EAST ORANGE SCHOOL DISTRICT

BENJAMIN BANNEKER ACADEMY

500 S. CLINTON STREET
EAST ORANGE, NEW JERSEY

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:	PSE&G
Electric Utility Rate Structure:	LPLS
Third Party Supplier:	Direct Energy

Natural Gas Utility Provider:	PSE&G
Utility Rate Structure:	LVG
Third Party Supplier:	N/A

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: 778018128
Account No: 42 104 538 03
Third Party Utility Provider: Direct Energy
TPS Meter / Acct No: PE000009446208223120

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
May-14	130,800	276.0	$19,149
Jun-14	113,871	308.0	$17,428
Jul-14	144,529	308.0	$22,120
Aug-14	124,800	272.0	$18,614
Sep-14	106,800	272.0	$14,527
Oct-14	64,000	200.0	$10,260
Nov-14	92,400	208.0	$12,767
Dec-14	79,600	188.0	$11,382
Jan-15	69,207	196.0	$10,371
Feb-15	77,193	196.0	$11,568
Mar-15	21,600	188.0	$3,228
Apr-15	111,600	168.0	$15,158
Totals	**1,136,400**	**308.0 Max**	**$166,571**

AVERAGE DEMAND **231.7 KW average**
AVERAGE RATE **$0.147** **$/kWh**

Figure 1
Electricity Usage Profile

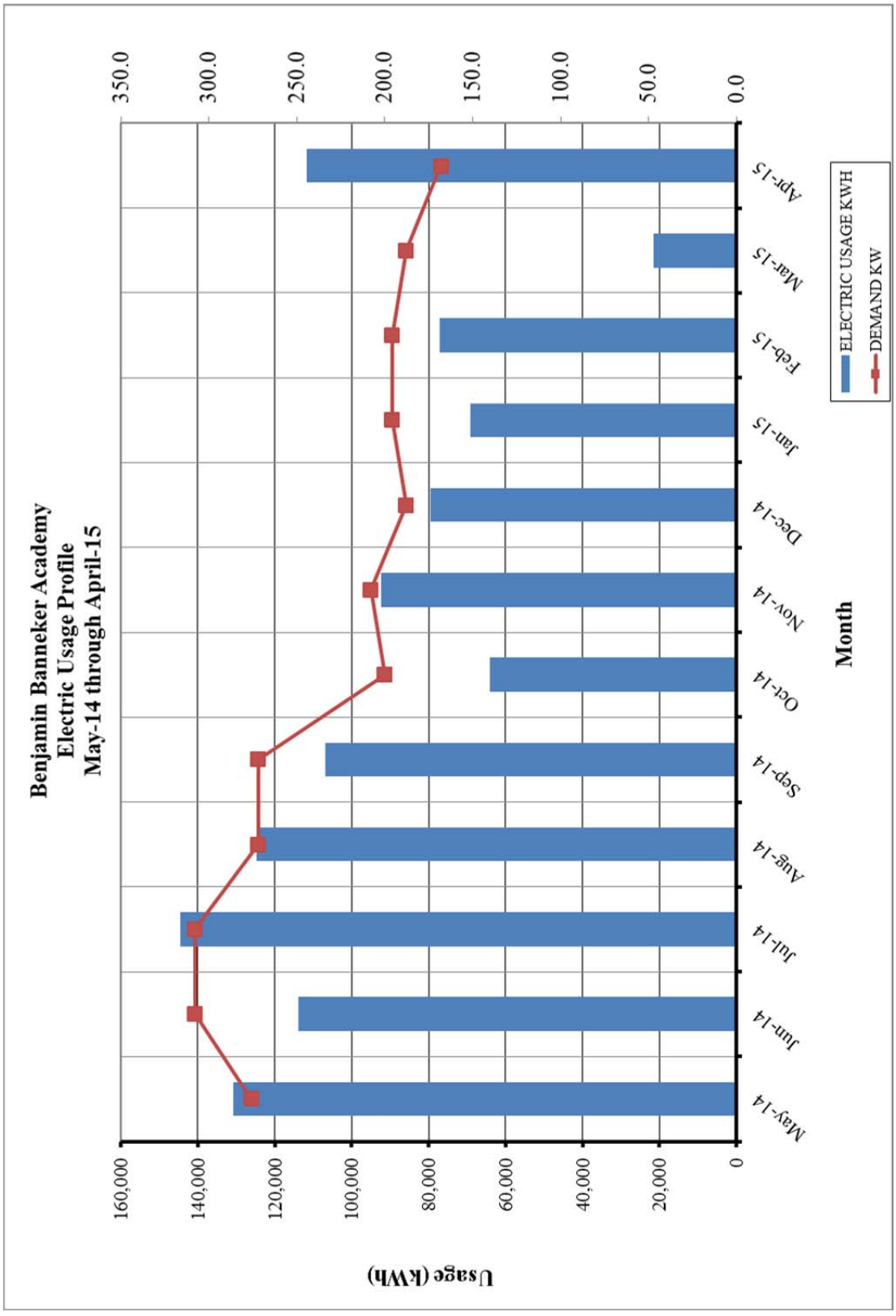
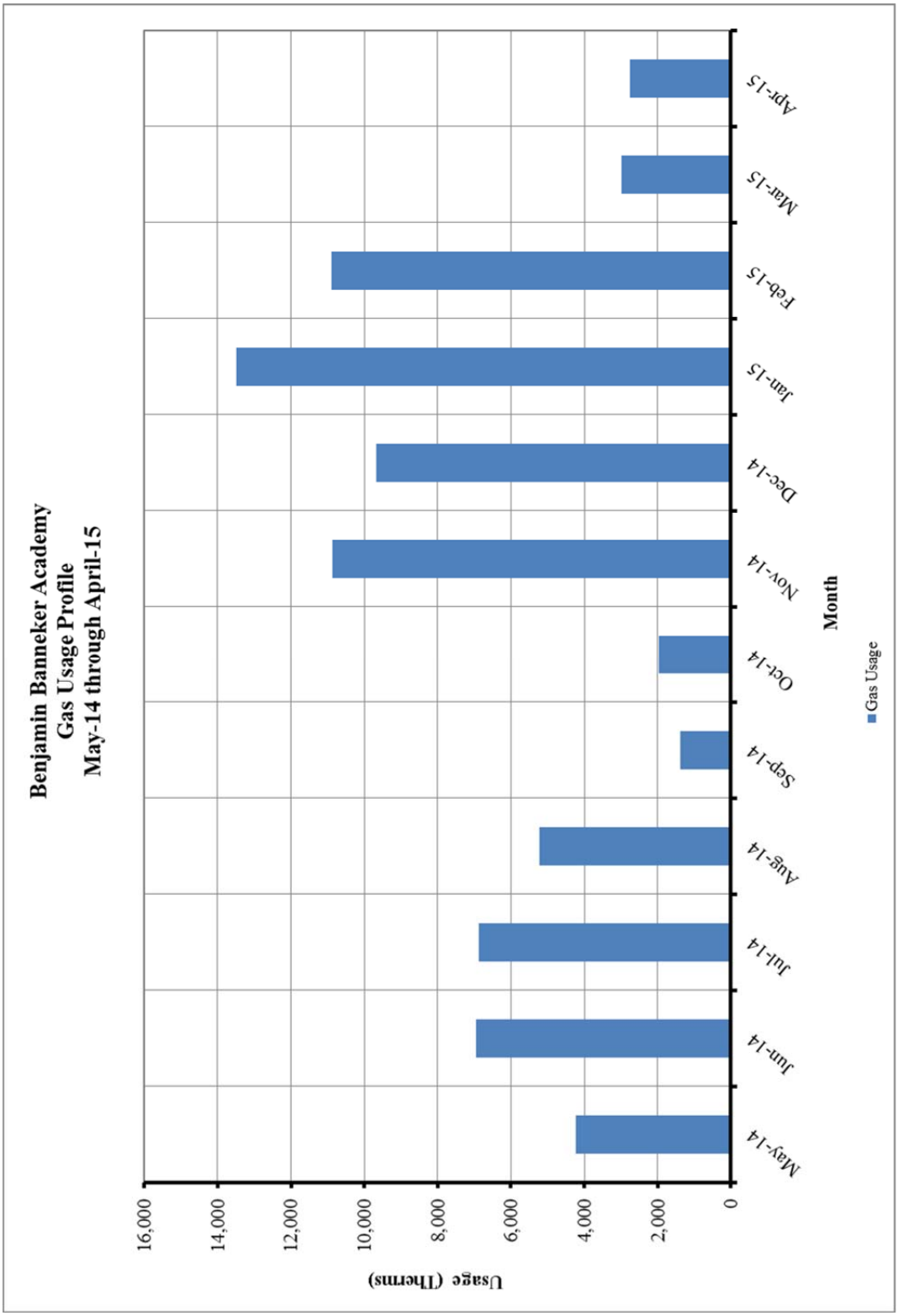


Table 2
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: PSE&G		
Rate: LVG		
Meter No: 3553001		
Account No: 69 610 094 09		
Third Party Utility Provider: -		
TPS Meter No: -		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
May-14	4,226.76	$3,451.76
Jun-14	6,949.63	$5,423.31
Jul-14	6,877.36	$5,089.90
Aug-14	5,217.38	$3,756.05
Sep-14	1,372.70	$1,083.49
Oct-14	1,955.28	$2,271.45
Nov-14	10,872.04	$9,586.34
Dec-14	9,666.42	$8,474.92
Jan-15	13,480.24	$10,976.66
Feb-15	10,887.21	$8,747.37
Mar-15	2,994.64	$1,823.22
Apr-15	2,758.59	$1,626.76
TOTALS	**77,258.25**	**$62,311.23**
AVERAGE RATE:	**$0.81**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY ENERGY USE INDEX (EUI)

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. Building Benchmarking data is collected and analyzed within the Commercial Building Energy Consumption Survey (CBECS), performed by the Energy and Information Administration (EIA). Building data is grouped by function types and tabulated, from which a median site and source energy intensity is determined. The national median or PEER Group Comparable in this instance is the middle value of the national population meaning half the buildings use more energy, and half use less. The PEER Group EUI allows us to compare the relative efficiency of the audited building to that of an average building with the same or similar primary function (i.e. group type).

Source use differs from site usage when comparing a building's energy consumption with the national average. Site energy use is the energy consumed by the building at the building site only. Source energy use includes the site energy use as well as all of the losses to create and distribute the energy to the building. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, which allows for a complete assessment of energy efficiency in a building. The type of utility purchased has a substantial impact on the source energy use of a building. The EPA has determined that **source energy** is the most comparable unit for evaluation purposes and overall global impact. Both the site and source EUI ratings for the building are provided to understand and compare the differences in energy use.

The site and source EUI for this facility is calculated as follows:

$$\text{Building Site EUI} = \frac{(\text{Electric Usage in kBtu} + \text{Fuel Usage in kBtu})}{\text{Building Square Footage}}$$

$$\text{Building Source EUI} = \frac{(\text{Electric Usage in kBtu} \times \text{SS Ratio} + \text{Fuel Usage in kBtu} \times \text{SS Ratio})}{\text{Building Square Footage}}$$

Table 3
Energy Use Index Summary

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	**BUILDING USE**			**SITE ENERGY**	**SITE-SOURCE RATIO**	**SOURCE ENERGY**
	kWh	**Therms**	**Gallons**	**kBtu**		**kBtu**
ELECTRIC	1,136,400.0			3,879,670	3.140	12,182,163
NATURAL GAS		77,258.2		7,725,825	1.050	8,112,116
TOTAL				11,605,495		20,294,279

*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document.

	AUDITED BUILDING		**PEER COMPARISON**	
BUILDING TYPE	K-12 School		K-12 School	
BUILDING AREA	91,505	SQUARE FEET		
BUILDING SITE EUI	*126.83*	kBtu/SF/YR	58.2	kBtu/SF/YR
BUILDING SOURCE EUI	*221.78*	kBtu/SF/YR	141.4	kBtu/SF/YR

57%	Less Efficient than PEER Comparison

III. FACILITY DESCRIPTION

The Benjamin Banneker Academy is located at 500 South Clinton Street in East Orange, New Jersey. This 91,505 SF facility was built in 2008. The facility is three stories with a basement for the HVAC equipment, utility rooms, maintenance office and storage room. The balance of the facility is comprised of classrooms, a gymnasium, an auditorium/stage, a cafeteria/kitchen, media center, administration offices, music room, nurse's office, computer lab, restrooms, and various utility/storage rooms.

Occupancy Profile

The school is in use from 8:00 am till 3:00 pm, 5 days a week, with staff staying after hours for cleaning and some student activities. There are approximately (430) Pre-K thru 5th Grade students which occupy the facility.

Building Envelope

Exterior walls for the building are masonry block with a concrete block construction. The windows throughout the facility are in good condition. Typical windows are double-pane coated with aluminum frames. The larger portions of the roof are constructed of modified bitumen roofing, rigid insulation and steel roof decking on the flat portions and the slopped portions of the roof are sheathing covered with tar shingles. Insulation below the roof is estimated to be 3 to 5 inches.

HVAC Systems

The Benjamin Banneker Academy has central heating and cooling provided by variable air volume and constant volume air handlers located on the roof.

The heating hot water is supplied to the air handlers, cabinet heaters, unit heaters, convectors, fin-tubed radiators, heating & ventilating unit, and reheat coils from a single boiler plant located in the basement mechanical room. There are four (4) condensing natural gas-fired boilers rated at 2,000 MBH input manufactured by AERCO. These units have an AHRI efficiency rating of approximately 86%. Heating water is circulated via two (2) Armstrong end suction pumps with 20 horsepower motors with an efficiency of 91% and a flow rated at 345 gallons per minute. In addition there are two (2) Armstrong end suction pumps with 10 horsepower motors with an efficiency of 89.5% and a flow rated at 100 gallons per minute.

Numerous hot water unit heaters, convectors, fin-tubed radiators and electric duct heaters make up the balance of the heating system.

The cooling system consists of a Broad Model BZ135IXD direct, gas-fired absorption chiller/heater rated at 450 tons of cooling, 4,580 MBH of heating, chilled glycol/ water flow of 1,210 gallons per minute, a heating hot water flow of 458 gallons per minute. The chilled water is circulated to all the chilled water coils via two (2) Armstrong Model BF-STD pumps with 125 horsepower motors, flow rate of 1,210 gallons per minute and an efficiency of 95%. There is a glycol make-up unit in the basement that feeds the chilled water loop.

The condenser water system for the chiller is an Evapco Model UT 29-124 induced draft cooling tower rated at 1,215 gallons per minute with two (2) 10 horsepower fans and two (2) Armstrong condenser water pumps rated at 1,216 gallons per minute with 40 horsepower motors and an efficiency of 93.6%.

The basement is heated and ventilated by a York Solutions Model IAHU rated at 385 MBH of heating with a 5 horsepower supply fan motor.

The classrooms on the 3rd Floor - West are conditioned by a York Solutions Model XTO rooftop unit rated at 730 MBH of chilled water cooling and 389 MBH of hot water heating. Each classroom has a variable air volume terminal box with hot water heating coil.

The classrooms on the 1st and 2nd floor - West are conditioned by a York Solutions Model XTO-090 rooftop unit rated at 1,188 MBH of chilled water cooling and 586 MBH of hot water heating. Each classroom has a variable air volume terminal box with hot water heating coil.

The classrooms on the 3rd Floor - East are conditioned by a York Solutions Model XTO-051 rooftop unit rated at 300 MBH of chilled water cooling and 163 MBH of hot water heating. Each classroom has a variable air volume terminal box with hot water heating coil.

The classrooms on the 1st and 2nd floor - East are conditioned by a York Solutions Model XTO-053 rooftop unit rated at 549 MBH of chilled water cooling and 228 MBH of hot water heating. Each classroom has a variable air volume terminal box with hot water heating coil.

The Corridors are conditioned by a York Solutions Model XTO-048 rooftop unit rated at 352 MBH of chilled water cooling and 270 MBH of hot water heating.

The Cafeteria and Gymnasium are condition by two (2) York Solutions Model XTO-048 constant volume packaged rooftop units (RTU-7, 8). The cafeteria unit is rated at 203 MBH of cooling with hot water heating rated at 284 MBH. The gym unit is rated at 245 MBH of cooling with hot water heating rated at 121 MBH.

The Auditorium is conditioned by a York Solutions Model XTO-051 rooftop unit rated at 554 MBH of chilled water cooling and 454 MBH of hot water heating. The Kitchen is conditioned by a York rooftop unit rated at 427 MBH of chilled water cooling and 544 MBH of hot water heating.

There are five (5) split systems manufactured by Liebert that cool electrical and data closets with servers with the air-cooled condensers located on the roof. These units only provide cooling and are rated at from 2 to 8 tons of cooling.

Exhaust System

Factional horsepower upblast style exhaust fans are utilized for general and toilet exhaust air. The stairwells have smoke control fans. Fans range in size from 125 CFM to 3,320 CFM and the fan motors from 1/30 HP to 2 HP.

Makeup air for the kitchen exhaust hood is supplied by a Reznor gas-fired rooftop unit with heating only. The unit is rated for 400 MBH of heating and provides no cooling.

HVAC System Controls

The building HVAC Systems are controlled by a Johnson Controls Metasys Building Management System (BMS). The control system has direct control over room set points and setbacks. However, occupants do have limited temperature control at the thermostat to modify the space conditions.

Domestic Hot Water

Domestic hot water for the facility is provided by a PVi Model 100 P 250A-MXG water heater with a 250-gallon capacity, 1,000 input MBH, a recovery of 1,250 gallons per hour and a thermal efficiency of 80%.

Plumbing System

The Benjamin Banneker Academy utilizes sinks rated at 2.2 gallons per minute. Additionally, toilets and urinals located in the restroom areas have a rating of 1.6 and 1.0 gallons per flush, respectively.

Kitchen Equipment

The kitchen equipment at the facility contains one (1) walk-in refrigeration box and a walk-in freezer box. There are four (4) natural gas-fired convection ovens, a steam kettle, a convection steam oven, and two (2) Garland 4-burner combination oven/range underneath a Captive-Aire kitchen hood. In addition there is a CMA-180 Model T-HTC dishwasher.

The kitchen hood and dishwasher have large up blast exhaust fans rated at 1,925 CFM with 2 HP motors.

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.

IV. 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.

V. 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	Interior Lighting Upgrade	$117,193	$11,152	10.5	42.7%
ECM #2	Exterior Lighting Upgrade	$1,450	$88	16.5	-9.0%
ECM #3	Lighting Controls	$2,625	$134	19.6	-23.4%
ECM #4	Hot Water Pump VFD Installation	$37,115	$5,777	6.4	133.5%
ECM #5	Cooling Tower Fan VFD Installation	$25,020	$3,855	6.5	131.1%
ECM #6	NEMA Premium Efficiency Motors	$14,390	$443	32.5	-53.8%

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	Interior Lighting Upgrade	38.8	62,954	0
ECM #2	Exterior Lighting Upgrade	0.2	600	0
ECM #3	Lighting Controls	0.0	908	0
ECM #4	Hot Water Pump VFD Installation	0.0	39,298	0
ECM #5	Cooling Tower Fan VFD Installation	0.0	26,225	0
ECM #6	NEMA Premium Efficiency Motors	0.9	3,013	0

Table 3
ECM Emissions Summary

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	GREENHOUSE GAS EMISSIONS REDUCTION		
		CO_2 EMISSIONS (LBS)	NO_X EMISSIONS (LBS)	SO_2 EMISSIONS (LBS)
ECM #1	Interior Lighting Upgrade	95,690	176	409
ECM #2	Exterior Lighting Upgrade	912	2	4
ECM #3	Lighting Controls	1,380	3	6
ECM #4	Hot Water Pump VFD Installation	59,733	110	255
ECM #5	Cooling Tower Fan VFD Installation	39,862	73	170
ECM #6	NEMA Premium Efficiency Motors	4,580	8	20
Notes:	A. Emissions Reduction based on NJCEP published factors for electric & gas.			

Table 4
Facility Project Summary

FACILITY PROJECT SUMMARY TABLE					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Interior Lighting Upgrade	$11,152	$134,208	$17,015	$117,193	10.5
Exterior Lighting Upgrade	$88	$1,950	$500	$1,450	16.5
Lighting Controls	$134	$2,800	$175	$2,625	19.6
Hot Water Pump VFD Installation	$5,777	$37,115	$0	$37,115	6.4
Cooling Tower Fan VFD Installation	$3,855	$25,020	$0	$25,020	6.5
NEMA Premium Efficiency Motors	$443	$14,390	$0	$14,390	32.5
Total Project	**$21,449**	**$215,483**	**$17,690**	**$197,793**	**9.2**

Note the measure totals in this table do not take into account interactive effects of measures; see Method of Analysis Section III in Executive Report for further explanation.

This project does not qualify for additional incentives through the Pay for Performance Program; please see the Installation Funding Options section for additional program options.

ECM #1: Interior Lighting Upgrades

Description:

The majority of the interior lighting throughout the Benjamin Banneker Academy is provided by 1x4, 2x4, 1/2x4 and 2x2 fluorescent fixtures with newer generation 700 Series 32W T8 lamps in addition to various CFL screw-in bulbs, CFL pin base bulbs, and incandescent A-lamp bulbs. It is recommended that all fixtures within the building, except for the CFL pin base bulbs, be replaced with LED equivalent tube lamps and screw-in bulbs due to their efficiency and low power usage.

This ECM includes replacing and retrofitting all of the interior lighting in the school, except pin base CFL bulbs, with new LED type lamps and fixtures. It is recommended that the School District consult with a lighting engineer prior to retrofitting or replacing interior fixtures to ensure code required minimum light levels will be met.

Energy Savings Calculations:

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

LIGHTING UPGRADE SAVINGS SUMMARY	
DESCRIPTION	**SAVINGS**
Electric Demand Savings (kW)	45.2
Electric Usage Savings (kWh)	75,866
Electric Cost Savings ($)	$11,152

Maintenance Savings and Project Costs:

No maintenance cost savings were estimated for this measure.

Project Costs are based off RS Means Unit Cost Data and Vendor quotes.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$134,208
NJ Smart Start Equipment Incentive ($):	$17,015
Net Installation Cost ($):	$117,193
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$11,152
Total Yearly Savings ($/Yr):	$11,152
Estimated ECM Lifetime (Yr):	15
Simple Payback	10.5
Simple Lifetime ROI	42.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$167,284
Internal Rate of Return (IRR)	5%
Net Present Value (NPV)	$15,942.61

ECM #2: Exterior Lighting Upgrade

Description:

The exterior lighting at the school includes exterior building lighting only. The exterior of the building is currently lit by recessed metal halide fixtures.

Concord Engineering recommends upgrading all of the exterior lighting to an energy-efficient lighting system that includes LED bulbs and fixtures in place of the metal halide lamps.

This ECM would replace the existing exterior lamps and fixtures with equivalent LED lamps and fixtures.

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.

LIGHTING UPGRADE SAVINGS SUMMARY	
DESCRIPTION	**SAVINGS**
Electric Demand Savings (kW)	0.2
Electric Usage Savings (kWh)	600
Electric Cost Savings ($)	$88

Maintenance Savings and Project Costs:

No maintenance cost savings were estimated for this measure.

Project Costs are based off RS Means Unit Cost Data and Vendor quotes.

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,950
NJ Smart Start Equipment Incentive ($):	$500
Net Installation Cost ($):	$1,450
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$88
Total Yearly Savings ($/Yr):	$88
Estimated ECM Lifetime (Yr):	15
Simple Payback	16.5
Simple Lifetime ROI	-9.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$1,320
Internal Rate of Return (IRR)	-1%
Net Present Value (NPV)	($399.46)

ECM #3: Interior Lighting Controls Upgrade

Description:

Sometimes lights in a school are left on unnecessarily. In many cases the lights may be left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. In some instances lights might be 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. In addition, daylight control systems can be implemented using daylighting control systems that dim the electric lighting in response to interior daylight levels. The light output of the fluorescent lamps (T8) is varied by using electronic dimming ballasts. Photosensors, typically mounted in the ceiling, are used to measure the quantity of daylight in the space then determine the amount of dimming required to maintain adequate lighting levels in the total space.

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 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.

This ECM includes installation of ceiling or switch-mount sensors for the conference rooms, offices, and restrooms. 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 which can be implemented in this ECM and outlines the proposed lighting/daylighting 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:

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

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

LIGHTING CONTROLS SAVINGS SUMMARY	
DESCRIPTION	**SAVINGS**
Electric Demand Savings (kW)	0.0
Electric Usage Savings (kWh)	908
Electric Cost Savings ($)	$134

Maintenance Savings and Project Costs:

No maintenance cost savings were estimated for this measure.

Project Costs are based off RS Means Unit Cost Data and Vendor quotes.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$2,800
NJ Smart Start Equipment Incentive ($):	$175
Net Installation Cost ($):	$2,625
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$134
Total Yearly Savings ($/Yr):	$134
Estimated ECM Lifetime (Yr):	15
Simple Payback	19.6
Simple Lifetime ROI	-23.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$2,010
Internal Rate of Return (IRR)	-3%
Net Present Value (NPV)	($1,025.32)

ECM #4: Install VFD on Hot Water Pumps

Description:

Heating hot water is circulated via two (2) Armstrong end suction pumps with 20 horsepower motors with an efficiency of 91% and a flow rated at 345 gallons per minute. In addition there are two (2) Armstrong end suction pumps with 10 horsepower motors with an efficiency of 89.5% and a flow rated at 100 gallons per minute.

This ECM includes the installation of Variable Frequency Drives on the two (2) 10 horsepower and the two (2) 20 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:

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

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

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

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

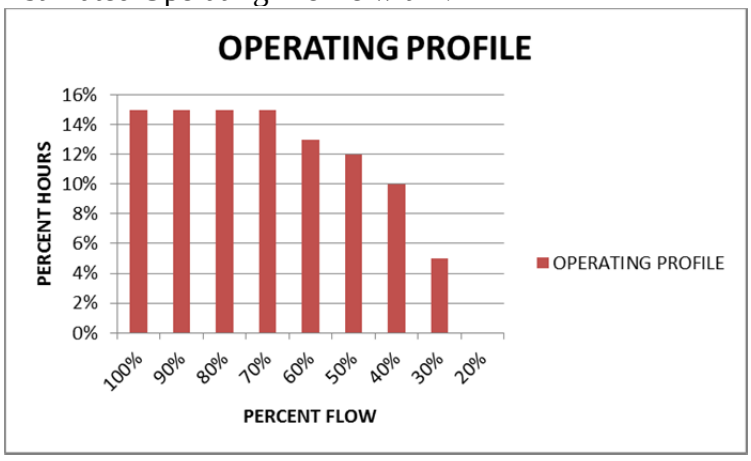
Affinity Laws are used in order to calculate energy savings by calculating the reduced power consumption requirement based a reduction in flow. Affinity laws, are as following:

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

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

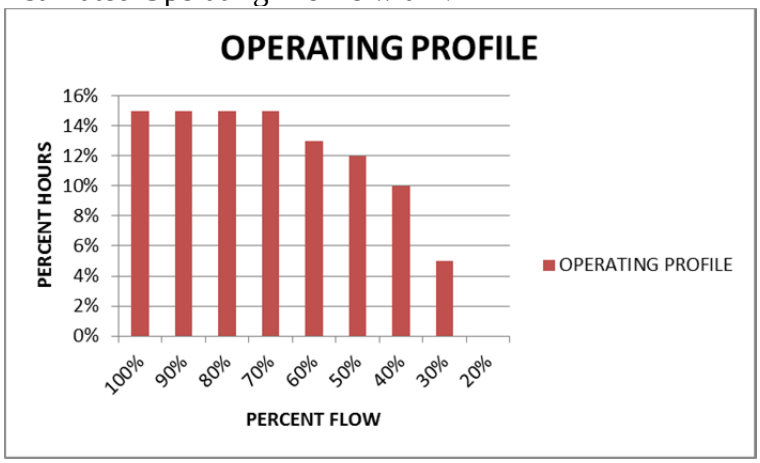
HOT WATER SET #1 PUMPS VFD CALULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	Throttle	VFD	-
Motor Nameplate HP	20.0	20.0	
Flow* (GPM)	345	345	-
Head* (Ft)	110	110	-
Pump Efficiency (%)	65.0%	65.0%	-
Motor Efficiency (%)	91.0%	91.0%	0.0%
Operating Hrs	5100	5100	-
Elec Cost ($/kWh)	0.147	0.147	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	62,713	36,660	26,053
Electric Energy Cost ($)	$9,219	$5,389	$3,830
COMMENTS:			

Estimated Operating Profile with VFD



HOT WATER SET #2 PUMPS VFD CALULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	Throttle	VFD	-
Motor Nameplate HP	10.0	10.0	
Flow* (GPM)	100	100	-
Head* (Ft)	110	110	-
Pump Efficiency (%)	65.0%	65.0%	-
Motor Efficiency (%)	89.5%	89.5%	0.0%
Operating Hrs	5100	5100	-
Elec Cost ($/kWh)	0.147	0.147	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	31,882	18,637	13,245
Electric Energy Cost ($)	$4,687	$2,740	$1,947
COMMENTS:	Estimated Flow and Head.		

Estimated Operating Profile with VFD



Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$37,115
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$37,115
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$5,777
Total Yearly Savings ($/Yr):	$5,777
Estimated ECM Lifetime (Yr):	15
Simple Payback	6.4
Simple Lifetime ROI	133.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$86,655
Internal Rate of Return (IRR)	13%
Net Present Value (NPV)	$31,850.45

ECM #5: Install VFD on Cooling Tower Fans

Description:

The Evapco cooling tower on the Benjamin Banneker roof currently has two (2) 10 horsepower constant speed fans. The installation of a VFD will allow the tower fans to modulate based on the required amount airflow needed to maintain the necessary condenser water temperature for the chiller.

This ECM includes the installation of two (2) variable frequency drives and inverter duty premium efficiency motors on the tower fans along with the required tower controls to modulate the fan speed.

Energy Savings Calculations:

Load Factor = 75% (without VFD)

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

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

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

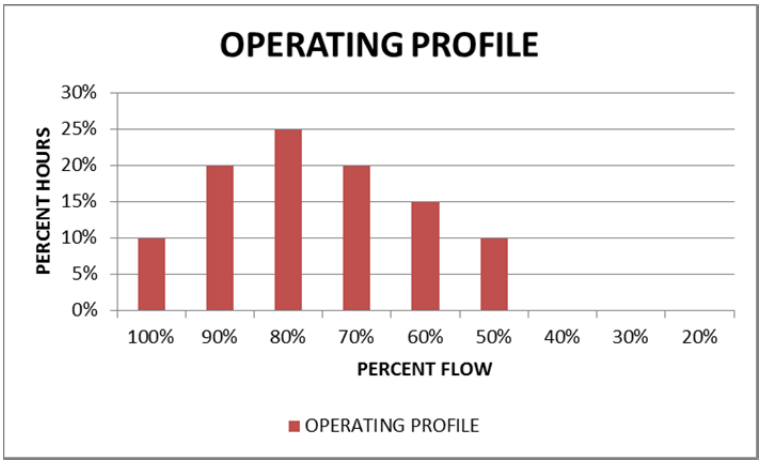
Affinity Laws are used in order to calculate energy savings by calculating the reduced power consumption requirement based a reduction in flow. Affinity laws, are as following:

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

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

COOLING TOWER FAN VFD CALULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Constant Fan	VFD Fan	
Control	On/Off	VFD	-
Quantiy of Fans	2	2	
Motor Nameplate HP	10.0	10.0	-
Motor Efficiency (%)	89.5%	91.7%	2.2%
Operating Hrs	3000	3000	-
Load Factor	75.0%	75.0%	
Elec Cost ($/kWh)	$0.147	$0.147	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	50,011	23,786	26,225
Electric Energy Cost ($)	$7,352	$3,497	$3,855
COMMENTS:			

Estimated Operating Profile with VFD



Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$25,020
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$25,020
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$3,855
Total Yearly Savings ($/Yr):	$3,855
Estimated ECM Lifetime (Yr):	15
Simple Payback	6.5
Simple Lifetime ROI	131.1%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$57,825
Internal Rate of Return (IRR)	13%
Net Present Value (NPV)	$21,000.74

ECM #6: Install NEMA Premium® Efficiency Motors

Description:

The improved efficiency of the NEMA Premium® efficient motors is primarily due to better designs with use of better materials to reduce losses. Surprisingly, the electricity used to power a motor represents 95 % of its total lifetime operating cost. Because many motors operate continuously 24 hours a day, even small increases in efficiency can yield substantial energy and dollar savings.

The electric motors driving the heating hot water pumps are candidates for replacing with premium efficiency motors. These standard efficiency motors run considerable amount of time over a year.

This energy conservation measure replaces existing inefficient electric motors with NEMA Premium® efficiency motors. NEMA Premium® is the most efficient motor designation in the marketplace today.

IMPLEMENTATION SUMMARY					
EQMT ID	**FUNCTION**	**MOTOR HP**	**HOURS OF OPERATION**	**EXISTING EFFICIENCY**	**NEMA PREMIUM EFFICIENCY**
P-5	Heating Hot Water Pump	20	3,391	91.0%	93.0%
P-6	Heating Hot Water Pump	20	3,391	91.0%	93.0%
P-7	Heating Hot Water Pump	10	3,391	89.5%	92.4%
P-8	Heating Hot Water Pump	10	2,745	89.5%	92.4%

Energy Savings Calculations:

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

where, HP = Motor Nameplate Horsepower Rating

LF = Load Factor Motor Efficiency = Motor Nameplate Efficiency

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$\text{Electric cost savings} = \text{Electric Usage Savings} \times \text{Electric Rate} \left(\frac{\$}{\text{kWh}}\right)$$

The calculations were carried out and the results are tabulated in the table below:

PREMIUM EFFICIENCY MOTOR CALCULATIONS							
EQMT ID	MOTOR HP	LOAD FACTOR	EXISTING EFFICIENCY	NEMA PREMIUM EFFICIENCY	POWER SAVINGS kW	ENERGY SAVINGS kWH	COST SAVINGS
P-5	20	75%	91.0%	93.0%	0.26	902	$133
P-6	20	75%	91.0%	93.0%	0.26	902	$133
P-7	10	75%	89.5%	92.4%	0.20	669	$98
P-8	10	75%	89.5%	92.4%	0.20	541	$80
TOTAL					**0.9**	**3,013.4**	**443.0**

Equipment Cost and Incentives

There are no SmartStart Building® incentives for premium efficiency motors.

Project Costs are based off RS Means Unit Cost Data and Vendor quotes.

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$14,390
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$14,390
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$443
Total Yearly Savings ($/Yr):	$443
Estimated ECM Lifetime (Yr):	15
Simple Payback	32.5
Simple Lifetime ROI	-53.8%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$6,645
Internal Rate of Return (IRR)	-8%
Net Present Value (NPV)	($9,101.49)

REM #1: Solar System

Description:

Benjamin Banneker Academy has limited roof space which is not conducive to the installation of a solar array. Although there is an open area available on the east side of the building, it is surrounded on two sides by the higher level roof, limiting sun exposure. Additionally, any parking lot solar array installations were deemed infeasible due to the building's shadow limiting sun exposure.

VI. ADDITIONAL RECOMMENDATIONS

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

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

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

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

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

F. Replace any old CRT Monitors with LED/LCD Type Monitors, which can draw as much as a quarter the power of an equivalent CRT monitor.

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

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING

East Orange School District - Benjamin Banneker Academy

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	Interior Lighting Upgrade	$88,275	$45,933	$17,015	$117,193	$11,152	$0	$11,152	15	$167,284	$0	42.7%	10.5	4.82%	$15,942.61
ECM #2	Exterior Lighting Upgrade	$1,500	$450	$500	$1,450	$88	$0	$88	15	$1,320	$0	-9.0%	16.5	-1.15%	($399.46)
ECM #3	Lighting Controls	$1,850	$950	$175	$2,625	$134	$0	$134	15	$2,010	$0	-23.4%	19.6	-3.17%	($1,025.32)
ECM #4	Hot Water Pump VFD Installation	$18,600	$18,515	$0	$37,115	$5,777	$0	$5,777	15	$86,655	$0	133.5%	6.4	13.11%	$31,850.45
ECM #5	Cooling Tower Fan VFD Installation	$12,400	$12,620	$0	$25,020	$3,855	$0	$3,855	15	$57,825	$0	131.1%	6.5	12.92%	$21,000.74
ECM #6	NEMA Premium Efficiency Motors	$7,550	$6,840	$0	$14,390	$443	$0	$443	15	$6,645	$0	-53.8%	32.5	-8.40%	($9,101.49)

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 from July 1, 2015 to June 30, 2016, further details including how to apply, forms, and calculated incentive values can be found the Clean Energy Website. (www.njcleanenergy.com)

Electric Chillers

Water-Cooled Chillers	Constant Speed: Base: $8 - $30 per ton Performance Add: $2 - $2.25 per ton Variable Speed: Base: $12 - $44 per ton Performance Add: $2 - $4.00 per ton
Air-Cooled Chillers	Constant Speed: Base: $20 per ton Performance Add: $3.50 per ton Variable Speed: Base: $90 - $92 per ton Performance Add: $4.00 per ton

Energy Efficiency must comply with ASHRAE 90.1-2013

Gas Cooling

Gas Absorption Chillers (Indirect & Direct-Fired)	$185 - $450 per ton

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

Hot Water Gas Fired Boilers < 300 MBH	Non-Condensing: $0.95 per MBH, Minimum $400 per unit Condensing: $2.00 per MBH, Minimum $1000 per unit
Hot Water Gas Fired Boilers ≥ 300 - 1500 MBH	Non-Condensing: $1.75 per MBH Condensing: $2.20 per MBH Minimum $1000 per unit
Hot Water Gas Fired Boilers >1500 - ≤ 2500 MBH	Non-Condensing: $1.50 per MBH Condensing: $2.20 per MBH
Hot Water Gas Fired Boilers >2500 - ≤ 4000 MBH	Non-Condensing: $1.30 per MBH Condensing: $2.00 per MBH
Steam, Except Natural Draft, Gas fired Boilers < 300 MBH	$1.40 per MBH, Minimum $400 per unit
Steam, Except Natural Draft, Gas fired Boilers ≥ 300 – 1500 MBH	$1.20 per MBH
Steam, Except Natural Draft, Gas fired Boilers > 1500 – 2500 MBH	$1.20 per MBH
Steam, Except Natural Draft, Gas fired Boilers > 2500 – 4000 MBH	$1.00 per MBH
Steam, Natural Draft < 300 MBH	$1.40 per MBH, Minimum $300 per unit
Steam, Natural Draft ≥ 300 - 1500 MBH	$1.00 per MBH
Steam, Natural Draft >1500 - ≤ 2500 MBH	$0.90 per MBH
Steam, Natural Draft >2500 - ≤ 4000 MBH	$0.70 per MBH
All Types 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

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

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 ≥ 20 hp	$60 per VFD rated hp
Rotary Screw Air Compressors ≥ 25 hp	$5,250 to $12,500 per drive
Centrifugal Fan Applications on Constant Volume HVAC Systems	$80 per VFD rated hp, maximum $6,000 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

Prescriptive Lighting

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)	$5 per fixture
T-5 and T-8 High Bay Fixtures	$25 - $150 per fixture
HID ≥ 100w Replace with new induction fixture. (must be 30% less watts/fixture than HID system)	$70 per fixture
HID ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	$50 per fixture

Prescriptive Lighting - LED

LED Architectural Floor and Spot Luminaires	$50 per fixture
LED Bollard Fixtures	$50 per fixture
LED Display Case Lighting	$30 per display case
LED Fuel Pump Canopy	$100 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 Linear Ambient Luminaires (Indirect, Indirect/Direct, Direct/Indirect, Direct)	2’ Fixtures - $20/fixture 3’ Fixtures - $30/fixture 4’ Fixtures - $45/fixture 6’ Fixtures - $60/fixture 8’ Fixtures - $75/fixture
LED Linear Replacement Lamps (2’ & 4’ only)	$5 per lamp
Luminaires for Ambient Lighting of Interior Commercial Spaces (1x4, 2x2, 2x4 New Fixtures and Retrofit Kits)	1x4 LED - $15 per fixture 2x2 LED - $15 per fixture 2x4 LED - $25 per fixture
LED Outdoor Pole/Arm-Mounted Area and Roadway Luminaries	$100 per fixture
LED Outdoor Pole/Arm-Mounted Decorative Luminaries	$50 per fixture
LED Outdoor Wall-Mounted Area Luminaries	$100 per fixture
LED Parking Garage Luminaries	$100 per fixture
LED Retrofit Kits for Large Outdoor Pole / Arm-Mounted Area and Roadway Luminaires	$150 per fixture
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 Shelf-Mtd. Display & Task Lights	$15 per linear foot

LED Stairwell and Passageway Luminaires	$40 per fixture
LED Track or Mono-Point Directional Lighting Fixtures	$30 per fixture
LED Wall-Wash Lights	$30 per fixture
EnergyStar Commercial Lighting Fixtures	$5 to $10 per fixture
EnergyStar Screw and Pine-Based Bulbs	$5 to $10 per lamp

Lighting Controls – Occupancy Sensors

Wall Mounted (Existing Facilities Only)	$20 per control
Remote Mounted (Existing Facilities Only)	$35 per control
Daylight Dimming Controls	$45 per fixture controlled
Occupancy Based hi-low Dimming Control	$35 per fixture controlled
Occupancy Sensor Remote Mounted High-Bay (Existing Facilities Only)	$35 per control

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

Refrigerator / Freezer Case Premium Efficiency Motors

Fraction ECM Motor < 1 HP	$40 per ECM for replacement of existing shaded-pole motor

Food Service Equipment

Combination Oven/Steamer (Electric)	$1,000/oven
Combination Oven/Steamer (Natural Gas)	$750/oven
Convection Oven (Electric)	$350/oven
Convection Oven (Natural Gas)	$500/oven
Rack Oven (Natural Gas)	$1,000/single oven, $2,000/double oven
Conveyor Oven (Natural Gas)	$500/small deck $750/large deck
Fryer (Electric)	$200/vat
Fryer (Natural Gas)	$749/vat
Large Vat Fryer (Electric)	$200/vat
Large Vat Fryer (Natural Gas)	$500/vat
Griddle (Electric)	$300/griddle
Griddle (Natural Gas)	$125/griddle
Steam Cooker (Electric)	$1,250/steamer
Steam Cooker (Natural Gas)	$2,000/steamer
Insulated Holding Cabinets	$200 to $300/unit
Glass Door Refrigerators	$75 to $150/unit
Solid Door Refrigerators	$50 to $200/unit
Glass Door Freezers	$200 to $1,000/unit
Solid Door Freezers	$100 to $600/unit
Ice Machines	$50 to $500/unit
Dishwashers	$400 to $1,500/unit

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

ENERGY STAR® Data Verification Checklist

17

ENERGY STAR ® Score[1]

Benjamin Banneker Academy

Registry Name: Benjamin Banneker Academy
Primary Function: K-12 School
Gross Floor Area (ft²): 91,505
Built: 2009

For Year Ending: 04/30/2015
Date Generated: 08/13/2015

1. The ENERGY STAR score is a 1-to-100 assessment of a building's energy efficiency as compared with similar building nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address
Benjamin Banneker Academy
500 S Clinton Street
East Orange, New Jersey 07018

Property ID: 4441527

Property Owner
East Orange School District
199 4th Avenue, 5th Floor
East Orange, NJ 07017
(____)____-_____

Primary Contact
Racquel Ferguson
199 4th Avenue, 5th Floor
East Orange, NJ 07017
(973) 266-5742
racquel.ferguson@eastorange.k12.nj.us

1. Review of Whole Property Characteristics

Basic Property Information

1) **Property Name:** Benjamin Banneker Academy

Is this the official name of the property? ☐ Yes ☐ No

If "No", please specify: _____

2) **Primary Function:** K-12 School

Is this an accurate description of the primary use of this property? ☐ Yes ☐ No

3) **Location:**

500 S Clinton Street
East Orange, New Jersey 07018

Is this correct and complete? ☐ Yes ☐ No

4) **Gross Floor Area:** 91,505 ft²

☐ Yes ☐ No

Does this represent the entire property? (i.e., no part of the building/property was excluded/subtracted from the total) If “no” please specify what space has been excluded.

5) **Average Occupancy:** 90

Is this occupancy accurate for the entire 12 month period being assessed? ☐ Yes ☐ No

6) **Number of Buildings:** 1

Does this number accurately represent all structures? ☐ Yes ☐ No

Notes:

Indoor Environmental Standards

1) **Ventilation for Acceptable Indoor Air Quality**

Does this property meet the ASHRAE Standard 62 for ventilation for acceptable indoor air quality? ☐ Yes ☐ No

2) **Acceptable Thermal Environmental Conditions**

Does this property meet the ASHRAE Standard 55 for thermal comfort? ☐ Yes ☐ No

3) **Adequate Illumination**

Does this property adhere to the IESNA Lighting Handbook for lighting quality? ☐ Yes ☐ No

Notes:

2. Review of Property Use Details

K-12 School: Building Use

1) **Gross Floor Area:** 91,505 ft²

Is this the total size, as measured between the principal exterior surfaces of the enclosing fixed walls of the building(s)? This includes all areas inside the building(s) such as: occupied tenant areas, common areas, meeting areas, break rooms, restrooms, elevator shafts, mechanical equipment areas, and storage rooms. Gross ☐ Yes ☐ No

Floor Area should not include interstitial plenum space between floors, which may house pipes and ventilation. Gross Floor Area is not the same as rentable, but rather includes all area inside the building(s). Leasable space would be a sub-set of Gross Floor Area. In the case where there is an atrium, you should count the Gross Floor Area at the base level only. Do not increase the size to accommodate open atrium space at higher levels. The Gross Floor Area should not include any exterior spaces such as balconies or exterior loading docks and driveways.

2) Gymnasium Floor Area: 0 ft²

Does the gymnasium floor area include all areas devoted to a gymnasium, including gymnasium/athletic areas, spectator areas, locker rooms, and other associated spaces? ☐ **Yes** ☐ **No**

3) High School: No

Is the property a high school (teaching grades 10, 11, and/or 12)? If the property 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'. ☐ **Yes** ☐ **No**

4) Number of Workers on Main Shift: 64

Is this the number of workers present during the main shift? Note that this is not a total count of workers, but rather a count of workers who are present at the same time. For example, if there are two daily eight hour shifts of 100 workers each, the Number of Workers on Main Shift value is 100. Number of Workers on Main Shift may include employees of the property, sub-contractors who are onsite regularly, and volunteers who perform regular onsite tasks. Number of Workers should not include visitors to the buildings such as clients, customers, or patients. ☐ **Yes** ☐ **No**

5) Student Seating Capacity: 431

Is this the maximum number of students for which the school was designed? This should include the seating capacity of the entire school. If portable classrooms have been added to the school, include the capacity of these classrooms, as they expand the overall capacity of the school. ☐ **Yes** ☐ **No**

6) Months in Use: 10

Is this the total number of months that the property is open for standard activities? ☐ **Yes** ☐ **No**

7) Weekend Operation: No

Does the property include regular activities on the weekend beyond the scope of maintenance, cleaning, and security personnel? Weekend activity could include any time when the property is used for classes, performances, or other school or community activities. The Yes selection is appropriate for any property that is open on one or both days of the weekend during one or more seasons of the year. ☐ **Yes** ☐ **No**

8) Number of Computers: 502

Is this the total number of desktop computers, laptops, and data servers at the property? This number should not include tablet computers, such as iPads, or any other types of office equipment. The count should only reflect computers that are owned by the school. It should not include any computers that are brought onsite by students or staff. ☐ **Yes** ☐ **No**

9) Cooking Facilities: 100% Yes

Does the property have a commercial cooking area designed to provide and serve food to occupants and/or visitors? This may include restaurants and cafeterias. If the property contains only employee break room kitchens, this field should be marked No. ☐ **Yes** ☐ **No**

10) Number of Walk-in Refrigeration/Freezer Units: 0

Is this the total count of walk-in units at the property? Walk-in Refrigeration/Freezers are typically very large units located in storage areas or commercial kitchens that would not be accessible to all building occupants. This count should only include large storage units that a person actually walks into in order to store or retrieve perishable goods. ☐ **Yes** ☐ **No**

11) Percent That Can Be Heated: 100

Is this the total percentage of the property that can be heated by mechanical equipment? ☐ **Yes** ☐ **No**

12) Percent That Can Be Cooled: 100

Is this the total percentage of the property that can be cooled by mechanical equipment? This includes all types of cooling from central air to individual window units. ☐ **Yes** ☐ **No**

13) School District: East Orange

Is this the administrative school district in which the property is located? ☐ **Yes** ☐ **No**

Notes:

3. Review of Energy Consumption

Data Overview

Site Energy Use Summary	
Electric - Grid (kBtu)	4,121,563.8 (35%)
Natural Gas (kBtu)	7,731,673.6 (65%)
Total Energy (kBtu)	11,853,237.5
Energy Intensity	
Site (kBtu/ft²)	129.5
Source (kBtu/ft²)	230.2

National Median Comparison	
National Median Site EUI (kBtu/ft²)	94
National Median Source EUI (kBtu/ft²)	167
% Diff from National Median Source EUI	37.8%
Emissions (based on site energy use)	
Greenhouse Gas Emissions (Metric Tons CO2e)	962.4

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

Note: All values are annualized to a 12-month period. Source Energy includes energy used in generation and transmission to enable an equitable assessment.

Summary of All Associated Meters

The following meters are associated with the property, meaning that they are added together to get the total energy use for the property. Please see additional tables in this checklist for the exact meter consumption values.

Meter Name	Fuel Type	Start Date	End Date	Associated With
Natural Gas	Natural Gas	12/13/2013	In Use	Benjamin Banneker Academy

Meter Name	Fuel Type	Start Date	End Date	Associated With
Electric Grid Meter	Electric	12/13/2013	In Use	Benjamin Banneker Academy

Total Energy Use

Do the meters shown above account for the total energy use of this property during the reporting period of this application?

☐ **Yes** ☐ **No**

Additional Fuels

Do the meters above include all fuel *types* at the property? That is, no additional fuels such as district steam, generator fuel oil have been excluded.

☐ **Yes** ☐ **No**

On-Site Solar and Wind Energy

Are all on-site solar and wind installations reported in this list (if present)? All on-site systems must be reported.

☐ **Yes** ☐ **No**

Notes:

Natural Gas Meter: Natural Gas (therms)

Associated With: Benjamin Banneker Academy

Start Date	End Date	Usage
04/15/2014	05/16/2014	2,873.12
05/16/2014	06/16/2014	4,226.76
06/16/2014	07/16/2014	6,949.63
07/16/2014	08/14/2014	6,877.36
08/14/2014	09/15/2014	5,217.38
09/15/2014	10/14/2014	1,372.7
10/14/2014	11/12/2014	1,955.28
11/12/2014	12/15/2014	10,872.04
12/15/2014	01/15/2015	9,666.42
01/15/2015	02/13/2015	13,480.24
02/13/2015	03/19/2015	10,887.21
03/19/2015	04/16/2015	2,994.64

Start Date	End Date	Usage
04/16/2015	05/15/2015	2,758.59
	Total Consumption (therms):	80,131.37
	Total Consumption (kBtu (thousand Btu)):	8,013,137

Total Energy Consumption for this Meter ☐ **Yes** ☐ **No**

Do the fuel consumption totals shown above include consumption of all energy tracked through this meter that affect energy calculations for the reporting period of this application (i.e., do the entries match the utility bills received by the property)?

Notes:

Electric Meter: Electric Grid Meter (kWh (thousand Watt-hours))

Associated With: Benjamin Banneker Academy

Start Date	End Date	Usage	Green Power?
04/15/2014	05/16/2014	76,800	No
05/16/2014	06/16/2014	130,800	No
06/16/2014	08/14/2014	258,400	No
08/14/2014	09/15/2014	124,800	No
09/15/2014	10/14/2014	106,800	No
10/14/2014	11/12/2014	64,000	No
11/12/2014	12/15/2014	92,400	No
12/15/2014	01/15/2015	79,600	No
01/15/2015	03/11/2015	146,400	No
03/11/2015	03/19/2015	21,600	No
03/19/2015	04/23/2015	111,600	No
04/23/2015	05/21/2015	120,400	No
	Total Consumption (kWh (thousand Watt-hours)):	1,333,600	
	Total Consumption (kBtu (thousand Btu)):	4,550,243.2	

Total Energy Consumption for this Meter ☐ **Yes** ☐ **No**

Do the fuel consumption totals shown above include consumption of all energy tracked through this meter that affect energy calculations for the reporting period of this application (i.e., do the entries match the utility bills received by the property)?

Notes:

4. Signature & Stamp of Verifying Licensed Professional

_____ (Name) visited this site on _____ (Date). Based on the conditions observed at the time of the visit to this property, I verify that the information contained within this application is accurate and in accordance with the Licensed Professional Guide.

Signature: _____ Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

NOTE: When applying for the ENERGY STAR, the signature of the Verifying Professional must match the stamp.

Professional Engineer Stamp
(if applicable)

ENERGY STAR® Statement of Energy Performance

17

ENERGY STAR® Score[1]

Benjamin Banneker Academy

Primary Property Function: K-12 School
Gross Floor Area (ft²): 91,505
Built: 2009

For Year Ending: April 30, 2015
Date Generated: August 13, 2015

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
Benjamin Banneker Academy 500 S Clinton Street East Orange, New Jersey 07018	East Orange School District 199 4th Avenue, 5th Floor East Orange, NJ 07017 (____)____-_____	Racquel Ferguson 199 4th Avenue, 5th Floor East Orange, NJ 07017 (973) 266-5742 racquel.ferguson@eastorange.k12.nj.us

Property ID: 4441527

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
129.5 kBtu/ft²

Source EUI
230.2 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	4,121,564 (35%)
Natural Gas (kBtu)	7,731,674 (65%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	94
National Median Source EUI (kBtu/ft²)	167
% Diff from National Median Source EUI	38%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	962

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp (if applicable)

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering

Rooftop Units

Tag	AHU-1	AHU-2	AHU-3
Unit Type	Rooftop	Rooftop	Rooftop
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	3rd Fl - West	1st & 2nd Fl - West	3rd Fl - East
Manufacturer	York	York	York
Model No.	XTO-0--	XTO-090	XT0-051
Serial No.	CCTMX----	CCTMXT0071	CCTMXT0067
Cooling Type	Chilled Water	Chilled Water	Chilled Water
Cooling Capacity (MBH)	730	1,188	300
Cooling Efficiency (SEER/EER)	N/A	N/A	N/A
Heating Type	Hot Water	Hot Water	Hot Water
Heating Capacity (MBH)	389	585.9	162.5
Efficiency	N/A	N/A	N/A
Supply Fan (HP)	40	60	15
Supply Fan VFD	☑ Yes ☐ No ☐ N/A	☑ Yes ☐ No ☐ N/A	☑ Yes ☐ No ☐ N/A
Return/Exhaust Fan (HP)	15	25	7.5
Return/Exhaust Fan VFD	☑ Yes ☐ No ☐ N/A	☑ Yes ☐ No ☐ N/A	☑ Yes ☐ No ☐ N/A
Approx Age	7	7	7
ASHRAE Service Life	15	15	15
Remaining Life	8	8	8
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Rooftop Units

Tag	AHU-4	AHU-5	AHU-6
Unit Type	Rooftop	Rooftop	Rooftop
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	1st & 2nd Fl - East	Corridors	Auditorium
Manufacturer	York	York	York
Model No.	XT0-053	XTO-048	XTO-051
Serial No.	CCTMXT0092	CCTMXT0030	CCTMXT0178
Cooling Type	Chilled Water	Chilled Water	Chilled Water
Cooling Capacity (MBH)	549	352	554
Cooling Efficiency (SEER/EER)	N/A	N/A	N/A
Heating Type	Hot Water	Hot Water	Hot Water
Heating Capacity (MBH)	228	270	454
Efficiency	N/A	N/A	N/A
Supply Fan (HP)	20	10	15
Supply Fan VFD	☑ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Return/Exhaust Fan (HP)	7.5	5	7.5
Return/Exhaust Fan VFD	☑ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Approx Age	7	7	7
ASHRAE Service Life	15	15	15
Remaining Life	8	8	8
Comments			Energy recovery wheel

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Rooftop Units

Tag	AHU-7	AHU-8	AHU-9
Unit Type	Rooftop	Rooftop	Rooftop
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Cafeteria	Gymnasium	Kitchen
Manufacturer	York	York	York
Model No.	XTO-048	XTO-048	
Serial No.	CCTMC70127	CCTMXT0039	
Cooling Type	Chilled Water	Chilled Water	Chilled Water
Cooling Capacity (MBH)	203	245	427
Cooling Efficiency (SEER/EER)	N/A	N/A	N/A
Heating Type	Hot Water	Hot Water	Hot Water
Heating Capacity (MBH)	284.2	121	544.3
Efficiency	N/A	N/A	N/A
Supply Fan (HP)	7.5	15	15
Supply Fan VFD	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Return/Exhaust Fan (HP)	3	7.5	3
Return/Exhaust Fan VFD	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Approx Age	7	7	7
ASHRAE Service Life	15	15	15
Remaining Life	8	8	8
Comments	Energy recovery wheel		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Air Handler Units

Tag	HV-1	CRAC-1
Unit Type	Heating and Ventilating Unit	Split System AC Unit
Qty	1	1
Location	Basement	1st Floor
Area Served	Mechanical Room	MDF Room
Manufacturer	York	Liebert
Model No.	-	MM-96E
Serial No.	-	-
Cooling Type	No Cooling	Split System DX
Cooling Capacity (Tons)	N/A	8
Heating Type	Hot Water	No Heating
Heating Input (MBH)	385	N/A
Supply Fan (HP)	5	3
Supply Fan VFD	☐ Yes ☑ No ☐ N/A	☐ Yes ☑ No ☐ N/A
Return Fan (HP)	N/A	N/A
Return Fan VFD	☐ Yes ☑ No ☐ N/A	☐ Yes ☐ No ☑ N/A
Approx Age	7	7
ASHRAE Service Life	20	20
Remaining Life	13	13
Comments		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Air Handler Units

Tag	CRAC-2	CRAC-3
Unit Type	Split System AC Unit	Split System AC Unit
Qty	1	1
Location	2nd Floor	3rd Floor
Area Served	IDF Room	IDF Room
Manufacturer	Liebert	Liebert
Model No.	MM-24E	MM-24E
Serial No.	-	-
Cooling Type	Split System DX	Split System DX
Cooling Capacity (Tons)	2	2
Heating Type	No Heating	No Heating
Heating Input (MBH)	N/A	N/A
Supply Fan (HP)	1/2	1/2
Supply Fan VFD	☐ Yes ☑ No ☐ N/A	☐ Yes ☑ No ☐ N/A
Return Fan (HP)	N/A	N/A
Return Fan VFD	☐ Yes ☐ No ☑ N/A	☐ Yes ☐ No ☑ N/A
Approx Age	7	7
ASHRAE Service Life	20	20
Remaining Life	13	13
Comments		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Air Handler Units

Tag	CRAC-4	CRAC-5
Unit Type	Split System AC Unit	Split System AC Unit
Qty	1	1
Location	Basement	Basement
Area Served	Electrical Room	Elevator Mach Room
Manufacturer	Liebert	Liebert
Model No.	MM-60E	MM-36E
Serial No.	-	-
Cooling Type	Split System DX	Split System DX
Cooling Capacity (Tons)	5	3
Heating Type	No Heating	No Heating
Heating Input (MBH)	N/A	N/A
Supply Fan (HP)	2	1/2
Supply Fan VFD	☐ Yes ☑ No ☐ N/A	☐ Yes ☑ No ☐ N/A
Return Fan (HP)	N/A	N/A
Return Fan VFD	☐ Yes ☐ No ☑ N/A	☐ Yes ☐ No ☑ N/A
Approx Age	7	7
ASHRAE Service Life	20	20
Remaining Life	13	13
Comments		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Condensing Units

Tag	CACC-1	CACC-2	CACC-3
Unit Type	Standard Air-Cooled	Standard Air-Cooled	Standard Air-Cooled
Qty	1	1	1
Location	Roof	Roof	Roof
Area/Unit Served	MDF Room	IDF Room	IDF Room
Manufacturer	Liebert	Liebert	Liebert
Model No.	PFH096A	PFH027A	PFH027A
Serial No.	-	-	-
Refrigerant Type	407C	407C	407C
Cooling Capacity	8 Tons	2 Tons	2 Tons
Cooling Efficiency	15 EER	12 EER	12 EER
Volts / Phase / Hz	460/3/60	208/1/60	208/1/60
Approx Age	7	7	7
ASHRAE Service Life	20	20	20
Remaining Life	13	13	13
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering

Condensing Units

Tag	CACC-4	CACC-5
Unit Type	Standard Air-Cooled	Standard Air-Cooled
Qty	1	1
Location	Roof	Roof
Area/Unit Served	Electrical Room	Elevator Mach Room
Manufacturer	Liebert	Liebert
Model No.	PFH067A	PFH027A
Serial No.	-	-
Refrigerant Type	407C	407C
Cooling Capacity	5 Tons	2 Tons
Cooling Efficiency	13 EER	12 EER
Volts / Phase / Hz	460/3/60	208/1/60
Approx Age	7	7
ASHRAE Service Life	20	20
Remaining Life	13	13
Comments		

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

MAJOR EQUIPMENT LIST

Concord Engineering

Boilers

Tag	B-1,2,3,4
Unit Type	Condensing (Water)
Qty	4
Location	Basement Mechanical Room
Manufacturer	Aerco
Model No.	BMK-2.0
Serial No.	Varies
Input Capacity (MBH)	2,000
Output Capacity (MBH)	1,720
Approx. Efficiency %	86.0%
Fuel Type	Natural Gas
Approx Age	8
ASHRAE Service Life	24
Remaining Life	16
Comments	

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

MAJOR EQUIPMENT LIST

Concord Engineering

Chiller

Tag	CH-1
Unit Type	Absorption
Qty	1
Location	Mechanical Room
Area Served	Building CHW Loop
Manufacturer	Broad
Model No.	BZ135IXD
Serial No.	7126273
Refrigerant	
Cooling Capacity (Tons)	450
Cooling Efficiency (KW/Ton)	5289 MBH Input
Volts / Phase / Hz	460V/ 3Ph
Chilled Water GPM / ΔT	1210 GPM / 10F
Condenser Water GPM / ΔT	1216 GPM / 15F
Approx Age	7
ASHRAE Service Life	20
Remaining Life	13
Comments	

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Cooling Tower

Tag	CT-1
Unit Type	Induced Draft
Qty	1
Location	Roof
Area Served	Condenser Loop
Manufacturer	Evapco
Model #	UT 29-124
Serial #	7-309655
Rated Flow GPM	1,215
EWT / LWT	100 / 85
Motor HP	2 X 10 HP
Electrical	460/3/60
Tower Fan VFD	☐ Yes ☑ No ☐ N/A
Approx Age	7
ASHRAE Service Life	20
Remaining Life	13
Comments	

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Domestic Water Heaters

Tag	DHW-1
Unit Type	Storage
Qty	1
Location	Mechanical Room
Area Served	Building DHW
Manufacturer	PVi
Model #	100 P 250A-MXG
Serial #	1209128668
Storage Size (Gal)	250
Input Capacity (MBH/KW)	1,000
Recovery (Gal/Hr)	1250
Efficiency %	80%
Fuel	Natural Gas
Approx Age	7
ASHRAE Service Life	15
Remaining Life	8
Comments	

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Pumps

Tag	P-1,2	P-3,4
Unit Type	Base-mounted	Base-mounted
Qty	2	2
Location	Basement	Basement
System Served	Primary Chilled Water	Condenser Water
Manufacturer	Armstrong	Armstrong
Model #	BF-STD	-
Serial #	594977	-
Horse Power	125.0	40.0
Flow Rate (GPM)	1,210	1,216
Head Pressure (FTHD)	180	70
Motor Manufacturer	Westinghouse	Westinghouse
Motor Frame	405T	324T
Electrical Power (V/P/HZ)	460/3/60	460/3/60
Motor RPM	1775	1765
Motor Efficiency %	95.0%	93.6%
Pump VFD	☑ Yes ☐ No ☐ N/A	☑ Yes ☐ No ☐ N/A
Approx Age	7	7
ASHRAE Service Life	18	18
Remaining Life	11	11
Comments		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Pumps

Tag	P-5,6	P-7,8
Unit Type	Base-mounted	Base-mounted
Qty	2	2
Location	Basement	Basement
System Served	Heating Hot Water	Heating Hot Water
Manufacturer	Armstrong	Armstrong
Model #	-	-
Serial #	-	-
Horse Power	20.0	10.0
Flow Rate (GPM)	345	100
Head Pressure (FTHD)	110	110
Motor Manufacturer	Westinghouse	Westinghouse
Motor Frame	256T	215T
Electrical Power (V/P/HZ)	460/3/60	460/3/60
Motor RPM	1755	1740
Motor Efficiency %	91.0%	89.5%
Pump VFD	☐ Yes ☑ No ☐ N/A	☐ Yes ☑ No ☐ N/A
Approx Age	7	7
ASHRAE Service Life	18	18
Remaining Life	11	11
Comments		

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering

Large Exhaust Fans

Tag	TE-1	KE-1	DE-1
Unit Type	Up Blast	Up Blast	Up Blast
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Basmt thru 3rd Fl Toilets	Kitchen Hood	Dishwashing Exhaust
Manufacturer	Greenheck	Greenheck	Greenheck
Model #	CUBE-220HP	CUBE-240XP	CUBE-240XP
Motor (HP)	2	2	2
Electrical (V/H/P)	460/3/60	460/3/60	460/3/60
Approx Age	7	7	7
ASHRAE Service Life	20	20	20
Remaining Life	13	13	13
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

APPENDIX E

CEG Project #: 1C15143
Facility Name: Benjamin Banneker Academy
Address: 500 S. Clinton St.
City, State, Zip East Orange, NJ 07018

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
37	2 - Classroom 201	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	YES	-
37	2 - Classroom 202	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	11	1.02	1,637	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	11	0.50	792	0.53	845	$124	0	No New Controls	0	0.0%	0	$0	$990.00	$495.00	$1,485.00	$165.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	2 - Classroom 203	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	2 - Classroom 204	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	2 - Classroom 205	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	12	12	0.14	230	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	(0.40)	(634)	($93)	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	(15.46)	$0.00	$0.00	$0.00	FALSE	-
37	2 - Classroom 206	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	2 - Classroom 210	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	2 - Special Room 212	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	7	0.65	1,042	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	7	0.32	504	0.34	538	$79	0	No New Controls	0	0.0%	0	$0	$630.00	$315.00	$945.00	$105.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	2 - Special Room 212 Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	2 - Classroom 214	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	2 - Physical Therapy (Small Group Room) 213	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	6	0.56	893	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	6	0.27	432	0.29	461	$68	0	No New Controls	0	0.0%	0	$0	$540.00	$270.00	$810.00	$90.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	2 - Classroom 211	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	FALSE	-

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
37	2 - Classroom 209	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	2 - Boys Bathroom	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	3	0.28	614	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	3	0.14	297	0.14	317	$47	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	59	$9	$270.00	$135.00	$405.00	$45.00	7.73	$200.00	$50.00	$250.00	FALSE	28.63
37	2 - Girls Bathroom	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	3	0.28	614	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	3	0.14	297	0.14	317	$47	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	59	$9	$270.00	$135.00	$405.00	$45.00	7.73	$200.00	$50.00	$250.00	FALSE	28.63
52	2 - Supply Closet	400	2-Lamp T8 Electronic 2x4 Pendant Mounted Parabolic Lens	2	62	1	0.06	25	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	1	0.03	12	0.03	13	$2	0	No New Controls	0	0.0%	0	$0	$60.00	$45.00	$105.00	$10.00	50.49	$0.00	$0.00	$0.00	FALSE	-
37	2 - Guidance Office Suite Hallway	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	6	0.56	1,228	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	6	0.27	594	0.29	634	$93	0	No New Controls	0	0.0%	0	$0	$540.00	$270.00	$810.00	$90.00	7.73	$0.00	$0.00	$0.00	FALSE	-
37	2 - Guidance Office	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	4	0.37	744	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	4	0.18	360	0.19	384	$56	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	72	$11	$360.00	$180.00	$540.00	$60.00	8.50	$50.00	$50.00	$100.00	$20.00	7.56
131	2 - Assistant Principal's Office	2000	3-Lamp T8 Electronic 2x2 Recessed Parabolic Lens	3	53	4	0.21	424	Re-Lamp / Reflector	Seesmart LED 2' Tube 9W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	27	4	0.11	216	0.10	208	$31	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	43	$6	$240.00	$180.00	$420.00	$60.00	11.77	$50.00	$50.00	$100.00	$20.00	12.60
131	2 - Social Worker's Office	2000	3-Lamp T8 Electronic 2x2 Recessed Parabolic Lens	3	53	4	0.21	424	Re-Lamp / Reflector	Seesmart LED 2' Tube 9W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	27	4	0.11	216	0.10	208	$31	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	43	$6	$240.00	$180.00	$420.00	$60.00	11.77	$50.00	$50.00	$100.00	FALSE	15.75
37	2 - Teacher Copy Room	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	6	0.56	1,116	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	6	0.27	540	0.29	576	$85	0	No New Controls	0	0.0%	0	$0	$540.00	$270.00	$810.00	$90.00	8.50	$0.00	$0.00	$0.00	FALSE	-
37	2 - Lunch Room	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	6	0.56	893	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	6	0.27	432	0.29	461	$68	0	No New Controls	0	0.0%	0	$0	$540.00	$270.00	$810.00	$90.00	10.63	$0.00	$0.00	$0.00	FALSE	-
83	2 - Gym	2000	Metal Halide 250W Pendant Mounted Direct	1	295	24	7.08	14,160	Replace	Cree High Bay LED 160W	1	160	24	3.84	7,680	3.24	6,480	$953	0	No New Controls	0	0.0%	0	$0	$10,800.00	$2,160.00	$12,960.00	$3,600.00	9.83	$0.00	$0.00	$0.00	FALSE	-
37	2 - PE Office	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	372	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.10	192	$28	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	36	$5	$180.00	$90.00	$270.00	$30.00	8.50	$50.00	$50.00	$100.00	$20.00	15.12
37	2 - PE Office Restroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
39	2 - PE Storage	400	2-Lamp T8 Electronic 1x4 Pendant Parabolic Lens	2	62	3	0.19	74	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	3	0.09	36	0.10	38	$6	0	No New Controls	0	0.0%	0	$0	$180.00	$135.00	$315.00	$30.00	50.49	$0.00	$0.00	$0.00	FALSE	-
37	2 - Staff Restroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	2 - 2nd Floor Hallway	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	21	1.95	4,297	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	21	0.95	2,079	1.01	2,218	$326	0	No New Controls	0	0.0%	0	$0	$1,890.00	$945.00	$2,835.00	$315.00	7.73	$0.00	$0.00	$0.00	FALSE	-
37	3 - 311 Music Room	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	FALSE	-
80	B - Electrical Room	400	2-Lamp T8 Electronic 1x4 Pendant Mount Direct	2	62	8	0.50	198	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	8	0.24	96	0.26	102	$15	0	No New Controls	0	0.0%	0	$0	$480.00	$360.00	$840.00	$80.00	50.49	$0.00	$0.00	$0.00	FALSE	-
80	B - Generator Room	400	2-Lamp T8 Electronic 1x4 Pendant Mount Direct	2	62	6	0.37	149	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	6	0.18	72	0.19	77	$11	0	No New Controls	0	0.0%	0	$0	$360.00	$270.00	$630.00	$60.00	50.49	$0.00	$0.00	$0.00	FALSE	-
80	B - Meter Room	400	2-Lamp T8 Electronic 1x4 Pendant Mount Direct	2	62	6	0.37	149	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	6	0.18	72	0.19	77	$11	0	No New Controls	0	0.0%	0	$0	$360.00	$270.00	$630.00	$60.00	50.49	$0.00	$0.00	$0.00	FALSE	-
80	B - Boiler Room	400	2-Lamp T8 Electronic 1x4 Pendant Mount Direct	2	62	29	1.80	719	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	29	0.87	348	0.93	371	$55	0	No New Controls	0	0.0%	0	$0	$1,740.00	$1,305.00	$3,045.00	$290.00	50.49	$0.00	$0.00	$0.00	FALSE	-
80	B - Water Meter Room	400	2-Lamp T8 Electronic 1x4 Pendant Mount Direct	2	62	4	0.25	99	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	4	0.12	48	0.13	51	$8	0	No New Controls	0	0.0%	0	$0	$240.00	$180.00	$420.00	$40.00	50.49	$0.00	$0.00	$0.00	FALSE	-
116	B - Corridor	2200	2-Lamp T8 Electronic .5x4 Surface Mounted Prismatic Lens	2	62	5	0.31	682	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	5	0.15	330	0.16	352	$52	0	No New Controls	0	0.0%	0	$0	$300.00	$225.00	$525.00	$50.00	9.18	$0.00	$0.00	$0.00	FALSE	-
80	B - Generator Room Lobby	2200	2-Lamp T8 Electronic 1x4 Pendant Mount Direct	2	62	2	0.12	273	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	2	0.06	132	0.06	141	$21	0	No New Controls	0	0.0%	0	$0	$120.00	$90.00	$210.00	$20.00	9.18	$0.00	$0.00	$0.00	FALSE	-
80	B - Storage Room	400	2-Lamp T8 Electronic 1x4 Pendant Mount Direct	2	62	2	0.12	50	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	2	0.06	24	0.06	26	$4	0	No New Controls	0	0.0%	0	$0	$120.00	$90.00	$210.00	$20.00	50.49	$0.00	$0.00	$0.00	FALSE	-
80	B - Closet (Next to Elevator)	400	2-Lamp T8 Electronic 1x4 Pendant Mount Direct	2	62	1	0.06	25	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	1	0.03	12	0.03	13	$2	0	No New Controls	0	0.0%	0	$0	$60.00	$45.00	$105.00	$10.00	50.49	$0.00	$0.00	$0.00	FALSE	-

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
80	B - Elevator Machine Room	400	2-Lamp T8 Electronic 1x4 Pendant Mount Direct	2	62	2	0.12	50	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	2	0.06	24	0.06	26	$4	0	No New Controls	0	0.0%	0	$0	$120.00	$90.00	$210.00	$20.00	50.49	$0.00	$0.00	$0.00	FALSE	-
80	B - Parent's Room Storage (Maintenance Office)	400	2-Lamp T8 Electronic 1x4 Pendant Mount Direct	2	62	2	0.12	50	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	2	0.06	24	0.06	26	$4	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	5	$1	$120.00	$90.00	$210.00	$20.00	50.49	$50.00	$50.00	$100.00	FALSE	141.72
37	B - Parent's Room	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	372	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.10	192	$28	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	8.50	$0.00	$0.00	$0.00	FALSE	-
3	B -Parent's Room	2000	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	4	0.46	912	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	4	0.18	360	0.28	552	$81	0	No New Controls	0	0.0%	0	$0	$360.00	$180.00	$540.00	$60.00	5.92	$0.00	$0.00	$0.00	FALSE	-
37	B - Corridor 2	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	3	0.28	614	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	3	0.14	297	0.14	317	$47	0	No New Controls	0	0.0%	0	$0	$270.00	$135.00	$405.00	$45.00	7.73	$0.00	$0.00	$0.00	FALSE	-
24	B - Stair 1 B	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	3	0.10	211	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	3	0.05	99	0.05	112	$16	0	No New Controls	0	0.0%	0	$0	$90.00	$135.00	$225.00	$15.00	12.73	$0.00	$0.00	$0.00	FALSE	-
24	B - Stair 1A	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	1	0.03	70	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	1	0.02	33	0.02	37	$5	0	No New Controls	0	0.0%	0	$0	$30.00	$45.00	$75.00	$5.00	12.73	$0.00	$0.00	$0.00	FALSE	-
6	B - Stair 1A	2200	2-Lamp T8 Electronic 1x4 Surface Mount Prismatic Lens	2	62	1	0.06	136	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	1	0.03	66	0.03	70	$10	0	No New Controls	0	0.0%	0	$0	$60.00	$45.00	$105.00	$10.00	9.18	$0.00	$0.00	$0.00	FALSE	-
37	1 - Pre-Kindergarten 1	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	11	1.02	1,637	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	11	0.50	792	0.53	845	$124	0	No New Controls	0	0.0%	0	$0	$990.00	$495.00	$1,485.00	$165.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	1 - Pre-K Room 1 Bathroom	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	149	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	72	0.05	77	$11	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	1 - Special Ed	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	9	0.84	1,339	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	9	0.41	648	0.43	691	$102	0	No New Controls	0	0.0%	0	$0	$810.00	$405.00	$1,215.00	$135.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	1 - Special Ed Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 - Pre-K Room 2	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	11	1.02	1,637	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	11	0.50	792	0.53	845	$124	0	No New Controls	0	0.0%	0	$0	$990.00	$495.00	$1,485.00	$165.00	10.63	$0.00	$0.00	$0.00	FALSE	-

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
37	1 - Pre-K Room 2 Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 - Pre-K Room 3	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	11	1.02	1,637	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	11	0.50	792	0.53	845	$124	0	No New Controls	0	0.0%	0	$0	$990.00	$495.00	$1,485.00	$165.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	1 - Pre-K Room 3 Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 - Pre-K Room 4	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	11	1.02	1,637	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	11	0.50	792	0.53	845	$124	0	No New Controls	0	0.0%	0	$0	$990.00	$495.00	$1,485.00	$165.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	1 - Pre-K Room 4 Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 - Resource Center	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	6	0.56	1,116	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	6	0.27	540	0.29	576	$85	0	No New Controls	0	0.0%	0	$0	$540.00	$270.00	$810.00	$90.00	8.50	$0.00	$0.00	$0.00	FALSE	-
37	1 - Kindergarten 1	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	11	1.02	1,637	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	11	0.50	792	0.53	845	$124	0	No New Controls	0	0.0%	0	$0	$990.00	$495.00	$1,485.00	$165.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	1 - Kindergarten 1 Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 - Kindergarten 2	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	15	1.40	2,232	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	15	0.68	1,080	0.72	1,152	$169	0	No New Controls	0	0.0%	0	$0	$1,350.00	$675.00	$2,025.00	$225.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	1 - Kindergarten 2 Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 - Kindergarten 3	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	15	1.40	2,232	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	15	0.68	1,080	0.72	1,152	$169	0	No New Controls	0	0.0%	0	$0	$1,350.00	$675.00	$2,025.00	$225.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	1 - Kindergarten 3 Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
5	1 - Vestibule	2200	2-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	2	62	4	0.25	546	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	2	30	4	0.12	264	0.13	282	$41	0	No New Controls	0	0.0%	0	$0	$240.00	$180.00	$420.00	$40.00	9.18	$0.00	$0.00	$0.00	FALSE	-

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
3	1 - MDF Room 105	400	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	2	0.23	91	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	36	0.14	55	$8	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	29.58	$0.00	$0.00	$0.00	FALSE	-
37	1 - MDF Room 105	400	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	37	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	18	0.05	19	$3	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	42.52	$0.00	$0.00	$0.00	FALSE	-
37	1 - Pre-K 104	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	11	1.02	1,637	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	11	0.50	792	0.53	845	$124	0	No New Controls	0	0.0%	0	$0	$990.00	$495.00	$1,485.00	$165.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	1 - Pre-K 104 Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 - Pre-K 102	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	11	1.02	1,637	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	11	0.50	792	0.53	845	$124	0	No New Controls	0	0.0%	0	$0	$990.00	$495.00	$1,485.00	$165.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	1 - Pre-K 102 Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 - Facilitator Office	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	372	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.10	192	$28	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	8.50	$0.00	$0.00	$0.00	FALSE	-
35	1 - Conference Room	2000	2-Lamp U T8 Electronic 2x2 Recessed Mount Prismatic Lens	2	62	6	0.37	744	Re-Lamp/Reflector	Seesmart LED U-Tube 18W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	2	36	6	0.22	432	0.16	312	$46	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	86	$13	$420.00	$270.00	$690.00	$60.00	13.74	$50.00	$50.00	$100.00	$20.00	6.30
35	1 - Principal's Office	2000	2-Lamp U T8 Electronic 2x2 Recessed Mount Prismatic Lens	2	62	4	0.25	496	Re-Lamp/Reflector	Seesmart LED U-Tube 18W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	2	36	4	0.14	288	0.10	208	$31	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	58	$8	$280.00	$180.00	$460.00	$40.00	13.74	$50.00	$50.00	$100.00	FALSE	11.81
37	1 - General Office	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	14	1.30	2,604	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	14	0.63	1,260	0.67	1,344	$198	0	No New Controls	0	0.0%	0	$0	$1,260.00	$630.00	$1,890.00	$210.00	8.50	$0.00	$0.00	$0.00	FALSE	-
6	1 - Work Storage Room	400	2-Lamp T8 Electronic 1x4 Surface Mount Prismatic Lens	2	62	3	0.19	74	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	3	0.09	36	0.10	38	$6	0	No New Controls	0	0.0%	0	$0	$180.00	$135.00	$315.00	$30.00	50.49	$0.00	$0.00	$0.00	FALSE	-
37	1 - Security Office	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	372	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.10	192	$28	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	36	$5	$180.00	$90.00	$270.00	$30.00	8.50	$50.00	$50.00	$100.00	FALSE	18.90
142	1 - Vestibule	2200	1-Lamp 2-Pin CFl (26W) Recessed Direct	1	26	2	0.05	114	Existing to Remain	Existing to Remain	1	26	0	0.05	114	0.00	0	$0	0	No New Controls	0	0.0%	0	$0	$0.00	$0.00	$0.00	$0.00	-	$0.00	$0.00	$0.00	FALSE	-

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
84	1 - Stair 1B	2200	1-Lamp T8 Electronic 1x4 Surface Mount Prismatic Lens	1	32	2	0.06	141	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	2	0.06	132	0.00	9	$1	0	No New Controls	0	0.0%	0	$0	$120.00	$90.00	$210.00	$20.00	146.88	$0.00	$0.00	$0.00	FALSE	-
84	1 - Stair 1A	2200	1-Lamp T8 Electronic 1x4 Surface Mount Prismatic Lens	1	32	2	0.06	141	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	2	0.06	132	0.00	9	$1	0	No New Controls	0	0.0%	0	$0	$120.00	$90.00	$210.00	$20.00	146.88	$0.00	$0.00	$0.00	FALSE	-
11	1 - Loading Dock	3000	1-Lamp Metal Halide (70W) Recessed Direct	1	92	6	0.55	1,656	Replace	RAB GLED 52W	1	52	6	0.31	936	0.24	720	$106	0	No New Controls	0	0.0%	0	$0	$1,800.00	$540.00	$2,340.00	$600.00	16.44	$0.00	$0.00	$0.00	FALSE	-
37	1 - Boys Bathroom	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	3	0.28	614	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	3	0.14	297	0.14	317	$47	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	59	$9	$270.00	$135.00	$405.00	$45.00	7.73	$200.00	$50.00	$250.00	FALSE	28.63
37	1 - Girls Bathroom	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	3	0.28	614	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	3	0.14	297	0.14	317	$47	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	59	$9	$270.00	$135.00	$405.00	$45.00	7.73	$200.00	$50.00	$250.00	$35.00	24.62
37	1 - Staff Bathroom 1	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 - Staff Bathroom 2	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
6	1 - Storage	400	2-Lamp T8 Electronic 1x4 Surface Mount Prismatic Lens	2	62	3	0.19	74	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	3	0.09	36	0.10	38	$6	0	No New Controls	0	0.0%	0	$0	$180.00	$135.00	$315.00	$30.00	50.49	$0.00	$0.00	$0.00	FALSE	-
37	1 - Nurse's Office	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	372	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.10	192	$28	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	8.50	$0.00	$0.00	$0.00	FALSE	-
37	1 - Exam Room	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	372	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.10	192	$28	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	8.50	$0.00	$0.00	$0.00	FALSE	-
37	1 - Nurse Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 -Nurse Storage	400	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	3	0.28	112	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	3	0.14	54	0.14	58	$8	0	No New Controls	0	0.0%	0	$0	$270.00	$135.00	$405.00	$45.00	42.52	$0.00	$0.00	$0.00	FALSE	-
37	1 - Nurse's Lobby	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	4	0.37	818	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	4	0.18	396	0.19	422	$62	0	No New Controls	0	0.0%	0	$0	$360.00	$180.00	$540.00	$60.00	7.73	$0.00	$0.00	$0.00	FALSE	-

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
5	1 - Corridor 1	2200	2-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	2	62	18	1.12	2,455	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	2	30	18	0.54	1,188	0.58	1,267	$186	0	No New Controls	0	0.0%	0	$0	$1,080.00	$810.00	$1,890.00	$180.00	9.18	$0.00	$0.00	$0.00	FALSE	-
5	1 - Corridor 2	2200	2-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	2	62	10	0.62	1,364	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	2	30	10	0.30	660	0.32	704	$103	0	No New Controls	0	0.0%	0	$0	$600.00	$450.00	$1,050.00	$100.00	9.18	$0.00	$0.00	$0.00	FALSE	-
24	1 -Loading Dock Vestibule	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	4	0.13	282	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	4	0.06	132	0.07	150	$22	0	No New Controls	0	0.0%	0	$0	$120.00	$180.00	$300.00	$20.00	12.73	$0.00	$0.00	$0.00	FALSE	-
142	1 - Auditorium	1600	1-Lamp 2-Pin CFl (26W) Recessed Direct	1	26	104	2.70	4,326	Existing to Remain	Existing to Remain	1	26	0	2.70	4,326	0.00	0	$0	0	No New Controls	0	0.0%	0	$0	$0.00	$0.00	$0.00	$0.00	-	$0.00	$0.00	$0.00	FALSE	-
6	1 - Auditorium Storage 1	400	2-Lamp T8 Electronic 1x4 Surface Mount Prismatic Lens	2	62	1	0.06	25	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	1	0.03	12	0.03	13	$2	0	No New Controls	0	0.0%	0	$0	$60.00	$45.00	$105.00	$10.00	50.49	$0.00	$0.00	$0.00	FALSE	-
37	1 - Boys Dressing Room	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	93	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	45	0.10	48	$7	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 - Girls Dressing Room	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	93	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	45	0.10	48	$7	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	1 - Auditorium Storage 2	400	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	37	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	18	0.05	19	$3	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	42.52	$0.00	$0.00	$0.00	FALSE	-
37	1 - Auditorium Vestibule	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	3	0.28	614	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	3	0.14	297	0.14	317	$47	0	No New Controls	0	0.0%	0	$0	$270.00	$135.00	$405.00	$45.00	7.73	$0.00	$0.00	$0.00	FALSE	-
116	1 - Cafeteria	2000	2-Lamp T8 Electronic .5x4 Surface Mounted Prismatic Lens	2	62	24	1.49	2,976	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	24	0.72	1,440	0.77	1,536	$226	0	No New Controls	0	0.0%	0	$0	$1,440.00	$1,080.00	$2,520.00	$240.00	10.10	$0.00	$0.00	$0.00	FALSE	-
142	1 - Cafeteria	2000	1-Lamp 2-Pin CFl (26W) Recessed Direct	1	26	36	0.94	1,872	Existing to Remain	Existing to Remain	1	26	0	0.94	1,872	0.00	0	$0	0	No New Controls	0	0.0%	0	$0	$0.00	$0.00	$0.00	$0.00	-	$0.00	$0.00	$0.00	FALSE	-
37	1 - Kitchen	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	16	1.49	2,976	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	16	0.72	1,440	0.77	1,536	$226	0	No New Controls	0	0.0%	0	$0	$1,440.00	$720.00	$2,160.00	$240.00	8.50	$0.00	$0.00	$0.00	FALSE	-
35	1 - Food Service Office	2000	2-Lamp U T8 Electronic 2x2 Recessed Mount Prismatic Lens	2	62	2	0.12	248	Re-Lamp/Reflector	Seesmart LED U-Tube 18W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	2	36	2	0.07	144	0.05	104	$15	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	29	$4	$140.00	$90.00	$230.00	$20.00	13.74	$50.00	$50.00	$100.00	FALSE	23.62

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
37	1 - Dry Storage Cabinet	400	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	74	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	36	0.10	38	$6	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	42.52	$0.00	$0.00	$0.00	FALSE	-
37	1 - Unisex Lockers 1	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	205	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	99	0.05	106	$16	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	7.73	$0.00	$0.00	$0.00	FALSE	-
37	1 - Unisex Lockers 2	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	205	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	99	0.05	106	$16	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	7.73	$0.00	$0.00	$0.00	FALSE	-
37	1 - Loading Dock Vestibule 2	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	409	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	198	0.10	211	$31	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	7.73	$0.00	$0.00	$0.00	FALSE	-
37	1 - Washing Station	400	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	37	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	18	0.05	19	$3	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	42.52	$0.00	$0.00	$0.00	FALSE	-
37	1 - Kitchen Storage	400	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	74	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	36	0.10	38	$6	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	42.52	$0.00	$0.00	$0.00	FALSE	-
124	1 - Loading Dock 2	3000	Metal Halide (100W) Recessed Parabolic Lens	1	122	2	0.24	732	Replace	RAB GLED 52W	1	52	2	0.10	312	0.14	420	$62	0	No New Controls	0	0.0%	0	$0	$600.00	$180.00	$780.00	$200.00	9.39	$0.00	$0.00	$0.00	FALSE	-
24	1 - Stair 3	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	2	0.06	141	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	2	0.03	66	0.03	75	$11	0	No New Controls	0	0.0%	0	$0	$60.00	$90.00	$150.00	$10.00	12.73	$0.00	$0.00	$0.00	FALSE	-
24	1 - Corridor 2	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	42	1.34	2,957	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	42	0.63	1,386	0.71	1,571	$231	0	No New Controls	0	0.0%	0	$0	$1,260.00	$1,890.00	$3,150.00	$210.00	12.73	$0.00	$0.00	$0.00	FALSE	-
24	1 - Corridor 1	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	9	0.29	634	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	9	0.14	297	0.15	337	$49	0	No New Controls	0	0.0%	0	$0	$270.00	$405.00	$675.00	$45.00	12.73	$0.00	$0.00	$0.00	FALSE	-
24	1 - Stair 2	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	3	0.10	211	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	3	0.05	99	0.05	112	$16	0	No New Controls	0	0.0%	0	$0	$90.00	$135.00	$225.00	$15.00	12.73	$0.00	$0.00	$0.00	FALSE	-
24	1 - Stair 4	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	1	0.03	70	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	1	0.02	33	0.02	37	$5	0	No New Controls	0	0.0%	0	$0	$30.00	$45.00	$75.00	$5.00	12.73	$0.00	$0.00	$0.00	FALSE	-
37	2 - Hospitality Room 207	2000	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	28	2.60	5,208	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	28	1.26	2,520	1.34	2,688	$395	0	No New Controls	0	0.0%	0	$0	$2,520.00	$1,260.00	$3,780.00	$420.00	8.50	$0.00	$0.00	$0.00	FALSE	-

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
37	2 - Computer Lab 205	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	16	1.49	2,381	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	16	0.72	1,152	0.77	1,229	$181	0	No New Controls	0	0.0%	0	$0	$1,440.00	$720.00	$2,160.00	$240.00	10.63	$0.00	$0.00	$0.00	FALSE	-
3	2 - IT Office	2000	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	2	0.23	456	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.14	276	$41	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	5.92	$0.00	$0.00	$0.00	FALSE	-
3	2 - Testing Room	2000	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	2	0.23	456	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.14	276	$41	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	5.92	$0.00	$0.00	$0.00	FALSE	-
3	2 - CST Office 1	2000	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	2	0.23	456	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.14	276	$41	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	36	$5	$180.00	$90.00	$270.00	$30.00	5.92	$50.00	$50.00	$100.00	$20.00	15.12
3	2 - CST Office 2	2000	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	2	0.23	456	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.14	276	$41	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	36	$5	$180.00	$90.00	$270.00	$30.00	5.92	$50.00	$50.00	$100.00	$20.00	15.12
3	2 - CST Office 3	2000	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	2	0.23	456	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.14	276	$41	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	36	$5	$180.00	$90.00	$270.00	$30.00	5.92	$50.00	$50.00	$100.00	$20.00	15.12
74	2 - Gym	2000	1-Lamp Incandescent (75W) Surface Mounted Direct	1	75	11	0.83	1,650	Replace	16W LED A-Lamp	1	16	11	0.18	352	0.65	1,298	$191	0	No New Controls	0	0.0%	0	$0	$165.00	$302.50	$467.50	$110.00	1.87	$0.00	$0.00	$0.00	FALSE	-
24	2 - Stair 1A	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	3	0.10	211	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	3	0.05	99	0.05	112	$16	0	No New Controls	0	0.0%	0	$0	$90.00	$135.00	$225.00	$15.00	12.73	$0.00	$0.00	$0.00	FALSE	-
24	2 - Stair 1B	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	3	0.10	211	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	3	0.05	99	0.05	112	$16	0	No New Controls	0	0.0%	0	$0	$90.00	$135.00	$225.00	$15.00	12.73	$0.00	$0.00	$0.00	FALSE	-
24	2 - Stair 2	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	4	0.13	282	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	4	0.06	132	0.07	150	$22	0	No New Controls	0	0.0%	0	$0	$120.00	$180.00	$300.00	$20.00	12.73	$0.00	$0.00	$0.00	FALSE	-
37	2 - Stair 2	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	205	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	99	0.05	106	$16	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	7.73	$0.00	$0.00	$0.00	FALSE	-
12	2 - Stair 3	2200	2-Lamp T8 Electronic 1x4 Pendant Prismatic Lens	2	62	2	0.12	273	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	2	0.06	132	0.06	141	$21	0	No New Controls	0	0.0%	0	$0	$120.00	$90.00	$210.00	$20.00	9.18	$0.00	$0.00	$0.00	FALSE	-
37	3 - Small Group Room 313	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	6	0.56	893	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	6	0.27	432	0.29	461	$68	0	No New Controls	0	0.0%	0	$0	$540.00	$270.00	$810.00	$90.00	10.63	$0.00	$0.00	$0.00	FALSE	-

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
37	3 - Science Demo Room 314	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	3 - Specialized Room 312	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	9	0.84	1,339	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	9	0.41	648	0.43	691	$102	0	No New Controls	0	0.0%	0	$0	$810.00	$405.00	$1,215.00	$135.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	3 - Specialized Room 312 Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	3 - Art Room 310	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	14	1.30	2,083	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	14	0.63	1,008	0.67	1,075	$158	0	No New Controls	0	0.0%	0	$0	$1,260.00	$630.00	$1,890.00	$210.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	3 - Art Room 310 Storage	400	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	74	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	36	0.10	38	$6	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	42.52	$0.00	$0.00	$0.00	FALSE	-
37	3 - Art Room 310 Bathroom	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	3 - Classroom 308	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	4	0.37	595	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	4	0.18	288	0.19	307	$45	0	No New Controls	0	0.0%	0	$0	$360.00	$180.00	$540.00	$60.00	10.63	$0.00	$0.00	$0.00	FALSE	-
3	3 - Classroom 308	1600	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	8	0.91	1,459	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	8	0.36	576	0.55	883	$130	0	No New Controls	0	0.0%	0	$0	$720.00	$360.00	$1,080.00	$120.00	7.39	$0.00	$0.00	$0.00	FALSE	-
37	3 - Classroom 306	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	4	0.37	595	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	4	0.18	288	0.19	307	$45	0	No New Controls	0	0.0%	0	$0	$360.00	$180.00	$540.00	$60.00	10.63	$0.00	$0.00	$0.00	FALSE	-
3	3 - Classroom 306	1600	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	8	0.91	1,459	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	8	0.36	576	0.55	883	$130	0	No New Controls	0	0.0%	0	$0	$720.00	$360.00	$1,080.00	$120.00	7.39	$0.00	$0.00	$0.00	FALSE	-
37	3 - Classroom 304	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	4	0.37	595	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	4	0.18	288	0.19	307	$45	0	No New Controls	0	0.0%	0	$0	$360.00	$180.00	$540.00	$60.00	10.63	$0.00	$0.00	$0.00	FALSE	-
3	3 - Classroom 304	1600	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	8	0.91	1,459	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	8	0.36	576	0.55	883	$130	0	No New Controls	0	0.0%	0	$0	$720.00	$360.00	$1,080.00	$120.00	7.39	$0.00	$0.00	$0.00	FALSE	-
37	3 - Classroom 302	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	4	0.37	595	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	4	0.18	288	0.19	307	$45	0	No New Controls	0	0.0%	0	$0	$360.00	$180.00	$540.00	$60.00	10.63	$0.00	$0.00	$0.00	FALSE	-

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
3	3 - Classroom 302	1600	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	8	0.91	1,459	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	8	0.36	576	0.55	883	$130	0	No New Controls	0	0.0%	0	$0	$720.00	$360.00	$1,080.00	$120.00	7.39	$0.00	$0.00	$0.00	FALSE	-
37	3 - Foreign Language Lab 309	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	FALSE	-
37	3 - Classroom 307	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	4	0.37	595	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	4	0.18	288	0.19	307	$45	0	No New Controls	0	0.0%	0	$0	$360.00	$180.00	$540.00	$60.00	10.63	$0.00	$0.00	$0.00	FALSE	-
3	3 - Classroom 307	1600	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	8	0.91	1,459	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	8	0.36	576	0.55	883	$130	0	No New Controls	0	0.0%	0	$0	$720.00	$360.00	$1,080.00	$120.00	7.39	$0.00	$0.00	$0.00	FALSE	-
37	3 - Classroom 305	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	4	0.37	595	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	4	0.18	288	0.19	307	$45	0	No New Controls	0	0.0%	0	$0	$360.00	$180.00	$540.00	$60.00	10.63	$0.00	$0.00	$0.00	FALSE	-
3	3 - Classroom 305	1600	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	8	0.91	1,459	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	8	0.36	576	0.55	883	$130	0	No New Controls	0	0.0%	0	$0	$720.00	$360.00	$1,080.00	$120.00	7.39	$0.00	$0.00	$0.00	FALSE	-
37	3 - English Language Arts 303	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	4	0.37	595	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	4	0.18	288	0.19	307	$45	0	No New Controls	0	0.0%	0	$0	$360.00	$180.00	$540.00	$60.00	10.63	$0.00	$0.00	$0.00	FALSE	-
3	3 - English Language Arts 303	1600	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	8	0.91	1,459	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	8	0.36	576	0.55	883	$130	0	No New Controls	0	0.0%	0	$0	$720.00	$360.00	$1,080.00	$120.00	7.39	$0.00	$0.00	$0.00	FALSE	-
37	3 - Speaking & Writing Lab	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	12	1.12	1,786	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	12	0.54	864	0.58	922	$135	0	No New Controls	0	0.0%	0	$0	$1,080.00	$540.00	$1,620.00	$180.00	10.63	$0.00	$0.00	$0.00	FALSE	-
12	3 - Electrical Closet	400	2-Lamp T8 Electronic 1x4 Pendant Prismatic Lens	2	62	1	0.06	25	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	1	0.03	12	0.03	13	$2	0	No New Controls	0	0.0%	0	$0	$60.00	$45.00	$105.00	$10.00	50.49	$0.00	$0.00	$0.00	FALSE	-
37	3 - Boys Bathroom	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	3	0.28	614	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	3	0.14	297	0.14	317	$47	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	59	$9	$270.00	$135.00	$405.00	$45.00	7.73	$200.00	$50.00	$250.00	FALSE	28.63
37	3 - Girls Bathroom	2200	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	3	0.28	614	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	3	0.14	297	0.14	317	$47	5	Dual Technology Occupancy Sensor - Remote Mnt.	1	20.0%	59	$9	$270.00	$135.00	$405.00	$45.00	7.73	$200.00	$50.00	$250.00	FALSE	28.63
37	3 - IT Server Room	400	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	2	0.19	74	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	36	0.10	38	$6	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	42.52	$0.00	$0.00	$0.00	FALSE	-

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						LIGHTING RETROFIT COSTS					LIGHTING CONTROLS COST				
Fixture Reference #	Location	Average Burn Hours	Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, $	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, $	Material	Total Labor	Total All	Rebate Estimate	Simple Payback	Total Materials	Total Labor	Total All	Smart Start Incentive	Simple Payback
12	3 - Janitor's Closet	400	2-Lamp T8 Electronic 1x4 Pendant Prismatic Lens	2	62	1	0.06	25	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	2	30	1	0.03	12	0.03	13	$2	0	No New Controls	0	0.0%	0	$0	$60.00	$45.00	$105.00	$10.00	50.49	$0.00	$0.00	$0.00	FALSE	-
37	3 - Staff Toilet	500	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	1	0.09	47	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	1	0.05	23	0.05	24	$4	0	No New Controls	0	0.0%	0	$0	$90.00	$45.00	$135.00	$15.00	34.01	$0.00	$0.00	$0.00	FALSE	-
37	3 - Media Center	1600	3-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	3	93	17	1.58	2,530	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	17	0.77	1,224	0.82	1,306	$192	0	No New Controls	0	0.0%	0	$0	$1,530.00	$765.00	$2,295.00	$255.00	10.63	$0.00	$0.00	$0.00	FALSE	-
3	3 - Media Center	1600	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	27	3.08	4,925	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	27	1.22	1,944	1.86	2,981	$438	0	No New Controls	0	0.0%	0	$0	$2,430.00	$1,215.00	$3,645.00	$405.00	7.39	$0.00	$0.00	$0.00	FALSE	-
3	3 - Librarian's Office	2000	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	2	0.23	456	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	180	0.14	276	$41	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	36	$5	$180.00	$90.00	$270.00	$30.00	5.92	$50.00	$50.00	$100.00	FALSE	18.90
3	3 - A/V Storage	400	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	2	0.23	91	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	36	0.14	55	$8	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	29.58	$0.00	$0.00	$0.00	FALSE	-
3	3 - Corridor 2	2200	4-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	4	114	2	0.23	502	Re-Lamp / De-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	3	45	2	0.09	198	0.14	304	$45	0	No New Controls	0	0.0%	0	$0	$180.00	$90.00	$270.00	$30.00	5.38	$0.00	$0.00	$0.00	FALSE	-
5	3 - Corridor 2	2200	2-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	2	62	2	0.12	273	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	2	30	2	0.06	132	0.06	141	$21	0	No New Controls	0	0.0%	0	$0	$120.00	$90.00	$210.00	$20.00	9.18	$0.00	$0.00	$0.00	FALSE	-
5	3 - Corridor 1	2200	2-Lamp T8 Electronic 2x4 Recessed Prismatic Lens	2	62	18	1.12	2,455	Re-Lamp / Reflector	Seesmart LED Tube 15W 4K with semi Specular Reflector Kit bypass ballast and provide new tombstones	2	30	18	0.54	1,188	0.58	1,267	$186	0	No New Controls	0	0.0%	0	$0	$1,080.00	$810.00	$1,890.00	$180.00	9.18	$0.00	$0.00	$0.00	FALSE	-
24	3 - Stair 2	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	4	0.13	282	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	4	0.06	132	0.07	150	$22	0	No New Controls	0	0.0%	0	$0	$120.00	$180.00	$300.00	$20.00	12.73	$0.00	$0.00	$0.00	FALSE	-
24	3 - Stair 1B	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	4	0.13	282	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	4	0.06	132	0.07	150	$22	0	No New Controls	0	0.0%	0	$0	$120.00	$180.00	$300.00	$20.00	12.73	$0.00	$0.00	$0.00	FALSE	-
24	3 - Stair 1A	2200	1-Lamp T8 Electronic 0.5x4 Surface Mount Prismatic Lens	1	32	4	0.13	282	Re-Lamp	Seesmart LED Tube 15W 4K bypass ballast and provide new tombstones	1	15	4	0.06	132	0.07	150	$22	0	No New Controls	0	0.0%	0	$0	$120.00	$180.00	$300.00	$20.00	12.73	$0.00	$0.00	$0.00	FALSE	-
11	1 - Outside	3000	1-Lamp Metal Halide (70W) Recessed Direct	1	92	5	0.46	1,380	Replace	RAB GLED 52W	1	52	5	0.26	780	0.20	600	$88	0	No New Controls	0	0.0%	0	$0	$1,500.00	$450.00	$1,950.00	$500.00	16.44	$0.00	$0.00	$0.00	FALSE	-
	TOTAL					**1,140**	**91.3**	**154,087**					**998**	**46**	**77,621**	**45.4**	**76,466**	**$11,240**			**19**	**4**	**908**	**$134**	**$89,775**	**$46,383**	**$136,158**	**$17,515**	**10.55**	**$1,850**	**$950**	**$2,800**	**$175.00**	**19.66**