WOODBURY CITY SCHOOL DISTRICT

WALNUT STREET ELEMENTARY

60 WALNUT STREET
WOODBURY, NJ 08096

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 & Lighting Service (LPLS)
Third Party Supplier:	South Jersey Energy

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.

Table 1
Electricity Billing Data

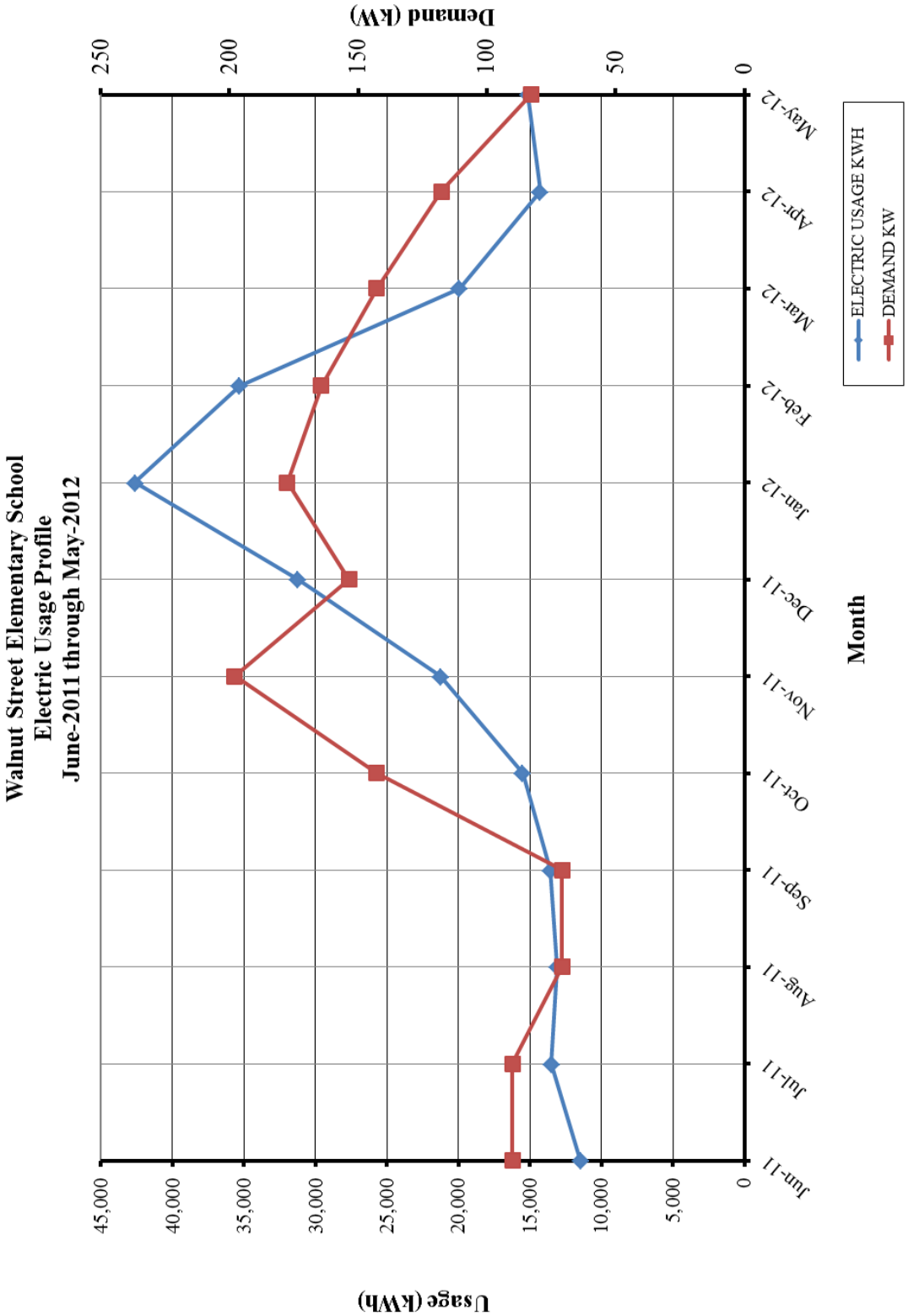
ELECTRIC USAGE SUMMARY

Utility Provider: PSE&G
Rate: LPLS
Meter No: 778018554
Account # 42 003 452 18
Third Party Utility Provider: South Jersey Energy
TPS Meter / Acct No: -

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Jun-11	11,457	90	$2,686
Jul-11	13,503	90	$3,166
Aug-11	13,094	71	$2,776
Sep-11	13,546	71	$2,872
Oct-11	15,480	143	$2,748
Nov-11	21,240	198	$3,646
Dec-11	31,200	154	$4,698
Jan-12	42,600	178	$6,184
Feb-12	35,280	164	$5,352
Mar-12	19,920	143	$3,363
Apr-12	14,280	118	$2,573
May-12	15,120	83	$2,556
Totals	**246,720**	**198 Max**	**$42,621**

AVERAGE DEMAND **125.1 KW average**
AVERAGE RATE **$0.173** **$/kWh**

Figure 1
Electricity Usage Profile



II. FACILITY DESCRIPTION

The Walnut Street Elementary School is located at 60 Walnut Street in Woodbury, New Jersey. The 22,292 SF facility was originally built in 1889 (since been demolished) with additions/alterations in 1927, 1955, 1967, and 1999. In 2007, a large HVAC upgrade project was completed that converted the elementary school to air-to-air heat pump technology. The building is a 3-story structure that includes administration offices, classrooms, multi-purpose room, stage, library, computer lab, nurse's suite, mechanical/electrical rooms, rest rooms, etc.

Occupancy Profile

The typical hours of operation for this facility are Monday through Friday between 7:00 AM and 4:30 PM. There are sports and other activities in the evenings. The school employs 28 people.

Building Envelope

Exterior walls for the Walnut Street School are brick faced with a concrete block construction. The amount of insulation within the walls is approximately ¾" foam insulation. The windows throughout the facility are in good condition and appear to be maintained. The roof is a flat, built up rubber roof where the HVAC equipment resides. The amount of insulation below the roofing ranges from 2" to 5" depending on the location and slope of the roof.

HVAC Systems

The All Purpose Room is heated & cooled by a Trane Model BA-15E36PTU commercial packaged heat pump rooftop unit that is rated at 6,000 CFM, 172 MBH heating and a nominal 15-Ton of cooling. The unit includes 27 kW of auxiliary electric heat. The unit has an EER of 13.5 which is efficient for a 2006 vintage unit.

The Nurse's Suite is heated & cooled by a Trane Model TCD075C300 commercial packaged electric/DX rooftop unit that is rated at 2,250 CFM, 58.6 MBH heating and a nominal 6-Ton of cooling. The unit includes an economizer for free cooling during the shoulder months, a power exhaust, and 5.6 kW of auxiliary electric heat.

The administration offices, conference room, faculty room, faculty work room and adjacent corridors are heated and cooled by Mitsubishi split fan coil units with outdoor, rooftop, air-cooled heat pump units. These units range in size from 18,000 BTU/Hour to 35,000 BTU/Hour cooling with capacities from 1,200 CFM to 1,940 CFM. In the heating mode, these units range from 19,000 BTU/Hour to 37,000 BTU/Hour.

The boys/girls restrooms, CST Offices and several corridors are heated and cooled by Luxaire Model EABD-T036 split heat pumps with outdoor, rooftop, air-cooled heat pump units. These units are rated at 36,000 BTU/Hour in both the heating and cooling modes. These units are very efficient with a SEER = 13.0.

Most of the classrooms are heated and cooled by vertical heat pumps which are installed in the exterior walls of the classrooms. These Airedale Model CHH-3 and CHH-2 consist of heat pumps, desiccant heat recovery wheels, and 7.5 kW of auxiliary electric heat.

The restroom perimeter walls, stairways, basement mechanical rooms and the multi-purpose room/stage are additionally heated by Qmark electric unit heaters ranging in size from 2 kW to 7.5 kW. The rated output capacity of these heating units ranges from 7,500 BTU/Hour to 25,600 BTU/Hour.

HVAC System Controls

Most of the upgraded HVAC units are connected and controlled by the building's DDC System. The balance of the units such as the unit heaters are controlled by local wall sensors.

Domestic Hot Water

Domestic hot water for the restrooms is provided by a 40-gallon Hotpoint Model HE40M electric hot water heater, capacity of 2,855 Watts/level (2 levels) located in the basement MER. There is also a somewhat smaller electric water heater in the nurse's suite.

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 Upgrade (CFL's)	$586	$86	6.8	120.1%
ECM #2	Lighting Upgrade (MH to T5HO)	$3,120	$65	48.0	-68.8%
ECM #3	Exterior Lighting Upgrades	$5,405	$748	7.2	107.6%
ECM #4	Lighting Controls Upgrade	$4,688	$993	4.7	217.7%
ECM #5	Rooftop Unit Replacement	$20,688	$942	22.0	-31.7%
ECM #6	Energy Star Refrigerators	$1,800	$169	10.7	40.8%
ECM #7	Vending Miser Controls	$600	$271	2.2	576.6%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	63.92 KW PV System	$428,150	$28,041	15.3	-1.8%
Notes:	A. Cost takes into consideration applicable NJ Smart StartTM incentives.				
	B. Savings takes into consideration applicable maintenance savings.				

Table 2
ECM Energy Summary

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Lighting Upgrade (CFL's)	1.0	498	0
ECM #2	Lighting Upgrade (MH to T5HO)	0.5	378	0
ECM #3	Exterior Lighting Upgrades	1.4	4,321	0
ECM #4	Lighting Controls Upgrade	0.0	5,741	0
ECM #5	Rooftop Unit Replacement	0.0	5,445	0
ECM #6	Energy Star Refrigerators	0.0	978	0
ECM #7	Vending Miser Controls	0.0	1,564	0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	63.92 KW PV System	129.0	156,421	0

Table 3
Facility Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Lighting Upgrade (CFL's)	$86	$606	$20	$586	6.8
Lighting Upgrade (MH to T5HO)	$65	$3,520	$400	$3,120	48.0
Exterior Lighting Upgrades	$748	$6,505	$1,100	$5,405	7.2
Lighting Controls Upgrade	$993	$4,758	$70	$4,688	4.7
Rooftop Unit Replacement	$942	$20,688	$0	$20,688	22.0
Energy Star Refrigerators	$169	$1,800	$0	$1,800	10.7
Vending Miser Controls	$271	$600	$0	$600	2.2
Design / Construction Extras (15%)	*$0*	*$5,771*	*$0*	*$5,771*	
Total Project	**$3,274**	**$44,248**	**$1,590**	**$42,658**	**13.0**

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

ECM #1: Lighting Upgrade – General

Description:

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

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

Additionally, there is an area which contains older CFL exit lamps which can be replaced with new LED exit lamp technology.

Energy Savings Calculations:

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

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$606
NJ Smart Start Equipment Incentive ($):	$20
Net Installation Cost ($):	$586
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$86
Total Yearly Savings ($/Yr):	$86
Estimated ECM Lifetime (Yr):	15
Simple Payback	6.8
Simple Lifetime ROI	120.1%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$1,290
Internal Rate of Return (IRR)	12%
Net Present Value (NPV)	$440.66

ECM #2: Lighting Upgrade – All Purpose Room

Description:

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

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

Energy Savings Calculations:

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

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$3,520
NJ Smart Start Equipment Incentive ($):	$400
Net Installation Cost ($):	$3,120
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$65
Total Yearly Savings ($/Yr):	$65
Estimated ECM Lifetime (Yr):	15
Simple Payback	48.0
Simple Lifetime ROI	-68.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$975
Internal Rate of Return (IRR)	-12%
Net Present Value (NPV)	($2,344.03)

ECM #3: Lighting Upgrade – Exterior Lighting

Description:

The exterior lighting at Walnut Street Elementary School is currently lit via 175 watt metal halide wall packs, 70 watt wall packs and incandescent down lights. The exterior would be better served by an LED wall pack fixture which would replace the 175 watt metal halide fixtures. Concord Engineering recommends upgrading the existing 175 watt metal halides to an energy-efficient LED system.

This measure replaces the 175 watt metal halide fixtures with new LED technology.

Energy Savings Calculations:

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

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$6,505
NJ Smart Start Equipment Incentive ($):	$1,100
Net Installation Cost ($):	$5,405
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$748
Total Yearly Savings ($/Yr):	$748
Estimated ECM Lifetime (Yr):	15
Simple Payback	7.2
Simple Lifetime ROI	107.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$11,220
Internal Rate of Return (IRR)	11%
Net Present Value (NPV)	$3,524.58

ECM #4: Lighting Controls Upgrade – Occupancy Sensors

Description:

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

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

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

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

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

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

Energy Savings Calculations:

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

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

Rebates and Incentives:

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

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

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$4,758
NJ Smart Start Equipment Incentive ($):	$70
Net Installation Cost ($):	$4,688
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$993
Total Yearly Savings ($/Yr):	$993
Estimated ECM Lifetime (Yr):	15
Simple Payback	4.7
Simple Lifetime ROI	217.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$14,895
Internal Rate of Return (IRR)	20%
Net Present Value (NPV)	$7,166.37

ECM #5: Replace Packaged Electric/DX Rooftop Unit with Heat Pump Unit

Description:

Heating and cooling for the Nurse's Suite and Faculty Room is provided by a Trane Model TCD075 packaged DX cooling/electric heating rooftop unit. The cooling capacity is rated at 75,000 BtuH while the heating requires an electrical input of 5.6 kW. This unit is in fair condition though the current unit in operation is not a high-efficiency unit.

This unit can be replaced with a new high-efficiency heat pump unit similar to the packaged heat pump that serves the all-purpose room. The manufacturer used as the basis for the calculation is Trane. The unit pricing and installation cost were estimated based on current rates quotes and labor rates. The payback may change based on actual unit pricing and installed cost if the ECM is implemented.

Energy Savings Calculations:

According to the New Jersey Clean Energy Program, Protocols to Measure Resource Savings, dated August 2012, the heat pump algorithms are as follows:

Cooling Energy Savings:

$$\text{Energy Savings, kWh} = \text{Cooling Capacity,} \frac{\text{BTUHc}}{1{,}000} \times \left(\frac{1}{\text{EER}_{\text{Old}}} - \frac{1}{\text{EER}_{\text{New}}}\right) \times \text{Equivalent Full Load Hrs}$$

$$\text{Demand Savings, kW} = \frac{\text{BTUHc}}{1{,}000} \times \left(\frac{1}{\text{EER}_{\text{Old}}} - \frac{1}{\text{EER}_{\text{New}}}\right) \times \textit{Coincidence Factor } (CF)$$

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

Heating Energy Savings

$$\text{Energy Savings} = \text{Heating Capacity,} \frac{\text{BTUHh}}{1{,}000} \times \frac{\left(\left(\frac{1}{\text{COP}_{\text{Old}}} - \frac{1}{\text{COP}_{\text{New}}}\right) 3.412\right)}{\text{Equivalent Full Load Hrs}}$$

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

At an outdoor temperature of less than 40 degrees Fahrenheit Stage 2 backup heat activates.

The following table represents the savings for the 6 ton rooftop conversion:

CONVERT ELECTRIC HEAT / COOLING TO HEATPUMP			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Quantity of Units	1	1	
Unit Cooling Capacity (Btu/h)	75,000	75,000	
Unit Electric Heating Capacity (kW)	5.6	5.6	
HEATING SAVINGS CALCULATION			
Unit Capacity (Btu/h)	19,107.2	19,107.2	
Coefficient of Performance (COP)	-	3.50	
Heating Degree Days (65 F)	3,701	3,701	
Percent HDD less than 40 F	N/A	8%	
Percent HDD between 40 F to 65 F	N/A	92%	
Heating Stage 1 [Heat Pump] (kBtu)	N/A	2,041	
Heating Stage 2 [Electric Backup] (kBtu)	N/A	658	
Electric Usage (kWh)	7,803	2,699	5,103
COOLING SAVINGS CALCULATION			
Cooling Efficiency (EER)	10.9	11.4	
Cooling Equivalent Full Load Hours	1,131	1,131	
Electric Usage (kWh)	7,782	7,441	341
Electric Cost ($/kWh)	$0.1730	$0.1730	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	15,585	10,140	5,445
Energy Cost ($)	$2,696	$1,754	$942
COMMENTS:	HP Operation Above 40F for Heating, Below 40 F for Backup Electric Heat. HDD Adjusted for Use Type		

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$20,688
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$20,688
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$942
Total Yearly Savings ($/Yr):	$942
Estimated ECM Lifetime (Yr):	15
Simple Payback	22.0
Simple Lifetime ROI	-31.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$14,130
Internal Rate of Return (IRR)	-4%
Net Present Value (NPV)	($9,441.97)

ECM #6: Energy Star Refrigerators

Description:

Refrigerators manufactured before 2003 should be replaced with Energy Star® Qualified Refrigerators that can save up to $100 per year in electric costs. There are two (2) units in this facility that have refrigerators that are good candidates for replacement. These are a Tappan Model TRT16NRHW4 with an energy rating of 753 kWh per year and a GE Model TBX14SPGR with an energy rating of 935 kWh per year.

Energy Savings Calculations:

Using an Energy Star energy savings calculator, the following tables illustrate the savings for each refrigerator replacement:

ENERGY STAR REFRIGERATOR CALCULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Quantity of Units	1	1	
Manufacturer	Tappan	GE	
Type	Top/Bottom	Top/Bottom	
Model	Various	Various	
Size (Cu-Ft)	TRT16	-	
Per Unit Electric Usage (kWh)	753	358	
Electric Rate ($/kWh)	$0.173	$0.173	
ENERGY SAVINGS CALCULATIONS			
Electric Usage (kWh)	753	358	395
Energy Cost ($)	$130	$62	$68
COMMENTS:	Calculations based Energy Star Website http://www.energystar.gov/index.cfm?fuseaction=refrig.calculator		

ENERGY STAR REFRIGERATOR CALCULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Quantity of Units	1	1	
Manufacturer	GE	GE	
Type	Top/Bottom	Top/Bottom	
Model	Various	Various	
Size (Cu-Ft)	TBX14SP	-	
Per Unit Electric Usage (kWh)	935	352	
Electric Rate ($/kWh)	$0.173	$0.173	
ENERGY SAVINGS CALCULATIONS			
Electric Usage (kWh)	935	352	583
Energy Cost ($)	$162	$61	$101
COMMENTS:	Calculations based Energy Star Website http://www.energystar.gov/index.cfm?fuseaction=refrig.calculator		

The basis used for cost estimation was the GE GTN16BBXWW refrigerator listed at $690 and the Frigidaire Model FFHT1513L refrigerator listed at $610.

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,800
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$1,800
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$169
Total Yearly Savings ($/Yr):	$169
Estimated ECM Lifetime (Yr):	15
Simple Payback	10.7
Simple Lifetime ROI	40.8%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$2,535
Internal Rate of Return (IRR)	5%
Net Present Value (NPV)	$217.51

ECM #7: Vending Miser Controls

Description:

The faculty room currently utilizes a vending machine. Vending machines are in different levels for the Walnut Street Elementary School which can be in use for a limited time during the day. The installation of the Vending Miser system will help reduce the operating hours of vending machines.

Cold beverage machines regularly operate inefficiently trying to maintain a constant cool temperature within the machine and snack machines with no cooling usually have lights that operate 24/7. The VendingMiser® system incorporates innovative energy-saving technology into a small plug-and-play device that in conjunction with a passive infrared sensor regulate the operation of the cold beverage and snack machines based on occupancy and room temperature. This ECM approximates the installation of two (2) of these control systems, one (1) for the snack machine and one (1) for the cold beverage machine.

Energy Savings Calculations:

Cold Drink and Snack Vending Machine Energy Conservation Project

Energy Analysis Prepared For:

Walnut Street ES

www.VendingMiserStore.com

Input Variables	
Energy Costs ($0.000 per kwh)	$0.173
Facility Occupied Hours per Week	102
Number of Cold Drink Vending Machines	1
Number of Uncooled Snack Machines	1
Power Requirements of Cold Drink Machine (avg watts	427
Power Requirements of Snack Machine (avg watts)	100
VendingMiser Sale Price (for cold drink machines)	$250.00
OfficeMiser Sale Price (for snack machines)	$150.00

Savings Analysis

	Before	After	
Cold Drink Machines	$647.55	$436.28	Cost of Operation
	3,743	2,522	kWh
		33%	% Energy Savings
Snack Machines	$151.13	$91.76	Cost of Operation
	874	530	kWh
		39%	% Energy Savings

Project Summary

Present kWh	Projected kWh	kWh Savings per Year
4,617	3,052	1,564

Present Cost	Projected Costs	Annual Savings	Per Cent Savings	Total Project Cost	Break Even (Months)
$798.69	$528.04	$270.64	34%	$400.00	17.7

See **Vending Miser Appendix** for calculation methods and analysis.

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$600
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$600
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$271
Total Yearly Savings ($/Yr):	$271
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.2
Simple Lifetime ROI	576.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$4,060
Internal Rate of Return (IRR)	45%
Net Present Value (NPV)	$2,630.88

REM #1: 63.92 kW Solar System

Description:

The Walnut Street Elementary School has available roof and parking lot space that could accommodate a significant amount of solar generation. Based on the available areas a 63.92 kilowatt solar array could be installed, assuming the existing roof structure is capable of supporting an array. The array will produce approximately 77,019 kilowatt-hours annually that will reduce the overall electric usage of the facility by 31.2%.

Energy Savings Calculations:

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

Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
System Size (KW_{DC}):	63.92
Electric Generation (KWH/Yr):	77,019
Installation Cost ($):	$428,150
SREC Revenue ($/Yr):	$14,717
Energy Savings ($/Yr):	$13,324
Total Yearly Savings ($/Yr):	$28,041
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	15.3
Analysis Period Electric Savings ($):	$247,817
Analysis Period SREC Revenue ($):	$213,196
Net Present Value (NPV)	($145,164.97)

V. ADDITIONAL RECOMMENDATIONS

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

A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

D. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

E. Turn off computers when not in use. Ensure computers are not running in screen saver mode.

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

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Woodbury City Public School District – Walnut Street Elementary School

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^{n_i}}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^{n_i}}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrade (CFL's)	$156	$450	$20	$586	$86	$0	$86	15	$1,290	$0	120.1%	6.8	11.99%	$440.66
ECM #2	Lighting Upgrade (MH to T5HO)	$2,160	$1,360	$400	$3,120	$65	$0	$65	15	$975	$0	-68.8%	48.0	-11.93%	($2,344.03)
ECM #3	Exterior Lighting Upgrades	$4,575	$1,930	$1,100	$5,405	$748	$0	$748	15	$11,220	$0	107.6%	7.2	10.91%	$3,524.58
ECM #4	Lighting Controls Upgrade	$2,550	$2,208	$70	$4,688	$993	$0	$993	15	$14,895	$0	217.7%	4.7	19.77%	$7,166.37
ECM #5	Rooftop Unit Replacement	$9,700	$10,988	$0	$20,688	$942	$0	$942	15	$14,130	$0	-31.7%	22.0	-4.43%	($9,441.97)
ECM #6	Energy Star Refrigerators	$1,300	$500	$0	$1,800	$169	$0	$169	15	$2,535	$0	40.8%	10.7	4.62%	$217.51
ECM #7	Vending Miser Controls	$400	$200	$0	$600	$271	$0	$271	15	$4,060	$0	576.6%	2.2	44.93%	$2,630.88
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	63.92 KW PV System	$428,150	$0	$0	$428,150	$13,324	$14,717	$28,041	15	$420,621	$220,757	-1.8%	15.3	-0.22%	($93,393.07)

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

APPENDIX B

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

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

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Cooling

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

Desiccant Systems

$1.00 per cfm – gas or electric

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 ≥ 16 \$600 per ton, EER ≥ 18 \$750 per ton, EER ≥ 20

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

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

Natural Gas Water Heating

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

Prescriptive Lighting

Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	\$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 ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	\$50 per fixture
HID ≥ 100w Replacement with new HID ≥ 100w	\$70 per fixture

Prescriptive Lighting - LED

LED 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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Walnut Street Elementary School

Building ID: 3355089
For 12-month Period Ending: May 31, 2012[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: November 16, 2012

Facility
Walnut Street Elementary School
60 Walnut Street
Woodbury, NJ 08096

Facility Owner
Woodbury City Public School District
25 North Broad Street
Woodbury, NJ 08096

Primary Contact for this Facility
Kara Huber
25 North Broad Street
Woodbury, NJ 08096

Year Built: 1889
Gross Floor Area (ft²): 22,292

Energy Performance Rating[2] (1-100) 75

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	840,144
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	840,144

Energy Intensity[4]

Site (kBtu/ft²/yr)	38
Source (kBtu/ft²/yr)	126

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	119

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	48
National Median Source EUI	162
% Difference from National Median Source EUI	-22%
Building Type	K-12 School

Stamp of Certifying Professional

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

Meets Industry Standards[5] **for Indoor Environmental Conditions:**

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

Certifying Professional
Michael Fischette
520 South Burnt Mill Road
Voorhees, NJ 08043

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Walnut Street Elementary 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	60 Walnut Street , Woodbury, NJ 08096	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.		☐
Walnut Street Elementary School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	22,292 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	47	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	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	80 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	10(Optional)	Is this school in operation for at least 8 months of the year?		☐

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

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity		
Meter: electric (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
04/02/2012	05/01/2012	14,280.00
03/02/2012	04/01/2012	19,920.00
02/02/2012	03/01/2012	35,280.00
01/02/2012	02/01/2012	42,600.00
12/02/2011	01/01/2012	31,200.00
11/02/2011	12/01/2011	21,240.00
10/02/2011	11/01/2011	15,480.00
09/02/2011	10/01/2011	13,546.00
08/02/2011	09/01/2011	13,094.00
07/02/2011	08/01/2011	13,503.00
06/02/2011	07/01/2011	11,457.00
electric Consumption (kWh (thousand Watt-hours))		**231,600.00**
electric Consumption (kBtu (thousand Btu))		**790,219.20**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**790,219.20**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity 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
Walnut Street Elementary School
60 Walnut Street
Woodbury, NJ 08096

Facility Owner
Woodbury City Public School District
25 North Broad Street
Woodbury, NJ 08096

Primary Contact for this Facility
Kara Huber
25 North Broad Street
Woodbury, NJ 08096

General Information

Walnut Street Elementary School	
Gross Floor Area Excluding Parking: (ft^2)	22,292
Year Built	1889
For 12-month Evaluation Period Ending Date:	May 31, 2012

Facility Space Use Summary

Walnut Street Elementary School	
Space Type	K-12 School
Gross Floor Area (ft^2)	22,292
Open Weekends?	No
Number of PCs	47
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes
Percent Cooled	80
Percent Heated	100
Months °	10
High School?	No
School District °	woodbury

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 05/31/2012)	**Baseline** (Ending Date 05/31/2012)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	75	75	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	38	38	38	N/A	48
Source ($kBtu/ft^2$)	126	126	127	N/A	162
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/$ft^2$/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	119	119	120	N/A	153
$kgCO_2e/ft^2$/year	5	5	5	N/A	6

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

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

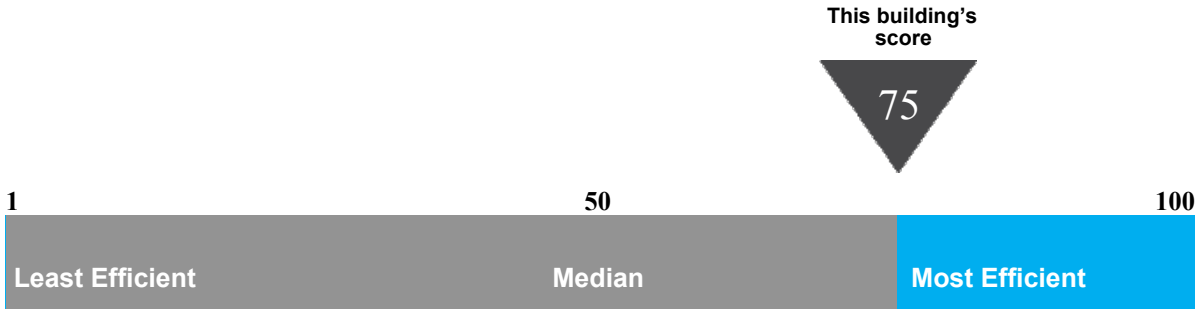
Statement of Energy Performance

2012

Walnut Street Elementary School
60 Walnut Street
Woodbury, NJ 08096

Portfolio Manager Building ID: 3355089

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 126 kBtu per square foot per year.*

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

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 11/16/2012

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Walnut Street Elementary School

Rooftop Units

Tag	RTU-1	RTU-2	
Unit Type	Packaged Electric/DX	Packaged Heat Pump	
Qty	1	1	
Location	Roof	Roof	
Area Served	Nurse's Suite/Faculty Room	All Purpose Room	
Manufacturer	Trane	Trane	
Model #	TCD075C300BC	BA-15E36PTUAAID	
Serial #	R24100005D	N07896527	
Cooling Type	DX	Heat Pump	
Cooling Capacity (Tons)	Nominal 6 Ton	15-Tons	
Cooling Efficiency (SEER/EER)	EER=10.9	EER=13.5	
Heating kW	5.6	27.0	
Heating Output (MBH)	58.6	172	
Capacity (CFM)	2,250	6,000	
Supply Fan HP	2	5	
Electrical	208/3/60	208/3/60	
Approx Age	12	6	
ASHRAE Service Life	20	20	
Remaining Life	8	14	
Comments	Economizer with Power Exhaust	Heater Model # 2HZ045E	

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Walnut Street Elementary School

SPLIT FCU's

Tag	CAH-1	CAH-2	CAH-3
Unit Type	Split Fan Coil Units	Split Fan Coil Units	Split Fan Coil Units
Qty	2	5	4
Location	Roof	Roof	Roof
Area Served	Work Room Faculty Room	Admin Offices, Conf Rm,Faculty Rm	Corridors
Manufacturer	Mitsubishi Mr. Slim	Mitsubishi Mr. Slim	Mitsubishi Mr. Slim
Indoor Unit Model #	PLA-A18AA	PLA-A24AA	PLA-A36AA
Outdoor Unit Model #	PUZ-A18NHA	PUZ-A24NHA	PUZ-A36NHA
Cooling Type	Heat Pump	Heat Pump	Heat Pump
Cooling Capacity (BTUH)	18,000	24,000	35,000
Cooling Efficiency (SEER/EER)	SEER=14.2	SEER=13.6	SEER=14.2
Heating Type	Heat Pump	Heat Pump	Heat Pump
Heating Output (BTUH)	19,000	26,000	37,000
Capacity (CFM)	1,200	1,940	1,940
Electrical	208/3/60	208/3/60	208/3/60
Approx Age	6	6	6
ASHRAE Service Life	20	20	20
Remaining Life	14	14	14
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Walnut Street Elementary School

Split Heat Pumps

Tag	HAH-6, 7	
Unit Type	Split Heat Pump	
Qty	4	
Location	Roof	
Area Served	Boys/Girls Rest Rooms, CST Offices, Corridors	
Manufacturer	Luxaire	
Model #	EABD-T036SB	
Serial #	WOL6126640,6649,6639,6648	
COOLING - Rated Output Capacity (Btu/Hr)	36,000	
HEATING - Rated Output Capacity (Btu/Hr)	36,000	
Approx. Efficiency %	SEER=13.0	
Electrical	208/3/60	
Approx Age	6	
ASHRAE Service Life	20	
Remaining Life	14	
Comments		

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Walnut Street Elementary School

Domestic Water Heaters

Tag	DHW-1	DHW
Unit Type	Electric DHW Heater	Electric DHW Heater
Qty	1	1
Location	Basement MER	Nurse's Suite
Area Served	Entire Facility	Nurse's Suite
Manufacturer	Hot Point	Bradford White
Model #	HE40M1A	_
Serial #	HP 0902B07138	_
Size (Gallons)	40	_
Input Capacity (MBH/KW)	2,855 Watts 2 Levels	_
Recovery (Gal/Hr)	53 gal/hour	_
Efficiency %	100%	100%
Fuel	Electric HW Heater	Electric HW Heater
Approx Age	10	_
ASHRAE Service Life	15	15
Remaining Life	5	_
Comments		

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Walnut Street Elementary School

Electric Unit Heaters

Tag	UH-1 & UH-2	UH-3	UH-4
Unit Type	Electric Unit Heater	Electric Unit Heater	Electric Unit Heater
Qty	7	10	6
Location	Restrooms, MER's	Stairways	MPR/Stage,Basement Mech Room
Area Served	Restrooms, MER's	Stairways	MPR/Stage,Basement Mech Room
Manufacturer	QMARK	QMARK	QMARK
Model #	MUH0321	MUH0381	MUH078
kW Rating	2/2.2	3	7.5
HEATING - Rated Output Capacity (Btu/Hr)	7,500	10,200	25,600
Rated CFM	250	350	650
Electrical	208/3/60	208/3/60	208/3/60
Approx Age	6	6	6
ASHRAE Service Life	13	13	13
Remaining Life	7	7	7
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Walnut Street Elementary School

Split Heat Pumps

Tag	VHP-4	VHP-5
Unit Type	Vertical Heat Pump	Vertical Heat Pump
Qty	10	1
Location	Classrooms	Pantry
Area Served	Classrooms	Pantry
Manufacturer	Airedale	Airedale
Model #	CHH-3	CHH-2
COOLING - Rated Output Capacity (MBH)	37.8	27.0
HEATING - Rated Output Capacity (MBH)	38.5	27.0
Auxillary Electric Heat kW	7.5	7.5
Airflow CFM	1,100	900
Approx. Efficiency %	SEER=11.0	SEER=10.7
Electrical	208/3/60	208/3/60
Approx Age	6	6
ASHRAE Service Life	20	20
Remaining Life	14	14
Comments	Includes Desicant HR Wheel	Includes Desicant HR Wheel

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

APPENDIX E

CEG Project #: 9C12054
Facility Name: Walnut Street School
Address: 60 Walnut Street
City, State, Zip Woodbury, NJ 08096

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Floor and Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
1	1. Main Office	1900	2x4, 3 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	82	6	0.49	935	Existing to Remain	Existing to Remain	3	82	0	0.49	935	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
1	1. Principal's office	1900	2x4, 3 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	82	6	0.49	935	Existing to Remain	Existing to Remain	3	82	0	0.49	935	0.00	0	$0	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	187	$32
2	1. Library	2280	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	17	1.85	4,225	Existing to Remain	Existing to Remain	4	109	0	1.85	4,225	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
3	1. Library Exits	8760	LED Exits Signs	1	2	2	0.00	35	Existing to Remain	Existing to Remain	1	2	0	0.00	35	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
2	1. Library Guidance	1900	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	4	0.44	828	Existing to Remain	Existing to Remain	4	109	0	0.44	828	0.00	0	$0	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	166	$29
2	1. Library Computer Lab	2280	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	10	1.09	2,485	Existing to Remain	Existing to Remain	4	109	0	1.09	2,485	0.00	0	$0	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	497	$86
4	1. Mechanical Room Vestibule	920	1 Lamp, Incandescent 100w, Surface Mnt., No Lens	1	100	1	0.10	92	Re-Lamp	Philips CFL Energy Saver TuffGuard 25w	1	25	1	0.03	23	0.08	69	$12	0	No New Controls	0	0.0%	0	$0
5	1. Mechanical Room	920	1x4, 2 Lamp, T8 32w, Elect Ballast, Surface Mnt., Prismatic Lens	2	58	2	0.12	107	Existing to Remain	Existing to Remain	2	58	0	0.12	107	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
6	1. Mechancial Room	920	2x4, 3 Lamp, T8 32w, Elect. Ballast, Surface Mnt., Parabolic Lens	3	82	1	0.08	75	Existing to Remain	Existing to Remain	3	82	0	0.08	75	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
7	1. Mechanical Room / Rear Room	920	1x4, 2 Lamp, T8 32w, Elect Ballast, Surface Mnt., No Lens	2	58	1	0.06	53	Existing to Remain	Existing to Remain	2	58	0	0.06	53	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
5	1. Electrical Room	920	1x4, 2 Lamp, T8 32w, Elect Ballast, Surface Mnt., Prismatic Lens	2	58	4	0.23	213	Existing to Remain	Existing to Remain	2	58	0	0.23	213	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
8	1. Electrical Room Storage	920	2x2, 2 U-Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	73	1	0.07	67	Existing to Remain	Existing to Remain	2	73	0	0.07	67	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
2	1. Electrical Room Lavatory	380	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	1	0.11	41	Existing to Remain	Existing to Remain	4	109	0	0.11	41	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
2	1. First Floor Hallway	3460	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	6	0.65	2,263	Existing to Remain	Existing to Remain	4	109	0	0.65	2,263	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
2	2. Office	1900	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	2	0.22	414	Existing to Remain	Existing to Remain	4	109	0	0.22	414	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
9	2. Custodian Closet	920	1 Lamp, Incandescent 100w, Pendant Mnt., No Lens	1	100	1	0.10	92	Re-Lamp	Philips CFL Energy Saver TuffGuard 25w	1	25	1	0.03	23	0.08	69	$12	0	No New Controls	0	0.0%	0	$0
8	2. Corridor	3460	2x2, 2 U-Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	73	2	0.15	505	Existing to Remain	Existing to Remain	2	73	0	0.15	505	0.00	0	$0	0	No New Controls	0	0.0%	0	$0

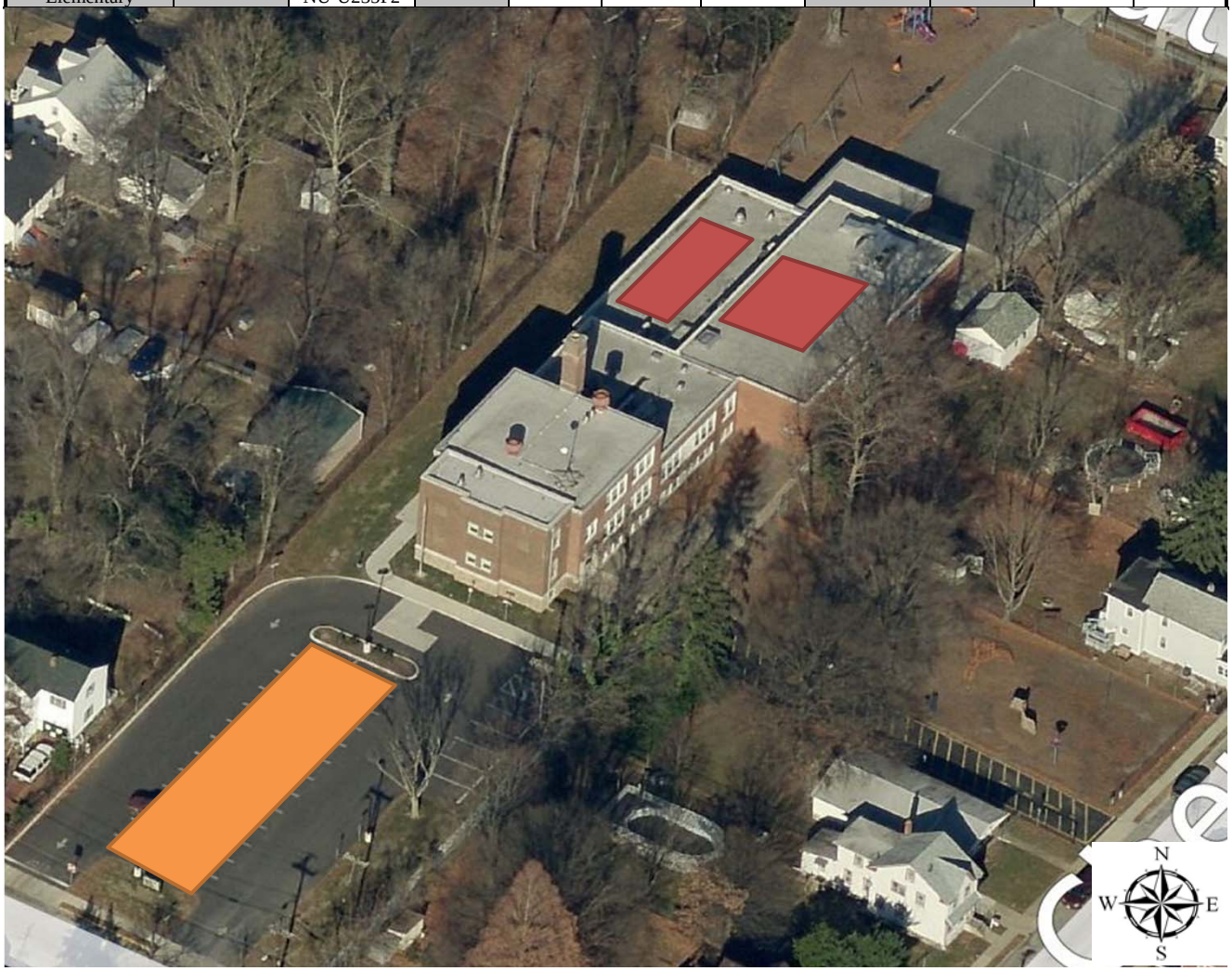
			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Floor and Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
2	2. Men's Lavatory	2660	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	2	0.22	580	Existing to Remain	Existing to Remain	4	109	0	0.22	580	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
10	2. Classroom 2	2660	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	21	1.22	3,240	Existing to Remain	Existing to Remain	2	58	0	1.22	3,240	0.00	0	$0	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	648	$112
2	2. Classroom 3	2660	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	10	1.09	2,899	Existing to Remain	Existing to Remain	4	109	0	1.09	2,899	0.00	0	$0	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	580	$100
10	2. Classroom 4	2660	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	21	1.22	3,240	Existing to Remain	Existing to Remain	2	58	0	1.22	3,240	0.00	0	$0	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	648	$112
2	2.. Faculty Lounge 5	2280	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	8	0.87	1,988	Existing to Remain	Existing to Remain	4	109	0	0.87	1,988	0.00	0	$0	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	398	$69
2	2. Nurse	1900	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	7	0.76	1,450	Existing to Remain	Existing to Remain	4	109	0	0.76	1,450	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
2	2. Nurse Sick Room	1900	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	1	0.11	207	Existing to Remain	Existing to Remain	4	109	0	0.11	207	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
13	2. Nurse Lavatory	380	2x4, 2 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	58	1	0.06	22	Existing to Remain	Existing to Remain	2	58	0	0.06	22	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
5		380	1x4, 2 Lamp, T8 32w, Elect Ballast, Surface Mnt., Prismatic Lens	2	58	1	0.06	22	Existing to Remain	Existing to Remain	2	58	0	0.06	22	0.00	0	$0				0.0%	0	$0
10	2. Stage	2660	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	6	0.35	926	Existing to Remain	Existing to Remain	2	58	0	0.35	926	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
10	2. Classroom 6	2660	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	20	1.16	3,086	Existing to Remain	Existing to Remain	2	58	0	1.16	3,086	0.00	0	$0	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	617	$107
11	2. Classroom 6 Sink Light	380	12"x12", 1 Lamp, Incandescent 100w, Recessed Mnt., Prismatic Lens	1	100	1	0.10	38	Re-Lamp	Philips CFL Energy Saver 26w Mini Twister	1	26	1	0.03	10	0.07	28	$5	0	No New Controls	0	0.0%	0	$0
12	2. Classroom 6 Lavatory	380	1 Lamp, Incandescent 100w, Surface Mnt., Globe	1	100	1	0.10	38	Re-Lamp	Philips CFL Energy Saver 26w Mini Twister	1	26	1	0.03	10	0.07	28	$5	0	No New Controls	0	0.0%	0	$0
10	2. Classroom 7	2660	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	20	1.16	3,086	Existing to Remain	Existing to Remain	2	58	0	1.16	3,086	0.00	0	$0	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	617	$107
11	2. Classroom 7 Sink Light	380	12"x12", 1 Lamp, Incandescent 100w, Recessed Mnt., Prismatic Lens	1	100	1	0.10	38	Re-Lamp	Philips CFL Energy Saver 26w Mini Twister	1	26	1	0.03	10	0.07	28	$5	0	No New Controls	0	0.0%	0	$0
12	2. Classroom 7 Lavatory	380	1 Lamp, Incandescent 100w, Surface Mnt., Globe	1	100	1	0.10	38	Re-Lamp	Philips CFL Energy Saver 26w Mini Twister	1	26	1	0.03	10	0.07	28	$5	0	No New Controls	0	0.0%	0	$0
13	2. Kitchen	1900	2x4, 2 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	58	4	0.23	441	Existing to Remain	Existing to Remain	2	58	0	0.23	441	0.00	0	$0	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	88	$15
5		1900	1x4, 2 Lamp, T8 32w, Elect Ballast, Surface Mnt., Prismatic Lens	2	58	3	0.17	331	Existing to Remain	Existing to Remain	2	58	0	0.17	331	0.00	0	$0				0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Floor and Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
9	2. Kitchen Storage	920	1 Lamp, Incandescent 100w, Pendant Mnt., No Lens	1	100	1	0.10	92	Re-Lamp	Philips CFL Energy Saver TuffGuard 25w	1	25	1	0.03	23	0.08	69	$12	0	No New Controls	0	0.0%	0	$0
14	2. Custodian Closet	920	1 Lamp, Incandescent 100w, Pendant Mnt., Glass Lens	1	100	1	0.10	92	Re-Lamp	Philips CFL Energy Saver 26w Mini Twister	1	26	1	0.03	24	0.07	68	$12	0	No New Controls	0	0.0%	0	$0
13	2. Men's Lavatory	2660	2x4, 2 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	58	2	0.12	309	Existing to Remain	Existing to Remain	2	58	0	0.12	309	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
5	2. Men's Lavatory	2660	1x4, 2 Lamp, T8 32w, Elect Ballast, Surface Mnt., Prismatic Lens	2	58	1	0.06	154	Existing to Remain	Existing to Remain	2	58	0	0.06	154	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
13	2. Women's Lavatory	2660	2x4, 2 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	58	2	0.12	309	Existing to Remain	Existing to Remain	2	58	0	0.12	309	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
5	2. Women's Lavatory	2660	1x4, 2 Lamp, T8 32w, Elect Ballast, Surface Mnt., Prismatic Lens	2	58	1	0.06	154	Existing to Remain	Existing to Remain	2	58	0	0.06	154	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
13	2. Vestibule	3460	2x4, 2 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	58	1	0.06	201	Existing to Remain	Existing to Remain	2	58	0	0.06	201	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
13	2. Corridor by Lavatories	3460	2x4, 2 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	58	3	0.17	602	Existing to Remain	Existing to Remain	2	58	0	0.17	602	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
15	2. Corridor by Lavatories	3460	CFL (2) 7w, Exit Lamp	1	20	2	0.04	138	Replace	LED Exit Sign	1	4	2	0.01	28	0.03	111	$19	0	No New Controls	0	0.0%	0	$0
13	2. Corridor by All Purpose Room	3460	2x4, 2 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	58	6	0.35	1,204	Existing to Remain	Existing to Remain	2	58	0	0.35	1,204	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
17	2. All Purpose Room	800	24", Metal Halide 250w, Magnetic Ballast, Pendant Mnt., Prismatic Lens	1	295	8	2.36	1,888	Replace	2x4 54w T5HO 4 Lamp w/Reflector, Lightolier TriLyte #FH4C5DVI454UNV	4	236	8	1.89	1,510	0.47	378	$65	0	No New Controls	0	0.0%	0	$0
13	2. Corridor by Stage	3460	2x4, 2 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	58	2	0.12	401	Existing to Remain	Existing to Remain	2	58	0	0.12	401	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
10	2. Stair 3 (2nd Floor)	3680	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	2	0.12	427	Existing to Remain	Existing to Remain	2	58	0	0.12	427	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
5	2. Stair 3 (1st Floor)	3680	1x4, 2 Lamp, T8 32w, Elect Ballast, Surface Mnt., Prismatic Lens	2	58	1	0.06	213	Existing to Remain	Existing to Remain	2	58	0	0.06	213	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
5	2. Corridor by 4/5	3460	1x4, 2 Lamp, T8 32w, Elect Ballast, Surface Mnt., Prismatic Lens	2	58	3	0.17	602	Existing to Remain	Existing to Remain	2	58	0	0.17	602	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
10	2. Corridor by 2/3	3460	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	3	0.17	602	Existing to Remain	Existing to Remain	2	58	0	0.17	602	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
2	3. Corridor by Girls' Lavatory	3460	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	2	0.22	754	Existing to Remain	Existing to Remain	4	109	0	0.22	754	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
2	3. Office	1900	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	2	0.22	414	Existing to Remain	Existing to Remain	4	109	0	0.22	414	0.00	0	$0	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Floor and Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
2	3. Girls' Lavatory	2660	2x4, 4 Lamp, T8 32w, Elect. Ballast, Recessed Mnt., Primatic Lens	4	109	2	0.22	580	Existing to Remain	Existing to Remain	4	109	0	0.22	580	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
3	3. Corridor by Girls' Lavatory Exit	3460	LED Exits Signs	1	2	1	0.00	7	Existing to Remain	Existing to Remain	1	2	0	0.00	7	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
18	3. Storage Room	920	2x4, 4 Lamp, T8 32w, Elect. Ballast, Pendant Mnt., Primatic Lens	4	109	1	0.11	100	Existing to Remain	Existing to Remain	4	109	0	0.11	100	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
10	3. Classroom 10	2660	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	21	1.22	3,240	Existing to Remain	Existing to Remain	2	58	0	1.22	3,240	0.00	0	$0	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	648	$112
10	3. Classroom 11	2660	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	21	1.22	3,240	Existing to Remain	Existing to Remain	2	58	0	1.22	3,240	0.00	0	$0	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	1	20.0%	648	$112
10	3. Corridor	3460	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	2	0.12	401	Existing to Remain	Existing to Remain	2	58	0	0.12	401	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
10	Stairway 2 (3rd Floor)	3680	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	2	0.12	427	Existing to Remain	Existing to Remain	2	58	0	0.12	427	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
10	Stairway 2 (2nd Floor)	3680	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	2	0.12	427	Existing to Remain	Existing to Remain	2	58	0	0.12	427	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
5	Stairway 2 (1st Floor)	3680	1x4, 2 Lamp, T8 32w, Elect Ballast, Surface Mnt., Prismatic Lens	2	58	1	0.06	213	Existing to Remain	Existing to Remain	2	58	0	0.06	213	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
10	Stairway 1 (3rd Floor)	3680	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	1	0.06	213	Existing to Remain	Existing to Remain	2	58	0	0.06	213	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
19	Stairway 1 (3rd Floor)	3680	1x4, 4 Lamp, T8 32w, Elect. Ballast, Pendant Mnt. Prismatic Lens	2	109	1	0.11	401	Existing to Remain	Existing to Remain	2	109	0	0.11	401	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
10	Stairway 1 (2nd Floor)	3680	1x4, 2 Lamp, T8 32w, Elect Ballast, Pendant Mnt., Prismatic Lens	2	58	2	0.12	427	Existing to Remain	Existing to Remain	2	58	0	0.12	427	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
5	Stairway 1 (1st Floor)	3680	1x4, 2 Lamp, T8 32w, Elect Ballast, Surface Mnt., Prismatic Lens	2	58	1	0.06	213	Existing to Remain	Existing to Remain	2	58	0	0.06	213	0.00	0	$0	0	No New Controls	0	0.0%	0	$0
20	Exterior	3120	1 Lamp, 175w Metal Halide, Mag. Ballast, Wall Pack, Exterior	1	213	9	1.92	5,981	Replace Fixture	90w LED Wall Pack	1	90	9	0.81	2,527	1.11	3,454	$598	0	No New Controls	0	0.0%	0	$0
21	Exterior	3120	1 Lamp, 100w Metal Halide, Mag. Ballast, Wall Pack, Exterior	1	125	2	0.25	780	Replace Fixture	60w LED Wall Pack	1	60	2	0.12	374	0.13	406	$70	0	No New Controls	0	0.0%	0	$0
22	Exterior	3120	1 Lamp, 100w Incand., Recessed Downlight, Exterior	1	100	2	0.20	624	Re-Lamp	Philips CFL Energy Saver 26w Mini Twister	1	26	2	0.05	162	0.15	462	$80	0	No New Controls	0	0.0%	0	$0
	TOTAL					**310**	**26**	**60,868**					**31**	**23**	**55,671**	**2**	**5,197**	**899**			**12**	**2**	**5,741**	**993**

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
Walnut Street Elementary	5125	SHARP NU-U235F2	272	17.5	4,771	63.92	77,019	51.8	11,397	13.40



= Proposed Roof PV Layout = Proposed Parking PV Layout

Notes:

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

Project Name: **LGEA Solar PV Project - Walnut Street Elementary**
Location: **Woodbury, NJ**
Description: **Photovoltaic System 100% Financing - 15 year**

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$428,150
Annual kWh Production	77,019
Annual Energy Cost Reduction	$13,324
Average Annual SREC Revenue	$14,717

Simple Payback: **15.27** Years

Life Cycle Cost Analysis

Analysis Period (years): 15
Discount Rate: 3%
Average Energy Cost ($/kWh) **$0.173**
Financing Rate: 6.00%
Financing %: 100%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
Average SREC Value ($/kWh) $0.191

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$0	0	0	0	$0	0	0	0	0
1	$0	77,019	$13,324	$0	$19,255	$25,195	$18,161	($10,777)	($10,777)
2	$0	76,634	$13,724	$0	$19,158	$24,075	$19,281	($10,473)	($21,250)
3	$0	76,251	$14,136	$0	$19,063	$22,886	$20,470	($10,157)	($31,407)
4	$0	75,869	$14,560	$0	$18,967	$21,623	$21,733	($9,828)	($41,236)
5	$0	75,490	$14,997	$778	$18,873	$20,283	$23,073	($10,264)	($51,500)
6	$0	75,113	$15,447	$774	$15,023	$18,860	$24,496	($13,660)	($65,160)
7	$0	74,737	$15,910	$770	$14,947	$17,349	$26,007	($13,268)	($78,428)
8	$0	74,363	$16,387	$766	$14,873	$15,745	$27,611	($12,862)	($91,290)
9	$0	73,992	$16,879	$762	$14,798	$14,042	$29,314	($12,441)	($103,730)
10	$0	73,622	$17,385	$758	$11,043	$12,234	$31,122	($15,686)	($119,416)
11	$0	73,254	$17,907	$755	$10,988	$10,314	$33,042	($15,215)	($134,631)
12	$0	72,887	$18,444	$751	$10,933	$8,276	$35,079	($14,729)	($149,361)
13	$0	72,523	$18,997	$747	$10,878	$6,113	$37,243	($14,227)	($163,588)
14	$0	72,160	$19,567	$743	$7,216	$3,816	$39,540	($17,316)	($180,903)
15	$0	71,799	$20,154	$740	$7,180	$1,377	$41,979	($16,761)	($197,664)
	Totals:	1,115,713	$247,817	$8,342	$213,196	$222,185	$428,150	($197,664)	($1,440,340)

Net Present Value (NPV) **($145,165)**