

**UPPER FREEHOLD REGIONAL
SCHOOL DISTRICT**

STONE BRIDGE MIDDLE SCHOOL

**1252 YARDVILLE-AlLENTOWN ROAD
ALLENTOWN, NJ 08501**

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:	Large Power and Lighting Service (LPLS)
Third Party Supplier:	South Jersey Energy

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

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

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

Table 1
Electricity Billing Data

ELECTRIC USAGE SUMMARY			
Utility Provider: PSE&G Rate: LPLS Meter No: 9197942 Account # 42 047 501 09 Third Party Utility South Jersey Energy TPS Meter / Acct No: N/A			
MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Jun-11	134,229	476.5	\$22,042
Jul-11	101,895	391.8	\$17,193
Aug-11	95,655	368.8	\$16,257
Sep-11	118,949	418.4	\$19,649
Oct-11	106,280	420.3	\$14,658
Nov-11	114,840	550.0	\$16,179
Dec-11	164,373	579.4	\$22,301
Jan-12	216,740	564.5	\$28,700
Feb-12	224,204	566.2	\$30,282
Mar-12	171,188	514.0	\$23,498
Apr-12	115,227	462.2	\$16,347
May-12	115,773	438.7	\$16,333
Totals	1,679,353	579.4 Max	\$243,440
AVERAGE DEMAND 479.2 KW average AVERAGE RATE \$0.145 \$/kWh			

Figure 1
Electricity Usage Profile

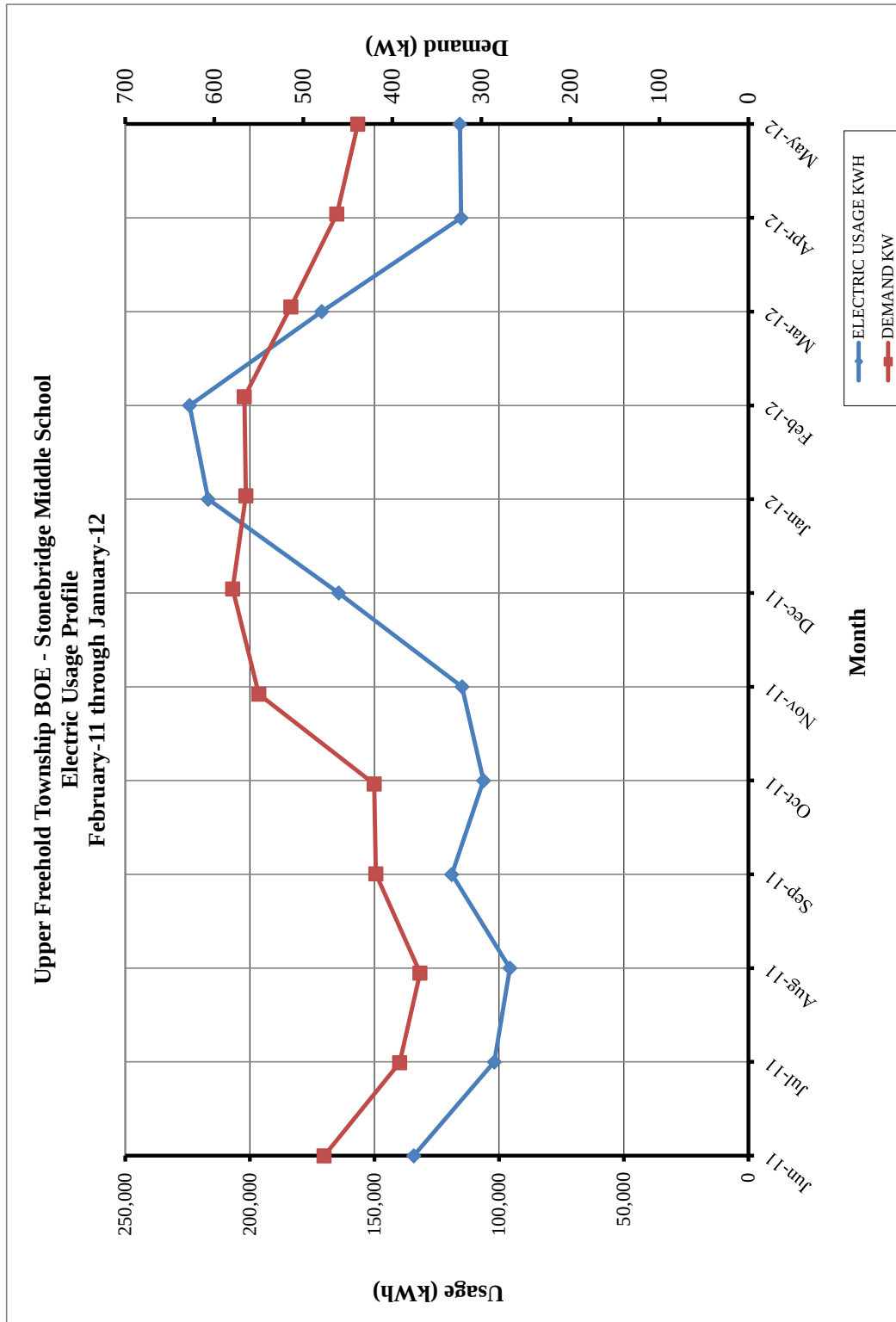
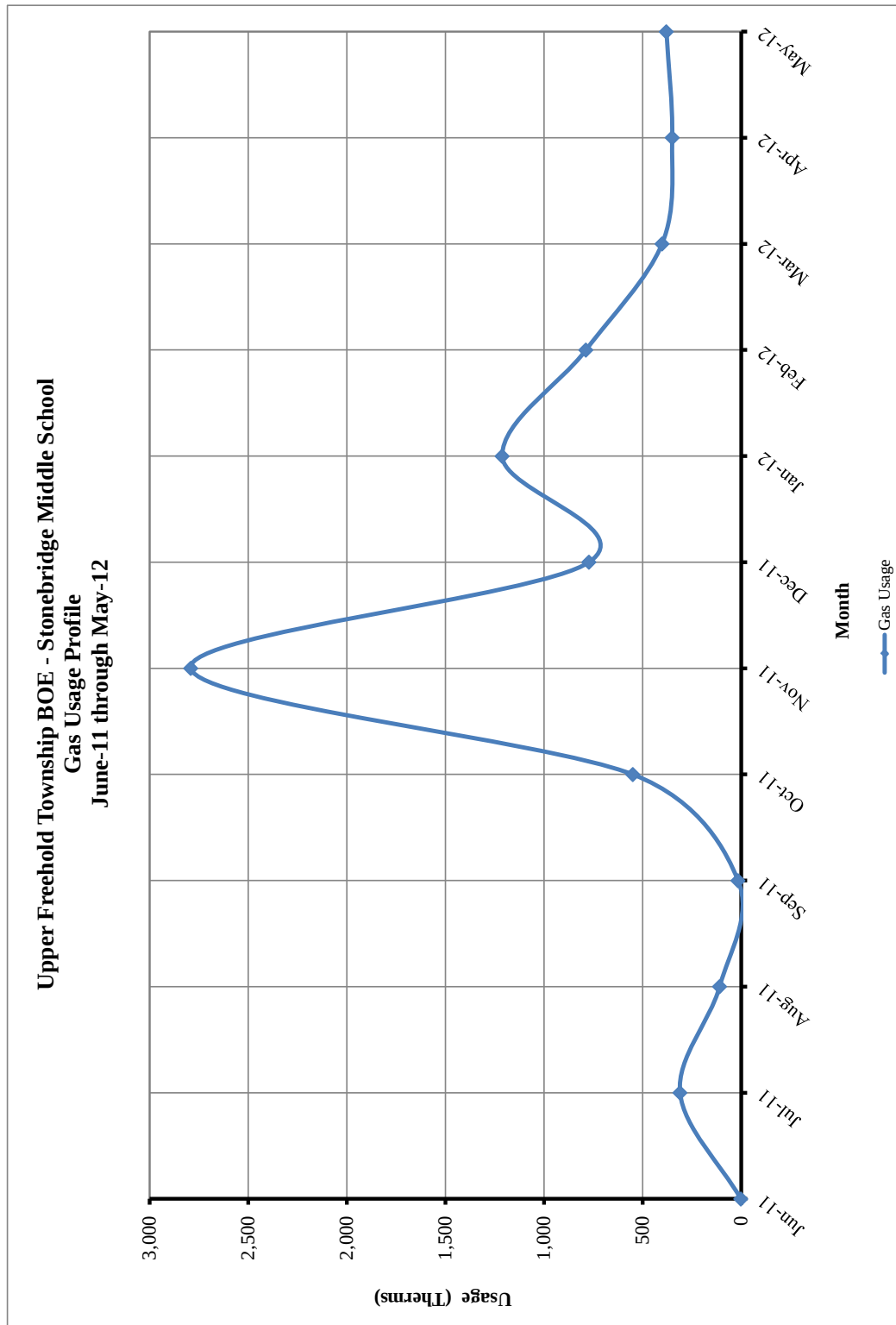


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: PSE&G Rate: LVG Meter No: 3567921 Point of Delivery ID: PG000011878367971713 Third Party Utility Provider: TPS Meter No:		
MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
Jun-11	2.18	\$97.60
Jul-11	310.53	\$142.16
Aug-11	109.99	\$115.09
Sep-11	16.39	\$101.89
Oct-11	550.20	\$179.67
Nov-11	2,791.47	\$2,689.71
Dec-11	772.64	\$988.01
Jan-12	1,212.23	\$2,026.93
Feb-12	787.78	\$875.83
Mar-12	401.98	\$455.34
Apr-12	350.56	\$315.77
May-12	379.59	\$326.51
TOTALS	7,685.53	\$8,314.51
AVERAGE RATE:	\$1.08	\$/THERM

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

Stone Bridge Middle School is located on 1252 Yardville-Allentown Road in Allentown, New Jersey. The 142,000 SF Middle School 2010 with no renovations. The building is a two story facility comprised of classrooms, gymnasium, auditorium, cafeteria, kitchen, library/media center and administrative offices.

Occupancy Profile

The typical hours of operation for the school are Monday through Friday between 8:00 am and 9:00 pm, during the school months of September through June, with limited occupancy on the weekends. In the Summer Months (end of June through the beginning of September), the school has limited occupancy (approximately 10% of the building) for approximately 4 hours per day. The schools current student enrollment is approximately 500 with approximately 60 teachers and support staff.

Building Envelope

Exterior walls for the Middle School are a brick faced with a concrete block construction. The amount of insulation within the walls is unknown. The windows throughout the school are in good condition. Typical windows throughout the school are a double pane, operable, ¼” tinted glass with aluminum frames. Blinds are utilized through the office area of the facility per occupant comfort. The blinds are valuable because they help to reduce heat loss in the winter and reduce solar heat in the summer. The majority of the roof is a flat, built up rubber EPDM. The roof over the Gymnasium, Auditorium, Science Classrooms and Main entry is a sloped roof with asphalt shingles.

HVAC Systems

The HVAC if the middle school is a closed loop, ground coupled heat pump system consisting of classroom heat pumps and rooftop make-up air and ventilation air units with energy recovery wheel.

The geothermal heat pump loop is circulated via two (2) base mounted end suction pumps with 100 HP NEMA premium efficiency motors and variable speed drives.

The Auditorium and the Gymnasium are each served by a 31 Ton packaged rooftop unit, manufactured by Aeon. These units utilize D/X for cooling and each has a 540 MBH gas fired heating section.

The Auxiliary Gym is served by a 13 Ton packaged rooftop unit, manufactured by Aeon. This unit utilizes D/X for cooling and has a 180 MBH gas fired heating section.

Conditioned makeup is provided to the building via eight (8) packaged rooftop energy recovery units, by Annexaire. These units all utilize the ground source heat pump loop for heating and cooling. In addition, there are ten (10) Greenheck, 100% outside air energy recovery units that provide tempered outside air for ventilation. The classrooms are conditioned by high efficiency ground source heat pumps.

Heated make-up air is provided to the science classrooms, when the fume hoods are in operation, and to the kitchen, when the kitchen exhaust hood fan is in operation. These make-up air units are Greenheck models with gas fired heating sections.

Exhaust System

Air is exhausted from the toilet rooms through the roof exhausters. The roof exhaust fans are controlled by the DDC system and operate based on the building occupancy schedule.

HVAC System Controls

The HVAC systems within school are controlled by a DDC system by Carrier. The DDC system controls the operation, status and temperature set points of the all of the heating and cooling equipment in the facility, including the classroom heat pumps, geothermal loop pumps and packaged rooftop equipment.

Domestic Hot Water

Domestic hot water for the restrooms is provided by a Lochinvar Copper Fin II, gas fired hot water heater rated for 650 MBH input capacity with a separate 752 gallon insulated storage tank. There is an additional 125 MBH, 60 gallon gas fired Lochinvar hot water heater that serves the kitchen.

Lighting

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

III. MAJOR EQUIPMENT LIST

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

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

IV. ENERGY CONSERVATION MEASURES

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

Table 1
ECM Financial Summary

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	DESCRIPTION	NET INSTALLATION COST^A	ANNUAL SAVINGS^B	SIMPLE PAYBACK (Yrs)	SIMPLE LIFETIME ROI
ECM #1	Lighting Controls	\$5,150	\$3,935	1.3	1046.1%
ECM #2	Retro Commissioning	\$42,600	\$12,524	3.4	341.0%
ECM #3	CRT Computer Monitor Replacement	\$1,300	\$152	8.6	75.4%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	DESCRIPTION	NET INSTALLATION COST	ANNUAL SAVINGS	SIMPLE PAYBACK (Yrs)	SIMPLE LIFETIME ROI
REM #1	98.7 KW Roof Solar Array	\$604,989	\$39,472	15.3	-2.1%
REM #2	646.72 KW Ground Mounted Solar Array	\$3,259,445	\$271,356	12.0	24.9%
Notes: A. Cost takes into consideration applicable NJ Smart Start TM 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 Controls	-	27,136	-
ECM #2	Retro Commissioning	-	83,968	384
ECM #3	CRT Computer Monitor Replacement	0.48	1,048	-
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	98.7 KW Roof Solar Array	79.9	114,053	-
REM #2	646.72 KW Ground Mounted Solar Array	523.8	807,404	-

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 Controls	\$3,935	\$5,150	\$0	\$5,150	1.3
Retro Commissioning	\$12,524	\$42,600	\$0	\$42,600	3.4
CRT Computer Monitor Replacement	\$152	\$1,300	\$0	\$1,300	8.6
<i>Design / Construction Extras (15%)</i>		<i>\$7,358</i>		<i>\$7,358</i>	
Total Project	\$16,611	\$56,408	\$0	\$56,408	3.4

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 Controls Upgrade

Description:

Several room lights are left on 24 hours a day as night lighting. These fixtures are typically two or three lamp fixtures. This ECM includes installation of bi-level lighting controls to these fixtures so that only one (1) lamp will remain on in evening hours as a night light. In addition, daylight sensors will be added to the boys and girls locker rooms.

The **Investment Grade Lighting Audit Appendix** of this report includes the summary of lighting controls implemented in this ECM and outlines the proposed controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by the applicable percent savings for each area that includes lighting controls.

Energy Savings Calculations:

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

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

Rebates and Incentives:

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

Smart Start Incentive

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

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$5,150
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$5,150
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$3,935
Total Yearly Savings (\$/Yr):	\$3,935
Estimated ECM Lifetime (Yr):	15
Simple Payback	1.3
Simple Lifetime ROI	1046.1%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$59,025
Internal Rate of Return (IRR)	76%
Net Present Value (NPV)	\$41,825.77

ECM #2: Retro Commissioning

Description:

Retro-commissioning is a quality-oriented process for verifying and documenting that HVAC systems within the building perform as closely as possible to defined performance criteria. The benefits include: documenting accurately the existing system's function and performance; verifying that system performance meets the facility's requirements; benchmarking the performance of existing systems for future changes; and most importantly identifying problems in the system.

The cost of retro-commissioning of Stone Bridge Middle School is between \$0.15 and \$0.30 per Square Foot (Source: Thorne & Nadel "Retro-Commissioning: Program Strategies To Capture Energy Savings in Existing Buildings (2003)" – average Retro-Commissioning costs of \$0.22 in TX, TN, CO, MA, AZ, OR, CA).

The energy savings from retro-commissioning critical systems such as HVAC and power systems is approximately 5% of the total energy used (Source: E. Mills et al, "Cost-effectiveness of Commissioning 224 Buildings across 21 states – 2004").

Energy Savings Calculations:

Following table summarizes energy savings for this facility via implementation of a Retro Commissioning process:

RETRO COMMISSIONING CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing System Operation	Improved Operation from Retro Cx	
Energy Savings, Nat. Gas	-	5%	
Energy Savings, Electricity	-	5%	
Gas Cost (\$/Therm)	\$1.08	\$1.080	
Electricity Cost (\$/kWh)	\$0.145	\$0.145	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Natural Gas Usage (Therms)	7,686	7,301	384
Electricity Usage (kWh)	1,679,353	1,595,385	83,968
Natural Gas Cost (\$)	\$8,300	\$7,885	\$415
Electricity Cost (\$)	\$243,440	\$231,331	\$12,109
Total Energy Cost (\$)	\$251,740	\$239,216	\$12,524
COMMENTS:			

Estimated Cost of Retro-Commissioning = $\$0.30/\text{SF} \times 142,000 \text{ SF} = \underline{\$42,600}$

Currently, there are no prequalified NJ SmartSmart Incentives for Retro-Commissioning.

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$42,600
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$42,600
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$12,524
Total Yearly Savings (\$/Yr):	\$12,524
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.4
Simple Lifetime ROI	341.0%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$187,860
Internal Rate of Return (IRR)	29%
Net Present Value (NPV)	\$106,910.70

ECM #3: CRT Monitor Replacement

Description:

Stone Bridge Middle School still utilizes a small amount of CRT Monitors for use by its staff and students. These monitors not only utilize more energy in operating mode, but also while being in idle mode. Typical monitors throughout the buildings consisted of 17 inch size monitors.

This ECM will replace all remaining seventy three (73) existing CRT monitors throughout the school with new 19" Widescreen Dell LCD Model E1913.

Energy Savings Calculations / Results:

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.

$$\text{Energy Savings} = Qty \times Op\ Hrs \times P_o + Qty \times IdleHrs \times P_i$$

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	17" CRT	19" LCD	
# of Monitors	10	10	
Power Cons. (W)	71	23	48
Idle Power Cons. (W)	5	0.5	4.5
Operating Hrs per Week	40	40	
Operating Weeks per Yr	42	42	
Idle Hrs per Week	128	128	
Idle Weeks per Yr	42	42	
Elec Cost (\$/kWh)	0.145	0.145	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Electric Demand (kW)	0.71	0.23	0.48
Electric Usage (kWh)	1,462	413	1,048
Energy Cost (\$)	\$212	\$60	\$152
COMMENTS:	Savings Based on Dell 17: CRT Monitor Compared with Dell 19 " LCD Model E1913		

Cost:

Cost is based on the list price of new monitors with sound bar of \$130 per unit. Concord also took into account the IT department will distribute and install the monitors throughout the district.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$1,300
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$1,300
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$152
Total Yearly Savings (\$/Yr):	\$152
Estimated ECM Lifetime (Yr):	15
Simple Payback	8.6
Simple Lifetime ROI	75.4%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$2,280
Internal Rate of Return (IRR)	8%
Net Present Value (NPV)	\$514.57

REM #1: 98.7 kW Solar System**Description:**

Stone Bridge Middle School currently has an existing roof mounted solar array. However, there is available roof space that could accommodate an additional significant amount of solar generation. Based on the available areas, a 98.7 KW DC solar array could be installed, assuming the existing roof structure is capable of supporting an array. The array will produce approximately 114,053 kilowatt-hours annually that will reduce the overall electric usage of the facility by an additional 6.79%.

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	
Installation Cost (\$):	\$604,989
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$604,989
Maintenance Savings (\$/Yr):	\$21,794
Energy Savings (\$/Yr):	\$17,678
Total Yearly Savings (\$/Yr):	\$39,472
Estimated ECM Lifetime (Yr):	15
Simple Payback	15.3
Simple Lifetime ROI	-2.1%
Simple Lifetime Maintenance Savings	\$326,910
Simple Lifetime Savings	\$592,080
Internal Rate of Return (IRR)	0%
Net Present Value (NPV)	(\$133,774.83)

REM #2: 646.72 kW Ground Mounted Solar System**Description:**

In addition to having available roof space for a solar array, Stone Bridge Middle School currently has available open areas for a ground mounted solar array. Based on the available areas around the school, an array of 646.72 KW DC could be installed. The array will produce approximately 807,404 kilowatt-hours annually that will reduce the overall electric usage of the facility by an additional 48.0%.

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 #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$3,259,445
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$3,259,445
Maintenance Savings (\$/Yr):	\$154,282
Energy Savings (\$/Yr):	\$117,074
Total Yearly Savings (\$/Yr):	\$271,356
Estimated ECM Lifetime (Yr):	15
Simple Payback	12.0
Simple Lifetime ROI	24.9%
Simple Lifetime Maintenance Savings	\$2,314,230
Simple Lifetime Savings	\$4,070,340
Internal Rate of Return (IRR)	3%
Net Present Value (NPV)	(\$20,014.69)

V. ADDITIONAL RECOMMENDATIONS

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

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

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Upper Freehold School District - Stone Bridge Middle School

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Saving * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^N \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^N \frac{C_n}{(1+DR)^n}$
		(\$)	(\$)	(\$)	(\$)	(\$/Yr)	(\$/Yr)	(\$/Yr)		(\$)	(\$)	(%)	(Yr)	(\$)	(\$)
ECM #1	Lighting Controls	\$250	\$4,900	\$0	\$5,150	\$3,935	\$0	\$3,935	15	\$59,025	\$0	1046.1%	1.3	76.39%	\$41,825.77
ECM #2	Retro Commissioning	\$0	\$42,600	\$0	\$42,600	\$12,524	\$0	\$12,524	15	\$187,860	\$0	341.0%	3.4	28.73%	\$106,910.70
ECM #3	CRT Computer Monitor Replacement	\$1,300	\$0	\$0	\$1,300	\$152	\$0	\$152	15	\$2,280	\$0	75.4%	8.6	8.01%	\$514.57
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	98.7 KW Roof Solar Array	\$604,989	\$0	\$0	\$604,989	\$17,678	\$21,794	\$39,472	15	\$592,080	\$326,910	-2.1%	15.3	-0.27%	(\$133,774.83)
REM #2	646.72 KW Ground Mounted Solar Array	\$3,259,445	\$0	\$0	\$3,259,445	\$117,074	\$154,282	\$271,356	15	\$4,070,340	\$2,314,230	24.9%	12.0	2.91%	(\$20,014.69)

- 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.

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SmartStart Building Incentives

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

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Cooling

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

Desiccant Systems

\$1.00 per cfm – gas or electric

Electric Unitary HVAC

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

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

Ground Source Heat Pumps

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

Variable Frequency Drives

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

Natural Gas Water Heating

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

Prescriptive Lighting

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

Prescriptive Lighting - LED

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

Lighting Controls – Occupancy Sensors

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

Lighting Controls – HID or Fluorescent Hi-Bay Controls

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

Premium Motors

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

Other Equipment Incentives

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

APPENDIX C



STATEMENT OF ENERGY PERFORMANCE

Stone Bridge Middle School

Building ID: 3309589

For 12-month Period Ending: April 30, 2012¹

Date SEP becomes ineligible: N/A

Date SEP Generated: November 09, 2012

Facility

Stone Bridge Middle School
1252 Yadville-Allentown Rd
Allentown, NJ 08510

Facility Owner

N/A

Primary Contact for this Facility

N/A

Year Built: 2010**Gross Floor Area (ft²):** 142,000**Energy Performance Rating²** (1-100) 58**Site Energy Use Summary³**

Electricity - Grid Purchase(kBtu)	5,757,498
Natural Gas (kBtu) ⁴	544,878
Total Energy (kBtu)	6,302,376

Energy Intensity⁴

Site (kBtu/ft ² /yr)	44
Source (kBtu/ft ² /yr)	139

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	844
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Electric Distribution Utility

Jersey Central Power & Light Co [FirstEnergy Corp]

National Median Comparison

National Median Site EUI	48
National Median Source EUI	151
% Difference from National Median Source EUI	-8%
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 Standards⁵ for Indoor Environmental Conditions:

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

Certifying Professional

N/A

Notes:

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

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	Stone Bridge Middle School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	1252 Yadville-Allentown Rd, Allentown, NJ 08510	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.		☐
School (K-12 School)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☒
Gross Floor Area	142,000 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	Yes	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	125	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	2	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	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	100 %	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	12(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'.	☐
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ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity		
Meter: Electric (kWh (thousand Watt-hours)) Space(s): Entire Facility Generation Method: Grid Purchase		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
03/27/2012	04/26/2012	115,227.00
02/27/2012	03/26/2012	171,188.00
01/27/2012	02/26/2012	224,204.00
12/27/2011	01/26/2012	216,740.00
11/27/2011	12/26/2011	164,373.00
10/27/2011	11/26/2011	114,840.00
09/27/2011	10/26/2011	106,280.00
08/27/2011	09/26/2011	118,949.00
07/27/2011	08/26/2011	95,655.00
06/27/2011	07/26/2011	101,895.00
05/27/2011	06/26/2011	134,229.00
Electric Consumption (kWh (thousand Watt-hours))		1,563,580.00
Electric Consumption (kBtu (thousand Btu))		5,334,934.96
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		5,334,934.96
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)
03/27/2012	04/26/2012	350.56
02/27/2012	03/26/2012	401.98
01/27/2012	02/26/2012	787.78
12/27/2011	01/26/2012	1,212.23
11/27/2011	12/26/2011	772.64
10/27/2011	11/26/2011	405.90
09/27/2011	10/26/2011	550.20
08/27/2011	09/26/2011	16.39
07/27/2011	08/26/2011	109.99
06/27/2011	07/26/2011	310.53
05/27/2011	06/26/2011	2.18

Gas Consumption (therms)	4,920.38
Gas Consumption (kBtu (thousand Btu))	492,038.00
Total Natural Gas Consumption (kBtu (thousand Btu))	492,038.00
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

Stone Bridge Middle School
1252 Yadville-Allentown Rd
Allentown, NJ 08510

Facility Owner

N/A

Primary Contact for this Facility

N/A

General Information

Stone Bridge Middle School	
Gross Floor Area Excluding Parking: (ft ²)	142,000
Year Built	2010
For 12-month Evaluation Period Ending Date:	April 30, 2012

Facility Space Use Summary

School	
Space Type	K-12 School
Gross Floor Area (ft ²)	142,000
Open Weekends?	Yes
Number of PCs	125
Number of walk-in refrigeration/freezer units	2
Presence of cooking facilities	Yes
Percent Cooled	100
Percent Heated	100
Months °	12
High School?	No
School District °	Upper Freehold

Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 04/30/2012)	Baseline (Ending Date 01/31/2012)	Rating of 75	Target	National Median
Energy Performance Rating	58	59	75	N/A	50
Energy Intensity					
Site (kBtu/ft ²)	44	46	38	N/A	48
Source (kBtu/ft ²)	139	139	118	N/A	151
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 ₂ e/year	844	846	715	N/A	914
kgCO ₂ e/ft ² /year	6	6	5	N/A	7

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

Notes:

o - This attribute is optional.

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

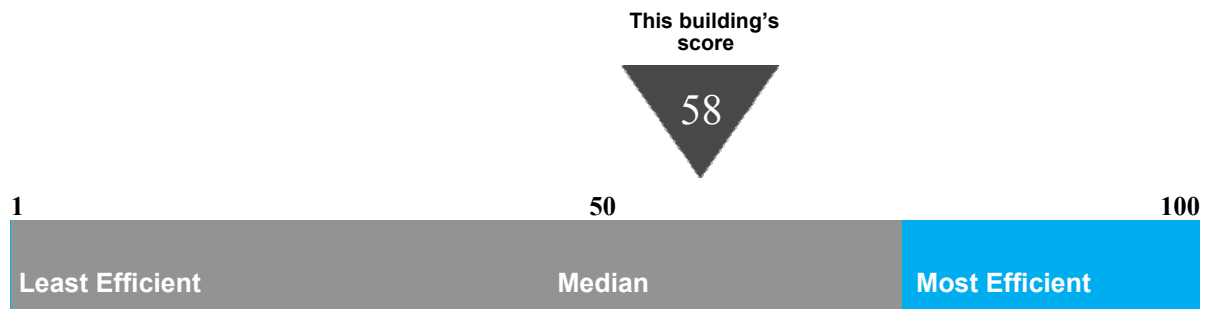
Statement of Energy Performance

2012

Stone Bridge Middle School
1252 Yadville-Allentown Rd
Allentown, NJ 08510

Portfolio Manager Building ID: 3309589

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 139 kBtu per square foot per year.*

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

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

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

Date of certification



APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Stone Bridge Middle School

Rooftop Units

Tag	RTU-1,2	RTU-3	RTU-4
Unit Type	Packaged Rooftop Unit	Packaged Rooftop Unit	Rooftop GSHP Unit
Qty	2	1	1
Location	Roof	Roof	Roof
Area Served	Auditorium ; Gymnasium	Auxiliary Gym	TV Studio
Manufacturer	Aaon	Aaon	Trane
Model #	RN-031-3-0-AB04-369	RM-013-3-0-AB02-339	RE10FCAABXXBXA B
Serial #	200812 BNGV04596	200812-AMGK46800	M10925981
Cooling Type	D/X	D/X	D/X
Cooling Capacity (Tons)	31	13	10
Cooling Efficiency (SEER/EER)	11	11	-
Heating Type	Gas w/ energy wheel	Gas	Heat Pump
Heating Input (MBH)	540	180	-
Efficiency	80%	80%	
Fuel	Nat. Gas	Nat. Gas	-
Approx Age	2	2	2
ASHRAE Service Life	12	12	12
Remaining Life	10	10	10
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Stone Bridge Middle School

AHUs

Tag	ERV-1	ERV-5,6,7,8	EHR-1,2
Unit Type	Energy Recovery Ventilator	Energy Recovery Ventilator	Packaged Rooftop Energy Recovery Unit
Qty	4	4	2
Location	Roof	Roof	Roof
Area Served	Building Ventilation Air	Building Ventilation Air	Conditioned Makeup Air
Manufacturer	Greenheck	Greenheck	Annexaire
Model #	ERV-251H-20-B-ES	ERV-251S-20-B-ES	ERP-05-HW-D-H-WS
Serial #	11600078	11921904; 11921905; 119201906; 11921907	1369-01-0409; 1369-02-0409;
Cooling Type	N/A	N/A	D/X, R-22
Capacity (CFM)	-	-	5,600
Cooling Efficiency (SEER/EER)	N/A	N/A	-
Heating Type	N/A	N/A	Heat Pump / Energy Wheel
Heating Input (MBH)	N/A	N/A	-
Efficiency	50%	50%	-
Fuel	N/A	N/A	-
Approx Age	2	2	2
ASHRAE Service Life	12	12	12
Remaining Life	10	10	10
Comments	Energy wheel	Energy wheel	Connected to Geo-Heat Pump Loop

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Stone Bridge Middle School

AHUs

Tag	EHR-4	EHR-5	EHR-7
Unit Type	Packaged Rooftop Energy Recovery Unit	Packaged Rooftop Energy Recovery Unit	Packaged Rooftop Energy Recovery Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Conditioned Makeup Air	Conditioned Makeup Air	Kitchen Make-up Air
Manufacturer	Annexaire	Annexaire	Annexaire
Model #	ERP-E-05-HW-D-H-WS	ERP-05-HW-D-H-WS	ERP-E-03-HW-D-H-WS
Serial #	1369-04-6409	1369-05-6409	1369-07-0409
Cooling Type	D/X, R-22	D/X, R-22	D/X, R-22
Capacity (CFM)	5,600	5,600	3,200
Cooling Efficiency (SEER/EER)	-	-	-
Heating Type	Heat Pump / Energy Wheel	Heat Pump / Energy Wheel	Heat Pump / Energy Wheel
Heating Input (MBH)	-	-	-
Efficiency	-	-	-
Fuel	-	-	-
Approx Age	2	2	2
ASHRAE Service Life	12	12	12
Remaining Life	10	10	10
Comments	Connected to Geo-Heat Pump Loop	Connected to Geo-Heat Pump Loop	Connected to Geo-Heat Pump Loop

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Stone Bridge Middle School

AHUs

Tag	EHR-8	EHR-3	EHR-6
Unit Type	Packaged Rooftop Energy Recovery Unit	Packaged Rooftop Energy Recovery Unit	Packaged Rooftop Energy Recovery Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Auditorium Make-up Air	Conditioned Makeup Air	Cafeteria
Manufacturer	Annexaire	Annexaire	Annexaire
Model #	ERP-E-02-HW-C-HG-AC	ERHRE-05-HW-D-H-WS	ERP-E-07-HW-D-H-WS
Serial #	1369-08-0409	1369-05-0409	1369-06-0409
Cooling Type	D/X, R-407C	D/X, R-22	D/X, R-22
Capacity (CFM)	2000, 6-tons	5,600	7,300
Cooling Efficiency (SEER/EER)	-		-
Heating Type	Gas fired H/X and Energy Wheel	Heat Pump / Energy Wheel	Heat Pump / Energy Wheel
Heating Input (MBH)	75	-	-
Efficiency	80%	-	-
Fuel	Natural Gas	-	-
Approx Age	2	2	2
ASHRAE Service Life	12	12	12
Remaining Life	10	10	10
Comments		Connected to Geo-Heat Pump Loop	Connected to Geo-Heat Pump Loop

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Stone Bridge Middle School

AHUs

Tag	MAU-1	MAU-3,4	
Unit Type	Gas Fired Make-up Air Unit	Gas Fired Make-up Air Unit	
Qty	4	2	
Location	Roof	Roof	
Area Served	Science Lab	Kitchen	
Manufacturer	Greenheck	Greenheck	
Model #	PVF-150H	PVF-150H	
Serial #	11600083	11600090	
Cooling Type	N/A	N/A	
Capacity (CFM)	N/A	N/A	
Cooling Efficiency (SEER/EER)	N/A	N/A	
Heating Type	Gas Fired H/X	Gas Fired H/X	
Heating Input (MBH)	150	150	
Efficiency	80%	80%	
Fuel	Natural Gas	Natural Gas	
Approx Age	2	2	2
ASHRAE Service Life	12	12	12
Remaining Life	10	10	10
Comments			Connected to Geo-Heat Pump Loop

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Stone Bridge Middle School

Domestic Water Heaters

Tag	DHW-1	DHW-2	
Unit Type	Domestic Hot Water Boiler	Domestic Hot Water Heater w/ Integral Storage Tank	
Qty	1	1	
Location	Mechanical Room	Kitchen	
Area Served	Building DWH	Kitchen	
Manufacturer	Lochinvar	Lochinvar	
Model #	CFN651 PM	TNR125-060	
Serial #	L08 H00215539	EL11288482	
Size (Gallons)	752 Gal (Separate tank)	60	
Input Capacity (MBH/KW)	650 MBH	125 MBH	
Recovery (Gal/Hr)	670	143.9	
Efficiency %	80%	80.00%	
Fuel	Natural Gas	Natural Gas	
Approx Age	2	2	
ASHRAE Service Life	25	12	
Remaining Life	23	10	
Comments	Copper Fin Tube Boiler w/ Separate Storage Tank		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Stone Bridge Middle School

Pumps

Tag	GSHP-1,2	DHWP-1	
Unit Type	Base Mounted End Suction	In-line Circ Pump	
Qty	2	1	
Location	Mechanical Room	Mechanical Room	
Area Served	Building Geo Loop	Dom. HW Loop	
Manufacturer	B&G	B&G	
Model #	151U BF B25	60	
Serial #	C08 0729-02D90	C077 39-01 L80	
Horse Power	100	1	
Flow	1290 GPM @ 204 ftHD	-	
Motor Info	Emerson	B&G Motor	
Electrical Power	460V/3ph	208/230V-3Ph	
RPM	3565	1725	
Motor Efficiency %	94.1%	88.0%	
Approx Age	2	2	
ASHRAE Service Life	20	10	
Remaining Life	18	8	
Comments	Variable Speed Drive		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

APPENDIX E

CEG Project #: 9C12041
Facility Name: Stone Bridge Middle School
Address: 27 High Street
City, State, Zip: Allentown, NJ 08601

Fixture Reference #	Location	Average Burn Hours	Existing Fixtures						Proposed Fixtures Retrofit						Retrofit Energy Savings			Lighting Retrofit Costs				Simple Payback	Control Ref #	Proposed Lighting Controls				
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All	Retrofit Estimate		Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$
232.22	SGI 731	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	9	0.77	2,012	Existing to Remain	0	3	86	0	0.77	2,012	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 729	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	15	1.29	3,354	Existing to Remain	0	3	86	0	1.29	3,354	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	SGI 727	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Boy's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	0	2	62	0	0.12	322	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Roof Access	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Prismatic Lens	1	62	1	0.06	74	Existing to Remain	0	1	62	0	0.06	74	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Girl's Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	0	2	62	0	0.12	322	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
242.22	Office 719	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	4	104	2	0.21	541	Existing to Remain	0	4	104	0	0.21	541	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
227.22	Conference Room 717	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	2	58	6	0.35	905	Existing to Remain	0	2	58	0	0.35	905	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Work Room 711	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Prismatic Lens	2	62	7	0.43	1,128	Existing to Remain	0	2	62	0	0.43	1,128	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21	Copy 711B	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Prismatic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
242.22	Office 707	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	4	104	2	0.21	541	Existing to Remain	0	4	104	0	0.21	541	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	SGI 703	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	SGI 701B	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 700	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 701	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	15	1.29	3,354	Existing to Remain	0	3	86	0	1.29	3,354	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 702	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 704	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 706	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 708	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	16	1.38	3,578	Existing to Remain	0	3	86	0	1.38	3,578	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21	Prep 710	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Prismatic Lens	3	86	3	0.26	671	Existing to Remain	0	3	86	0	0.26	671	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Prismatic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 712	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	19	1.63	4,248	Existing to Remain	0	3	86	0	1.63	4,248	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
222.21	Files 714	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	0	2	62	0	0.12	322	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 716	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 718	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recersed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0

Fixture Reference #	Location	Average Burn Hours	Existing Fixtures						Proposed Fixtures Retrofit						Retrofit Energy Savings			Lighting Retrofit Costs				Control Ref #	Proposed Lighting Controls						
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All		Rebate Estimate	Simple Payback	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$
232.22	Classroom 720	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 722	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 622	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 620	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 618	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 616	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Files 614	2600	2x4, 2 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	0	2	62	0	0.12	322	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 612	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	19	1.63	4,248	Existing to Remain	0	3	86	0	1.63	4,248	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.21	Prep 610	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	1	0.09	224	Existing to Remain	0	3	86	0	0.09	224	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 608	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	16	1.38	3,578	Existing to Remain	0	3	86	0	1.38	3,578	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 600	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 602	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 604	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 606	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	SGI 601A	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 601B	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	15	1.29	3,354	Existing to Remain	0	3	86	0	1.29	3,354	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	SGI 603	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Office 607	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	1	0.09	224	Existing to Remain	0	3	86	0	0.09	224	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
222.21	Work Room 611	2600	2x4, 2 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	8	0.50	1,290	Existing to Remain	0	2	62	0	0.50	1,290	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21	Copy 611A	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0

Fixture Reference #	Location	Average Burn Hours	Existing Fixtures					Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs				Simple Payback	Control Ref #	Proposed Lighting Controls				
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Material	Total Labor	Total All			Rebate Estimate	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh
227.22	Conference Room 617	2600	2x2, 2 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	2	58	6	0.35	905	Existing to Remain	0	2	58	0	0.35	905	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Office 619	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Girl's Restroom	2600	2x4, 2 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	0	2	62	0	0.12	322	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Boy's Restroom	2600	2x4, 2 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	0	2	62	0	0.12	322	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	SGI 627	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 629	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	15	1.29	3,354	Existing to Remain	0	3	86	0	1.29	3,354	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	SGI 631	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	9	0.77	2,012	Existing to Remain	0	3	86	0	0.77	2,012	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 322	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 320	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 318	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 316	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 312	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
222.21	Files 314	2600	2x4, 2 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	0	2	62	0	0.12	322	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21	Prep 310	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 308	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 306	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 304	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 302	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 300	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 301	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	15	1.29	3,354	Existing to Remain	0	3	86	0	1.29	3,354	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0

Fixture Reference #	Location	Average Burn Hours	Existing Fixtures						Proposed Fixtures Retrofit						Retrofit Energy Savings			Lighting Retrofit Costs				Simple Payback	Control Ref #	Proposed Lighting Controls				
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings kWh	Energy Savings \$	Material	Total Labor	Total All	Relate Estimate			Controls Description	Qty of Controls	Hour Reduction %	Energy Savings kWh	Energy Savings \$
232.22	SGI 303	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Office 307	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Work Room 311	2000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Prismatic Lens	2	62	8	0.50	1,290	Existing to Remain	0	2	62	0	0.50	1,290	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21	Copy 311A	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Prismatic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
227.22	Conference Room 317	2000	2x2, 2 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	2	58	6	0.35	905	Existing to Remain	0	2	58	0	0.35	905	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Office 319	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Girl's Restroom	2000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	0	2	62	0	0.19	484	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Boy's Restroom	2000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	0	2	62	0	0.19	484	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	SGI 327	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 329	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	15	1.29	3,354	Existing to Remain	0	3	86	0	1.29	3,354	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 341	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	15	1.29	3,354	Existing to Remain	0	3	86	0	1.29	3,354	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	SGI 429	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Girl's Restroom	2000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	0	2	62	0	0.19	484	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Boy's Restroom	2000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	0	2	62	0	0.19	484	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
242.22	Office 421	2000	2x4, 4 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	4	104	2	0.21	541	Existing to Remain	0	4	104	0	0.21	541	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
227.22	Conference Room 419	2000	2x2, 2 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	2	58	6	0.35	905	Existing to Remain	0	2	58	0	0.35	905	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Work Room 413	2000	2x4, 2 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Prismatic Lens	2	62	8	0.50	1,290	Existing to Remain	0	2	62	0	0.50	1,290	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21	Copy 413B	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Prismatic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
242.21	Office 409	2000	2x4, 4 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Prismatic Lens	4	107	2	0.21	556	Existing to Remain	0	4	107	0	0.21	556	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	SGI 405	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 407	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
242.22	Office 401	2000	2x4, 4 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	4	104	3	0.31	811	Existing to Remain	0	4	104	0	0.31	811	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
242.22x		8760	2x4, 4 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens; used as Night Light	4	104	1	0.10	911	Existing to Remain	0	4	104	0	0.10	911	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	638	\$92
232.22	Classroom 400	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 402	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 404	2000	2x4, 3 Lamp, 32w TR, Elec. Ballast, Recersed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0

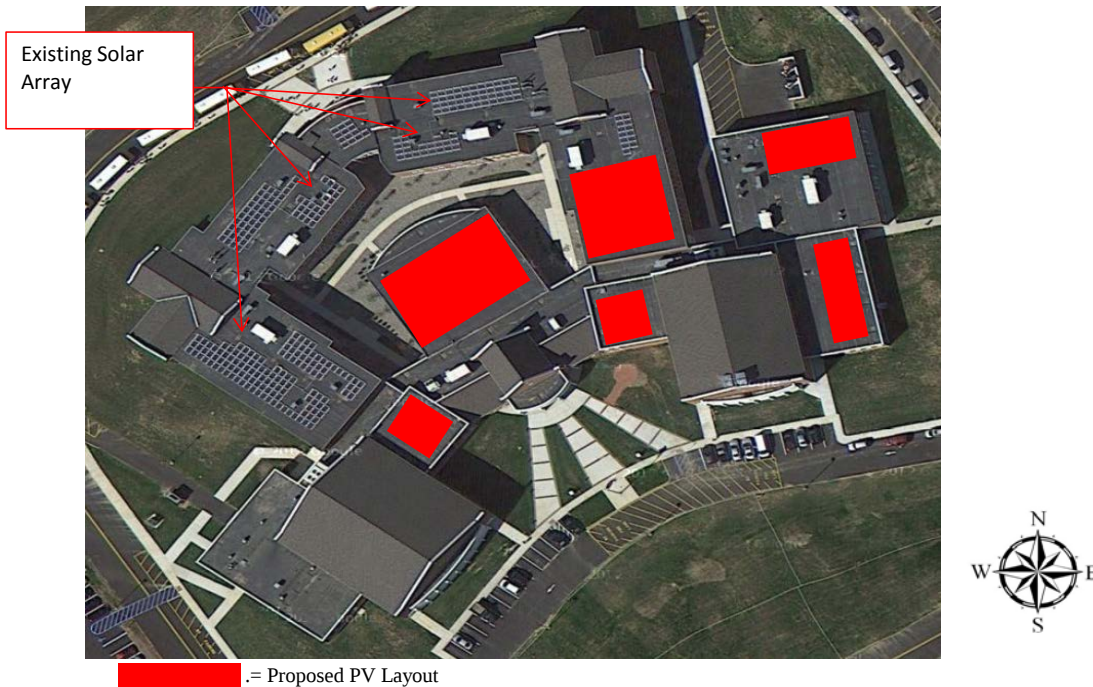
Fixture Reference #	Location	Average Burn Hours	Existing Fixtures					Proposed Fixtures Retrofit					Retrofit Energy Savings			Lighting Retrofit Costs				Simple Payback	Control Ref #	Proposed Lighting Controls							
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Material			Total Labor	Total All	Rebate Estimate	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$
232.22x	Classroom 406	8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22		2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22		Classroom 408	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	16	1.38	3,578	Existing to Remain	0	3	86	0	1.38	3,578	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0
232.22	Classroom 412	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	19	1.63	4,248	Existing to Remain	0	3	86	0	1.63	4,248	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.21	Prep 410	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	3	0.26	671	Existing to Remain	0	3	86	0	0.26	671	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 416	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 418	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 420	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 422	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	0	3	86	0	1.03	2,683	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Lounge 501	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	8	0.50	1,290	Existing to Remain	0	2	62	0	0.50	1,290	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21	Cafeteria	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	23	1.98	5,143	Existing to Remain	0	3	86	0	1.98	5,143	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens; used as Night Light	3	86	6	0.52	4,520	Existing to Remain	0	3	86	0	0.52	4,520	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	6	70.0%	3,164	\$459
227.21		2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	58	34	1.97	5,127	Existing to Remain	0	2	58	0	1.97	5,127	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
242.21	Kitchen	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	107	9	0.96	2,504	Existing to Remain	0	4	107	0	0.96	2,504	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
242.22x		8760	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	4	104	5	0.52	4,555	Existing to Remain	0	4	104	0	0.52	4,555	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	5	70.0%	3,189	\$462
232.21	Girl's Restroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.21	Snack Room	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	1	0.09	224	Existing to Remain	0	3	86	0	0.09	224	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.21	Boy's Restroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.21	Music 520	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	11	0.95	2,460	Existing to Remain	0	3	86	0	0.95	2,460	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76

Fixture Reference #	Location	Average Burn Hours	Existing Fixtures					Proposed Fixtures Retrofit					Retrofit Energy Savings			Lighting Retrofit Costs				Simple Payback	Control Ref #	Proposed Lighting Controls							
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kWh	Energy Savings, kWh	Energy Savings, \$	Material			Total Labor	Total All	Retail Estimate	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$
232.21	Office 520A	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	1	0.09	224	Existing to Remain	0	3	86	0	0.09	224	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0	
232.21x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.21	Music 516	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	8	0.69	1,789	Existing to Remain	0	3	86	0	0.69	1,789	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.21	Music 518	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	18	1.55	4,025	Existing to Remain	0	3	86	0	1.55	4,025	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens; used as Night Light	3	86	2	0.17	1,507	Existing to Remain	0	3	86	0	0.17	1,507	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	2	70.0%	1,055	\$153
232.22	Control Room	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	5	0.43	1,118	Existing to Remain	0	3	86	0	0.43	1,118	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
222.21	Control Room Hal	3000	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	372	Existing to Remain	0	2	62	0	0.12	372	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
221.34	Studio	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	6	0.37	967	Existing to Remain	0	2	62	0	0.37	967	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
563	Lobby	3000	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	9	0.47	1,404	Existing to Remain	0	2	52	0	0.47	1,404	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Main Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	10	0.86	2,236	Existing to Remain	0	3	86	0	0.86	2,236	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	VP Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	0	3	86	0	0.34	894	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Work Room	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	0	3	86	0	0.52	1,342	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.21	Copy	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	447	Existing to Remain	0	3	86	0	0.17	447	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Conference Room	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	0	3	86	0	0.34	894	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Principals Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	0	3	86	0	0.34	894	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Nurse	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	11	0.68	1,773	Existing to Remain	0	2	62	0	0.68	1,773	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Classroom 105	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	7	0.60	1,565	Existing to Remain	0	3	86	0	0.60	1,565	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Classroom 103	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	7	0.60	1,565	Existing to Remain	0	3	86	0	0.60	1,565	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
231.33	Media Center	2600	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect	3	86	30	2.58	6,708	Existing to Remain	0	3	86	0	2.58	6,708	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
227.22		2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	2	58	39	2.26	5,881	Existing to Remain	0	2	58	0	2.26	5,881	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	Work Room 101	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	5	0.43	1,118	Existing to Remain	0	3	86	0	0.43	1,118	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
232.22	Library 101B	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	0	3	86	0	0.34	894	0.00	0	\$0	\$0.00	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0

Fixture Reference #	Location	Average Burn Hours	Existing Fixtures						Proposed Fixtures Retrofit						Retrofit Energy Savings			Lighting Retrofit Costs				Simple Payback	Control Ref #	Proposed Lighting Controls				
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings kWh	Energy Savings \$	Material	Total Labor	Total All	Retrofit Estimate			Controls Description	Qty of Controls	Hour Reduction %	Energy Savings kWh	Energy Savings \$
222.21	Library Hall	3000	2x4, 2 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	558	Existing to Remain	0	2	62	0	0.19	558	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	OT/PT 104	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	0	3	86	0	0.34	894	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
745	Aux Gym	2600	250w MH, Prismatic Lens	1	265	9	2.39	6,201	Existing to Remain	0	1	265	0	2.39	6,201	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
745	Main Gym	2600	250w MH, Prismatic Lens	1	265	30	7.95	20,670	Existing to Remain	0	1	265	0	7.95	20,670	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
221.34	Storage	1200	1x4, 2 Lamp, 32w TR, Elect. Ballast, Pendant Mnt., No Lens	2	62	2	0.12	149	Existing to Remain	0	2	62	0	0.12	149	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22	PE Office off of Aux Gym	2600	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	0	3	86	0	0.34	894	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
232.22x		8760	2x4, 3 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Parabolic Lens; used as Night Light	3	86	1	0.09	753	Existing to Remain	0	3	86	0	0.09	753	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	6	Utilize Existing Switching For 2 Lamp Ballast - 1 Lamp to Remain as Night Light	1	70.0%	527	\$76
221.31	Boy's Locker Room	2600	1x4, 2 Lamp, 32w TR, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	9	0.56	1,451	Existing to Remain	0	2	62	0	0.56	1,451	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	1	Daylight Sensor; Add On Existing Occ Sensor	1	40.0%	580	\$84
221.31	Hall	3000	1x4, 2 Lamp, 32w TR, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	3	0.19	558	Existing to Remain	0	2	62	0	0.19	558	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Office 202D	2600	2x4, 2 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	0	2	62	0	0.19	484	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
221.31	Girl's Locker Room	2600	1x4, 2 Lamp, 32w TR, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	9	0.56	1,451	Existing to Remain	0	2	62	0	0.56	1,451	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	1	Daylight Sensor; Add On Existing Occ Sensor	1	40.0%	580	\$84
221.31	Hall	3000	1x4, 2 Lamp, 32w TR, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	3	0.19	558	Existing to Remain	0	2	62	0	0.19	558	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Office 204A	2600	2x4, 2 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	0	2	62	0	0.19	484	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Boy's Restroom	2600	2x4, 2 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	0	2	62	0	0.19	484	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
222.21	Girl's Restroom	2600	2x4, 2 Lamp, 32w TR, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	0	2	62	0	0.19	484	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
221.34	Pump Room	2000	1x4, 2 Lamp, 32w TR, Elect. Ballast, Pendant Mnt., No Lens	2	62	6	0.37	744	Existing to Remain	0	2	62	0	0.37	744	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
221.34	Elec Room	2000	1x4, 2 Lamp, 32w TR, Elect. Ballast, Pendant Mnt., No Lens	2	62	3	0.19	372	Existing to Remain	0	2	62	0	0.19	372	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
221.34	Receiving	3000	1x4, 2 Lamp, 32w TR, Elect. Ballast, Pendant Mnt., No Lens	2	62	5	0.31	930	Existing to Remain	0	2	62	0	0.31	930	0.00	0	\$0	\$0.00	\$0.00	\$0.00	-	0	No New Controls	0	0.0%	0	\$0
TOTAL						1,233	107	304,641					0	107	304,641	0	0	0	0	0	0	0			50		27,136	\$3,935

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
Stone Bridge Middle School	10300	SHARP NU-U235F2	420	17.5	7,367	98.70	114,053	79.9	17,598	13.40



Notes:

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

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	98.7 kW
DC to AC Derate Factor:	0.810
AC Rating:	79.9 kW
Array Type:	Fixed Tilt
Array Tilt:	10.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	15.5 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
1	2.39	5922	917.91
2	3.17	7179	1112.75
3	4.07	10048	1557.44
4	4.83	11132	1725.46
5	5.70	13244	2052.82
6	5.94	12942	2006.01
7	5.77	12841	1990.36
8	5.38	11894	1843.57
9	4.65	10233	1586.12
10	3.61	8424	1305.72
11	2.35	5373	832.82
12	2.01	4821	747.25
Year	4.16	114053	17678.22

Project Name: LGEA Solar PV Project - Stone Bridge Middle School

Location: Allentown, NJ

Description: Photovoltaic System 100% Financing - 15 year

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	\$604,989
Annual kWh Production	114,053
Annual Energy Cost Reduction	\$17,678
Average Annual SREC Revenue	\$21,794
Simple Payback:	15.33 Years

Life Cycle Cost Analysis

Analysis Period (years):	15	Financing %:	100%						
Discount Rate:	3%	Maintenance Escalation Rate:	3.0%						
Average Energy Cost (\$/kWh)	\$0.155	Energy Cost Escalation Rate:	3.0%						
Financing Rate:	6.00%	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	114,053	\$17,678	\$0	\$28,513	\$35,601	\$25,662	(\$15,071)	(\$15,071)
2	\$0	113,483	\$18,209	\$0	\$28,371	\$34,019	\$27,244	(\$14,684)	(\$29,755)
3	\$0	112,915	\$18,755	\$0	\$28,229	\$32,338	\$28,925	(\$14,279)	(\$44,034)
4	\$0	112,351	\$19,317	\$0	\$28,088	\$30,554	\$30,709	(\$13,858)	(\$57,892)
5	\$0	111,789	\$19,897	\$1,151	\$27,947	\$28,660	\$32,603	(\$14,570)	(\$72,462)
6	\$0	111,230	\$20,494	\$1,146	\$22,246	\$26,649	\$34,614	(\$19,669)	(\$92,131)
7	\$0	110,674	\$21,109	\$1,140	\$22,135	\$24,514	\$36,749	(\$19,159)	(\$111,290)
8	\$0	110,121	\$21,742	\$1,134	\$22,024	\$22,248	\$39,015	(\$18,631)	(\$129,921)
9	\$0	109,570	\$22,394	\$1,129	\$21,914	\$19,841	\$41,422	(\$18,083)	(\$148,005)
10	\$0	109,022	\$23,066	\$1,123	\$16,353	\$17,287	\$43,976	(\$22,966)	(\$170,971)
11	\$0	108,477	\$23,758	\$1,117	\$16,272	\$14,574	\$46,689	(\$22,351)	(\$193,322)
12	\$0	107,935	\$24,471	\$1,112	\$16,190	\$11,695	\$49,568	(\$21,714)	(\$215,035)
13	\$0	107,395	\$25,205	\$1,106	\$16,109	\$8,637	\$52,626	(\$21,055)	(\$236,090)
14	\$0	106,858	\$25,961	\$1,101	\$10,686	\$5,391	\$55,871	(\$25,717)	(\$261,807)
15	\$0	106,324	\$26,740	\$1,095	\$10,632	\$1,945	\$59,317	(\$24,986)	(\$286,793)
Totals:		1,652,195	\$328,796	\$12,354	\$315,709	\$313,955	\$604,989	(\$286,793)	(\$2,064,582)
Net Present Value (NPV)							(\$210,072)		

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
Stone Bridge Middle School Ground Mounted Array	90000	SHARP NU-U235F2	2752	17.5	48,272	646.72	807,404.0	523.8	115,309	13.40



[Red Square] := Proposed PV Layout

Notes:

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

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	646.7 kW
DC to AC Derate Factor:	0.810
AC Rating:	523.8 kW
Array Type:	Fixed Tilt
Array Tilt:	30.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	14.5 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
1	3.10	51873	7521.59
2	3.83	57616	8354.32
3	4.52	72946	10577.17
4	4.95	74293	10772.49
5	5.57	84157	12202.76
6	5.67	80627	11690.92
7	5.57	80984	11742.68
8	5.43	77895	11294.77
9	5.04	72587	10525.11
10	4.27	65667	9521.72
11	2.94	45610	6613.45
12	2.64	43150	6256.75
Year	4.46	807404	117073.58

Project Name: LGEA Solar PV Project - Stone Bridge Middle School Ground Mounted Array									
Location: Allentown, NJ									
Description: Photovoltaic System 100% Financing - 15 year									
Simple Payback Analysis									
		Photovoltaic System 100% Financing - 15 year							
Total Construction Cost		\$3,259,445							
Annual kWh Production		807,404							
Annual Energy Cost Reduction		\$117,074							
Average Annual SREC Revenue		\$154,282							
Simple Payback:		12.01						Years	
Life Cycle Cost Analysis									
Analysis Period (years):		15				Financing %:		100%	
Discount Rate:		3%				Maintenance Escalation Rate:		3.0%	
Average Energy Cost (\$/kWh)		\$0.145				Energy Cost Escalation Rate:		3.0%	
Financing Rate:		6.00%				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	807,404	\$117,074	\$0	\$201,851	\$191,806	\$138,255	(\$11,136)	(\$11,136)
2	\$0	803,367	\$120,586	\$0	\$200,842	\$183,279	\$146,782	(\$8,633)	(\$19,769)
3	\$0	799,350	\$124,203	\$0	\$199,838	\$174,225	\$155,835	(\$6,020)	(\$25,789)
4	\$0	795,353	\$127,929	\$0	\$198,838	\$164,614	\$165,447	(\$3,293)	(\$29,081)
5	\$0	791,377	\$131,767	\$8,151	\$197,844	\$154,409	\$175,651	(\$8,600)	(\$37,682)
6	\$0	787,420	\$135,720	\$8,110	\$157,484	\$143,576	\$186,485	(\$44,967)	(\$82,648)
7	\$0	783,483	\$139,792	\$8,070	\$156,697	\$132,074	\$197,987	(\$41,642)	(\$124,290)
8	\$0	779,565	\$143,986	\$8,030	\$155,913	\$119,862	\$210,198	(\$38,191)	(\$162,482)
9	\$0	775,667	\$148,305	\$7,989	\$155,133	\$106,898	\$223,163	(\$34,611)	(\$197,093)
10	\$0	771,789	\$152,754	\$7,949	\$115,768	\$93,133	\$236,927	(\$69,487)	(\$266,580)
11	\$0	767,930	\$157,337	\$7,910	\$115,190	\$78,520	\$251,540	(\$65,444)	(\$332,024)
12	\$0	764,090	\$162,057	\$7,870	\$114,614	\$63,006	\$267,055	(\$61,260)	(\$393,283)
13	\$0	760,270	\$166,919	\$7,831	\$114,041	\$46,534	\$283,526	(\$56,932)	(\$450,215)
14	\$0	756,469	\$171,926	\$7,792	\$75,647	\$29,047	\$301,013	(\$90,279)	(\$540,494)
15	\$0	752,686	\$177,084	\$7,753	\$75,269	\$10,481	\$319,579	(\$85,460)	(\$625,954)
Totals:		11,696,221	\$2,177,441	\$87,455	\$2,234,967	\$1,691,464	\$3,259,445	(\$625,954)	(\$3,298,521)
Net Present Value (NPV)							(\$431,931)		