NEW BRUNSWICK
BOARD OF EDUCATION

MCKINLEY COMMUNITY SCHOOL

15 VAN DYKE AVENUE
NEW BRUNSWICK, NJ 08901

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:	None

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: 778010688
Account # 42 003 671 06
Third Party Utility Direct Energy
TPS Meter / Acct No: N/A

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Nov-11	104,604	236.7	$12,392
Dec-11	94,400	233.6	$12,137
Jan-12	75,840	230.4	$9,991
Feb-12	82,240	236.8	$10,756
Mar-12	77,120	307.2	$10,407
Apr-12	94,400	291.2	$12,357
May-12	153,600	483.2	$24,004
Jun-12	158,720	100.0	$23,765
Jul-12	94,400	329.6	$15,347
Aug-12	96,320	422.4	$16,696
Sep-12	88,000	313.6	$11,824
Oct-12	56,320	233.6	$7,807
Totals	**1,175,964**	**483.2 Max**	**$167,484**

AVERAGE DEMAND **284.9 KW average**
AVERAGE RATE **$0.142 $/kWh**

Figure 1
Electricity Usage Profile

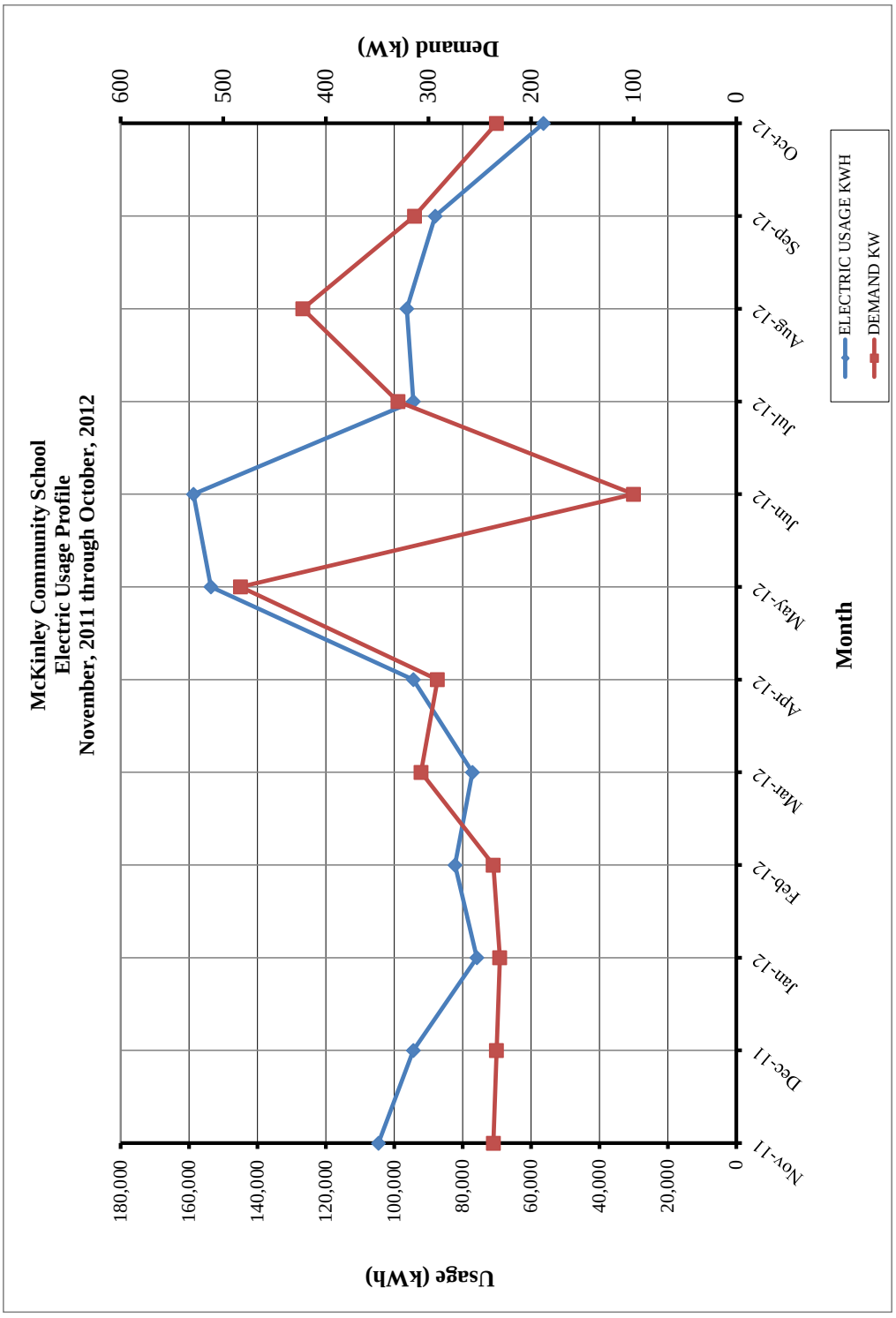
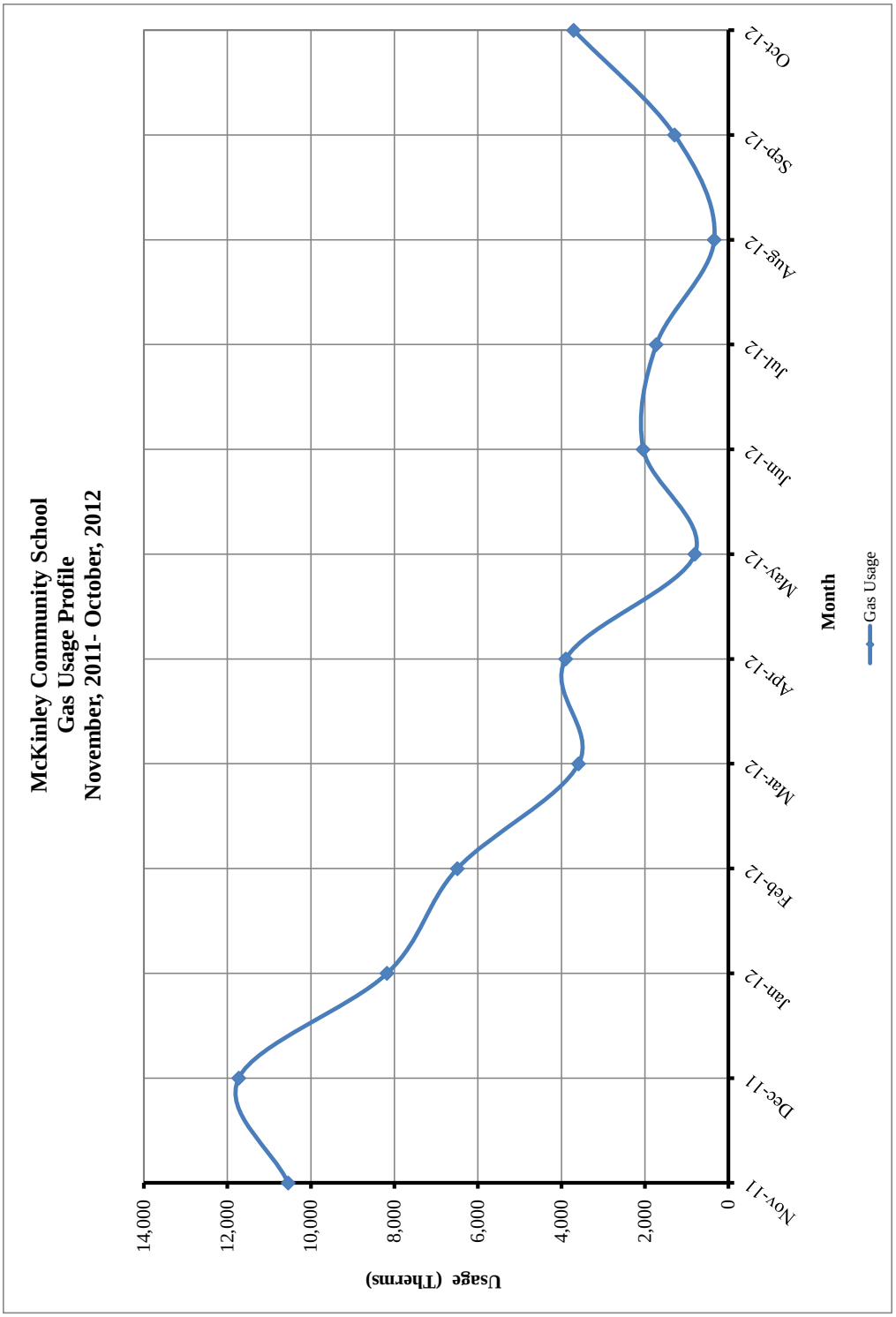


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	PSE&G	
Rate:	LVG	
Meter No:	2600317	
Point of Delivery ID:	PG000008517583443932	
Third Party Utility Provider:	N/A	
TPS Meter No:	N/A	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Nov-11	10,543.00	$10,099.03
Dec-11	11,728.00	$10,902.51
Jan-12	8,175.00	$7,594.77
Feb-12	6,491.60	$6,081.50
Mar-12	3,588.00	$2,215.79
Apr-12	3,894.00	$2,310.12
May-12	801.00	$600.30
Jun-12	2,039.00	$1,409.47
Jul-12	1,727.00	$1,267.00
Aug-12	339.00	$330.14
Sep-12	1,290.00	$975.49
Oct-12	3,707.00	$4,568.37
TOTALS	**54,322.60**	**$48,354.49**
AVERAGE RATE:	**$0.89**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

The McKinley Community School is located at 15 Van Dyke Avenue in New Brunswick, New Jersey. The 124,000 Elementary School was built in 1954 with an addition constructed in 1994. The building is a single-story structure and consists of office space for administrative use, gymnasium, community room, classrooms, kitchen, media center, cafeteria and mechanical rooms. There is a second story over the "100" wing classrooms consisting of ten (10) classrooms.

Occupancy Profile

The typical hours of operation for the McKinley Community School are Monday through Friday between 8:50 am and 3:15 pm. The school is used for evening recreation from 6:00pm to 9:00 pm. The custodial services start at 7:00 am and run until 11:00 pm. The gymnasium in the school is also used on Saturdays from 10:00 am to 2:00 pm. The elementary school has a student population of 713 present for 10 months, and a year round occupancy of 68 administrative staff.

Building Envelope

Exterior walls for the original section of McKinley Community School are a 6" brick with concrete block interior. The amount of insulation within the walls is unknown. The exterior walls of the newer addition are a colored concrete masonry block with drywall interior walls. The amount of insulation within the walls is unknown, but based on the date of construction; it is assumed that there is 6" of insulation within the wall cavity. The windows throughout the school are in good condition and are double pane insulated windows with aluminum frames. Blinds are utilized throughout the school per occupant comfort. The roof is a flat, built up rubber roof with a stone covering over the original building. The roof over the newer addition is flat; EPDM roofing system. The amount of insulation below the roof is unknown. The roofing appears to be in good condition.

Heating Plant

Heating is provided to the facility from the Mechanical Room which houses three (3) natural gas fired, cast iron sectional hot water boilers made by Weil McLain. Two of the boilers are original to the building and are each rated for a natural gas input of 3,073 MBH and an output rating of 2,156.5 MBH. These boilers have an estimated efficiency of 70%. These boilers are approximately 35 years old and have reached the end of their useful service life, as defined by ASHRAE. The third boiler was installed in 1994 as part of the addition. This boiler is rated for a natural gas input of 5,845 MBH and an output of 4,035 MBH. This boiler also has an efficiency rating of 70%. This boiler is 19 years old and is still within its useful service life, as defined by ASHRAE. The entire boiler plant is an ideal candidate for replacement with a new, high efficiency condensing boiler plant.

The heating hot water is circulated throughout the building via two 30 HP, constant speed end-suction pumps located in the Mechanical Room. These pumps are driven with NEMA premium efficient motors. The hot water heating system provides heating hot water to the classroom unit ventilators and building air handling units.

Cooling Plant

Cooling is provided to the school from the Mechanical Room which houses two (2) centrifugal, water cooled chillers. These chillers were installed in 1994 as part of the building addition. These chillers are both Trane Centravac model chillers. Chiller #1 is rated for 215 Tons of cooling and Chiller #2 is rated for 255 Tons of cooling. Based on the overall size of the building, these chillers operated in parallel and are staged to handle the building load. Chilled water is circulated throughout the building via two (2) 40 HP, constant speed, base mounted, end suction pumps. Pump #1 is for Chiller #1 and is rated for 580 GPM; Pump #2 is for Chiller #2 and is rated for 690 GPM. These pumps are driven with NEMA premium efficient motors. Chilled water is circulated throughout the building to the classroom unit ventilators and air handling units. Bother chillers are 19 years old and are approaching the end of their useful service life, as defined by ASHRAE.

The condenser water is served by two (2) closed cell cooling towers, located at grade outside of the mechanical room. These cooling towers are Baltimore Air Coil Model VTL. Cooling Tower #1 serves Chiller #1 and has a single 40 HP fan. Cooling Tower #2 serves Chiller #2 and has a single 50 HP fan. The condenser water is circulated between the chillers and the cooling towers via two (2) constant speed, end suction pumps. Pump #3 serves Chiller #1 and Cooling Tower #1. This pump has a 10 HP NEMA premium efficiency motor and is rated for 629 GPM. Pump #4 serves Chiller #2 and Cooling Tower #2. This pump has a 20 HP NEMA premium efficiency motor and is rated for 789 GPM. The cooling towers are 19 years old and are approaching the end of their useful service life, per ASHRAE Standards.

HVAC Systems

The classrooms of the school are served by hydronic unit ventilators. These units are equipped with both hot and chilled water coils for heating and cooling. Most of the units are equipped with constant volume 3-way valves .

Common areas, such as the Gymnasium and Library are served by indoor, central station air handling units with chilled and hot water coils. The corridors and restrooms are served by above ceiling hydronic heating only fan coil units.

Exhaust System

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

HVAC System Controls

The HVAC systems within the McKinley Community School are controlled a Trane Tracer control system. This system has the ability to be remotely accessed via modem installed in the control panel that provides supervisory control and monitoring.

Domestic Water

The domestic cold water system is served by a duplex booster pump skid, by Canariis. This skid has two (2) 5 HP pumps. This skid is approximately 19 years old, and can be replaced with a newer duplex pumping skid with variable frequency drives.

Domestic Hot Water

The main source of domestic hot water for McKinley Community School is an PVI Industries 540 MBH gas fired water heater with an integrated storage capacity of 250 gallons.

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	Gym Lighting Upgrade	$18,340	$1,551	11.8	26.8%
ECM #2	Lighting Controls Upgrade	$15,725	$3,515	4.5	235.3%
ECM #3	Domestic Hot Water Replacement	$21,950	$998	22.0	-45.4%
ECM #4	Boiler Replacement	$248,465	$9,846	25.2	-0.9%
ECM #5	Computer Automatic Standby or Hibernate Modes	$2,084	$2,740	0.8	557.3%
ECM #6	Chilled Water Pump VFD	$74,308	$2,571	28.9	-48.1%
ECM #7	Hot Water Pump VFD	$71,956	$2,332	30.9	-51.4%
ECM #8	Domestic Hot Water Booster Skid/VFD	$22,310	$1,474	15.1	32.1%
ECM #9	Chiller Replacement	$202,725	$4,548	44.6	-48.4%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	199.99 KW PV System	$1,200,552	$76,975	15.6	-3.8%
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	Gym Lighting Upgrade	4.2	10,920	-
ECM #2	Lighting Controls Upgrade	-	24,753	-
ECM #3	Domestic Hot Water Replacement	-	-	1,121
ECM #4	Boiler Replacement	-	-	11,063
ECM #5	Computer Automatic Standby or Hibernate Modes	-	19,294	-
ECM #6	Chilled Water Pump VFD	-	18,108	-
ECM #7	Hot Water Pump VFD	-	16,421	-
ECM #8	Domestic Hot Water Booster Skid/VFD	-	10,379	-
ECM #9	Chiller Replacement	29.1	32,026	-
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
REM #1	199.99 KW PV System	200.0	231,098	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**
Gym Lighting Upgrade	$1,551	$21,140	$2,800	$18,340	11.8
Lighting Controls Upgrade	$3,515	$17,300	$1,575	$15,725	4.5
~~Domestic Hot Water Replacement~~	~~$998~~	~~$23,000~~	~~$1,050~~	~~$21,950~~	~~22.0~~
Boiler Replacement	$9,846	$248,465	$0	$248,465	25.2
Computer Automatic Standby or Hibernate	$2,740	$2,084	$0	$2,084	0.8
Chilled Water Pump VFD	$2,571	$74,308	$0	$74,308	28.9
~~Hot Water Pump VFD~~	~~$2,332~~	~~$71,956~~	~~$0~~	~~$71,956~~	~~30.9~~
Domestic Hot Water Booster Skid/VFD	$1,474	$22,310	$0	$22,310	15.1
~~Chiller Replacement~~	~~$4,548~~	~~$226,375~~	~~$23,650~~	~~$202,725~~	~~44.6~~
Design / Construction Extras (15%)	*$0*	*$57,841*	*$0*	*$57,841*	
Total Project	**$21,696**	**$443,448**	**$4,375**	**$439,073**	**20**

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

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

ECM #1: Lighting Upgrade – Gymnasium

Description:

The gymnasium at McKinley Community School is currently lit via Twenty-eight 400W Metal Halide 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 lighting system.

This measure replaces all the HID, 400 W HID MH fixtures with a well-designed T5HO lighting system. Twenty-eight, 54 watt, 6-Lamp T5HO fixtures 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 #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$21,140
NJ Smart Start Equipment Incentive ($):	$2,800
Net Installation Cost ($):	$18,340
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,551
Total Yearly Savings ($/Yr):	$1,551
Estimated ECM Lifetime (Yr):	15
Simple Payback	11.8
Simple Lifetime ROI	26.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$23,260
Internal Rate of Return (IRR)	3%
Net Present Value (NPV)	$171.44

ECM #2: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the McKinley Community 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 #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$17,300
NJ Smart Start Equipment Incentive ($):	$1,575
Net Installation Cost ($):	$15,725
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$3,515
Total Yearly Savings ($/Yr):	$3,515
Estimated ECM Lifetime (Yr):	15
Simple Payback	4.5
Simple Lifetime ROI	235.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$52,725
Internal Rate of Return (IRR)	21%
Net Present Value (NPV)	$26,236.64

ECM #3: High Efficiency Gas Hot Water Heater

Description:

The McKinley Community School has one PVI gas-fired hot water heater that serves the entirety of the building.

This ECM will replace the original gas fired domestic water heaters with Natural Gas fired 97% thermal efficient PVI Conquest condensing water boiler. The unit will be replaced with a 600 MBH and 130 gallon heater. (Before proceeding with installation of aforementioned system, Concord Engineering suggests consulting a plumber to evaluate the system fully.)

Energy Savings Calculations:

DOM. HOT WATER HEATER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Gas Hot Water Heater	High Efficiency Heater	
Building Type	Education		
Building Square-foot	124,000	124,000	
Domestic Water Usage, kBtu	644,800.00	644,800.00	
DHW Heating Fuel Type	Gas	Gas	
Heating Efficiency	83%	97%	14%
Total Usage (kBTU)	776,867	664,742	112,125
Nat Gas Cost ($/Therm)	$ 0.890	$ 0.890	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	7,769	6,647	1,121
Energy Cost ($)	$6,914	$5,916	$998
COMMENTS:	Savings are based on Energy Information Administration Commercial Building Energy Consumption Survey 2003 Information		

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

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

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

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

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$23,000
NJ Smart Start Equipment Incentive ($):	$1,050
Net Installation Cost ($):	$21,950
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$998
Total Yearly Savings ($/Yr):	$998
Estimated ECM Lifetime (Yr):	12
Simple Payback	22.0
Simple Lifetime ROI	-45.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$11,975
Internal Rate of Return (IRR)	-8%
Net Present Value (NPV)	($12,016.76)

ECM #4: Condensing Boiler Installation

Description:

There are three existing Weil McLain boilers which are used as the primary source of heat for McKinley Community School. The two PL-1286 boilers are original to the building and until the new boiler was installed in 1994, they were the primary source for the original building only. Currently all three boilers are connected to the same loop and serve the original building as well as the addition. The older boilers are approximately 35 years old and have surpassed their life expectancy of a typical cast iron boiler and should be considered for replacement but the newest boiler is only 19 years old and is still within the recommended ASHRAE service life. With the increased efficiency of the condensing boilers, the savings can be substantial.

New condensing boilers could substantially improve the operating efficiency of the heating system of the building. Condensing boiler's peak efficiency tops out at 99% depending on return water temperature. Due to the operating conditions of the building, the annual average operating efficiency of the proposed condensing boiler is expected to be 92%. The existing boilers efficiencies are approximately 70%, which makes the condensing boilers a 22% increase in efficiency. This ECM is based on variable supply water temperature adjusted based on outdoor temperature.

This ECM includes installation of one condensing gas fired boiler to replace the existing two Weil McLain cast iron boilers. The basis for this ECM is Aerco condensing boiler; model number BMK – 6000. The boiler installation is based on a one for one replacement based on capacity of the existing boilers. To effectively retrofit the school with the best possible option in replacement, Concord Engineering suggests replacing the two existing PL-1286 boilers with the BMK-6000 while keeping the existing Weil McLain model 1888 boiler in operation for back-up or when the building calls for additional load. Concord Engineering suggests New Brunswick BOE conduct a full load calculation on the McKinley Community School to confirm current loading conditions.

Energy Savings Calculations:

Total Gas Therms Used:	54,323 Therms
Baseline Hot Water Gas Use:	8,060 Therms
Boiler Section:	54,323 Therms – 8,060 Domestic HW = 46,263 Therms

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

$$Proposed\ Heating\ Gas\ Usage = \frac{Bldg\ Heat\ Required\ (BTU)}{Heating\ Eff.(\%) \times Fuel\ Heat\ Value\left(\frac{BTU}{Therm}\right)}$$

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

CONDENSING BOILER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Cast Iron Boilers	New Condensing Boilers	
Existing Nat Gas (Therms)	46,263	0	
Boiler Efficiency (%)	70%	92%	22%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	
Equivalent Building Heat Usage (MMBTUs)	3,238	3,238	
Gas Cost ($/Therm)	0.89	0.89	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	46,263	35,200	11,063
Energy Cost ($)	$41,174	$31,328	$9,846
COMMENTS:			

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

From the **NJ Smart Start Appendix**, the installation of new condensing boilers warrants the following incentive: $1.00 per MBH.

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$90,188
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$90,188
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,687
Total Yearly Savings ($/Yr):	$1,687
Estimated ECM Lifetime (Yr):	15
Simple Payback	53.5
Simple Lifetime ROI	-71.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$25,308
Internal Rate of Return (IRR)	-13%
Net Present Value (NPV)	($70,045.60)

ECM #5: Set Computers to Automatic Stand-by or Hibernate Modes

Description:

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

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

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

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

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

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

Energy Savings Calculations:

No. of CRT Computers:	125
Operating Weeks per Yr:	42
Estimated percentage of computers left ON over night:	75%

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

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

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

Implementation Costs: = # Computers X Configuration Time X Cost per Hour
= 125 Monitors X 10 Minutes/Computer X $100 per Hour

= $2,084

AUTOMATIC SLEEP OR HIBERNATE MODES FOR COMPUTERS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Manual Operation	Auto Power Save	-
# of Computers	125	125	-
% Computers left ON	75%	75%	-
Power when left ON (Watt)	50	50	-
Power at Stand-by (Watt)	5	5	-
Power at Hibernate (Watt)	4	4	-
Power when OFF (Watt)	0	0	-
Operating Weeks per Yr	42	42	-
Operating Hours per Week	168	168	-
Hours/Wk Computers ON	120	20	-
Hours/Wk at Sleep Mode	0	20	-
Hours/Wk at Hibernate Mode	0	80	-
Hours/Wk at Power Down	48	48	-
Elec Cost ($/kWh)	0.142	0.142	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	23,625	4,331	19,294
Energy Cost ($)	$3,355	$615	$2,740
COMMENTS:	Calculation assumes computers currently run throughout work week and get shut down over the weekend.		

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$2,084
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$2,084
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,740
Total Yearly Savings ($/Yr):	$2,740
Estimated ECM Lifetime (Yr):	5
Simple Payback	0.8
Simple Lifetime ROI	557.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$13,699
Internal Rate of Return (IRR)	129%
Net Present Value (NPV)	$10,463.08

ECM #6: Install VFD on Chilled Water Pumps

Description:

The McKinley Community School's chilled water pumps operate as constant speed pumps regardless of the cooling demand of the system. The installation of a variable flow pumping system will allow the pumps to monitor differential pressure in the system in order to vary the speed of the pumps to reduce flow during low demand periods on the system.

This ECM includes the installation of Variable Frequency Drives on the two (2) 40 horsepower existing chilled water pumps. The VFD control is based on a differential pressure sensor in the water loop to measure demand for water.

Energy Savings Calculations:

$$\text{Pump Power HP} = \frac{\text{Flow}_{\text{GPM}} \times \text{Head}_{\text{ft-hd.}}}{3650 \times \eta_{\text{Pump}} \times \eta_{\text{motor}}}$$

$$\text{Energy Consumption (kWh)} = \text{Motor HP} \times 0.746 \frac{\text{kW}}{\text{HP}} \times \text{Hours of operation (Hr)} \times \frac{1}{\eta_{\text{motor}}}$$

$$\text{Total Energy Consumption (kWh)} = \sum \text{Energy Consumption of Each Motor}$$

$$\text{Energy Cost (\$)} = \text{Total Comsumption(kWh)} \times \text{Average Cost of Electric} \left(\frac{\$}{\text{kWh}}\right)$$

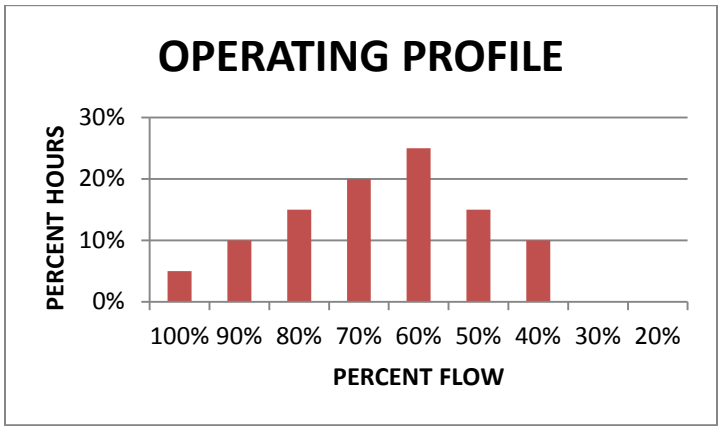
Affinity Laws are used in order to calculate energy savings by calculating the reduced power consumption requirement based a reduction in flow. Affinity laws, are as following:

Q = Flow, n = RPM, p = total pressure

$$\frac{Q_2}{Q_1} = \frac{n_2}{n_1} \qquad \frac{p_2}{p_1} = \left(\frac{n_2}{n_1}\right)^2 \qquad \frac{HP_2}{HP_1} = \left(\frac{n_2}{n_1}\right)^3$$

CHILLER PUMPS VFD CALULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	Throttle	VFD	-
Motor Nameplate HP	40.0	40.0	
Flow (GPM)	580	580	-
Head (Ft)	122	122	-
Pump Efficiency (%)	75.0%	75.0%	-
Motor Efficiency (%)	94.1%	94.1%	0.0%
Operating Hrs	2000	2000	-
Estimated Power (HP)	25.3	25.3	0.00
Elec Cost ($/kWh)	0.142	0.142	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	40,144	22,036	18,108
Electric Energy Cost ($)	$5,700	$3,129	$2,571
COMMENTS:			

Estimated Operating Profile with VFD



Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$74,308
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$74,308
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,571
Total Yearly Savings ($/Yr):	$2,571
Estimated ECM Lifetime (Yr):	15
Simple Payback	28.9
Simple Lifetime ROI	-48.1%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$38,570
Internal Rate of Return (IRR)	-7%
Net Present Value (NPV)	($43,611.40)

ECM #7: Install VFD on Hot Water Pumps

Description:

The McKinley Community School currently has 30 horsepower hot water pumps to distribute heating water to the air handling units for the large open spaces and unit ventilators for the classroom and office spaces. The existing pumps operate at constant flow and ride the pump curve only.

This ECM includes the installation of Variable Frequency Drives on the two (2) 30 horsepower existing hot water pumps. The VFD control is based on a differential pressure sensor in the water loop to measure demand for water.

Energy Savings Calculations:

$$\text{Pump Power HP} = \frac{\text{Flow}_{\text{GPM}} \times \text{Head}_{\text{ft-hd.}}}{3650 \times \eta_{\text{Pump}} \times \eta_{\text{motor}}}$$

$$\text{Energy Consumption (kWh)} = \text{Motor HP} \times 0.746 \frac{\text{kW}}{\text{HP}} \times \text{Hours of operation (Hr)} \times \frac{1}{\eta_{\text{motor}}}$$

$$\text{Total Energy Consumption (kWh)} = \sum \text{Energy Consumption of Each Motor}$$

$$\text{Energy Cost (\$)} = \text{Total Comsumption(kWh)} \times \text{Average Cost of Electric} \left(\frac{\$}{\text{kWh}}\right)$$

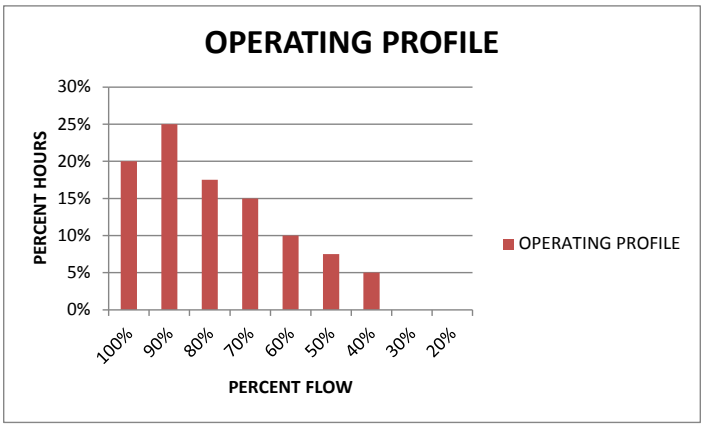
Affinity Laws are used in order to calculate energy savings by calculating the reduced power consumption requirement based a reduction in flow. Affinity laws, are as following:

Q = Flow, n = RPM, p = total pressure

$$\frac{Q_2}{Q_1} = \frac{n_2}{n_1} \qquad \frac{p_2}{p_1} = \left(\frac{n_2}{n_1}\right)^2 \qquad \frac{HP_2}{HP_1} = \left(\frac{n_2}{n_1}\right)^3$$

HW PUMPS VFD CALULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	Throttle	VFD	-
Motor Nameplate HP	30.0	30.0	
Flow* (GPM)	570	570	-
Head* (Ft)	105	105	-
Pump Efficiency (%)	75.0%	75.0%	-
Motor Efficiency (%)	92.4%	92.4%	0.0%
Operating Hrs	4000	4000	-
Estimated Power (HP)	21.8	21.8	0.00
Elec Cost ($/kWh)	0.142	0.142	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	70,431	54,010	16,421
Electric Energy Cost ($)	$10,001	$7,669	$2,332
COMMENTS:	Estimated Flow and Head Pressure, Savings for One Pump, assumed two operate.		

Estimated Operating Profile with VFD



Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$71,956
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$71,956
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,332
Total Yearly Savings ($/Yr):	$2,332
Estimated ECM Lifetime (Yr):	15
Simple Payback	30.9
Simple Lifetime ROI	-51.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$34,976
Internal Rate of Return (IRR)	-8%
Net Present Value (NPV)	($44,119.54)

ECM #8: Install Domestic Water Booster Skid w/VFD

Description:

Domestic Water is supplied to McKinley Community School building via a set of two (2) domestic water booster pumps. The pump skid is fairly old and the pump motors are standard efficiency motors. The pump set operates 24/7. Modern domestic water booster pump systems utilize variable frequency drives and advanced controls in order to vary flow based on the facility water demand.

This ECM replaces the existing domestic cold water booster pump set with a new variable flow domestic booster pump set. The new pump set includes new pumps, premium efficiency motors, variable frequency drives and controls. The basis for this ECM is Delta Pak ES System variable flow domestic booster pump control system.

Energy Savings Calculations:

$$\text{Pump Power HP} = \frac{\text{Flow}_{\text{GPM}} \times \text{Head}_{\text{ft-hd.}}}{3650 \times \eta_{\text{Pump}} \times \eta_{\text{motor}}}$$

$$\text{Energy Consumption (kWh)} = \text{Motor HP} \times 0.746 \frac{\text{kW}}{\text{HP}} \times \text{Hours of operation (Hr)} \times \frac{1}{\eta_{\text{motor}}}$$

$$\text{Total Energy Consumption (kWh)} = \sum \text{Energy Consumption of Each Motor}$$

$$\text{Energy Cost (\$)} = \text{Total Comsumption(kWh)} \times \text{Average Cost of Electric} \left(\frac{\$}{\text{kWh}}\right)$$

Affinity Laws are used in order to calculate energy savings by calculating the reduced power consumption requirement based a reduction in flow. Affinity laws, are as following:

Q = Flow, n = RPM, p = total pressure

$$\frac{Q_2}{Q_1} = \frac{n_2}{n_1} \qquad \frac{p_2}{p_1} = \left(\frac{n_2}{n_1}\right)^2 \qquad \frac{HP_2}{HP_1} = \left(\frac{n_2}{n_1}\right)^3$$

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$22,310
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$22,310
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,474
Total Yearly Savings ($/Yr):	$1,474
Estimated ECM Lifetime (Yr):	20
Simple Payback	15.1
Simple Lifetime ROI	32.1%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$29,476
Internal Rate of Return (IRR)	3%
Net Present Value (NPV)	($383.32)

ECM #9: Water Cooled Chiller Replacements

Description:

The facility currently has two water cooled chillers that are approaching their useful life expectancy. The chillers are 215 and 255 ton Trane model located in the mechanical room. These chillers serve the entire chilled water loop within the air handling units and the unit ventilators within the classrooms. The estimated efficiency of the chillers are approximately .79 and .75 KW/Ton at full load capacity, and an estimated .5 and .45 kW/Ton at part load, for the 215 and 255 ton units respectively.

This ECM includes the installation of a new high efficient water cooled chiller. The chiller is based on 215 ton York Model YMC2.

This system will function most efficiently if only one chiller is replaced while the remaining chiller operates as a standby and backup. As a result, the 215 Ton chiller will be replaced and the existing 255 ton chiller will remain as backup. Since the system operates at part load most of the season, the 215 ton chiller will be able to maintain cooling during most peak load hours. The owner should have a professional engineer verify heating and cooling loads prior to moving forward with this ECM.

Energy Savings Calculations:

$$Electric\,Usage = Cooling\,Tons \times \left(\frac{kW}{Ton}\right) \times Full\ Load\ Hrs.$$

$$Demand\ Savings = Cooling\,Tons\ x\left(Existing\,\frac{kW}{Ton} - \Pr oposed\,\frac{kW}{Ton}\right)$$

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

CHILLER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Air Cooled Chiller	High Efficiency Chiller	
Operating Capacity (Tons)	215.0	215.0	
Chiller Efficiency (KW/Ton)	0.703	0.568	
Full Load Cooling Hrs (Est.)	400	400	
Cooling Energy (kWh)	60,492	48,848	
Chiller Operating Hours (May to Sept)	1,200	1,200	
Chiller Part Load Hours Est.	800	800	
Chiller IPLV (KW/Ton)	0.596	0.359	
Chiller Part Load %	50.0%	50.0%	
Part Load Cooling Energy (kWh)	51,256	30,874	
Elec Cost ($/kWh)	0.142	0.142	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	111,748	79,722	32,026
Electric Demand (KW)	151.2	122.1	29.1
Electric Energy Cost ($)	$15,868	$11,321	$4,548
COMMENTS:			

From the NJ Smart Start® Program appendix, the unit falls under the category “Electric Chiller” and warrants an incentive based on efficiency. The 215 ton chiller qualifies for $110/Ton.

Energy Savings Summary:

ECM #9 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$226,375
NJ Smart Start Equipment Incentive ($):	$23,650
Net Installation Cost ($):	$202,725
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$4,548
Total Yearly Savings ($/Yr):	$4,548
Estimated ECM Lifetime (Yr):	23
Simple Payback	44.6
Simple Lifetime ROI	-48.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$104,604
Internal Rate of Return (IRR)	-5%
Net Present Value (NPV)	($127,939.47)

REM #1: 199.99 kW Solar System

Description:

The McKinley Community School has available roof space that could accommodate a significant amount of solar generation. Based on the available areas a 199.99 kilowatt solar array could be installed, assuming the existing roof structure is capable of supporting an array. The array will produce approximately 231,098 kilowatt-hours annually that will reduce the overall electric usage of the facility by 19.65%.

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}):	199.99
Electric Generation (KWH/Yr):	231,098
Installation Cost ($):	$1,200,552
SREC Revenue ($/Yr):	$44,159
Energy Savings ($/Yr):	$32,816
Total Yearly Savings ($/Yr):	$76,975
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	15.6
Analysis Period Electric Savings ($):	$610,340
Analysis Period SREC Revenue ($):	$639,700
Net Present Value (NPV)	($438,083.82)

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

New Brunswick Board of Education - McKinley Community 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 (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)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Gym Lighting Upgrade	$7,000	$14,140	$2,800	$18,340	$1,551	$0	$1,551	15	$23,260	$0	26.8%	11.8	3.13%	$171.44
ECM #2	Lighting Controls Upgrade	$14,250	$3,050	$1,575	$15,725	$3,515	$0	$3,515	15	$52,725	$0	235.3%	4.5	21.09%	$26,236.64
ECM #3	Domestic Hot Water Replacement	$18,000	$5,000	$1,050	$21,950	$998	$0	$998	12	$11,975	$0	-45.4%	22.0	-8.28%	($12,016.76)
ECM #4	Boiler Replacement	$173,505	$74,960	$0	$248,465	$9,846	$0	$9,846	25	$246,149	$0	-0.9%	25.2	-0.07%	($77,015.23)
ECM #5	Computer Automatic Standby or Hibernate Modes	$0	$2,084	$0	$2,084	$2,740	$0	$2,740	5	$13,699	$0	557.3%	0.8	129.39%	$10,463.08
ECM #6	Chilled Water Pump VFD	$18,708	$55,600	$0	$74,308	$2,571	$0	$2,571	15	$38,570	$0	-48.1%	28.9	-7.26%	($43,611.40)
ECM #7	Hot Water Pump VFD	$16,356	$55,600	$0	$71,956	$2,332	$0	$2,332	15	$34,976	$0	-51.4%	30.9	-7.91%	($44,119.54)
ECM #8	Domestic Hot Water Booster Skid/VFD	$13,685	$8,625	$0	$22,310	$1,474	$0	$1,474	20	$29,476	$0	32.1%	15.1	2.81%	($383.32)
ECM #9	Chiller Replacement	$147,100	$79,275	$23,650	$202,725	$4,548	$0	$4,548	23	$104,604	$0	-48.4%	44.6	-4.93%	($127,939.47)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	199.99 KW PV System	$1,200,552	$0	$0	$1,200,552	$32,816	$44,159	$76,975	15	$1,154,628	$662,389	-3.8%	15.6	-0.48%	($281,627.04)

Notes:

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

APPENDIX B

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

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

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Cooling

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

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

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

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

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

Natural Gas Water Heating

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

Prescriptive Lighting

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

Prescriptive Lighting - LED

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

Lighting Controls – Occupancy Sensors

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

Lighting Controls – HID or Fluorescent Hi-Bay Controls

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

Premium Motors

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

Refrigeration Doors/Covers

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

Refrigeration Controls

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

Other Equipment Incentives

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

APPENDIX C

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
6-New Brunswick BOE - McKinley Community School

Building ID: 3415900
For 12-month Period Ending: October 31, 2012[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: February 04, 2013

Facility
6-New Brunswick BOE - McKinley Community School
15 Van Dyke Avenue
New Brunswick, NJ 08901

Facility Owner
New Brunswick Board of Education
268 Baldwin Street 3rd Floor
New Brunswick, NJ 08901

Primary Contact for this Facility
Jack Humma
268 Baldwin Street 3rd Floor
New Brunswick, NJ 08901

Year Built: 1954
Gross Floor Area (ft²): 124,000

Energy Performance Rating[2] (1-100) 32

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	4,075,736
Natural Gas (kBtu)[4]	5,462,406
Total Energy (kBtu)	9,538,142

Energy Intensity[4]	
Site (kBtu/ft²/yr)	77
Source (kBtu/ft²/yr)	156

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	868

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison	
National Median Site EUI	65
National Median Source EUI	133
% Difference from National Median Source EUI	18%
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.

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

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**

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	6-New Brunswick BOE - McKinley Community 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	15 Van Dyke Avenue, New Brunswick, NJ 08901	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.		☐
McKinley Community School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	124,000 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?	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	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	90 %	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 Meter # 778010688 (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
09/16/2012	10/15/2012	88,000.00
08/16/2012	09/15/2012	96,320.00
07/16/2012	08/15/2012	94,400.00
06/16/2012	07/15/2012	158,720.00
05/16/2012	06/15/2012	153,600.00
04/16/2012	05/15/2012	94,400.00
03/16/2012	04/15/2012	77,120.00
02/16/2012	03/15/2012	82,240.00
01/16/2012	02/15/2012	75,840.00
12/16/2011	01/15/2012	94,400.00
11/16/2011	12/15/2011	104,604.00
Electric Meter # 778010688 Consumption (kWh (thousand Watt-hours))		**1,119,644.00**
Electric Meter # 778010688 Consumption (kBtu (thousand Btu))		**3,820,225.33**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**3,820,225.33**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: Gas Meter # 2600317 (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
09/16/2012	10/15/2012	1,290.00
08/16/2012	09/15/2012	339.00
07/16/2012	08/15/2012	1,727.00
06/16/2012	07/15/2012	2,039.00
05/16/2012	06/15/2012	801.00
04/16/2012	05/15/2012	3,894.00
03/16/2012	04/15/2012	3,588.00
02/16/2012	03/15/2012	6,491.60
01/16/2012	02/15/2012	8,175.00
12/16/2011	01/15/2012	11,728.00
11/16/2011	12/15/2011	10,543.00

Gas Meter # 2600317 Consumption (therms)	**50,615.60**
Gas Meter # 2600317 Consumption (kBtu (thousand Btu))	**5,061,560.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**5,061,560.00**
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
6-New Brunswick BOE - McKinley Community School
15 Van Dyke Avenue
New Brunswick, NJ 08901

Facility Owner
New Brunswick Board of Education
268 Baldwin Street 3rd Floor
New Brunswick, NJ 08901

Primary Contact for this Facility
Jack Humma
268 Baldwin Street 3rd Floor
New Brunswick, NJ 08901

General Information

6-New Brunswick BOE - McKinley Community School	
Gross Floor Area Excluding Parking: (ft^2)	124,000
Year Built	1954
For 12-month Evaluation Period Ending Date:	October 31, 2012

Facility Space Use Summary

McKinley Community School	
Space Type	K-12 School
Gross Floor Area (ft^2)	124,000
Open Weekends?	No
Number of PCs	125
Number of walk-in refrigeration/freezer units	2
Presence of cooking facilities	Yes
Percent Cooled	90
Percent Heated	100
Months °	10
High School?	No
School District °	new brunswick

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 10/31/2012)	**Baseline** (Ending Date 10/31/2012)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	32	32	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	77	77	51	N/A	65
Source ($kBtu/ft^2$)	156	156	104	N/A	133
Energy Cost					
$/year	$ 209,850.61	$ 209,850.61	$ 139,682.15	N/A	$ 178,640.38
$/ft²/year	$ 1.69	$ 1.69	$ 1.12	N/A	$ 1.44
Greenhouse Gas Emissions					
$MtCO_2e$/year	868	868	578	N/A	739
$kgCO_2e/ft^2$/year	7	7	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.

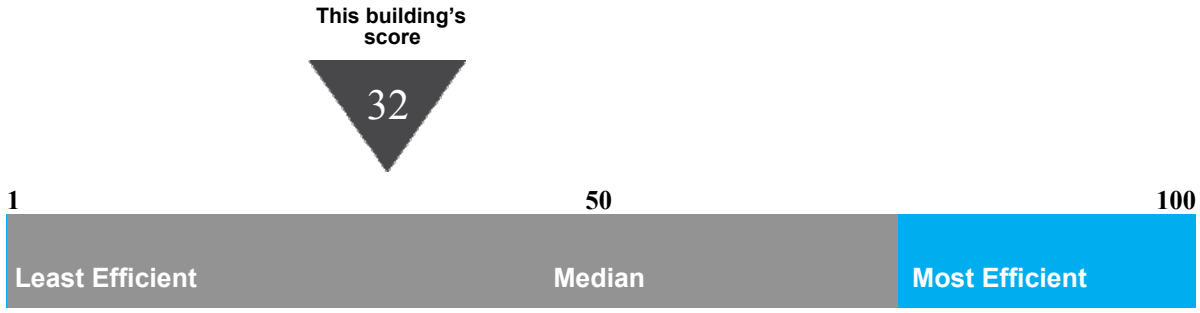
Statement of Energy Performance

2012

6-New Brunswick BOE - McKinley Community School
15 Van Dyke Avenue
New Brunswick, NJ 08901

Portfolio Manager Building ID: 3415900

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 156 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending October 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: 02/04/2013

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

McKinley Community School

Boilers

Tag	B-1	B-2	B-3
Unit Type	Cast Iron Sectional Boiler	Cast Iron Sectional Boiler	Cast Iron Sectional Boiler
Qty	1	1	1
Location	Boiler Room	Boiler Room	Boiler Room
Area Served	Hot Water Loop	Hot Water Loop	Hot Water Loop
Manufacturer	Weil McLain	Weil McLain	Weil McLain
Model #	1888	PL-1286-W-F	PL-1286-W-F
Serial #	-	266197	266199
Input Capacity (Btu/Hr)	5,845	3,073	3,073
Rated Output Capacity (Btu/Hr)	4,035	2,157	2,157
Approx. Efficiency %	69.0%	70.0%	70.0%
Fuel	Natural Gas	Natural Gas	Natural Gas
Approx Age	19	35	35
ASHRAE Service Life	35	35	35
Remaining Life	16	0	0
Comments	Boiler is in fair condition	Boiler is in fair condition	Boiler is in fair condition

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

McKinley Community School

Chillers

Tag	CH-1	CH-2	
Unit Type	Water Cooled Centrifugal Chiller	Water Cooled Centrifugal Chiller	
Qty	1	1	
Location	Mechanical Room	Mechanical Room	
Area Served	Chilled Water Loop	Chilled Water Loop	
Manufacturer	Trane	Trane	
Model #	Centravac RTHB215FM	Centravac RTHB255FM	
Serial #	U94MD2081	U94MD2081	
Refrigerant	R-22	R-22	
Cooling Capacity (Tons)	215	255	
Cooling Efficiency (KW/Ton)	0.77	0.77	
Volts / Phase / Hz	460V / 3 PH / 60 Hz	460V / 3 PH / 60 Hz	
Fuel	N/A	N/A	
Chilled Water GPM / ΔT	-	-	
Condenser Water GPM / ΔT	-	-	
Approx Age	19	19	
ASHRAE Service Life	23	23	
Remaining Life	4	4	
Comments	Chiller is in fair condition	Chiller is in fair condition	

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

McKinley Community School

Cooling Towers

Tag	CT-1	CT-2	
Unit Type	Closed Circuit	Closed Circuit	
Qty	1	1	
Location	Outside of Boiler Room	Outside of Boiler Room	
Area Served	Chiller Condenser Loop	Chiller Condenser Loop	
Manufacturer	Baltimore Air Coil	Baltimore Air Coil	
Model #	VTL-227-OMCX	VTL-272-OMCX	
Serial #	R94100983	-	
Rated Flow GPM	629	789	
EWT / LWT	95°F / 85°F	95°F / 85°F	
Motor HP	40	50	
Electrical	460V/3Ph	460V/3Ph	
Approx Age	19	19	
ASHRAE Service Life	20	20	
Remaining Life	1	1	
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

McKinley Community School

Pumps

Tag	P-1,2	P-3	P-4
Unit Type	Base Mounted End Suction	Base Mounted End Suction	Base Mounted End Suction
Qty	2	1	1
Location	Boiler Room	Boiler Room	Boiler Room
Area Served	Chilled Water Loop	Condenser Water Loop	Condenser Water Loop
Manufacturer	B&G	B&G	B&G
Model #	-	-	-
Serial #	-	-	-
Horse Power	40	10	20
Flow	580 GPM @ 122 Ft	629 GPM @ 40 Ft	789 GPM @ 60 Ft
Motor Info	Super E	Super E	Super E
Electrical Power	230/460V 3Ph	230/460V 3Ph	230/460V 3Ph
RPM	1780	1170	1765
Motor Efficiency %	94.1%	91.0%	93.0%
Approx Age	16	16	16
ASHRAE Service Life	18	18	18
Remaining Life	2	2	2
Comments	NEMA Premium Motors	NEMA Premium Motor	NEMA Premium Motor

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

Pumps

Tag	P-5,6	P-7	
Unit Type	Base Mounted End Suction	Domestic Water Booster Skid	
Qty	2	2	
Location	Boiler Room	Boiler Room	
Area Served	Hot Water Loop	Domestic Water	
Manufacturer	B&G	Canariis	
Model #	-	DS-225-35	
Serial #	-	95-0144	
Horse Power	30	5	
Flow	570 GPM @ 105 Ft	-	
Motor Info	Super E	Unimount	
Electrical Power	230/460V 3Ph	460V/3Ph	
RPM	1780	3495	
Motor Efficiency %	92.4%	85.5%	
Approx Age	16	16	
ASHRAE Service Life	18	18	
Remaining Life	2	2	
Comments	NEMA Premium Motors	Standard Efficiency Skid	

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

McKinley Community School

Domestic Water Heaters

Tag	HWH-1		
Unit Type	Domestic Hot Water Heater		
Qty	1		
Location	Boiler Room		
Area Served	Domestic Hot Water Loop		
Manufacturer	PVI		
Model #	54 P 250A-MXG		
Serial #	1211133496		
Size (Gallons)	250		
Input Capacity (MBH/KW)	540 MBH		
Recovery (Gal/Hr)	670		
Efficiency %	80%		
Fuel	Natural Gas		
Approx Age	19		
ASHRAE Service Life	12		
Remaining Life	(7)		
Comments			

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

APPENDIX E

CEG Project #: 9C12064
Facility Name: McKinley Community School
Address: 15 Van Dyke Avenue
City, State, Zip New Brunswick, NJ 08901

			Existing Fixtures						Proposed Fixtures Retrofit						Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
232.22	101 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	13	1.12	2,907	Existing to Remain	Existing to Remain	3	86	0	1.12	2,907	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	581	$83
221.21	101 Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	101 Closet	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	102 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	14	1.20	3,130	Existing to Remain	Existing to Remain	3	86	0	1.20	3,130	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	626	$89
221.21	102 Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	102 Closet	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	103 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	13	1.12	2,907	Existing to Remain	Existing to Remain	3	86	0	1.12	2,907	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	581	$83
221.21	103 Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	103 Closet	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	104 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
221.21	104 Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	104 Closet	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	105 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
221.21	105 Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	105 Closet	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	106 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
221.21	106 Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	106 Closet	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.11	Kindergarten Hallway	3000	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	1	33	11	0.36	1,089	Existing to Remain	Existing to Remain	1	33	0	0.36	1,089	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Kindergarten Hallway	3000	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	33	6	0.20	594	Existing to Remain	Existing to Remain	2	33	0	0.20	594	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Kindergarten Hallway	3000	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	15	0.78	2,340	Existing to Remain	Existing to Remain	2	52	0	0.78	2,340	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.11	Main Lobby	3000	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	1	33	7	0.23	693	Existing to Remain	Existing to Remain	1	33	0	0.23	693	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Main Lobby	3000	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	7	0.36	1,092	Existing to Remain	Existing to Remain	2	52	0	0.36	1,092	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Vestibule	3000	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	3	0.16	468	Existing to Remain	Existing to Remain	2	52	0	0.16	468	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
227.21	Nurse	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	33	5	0.17	429	Existing to Remain	Existing to Remain	2	33	0	0.17	429	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Nurse	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	5	0.31	806	Existing to Remain	Existing to Remain	2	62	0	0.31	806	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	Nurse Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$25
232.22	Nurse Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$25
563	Main Office	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	12	0.62	1,622	Existing to Remain	Existing to Remain	2	52	0	0.62	1,622	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	6	0.52	1,342	Existing to Remain	Existing to Remain	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	Main Office Workroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$25
221.21	Main Office Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Main Office Hallway	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	33	6	0.20	515	Existing to Remain	Existing to Remain	2	33	0	0.20	515	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	Social Work	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$25
232.22	Vice Principal	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$25
232.22	Guidance	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$25
232.22	Principal	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	Existing to Remain	3	86	0	0.52	1,342	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	268	$38
221.34	Mechanical Room	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	41	2.54	3,050	Existing to Remain	Existing to Remain	2	62	0	2.54	3,050	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Front Hallway	3000	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	33	5	0.17	495	Existing to Remain	Existing to Remain	2	33	0	0.17	495	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Media Center	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect Lens	2	62	148	9.18	23,858	Existing to Remain	Existing to Remain	2	62	0	9.18	23,858	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Media Center	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	21	1.09	2,839	Existing to Remain	Existing to Remain	2	52	0	1.09	2,839	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	Media Center Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	Existing to Remain	3	86	0	0.52	1,342	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	268	$38
221.21	Media Center Storage	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	223	Existing to Remain	Existing to Remain	2	62	0	0.19	223	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Media Center VR Room	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	298	Existing to Remain	Existing to Remain	2	62	0	0.25	298	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	60	$8
232.22	Media Center Storage	1200	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	3	0.26	310	Existing to Remain	Existing to Remain	3	86	0	0.26	310	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Media Center VP	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	5	0.31	806	Existing to Remain	Existing to Remain	2	62	0	0.31	806	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	161	$23
221.21	Electrical Room	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	223	Existing to Remain	Existing to Remain	2	62	0	0.19	223	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.11	North Hallway	3000	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	1	33	8	0.26	792	Existing to Remain	Existing to Remain	1	33	0	0.26	792	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	North Hallway	3000	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	33	25	0.83	2,475	Existing to Remain	Existing to Remain	2	33	0	0.83	2,475	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	North Hallway	3000	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	23	1.20	3,588	Existing to Remain	Existing to Remain	2	52	0	1.20	3,588	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
221.15	North Hallway	3000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Indirect Lens	2	62	6	0.37	1,116	Existing to Remain	Existing to Remain	2	62	0	0.37	1,116	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Stairwells (2)	3000	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	8	0.42	1,248	Existing to Remain	Existing to Remain	2	52	0	0.42	1,248	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	110 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
221.21	110 Classroom Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	110 Classroom Closet	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	111 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
221.21	111 Classroom Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	111 Classroom Closet	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	112 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
221.21	112 Classroom Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	112 Classroom Closet	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	113 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
221.21	113 Classroom Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	113 Classroom Closet	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	114 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
221.21	114 Classroom Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	114 Classroom Closet	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	115 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
221.21	115 Classroom Bathroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	115 Classroom Closet	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	116 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	21	1.81	4,696	Existing to Remain	Existing to Remain	3	86	0	1.81	4,696	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	939	$133
221.34	116 Classroom Closet	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	Electrical Closet	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Hallways	3000	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	33	71	2.34	7,029	Existing to Remain	Existing to Remain	2	33	0	2.34	7,029	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.11	Southwest Lobby	3000	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	1	33	8	0.26	792	Existing to Remain	Existing to Remain	1	33	0	0.26	792	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Southwest Lobby	3000	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	14	0.73	2,184	Existing to Remain	Existing to Remain	2	52	0	0.73	2,184	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
232.22	300 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
232.22	301 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
232.22	302 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
232.22	303 Science Lab	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	20	1.72	4,472	Existing to Remain	Existing to Remain	3	86	0	1.72	4,472	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	894	$127
232.21	303 Science Lab Storage	1200	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	206	Existing to Remain	Existing to Remain	3	86	0	0.17	206	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	304 SGI	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	2	0.17	447	Existing to Remain	Existing to Remain	3	86	0	0.17	447	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	89	$13
232.22	305 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
232.22	306 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
232.22	307 Computer Lab	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
232.22	308 SGI	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	Existing to Remain	3	86	0	0.52	1,342	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	268	$38
232.22	309 SGI	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	6	0.52	1,342	Existing to Remain	Existing to Remain	3	86	0	0.52	1,342	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	268	$38
232.22	310 Computer Lab	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
232.22	311 Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	179	$25
227.22	311 Office	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	2	65	1	0.07	169	Existing to Remain	Existing to Remain	2	65	0	0.07	169	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	34	$5
232.22	312 SGI	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	179	$25
227.22	312 SGI	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	2	65	1	0.07	169	Existing to Remain	Existing to Remain	2	65	0	0.07	169	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	34	$5
221.34	Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	6	0.37	446	Existing to Remain	Existing to Remain	2	62	0	0.37	446	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	313 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
232.22	314 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
232.22	315 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
232.22	316 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	12	1.03	2,683	Existing to Remain	Existing to Remain	3	86	0	1.03	2,683	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	537	$76
221.34	316 Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	30	$4
232.22	Special Faculty Support Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	15	1.29	3,354	Existing to Remain	Existing to Remain	3	86	0	1.29	3,354	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	671	$95
221.34	Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Boys Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Boys Restroom	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	1	0.05	135	Existing to Remain	Existing to Remain	2	52	0	0.05	135	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0

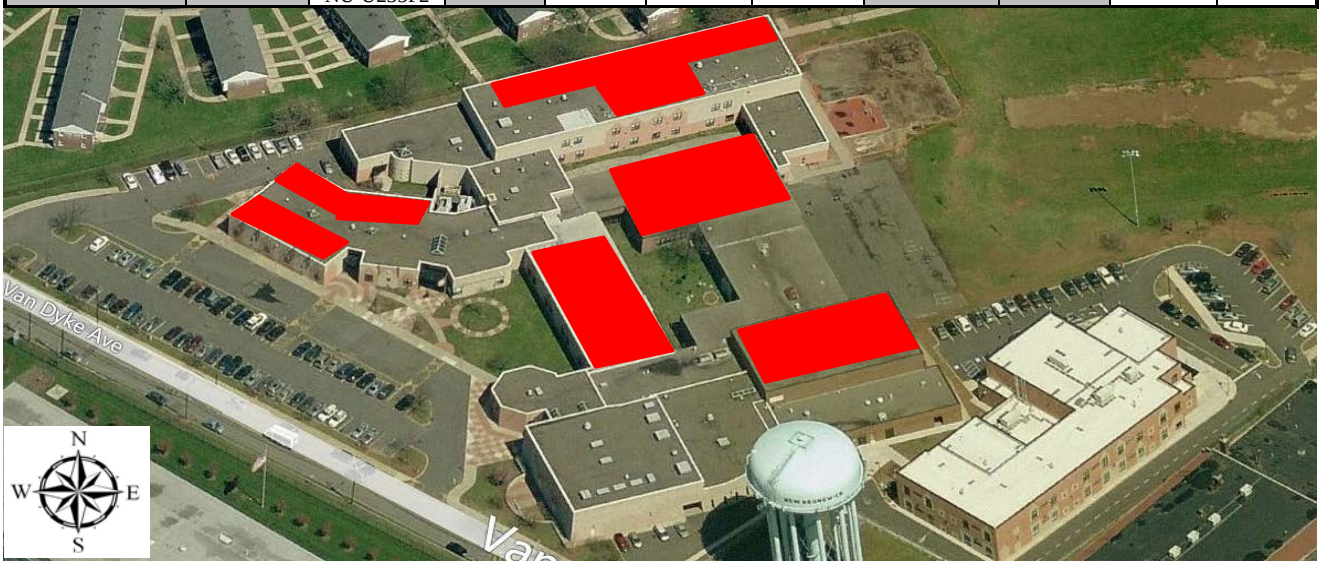
			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
221.21	Girls Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Girls Restroom	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	1	0.05	135	Existing to Remain	Existing to Remain	2	52	0	0.05	135	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	Janitor Closet	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Office	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	64	$9
232.22	Dept Head Office Suite	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	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	Office 1	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$25
232.22	Office 2	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$25
232.22	Office 3	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$25
232.22	Office 4	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$25
232.22	Office 5	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	4	0.34	894	Existing to Remain	Existing to Remain	3	86	0	0.34	894	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	179	$25
221.21	Office 6	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	64	$9
232.22	Closet	1200	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	2	0.17	206	Existing to Remain	Existing to Remain	3	86	0	0.17	206	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Janitor Closet	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
362.34	Gymnasium	2600	2x4, 6 Lamp, 54w T5HO Fixture	6	345	19	6.56	17,043	Existing to Remain	Existing to Remain	6	345	0	6.56	17,043	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.22	323 Classroom	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	16	1.38	3,578	Existing to Remain	Existing to Remain	3	86	0	1.38	3,578	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	716	$102
221.34	323 Closet	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.31	324 Music Classroom	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$82
221.31	325 Art Classroom	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$82
221.31	326 Classroom	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$82
221.21	Boys Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	645	Existing to Remain	Existing to Remain	2	62	0	0.25	645	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Girls Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	4	0.25	645	Existing to Remain	Existing to Remain	2	62	0	0.25	645	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Janitor Closet	1200	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	4	107	1	0.11	128	Existing to Remain	Existing to Remain	4	107	0	0.11	128	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
242.21	Storage	1200	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	4	107	1	0.11	128	Existing to Remain	Existing to Remain	4	107	0	0.11	128	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.31	327 Classroom	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$82
221.31	328 Classroom	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$82
221.31	329 Classroom	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	2	62	18	1.12	2,902	Existing to Remain	Existing to Remain	2	62	0	1.12	2,902	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	580	$82

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
211.11	Community Room	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	1	33	20	0.66	1,716	Existing to Remain	Existing to Remain	1	33	0	0.66	1,716	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.11	Pantry	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	1	33	2	0.07	172	Existing to Remain	Existing to Remain	1	33	0	0.07	172	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Girls Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Girls Restroom	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	1	0.05	135	Existing to Remain	Existing to Remain	2	52	0	0.05	135	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Boys Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Boys Restroom	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	1	0.05	135	Existing to Remain	Existing to Remain	2	52	0	0.05	135	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	320 Music Classroom	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect Lens	2	62	25	1.55	4,030	Existing to Remain	Existing to Remain	2	62	0	1.55	4,030	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	0.5	20.0%	806	$114
211.11	320 Music Classroom	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	1	33	3	0.10	257	Existing to Remain	Existing to Remain	1	33	0	0.10	257	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	4	Dual Technology Occupancy Sensor - Remote Mnt.	0.5	20.0%	51	$7
232.22	320 Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	3	0.26	671	Existing to Remain	Existing to Remain	3	86	0	0.26	671	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	134	$19
232.22	320 PR Room	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	3	86	2	0.17	447	Existing to Remain	Existing to Remain	3	86	0	0.17	447	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	89	$13
221.34	Janitor Closet	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	Office	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	64	$9
221.21	Boys Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Boys Restroom	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	1	0.05	135	Existing to Remain	Existing to Remain	2	52	0	0.05	135	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Girls Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Girls Restroom	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	1	0.05	135	Existing to Remain	Existing to Remain	2	52	0	0.05	135	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
768	Auditorium	2600	400w MH, Uplights	1	465	28	13.02	33,852	Remove and Return	2x4, 6 Lamp, 54w T5HO, Elect. Ballast, HI Bay	6	315	28	8.82	22,932	4.20	10,920	$1,551	$7,000.00	$14,140.00	$21,140.00	$2,800.00	11.83	0	No New Controls	0	0.0%	0	$0
563	Auditorium	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	7	0.36	946	Existing to Remain	Existing to Remain	2	52	0	0.36	946	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.33	Stage	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect Lens	2	62	28	1.74	4,514	Existing to Remain	Existing to Remain	2	62	0	1.74	4,514	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	Stage Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.34	Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
211.11	Cafeteria	2600	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	1	33	23	0.76	1,973	Existing to Remain	Existing to Remain	1	33	0	0.76	1,973	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.22	Cafeteria	2600	2x2, 2 Lamp U-Tube, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	2	65	70	4.55	11,830	Existing to Remain	Existing to Remain	2	65	0	4.55	11,830	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0

			Existing Fixtures						Proposed Fixtures Retrofit							Retrofit Energy Savings			Lighting Retrofit Costs					Proposed Lighting Controls					
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $
563	Cafeteria	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	8	0.42	1,082	Existing to Remain	Existing to Remain	2	52	0	0.42	1,082	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
769	Faculty Dining	2600	4 Lamp, F36BX Pendant Mount	4	144	6	0.86	2,246	Existing to Remain	Existing to Remain	4	144	0	0.86	2,246	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	5	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	449	$64
563	Corridor	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	7	0.36	946	Existing to Remain	Existing to Remain	2	52	0	0.36	946	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Restroom	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Servery	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	7	0.36	946	Existing to Remain	Existing to Remain	2	52	0	0.36	946	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Servery	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	3	0.19	484	Existing to Remain	Existing to Remain	2	62	0	0.19	484	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Kitchen	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	12	0.74	1,934	Existing to Remain	Existing to Remain	2	62	0	0.74	1,934	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Kitchen	2600	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	33	1	0.03	86	Existing to Remain	Existing to Remain	2	33	0	0.03	86	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Kitchen Office	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	2	0.12	322	Existing to Remain	Existing to Remain	2	62	0	0.12	322	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Dry Storage	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	6	0.37	446	Existing to Remain	Existing to Remain	2	62	0	0.37	446	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Kitchen toilet	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	161	Existing to Remain	Existing to Remain	2	62	0	0.06	161	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
222.21	Kitchen Storage	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Kitchen Storage	1200	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	1	0.06	74	Existing to Remain	Existing to Remain	2	62	0	0.06	74	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Boys Locker Room	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	6	0.37	967	Existing to Remain	Existing to Remain	2	62	0	0.37	967	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Boys Locker Room	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	2	0.10	270	Existing to Remain	Existing to Remain	2	52	0	0.10	270	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
221.21	Girls Locker Room	2600	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	62	6	0.37	967	Existing to Remain	Existing to Remain	2	62	0	0.37	967	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
563	Girls Locker Room	2600	Recessed Down Light, (2)26w Quad CFL Lamp	2	52	2	0.10	270	Existing to Remain	Existing to Remain	2	52	0	0.10	270	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
227.21	Locker Hallway	3000	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	2	33	4	0.13	396	Existing to Remain	Existing to Remain	2	33	0	0.13	396	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
232.21	Locker Office	2600	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	3	86	2	0.17	447	Existing to Remain	Existing to Remain	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
221.34	Locker Storage	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	2	0.12	149	Existing to Remain	Existing to Remain	2	62	0	0.12	149	0.00	0	$0	$0.00	$0.00	$0.00	$0.00	-	0	No New Controls	0	0.0%	0	$0
	TOTAL					**1,423**	**109**	**277,658**					**28**	**105**	**266,738**	**4**	**10,920**	**1,551**	**7,000**	**14,140**	**21,140**	**2,800**	**13.63**			**61**		**24,753**	**3,515**

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
McKinley ES	20850	SHARP NU-U235F2	851	17.5	14,927	199.99	231,098	162.0	35,657	13.40



.= Proposed 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 - McKinley ES**
Location: **New Brunswick, NJ**
Description: **Photovoltaic System 100% Financing - 15 year**

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$1,200,552
Annual kWh Production	231,098
Annual Energy Cost Reduction	$32,816
Average Annual SREC Revenue	$44,159

Simple Payback: **15.60** Years

Life Cycle Cost Analysis

Analysis Period (years): 15
Discount Rate: 3%
Average Energy Cost ($/kWh) **$0.142**
Financing Rate: 6.00%
Financing %: 100%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
Average SREC Value ($/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	231,098	$32,816	$0	$57,775	$70,648	$50,923	($30,981)	($30,981)
2	$0	229,943	$33,800	$0	$57,486	$67,507	$54,064	($30,285)	($61,266)
3	$0	228,793	$34,814	$0	$57,198	$64,172	$57,399	($29,559)	($90,825)
4	$0	227,649	$35,859	$0	$56,912	$60,632	$60,939	($28,800)	($119,625)
5	$0	226,511	$36,935	$2,333	$56,628	$56,874	$64,698	($30,342)	($149,967)
6	$0	225,378	$38,043	$2,321	$45,076	$52,883	$68,688	($40,774)	($190,741)
7	$0	224,251	$39,184	$2,310	$44,850	$48,647	$72,925	($39,847)	($230,588)
8	$0	223,130	$40,359	$2,298	$44,626	$44,149	$77,422	($38,884)	($269,472)
9	$0	222,014	$41,570	$2,287	$44,403	$39,374	$82,198	($37,885)	($307,357)
10	$0	220,904	$42,817	$2,275	$33,136	$34,304	$87,267	($47,894)	($355,251)
11	$0	219,800	$44,102	$2,264	$32,970	$28,921	$92,650	($46,763)	($402,014)
12	$0	218,701	$45,425	$2,253	$32,805	$23,207	$98,364	($45,594)	($447,608)
13	$0	217,607	$46,788	$2,241	$32,641	$17,140	$104,431	($44,384)	($491,992)
14	$0	216,519	$48,191	$2,230	$21,652	$10,699	$110,872	($53,958)	($545,950)
15	$0	215,437	$49,637	$2,219	$21,544	$3,861	$117,711	($52,610)	($598,560)
	Totals:	3,347,733	$610,340	$25,032	$639,700	$623,017	$1,200,552	($598,560)	($4,292,198)

Net Present Value (NPV) **($438,084)**