLE PAYBACK
P-1	10	$2,560	$2,560	$255	10.0
P-2	10	$2,560	$2,560	$255	10.0
TOTAL	**Totals:**	**$5,120**	**$5,120**	**$510**	**10.0**

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$5,120
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$5,120
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$510
Total Yearly Savings ($/Yr):	$510
Estimated ECM Lifetime (Yr):	18
Simple Payback	10.0
Simple Lifetime ROI	79.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$9,180
Internal Rate of Return (IRR)	7%
Net Present Value (NPV)	$1,894.29

ECM #6: Pipe Insulation

Description:

The boiler plant at Clifton Elementary School #12, supplies hot water to the unit ventilators throughout the system. The piping remains heated at around 180°F continuously during this period (approximately 6 months). Un-insulated piping has significant heat losses due to the exposure of the steel and copper piping to the surrounding air. Insulated piping has a heat loss which is a small fraction of the heat loss from un-insulated piping. It was identified that insulation for the large hot water piping in the boiler room were missing.

Based on the site survey following piping was identified for insulation:

Qty.	Size	Description	Surface Temp.	Area (Ea.) (Sq.ft.)	Bare Heat Loss (BTU/Hr/SF)	Bare Heat Loss (BTU/Hr)	Bare Heat Loss mmBtu	Insulated Heat Loss (BTU/Hr/SF)	Insulated Heat Loss (BTU/Hr)	Insulated Heat Loss mmBtu	Fuel Savings mmBtu/yr	Fuel Savings $/yr
50	6"	Supply Hot Water Piping	180	78.00	38.00	148,200.00	592.80	26.00	101,416.51	405.67	187.13	$1,684.21
50	4"	Supply Hot Water Piping	180	71.00	28.00	99,400.00	397.60	26.00	92,315.03	369.26	28.34	$255.06
TOTAL											215.5	$1,939

Pipe insulation is designed to provide insulation value over large pipes that must remain accessible. This ECM includes installation of pipe insulation on all exposed boiler system pipes.

Energy Savings Calculations:

Heat Loss for un-insulated steel piping is based on ASHRAE 2009 Fundamentals – "Insulation for Mechanical Systems".

$$\text{Heat Loss}\,\frac{\text{BTU}}{\text{HR}}\,\text{per Linear FT} = \frac{1}{\text{R} - \text{Value}} \times \text{Pipe Dia (FT)} \times 3.14 \times (\text{Pipe Temp (°F)} - \text{Ambient Temp(°F)})$$

$$\text{Heat Loss}\,\frac{\text{BTU}}{\text{HR}} = \text{Heat Loss}\,\frac{\text{BTU}}{\text{HR}}\,\text{per Linear FT} \times \text{Length of Uninsulated Pipe}$$

$$\text{Energy Use, Therms} = \frac{\text{Heat Loss}\,\frac{\text{BTU}}{\text{HR}} \times \text{Operating Hrs}}{\text{Heating System Eff. (\%)} \times \text{Fuel Heat Value}\,\frac{\text{BTU}}{\text{Therm}}}$$

$$\text{Heating Energy Cost Savings} = \text{Energy Use, Therms} \times \text{Cost of Nat Gas}\left(\frac{\$}{\text{Therm}}\right)$$

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$6,330
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$6,330
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,939
Total Yearly Savings ($/Yr):	$1,939
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.3
Simple Lifetime ROI	359.5%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$29,085
Internal Rate of Return (IRR)	30%
Net Present Value (NPV)	$16,817.66

ECM #7: High Efficiency Gas Hot Water Heater

Description:

The Clifton Elementary School #12 has one Rheem-Ruud electric hot water heater that serves the entirety of the building. The electric hot water heater is only 2 years old but distributing hot water to the entire system via an electric hot water heater can be very expensive. Converting the domestic system over to gas would be viable and more cost effective because there are already gas fired boilers for the main hot water system which the domestic system could make use of the existing gas lines.

This ECM will replace the original electric domestic water heater with Natural Gas fired 95% thermal efficient Bradford White eF Series. The unit will be replaced with a 120 MBH and 60 gallon heater. (Before proceeding with installation of aforementioned system, Concord Engineering suggests consulting a plumber to evaluate the system fully.)

Energy Savings Calculations:

DOM. HOT WATER HEATER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Electric Hot Water Heater	High Efficiency Gas Heater	
Building Type	Education		
Building Square-foot	69,969	69,969	
Domestic Water Usage, kBtu	174,922.50	174,922.50	
DHW Heating Fuel Type	Electric	Gas	
Heating Efficiency	98%	95%	-3%
Total Usage (kBTU)	178,492	184,129	-5,637
Electric Cost ($/kWh)	$ 0.153	$ -	
Nat Gas Cost ($/Therm)	$ 0.900	$ 0.900	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	52,298	0	52,298
Natural Gas Usage (Therms)	0	1,841	-1,841
Energy Cost ($)	$8,002	$1,657	$6,344
COMMENTS:	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

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

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

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

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$30,000
NJ Smart Start Equipment Incentive ($):	$240
Net Installation Cost ($):	$29,760
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$6,344
Total Yearly Savings ($/Yr):	$6,344
Estimated ECM Lifetime (Yr):	12
Simple Payback	4.7
Simple Lifetime ROI	155.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$76,128
Internal Rate of Return (IRR)	19%
Net Present Value (NPV)	$33,388.20

ECM #8: Water Conservation

Description:

The facility utilizes standard plumbing fixtures. The typical sink aerator consumption only meets the minimum federally required standard for water efficiency. New fixtures and aerators are available that use less water than today's requirements and can add up to significant water reduction over a long period.

This ECM includes the replacement of the existing sink aerators with low flow sink aerators in the restrooms.

Energy Savings Calculations:

Faucets:

$$\text{Water Consumption} = \text{Occupancy}\left(\frac{\text{Days}}{\text{Yr}}\right) \times \text{Use}\left(\frac{\text{min}}{\text{Day}}\right) \times \textit{FixtureQuantity} \times \text{Fixture}\left(\frac{\text{Gal}}{\text{Min}}\right)$$

$$\text{Water Cost} = \frac{\text{Water Consumption (Gallons)} \times \text{Ave Cost}\left(\frac{\$}{1000\ \text{Gal}}\right)}{1000(\text{Gal})}$$

$$\text{Water Heating Usage (kWh)} = \frac{\text{Gallons}}{\text{year}} \times 8.33\frac{\text{Btu}}{\text{gal}} \times \Delta\text{T}\ (50°\text{F}) \times \frac{1}{\text{Heater Eff}\ (95\%)} \times \frac{\text{kW}}{3412\ \text{Btu}}$$

LOW FLOW WATER SAVING DEVICES			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Quantity of Sinks	8	8	
Flow Rate (GPM)	2.2	1.0	1.2
Device Usage (min per day)	30	30	
Facility Operation (days / year)	150	150	
Electric Rate ($/kWh)	$0.153	$0.153	
Water Rate ($/1000gal)	$5.000	$5.000	
ENERGY SAVINGS CALCULATIONS			
Electric Usage (kWh)	12,081	5,492	6,590
Water Usage (gallons)	79,200	36,000	43,200
Energy Cost ($)	$2,244	$1,020	$1,224
COMMENTS:			

Note water savings are shown as maintenance savings in summary tables.

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$238
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$238
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,224
Total Yearly Savings ($/Yr):	$1,224
Estimated ECM Lifetime (Yr):	15
Simple Payback	0.2
Simple Lifetime ROI	7614.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$18,360
Internal Rate of Return (IRR)	514%
Net Present Value (NPV)	$14,374.03

ECM #9: Digital Energy Management System (DDC EMS)

Description:

Currently, Clifton Elementary School #12 uses a pneumatic control system with manual boiler start-up controls. This system is very old and offers little more than an on/off cycling control of the heating system.

Concord Engineering recommends installing a DDC system throughout the school to control all of the HVAC systems including the boilers, indoor air handling units, and roof exhaust fans.

The system will include new temperature sensors and new local thermostats with limited over-ride capability, a front end computer and main controller. With the communication between the control devices and the front end computer interface, the facility manager will be able to take advantage of scheduling for occupied and unoccupied periods based on the actual occupancy of each space in the facility. Due to the fact that the building may have diverse hours of occupancy, including evening and weekend activities, having supervisory control over all of the equipment makes sense. The DDC system will also aid in the response time to service / maintenance issues when the facility is not under normal maintenance supervision, i.e. after-hours.

The new DDC system has the potential to provide significant savings by controlling the HVAC systems as a whole and provide operating schedules and features such as space averaging, night set-back, temperature override control, etc. 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 referenced report:

- Energy Management and Control System Savings: 5%-15%.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 5% of the electricity and 10% for natural gas in these buildings.

The basis for the DDC system expansion is the Automated Logic Energy Management System or similar.

Energy Savings Calculations:

Energy savings for each utility is calculated with the equation below.

$$\text{Energy Savings (Utility)} = \text{Current Energy Consumption} \times \text{Estimated Savings, \%}$$

Following table summarizes energy savings for this facility via implementation of an Energy Management System:

DDC ENERGY MANAGEMENT SYSYEM CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Controls w/ Local Thermostats	DDC Controls	
Existing Nat Gas Usage (Therms)	25,673	-	
Existing Electricity Usage (kWh)	103,407	-	
Energy Savings, Nat Gas	-	10%	
Energy Savings, Electricity	-	5%	
Gas Cost ($/Therm)	*$0.90*	$0.90	
Electricity Cost ($/kWh)	*$0.153*	$0.153	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Nat Gas Usage (Therms)	25,673	23,105	2,567
Electricity Usage (kWh)	103,407	98,236	5,170
Nat Gas Cost ($)	$23,105	$20,795	$2,311
Electricity Cost ($)	$15,821	$15,030	$791
Energy Cost ($)	$38,927	$35,825	$3,102
COMMENTS:			

Demand savings due to implementation of this ECM is minimal.

The cost of a full DDC system with new field devices, controllers, computer, software, programming, etc. is approximately $3.83 per SF in accordance with recent Contractor pricing for systems of this magnitude. Savings from the implementation of this ECM will be from the reduced energy consumption currently used by the HVAC system by proper control of schedule and temperatures via the DDC system.

Energy Savings Summary:

ECM #9 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$268,020
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$268,020
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$3,102
Total Yearly Savings ($/Yr):	$3,102
Estimated ECM Lifetime (Yr):	15
Simple Payback	86.4
Simple Lifetime ROI	-82.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$46,530
Internal Rate of Return (IRR)	-17%
Net Present Value (NPV)	($230,988.53)

REM #1: 99.17 kW Solar System

Description:

The Clifton Elementary School #12 has available roof space that could accommodate a significant amount of solar generation. Based on the available areas a 99.17 kilowatt solar array could be installed. The array will produce approximately 114,596 kilowatt-hours annually that will reduce the overall electric usage of the facility by 35.48%.

Energy Savings Calculations:

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

Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
System Size (KW_{DC}):	99.17
Electric Generation (KWH/Yr):	114,596
Installation Cost ($):	$607,785
SREC Revenue ($/Yr):	$21,898
Energy Savings ($/Yr):	$17,533
Total Yearly Savings ($/Yr):	$39,431
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	15.4
Analysis Period Electric Savings ($):	$326,098
Analysis Period SREC Revenue ($):	$317,212
Net Present Value (NPV)	($214,122.00)

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. While the District is already performing many of these functions through routine maintenance it is important to continue to address these items as they provide an energy savings benefit.

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. Replace older style CRT monitors with newer energy efficient LCD/LED monitors.

G. Ensure classroom televisions are turned off at the end of the day and while not in use.

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

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Clifton Public Schools – School #12

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^{n_i}}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^{n_i}}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrade - General	$19,454	$22,700	$3,640	$38,514	$4,321	$0	$4,321	15	$64,815	$0	68.3%	8.9	7.34%	$13,069.82
ECM #2	Lighting Upgrade - Gym	$2,250	$3,250	$500	$5,000	$219	$0	$219	15	$3,285	$0	-34.3%	22.8	-4.84%	($2,385.59)
ECM #3	Lighting Controls Upgrade	$6,100	$3,300	$1,140	$8,260	$2,420	$0	$2,420	15	$36,294	$0	339.4%	3.4	28.62%	$20,625.21
ECM #4	Boiler Upgrade	$63,755	$70,869	$3,000	$131,624	$4,269	$0	$4,269	25	$106,737	$0	-18.9%	30.8	-1.55%	($57,278.47)
ECM #5	NEMA Premium Motors	$5,120	$0	$0	$5,120	$510	$0	$510	18	$9,180	$0	79.3%	10.0	7.03%	$1,894.29
ECM #6	Pipe Insulatin	$1,330	$5,000	$0	$6,330	$1,939	$0	$1,939	15	$29,085	$0	359.5%	3.3	30.04%	$16,817.66
ECM #7	Domestic Hot Water Heater Converstion	$10,000	$20,000	$240	$29,760	$6,344	$0	$6,344	12	$76,128	$0	155.8%	4.7	18.55%	$33,388.20
ECM #8	Water Conservation	$160	$78	$0	$238	$1,224	$0	$1,224	15	$18,360	$0	7614.3%	0.2	514.29%	$14,374.03
ECM #9	DDC Controls Upgrade	$268,020	$0	$0	$268,020	$3,102	$0	$3,102	15	$46,530	$0	-82.6%	86.4	-16.66%	($230,988.53)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	99.17 KW PV System	$607,785	$0	$0	$607,785	$17,533	$21,898	$39,431	15	$591,461	$328,463	-2.7%	15.4	-0.34%	($137,063.67)

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

APPENDIX B

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

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

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Cooling

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

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

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

Ground Source Heat Pumps

Closed Loop	$450 per ton, EER ≥ 16 $600 per ton, EER ≥ 18 $750 per ton, EER ≥ 20

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

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

Natural Gas Water Heating

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

Prescriptive Lighting

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

Prescriptive Lighting - LED

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

Lighting Controls – Occupancy Sensors

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

Lighting Controls – HID or Fluorescent Hi-Bay Controls

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

Premium Motors

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

Refrigeration Doors/Covers

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

Refrigeration Controls

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

Other Equipment Incentives

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

APPENDIX C

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
9-Clifton BOE - PS 12

Building ID: 3477592
For 12-month Period Ending: February 28, 2013[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: April 11, 2013

Facility
9-Clifton BOE - PS 12
165 Clifton Avenue
Clifton, NJ 07011

Facility Owner
Clifton BOE
745 Clifton Avenue
Clifton, NJ 07013

Primary Contact for this Facility
Karen Perkins
745 Clifton Avenue
Clifton, NJ 07013

Year Built: 1910
Gross Floor Area (ft²): 69,969

Energy Performance Rating[2] (1-100) 37

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	1,092,423
Natural Gas (kBtu)[4]	2,475,497
Total Energy (kBtu)	3,567,920

Energy Intensity[4]

Site (kBtu/ft²/yr)	51
Source (kBtu/ft²/yr)	89

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	286

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	45
National Median Source EUI	80
% Difference from National Median Source EUI	12%
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[5] **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	☑
Building Name	9-Clifton BOE - PS 12	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	165 Clifton Avenue, Clifton, NJ 07011	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
Elementary School 12 (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	69,969 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	131	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	No	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	0 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	10(Optional)	Is this school in operation for at least 8 months of the year?		☐

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

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity

Meter: Electric (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
01/06/2013	02/05/2013	39,975.00
12/06/2012	01/05/2013	37,575.00
11/06/2012	12/05/2012	35,625.00
10/06/2012	11/05/2012	24,825.00
09/06/2012	10/05/2012	23,025.00
08/06/2012	09/05/2012	10,575.00
07/06/2012	08/05/2012	10,575.00
06/06/2012	07/05/2012	18,975.00
05/06/2012	06/05/2012	24,750.00
04/06/2012	05/05/2012	24,225.00
03/06/2012	04/05/2012	32,700.00

Electric Consumption (kWh (thousand Watt-hours))	**282,825.00**
Electric Consumption (kBtu (thousand Btu))	**964,998.90**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))	**964,998.90**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?	☐

Fuel Type: Natural Gas

Meter: gas (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
01/06/2013	02/05/2013	5,877.81
12/06/2012	01/05/2013	5,207.63
11/06/2012	12/05/2012	4,450.13
10/06/2012	11/05/2012	137.22
09/06/2012	10/05/2012	0.00
08/06/2012	09/05/2012	0.00
07/06/2012	08/05/2012	0.00
06/06/2012	07/05/2012	0.00
05/06/2012	06/05/2012	0.00
04/06/2012	05/05/2012	643.34
03/06/2012	04/05/2012	2,318.37

gas Consumption (therms)	**18,634.50**
gas Consumption (kBtu (thousand Btu))	**1,863,450.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**1,863,450.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
9-Clifton BOE - PS 12
165 Clifton Avenue
Clifton, NJ 07011

Facility Owner
Clifton BOE
745 Clifton Avenue
Clifton, NJ 07013

Primary Contact for this Facility
Karen Perkins
745 Clifton Avenue
Clifton, NJ 07013

General Information

9-Clifton BOE - PS 12	
Gross Floor Area Excluding Parking: (ft^2)	69,969
Year Built	1910
For 12-month Evaluation Period Ending Date:	February 28, 2013

Facility Space Use Summary

Elementary School 12	
Space Type	K-12 School
Gross Floor Area (ft^2)	69,969
Open Weekends?	No
Number of PCs	131
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	No
Percent Cooled	0
Percent Heated	100
Months °	10
High School?	No
School District °	clifton

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 02/28/2013)	**Baseline** (Ending Date 02/28/2013)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	37	37	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	51	51	36	N/A	45
Source ($kBtu/ft^2$)	89	89	62	N/A	80
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/$ft^2$/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	286	286	200	N/A	255
$kgCO_2e/ft^2$/year	4	4	3	N/A	4

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.

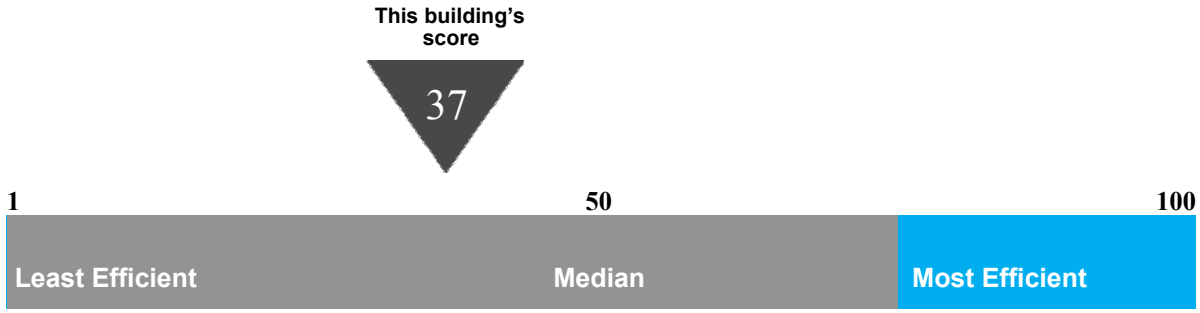
Statement of Energy Performance

2013

9-Clifton BOE - PS 12
165 Clifton Avenue
Clifton, NJ 07011

Portfolio Manager Building ID: 3477592

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



This building uses 89 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending February 2013

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 04/11/2013

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

School #12

AHUs

Tag	**HV-1**	
Unit Type	Air Handling Unit	
Qty	1	
Location	Basement	
Area Served	Basement	
Manufacturer	Trane	
Model #	MCCA012MAE	
Serial #	-	
Cooling Type	N/A	
Cooling Capacity (Tons)	N/A	
Heating Type	Hot Water	
Heating Input (MBH)	-	
Supply Fan (HP)	3 HP	
Return Fan (HP)	-	
Electrical (V/H/P)	-	
Approx Age	15	
ASHRAE Service Life	15	
Remaining Life	0	
Comments	**Unit was found to be inoperative.**	

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

School #12

Boilers

Tag	B-1 & B-2	
Unit Type	Cast Iron Sectional Boilers	
Qty	2	
Location	Basement Boiler Room	
Area Served	Hot Water Loop	
Manufacturer	Smith Cast Iron Boilers	
Model #	28A-12	
Serial #	N96-144	
Input Capacity (Btu/Hr)	3844 MBH	
Rated Output Capacity (Btu/Hr)	3031 MBH (91HP)	
Approx. Efficiency %	75.0%	
Fuel	Natural Gas	
Approx Age	17	
ASHRAE Service Life	35	
Remaining Life	18	
Comments	Industrial Combustion Burner : MN: FPG-35 SN:35971-1	

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

School #12

Domestic Water Heaters

Tag	DHWH-1	
Unit Type	Electric Domestic Hot Water Heater	
Qty	1	
Location	Boiler Room	
Area Served	Domestic Water	
Manufacturer	Rheem-Ruud	
Model #	ES120-18-G	
Serial #	RR0211E00061	
Size (Gallons)	120	
Input Capacity (MBH/KW)	18 KW	
Recovery (Gal/Hr)	74 Gal/Hr	
Efficiency %	98%	
Fuel	Electric	
Approx Age	2	
ASHRAE Service Life	12	
Remaining Life	10	
Comments		

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

School #12

Pumps

Tag	P-1	P-2
Unit Type	Base Mounted End Suction	Base Mounted End Suction
Qty	2	2
Location	Basement Boiler Room	Basement Boiler Room
Area Served	Hot Water Loop	Hot Water Loop
Manufacturer	Bell & Gossett	TACO
Model #	2AC 6.125 BF (1510 Series)	FE2510E2H1F2L0A
Serial #	1808318	160543
Horse Power	1.5 HP	10 HP
Flow	110 GPM @ 30 FTHD	-
Motor Info	Marathon	Baldor
Electrical Power	208-230/460/3/60	208-230/460/3/60
RPM	1735 RPM	1725 RPM
Motor Efficiency %	80.0%	85.5%
Approx Age	19	19
ASHRAE Service Life	20	20
Remaining Life	1	1
Comments		

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

APPENDIX E

CEG Project #: 9C12066
Facility Name: School #12
Address: 700 Gregory Avenue
City, State, Zip Clifton, NJ 07013

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
5	Gym	2600	250w Metal Halide Pendant	1	295	10	2.95	7,670	Remove & Replace New Fixture	2x4, 4 Lamp, 54w T5, (2) 2/54 Elect. Ballast, Singlepoint Mnt., High Bay, Wire Guard, Lens	4	240	10	2.40	6,240	0.55	1,430	$219	0	No New Controls	0	0.0%	0	$0
242.21	Boys Restroom	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	1	0.11	283	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	1	0.07	187	0.04	96	$15	0	No New Controls	0	0.0%	0	$0
242.21	Girls Restroom	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	1	0.11	283	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	1	0.07	187	0.04	96	$15	0	No New Controls	0	0.0%	0	$0
221.11	Gym Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.11	Gym Office	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	4	109	2	0.22	567	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	374	0.07	192	$29	0	No New Controls	0	0.0%	0	$0
221.11	Stage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	8	0.50	595	Existing to Remain	Existing to Remain	2	62	0	0.50	595	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Stage to Basement Hallway	3000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	372	Existing to Remain	Existing to Remain	2	62	0	0.12	372	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
241.11	Stage to Basement Hallway	3000	1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	4	109	2	0.22	654	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	432	0.07	222	$34	0	No New Controls	0	0.0%	0	$0
221.11	Gym to Main Bldg Hallway	3000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	4	0.25	744	Existing to Remain	Existing to Remain	2	62	0	0.25	744	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Stairs 1	3000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	5	0.31	930	Existing to Remain	Existing to Remain	2	62	0	0.31	930	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
241.11	Stairs 1	3000	1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	4	109	1	0.11	327	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	1	0.07	216	0.04	111	$17	0	No New Controls	0	0.0%	0	$0
232.21	Stairs 1	3000	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	516	Existing to Remain	Existing to Remain	3	86	0	0.17	516	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
232.21	Front Main Hallway	3000	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	9	0.77	2,322	Existing to Remain	Existing to Remain	3	86	0	0.77	2,322	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
232.21	Classroom 7	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
221.11	Classroom 7 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Classroom 8	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, 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	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classroom 8 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	Girls Restroom	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	567	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	374	0.07	192	$29	0	No New Controls	0	0.0%	0	$0
227.21	Girls Restroom	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	169	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	88	0.03	81	$12	0	No New Controls	0	0.0%	0	$0
221.11	Hall to CR 8	3000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	372	Existing to Remain	Existing to Remain	2	62	0	0.12	372	0.00	0	$0	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
227.21	Hall to CR 7	3000	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	195	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	102	0.03	93	$14	0	No New Controls	0	0.0%	0	$0
221.21	Classroom 6	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	17	1.05	2,740	Existing to Remain	Existing to Remain	2	62	0	1.05	2,740	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	548	$84
221.11	Classroom 6 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	Nurse Office	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	7	0.76	1,984	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	7	0.50	1,310	0.26	673	$103	0	No New Controls	0	0.0%	0	$0
222.21	Nurse Office	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
227.21	Nurse Restroom	1200	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	78	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	41	0.03	37	$6	0	No New Controls	0	0.0%	0	$0
242.21	Front Entrance	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	567	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	374	0.07	192	$29	0	No New Controls	0	0.0%	0	$0
242.21	Classroom 3 Art	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	15	1.64	4,251	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	15	1.08	2,808	0.56	1,443	$221	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	562	$86
221.11	Classroom 3 Art Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Classroom 3 Art Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Main Office	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, 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	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	193	$30
232.21	Side Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	1	0.09	224	Existing to Remain	Existing to Remain	3	86	0	0.09	224	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	45	$7
221.11	Principal's Office	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface 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	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	129	$20
221.11	Office 2	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, 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	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	97	$15
221.11	Office Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.21	Classroom 2	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed 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	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$89
221.11	Classroom 2 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Classroom 1	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, 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	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	387	$59
221.11	Classroom 1 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	Boys Restroom	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	567	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	374	0.07	192	$29	0	No New Controls	0	0.0%	0	$0
227.21	Boys Restroom	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	169	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	88	0.03	81	$12	0	No New Controls	0	0.0%	0	$0
222.21	Ramp to Stairs	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	6	0.37	1,116	Existing to Remain	Existing to Remain	2	62	0	0.37	1,116	0.00	0	$0	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
222.21	Hall from main bldg to Café	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	17	1.05	3,162	Existing to Remain	Existing to Remain	2	62	0	1.05	3,162	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	Hall from main bldg to Café	3000	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	1	0.11	327	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	1	0.07	216	0.04	111	$17	0	No New Controls	0	0.0%	0	$0
1	Janitor Closet	1200	3 Lamp, 13w CFL Globe	3	39	1	0.04	47	Existing to Remain	Existing to Remain	3	39	0	0.04	47	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
222.21	Stairs 2	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	18	1.12	3,348	Existing to Remain	Existing to Remain	2	62	0	1.12	3,348	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
227.21	Girls Restroom	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	169	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	88	0.03	81	$12	0	No New Controls	0	0.0%	0	$0
222.21	Girls Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
227.21	Boys Restroom	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	169	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	88	0.03	81	$12	0	No New Controls	0	0.0%	0	$0
222.21	Boys Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed 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	No New Controls	0	0.0%	0	$0
242.21	Kindergarten 107	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	12	1.31	3,401	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	12	0.86	2,246	0.44	1,154	$177	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	449	$69
227.21	Kindergarten 107 Restroom	1200	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	78	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	41	0.03	37	$6	0	No New Controls	0	0.0%	0	$0
222.21	Kindergarten 107/106 Storage	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	Kindergarten 106	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	12	1.31	3,401	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	12	0.86	2,246	0.44	1,154	$177	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	449	$69
227.21	Kindergarten 106 Restroom	1200	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	78	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	41	0.03	37	$6	0	No New Controls	0	0.0%	0	$0
221.11	Janitor Closet	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
227.21	Cafeteria & Music Area	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	74	4.81	12,506	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	74	2.52	6,542	2.29	5,964	$913	0	No New Controls	0	0.0%	0	$0
242.21	Kitchen Storage	1200	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	262	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	173	0.07	89	$14	0	No New Controls	0	0.0%	0	$0
242.21	Kitchen Serving Area	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	5	0.55	1,417	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	5	0.36	936	0.19	481	$74	0	No New Controls	0	0.0%	0	$0
221.11	Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	Classroom 201	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	12	1.31	3,401	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	12	0.86	2,246	0.44	1,154	$177	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	449	$69
242.21	Classroom 202	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	12	1.31	3,401	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	12	0.86	2,246	0.44	1,154	$177	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	449	$69
242.21	Classroom 203	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	12	1.31	3,401	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	12	0.86	2,246	0.44	1,154	$177	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	449	$69

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
242.21	Classroom 204	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	12	1.31	3,401	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	12	0.86	2,246	0.44	1,154	$177	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	449	$69
222.21	2F Hallway	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	17	1.05	3,162	Existing to Remain	Existing to Remain	2	62	0	1.05	3,162	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	2F Hallway	3000	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	654	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	432	0.07	222	$34	0	No New Controls	0	0.0%	0	$0
222.21	2F Office	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	64	$10
4	2F Janitor Closet	1200	2 Lamp Incandescent Globe 150w	2	300	1	0.30	360	Re-Lamp	42w CFL Screw Base	2	84	1	0.08	101	0.22	259	$40	0	No New Controls	0	0.0%	0	$0
242.21	Small Group 205	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	6	0.65	1,700	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	6	0.43	1,123	0.22	577	$88	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	225	$34
242.21	Classroom 206	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	12	1.31	3,401	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	12	0.86	2,246	0.44	1,154	$177	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	449	$69
242.21	Classroom 207	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	12	1.31	3,401	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	12	0.86	2,246	0.44	1,154	$177	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	449	$69
242.21	Faculty	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	5	0.55	1,417	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	5	0.36	936	0.19	481	$74	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	187	$29
227.21	Faculty	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	2	0.13	338	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	2	0.07	177	0.06	161	$25	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	35	$5
227.21	Teacher Restroom	1200	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	78	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	41	0.03	37	$6	0	No New Controls	0	0.0%	0	$0
222.21	Girls Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed 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	No New Controls	0	0.0%	0	$0
227.21	Girls Restroom	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	169	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	88	0.03	81	$12	0	No New Controls	0	0.0%	0	$0
242.21	Boys Restroom	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	567	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	374	0.07	192	$29	0	No New Controls	0	0.0%	0	$0
227.21	Boys Restroom	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	169	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	88	0.03	81	$12	0	No New Controls	0	0.0%	0	$0
221.11	Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
227.21	Hall from main to addition 2F	3000	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	4	0.26	780	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	4	0.14	408	0.12	372	$57	0	No New Controls	0	0.0%	0	$0
232.21	Classroom 9	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
232.21	Classroom 9 Storage	1200	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	206	Existing to Remain	Existing to Remain	3	86	0	0.17	206	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
232.21	Classroom 10	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
221.11	Classroom 10 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
227.21	Hallway	3000	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	195	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	102	0.03	93	$14	0	No New Controls	0	0.0%	0	$0

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Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
222.21	Hallway	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	186	Existing to Remain	Existing to Remain	2	62	0	0.06	186	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	Boys Restroom	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	567	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	374	0.07	192	$29	0	No New Controls	0	0.0%	0	$0
227.21	Boys Restroom	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	169	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	88	0.03	81	$12	0	No New Controls	0	0.0%	0	$0
1	Storage	1200	3 Lamp, 13w CFL Globe	3	39	1	0.04	47	Existing to Remain	Existing to Remain	3	39	0	0.04	47	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
232.21	Classroom 12	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	15	1.29	3,354	Existing to Remain	Existing to Remain	3	86	0	1.29	3,354	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	671	$103
232.21	Classroom 12 Storage	1200	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	206	Existing to Remain	Existing to Remain	3	86	0	0.17	206	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
232.21	Book Room	1200	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	5	0.43	516	Existing to Remain	Existing to Remain	3	86	0	0.43	516	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	103	$16
232.21	Classroom 14	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	15	1.29	3,354	Existing to Remain	Existing to Remain	3	86	0	1.29	3,354	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	671	$103
232.21	Classroom 14 Storage	1200	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	206	Existing to Remain	Existing to Remain	3	86	0	0.17	206	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
232.21	Media Center	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	24	2.06	5,366	Existing to Remain	Existing to Remain	3	86	0	2.06	5,366	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Media Center Storage 1	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Media Center Storage 2	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Media Center Storage 3	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Media Center Storage 4	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
227.21	Main Hall	3000	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	14	0.91	2,730	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	14	0.48	1,428	0.43	1,302	$199	0	No New Controls	0	0.0%	0	$0
222.21	Main Hall	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	558	Existing to Remain	Existing to Remain	2	62	0	0.19	558	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	Girls Restroom	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	567	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	374	0.07	192	$29	0	No New Controls	0	0.0%	0	$0
227.21	Girls Restroom	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	169	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	88	0.03	81	$12	0	No New Controls	0	0.0%	0	$0
232.21	Classroom 15	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
232.21	Classroom 15 Storage	1200	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	206	Existing to Remain	Existing to Remain	3	86	0	0.17	206	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
232.21	Classroom 16	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$82
232.21	Classroom 16 Storage	1200	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	206	Existing to Remain	Existing to Remain	3	86	0	0.17	206	0.00	0	$0	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
221.11	Classroom 17	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, 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	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	484	$74
221.11	Classroom 17 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	Boys Restroom	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	567	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	374	0.07	192	$29	0	No New Controls	0	0.0%	0	$0
227.21	Boys Restroom	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	169	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	88	0.03	81	$12	0	No New Controls	0	0.0%	0	$0
222.21	3F Main Hall	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	15	0.93	2,790	Existing to Remain	Existing to Remain	2	62	0	0.93	2,790	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
227.21	3F Main Hall	3000	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	5	0.33	975	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	5	0.17	510	0.16	465	$71	0	No New Controls	0	0.0%	0	$0
221.11	Classroom 18	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, 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	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	484	$74
221.11	Classroom 18 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	3F Office	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	567	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	374	0.07	192	$29	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	75	$11
221.11	3F Office	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	64	$10
242.21	3F Small Hall	3000	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	654	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	432	0.07	222	$34	0	No New Controls	0	0.0%	0	$0
217.41	3F Restroom	1200	1x2, 1 Lamp, F17 T8, 17w, Elect. Ballast, Wall Mnt., Prismatic Lens	1	18	1	0.02	22	Existing to Remain	Existing to Remain	1	18	0	0.02	22	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.21	Classroom 19	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed 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	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$89
221.11	Classroom 19 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.21	Classroom 20	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed 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	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$89
221.11	Classroom 20 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.21	Classroom 21	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed 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	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$89
221.11	Classroom 21 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.21	Classroom 22	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed 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	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$89
221.11	Classroom 22 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	Classroom 23	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, 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	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	484	$74
221.11	Classroom 23 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
221.11	Classroom 24	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, 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	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	484	$74
221.11	Classroom 24 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
242.21	Girls Restroom	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	567	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	2	0.14	374	0.07	192	$29	0	No New Controls	0	0.0%	0	$0
227.21	Girls Restroom	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	169	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	88	0.03	81	$12	0	No New Controls	0	0.0%	0	$0
221.11	Teacher Prep	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface 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	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	258	$39
4	B1 Storage 1	1200	2 Lamp Incandescent Globe 150w	2	300	6	1.80	2,160	Re-Lamp	42w CFL Screw Base	2	84	6	0.50	605	1.30	1,555	$238	0	No New Controls	0	0.0%	0	$0
3	B1 Stock Room	1200	150w Incandescent	1	150	4	0.60	720	Re-Lamp	42w CFL Screw Base	1	42	4	0.17	202	0.43	518	$79	0	No New Controls	0	0.0%	0	$0
221.11	B1 Storage 2	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	8	0.50	595	Existing to Remain	Existing to Remain	2	62	0	0.50	595	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	B1 Storage 3	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	893	Existing to Remain	Existing to Remain	2	62	0	0.74	893	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
3	B1 Storage 3	1200	150w Incandescent	1	150	1	0.15	180	Re-Lamp	42w CFL Screw Base	1	42	1	0.04	50	0.11	130	$20	0	No New Controls	0	0.0%	0	$0
221.11	B1 Storage 4	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	12	0.74	893	Existing to Remain	Existing to Remain	2	62	0	0.74	893	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
3	B1 Storage 4	1200	150w Incandescent	1	150	2	0.30	360	Re-Lamp	42w CFL Screw Base	1	42	2	0.08	101	0.22	259	$40	0	No New Controls	0	0.0%	0	$0
2	B1 Storage 4	1200	28w CFL	1	28	1	0.03	34	Existing to Remain	Existing to Remain	1	28	0	0.03	34	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	B1 Boiler Room	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, 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	No New Controls	0	0.0%	0	$0
3	B1 Boiler Room	1200	150w Incandescent	1	150	1	0.15	180	Re-Lamp	42w CFL Screw Base	1	42	1	0.04	50	0.11	130	$20	0	No New Controls	0	0.0%	0	$0
221.11	B1 Storage 5	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	B1 Custodian	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	B1 Storage 6	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	6	0.37	446	Existing to Remain	Existing to Remain	2	62	0	0.37	446	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	B1 Storage 6	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
221.11	B1 Hallway	3000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	8	0.50	1,488	Existing to Remain	Existing to Remain	2	62	0	0.50	1,488	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
222.21	B1 Hallway	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	8	0.50	1,488	Existing to Remain	Existing to Remain	2	62	0	0.50	1,488	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
	TOTAL					**880**	**70.67**	**171,965**					**306**	**58.03**	**142,294**	**13**	**29,671**	**$4,540**			**38**	**8**	**15,814**	**$2,420**

APPENDIX F

Location Description	Area (Sq FT)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Total KW_{AC}	Panel Weight (41.9 lbs)	W/SQFT
School #12	10350	SHARP NU-U235F2	422	17.5	7,402	99.17	114,596	80.3	17,682	13.40

= Proposed Roof PV Layout = Proposed Parking PV Layout

Notes:

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

Project Name: **LGEA Solar PV Project - School #12**
Location: **Clifton, NJ**
Description: **Photovoltaic System 100% Financing - 15 year**

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$607,785
Annual kWh Production	114,596
Annual Energy Cost Reduction	$17,533
Average Annual SREC Revenue	$21,898

Simple Payback: **15.41** Years

Life Cycle Cost Analysis

Analysis Period (years): 15
Discount Rate: 3%
Average Energy Cost ($/kWh) **$0.153**
Financing Rate: 6.00%

Financing %: 100%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
Average SREC Value ($/kWh) $0.191

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$0	0	0	0	$0	0	0	0	0
1	$0	114,596	$17,533	$0	$28,649	$35,766	$25,780	($15,364)	($15,364)
2	$0	114,023	$18,059	$0	$28,506	$34,176	$27,370	($14,981)	($30,345)
3	$0	113,453	$18,601	$0	$28,363	$32,488	$29,058	($14,582)	($44,927)
4	$0	112,886	$19,159	$0	$28,221	$30,695	$30,851	($14,166)	($59,092)
5	$0	112,321	$19,734	$1,157	$28,080	$28,793	$32,753	($14,889)	($73,981)
6	$0	111,760	$20,326	$1,151	$22,352	$26,772	$34,774	($20,019)	($94,001)
7	$0	111,201	$20,936	$1,145	$22,240	$24,628	$36,918	($19,516)	($113,516)
8	$0	110,645	$21,564	$1,140	$22,129	$22,351	$39,195	($18,993)	($132,509)
9	$0	110,092	$22,211	$1,134	$22,018	$19,933	$41,613	($18,451)	($150,961)
10	$0	109,541	$22,877	$1,128	$16,431	$17,366	$44,180	($23,366)	($174,327)
11	$0	108,993	$23,563	$1,123	$16,349	$14,642	$46,904	($22,757)	($197,083)
12	$0	108,448	$24,270	$1,117	$16,267	$11,749	$49,797	($22,126)	($219,209)
13	$0	107,906	$24,998	$1,111	$16,186	$8,677	$52,869	($21,473)	($240,683)
14	$0	107,367	$25,748	$1,106	$10,737	$5,416	$56,130	($26,167)	($266,850)
15	$0	106,830	$26,521	$1,100	$10,683	$1,954	$59,592	($25,443)	($292,293)
	Totals:	1,660,061	$326,098	$12,413	$317,212	$315,405	$607,785	($292,293)	($2,105,140)

Net Present Value (NPV) **($214,122)**