CLIFTON PUBLIC SCHOOLS
PUBLIC SCHOOL #4

194 WEST SECOND STREET
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 and Power (GLP)
Third Party Supplier:	Champion Energy Services

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: 727000174
Account No: 66 074 390 04
Third Party Utility Provider: Champion Energy Services LLC
TPS Meter / Acct No: -

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Mar-12	7,360	27.2	$1,107
Apr-12	6,960	28.8	$1,072
May-12	6,720	28.0	$1,297
Jun-12	6,160	28.0	$1,223
Jul-12	7,120	22.4	$1,281
Aug-12	2,720	28.0	$834
Sep-12	6,560	28.8	$1,004
Oct-12	7,920	28.8	$1,148
Nov-12	5,680	28.8	$902
Dec-12	7,440	28.8	$1,086
Jan-13	8,320	28.8	$1,194
Feb-13	7,760	28.8	$1,147
Totals	**80,720**	**28.8 Max**	**$13,295**

AVERAGE DEMAND **27.9 KW average**
AVERAGE RATE **$0.165** **$/kWh**

Figure 1
Electricity Usage Profile

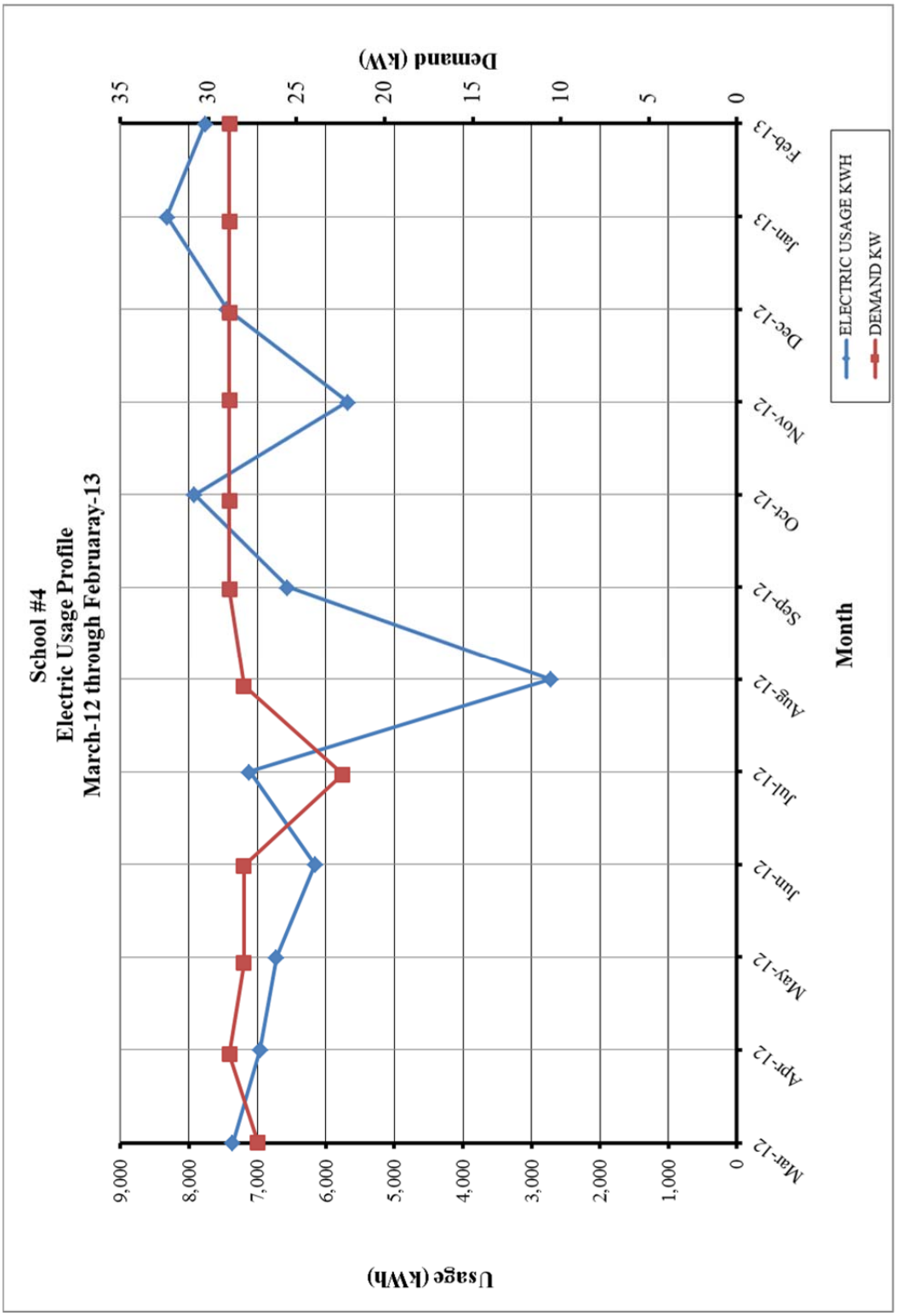
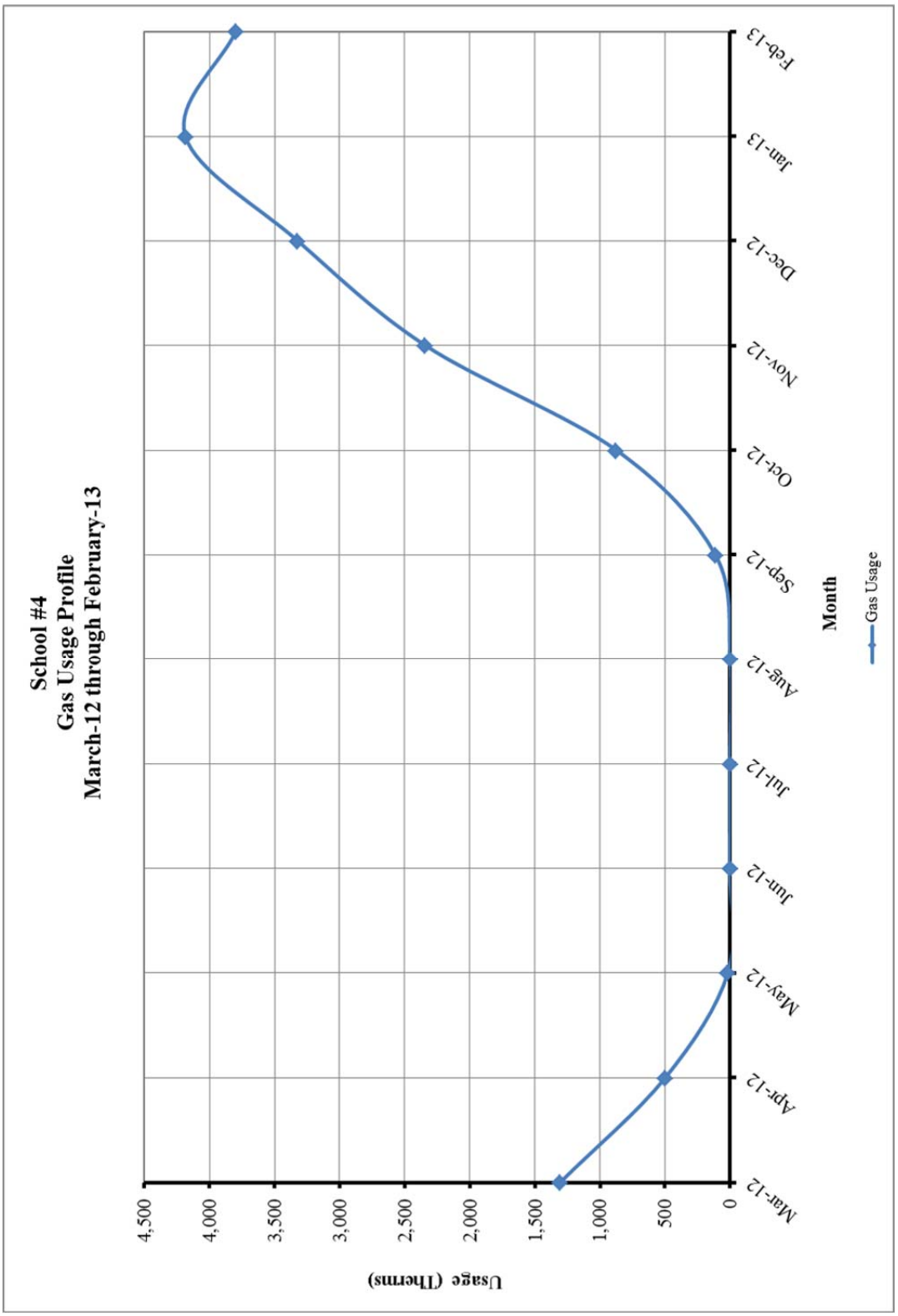


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: PSE&G		
Rate: LVG		
Meter No: 3341992		
Account No: 66 074 390 04		
Third Party Utility Provider: Hess		
TPS Meter No: 446575/446934		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Mar-12	1,305.20	$928.53
Apr-12	497.10	$347.96
May-12	17.80	$108.30
Jun-12	2.00	$100.60
Jul-12	1.00	$100.09
Aug-12	0.00	$99.50
Sep-12	114.50	$164.53
Oct-12	876.00	$1,134.56
Nov-12	2,343.50	$2,238.04
Dec-12	3,323.90	$3,036.51
Jan-13	4,186.40	$3,633.76
Feb-13	3,796.20	$3,420.51
TOTALS	**16,463.60**	**$15,312.89**
AVERAGE RATE:	**$0.93**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

The Clifton Public School #4 is located at 194 West Second Street in Clifton, New Jersey. The 15,550 SF Elementary School was built in 1929 with a 5,830 SF Addition built in 1959. The building is a two story facility comprised of classrooms, offices, multi-purpose room, media center and mechanical rooms.

Occupancy Profile

The typical hours of operation for the Elementary School 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. The school's enrollment is approximately 157 students, grades 1st through 5th, and has 14 teachers, support staff, and administrative personnel.

Building Envelope

Exterior walls in the original building are brick faced with a concrete block construction. The amount of insulation within the walls is unknown. The exterior walls for the addition are curtain walls consisting of a spandrel panel, and large glass panel with an operable window. Typical windows throughout the school are double pane, operable, ¼" clear glass with aluminum frames. The roof on the original building is a pitched roof with asphalt shingles. The roof over the addition is a flat, EPDM rubber roof on steel decking. The amount of insulation below the roof is unknown.

HVAC Systems

The elementary school HVAC system consists of one steam boiler, one steam to hot water heat exchanger, a heating and ventilation unit for the multi-purpose room, unit ventilators and steam radiators for the classrooms, and one split ac unit for the offices.

The boiler is a cast iron sectional boiler manufactured by H.B. Smith. It has 13 sections, which correlates to an input capacity of 3370 MBH and an output capacity of 2640 MBH, for a rated efficiency of 78%. This boiler serves the heat load of the entire facility. In the old building, there are steam radiators and unit ventilators that serve the spaces. The addition, however, has hot water heating coils in its unit ventilators and heating and ventilation unit for the multi-purpose room. These coils are fed by the steam to hot water heat exchanger and the two in-line hot water pumps located in the boiler room.

Fresh air is supplied to the building by unit ventilators in the classrooms. A large heating and ventilation unit also supplies fresh air to the multi-purpose room. These units all appear to be very old, and past their useful service life.

The only spaces in the school that have air conditioning are the faculty room, which is served by a window mounted ac unit, and the offices, which are served by a split ac unit. The window ac unit for the faculty room is a Kenmore unit with unit mounted controls. The split unit for the offices is a two ton carrier unit, and it is controlled by a local thermostat.

Exhaust System

Air is exhausted from the toilet rooms through switch controlled exhaust fans. The multi-purpose room has two exhaust fans to exhaust air through the roof. Those fans are controlled by a timer.

HVAC System Controls

The HVAC systems within the building are controlled through local electronic controls and timers. The classrooms have individual thermostats to control a steam valve at the unit ventilators and radiators. The multi-purpose room is on a timer set up for an occupied schedule of approximately 6:00 AM till 3:00 PM.

Domestic Hot Water

Domestic hot water for the restrooms is provided by an electric hot water heater.

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

There are two Energy Star rated refrigerators, and one chest cooler in the boiler room. There is also an EPCO heating rack in the multi-purpose room.

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	$6,020	$561	10.7	39.8%
ECM #2	Lighting Upgrade - Gym	$5,040	$107	47.1	-68.2%
ECM #3	Lighting Upgrade - Exterior	$360	$44	8.2	83.3%
ECM #4	Lighting Controls Upgrade	$2,625	$455	5.8	160.0%
ECM #5	DDC Building Controls Upgrade	$60,000	$1,739	34.5	-56.5%
ECM #6	Boiler Burner and Controls	$0	$1,225	41.6	-52.0%
ECM #7	Steam Trap Replacement	$38,815	$401	96.9	-89.7%
ECM #8	Replace Condensate Pump Receiver	$18,850	$200	94.3	-89.4%
ECM #9	CRT Monitor Replacement	$7,322	$503	14.6	3.0%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	24.44 KW PV System	$156,104	$10,057	15.5	-3.4%

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	2.2	3,402	-
ECM #2	Lighting Upgrade - Gym	0.4	648	-
ECM #3	Lighting Upgrade - Exterior	0.2	266	-
ECM #4	Lighting Controls Upgrade	-	2,756	-
ECM #5	DDC Building Controls Upgrade	0.0	1,889	1,535
ECM #6	Boiler Burner and Controls	0.0	0	1,317
ECM #7	Steam Trap Replacement	0.0	0	3,593
ECM #8	Replace Condensate Pump Receiver	0.0	1,132	200
ECM #9	CRT Monitor Replacement	1.7	3,203	0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
REM #1	24.44 KW PV System	24.4	28,242	-

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	$561	$6,390	$370	$6,020	10.7
Lighting Upgrade - Gym	$107	$5,440	$400	$5,040	47.1
Lighting Upgrade - Exterior	$44	$560	$200	$360	8.2
Lighting Controls Upgrade	$455	$3,000	$375	$2,625	5.8
~~DDC Building Controls Upgrade~~	~~$1,739~~	~~$60,000~~	~~$0~~	~~$60,000~~	~~34.5~~
~~Boiler Burner and Controls~~	~~$1,225~~	~~$51,000~~	~~$0~~	~~$51,000~~	~~41.6~~
Steam Trap Replacement	$401	$38,815	$0	$38,815	96.9
~~Replace Condensate Pump Receiver~~	~~$200~~	~~$18,850~~	~~$0~~	~~$18,850~~	~~94.3~~
CRT Monitor Replacement	$503	$7,322	$0	$7,322	14.6
Design / Construction Extras (15%)		$9,229		*$9,229*	
Total Project	**$2,071**	**$70,756**	**$1,345**	**$69,411**	**33.5**

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 #4 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.

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 ($):	$6,390
NJ Smart Start Equipment Incentive ($):	$370
Net Installation Cost ($):	$6,020
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$561
Total Yearly Savings ($/Yr):	$561
Estimated ECM Lifetime (Yr):	15
Simple Payback	10.7
Simple Lifetime ROI	39.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$8,415
Internal Rate of Return (IRR)	5%
Net Present Value (NPV)	$677.18

ECM #2: Lighting Upgrade – Gym

Description:

The Gym at Clifton Elementary School #4 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 ($):	$5,440
NJ Smart Start Equipment Incentive ($):	$400
Net Installation Cost ($):	$5,040
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$107
Total Yearly Savings ($/Yr):	$107
Estimated ECM Lifetime (Yr):	15
Simple Payback	47.1
Simple Lifetime ROI	-68.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$1,605
Internal Rate of Return (IRR)	-12%
Net Present Value (NPV)	($3,762.64)

ECM #3: Lighting Upgrade – Exterior Lighting

Description:

The exterior lighting at Clifton Elementary School #4 is currently lit via 70 watt high pressure sodium (HPS) wall packs. The exterior would be better served with more efficient LED lighting system. Concord Engineering recommends upgrading the lighting to an energy-efficient LED lighting system that includes LED lamps for the existing 70 watt HPS wall packs on the exterior with 20 watt Lumarck LED Wall packs.

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 #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$560
NJ Smart Start Equipment Incentive ($):	$200
Net Installation Cost ($):	$360
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$44
Total Yearly Savings ($/Yr):	$44
Estimated ECM Lifetime (Yr):	15
Simple Payback	8.2
Simple Lifetime ROI	83.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$660
Internal Rate of Return (IRR)	9%
Net Present Value (NPV)	$165.27

ECM #4: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the Clifton Elementary School #4 are left on unnecessarily. In many cases the lights are left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. This is common in rooms that are occupied for only short periods and only a few times per day. In some instances lights are left on due to the misconception that it is better to keep the lights on rather than to continuously switch lights on and off. Although increased switching reduces lamp life, the energy savings outweigh the lamp replacement costs. The payback timeframe for when to turn the lights off is approximately two minutes. If the lights are expected to be off for at least a two minute interval, then it pays to shut them off.

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

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

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

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

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

Energy Savings Calculations:

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

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

Rebates and Incentives:

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

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

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$3,000
NJ Smart Start Equipment Incentive ($):	$375
Net Installation Cost ($):	$2,625
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$455
Total Yearly Savings ($/Yr):	$455
Estimated ECM Lifetime (Yr):	15
Simple Payback	5.8
Simple Lifetime ROI	160.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$6,825
Internal Rate of Return (IRR)	15%
Net Present Value (NPV)	$2,806.76

ECM #5: Digital Energy Management System (DDC EMS)

Description:

Currently, Clifton Public School #4 uses a pneumatic control system. This system is very old and offers limited control options for the HVAC systems.

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. The system will also include central controls for lighting. 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 10% of the electricity and 10% for natural gas in this building.

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)	15,351	-	
Existing Electricity Usage (kWh)	37,773	-	
Energy Savings, Nat Gas	-	10%	
Energy Savings, Electricity	-	5%	
Gas Cost ($/Therm)	*$0.93*	$0.93	
Electricity Cost ($/kWh)	*$0.165*	$0.165	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Nat Gas Usage (Therms)	15,351	13,816	1,535
Electricity Usage (kWh)	37,773	35,884	1,889
Nat Gas Cost ($)	$14,277	$12,849	$1,428
Electricity Cost ($)	$6,233	$5,921	$312
Energy Cost ($)	$20,509	$18,770	$1,739
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 estimated to be $60,000 for this school based on 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.

Currently, there are no prequalified NJ SmartSmart Incentives for installation of the DDC system.

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$60,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$60,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,739
Total Yearly Savings ($/Yr):	$1,739
Estimated ECM Lifetime (Yr):	15
Simple Payback	34.5
Simple Lifetime ROI	-56.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$26,085
Internal Rate of Return (IRR)	-9%
Net Present Value (NPV)	($39,239.93)

ECM #6: Steam Boiler Burner & Controls Upgrade

Description:

The majority of the heating is provided to the Clifton Public School #4 facility by HB Smith 450 mills natural gas-fired boilers that produce steam for the heating season. The boiler is very old and is well maintained and currently should be capable of achieving an efficiency rating of 70 to 75 percent while operating. Given the limitations of the current system burner and controls and the vast improvement in boiler controls today over what was available when this boiler was installed, it is recommended that a burner and new controls upgrade be performed.

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

Energy Savings Calculations:

Annual Heating Energy Savings = Existing Fuel Consumption **x** 5% Efficiency Increase

Heating Cost Savings = Annual Heating Energy **x** Fuel Cost $/Unit

Savings were calculated using a spreadsheet and are tabulated below.

Month	Days	HDD	Fuel Usage , kBtu	Fuel Usage, Therms	Avg Boiler Input Load, Btu/h	Fuel Usage Reduction, kBtu	Fuel Usage Reduction, Therms	Fuel Cost Savings
January	31	914	399,007.1	3,990.1	536,299.9	31,920.6	319.2	$297
February	28	708	355,096.0	3,551.0	528,416.7	28,407.7	284.1	$264
March	31	461	190,416.4	1,904.2	255,936.0	15,233.3	152.3	$142
April	30	311	61,499.2	615.0	85,415.5	4,919.9	49.2	$46
May	31	90	8,349.5	83.5	11,222.4	668.0	6.7	$6
June	30	25	452.6	4.5	628.6	36.2	0.4	$0
July	31	0	123.8	1.2	166.4	9.9	0.1	$0
August	31	1	10.7	0.1	14.4	0.9	0.0	$0
September	30	40	10,223.2	102.2	14,198.9	817.9	8.2	$8
October	31	219	75,139.3	751.4	100,993.7	6,011.1	60.1	$56
November	30	656	214,558.9	2,145.6	297,998.5	17,164.7	171.6	$160
December	31	732	331,483.4	3,314.8	445,542.2	26,518.7	265.2	$247
Total	**365**	**4,157**	**1,646,360.0**	**16,463.6**		**131,709**	**1,317**	**$1,225**

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$51,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$51,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,225
Total Yearly Savings ($/Yr):	$1,225
Estimated ECM Lifetime (Yr):	21
Simple Payback	41.6
Simple Lifetime ROI	-49.6%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$25,725
Internal Rate of Return (IRR)	-6%
Net Present Value (NPV)	($32,116.60)

ECM #7: Steam Trap Replacement Program

Description:

Steam traps are required for the proper operation of steam distribution systems. Traps are mechanical devices installed on steam pipes to remove condensate from steam flow. When working properly, traps allow condensate to pass, while keeping the steam in the system to deliver heat where it is needed. Unfortunately steam traps have a tendency to leak. On average, steam traps have a useful life of 5 years, and with the large quantity of traps typically used within a facility, maintenance personnel have a hard time keeping up with the replacements. As a result, steam is lost and energy is wasted.

This ECM would replace approximately eleven (11) steam traps throughout the building. All non-thermostatic traps will be replaced with either bucket or float & thermostatic traps. Thermostatic traps will be repaired with cage units and new covers. Where repairing is not feasible, the thermostatic traps will be replaced. Schedule 80 piping and extra heavy fittings will be used, and all piping and fittings between the unions will be replaced along with the steam traps. In addition, a complete steam trap survey will be performed along with tagging and implementing a 3-year, revolving, steam trap maintenance program.

Energy Savings Calculations:

See **Appendix G** for a detailed analysis.

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$38,815
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$38,815
Maintenance Savings ($/Yr):	($2,666)
Energy Savings ($/Yr):	$3,067
Total Yearly Savings ($/Yr):	$401
Estimated ECM Lifetime (Yr):	10
Simple Payback	96.9
Simple Lifetime ROI	-89.7%
Simple Lifetime Maintenance Savings	($26,661)
Simple Lifetime Savings	$4,007
Internal Rate of Return (IRR)	-28%
Net Present Value (NPV)	($35,396.74)

ECM #8: Condensate Pump and Receiver Replacement

Description:

The condensate pump and receiver set in the boiler room is in very poor condition and leaking condensate from the receiver and pump seals. The lost condensate is a loss of water which is costly and a loss of 200° F water that does not return to the receiver and steam boilers. The make-up water has to be heated from 55° F resulting in a loss of energy.

Energy Savings Calculations:

The losses of condensate were estimated and the energy required to heat the make-up water from 60^0F to 200^0F was calculated. The existing condensate pumps have older less efficient motors and the efficiency gained by installing premium efficiency motors was also calculated.
See **Appendix H** for detailed energy savings calculations.

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$18,850
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$18,850
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$200
Total Yearly Savings ($/Yr):	$200
Estimated ECM Lifetime (Yr):	10
Simple Payback	94.3
Simple Lifetime ROI	-89.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$2,000
Internal Rate of Return (IRR)	-28%
Net Present Value (NPV)	($17,143.96)

ECM #9: CRT Monitor Replacement

Description:

Clifton School #4 still utilizes CRT Monitors for use by its staff and students. These monitors not only utilize more energy in operating mode, but also while in idle mode. Typical monitors throughout the buildings consisted of 15 inch size monitors.

This ECM will replace all remaining thirty-six (36) existing CRT monitors throughout the school with new 19" Widescreen Dell LCD Model P1911 with AX510 sounds bars.

Energy Savings Calculations:

Savings calculations were based on operating occupied hours per week of operating staff and students, and estimated idle time of monitors per week outside occupied hours. Power consumption data is based on actual monitor characteristics for a Dell CRT Model E773c, and Dell LCD Model P1911.

$$\text{Energy Savings} = \text{Qty} \times \text{Op Hrs} \times P_O + \text{Qty} \times \text{IdleHrs} \times P_I$$

Qty = Quantity
Op Hrs = Operating Hours per Year
Idle Hrs = Idle Hours per Year
P_O = Operating Power Consumption Watts
P_I = Idle Power Consumption Watts

CRT MONITOR REPLACEMENT CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	15" CRT	19" LCD	
# of Monitors	36	36	
Power Cons. (W)	71	23	48
Idle Power Cons. (W)	5	0.5	4.5
Operating Hrs per Week	33	33	
Operating Weeks per Yr	41	41	
Idle Hrs per Week	136	136	
Idle Weeks per Yr	41	41	
Elec Cost ($/kWh)	0.157	0.157	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Demand (kW)	2.556	0.828	1.728
Electric Usage (kWh)	4,406	1,203	3,203
Energy Cost ($)	$692	$189	$503
COMMENTS:	Savings Based on Dell 15" CRT Monitor Compared with Dell 19 " LCD Model P1911 w/ AX510 Soundbar		

Energy Savings Summary:

ECM #9 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$7,322
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$7,322
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$503
Total Yearly Savings ($/Yr):	$503
Estimated ECM Lifetime (Yr):	15
Simple Payback	14.6
Simple Lifetime ROI	3.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$7,545
Internal Rate of Return (IRR)	0%
Net Present Value (NPV)	($1,317.22)

REM #1: 24.44 kW Solar System

Description:

The Clifton Elementary School #4 has available roof space that could accommodate a significant amount of solar generation, if capable of handling this additional panel weight. Based on the available areas a 24.44 kilowatt solar array could be installed. The array will produce approximately 28,242 kilowatt-hours annually that will reduce the overall electric usage of the facility by 34.99%.

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}):	24.44
Electric Generation (KWH/Yr):	28,242
Installation Cost ($):	$156,104
SREC Revenue ($/Yr):	$5,397
Energy Savings ($/Yr):	$4,660
Total Yearly Savings ($/Yr):	$10,057
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	15.5
Analysis Period Electric Savings ($):	$86,670
Analysis Period SREC Revenue ($):	$78,176
Net Present Value (NPV)	($55,304.65)

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 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 #4

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	$2,590	$3,800	$370	$6,020	$561	$0	$561	15	$8,415	$0	39.8%	10.7	4.51%	$677.18
ECM #2	Lighting Upgrade - Gym	$1,800	$3,640	$400	$5,040	$107	$0	$107	15	$1,605	$0	-68.2%	47.1	-11.77%	($3,762.64)
ECM #3	Lighting Upgrade - Exterior	$400	$160	$200	$360	$44	$0	$44	15	$660	$0	83.3%	8.2	8.75%	$165.27
ECM #4	Lighting Controls Upgrade	$1,950	$1,050	$375	$2,625	$455	$0	$455	15	$6,825	$0	160.0%	5.8	15.28%	$2,806.76
ECM #5	DDC Building Controls Upgrade	$60,000	$0	$0	$60,000	$1,739	$0	$1,739	15	$26,085	$0	-56.5%	34.5	-8.97%	($39,239.93)
ECM #6	Boiler Burner and Controls	$26,000	$25,000	$0	$51,000	$1,225	$0	$1,225	20	$24,500	$0	-52.0%	41.6	-6.15%	($32,775.09)
ECM #7	Steam Trap Replacement	$10,615	$28,200	$0	$38,815	$3,067	($2,666)	$401	10	$4,007	-$26,661	-89.7%	96.9	-28.49%	($35,396.74)
ECM #8	Replace Condensate Pump Receiver	$13,000	$5,850	$0	$18,850	$200	$0	$200	10	$2,000	$0	-89.4%	94.3	-28.24%	($17,143.96)
ECM #9	CRT Monitor Replacement	$7,322	$0	$0	$7,322	$503	$0	$503	15	$7,545	$0	3.0%	14.6	0.38%	($1,317.22)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	24.44 KW PV System	$156,104	$0	$0	$156,104	$4,660	$5,397	$10,057	15	$150,848	$80,949	-3.4%	15.5	-0.43%	($36,050.05)

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
4-Clifton BOE - PS 4

Building ID: 3477570
For 12-month Period Ending: February 28, 2013[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: April 11, 2013

Facility
4-Clifton BOE - PS 4
194 West Second Street
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: 1929
Gross Floor Area (ft²): 21,380

Energy Performance Rating[2] (1-100) 29

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	274,251
Natural Gas (kBtu)[4]	1,591,169
Total Energy (kBtu)	1,865,420

Energy Intensity[4]

Site (kBtu/ft²/yr)	87
Source (kBtu/ft²/yr)	121

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	123

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	73
National Median Source EUI	101
% Difference from National Median Source EUI	20%
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.

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	4-Clifton BOE - PS 4	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	194 West Second Street, 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 4 (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	21,380 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	37 (Default)	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))
01/07/2013	02/06/2013	8,320.00
12/07/2012	01/06/2013	7,440.00
11/07/2012	12/06/2012	5,680.00
10/07/2012	11/06/2012	7,920.00
09/07/2012	10/06/2012	6,560.00
08/07/2012	09/06/2012	2,720.00
07/07/2012	08/06/2012	7,120.00
06/07/2012	07/06/2012	6,160.00
05/07/2012	06/06/2012	6,720.00
04/07/2012	05/06/2012	6,960.00
03/07/2012	04/06/2012	7,360.00
Electric Consumption (kWh (thousand Watt-hours))		**72,960.00**
Electric Consumption (kBtu (thousand Btu))		**248,939.52**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**248,939.52**
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)
01/07/2013	02/06/2013	4,186.40
12/07/2012	01/06/2013	3,323.90
11/07/2012	12/06/2012	2,343.50
10/07/2012	11/06/2012	876.00
09/07/2012	10/06/2012	114.50
08/07/2012	09/06/2012	0.00
07/07/2012	08/06/2012	1.00
06/07/2012	07/06/2012	2.00
05/07/2012	06/06/2012	17.80
04/07/2012	05/06/2012	497.10
03/07/2012	04/06/2012	1,305.20

gas Consumption (therms)	**12,667.40**
gas Consumption (kBtu (thousand Btu))	**1,266,740.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**1,266,740.00**
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
4-Clifton BOE - PS 4
194 West Second Street
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

4-Clifton BOE - PS 4	
Gross Floor Area Excluding Parking: (ft^2)	21,380
Year Built	1929
For 12-month Evaluation Period Ending Date:	February 28, 2013

Facility Space Use Summary

Elementary School 4	
Space Type	K-12 School
Gross Floor Area (ft^2)	21,380
Open Weekends?	No
Number of PCs [d]	37
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	No
Percent Cooled	0
Percent Heated	100
Months [o]	10
High School?	No
School District [o]	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	29	29	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	87	87	57	N/A	73
Source ($kBtu/ft^2$)	121	121	79	N/A	101
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	123	123	80	N/A	102
$kgCO_2e/ft^2$/year	6	6	4	N/A	5

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

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

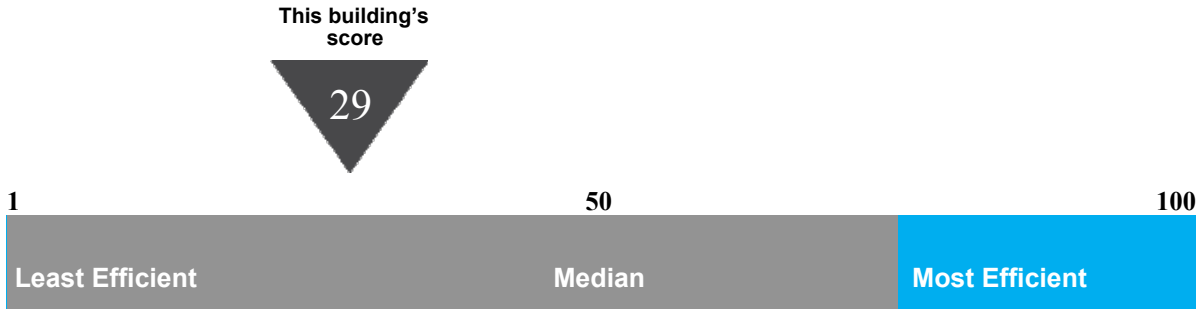
Statement of Energy Performance

2013

4-Clifton BOE - PS 4
194 West Second Street
Clifton, NJ 07011

Portfolio Manager Building ID: 3477570

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 121 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 #4

AC Units

Tag	UV	UV	
Unit Type	Unit Ventilator	Unit Ventilator	
Qty	7	2	
Location	Classrooms	Classrooms, New Addition	
Area Served	Classrooms	Classrooms, New Addition	
Manufacturer	Nesbitt	Nesbitt	
Model #	-	-	
Serial #	-	-	
Cooling Type	N/A	N/A	
Cooling Capacity (Tons)	N/A	N/A	
Cooling Efficiency (SEER/EER)	N/A	N/A	
Heating Type	Steam	Hot Water	
Heating Input (MBH)	-	-	
Efficiency	-	-	
Fuel	-	-	
Approx Age	>25	>25	
ASHRAE Service Life	25	25	
Remaining Life	0	0	
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

School #4

AHUs

Tag	H&V		
Unit Type	Heating and Ventilation		
Qty	1		
Location	Stairs outside Multi-Purpose Room		
Area Served	Multi-Purpose Room		
Manufacturer	-		
Model #	-		
Serial #	-		
Cooling Type	N/A		
Cooling Capacity (Tons)	N/A		
Heating Type	Hot Water		
Heating Input (MBH)	-		
Supply Fan (HP)	-		
Return Fan (HP)	-		
Electrical (V/H/P)	-		
Approx Age	>25		
ASHRAE Service Life	25		
Remaining Life	0		
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

School #4

Boilers

Tag	B-1		
Unit Type	Cast Iron Sectional		
Qty	1		
Location	Boiler Room		
Area Served	School Heating		
Manufacturer	HB Smith		
Model #	450 Mills		
Serial #	-		
Input Capacity (Btu/Hr)	3,370		
Rated Output Capacity (Btu/Hr)	2,640		
Approx. Efficiency %	78.3%		
Fuel	Natural Gas		
Approx Age	>25		
ASHRAE Service Life	25		
Remaining Life	0		
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

School #4

Pumps

Tag	HWP-1	HWP-2	
Unit Type	In-Line Circulator	In-Line Circulator	
Qty	1	1	
Location	Boiler Room	Boiler Room	
Area Served	Addition Heat	Addition Heat	
Manufacturer	B & G	B & G	
Model #	-	-	
Serial #	-	-	
Horse Power	-	-	
Flow	-	-	
Motor Info	-	-	
Electrical Power	-	-	
RPM	-	-	
Motor Efficiency %	-	-	
Approx Age	-	-	
ASHRAE Service Life			
Remaining Life			
Comments			

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

APPENDIX E

CEG Project #: 9C12066
Facility Name: School #4
Address: 194 West Second Street
City, State, Zip Clifton, New Jersey

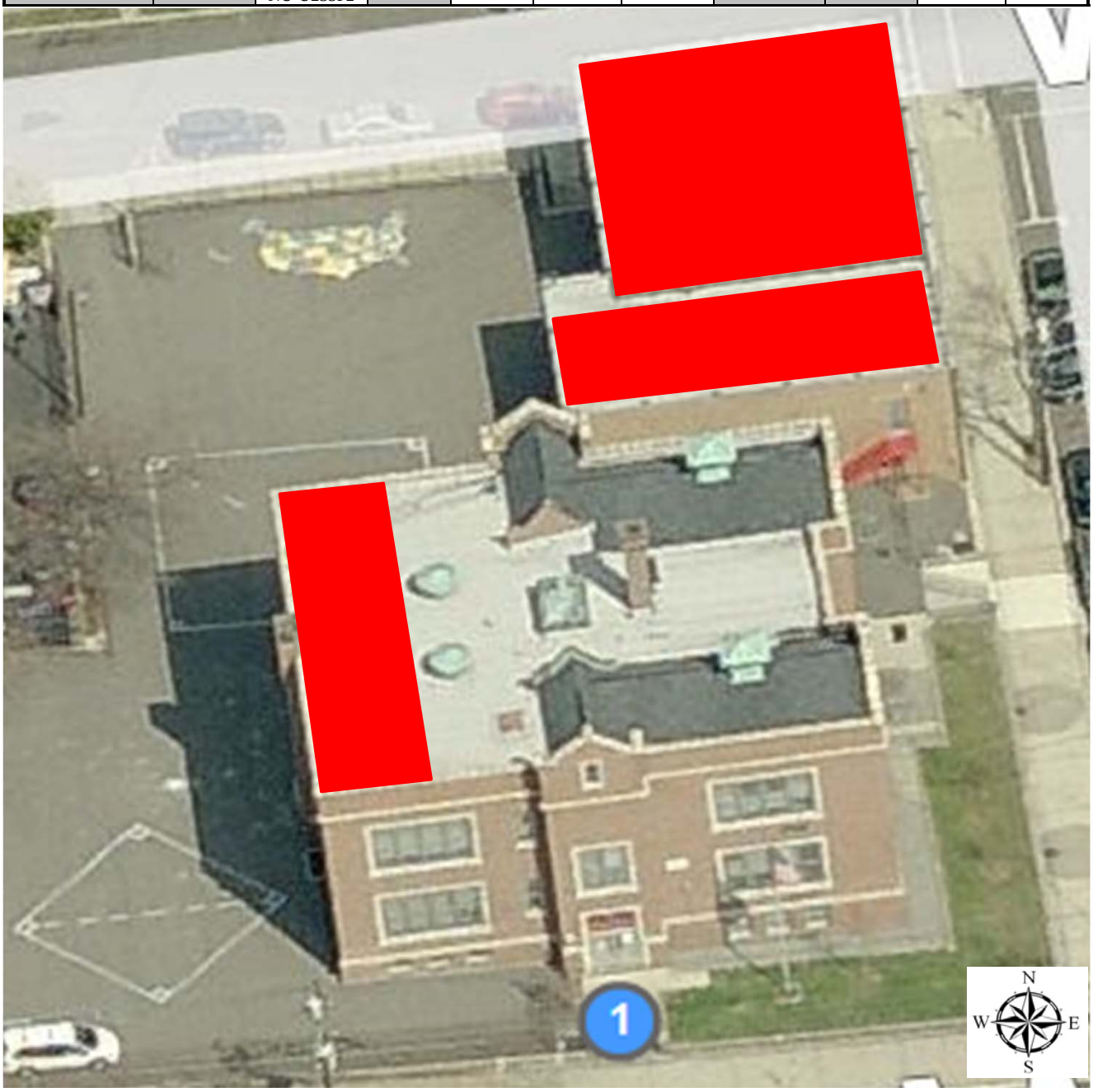
			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	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, $
1	1 - Classroom #1	1400	1x4 Pendant Louver 2-Lamp 32 W T8	2	58	21	1.22	1,705	Existing To Remain	Existing To Remain	2	58	0	1.22	1,705	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	341	$56
1	1 - Classroom #2	1400	1x4 Pendant Louver 2-Lamp 32 W T8	2	58	21	1.22	1,705	Existing To Remain	Existing To Remain	2	58	0	1.22	1,705	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	341	$56
2	1 - Office #3	1800	2x4 Recessed Prismatic 4-Lamp 32 W T8	4	109	4	0.44	785	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	4	0.29	518	0.15	266	$44	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	104	$17
2	1 - Office #4	1800	2x4 Recessed Prismatic 4-Lamp 32 W T8	4	109	3	0.33	589	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	3	0.22	389	0.11	200	$33	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	78	$13
1	1 - Classroom #5	1400	1x4 Pendant Louver 2-Lamp 32 W T8	2	58	6	0.35	487	Existing To Remain	Existing To Remain	2	58	0	0.35	487	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	97	$16
4	1 - 2nd Street Entrance Stair	2200	1x4 Surface Wrap 2-Lamp 32 W T8	2	58	3	0.17	383	Existing To Remain	Existing To Remain	2	58	0	0.17	383	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
9	1 - 2nd Street Entrance Stair	2200	1x2 Surface Wrap 2-Lamp F20 T12	2	44	2	0.09	194	Re-Lamp / Re-Ballast	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	2	0.07	150	0.02	44	$7	0	No New Controls	0	0.0%	0	$0
6	1 - Classroom #1 Storage	1000	1x4 Surface Utility 1-Lamp 34 W T12	1	50	1	0.05	50	Re-Lamp / Re-Ballast	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	1	28	1	0.03	28	0.02	22	$4	0	No New Controls	0	0.0%	0	$0
6	1 - Classroom #2 Storage	1000	1x4 Surface Utility 1-Lamp 34 W T12	1	50	1	0.05	50	Re-Lamp / Re-Ballast	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	1	28	1	0.03	28	0.02	22	$4	0	No New Controls	0	0.0%	0	$0
6	1 - Classroom #5 Storage	1000	1x4 Surface Utility 1-Lamp 34 W T12	1	50	1	0.05	50	Re-Lamp / Re-Ballast	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	1	28	1	0.03	28	0.02	22	$4	0	No New Controls	0	0.0%	0	$0
4	1 - Classroom #6	1400	1x4 Surface Wrap 2-Lamp 32 W T8	2	58	16	0.93	1,299	Existing To Remain	Existing To Remain	2	58	0	0.93	1,299	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	260	$43
10	1 - Classroom #6 Toilet	1000	60 W Incandescent A-Lamp	1	60	2	0.12	120	Re-Lamp	13w CFL Screw Base	1	13	2	0.03	26	0.09	94	$16	0	No New Controls	0	0.0%	0	$0
12	1 - Boy's Restroom	2200	2x4 Recessed Prismatic 2-Lamp 34 W T12	2	80	1	0.08	176	Re-Lamp / Re-Ballast	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	49	1	0.05	108	0.03	68	$11	0	No New Controls	0	0.0%	0	$0
11	1 - Janitor Closet	1000	100 W Incandescent A-Lamp	1	100	1	0.10	100	Re-Lamp	23w CFL Screw Base	1	23	1	0.02	23	0.08	77	$13	0	No New Controls	0	0.0%	0	$0
10	1 - Girl's Restroom	2200	60 W Incandescent A-Lamp	1	60	5	0.30	660	Re-Lamp	13w CFL Screw Base	1	13	5	0.07	143	0.24	517	$85	0	No New Controls	0	0.0%	0	$0
6	1 - Addition Hallway	2200	1x4 Surface Utility 1-Lamp 34 W T12	1	50	1	0.05	110	Re-Lamp / Re-Ballast	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	1	28	1	0.03	62	0.02	48	$8	0	No New Controls	0	0.0%	0	$0
13	1 - Addition Hallway	2200	2x4 Surface Prismatic 4-Lamp 32 W T8	4	109	1	0.11	240	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	158	0.04	81	$13	0	No New Controls	0	0.0%	0	$0
2	1 - Addition Hallway	2200	2x4 Recessed Prismatic 4-Lamp 32 W T8	4	109	2	0.22	480	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	317	0.07	163	$27	0	No New Controls	0	0.0%	0	$0
14	1 - Gymnasium #7	1800	250 W Metal Halide HID High Bay	1	285	8	2.28	4,104	Remove & Replace New Fixture	2x4, 4 Lamp, 54w T5, (2) 2/54 Elect. Ballast, Singlepoint Mnt., High Bay, Wire Guard, Lens	4	240	8	1.92	3,456	0.36	648	$107	0	No New Controls	0	0.0%	0	$0
4	1 - Gymnasium #7	1800	1x4 Surface Wrap 2-Lamp 32 W T8	2	58	2	0.12	209	Existing To Remain	Existing To Remain	2	58	0	0.12	209	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, $
3	1 - Hallway	2200	1x4 Pendant Wrap 2-Lamp 32 W T8	2	58	2	0.12	255	Existing To Remain	Existing To Remain	2	58	0	0.12	255	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
7	1 - 1st Street Stair	2200	2x2 Recessed Prismatic 2-U Lamp T8	2	73	1	0.07	161	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	75	0.04	86	$14	0	No New Controls	0	0.0%	0	$0
8	1 - 1st Street Stair	2200	2x2 Recessed Prismatic 2-U Lamp T12	2	94	2	0.19	414	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	2	0.07	150	0.12	264	$44	0	No New Controls	0	0.0%	0	$0
1	2 - Classroom #1	1400	1x4 Pendant Louver 2-Lamp 32 W T8	2	58	21	1.22	1,705	Existing To Remain	Existing To Remain	2	58	0	1.22	1,705	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	341	$56
5.1	2 - Classroom #1 Storage	1000	1x4 Surface Utility 1-Lamp 32 W T8 Magnetic Ballast	1	40	1	0.04	40	Existing To Remain	Existing To Remain	1	40	0	0.04	40	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
1	2 - Classroom #2	1400	1x4 Pendant Louver 2-Lamp 32 W T8	2	58	21	1.22	1,705	Existing To Remain	Existing To Remain	2	58	0	1.22	1,705	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	341	$56
6	2 - Classroom #2 Storage	1000	1x4 Surface Utility 1-Lamp 34 W T12	1	50	1	0.05	50	Re-Lamp / Re-Ballast	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	1	28	1	0.03	28	0.02	22	$4	0	No New Controls	0	0.0%	0	$0
2	2 - Classroom #3	1400	2x4 Recessed Prismatic 4-Lamp 32 W T8	4	109	8	0.87	1,221	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	8	0.58	806	0.30	414	$68	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	161	$27
6	2 - Classroom #3 Storage	1000	1x4 Surface Utility 1-Lamp 34 W T12	1	50	1	0.05	50	Re-Lamp / Re-Ballast	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	1	28	1	0.03	28	0.02	22	$4	0	No New Controls	0	0.0%	0	$0
3	2 - Teacher's Lounge #4	1600	1x4 Pendant Wrap 2-Lamp 32 W T8	2	58	4	0.23	371	Existing To Remain	Existing To Remain	2	58	0	0.23	371	0.00	0	$0	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	74	$12
11	2 - Teacher's Lounge #4 Toilet	1000	100 W Incandescent A-Lamp	1	100	2	0.20	200	Re-Lamp	23w CFL Screw Base	1	23	2	0.05	46	0.15	154	$25	0	No New Controls	0	0.0%	0	$0
1	2 - Classroom #5	1400	1x4 Pendant Louver 2-Lamp 32 W T8	2	58	18	1.04	1,462	Existing To Remain	Existing To Remain	2	58	0	1.04	1,462	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	292	$48
5.1	2 - Classroom #5 Storage	1000	1x4 Surface Utility 1-Lamp 32 W T8 Magnetic Ballast	1	40	1	0.04	40	Existing To Remain	Existing To Remain	1	40	0	0.04	40	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
4	2 - Classroom #6	1400	1x4 Surface Wrap 2-Lamp 32 W T8	2	58	20	1.16	1,624	Existing To Remain	Existing To Remain	2	58	0	1.16	1,624	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	0.5	20.0%	325	$54
15	2 - Classroom #6	1400	T9 Circline Fixture Magnetic Balalst	1	0	1	0.00	0	Existing To Remain	Existing To Remain	1	0	0	0.00	0	0.00	0	$0	5	Dual Technology Occupancy Sensor - Remote Mnt.	0.5	20.0%	0	$0
8	2 - Classroom #6 Toilet	1000	2x2 Recessed Prismatic 2-U Lamp T12	2	94	1	0.09	94	Re-Lamp / Re-Ballast Reflector	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	1	0.03	34	0.06	60	$10	0	No New Controls	0	0.0%	0	$0
3	2 - Hallway	2200	1x4 Pendant Wrap 2-Lamp 32 W T8	2	58	2	0.12	255	Existing To Remain	Existing To Remain	2	58	0	0.12	255	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
4	0 - 2nd Street Entrance Stair	2200	1x4 Surface Wrap 2-Lamp 32 W T8	2	58	1	0.06	128	Existing To Remain	Existing To Remain	2	58	0	0.06	128	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
13	0 - Multi-Purpose #1	1400	2x4 Surface Prismatic 4-Lamp 32 W T8	4	109	4	0.44	610	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	3	72	4	0.29	403	0.15	207	$34	0	No New Controls	0	0.0%	0	$0
16	0 - Multi-Purpose #2	1400	2x4 Surface Prismatic 2-Lamp 32 W T8	2	58	4	0.23	325	Existing To Remain	Existing To Remain	2	58	0	0.23	325	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
4	0 - Boy's Restroom	2200	1x4 Surface Wrap 2-Lamp 32 W T8	2	58	1	0.06	128	Existing To Remain	Existing To Remain	2	58	0	0.06	128	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
13	0 - Boy's Restroom	2200	2x4 Surface Prismatic 4-Lamp 32 W T8	4	109	1	0.11	240	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	158	0.04	81	$13	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, $
4	0 - Girl's Retroom	2200	1x4 Surface Wrap 2-Lamp 32 W T8	2	58	2	0.12	255	Existing To Remain	Existing To Remain	2	58	0	0.12	255	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
13	0 - Boiler Room	1000	2x4 Surface Prismatic 4-Lamp 32 W T8	4	109	1	0.11	109	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	72	0.04	37	$6	0	No New Controls	0	0.0%	0	$0
17	0 - Boiler Room	1000	1x4 Surface Utility 2-Lamp 34 W T12	2	80	2	0.16	160	Re-Lamp / Re-Ballast	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	49	2	0.10	98	0.06	62	$10	0	No New Controls	0	0.0%	0	$0
10	0 - Boiler Room	1000	60 W Incandescent A-Lamp	1	60	2	0.12	120	Re-Lamp	13w CFL Screw Base	1	13	2	0.03	26	0.09	94	$16	0	No New Controls	0	0.0%	0	$0
4	0 - Hallway	2200	1x4 Surface Wrap 2-Lamp 32 W T8	2	58	2	0.12	255	Existing To Remain	Existing To Remain	2	58	0	0.12	255	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
18	0 - Hallway	2200	2x4 Surface Prismatic 2-Lamp 34 W T12	2	80	2	0.16	352	Re-Lamp / Re-Ballast	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	49	2	0.10	216	0.06	136	$23	0	No New Controls	0	0.0%	0	$0
18	0 - Storage Cage	1000	2x4 Surface Prismatic 2-Lamp 34 W T12	2	80	3	0.24	240	Re-Lamp / Re-Ballast	Sylvania Lamp FO28/841/XP/XL/SS/ECO3 Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	49	3	0.15	147	0.09	93	$15	0	No New Controls	0	0.0%	0	$0
4	0 - Middle Stair	2200	1x4 Surface Wrap 2-Lamp 32 W T8	2	58	1	0.06	128	Existing To Remain	Existing To Remain	2	58	0	0.06	128	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
4	1 - Middle Stair	2200	1x4 Surface Wrap 2-Lamp 32 W T8	2	58	3	0.17	383	Existing To Remain	Existing To Remain	2	58	0	0.17	383	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
9	1 - Middle Stair	2200	1x2 Surface Wrap 2-Lamp F20 T12	2	44	2	0.09	194	Re-Lamp / Re-Ballast	Sylvania Lamp FO17/841/XP/ECO Sylvania Ballast QHE2X32T8/UNV ISL-SC	2	34	2	0.07	150	0.02	44	$7	0	No New Controls	0	0.0%	0	$0
19	Exterior	1800	70 W HPS Wall Pack	1	94	2	0.19	338	Replace	Lumark 20W LED Wall Pack XTOR2A-PC2	1	20	2	0.04	72	0.15	266	$44	0	No New Controls	0	0.0%	0	$0
	TOTAL					**242**	**17**	**27,105**					**68**	**15**	**22,789**	**3**	**4,317**	**$712**			**12**	**3**	**2,756**	**$455**

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 #4	2550	SHARP NU-U235F2	104	17.5	1,824	24.44	28,242	19.8	4,358	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 #4**
Location: **Clifton, NJ**
Description: **Photovoltaic System 100% Financing - 15 year**

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$156,104
Annual kWh Production	28,242
Annual Energy Cost Reduction	$4,660
Average Annual SREC Revenue	$5,397

Simple Payback: **15.52** Years

Life Cycle Cost Analysis

Analysis Period (years): 15
Discount Rate: 3%
Average Energy Cost ($/kWh) **$0.165**
Financing Rate: 6.00%
Financing %: 100%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
Average SREC Value ($/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	28,242	$4,660	$0	$7,061	$9,186	$6,621	($4,087)	($4,087)
2	$0	28,101	$4,800	$0	$7,025	$8,778	$7,030	($3,983)	($8,070)
3	$0	27,960	$4,944	$0	$6,990	$8,344	$7,463	($3,874)	($11,944)
4	$0	27,820	$5,092	$0	$6,955	$7,884	$7,924	($3,760)	($15,704)
5	$0	27,681	$5,245	$285	$6,920	$7,395	$8,412	($3,928)	($19,632)
6	$0	27,543	$5,402	$284	$5,509	$6,876	$8,931	($5,181)	($24,812)
7	$0	27,405	$5,564	$282	$5,481	$6,325	$9,482	($5,045)	($29,857)
8	$0	27,268	$5,731	$281	$5,454	$5,741	$10,067	($4,904)	($34,760)
9	$0	27,132	$5,903	$279	$5,426	$5,120	$10,688	($4,758)	($39,518)
10	$0	26,996	$6,080	$278	$4,049	$4,460	$11,347	($5,956)	($45,474)
11	$0	26,861	$6,263	$277	$4,029	$3,761	$12,047	($5,792)	($51,266)
12	$0	26,727	$6,450	$275	$4,009	$3,018	$12,790	($5,623)	($56,890)
13	$0	26,593	$6,644	$274	$3,989	$2,229	$13,579	($5,449)	($62,338)
14	$0	26,460	$6,843	$273	$2,646	$1,391	$14,416	($6,591)	($68,929)
15	$0	26,328	$7,049	$271	$2,633	$502	$15,306	($6,397)	($75,327)
	Totals:	409,119	$86,670	$3,059	$78,176	$81,009	$156,104	($75,327)	($548,607)

Net Present Value (NPV) **($55,305)**

APPENDIX G

STEAM TRAP REPLACEMENT ANALYSIS

Calculation Assumptions		
Description	**Value**	**Units**
Ann. Gas Usage	16,464	Therm
Less DHW Gas Usage	0	Therm
Less Other Gas Usage	0	Therm
Net Heating Gas Usage	16,464	Therm
Est. Steam Production	1,227,406	lbs
Boiler Efficiency	75%	
Makeup Water	50	°F
Condenstate Return	200	°F
30% Makeup		
Feedwater Enthalpy	155	btu/lb
Steam Enthalpy	1161	btu/lb
Steam Production Conversion	74.55	lb / Th
Hours per Day On	8	
Days per Week	5.5	
Htg Months per Year	6	
Ann. System Operation	1,144	hrs / yr
Gas Cost ($/Th)	$0.93	
Trap Failure Rate	15.00%	

Building Area	Estimated Quantity
Boiler Plant	1
Classroom UV	18
Radiators	30
TOTAL	49

STEAM TRAP LOSS CALCULATION

Steam Trap Sizes	Trap Orifice Diamter (in)	Steam Loss lb/hr (15 PSI)	Quantity of Traps	Estimated Quantity Failed	Annual Steam Loss lbs	Annual Steam Loss Therm	Cost Savings
1/2" Trap	1/8"	13.70	0	0	0	0	$0
3/4" Trap	3/16"	30.70	48	7	245,846	3,298	$3,067
1" Trap	1/4"	54.70	1	0	0	0	$0
1 -1/2" Trap	3/8"	123.00	0	0	0	0	$0
TOTAL			**49**	**7**	**245,846**	**3,298**	**$3,067**

APPENDIX H

DESCRIPTION: CONDENSATE RETURN PUMP/RECEIVER REPLACEMENT

UNIT #	FUNCTION		MOTOR HP	MOTOR EFF.%	HR/DAY OPER.	ANNUAL KWh	PREMIUM EFF.%	ANNUAL KWh	ANNUAL KWh SAVINGS	$ SAV. $0.165	COND LOSS QT/MIN	ANNUAL HTG $ SAV	**TOTAL $ ENERGY SAV (E&G)**	EQUIP.& INST. COST	TOTAL COST NOTE 2
CP-x	COND. PUMP		1	78.5%	4	1,233	85.5%	1,132	101	$17	0.25	$186	$203	$13,000	$18,850
TOTALS=										**$17**		**$186**	**$ 203**		**$18,850**

NOTE 1: KWH= HP / MOTOR% * 746 /1000 * HR/DAY * 365 * 0.8(MOTOR LOAD) * 0.9 PF
NOTE 2: INCLUDES 15% CONTINGENCY + 25% FOR RETROFIT WORK+ 15% CONTR. OH&P+ 10% Cx
NOTE 3: SAVINGS CALCULATED ON HEATING MAKE-UP FROM 60 F TO 200 F AND $1.07/THERM AND 70% EFFICIENT BOILER PLANT